PRELIMINARY DRAINAGE STUDY

In the City of Victorville, CA

TENTATIVE TRACT MAP NO. 20525

BEING THE WEST HALF OF THE WEST HALF OF THE SOUTHWEST QUARTER OF SECTION 12, TOWNSHIP 5 NORTH, RANGE 5 WEST, S.B.M., IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA ACCORDING TO OFFICIL PLAT THEREOF.
EXCEPTING THE NORTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF THE SOUTHWEST ONE-QUARTER OF SAID SECTION 12.

Prepared for:
Mojave Amethyst 40, LP(Owner)
Three Arch Investment Corp. (General Partner)
David Michelson (President)
17802 Lakeside Haven Dr.
Cypress, Texas 77433
March 14, 2023

REGISTERED PROFESSIONAL ENGINEER
JEFFREY MARTIN ASHBAKER
No. 91606
CIVIL
STATE OF CALIFORNIA

Jeffrey Martin Ashbaker 03-21-23
Jeffrey Martin Ashbaker Date:
R.C.E. 91606 EXP.

Ludwig Engineering Associates, Inc.
Civil Engineering • Surveying • Planning

109 E. 3rd St., San Bernardino, CA 92410
Phone 909-884-8217 Fax 909-889-0153

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INTRODUCTION

A: PROJECT LOCATION

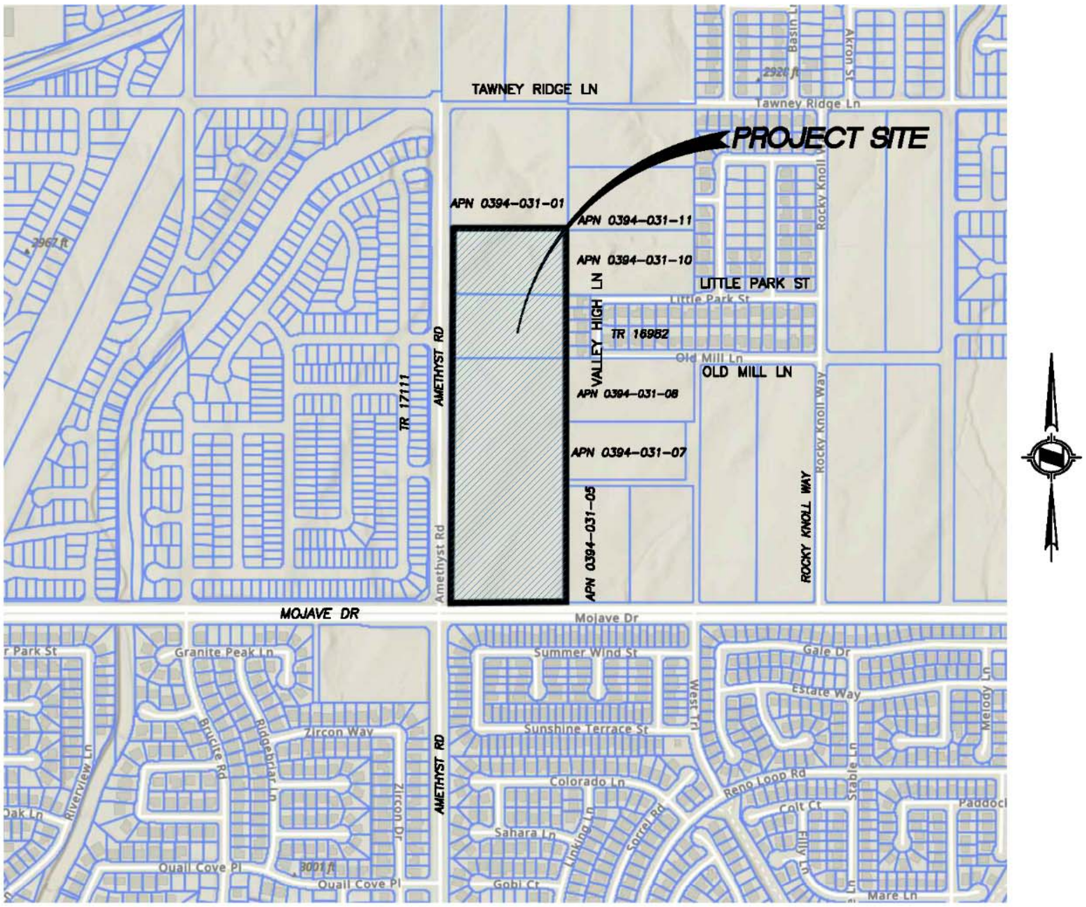
The project site is for Tentative Tract 20525 is located at the northeast corner of Amethyst Road and Mojave Road, in the City of Victorville, County of San Bernardino, State of California (APNs 0394-031-02,03 and 04).

B: STUDY PURPOSE

This study is to supplement the submittal of the Tentative Map for Tract 20525. The proposed development is composed of 109-Lot Single Family Residential Lots. This study determines the 10-year and 100-year peak storm runoff produced from the project site in the existing and proposed condition.

C: PROJECT STAFF

Ludwig Engineering staff involved in this study include: Jeff Ashbaker and Larry Callejas.



LOCATION MAP

SCALE 1" : 800'

Ludwig Engineering ASSOCIATES, INC.

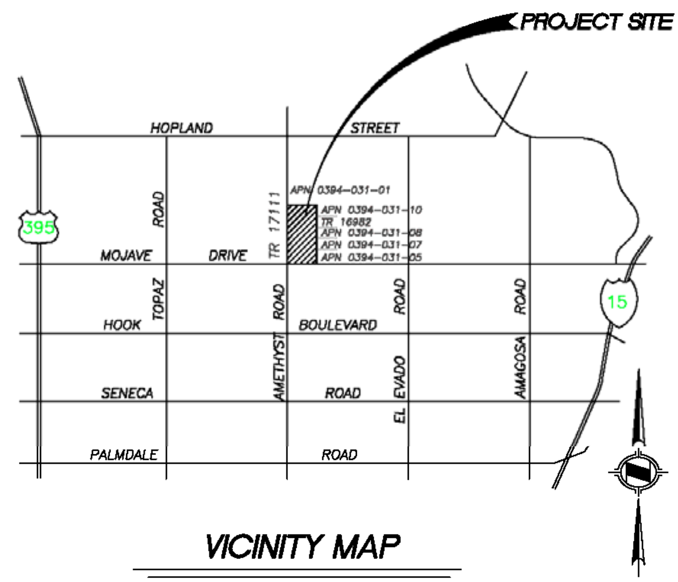
Civil Engineering • Surveying • Planning

109 East Third Street San Bernardino, CA 92410 Phone: 909-884-8217 Fax: 909-889-0153	5890 Hwy. 95, Ste. B Fort Mohave, AZ 88426 Phone: 928-768-1857 Fax: 928-768-7086
15252 Seneca Rd. Victorville, CA 92392 Phone: 760-951-7676 Fax: 760-241-0573	2126 McCulloch Blvd., Ste. 8 Lake Havasu City, AZ 86403 Phone: 928-680-6060 Fax: 928-854-6530

TR 20525

CITY OF VICTORVILLE

Figure 1 Ortho View of Site



VICINITY MAP

N.T.S

Ludwig Engineering Associates, Inc.	TR 20525
Civil Engineering • Surveying • Planning	CITY OF VICTORVILLE

109 East Third Street
San Bernardino, CA 92410
Phone: 909-884-8217
Fax: 909-889-0153

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Lake Havasu City, AZ 86403
Phone: 928-680-6060
Fax: 928-854-6530

DISCUSSION and SUMMARY

1. Project Description

Tentative Tract No. 20525 is located at the N.E. corner of Amethyst Road and Mojave Drive in the City of Victorville, State of California, also within the S.W. one- quarter of Section 12, T5N, R5W, S.B.M., County of San Bernardino, California.
This development for Tract 20525 (30.1 Acres) will construct 108 single-family dwelling units with Lots "A" through "C" as LMAD areas, Lot "D" as the WQMP Basin and Lot "E" as a community park site. On the proposed southeasterly Basin was totally omitted and replace by a Lot no. 22. Onsite Post-developed flows confluence to the streets and flows to catch basins located at the Northwesterly corner of this project and outflows to Amethyst Road through a parkway drain. The outflow is less from pre-developed flows.

2. Existing Conditions

The project site is currently a vacant lot. The existing ground surface has two separate drainage areas. The southeasterly drainage area has rolling and gentle slopes towards the Northeast at gradient of approximately 1.8 percent. This area of the site sheet flows the stormwater in a North-East to the existing flowline.

The Northwesterly drainage area is rolling and generally slopes towards the North and Northwest at a gradient of approximately 2.0 percent. The site stormwater currently sheet flows in a Northerly and North-West direction.

The site contains a moderate growth of Sage, weeds, and brush.

The site is divided into two drainage areas, "A" and "B", as shown on the map. To compare with the proposed condition in producing 100-year storm runoff we used the outer drainage boundary, therefore, the total drainage area of the site is also 29.2 acres.
Drainage area "A" has an area of 14.09 acres and produces a 100-year, 1-hour storm runoff of 26.08 cfs. This existing flow currently flow towards the proposed Facility E-04 per the VMPD. Drainage area "B" has an area of 15.11 acres and produces a 100-year, 1-hour storm runoff of 34.5 cfs. This flow currently flows towards the proposed Facility E-05 per the VMPD.

See Exhibit Drainage Map for existing condition hydrology calculations.

3. Existing Drainage Pattern

The offsite watershed (See Overall Offsite Map) upstream of Tract 20525 is comprised of natural terrain and low-density developments. Existing developments consist of large parcels (one-acre residential lots) with unpaved streets and relatively unaffected natural drainage courses.

The existing drainage travel to the site essentially via a semi-sheet flow action. This semi-sheet flow action is rationalized by the fact that there is no one single concentrated watercourse for the site but instead several existing drainage courses which are broad and not very deep. Semi-sheet flow action decreases the overall storm water runoff velocity and increases the time of concentration considerably especially when compared with the time of concentration considerably especially when compared with the time of concentration that would if the area were developed with paved streets and channels.

4. Proposed Drainage Condition

The site is divided into two (2) drainage area ("A" and "B") as shown on the attached Pre-development Drainage Maps. During the Pre-submittal stage with the City Engineering Staff directed us to " Combine" Drainage Area "A" with Drainage Area "B" and have only one WQMP/Detention Basin at the N.W. corner of the Tract (Low Point).

Area "B"(N.W. portion) has 15.11 acres of pre-development area that flows 34.5 cfs (Q100-24hrs) towards the City's E-05 Master Plan Facility.

Post-development inflow (30.1 acres, combine drainage Area “A” & “B”) into Basin No.1 has 60.2 cfs (Q100-24hrs) going in and outflow to Amethyst Rd. of 22.2 cfs (Q100-24hrs) for reduction of 12.3 cfs to E-05 Master Plan Facility.

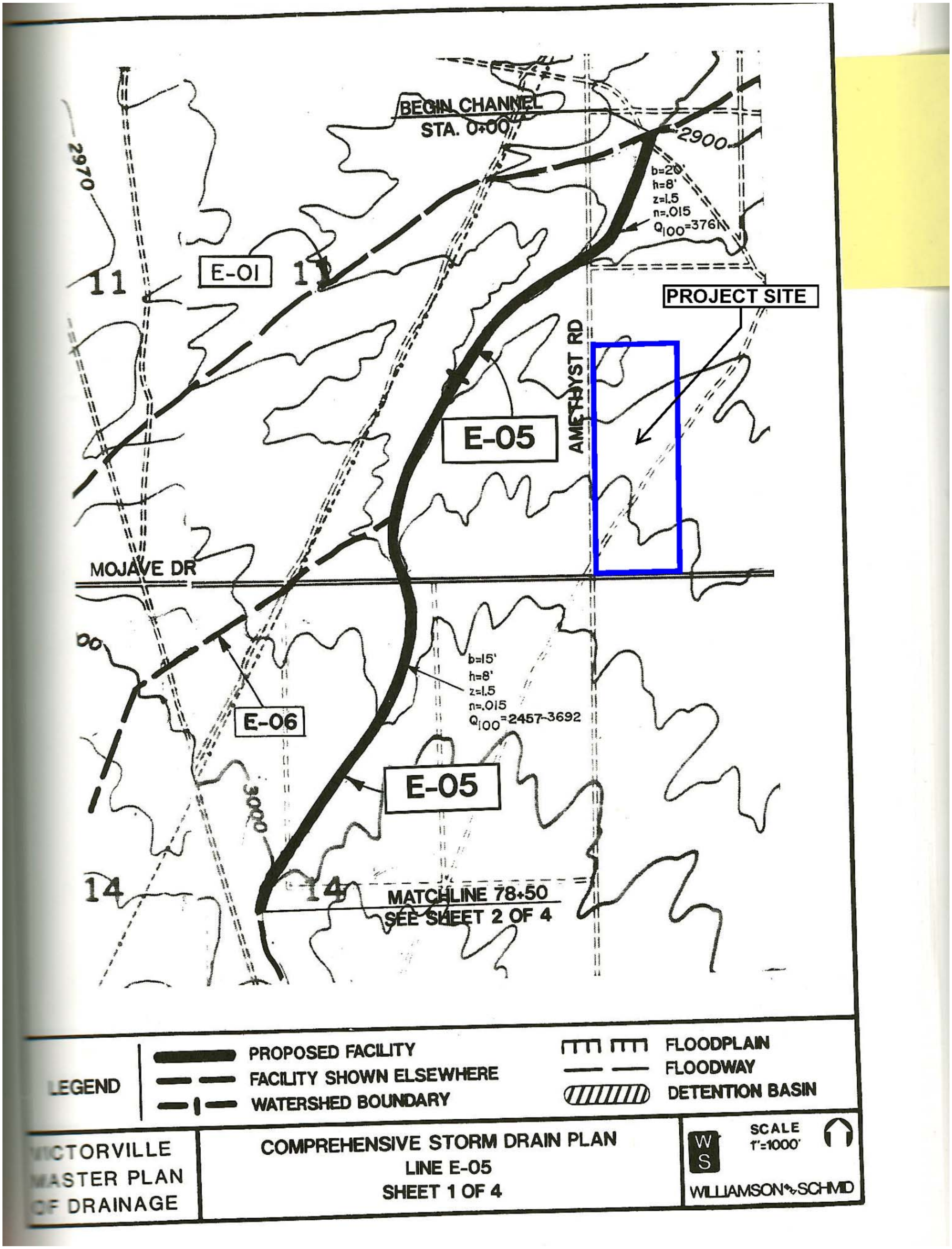
Detention/WQMP Basin on the northwest corner of the site have an Inflow of (Q100-24hrs) = 60.21 cfs post-Developed,
The outflow leaving the site Through parkway drain on the west side of the Basin flow towards North of Amethyst Road is 22.2 cfs (Q100-24hrs)
The Difference between Post-developed minus pre-developed is equal to 25.7cfs.

The existing pre-developed flow is 34.5 cfs.

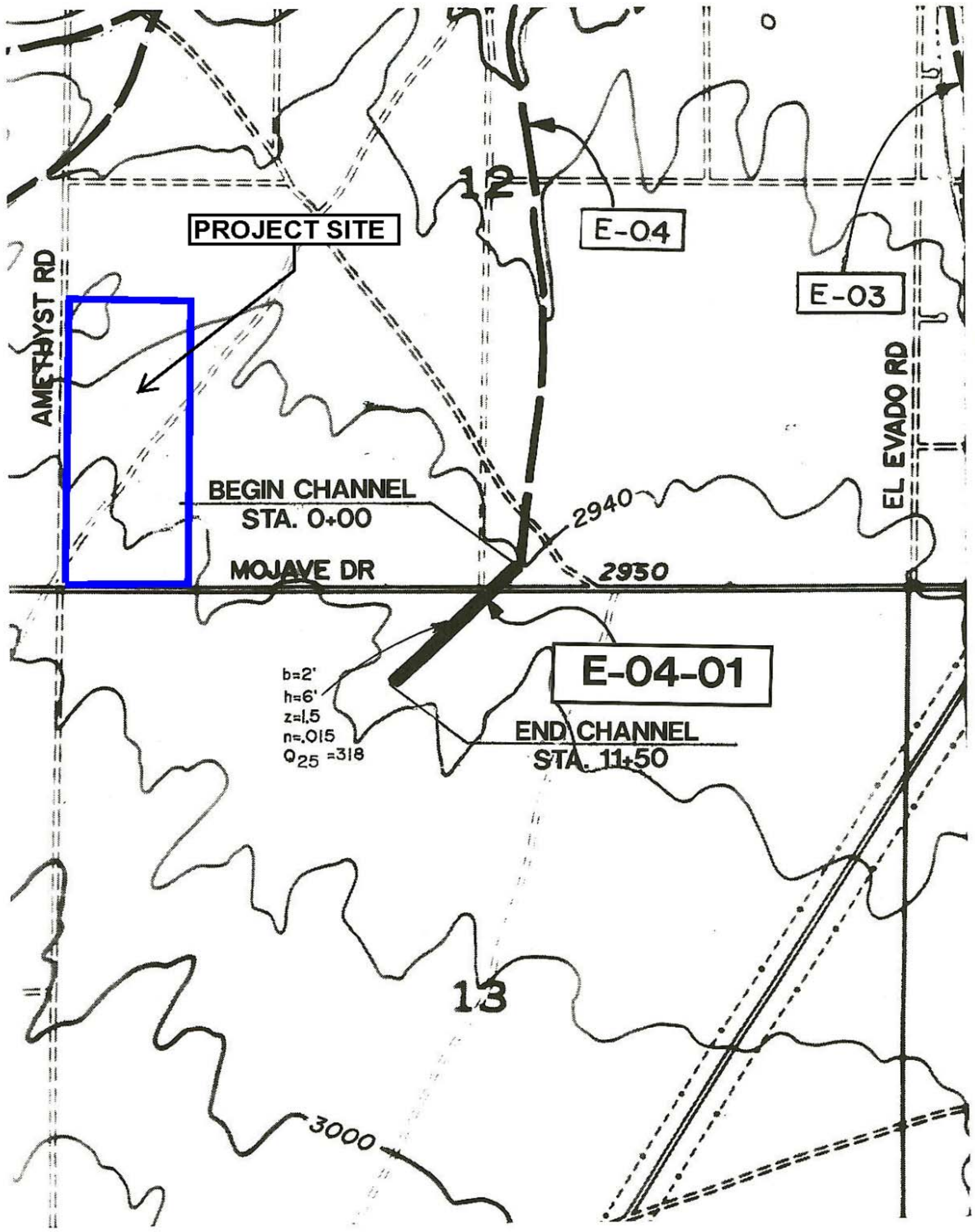
5. Detention Calculations

There are no existing storm drains in the vicinity of the project site. Discharge from the site will be limited to less than existing conditions to assure that there are not any adverse effects to downstream properties. In order to limit runoff from the site, some detention will be required. The project site will include one WQMP/detention basin and will be utilized for peak flow detention.
Basin Proposed Post Development condition calculations show that areas "AA" & “BB” produce 60.21 cfs, (100-yr,24-hours storm event) that flows through the paved streets to Basin No.1 corner with a ponding depth of about 5.4 feet. The volume stored at this is approximately 1.56 acre-feet including the Post minus the Pre storm volume captured. With the onsite detention, the 100-year, 24-hour storm proposed condition from the project site is has a peak flow of 60.2cfs(post)–22.22 cfs(pre)= 37.98 cfs(difference) with basin maximum volume provided of 78,552.7 cu.ft. The total outflow from Detention Basin is 22.2 cfs. This is less than the pre-developed condition 100-year, 24-hours storm peak flow rate of 34.5 cfs.

See below Victorville Master Plan of Drainage Line E-04 & Line E-05 Proposed Facility Alignment.



BEGIN CHANNEL
STA. 0+00
2900
b=20'
h=8'
z=1.5
n=.015
Q100=376
2970
11
E-01
PROJECT SITE
AMETHYST RD
E-05
MOJAVE DR
b=15'
h=8'
z=1.5
n=.015
Q100=2457-3692
E-06
E-05
3000
14
MATCHLINE 78+50
SEE SHEET 2 OF 4
LEGEND
PROPOSED FACILITY
FACILITY SHOWN ELSEWHERE
WATERSHED BOUNDARY
FLOODPLAIN
FLOODWAY
DETENTION BASIN
VICTORVILLE
MASTER PLAN
OF DRAINAGE
COMPREHENSIVE STORM DRAIN PLAN
LINE E-05
SHEET 1 OF 4
SCALE
1"=1000'
WILLIAMSON & SCHMID



LEGEND		
	PROPOSED FACILITY	FLOODPLAIN
	FACILITY SHOWN ELSEWHERE	FLOODWAY
	WATERSHED BOUNDARY	DETENTION BASIN

VICTORVILLE MASTER PLAN OF DRAINAGE	COMPREHENSIVE STORM DRAIN PLAN LINE E-04-01 SHEET 1 OF 1	WS SCALE 1"=1000' WILLIAMSON & SCHMID

6. Hydrology Methodology

The calculated runoff flows are depicted on the enclosed Drainage Maps.

All rational hydrologic analysis was performed in accordance with Section D of the 1986 San Bernardino County Hydrology Manual. Storm flows were calculated using "RSBC.exe" of the San Bernardino County Rational Hydrology Program Package by CivilCADD/CivilDesign Engineering Software, Version 7.1, 1989-2005.

All runoff hydrograph for Offsite Watershed was performed in accordance with Section E of the 1986 San Bernardino County Hydrology Manual. The storm runoff hydrograph was calculated flows using "UNSB.exe" a SB. Co. Unit Hydrograph Program Package by CivilCADD/CivilDesign Engineering Software, Version 7.0, 1989-2004.

The calculated run-off flows are depicted on the enclosed Drainage Maps. All run-off values are calculated using the rational method as outlined in the 1986 San Bernardino County Hydrology Manual, assuming:

a) 100- & 10-years storm frequency

b) 1-hour rainfall intensity = 100yr – 1.08 in/hr.; 10yr - 0.626 in/hr. of the NOAA Atlas 14, Volume 6, Version 2. Adelanto, California

c) Per San Bernardino County Flood Control District, Isohyetals, Desert Area, Hydrology Manual.

d) Slope on the intensity /duration curve = 0.7 Desert areas, Per Figure D-3 of the S. B. County Hydrology Manual.

e) Single Family Residential (3-4 dwl/acre)

f) Antecedent Moisture Content value (AMC) for Rational Method and (AMC) of III for the Unit Hydrograph per section C.5 of the S. B. County Hydrology Manual.

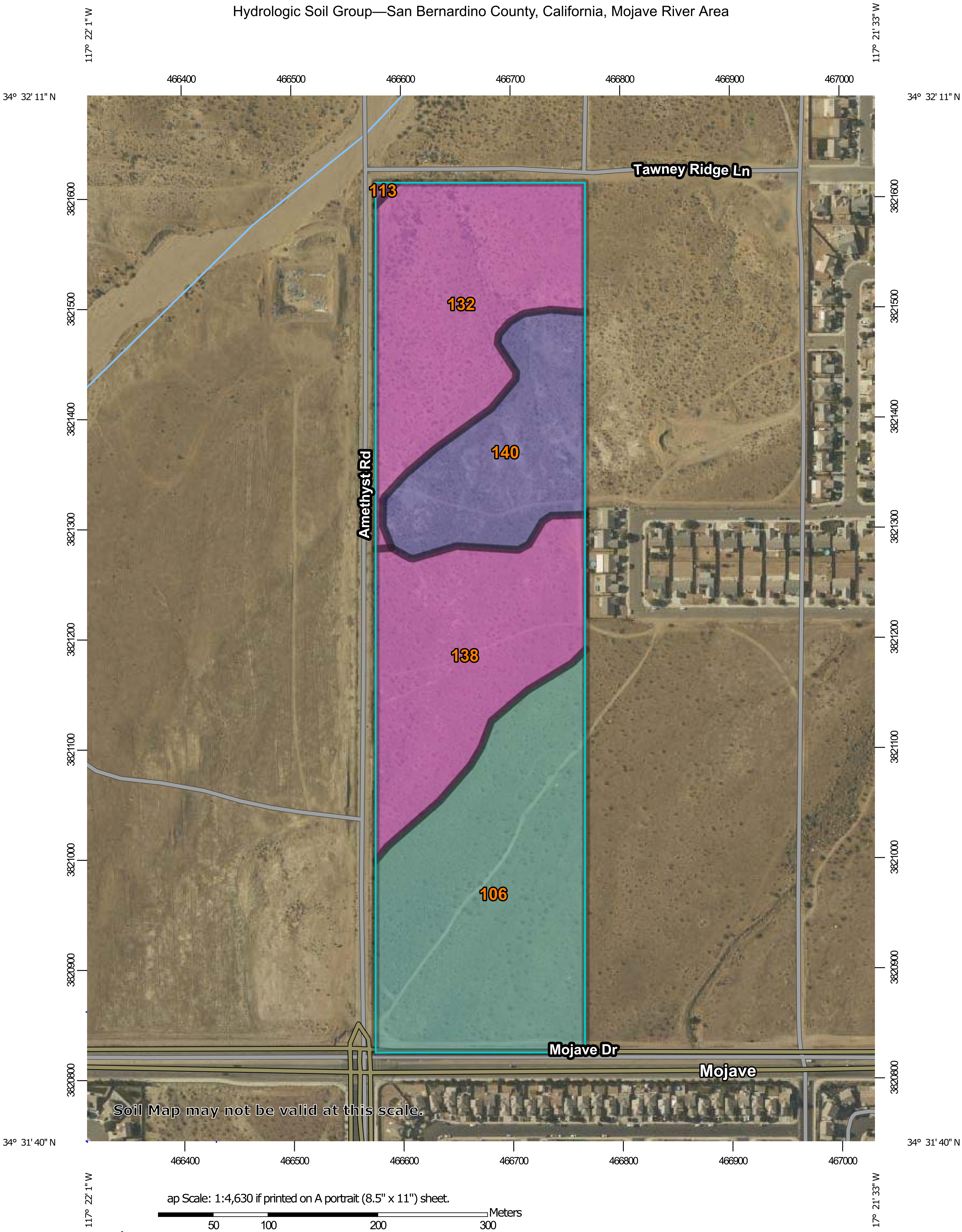
g) Soils group “A” & “C” Per Hydrologic Soils Group Map for Southcentral Area per S. B. County Hydrology Manual Figure C-11

h) Slope on the intensity duration curve = 0.70

Conclusion

Tentative Tract No. 20525 and downstream properties should be adequately protected from offsite & onsite runoff if the proposed interim and ultimate street sections are implemented as shown in this report.

Hydrologic Soil Group—San Bernardino County, California, Mojave River Area



ap Scale: 1:4,630 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 50, 100, 200, 300

Feet: 0, 200, 400, 800, 1200

N

USDA

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 13, Sep 13, 2021

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

Date(s) aerial images were photographed: Jun 26, 2019—Jul 8, 2019

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
106	BRYMAN LOAMY FINE SAND, 2 TO 5 PERCENT SLOPES	C	13.1	34.9%
113	CAJON SAND, 2 TO 9 PERCENT SLOPES	A	0.0	0.1%
132	HELENDALE LOAMY SAND, 2 TO 5 PERCENT SLOPES	A	9.2	24.7%
138	KIMBERLINA LOAMY FINE SAND, COOL, 2 TO 5 PERCENT SLOPES	A	8.9	23.8%
140	LAVIC LOAMY FINE SAND	B	6.2	16.5%
Totals for Area of Interest			**37.4**	**100.0%**

Description

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

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

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

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

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

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

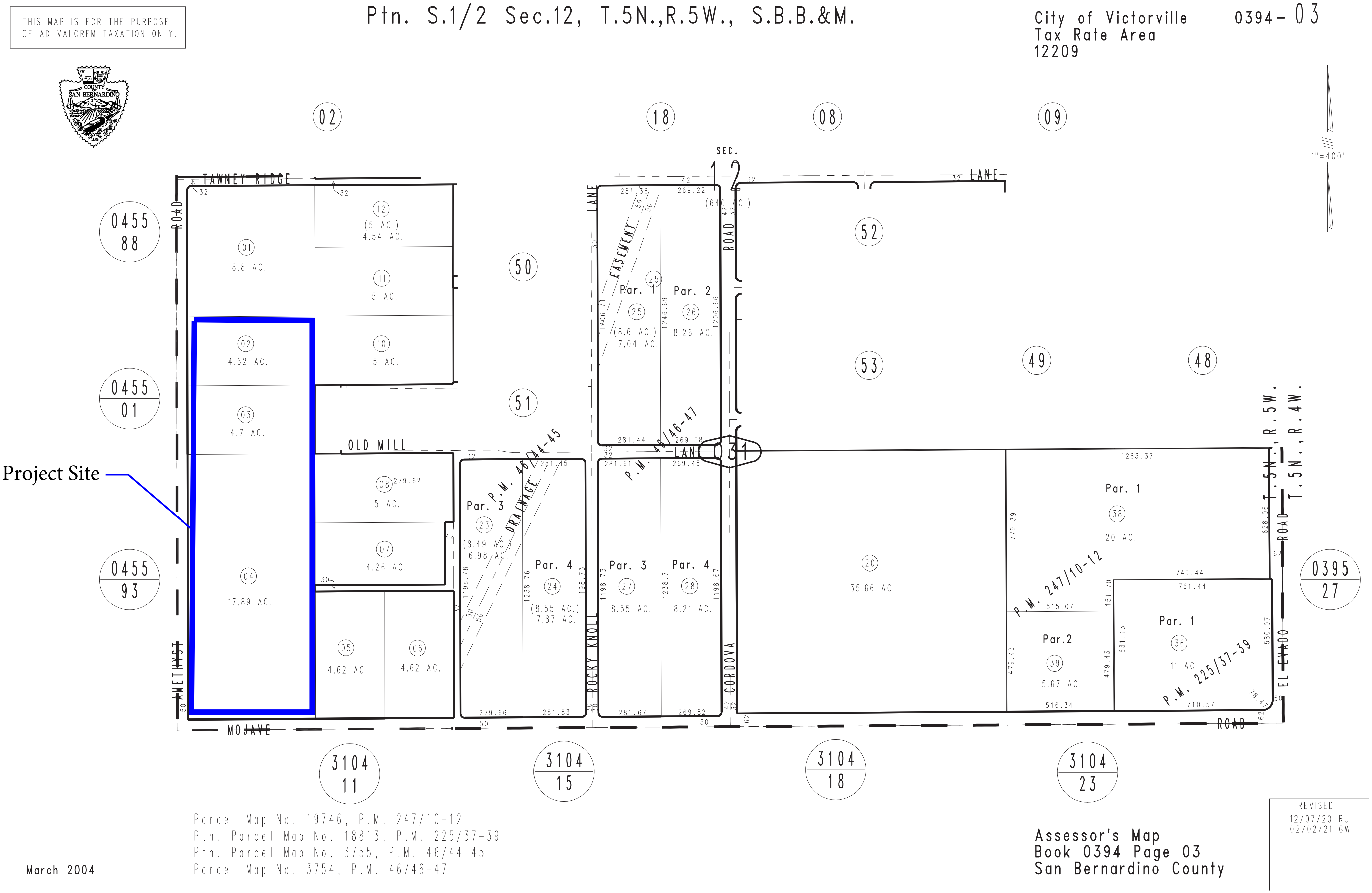
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



THIS MAP IS FOR THE PURPOSE OF AD VALOREM TAXATION ONLY.
Ptn. S.1/2 Sec.12, T.5N.,R.5W., S.B.B.&M.
City of Victorville
Tax Rate Area
12209
0394-03
1"=400'
TAWNEY RIDGE
OLD MILL
LANE
MOJAVE
ROAD
AMETHYST
ROCKY KNOLL
CORDOVA
EL EVADO
EASEMENT
DRAINAGE
Project Site
0455 88
0455 01
0455 93
0395 27
3104 11
3104 15
3104 18
3104 23
01 8.8 AC.
02 4.62 AC.
03 4.7 AC.
04 17.89 AC.
05 4.62 AC.
06 4.62 AC.
07 4.26 AC.
08 5 AC.
10 5 AC.
11 5 AC.
12 (5 AC.) 4.54 AC.
20 35.66 AC.
Par. 1 38 20 AC.
Par. 1 36 11 AC.
Par.2 39 5.67 AC.
P.M. 247/10-12
P.M. 225/37-39
P.M. 46/44-45
P.M. 46/46-47
Par. 3 23 (8.49 AC.) 6.98 AC.
Par. 4 24 (8.55 AC.) 7.87 AC.
Par. 3 27 8.55 AC.
Par. 4 28 8.21 AC.
Par. 1 25 (8.6 AC.) 7.04 AC.
Par. 2 26 8.26 AC.
(640 AC.)
T.5N., R.5W.
T.5N., R.4W.
Parcel Map No. 19746, P.M. 247/10-12
Ptn. Parcel Map No. 18813, P.M. 225/37-39
Ptn. Parcel Map No. 3755, P.M. 46/44-45
Parcel Map No. 3754, P.M. 46/46-47
March 2004
REVISED
12/07/20 RU
02/02/21 GW
Assessor's Map
Book 0394 Page 03
San Bernardino County

NOAA Atlas 14, Volume 6, Version 2
Location name: Victorville, California, USA*
Latitude: 34.5319°, Longitude: -117.363°
Elevation: 2947.41 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	**0.090** (0.075-0.111)	**0.126** (0.104-0.154)	**0.175** (0.144-0.215)	**0.216** (0.176-0.268)	**0.275** (0.217-0.352)	**0.323** (0.249-0.421)	**0.373** (0.281-0.499)	**0.427** (0.313-0.587)	**0.503** (0.354-0.721)	**0.565** (0.384-0.838)
10-min	**0.130** (0.107-0.158)	**0.180** (0.149-0.221)	**0.250** (0.206-0.308)	**0.310** (0.253-0.383)	**0.394** (0.311-0.504)	**0.462** (0.357-0.604)	**0.534** (0.403-0.715)	**0.611** (0.449-0.842)	**0.721** (0.507-1.03)	**0.809** (0.551-1.20)
15-min	**0.157** (0.129-0.192)	**0.218** (0.180-0.267)	**0.303** (0.249-0.372)	**0.375** (0.306-0.464)	**0.477** (0.376-0.610)	**0.559** (0.432-0.730)	**0.646** (0.487-0.865)	**0.739** (0.542-1.02)	**0.872** (0.614-1.25)	**0.979** (0.666-1.45)
30-min	**0.217** (0.180-0.266)	**0.303** (0.250-0.371)	**0.420** (0.346-0.516)	**0.520** (0.424-0.644)	**0.662** (0.522-0.847)	**0.776** (0.600-1.01)	**0.897** (0.677-1.20)	**1.03** (0.753-1.41)	**1.21** (0.852-1.74)	**1.36** (0.924-2.02)
60-min	**0.262** (0.216-0.320)	**0.365** (0.301-0.446)	**0.506** (0.416-0.621)	**0.626** (0.510-0.775)	**0.796** (0.628-1.02)	**0.934** (0.722-1.22)	**1.08** (0.814-1.45)	**1.24** (0.906-1.70)	**1.46** (1.02-2.09)	**1.64** (1.11-2.43)
2-hr	**0.365** (0.301-0.446)	**0.491** (0.405-0.602)	**0.666** (0.548-0.818)	**0.814** (0.664-1.01)	**1.03** (0.810-1.31)	**1.20** (0.926-1.57)	**1.38** (1.04-1.85)	**1.57** (1.15-2.17)	**1.85** (1.30-2.65)	**2.07** (1.41-3.07)
3-hr	**0.439** (0.363-0.537)	**0.585** (0.483-0.717)	**0.787** (0.647-0.966)	**0.959** (0.782-1.19)	**1.21** (0.951-1.54)	**1.40** (1.09-1.83)	**1.61** (1.22-2.16)	**1.84** (1.35-2.53)	**2.15** (1.52-3.09)	**2.41** (1.64-3.58)
6-hr	**0.591** (0.488-0.723)	**0.783** (0.646-0.959)	**1.05** (0.862-1.29)	**1.27** (1.04-1.58)	**1.59** (1.26-2.04)	**1.85** (1.43-2.42)	**2.13** (1.60-2.85)	**2.42** (1.78-3.33)	**2.83** (2.00-4.06)	**3.17** (2.15-4.70)
12-hr	**0.742** (0.613-0.908)	**1.00** (0.828-1.23)	**1.36** (1.12-1.67)	**1.66** (1.36-2.06)	**2.09** (1.65-2.67)	**2.43** (1.88-3.17)	**2.78** (2.10-3.73)	**3.16** (2.32-4.35)	**3.69** (2.60-5.30)	**4.12** (2.80-6.12)
24-hr	**0.965** (0.856-1.11)	**1.34** (1.19-1.54)	**1.85** (1.63-2.13)	**2.27** (1.99-2.64)	**2.86** (2.43-3.45)	**3.33** (2.77-4.10)	**3.82** (3.10-4.82)	**4.34** (3.42-5.63)	**5.07** (3.83-6.84)	**5.65** (4.13-7.90)
2-day	**1.08** (0.954-1.24)	**1.51** (1.34-1.74)	**2.10** (1.85-2.42)	**2.59** (2.27-3.02)	**3.28** (2.78-3.95)	**3.83** (3.18-4.71)	**4.41** (3.57-5.55)	**5.02** (3.96-6.50)	**5.88** (4.44-7.93)	**6.56** (4.79-9.17)
3-day	**1.16** (1.03-1.34)	**1.64** (1.45-1.89)	**2.29** (2.02-2.64)	**2.83** (2.48-3.30)	**3.59** (3.05-4.33)	**4.20** (3.49-5.16)	**4.84** (3.92-6.09)	**5.51** (4.34-7.14)	**6.47** (4.89-8.73)	**7.24** (5.28-10.1)
4-day	**1.24** (1.10-1.43)	**1.75** (1.55-2.01)	**2.44** (2.15-2.82)	**3.02** (2.65-3.52)	**3.83** (3.25-4.61)	**4.48** (3.72-5.50)	**5.15** (4.17-6.49)	**5.87** (4.63-7.61)	**6.88** (5.20-9.29)	**7.69** (5.62-10.7)
7-day	**1.33** (1.18-1.53)	**1.86** (1.64-2.14)	**2.58** (2.28-2.98)	**3.19** (2.79-3.72)	**4.04** (3.42-4.86)	**4.70** (3.90-5.78)	**5.39** (4.37-6.79)	**6.12** (4.82-7.93)	**7.13** (5.39-9.63)	**7.93** (5.79-11.1)
10-day	**1.40** (1.24-1.61)	**1.96** (1.73-2.25)	**2.72** (2.40-3.14)	**3.35** (2.93-3.90)	**4.23** (3.59-5.10)	**4.93** (4.09-6.06)	**5.65** (4.57-7.11)	**6.40** (5.04-8.29)	**7.44** (5.63-10.0)	**8.26** (6.03-11.5)
20-day	**1.61** (1.43-1.86)	**2.28** (2.02-2.62)	**3.19** (2.82-3.68)	**3.95** (3.46-4.60)	**5.03** (4.27-6.06)	**5.89** (4.89-7.24)	**6.78** (5.49-8.54)	**7.71** (6.07-9.98)	**8.98** (6.79-12.1)	**9.98** (7.29-13.9)
30-day	**1.83** (1.62-2.10)	**2.59** (2.29-2.98)	**3.66** (3.23-4.23)	**4.57** (4.00-5.32)	**5.87** (4.98-7.07)	**6.91** (5.74-8.50)	**7.99** (6.47-10.1)	**9.13** (7.19-11.8)	**10.7** (8.09-14.4)	**11.9** (8.71-16.7)
45-day	**2.12** (1.88-2.44)	**3.01** (2.67-3.47)	**4.29** (3.79-4.96)	**5.40** (4.73-6.29)	**7.02** (5.95-8.45)	**8.34** (6.92-10.3)	**9.72** (7.88-12.2)	**11.2** (8.82-14.5)	**13.2** (10.0-17.9)	**14.9** (10.9-20.8)
60-day	**2.33** (2.06-2.68)	**3.31** (2.93-3.81)	**4.74** (4.18-5.47)	**6.00** (5.25-6.98)	**7.86** (6.66-9.46)	**9.40** (7.80-11.6)	**11.0** (8.95-13.9)	**12.8** (10.1-16.6)	**15.3** (11.6-20.7)	**17.3** (12.6-24.2)

[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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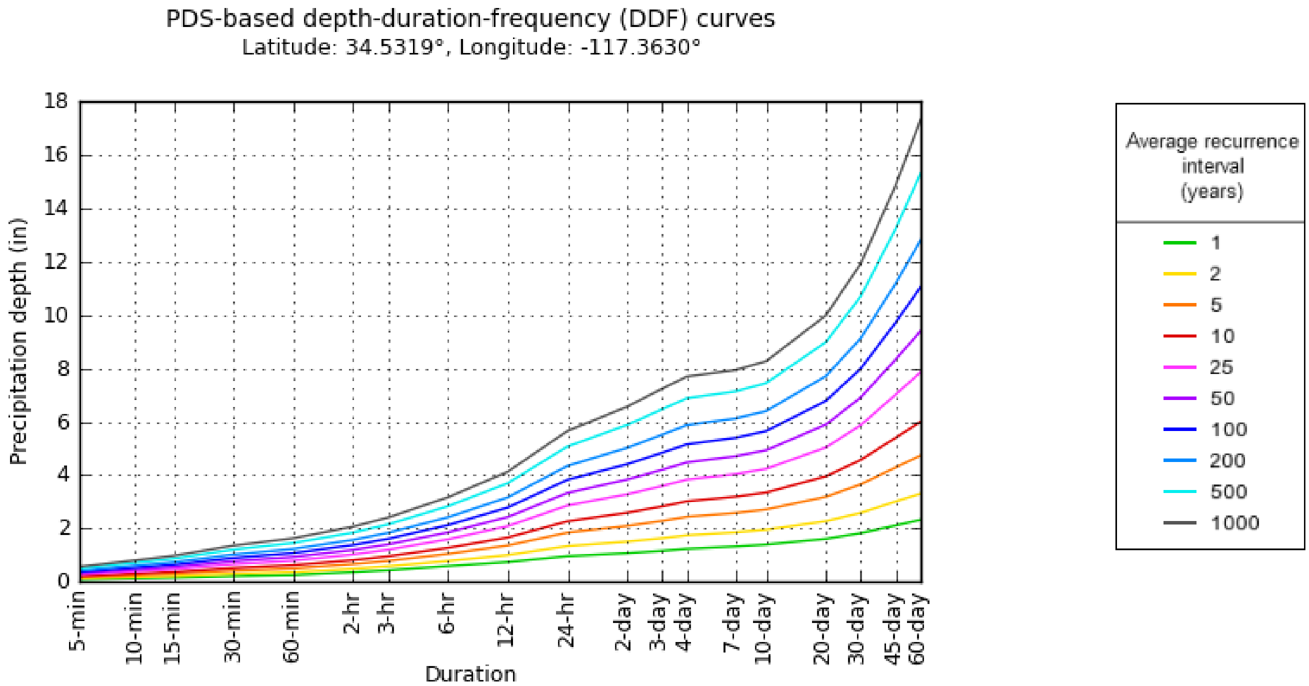
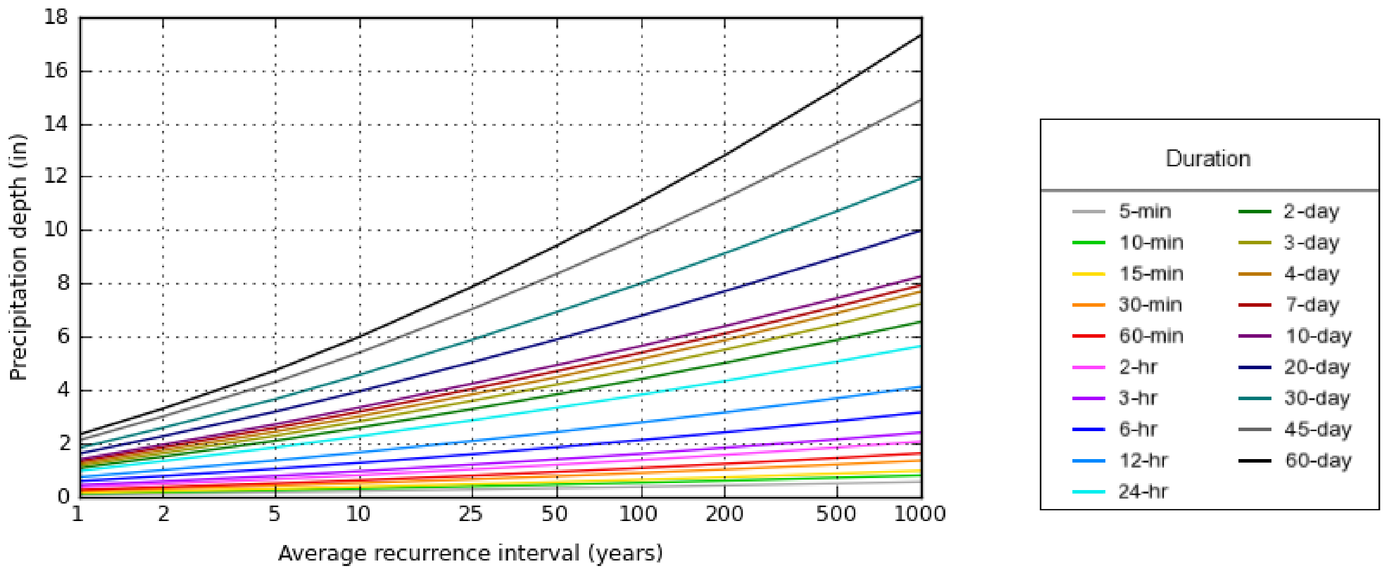
PF graphical





NOAA Atlas 14, Volume 6, Version 2 Created (GMT): Tue Oct 26 17:37:13 2021

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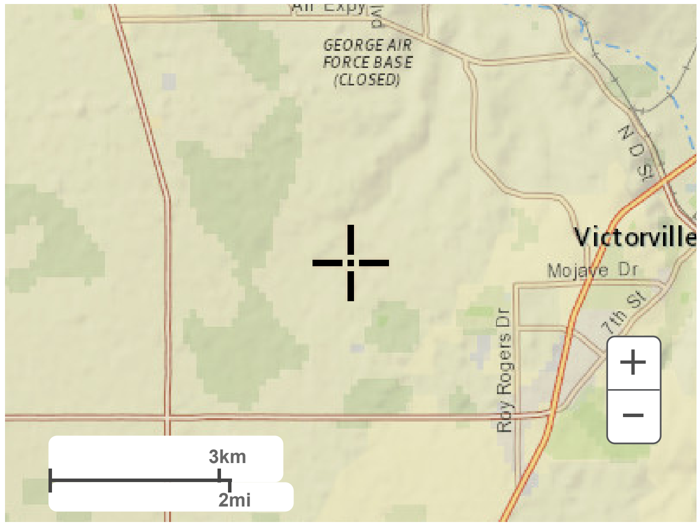
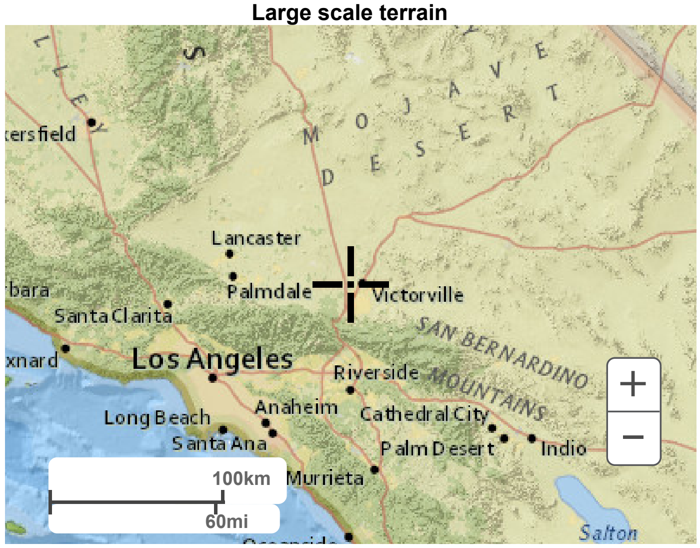
Maps & aerials

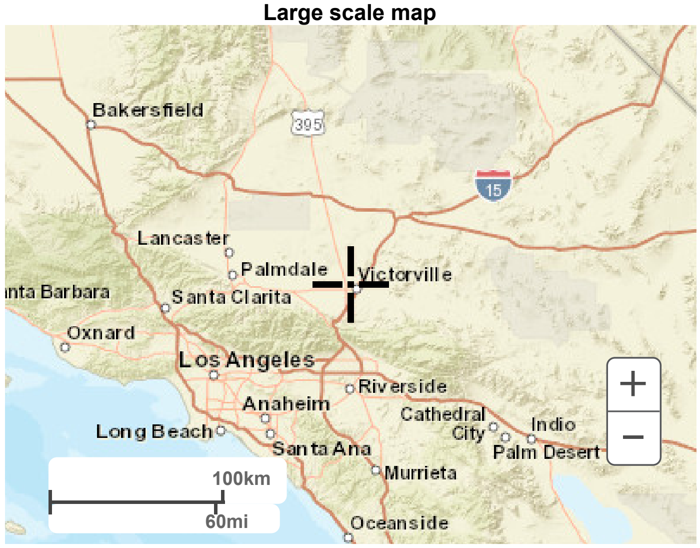
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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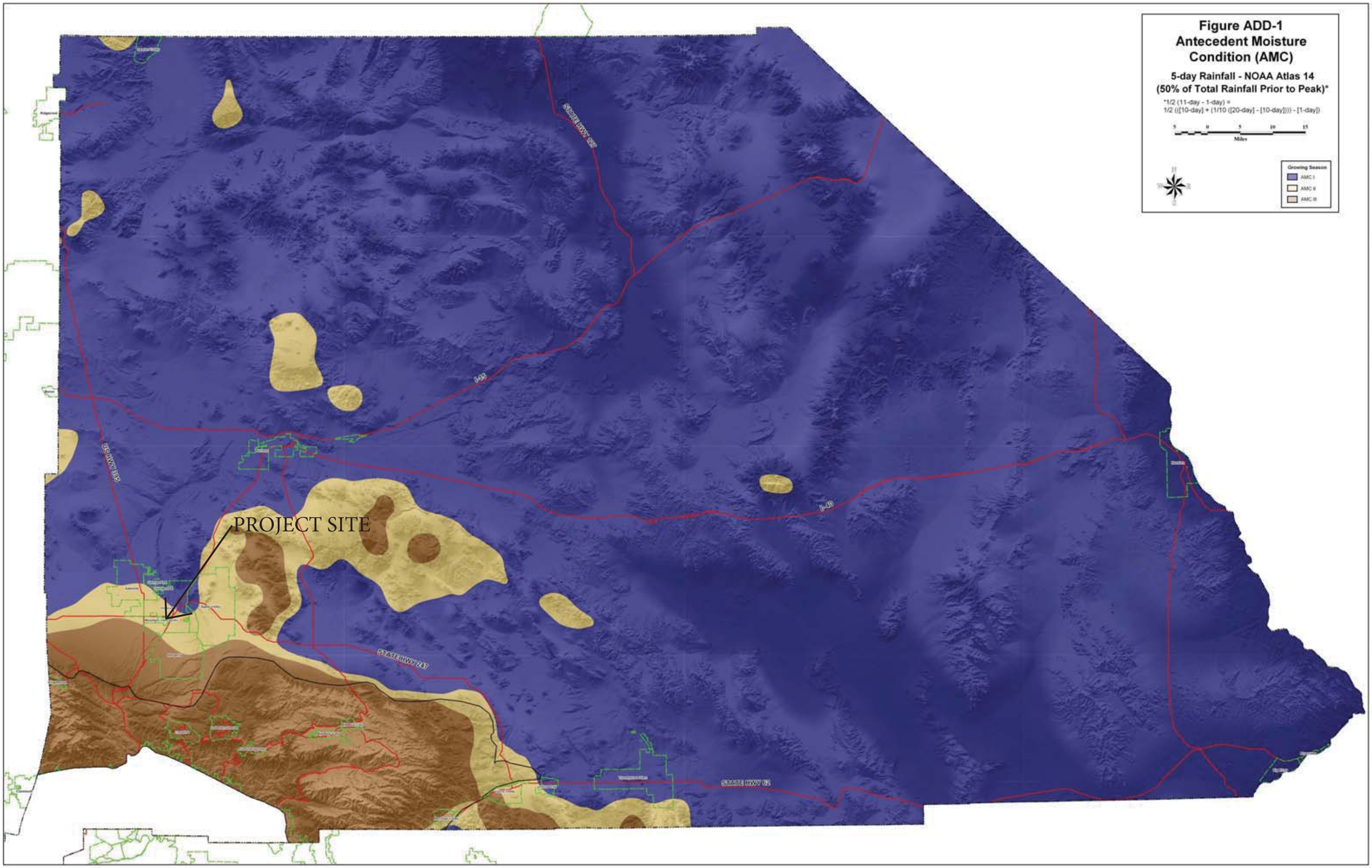
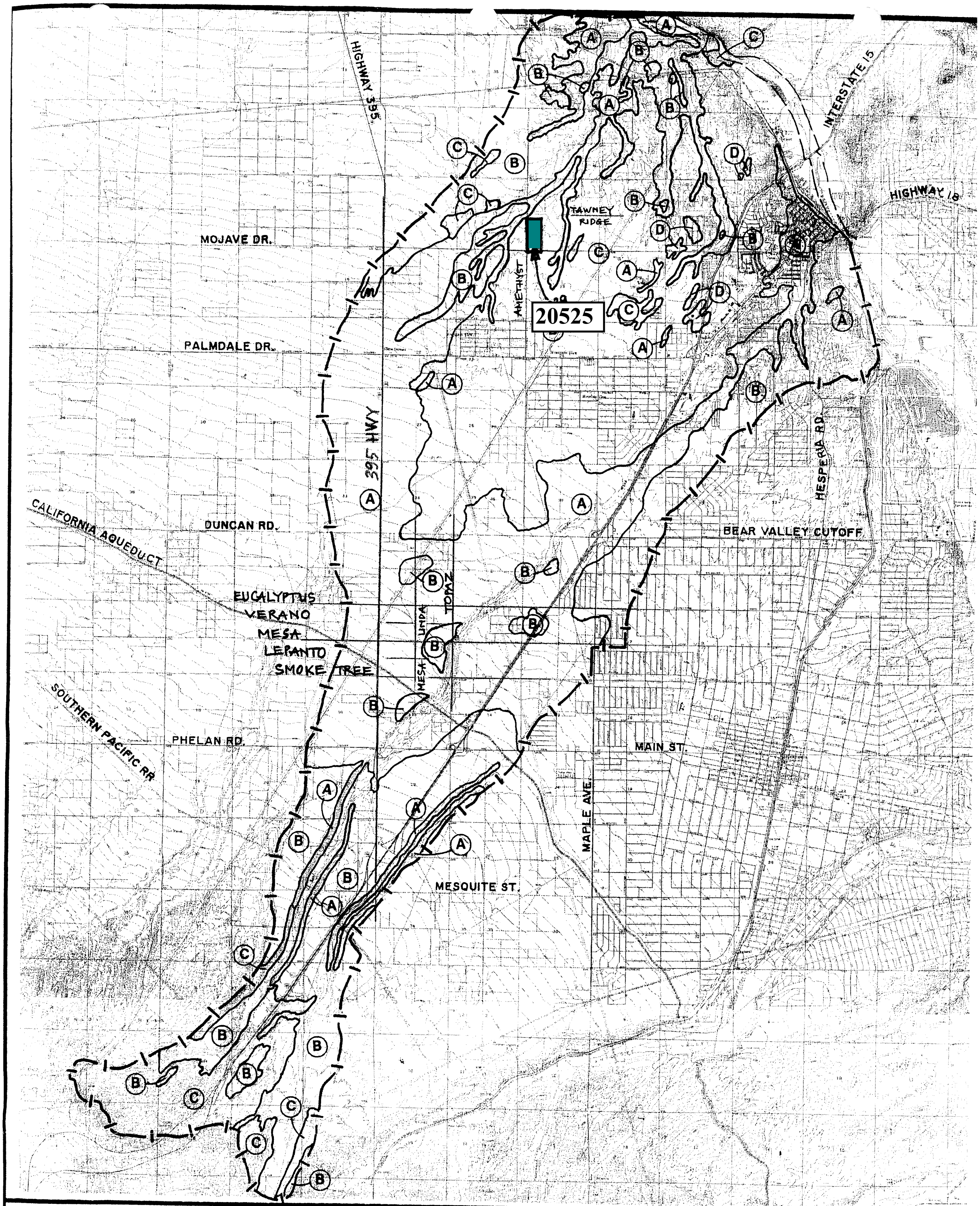


Figure ADD-1
Antecedent Moisture
Condition (AMC)
5-day Rainfall - NOAA Atlas 14
(50% of Total Rainfall Prior to Peak)*
*1/2 (11-day - 1-day) =
1/2 (([10-day] + (1/10 ([20-day] - [10-day]))) - [1-day])
5 0 5 10 15
Miles
Growing Season
AMC I
AMC II
AMC III
STATE HWY 127
I-15
US HWY 395
I-40
PROJECT SITE
STATE HWY 247
STATE HWY 62



LEGEND

WATERSHED BOUNDARY

SOIL GROUP BOUNDARY

(A) HYDROLOGIC SOIL GROUP

VICTORVILLE
MASTER PLAN
OF DRAINAGE

HYDROLOGIC SOIL GROUPS
FIGURE 4.2
4-6

WS
WILLIAMSON & SCHMID

SCALE
1"=10000'

Curve (1) Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparral, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparral, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	71	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent.)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	25	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		77	86	91	94

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

CURVE NUMBERS FOR PERVIOUS AREAS

Curve (1) Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (Continued)					
Legumes, Close Seeded	Poor	66	77	85	89
(Alfalfa, sweetclover, timothy, etc.)	Good	58	72	81	85
Orchards, Evergreen	Poor	57	73	82	86
(Citrus, avocados, etc.)	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland	Poor	68	79	86	89
(Annual grasses)	Fair	49	69	79	84
	Good	39	61	74	80
Pasture, Irrigated	Poor	58	74	83	87
(Legumes and perennial grass)	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops	Poor	72	81	88	91
(Field crops - tomatoes, sugar beets, etc.)	Good	67	78	85	89
Small grain	Poor	65	76	84	88
(Wheat, oats, barley, etc.)	Good	63	75	83	87

Notes:

1. All curve numbers are for Antecedent Moisture Condition (AMC) II.
2. Quality of cover definitions:

   Poor-Heavily grazed, regularly burned areas, or areas of high burn potential. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.

   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.

   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.
3. See Figure C-2 for definition of cover types.

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

CURVE NUMBERS FOR PERVIOUS AREAS

TABLE C.2. Fm (in/hr) VALUES
FOR TYPICAL COVER TYPES

COVER TYPE	SOIL GROUP A_p(1)	A	B	C	D
NATURAL:					
Barren	1.0	0.41	0.27	0.18	0.14
Row Crops (good)	1.0	0.59	0.41	0.29	0.22
Grass (fair)	1.0	0.82	0.56	0.40	0.31
Orchards (fair)	1.0	0.88	0.62	0.43	0.34
Woodland (fair)	1.0	0.95	0.69	0.50	0.40
URBAN:					
Residential (1 DU/AC)	0.80	0.78	0.60	0.45	0.37
Residential (2 DU/AC)	0.70	0.68	0.53	0.39	0.32
Residential (4 DU/AC)	0.60	0.58	0.45	0.34	0.28
Residential (10 DU/AC)	0.40	0.39	0.30	0.22	0.18
Condominium	0.35	0.34	0.26	0.20	0.16
Mobile Home Park	0.25	0.24	0.19	0.14	0.12
Apartments	0.20	0.19	0.15	0.11	0.09
Commercial/Industrial	0.10	0.10	0.08	0.06	0.05

NOTES:

(1) Recommended a_p values from Figure C-4

(2) AMC II assumed for all Fm values

(3) CN values obtained from Figure C-3

(4) DU/AC=dwelling unit per acre

TR. 20525

ONSITE

HYDROLOGY INPUT TABLES

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109 E. Third Street
San Bernardino, California 92410
(909)884-8217
Fax (909) 889-0153

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CHECKED BY ______ **DATE** ______

DESCRIPTION TR 20525 RATIONAL METHOD
CITY OF VICTORVILLE

NODE NO.	AREA NO.	HIGH EL. (FT)	ELEVATION (FT)	LENGTH (FT)	AREA (AC)	SOIL TYPE	COVER TYPE	Q100 (CFS)	REMARKS
FILE: 20525A1A2PRE100YR.OUT					*PRE-DEVELOPED CONDITION*			1.08in	**100-YEAR, 1-HR**
1 > 2	A1	2965.00	2953.00	620.00	3.53	C	UNDEV OPEN BRUSH	**6.60**	INITIAL SUBAREA
2 > 3	A2	2953.00	2945.50	480.00	8.16	C	UNDEV OPEN BRUSH	**19.60**	IRREGULAR CHANNEL + SUBAREAS
2 > 3						C	UNDEV OPEN BRUSH	**19.60**	**CONFLUENCE 1 OF 2**
4 > 5	A3	2954.50	2945.80	500.00	2.40	50%A 50%C	UNDEV OPEN BRUSH	**3.10**	INITIAL SUBAREA
4 > 5		tc=20.54	ap=1	scs=74.4	14.09ac	50%A 50%C	UNDEV OPEN BRUSH	**22.70**	**CONFLUENCE 2 OF 2**
	FILE: 20525A1A2PRE10YR.OUT				*PRE-DEVELOPED CONDITION*			0.626in	**10-YEAR, 1-HR**
1 > 2	A1	2965.00	2953.00	620.00	3.53	C	UNDEV OPEN BRUSH	**3.30**	INITIAL SUBAREA
2 > 3	A2	2953.00	2945.50	480.00	8.16	C	UNDEV OPEN BRUSH	**9.20**	IRREGULAR CHANNEL + SUBAREAS
2 > 3						C	UNDEV OPEN BRUSH	**9.20**	**CONFLUENCE 1 OF 2**
4 > 5	A3	2954.50	2945.80	500.00	2.40	50%A 50%C	UNDEV OPEN BRUSH	**1.20**	INITIAL SUBAREA
4 > 5		tc=21.14	ap=1	scs=74.4	14.09ac	50%A 50%C	UNDEV OPEN BRUSH	**10.50**	**CONFLUENCE 2 OF 2**
	FILE: 20525A1A2PRE2YR.OUT				*PRE-DEVELOPED CONDITION*			0.365in	**2-YEAR, 1-HR**
1 > 2	A1	2965.00	2953.00	620.00	3.53	C	UNDEV OPEN BRUSH	**1.30**	INITIAL SUBAREA
2 > 3	A2	2953.00	2945.50	480.00	8.16	C	UNDEV OPEN BRUSH	**3.30**	IRREGULAR CHANNEL + SUBAREAS
2 > 3						C	UNDEV OPEN BRUSH	**3.30**	**CONFLUENCE 1 OF 2**
4 > 5	A3	2954.50	2945.80	500.00	2.40	50%A 50%C	UNDEV OPEN BRUSH	**0.10**	INITIAL SUBAREA
4 > 5		tc=22.27	ap=1	scs=74.4	14.09ac	50%A 50%C	UNDEV OPEN BRUSH	**3.41**	**CONFLUENCE 2 OF 2**

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San Bernardino, California 92410
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DESCRIPTION TR 20525 RATIONAL METHOD
CITY OF VICTORVILLE

NODE NO.	AREA NO.	HIGH EL. (FT)	ELEVATION (FT)	LENGTH (FT)	AREA (AC)	SOIL TYPE	COVER TYPE	Q100 (CFS)	REMARKS
FILE: 20525B1B2PRE100YR.OUT					*PRE-DEVELOPED CONDITION*			1.08in	**100-YEAR, 1-HR**
11 > 12	**B1**	2965.00	2958.00	580.00	0.40	C	UNDEV OPEN BRUSH	**0.90**	INITIAL SUBAREA
12 > 13	**B2**	2958.00	2926.60	1350.00	7.95	94%A 6%B	UNDEV OPEN BRUSH	**11.50**	IRREGULAR CHANNEL + SUBAREAS
12 > 13						94%A 6%B	UNDEV OPEN BRUSH	**11.50**	**CONFLUENCE 1 OF 2**
6 > 14	**B3**	2950.00	2926.00	723.00	6.76	38%A 62%B	UNDEV OPEN BRUSH	**14.90**	INITIAL SUBAREA
6 > 14		tc=14.4	ap=1	scs=71.2	15.11ac	38%A 62%B	UNDEV OPEN BRUSH	**25.90**	**CONFLUENCE 2 OF 2**
6 > 14								**25.90**	**MAIN STREAM CONFLUENCE 1 OF 3**
15 > 12	**C1**	2967.70	2958.00	800.00	6.60	A	UNDEV OPEN BRUSH	**11.20**	INITIAL SUBAREA
12 > 13	**C4**	2958.00	2926.60	1254.00	1.20	A	UNDEV OPEN BRUSH	**11.20**	IRREGULAR CHANNEL + SUBAREAS
12 > 13								**11.20**	**MAIN STREAM CONFLUENCE 2 OF 3**
16 > 17	**C2**	2972.00	2950.00	964.00	6.30	A	UNDEV OPEN BRUSH	**11.20**	INITIAL SUBAREA
17 > 13	**C3**	2950.00	2926.60	1226.00	8.30	A	UNDEV OPEN BRUSH	**20.20**	IRREGULAR CHANNEL + SUBAREAS
12 > 13		tc=14.4	ap=1	scs=68.7	37.51ac			**56.10**	**MAIN STREAM CONFLUENCE 2 OF 3**
	FILE: 20525B1B2PRE10YR.OUT				*PRE-DEVELOPED CONDITION*			0.626in	**10-YEAR, 1-HR**
11 > 12	**B1**	2965.00	2958.00	580.00	0.40	C	UNDEV OPEN BRUSH	**0.50**	INITIAL SUBAREA
12 > 13	**B2**	2958.00	2926.60	1350.00	7.95	94%A 6%B	UNDEV OPEN BRUSH	**4.30**	IRREGULAR CHANNEL + SUBAREAS
12 > 13						94%A 6%B	UNDEV OPEN BRUSH	**4.30**	**CONFLUENCE 1 OF 2**
6 > 14	**B3**	2950.00	2926.00	723.00	6.76	38%A 62%B	UNDEV OPEN BRUSH	**7.40**	INITIAL SUBAREA
6 > 14		tc=14.4	ap=1	scs=71.2	15.11ac	38%A 62%B	UNDEV OPEN BRUSH	**12.20**	**CONFLUENCE 2 OF 2**
6 > 14								**12.20**	**MAIN STREAM CONFLUENCE 1 OF 3**
15 > 12	**C1**	2967.70	2958.00	800.00	6.60	A	UNDEV OPEN BRUSH	**5.10**	INITIAL SUBAREA
12 > 13	**C4**	2958.00	2926.60	1254.00	1.20	A	UNDEV OPEN BRUSH	**5.10**	IRREGULAR CHANNEL + SUBAREAS
12 > 13								**5.10**	**MAIN STREAM CONFLUENCE 2 OF 3**
16 > 17	**C2**	2972.00	2950.00	964.00	6.30	A	UNDEV OPEN BRUSH	**5.10**	INITIAL SUBAREA
17 > 13	**C3**	2950.00	2926.60	1226.00	8.30	A	UNDEV OPEN BRUSH	**7.70**	IRREGULAR CHANNEL + SUBAREAS
12 > 13		tc=14.4	ap=1	scs=68.7	37.51ac			**26.30**	**MAIN STREAM CONFLUENCE 2 OF 3**

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CITY OF VICTORVILLE

NODE NO.	AREA NO.	HIGH EL. (FT)	ELEVATION (FT)	LENGTH (FT)	AREA (AC)	SOIL TYPE	COVER TYPE	Q100 (CFS)	REMARKS
	FILE: 20525B1B2PRE2YR.OUT				*PRE-DEVELOPED CONDITION*			0.365in	**2-YEAR, 1-HR**
11 > 12	**B1**	2965.00	2958.00	580.00	0.40	C	UNDEV OPEN BRUSH	**0.20**	INITIAL SUBAREA
12 > 13	**B2**	2958.00	2926.60	1350.00	7.95	94%A 6%B	UNDEV OPEN BRUSH	**0.20**	IRREGULAR CHANNEL + SUBAREAS
12 > 13						94%A 6%B	UNDEV OPEN BRUSH	**0.20**	**CONFLUENCE 1 OF 2**
6 > 14	**B3**	2950.00	2926.00	723.00	6.76	38%A 62%B	UNDEV OPEN BRUSH	**3.10**	INITIAL SUBAREA
6 > 14		tc=14.4	ap=1	scs=71.2	15.11ac	38%A 62%B	UNDEV OPEN BRUSH	**3.20**	**CONFLUENCE 2 OF 2**
6 > 14								**3.20**	**MAIN STREAM CONFLUENCE 1 OF 3**
15 > 12	**C1**	2967.70	2958.00	800.00	6.60	A	UNDEV OPEN BRUSH	**1.50**	INITIAL SUBAREA
12 > 13	**C4**	2958.00	2926.60	1254.00	1.20	A	UNDEV OPEN BRUSH	**1.50**	IRREGULAR CHANNEL + SUBAREAS
12 > 13								**1.50**	**MAIN STREAM CONFLUENCE 2 OF 3**
16 > 17	**C2**	2972.00	2950.00	964.00	6.30	A	UNDEV OPEN BRUSH	**1.60**	INITIAL SUBAREA
17 > 13	**C3**	2950.00	2926.60	1226.00	8.30	A	UNDEV OPEN BRUSH	**1.60**	IRREGULAR CHANNEL + SUBAREAS
12 > 13		tc=14.4	ap=1	scs=68.7	37.51ac			**17.00**	**MAIN STREAM CONFLUENCE 2 OF 3**
FILE: 20525AMETHYSTPRE100YR.OUT					*PRE-DEVELOPED CONDITION*			1.08in	**100-YEAR, 1-HR**
11 > 18	**D1**	2965.00	2960.50	625.00	0.97	C	3.85 DU/AC	**2.30**	INITIAL SUBAREA
		tc=14.5	Ap=0.6	SCS=69					
FILE: 20525AMETHYSTPRE100YR.OUT					*PRE-DEVELOPED CONDITION*			0.626in	**10-YEAR, 1-HR**
11 > 18	**D1**	2965.00	2960.50	625.00	0.97	C	3.85 DU/AC	**1.20**	INITIAL SUBAREA
		tc=14.5	Ap=0.6	SCS=69					
FILE: 20525AMETHYSTPRE100YR.OUT					*PRE-DEVELOPED CONDITION*			0.365in	**2-YEAR, 1-HR**
11 > 18	**D1**	2965.00	2960.50	625.00	0.97	C	3.85 DU/AC	**0.60**	INITIAL SUBAREA
		tc=14.5	Ap=0.6	SCS=69					

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NODE NO.	AREA NO.	HIGH EL. (FT)	ELEVATION (FT)	LENGTH (FT)	AREA (AC)	SOIL TYPE	COVER TYPE	Q100 (CFS)	REMARKS
FILE: 20525RATIONALPOST100YRREV1.OUT				*POST DEVELOPED CONDITION*				1.08in	**100-YEAR, 1-HR**
101 >102	**AA1**	2963.50	2957.50	413.00	1.98	C	3.85 DU/AC	**5.80**	INITIAL SUBAREA
102 >103	**AA2**	2957.50	2946.70	803.00	5.52	C	3.85 DU/AC	**16.90**	STREET FLOW + SUBAREAS
103 >106	**BB1**	2946.70	2929.50	1129.00	7.82	51%A 36%B 13%C	3.85 DU/AC	**26.10**	STREET FLOW + SUBAREAS
103 >106							3.85 DU/AC	**26.10**	**CONFLUENCE 1 OF 3**
104 >105	**BB2**	2963.50	2944.40	1000.00	6.41	35%A 65%C	3.85 DU/AC	**14.40**	INITIAL SUBAREA
105 >106	**BB3**	2944.40	2929.50	769.00	5.00	68%A 32%B	3.85 DU/AC	**21.00**	STREET FLOW + SUBAREAS
105 >106						68%A 32%B	3.85 DU/AC	**21.00**	**CONFLUENCE 2 OF 3**
107 >108	**BB4**	2965.50	2941.80	1000.00	1.26	40%A 60%C	3.85 DU/AC	**2.90**	INITIAL SUBAREA
108 >109	**BB5**	2941.80	2928.50	724.00	1.00	A	3.85 DU/AC	**4.20**	STREET FLOW + SUBAREAS
108 >109		tc=17.71	ap=0.6	scs=54.1	28.99ac	A	3.85 DU/AC	**50.80**	**CONFLUENCE 3 OF 3**
108 >109		tc=17.71	ap=0.6	scs=54.1	12.2ac	A	3.85 DU/AC	**22.20**	**USER DEFINE**
108 >109						A	3.85 DU/AC	**22.20**	**MAIN STREAM CONFLUENCE 1 OF 3**
16 >17	**C2**	2972.00	2950.00	964.00	6.30	A	UNDEV OPEN BRUSH	**11.20**	INITIAL SUBAREA
17 >13	**C3**	2950.00	2926.60	1226.00	8.30	A	UNDEV OPEN BRUSH	**20.20**	STREET FLOW + SUBAREAS
17 >13						A	UNDEV OPEN BRUSH	**20.20**	**MAIN STREAM CONFLUENCE 2 OF 3**
15 >12	**C1**	2967.70	2958.00	800.00	6.60	A	UNDEV OPEN BRUSH	**11.20**	INITIAL SUBAREA
12 >13	**C4**	2950.00	2926.60	1350.00	1.20	A	UNDEV OPEN BRUSH	**11.20**	STREET FLOW + SUBAREAS
12 >13		tc=17.71	ap=0.741	scs=58.6	51.39ac	A	3.85 DU/AC	**53.10**	**MAIN STREAM CONFLUENCE 3 OF 3**

Ludwig Engineering
109 E. Third Street
San Bernardino, California 92410
(909)884-8217
Fax (909) 889-0153

JOB MI-0508

CALCULATED BY ______ DATE 11/1/2022
CHECKED BY ______ DATE ______

DESCRIPTION TR 20525 RATIONAL METHOD
CITY OF VICTORVILLE

NODE NO.	AREA NO.	HIGH EL. (FT)	ELEVATION (FT)	LENGTH (FT)	AREA (AC)	SOIL TYPE	COVER TYPE	Q100 (CFS)	REMARKS
FILE: 20525RATIONALPOST10YRREV1.OUT				*POST DEVELOPED CONDITION*				0.626in	**10-YEAR, 1-HR**
101 >102	**AA1**	2963.50	2957.50	413.00	1.98	C	3.85 DU/AC	**3.10**	INITIAL SUBAREA
102 >103	**AA2**	2957.50	2946.70	803.00	5.52	C	3.85 DU/AC	**8.50**	STREET FLOW + SUBAREAS
103 >106	**BB1**	2946.70	2929.50	1129.00	7.82	51%A 36%B 13%C	3.85 DU/AC	**11.60**	STREET FLOW + SUBAREAS
103 >106						51%A 36%B 13%C	3.85 DU/AC	**11.60**	**CONFLUENCE 1 OF 3**
104 >105	**BB2**	2963.50	2944.40	1000.00	6.41	35%A 65%C	3.85 DU/AC	**7.30**	INITIAL SUBAREA
105 >106	**BB3**	2944.40	2929.50	769.00	5.00	68%A 32%B	3.85 DU/AC	**9.70**	STREET FLOW + SUBAREAS
105 >106						68%A 32%B	3.85 DU/AC	**9.70**	**CONFLUENCE 2 OF 3**
107 >108	**BB4**	2965.50	2941.80	1000.00	1.26	40%A 60%C	3.85 DU/AC	**1.50**	INITIAL SUBAREA
108 >109	**BB5**	2941.80	2928.50	724.00	1.00	A	3.85 DU/AC	**2.00**	STREET FLOW + SUBAREAS
108 >109		tc=18.35	ap=0.6	scs=54.1	28.99ac	A	3.85 DU/AC	**23.40**	**CONFLUENCE 3 OF 3**
108 >109		tc=18.35	ap=0.6	scs=54.1	17.04ac	A	3.85 DU/AC	**14.40**	**USER DEFINE**
108 >109						A	3.85 DU/AC	**14.40**	**MAIN STREAM CONFLUENCE 1 OF 3**
16 >17	**C2**	2972.00	2950.00	964.00	6.30	A	UNDEV OPEN BRUSH	**5.10**	INITIAL SUBAREA
17 >13	**C3**	2950.00	2926.60	1226.00	8.30	A	UNDEV OPEN BRUSH	**7.70**	STREET FLOW + SUBAREAS
17 >13						A	UNDEV OPEN BRUSH	**7.70**	**MAIN STREAM CONFLUENCE 2 OF 3**
15 >12	**C1**	2967.70	2958.00	800.00	6.60	A	UNDEV OPEN BRUSH	**5.10**	INITIAL SUBAREA
12 >13	**C4**	2950.00	2926.60	1350.00	1.20	A	UNDEV OPEN BRUSH	**5.10**	STREET FLOW + SUBAREAS
12 >13		tc=18.4	ap=0.731	scs=58.3		A	3.85 DU/AC	**28.20**	**MAIN STREAM CONFLUENCE 3 OF 3**

Ludwig Engineering
109 E. Third Street
San Bernardino, California 92410
(909)884-8217
Fax (909) 889-0153

JOB MI-0508

CALCULATED BY ________ **DATE** 11/1/2022
CHECKED BY ________ **DATE** ________

DESCRIPTION TR 20525 RATIONAL METHOD
CITY OF VICTORVILLE

NODE NO.	AREA NO.	HIGH EL. (FT)	ELEVATION (FT)	LENGTH (FT)	AREA (AC)	SOIL TYPE	COVER TYPE	Q100 (CFS)	REMARKS
FILE: 20525RATIONALPOST2YR.OUT				*POST DEVELOPED CONDITION*				0.365in	**2-YEAR, 1-HR**
101 >102	**AA1**	2963.50	2957.50	413.00	1.98	C	3.85 DU/AC	**1.60**	INITIAL SUBAREA
102 >103	**AA2**	2957.50	2946.70	803.00	5.52	C	3.85 DU/AC	**3.80**	STREET FLOW + SUBAREAS
103 >106	**BB1**	2946.70	2929.50	1129.00	7.82	51%A 36%B 13%C	3.85 DU/AC	**3.80**	INITIAL SUBAREA
103 >106						51%A 36%B 13%C	3.85 DU/AC	**3.80**	**CONFLUENCE 1 OF 3**
104 >105	**BB2**	2963.50	2944.40	1000.00	6.41	35%A 65%C	3.85 DU/AC	**3.20**	INITIAL SUBAREA
105 >106	**BB3**	2944.40	2929.50	769.00	5.00	68%A 32%B	3.85 DU/AC	**3.30**	STREET FLOW + SUBAREAS
105 >106						68%A 32%B	3.85 DU/AC	**3.30**	**CONFLUENCE 2 OF 3**
107 >108	**BB4**	2965.50	2941.80	1000.00	1.26	40%A 60%C	3.85 DU/AC	**0.60**	INITIAL SUBAREA
108 >109	**BB5**	2941.80	2928.50	724.00	1.00	A	3.85 DU/AC	**0.80**	STREET FLOW + SUBAREAS
108 >109		tc=19.35	ap=0.6	scs=54.1	28.99ac	A	3.85 DU/AC	**8.50**	**CONFLUENCE 3 OF 3**
FILE: 20525AMETHYSTPOST100YR.OUT				*POST-DEVELOPED CONDITION*				1.08in	**100-YEAR, 1-HR**
107 >110	**D1**	2965.00	2960.50	625.00	0.97	C	3.85 DU/AC	**2.30**	INITIAL SUBAREA
		tc=14.5	Ap=0.6	SCS=69					
FILE: 20525AMETHYSTPOST100YR.OUT				*POST-DEVELOPED CONDITION*				0.626in	**10-YEAR, 1-HR**
107 >110	**D1**	2965.00	2960.50	625.00	0.97	C	3.85 DU/AC	**1.20**	INITIAL SUBAREA
		tc=14.5	Ap=0.6	SCS=69					
FILE: 20525AMETHYSTPOST100YR.OUT				*POST-DEVELOPED CONDITION*				0.365in	**2-YEAR, 1-HR**
107 >110	**D1**	2965.00	2960.50	625.00	0.97	C	3.85 DU/AC	**0.60**	INITIAL SUBAREA
		tc=14.5	Ap=0.6	SCS=69					

TR. 20525

100-year,10-year & 2-year, 1-Hours Storm Events

Rational Method Pre–Developed

```
          San Bernardino County Rational Hydrology Program

              (Hydrology Manual Date - August 1986)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version 7.1
      Rational Hydrology Study        Date: 10/28/21
------------------------------------------------------------------------
```

100-YEAR, 1-HOUR RATIONAL STUDY PRE-DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA A1, A2 & A3 (Onsite Easterly Areas to APN 0394-031-08)
FILE: 17839A1A2PRE100.OUT

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


Program License Serial Number 4070

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

------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
Computed rainfall intensity:
Storm year =   100.00   1 hour rainfall =     1.080 (In.)
Slope used for rainfall intensity curve b =  0.7000
Soil antecedent moisture condition (AMC) = 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station       2.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 77.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.420(In/Hr)
Initial subarea data:
Initial area flow distance =   620.000(Ft.)
Top (of initial area) elevation =  2965.000(Ft.)
Bottom (of initial area) elevation =  2953.000(Ft.)
Difference in elevation =    12.000(Ft.)
Slope =    0.01935  s(%)=       1.94
TC = k(0.628)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.106 min.
Rainfall intensity =      2.498(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.749
Subarea runoff =      6.602(CFS)
Total initial stream area =        3.530(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.420(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.525(Ft.), Average velocity =   3.286(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1               0.00              1.00
      2               5.00              0.00
      3              10.00              0.00
      4              15.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =     13.161(CFS)
  '     '    flow top width =     10.251(Ft.)
  '     '     velocity=    3.286(Ft/s)
  '     '    area =      4.005(Sq.Ft)
  '     '    Froude number =     0.927

Upstream point elevation =  2953.000(Ft.)
Downstream point elevation =  2945.500(Ft.)
Flow length =   480.000(Ft.)
Travel time  =    2.43 min.
Time of concentration =   20.54 min.
Depth of flow =   0.525(Ft.)
Average velocity =   3.286(Ft/s)
Total irregular channel flow =    13.161(CFS)
Irregular channel normal depth above invert elev. =   0.525(Ft.)
Average velocity of channel(s) =   3.286(Ft/s)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 77.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.420(In/Hr)
Rainfall intensity =      2.287(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.735
Subarea runoff =     13.041(CFS) for    8.160(Ac.)
Total runoff =     19.643(CFS)
Effective area this stream =       11.69(Ac.)
Total Study Area (Main Stream No. 1) =       11.69(Ac.)
Area averaged Fm value =    0.420(In/Hr)
Depth of flow =   0.647(Ft.), Average velocity =   3.686(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     11.690(Ac.)
Runoff from this stream =     19.643(CFS)
Time of concentration =   20.54 min.
Rainfall intensity =     2.287(In/Hr)
Area averaged loss rate (Fm) =    0.4202(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        5.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 61.50
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.659(In/Hr)
Initial subarea data:
Initial area flow distance =   500.000(Ft.)
Top (of initial area) elevation =  2954.500(Ft.)
Bottom (of initial area) elevation =  2945.800(Ft.)
Difference in elevation =     8.700(Ft.)
Slope =    0.01740  s(%)=       1.74
TC = k(0.877)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   23.683 min.
Rainfall intensity =      2.070(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.614
Subarea runoff =      3.049(CFS)
Total initial stream area =        2.400(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.659(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        5.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.400(Ac.)
Runoff from this stream =      3.049(CFS)
Time of concentration =   23.68 min.
Rainfall intensity =     2.070(In/Hr)
Area averaged loss rate (Fm) =    0.6587(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

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


1     19.64    11.690     20.54    0.420      2.287
2      3.05     2.400     23.68    0.659      2.070
Qmax(1) =
         1.000 *    1.000 *    19.643) +
         1.154 *    0.867 *     3.049) + =      22.694
Qmax(2) =
         0.884 *    1.000 *    19.643) +
         1.000 *    1.000 *     3.049) + =      20.410

Total of 2 streams to confluence:
Flow rates before confluence point:
      19.643       3.049
Maximum flow rates at confluence using above data:
       22.694       20.410
Area of streams before confluence:
       11.690        2.400
Effective area values after confluence:
       13.772       14.090
```

Results of confluence:
Total flow rate =   22.694(CFS)
Time of concentration =   20.540 min.
Effective stream area after confluence =   13.772(Ac.)
Study area average Pervious fraction(Ap) = 1.000
Study area average soil loss rate(Fm) =   0.461(In/Hr)
Study area total (this main stream) =   14.09(Ac.)
End of computations, Total Study Area =   14.09 (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) = 1.000
Area averaged SCS curve number = 74.4

```
              San Bernardino County Rational Hydrology Program

                  (Hydrology Manual Date - August 1986)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version 7.1
      Rational Hydrology Study        Date: 10/28/21
------------------------------------------------------------------------
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10-YEAR, 1-HOUR RATIONAL STUDY PRE-DEVELOPED
TR 20525,, **CITY OF VICTORVILLE**
AREA A1, A2 & A3 (Onsite Easterly Areas to APN 0394-031-08)
FILE: 17839A1A2PRE10.OUT

```
------------------------------------------------------------------------


Program License Serial Number 4070

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

------------------------------------------------------------------------
Rational hydrology study storm event year is    10.0
Computed rainfall intensity:
Storm year =    10.00   1 hour rainfall =     0.626 (In.)
Slope used for rainfall intensity curve b =  0.7000
Soil antecedent moisture condition (AMC) = 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        2.000
**** INITIAL AREA EVALUATION ****
```

```
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 77.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.420(In/Hr)
Initial subarea data:
Initial area flow distance =   620.000(Ft.)
Top (of initial area) elevation =  2965.000(Ft.)
Bottom (of initial area) elevation =  2953.000(Ft.)
Difference in elevation =    12.000(Ft.)
Slope =    0.01935  s(%)=       1.94
TC = k(0.628)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.106 min.
Rainfall intensity =      1.448(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.639
Subarea runoff =      3.266(CFS)
Total initial stream area =        3.530(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.420(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.353(Ft.), Average velocity =   2.634(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              5.00              0.00
      3             10.00              0.00
      4             15.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      6.285(CFS)
  '     '    flow top width =      8.527(Ft.)
  '     '     velocity=    2.634(Ft/s)
  '     '    area =      2.386(Sq.Ft)
  '     '    Froude number =     0.878

Upstream point elevation =  2953.000(Ft.)
Downstream point elevation =  2945.500(Ft.)
Flow length =   480.000(Ft.)
Travel time  =    3.04 min.
Time of concentration =   21.14 min.
Depth of flow =   0.353(Ft.)
Average velocity =   2.634(Ft/s)
Total irregular channel flow =     6.285(CFS)
Irregular channel normal depth above invert elev. =   0.353(Ft.)
Average velocity of channel(s) =   2.634(Ft/s)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 77.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.420(In/Hr)
Rainfall intensity =      1.299(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.609
Subarea runoff =      5.982(CFS) for    8.160(Ac.)
Total runoff =      9.248(CFS)
Effective area this stream =       11.69(Ac.)
Total Study Area (Main Stream No. 1) =       11.69(Ac.)
Area averaged Fm value =    0.420(In/Hr)
Depth of flow =   0.435(Ft.), Average velocity =   2.962(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station       3.000
**** CONFLUENCE OF MINOR STREAMS ****
```

```
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     11.690(Ac.)
Runoff from this stream =      9.248(CFS)
Time of concentration =   21.14 min.
Rainfall intensity =     1.299(In/Hr)
Area averaged loss rate (Fm) =    0.4202(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       4.000 to Point/Station       5.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 61.50
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.659(In/Hr)
Initial subarea data:
Initial area flow distance =   500.000(Ft.)
Top (of initial area) elevation =  2954.500(Ft.)
Bottom (of initial area) elevation =  2945.800(Ft.)
Difference in elevation =     8.700(Ft.)
Slope =    0.01740  s(%)=       1.74
TC = k(0.877)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   23.683 min.
Rainfall intensity =      1.200(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.406
Subarea runoff =      1.169(CFS)
Total initial stream area =        2.400(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.659(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        5.000
**** CONFLUENCE OF MINOR STREAMS ****
```

```
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.400(Ac.)
Runoff from this stream =      1.169(CFS)
Time of concentration =   23.68 min.
Rainfall intensity =     1.200(In/Hr)
Area averaged loss rate (Fm) =    0.6587(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

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


1      9.25    11.690     21.14    0.420      1.299
2      1.17     2.400     23.68    0.659      1.200
Qmax(1) =
         1.000 *    1.000 *     9.248) +
         1.183 *    0.893 *     1.169) + =      10.483
Qmax(2) =
         0.887 *    1.000 *     9.248) +
         1.000 *    1.000 *     1.169) + =       9.374

Total of 2 streams to confluence:
Flow rates before confluence point:
       9.248       1.169
Maximum flow rates at confluence using above data:
       10.483        9.374
Area of streams before confluence:
       11.690        2.400
Effective area values after confluence:
       13.833       14.090
```

Results of confluence:
Total flow rate =   10.483(CFS)
Time of concentration =   21.143 min.
Effective stream area after confluence =   13.833(Ac.)
Study area average Pervious fraction(Ap) = 1.000
Study area average soil loss rate(Fm) =   0.461(In/Hr)
Study area total (this main stream) =   14.09(Ac.)
End of computations, Total Study Area =   14.09 (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) = 1.000
Area averaged SCS curve number = 74.4

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 10/28/21

2-YEAR, 1-HOUR RATIONAL STUDY PRE-DEVELOPED
TR 20525,, **CITY OF VICTORVILLE**
AREA A1, A2 & A3 (Onsite Easterly Areas to APN 0394-031-08)
FILE: 17839A1A2PRE2.OUT

Program License Serial Number 4070

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

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.365 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station       2.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 77.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.420(In/Hr)
Initial subarea data:
Initial area flow distance =   620.000(Ft.)
Top (of initial area) elevation =  2965.000(Ft.)
Bottom (of initial area) elevation =  2953.000(Ft.)
Difference in elevation =    12.000(Ft.)
Slope =    0.01935  s(%)=       1.94
TC = k(0.628)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.106 min.
Rainfall intensity =      0.844(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.452
Subarea runoff =      1.348(CFS)
Total initial stream area =        3.530(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.420(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       2.000 to Point/Station       3.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.203(Ft.), Average velocity =   1.922(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              5.00              0.00
      3             10.00              0.00
      4             15.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      2.352(CFS)
  '     '   flow top width =      7.034(Ft.)
  '     '    velocity=    1.922(Ft/s)
  '     '   area =      1.224(Sq.Ft)
  '     '   Froude number =     0.812

Upstream point elevation =  2953.000(Ft.)
Downstream point elevation =  2945.500(Ft.)
Flow length =   480.000(Ft.)
Travel time  =    4.16 min.
Time of concentration =   22.27 min.
Depth of flow =   0.203(Ft.)
Average velocity =   1.922(Ft/s)
Total irregular channel flow =     2.352(CFS)
Irregular channel normal depth above invert elev. =   0.203(Ft.)
Average velocity of channel(s) =   1.922(Ft/s)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 77.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.420(In/Hr)
Rainfall intensity =      0.731(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.382
Subarea runoff =      1.918(CFS) for    8.160(Ac.)
Total runoff =      3.265(CFS)
Effective area this stream =       11.69(Ac.)
Total Study Area (Main Stream No. 1) =       11.69(Ac.)
Area averaged Fm value =    0.420(In/Hr)
Depth of flow =   0.245(Ft.), Average velocity =   2.141(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** CONFLUENCE OF MINOR STREAMS ****
```

```
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     11.690(Ac.)
Runoff from this stream =      3.265(CFS)
Time of concentration =   22.27 min.
Rainfall intensity =     0.731(In/Hr)
Area averaged loss rate (Fm) =    0.4202(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        5.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 61.50
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.659(In/Hr)
Initial subarea data:
Initial area flow distance =   500.000(Ft.)
Top (of initial area) elevation =  2954.500(Ft.)
Bottom (of initial area) elevation =  2945.800(Ft.)
Difference in elevation =     8.700(Ft.)
Slope =    0.01740  s(%)=       1.74
TC = k(0.877)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   23.683 min.
Rainfall intensity =      0.700(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.053
Subarea runoff =      0.089(CFS)
Total initial stream area =        2.400(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.659(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       4.000 to Point/Station       5.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.400(Ac.)
Runoff from this stream =      0.089(CFS)
Time of concentration =   23.68 min.
Rainfall intensity =     0.700(In/Hr)
Area averaged loss rate (Fm) =    0.6587(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

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


1      3.27    11.690     22.27    0.420      0.731
2      0.09     2.400     23.68    0.659      0.700
Qmax(1) =
         1.000 *    1.000 *     3.265) +
         1.752 *    0.940 *     0.089) + =       3.411
Qmax(2) =
         0.901 *    1.000 *     3.265) +
         1.000 *    1.000 *     0.089) + =       3.029

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.265       0.089
Maximum flow rates at confluence using above data:
        3.411        3.029
Area of streams before confluence:
       11.690        2.400
Effective area values after confluence:
       13.947       14.090
```

Results of confluence:
Total flow rate =   3.411(CFS)
Time of concentration =   22.268 min.
Effective stream area after confluence =   13.947(Ac.)
Study area average Pervious fraction(Ap) = 1.000
Study area average soil loss rate(Fm) =   0.461(In/Hr)
Study area total (this main stream) =   14.09(Ac.)
End of computations, Total Study Area =   14.09 (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) = 1.000
Area averaged SCS curve number = 74.4

```
              San Bernardino County Rational Hydrology Program

                   (Hydrology Manual Date - August 1986)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version 7.1
      Rational Hydrology Study        Date: 10/31/22
------------------------------------------------------------------------
```
100-YEAR, 1-HOUR RATIONAL STUDY PRE-DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA B1, B2 & B3 (WESTERLY AREA), C1-C4(OFFSITE)
FILE: 20525RATIONALPRE100REV1.OUT

```
------------------------------------------------------------------------


Program License Serial Number 4070

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

------------------------------------------------------------------------
```
Rational hydrology study storm event year is   100.0

```
Computed rainfall intensity:
Storm year =   100.00   1 hour rainfall =     1.080 (In.)
Slope used for rainfall intensity curve b =  0.7000
Soil antecedent moisture condition (AMC) = 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      11.000 to Point/Station      12.000
**** INITIAL AREA EVALUATION ****
```

```
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 86.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.265(In/Hr)
Initial subarea data:
Initial area flow distance =   580.000(Ft.)
Top (of initial area) elevation =  2965.000(Ft.)
Bottom (of initial area) elevation =  2958.000(Ft.)
Difference in elevation =     7.000(Ft.)
Slope =    0.01207  s(%)=       1.21
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.188 min.
Rainfall intensity =      2.702(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.812
Subarea runoff =      0.877(CFS)
Total initial stream area =        0.400(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.265(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station      13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.314(Ft.), Average velocity =   3.012(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              5.00              0.00
      3             10.00              0.00
      4             15.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      6.220(CFS)
  '     '    flow top width =      8.143(Ft.)
  '     '     velocity=    3.012(Ft/s)
  '     '    area =      2.065(Sq.Ft)
  '     '    Froude number =     1.054

Upstream point elevation =  2958.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1350.000(Ft.)
Travel time  =    7.47 min.
Time of concentration =   23.66 min.
Depth of flow =   0.314(Ft.)
Average velocity =   3.012(Ft/s)
Total irregular channel flow =     6.220(CFS)
Irregular channel normal depth above invert elev. =   0.314(Ft.)
Average velocity of channel(s) =   3.012(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.940
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.060
SCS curve number for soil(AMC 2)  = 68.32
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.558(In/Hr)
Rainfall intensity =      2.072(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.664
Subarea runoff =     10.601(CFS) for    7.950(Ac.)
Total runoff =     11.479(CFS)
Effective area this stream =        8.35(Ac.)
Total Study Area (Main Stream No. 1) =        8.35(Ac.)
Area averaged Fm value =    0.544(In/Hr)
Depth of flow =   0.439(Ft.), Average velocity =   3.632(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station      13.000
**** CONFLUENCE OF MINOR STREAMS ****
```

```
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      8.350(Ac.)
Runoff from this stream =     11.479(CFS)
Time of concentration =   23.66 min.
Rainfall intensity =     2.072(In/Hr)
Area averaged loss rate (Fm) =    0.5443(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       6.000 to Point/Station      14.000
**** INITIAL AREA EVALUATION ****
```

```
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.380
Decimal fraction soil group B = 0.620
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 73.82
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.472(In/Hr)
Initial subarea data:
Initial area flow distance =   723.000(Ft.)
Top (of initial area) elevation =  2950.000(Ft.)
Bottom (of initial area) elevation =  2926.000(Ft.)
Difference in elevation =    24.000(Ft.)
Slope =    0.03320  s(%)=       3.32
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.441 min.
Rainfall intensity =      2.927(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.755
Subarea runoff =     14.935(CFS)
Total initial stream area =        6.760(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.472(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station       14.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      6.760(Ac.)
Runoff from this stream =     14.935(CFS)
Time of concentration =   14.44 min.
Rainfall intensity =     2.927(In/Hr)
Area averaged loss rate (Fm) =    0.4721(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

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


1     11.48     8.350     23.66    0.544      2.072
2     14.94     6.760     14.44    0.472      2.927
Qmax(1) =
         1.000 *    1.000 *    11.479) +
         0.652 *    1.000 *    14.935) + =      21.211
Qmax(2) =
         1.560 *    0.610 *    11.479) +
         1.000 *    1.000 *    14.935) + =      25.864

Total of 2 streams to confluence:
Flow rates before confluence point:
      11.479      14.935
Maximum flow rates at confluence using above data:
       21.211       25.864
Area of streams before confluence:
        8.350        6.760
Effective area values after confluence:
       15.110       11.857
Results of confluence:
Total flow rate =     25.864(CFS)
Time of concentration =    14.441 min.
Effective stream area after confluence =     11.857(Ac.)
Study area average Pervious fraction(Ap) =  1.000
Study area average soil loss rate(Fm) =    0.512(In/Hr)
Study area total (this main stream) =      15.11(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
```

```
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     11.857(Ac.)
Runoff from this stream =     25.864(CFS)
Time of concentration =   14.44 min.
Rainfall intensity =     2.927(In/Hr)
Area averaged loss rate (Fm) =    0.5120(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      15.000 to Point/Station      12.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Initial subarea data:
Initial area flow distance =   800.000(Ft.)
Top (of initial area) elevation =  2967.700(Ft.)
Bottom (of initial area) elevation =  2958.000(Ft.)
Difference in elevation =     9.700(Ft.)
Slope =    0.01212  s(%)=       1.21
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.393 min.
Rainfall intensity =      2.471(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.689
Subarea runoff =     11.242(CFS)
Total initial stream area =        6.600(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.578(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.826(Ft.), Average velocity =   5.514(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00               1.00
      2              3.00               0.00
      3              6.00               1.00
Manning's 'N' friction factor =   0.022
-----------------------------------------------------------------
Sub-Channel flow  =     11.274(CFS)
  '     '    flow top width =      4.953(Ft.)
  '     '     velocity=    5.514(Ft/s)
  '     '    area =      2.045(Sq.Ft)
  '     '    Froude number =     1.512

Upstream point elevation =  2958.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1350.000(Ft.)
Travel time  =    4.08 min.
Time of concentration =   22.47 min.
Depth of flow =   0.826(Ft.)
Average velocity =   5.514(Ft/s)
Total irregular channel flow =    11.274(CFS)
Irregular channel normal depth above invert elev. =   0.826(Ft.)
Average velocity of channel(s) =   5.514(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     11.016(CFS)
therefore the upstream flow rate of Q =     11.242(CFS) is being used
Rainfall intensity =      2.148(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.658
Subarea runoff =      0.000(CFS) for    1.200(Ac.)
Total runoff =     11.242(CFS)
Effective area this stream =        7.80(Ac.)
Total Study Area (Main Stream No. 2) =       22.91(Ac.)
Area averaged Fm value =    0.578(In/Hr)
Depth of flow =   0.825(Ft.), Average velocity =   5.510(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station      13.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      7.800(Ac.)
Runoff from this stream =     11.242(CFS)
Time of concentration =   22.47 min.
Rainfall intensity =     2.148(In/Hr)
Area averaged loss rate (Fm) =    0.5783(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Program is now starting with Main Stream No. 3
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station      17.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Initial subarea data:
Initial area flow distance =   964.000(Ft.)
Top (of initial area) elevation =  2972.000(Ft.)
Bottom (of initial area) elevation =  2950.000(Ft.)
Difference in elevation =    22.000(Ft.)
Slope =    0.02282  s(%)=       2.28
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.463 min.
Rainfall intensity =      2.562(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.697
Subarea runoff =     11.250(CFS)
Total initial stream area =        6.300(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.578(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station      13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.548(Ft.), Average velocity =   3.717(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              5.00              0.00
      3             10.00              0.00
      4             15.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =     15.755(CFS)
  '     '    flow top width =     10.477(Ft.)
  '     '     velocity=    3.717(Ft/s)
  '     '    area =      4.238(Sq.Ft)
  '     '    Froude number =     1.030

Upstream point elevation =  2950.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1226.000(Ft.)
Travel time  =    5.50 min.
Time of concentration =   22.96 min.
Depth of flow =   0.548(Ft.)
Average velocity =   3.717(Ft/s)
Total irregular channel flow =    15.755(CFS)
Irregular channel normal depth above invert elev. =   0.548(Ft.)
Average velocity of channel(s) =   3.717(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Rainfall intensity =      2.116(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.654
Subarea runoff =      8.951(CFS) for    8.300(Ac.)
Total runoff =     20.201(CFS)
Effective area this stream =       14.60(Ac.)
Total Study Area (Main Stream No. 3) =       37.51(Ac.)
Area averaged Fm value =    0.578(In/Hr)
Depth of flow =   0.623(Ft.), Average velocity =   3.992(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =     14.600(Ac.)
Runoff from this stream =     20.201(CFS)
Time of concentration =   22.96 min.
Rainfall intensity =     2.116(In/Hr)
Area averaged loss rate (Fm) =    0.5783(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

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


1     25.86    11.857     14.44    0.512      2.927
2     11.24     7.800     22.47    0.578      2.148
3     20.20    14.600     22.96    0.578      2.116
Qmax(1) =
         1.000 *    1.000 *    25.864) +
         1.497 *    0.643 *    11.242) +
         1.528 *    0.629 *    20.201) + =      56.086
Qmax(2) =
         0.677 *    1.000 *    25.864) +
         1.000 *    1.000 *    11.242) +
         1.021 *    0.979 *    20.201) + =      48.944
Qmax(3) =
         0.664 *    1.000 *    25.864) +
         0.980 *    1.000 *    11.242) +
         1.000 *    1.000 *    20.201) + =      48.391

Total of 3 main streams to confluence:
Flow rates before confluence point:
      26.864      12.242      21.201
Maximum flow rates at confluence using above data:
       56.086       48.944       48.391
Area of streams before confluence:
       11.857        7.800       14.600
Effective area values after confluence:
       26.052       33.948       34.257
```

Results of confluence:
Total flow rate =   56.086(CFS)
Time of concentration =   14.441 min.
Effective stream area after confluence =   26.052(Ac.)
Study area average Pervious fraction(Ap) = 1.000
Study area average soil loss rate(Fm) =   0.555(In/Hr)
Study area total =   34.26(Ac.)

```
End of computations, Total Study Area =          37.51 (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) = 1.000
Area averaged SCS curve number =  68.7
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 10/31/22

10-YEAR, 1-HOUR RATIONAL STUDY PRE-DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA B1, B2 & B3 (WESTERLY AREA), C1-C4(OFFSITE)
FILE: 20525RATIONALPRE100REV1.OUT

Program License Serial Number 4070

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.626 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
```

```
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 86.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.265(In/Hr)
Initial subarea data:
Initial area flow distance =   580.000(Ft.)
Top (of initial area) elevation =  2965.000(Ft.)
Bottom (of initial area) elevation =  2958.000(Ft.)
Difference in elevation =     7.000(Ft.)
Slope =    0.01207  s(%)=       1.21
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.188 min.
Rainfall intensity =      1.566(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.748
Subarea runoff =      0.468(CFS)
Total initial stream area =        0.400(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.265(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station      13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.184(Ft.), Average velocity =   2.214(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              5.00              0.00
      3             10.00              0.00
      4             15.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      2.418(CFS)
  '     '    flow top width =      6.844(Ft.)
  '     '     velocity=    2.214(Ft/s)
  '     '    area =      1.092(Sq.Ft)
  '     '    Froude number =     0.977

Upstream point elevation =  2958.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1350.000(Ft.)
Travel time  =   10.16 min.
Time of concentration =   26.35 min.
Depth of flow =   0.184(Ft.)
Average velocity =   2.214(Ft/s)
Total irregular channel flow =     2.418(CFS)
Irregular channel normal depth above invert elev. =   0.184(Ft.)
Average velocity of channel(s) =   2.214(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.940
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.060
SCS curve number for soil(AMC 2)  = 68.32
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.558(In/Hr)
Rainfall intensity =      1.114(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.460
Subarea runoff =      3.810(CFS) for    7.950(Ac.)
Total runoff =      4.279(CFS)
Effective area this stream =        8.35(Ac.)
Total Study Area (Main Stream No. 1) =        8.35(Ac.)
Area averaged Fm value =    0.544(In/Hr)
Depth of flow =   0.255(Ft.), Average velocity =   2.674(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      8.350(Ac.)
Runoff from this stream =      4.279(CFS)
Time of concentration =   26.35 min.
Rainfall intensity =     1.114(In/Hr)
Area averaged loss rate (Fm) =    0.5443(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.380
Decimal fraction soil group B = 0.620
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 73.82
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.472(In/Hr)
Initial subarea data:
Initial area flow distance =   723.000(Ft.)
Top (of initial area) elevation =  2950.000(Ft.)
Bottom (of initial area) elevation =  2926.000(Ft.)
Difference in elevation =    24.000(Ft.)
Slope =    0.03320  s(%)=       3.32
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.441 min.
Rainfall intensity =      1.697(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.650
Subarea runoff =      7.449(CFS)
Total initial stream area =        6.760(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.472(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station       14.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      6.760(Ac.)
Runoff from this stream =      7.449(CFS)
Time of concentration =   14.44 min.
Rainfall intensity =     1.697(In/Hr)
Area averaged loss rate (Fm) =    0.4721(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

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


1      4.28     8.350     26.35    0.544      1.114
2      7.45     6.760     14.44    0.472      1.697
Qmax(1) =
         1.000 *    1.000 *     4.279) +
         0.524 *    1.000 *     7.449) + =       8.182
Qmax(2) =
         2.024 *    0.548 *     4.279) +
         1.000 *    1.000 *     7.449) + =      12.195

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.279       7.449
Maximum flow rates at confluence using above data:
        8.182       12.195
Area of streams before confluence:
        8.350        6.760
Effective area values after confluence:
       15.110       11.336
Results of confluence:
Total flow rate =     12.195(CFS)
Time of concentration =    14.441 min.
Effective stream area after confluence =     11.336(Ac.)
Study area average Pervious fraction(Ap) =  1.000
Study area average soil loss rate(Fm) =    0.512(In/Hr)
Study area total (this main stream) =      15.11(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     11.336(Ac.)
Runoff from this stream =     12.195(CFS)
Time of concentration =   14.44 min.
Rainfall intensity =     1.697(In/Hr)
Area averaged loss rate (Fm) =    0.5120(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      15.000 to Point/Station      12.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Initial subarea data:
Initial area flow distance =   800.000(Ft.)
Top (of initial area) elevation =  2967.700(Ft.)
Bottom (of initial area) elevation =  2958.000(Ft.)
Difference in elevation =     9.700(Ft.)
Slope =    0.01212  s(%)=       1.21
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.393 min.
Rainfall intensity =      1.432(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.537
Subarea runoff =      5.072(CFS)
Total initial stream area =        6.600(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.578(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.613(Ft.), Average velocity =   4.522(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              3.00              0.00
      3              6.00              1.00
Manning's 'N' friction factor =   0.022
-----------------------------------------------------------------
Sub-Channel flow  =      5.101(CFS)
  '     '    flow top width =      3.679(Ft.)
  '     '     velocity=    4.522(Ft/s)
  '     '    area =      1.128(Sq.Ft)
  '     '    Froude number =     1.439

Upstream point elevation =  2958.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1350.000(Ft.)
Travel time  =    4.98 min.
Time of concentration =   23.37 min.
Depth of flow =   0.613(Ft.)
Average velocity =   4.522(Ft/s)
Total irregular channel flow =     5.101(CFS)
Irregular channel normal depth above invert elev. =   0.613(Ft.)
Average velocity of channel(s) =   4.522(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      4.443(CFS)
therefore the upstream flow rate of Q =      5.072(CFS) is being used
Rainfall intensity =      1.211(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.470
Subarea runoff =      0.000(CFS) for    1.200(Ac.)
Total runoff =      5.072(CFS)
Effective area this stream =        7.80(Ac.)
Total Study Area (Main Stream No. 2) =       22.91(Ac.)
Area averaged Fm value =    0.578(In/Hr)
Depth of flow =   0.612(Ft.), Average velocity =   4.516(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station      13.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      7.800(Ac.)
Runoff from this stream =      5.072(CFS)
Time of concentration =   23.37 min.
Rainfall intensity =     1.211(In/Hr)
Area averaged loss rate (Fm) =    0.5783(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Program is now starting with Main Stream No. 3
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      16.000 to Point/Station      17.000
**** INITIAL AREA EVALUATION ****
```

```
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Initial subarea data:
Initial area flow distance =   964.000(Ft.)
Top (of initial area) elevation =  2972.000(Ft.)
Bottom (of initial area) elevation =  2950.000(Ft.)
Difference in elevation =    22.000(Ft.)
Slope =    0.02282  s(%)=       2.28
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.463 min.
Rainfall intensity =      1.485(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.550
Subarea runoff =      5.142(CFS)
Total initial stream area =        6.300(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.578(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station      13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.340(Ft.), Average velocity =   2.851(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              5.00              0.00
      3             10.00              0.00
      4             15.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      6.487(CFS)
  '     '    flow top width =      8.397(Ft.)
  '     '     velocity=    2.851(Ft/s)
  '     '    area =      2.276(Sq.Ft)
  '     '    Froude number =     0.965

Upstream point elevation =  2950.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1226.000(Ft.)
Travel time  =    7.17 min.
Time of concentration =   24.63 min.
Depth of flow =   0.340(Ft.)
Average velocity =   2.851(Ft/s)
Total irregular channel flow =     6.487(CFS)
Irregular channel normal depth above invert elev. =   0.340(Ft.)
Average velocity of channel(s) =   2.851(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Rainfall intensity =      1.167(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.454
Subarea runoff =      2.599(CFS) for    8.300(Ac.)
Total runoff =      7.741(CFS)
Effective area this stream =       14.60(Ac.)
Total Study Area (Main Stream No. 3) =       37.51(Ac.)
Area averaged Fm value =    0.578(In/Hr)
Depth of flow =   0.374(Ft.), Average velocity =   3.010(Ft/s)
```

++
Process from Point/Station 17.000 to Point/Station 13.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area = 14.600(Ac.)
Runoff from this stream = 7.741(CFS)
Time of concentration = 24.63 min.
Rainfall intensity = 1.167(In/Hr)
Area averaged loss rate (Fm) = 0.5783(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	12.20	11.336	14.44	0.512	1.697
2	5.07	7.800	23.37	0.578	1.211
3	7.74	14.600	24.63	0.578	1.167

```
Qmax(1) =
         1.000 *    1.000 *    12.195) +
         1.767 *    0.618 *     5.072) +
         1.898 *    0.586 *     7.741) + =      26.348
Qmax(2) =
         0.590 *    1.000 *    12.195) +
         1.000 *    1.000 *     5.072) +
         1.074 *    0.949 *     7.741) + =      20.162
Qmax(3) =
         0.553 *    1.000 *    12.195) +
         0.931 *    1.000 *     5.072) +
         1.000 *    1.000 *     7.741) + =      19.211
```

Total of 3 main streams to confluence:
Flow rates before confluence point:
13.195 6.072 8.741
Maximum flow rates at confluence using above data:
26.348 20.162 19.211
Area of streams before confluence:
11.336 7.800 14.600
Effective area values after confluence:
24.716 32.988 33.736

Results of confluence:
Total flow rate = 26.348(CFS)
Time of concentration = 14.441 min.
Effective stream area after confluence = 24.716(Ac.)
Study area average Pervious fraction(Ap) = 1.000
Study area average soil loss rate(Fm) = 0.556(In/Hr)
Study area total = 33.74(Ac.)

End of computations, Total Study Area = 37.51 (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) = 1.000
Area averaged SCS curve number = 68.7

```
              San Bernardino County Rational Hydrology Program

                 (Hydrology Manual Date - August 1986)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version 7.1
      Rational Hydrology Study        Date: 10/31/22
------------------------------------------------------------------------
```
100-YEAR, 1-HOUR RATIONAL STUDY PRE-DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA B1, B2 & B3 (WESTERLY AREA), C1-C4(OFFSITE)
FILE: 20525RATIONALPRE100.OUT

```
Program License Serial Number 4070

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

------------------------------------------------------------------------
```
Rational hydrology study storm event year is   2.0
```
Computed rainfall intensity:
Storm year =     2.00   1 hour rainfall =     0.365 (In.)
Slope used for rainfall intensity curve b =  0.7000
Soil antecedent moisture condition (AMC) = 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 86.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.265(In/Hr)
Initial subarea data:
Initial area flow distance =   580.000(Ft.)
Top (of initial area) elevation =  2965.000(Ft.)
Bottom (of initial area) elevation =  2958.000(Ft.)
Difference in elevation =     7.000(Ft.)
Slope =    0.01207  s(%)=       1.21
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.188 min.
Rainfall intensity =      0.913(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.639
Subarea runoff =      0.233(CFS)
Total initial stream area =        0.400(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.265(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.053(Ft.), Average velocity =   1.024(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              5.00              0.00
      3             10.00              0.00
      4             15.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      0.283(CFS)
  '     '   flow top width =      5.525(Ft.)
  '     '    velocity=    1.024(Ft/s)
  '     '   area =      0.276(Sq.Ft)
  '     '   Froude number =     0.807

Upstream point elevation =  2958.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1350.000(Ft.)
Travel time  =   21.96 min.
Time of concentration =   38.15 min.
Depth of flow =   0.053(Ft.)
Average velocity =   1.024(Ft/s)
Total irregular channel flow =     0.283(CFS)
Irregular channel normal depth above invert elev. =   0.053(Ft.)
Average velocity of channel(s) =   1.024(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.940
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.060
SCS curve number for soil(AMC 2)  = 68.32
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.558(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      0.000(CFS)
therefore the upstream flow rate of Q =      0.233(CFS) is being used
Rainfall intensity =      0.501(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.000
Subarea runoff =      0.000(CFS) for    7.950(Ac.)
Total runoff =      0.233(CFS)
Effective area this stream =        8.35(Ac.)
Total Study Area (Main Stream No. 1) =        8.35(Ac.)
Area averaged Fm value =    0.544(In/Hr)
Depth of flow =   0.047(Ft.), Average velocity =   0.952(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      8.350(Ac.)
Runoff from this stream =      0.233(CFS)
Time of concentration =   38.15 min.
Rainfall intensity =     0.501(In/Hr)
Area averaged loss rate (Fm) =    0.5443(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       6.000 to Point/Station      14.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.380
Decimal fraction soil group B = 0.620
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 73.82
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.472(In/Hr)
Initial subarea data:
Initial area flow distance =   723.000(Ft.)
Top (of initial area) elevation =  2950.000(Ft.)
Bottom (of initial area) elevation =  2926.000(Ft.)
Difference in elevation =    24.000(Ft.)
Slope =    0.03320  s(%)=       3.32
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.441 min.
Rainfall intensity =      0.989(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.470
Subarea runoff =      3.146(CFS)
Total initial stream area =        6.760(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.472(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station       14.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      6.760(Ac.)
Runoff from this stream =      3.146(CFS)
Time of concentration =   14.44 min.
Rainfall intensity =     0.989(In/Hr)
Area averaged loss rate (Fm) =    0.4721(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

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


1      0.23     8.350     38.15    0.544      0.501
2      3.15     6.760     14.44    0.472      0.989
Qmax(1) =
         1.000 *    1.000 *     0.233) +
         0.056 *    1.000 *     3.146) + =       0.410
Qmax(2) =
Fm Value exceeds Rainfall Intensity in one of the streams
Summing flow rates for conflunce solution
         1.000 *    0.379 *     0.233) +
         1.000 *    1.000 *     3.146) + =       3.234

Total of 2 streams to confluence:
Flow rates before confluence point:
       0.233       3.146
Maximum flow rates at confluence using above data:
        0.410        3.234
Area of streams before confluence:
        8.350        6.760
Effective area values after confluence:
       15.110        9.921
Results of confluence:
Total flow rate =      3.234(CFS)
Time of concentration =    14.441 min.
Effective stream area after confluence =      9.921(Ac.)
Study area average Pervious fraction(Ap) =  1.000
Study area average soil loss rate(Fm) =    0.512(In/Hr)
Study area total (this main stream) =      15.11(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
```

```
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.921(Ac.)
Runoff from this stream =      3.234(CFS)
Time of concentration =   14.44 min.
Rainfall intensity =     0.989(In/Hr)
Area averaged loss rate (Fm) =    0.5120(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      15.000 to Point/Station      12.000
**** INITIAL AREA EVALUATION ****
```

```
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Initial subarea data:
Initial area flow distance =   800.000(Ft.)
Top (of initial area) elevation =  2967.700(Ft.)
Bottom (of initial area) elevation =  2958.000(Ft.)
Difference in elevation =     9.700(Ft.)
Slope =    0.01212  s(%)=       1.21
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.393 min.
Rainfall intensity =      0.835(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.277
Subarea runoff =      1.525(CFS)
Total initial stream area =        6.600(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.578(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station      13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.393(Ft.), Average velocity =   3.363(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              3.00              0.00
      3              6.00              1.00
Manning's 'N' friction factor =   0.022
-----------------------------------------------------------------
Sub-Channel flow  =      1.560(CFS)
  '     '    flow top width =      2.359(Ft.)
  '     '     velocity=    3.363(Ft/s)
  '     '    area =      0.464(Sq.Ft)
  '     '    Froude number =     1.337

Upstream point elevation =  2958.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1350.000(Ft.)
Travel time  =    6.69 min.
Time of concentration =   25.08 min.
Depth of flow =   0.393(Ft.)
Average velocity =   3.363(Ft/s)
Total irregular channel flow =     1.560(CFS)
Irregular channel normal depth above invert elev. =   0.393(Ft.)
Average velocity of channel(s) =   3.363(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      0.658(CFS)
therefore the upstream flow rate of Q =      1.525(CFS) is being used
Rainfall intensity =      0.672(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.126
Subarea runoff =      0.000(CFS) for    1.200(Ac.)
Total runoff =      1.525(CFS)
Effective area this stream =        7.80(Ac.)
Total Study Area (Main Stream No. 2) =       22.91(Ac.)
Area averaged Fm value =    0.578(In/Hr)
Depth of flow =   0.390(Ft.), Average velocity =   3.344(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      7.800(Ac.)
Runoff from this stream =      1.525(CFS)
Time of concentration =   25.08 min.
Rainfall intensity =     0.672(In/Hr)
Area averaged loss rate (Fm) =    0.5783(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Program is now starting with Main Stream No. 3
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
```

```
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Initial subarea data:
Initial area flow distance =   964.000(Ft.)
Top (of initial area) elevation =  2972.000(Ft.)
Bottom (of initial area) elevation =  2950.000(Ft.)
Difference in elevation =    22.000(Ft.)
Slope =    0.02282  s(%)=       2.28
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.463 min.
Rainfall intensity =      0.866(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.299
Subarea runoff =      1.631(CFS)
Total initial stream area =        6.300(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.578(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station      13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.157(Ft.), Average velocity =   1.827(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              5.00              0.00
      3             10.00              0.00
      4             15.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      1.665(CFS)
  '     '   flow top width =      6.574(Ft.)
  '     '    velocity=    1.827(Ft/s)
  '     '   area =      0.911(Sq.Ft)
  '     '   Froude number =     0.865

Upstream point elevation =  2950.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1226.000(Ft.)
Travel time  =   11.18 min.
Time of concentration =   28.65 min.
Depth of flow =   0.157(Ft.)
Average velocity =   1.827(Ft/s)
Total irregular channel flow =     1.665(CFS)
Irregular channel normal depth above invert elev. =   0.157(Ft.)
Average velocity of channel(s) =   1.827(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      0.448(CFS)
therefore the upstream flow rate of Q =      1.631(CFS) is being used
Rainfall intensity =      0.612(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.050
Subarea runoff =      0.000(CFS) for    8.300(Ac.)
Total runoff =      1.631(CFS)
Effective area this stream =       14.60(Ac.)
Total Study Area (Main Stream No. 3) =       37.51(Ac.)
Area averaged Fm value =    0.578(In/Hr)
Depth of flow =   0.156(Ft.), Average velocity =   1.814(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =     14.600(Ac.)
Runoff from this stream =      1.631(CFS)
Time of concentration =   28.65 min.
Rainfall intensity =     0.612(In/Hr)
Area averaged loss rate (Fm) =    0.5783(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

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


1      3.23     9.921     14.44    0.512      0.989
2      1.53     7.800     25.08    0.578      0.672
3      1.63    14.600     28.65    0.578      0.612
Qmax(1) =
         1.000 *    1.000 *     3.234) +
         4.382 *    0.576 *     1.525) +
        12.057 *    0.504 *     1.631) + =      16.996
Qmax(2) =
         0.335 *    1.000 *     3.234) +
         1.000 *    1.000 *     1.525) +
         2.751 *    0.876 *     1.631) + =       6.540
Qmax(3) =
         0.210 *    1.000 *     3.234) +
         0.363 *    1.000 *     1.525) +
         1.000 *    1.000 *     1.631) + =       2.866

Total of 3 main streams to confluence:
Flow rates before confluence point:
       4.234       2.525       2.631
Maximum flow rates at confluence using above data:
       16.996        6.540        2.866
Area of streams before confluence:
        9.921        7.800       14.600
Effective area values after confluence:
       21.771       30.504       32.321
```

Results of confluence:
Total flow rate =   16.996(CFS)
Time of concentration =   14.441 min.
Effective stream area after confluence =   21.771(Ac.)
Study area average Pervious fraction(Ap) = 1.000
Study area average soil loss rate(Fm) =   0.558(In/Hr)
Study area total =   32.32(Ac.)

```
End of computations, Total Study Area =           37.51 (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) = 1.000
Area averaged SCS curve number =  68.7
```

```
          San Bernardino County Rational Hydrology Program

               (Hydrology Manual Date - August 1986)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version 7.1
      Rational Hydrology Study        Date: 11/01/22
------------------------------------------------------------------------
```
100-YEAR, 1-HOUR RATIONAL STUDY PRE-DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA D1 MOJAVE DRIVE
FILE: 20525MOJAVEPRE100.OUT
--

```
Program License Serial Number 4070

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

------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
Computed rainfall intensity:
Storm year =   100.00   1 hour rainfall =     1.080 (In.)
Slope used for rainfall intensity curve b =  0.7000
Soil antecedent moisture condition (AMC) = 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       18.000
**** INITIAL AREA EVALUATION ****
```

```
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.329(In/Hr)
Initial subarea data:
Initial area flow distance =   625.000(Ft.)
Top (of initial area) elevation =  2965.000(Ft.)
Bottom (of initial area) elevation =  2960.500(Ft.)
Difference in elevation =     4.500(Ft.)
Slope =    0.00720  s(%)=       0.72
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.514 min.
Rainfall intensity =      2.917(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.799
```

Subarea runoff =   2.259(CFS)
Total initial stream area =   0.970(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =   0.329(In/Hr)
End of computations, Total Study Area =   0.97 (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 = 69.0

```
            San Bernardino County Rational Hydrology Program

                  (Hydrology Manual Date - August 1986)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version 7.1
      Rational Hydrology Study        Date: 11/01/22
------------------------------------------------------------------------
10-YEAR, 1-HOUR RATIONAL STUDY PRE-DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA D1 MOJAVE DRIVE
FILE: 20525MOJAVEPRE10.OUT
------------------------------------------------------------------------


Program License Serial Number 4070

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

------------------------------------------------------------------------
Rational hydrology study storm event year is    10.0
Computed rainfall intensity:
Storm year =    10.00   1 hour rainfall =     0.626 (In.)
Slope used for rainfall intensity curve b =  0.7000
Soil antecedent moisture condition (AMC) = 2
```

++
Process from Point/Station   11.000 to Point/Station   18.000
**** INITIAL AREA EVALUATION ****

RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(Ap) = 0.6000   Max loss rate(Fm)=   0.329(In/Hr)
Initial subarea data:
Initial area flow distance =   625.000(Ft.)
Top (of initial area) elevation = 2965.000(Ft.)
Bottom (of initial area) elevation = 2960.500(Ft.)
Difference in elevation =   4.500(Ft.)
Slope =   0.00720 s(%)=   0.72
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.514 min.
Rainfall intensity =   1.691(In/Hr) for a   10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.725
Subarea runoff =   1.189(CFS)
Total initial stream area =   0.970(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =   0.329(In/Hr)
End of computations, Total Study Area =   0.97 (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 = 69.0

```
                 San Bernardino County Rational Hydrology Program

                     (Hydrology Manual Date - August 1986)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version 7.1
      Rational Hydrology Study        Date: 11/01/22
------------------------------------------------------------------------
```

2-YEAR, 1-HOUR RATIONAL STUDY PRE-DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA D1 MOJAVE DRIVE
FILE: 20525MOJAVEPRE2.OUT

```
------------------------------------------------------------------------


Program License Serial Number 4070

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

------------------------------------------------------------------------
Rational hydrology study storm event year is     2.0
Computed rainfall intensity:
Storm year =     2.00   1 hour rainfall =     0.365 (In.)
Slope used for rainfall intensity curve b =  0.7000
Soil antecedent moisture condition (AMC) = 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      11.000 to Point/Station      18.000
**** INITIAL AREA EVALUATION ****
```

```
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.329(In/Hr)
Initial subarea data:
Initial area flow distance =   625.000(Ft.)
Top (of initial area) elevation =  2965.000(Ft.)
Bottom (of initial area) elevation =  2960.500(Ft.)
Difference in elevation =     4.500(Ft.)
Slope =    0.00720  s(%)=       0.72
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.514 min.
Rainfall intensity =      0.986(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
```

Subarea runoff =   0.574(CFS)
Total initial stream area =   0.970(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =   0.329(In/Hr)
End of computations, Total Study Area =   0.97 (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 = 69.0

TR. 20525

100-year,10-year & 2-year 1-Hours Storm Events

Rational Method Post-Developed

```
             San Bernardino County Rational Hydrology Program

                 (Hydrology Manual Date - August 1986)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version 7.1
      Rational Hydrology Study        Date: 10/31/22
------------------------------------------------------------------------
```
100-YEAR, 1-HOUR RATIONAL STUDY POST DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA BB1, BB2, BB3, BB4 & BB5(ONSITE), C1-C4(OFFSITE)
FILE: 20525RATIONALPOST100REV1.OUT
```
------------------------------------------------------------------------


Program License Serial Number 4070

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

------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
Computed rainfall intensity:
Storm year =   100.00   1 hour rainfall =     1.080 (In.)
Slope used for rainfall intensity curve b =  0.7000
Soil antecedent moisture condition (AMC) = 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.329(In/Hr)
Initial subarea data:
Initial area flow distance =   413.000(Ft.)
Top (of initial area) elevation =  2963.500(Ft.)
Bottom (of initial area) elevation =  2957.500(Ft.)
Difference in elevation =     6.000(Ft.)
Slope =    0.01453  s(%)=       1.45
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.687 min.
Rainfall intensity =      3.614(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.818
Subarea runoff =      5.854(CFS)
Total initial stream area =        1.980(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =    0.329(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  2957.500(Ft.)
End of street segment elevation =  2946.700(Ft.)
Length of street segment  =   803.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.416(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     11.493(CFS)
Depth of flow =   0.358(Ft.), Average velocity =   3.042(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  13.503(Ft.)
Flow velocity =   3.04(Ft/s)
Travel time =    4.40 min.     TC =   15.09  min.
 Adding area flow to street
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.329(In/Hr)
Rainfall intensity =      2.839(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.796
Subarea runoff =     11.089(CFS) for    5.520(Ac.)
Total runoff =     16.942(CFS)
Effective area this stream =        7.50(Ac.)
Total Study Area (Main Stream No. 1) =        7.50(Ac.)
Area averaged Fm value =    0.329(In/Hr)
Street flow at end of street =     16.942(CFS)
Half street flow at end of street =      8.471(CFS)
Depth of flow =   0.402(Ft.), Average velocity =   3.346(Ft/s)
Flow width (from curb towards crown)=  15.704(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      106.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  2946.700(Ft.)
End of street segment elevation =  2929.500(Ft.)
Length of street segment  =  1129.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.416(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     21.606(CFS)
Depth of flow =   0.425(Ft.), Average velocity =   3.723(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.840(Ft.)
Flow velocity =   3.72(Ft/s)
Travel time =    5.05 min.     TC =   20.14  min.
 Adding area flow to street
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.510
Decimal fraction soil group B = 0.360
Decimal fraction soil group C = 0.130
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 45.45
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.517(In/Hr)
Rainfall intensity =      2.319(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.735
Subarea runoff =      9.173(CFS) for    7.820(Ac.)
Total runoff =     26.115(CFS)
Effective area this stream =       15.32(Ac.)
Total Study Area (Main Stream No. 1) =       15.32(Ac.)
Area averaged Fm value =    0.425(In/Hr)
Street flow at end of street =     26.115(CFS)
Half street flow at end of street =     13.058(CFS)
Depth of flow =   0.450(Ft.), Average velocity =   3.901(Ft/s)
Flow width (from curb towards crown)=  18.113(Ft.)
```

++
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 = 15.320(Ac.)
Runoff from this stream = 26.115(CFS)
Time of concentration = 20.14 min.
Rainfall intensity = 2.319(In/Hr)
Area averaged loss rate (Fm) = 0.4248(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6000

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.350
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.650
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.05
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.440(In/Hr)
Initial subarea data:
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  2963.500(Ft.)
Bottom (of initial area) elevation =  2944.400(Ft.)
Difference in elevation =    19.100(Ft.)
Slope =    0.01910  s(%)=       1.91
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.411 min.
Rainfall intensity =      2.931(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.765
Subarea runoff =     14.372(CFS)
Total initial stream area =        6.410(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =    0.440(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  2944.400(Ft.)
End of street segment elevation =  2929.500(Ft.)
Length of street segment  =   769.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.416(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     17.781(CFS)
Depth of flow =   0.386(Ft.), Average velocity =   3.885(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  14.907(Ft.)
Flow velocity =   3.89(Ft/s)
Travel time =    3.30 min.     TC =   17.71  min.
 Adding area flow to street
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.680
Decimal fraction soil group B = 0.320
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 39.68
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.552(In/Hr)
Rainfall intensity =      2.537(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.727
Subarea runoff =      6.663(CFS) for    5.000(Ac.)
Total runoff =     21.035(CFS)
Effective area this stream =       11.41(Ac.)
Total Study Area (Main Stream No. 1) =       26.73(Ac.)
Area averaged Fm value =    0.489(In/Hr)
Street flow at end of street =     21.035(CFS)
Half street flow at end of street =     10.518(CFS)
Depth of flow =   0.406(Ft.), Average velocity =   4.049(Ft/s)
Flow width (from curb towards crown)=  15.911(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     11.410(Ac.)
Runoff from this stream =     21.035(CFS)
Time of concentration =   17.71 min.
Rainfall intensity =     2.537(In/Hr)
Area averaged loss rate (Fm) =    0.4890(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6000
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.400
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 54.20
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.454(In/Hr)
Initial subarea data:
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  2965.500(Ft.)
Bottom (of initial area) elevation =  2941.800(Ft.)
Difference in elevation =    23.700(Ft.)
Slope =    0.02370  s(%)=       2.37
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.802 min.
Rainfall intensity =      3.021(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.765
Subarea runoff =      2.911(CFS)
Total initial stream area =        1.260(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =    0.454(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  2941.800(Ft.)
End of street segment elevation =  2928.500(Ft.)
Length of street segment  =   724.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  40.000(Ft.)
Distance from crown to crossfall grade break  =  38.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.416(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      3.625(CFS)
Depth of flow =   0.247(Ft.), Average velocity =   2.597(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   7.948(Ft.)
Flow velocity =   2.60(Ft/s)
Travel time =    4.65 min.     TC =   18.45  min.
 Adding area flow to street
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.329(In/Hr)
Rainfall intensity =      2.466(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.754
Subarea runoff =      1.294(CFS) for    1.000(Ac.)
Total runoff =      4.204(CFS)
Effective area this stream =        2.26(Ac.)
Total Study Area (Main Stream No. 1) =       28.99(Ac.)
Area averaged Fm value =    0.399(In/Hr)
Street flow at end of street =      4.204(CFS)
Half street flow at end of street =      2.102(CFS)
Depth of flow =   0.257(Ft.), Average velocity =   2.689(Ft/s)
Flow width (from curb towards crown)=   8.460(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      2.260(Ac.)
Runoff from this stream =      4.204(CFS)
Time of concentration =   18.45 min.
Rainfall intensity =     2.466(In/Hr)
Area averaged loss rate (Fm) =    0.3988(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6000
Summary of stream data:

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


1     26.12    15.320     20.14    0.425      2.319
2     21.04    11.410     17.71    0.489      2.537
3      4.20     2.260     18.45    0.399      2.466
Qmax(1) =
         1.000 *    1.000 *    26.115) +
         0.893 *    1.000 *    21.035) +
         0.929 *    1.000 *     4.204) + =      48.812
Qmax(2) =
         1.115 *    0.879 *    26.115) +
         1.000 *    1.000 *    21.035) +
         1.035 *    0.960 *     4.204) + =      50.823
Qmax(3) =
         1.078 *    0.916 *    26.115) +
         0.965 *    1.000 *    21.035) +
         1.000 *    1.000 *     4.204) + =      50.282

Total of 3 streams to confluence:
Flow rates before confluence point:
      26.115      21.035      4.204
Maximum flow rates at confluence using above data:
       48.812       50.823       50.282
Area of streams before confluence:
       15.320       11.410        2.260
Effective area values after confluence:
       28.990       27.050       27.702
Results of confluence:
Total flow rate =     50.823(CFS)
Time of concentration =    17.710 min.
Effective stream area after confluence =     27.050(Ac.)
Study area average Pervious fraction(Ap) =  0.600
Study area average soil loss rate(Fm) =    0.448(In/Hr)
Study area total (this main stream) =      28.99(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
______________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 54.10
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.455(In/Hr)
Rainfall intensity =      2.537(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  17.71 min.  Rain intensity =       2.54(In/Hr)
Total area this stream =       12.20(Ac.)
Total Study Area (Main Stream No. 1) =       41.19(Ac.)
Total runoff =     22.20(CFS)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** CONFLUENCE OF MAIN STREAMS ****
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```
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     12.200(Ac.)
Runoff from this stream =     22.200(CFS)
Time of concentration =   17.71 min.
Rainfall intensity =     2.537(In/Hr)
Area averaged loss rate (Fm) =    0.4552(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6000
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station      17.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Initial subarea data:
Initial area flow distance =   964.000(Ft.)
Top (of initial area) elevation =  2972.000(Ft.)
Bottom (of initial area) elevation =  2950.000(Ft.)
Difference in elevation =    22.000(Ft.)
Slope =    0.02282  s(%)=       2.28
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.463 min.
Rainfall intensity =      2.562(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.697
Subarea runoff =     11.250(CFS)
Total initial stream area =        6.300(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.578(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station      13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     31.509(CFS)
Depth of flow =   0.548(Ft.), Average velocity =   3.717(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              5.00              0.00
      3             10.00              0.00
      4             15.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =     15.755(CFS)
  '     '    flow top width =     10.477(Ft.)
  '     '     velocity=    3.717(Ft/s)
  '     '    area =      4.238(Sq.Ft)
  '     '    Froude number =     1.030

Upstream point elevation =  2950.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1226.000(Ft.)
Travel time  =    5.50 min.
Time of concentration =   22.96 min.
Depth of flow =   0.548(Ft.)
Average velocity =   3.717(Ft/s)
Total irregular channel flow =    15.755(CFS)
Irregular channel normal depth above invert elev. =   0.548(Ft.)
Average velocity of channel(s) =   3.717(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Rainfall intensity =      2.116(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.654
Subarea runoff =      8.951(CFS) for    8.300(Ac.)
Total runoff =     20.201(CFS)
Effective area this stream =       14.60(Ac.)
Total Study Area (Main Stream No. 2) =       55.79(Ac.)
Area averaged Fm value =    0.578(In/Hr)
Depth of flow =   0.623(Ft.), Average velocity =   3.992(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     14.600(Ac.)
Runoff from this stream =     20.201(CFS)
Time of concentration =   22.96 min.
Rainfall intensity =     2.116(In/Hr)
Area averaged loss rate (Fm) =    0.5783(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Program is now starting with Main Stream No. 3
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station      12.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Initial subarea data:
Initial area flow distance =   800.000(Ft.)
Top (of initial area) elevation =  2967.700(Ft.)
Bottom (of initial area) elevation =  2958.000(Ft.)
Difference in elevation =     9.700(Ft.)
Slope =    0.01212  s(%)=       1.21
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.393 min.
Rainfall intensity =      2.471(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.689
Subarea runoff =     11.242(CFS)
Total initial stream area =        6.600(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.578(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      12.000 to Point/Station      13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     22.549(CFS)
Depth of flow =   0.814(Ft.), Average velocity =   5.669(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              3.00              0.00
      3              6.00              1.00
Manning's 'N' friction factor =   0.022
-----------------------------------------------------------------
Sub-Channel flow  =     11.274(CFS)
  '     '    flow top width =      4.885(Ft.)
  '     '     velocity=    5.669(Ft/s)
  '     '    area =      1.989(Sq.Ft)
  '     '    Froude number =     1.566

Upstream point elevation =  2958.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1254.000(Ft.)
Travel time  =    3.69 min.
Time of concentration =   22.08 min.
Depth of flow =   0.814(Ft.)
Average velocity =   5.669(Ft/s)
Total irregular channel flow =    11.274(CFS)
Irregular channel normal depth above invert elev. =   0.814(Ft.)
Average velocity of channel(s) =   5.669(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     11.204(CFS)
therefore the upstream flow rate of Q =     11.242(CFS) is being used
Rainfall intensity =      2.174(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.661
Subarea runoff =      0.000(CFS) for    1.200(Ac.)
Total runoff =     11.242(CFS)
Effective area this stream =        7.80(Ac.)
Total Study Area (Main Stream No. 3) =       63.59(Ac.)
Area averaged Fm value =    0.578(In/Hr)
Depth of flow =   0.813(Ft.), Average velocity =   5.665(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      7.800(Ac.)
Runoff from this stream =     11.242(CFS)
Time of concentration =   22.08 min.
Rainfall intensity =     2.174(In/Hr)
Area averaged loss rate (Fm) =    0.5783(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

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


1     22.20    12.200     17.71    0.455      2.537
2     20.20    14.600     22.96    0.578      2.116
3     11.24     7.800     22.08    0.578      2.174
Qmax(1) =
         1.000 *    1.000 *    22.200) +
         1.274 *    0.771 *    20.201) +
         1.227 *    0.802 *    11.242) + =      53.124
Qmax(2) =
         0.797 *    1.000 *    22.200) +
         1.000 *    1.000 *    20.201) +
         0.963 *    1.000 *    11.242) + =      48.735
Qmax(3) =
         0.826 *    1.000 *    22.200) +
         1.038 *    0.962 *    20.201) +
         1.000 *    1.000 *    11.242) + =      49.740

Total of 3 main streams to confluence:
Flow rates before confluence point:
      23.200      21.201      12.242
Maximum flow rates at confluence using above data:
       53.124       48.735       49.740
Area of streams before confluence:
       12.200       14.600        7.800
Effective area values after confluence:
       29.718       34.600       34.041
```

Results of confluence:
Total flow rate =   53.124(CFS)
Time of concentration =   17.710 min.
Effective stream area after confluence =   29.718(Ac.)
Study area average Pervious fraction(Ap) = 0.859
Study area average soil loss rate(Fm) =   0.535(In/Hr)
Study area total =   34.60(Ac.)

```
End of computations, Total Study Area =          63.59 (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) = 0.741
Area averaged SCS curve number =  58.6
```

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                San Bernardino County Rational Hydrology Program

                    (Hydrology Manual Date - August 1986)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version 7.1
      Rational Hydrology Study        Date: 10/31/22
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10-YEAR, 1-HOUR RATIONAL STUDY POST DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA BB1, BB2, BB3, BB4 & BB5(ONSITE), C1-C4(OFFSITE)
FILE: 20525RATIONALPOST10REV.OUT

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Program License Serial Number 4070

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

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Rational hydrology study storm event year is   10.0

```
Computed rainfall intensity:
Storm year =    10.00   1 hour rainfall =     0.626 (In.)
Slope used for rainfall intensity curve b =  0.7000
Soil antecedent moisture condition (AMC) = 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.329(In/Hr)
Initial subarea data:
Initial area flow distance =   413.000(Ft.)
Top (of initial area) elevation =  2963.500(Ft.)
Bottom (of initial area) elevation =  2957.500(Ft.)
Difference in elevation =     6.000(Ft.)
Slope =    0.01453  s(%)=       1.45
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.687 min.
Rainfall intensity =      2.095(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.759
Subarea runoff =      3.147(CFS)
Total initial stream area =        1.980(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =    0.329(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  2957.500(Ft.)
End of street segment elevation =  2946.700(Ft.)
Length of street segment  =   803.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.416(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      5.890(CFS)
Depth of flow =   0.295(Ft.), Average velocity =   2.587(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.356(Ft.)
Flow velocity =   2.59(Ft/s)
Travel time =    5.17 min.     TC =   15.86  min.
 Adding area flow to street
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.329(In/Hr)
Rainfall intensity =      1.589(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.714
Subarea runoff =      5.358(CFS) for    5.520(Ac.)
Total runoff =      8.505(CFS)
Effective area this stream =        7.50(Ac.)
Total Study Area (Main Stream No. 1) =        7.50(Ac.)
Area averaged Fm value =    0.329(In/Hr)
Street flow at end of street =      8.505(CFS)
Half street flow at end of street =      4.253(CFS)
Depth of flow =   0.328(Ft.), Average velocity =   2.827(Ft/s)
Flow width (from curb towards crown)=  11.994(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      106.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  2946.700(Ft.)
End of street segment elevation =  2929.500(Ft.)
Length of street segment  =  1129.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.416(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     10.103(CFS)
Depth of flow =   0.339(Ft.), Average velocity =   3.090(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  12.525(Ft.)
Flow velocity =   3.09(Ft/s)
Travel time =    6.09 min.     TC =   21.95  min.
 Adding area flow to street
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.510
Decimal fraction soil group B = 0.360
Decimal fraction soil group C = 0.130
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 45.45
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.517(In/Hr)
Rainfall intensity =      1.266(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.598
Subarea runoff =      3.087(CFS) for    7.820(Ac.)
Total runoff =     11.592(CFS)
Effective area this stream =       15.32(Ac.)
Total Study Area (Main Stream No. 1) =       15.32(Ac.)
Area averaged Fm value =    0.425(In/Hr)
Street flow at end of street =     11.592(CFS)
Half street flow at end of street =      5.796(CFS)
Depth of flow =   0.352(Ft.), Average velocity =   3.195(Ft/s)
Flow width (from curb towards crown)=  13.221(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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 =     15.320(Ac.)
Runoff from this stream =     11.592(CFS)
Time of concentration =   21.95 min.
Rainfall intensity =     1.266(In/Hr)
Area averaged loss rate (Fm) =    0.4248(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.350
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.650
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.05
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.440(In/Hr)
Initial subarea data:
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  2963.500(Ft.)
Bottom (of initial area) elevation =  2944.400(Ft.)
Difference in elevation =    19.100(Ft.)
Slope =    0.01910  s(%)=       1.91
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.411 min.
Rainfall intensity =      1.699(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.667
Subarea runoff =      7.263(CFS)
Total initial stream area =        6.410(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =    0.440(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  2944.400(Ft.)
End of street segment elevation =  2929.500(Ft.)
Length of street segment  =   769.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.416(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      8.542(CFS)
Depth of flow =   0.311(Ft.), Average velocity =   3.249(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  11.173(Ft.)
Flow velocity =   3.25(Ft/s)
Travel time =    3.94 min.     TC =   18.36  min.
 Adding area flow to street
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.680
Decimal fraction soil group B = 0.320
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 39.68
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.552(In/Hr)
Rainfall intensity =      1.434(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.593
Subarea runoff =      2.445(CFS) for    5.000(Ac.)
Total runoff =      9.708(CFS)
Effective area this stream =       11.41(Ac.)
Total Study Area (Main Stream No. 1) =       26.73(Ac.)
Area averaged Fm value =    0.489(In/Hr)
Street flow at end of street =      9.708(CFS)
Half street flow at end of street =      4.854(CFS)
Depth of flow =   0.323(Ft.), Average velocity =   3.352(Ft/s)
Flow width (from curb towards crown)=  11.757(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     11.410(Ac.)
Runoff from this stream =      9.708(CFS)
Time of concentration =   18.36 min.
Rainfall intensity =     1.434(In/Hr)
Area averaged loss rate (Fm) =    0.4890(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** INITIAL AREA EVALUATION ****
```

```
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.400
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 54.20
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.454(In/Hr)
Initial subarea data:
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  2965.500(Ft.)
Bottom (of initial area) elevation =  2941.800(Ft.)
Difference in elevation =    23.700(Ft.)
Slope =    0.02370  s(%)=       2.37
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.802 min.
Rainfall intensity =      1.751(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.666
Subarea runoff =      1.470(CFS)
Total initial stream area =        1.260(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =    0.454(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  2941.800(Ft.)
End of street segment elevation =  2928.500(Ft.)
Length of street segment  =   724.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  40.000(Ft.)
Distance from crown to crossfall grade break  =  38.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.416(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      1.823(CFS)
Depth of flow =   0.205(Ft.), Average velocity =   2.225(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   5.862(Ft.)
Flow velocity =   2.22(Ft/s)
Travel time =    5.42 min.     TC =   19.23  min.
 Adding area flow to street
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.329(In/Hr)
Rainfall intensity =      1.389(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.642
Subarea runoff =      0.543(CFS) for    1.000(Ac.)
Total runoff =      2.013(CFS)
Effective area this stream =        2.26(Ac.)
Total Study Area (Main Stream No. 1) =       28.99(Ac.)
Area averaged Fm value =    0.399(In/Hr)
Street flow at end of street =       2.013(CFS)
Half street flow at end of street =      1.007(CFS)
Depth of flow =   0.211(Ft.), Average velocity =   2.274(Ft/s)
Flow width (from curb towards crown)=   6.138(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      2.260(Ac.)
Runoff from this stream =      2.013(CFS)
Time of concentration =   19.23 min.
Rainfall intensity =     1.389(In/Hr)
Area averaged loss rate (Fm) =    0.3988(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6000
Summary of stream data:

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


1     11.59    15.320     21.95    0.425      1.266
2      9.71    11.410     18.36    0.489      1.434
3      2.01     2.260     19.23    0.399      1.389
Qmax(1) =
         1.000 *    1.000 *    11.592) +
         0.821 *    1.000 *     9.708) +
         0.876 *    1.000 *     2.013) + =      21.329
Qmax(2) =
         1.201 *    0.836 *    11.592) +
         1.000 *    1.000 *     9.708) +
         1.046 *    0.955 *     2.013) + =      23.358
Qmax(3) =
         1.146 *    0.876 *    11.592) +
         0.952 *    1.000 *     9.708) +
         1.000 *    1.000 *     2.013) + =      22.890

Total of 3 streams to confluence:
Flow rates before confluence point:
      11.592       9.708       2.013
Maximum flow rates at confluence using above data:
       21.329       23.358       22.890
Area of streams before confluence:
       15.320       11.410        2.260
Effective area values after confluence:
       28.990       26.378       27.088
Results of confluence:
Total flow rate =     23.358(CFS)
Time of concentration =    18.355 min.
Effective stream area after confluence =     26.378(Ac.)
Study area average Pervious fraction(Ap) =  0.600
Study area average soil loss rate(Fm) =    0.448(In/Hr)
Study area total (this main stream) =      28.99(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
______________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 54.10
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.455(In/Hr)
Rainfall intensity =      1.435(In/Hr) for a    10.0 year storm
User specified values are as follows:
TC =  18.35 min.  Rain intensity =       1.43(In/Hr)
Total area this stream =       17.04(Ac.)
Total Study Area (Main Stream No. 1) =       46.03(Ac.)
Total runoff =     14.43(CFS)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     17.040(Ac.)
Runoff from this stream =     14.430(CFS)
Time of concentration =   18.35 min.
Rainfall intensity =     1.435(In/Hr)
Area averaged loss rate (Fm) =    0.4552(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6000
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station      17.000
**** INITIAL AREA EVALUATION ****
```

```
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Initial subarea data:
Initial area flow distance =   964.000(Ft.)
Top (of initial area) elevation =  2972.000(Ft.)
Bottom (of initial area) elevation =  2950.000(Ft.)
Difference in elevation =    22.000(Ft.)
Slope =    0.02282  s(%)=       2.28
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.463 min.
Rainfall intensity =      1.485(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.550
Subarea runoff =      5.142(CFS)
Total initial stream area =        6.300(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.578(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station      13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     12.975(CFS)
Depth of flow =   0.340(Ft.), Average velocity =   2.851(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              5.00              0.00
      3             10.00              0.00
      4             15.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      6.487(CFS)
  '     '    flow top width =      8.397(Ft.)
  '     '     velocity=    2.851(Ft/s)
  '     '    area =      2.276(Sq.Ft)
  '     '    Froude number =     0.965

Upstream point elevation =  2950.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1226.000(Ft.)
Travel time  =    7.17 min.
Time of concentration =   24.63 min.
Depth of flow =   0.340(Ft.)
Average velocity =   2.851(Ft/s)
Total irregular channel flow =     6.487(CFS)
Irregular channel normal depth above invert elev. =   0.340(Ft.)
Average velocity of channel(s) =   2.851(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Rainfall intensity =      1.167(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.454
Subarea runoff =      2.599(CFS) for    8.300(Ac.)
Total runoff =      7.741(CFS)
Effective area this stream =       14.60(Ac.)
Total Study Area (Main Stream No. 2) =       60.63(Ac.)
Area averaged Fm value =    0.578(In/Hr)
Depth of flow =   0.374(Ft.), Average velocity =   3.010(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station      13.000
**** CONFLUENCE OF MAIN STREAMS ****
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     14.600(Ac.)
Runoff from this stream =      7.741(CFS)
Time of concentration =   24.63 min.
Rainfall intensity =     1.167(In/Hr)
Area averaged loss rate (Fm) =    0.5783(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Program is now starting with Main Stream No. 3
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
```

```
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Initial subarea data:
Initial area flow distance =   800.000(Ft.)
Top (of initial area) elevation =  2967.700(Ft.)
Bottom (of initial area) elevation =  2958.000(Ft.)
Difference in elevation =     9.700(Ft.)
Slope =    0.01212  s(%)=       1.21
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.393 min.
Rainfall intensity =      1.432(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.537
Subarea runoff =      5.072(CFS)
Total initial stream area =        6.600(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.578(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      12.000 to Point/Station      13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     10.202(CFS)
Depth of flow =   0.605(Ft.), Average velocity =   4.649(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              3.00              0.00
      3              6.00              1.00
Manning's 'N' friction factor =   0.022
-----------------------------------------------------------------
Sub-Channel flow  =      5.101(CFS)
  '     '    flow top width =      3.629(Ft.)
  '     '     velocity=    4.649(Ft/s)
  '     '    area =      1.097(Sq.Ft)
  '     '    Froude number =     1.490

Upstream point elevation =  2958.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1254.000(Ft.)
Travel time  =    4.50 min.
Time of concentration =   22.89 min.
Depth of flow =   0.605(Ft.)
Average velocity =   4.649(Ft/s)
Total irregular channel flow =     5.101(CFS)
Irregular channel normal depth above invert elev. =   0.605(Ft.)
Average velocity of channel(s) =   4.649(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      4.568(CFS)
therefore the upstream flow rate of Q =      5.072(CFS) is being used
Rainfall intensity =      1.229(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.476
Subarea runoff =      0.000(CFS) for    1.200(Ac.)
Total runoff =      5.072(CFS)
Effective area this stream =        7.80(Ac.)
Total Study Area (Main Stream No. 3) =       68.43(Ac.)
Area averaged Fm value =    0.578(In/Hr)
Depth of flow =   0.603(Ft.), Average velocity =   4.642(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      7.800(Ac.)
Runoff from this stream =      5.072(CFS)
Time of concentration =   22.89 min.
Rainfall intensity =     1.229(In/Hr)
Area averaged loss rate (Fm) =    0.5783(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

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


1     14.43    17.040     18.35    0.455      1.435
2      7.74    14.600     24.63    0.578      1.167
3      5.07     7.800     22.89    0.578      1.229
Qmax(1) =
         1.000 *    1.000 *    14.430) +
         1.453 *    0.745 *     7.741) +
         1.316 *    0.802 *     5.072) + =      28.164
Qmax(2) =
         0.727 *    1.000 *    14.430) +
         1.000 *    1.000 *     7.741) +
         0.905 *    1.000 *     5.072) + =      22.828
Qmax(3) =
         0.790 *    1.000 *    14.430) +
         1.104 *    0.929 *     7.741) +
         1.000 *    1.000 *     5.072) + =      24.417

Total of 3 main streams to confluence:
Flow rates before confluence point:
      15.430       8.741       6.072
Maximum flow rates at confluence using above data:
       28.164       22.828       24.417
Area of streams before confluence:
       17.040       14.600        7.800
Effective area values after confluence:
       34.170       39.440       38.407


Results of confluence:
Total flow rate =     28.164(CFS)
Time of concentration =    18.350 min.
Effective stream area after confluence  =     34.170(Ac.)
Study area average Pervious fraction(Ap) =  0.827
Study area average soil loss rate(Fm) =    0.525(In/Hr)
Study area total =      39.44(Ac.)
```

```
End of computations, Total Study Area =          68.43 (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) = 0.731
Area averaged SCS curve number =  58.3
```

```
            San Bernardino County Rational Hydrology Program

                 (Hydrology Manual Date - August 1986)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version 7.1
      Rational Hydrology Study        Date: 10/31/22
------------------------------------------------------------------------
```
2-YEAR, 1-HOUR RATIONAL STUDY POST DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA BB1, BB2, BB3, BB4 & BB5(ONSITE), C1-C4(OFFSITE)
FILE: 20525RATIONALPOST2REV1.OUT

```
------------------------------------------------------------------------


Program License Serial Number 4070

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

------------------------------------------------------------------------
```
Rational hydrology study storm event year is   2.0

```
Computed rainfall intensity:
Storm year =     2.00   1 hour rainfall =     0.365 (In.)
Slope used for rainfall intensity curve b =  0.7000
Soil antecedent moisture condition (AMC) = 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****
```

```
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.329(In/Hr)
Initial subarea data:
Initial area flow distance =   413.000(Ft.)
Top (of initial area) elevation =  2963.500(Ft.)
Bottom (of initial area) elevation =  2957.500(Ft.)
Difference in elevation =     6.000(Ft.)
Slope =    0.01453  s(%)=       1.45
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.687 min.
Rainfall intensity =      1.221(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.658
Subarea runoff =      1.590(CFS)
Total initial stream area =        1.980(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =    0.329(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  2957.500(Ft.)
End of street segment elevation =  2946.700(Ft.)
Length of street segment  =   803.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.416(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      2.764(CFS)
Depth of flow =   0.239(Ft.), Average velocity =   2.164(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   7.567(Ft.)
Flow velocity =   2.16(Ft/s)
Travel time =    6.18 min.     TC =   16.87  min.
 Adding area flow to street
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.329(In/Hr)
Rainfall intensity =      0.887(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.566
Subarea runoff =      2.179(CFS) for    5.520(Ac.)
Total runoff =      3.769(CFS)
Effective area this stream =        7.50(Ac.)
Total Study Area (Main Stream No. 1) =        7.50(Ac.)
Area averaged Fm value =    0.329(In/Hr)
Street flow at end of street =      3.769(CFS)
Half street flow at end of street =      1.885(CFS)
Depth of flow =   0.261(Ft.), Average velocity =   2.326(Ft/s)
Flow width (from curb towards crown)=   8.627(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      106.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  2946.700(Ft.)
End of street segment elevation =  2929.500(Ft.)
Length of street segment  =  1129.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.416(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      3.831(CFS)
Depth of flow =   0.257(Ft.), Average velocity =   2.449(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   8.462(Ft.)
Flow velocity =   2.45(Ft/s)
Travel time =    7.68 min.     TC =   24.55  min.
 Adding area flow to street
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.510
Decimal fraction soil group B = 0.360
Decimal fraction soil group C = 0.130
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 45.45
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.517(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      3.762(CFS)
therefore the upstream flow rate of Q =      3.769(CFS) is being used
Rainfall intensity =      0.682(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.360
Subarea runoff =      0.000(CFS) for    7.820(Ac.)
Total runoff =      3.769(CFS)
Effective area this stream =       15.32(Ac.)
Total Study Area (Main Stream No. 1) =       15.32(Ac.)
Area averaged Fm value =    0.425(In/Hr)
Street flow at end of street =      3.769(CFS)
Half street flow at end of street =      1.885(CFS)
Depth of flow =   0.256(Ft.), Average velocity =   2.440(Ft/s)
Flow width (from curb towards crown)=   8.405(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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 =     15.320(Ac.)
Runoff from this stream =      3.769(CFS)
Time of concentration =   24.55 min.
Rainfall intensity =     0.682(In/Hr)
Area averaged loss rate (Fm) =    0.4248(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.350
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.650
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.05
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.440(In/Hr)
Initial subarea data:
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  2963.500(Ft.)
Bottom (of initial area) elevation =  2944.400(Ft.)
Difference in elevation =    19.100(Ft.)
Slope =    0.01910  s(%)=       1.91
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.411 min.
Rainfall intensity =      0.991(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.500
Subarea runoff =      3.177(CFS)
Total initial stream area =        6.410(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =    0.440(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  2944.400(Ft.)
End of street segment elevation =  2929.500(Ft.)
Length of street segment  =   769.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.416(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      3.302(CFS)
Depth of flow =   0.239(Ft.), Average velocity =   2.595(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   7.552(Ft.)
Flow velocity =   2.59(Ft/s)
Travel time =    4.94 min.     TC =   19.35  min.
 Adding area flow to street
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.680
Decimal fraction soil group B = 0.320
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 39.68
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.552(In/Hr)
Rainfall intensity =      0.806(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.360
Subarea runoff =      0.134(CFS) for    5.000(Ac.)
Total runoff =      3.311(CFS)
Effective area this stream =       11.41(Ac.)
Total Study Area (Main Stream No. 1) =       26.73(Ac.)
Area averaged Fm value =    0.489(In/Hr)
Street flow at end of street =      3.311(CFS)
Half street flow at end of street =      1.655(CFS)
Depth of flow =   0.239(Ft.), Average velocity =   2.596(Ft/s)
Flow width (from curb towards crown)=   7.560(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     11.410(Ac.)
Runoff from this stream =      3.311(CFS)
Time of concentration =   19.35 min.
Rainfall intensity =     0.806(In/Hr)
Area averaged loss rate (Fm) =    0.4890(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** INITIAL AREA EVALUATION ****
```

```
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.400
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 54.20
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.454(In/Hr)
Initial subarea data:
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  2965.500(Ft.)
Bottom (of initial area) elevation =  2941.800(Ft.)
Difference in elevation =    23.700(Ft.)
Slope =    0.02370  s(%)=       2.37
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.802 min.
Rainfall intensity =      1.021(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.499
Subarea runoff =      0.643(CFS)
Total initial stream area =        1.260(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =    0.454(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  2941.800(Ft.)
End of street segment elevation =  2928.500(Ft.)
Length of street segment  =   724.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  40.000(Ft.)
Distance from crown to crossfall grade break  =  38.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.416(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      0.806(CFS)
Depth of flow =   0.165(Ft.), Average velocity =   1.898(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   3.826(Ft.)
Flow velocity =   1.90(Ft/s)
Travel time =    6.36 min.     TC =   20.16  min.
 Adding area flow to street
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.329(In/Hr)
Rainfall intensity =      0.783(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.442
Subarea runoff =      0.139(CFS) for    1.000(Ac.)
Total runoff =      0.782(CFS)
Effective area this stream =        2.26(Ac.)
Total Study Area (Main Stream No. 1) =       28.99(Ac.)
Area averaged Fm value =    0.399(In/Hr)
Street flow at end of street =      0.782(CFS)
Half street flow at end of street =      0.391(CFS)
Depth of flow =   0.163(Ft.), Average velocity =   1.889(Ft/s)
Flow width (from curb towards crown)=   3.755(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      2.260(Ac.)
Runoff from this stream =      0.782(CFS)
Time of concentration =   20.16 min.
Rainfall intensity =     0.783(In/Hr)
Area averaged loss rate (Fm) =    0.3988(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6000
Summary of stream data:

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


1      3.77    15.320     24.55    0.425      0.682
2      3.31    11.410     19.35    0.489      0.806
3      0.78     2.260     20.16    0.399      0.783
Qmax(1) =
         1.000 *    1.000 *     3.769) +
         0.610 *    1.000 *     3.311) +
         0.737 *    1.000 *     0.782) + =      6.364
Qmax(2) =
         1.481 *    0.788 *     3.769) +
         1.000 *    1.000 *     3.311) +
         1.059 *    0.960 *     0.782) + =      8.504
Qmax(3) =
         1.392 *    0.821 *     3.769) +
         0.928 *    1.000 *     3.311) +
         1.000 *    1.000 *     0.782) + =      8.164

Total of 3 streams to confluence:
Flow rates before confluence point:
       3.769       3.311       0.782
Maximum flow rates at confluence using above data:
        6.364        8.504        8.164
Area of streams before confluence:
       15.320       11.410        2.260
Effective area values after confluence:
       28.990       25.653       26.247
Results of confluence:
Total flow rate =      8.504(CFS)
Time of concentration =    19.351 min.
Effective stream area after confluence =     25.653(Ac.)
Study area average Pervious fraction(Ap) =  0.600
Study area average soil loss rate(Fm) =    0.448(In/Hr)
Study area total (this main stream) =      28.99(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
______________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 54.10
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.455(In/Hr)
Rainfall intensity =      6.412(In/Hr) for a     2.0 year storm
User specified values are as follows:
TC =   1.00 min.  Rain intensity =       6.41(In/Hr)
Total area this stream =         0.00(Ac.)
Total Study Area (Main Stream No. 1) =       28.99(Ac.)
Total runoff =      0.01(CFS)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** CONFLUENCE OF MAIN STREAMS ****
```

```
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      0.000(Ac.)
Runoff from this stream =      0.010(CFS)
Time of concentration =    1.00 min.
Rainfall intensity =     6.412(In/Hr)
Area averaged loss rate (Fm) =   -1.#IND(In/Hr)
Area averaged Pervious ratio (Ap) = -1.#IND
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Initial subarea data:
Initial area flow distance =   964.000(Ft.)
Top (of initial area) elevation =  2972.000(Ft.)
Bottom (of initial area) elevation =  2950.000(Ft.)
Difference in elevation =    22.000(Ft.)
Slope =    0.02282  s(%)=       2.28
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.463 min.
Rainfall intensity =      0.866(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.299
Subarea runoff =      1.631(CFS)
Total initial stream area =        6.300(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.578(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station      13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      3.329(CFS)
Depth of flow =   0.157(Ft.), Average velocity =   1.827(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              5.00              0.00
      3             10.00              0.00
      4             15.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      1.665(CFS)
  '     '   flow top width =      6.574(Ft.)
  '     '    velocity=    1.827(Ft/s)
  '     '   area =      0.911(Sq.Ft)
  '     '   Froude number =     0.865

Upstream point elevation =  2950.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1226.000(Ft.)
Travel time  =   11.18 min.
Time of concentration =   28.65 min.
Depth of flow =   0.157(Ft.)
Average velocity =   1.827(Ft/s)
Total irregular channel flow =     1.665(CFS)
Irregular channel normal depth above invert elev. =   0.157(Ft.)
Average velocity of channel(s) =   1.827(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      0.448(CFS)
therefore the upstream flow rate of Q =      1.631(CFS) is being used
Rainfall intensity =      0.612(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.050
Subarea runoff =      0.000(CFS) for    8.300(Ac.)
Total runoff =      1.631(CFS)
Effective area this stream =       14.60(Ac.)
Total Study Area (Main Stream No. 2) =       43.59(Ac.)
Area averaged Fm value =    0.578(In/Hr)
Depth of flow =   0.156(Ft.), Average velocity =   1.814(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     14.600(Ac.)
Runoff from this stream =      1.631(CFS)
Time of concentration =   28.65 min.
Rainfall intensity =     0.612(In/Hr)
Area averaged loss rate (Fm) =    0.5783(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Program is now starting with Main Stream No. 3
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
```

```
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
Initial subarea data:
Initial area flow distance =   800.000(Ft.)
Top (of initial area) elevation =  2967.700(Ft.)
Bottom (of initial area) elevation =  2958.000(Ft.)
Difference in elevation =     9.700(Ft.)
Slope =    0.01212  s(%)=       1.21
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.393 min.
Rainfall intensity =      0.835(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.277
Subarea runoff =      1.525(CFS)
Total initial stream area =        6.600(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.578(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station      13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      3.120(CFS)
Depth of flow =   0.388(Ft.), Average velocity =   3.457(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              3.00              0.00
      3              6.00              1.00
Manning's 'N' friction factor =   0.022
-----------------------------------------------------------------
Sub-Channel flow  =      1.560(CFS)
  '     '    flow top width =      2.327(Ft.)
  '     '     velocity=    3.457(Ft/s)
  '     '    area =      0.451(Sq.Ft)
  '     '    Froude number =     1.384

Upstream point elevation =  2958.000(Ft.)
Downstream point elevation =  2926.600(Ft.)
Flow length =  1254.000(Ft.)
Travel time  =    6.05 min.
Time of concentration =   24.44 min.
Depth of flow =   0.388(Ft.)
Average velocity =   3.457(Ft/s)
Total irregular channel flow =     1.560(CFS)
Irregular channel normal depth above invert elev. =   0.388(Ft.)
Average velocity of channel(s) =   3.457(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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)  = 67.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.578(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      0.745(CFS)
therefore the upstream flow rate of Q =      1.525(CFS) is being used
Rainfall intensity =      0.684(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.140
Subarea runoff =      0.000(CFS) for    1.200(Ac.)
Total runoff =      1.525(CFS)
Effective area this stream =        7.80(Ac.)
Total Study Area (Main Stream No. 3) =       51.39(Ac.)
Area averaged Fm value =    0.578(In/Hr)
Depth of flow =   0.385(Ft.), Average velocity =   3.438(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      7.800(Ac.)
Runoff from this stream =      1.525(CFS)
Time of concentration =   24.44 min.
Rainfall intensity =     0.684(In/Hr)
Area averaged loss rate (Fm) =    0.5783(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

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



1      0.01     0.000      1.00   -1.#IO      6.412
2      1.63    14.600     28.65    0.578      0.612
3      1.53     7.800     24.44    0.578      0.684
Qmax(1) =
Fm Value exceeds Rainfall Intensity in one of the streams
Summing flow rates for conflunce solution
         1.000 *    1.000 *     0.010) +
       171.201 *    0.035 *     1.631) +
        54.968 *    0.041 *     1.525) + =      13.188
Qmax(2) =
Fm Value exceeds Rainfall Intensity in one of the streams
Summing flow rates for conflunce solution
         1.000 *    1.000 *     0.010) +
         1.000 *    1.000 *     1.631) +
         0.321 *    1.000 *     1.525) + =       2.131
Qmax(3) =
Fm Value exceeds Rainfall Intensity in one of the streams
Summing flow rates for conflunce solution
         1.000 *    1.000 *     0.010) +
         3.115 *    0.853 *     1.631) +
         1.000 *    1.000 *     1.525) + =       5.869

Total of 3 main streams to confluence:
Flow rates before confluence point:
       1.010       2.631       2.525
Maximum flow rates at confluence using above data:
       13.188         2.131        5.869
Area of streams before confluence:
        0.000       14.600        7.800
Effective area values after confluence:
        0.829       22.400       20.255
```

Results of confluence:

```
Total flow rate =     13.188(CFS)
Time of concentration =     1.000 min.
Effective stream area after confluence  =      0.829(Ac.)
Study area average Pervious fraction(Ap) = -1.#IO
Study area average soil loss rate(Fm) =   -1.#IO(In/Hr)
Study area total =      22.40(Ac.)
End of computations, Total Study Area =           51.39 (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) = 0.774
Area averaged SCS curve number =  59.7
```

TR. 20525

100-year, 24-Hours Storm Events

Unit Hydrograph Pre–Developed

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

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

          Study date  12/15/21

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


Program License Serial Number 4070

---------------------------------------------------------------------
100-YR, 24-HOUR UNIT HYDROGRAPH PRE-DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA A1, A2 & A3 ONSITE  (ONSITE EASTERLY AREAS TO APN 0394-031-08)
FILE: 20525HYDROA1A3PRE100YR.OUT
--------------------------------------------------------------------

     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       Duration       Isohyetal
     (Ac.)           (hours)         (In)
Rainfall data for year 100
         14.09           1           1.08
--------------------------------------------------------------------
Rainfall data for year 100
         14.09           6           2.13
--------------------------------------------------------------------
Rainfall data for year 100
         14.09          24           3.82
--------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

******** 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)
74.4	90.5	14.09	1.000	0.183	1.000	0.183

Area-averaged adjusted loss rate Fm (In/Hr) = 0.183

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
14.09	1.000	74.4	90.5	1.05	0.733

Area-averaged catchment yield fraction, Y = 0.733
Area-averaged low loss fraction, Yb = 0.267
User entry of time of concentration = 0.342 (hours)
+++
Watershed area = 14.09(Ac.)
Catchment Lag time = 0.274 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 30.4314
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.183(In/Hr)
Average low loss rate fraction (Yb) = 0.267 (decimal)
DESERT S-Graph Selected
Computed peak 5-minute rainfall = 0.512(In)
Computed peak 30-minute rainfall = 0.877(In)
Specified peak 1-hour rainfall = 1.080(In)
Computed peak 3-hour rainfall = 1.638(In)
Specified peak 6-hour rainfall = 2.130(In)
Specified peak 24-hour rainfall = 3.820(In)

Rainfall depth area reduction factors:
Using a total area of 14.09(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.512(In)
30-minute factor = 0.999 Adjusted rainfall = 0.877(In)
1-hour factor = 0.999 Adjusted rainfall = 1.079(In)
3-hour factor = 1.000 Adjusted rainfall = 1.638(In)
6-hour factor = 1.000 Adjusted rainfall = 2.130(In)
24-hour factor = 1.000 Adjusted rainfall = 3.820(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 = 170.40 (CFS))	
1	1.800	3.068
2	9.699	13.459
3	31.637	37.383
4	53.046	36.480

5	64.842	20.101
6	72.382	12.848
7	77.828	9.280
8	81.893	6.927
9	85.124	5.505
10	87.821	4.597
11	89.866	3.483
12	91.568	2.900
13	93.031	2.494
14	94.265	2.103
15	95.297	1.759
16	96.164	1.477
17	96.916	1.281
18	97.486	0.972
19	97.929	0.755
20	98.237	0.524
21	98.586	0.596
22	98.951	0.622
23	99.316	0.622
24	99.595	0.474
25	99.785	0.324
26	100.000	0.162

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5121	0.5121
2	0.6305	0.1184
3	0.7121	0.0816
4	0.7762	0.0642
5	0.8300	0.0537
6	0.8767	0.0467
7	0.9181	0.0415
8	0.9557	0.0375
9	0.9900	0.0344
10	1.0218	0.0318
11	1.0515	0.0296
12	1.0793	0.0278
13	1.1126	0.0333
14	1.1443	0.0317
15	1.1747	0.0304
16	1.2038	0.0291
17	1.2318	0.0280
18	1.2589	0.0270
19	1.2850	0.0261
20	1.3102	0.0253
21	1.3347	0.0245
22	1.3585	0.0238
23	1.3816	0.0231
24	1.4041	0.0225
25	1.4260	0.0219
26	1.4474	0.0214
27	1.4683	0.0209
28	1.4887	0.0204
29	1.5087	0.0200

30	1.5282	0.0195
31	1.5474	0.0191
32	1.5661	0.0188
33	1.5845	0.0184
34	1.6026	0.0181
35	1.6203	0.0177
36	1.6377	0.0174
37	1.6548	0.0171
38	1.6716	0.0168
39	1.6882	0.0165
40	1.7045	0.0163
41	1.7205	0.0160
42	1.7363	0.0158
43	1.7518	0.0156
44	1.7672	0.0153
45	1.7823	0.0151
46	1.7972	0.0149
47	1.8119	0.0147
48	1.8264	0.0145
49	1.8408	0.0143
50	1.8549	0.0142
51	1.8689	0.0140
52	1.8827	0.0138
53	1.8963	0.0136
54	1.9098	0.0135
55	1.9232	0.0133
56	1.9363	0.0132
57	1.9494	0.0130
58	1.9623	0.0129
59	1.9750	0.0128
60	1.9877	0.0126
61	2.0002	0.0125
62	2.0125	0.0124
63	2.0248	0.0122
64	2.0369	0.0121
65	2.0489	0.0120
66	2.0608	0.0119
67	2.0726	0.0118
68	2.0842	0.0117
69	2.0958	0.0116
70	2.1073	0.0115
71	2.1186	0.0114
72	2.1299	0.0113
73	2.1423	0.0124
74	2.1546	0.0123
75	2.1669	0.0122
76	2.1790	0.0121
77	2.1910	0.0120
78	2.2030	0.0119
79	2.2148	0.0119
80	2.2266	0.0118
81	2.2383	0.0117
82	2.2499	0.0116
83	2.2614	0.0115

84	2.2728	0.0114
85	2.2842	0.0114
86	2.2955	0.0113
87	2.3067	0.0112
88	2.3178	0.0111
89	2.3289	0.0111
90	2.3399	0.0110
91	2.3508	0.0109
92	2.3617	0.0109
93	2.3724	0.0108
94	2.3832	0.0107
95	2.3938	0.0107
96	2.4044	0.0106
97	2.4149	0.0105
98	2.4254	0.0105
99	2.4358	0.0104
100	2.4461	0.0103
101	2.4564	0.0103
102	2.4666	0.0102
103	2.4768	0.0102
104	2.4869	0.0101
105	2.4969	0.0100
106	2.5069	0.0100
107	2.5169	0.0099
108	2.5267	0.0099
109	2.5366	0.0098
110	2.5464	0.0098
111	2.5561	0.0097
112	2.5658	0.0097
113	2.5754	0.0096
114	2.5850	0.0096
115	2.5945	0.0095
116	2.6040	0.0095
117	2.6134	0.0094
118	2.6228	0.0094
119	2.6322	0.0093
120	2.6415	0.0093
121	2.6507	0.0093
122	2.6599	0.0092
123	2.6691	0.0092
124	2.6782	0.0091
125	2.6873	0.0091
126	2.6963	0.0090
127	2.7053	0.0090
128	2.7143	0.0090
129	2.7232	0.0089
130	2.7321	0.0089
131	2.7409	0.0088
132	2.7497	0.0088
133	2.7585	0.0088
134	2.7672	0.0087
135	2.7759	0.0087
136	2.7845	0.0086
137	2.7931	0.0086

138	2.8017	0.0086
139	2.8102	0.0085
140	2.8187	0.0085
141	2.8272	0.0085
142	2.8356	0.0084
143	2.8440	0.0084
144	2.8524	0.0084
145	2.8607	0.0083
146	2.8690	0.0083
147	2.8773	0.0083
148	2.8855	0.0082
149	2.8937	0.0082
150	2.9019	0.0082
151	2.9100	0.0081
152	2.9181	0.0081
153	2.9262	0.0081
154	2.9342	0.0080
155	2.9422	0.0080
156	2.9502	0.0080
157	2.9582	0.0080
158	2.9661	0.0079
159	2.9740	0.0079
160	2.9819	0.0079
161	2.9897	0.0078
162	2.9975	0.0078
163	3.0053	0.0078
164	3.0131	0.0078
165	3.0208	0.0077
166	3.0285	0.0077
167	3.0362	0.0077
168	3.0438	0.0076
169	3.0514	0.0076
170	3.0590	0.0076
171	3.0666	0.0076
172	3.0741	0.0075
173	3.0817	0.0075
174	3.0892	0.0075
175	3.0966	0.0075
176	3.1041	0.0074
177	3.1115	0.0074
178	3.1189	0.0074
179	3.1263	0.0074
180	3.1336	0.0073
181	3.1409	0.0073
182	3.1482	0.0073
183	3.1555	0.0073
184	3.1628	0.0073
185	3.1700	0.0072
186	3.1772	0.0072
187	3.1844	0.0072
188	3.1916	0.0072
189	3.1987	0.0071
190	3.2058	0.0071
191	3.2129	0.0071

192	3.2200	0.0071
193	3.2270	0.0071
194	3.2341	0.0070
195	3.2411	0.0070
196	3.2481	0.0070
197	3.2551	0.0070
198	3.2620	0.0070
199	3.2689	0.0069
200	3.2759	0.0069
201	3.2828	0.0069
202	3.2896	0.0069
203	3.2965	0.0069
204	3.3033	0.0068
205	3.3101	0.0068
206	3.3169	0.0068
207	3.3237	0.0068
208	3.3304	0.0068
209	3.3372	0.0067
210	3.3439	0.0067
211	3.3506	0.0067
212	3.3573	0.0067
213	3.3640	0.0067
214	3.3706	0.0066
215	3.3772	0.0066
216	3.3838	0.0066
217	3.3904	0.0066
218	3.3970	0.0066
219	3.4036	0.0066
220	3.4101	0.0065
221	3.4166	0.0065
222	3.4231	0.0065
223	3.4296	0.0065
224	3.4361	0.0065
225	3.4425	0.0065
226	3.4490	0.0064
227	3.4554	0.0064
228	3.4618	0.0064
229	3.4682	0.0064
230	3.4746	0.0064
231	3.4809	0.0064
232	3.4873	0.0063
233	3.4936	0.0063
234	3.4999	0.0063
235	3.5062	0.0063
236	3.5125	0.0063
237	3.5188	0.0063
238	3.5250	0.0062
239	3.5312	0.0062
240	3.5375	0.0062
241	3.5437	0.0062
242	3.5498	0.0062
243	3.5560	0.0062
244	3.5622	0.0062
245	3.5683	0.0061

246	3.5745	0.0061
247	3.5806	0.0061
248	3.5867	0.0061
249	3.5928	0.0061
250	3.5988	0.0061
251	3.6049	0.0061
252	3.6109	0.0060
253	3.6170	0.0060
254	3.6230	0.0060
255	3.6290	0.0060
256	3.6350	0.0060
257	3.6409	0.0060
258	3.6469	0.0060
259	3.6529	0.0059
260	3.6588	0.0059
261	3.6647	0.0059
262	3.6706	0.0059
263	3.6765	0.0059
264	3.6824	0.0059
265	3.6883	0.0059
266	3.6941	0.0059
267	3.7000	0.0058
268	3.7058	0.0058
269	3.7116	0.0058
270	3.7174	0.0058
271	3.7232	0.0058
272	3.7290	0.0058
273	3.7348	0.0058
274	3.7406	0.0058
275	3.7463	0.0057
276	3.7520	0.0057
277	3.7578	0.0057
278	3.7635	0.0057
279	3.7692	0.0057
280	3.7749	0.0057
281	3.7805	0.0057
282	3.7862	0.0057
283	3.7918	0.0057
284	3.7975	0.0056
285	3.8031	0.0056
286	3.8087	0.0056
287	3.8143	0.0056
288	3.8199	0.0056

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0056	0.0015	0.0041
2	0.0056	0.0015	0.0041
3	0.0056	0.0015	0.0041
4	0.0056	0.0015	0.0041
5	0.0057	0.0015	0.0041
6	0.0057	0.0015	0.0042

7	0.0057	0.0015	0.0042
8	0.0057	0.0015	0.0042
9	0.0057	0.0015	0.0042
10	0.0057	0.0015	0.0042
11	0.0058	0.0015	0.0042
12	0.0058	0.0015	0.0042
13	0.0058	0.0016	0.0043
14	0.0058	0.0016	0.0043
15	0.0058	0.0016	0.0043
16	0.0059	0.0016	0.0043
17	0.0059	0.0016	0.0043
18	0.0059	0.0016	0.0043
19	0.0059	0.0016	0.0043
20	0.0059	0.0016	0.0043
21	0.0060	0.0016	0.0044
22	0.0060	0.0016	0.0044
23	0.0060	0.0016	0.0044
24	0.0060	0.0016	0.0044
25	0.0060	0.0016	0.0044
26	0.0061	0.0016	0.0044
27	0.0061	0.0016	0.0045
28	0.0061	0.0016	0.0045
29	0.0061	0.0016	0.0045
30	0.0061	0.0016	0.0045
31	0.0062	0.0017	0.0045
32	0.0062	0.0017	0.0045
33	0.0062	0.0017	0.0046
34	0.0062	0.0017	0.0046
35	0.0063	0.0017	0.0046
36	0.0063	0.0017	0.0046
37	0.0063	0.0017	0.0046
38	0.0063	0.0017	0.0046
39	0.0064	0.0017	0.0047
40	0.0064	0.0017	0.0047
41	0.0064	0.0017	0.0047
42	0.0064	0.0017	0.0047
43	0.0065	0.0017	0.0047
44	0.0065	0.0017	0.0047
45	0.0065	0.0017	0.0048
46	0.0065	0.0017	0.0048
47	0.0066	0.0018	0.0048
48	0.0066	0.0018	0.0048
49	0.0066	0.0018	0.0048
50	0.0066	0.0018	0.0049
51	0.0067	0.0018	0.0049
52	0.0067	0.0018	0.0049
53	0.0067	0.0018	0.0049
54	0.0067	0.0018	0.0049
55	0.0068	0.0018	0.0050
56	0.0068	0.0018	0.0050
57	0.0068	0.0018	0.0050
58	0.0069	0.0018	0.0050
59	0.0069	0.0018	0.0050
60	0.0069	0.0018	0.0051

61	0.0070	0.0019	0.0051
62	0.0070	0.0019	0.0051
63	0.0070	0.0019	0.0051
64	0.0070	0.0019	0.0052
65	0.0071	0.0019	0.0052
66	0.0071	0.0019	0.0052
67	0.0071	0.0019	0.0052
68	0.0072	0.0019	0.0052
69	0.0072	0.0019	0.0053
70	0.0072	0.0019	0.0053
71	0.0073	0.0019	0.0053
72	0.0073	0.0020	0.0053
73	0.0073	0.0020	0.0054
74	0.0074	0.0020	0.0054
75	0.0074	0.0020	0.0054
76	0.0074	0.0020	0.0055
77	0.0075	0.0020	0.0055
78	0.0075	0.0020	0.0055
79	0.0076	0.0020	0.0055
80	0.0076	0.0020	0.0056
81	0.0076	0.0020	0.0056
82	0.0077	0.0021	0.0056
83	0.0077	0.0021	0.0057
84	0.0078	0.0021	0.0057
85	0.0078	0.0021	0.0057
86	0.0078	0.0021	0.0057
87	0.0079	0.0021	0.0058
88	0.0079	0.0021	0.0058
89	0.0080	0.0021	0.0058
90	0.0080	0.0021	0.0059
91	0.0081	0.0022	0.0059
92	0.0081	0.0022	0.0059
93	0.0082	0.0022	0.0060
94	0.0082	0.0022	0.0060
95	0.0083	0.0022	0.0061
96	0.0083	0.0022	0.0061
97	0.0084	0.0022	0.0061
98	0.0084	0.0022	0.0062
99	0.0085	0.0023	0.0062
100	0.0085	0.0023	0.0062
101	0.0086	0.0023	0.0063
102	0.0086	0.0023	0.0063
103	0.0087	0.0023	0.0064
104	0.0087	0.0023	0.0064
105	0.0088	0.0024	0.0064
106	0.0088	0.0024	0.0065
107	0.0089	0.0024	0.0065
108	0.0090	0.0024	0.0066
109	0.0090	0.0024	0.0066
110	0.0091	0.0024	0.0067
111	0.0092	0.0025	0.0067
112	0.0092	0.0025	0.0067
113	0.0093	0.0025	0.0068
114	0.0093	0.0025	0.0068

115	0.0094	0.0025	0.0069
116	0.0095	0.0025	0.0069
117	0.0096	0.0026	0.0070
118	0.0096	0.0026	0.0071
119	0.0097	0.0026	0.0071
120	0.0098	0.0026	0.0072
121	0.0099	0.0026	0.0072
122	0.0099	0.0027	0.0073
123	0.0100	0.0027	0.0074
124	0.0101	0.0027	0.0074
125	0.0102	0.0027	0.0075
126	0.0103	0.0027	0.0075
127	0.0104	0.0028	0.0076
128	0.0105	0.0028	0.0077
129	0.0106	0.0028	0.0078
130	0.0107	0.0028	0.0078
131	0.0108	0.0029	0.0079
132	0.0109	0.0029	0.0080
133	0.0110	0.0029	0.0081
134	0.0111	0.0030	0.0081
135	0.0112	0.0030	0.0082
136	0.0113	0.0030	0.0083
137	0.0114	0.0031	0.0084
138	0.0115	0.0031	0.0084
139	0.0117	0.0031	0.0086
140	0.0118	0.0031	0.0086
141	0.0119	0.0032	0.0088
142	0.0120	0.0032	0.0088
143	0.0122	0.0033	0.0090
144	0.0123	0.0033	0.0090
145	0.0113	0.0030	0.0083
146	0.0114	0.0030	0.0083
147	0.0116	0.0031	0.0085
148	0.0117	0.0031	0.0086
149	0.0119	0.0032	0.0087
150	0.0120	0.0032	0.0088
151	0.0122	0.0033	0.0090
152	0.0124	0.0033	0.0091
153	0.0126	0.0034	0.0092
154	0.0128	0.0034	0.0093
155	0.0130	0.0035	0.0096
156	0.0132	0.0035	0.0097
157	0.0135	0.0036	0.0099
158	0.0136	0.0036	0.0100
159	0.0140	0.0037	0.0102
160	0.0142	0.0038	0.0104
161	0.0145	0.0039	0.0106
162	0.0147	0.0039	0.0108
163	0.0151	0.0040	0.0111
164	0.0153	0.0041	0.0112
165	0.0158	0.0042	0.0116
166	0.0160	0.0043	0.0117
167	0.0165	0.0044	0.0121
168	0.0168	0.0045	0.0123

169	0.0174	0.0047	0.0128
170	0.0177	0.0047	0.0130
171	0.0184	0.0049	0.0135
172	0.0188	0.0050	0.0137
173	0.0195	0.0052	0.0143
174	0.0200	0.0053	0.0146
175	0.0209	0.0056	0.0153
176	0.0214	0.0057	0.0157
177	0.0225	0.0060	0.0165
178	0.0231	0.0062	0.0169
179	0.0245	0.0065	0.0179
180	0.0253	0.0068	0.0185
181	0.0270	0.0072	0.0198
182	0.0280	0.0075	0.0205
183	0.0304	0.0081	0.0222
184	0.0317	0.0085	0.0233
185	0.0278	0.0074	0.0204
186	0.0296	0.0079	0.0217
187	0.0344	0.0092	0.0252
188	0.0375	0.0100	0.0275
189	0.0467	0.0125	0.0342
190	0.0537	0.0144	0.0394
191	0.0816	0.0152	0.0663
192	0.1184	0.0152	0.1031
193	0.5121	0.0152	0.4969
194	0.0642	0.0152	0.0490
195	0.0415	0.0111	0.0304
196	0.0318	0.0085	0.0233
197	0.0333	0.0089	0.0244
198	0.0291	0.0078	0.0213
199	0.0261	0.0070	0.0191
200	0.0238	0.0064	0.0174
201	0.0219	0.0059	0.0161
202	0.0204	0.0055	0.0150
203	0.0191	0.0051	0.0140
204	0.0181	0.0048	0.0132
205	0.0171	0.0046	0.0125
206	0.0163	0.0044	0.0119
207	0.0156	0.0042	0.0114
208	0.0149	0.0040	0.0109
209	0.0143	0.0038	0.0105
210	0.0138	0.0037	0.0101
211	0.0133	0.0036	0.0098
212	0.0129	0.0034	0.0094
213	0.0125	0.0033	0.0092
214	0.0121	0.0032	0.0089
215	0.0118	0.0031	0.0086
216	0.0115	0.0031	0.0084
217	0.0124	0.0033	0.0091
218	0.0121	0.0032	0.0089
219	0.0119	0.0032	0.0087
220	0.0116	0.0031	0.0085
221	0.0114	0.0030	0.0083
222	0.0111	0.0030	0.0082

223	0.0109	0.0029	0.0080
224	0.0107	0.0029	0.0079
225	0.0105	0.0028	0.0077
226	0.0103	0.0028	0.0076
227	0.0102	0.0027	0.0074
228	0.0100	0.0027	0.0073
229	0.0098	0.0026	0.0072
230	0.0097	0.0026	0.0071
231	0.0095	0.0025	0.0070
232	0.0094	0.0025	0.0069
233	0.0093	0.0025	0.0068
234	0.0091	0.0024	0.0067
235	0.0090	0.0024	0.0066
236	0.0089	0.0024	0.0065
237	0.0088	0.0023	0.0064
238	0.0086	0.0023	0.0063
239	0.0085	0.0023	0.0063
240	0.0084	0.0023	0.0062
241	0.0083	0.0022	0.0061
242	0.0082	0.0022	0.0060
243	0.0081	0.0022	0.0060
244	0.0080	0.0022	0.0059
245	0.0080	0.0021	0.0058
246	0.0079	0.0021	0.0058
247	0.0078	0.0021	0.0057
248	0.0077	0.0021	0.0056
249	0.0076	0.0020	0.0056
250	0.0075	0.0020	0.0055
251	0.0075	0.0020	0.0055
252	0.0074	0.0020	0.0054
253	0.0073	0.0020	0.0054
254	0.0073	0.0019	0.0053
255	0.0072	0.0019	0.0053
256	0.0071	0.0019	0.0052
257	0.0071	0.0019	0.0052
258	0.0070	0.0019	0.0051
259	0.0069	0.0019	0.0051
260	0.0069	0.0018	0.0050
261	0.0068	0.0018	0.0050
262	0.0068	0.0018	0.0050
263	0.0067	0.0018	0.0049
264	0.0066	0.0018	0.0049
265	0.0066	0.0018	0.0048
266	0.0065	0.0017	0.0048
267	0.0065	0.0017	0.0048
268	0.0064	0.0017	0.0047
269	0.0064	0.0017	0.0047
270	0.0063	0.0017	0.0046
271	0.0063	0.0017	0.0046
272	0.0062	0.0017	0.0046
273	0.0062	0.0017	0.0045
274	0.0062	0.0016	0.0045
275	0.0061	0.0016	0.0045
276	0.0061	0.0016	0.0044

277	0.0060	0.0016	0.0044
278	0.0060	0.0016	0.0044
279	0.0059	0.0016	0.0044
280	0.0059	0.0016	0.0043
281	0.0059	0.0016	0.0043
282	0.0058	0.0016	0.0043
283	0.0058	0.0015	0.0042
284	0.0058	0.0015	0.0042
285	0.0057	0.0015	0.0042
286	0.0057	0.0015	0.0042
287	0.0057	0.0015	0.0041
288	0.0056	0.0015	0.0041

Total soil rain loss = 0.87(In)
Total effective rainfall = 2.95(In)
Peak flow rate in flood hydrograph = 26.08(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      0.0001      0.01  Q         |         |         |         |
  0+10      0.0006      0.07  Q         |         |         |         |
  0+15      0.0021      0.22  Q         |         |         |         |
  0+20      0.0046      0.37  Q         |         |         |         |
  0+25      0.0078      0.45  Q         |         |         |         |
  0+30      0.0113      0.51  Q         |         |         |         |
  0+35      0.0150      0.55  Q         |         |         |         |
  0+40      0.0190      0.58  Q         |         |         |         |
  0+45      0.0232      0.60  Q         |         |         |         |
  0+50      0.0275      0.62  Q         |         |         |         |
  0+55      0.0319      0.64  Q         |         |         |         |
  1+ 0      0.0364      0.65  Q         |         |         |         |
  1+ 5      0.0410      0.67  Q         |         |         |         |
  1+10      0.0456      0.68  Q         |         |         |         |
  1+15      0.0503      0.69  Q         |         |         |         |
  1+20      0.0551      0.69  Q         |         |         |         |
  1+25      0.0600      0.70  Q         |         |         |         |
  1+30      0.0648      0.71  Q         |         |         |         |
  1+35      0.0697      0.71  Q         |         |         |         |
  1+40      0.0747      0.72  Q         |         |         |         |
  1+45      0.0797      0.72  Q         |         |         |         |
  1+50      0.0847      0.73  Q         |         |         |         |
  1+55      0.0897      0.73  QV        |         |         |         |
  2+ 0      0.0948      0.74  QV        |         |         |         |
  2+ 5      0.0999      0.74  QV        |         |         |         |
  2+10      0.1050      0.74  QV        |         |         |         |
  2+15      0.1102      0.75  QV        |         |         |         |
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2+20	0.1153	0.75	QV			
2+25	0.1205	0.75	Q			
2+30	0.1257	0.75	Q			
2+35	0.1309	0.76	Q			
2+40	0.1361	0.76	Q			
2+45	0.1414	0.76	Q			
2+50	0.1466	0.76	Q			
2+55	0.1519	0.77	Q			
3+ 0	0.1572	0.77	Q			
3+ 5	0.1625	0.77	Q			
3+10	0.1679	0.78	Q			
3+15	0.1732	0.78	QV			
3+20	0.1786	0.78	QV			
3+25	0.1840	0.78	QV			
3+30	0.1894	0.79	QV			
3+35	0.1949	0.79	QV			
3+40	0.2003	0.79	QV			
3+45	0.2058	0.80	QV			
3+50	0.2113	0.80	QV			
3+55	0.2169	0.80	QV			
4+ 0	0.2224	0.81	QV			
4+ 5	0.2280	0.81	QV			
4+10	0.2336	0.81	QV			
4+15	0.2392	0.81	QV			
4+20	0.2448	0.82	QV			
4+25	0.2505	0.82	QV			
4+30	0.2561	0.82	QV			
4+35	0.2618	0.83	Q V			
4+40	0.2676	0.83	Q V			
4+45	0.2733	0.83	Q V			
4+50	0.2791	0.84	Q V			
4+55	0.2849	0.84	Q V			
5+ 0	0.2907	0.85	Q V			
5+ 5	0.2965	0.85	Q V			
5+10	0.3024	0.85	Q V			
5+15	0.3083	0.86	Q V			
5+20	0.3142	0.86	Q V			
5+25	0.3202	0.86	Q V			
5+30	0.3262	0.87	Q V			
5+35	0.3322	0.87	Q V			
5+40	0.3382	0.87	Q V			
5+45	0.3442	0.88	Q V			
5+50	0.3503	0.88	Q V			
5+55	0.3564	0.89	Q V			
6+ 0	0.3626	0.89	Q V			
6+ 5	0.3687	0.90	Q V			
6+10	0.3749	0.90	Q V			
6+15	0.3811	0.90	Q V			
6+20	0.3874	0.91	Q V			
6+25	0.3937	0.91	Q V			
6+30	0.4000	0.92	Q V			
6+35	0.4063	0.92	Q V			
6+40	0.4127	0.93	Q V			
6+45	0.4191	0.93	Q V			

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  6+50      0.4256      0.93   |Q  V     |         |         |         |
  6+55      0.4320      0.94   |Q   V    |         |         |         |
  7+ 0      0.4385      0.94   |Q   V    |         |         |         |
  7+ 5      0.4451      0.95   |Q   V    |         |         |         |
  7+10      0.4516      0.95   |Q   V    |         |         |         |
  7+15      0.4582      0.96   |Q   V    |         |         |         |
  7+20      0.4649      0.96   |Q   V    |         |         |         |
  7+25      0.4716      0.97   |Q   V    |         |         |         |
  7+30      0.4783      0.97   |Q   V    |         |         |         |
  7+35      0.4850      0.98   |Q   V    |         |         |         |
  7+40      0.4918      0.99   |Q   V    |         |         |         |
  7+45      0.4986      0.99   |Q   V    |         |         |         |
  7+50      0.5055      1.00   |Q   V    |         |         |         |
  7+55      0.5124      1.00   |Q   V    |         |         |         |
  8+ 0      0.5193      1.01   |Q    V   |         |         |         |
  8+ 5      0.5263      1.01   |Q    V   |         |         |         |
  8+10      0.5333      1.02   |Q    V   |         |         |         |
  8+15      0.5404      1.03   |Q    V   |         |         |         |
  8+20      0.5475      1.03   |Q    V   |         |         |         |
  8+25      0.5546      1.04   |Q    V   |         |         |         |
  8+30      0.5618      1.04   |Q    V   |         |         |         |
  8+35      0.5690      1.05   |Q    V   |         |         |         |
  8+40      0.5763      1.06   |Q    V   |         |         |         |
  8+45      0.5836      1.06   |Q    V   |         |         |         |
  8+50      0.5910      1.07   |Q    V   |         |         |         |
  8+55      0.5984      1.08   |Q    V   |         |         |         |
  9+ 0      0.6059      1.08   |Q     V  |         |         |         |
  9+ 5      0.6134      1.09   |Q     V  |         |         |         |
  9+10      0.6210      1.10   |Q     V  |         |         |         |
  9+15      0.6286      1.11   |Q     V  |         |         |         |
  9+20      0.6362      1.11   |Q     V  |         |         |         |
  9+25      0.6440      1.12   |Q     V  |         |         |         |
  9+30      0.6517      1.13   |Q     V  |         |         |         |
  9+35      0.6596      1.14   |Q     V  |         |         |         |
  9+40      0.6674      1.14   |Q     V  |         |         |         |
  9+45      0.6754      1.15   |Q     V  |         |         |         |
  9+50      0.6834      1.16   |Q     V  |         |         |         |
  9+55      0.6914      1.17   |Q      V |         |         |         |
 10+ 0      0.6995      1.18   |Q      V |         |         |         |
 10+ 5      0.7077      1.19   |Q      V |         |         |         |
 10+10      0.7159      1.20   |Q      V |         |         |         |
 10+15      0.7242      1.21   |Q      V |         |         |         |
 10+20      0.7326      1.21   |Q      V |         |         |         |
 10+25      0.7410      1.22   |Q      V |         |         |         |
 10+30      0.7495      1.23   |Q      V |         |         |         |
 10+35      0.7581      1.24   |Q      V |         |         |         |
 10+40      0.7667      1.25   |Q      V |         |         |         |
 10+45      0.7755      1.27   |Q      V |         |         |         |
 10+50      0.7843      1.28   |Q       V|         |         |         |
 10+55      0.7931      1.29   |Q       V|         |         |         |
 11+ 0      0.8021      1.30   |Q       V|         |         |         |
 11+ 5      0.8111      1.31   |Q       V|         |         |         |
 11+10      0.8202      1.32   |Q       V|         |         |         |
 11+15      0.8294      1.33   |Q       V|         |         |         |
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11+20       0.8387      1.35  |Q       V|         |         |         |
11+25       0.8480      1.36  |Q       V|         |         |         |
11+30       0.8575      1.37  |Q       V|         |         |         |
11+35       0.8670      1.39  |Q        V         |         |         |
11+40       0.8767      1.40  |Q        V         |         |         |
11+45       0.8864      1.42  |Q        V         |         |         |
11+50       0.8963      1.43  |Q        V         |         |         |
11+55       0.9062      1.45  |Q        V         |         |         |
12+ 0       0.9163      1.46  |Q        V         |         |         |
12+ 5       0.9264      1.47  |Q        V         |         |         |
12+10       0.9366      1.48  |Q        V         |         |         |
12+15       0.9467      1.46  |Q        V         |         |         |
12+20       0.9566      1.44  |Q        |V        |         |         |
12+25       0.9666      1.44  |Q        |V        |         |         |
12+30       0.9766      1.45  |Q        |V        |         |         |
12+35       0.9866      1.46  |Q        |V        |         |         |
12+40       0.9968      1.47  |Q        |V        |         |         |
12+45       1.0071      1.49  |Q        |V        |         |         |
12+50       1.0174      1.51  | Q       |V        |         |         |
12+55       1.0280      1.53  | Q       |V        |         |         |
13+ 0       1.0386      1.55  | Q       | V       |         |         |
13+ 5       1.0494      1.57  | Q       | V       |         |         |
13+10       1.0603      1.59  | Q       | V       |         |         |
13+15       1.0715      1.61  | Q       | V       |         |         |
13+20       1.0828      1.64  | Q       | V       |         |         |
13+25       1.0942      1.67  | Q       | V       |         |         |
13+30       1.1059      1.69  | Q       | V       |         |         |
13+35       1.1178      1.73  | Q       | V       |         |         |
13+40       1.1299      1.76  | Q       |  V      |         |         |
13+45       1.1422      1.79  | Q       |  V      |         |         |
13+50       1.1548      1.82  | Q       |  V      |         |         |
13+55       1.1676      1.86  | Q       |  V      |         |         |
14+ 0       1.1807      1.90  | Q       |  V      |         |         |
14+ 5       1.1941      1.94  | Q       |  V      |         |         |
14+10       1.2078      1.99  | Q       |  V      |         |         |
14+15       1.2218      2.04  | Q       |   V     |         |         |
14+20       1.2362      2.09  | Q       |   V     |         |         |
14+25       1.2509      2.14  | Q       |   V     |         |         |
14+30       1.2660      2.20  | Q       |   V     |         |         |
14+35       1.2816      2.26  |  Q      |   V     |         |         |
14+40       1.2977      2.33  |  Q      |    V    |         |         |
14+45       1.3142      2.40  |  Q      |    V    |         |         |
14+50       1.3313      2.48  |  Q      |    V    |         |         |
14+55       1.3489      2.57  |  Q      |    V    |         |         |
15+ 0       1.3673      2.66  |  Q      |    V    |         |         |
15+ 5       1.3863      2.77  |  Q      |     V   |         |         |
15+10       1.4061      2.88  |  Q      |     V   |         |         |
15+15       1.4269      3.01  |   Q     |     V   |         |         |
15+20       1.4487      3.16  |   Q     |     V   |         |         |
15+25       1.4715      3.32  |   Q     |      V  |         |         |
15+30       1.4952      3.44  |   Q     |      V  |         |         |
15+35       1.5191      3.47  |   Q     |      V  |         |         |
15+40       1.5436      3.55  |   Q     |      V  |         |         |
15+45       1.5696      3.78  |    Q    |       V |         |         |
```

AREA A1, A2 & A3
PRE-DEVELOPED
Q100= 26.08 CFS

```
15+50       1.5980      4.13  |    Q    |                             |
15+55       1.6304      4.71  |     Q   |                             |
16+ 0       1.6699      5.73  |      Q  |                             |
16+ 5       1.7309      8.85  |         |Q        V         |         |
16+10       1.8368     15.38  |         |         QV        |         |
16+15       2.0164     26.08  |         |         |  V      |   Q     |
16+20       2.1861     24.64  |         |         |    V    | Q       |
16+25       2.2980     16.26  |         |         |Q    V   |         |
16+30       2.3806     11.99  |         |    Q    |      V  |         |
16+35       2.4475      9.72  |         | Q       |       V |         |
16+40       2.5038      8.18  |         Q         |        V|         |
16+45       2.5527      7.09  |        Q|         |        V|         |
16+50       2.5958      6.27  |       Q |         |         V         |
16+55       2.6333      5.43  |      Q  |         |         V         |
17+ 0       2.6669      4.88  |     Q   |         |         V         |
17+ 5       2.6974      4.44  |    Q    |         |         |V        |
17+10       2.7252      4.04  |    Q    |         |         |V        |
17+15       2.7506      3.68  |   Q     |         |         |V        |
17+20       2.7738      3.37  |   Q     |         |         | V       |
17+25       2.7952      3.11  |   Q     |         |         | V       |
17+30       2.8146      2.82  |  Q      |         |         | V       |
17+35       2.8325      2.60  |  Q      |         |         | V       |
17+40       2.8490      2.39  |  Q      |         |         |  V      |
17+45       2.8650      2.33  |  Q      |         |         |  V      |
17+50       2.8805      2.26  |  Q      |         |         |  V      |
17+55       2.8954      2.16  | Q       |         |         |  V      |
18+ 0       2.9093      2.01  | Q       |         |         |  V      |
18+ 5       2.9220      1.85  | Q       |         |         |  V      |
18+10       2.9338      1.72  | Q       |         |         |  V      |
18+15       2.9450      1.62  | Q       |         |         |   V     |
18+20       2.9560      1.60  | Q       |         |         |   V     |
18+25       2.9668      1.57  | Q       |         |         |   V     |
18+30       2.9773      1.54  | Q       |         |         |   V     |
18+35       2.9877      1.50  | Q       |         |         |   V     |
18+40       2.9978      1.47  |Q        |         |         |   V     |
18+45       3.0078      1.44  |Q        |         |         |   V     |
18+50       3.0175      1.41  |Q        |         |         |   V     |
18+55       3.0270      1.39  |Q        |         |         |    V    |
19+ 0       3.0364      1.36  |Q        |         |         |    V    |
19+ 5       3.0456      1.34  |Q        |         |         |    V    |
19+10       3.0547      1.31  |Q        |         |         |    V    |
19+15       3.0636      1.29  |Q        |         |         |    V    |
19+20       3.0723      1.27  |Q        |         |         |    V    |
19+25       3.0809      1.25  |Q        |         |         |    V    |
19+30       3.0894      1.23  |Q        |         |         |    V    |
19+35       3.0977      1.21  |Q        |         |         |    V    |
19+40       3.1059      1.19  |Q        |         |         |    V    |
19+45       3.1140      1.17  |Q        |         |         |     V   |
19+50       3.1220      1.16  |Q        |         |         |     V   |
19+55       3.1298      1.14  |Q        |         |         |     V   |
20+ 0       3.1376      1.13  |Q        |         |         |     V   |
20+ 5       3.1452      1.11  |Q        |         |         |     V   |
20+10       3.1528      1.10  |Q        |         |         |     V   |
20+15       3.1602      1.08  |Q        |         |         |     V   |
```

```
   20+20       3.1676      1.07  |Q        |         |         |     V   |
   20+25       3.1748      1.05  |Q        |         |         |     V   |
   20+30       3.1820      1.04  |Q        |         |         |     V   |
   20+35       3.1891      1.03  |Q        |         |         |     V   |
   20+40       3.1961      1.02  |Q        |         |         |      V  |
   20+45       3.2030      1.00  |Q        |         |         |      V  |
   20+50       3.2099      0.99  |Q        |         |         |      V  |
   20+55       3.2166      0.98  |Q        |         |         |      V  |
   21+ 0       3.2233      0.97  |Q        |         |         |      V  |
   21+ 5       3.2299      0.96  |Q        |         |         |      V  |
   21+10       3.2365      0.95  |Q        |         |         |      V  |
   21+15       3.2430      0.94  |Q        |         |         |      V  |
   21+20       3.2494      0.93  |Q        |         |         |      V  |
   21+25       3.2558      0.92  |Q        |         |         |      V  |
   21+30       3.2621      0.91  |Q        |         |         |      V  |
   21+35       3.2683      0.91  |Q        |         |         |      V  |
   21+40       3.2745      0.90  |Q        |         |         |      V  |
   21+45       3.2806      0.89  |Q        |         |         |       V |
   21+50       3.2867      0.88  |Q        |         |         |       V |
   21+55       3.2927      0.87  |Q        |         |         |       V |
   22+ 0       3.2986      0.87  |Q        |         |         |       V |
   22+ 5       3.3045      0.86  |Q        |         |         |       V |
   22+10       3.3104      0.85  |Q        |         |         |       V |
   22+15       3.3162      0.84  |Q        |         |         |       V |
   22+20       3.3219      0.84  |Q        |         |         |       V |
   22+25       3.3277      0.83  |Q        |         |         |       V |
   22+30       3.3333      0.82  |Q        |         |         |       V |
   22+35       3.3389      0.82  |Q        |         |         |       V |
   22+40       3.3445      0.81  |Q        |         |         |       V |
   22+45       3.3501      0.80  |Q        |         |         |       V |
   22+50       3.3555      0.80  |Q        |         |         |       V |
   22+55       3.3610      0.79  |Q        |         |         |       V |
   23+ 0       3.3664      0.79  |Q        |         |         |        V|
   23+ 5       3.3718      0.78  |Q        |         |         |        V|
   23+10       3.3771      0.77  |Q        |         |         |        V|
   23+15       3.3824      0.77  |Q        |         |         |        V|
   23+20       3.3876      0.76  |Q        |         |         |        V|
   23+25       3.3929      0.76  |Q        |         |         |        V|
   23+30       3.3980      0.75  |Q        |         |         |        V|
   23+35       3.4032      0.75  Q         |         |         |        V|
   23+40       3.4083      0.74  Q         |         |         |        V|
   23+45       3.4134      0.74  Q         |         |         |        V|
   23+50       3.4184      0.73  Q         |         |         |        V|
   23+55       3.4234      0.73  Q         |         |         |        V|
   24+ 0       3.4284      0.72  Q         |         |         |        V|
-----------------------------------------------------------------------
```

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

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

           Study date  10/25/22

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


Program License Serial Number 4070
```

100-YR, 24-HOUR UNIT HYDROGRAPH PRE-DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA B1, B2 & B3 (ONSITE WESTERLY AREAS FLOW TOWARDS AMETHYST RD.)
FILE: 20525HYDROB1B3PRE100YR.OUT

```
     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        Duration        Isohyetal
     (Ac.)           (hours)          (In)
Rainfall data for year 100
         15.11           1           1.08
--------------------------------------------------------------------
Rainfall data for year 100
         15.11           6           2.13
--------------------------------------------------------------------
Rainfall data for year 100
         15.11          24           3.82
--------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

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

```
SCS curve  SCS curve     Area     Area     Fp(Fig C6)    Ap      Fm
No.(AMCII) NO.(AMC 3)    (Ac.)    Fraction     (In/Hr)  (dec.)   (In/Hr)
 71.2      88.0         15.11      1.000     0.230    1.000    0.230

Area-averaged adjusted loss rate Fm (In/Hr) =  0.230

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

Area       Area          SCS CN    SCS CN      S     Pervious
 (Ac.)      Fract         (AMC2)    (AMC3)           Yield Fr
    15.11   1.000         71.2      88.0       1.37     0.670

Area-averaged catchment yield fraction, Y =  0.670
Area-averaged low loss fraction, Yb =  0.330
User entry of time of concentration  =   0.240 (hours)
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Watershed area =      15.11(Ac.)
Catchment Lag time =   0.192 hours
Unit interval =   5.000 minutes
Unit interval percentage of lag time = 43.4028
Hydrograph baseflow =     0.00(CFS)
Average maximum watershed loss rate(Fm) =  0.230(In/Hr)
Average low loss rate fraction (Yb) = 0.330 (decimal)
DESERT S-Graph Selected
Computed peak 5-minute rainfall =  0.512(In)
Computed peak 30-minute rainfall =  0.877(In)
Specified peak 1-hour rainfall =  1.080(In)
Computed peak 3-hour rainfall =  1.638(In)
Specified peak 6-hour rainfall =  2.130(In)
Specified peak 24-hour rainfall =  3.820(In)


Rainfall depth area reduction factors:
Using a total area of      15.11(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999     Adjusted rainfall =  0.512(In)
30-minute factor = 0.999    Adjusted rainfall =  0.877(In)
1-hour factor = 0.999       Adjusted rainfall =  1.079(In)
3-hour factor = 1.000       Adjusted rainfall =  1.638(In)
6-hour factor = 1.000       Adjusted rainfall =  2.130(In)
24-hour factor = 1.000      Adjusted rainfall =  3.820(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 =       182.74 (CFS))

  1                3.137                  5.733
  2               22.663                 35.680
  3               53.668                 56.658
  4               68.764                 27.586
```

5	77.374	15.734
6	83.049	10.369
7	87.227	7.635
8	90.208	5.448
9	92.496	4.181
10	94.309	3.312
11	95.725	2.588
12	96.837	2.032
13	97.647	1.479
14	98.161	0.939
15	98.652	0.898
16	99.173	0.952
17	99.599	0.778
18	100.000	0.733

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5121	0.5121
2	0.6305	0.1184
3	0.7120	0.0816
4	0.7762	0.0642
5	0.8300	0.0537
6	0.8766	0.0467
7	0.9181	0.0415
8	0.9556	0.0375
9	0.9900	0.0344
10	1.0218	0.0318
11	1.0514	0.0296
12	1.0792	0.0278
13	1.1125	0.0333
14	1.1443	0.0317
15	1.1746	0.0304
16	1.2038	0.0291
17	1.2318	0.0280
18	1.2588	0.0270
19	1.2849	0.0261
20	1.3102	0.0253
21	1.3347	0.0245
22	1.3585	0.0238
23	1.3816	0.0231
24	1.4041	0.0225
25	1.4260	0.0219
26	1.4474	0.0214
27	1.4683	0.0209
28	1.4887	0.0204
29	1.5087	0.0200
30	1.5282	0.0195
31	1.5473	0.0191
32	1.5661	0.0188
33	1.5845	0.0184
34	1.6026	0.0181
35	1.6203	0.0177
36	1.6377	0.0174
37	1.6548	0.0171

38	1.6716	0.0168
39	1.6882	0.0165
40	1.7044	0.0163
41	1.7205	0.0160
42	1.7363	0.0158
43	1.7518	0.0156
44	1.7672	0.0153
45	1.7823	0.0151
46	1.7972	0.0149
47	1.8119	0.0147
48	1.8264	0.0145
49	1.8408	0.0143
50	1.8549	0.0142
51	1.8689	0.0140
52	1.8827	0.0138
53	1.8963	0.0136
54	1.9098	0.0135
55	1.9232	0.0133
56	1.9363	0.0132
57	1.9494	0.0130
58	1.9623	0.0129
59	1.9750	0.0128
60	1.9877	0.0126
61	2.0001	0.0125
62	2.0125	0.0124
63	2.0248	0.0122
64	2.0369	0.0121
65	2.0489	0.0120
66	2.0608	0.0119
67	2.0726	0.0118
68	2.0842	0.0117
69	2.0958	0.0116
70	2.1073	0.0115
71	2.1186	0.0114
72	2.1299	0.0113
73	2.1423	0.0124
74	2.1546	0.0123
75	2.1669	0.0122
76	2.1790	0.0121
77	2.1910	0.0120
78	2.2030	0.0119
79	2.2148	0.0119
80	2.2266	0.0118
81	2.2383	0.0117
82	2.2499	0.0116
83	2.2614	0.0115
84	2.2728	0.0114
85	2.2842	0.0114
86	2.2955	0.0113
87	2.3067	0.0112
88	2.3178	0.0111
89	2.3289	0.0111
90	2.3399	0.0110
91	2.3508	0.0109

92	2.3617	0.0109
93	2.3724	0.0108
94	2.3832	0.0107
95	2.3938	0.0107
96	2.4044	0.0106
97	2.4149	0.0105
98	2.4254	0.0105
99	2.4358	0.0104
100	2.4461	0.0103
101	2.4564	0.0103
102	2.4666	0.0102
103	2.4768	0.0102
104	2.4869	0.0101
105	2.4969	0.0100
106	2.5069	0.0100
107	2.5169	0.0099
108	2.5267	0.0099
109	2.5366	0.0098
110	2.5464	0.0098
111	2.5561	0.0097
112	2.5658	0.0097
113	2.5754	0.0096
114	2.5850	0.0096
115	2.5945	0.0095
116	2.6040	0.0095
117	2.6134	0.0094
118	2.6228	0.0094
119	2.6321	0.0093
120	2.6414	0.0093
121	2.6507	0.0093
122	2.6599	0.0092
123	2.6691	0.0092
124	2.6782	0.0091
125	2.6873	0.0091
126	2.6963	0.0090
127	2.7053	0.0090
128	2.7143	0.0090
129	2.7232	0.0089
130	2.7321	0.0089
131	2.7409	0.0088
132	2.7497	0.0088
133	2.7584	0.0088
134	2.7672	0.0087
135	2.7759	0.0087
136	2.7845	0.0086
137	2.7931	0.0086
138	2.8017	0.0086
139	2.8102	0.0085
140	2.8187	0.0085
141	2.8272	0.0085
142	2.8356	0.0084
143	2.8440	0.0084
144	2.8524	0.0084
145	2.8607	0.0083

146	2.8690	0.0083
147	2.8773	0.0083
148	2.8855	0.0082
149	2.8937	0.0082
150	2.9019	0.0082
151	2.9100	0.0081
152	2.9181	0.0081
153	2.9262	0.0081
154	2.9342	0.0080
155	2.9422	0.0080
156	2.9502	0.0080
157	2.9582	0.0080
158	2.9661	0.0079
159	2.9740	0.0079
160	2.9819	0.0079
161	2.9897	0.0078
162	2.9975	0.0078
163	3.0053	0.0078
164	3.0131	0.0078
165	3.0208	0.0077
166	3.0285	0.0077
167	3.0362	0.0077
168	3.0438	0.0076
169	3.0514	0.0076
170	3.0590	0.0076
171	3.0666	0.0076
172	3.0741	0.0075
173	3.0817	0.0075
174	3.0891	0.0075
175	3.0966	0.0075
176	3.1041	0.0074
177	3.1115	0.0074
178	3.1189	0.0074
179	3.1262	0.0074
180	3.1336	0.0073
181	3.1409	0.0073
182	3.1482	0.0073
183	3.1555	0.0073
184	3.1628	0.0073
185	3.1700	0.0072
186	3.1772	0.0072
187	3.1844	0.0072
188	3.1915	0.0072
189	3.1987	0.0071
190	3.2058	0.0071
191	3.2129	0.0071
192	3.2200	0.0071
193	3.2270	0.0071
194	3.2341	0.0070
195	3.2411	0.0070
196	3.2481	0.0070
197	3.2551	0.0070
198	3.2620	0.0070
199	3.2689	0.0069

200	3.2759	0.0069
201	3.2827	0.0069
202	3.2896	0.0069
203	3.2965	0.0069
204	3.3033	0.0068
205	3.3101	0.0068
206	3.3169	0.0068
207	3.3237	0.0068
208	3.3304	0.0068
209	3.3372	0.0067
210	3.3439	0.0067
211	3.3506	0.0067
212	3.3573	0.0067
213	3.3639	0.0067
214	3.3706	0.0066
215	3.3772	0.0066
216	3.3838	0.0066
217	3.3904	0.0066
218	3.3970	0.0066
219	3.4036	0.0066
220	3.4101	0.0065
221	3.4166	0.0065
222	3.4231	0.0065
223	3.4296	0.0065
224	3.4361	0.0065
225	3.4425	0.0065
226	3.4490	0.0064
227	3.4554	0.0064
228	3.4618	0.0064
229	3.4682	0.0064
230	3.4746	0.0064
231	3.4809	0.0064
232	3.4873	0.0063
233	3.4936	0.0063
234	3.4999	0.0063
235	3.5062	0.0063
236	3.5125	0.0063
237	3.5187	0.0063
238	3.5250	0.0062
239	3.5312	0.0062
240	3.5374	0.0062
241	3.5436	0.0062
242	3.5498	0.0062
243	3.5560	0.0062
244	3.5622	0.0062
245	3.5683	0.0061
246	3.5744	0.0061
247	3.5806	0.0061
248	3.5867	0.0061
249	3.5927	0.0061
250	3.5988	0.0061
251	3.6049	0.0061
252	3.6109	0.0060
253	3.6170	0.0060

254	3.6230	0.0060
255	3.6290	0.0060
256	3.6350	0.0060
257	3.6409	0.0060
258	3.6469	0.0060
259	3.6529	0.0059
260	3.6588	0.0059
261	3.6647	0.0059
262	3.6706	0.0059
263	3.6765	0.0059
264	3.6824	0.0059
265	3.6883	0.0059
266	3.6941	0.0059
267	3.7000	0.0058
268	3.7058	0.0058
269	3.7116	0.0058
270	3.7174	0.0058
271	3.7232	0.0058
272	3.7290	0.0058
273	3.7348	0.0058
274	3.7406	0.0058
275	3.7463	0.0057
276	3.7520	0.0057
277	3.7578	0.0057
278	3.7635	0.0057
279	3.7692	0.0057
280	3.7749	0.0057
281	3.7805	0.0057
282	3.7862	0.0057
283	3.7918	0.0057
284	3.7975	0.0056
285	3.8031	0.0056
286	3.8087	0.0056
287	3.8143	0.0056
288	3.8199	0.0056

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0056	0.0018	0.0037
2	0.0056	0.0019	0.0038
3	0.0056	0.0019	0.0038
4	0.0056	0.0019	0.0038
5	0.0057	0.0019	0.0038
6	0.0057	0.0019	0.0038
7	0.0057	0.0019	0.0038
8	0.0057	0.0019	0.0038
9	0.0057	0.0019	0.0038
10	0.0057	0.0019	0.0038
11	0.0058	0.0019	0.0039
12	0.0058	0.0019	0.0039
13	0.0058	0.0019	0.0039
14	0.0058	0.0019	0.0039

15	0.0058	0.0019	0.0039
16	0.0059	0.0019	0.0039
17	0.0059	0.0019	0.0039
18	0.0059	0.0019	0.0039
19	0.0059	0.0020	0.0040
20	0.0059	0.0020	0.0040
21	0.0060	0.0020	0.0040
22	0.0060	0.0020	0.0040
23	0.0060	0.0020	0.0040
24	0.0060	0.0020	0.0040
25	0.0060	0.0020	0.0040
26	0.0061	0.0020	0.0041
27	0.0061	0.0020	0.0041
28	0.0061	0.0020	0.0041
29	0.0061	0.0020	0.0041
30	0.0061	0.0020	0.0041
31	0.0062	0.0020	0.0041
32	0.0062	0.0020	0.0041
33	0.0062	0.0021	0.0042
34	0.0062	0.0021	0.0042
35	0.0063	0.0021	0.0042
36	0.0063	0.0021	0.0042
37	0.0063	0.0021	0.0042
38	0.0063	0.0021	0.0042
39	0.0064	0.0021	0.0043
40	0.0064	0.0021	0.0043
41	0.0064	0.0021	0.0043
42	0.0064	0.0021	0.0043
43	0.0065	0.0021	0.0043
44	0.0065	0.0021	0.0043
45	0.0065	0.0021	0.0044
46	0.0065	0.0022	0.0044
47	0.0066	0.0022	0.0044
48	0.0066	0.0022	0.0044
49	0.0066	0.0022	0.0044
50	0.0066	0.0022	0.0044
51	0.0067	0.0022	0.0045
52	0.0067	0.0022	0.0045
53	0.0067	0.0022	0.0045
54	0.0067	0.0022	0.0045
55	0.0068	0.0022	0.0045
56	0.0068	0.0022	0.0046
57	0.0068	0.0023	0.0046
58	0.0069	0.0023	0.0046
59	0.0069	0.0023	0.0046
60	0.0069	0.0023	0.0046
61	0.0070	0.0023	0.0047
62	0.0070	0.0023	0.0047
63	0.0070	0.0023	0.0047
64	0.0070	0.0023	0.0047
65	0.0071	0.0023	0.0047
66	0.0071	0.0023	0.0048
67	0.0071	0.0024	0.0048
68	0.0072	0.0024	0.0048

69	0.0072	0.0024	0.0048
70	0.0072	0.0024	0.0048
71	0.0073	0.0024	0.0049
72	0.0073	0.0024	0.0049
73	0.0073	0.0024	0.0049
74	0.0074	0.0024	0.0049
75	0.0074	0.0024	0.0050
76	0.0074	0.0025	0.0050
77	0.0075	0.0025	0.0050
78	0.0075	0.0025	0.0050
79	0.0076	0.0025	0.0051
80	0.0076	0.0025	0.0051
81	0.0076	0.0025	0.0051
82	0.0077	0.0025	0.0051
83	0.0077	0.0026	0.0052
84	0.0078	0.0026	0.0052
85	0.0078	0.0026	0.0052
86	0.0078	0.0026	0.0053
87	0.0079	0.0026	0.0053
88	0.0079	0.0026	0.0053
89	0.0080	0.0026	0.0053
90	0.0080	0.0026	0.0054
91	0.0081	0.0027	0.0054
92	0.0081	0.0027	0.0054
93	0.0082	0.0027	0.0055
94	0.0082	0.0027	0.0055
95	0.0083	0.0027	0.0055
96	0.0083	0.0027	0.0056
97	0.0084	0.0028	0.0056
98	0.0084	0.0028	0.0056
99	0.0085	0.0028	0.0057
100	0.0085	0.0028	0.0057
101	0.0086	0.0028	0.0057
102	0.0086	0.0028	0.0058
103	0.0087	0.0029	0.0058
104	0.0087	0.0029	0.0058
105	0.0088	0.0029	0.0059
106	0.0088	0.0029	0.0059
107	0.0089	0.0029	0.0060
108	0.0090	0.0030	0.0060
109	0.0090	0.0030	0.0061
110	0.0091	0.0030	0.0061
111	0.0092	0.0030	0.0061
112	0.0092	0.0030	0.0062
113	0.0093	0.0031	0.0062
114	0.0093	0.0031	0.0063
115	0.0094	0.0031	0.0063
116	0.0095	0.0031	0.0064
117	0.0096	0.0032	0.0064
118	0.0096	0.0032	0.0064
119	0.0097	0.0032	0.0065
120	0.0098	0.0032	0.0066
121	0.0099	0.0033	0.0066
122	0.0099	0.0033	0.0067

123	0.0100	0.0033	0.0067
124	0.0101	0.0033	0.0068
125	0.0102	0.0034	0.0068
126	0.0103	0.0034	0.0069
127	0.0104	0.0034	0.0070
128	0.0105	0.0035	0.0070
129	0.0106	0.0035	0.0071
130	0.0107	0.0035	0.0071
131	0.0108	0.0036	0.0072
132	0.0109	0.0036	0.0073
133	0.0110	0.0036	0.0074
134	0.0111	0.0037	0.0074
135	0.0112	0.0037	0.0075
136	0.0113	0.0037	0.0076
137	0.0114	0.0038	0.0077
138	0.0115	0.0038	0.0077
139	0.0117	0.0039	0.0078
140	0.0118	0.0039	0.0079
141	0.0119	0.0039	0.0080
142	0.0120	0.0040	0.0081
143	0.0122	0.0040	0.0082
144	0.0123	0.0041	0.0083
145	0.0113	0.0037	0.0075
146	0.0114	0.0038	0.0076
147	0.0116	0.0038	0.0077
148	0.0117	0.0039	0.0078
149	0.0119	0.0039	0.0080
150	0.0120	0.0040	0.0080
151	0.0122	0.0040	0.0082
152	0.0124	0.0041	0.0083
153	0.0126	0.0042	0.0085
154	0.0128	0.0042	0.0085
155	0.0130	0.0043	0.0087
156	0.0132	0.0044	0.0088
157	0.0135	0.0045	0.0090
158	0.0136	0.0045	0.0091
159	0.0140	0.0046	0.0094
160	0.0142	0.0047	0.0095
161	0.0145	0.0048	0.0097
162	0.0147	0.0049	0.0099
163	0.0151	0.0050	0.0101
164	0.0153	0.0051	0.0103
165	0.0158	0.0052	0.0106
166	0.0160	0.0053	0.0107
167	0.0165	0.0055	0.0111
168	0.0168	0.0056	0.0113
169	0.0174	0.0058	0.0117
170	0.0177	0.0059	0.0119
171	0.0184	0.0061	0.0123
172	0.0188	0.0062	0.0126
173	0.0195	0.0065	0.0131
174	0.0200	0.0066	0.0134
175	0.0209	0.0069	0.0140
176	0.0214	0.0071	0.0143

177	0.0225	0.0074	0.0151
178	0.0231	0.0076	0.0155
179	0.0245	0.0081	0.0164
180	0.0253	0.0083	0.0169
181	0.0270	0.0089	0.0181
182	0.0280	0.0093	0.0188
183	0.0304	0.0100	0.0203
184	0.0317	0.0105	0.0213
185	0.0278	0.0092	0.0186
186	0.0296	0.0098	0.0199
187	0.0344	0.0113	0.0230
188	0.0375	0.0124	0.0251
189	0.0467	0.0154	0.0313
190	0.0537	0.0177	0.0360
191	0.0816	0.0191	0.0624
192	0.1184	0.0191	0.0992
193	0.5121	0.0191	0.4930
194	0.0642	0.0191	0.0450
195	0.0415	0.0137	0.0278
196	0.0318	0.0105	0.0213
197	0.0333	0.0110	0.0223
198	0.0291	0.0096	0.0195
199	0.0261	0.0086	0.0175
200	0.0238	0.0079	0.0159
201	0.0219	0.0072	0.0147
202	0.0204	0.0067	0.0137
203	0.0191	0.0063	0.0128
204	0.0181	0.0060	0.0121
205	0.0171	0.0056	0.0115
206	0.0163	0.0054	0.0109
207	0.0156	0.0051	0.0104
208	0.0149	0.0049	0.0100
209	0.0143	0.0047	0.0096
210	0.0138	0.0046	0.0092
211	0.0133	0.0044	0.0089
212	0.0129	0.0043	0.0086
213	0.0125	0.0041	0.0084
214	0.0121	0.0040	0.0081
215	0.0118	0.0039	0.0079
216	0.0115	0.0038	0.0077
217	0.0124	0.0041	0.0083
218	0.0121	0.0040	0.0081
219	0.0119	0.0039	0.0079
220	0.0116	0.0038	0.0078
221	0.0114	0.0038	0.0076
222	0.0111	0.0037	0.0075
223	0.0109	0.0036	0.0073
224	0.0107	0.0035	0.0072
225	0.0105	0.0035	0.0070
226	0.0103	0.0034	0.0069
227	0.0102	0.0034	0.0068
228	0.0100	0.0033	0.0067
229	0.0098	0.0032	0.0066
230	0.0097	0.0032	0.0065

231	0.0095	0.0031	0.0064
232	0.0094	0.0031	0.0063
233	0.0093	0.0031	0.0062
234	0.0091	0.0030	0.0061
235	0.0090	0.0030	0.0060
236	0.0089	0.0029	0.0059
237	0.0088	0.0029	0.0059
238	0.0086	0.0029	0.0058
239	0.0085	0.0028	0.0057
240	0.0084	0.0028	0.0056
241	0.0083	0.0028	0.0056
242	0.0082	0.0027	0.0055
243	0.0081	0.0027	0.0054
244	0.0080	0.0027	0.0054
245	0.0080	0.0026	0.0053
246	0.0079	0.0026	0.0053
247	0.0078	0.0026	0.0052
248	0.0077	0.0025	0.0052
249	0.0076	0.0025	0.0051
250	0.0075	0.0025	0.0051
251	0.0075	0.0025	0.0050
252	0.0074	0.0024	0.0050
253	0.0073	0.0024	0.0049
254	0.0073	0.0024	0.0049
255	0.0072	0.0024	0.0048
256	0.0071	0.0024	0.0048
257	0.0071	0.0023	0.0047
258	0.0070	0.0023	0.0047
259	0.0069	0.0023	0.0046
260	0.0069	0.0023	0.0046
261	0.0068	0.0022	0.0046
262	0.0068	0.0022	0.0045
263	0.0067	0.0022	0.0045
264	0.0066	0.0022	0.0045
265	0.0066	0.0022	0.0044
266	0.0065	0.0022	0.0044
267	0.0065	0.0021	0.0043
268	0.0064	0.0021	0.0043
269	0.0064	0.0021	0.0043
270	0.0063	0.0021	0.0042
271	0.0063	0.0021	0.0042
272	0.0062	0.0021	0.0042
273	0.0062	0.0020	0.0042
274	0.0062	0.0020	0.0041
275	0.0061	0.0020	0.0041
276	0.0061	0.0020	0.0041
277	0.0060	0.0020	0.0040
278	0.0060	0.0020	0.0040
279	0.0059	0.0020	0.0040
280	0.0059	0.0020	0.0040
281	0.0059	0.0019	0.0039
282	0.0058	0.0019	0.0039
283	0.0058	0.0019	0.0039
284	0.0058	0.0019	0.0039

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   285             0.0057           0.0019              0.0038
   286             0.0057           0.0019              0.0038
   287             0.0057           0.0019              0.0038
   288             0.0056           0.0019              0.0038
   --------------------------------------------------------------------
   --------------------------------------------------------------------
   Total soil rain loss =      1.08(In)
   Total effective rainfall =      2.74(In)
   Peak flow rate in flood hydrograph =     34.52(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       10.0      20.0      30.0      40.0
-----------------------------------------------------------------------
  0+ 5       0.0001      0.02  Q         |         |         |         |
  0+10       0.0012      0.16  Q         |         |         |         |
  0+15       0.0038      0.37  Q         |         |         |         |
  0+20       0.0070      0.47  Q         |         |         |         |
  0+25       0.0107      0.53  Q         |         |         |         |
  0+30       0.0146      0.57  Q         |         |         |         |
  0+35       0.0188      0.60  Q         |         |         |         |
  0+40       0.0231      0.63  Q         |         |         |         |
  0+45       0.0275      0.64  Q         |         |         |         |
  0+50       0.0320      0.66  Q         |         |         |         |
  0+55       0.0367      0.67  Q         |         |         |         |
  1+ 0       0.0413      0.68  Q         |         |         |         |
  1+ 5       0.0461      0.69  Q         |         |         |         |
  1+10       0.0508      0.69  Q         |         |         |         |
  1+15       0.0556      0.70  Q         |         |         |         |
  1+20       0.0605      0.70  Q         |         |         |         |
  1+25       0.0654      0.71  Q         |         |         |         |
  1+30       0.0703      0.71  Q         |         |         |         |
  1+35       0.0752      0.72  Q         |         |         |         |
  1+40       0.0802      0.72  Q         |         |         |         |
  1+45       0.0852      0.72  Q         |         |         |         |
  1+50       0.0901      0.72  QV        |         |         |         |
  1+55       0.0951      0.73  QV        |         |         |         |
  2+ 0       0.1002      0.73  QV        |         |         |         |
  2+ 5       0.1052      0.73  QV        |         |         |         |
  2+10       0.1102      0.73  QV        |         |         |         |
  2+15       0.1153      0.74  QV        |         |         |         |
  2+20       0.1204      0.74  QV        |         |         |         |
  2+25       0.1255      0.74  QV        |         |         |         |
  2+30       0.1306      0.74  QV        |         |         |         |
  2+35       0.1358      0.75  QV        |         |         |         |
  2+40       0.1409      0.75  QV        |         |         |         |
  2+45       0.1461      0.75  QV        |         |         |         |
  2+50       0.1513      0.75  QV        |         |         |         |
  2+55       0.1565      0.76  QV        |         |         |         |
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3+ 0       0.1617      0.76  QV         |         |         |         |
3+ 5       0.1670      0.76  QV         |         |         |         |
3+10       0.1722      0.77  QV         |         |         |         |
3+15       0.1775      0.77  Q V        |         |         |         |
3+20       0.1828      0.77  Q V        |         |         |         |
3+25       0.1882      0.77  Q V        |         |         |         |
3+30       0.1935      0.78  Q V        |         |         |         |
3+35       0.1989      0.78  Q V        |         |         |         |
3+40       0.2043      0.78  Q V        |         |         |         |
3+45       0.2097      0.79  Q V        |         |         |         |
3+50       0.2151      0.79  Q V        |         |         |         |
3+55       0.2206      0.79  Q V        |         |         |         |
4+ 0       0.2260      0.79  Q V        |         |         |         |
4+ 5       0.2315      0.80  Q V        |         |         |         |
4+10       0.2371      0.80  Q V        |         |         |         |
4+15       0.2426      0.80  Q V        |         |         |         |
4+20       0.2482      0.81  Q V        |         |         |         |
4+25       0.2537      0.81  Q V        |         |         |         |
4+30       0.2593      0.81  Q  V       |         |         |         |
4+35       0.2650      0.82  Q  V       |         |         |         |
4+40       0.2706      0.82  Q  V       |         |         |         |
4+45       0.2763      0.82  Q  V       |         |         |         |
4+50       0.2820      0.83  Q  V       |         |         |         |
4+55       0.2877      0.83  Q  V       |         |         |         |
5+ 0       0.2935      0.83  Q  V       |         |         |         |
5+ 5       0.2992      0.84  Q  V       |         |         |         |
5+10       0.3050      0.84  Q  V       |         |         |         |
5+15       0.3109      0.85  Q  V       |         |         |         |
5+20       0.3167      0.85  Q  V       |         |         |         |
5+25       0.3226      0.85  Q  V       |         |         |         |
5+30       0.3285      0.86  Q  V       |         |         |         |
5+35       0.3344      0.86  Q  V       |         |         |         |
5+40       0.3404      0.86  Q  V       |         |         |         |
5+45       0.3463      0.87  Q   V      |         |         |         |
5+50       0.3523      0.87  Q   V      |         |         |         |
5+55       0.3584      0.88  Q   V      |         |         |         |
6+ 0       0.3644      0.88  Q   V      |         |         |         |
6+ 5       0.3705      0.88  Q   V      |         |         |         |
6+10       0.3766      0.89  Q   V      |         |         |         |
6+15       0.3828      0.89  Q   V      |         |         |         |
6+20       0.3890      0.90  Q   V      |         |         |         |
6+25       0.3952      0.90  Q   V      |         |         |         |
6+30       0.4014      0.91  Q   V      |         |         |         |
6+35       0.4077      0.91  Q   V      |         |         |         |
6+40       0.4140      0.91  Q   V      |         |         |         |
6+45       0.4203      0.92  Q   V      |         |         |         |
6+50       0.4267      0.92  Q   V      |         |         |         |
6+55       0.4331      0.93  Q    V     |         |         |         |
7+ 0       0.4395      0.93  Q    V     |         |         |         |
7+ 5       0.4460      0.94  Q    V     |         |         |         |
7+10       0.4525      0.94  Q    V     |         |         |         |
7+15       0.4590      0.95  Q    V     |         |         |         |
7+20       0.4656      0.95  Q    V     |         |         |         |
7+25       0.4722      0.96  Q    V     |         |         |         |
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 7+30       0.4788      0.96  Q    V    |         |         |         |
 7+35       0.4855      0.97  Q    V    |         |         |         |
 7+40       0.4922      0.97  Q    V    |         |         |         |
 7+45       0.4989      0.98  Q    V    |         |         |         |
 7+50       0.5057      0.99  Q    V    |         |         |         |
 7+55       0.5125      0.99  Q    V    |         |         |         |
 8+ 0       0.5194      1.00  Q     V   |         |         |         |
 8+ 5       0.5263      1.00  |Q    V   |         |         |         |
 8+10       0.5333      1.01  |Q    V   |         |         |         |
 8+15       0.5402      1.01  |Q    V   |         |         |         |
 8+20       0.5473      1.02  |Q    V   |         |         |         |
 8+25       0.5543      1.03  |Q    V   |         |         |         |
 8+30       0.5615      1.03  |Q    V   |         |         |         |
 8+35       0.5686      1.04  |Q    V   |         |         |         |
 8+40       0.5758      1.05  |Q    V   |         |         |         |
 8+45       0.5831      1.05  |Q    V   |         |         |         |
 8+50       0.5904      1.06  |Q    V   |         |         |         |
 8+55       0.5977      1.07  |Q    V   |         |         |         |
 9+ 0       0.6051      1.07  |Q     V  |         |         |         |
 9+ 5       0.6125      1.08  |Q     V  |         |         |         |
 9+10       0.6200      1.09  |Q     V  |         |         |         |
 9+15       0.6276      1.09  |Q     V  |         |         |         |
 9+20       0.6352      1.10  |Q     V  |         |         |         |
 9+25       0.6428      1.11  |Q     V  |         |         |         |
 9+30       0.6505      1.12  |Q     V  |         |         |         |
 9+35       0.6583      1.13  |Q     V  |         |         |         |
 9+40       0.6661      1.13  |Q     V  |         |         |         |
 9+45       0.6739      1.14  |Q     V  |         |         |         |
 9+50       0.6819      1.15  |Q     V  |         |         |         |
 9+55       0.6898      1.16  |Q      V |         |         |         |
10+ 0       0.6979      1.17  |Q      V |         |         |         |
10+ 5       0.7060      1.18  |Q      V |         |         |         |
10+10       0.7142      1.19  |Q      V |         |         |         |
10+15       0.7224      1.20  |Q      V |         |         |         |
10+20       0.7307      1.21  |Q      V |         |         |         |
10+25       0.7391      1.22  |Q      V |         |         |         |
10+30       0.7475      1.22  |Q      V |         |         |         |
10+35       0.7560      1.24  |Q      V |         |         |         |
10+40       0.7646      1.25  |Q      V |         |         |         |
10+45       0.7732      1.26  |Q      V |         |         |         |
10+50       0.7820      1.27  |Q       V|         |         |         |
10+55       0.7908      1.28  |Q       V|         |         |         |
11+ 0       0.7997      1.29  |Q       V|         |         |         |
11+ 5       0.8086      1.30  |Q       V|         |         |         |
11+10       0.8177      1.31  |Q       V|         |         |         |
11+15       0.8268      1.33  |Q       V|         |         |         |
11+20       0.8360      1.34  |Q       V|         |         |         |
11+25       0.8454      1.35  |Q       V|         |         |         |
11+30       0.8548      1.37  |Q       V|         |         |         |
11+35       0.8643      1.38  |Q        V         |         |         |
11+40       0.8739      1.39  |Q        V         |         |         |
11+45       0.8836      1.41  |Q        V         |         |         |
11+50       0.8934      1.42  |Q        V         |         |         |
11+55       0.9033      1.44  |Q        V         |         |         |
```

```
12+ 0       0.9133      1.45  |Q        V         |         |         |
12+ 5       0.9234      1.47  |Q        V         |         |         |
12+10       0.9334      1.45  |Q        V         |         |         |
12+15       0.9432      1.42  |Q        V         |         |         |
12+20       0.9530      1.42  |Q        |V        |         |         |
12+25       0.9628      1.42  |Q        |V        |         |         |
12+30       0.9726      1.43  |Q        |V        |         |         |
12+35       0.9826      1.45  |Q        |V        |         |         |
12+40       0.9927      1.46  |Q        |V        |         |         |
12+45       1.0028      1.48  |Q        |V        |         |         |
12+50       1.0132      1.50  |Q        |V        |         |         |
12+55       1.0236      1.52  |Q        |V        |         |         |
13+ 0       1.0342      1.54  |Q        | V       |         |         |
13+ 5       1.0450      1.56  |Q        | V       |         |         |
13+10       1.0559      1.59  |Q        | V       |         |         |
13+15       1.0670      1.61  |Q        | V       |         |         |
13+20       1.0783      1.64  |Q        | V       |         |         |
13+25       1.0898      1.67  |Q        | V       |         |         |
13+30       1.1015      1.70  |Q        | V       |         |         |
13+35       1.1134      1.73  |Q        | V       |         |         |
13+40       1.1256      1.76  |Q        |  V      |         |         |
13+45       1.1380      1.80  |Q        |  V      |         |         |
13+50       1.1506      1.84  |Q        |  V      |         |         |
13+55       1.1635      1.88  |Q        |  V      |         |         |
14+ 0       1.1767      1.92  |Q        |  V      |         |         |
14+ 5       1.1903      1.96  |Q        |  V      |         |         |
14+10       1.2041      2.01  | Q       |  V      |         |         |
14+15       1.2183      2.06  | Q       |   V     |         |         |
14+20       1.2328      2.11  | Q       |   V     |         |         |
14+25       1.2478      2.17  | Q       |   V     |         |         |
14+30       1.2632      2.23  | Q       |   V     |         |         |
14+35       1.2790      2.30  | Q       |   V     |         |         |
14+40       1.2953      2.37  | Q       |    V    |         |         |
14+45       1.3122      2.45  | Q       |    V    |         |         |
14+50       1.3296      2.53  | Q       |    V    |         |         |
14+55       1.3477      2.63  | Q       |    V    |         |         |
15+ 0       1.3665      2.73  | Q       |    V    |         |         |
15+ 5       1.3861      2.85  | Q       |     V   |         |         |
15+10       1.4066      2.97  | Q       |     V   |         |         |
15+15       1.4281      3.12  |  Q      |     V   |         |         |
15+20       1.4507      3.28  |  Q      |     V   |         |         |
15+25       1.4744      3.45  |  Q      |      V  |         |         |
15+30       1.4985      3.50  |  Q      |                             |
15+35       1.5226      3.49  |  Q      |                             |
15+40       1.5478      3.66  |  Q      |                             |
15+45       1.5753      3.99  |  Q      |       V |         |         |
15+50       1.6060      4.46  |   Q     |       V |         |         |
15+55       1.6421      5.25  |    Q    |        V|         |         |
16+ 0       1.6897      6.92  |     Q   |        V|         |         |
16+ 5       1.7742     12.26  |         | Q       V         |         |
16+10       1.9583     26.74  |         |         | V   Q   |         |
16+15       2.1961     34.52  |         |         |    V    |   Q     |
16+20       2.3359     20.30  |         |         Q      V  |         |
16+25       2.4295     13.59  |         |  Q      |       V |         |
```

AREA B1,B2 & B3
PRE-DEVELOPED
Q100= 34.52 CFS

```
16+30       2.5002     10.28  |         Q         |        V|         |
16+35       2.5587      8.49  |       Q |         |        V|         |
16+40       2.6069      6.99  |     Q   |         |         V         |
16+45       2.6480      5.97  |    Q    |         |         V         |
16+50       2.6838      5.20  |    Q    |         |         |V        |
16+55       2.7152      4.55  |   Q     |         |         |V        |
17+ 0       2.7428      4.01  |   Q     |         |         |V        |
17+ 5       2.7670      3.52  |  Q      |         |         | V       |
17+10       2.7883      3.09  |  Q      |         |         | V       |
17+15       2.8083      2.91  | Q       |         |         | V       |
17+20       2.8275      2.78  | Q       |         |         | V       |
17+25       2.8451      2.56  | Q       |         |         |  V      |
17+30       2.8615      2.38  | Q       |         |         |  V      |
17+35       2.8748      1.94  |Q        |         |         |  V      |
17+40       2.8875      1.84  |Q        |         |         |  V      |
17+45       2.8997      1.76  |Q        |         |         |  V      |
17+50       2.9113      1.70  |Q        |         |         |  V      |
17+55       2.9226      1.63  |Q        |         |         |  V      |
18+ 0       2.9334      1.58  |Q        |         |         |   V     |
18+ 5       2.9440      1.53  |Q        |         |         |   V     |
18+10       2.9544      1.51  |Q        |         |         |   V     |
18+15       2.9649      1.52  |Q        |         |         |   V     |
18+20       2.9752      1.50  |Q        |         |         |   V     |
18+25       2.9854      1.48  |Q        |         |         |   V     |
18+30       2.9954      1.45  |Q        |         |         |   V     |
18+35       3.0052      1.42  |Q        |         |         |   V     |
18+40       3.0148      1.40  |Q        |         |         |   V     |
18+45       3.0242      1.37  |Q        |         |         |    V    |
18+50       3.0335      1.35  |Q        |         |         |    V    |
18+55       3.0426      1.32  |Q        |         |         |    V    |
19+ 0       3.0516      1.30  |Q        |         |         |    V    |
19+ 5       3.0604      1.28  |Q        |         |         |    V    |
19+10       3.0690      1.26  |Q        |         |         |    V    |
19+15       3.0775      1.23  |Q        |         |         |    V    |
19+20       3.0859      1.21  |Q        |         |         |    V    |
19+25       3.0941      1.20  |Q        |         |         |    V    |
19+30       3.1022      1.18  |Q        |         |         |     V   |
19+35       3.1102      1.16  |Q        |         |         |     V   |
19+40       3.1181      1.14  |Q        |         |         |     V   |
19+45       3.1258      1.13  |Q        |         |         |     V   |
19+50       3.1335      1.11  |Q        |         |         |     V   |
19+55       3.1410      1.10  |Q        |         |         |     V   |
20+ 0       3.1485      1.08  |Q        |         |         |     V   |
20+ 5       3.1558      1.07  |Q        |         |         |     V   |
20+10       3.1631      1.05  |Q        |         |         |     V   |
20+15       3.1702      1.04  |Q        |         |         |     V   |
20+20       3.1773      1.03  |Q        |         |         |     V   |
20+25       3.1843      1.01  |Q        |         |         |     V   |
20+30       3.1912      1.00  |Q        |         |         |      V  |
20+35       3.1980      0.99  Q         |         |         |      V  |
20+40       3.2048      0.98  Q         |         |         |      V  |
20+45       3.2114      0.97  Q         |         |         |      V  |
20+50       3.2180      0.96  Q         |         |         |      V  |
20+55       3.2246      0.95  Q         |         |         |      V  |
```

21+ 0	3.2310	0.94	Q				V
21+ 5	3.2374	0.93	Q				V
21+10	3.2437	0.92	Q				V
21+15	3.2500	0.91	Q				V
21+20	3.2562	0.90	Q				V
21+25	3.2624	0.89	Q				V
21+30	3.2685	0.88	Q				V
21+35	3.2745	0.88	Q				V
21+40	3.2805	0.87	Q				V
21+45	3.2864	0.86	Q				V
21+50	3.2923	0.85	Q				V
21+55	3.2981	0.84	Q				V
22+ 0	3.3038	0.84	Q				V
22+ 5	3.3096	0.83	Q				V
22+10	3.3152	0.82	Q				V
22+15	3.3209	0.82	Q				V
22+20	3.3264	0.81	Q				V
22+25	3.3320	0.80	Q				V
22+30	3.3375	0.80	Q				V
22+35	3.3429	0.79	Q				V
22+40	3.3483	0.79	Q				V
22+45	3.3537	0.78	Q				V
22+50	3.3590	0.77	Q				V
22+55	3.3643	0.77	Q				V
23+ 0	3.3696	0.76	Q				V
23+ 5	3.3748	0.76	Q				V
23+10	3.3799	0.75	Q				V
23+15	3.3851	0.75	Q				V
23+20	3.3902	0.74	Q				V
23+25	3.3952	0.74	Q				V
23+30	3.4003	0.73	Q				V
23+35	3.4053	0.73	Q				V
23+40	3.4102	0.72	Q				V
23+45	3.4152	0.72	Q				V
23+50	3.4201	0.71	Q				V
23+55	3.4249	0.71	Q				V
24+ 0	3.4298	0.70	Q				V

TR. 20525

100-year & 10-year, 24-Hours Storm Events

Unit Hydrograph Post–Developed

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

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

          Study date  08/26/22

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


Program License Serial Number 4070

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```

100-YR, 24-HOUR UNIT HYDROGRAPH POST DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA AA & BB (ONSITE AREAS TOWARDS NORTHWEST CORNER to BASIN No.1)
FILE: 20525HYDROAA1100YR.OUT

```
--------------------------------------------------------------------
```

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        Duration        Isohyetal
     (Ac.)            (hours)         (In)
Rainfall data for year 100
         28.99           1           1.08
--------------------------------------------------------------------
Rainfall data for year 100
         28.99           6           2.13
--------------------------------------------------------------------
Rainfall data for year 100
         28.99          24           3.82
--------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

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

```
SCS curve  SCS curve     Area     Area     Fp(Fig C6)    Ap      Fm
No.(AMCII) NO.(AMC 3)    (Ac.)    Fraction    (In/Hr)  (dec.)   (In/Hr)
 54.1      74.1         28.99      1.000     0.468    0.600    0.281

Area-averaged adjusted loss rate Fm (In/Hr) =  0.281

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

Area       Area          SCS CN    SCS CN      S     Pervious
 (Ac.)      Fract         (AMC2)    (AMC3)           Yield Fr
    17.39   0.600          54.1      74.1       3.50     0.385
    11.60   0.400          98.0      98.0       0.20     0.939

Area-averaged catchment yield fraction, Y =  0.607
Area-averaged low loss fraction, Yb =  0.393
User entry of time of concentration  =   0.295 (hours)
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Watershed area =      28.99(Ac.)
Catchment Lag time =   0.236 hours
Unit interval =   5.000 minutes
Unit interval percentage of lag time = 35.2868
Hydrograph baseflow =     0.00(CFS)
Average maximum watershed loss rate(Fm) =  0.281(In/Hr)
Average low loss rate fraction (Yb) = 0.393 (decimal)
DESERT S-Graph Selected
Computed peak 5-minute rainfall =  0.512(In)
Computed peak 30-minute rainfall =  0.877(In)
Specified peak 1-hour rainfall =  1.080(In)
Computed peak 3-hour rainfall =  1.638(In)
Specified peak 6-hour rainfall =  2.130(In)
Specified peak 24-hour rainfall =  3.820(In)


Rainfall depth area reduction factors:
Using a total area of      28.99(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999     Adjusted rainfall =  0.512(In)
30-minute factor = 0.999    Adjusted rainfall =  0.876(In)
1-hour factor = 0.999       Adjusted rainfall =  1.079(In)
3-hour factor = 1.000       Adjusted rainfall =  1.638(In)
6-hour factor = 1.000       Adjusted rainfall =  2.130(In)
24-hour factor = 1.000      Adjusted rainfall =  3.820(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 =       350.60 (CFS))

  1                2.261                    7.928
  2               13.669                   39.994
  3               41.477                   97.496
```

4	60.365	66.223
5	70.472	35.435
6	77.221	23.661
7	82.011	16.795
8	85.693	12.907
9	88.607	10.218
10	90.769	7.577
11	92.575	6.333
12	94.077	5.268
13	95.288	4.246
14	96.286	3.497
15	97.106	2.875
16	97.721	2.157
17	98.122	1.407
18	98.510	1.360
19	98.934	1.485
20	99.354	1.475
21	99.646	1.023
22	99.867	0.773
23	100.000	0.467

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5118	0.5118
2	0.6301	0.1183
3	0.7116	0.0815
4	0.7757	0.0641
5	0.8294	0.0537
6	0.8760	0.0466
7	0.9175	0.0415
8	0.9550	0.0375
9	0.9894	0.0343
10	1.0211	0.0318
11	1.0507	0.0296
12	1.0785	0.0278
13	1.1119	0.0333
14	1.1436	0.0318
15	1.1740	0.0304
16	1.2032	0.0292
17	1.2312	0.0280
18	1.2583	0.0270
19	1.2844	0.0261
20	1.3097	0.0253
21	1.3342	0.0245
22	1.3580	0.0238
23	1.3811	0.0231
24	1.4037	0.0225
25	1.4256	0.0220
26	1.4470	0.0214
27	1.4679	0.0209
28	1.4884	0.0204
29	1.5084	0.0200
30	1.5279	0.0196
31	1.5471	0.0192

32	1.5659	0.0188
33	1.5843	0.0184
34	1.6024	0.0181
35	1.6201	0.0178
36	1.6376	0.0174
37	1.6547	0.0171
38	1.6715	0.0168
39	1.6880	0.0165
40	1.7043	0.0163
41	1.7203	0.0160
42	1.7361	0.0158
43	1.7517	0.0156
44	1.7670	0.0153
45	1.7822	0.0151
46	1.7971	0.0149
47	1.8118	0.0147
48	1.8263	0.0145
49	1.8406	0.0143
50	1.8548	0.0142
51	1.8688	0.0140
52	1.8826	0.0138
53	1.8962	0.0136
54	1.9097	0.0135
55	1.9230	0.0133
56	1.9362	0.0132
57	1.9493	0.0130
58	1.9622	0.0129
59	1.9749	0.0128
60	1.9875	0.0126
61	2.0000	0.0125
62	2.0124	0.0124
63	2.0247	0.0122
64	2.0368	0.0121
65	2.0488	0.0120
66	2.0607	0.0119
67	2.0725	0.0118
68	2.0841	0.0117
69	2.0957	0.0116
70	2.1072	0.0115
71	2.1185	0.0114
72	2.1298	0.0113
73	2.1422	0.0124
74	2.1545	0.0123
75	2.1668	0.0122
76	2.1789	0.0121
77	2.1909	0.0120
78	2.2029	0.0119
79	2.2147	0.0119
80	2.2265	0.0118
81	2.2382	0.0117
82	2.2498	0.0116
83	2.2613	0.0115
84	2.2727	0.0114
85	2.2841	0.0114

86	2.2954	0.0113
87	2.3066	0.0112
88	2.3177	0.0111
89	2.3288	0.0111
90	2.3398	0.0110
91	2.3507	0.0109
92	2.3616	0.0109
93	2.3724	0.0108
94	2.3831	0.0107
95	2.3937	0.0107
96	2.4043	0.0106
97	2.4148	0.0105
98	2.4253	0.0105
99	2.4357	0.0104
100	2.4460	0.0103
101	2.4563	0.0103
102	2.4665	0.0102
103	2.4767	0.0102
104	2.4868	0.0101
105	2.4968	0.0100
106	2.5068	0.0100
107	2.5168	0.0099
108	2.5266	0.0099
109	2.5365	0.0098
110	2.5463	0.0098
111	2.5560	0.0097
112	2.5657	0.0097
113	2.5753	0.0096
114	2.5849	0.0096
115	2.5944	0.0095
116	2.6039	0.0095
117	2.6133	0.0094
118	2.6227	0.0094
119	2.6321	0.0093
120	2.6414	0.0093
121	2.6506	0.0093
122	2.6598	0.0092
123	2.6690	0.0092
124	2.6781	0.0091
125	2.6872	0.0091
126	2.6962	0.0090
127	2.7052	0.0090
128	2.7142	0.0090
129	2.7231	0.0089
130	2.7320	0.0089
131	2.7408	0.0088
132	2.7496	0.0088
133	2.7584	0.0088
134	2.7671	0.0087
135	2.7758	0.0087
136	2.7844	0.0086
137	2.7930	0.0086
138	2.8016	0.0086
139	2.8101	0.0085

140	2.8186	0.0085
141	2.8271	0.0085
142	2.8355	0.0084
143	2.8439	0.0084
144	2.8523	0.0084
145	2.8606	0.0083
146	2.8689	0.0083
147	2.8772	0.0083
148	2.8854	0.0082
149	2.8936	0.0082
150	2.9018	0.0082
151	2.9099	0.0081
152	2.9180	0.0081
153	2.9261	0.0081
154	2.9341	0.0080
155	2.9422	0.0080
156	2.9501	0.0080
157	2.9581	0.0080
158	2.9660	0.0079
159	2.9739	0.0079
160	2.9818	0.0079
161	2.9896	0.0078
162	2.9974	0.0078
163	3.0052	0.0078
164	3.0130	0.0078
165	3.0207	0.0077
166	3.0284	0.0077
167	3.0361	0.0077
168	3.0437	0.0076
169	3.0513	0.0076
170	3.0589	0.0076
171	3.0665	0.0076
172	3.0741	0.0075
173	3.0816	0.0075
174	3.0891	0.0075
175	3.0965	0.0075
176	3.1040	0.0074
177	3.1114	0.0074
178	3.1188	0.0074
179	3.1262	0.0074
180	3.1335	0.0073
181	3.1408	0.0073
182	3.1481	0.0073
183	3.1554	0.0073
184	3.1627	0.0073
185	3.1699	0.0072
186	3.1771	0.0072
187	3.1843	0.0072
188	3.1915	0.0072
189	3.1986	0.0071
190	3.2057	0.0071
191	3.2128	0.0071
192	3.2199	0.0071
193	3.2270	0.0071

194	3.2340	0.0070
195	3.2410	0.0070
196	3.2480	0.0070
197	3.2550	0.0070
198	3.2619	0.0070
199	3.2689	0.0069
200	3.2758	0.0069
201	3.2827	0.0069
202	3.2895	0.0069
203	3.2964	0.0069
204	3.3032	0.0068
205	3.3100	0.0068
206	3.3168	0.0068
207	3.3236	0.0068
208	3.3304	0.0068
209	3.3371	0.0067
210	3.3438	0.0067
211	3.3505	0.0067
212	3.3572	0.0067
213	3.3639	0.0067
214	3.3705	0.0066
215	3.3771	0.0066
216	3.3838	0.0066
217	3.3903	0.0066
218	3.3969	0.0066
219	3.4035	0.0066
220	3.4100	0.0065
221	3.4165	0.0065
222	3.4230	0.0065
223	3.4295	0.0065
224	3.4360	0.0065
225	3.4425	0.0065
226	3.4489	0.0064
227	3.4553	0.0064
228	3.4617	0.0064
229	3.4681	0.0064
230	3.4745	0.0064
231	3.4809	0.0064
232	3.4872	0.0063
233	3.4935	0.0063
234	3.4998	0.0063
235	3.5061	0.0063
236	3.5124	0.0063
237	3.5187	0.0063
238	3.5249	0.0062
239	3.5312	0.0062
240	3.5374	0.0062
241	3.5436	0.0062
242	3.5498	0.0062
243	3.5559	0.0062
244	3.5621	0.0062
245	3.5682	0.0061
246	3.5744	0.0061
247	3.5805	0.0061

248	3.5866	0.0061
249	3.5927	0.0061
250	3.5987	0.0061
251	3.6048	0.0061
252	3.6109	0.0060
253	3.6169	0.0060
254	3.6229	0.0060
255	3.6289	0.0060
256	3.6349	0.0060
257	3.6409	0.0060
258	3.6468	0.0060
259	3.6528	0.0059
260	3.6587	0.0059
261	3.6646	0.0059
262	3.6706	0.0059
263	3.6765	0.0059
264	3.6823	0.0059
265	3.6882	0.0059
266	3.6941	0.0059
267	3.6999	0.0058
268	3.7057	0.0058
269	3.7116	0.0058
270	3.7174	0.0058
271	3.7232	0.0058
272	3.7290	0.0058
273	3.7347	0.0058
274	3.7405	0.0058
275	3.7462	0.0057
276	3.7520	0.0057
277	3.7577	0.0057
278	3.7634	0.0057
279	3.7691	0.0057
280	3.7748	0.0057
281	3.7805	0.0057
282	3.7861	0.0057
283	3.7918	0.0057
284	3.7974	0.0056
285	3.8030	0.0056
286	3.8087	0.0056
287	3.8143	0.0056
288	3.8199	0.0056

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0056	0.0022	0.0034
2	0.0056	0.0022	0.0034
3	0.0056	0.0022	0.0034
4	0.0056	0.0022	0.0034
5	0.0057	0.0022	0.0034
6	0.0057	0.0022	0.0034
7	0.0057	0.0022	0.0035
8	0.0057	0.0022	0.0035

9	0.0057	0.0023	0.0035
10	0.0057	0.0023	0.0035
11	0.0058	0.0023	0.0035
12	0.0058	0.0023	0.0035
13	0.0058	0.0023	0.0035
14	0.0058	0.0023	0.0035
15	0.0058	0.0023	0.0035
16	0.0059	0.0023	0.0036
17	0.0059	0.0023	0.0036
18	0.0059	0.0023	0.0036
19	0.0059	0.0023	0.0036
20	0.0059	0.0023	0.0036
21	0.0060	0.0023	0.0036
22	0.0060	0.0024	0.0036
23	0.0060	0.0024	0.0036
24	0.0060	0.0024	0.0037
25	0.0060	0.0024	0.0037
26	0.0061	0.0024	0.0037
27	0.0061	0.0024	0.0037
28	0.0061	0.0024	0.0037
29	0.0061	0.0024	0.0037
30	0.0061	0.0024	0.0037
31	0.0062	0.0024	0.0037
32	0.0062	0.0024	0.0038
33	0.0062	0.0024	0.0038
34	0.0062	0.0025	0.0038
35	0.0063	0.0025	0.0038
36	0.0063	0.0025	0.0038
37	0.0063	0.0025	0.0038
38	0.0063	0.0025	0.0038
39	0.0064	0.0025	0.0039
40	0.0064	0.0025	0.0039
41	0.0064	0.0025	0.0039
42	0.0064	0.0025	0.0039
43	0.0065	0.0025	0.0039
44	0.0065	0.0025	0.0039
45	0.0065	0.0026	0.0039
46	0.0065	0.0026	0.0040
47	0.0066	0.0026	0.0040
48	0.0066	0.0026	0.0040
49	0.0066	0.0026	0.0040
50	0.0066	0.0026	0.0040
51	0.0067	0.0026	0.0040
52	0.0067	0.0026	0.0041
53	0.0067	0.0026	0.0041
54	0.0067	0.0027	0.0041
55	0.0068	0.0027	0.0041
56	0.0068	0.0027	0.0041
57	0.0068	0.0027	0.0041
58	0.0069	0.0027	0.0042
59	0.0069	0.0027	0.0042
60	0.0069	0.0027	0.0042
61	0.0070	0.0027	0.0042
62	0.0070	0.0027	0.0042

63	0.0070	0.0028	0.0043
64	0.0070	0.0028	0.0043
65	0.0071	0.0028	0.0043
66	0.0071	0.0028	0.0043
67	0.0071	0.0028	0.0043
68	0.0072	0.0028	0.0043
69	0.0072	0.0028	0.0044
70	0.0072	0.0028	0.0044
71	0.0073	0.0029	0.0044
72	0.0073	0.0029	0.0044
73	0.0073	0.0029	0.0045
74	0.0074	0.0029	0.0045
75	0.0074	0.0029	0.0045
76	0.0074	0.0029	0.0045
77	0.0075	0.0029	0.0045
78	0.0075	0.0030	0.0046
79	0.0076	0.0030	0.0046
80	0.0076	0.0030	0.0046
81	0.0076	0.0030	0.0046
82	0.0077	0.0030	0.0047
83	0.0077	0.0030	0.0047
84	0.0078	0.0031	0.0047
85	0.0078	0.0031	0.0047
86	0.0078	0.0031	0.0048
87	0.0079	0.0031	0.0048
88	0.0079	0.0031	0.0048
89	0.0080	0.0031	0.0048
90	0.0080	0.0032	0.0049
91	0.0081	0.0032	0.0049
92	0.0081	0.0032	0.0049
93	0.0082	0.0032	0.0050
94	0.0082	0.0032	0.0050
95	0.0083	0.0033	0.0050
96	0.0083	0.0033	0.0050
97	0.0084	0.0033	0.0051
98	0.0084	0.0033	0.0051
99	0.0085	0.0033	0.0051
100	0.0085	0.0033	0.0052
101	0.0086	0.0034	0.0052
102	0.0086	0.0034	0.0052
103	0.0087	0.0034	0.0053
104	0.0087	0.0034	0.0053
105	0.0088	0.0035	0.0053
106	0.0088	0.0035	0.0054
107	0.0089	0.0035	0.0054
108	0.0090	0.0035	0.0054
109	0.0090	0.0036	0.0055
110	0.0091	0.0036	0.0055
111	0.0092	0.0036	0.0056
112	0.0092	0.0036	0.0056
113	0.0093	0.0037	0.0056
114	0.0093	0.0037	0.0057
115	0.0094	0.0037	0.0057
116	0.0095	0.0037	0.0058

117	0.0096	0.0038	0.0058
118	0.0096	0.0038	0.0058
119	0.0097	0.0038	0.0059
120	0.0098	0.0038	0.0059
121	0.0099	0.0039	0.0060
122	0.0099	0.0039	0.0060
123	0.0100	0.0040	0.0061
124	0.0101	0.0040	0.0061
125	0.0102	0.0040	0.0062
126	0.0103	0.0040	0.0062
127	0.0104	0.0041	0.0063
128	0.0105	0.0041	0.0063
129	0.0106	0.0042	0.0064
130	0.0107	0.0042	0.0065
131	0.0108	0.0042	0.0065
132	0.0109	0.0043	0.0066
133	0.0110	0.0043	0.0067
134	0.0111	0.0044	0.0067
135	0.0112	0.0044	0.0068
136	0.0113	0.0044	0.0068
137	0.0114	0.0045	0.0069
138	0.0115	0.0045	0.0070
139	0.0117	0.0046	0.0071
140	0.0118	0.0046	0.0071
141	0.0119	0.0047	0.0072
142	0.0120	0.0047	0.0073
143	0.0122	0.0048	0.0074
144	0.0123	0.0048	0.0075
145	0.0113	0.0044	0.0068
146	0.0114	0.0045	0.0069
147	0.0116	0.0046	0.0070
148	0.0117	0.0046	0.0071
149	0.0119	0.0047	0.0072
150	0.0120	0.0047	0.0073
151	0.0122	0.0048	0.0074
152	0.0124	0.0049	0.0075
153	0.0126	0.0050	0.0077
154	0.0128	0.0050	0.0077
155	0.0130	0.0051	0.0079
156	0.0132	0.0052	0.0080
157	0.0135	0.0053	0.0082
158	0.0136	0.0054	0.0083
159	0.0140	0.0055	0.0085
160	0.0142	0.0056	0.0086
161	0.0145	0.0057	0.0088
162	0.0147	0.0058	0.0089
163	0.0151	0.0059	0.0092
164	0.0153	0.0060	0.0093
165	0.0158	0.0062	0.0096
166	0.0160	0.0063	0.0097
167	0.0165	0.0065	0.0100
168	0.0168	0.0066	0.0102
169	0.0174	0.0069	0.0106
170	0.0178	0.0070	0.0108

171	0.0184	0.0072	0.0112
172	0.0188	0.0074	0.0114
173	0.0196	0.0077	0.0119
174	0.0200	0.0079	0.0121
175	0.0209	0.0082	0.0127
176	0.0214	0.0084	0.0130
177	0.0225	0.0089	0.0137
178	0.0231	0.0091	0.0140
179	0.0245	0.0096	0.0149
180	0.0253	0.0099	0.0153
181	0.0270	0.0106	0.0164
182	0.0280	0.0110	0.0170
183	0.0304	0.0120	0.0184
184	0.0318	0.0125	0.0193
185	0.0278	0.0109	0.0169
186	0.0296	0.0116	0.0180
187	0.0343	0.0135	0.0208
188	0.0375	0.0147	0.0228
189	0.0466	0.0183	0.0283
190	0.0537	0.0211	0.0326
191	0.0815	0.0234	0.0581
192	0.1183	0.0234	0.0949
193	0.5118	0.0234	0.4884
194	0.0641	0.0234	0.0408
195	0.0415	0.0163	0.0252
196	0.0318	0.0125	0.0193
197	0.0333	0.0131	0.0202
198	0.0292	0.0115	0.0177
199	0.0261	0.0103	0.0159
200	0.0238	0.0094	0.0144
201	0.0220	0.0086	0.0133
202	0.0204	0.0080	0.0124
203	0.0192	0.0075	0.0116
204	0.0181	0.0071	0.0110
205	0.0171	0.0067	0.0104
206	0.0163	0.0064	0.0099
207	0.0156	0.0061	0.0094
208	0.0149	0.0059	0.0090
209	0.0143	0.0056	0.0087
210	0.0138	0.0054	0.0084
211	0.0133	0.0052	0.0081
212	0.0129	0.0051	0.0078
213	0.0125	0.0049	0.0076
214	0.0121	0.0048	0.0074
215	0.0118	0.0046	0.0071
216	0.0115	0.0045	0.0070
217	0.0124	0.0049	0.0075
218	0.0121	0.0048	0.0074
219	0.0119	0.0047	0.0072
220	0.0116	0.0046	0.0070
221	0.0114	0.0045	0.0069
222	0.0111	0.0044	0.0068
223	0.0109	0.0043	0.0066
224	0.0107	0.0042	0.0065

225	0.0105	0.0041	0.0064
226	0.0103	0.0041	0.0063
227	0.0102	0.0040	0.0062
228	0.0100	0.0039	0.0061
229	0.0098	0.0039	0.0060
230	0.0097	0.0038	0.0059
231	0.0095	0.0037	0.0058
232	0.0094	0.0037	0.0057
233	0.0093	0.0036	0.0056
234	0.0091	0.0036	0.0055
235	0.0090	0.0035	0.0055
236	0.0089	0.0035	0.0054
237	0.0088	0.0034	0.0053
238	0.0086	0.0034	0.0052
239	0.0085	0.0034	0.0052
240	0.0084	0.0033	0.0051
241	0.0083	0.0033	0.0051
242	0.0082	0.0032	0.0050
243	0.0081	0.0032	0.0049
244	0.0080	0.0032	0.0049
245	0.0080	0.0031	0.0048
246	0.0079	0.0031	0.0048
247	0.0078	0.0031	0.0047
248	0.0077	0.0030	0.0047
249	0.0076	0.0030	0.0046
250	0.0075	0.0030	0.0046
251	0.0075	0.0029	0.0045
252	0.0074	0.0029	0.0045
253	0.0073	0.0029	0.0044
254	0.0073	0.0029	0.0044
255	0.0072	0.0028	0.0044
256	0.0071	0.0028	0.0043
257	0.0071	0.0028	0.0043
258	0.0070	0.0028	0.0042
259	0.0069	0.0027	0.0042
260	0.0069	0.0027	0.0042
261	0.0068	0.0027	0.0041
262	0.0068	0.0027	0.0041
263	0.0067	0.0026	0.0041
264	0.0066	0.0026	0.0040
265	0.0066	0.0026	0.0040
266	0.0065	0.0026	0.0040
267	0.0065	0.0026	0.0039
268	0.0064	0.0025	0.0039
269	0.0064	0.0025	0.0039
270	0.0063	0.0025	0.0038
271	0.0063	0.0025	0.0038
272	0.0062	0.0025	0.0038
273	0.0062	0.0024	0.0038
274	0.0062	0.0024	0.0037
275	0.0061	0.0024	0.0037
276	0.0061	0.0024	0.0037
277	0.0060	0.0024	0.0037
278	0.0060	0.0024	0.0036

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279               0.0059            0.0023              0.0036
280               0.0059            0.0023              0.0036
281               0.0059            0.0023              0.0036
282               0.0058            0.0023              0.0035
283               0.0058            0.0023              0.0035
284               0.0058            0.0023              0.0035
285               0.0057            0.0023              0.0035
286               0.0057            0.0022              0.0035
287               0.0057            0.0022              0.0034
288               0.0056            0.0022              0.0034
--------------------------------------------------------------------
--------------------------------------------------------------------
Total soil rain loss =      1.29(In)
Total effective rainfall =      2.53(In)
Peak flow rate in flood hydrograph =     60.21(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       17.5      35.0      52.5      70.0
-----------------------------------------------------------------------
  0+ 5       0.0002      0.03  Q         |         |         |         |
  0+10       0.0013      0.16  Q         |         |         |         |
  0+15       0.0047      0.49  Q         |         |         |         |
  0+20       0.0097      0.72  Q         |         |         |         |
  0+25       0.0155      0.84  Q         |         |         |         |
  0+30       0.0218      0.93  Q         |         |         |         |
  0+35       0.0286      0.99  Q         |         |         |         |
  0+40       0.0357      1.03  Q         |         |         |         |
  0+45       0.0431      1.07  Q         |         |         |         |
  0+50       0.0507      1.10  Q         |         |         |         |
  0+55       0.0584      1.12  Q         |         |         |         |
  1+ 0       0.0663      1.15  Q         |         |         |         |
  1+ 5       0.0743      1.16  Q         |         |         |         |
  1+10       0.0824      1.18  Q         |         |         |         |
  1+15       0.0906      1.19  Q         |         |         |         |
  1+20       0.0989      1.20  Q         |         |         |         |
  1+25       0.1073      1.21  Q         |         |         |         |
  1+30       0.1157      1.22  Q         |         |         |         |
  1+35       0.1241      1.23  Q         |         |         |         |
  1+40       0.1327      1.24  Q         |         |         |         |
  1+45       0.1413      1.25  Q         |         |         |         |
  1+50       0.1499      1.25  Q         |         |         |         |
  1+55       0.1586      1.26  QV        |         |         |         |
  2+ 0       0.1673      1.26  QV        |         |         |         |
  2+ 5       0.1760      1.27  QV        |         |         |         |
  2+10       0.1847      1.27  QV        |         |         |         |
  2+15       0.1935      1.28  QV        |         |         |         |
  2+20       0.2023      1.28  QV        |         |         |         |
  2+25       0.2112      1.28  QV        |         |         |         |
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2+30       0.2201      1.29  QV        |         |         |         |
2+35       0.2290      1.29  QV        |         |         |         |
2+40       0.2379      1.30  QV        |         |         |         |
2+45       0.2469      1.30  QV        |         |         |         |
2+50       0.2559      1.31  QV        |         |         |         |
2+55       0.2649      1.31  QV        |         |         |         |
3+ 0       0.2740      1.32  QV        |         |         |         |
3+ 5       0.2831      1.32  QV        |         |         |         |
3+10       0.2922      1.33  QV        |         |         |         |
3+15       0.3014      1.33  QV        |         |         |         |
3+20       0.3106      1.34  Q V       |         |         |         |
3+25       0.3198      1.34  Q V       |         |         |         |
3+30       0.3291      1.35  Q V       |         |         |         |
3+35       0.3384      1.35  Q V       |         |         |         |
3+40       0.3477      1.36  Q V       |         |         |         |
3+45       0.3571      1.36  Q V       |         |         |         |
3+50       0.3665      1.37  Q V       |         |         |         |
3+55       0.3760      1.37  Q V       |         |         |         |
4+ 0       0.3854      1.38  Q V       |         |         |         |
4+ 5       0.3950      1.38  Q V       |         |         |         |
4+10       0.4045      1.39  Q V       |         |         |         |
4+15       0.4141      1.39  Q V       |         |         |         |
4+20       0.4237      1.40  Q V       |         |         |         |
4+25       0.4334      1.40  Q V       |         |         |         |
4+30       0.4431      1.41  Q V       |         |         |         |
4+35       0.4529      1.42  Q V       |         |         |         |
4+40       0.4627      1.42  Q  V      |         |         |         |
4+45       0.4725      1.43  Q  V      |         |         |         |
4+50       0.4824      1.43  Q  V      |         |         |         |
4+55       0.4923      1.44  Q  V      |         |         |         |
5+ 0       0.5022      1.45  Q  V      |         |         |         |
5+ 5       0.5122      1.45  Q  V      |         |         |         |
5+10       0.5223      1.46  Q  V      |         |         |         |
5+15       0.5324      1.46  Q  V      |         |         |         |
5+20       0.5425      1.47  Q  V      |         |         |         |
5+25       0.5527      1.48  Q  V      |         |         |         |
5+30       0.5629      1.48  Q  V      |         |         |         |
5+35       0.5731      1.49  Q  V      |         |         |         |
5+40       0.5834      1.50  Q  V      |         |         |         |
5+45       0.5938      1.50  Q  V      |         |         |         |
5+50       0.6042      1.51  Q  V      |         |         |         |
5+55       0.6146      1.52  Q   V     |         |         |         |
6+ 0       0.6251      1.52  Q   V     |         |         |         |
6+ 5       0.6357      1.53  Q   V     |         |         |         |
6+10       0.6463      1.54  Q   V     |         |         |         |
6+15       0.6569      1.55  Q   V     |         |         |         |
6+20       0.6676      1.55  Q   V     |         |         |         |
6+25       0.6784      1.56  Q   V     |         |         |         |
6+30       0.6892      1.57  Q   V     |         |         |         |
6+35       0.7000      1.58  Q   V     |         |         |         |
6+40       0.7109      1.58  Q   V     |         |         |         |
6+45       0.7219      1.59  Q   V     |         |         |         |
6+50       0.7329      1.60  Q   V     |         |         |         |
6+55       0.7440      1.61  Q   V     |         |         |         |
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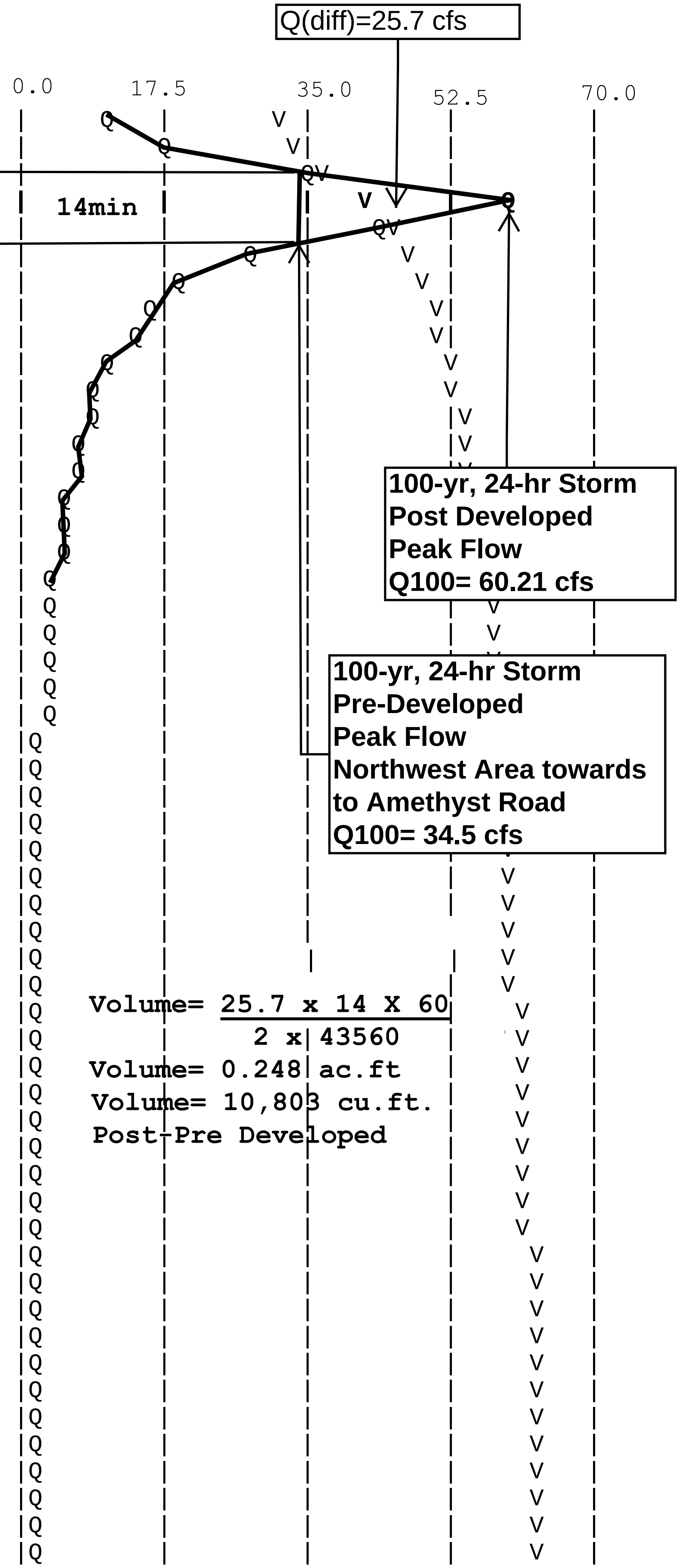
 7+ 0       0.7551      1.62  Q   V     |         |         |         |
 7+ 5       0.7663      1.62  Q    V    |         |         |         |
 7+10       0.7776      1.63  Q    V    |         |         |         |
 7+15       0.7889      1.64  Q    V    |         |         |         |
 7+20       0.8002      1.65  Q    V    |         |         |         |
 7+25       0.8117      1.66  Q    V    |         |         |         |
 7+30       0.8231      1.67  Q    V    |         |         |         |
 7+35       0.8347      1.68  Q    V    |         |         |         |
 7+40       0.8463      1.69  Q    V    |         |         |         |
 7+45       0.8580      1.70  Q    V    |         |         |         |
 7+50       0.8697      1.71  Q    V    |         |         |         |
 7+55       0.8815      1.71  Q    V    |         |         |         |
 8+ 0       0.8934      1.72  Q    V    |         |         |         |
 8+ 5       0.9054      1.73  Q    V    |         |         |         |
 8+10       0.9174      1.74  Q     V   |         |         |         |
 8+15       0.9295      1.76  |Q    V   |         |         |         |
 8+20       0.9416      1.77  |Q    V   |         |         |         |
 8+25       0.9539      1.78  |Q    V   |         |         |         |
 8+30       0.9662      1.79  |Q    V   |         |         |         |
 8+35       0.9785      1.80  |Q    V   |         |         |         |
 8+40       0.9910      1.81  |Q    V   |         |         |         |
 8+45       1.0035      1.82  |Q    V   |         |         |         |
 8+50       1.0162      1.83  |Q    V   |         |         |         |
 8+55       1.0289      1.84  |Q    V   |         |         |         |
 9+ 0       1.0416      1.86  |Q    V   |         |         |         |
 9+ 5       1.0545      1.87  |Q    V   |         |         |         |
 9+10       1.0675      1.88  |Q    V   |         |         |         |
 9+15       1.0805      1.89  |Q     V  |         |         |         |
 9+20       1.0936      1.91  |Q     V  |         |         |         |
 9+25       1.1068      1.92  |Q     V  |         |         |         |
 9+30       1.1202      1.93  |Q     V  |         |         |         |
 9+35       1.1336      1.95  |Q     V  |         |         |         |
 9+40       1.1471      1.96  |Q     V  |         |         |         |
 9+45       1.1607      1.97  |Q     V  |         |         |         |
 9+50       1.1743      1.99  |Q     V  |         |         |         |
 9+55       1.1881      2.00  |Q     V  |         |         |         |
10+ 0       1.2020      2.02  |Q     V  |         |         |         |
10+ 5       1.2161      2.03  |Q     V  |         |         |         |
10+10       1.2302      2.05  |Q      V |         |         |         |
10+15       1.2444      2.07  |Q      V |         |         |         |
10+20       1.2587      2.08  |Q      V |         |         |         |
10+25       1.2732      2.10  |Q      V |         |         |         |
10+30       1.2878      2.12  |Q      V |         |         |         |
10+35       1.3025      2.13  |Q      V |         |         |         |
10+40       1.3173      2.15  |Q      V |         |         |         |
10+45       1.3322      2.17  |Q      V |         |         |         |
10+50       1.3473      2.19  |Q      V |         |         |         |
10+55       1.3625      2.21  |Q      V |         |         |         |
11+ 0       1.3778      2.23  |Q       V|         |         |         |
11+ 5       1.3933      2.25  |Q       V|         |         |         |
11+10       1.4089      2.27  |Q       V|         |         |         |
11+15       1.4247      2.29  |Q       V|         |         |         |
11+20       1.4406      2.31  |Q       V|         |         |         |
11+25       1.4567      2.33  |Q       V|         |         |         |
```

```
11+30       1.4729      2.36  |Q       V|         |         |         |
11+35       1.4893      2.38  |Q       V|         |         |         |
11+40       1.5058      2.40  |Q       V|         |         |         |
11+45       1.5226      2.43  |Q       V|         |         |         |
11+50       1.5395      2.45  |Q        V         |         |         |
11+55       1.5566      2.48  |Q        V         |         |         |
12+ 0       1.5738      2.51  |Q        V         |         |         |
12+ 5       1.5912      2.53  |Q        V         |         |         |
12+10       1.6087      2.53  |Q        V         |         |         |
12+15       1.6258      2.48  |Q        V         |         |         |
12+20       1.6427      2.46  |Q        V         |         |         |
12+25       1.6597      2.47  |Q        V         |         |         |
12+30       1.6768      2.48  |Q        V         |         |         |
12+35       1.6941      2.50  |Q        |V        |         |         |
12+40       1.7115      2.53  |Q        |V        |         |         |
12+45       1.7291      2.55  |Q        |V        |         |         |
12+50       1.7469      2.59  |Q        |V        |         |         |
12+55       1.7649      2.62  |Q        |V        |         |         |
13+ 0       1.7832      2.65  |Q        |V        |         |         |
13+ 5       1.8017      2.69  |Q        |V        |         |         |
13+10       1.8205      2.73  |Q        |V        |         |         |
13+15       1.8397      2.78  |Q        | V       |         |         |
13+20       1.8591      2.82  |Q        | V       |         |         |
13+25       1.8788      2.87  |Q        | V       |         |         |
13+30       1.8989      2.92  |Q        | V       |         |         |
13+35       1.9194      2.97  |Q        | V       |         |         |
13+40       1.9402      3.03  |Q        | V       |         |         |
13+45       1.9615      3.09  |Q        | V       |         |         |
13+50       1.9832      3.15  |Q        | V       |         |         |
13+55       2.0053      3.21  |Q        |  V      |         |         |
14+ 0       2.0279      3.28  |Q        |  V      |         |         |
14+ 5       2.0510      3.36  |Q        |  V      |         |         |
14+10       2.0747      3.43  |Q        |  V      |         |         |
14+15       2.0989      3.52  | Q       |  V      |         |         |
14+20       2.1238      3.61  | Q       |  V      |         |         |
14+25       2.1493      3.71  | Q       |   V     |         |         |
14+30       2.1756      3.81  | Q       |   V     |         |         |
14+35       2.2026      3.92  | Q       |   V     |         |         |
14+40       2.2304      4.04  | Q       |   V     |         |         |
14+45       2.2591      4.17  | Q       |   V     |         |         |
14+50       2.2888      4.31  | Q       |   V     |         |         |
14+55       2.3196      4.47  | Q       |    V    |         |         |
15+ 0       2.3514      4.63  | Q       |    V    |         |         |
15+ 5       2.3847      4.82  | Q       |    V    |         |         |
15+10       2.4193      5.03  | Q       |    V    |         |         |
15+15       2.4556      5.27  |  Q      |     V   |         |         |
15+20       2.4937      5.53  |  Q      |     V   |         |         |
15+25       2.5337      5.81  |  Q      |     V   |         |         |
15+30       2.5749      5.98  |  Q      |     V   |         |         |
15+35       2.6161      5.99  |  Q      |      V  |         |         |
15+40       2.6586      6.17  |  Q      |      V  |         |         |
15+45       2.7044      6.64  |  Q      |      V  |         |         |
15+50       2.7548      7.32  |   Q     |       V |         |         |
15+55       2.8134      8.50  |   Q     |       V |         |         |
```

16+ 0	2.8875	10.76
16+ 5	3.0144	18.44
16+10	3.2642	36.27
16+15	**3.6789**	**60.21**
16+20	3.9824	44.06
16+25	4.1757	28.06
16+30	4.3203	20.99
16+35	4.4365	16.87
16+40	4.5345	14.24
16+45	4.6186	12.21
16+50	4.6899	10.36
16+55	4.7533	9.21
17+ 0	4.8099	8.22
17+ 5	4.8604	7.32
17+10	4.9057	6.59
17+15	4.9467	5.95
17+20	4.9834	5.32
17+25	5.0161	4.75
17+30	5.0472	4.52
17+35	5.0774	4.39
17+40	5.1062	4.18
17+45	5.1324	3.80
17+50	5.1565	3.50
17+55	5.1786	3.20
18+ 0	5.1983	2.87
18+ 5	5.2174	2.77
18+10	5.2360	2.70
18+15	5.2546	2.69
18+20	5.2729	2.66
18+25	5.2909	2.62
18+30	5.3086	2.57
18+35	5.3260	2.52
18+40	5.3430	2.47
18+45	5.3597	2.42
18+50	5.3760	2.38
18+55	5.3921	2.33
19+ 0	5.4079	2.29
19+ 5	5.4234	2.25
19+10	5.4386	2.21
19+15	5.4536	2.18
19+20	5.4683	2.14
19+25	5.4828	2.11
19+30	5.4971	2.07
19+35	5.5112	2.04
19+40	5.5250	2.01
19+45	5.5387	1.98
19+50	5.5521	1.95
19+55	5.5654	1.93
20+ 0	5.5785	1.90
20+ 5	5.5914	1.88
20+10	5.6042	1.85
20+15	5.6168	1.83
20+20	5.6292	1.80
20+25	5.6414	1.78



$$\text{Volume}= \frac{25.7 \times 14 \times 60}{2 \times 43560}$$

Volume= 0.248 ac.ft

Volume= 10,803 cu.ft.

Post-Pre Developed

```
20+30       5.6536      1.76  |Q        |         |         |      V  |
20+35       5.6656      1.74  Q         |         |         |      V  |
20+40       5.6774      1.72  Q         |         |         |      V  |
20+45       5.6891      1.70  Q         |         |         |      V  |
20+50       5.7007      1.68  Q         |         |         |      V  |
20+55       5.7121      1.66  Q         |         |         |      V  |
21+ 0       5.7235      1.65  Q         |         |         |      V  |
21+ 5       5.7347      1.63  Q         |         |         |      V  |
21+10       5.7458      1.61  Q         |         |         |      V  |
21+15       5.7568      1.60  Q         |         |         |      V  |
21+20       5.7676      1.58  Q         |         |         |      V  |
21+25       5.7784      1.56  Q         |         |         |      V  |
21+30       5.7891      1.55  Q         |         |         |      V  |
21+35       5.7996      1.53  Q         |         |         |      V  |
21+40       5.8101      1.52  Q         |         |         |       V |
21+45       5.8205      1.51  Q         |         |         |       V |
21+50       5.8308      1.49  Q         |         |         |       V |
21+55       5.8410      1.48  Q         |         |         |       V |
22+ 0       5.8511      1.47  Q         |         |         |       V |
22+ 5       5.8611      1.45  Q         |         |         |       V |
22+10       5.8710      1.44  Q         |         |         |       V |
22+15       5.8808      1.43  Q         |         |         |       V |
22+20       5.8906      1.42  Q         |         |         |       V |
22+25       5.9003      1.41  Q         |         |         |       V |
22+30       5.9099      1.40  Q         |         |         |       V |
22+35       5.9194      1.38  Q         |         |         |       V |
22+40       5.9289      1.37  Q         |         |         |       V |
22+45       5.9383      1.36  Q         |         |         |       V |
22+50       5.9476      1.35  Q         |         |         |       V |
22+55       5.9568      1.34  Q         |         |         |        V|
23+ 0       5.9660      1.33  Q         |         |         |        V|
23+ 5       5.9751      1.32  Q         |         |         |        V|
23+10       5.9842      1.31  Q         |         |         |        V|
23+15       5.9932      1.30  Q         |         |         |        V|
23+20       6.0021      1.29  Q         |         |         |        V|
23+25       6.0109      1.29  Q         |         |         |        V|
23+30       6.0197      1.28  Q         |         |         |        V|
23+35       6.0285      1.27  Q         |         |         |        V|
23+40       6.0371      1.26  Q         |         |         |        V|
23+45       6.0458      1.25  Q         |         |         |        V|
23+50       6.0543      1.24  Q         |         |         |        V|
23+55       6.0628      1.24  Q         |         |         |        V|
24+ 0       6.0713      1.23  Q         |         |         |        V|
----------------------------------------------------------------------
```

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

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

          Study date  08/26/22

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


Program License Serial Number 4070

---------------------------------------------------------------------
10-YR, 24-HOUR UNIT HYDROGRAPH POST DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA AA & BB (ONSITE AREAS TOWARDS NORTHWEST CORNER to BASIN No.1)
FILE: 20525HYDROAA110YR.OUT
--------------------------------------------------------------------

     Storm Event Year = 10

     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       Duration       Isohyetal
     (Ac.)           (hours)        (In)
Rainfall data for year 10
         28.99           1          0.63
--------------------------------------------------------------------
Rainfall data for year 10
         28.99           6          1.27
--------------------------------------------------------------------
Rainfall data for year 10
         28.99          24          2.27
--------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

******** 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)
54.1	74.1	28.99	1.000	0.468	0.600	0.281

Area-averaged adjusted loss rate Fm (In/Hr) = 0.281

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
17.39	0.600	54.1	74.1	3.50	0.215
11.60	0.400	98.0	98.0	0.20	0.900

Area-averaged catchment yield fraction, Y = 0.489
Area-averaged low loss fraction, Yb = 0.511
User entry of time of concentration = 0.306 (hours)
++
Watershed area = 28.99(Ac.)
Catchment Lag time = 0.245 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 34.0637
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.281(In/Hr)
Average low loss rate fraction (Yb) = 0.511 (decimal)
DESERT S-Graph Selected
Computed peak 5-minute rainfall = 0.297(In)
Computed peak 30-minute rainfall = 0.508(In)
Specified peak 1-hour rainfall = 0.626(In)
Computed peak 3-hour rainfall = 0.966(In)
Specified peak 6-hour rainfall = 1.270(In)
Specified peak 24-hour rainfall = 2.270(In)

Rainfall depth area reduction factors:
Using a total area of 28.99(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999	Adjusted rainfall = 0.297(In)
30-minute factor = 0.999	Adjusted rainfall = 0.508(In)
1-hour factor = 0.999	Adjusted rainfall = 0.625(In)
3-hour factor = 1.000	Adjusted rainfall = 0.966(In)
6-hour factor = 1.000	Adjusted rainfall = 1.270(In)
24-hour factor = 1.000	Adjusted rainfall = 2.270(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 = 350.60 (CFS))	
1	2.141	7.507
2	12.528	36.416
3	39.187	93.466

4	58.736	68.537
5	69.185	36.636
6	76.122	24.321
7	81.063	17.322
8	84.802	13.110
9	87.849	10.682
10	90.102	7.898
11	91.958	6.507
12	93.525	5.494
13	94.777	4.390
14	95.850	3.763
15	96.728	3.077
16	97.404	2.370
17	97.918	1.801
18	98.266	1.222
19	98.662	1.388
20	99.071	1.433
21	99.460	1.364
22	99.702	0.850
23	100.000	0.425

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.2966	0.2966
2	0.3652	0.0686
3	0.4124	0.0472
4	0.4496	0.0372
5	0.4808	0.0311
6	0.5078	0.0270
7	0.5318	0.0240
8	0.5535	0.0217
9	0.5735	0.0199
10	0.5919	0.0184
11	0.6090	0.0172
12	0.6251	0.0161
13	0.6453	0.0201
14	0.6645	0.0192
15	0.6829	0.0184
16	0.7006	0.0177
17	0.7176	0.0170
18	0.7340	0.0164
19	0.7499	0.0159
20	0.7653	0.0154
21	0.7802	0.0149
22	0.7947	0.0145
23	0.8088	0.0141
24	0.8225	0.0137
25	0.8360	0.0134
26	0.8490	0.0131
27	0.8618	0.0128
28	0.8743	0.0125
29	0.8865	0.0122
30	0.8985	0.0120
31	0.9103	0.0117

32	0.9218	0.0115
33	0.9331	0.0113
34	0.9442	0.0111
35	0.9551	0.0109
36	0.9658	0.0107
37	0.9763	0.0105
38	0.9866	0.0103
39	0.9968	0.0102
40	1.0068	0.0100
41	1.0167	0.0099
42	1.0264	0.0097
43	1.0360	0.0096
44	1.0454	0.0094
45	1.0548	0.0093
46	1.0639	0.0092
47	1.0730	0.0091
48	1.0820	0.0090
49	1.0908	0.0088
50	1.0996	0.0087
51	1.1082	0.0086
52	1.1167	0.0085
53	1.1252	0.0084
54	1.1335	0.0083
55	1.1417	0.0082
56	1.1499	0.0082
57	1.1580	0.0081
58	1.1659	0.0080
59	1.1738	0.0079
60	1.1817	0.0078
61	1.1894	0.0077
62	1.1971	0.0077
63	1.2047	0.0076
64	1.2122	0.0075
65	1.2196	0.0074
66	1.2270	0.0074
67	1.2343	0.0073
68	1.2415	0.0072
69	1.2487	0.0072
70	1.2558	0.0071
71	1.2629	0.0071
72	1.2699	0.0070
73	1.2772	0.0074
74	1.2845	0.0073
75	1.2918	0.0072
76	1.2990	0.0072
77	1.3061	0.0071
78	1.3132	0.0071
79	1.3202	0.0070
80	1.3272	0.0070
81	1.3341	0.0069
82	1.3410	0.0069
83	1.3478	0.0068
84	1.3546	0.0068
85	1.3613	0.0067

86	1.3680	0.0067
87	1.3747	0.0066
88	1.3813	0.0066
89	1.3878	0.0066
90	1.3943	0.0065
91	1.4008	0.0065
92	1.4072	0.0064
93	1.4136	0.0064
94	1.4200	0.0063
95	1.4263	0.0063
96	1.4326	0.0063
97	1.4388	0.0062
98	1.4450	0.0062
99	1.4511	0.0062
100	1.4573	0.0061
101	1.4634	0.0061
102	1.4694	0.0061
103	1.4754	0.0060
104	1.4814	0.0060
105	1.4874	0.0060
106	1.4933	0.0059
107	1.4992	0.0059
108	1.5050	0.0059
109	1.5108	0.0058
110	1.5166	0.0058
111	1.5224	0.0058
112	1.5281	0.0057
113	1.5338	0.0057
114	1.5395	0.0057
115	1.5451	0.0056
116	1.5508	0.0056
117	1.5563	0.0056
118	1.5619	0.0056
119	1.5674	0.0055
120	1.5729	0.0055
121	1.5784	0.0055
122	1.5839	0.0055
123	1.5893	0.0054
124	1.5947	0.0054
125	1.6001	0.0054
126	1.6054	0.0054
127	1.6108	0.0053
128	1.6161	0.0053
129	1.6213	0.0053
130	1.6266	0.0053
131	1.6318	0.0052
132	1.6370	0.0052
133	1.6422	0.0052
134	1.6474	0.0052
135	1.6525	0.0051
136	1.6576	0.0051
137	1.6627	0.0051
138	1.6678	0.0051
139	1.6729	0.0051

140	1.6779	0.0050
141	1.6829	0.0050
142	1.6879	0.0050
143	1.6929	0.0050
144	1.6978	0.0049
145	1.7027	0.0049
146	1.7076	0.0049
147	1.7125	0.0049
148	1.7174	0.0049
149	1.7223	0.0049
150	1.7271	0.0048
151	1.7319	0.0048
152	1.7367	0.0048
153	1.7415	0.0048
154	1.7462	0.0048
155	1.7510	0.0047
156	1.7557	0.0047
157	1.7604	0.0047
158	1.7651	0.0047
159	1.7698	0.0047
160	1.7744	0.0047
161	1.7791	0.0046
162	1.7837	0.0046
163	1.7883	0.0046
164	1.7929	0.0046
165	1.7975	0.0046
166	1.8020	0.0046
167	1.8065	0.0045
168	1.8111	0.0045
169	1.8156	0.0045
170	1.8201	0.0045
171	1.8246	0.0045
172	1.8290	0.0045
173	1.8335	0.0044
174	1.8379	0.0044
175	1.8423	0.0044
176	1.8467	0.0044
177	1.8511	0.0044
178	1.8555	0.0044
179	1.8598	0.0044
180	1.8642	0.0043
181	1.8685	0.0043
182	1.8728	0.0043
183	1.8771	0.0043
184	1.8814	0.0043
185	1.8857	0.0043
186	1.8900	0.0043
187	1.8942	0.0043
188	1.8985	0.0042
189	1.9027	0.0042
190	1.9069	0.0042
191	1.9111	0.0042
192	1.9153	0.0042
193	1.9195	0.0042

194	1.9236	0.0042
195	1.9278	0.0041
196	1.9319	0.0041
197	1.9360	0.0041
198	1.9401	0.0041
199	1.9442	0.0041
200	1.9483	0.0041
201	1.9524	0.0041
202	1.9565	0.0041
203	1.9605	0.0041
204	1.9646	0.0040
205	1.9686	0.0040
206	1.9726	0.0040
207	1.9766	0.0040
208	1.9806	0.0040
209	1.9846	0.0040
210	1.9886	0.0040
211	1.9925	0.0040
212	1.9965	0.0040
213	2.0004	0.0039
214	2.0043	0.0039
215	2.0083	0.0039
216	2.0122	0.0039
217	2.0161	0.0039
218	2.0200	0.0039
219	2.0238	0.0039
220	2.0277	0.0039
221	2.0316	0.0039
222	2.0354	0.0038
223	2.0392	0.0038
224	2.0431	0.0038
225	2.0469	0.0038
226	2.0507	0.0038
227	2.0545	0.0038
228	2.0583	0.0038
229	2.0620	0.0038
230	2.0658	0.0038
231	2.0696	0.0038
232	2.0733	0.0037
233	2.0771	0.0037
234	2.0808	0.0037
235	2.0845	0.0037
236	2.0882	0.0037
237	2.0919	0.0037
238	2.0956	0.0037
239	2.0993	0.0037
240	2.1030	0.0037
241	2.1066	0.0037
242	2.1103	0.0037
243	2.1140	0.0036
244	2.1176	0.0036
245	2.1212	0.0036
246	2.1249	0.0036
247	2.1285	0.0036

248	2.1321	0.0036
249	2.1357	0.0036
250	2.1393	0.0036
251	2.1428	0.0036
252	2.1464	0.0036
253	2.1500	0.0036
254	2.1535	0.0036
255	2.1571	0.0035
256	2.1606	0.0035
257	2.1642	0.0035
258	2.1677	0.0035
259	2.1712	0.0035
260	2.1747	0.0035
261	2.1782	0.0035
262	2.1817	0.0035
263	2.1852	0.0035
264	2.1887	0.0035
265	2.1921	0.0035
266	2.1956	0.0035
267	2.1990	0.0035
268	2.2025	0.0034
269	2.2059	0.0034
270	2.2094	0.0034
271	2.2128	0.0034
272	2.2162	0.0034
273	2.2196	0.0034
274	2.2230	0.0034
275	2.2264	0.0034
276	2.2298	0.0034
277	2.2332	0.0034
278	2.2366	0.0034
279	2.2399	0.0034
280	2.2433	0.0034
281	2.2466	0.0034
282	2.2500	0.0033
283	2.2533	0.0033
284	2.2567	0.0033
285	2.2600	0.0033
286	2.2633	0.0033
287	2.2666	0.0033
288	2.2699	0.0033

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0033	0.0017	0.0016
2	0.0033	0.0017	0.0016
3	0.0033	0.0017	0.0016
4	0.0033	0.0017	0.0016
5	0.0033	0.0017	0.0016
6	0.0034	0.0017	0.0016
7	0.0034	0.0017	0.0016
8	0.0034	0.0017	0.0016

9	0.0034	0.0017	0.0017
10	0.0034	0.0017	0.0017
11	0.0034	0.0017	0.0017
12	0.0034	0.0017	0.0017
13	0.0034	0.0018	0.0017
14	0.0034	0.0018	0.0017
15	0.0035	0.0018	0.0017
16	0.0035	0.0018	0.0017
17	0.0035	0.0018	0.0017
18	0.0035	0.0018	0.0017
19	0.0035	0.0018	0.0017
20	0.0035	0.0018	0.0017
21	0.0035	0.0018	0.0017
22	0.0035	0.0018	0.0017
23	0.0035	0.0018	0.0017
24	0.0036	0.0018	0.0017
25	0.0036	0.0018	0.0017
26	0.0036	0.0018	0.0017
27	0.0036	0.0018	0.0018
28	0.0036	0.0018	0.0018
29	0.0036	0.0019	0.0018
30	0.0036	0.0019	0.0018
31	0.0036	0.0019	0.0018
32	0.0037	0.0019	0.0018
33	0.0037	0.0019	0.0018
34	0.0037	0.0019	0.0018
35	0.0037	0.0019	0.0018
36	0.0037	0.0019	0.0018
37	0.0037	0.0019	0.0018
38	0.0037	0.0019	0.0018
39	0.0038	0.0019	0.0018
40	0.0038	0.0019	0.0018
41	0.0038	0.0019	0.0019
42	0.0038	0.0019	0.0019
43	0.0038	0.0020	0.0019
44	0.0038	0.0020	0.0019
45	0.0038	0.0020	0.0019
46	0.0039	0.0020	0.0019
47	0.0039	0.0020	0.0019
48	0.0039	0.0020	0.0019
49	0.0039	0.0020	0.0019
50	0.0039	0.0020	0.0019
51	0.0039	0.0020	0.0019
52	0.0040	0.0020	0.0019
53	0.0040	0.0020	0.0019
54	0.0040	0.0020	0.0019
55	0.0040	0.0020	0.0020
56	0.0040	0.0021	0.0020
57	0.0040	0.0021	0.0020
58	0.0041	0.0021	0.0020
59	0.0041	0.0021	0.0020
60	0.0041	0.0021	0.0020
61	0.0041	0.0021	0.0020
62	0.0041	0.0021	0.0020

63	0.0041	0.0021	0.0020
64	0.0042	0.0021	0.0020
65	0.0042	0.0021	0.0020
66	0.0042	0.0021	0.0021
67	0.0042	0.0022	0.0021
68	0.0042	0.0022	0.0021
69	0.0043	0.0022	0.0021
70	0.0043	0.0022	0.0021
71	0.0043	0.0022	0.0021
72	0.0043	0.0022	0.0021
73	0.0043	0.0022	0.0021
74	0.0044	0.0022	0.0021
75	0.0044	0.0022	0.0021
76	0.0044	0.0023	0.0022
77	0.0044	0.0023	0.0022
78	0.0044	0.0023	0.0022
79	0.0045	0.0023	0.0022
80	0.0045	0.0023	0.0022
81	0.0045	0.0023	0.0022
82	0.0045	0.0023	0.0022
83	0.0046	0.0023	0.0022
84	0.0046	0.0023	0.0022
85	0.0046	0.0024	0.0023
86	0.0046	0.0024	0.0023
87	0.0047	0.0024	0.0023
88	0.0047	0.0024	0.0023
89	0.0047	0.0024	0.0023
90	0.0047	0.0024	0.0023
91	0.0048	0.0024	0.0023
92	0.0048	0.0025	0.0023
93	0.0048	0.0025	0.0024
94	0.0049	0.0025	0.0024
95	0.0049	0.0025	0.0024
96	0.0049	0.0025	0.0024
97	0.0049	0.0025	0.0024
98	0.0050	0.0025	0.0024
99	0.0050	0.0026	0.0024
100	0.0050	0.0026	0.0025
101	0.0051	0.0026	0.0025
102	0.0051	0.0026	0.0025
103	0.0051	0.0026	0.0025
104	0.0052	0.0026	0.0025
105	0.0052	0.0027	0.0025
106	0.0052	0.0027	0.0026
107	0.0053	0.0027	0.0026
108	0.0053	0.0027	0.0026
109	0.0054	0.0027	0.0026
110	0.0054	0.0027	0.0026
111	0.0054	0.0028	0.0027
112	0.0055	0.0028	0.0027
113	0.0055	0.0028	0.0027
114	0.0055	0.0028	0.0027
115	0.0056	0.0029	0.0027
116	0.0056	0.0029	0.0027

117	0.0057	0.0029	0.0028
118	0.0057	0.0029	0.0028
119	0.0058	0.0029	0.0028
120	0.0058	0.0030	0.0028
121	0.0059	0.0030	0.0029
122	0.0059	0.0030	0.0029
123	0.0060	0.0030	0.0029
124	0.0060	0.0031	0.0029
125	0.0061	0.0031	0.0030
126	0.0061	0.0031	0.0030
127	0.0062	0.0031	0.0030
128	0.0062	0.0032	0.0030
129	0.0063	0.0032	0.0031
130	0.0063	0.0032	0.0031
131	0.0064	0.0033	0.0031
132	0.0064	0.0033	0.0031
133	0.0065	0.0033	0.0032
134	0.0066	0.0034	0.0032
135	0.0066	0.0034	0.0032
136	0.0067	0.0034	0.0033
137	0.0068	0.0035	0.0033
138	0.0068	0.0035	0.0033
139	0.0069	0.0035	0.0034
140	0.0070	0.0036	0.0034
141	0.0071	0.0036	0.0035
142	0.0071	0.0036	0.0035
143	0.0072	0.0037	0.0035
144	0.0073	0.0037	0.0036
145	0.0070	0.0036	0.0034
146	0.0071	0.0036	0.0034
147	0.0072	0.0037	0.0035
148	0.0072	0.0037	0.0035
149	0.0074	0.0038	0.0036
150	0.0074	0.0038	0.0036
151	0.0076	0.0039	0.0037
152	0.0077	0.0039	0.0037
153	0.0078	0.0040	0.0038
154	0.0079	0.0040	0.0039
155	0.0081	0.0041	0.0039
156	0.0082	0.0042	0.0040
157	0.0083	0.0043	0.0041
158	0.0084	0.0043	0.0041
159	0.0086	0.0044	0.0042
160	0.0087	0.0045	0.0043
161	0.0090	0.0046	0.0044
162	0.0091	0.0046	0.0044
163	0.0093	0.0048	0.0046
164	0.0094	0.0048	0.0046
165	0.0097	0.0050	0.0048
166	0.0099	0.0050	0.0048
167	0.0102	0.0052	0.0050
168	0.0103	0.0053	0.0051
169	0.0107	0.0055	0.0052
170	0.0109	0.0056	0.0053

171	0.0113	0.0058	0.0055
172	0.0115	0.0059	0.0056
173	0.0120	0.0061	0.0059
174	0.0122	0.0063	0.0060
175	0.0128	0.0065	0.0062
176	0.0131	0.0067	0.0064
177	0.0137	0.0070	0.0067
178	0.0141	0.0072	0.0069
179	0.0149	0.0076	0.0073
180	0.0154	0.0079	0.0075
181	0.0164	0.0084	0.0080
182	0.0170	0.0087	0.0083
183	0.0184	0.0094	0.0090
184	0.0192	0.0098	0.0094
185	0.0161	0.0082	0.0079
186	0.0172	0.0088	0.0084
187	0.0199	0.0102	0.0097
188	0.0217	0.0111	0.0106
189	0.0270	0.0138	0.0132
190	0.0311	0.0159	0.0152
191	0.0472	0.0234	0.0239
192	0.0686	0.0234	0.0452
193	0.2966	0.0234	0.2733
194	0.0372	0.0190	0.0182
195	0.0240	0.0123	0.0117
196	0.0184	0.0094	0.0090
197	0.0201	0.0103	0.0098
198	0.0177	0.0090	0.0086
199	0.0159	0.0081	0.0078
200	0.0145	0.0074	0.0071
201	0.0134	0.0069	0.0065
202	0.0125	0.0064	0.0061
203	0.0117	0.0060	0.0057
204	0.0111	0.0057	0.0054
205	0.0105	0.0054	0.0051
206	0.0100	0.0051	0.0049
207	0.0096	0.0049	0.0047
208	0.0092	0.0047	0.0045
209	0.0088	0.0045	0.0043
210	0.0085	0.0044	0.0042
211	0.0082	0.0042	0.0040
212	0.0080	0.0041	0.0039
213	0.0077	0.0040	0.0038
214	0.0075	0.0038	0.0037
215	0.0073	0.0037	0.0036
216	0.0071	0.0036	0.0035
217	0.0074	0.0038	0.0036
218	0.0072	0.0037	0.0035
219	0.0070	0.0036	0.0034
220	0.0069	0.0035	0.0034
221	0.0067	0.0034	0.0033
222	0.0066	0.0034	0.0032
223	0.0065	0.0033	0.0032
224	0.0063	0.0032	0.0031

225	0.0062	0.0032	0.0030
226	0.0061	0.0031	0.0030
227	0.0060	0.0031	0.0029
228	0.0059	0.0030	0.0029
229	0.0058	0.0030	0.0028
230	0.0057	0.0029	0.0028
231	0.0056	0.0029	0.0028
232	0.0056	0.0028	0.0027
233	0.0055	0.0028	0.0027
234	0.0054	0.0028	0.0026
235	0.0053	0.0027	0.0026
236	0.0053	0.0027	0.0026
237	0.0052	0.0027	0.0025
238	0.0051	0.0026	0.0025
239	0.0051	0.0026	0.0025
240	0.0050	0.0026	0.0024
241	0.0049	0.0025	0.0024
242	0.0049	0.0025	0.0024
243	0.0048	0.0025	0.0024
244	0.0048	0.0024	0.0023
245	0.0047	0.0024	0.0023
246	0.0047	0.0024	0.0023
247	0.0046	0.0024	0.0022
248	0.0046	0.0023	0.0022
249	0.0045	0.0023	0.0022
250	0.0045	0.0023	0.0022
251	0.0044	0.0023	0.0022
252	0.0044	0.0022	0.0021
253	0.0043	0.0022	0.0021
254	0.0043	0.0022	0.0021
255	0.0043	0.0022	0.0021
256	0.0042	0.0022	0.0021
257	0.0042	0.0021	0.0020
258	0.0041	0.0021	0.0020
259	0.0041	0.0021	0.0020
260	0.0041	0.0021	0.0020
261	0.0040	0.0021	0.0020
262	0.0040	0.0020	0.0020
263	0.0040	0.0020	0.0019
264	0.0039	0.0020	0.0019
265	0.0039	0.0020	0.0019
266	0.0039	0.0020	0.0019
267	0.0038	0.0020	0.0019
268	0.0038	0.0019	0.0019
269	0.0038	0.0019	0.0018
270	0.0037	0.0019	0.0018
271	0.0037	0.0019	0.0018
272	0.0037	0.0019	0.0018
273	0.0037	0.0019	0.0018
274	0.0036	0.0019	0.0018
275	0.0036	0.0018	0.0018
276	0.0036	0.0018	0.0018
277	0.0036	0.0018	0.0017
278	0.0035	0.0018	0.0017

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   279               0.0035          0.0018              0.0017
   280               0.0035          0.0018              0.0017
   281               0.0035          0.0018              0.0017
   282               0.0034          0.0018              0.0017
   283               0.0034          0.0018              0.0017
   284               0.0034          0.0017              0.0017
   285               0.0034          0.0017              0.0017
   286               0.0034          0.0017              0.0016
   287               0.0033          0.0017              0.0016
   288               0.0033          0.0017              0.0016
   --------------------------------------------------------------------
   --------------------------------------------------------------------
   Total soil rain loss =      1.02(In)
   Total effective rainfall =      1.25(In)
   Peak flow rate in flood hydrograph =     31.44(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       10.0      20.0      30.0      40.0
-----------------------------------------------------------------------
  0+ 5       0.0001      0.01  Q         |         |         |         |
  0+10       0.0006      0.07  Q         |         |         |         |
  0+15       0.0021      0.22  Q         |         |         |         |
  0+20       0.0044      0.33  Q         |         |         |         |
  0+25       0.0071      0.39  Q         |         |         |         |
  0+30       0.0101      0.43  Q         |         |         |         |
  0+35       0.0133      0.46  Q         |         |         |         |
  0+40       0.0166      0.49  Q         |         |         |         |
  0+45       0.0201      0.50  Q         |         |         |         |
  0+50       0.0237      0.52  Q         |         |         |         |
  0+55       0.0273      0.53  Q         |         |         |         |
  1+ 0       0.0311      0.54  Q         |         |         |         |
  1+ 5       0.0349      0.55  Q         |         |         |         |
  1+10       0.0387      0.56  Q         |         |         |         |
  1+15       0.0426      0.57  Q         |         |         |         |
  1+20       0.0465      0.57  Q         |         |         |         |
  1+25       0.0505      0.58  Q         |         |         |         |
  1+30       0.0545      0.58  Q         |         |         |         |
  1+35       0.0585      0.58  Q         |         |         |         |
  1+40       0.0625      0.59  Q         |         |         |         |
  1+45       0.0666      0.59  Q         |         |         |         |
  1+50       0.0707      0.60  Q         |         |         |         |
  1+55       0.0748      0.60  Q         |         |         |         |
  2+ 0       0.0790      0.60  QV        |         |         |         |
  2+ 5       0.0831      0.60  QV        |         |         |         |
  2+10       0.0873      0.60  QV        |         |         |         |
  2+15       0.0914      0.61  QV        |         |         |         |
  2+20       0.0956      0.61  QV        |         |         |         |
  2+25       0.0998      0.61  QV        |         |         |         |
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  2+30        0.1040       0.61  QV        |          |          |          |
  2+35        0.1083       0.61  QV        |          |          |          |
  2+40        0.1125       0.62  QV        |          |          |          |
  2+45        0.1168       0.62  QV        |          |          |          |
  2+50        0.1211       0.62  QV        |          |          |          |
  2+55        0.1254       0.62  QV        |          |          |          |
  3+ 0        0.1297       0.63  QV        |          |          |          |
  3+ 5        0.1340       0.63  QV        |          |          |          |
  3+10        0.1383       0.63  QV        |          |          |          |
  3+15        0.1427       0.63  QV        |          |          |          |
  3+20        0.1470       0.63  QV        |          |          |          |
  3+25        0.1514       0.64  Q V       |          |          |          |
  3+30        0.1558       0.64  Q V       |          |          |          |
  3+35        0.1603       0.64  Q V       |          |          |          |
  3+40        0.1647       0.64  Q V       |          |          |          |
  3+45        0.1691       0.65  Q V       |          |          |          |
  3+50        0.1736       0.65  Q V       |          |          |          |
  3+55        0.1781       0.65  Q V       |          |          |          |
  4+ 0        0.1826       0.65  Q V       |          |          |          |
  4+ 5        0.1871       0.66  Q V       |          |          |          |
  4+10        0.1917       0.66  Q V       |          |          |          |
  4+15        0.1962       0.66  Q V       |          |          |          |
  4+20        0.2008       0.66  Q V       |          |          |          |
  4+25        0.2054       0.67  Q V       |          |          |          |
  4+30        0.2100       0.67  Q V       |          |          |          |
  4+35        0.2146       0.67  Q V       |          |          |          |
  4+40        0.2193       0.68  Q V       |          |          |          |
  4+45        0.2240       0.68  Q V       |          |          |          |
  4+50        0.2287       0.68  Q  V      |          |          |          |
  4+55        0.2334       0.68  Q  V      |          |          |          |
  5+ 0        0.2381       0.69  Q  V      |          |          |          |
  5+ 5        0.2428       0.69  Q  V      |          |          |          |
  5+10        0.2476       0.69  Q  V      |          |          |          |
  5+15        0.2524       0.70  Q  V      |          |          |          |
  5+20        0.2572       0.70  Q  V      |          |          |          |
  5+25        0.2621       0.70  Q  V      |          |          |          |
  5+30        0.2669       0.70  Q  V      |          |          |          |
  5+35        0.2718       0.71  Q  V      |          |          |          |
  5+40        0.2767       0.71  Q  V      |          |          |          |
  5+45        0.2816       0.71  Q  V      |          |          |          |
  5+50        0.2865       0.72  Q  V      |          |          |          |
  5+55        0.2915       0.72  Q  V      |          |          |          |
  6+ 0        0.2965       0.72  Q  V      |          |          |          |
  6+ 5        0.3015       0.73  Q   V     |          |          |          |
  6+10        0.3066       0.73  Q   V     |          |          |          |
  6+15        0.3116       0.73  Q   V     |          |          |          |
  6+20        0.3167       0.74  Q   V     |          |          |          |
  6+25        0.3218       0.74  Q   V     |          |          |          |
  6+30        0.3269       0.75  Q   V     |          |          |          |
  6+35        0.3321       0.75  Q   V     |          |          |          |
  6+40        0.3373       0.75  Q   V     |          |          |          |
  6+45        0.3425       0.76  Q   V     |          |          |          |
  6+50        0.3477       0.76  Q   V     |          |          |          |
  6+55        0.3530       0.76  Q   V     |          |          |          |
```

```
 7+ 0       0.3583      0.77  Q   V     |         |         |         |
 7+ 5       0.3636      0.77  Q   V     |         |         |         |
 7+10       0.3689      0.78  Q   V     |         |         |         |
 7+15       0.3743      0.78  Q   V     |         |         |         |
 7+20       0.3797      0.78  Q    V    |         |         |         |
 7+25       0.3852      0.79  Q    V    |         |         |         |
 7+30       0.3906      0.79  Q    V    |         |         |         |
 7+35       0.3961      0.80  Q    V    |         |         |         |
 7+40       0.4016      0.80  Q    V    |         |         |         |
 7+45       0.4072      0.81  Q    V    |         |         |         |
 7+50       0.4128      0.81  Q    V    |         |         |         |
 7+55       0.4184      0.82  Q    V    |         |         |         |
 8+ 0       0.4240      0.82  Q    V    |         |         |         |
 8+ 5       0.4297      0.82  Q    V    |         |         |         |
 8+10       0.4354      0.83  Q    V    |         |         |         |
 8+15       0.4412      0.83  Q    V    |         |         |         |
 8+20       0.4469      0.84  Q    V    |         |         |         |
 8+25       0.4528      0.84  Q     V   |         |         |         |
 8+30       0.4586      0.85  Q     V   |         |         |         |
 8+35       0.4645      0.85  Q     V   |         |         |         |
 8+40       0.4704      0.86  Q     V   |         |         |         |
 8+45       0.4764      0.87  Q     V   |         |         |         |
 8+50       0.4824      0.87  Q     V   |         |         |         |
 8+55       0.4884      0.88  Q     V   |         |         |         |
 9+ 0       0.4945      0.88  Q     V   |         |         |         |
 9+ 5       0.5006      0.89  Q     V   |         |         |         |
 9+10       0.5068      0.89  Q     V   |         |         |         |
 9+15       0.5130      0.90  Q     V   |         |         |         |
 9+20       0.5192      0.91  Q     V   |         |         |         |
 9+25       0.5255      0.91  Q     V   |         |         |         |
 9+30       0.5318      0.92  Q      V  |         |         |         |
 9+35       0.5382      0.93  Q      V  |         |         |         |
 9+40       0.5446      0.93  Q      V  |         |         |         |
 9+45       0.5511      0.94  Q      V  |         |         |         |
 9+50       0.5576      0.95  Q      V  |         |         |         |
 9+55       0.5642      0.95  Q      V  |         |         |         |
10+ 0       0.5708      0.96  Q      V  |         |         |         |
10+ 5       0.5775      0.97  Q      V  |         |         |         |
10+10       0.5842      0.97  Q      V  |         |         |         |
10+15       0.5909      0.98  Q      V  |         |         |         |
10+20       0.5978      0.99  Q      V  |         |         |         |
10+25       0.6046      1.00  Q       V |         |         |         |
10+30       0.6116      1.01  |Q      V |         |         |         |
10+35       0.6186      1.01  |Q      V |         |         |         |
10+40       0.6256      1.02  |Q      V |         |         |         |
10+45       0.6327      1.03  |Q      V |         |         |         |
10+50       0.6399      1.04  |Q      V |         |         |         |
10+55       0.6471      1.05  |Q      V |         |         |         |
11+ 0       0.6544      1.06  |Q      V |         |         |         |
11+ 5       0.6618      1.07  |Q      V |         |         |         |
11+10       0.6692      1.08  |Q      V |         |         |         |
11+15       0.6767      1.09  |Q      V |         |         |         |
11+20       0.6843      1.10  |Q       V|         |         |         |
11+25       0.6919      1.11  |Q       V|         |         |         |
```

```
11+30       0.6996      1.12  |Q       V|         |         |         |
11+35       0.7074      1.13  |Q       V|         |         |         |
11+40       0.7153      1.14  |Q       V|         |         |         |
11+45       0.7233      1.16  |Q       V|         |         |         |
11+50       0.7313      1.17  |Q       V|         |         |         |
11+55       0.7395      1.18  |Q       V|         |         |         |
12+ 0       0.7477      1.19  |Q       V|         |         |         |
12+ 5       0.7560      1.21  |Q        V         |         |         |
12+10       0.7643      1.21  |Q        V         |         |         |
12+15       0.7726      1.21  |Q        V         |         |         |
12+20       0.7809      1.21  |Q        V         |         |         |
12+25       0.7893      1.21  |Q        V         |         |         |
12+30       0.7977      1.22  |Q        V         |         |         |
12+35       0.8062      1.24  |Q        V         |         |         |
12+40       0.8149      1.25  |Q        V         |         |         |
12+45       0.8236      1.27  |Q        V         |         |         |
12+50       0.8324      1.28  |Q        |V        |         |         |
12+55       0.8413      1.30  |Q        |V        |         |         |
13+ 0       0.8504      1.32  |Q        |V        |         |         |
13+ 5       0.8596      1.34  |Q        |V        |         |         |
13+10       0.8689      1.36  |Q        |V        |         |         |
13+15       0.8784      1.38  |Q        |V        |         |         |
13+20       0.8881      1.40  |Q        |V        |         |         |
13+25       0.8978      1.42  |Q        |V        |         |         |
13+30       0.9078      1.45  |Q        | V       |         |         |
13+35       0.9179      1.47  |Q        | V       |         |         |
13+40       0.9283      1.50  |Q        | V       |         |         |
13+45       0.9388      1.53  |Q        | V       |         |         |
13+50       0.9495      1.56  |Q        | V       |         |         |
13+55       0.9604      1.59  |Q        | V       |         |         |
14+ 0       0.9716      1.62  |Q        | V       |         |         |
14+ 5       0.9830      1.66  |Q        |  V      |         |         |
14+10       0.9947      1.69  |Q        |  V      |         |         |
14+15       1.0067      1.74  |Q        |  V      |         |         |
14+20       1.0189      1.78  |Q        |  V      |         |         |
14+25       1.0315      1.83  |Q        |  V      |         |         |
14+30       1.0444      1.87  |Q        |  V      |         |         |
14+35       1.0577      1.93  |Q        |   V     |         |         |
14+40       1.0713      1.98  |Q        |   V     |         |         |
14+45       1.0854      2.05  | Q       |   V     |         |         |
14+50       1.1000      2.11  | Q       |   V     |         |         |
14+55       1.1150      2.19  | Q       |   V     |         |         |
15+ 0       1.1306      2.26  | Q       |    V    |         |         |
15+ 5       1.1468      2.36  | Q       |    V    |         |         |
15+10       1.1637      2.45  | Q       |    V    |         |         |
15+15       1.1814      2.57  | Q       |    V    |         |         |
15+20       1.1999      2.69  | Q       |    V    |         |         |
15+25       1.2193      2.82  | Q       |     V   |         |         |
15+30       1.2392      2.89  | Q       |     V   |         |         |
15+35       1.2590      2.86  | Q       |     V   |         |         |
15+40       1.2790      2.92  | Q       |     V   |         |         |
15+45       1.3005      3.12  |  Q      |      V  |         |         |
15+50       1.3240      3.41  |  Q      |      V  |         |         |
15+55       1.3510      3.91  |  Q      |      V  |         |         |
```

```
16+ 0       1.3842      4.83  |   Q     |       V |         |         |
16+ 5       1.4421      8.41  |       Q |        V|         |         |
16+10       1.5630     17.56  |         |      Q  V         |         |
16+15       1.7796     31.44  |         |         |  V      |Q        |
16+20       1.9453     24.06  |         |         |   QV    |         |
16+25       2.0484     14.98  |         |   Q     |      V  |         |
16+30       2.1245     11.05  |         |Q        |       V |         |
16+35       2.1852      8.81  |       Q |         |        V|         |
16+40       2.2360      7.37  |      Q  |         |        V|         |
16+45       2.2799      6.38  |     Q   |         |         V         |
16+50       2.3168      5.37  |    Q    |         |         V         |
16+55       2.3495      4.74  |   Q     |         |         |V        |
17+ 0       2.3788      4.25  |   Q     |         |         |V        |
17+ 5       2.4047      3.77  |  Q      |         |         |V        |
17+10       2.4283      3.42  |  Q      |         |         | V       |
17+15       2.4495      3.08  |  Q      |         |         | V       |
17+20       2.4685      2.75  | Q       |         |         | V       |
17+25       2.4856      2.48  | Q       |         |         |  V      |
17+30       2.5010      2.24  | Q       |         |         |  V      |
17+35       2.5161      2.19  | Q       |         |         |  V      |
17+40       2.5307      2.12  | Q       |         |         |  V      |
17+45       2.5445      2.01  | Q       |         |         |  V      |
17+50       2.5568      1.79  |Q        |         |         |  V      |
17+55       2.5678      1.60  |Q        |         |         |   V     |
18+ 0       2.5777      1.43  |Q        |         |         |   V     |
18+ 5       2.5872      1.38  |Q        |         |         |   V     |
18+10       2.5964      1.34  |Q        |         |         |   V     |
18+15       2.6055      1.32  |Q        |         |         |   V     |
18+20       2.6144      1.30  |Q        |         |         |   V     |
18+25       2.6232      1.27  |Q        |         |         |   V     |
18+30       2.6317      1.24  |Q        |         |         |   V     |
18+35       2.6401      1.21  |Q        |         |         |    V    |
18+40       2.6482      1.19  |Q        |         |         |    V    |
18+45       2.6563      1.16  |Q        |         |         |    V    |
18+50       2.6641      1.14  |Q        |         |         |    V    |
18+55       2.6718      1.12  |Q        |         |         |    V    |
19+ 0       2.6794      1.10  |Q        |         |         |    V    |
19+ 5       2.6868      1.08  |Q        |         |         |    V    |
19+10       2.6941      1.06  |Q        |         |         |    V    |
19+15       2.7012      1.04  |Q        |         |         |    V    |
19+20       2.7083      1.02  |Q        |         |         |    V    |
19+25       2.7152      1.01  |Q        |         |         |     V   |
19+30       2.7220      0.99  Q         |         |         |     V   |
19+35       2.7287      0.97  Q         |         |         |     V   |
19+40       2.7354      0.96  Q         |         |         |     V   |
19+45       2.7419      0.95  Q         |         |         |     V   |
19+50       2.7483      0.93  Q         |         |         |     V   |
19+55       2.7546      0.92  Q         |         |         |     V   |
20+ 0       2.7609      0.91  Q         |         |         |     V   |
20+ 5       2.7670      0.89  Q         |         |         |     V   |
20+10       2.7731      0.88  Q         |         |         |     V   |
20+15       2.7791      0.87  Q         |         |         |     V   |
20+20       2.7850      0.86  Q         |         |         |     V   |
20+25       2.7909      0.85  Q         |         |         |      V  |
```

```
   20+30       2.7966      0.84  Q         |         |         |      V  |
   20+35       2.8023      0.83  Q         |         |         |      V  |
   20+40       2.8080      0.82  Q         |         |         |      V  |
   20+45       2.8136      0.81  Q         |         |         |      V  |
   20+50       2.8191      0.80  Q         |         |         |      V  |
   20+55       2.8245      0.79  Q         |         |         |      V  |
   21+ 0       2.8299      0.78  Q         |         |         |      V  |
   21+ 5       2.8353      0.78  Q         |         |         |      V  |
   21+10       2.8406      0.77  Q         |         |         |      V  |
   21+15       2.8458      0.76  Q         |         |         |      V  |
   21+20       2.8510      0.75  Q         |         |         |      V  |
   21+25       2.8561      0.74  Q         |         |         |      V  |
   21+30       2.8612      0.74  Q         |         |         |      V  |
   21+35       2.8662      0.73  Q         |         |         |       V |
   21+40       2.8712      0.72  Q         |         |         |       V |
   21+45       2.8761      0.72  Q         |         |         |       V |
   21+50       2.8810      0.71  Q         |         |         |       V |
   21+55       2.8859      0.70  Q         |         |         |       V |
   22+ 0       2.8907      0.70  Q         |         |         |       V |
   22+ 5       2.8954      0.69  Q         |         |         |       V |
   22+10       2.9002      0.69  Q         |         |         |       V |
   22+15       2.9049      0.68  Q         |         |         |       V |
   22+20       2.9095      0.67  Q         |         |         |       V |
   22+25       2.9141      0.67  Q         |         |         |       V |
   22+30       2.9187      0.66  Q         |         |         |       V |
   22+35       2.9232      0.66  Q         |         |         |       V |
   22+40       2.9277      0.65  Q         |         |         |       V |
   22+45       2.9322      0.65  Q         |         |         |       V |
   22+50       2.9366      0.64  Q         |         |         |       V |
   22+55       2.9410      0.64  Q         |         |         |        V|
   23+ 0       2.9454      0.63  Q         |         |         |        V|
   23+ 5       2.9497      0.63  Q         |         |         |        V|
   23+10       2.9540      0.62  Q         |         |         |        V|
   23+15       2.9583      0.62  Q         |         |         |        V|
   23+20       2.9625      0.62  Q         |         |         |        V|
   23+25       2.9667      0.61  Q         |         |         |        V|
   23+30       2.9709      0.61  Q         |         |         |        V|
   23+35       2.9751      0.60  Q         |         |         |        V|
   23+40       2.9792      0.60  Q         |         |         |        V|
   23+45       2.9833      0.60  Q         |         |         |        V|
   23+50       2.9874      0.59  Q         |         |         |        V|
   23+55       2.9914      0.59  Q         |         |         |        V|
   24+ 0       2.9954      0.58  Q         |         |         |        V|
-----------------------------------------------------------------------
```

TR. 20525

2-year, 24-Hours Storm Events

Unit Hydrograph Post–Developed

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

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

           Study date  08/26/22

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

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


Program License Serial Number 4070

---------------------------------------------------------------------
2-YR, 24-HOUR UNIT HYDROGRAPH POST DEVELOPED
TR 20525, CITY OF VICTORVILLE
AREA AA & BB (ONSITE AREAS TOWARDS NORTHWEST CORNER to BASIN No.1)
FILE: 20525HYDROAA12YR.OUT
--------------------------------------------------------------------

     Storm Event Year = 2

     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       Duration       Isohyetal
     (Ac.)           (hours)        (In)
Rainfall data for year 2
         28.99           1          0.36
--------------------------------------------------------------------
Rainfall data for year 2
         28.99           6          0.78
--------------------------------------------------------------------
Rainfall data for year 2
         28.99          24          1.34
--------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

******** 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)
54.1	74.1	28.99	1.000	0.468	0.600	0.281

Area-averaged adjusted loss rate Fm (In/Hr) = 0.281

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
17.39	0.600	54.1	74.1	3.50	0.074
11.60	0.400	98.0	98.0	0.20	0.838

Area-averaged catchment yield fraction, Y = 0.380
Area-averaged low loss fraction, Yb = 0.620
User entry of time of concentration = 0.323 (hours)
++
Watershed area = 28.99(Ac.)
Catchment Lag time = 0.258 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 32.2997
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.281(In/Hr)
Average low loss rate fraction (Yb) = 0.620 (decimal)
DESERT S-Graph Selected
Computed peak 5-minute rainfall = 0.173(In)
Computed peak 30-minute rainfall = 0.296(In)
Specified peak 1-hour rainfall = 0.365(In)
Computed peak 3-hour rainfall = 0.583(In)
Specified peak 6-hour rainfall = 0.783(In)
Specified peak 24-hour rainfall = 1.340(In)

Rainfall depth area reduction factors:
Using a total area of 28.99(Ac.) (Ref: fig. E-4)

Factor	Adjusted rainfall
5-minute factor = 0.999	Adjusted rainfall = 0.173(In)
30-minute factor = 0.999	Adjusted rainfall = 0.296(In)
1-hour factor = 0.999	Adjusted rainfall = 0.365(In)
3-hour factor = 1.000	Adjusted rainfall = 0.583(In)
6-hour factor = 1.000	Adjusted rainfall = 0.783(In)
24-hour factor = 1.000	Adjusted rainfall = 1.340(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 =	350.60 (CFS))	
1	1.973	6.916
2	11.045	31.808
3	35.645	86.246

4	56.161	71.929
5	67.172	38.604
6	74.393	25.317
7	79.591	18.225
8	83.450	13.527
9	86.596	11.029
10	89.084	8.725
11	90.989	6.677
12	92.620	5.719
13	94.004	4.852
14	95.125	3.932
15	96.077	3.338
16	96.882	2.822
17	97.493	2.143
18	97.952	1.610
19	98.281	1.153
20	98.658	1.321
21	99.046	1.359
22	99.423	1.324
23	99.667	0.855
24	99.869	0.708
25	100.000	0.459

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.1730	0.1730
2	0.2129	0.0400
3	0.2405	0.0275
4	0.2622	0.0217
5	0.2803	0.0182
6	0.2961	0.0158
7	0.3101	0.0140
8	0.3228	0.0127
9	0.3344	0.0116
10	0.3451	0.0107
11	0.3551	0.0100
12	0.3645	0.0094
13	0.3772	0.0127
14	0.3893	0.0121
15	0.4009	0.0116
16	0.4122	0.0112
17	0.4230	0.0108
18	0.4334	0.0105
19	0.4435	0.0101
20	0.4534	0.0098
21	0.4629	0.0095
22	0.4722	0.0093
23	0.4812	0.0090
24	0.4901	0.0088
25	0.4987	0.0086
26	0.5071	0.0084
27	0.5153	0.0082
28	0.5234	0.0081
29	0.5313	0.0079

30	0.5391	0.0077
31	0.5467	0.0076
32	0.5541	0.0075
33	0.5615	0.0073
34	0.5687	0.0072
35	0.5757	0.0071
36	0.5827	0.0070
37	0.5896	0.0068
38	0.5963	0.0067
39	0.6029	0.0066
40	0.6095	0.0065
41	0.6159	0.0064
42	0.6223	0.0064
43	0.6285	0.0063
44	0.6347	0.0062
45	0.6408	0.0061
46	0.6469	0.0060
47	0.6528	0.0060
48	0.6587	0.0059
49	0.6645	0.0058
50	0.6703	0.0057
51	0.6759	0.0057
52	0.6816	0.0056
53	0.6871	0.0056
54	0.6926	0.0055
55	0.6980	0.0054
56	0.7034	0.0054
57	0.7087	0.0053
58	0.7140	0.0053
59	0.7192	0.0052
60	0.7244	0.0052
61	0.7295	0.0051
62	0.7346	0.0051
63	0.7396	0.0050
64	0.7446	0.0050
65	0.7495	0.0049
66	0.7544	0.0049
67	0.7593	0.0048
68	0.7641	0.0048
69	0.7689	0.0048
70	0.7736	0.0047
71	0.7783	0.0047
72	0.7829	0.0047
73	0.7871	0.0042
74	0.7913	0.0042
75	0.7954	0.0041
76	0.7995	0.0041
77	0.8036	0.0041
78	0.8076	0.0040
79	0.8116	0.0040
80	0.8156	0.0040
81	0.8195	0.0039
82	0.8234	0.0039
83	0.8273	0.0039

84	0.8311	0.0038
85	0.8350	0.0038
86	0.8388	0.0038
87	0.8425	0.0038
88	0.8463	0.0037
89	0.8500	0.0037
90	0.8537	0.0037
91	0.8573	0.0037
92	0.8610	0.0036
93	0.8646	0.0036
94	0.8682	0.0036
95	0.8717	0.0036
96	0.8753	0.0035
97	0.8788	0.0035
98	0.8823	0.0035
99	0.8858	0.0035
100	0.8892	0.0035
101	0.8927	0.0034
102	0.8961	0.0034
103	0.8995	0.0034
104	0.9029	0.0034
105	0.9062	0.0034
106	0.9096	0.0033
107	0.9129	0.0033
108	0.9162	0.0033
109	0.9195	0.0033
110	0.9227	0.0033
111	0.9260	0.0032
112	0.9292	0.0032
113	0.9324	0.0032
114	0.9356	0.0032
115	0.9387	0.0032
116	0.9419	0.0032
117	0.9450	0.0031
118	0.9482	0.0031
119	0.9513	0.0031
120	0.9544	0.0031
121	0.9574	0.0031
122	0.9605	0.0031
123	0.9635	0.0030
124	0.9666	0.0030
125	0.9696	0.0030
126	0.9726	0.0030
127	0.9756	0.0030
128	0.9785	0.0030
129	0.9815	0.0030
130	0.9844	0.0029
131	0.9874	0.0029
132	0.9903	0.0029
133	0.9932	0.0029
134	0.9961	0.0029
135	0.9989	0.0029
136	1.0018	0.0029
137	1.0047	0.0028

138	1.0075	0.0028
139	1.0103	0.0028
140	1.0131	0.0028
141	1.0159	0.0028
142	1.0187	0.0028
143	1.0215	0.0028
144	1.0242	0.0028
145	1.0270	0.0028
146	1.0297	0.0027
147	1.0325	0.0027
148	1.0352	0.0027
149	1.0379	0.0027
150	1.0406	0.0027
151	1.0433	0.0027
152	1.0459	0.0027
153	1.0486	0.0027
154	1.0513	0.0027
155	1.0539	0.0026
156	1.0565	0.0026
157	1.0591	0.0026
158	1.0618	0.0026
159	1.0644	0.0026
160	1.0669	0.0026
161	1.0695	0.0026
162	1.0721	0.0026
163	1.0747	0.0026
164	1.0772	0.0026
165	1.0797	0.0025
166	1.0823	0.0025
167	1.0848	0.0025
168	1.0873	0.0025
169	1.0898	0.0025
170	1.0923	0.0025
171	1.0948	0.0025
172	1.0973	0.0025
173	1.0997	0.0025
174	1.1022	0.0025
175	1.1047	0.0025
176	1.1071	0.0024
177	1.1095	0.0024
178	1.1120	0.0024
179	1.1144	0.0024
180	1.1168	0.0024
181	1.1192	0.0024
182	1.1216	0.0024
183	1.1240	0.0024
184	1.1263	0.0024
185	1.1287	0.0024
186	1.1311	0.0024
187	1.1334	0.0024
188	1.1358	0.0023
189	1.1381	0.0023
190	1.1404	0.0023
191	1.1428	0.0023

192	1.1451	0.0023
193	1.1474	0.0023
194	1.1497	0.0023
195	1.1520	0.0023
196	1.1543	0.0023
197	1.1565	0.0023
198	1.1588	0.0023
199	1.1611	0.0023
200	1.1633	0.0023
201	1.1656	0.0023
202	1.1678	0.0022
203	1.1701	0.0022
204	1.1723	0.0022
205	1.1745	0.0022
206	1.1767	0.0022
207	1.1790	0.0022
208	1.1812	0.0022
209	1.1834	0.0022
210	1.1855	0.0022
211	1.1877	0.0022
212	1.1899	0.0022
213	1.1921	0.0022
214	1.1942	0.0022
215	1.1964	0.0022
216	1.1986	0.0022
217	1.2007	0.0021
218	1.2029	0.0021
219	1.2050	0.0021
220	1.2071	0.0021
221	1.2092	0.0021
222	1.2114	0.0021
223	1.2135	0.0021
224	1.2156	0.0021
225	1.2177	0.0021
226	1.2198	0.0021
227	1.2219	0.0021
228	1.2239	0.0021
229	1.2260	0.0021
230	1.2281	0.0021
231	1.2302	0.0021
232	1.2322	0.0021
233	1.2343	0.0021
234	1.2363	0.0021
235	1.2384	0.0020
236	1.2404	0.0020
237	1.2425	0.0020
238	1.2445	0.0020
239	1.2465	0.0020
240	1.2485	0.0020
241	1.2505	0.0020
242	1.2525	0.0020
243	1.2546	0.0020
244	1.2566	0.0020
245	1.2585	0.0020

246	1.2605	0.0020
247	1.2625	0.0020
248	1.2645	0.0020
249	1.2665	0.0020
250	1.2684	0.0020
251	1.2704	0.0020
252	1.2724	0.0020
253	1.2743	0.0020
254	1.2763	0.0019
255	1.2782	0.0019
256	1.2802	0.0019
257	1.2821	0.0019
258	1.2840	0.0019
259	1.2859	0.0019
260	1.2879	0.0019
261	1.2898	0.0019
262	1.2917	0.0019
263	1.2936	0.0019
264	1.2955	0.0019
265	1.2974	0.0019
266	1.2993	0.0019
267	1.3012	0.0019
268	1.3031	0.0019
269	1.3050	0.0019
270	1.3068	0.0019
271	1.3087	0.0019
272	1.3106	0.0019
273	1.3125	0.0019
274	1.3143	0.0019
275	1.3162	0.0019
276	1.3180	0.0019
277	1.3199	0.0018
278	1.3217	0.0018
279	1.3236	0.0018
280	1.3254	0.0018
281	1.3272	0.0018
282	1.3291	0.0018
283	1.3309	0.0018
284	1.3327	0.0018
285	1.3345	0.0018
286	1.3363	0.0018
287	1.3381	0.0018
288	1.3400	0.0018

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0018	0.0011	0.0007
2	0.0018	0.0011	0.0007
3	0.0018	0.0011	0.0007
4	0.0018	0.0011	0.0007
5	0.0018	0.0011	0.0007
6	0.0018	0.0011	0.0007

7	0.0018	0.0011	0.0007
8	0.0018	0.0011	0.0007
9	0.0019	0.0011	0.0007
10	0.0019	0.0012	0.0007
11	0.0019	0.0012	0.0007
12	0.0019	0.0012	0.0007
13	0.0019	0.0012	0.0007
14	0.0019	0.0012	0.0007
15	0.0019	0.0012	0.0007
16	0.0019	0.0012	0.0007
17	0.0019	0.0012	0.0007
18	0.0019	0.0012	0.0007
19	0.0019	0.0012	0.0007
20	0.0019	0.0012	0.0007
21	0.0019	0.0012	0.0007
22	0.0019	0.0012	0.0007
23	0.0019	0.0012	0.0007
24	0.0019	0.0012	0.0007
25	0.0020	0.0012	0.0007
26	0.0020	0.0012	0.0007
27	0.0020	0.0012	0.0007
28	0.0020	0.0012	0.0008
29	0.0020	0.0012	0.0008
30	0.0020	0.0012	0.0008
31	0.0020	0.0012	0.0008
32	0.0020	0.0012	0.0008
33	0.0020	0.0013	0.0008
34	0.0020	0.0013	0.0008
35	0.0020	0.0013	0.0008
36	0.0020	0.0013	0.0008
37	0.0021	0.0013	0.0008
38	0.0021	0.0013	0.0008
39	0.0021	0.0013	0.0008
40	0.0021	0.0013	0.0008
41	0.0021	0.0013	0.0008
42	0.0021	0.0013	0.0008
43	0.0021	0.0013	0.0008
44	0.0021	0.0013	0.0008
45	0.0021	0.0013	0.0008
46	0.0021	0.0013	0.0008
47	0.0021	0.0013	0.0008
48	0.0021	0.0013	0.0008
49	0.0022	0.0013	0.0008
50	0.0022	0.0013	0.0008
51	0.0022	0.0013	0.0008
52	0.0022	0.0014	0.0008
53	0.0022	0.0014	0.0008
54	0.0022	0.0014	0.0008
55	0.0022	0.0014	0.0008
56	0.0022	0.0014	0.0008
57	0.0022	0.0014	0.0008
58	0.0022	0.0014	0.0008
59	0.0023	0.0014	0.0009
60	0.0023	0.0014	0.0009

61	0.0023	0.0014	0.0009
62	0.0023	0.0014	0.0009
63	0.0023	0.0014	0.0009
64	0.0023	0.0014	0.0009
65	0.0023	0.0014	0.0009
66	0.0023	0.0014	0.0009
67	0.0023	0.0015	0.0009
68	0.0023	0.0015	0.0009
69	0.0024	0.0015	0.0009
70	0.0024	0.0015	0.0009
71	0.0024	0.0015	0.0009
72	0.0024	0.0015	0.0009
73	0.0024	0.0015	0.0009
74	0.0024	0.0015	0.0009
75	0.0024	0.0015	0.0009
76	0.0024	0.0015	0.0009
77	0.0025	0.0015	0.0009
78	0.0025	0.0015	0.0009
79	0.0025	0.0015	0.0009
80	0.0025	0.0015	0.0009
81	0.0025	0.0016	0.0010
82	0.0025	0.0016	0.0010
83	0.0025	0.0016	0.0010
84	0.0026	0.0016	0.0010
85	0.0026	0.0016	0.0010
86	0.0026	0.0016	0.0010
87	0.0026	0.0016	0.0010
88	0.0026	0.0016	0.0010
89	0.0026	0.0016	0.0010
90	0.0026	0.0016	0.0010
91	0.0027	0.0017	0.0010
92	0.0027	0.0017	0.0010
93	0.0027	0.0017	0.0010
94	0.0027	0.0017	0.0010
95	0.0027	0.0017	0.0010
96	0.0027	0.0017	0.0010
97	0.0028	0.0017	0.0010
98	0.0028	0.0017	0.0011
99	0.0028	0.0017	0.0011
100	0.0028	0.0017	0.0011
101	0.0028	0.0018	0.0011
102	0.0028	0.0018	0.0011
103	0.0029	0.0018	0.0011
104	0.0029	0.0018	0.0011
105	0.0029	0.0018	0.0011
106	0.0029	0.0018	0.0011
107	0.0030	0.0018	0.0011
108	0.0030	0.0018	0.0011
109	0.0030	0.0019	0.0011
110	0.0030	0.0019	0.0011
111	0.0030	0.0019	0.0012
112	0.0031	0.0019	0.0012
113	0.0031	0.0019	0.0012
114	0.0031	0.0019	0.0012

115	0.0031	0.0019	0.0012
116	0.0032	0.0020	0.0012
117	0.0032	0.0020	0.0012
118	0.0032	0.0020	0.0012
119	0.0032	0.0020	0.0012
120	0.0033	0.0020	0.0012
121	0.0033	0.0020	0.0013
122	0.0033	0.0021	0.0013
123	0.0034	0.0021	0.0013
124	0.0034	0.0021	0.0013
125	0.0034	0.0021	0.0013
126	0.0034	0.0021	0.0013
127	0.0035	0.0022	0.0013
128	0.0035	0.0022	0.0013
129	0.0035	0.0022	0.0013
130	0.0036	0.0022	0.0014
131	0.0036	0.0022	0.0014
132	0.0036	0.0023	0.0014
133	0.0037	0.0023	0.0014
134	0.0037	0.0023	0.0014
135	0.0038	0.0023	0.0014
136	0.0038	0.0024	0.0014
137	0.0038	0.0024	0.0015
138	0.0039	0.0024	0.0015
139	0.0039	0.0024	0.0015
140	0.0040	0.0025	0.0015
141	0.0040	0.0025	0.0015
142	0.0041	0.0025	0.0015
143	0.0041	0.0026	0.0016
144	0.0042	0.0026	0.0016
145	0.0047	0.0029	0.0018
146	0.0047	0.0029	0.0018
147	0.0048	0.0030	0.0018
148	0.0048	0.0030	0.0018
149	0.0049	0.0030	0.0019
150	0.0049	0.0031	0.0019
151	0.0050	0.0031	0.0019
152	0.0051	0.0031	0.0019
153	0.0052	0.0032	0.0020
154	0.0052	0.0032	0.0020
155	0.0053	0.0033	0.0020
156	0.0054	0.0033	0.0020
157	0.0055	0.0034	0.0021
158	0.0056	0.0034	0.0021
159	0.0057	0.0035	0.0022
160	0.0057	0.0036	0.0022
161	0.0059	0.0036	0.0022
162	0.0060	0.0037	0.0023
163	0.0061	0.0038	0.0023
164	0.0062	0.0038	0.0023
165	0.0064	0.0039	0.0024
166	0.0064	0.0040	0.0024
167	0.0066	0.0041	0.0025
168	0.0067	0.0042	0.0026

169	0.0070	0.0043	0.0026
170	0.0071	0.0044	0.0027
171	0.0073	0.0045	0.0028
172	0.0075	0.0046	0.0028
173	0.0077	0.0048	0.0029
174	0.0079	0.0049	0.0030
175	0.0082	0.0051	0.0031
176	0.0084	0.0052	0.0032
177	0.0088	0.0055	0.0034
178	0.0090	0.0056	0.0034
179	0.0095	0.0059	0.0036
180	0.0098	0.0061	0.0037
181	0.0105	0.0065	0.0040
182	0.0108	0.0067	0.0041
183	0.0116	0.0072	0.0044
184	0.0121	0.0075	0.0046
185	0.0094	0.0058	0.0036
186	0.0100	0.0062	0.0038
187	0.0116	0.0072	0.0044
188	0.0127	0.0079	0.0048
189	0.0158	0.0098	0.0060
190	0.0182	0.0113	0.0069
191	0.0275	0.0171	0.0105
192	0.0400	0.0234	0.0166
193	0.1730	0.0234	0.1496
194	0.0217	0.0134	0.0082
195	0.0140	0.0087	0.0053
196	0.0107	0.0067	0.0041
197	0.0127	0.0079	0.0048
198	0.0112	0.0070	0.0043
199	0.0101	0.0063	0.0038
200	0.0093	0.0058	0.0035
201	0.0086	0.0053	0.0033
202	0.0081	0.0050	0.0031
203	0.0076	0.0047	0.0029
204	0.0072	0.0045	0.0027
205	0.0068	0.0042	0.0026
206	0.0065	0.0041	0.0025
207	0.0063	0.0039	0.0024
208	0.0060	0.0037	0.0023
209	0.0058	0.0036	0.0022
210	0.0056	0.0035	0.0021
211	0.0054	0.0034	0.0021
212	0.0053	0.0033	0.0020
213	0.0051	0.0032	0.0019
214	0.0050	0.0031	0.0019
215	0.0048	0.0030	0.0018
216	0.0047	0.0029	0.0018
217	0.0042	0.0026	0.0016
218	0.0041	0.0025	0.0016
219	0.0040	0.0025	0.0015
220	0.0039	0.0024	0.0015
221	0.0038	0.0024	0.0015
222	0.0037	0.0023	0.0014

223	0.0037	0.0023	0.0014
224	0.0036	0.0022	0.0014
225	0.0035	0.0022	0.0013
226	0.0035	0.0021	0.0013
227	0.0034	0.0021	0.0013
228	0.0033	0.0021	0.0013
229	0.0033	0.0020	0.0012
230	0.0032	0.0020	0.0012
231	0.0032	0.0020	0.0012
232	0.0031	0.0019	0.0012
233	0.0031	0.0019	0.0012
234	0.0030	0.0019	0.0011
235	0.0030	0.0019	0.0011
236	0.0029	0.0018	0.0011
237	0.0029	0.0018	0.0011
238	0.0029	0.0018	0.0011
239	0.0028	0.0018	0.0011
240	0.0028	0.0017	0.0011
241	0.0028	0.0017	0.0010
242	0.0027	0.0017	0.0010
243	0.0027	0.0017	0.0010
244	0.0027	0.0016	0.0010
245	0.0026	0.0016	0.0010
246	0.0026	0.0016	0.0010
247	0.0026	0.0016	0.0010
248	0.0025	0.0016	0.0010
249	0.0025	0.0016	0.0010
250	0.0025	0.0015	0.0009
251	0.0025	0.0015	0.0009
252	0.0024	0.0015	0.0009
253	0.0024	0.0015	0.0009
254	0.0024	0.0015	0.0009
255	0.0024	0.0015	0.0009
256	0.0023	0.0014	0.0009
257	0.0023	0.0014	0.0009
258	0.0023	0.0014	0.0009
259	0.0023	0.0014	0.0009
260	0.0022	0.0014	0.0009
261	0.0022	0.0014	0.0008
262	0.0022	0.0014	0.0008
263	0.0022	0.0014	0.0008
264	0.0022	0.0013	0.0008
265	0.0021	0.0013	0.0008
266	0.0021	0.0013	0.0008
267	0.0021	0.0013	0.0008
268	0.0021	0.0013	0.0008
269	0.0021	0.0013	0.0008
270	0.0021	0.0013	0.0008
271	0.0020	0.0013	0.0008
272	0.0020	0.0013	0.0008
273	0.0020	0.0012	0.0008
274	0.0020	0.0012	0.0008
275	0.0020	0.0012	0.0008
276	0.0020	0.0012	0.0007

277	0.0020	0.0012	0.0007
278	0.0019	0.0012	0.0007
279	0.0019	0.0012	0.0007
280	0.0019	0.0012	0.0007
281	0.0019	0.0012	0.0007
282	0.0019	0.0012	0.0007
283	0.0019	0.0012	0.0007
284	0.0019	0.0012	0.0007
285	0.0018	0.0011	0.0007
286	0.0018	0.0011	0.0007
287	0.0018	0.0011	0.0007
288	0.0018	0.0011	0.0007

```
----------------------------------------------------------------------
----------------------------------------------------------------------
Total soil rain loss =      0.75(In)
Total effective rainfall =      0.59(In)
Peak flow rate in flood hydrograph =     15.37(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        5.0      10.0      15.0      20.0
-----------------------------------------------------------------------
  0+ 5      0.0000      0.00  Q         |         |         |         |
  0+10      0.0002      0.03  Q         |         |         |         |
  0+15      0.0008      0.09  Q         |         |         |         |
  0+20      0.0017      0.14  Q         |         |         |         |
  0+25      0.0029      0.16  Q         |         |         |         |
  0+30      0.0041      0.18  Q         |         |         |         |
  0+35      0.0054      0.19  Q         |         |         |         |
  0+40      0.0068      0.20  Q         |         |         |         |
  0+45      0.0083      0.21  Q         |         |         |         |
  0+50      0.0098      0.22  Q         |         |         |         |
  0+55      0.0113      0.22  Q         |         |         |         |
  1+ 0      0.0129      0.23  Q         |         |         |         |
  1+ 5      0.0145      0.23  Q         |         |         |         |
  1+10      0.0161      0.24  Q         |         |         |         |
  1+15      0.0177      0.24  Q         |         |         |         |
  1+20      0.0194      0.24  Q         |         |         |         |
  1+25      0.0211      0.24  Q         |         |         |         |
  1+30      0.0228      0.25  Q         |         |         |         |
  1+35      0.0245      0.25  Q         |         |         |         |
  1+40      0.0262      0.25  Q         |         |         |         |
  1+45      0.0279      0.25  Q         |         |         |         |
  1+50      0.0296      0.25  Q         |         |         |         |
  1+55      0.0314      0.25  Q         |         |         |         |
  2+ 0      0.0332      0.26  Q         |         |         |         |
  2+ 5      0.0349      0.26  Q         |         |         |         |
  2+10      0.0367      0.26  QV        |         |         |         |
  2+15      0.0385      0.26  QV        |         |         |         |
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 2+20      0.0403      0.26  QV         |         |         |         |
 2+25      0.0420      0.26  QV         |         |         |         |
 2+30      0.0438      0.26  QV         |         |         |         |
 2+35      0.0457      0.26  QV         |         |         |         |
 2+40      0.0475      0.26  QV         |         |         |         |
 2+45      0.0493      0.26  QV         |         |         |         |
 2+50      0.0511      0.27  QV         |         |         |         |
 2+55      0.0529      0.27  QV         |         |         |         |
 3+ 0      0.0548      0.27  QV         |         |         |         |
 3+ 5      0.0566      0.27  QV         |         |         |         |
 3+10      0.0585      0.27  QV         |         |         |         |
 3+15      0.0603      0.27  QV         |         |         |         |
 3+20      0.0622      0.27  QV         |         |         |         |
 3+25      0.0641      0.27  QV         |         |         |         |
 3+30      0.0660      0.27  QV         |         |         |         |
 3+35      0.0679      0.27  QV         |         |         |         |
 3+40      0.0697      0.28  QV         |         |         |         |
 3+45      0.0717      0.28  QV         |         |         |         |
 3+50      0.0736      0.28  Q V        |         |         |         |
 3+55      0.0755      0.28  Q V        |         |         |         |
 4+ 0      0.0774      0.28  Q V        |         |         |         |
 4+ 5      0.0794      0.28  Q V        |         |         |         |
 4+10      0.0813      0.28  Q V        |         |         |         |
 4+15      0.0832      0.28  Q V        |         |         |         |
 4+20      0.0852      0.28  Q V        |         |         |         |
 4+25      0.0872      0.29  Q V        |         |         |         |
 4+30      0.0892      0.29  Q V        |         |         |         |
 4+35      0.0911      0.29  Q V        |         |         |         |
 4+40      0.0931      0.29  Q V        |         |         |         |
 4+45      0.0951      0.29  Q V        |         |         |         |
 4+50      0.0971      0.29  Q V        |         |         |         |
 4+55      0.0992      0.29  Q V        |         |         |         |
 5+ 0      0.1012      0.29  Q V        |         |         |         |
 5+ 5      0.1032      0.30  Q V        |         |         |         |
 5+10      0.1053      0.30  Q V        |         |         |         |
 5+15      0.1073      0.30  Q V        |         |         |         |
 5+20      0.1094      0.30  Q  V       |         |         |         |
 5+25      0.1115      0.30  Q  V       |         |         |         |
 5+30      0.1136      0.30  Q  V       |         |         |         |
 5+35      0.1157      0.30  Q  V       |         |         |         |
 5+40      0.1178      0.31  Q  V       |         |         |         |
 5+45      0.1199      0.31  Q  V       |         |         |         |
 5+50      0.1220      0.31  Q  V       |         |         |         |
 5+55      0.1242      0.31  Q  V       |         |         |         |
 6+ 0      0.1263      0.31  Q  V       |         |         |         |
 6+ 5      0.1285      0.31  Q  V       |         |         |         |
 6+10      0.1306      0.31  Q  V       |         |         |         |
 6+15      0.1328      0.32  Q  V       |         |         |         |
 6+20      0.1350      0.32  Q  V       |         |         |         |
 6+25      0.1372      0.32  Q  V       |         |         |         |
 6+30      0.1394      0.32  Q  V       |         |         |         |
 6+35      0.1416      0.32  Q  V       |         |         |         |
 6+40      0.1439      0.32  Q   V      |         |         |         |
 6+45      0.1461      0.33  Q   V      |         |         |         |
```

6+50	0.1484	0.33	Q	V			
6+55	0.1506	0.33	Q	V			
7+ 0	0.1529	0.33	Q	V			
7+ 5	0.1552	0.33	Q	V			
7+10	0.1575	0.34	Q	V			
7+15	0.1598	0.34	Q	V			
7+20	0.1622	0.34	Q	V			
7+25	0.1645	0.34	Q	V			
7+30	0.1669	0.34	Q	V			
7+35	0.1693	0.34	Q	V			
7+40	0.1717	0.35	Q	V			
7+45	0.1741	0.35	Q	V			
7+50	0.1765	0.35	Q	V			
7+55	0.1789	0.35	Q	V			
8+ 0	0.1813	0.36	Q	V			
8+ 5	0.1838	0.36	Q	V			
8+10	0.1863	0.36	Q	V			
8+15	0.1888	0.36	Q	V			
8+20	0.1913	0.36	Q	V			
8+25	0.1938	0.37	Q	V			
8+30	0.1963	0.37	Q	V			
8+35	0.1989	0.37	Q	V			
8+40	0.2015	0.37	Q	V			
8+45	0.2041	0.38	Q	V			
8+50	0.2067	0.38	Q	V			
8+55	0.2093	0.38	Q	V			
9+ 0	0.2119	0.38	Q	V			
9+ 5	0.2146	0.39	Q	V			
9+10	0.2173	0.39	Q	V			
9+15	0.2200	0.39	Q	V			
9+20	0.2227	0.39	Q	V			
9+25	0.2254	0.40	Q	V			
9+30	0.2282	0.40	Q	V			
9+35	0.2310	0.40	Q	V			
9+40	0.2338	0.41	Q	V			
9+45	0.2366	0.41	Q	V			
9+50	0.2394	0.41	Q	V			
9+55	0.2423	0.42	Q	V			
10+ 0	0.2452	0.42	Q	V			
10+ 5	0.2481	0.42	Q	V			
10+10	0.2510	0.43	Q	V			
10+15	0.2540	0.43	Q	V			
10+20	0.2570	0.43	Q	V			
10+25	0.2600	0.44	Q	V			
10+30	0.2630	0.44	Q	V			
10+35	0.2661	0.44	Q	V			
10+40	0.2691	0.45	Q	V			
10+45	0.2723	0.45	Q	V			
10+50	0.2754	0.46	Q	V			
10+55	0.2786	0.46	Q	V			
11+ 0	0.2818	0.46	Q	V			
11+ 5	0.2850	0.47	Q	V			
11+10	0.2883	0.47	Q	V			
11+15	0.2916	0.48	Q	V			

```
11+20       0.2949      0.48  Q       V |         |         |         |
11+25       0.2983      0.49  Q       V |         |         |         |
11+30       0.3017      0.49  Q       V |         |         |         |
11+35       0.3051      0.50  Q       V |         |         |         |
11+40       0.3086      0.50  |Q      V |         |         |         |
11+45       0.3121      0.51  |Q      V |         |         |         |
11+50       0.3156      0.51  |Q      V |         |         |         |
11+55       0.3192      0.52  |Q      V |         |         |         |
12+ 0       0.3228      0.53  |Q       V|         |         |         |
12+ 5       0.3265      0.53  |Q       V|         |         |         |
12+10       0.3303      0.55  |Q       V|         |         |         |
12+15       0.3342      0.57  |Q       V|         |         |         |
12+20       0.3382      0.58  |Q       V|         |         |         |
12+25       0.3423      0.60  |Q       V|         |         |         |
12+30       0.3465      0.61  |Q       V|         |         |         |
12+35       0.3507      0.62  |Q       V|         |         |         |
12+40       0.3551      0.63  |Q       V|         |         |         |
12+45       0.3595      0.64  |Q        V         |         |         |
12+50       0.3640      0.65  |Q        V         |         |         |
12+55       0.3685      0.66  |Q        V         |         |         |
13+ 0       0.3731      0.67  |Q        V         |         |         |
13+ 5       0.3778      0.68  |Q        V         |         |         |
13+10       0.3826      0.69  |Q        V         |         |         |
13+15       0.3874      0.70  |Q        V         |         |         |
13+20       0.3923      0.71  |Q        V         |         |         |
13+25       0.3973      0.72  |Q        |V        |         |         |
13+30       0.4024      0.74  |Q        |V        |         |         |
13+35       0.4075      0.75  |Q        |V        |         |         |
13+40       0.4128      0.76  |Q        |V        |         |         |
13+45       0.4181      0.78  |Q        |V        |         |         |
13+50       0.4236      0.79  |Q        |V        |         |         |
13+55       0.4291      0.81  |Q        |V        |         |         |
14+ 0       0.4348      0.82  |Q        | V       |         |         |
14+ 5       0.4406      0.84  |Q        | V       |         |         |
14+10       0.4465      0.86  |Q        | V       |         |         |
14+15       0.4525      0.88  |Q        | V       |         |         |
14+20       0.4587      0.90  |Q        | V       |         |         |
14+25       0.4650      0.92  |Q        | V       |         |         |
14+30       0.4715      0.94  |Q        |  V      |         |         |
14+35       0.4782      0.97  |Q        |  V      |         |         |
14+40       0.4850      0.99  |Q        |  V      |         |         |
14+45       0.4921      1.02  | Q       |  V      |         |         |
14+50       0.4993      1.05  | Q       |  V      |         |         |
14+55       0.5068      1.09  | Q       |   V     |         |         |
15+ 0       0.5146      1.13  | Q       |   V     |         |         |
15+ 5       0.5226      1.17  | Q       |   V     |         |         |
15+10       0.5310      1.21  | Q       |   V     |         |         |
15+15       0.5397      1.27  | Q       |    V    |         |         |
15+20       0.5488      1.32  | Q       |    V    |         |         |
15+25       0.5583      1.38  | Q       |    V    |         |         |
15+30       0.5680      1.41  | Q       |    V    |         |         |
15+35       0.5774      1.37  | Q       |     V   |         |         |
15+40       0.5869      1.37  | Q       |     V   |         |         |
15+45       0.5967      1.44  | Q       |     V   |         |         |
```

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15+50       0.6075      1.56  |  Q      |     V   |         |         |
15+55       0.6196      1.76  |  Q      |      V  |         |         |
16+ 0       0.6341      2.11  |   Q     |      V  |         |         |
16+ 5       0.6594      3.67  |      Q  |       V |         |         |
16+10       0.7130      7.78  |         |    Q   V|         |         |
16+15       0.8189     15.37  |         |         | V       Q         |
16+20       0.9085     13.02  |         |         |    VQ   |         |
16+25       0.9633      7.95  |         |    Q    |     V   |         |
16+30       1.0029      5.75  |         |Q        |      V  |         |
16+35       1.0344      4.58  |        Q|         |       V |         |
16+40       1.0605      3.79  |      Q  |         |        V|         |
16+45       1.0832      3.29  |     Q   |         |         V         |
16+50       1.1027      2.83  |    Q    |         |         V         |
16+55       1.1194      2.43  |   Q     |         |         |V        |
17+ 0       1.1346      2.20  |   Q     |         |         |V        |
17+ 5       1.1482      1.98  |  Q      |         |         | V       |
17+10       1.1604      1.77  |  Q      |         |         | V       |
17+15       1.1716      1.62  |  Q      |         |         | V       |
17+20       1.1818      1.48  | Q       |         |         | V       |
17+25       1.1909      1.32  | Q       |         |         |  V      |
17+30       1.1991      1.20  | Q       |         |         |  V      |
17+35       1.2067      1.09  | Q       |         |         |  V      |
17+40       1.2141      1.08  | Q       |         |         |  V      |
17+45       1.2213      1.05  | Q       |         |         |   V     |
17+50       1.2282      1.01  | Q       |         |         |   V     |
17+55       1.2345      0.91  |Q        |         |         |   V     |
18+ 0       1.2403      0.85  |Q        |         |         |   V     |
18+ 5       1.2457      0.78  |Q        |         |         |   V     |
18+10       1.2505      0.69  |Q        |         |         |   V     |
18+15       1.2550      0.65  |Q        |         |         |   V     |
18+20       1.2593      0.62  |Q        |         |         |    V    |
18+25       1.2634      0.60  |Q        |         |         |    V    |
18+30       1.2674      0.58  |Q        |         |         |    V    |
18+35       1.2713      0.56  |Q        |         |         |    V    |
18+40       1.2751      0.55  |Q        |         |         |    V    |
18+45       1.2787      0.53  |Q        |         |         |    V    |
18+50       1.2823      0.52  |Q        |         |         |    V    |
18+55       1.2858      0.51  |Q        |         |         |    V    |
19+ 0       1.2892      0.49  Q         |         |         |    V    |
19+ 5       1.2925      0.48  Q         |         |         |     V   |
19+10       1.2958      0.47  Q         |         |         |     V   |
19+15       1.2989      0.46  Q         |         |         |     V   |
19+20       1.3021      0.45  Q         |         |         |     V   |
19+25       1.3051      0.45  Q         |         |         |     V   |
19+30       1.3082      0.44  Q         |         |         |     V   |
19+35       1.3111      0.43  Q         |         |         |     V   |
19+40       1.3140      0.42  Q         |         |         |     V   |
19+45       1.3169      0.42  Q         |         |         |     V   |
19+50       1.3197      0.41  Q         |         |         |     V   |
19+55       1.3225      0.40  Q         |         |         |     V   |
20+ 0       1.3252      0.40  Q         |         |         |     V   |
20+ 5       1.3279      0.39  Q         |         |         |      V  |
20+10       1.3306      0.39  Q         |         |         |      V  |
20+15       1.3332      0.38  Q         |         |         |      V  |
```

20+20	1.3358	0.38	Q	|	|	|	V |
20+25	1.3384	0.37	Q	|	|	|	V |
20+30	1.3409	0.37	Q	|	|	|	V |
20+35	1.3434	0.36	Q	|	|	|	V |
20+40	1.3458	0.36	Q	|	|	|	V |
20+45	1.3482	0.35	Q	|	|	|	V |
20+50	1.3506	0.35	Q	|	|	|	V |
20+55	1.3530	0.34	Q	|	|	|	V |
21+ 0	1.3554	0.34	Q	|	|	|	V |
21+ 5	1.3577	0.34	Q	|	|	|	V |
21+10	1.3600	0.33	Q	|	|	|	V |
21+15	1.3622	0.33	Q	|	|	|	V |
21+20	1.3645	0.33	Q	|	|	|	V |
21+25	1.3667	0.32	Q	|	|	|	V |
21+30	1.3689	0.32	Q	|	|	|	V |
21+35	1.3711	0.32	Q	|	|	|	V |
21+40	1.3732	0.31	Q	|	|	|	V |
21+45	1.3754	0.31	Q	|	|	|	V |
21+50	1.3775	0.31	Q	|	|	|	V |
21+55	1.3796	0.30	Q	|	|	|	V |
22+ 0	1.3816	0.30	Q	|	|	|	V |
22+ 5	1.3837	0.30	Q	|	|	|	V |
22+10	1.3857	0.30	Q	|	|	|	V |
22+15	1.3877	0.29	Q	|	|	|	V |
22+20	1.3897	0.29	Q	|	|	|	V |
22+25	1.3917	0.29	Q	|	|	|	V |
22+30	1.3937	0.29	Q	|	|	|	V |
22+35	1.3956	0.28	Q	|	|	|	V |
22+40	1.3976	0.28	Q	|	|	|	V |
22+45	1.3995	0.28	Q	|	|	|	V|
22+50	1.4014	0.28	Q	|	|	|	V|
22+55	1.4033	0.27	Q	|	|	|	V|
23+ 0	1.4051	0.27	Q	|	|	|	V|
23+ 5	1.4070	0.27	Q	|	|	|	V|
23+10	1.4088	0.27	Q	|	|	|	V|
23+15	1.4107	0.27	Q	|	|	|	V|
23+20	1.4125	0.26	Q	|	|	|	V|
23+25	1.4143	0.26	Q	|	|	|	V|
23+30	1.4161	0.26	Q	|	|	|	V|
23+35	1.4179	0.26	Q	|	|	|	V|
23+40	1.4196	0.26	Q	|	|	|	V|
23+45	1.4214	0.25	Q	|	|	|	V|
23+50	1.4231	0.25	Q	|	|	|	V|
23+55	1.4248	0.25	Q	|	|	|	V|
24+ 0	**1.4265**	**0.25**	**Q**	**|**	**|**	**|**	**V|**

2-YEAR, 24-HOURS STORM
VOLUME= 1.43 AC.FT.
VOLUME= 62,291 CU.FT.

TR. 20525

100-year, 24-Hours Storm Events

Routing

```
              FLOOD HYDROGRAPH ROUTING PROGRAM
         Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004
                    Study date: 08/26/22

---------------------------------------------------------------------
```

100-YR ROUTING TO BASIN 1
TR 20525, CITY OF VICTORVILLE
AREA NORTHWEST Basin # 1
FILE; 20525ROUTINGBASIN.OUT

```
--------------------------------------------------------------------

Program License Serial Number 4070

--------------------------------------------------------------------
********************* HYDROGRAPH INFORMATION **********************

           From study/file name: 20525HYDROAA1100YR.rte
****************************HYDROGRAPH DATA***************************
           Number of intervals =   310
           Time interval =    5.0 (Min.)
           Maximum/Peak flow rate =       60.213 (CFS)
           Total volume =       6.107 (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       1.000 to Point/Station       2.000
**** RETARDING BASIN ROUTING ****
______________________________________________________________________

Program computation of outflow v. depth




CALCULATED OUTFLOW DATA AT DEPTH =    1.00(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    2.00(Ft.))
Total outflow at this depth =      0.00(CFS)
```

```
CALCULATED OUTFLOW DATA AT DEPTH =    3.00(Ft.))
Channel length =    44.00(Ft.)     Elevation difference =   0.88(Ft.)
Covered channel
Channel base width  =   10.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.333(Ft.)
Channel flow top width =   10.000(Ft.)
Depth of flow in channel =   0.06(Ft.)
Total number of channels (same dimensions) = 1
Flow Velocity =    2.04(Ft/s)
Travel time  =    0.09 min.
Individual channel flow =    1.140(CFS)
Total capacity of improved channels =      1.140(CFS)
Critical Depth in Channel =    0.07(Ft.)

Total outflow at this depth =      1.14(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.00(Ft.))
Channel length =    44.00(Ft.)     Elevation difference =   0.88(Ft.)
Covered channel
Channel base width  =   10.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.333(Ft.)
 NOTE: Assuming free outlet flow.
Pressure flow condition in covered channel:
Wetted perimeter =   20.67(Ft.)  Flow area =    3.33(Sq.Ft)
Total head loss through channel =      1.961(Ft.)
Friction loss =      1.348(Ft.), Minor loss =      0.614(Ft.)
Total number of channels (same dimensions) = 1
Flow Velocity =    5.13(Ft/s)
Travel time  =    0.14 min.
Individual channel flow =   17.095(CFS)
Total capacity of improved channels =     17.095(CFS)

Total outflow at this depth =     17.10(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    5.00(Ft.))
Channel length =    44.00(Ft.)     Elevation difference =   0.88(Ft.)
Covered channel
Channel base width  =   10.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.333(Ft.)
 NOTE: Assuming free outlet flow.
Pressure flow condition in covered channel:
Wetted perimeter =   20.67(Ft.)  Flow area =    3.33(Sq.Ft)
Total head loss through channel =      2.962(Ft.)
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```
Friction loss =      2.035(Ft.), Minor loss =      0.927(Ft.)
Total number of channels (same dimensions) = 1
Flow Velocity =    6.31(Ft/s)
Travel time  =    0.12 min.
Individual channel flow =   21.008(CFS)
Total capacity of improved channels =     21.008(CFS)

Total outflow at this depth =     21.01(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    6.00(Ft.))
Channel length =    44.00(Ft.)     Elevation difference =   0.88(Ft.)
Covered channel
Channel base width  =   10.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.333(Ft.)
 NOTE: Assuming free outlet flow.
Pressure flow condition in covered channel:
Wetted perimeter =   20.67(Ft.)  Flow area =    3.33(Sq.Ft)
Total head loss through channel =      3.963(Ft.)
Friction loss =      2.722(Ft.), Minor loss =      1.240(Ft.)
Total number of channels (same dimensions) = 1
Flow Velocity =    7.30(Ft/s)
Travel time  =    0.10 min.
Individual channel flow =   24.299(CFS)
Total capacity of improved channels =     24.299(CFS)

Total outflow at this depth =     24.30(CFS)

--------------------------------------------------------------------
Total number of inflow hydrograph intervals = 310
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
1.000	0.205	0.000	0.205	0.205
2.000	0.446	0.000	0.446	0.446
3.000	0.724	1.140	0.720	0.728
4.000	1.042	17.095	0.983	1.101
5.000	1.401	21.008	1.329	1.473
6.000	1.803	24.299	1.719	1.887

Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	15.1	30.11	45.16	60.21	Depth (Ft.)
0.083	0.03	0.00	0.000	O					0.00
0.167	0.16	0.00	0.001	O					0.00
0.250	0.49	0.00	0.003	O					0.01
0.333	0.72	0.00	0.007	O					0.04
0.417	0.84	0.00	0.013	O					0.06
0.500	0.93	0.00	0.019	O					0.09
0.583	0.99	0.00	0.025	O					0.12
0.667	1.03	0.00	0.032	O					0.16
0.750	1.07	0.00	0.039	O					0.19
0.833	1.10	0.00	0.047	O					0.23
0.917	1.12	0.00	0.055	O					0.27
1.000	1.15	0.00	0.062	O					0.30
1.083	1.16	0.00	0.070	O					0.34
1.167	1.18	0.00	0.078	O					0.38
1.250	1.19	0.00	0.087	O					0.42
1.333	1.20	0.00	0.095	O					0.46
1.417	1.21	0.00	0.103	O					0.50
1.500	1.22	0.00	0.111	O					0.54
1.583	1.23	0.00	0.120	O					0.58
1.667	1.24	0.00	0.128	O					0.63
1.750	1.25	0.00	0.137	O					0.67
1.833	1.25	0.00	0.146	O					0.71
1.917	1.26	0.00	0.154	O					0.75
2.000	1.26	0.00	0.163	O					0.79
2.083	1.27	0.00	0.172	O					0.84
2.167	1.27	0.00	0.180	O					0.88
2.250	1.28	0.00	0.189	O					0.92
2.333	1.28	0.00	0.198	O					0.97
2.417	1.28	0.00	0.207	O					1.01
2.500	1.29	0.00	0.216	O					1.04
2.583	1.29	0.00	0.225	O					1.08
2.667	1.30	0.00	0.233	O					1.12
2.750	1.30	0.00	0.242	O					1.16
2.833	1.31	0.00	0.251	O					1.19
2.917	1.31	0.00	0.260	O					1.23
3.000	1.32	0.00	0.269	O					1.27
3.083	1.32	0.00	0.279	O					1.31
3.167	1.33	0.00	0.288	O					1.34
3.250	1.33	0.00	0.297	O					1.38
3.333	1.34	0.00	0.306	O					1.42
3.417	1.34	0.00	0.315	O					1.46
3.500	1.35	0.00	0.324	O					1.50
3.583	1.35	0.00	0.334	O					1.53
3.667	1.36	0.00	0.343	O					1.57
3.750	1.36	0.00	0.352	O					1.61
3.833	1.37	0.00	0.362	O					1.65
3.917	1.37	0.00	0.371	O					1.69

4.000	1.38	0.00	0.381	O	|	|	|	|	1.73
4.083	1.38	0.00	0.390	O	|	|	|	|	1.77
4.167	1.39	0.00	0.400	O	|	|	|	|	1.81
4.250	1.39	0.00	0.409	O	|	|	|	|	1.85
4.333	1.40	0.00	0.419	O	|	|	|	|	1.89
4.417	1.40	0.00	0.429	O	|	|	|	|	1.93
4.500	1.41	0.00	0.438	O	|	|	|	|	1.97
4.583	1.42	0.01	0.448	O	|	|	|	|	2.01
4.667	1.42	0.05	0.458	O	|	|	|	|	2.04
4.750	1.43	0.09	0.467	O	|	|	|	|	2.08
4.833	1.43	0.12	0.476	O	|	|	|	|	2.11
4.917	1.44	0.16	0.485	O	|	|	|	|	2.14
5.000	1.45	0.20	0.494	O	|	|	|	|	2.17
5.083	1.45	0.23	0.502	O	|	|	|	|	2.20
5.167	1.46	0.26	0.510	O	|	|	|	|	2.23
5.250	1.46	0.30	0.519	O	|	|	|	|	2.26
5.333	1.47	0.33	0.527	O	|	|	|	|	2.29
5.417	1.48	0.36	0.534	O	|	|	|	|	2.32
5.500	1.48	0.39	0.542	O	|	|	|	|	2.35
5.583	1.49	0.42	0.549	O	|	|	|	|	2.37
5.667	1.50	0.45	0.557	O	|	|	|	|	2.40
5.750	1.50	0.48	0.564	O	|	|	|	|	2.42
5.833	1.51	0.51	0.571	O	|	|	|	|	2.45
5.917	1.52	0.54	0.577	O	|	|	|	|	2.47
6.000	1.52	0.57	0.584	O	|	|	|	|	2.50
6.083	1.53	0.59	0.591	O	|	|	|	|	2.52
6.167	1.54	0.62	0.597	O	|	|	|	|	2.54
6.250	1.55	0.65	0.603	O	|	|	|	|	2.57
6.333	1.55	0.67	0.609	O	|	|	|	|	2.59
6.417	1.56	0.70	0.615	O	|	|	|	|	2.61
6.500	1.57	0.72	0.621	O	|	|	|	|	2.63
6.583	1.58	0.74	0.627	O	|	|	|	|	2.65
6.667	1.58	0.77	0.633	O	|	|	|	|	2.67
6.750	1.59	0.79	0.638	O	|	|	|	|	2.69
6.833	1.60	0.81	0.644	O	|	|	|	|	2.71
6.917	1.61	0.83	0.649	O	|	|	|	|	2.73
7.000	1.62	0.86	0.655	O	|	|	|	|	2.75
7.083	1.62	0.88	0.660	O	|	|	|	|	2.77
7.167	1.63	0.90	0.665	O	|	|	|	|	2.79
7.250	1.64	0.92	0.670	O	|	|	|	|	2.81
7.333	1.65	0.94	0.675	O	|	|	|	|	2.82
7.417	1.66	0.96	0.680	O	|	|	|	|	2.84
7.500	1.67	0.98	0.685	O	|	|	|	|	2.86
7.583	1.68	1.00	0.689	O	|	|	|	|	2.87
7.667	1.69	1.02	0.694	O	|	|	|	|	2.89
7.750	1.70	1.04	0.698	O	|	|	|	|	2.91
7.833	1.71	1.05	0.703	O	|	|	|	|	2.92
7.917	1.71	1.07	0.707	O	|	|	|	|	2.94
8.000	1.72	1.09	0.712	O	|	|	|	|	2.96
8.083	1.73	1.11	0.716	O	|	|	|	|	2.97
8.167	1.74	1.13	0.720	O	|	|	|	|	2.99
8.250	1.76	1.17	0.725	O	|	|	|	|	3.00
8.333	1.77	1.34	0.728	O	|	|	|	|	3.01
8.417	1.78	1.47	0.731	O	|	|	|	|	3.02

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  8.500    1.79    1.56      0.732  O        |       |       |       |       3.03
  8.583    1.80    1.63      0.734  O        |       |       |       |       3.03
  8.667    1.81    1.68      0.735  O        |       |       |       |       3.03
  8.750    1.82    1.72      0.736  O        |       |       |       |       3.04
  8.833    1.83    1.75      0.736  O        |       |       |       |       3.04
  8.917    1.84    1.78      0.737  O        |       |       |       |       3.04
  9.000    1.86    1.80      0.737  O        |       |       |       |       3.04
  9.083    1.87    1.82      0.737  O        |       |       |       |       3.04
  9.167    1.88    1.83      0.738  O        |       |       |       |       3.04
  9.250    1.89    1.85      0.738  OI       |       |       |       |       3.04
  9.333    1.91    1.86      0.738  OI       |       |       |       |       3.05
  9.417    1.92    1.88      0.739  OI       |       |       |       |       3.05
  9.500    1.93    1.89      0.739  |O       |       |       |       |       3.05
  9.583    1.95    1.91      0.739  |O       |       |       |       |       3.05
  9.667    1.96    1.92      0.740  |O       |       |       |       |       3.05
  9.750    1.97    1.93      0.740  |O       |       |       |       |       3.05
  9.833    1.99    1.95      0.740  |O       |       |       |       |       3.05
  9.917    2.00    1.96      0.740  |O       |       |       |       |       3.05
 10.000    2.02    1.98      0.741  |O       |       |       |       |       3.05
 10.083    2.03    1.99      0.741  |O       |       |       |       |       3.05
 10.167    2.05    2.01      0.741  |O       |       |       |       |       3.05
 10.250    2.07    2.02      0.742  |O       |       |       |       |       3.06
 10.333    2.08    2.04      0.742  |O       |       |       |       |       3.06
 10.417    2.10    2.05      0.742  |O       |       |       |       |       3.06
 10.500    2.12    2.07      0.743  |O       |       |       |       |       3.06
 10.583    2.13    2.09      0.743  |O       |       |       |       |       3.06
 10.667    2.15    2.10      0.743  |O       |       |       |       |       3.06
 10.750    2.17    2.12      0.744  |O       |       |       |       |       3.06
 10.833    2.19    2.14      0.744  |O       |       |       |       |       3.06
 10.917    2.21    2.15      0.744  |O       |       |       |       |       3.06
 11.000    2.23    2.17      0.745  |O       |       |       |       |       3.06
 11.083    2.25    2.19      0.745  |O       |       |       |       |       3.07
 11.167    2.27    2.21      0.745  |O       |       |       |       |       3.07
 11.250    2.29    2.23      0.746  |O       |       |       |       |       3.07
 11.333    2.31    2.25      0.746  |O       |       |       |       |       3.07
 11.417    2.33    2.27      0.747  |O       |       |       |       |       3.07
 11.500    2.36    2.29      0.747  |O       |       |       |       |       3.07
 11.583    2.38    2.32      0.747  |O       |       |       |       |       3.07
 11.667    2.40    2.34      0.748  |O       |       |       |       |       3.08
 11.750    2.43    2.36      0.748  |O       |       |       |       |       3.08
 11.833    2.45    2.38      0.749  |O       |       |       |       |       3.08
 11.917    2.48    2.41      0.749  |O       |       |       |       |       3.08
 12.000    2.51    2.43      0.750  |O       |       |       |       |       3.08
 12.083    2.53    2.46      0.750  |O       |       |       |       |       3.08
 12.167    2.53    2.48      0.751  |O       |       |       |       |       3.08
 12.250    2.48    2.49      0.751  |O       |       |       |       |       3.08
 12.333    2.46    2.48      0.751  |O       |       |       |       |       3.08
 12.417    2.47    2.48      0.751  |O       |       |       |       |       3.08
 12.500    2.48    2.48      0.751  |O       |       |       |       |       3.08
 12.583    2.50    2.48      0.751  |O       |       |       |       |       3.08
 12.667    2.53    2.49      0.751  |O       |       |       |       |       3.08
 12.750    2.55    2.51      0.751  |O       |       |       |       |       3.09
 12.833    2.59    2.52      0.752  |O       |       |       |       |       3.09
 12.917    2.62    2.55      0.752  |O       |       |       |       |       3.09
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13.000	2.65	2.57	0.753	O	3.09
13.083	2.69	2.60	0.753	O	3.09
13.167	2.73	2.64	0.754	O	3.09
13.250	2.78	2.67	0.755	O	3.10
13.333	2.82	2.71	0.755	O	3.10
13.417	2.87	2.75	0.756	O	3.10
13.500	2.92	2.79	0.757	O	3.10
13.583	2.97	2.84	0.758	O	3.11
13.667	3.03	2.88	0.759	O	3.11
13.750	3.09	2.93	0.760	O	3.11
13.833	3.15	2.99	0.761	O	3.12
13.917	3.21	3.04	0.762	O	3.12
14.000	3.28	3.10	0.763	O	3.12
14.083	3.36	3.17	0.764	O	3.13
14.167	3.43	3.23	0.766	O	3.13
14.250	3.52	3.31	0.767	O	3.14
14.333	3.61	3.38	0.769	O	3.14
14.417	3.71	3.46	0.770	O	3.15
14.500	3.81	3.55	0.772	OI	3.15
14.583	3.92	3.64	0.774	OI	3.16
14.667	4.04	3.74	0.776	OI	3.16
14.750	4.17	3.85	0.778	O	3.17
14.833	4.31	3.96	0.780	O	3.18
14.917	4.47	4.09	0.783	O	3.18
15.000	4.63	4.22	0.785	O	3.19
15.083	4.82	4.37	0.788	O	3.20
15.167	5.03	4.54	0.792	O	3.21
15.250	5.27	4.72	0.795	O	3.22
15.333	5.53	4.92	0.799	O	3.24
15.417	5.81	5.14	0.804	OI	3.25
15.500	5.98	5.36	0.808	OI	3.26
15.583	5.99	5.55	0.812	OI	3.28
15.667	6.17	5.70	0.815	O	3.29
15.750	6.64	5.91	0.819	O	3.30
15.833	7.32	6.23	0.825	O	3.32
15.917	8.50	6.72	0.835	OI	3.35
16.000	10.76	7.58	0.852	OI	3.40
16.083	18.44	9.65	0.894	O I	3.53
16.167	36.27	14.86	0.998	O I	3.86
16.250	**60.21**	18.96	1.213	O I	4.48
16.333	44.06	21.28	1.434	O I	5.08
16.417	28.06	22.09	1.533	O I	5.33
16.500	20.99	**22.22**	**1.549**	**O**	**5.37**
16.583	16.87	22.04	1.527	I O	5.31
16.667	14.24	21.69	1.484	I O	5.21
16.750	12.21	21.22	1.427	I O	5.06
16.833	10.36	20.57	1.361	I O	4.89
16.917	9.21	19.79	1.289	I O	4.69
17.000	8.22	18.99	1.216	I O	4.48
17.083	7.32	18.18	1.141	I O	4.28
17.167	6.59	17.36	1.067	I O	4.07
17.250	5.95	14.93	0.999	I O	3.86
17.333	5.32	12.19	0.944	I O	3.69
17.417	4.75	10.08	0.902	I O	3.56

INFLOW
100-YEAR, 24-HOURS STORM
Q100= 60.21 CFS

OUTFLOW
100-YEAR
Q100= 22.22 CFS

MAX. DEPTH OF
WATER= 5.37 FT

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17.500    4.52    8.48     0.870  | I O  |       |       |       |        3.46
17.583    4.39    7.29     0.847  | IO   |       |       |       |        3.39
17.667    4.18    6.41     0.829  | IO   |       |       |       |        3.33
17.750    3.80    5.69     0.815  | IO   |       |       |       |        3.29
17.833    3.50    5.09     0.803  |IO    |       |       |       |        3.25
17.917    3.20    4.58     0.793  |IO    |       |       |       |        3.22
18.000    2.87    4.12     0.783  |IO    |       |       |       |        3.19
18.083    2.77    3.74     0.776  |O     |       |       |       |        3.16
18.167    2.70    3.44     0.770  |O     |       |       |       |        3.14
18.250    2.69    3.22     0.766  |O     |       |       |       |        3.13
18.333    2.66    3.06     0.762  |O     |       |       |       |        3.12
18.417    2.62    2.94     0.760  |O     |       |       |       |        3.11
18.500    2.57    2.84     0.758  |O     |       |       |       |        3.11
18.583    2.52    2.75     0.756  |O     |       |       |       |        3.10
18.667    2.47    2.67     0.755  |O     |       |       |       |        3.10
18.750    2.42    2.61     0.753  |O     |       |       |       |        3.09
18.833    2.38    2.55     0.752  |O     |       |       |       |        3.09
18.917    2.33    2.49     0.751  |O     |       |       |       |        3.08
19.000    2.29    2.44     0.750  |O     |       |       |       |        3.08
19.083    2.25    2.39     0.749  |O     |       |       |       |        3.08
19.167    2.21    2.34     0.748  |O     |       |       |       |        3.08
19.250    2.18    2.30     0.747  |O     |       |       |       |        3.07
19.333    2.14    2.26     0.746  |O     |       |       |       |        3.07
19.417    2.11    2.22     0.745  |O     |       |       |       |        3.07
19.500    2.07    2.18     0.745  |O     |       |       |       |        3.07
19.583    2.04    2.14     0.744  |O     |       |       |       |        3.06
19.667    2.01    2.11     0.743  |O     |       |       |       |        3.06
19.750    1.98    2.08     0.743  |O     |       |       |       |        3.06
19.833    1.95    2.04     0.742  |O     |       |       |       |        3.06
19.917    1.93    2.01     0.741  |O     |       |       |       |        3.05
20.000    1.90    1.98     0.741  |O     |       |       |       |        3.05
20.083    1.88    1.96     0.740  IO     |       |       |       |        3.05
20.167    1.85    1.93     0.740  IO     |       |       |       |        3.05
20.250    1.83    1.90     0.739  IO     |       |       |       |        3.05
20.333    1.80    1.88     0.739  O      |       |       |       |        3.05
20.417    1.78    1.85     0.738  O      |       |       |       |        3.04
20.500    1.76    1.83     0.738  O      |       |       |       |        3.04
20.583    1.74    1.81     0.737  O      |       |       |       |        3.04
20.667    1.72    1.78     0.737  O      |       |       |       |        3.04
20.750    1.70    1.76     0.736  O      |       |       |       |        3.04
20.833    1.68    1.74     0.736  O      |       |       |       |        3.04
20.917    1.66    1.72     0.736  O      |       |       |       |        3.04
21.000    1.65    1.70     0.735  O      |       |       |       |        3.04
21.083    1.63    1.68     0.735  O      |       |       |       |        3.03
21.167    1.61    1.66     0.734  O      |       |       |       |        3.03
21.250    1.60    1.65     0.734  O      |       |       |       |        3.03
21.333    1.58    1.63     0.734  O      |       |       |       |        3.03
21.417    1.56    1.61     0.733  O      |       |       |       |        3.03
21.500    1.55    1.60     0.733  O      |       |       |       |        3.03
21.583    1.53    1.58     0.733  O      |       |       |       |        3.03
21.667    1.52    1.56     0.732  O      |       |       |       |        3.03
21.750    1.51    1.55     0.732  O      |       |       |       |        3.03
21.833    1.49    1.53     0.732  O      |       |       |       |        3.02
21.917    1.48    1.52     0.732  O      |       |       |       |        3.02
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22.000	1.47	1.51	0.731	O	3.02
22.083	1.45	1.49	0.731	O	3.02
22.167	1.44	1.48	0.731	O	3.02
22.250	1.43	1.47	0.731	O	3.02
22.333	1.42	1.45	0.730	O	3.02
22.417	1.41	1.44	0.730	O	3.02
22.500	1.40	1.43	0.730	O	3.02
22.583	1.38	1.42	0.730	O	3.02
22.667	1.37	1.41	0.729	O	3.02
22.750	1.36	1.40	0.729	O	3.02
22.833	1.35	1.38	0.729	O	3.02
22.917	1.34	1.37	0.729	O	3.01
23.000	1.33	1.36	0.728	O	3.01
23.083	1.32	1.35	0.728	O	3.01
23.167	1.31	1.34	0.728	O	3.01
23.250	1.30	1.33	0.728	O	3.01
23.333	1.29	1.32	0.728	O	3.01
23.417	1.29	1.31	0.727	O	3.01
23.500	1.28	1.30	0.727	O	3.01
23.583	1.27	1.29	0.727	O	3.01
23.667	1.26	1.29	0.727	O	3.01
23.750	1.25	1.28	0.727	O	3.01
23.833	1.24	1.27	0.727	O	3.01
23.917	1.24	1.26	0.726	O	3.01
24.000	1.23	1.25	0.726	O	3.01
24.083	1.19	1.24	0.726	O	3.01
24.167	1.05	1.20	0.725	O	3.00
24.250	0.71	1.14	0.723	O	3.00
24.333	0.48	1.12	0.720	O	2.98
24.417	0.36	1.10	0.715	O	2.97
24.500	0.28	1.08	0.710	O	2.95
24.583	0.22	1.06	0.704	O	2.93
24.667	0.18	1.03	0.698	O	2.91
24.750	0.14	1.01	0.692	O	2.89
24.833	0.11	0.98	0.686	O	2.86
24.917	0.09	0.96	0.680	O	2.84
25.000	0.07	0.94	0.674	O	2.82
25.083	0.06	0.91	0.668	O	2.80
25.167	0.05	0.89	0.662	O	2.78
25.250	0.04	0.86	0.657	O	2.76
25.333	0.03	0.84	0.651	O	2.74
25.417	0.02	0.82	0.645	O	2.72
25.500	0.02	0.80	0.640	O	2.70
25.583	0.01	0.77	0.635	O	2.68
25.667	0.01	0.75	0.630	O	2.66
25.750	0.00	0.73	0.625	O	2.64
25.833	0.00	0.71	0.620	O	2.62
25.917	0.00	0.69	0.615	O	2.61
26.000	0.00	0.67	0.610	O	2.59
26.083	0.00	0.65	0.605	O	2.57
26.167	0.00	0.64	0.601	O	2.56
26.250	0.00	0.62	0.597	O	2.54
26.333	0.00	0.60	0.593	O	2.53
26.417	0.00	0.58	0.588	O	2.51

DCV= 0.702 AC.FT
DCV= 30,580 CU.FT.

DEPTH OF WATER @ DCV= 2.92 FT

26.500	0.00	0.57	0.584	O	|	|	|	|	2.50
26.583	0.00	0.55	0.581	O	|	|	|	|	2.48
26.667	0.00	0.54	0.577	O	|	|	|	|	2.47
26.750	0.00	0.52	0.573	O	|	|	|	|	2.46
26.833	0.00	0.51	0.570	O	|	|	|	|	2.44
26.917	0.00	0.49	0.566	O	|	|	|	|	2.43
27.000	0.00	0.48	0.563	O	|	|	|	|	2.42
27.083	0.00	0.47	0.560	O	|	|	|	|	2.41
27.167	0.00	0.45	0.556	O	|	|	|	|	2.40
27.250	0.00	0.44	0.553	O	|	|	|	|	2.39
27.333	0.00	0.43	0.550	O	|	|	|	|	2.38
27.417	0.00	0.42	0.547	O	|	|	|	|	2.37
27.500	0.00	0.40	0.545	O	|	|	|	|	2.35
27.583	0.00	0.39	0.542	O	|	|	|	|	2.35
27.667	0.00	0.38	0.539	O	|	|	|	|	2.34
27.750	0.00	0.37	0.537	O	|	|	|	|	2.33
27.833	0.00	0.36	0.534	O	|	|	|	|	2.32
27.917	0.00	0.35	0.532	O	|	|	|	|	2.31
28.000	0.00	0.34	0.529	O	|	|	|	|	2.30
28.083	0.00	0.33	0.527	O	|	|	|	|	2.29
28.167	0.00	0.32	0.525	O	|	|	|	|	2.28
28.250	0.00	0.31	0.523	O	|	|	|	|	2.28
28.333	0.00	0.31	0.520	O	|	|	|	|	2.27
28.417	0.00	0.30	0.518	O	|	|	|	|	2.26
28.500	0.00	0.29	0.516	O	|	|	|	|	2.25
28.583	0.00	0.28	0.514	O	|	|	|	|	2.25
28.667	0.00	0.27	0.512	O	|	|	|	|	2.24
28.750	0.00	0.26	0.511	O	|	|	|	|	2.23
28.833	0.00	0.26	0.509	O	|	|	|	|	2.23
28.917	0.00	0.25	0.507	O	|	|	|	|	2.22
29.000	0.00	0.24	0.505	O	|	|	|	|	2.21
29.083	0.00	0.24	0.504	O	|	|	|	|	2.21
29.167	0.00	0.23	0.502	O	|	|	|	|	2.20
29.250	0.00	0.22	0.501	O	|	|	|	|	2.20
29.333	0.00	0.22	0.499	O	|	|	|	|	2.19
29.417	0.00	0.21	0.498	O	|	|	|	|	2.19
29.500	0.00	0.21	0.496	O	|	|	|	|	2.18
29.583	0.00	0.20	0.495	O	|	|	|	|	2.18
29.667	0.00	0.19	0.493	O	|	|	|	|	2.17
29.750	0.00	0.19	0.492	O	|	|	|	|	2.17
29.833	0.00	0.18	0.491	O	|	|	|	|	2.16
29.917	0.00	0.18	0.489	O	|	|	|	|	2.16
30.000	0.00	0.17	0.488	O	|	|	|	|	2.15
30.083	0.00	0.17	0.487	O	|	|	|	|	2.15
30.167	0.00	0.16	0.486	O	|	|	|	|	2.14
30.250	0.00	0.16	0.485	O	|	|	|	|	2.14
30.333	0.00	0.15	0.484	O	|	|	|	|	2.14
30.417	0.00	0.15	0.483	O	|	|	|	|	2.13
30.500	0.00	0.15	0.482	O	|	|	|	|	2.13
30.583	0.00	0.14	0.481	O	|	|	|	|	2.12
30.667	0.00	0.14	0.480	O	|	|	|	|	2.12
30.750	0.00	0.13	0.479	O	|	|	|	|	2.12
30.833	0.00	0.13	0.478	O	|	|	|	|	2.11
30.917	0.00	0.13	0.477	O	|	|	|	|	2.11

31.000	0.00	0.12	0.476	O	|	|	|	|	2.11
31.083	0.00	0.12	0.475	O	|	|	|	|	2.11
31.167	0.00	0.12	0.474	O	|	|	|	|	2.10
31.250	0.00	0.11	0.474	O	|	|	|	|	2.10
31.333	0.00	0.11	0.473	O	|	|	|	|	2.10
31.417	0.00	0.11	0.472	O	|	|	|	|	2.09
31.500	0.00	0.10	0.471	O	|	|	|	|	2.09
31.583	0.00	0.10	0.471	O	|	|	|	|	2.09
31.667	0.00	0.10	0.470	O	|	|	|	|	2.09

Remaining water in basin = 0.47 (Ac.Ft)

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

Number of intervals = 380

Time interval = 5.0 (Min.)

Maximum/Peak flow rate = 22.222 (CFS)

Total volume = 5.637 (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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FILE: 20525LINEA.WSW                     W S P G W  - EDIT LISTING - Version 14.06             Date:11- 2-2022  Time:10:28:34
                                     WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING                             PAGE    1
 CARD  SECT  CHN   NO OF  AVE PIER  HEIGHT 1  BASE    ZL    ZR    INV   Y(1)  Y(2)  Y(3)  Y(4)  Y(5)  Y(6)  Y(7)  Y(8)  Y(9)  Y(10)
 CODE   NO   TYPE PIER/PIP WIDTH    DIAMETER  WIDTH               DROP

 CD      1    4      2             2.500
 CD      2    4      0             3.000
 CD      3    4      2             1.500
 CD      5    4      2             2.500
 CD      7    3      0     .000    4.000   14.000    .000   .000    .00
                                                          W S P G W                                                PAGE NO   1
                             WATER SURFACE PROFILE - TITLE CARD LISTING
HEADING LINE NO 1 IS -
                               WSPG LINE "A" INLET STORM DRAIN TO BASIN
HEADING LINE NO 2 IS -
                               TR 20525,  CITY OF VICTORVILLE
HEADING LINE NO 3 IS -
                               FILE: 20525LINEA.OUT
                                                          W S P G W                                                PAGE NO   2
                             WATER SURFACE PROFILE - ELEMENT CARD LISTING
 ELEMENT NO   1 IS A SYSTEM OUTLET     *         *     *
                    U/S DATA   STATION    INVERT  SECT                                  W S ELEV
                               1000.000 2924.560    1                                    2927.220
 ELEMENT NO   2 IS A REACH             *         *     *
                    U/S DATA   STATION    INVERT  SECT              N                            RADIUS    ANGLE     ANG PT  MAN H
                               1067.000 2925.230    1              .012                           .000     .000      .000     0
 ELEMENT NO   3 IS A JUNCTION          *         *     *     *                *                    *               *
                    U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2  N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                               1072.000 2925.430    1     7     0  .012    25.400      .000  2925.430     .000    .000     .000
                                                                                                 RADIUS    ANGLE
                                                                                                   .000     .000
WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS
 ELEMENT NO   4 IS A REACH             *         *     *
                    U/S DATA   STATION    INVERT  SECT              N                            RADIUS    ANGLE     ANG PT  MAN H
                               1112.000 2925.630    3              .012                           .000     .000    49.000     1
 ELEMENT NO   5 IS A REACH             *         *     *
                    U/S DATA   STATION    INVERT  SECT              N                            RADIUS    ANGLE     ANG PT  MAN H
                               1117.000 2925.830    3              .012                           .000     .000      .000     1
 ELEMENT NO   6 IS A SYSTEM HEADWORKS                  *                       *
                    U/S DATA   STATION    INVERT  SECT                                  W S ELEV
                               1117.000 2925.830    3                                  2929.660
```

FILE: 20525LINEA.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 1

Program Package Serial Number: 1586

WATER SURFACE PROFILE LISTING Date:11- 2-2022 Time:10:28:38

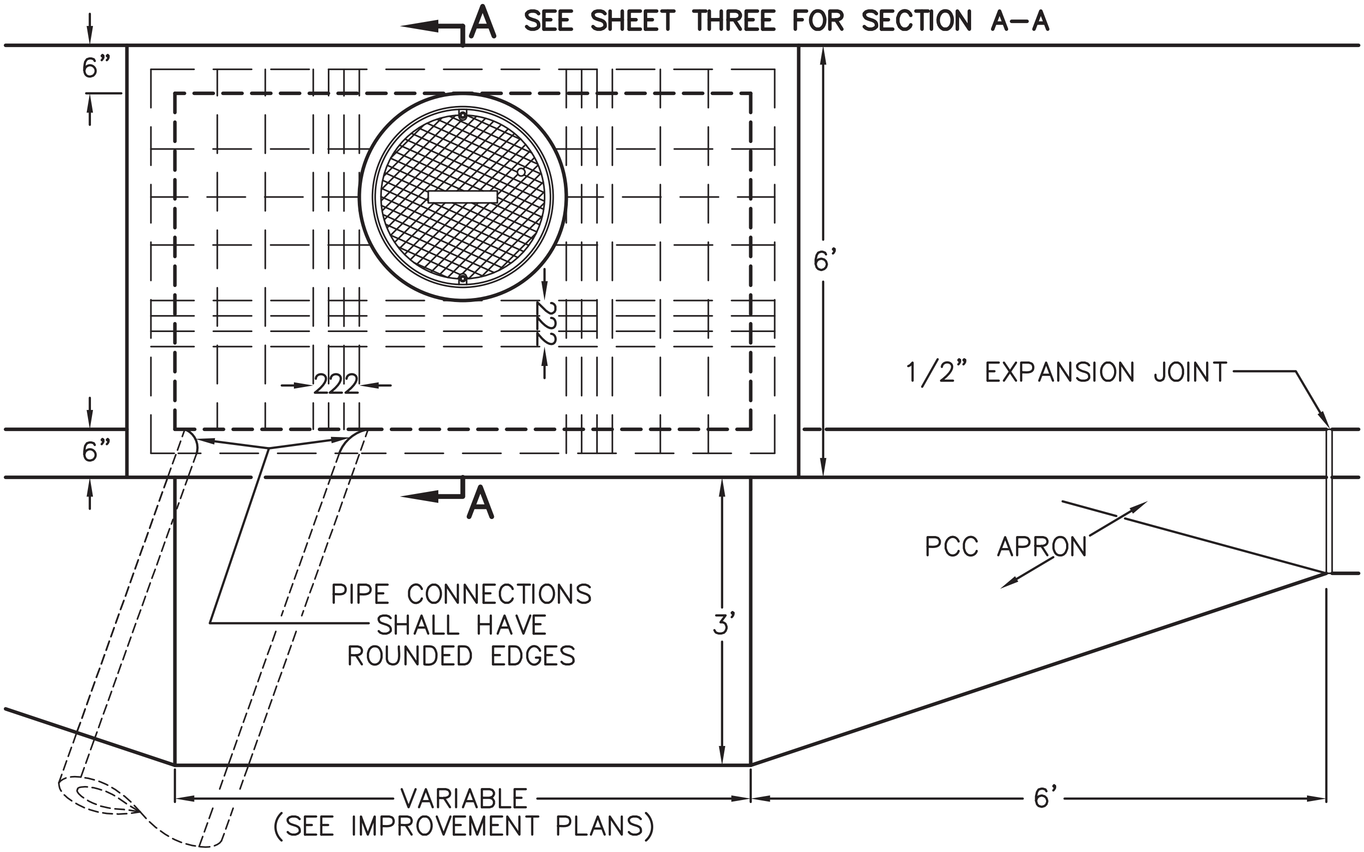
WSPG LINE "A" INLET STORM DRAIN TO BASIN

TR 20525, CITY OF VICTORVILLE

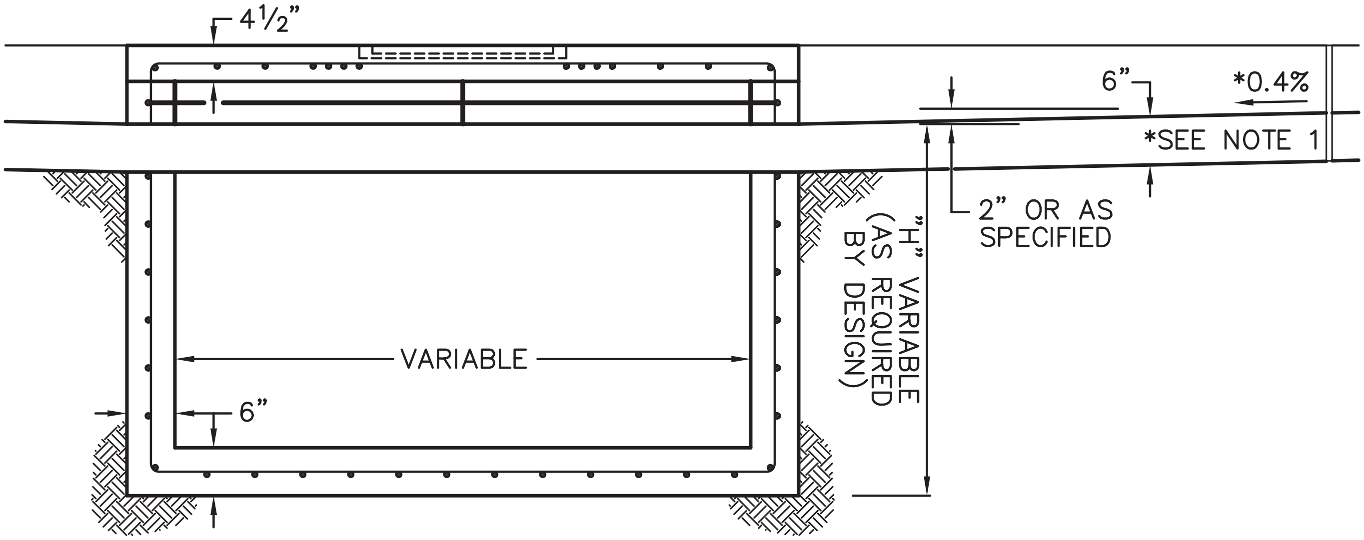
FILE: 20525LINEA.OUT

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1000.000	2924.560	1.404	2925.964	50.80	8.95	1.24	2927.21	.00	1.72	2.48	2.500	.000	.00	2 .0
34.425	.0100					.0084	.29	1.40	1.04	1.35	.012	.00	.00	PIPE
1034.425	2924.904	1.456	2926.360	50.80	8.56	1.14	2927.50	.00	1.72	2.47	2.500	.000	.00	2 .0
17.532	.0100					.0075	.13	1.46	.97	1.35	.012	.00	.00	PIPE
1051.957	2925.080	1.515	2926.595	50.80	8.16	1.03	2927.63	.00	1.72	2.44	2.500	.000	.00	2 .0
9.146	.0100					.0066	.06	1.52	.90	1.35	.012	.00	.00	PIPE
1061.102	2925.171	1.578	2926.749	50.80	7.78	.94	2927.69	.00	1.72	2.41	2.500	.000	.00	2 .0
4.698	.0100					.0059	.03	1.58	.83	1.35	.012	.00	.00	PIPE
1065.800	2925.218	1.644	2926.862	50.80	7.42	.85	2927.72	.00	1.72	2.37	2.500	.000	.00	2 .0
1.200	.0100					.0052	.01	1.64	.77	1.35	.012	.00	.00	PIPE
1067.000	2925.230	1.717	2926.947	50.80	7.07	.78	2927.72	.00	1.72	2.32	2.500	.000	.00	2 .0
JUNCT STR	.0400					.0029	.01	1.72	.71		.012	.00	.00	PIPE
1072.000	2925.430	2.560	2927.990	25.40	7.19	.80	2928.79	.00	1.34	.00	1.500	.000	.00	2 .0
40.000	.0050					.0125	.50	2.56	.00	1.50	.012	.00	.00	PIPE
1112.000	2925.630	3.029	2928.658	25.40	7.19	.80	2929.46	.00	1.34	.00	1.500	.000	.00	2 .0
5.000	.0400					.0125	.06	3.03	.00	.80	.012	.00	.00	PIPE
1117.000	2925.830	2.931	2928.761	25.40	7.19	.80	2929.56	.00	1.34	.00	1.500	.000	.00	2 .0

```
T1 WSPG LINE "A" INLET STORM DRAIN TO BASIN                                                    0
T2 TR 20525,  CITY OF VICTORVILLE
T3 FILE: 20525LINEA.OUT
SO   1000.0002924.560  1                          2927.220
R    1067.0002925.230  1      .012                                          .000    .000 0
JX   1072.0002925.430  1  7   .012   25.400         2925.430                   .0          .000
R    1112.0002925.630  3      .012                                          .000  49.000 1
R    1117.0002925.830  3      .012                                          .000    .000 1
SH   1117.0002925.830  3                          2929.660
CD   1  4   2    .000   2.500     .000  .000  .000   .00
CD   2  4   0    .000   3.000     .000  .000  .000   .00
CD   3  4   2    .000   1.500     .000  .000  .000   .00
CD   5  4   2    .000   2.500     .000  .000  .000   .00
CD   7  3   0    .000   4.000   14.000  .000  .000   .00
Q           25.400   .0
```



PLAN



SECTION

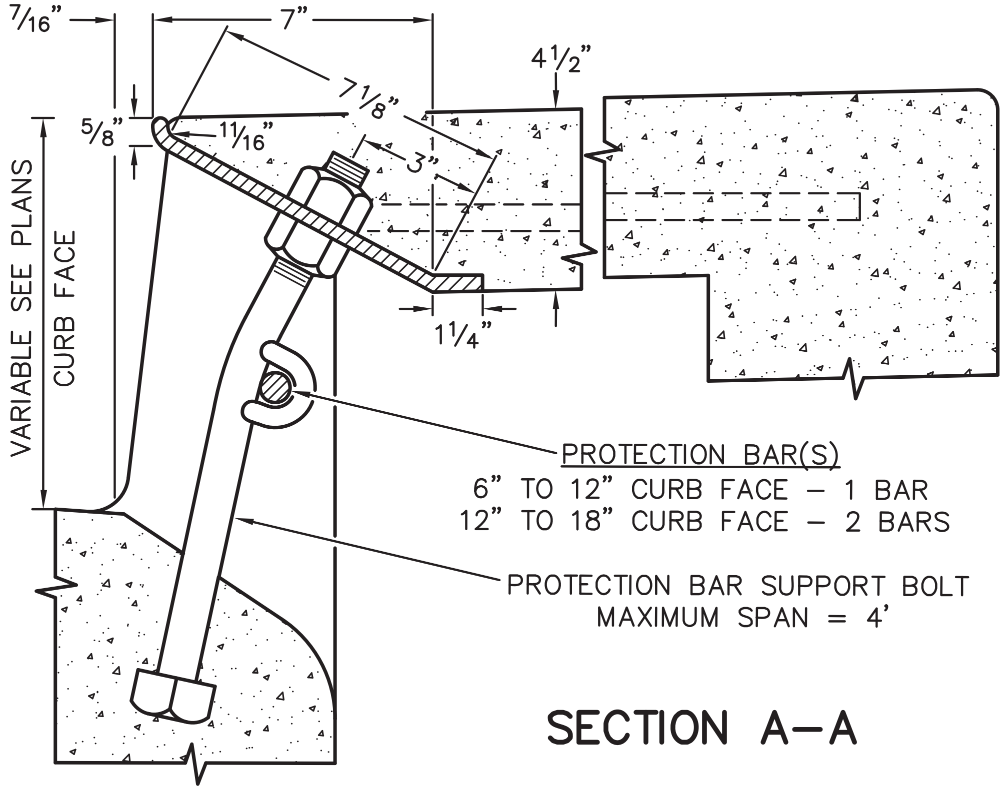
NOTES:

1. THE GUTTER CROSS SLOPE SHALL NOT EXCEED 8.33%. THE GUTTER FLOW LINE SHALL NOT BE LESS THAN 0.3% WITHIN 30 FEET OF THE EDGE OF THE DROP INLET OPENING. THE APRON TRANSITION MAY BE EXTENDED UP TO 15 FEET IN LENGTH.

REV.	DATE	BY
	1/26/65	J.H.F.
NOTES	5/1/77	M.A.T.

CITY OF VICTORVILLE - ENGINEERING DEPARTMENT

BOX WIDTH	3/21/78	X.S.S.	STANDARD DROP INLET	D-02
NOTES	7/1/94	D.G.H.		
	6/1/07	STAFF	JOHN A. McGLADE, CITY ENGINEER	SHEET 1 OF 3



SECTION A–A

NOTES:

1. CONCRETE SHALL BE CLASS 1, PER SECTION 90–1.01 OF STANDARD SPECIFICATIONS.
2. ALL CONCRETE SHALL HAVE 4% AIR ENTRAINMENT.
3. SEE DRAWING S–01 FOR EXPANSION JOINT DETAIL.
4. FLOOR SLOPE SHALL BE 1" PER FOOT TOWARD OUTLET OR AS SPECIFIED ON THE PLANS.
5. REINFORCING SHALL CONSIST OF NO. 4 DEFORMED BARS AT 6" CENTERS EACH WAY UNLESS OTHERWISE NOTED.
6. ALL STEEL REINFORCING SPLICES SHALL BE LAPPED 40 DIAMETERS.
7. ALL STEEL REINFORCING JOINTS SHALL BE BENT TO 1" RADIUS AND EITHER CONTINUED OR LAPPED 40 DIAMETERS.
8. COVER SHALL BE BOLTED DOWN WITH 2 SOCKET SET SCREW BOLTS PER DETAILS ON STANDARD DRAWING D–04.
9. FRAME AND COVER SHALL BE ALHAMBRA FOUNDRY NO. A1530B, GALVANIZED, 22" DIAMETER OPENING OR EQUAL.
10. CURB PROTECTION PLATE SHALL BE ALHAMBRA FOUNDRY NO. A3911 OR EQUAL. PROTECTION BAR SHALL BE ALHAMBRA FOUNDRY A1564 OR EQUAL. PROTECTION BAR SUPPORT BOLTS SHALL BE ALHAMBRA FOUNDRY A1572 OR EQUAL.
11. STEPS – NONE REQUIRED WHERE "H" IS 3'6" OR LESS. INSTALL ONE STEP 16"± ABOVE FLOOR WHEN "H" IS 3'6" TO 5'0". WHERE "H" IS MORE THAN 5'0", STEPS SHALL BE EVENLY SPACED AT 12"± INTERVALS FROM 16"± ABOVE FLOOR TO WITHIN 12"± OF THE TOP OF THE BOX. PLACE STEPS IN WALL WITHOUT PIPE OPENINGS.
12. ALL EXPOSED METAL PARTS SHALL BE GALVANIZED.

REV.	DATE	BY
	1/26/65	J.H.F.
NOTES	5/1/77	M.A.T.
NOTES	7/1/94	D.G.H.
	6/1/07	STAFF

CITY OF VICTORVILLE - ENGINEERING DEPARTMENT

STANDARD DROP INLET — **D-02**

JOHN A. McGLADE, CITY ENGINEER — SHEET 3 OF 3

LUDWIG ENGINEERING
109 E. Third Street
San Bernardino, California 92410
(909)884-8217
Fax (909) 889-0153

JOB **MI-0508**

CATCH BASIN #1 AND #2 @ BASIN NO. 2 (NORTHWEST) RIO BRAVO PLACE

CAPACITY OF CURB OPENING INLET ON A SUMP CONDITION:

HEIGHT OF CURB = 6" CF.

Q 100 = 25.4 CFS ; CATCH BASIN # 1
Q 100 = 25.4 CFS ; CATCH BASIN # 2

LOCAL DEPRESSION = 4"

PONDING DEPTH = 6" + 4" = H = 10" (1') TO TC.

h (eff.) = 0.58'

with h = 0.58' and $\frac{H}{h} = \frac{0.833'}{0.58'} = 1.44$

PER NOMOGRAPH:

$\frac{Q}{L} = 1.6$ CFS/FT

FOR CATCH BASIN #1 AND #2;

$\mathbf{L = \frac{25.4}{1.6}}$

L = 15.9' SAY **W=16' CATCH BASIN #1 AND #2**

MAXIMUM PONDING DEPTH = 6" + 4" + 0.2' = 1.033' TO R/W

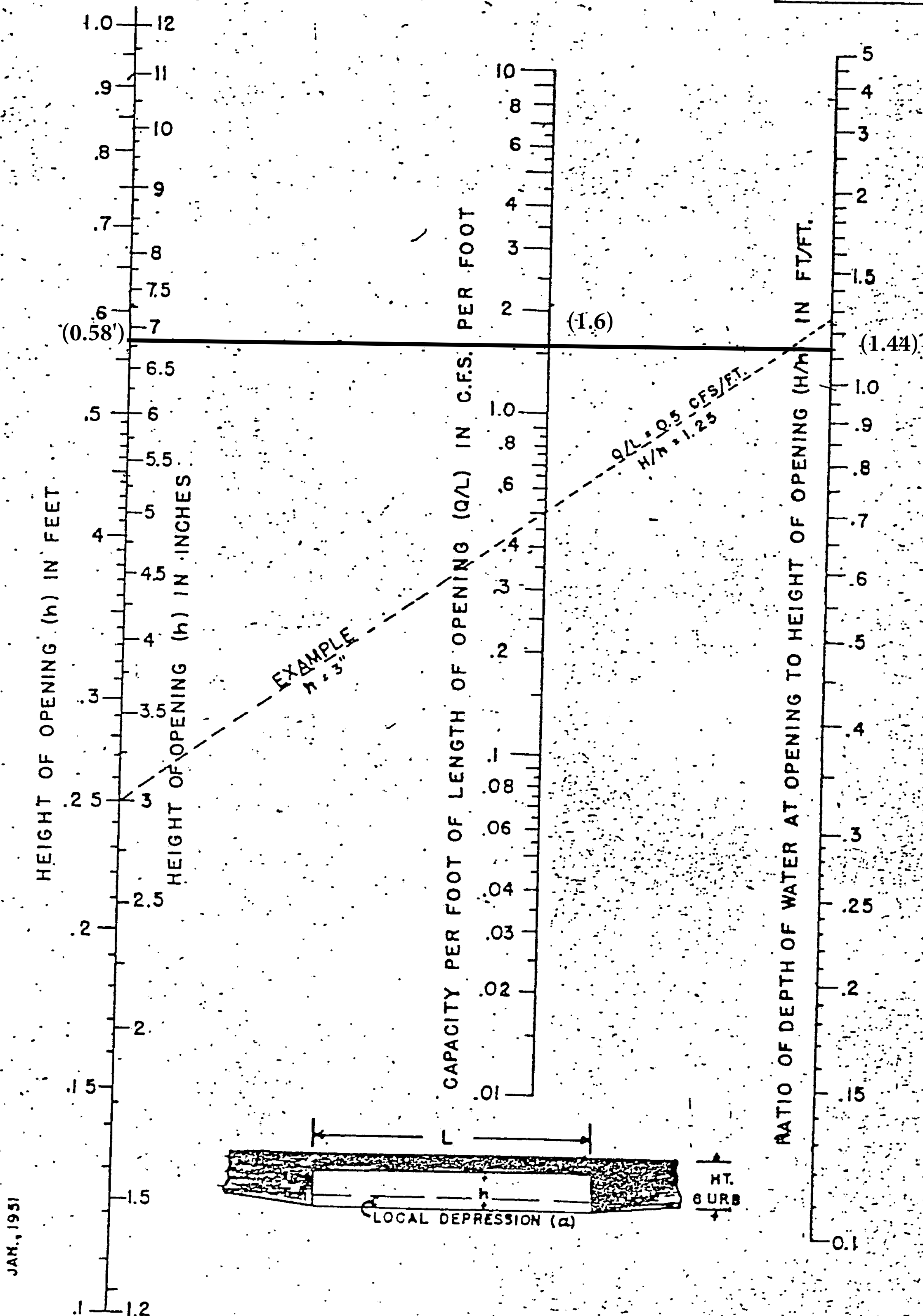
H = 1.033' h = 0.58' $\frac{H}{h} = \frac{1.033'}{0.58'} = 1.78$

PER NOMOGRAPH 1073.3

$\frac{Q}{L} = 2.6$ CFS/FT

$\mathbf{L = \frac{Q}{2.6} = \frac{25.4}{2.6} = 9.8'}$ **USE W = 10'**

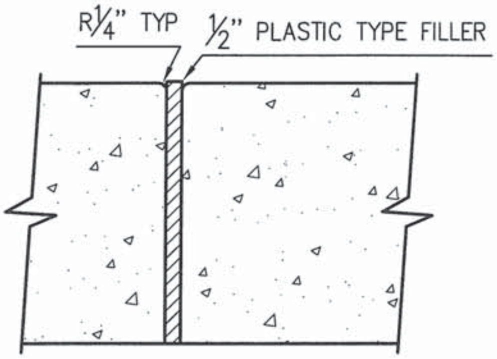
1073. 03



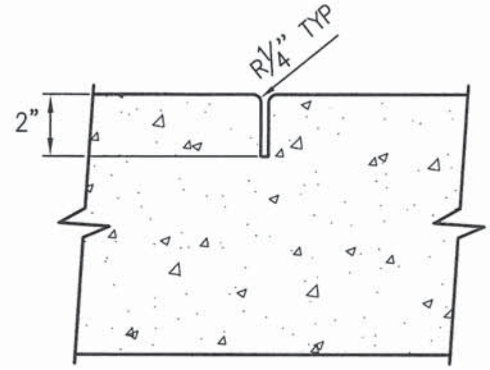
BUREAU OF PUBLIC ROADS
DIVISION TWO WASH., D. C.

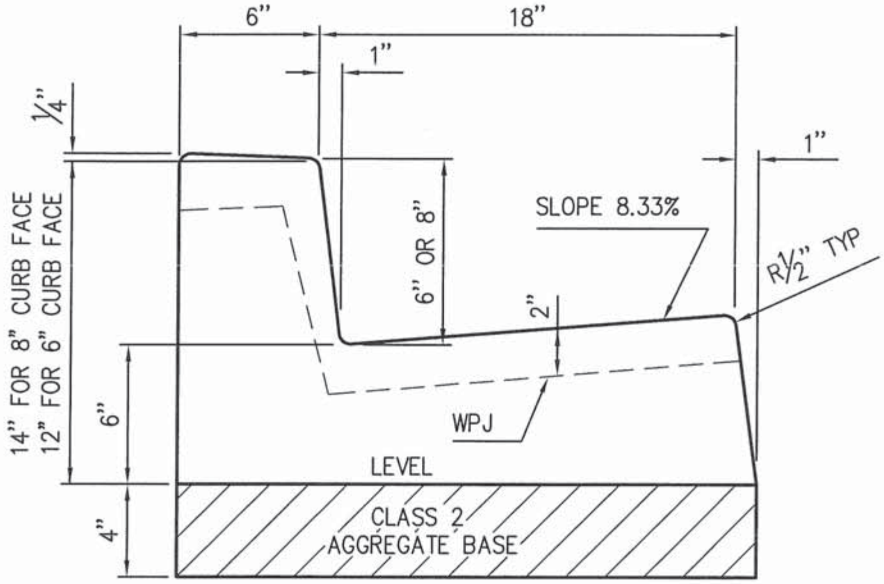
NOMOGRAPH FOR CAPACITY OF CURB OPENING INLETS AT LOW POINTS

EXPANSION JOINT



WEAKENED PLANE JOINT





STANDARD CURB & GUTTER

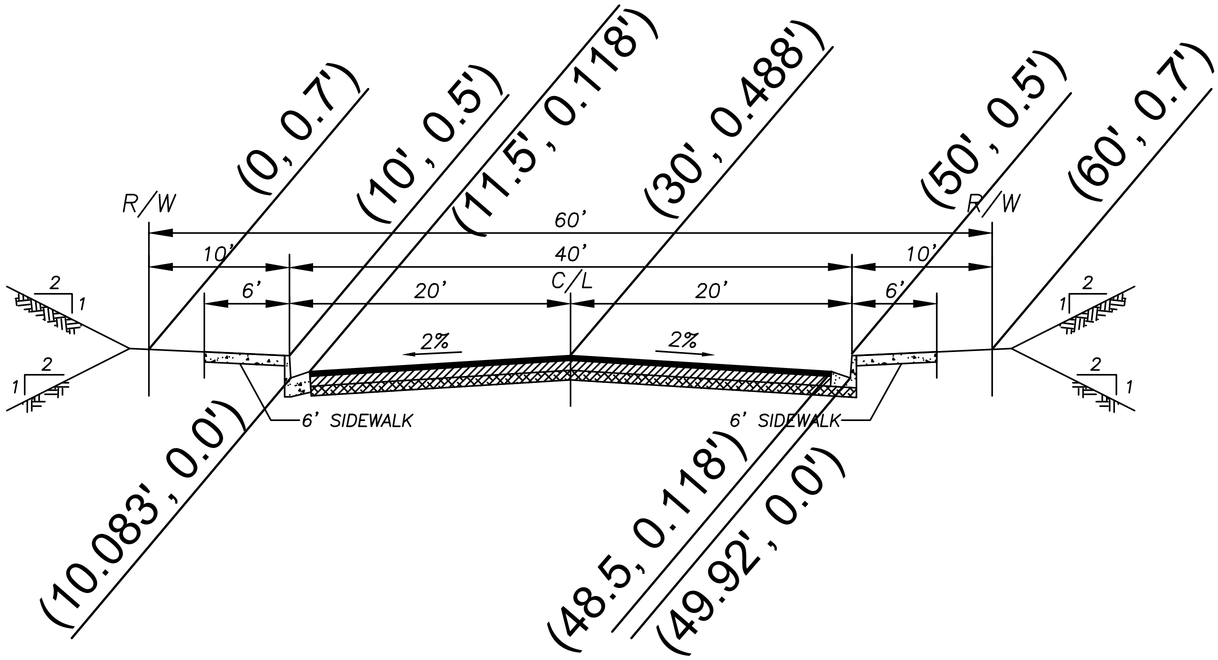
NOT TO SCALE

NOTES:

1. CURB AND GUTTER SHALL BE CONSTRUCTED FROM PORTLAND CEMENT CONCRETE CONTAINING NOT LESS THAN 550 POUNDS OF TYPE II PORTLAND CEMENT PER CUBIC YARD WITH 4% AIR ENTRAINMENT AND 1" MAXIMUM AGGREGATE GRADING.
2. CONCRETE SHALL BE CURED WITH WHITE PIGMENTED CURING COMPOUND.
3. CURB AND GUTTER SHALL BE CONSTRUCTED ON MINIMUM 4" CLASS 2 AGGREGATE BASE COMPACTED TO 95% RELATIVE COMPACTION.
4. WEAKENED PLANE JOINTS SHALL BE CONSTRUCTED AT 10' INTERVALS.
5. WEAKENED PLANE JOINTS SHALL BE AT LEAST 2" DEEP.
6. EXPANSION JOINTS SHALL BE CONSTRUCTED AT ALL CURB RETURNS, DRIVEWAY APPROACHES AND AT 60' INTERVALS.
7. EXPANSION JOINTS SHALL BE 1/2" WIDE AND FILLED WITH PLASTIC TYPE FILLERS.

(NOTES CONTINUE ON SHEET 2)

APPROVED BY CITY ENGINEER		CITY OF VICTORVILLE - ENGINEERING DEPARTMENT	
DATE	SIGNATURE	**STANDARD CURB & GUTTER**	**S-01**
02/03/09	J. McGlade	JOHN A. McGLADE, CITY ENGINEER	SHEET 1 OF 2



ABO LANE EAST, RIO BRAVO PLACE, FIRE BIRD LANE ABIENTO STREET, CAMARILLO PLACE & EL ROSE PLACE

(PUBLIC)
NTS

Ludwig Engineering
ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
109 East Third Street
San Bernardino, CA 92410
Phone: 909-884-8217
Fax: 909-341-7447

Hydraulic Analysis Report

Project Data

Project Title: **TR 20525**

Designer:

Project Date: Tuesday, August 30, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Street Capacity - Rio Bravo Place @ 0.65%

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	0.70	0.0170
10.00	0.50	0.0150
10.08	0.00	0.0150
11.50	0.12	0.0150
30.00	0.49	0.0150
48.50	0.12	0.0150
49.92	0.00	0.0150
50.00	0.50	0.0170
60.00	0.70	-----

Longitudinal Slope: 0.0065 ft/ft

Flow: 50.8000 cfs

Result Parameters

Depth: 0.6172 ft

Area of Flow: 13.9569 ft^2

Wetted Perimeter: 52.5921 ft

Hydraulic Radius: 0.2654 ft

Average Velocity: 3.6398 ft/s

Top Width: 51.7223 ft

Froude Number: 1.2348

Critical Depth: 0.6650 ft

Critical Velocity: 3.0705 ft/s

Critical Slope: 0.0040 ft/ft

Critical Top Width: 56.50 ft

Calculated Max Shear Stress: 0.2503 lb/ft^2

Calculated Avg Shear Stress: 0.1076 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0136

Hydraulic Analysis Report

Project Data

Project Title:**TR 20525**

Designer:

Project Date: Tuesday, August 30, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Street Capacity - Fire Bird Lane @ 1.18%

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	0.70	0.0170
10.00	0.50	0.0150
10.08	0.00	0.0150
11.50	0.12	0.0150
30.00	0.49	0.0150
48.50	0.12	0.0150
49.92	0.00	0.0150
50.00	0.50	0.0170
60.00	0.70	-----

Longitudinal Slope: 0.0118 ft/ft

Flow: 21.0000 cfs

Result Parameters

Depth: 0.4386 ft

Area of Flow: 6.2487 ft^2

Wetted Perimeter: 35.8055 ft

Hydraulic Radius: 0.1745 ft

Average Velocity: 3.3607 ft/s

Top Width: 35.0435 ft

Froude Number: 1.4025

Critical Depth: 0.4900 ft

Critical Velocity: 2.5666 ft/s

Critical Slope: 0.0057 ft/ft

Critical Top Width: 40.00 ft

Calculated Max Shear Stress: 0.3230 lb/ft^2

Calculated Avg Shear Stress: 0.1285 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Hydraulic Analysis Report

Project Data

Project Title:**TR 20525**

Designer:

Project Date: Tuesday, August 30, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Street Capacity - Fire Bird Lane @ 3.61%

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	0.70	0.0170
10.00	0.50	0.0150
10.08	0.00	0.0150
11.50	0.12	0.0150
30.00	0.49	0.0150
48.50	0.12	0.0150
49.92	0.00	0.0150
50.00	0.50	0.0170
60.00	0.70	-----

Longitudinal Slope: 0.0361 ft/ft

Flow: 21.0000 cfs

Result Parameters

Depth: 0.3707 ft

Area of Flow: 4.0994 ft^2

Wetted Perimeter: 28.8723 ft

Hydraulic Radius: 0.1420 ft

Average Velocity: 5.1228 ft/s

Top Width: 28.2271 ft

Froude Number: 2.3689

Critical Depth: 0.4900 ft

Critical Velocity: 2.5666 ft/s

Critical Slope: 0.0057 ft/ft

Critical Top Width: 40.00 ft

Calculated Max Shear Stress: 0.8350 lb/ft^2

Calculated Avg Shear Stress: 0.3198 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Hydraulic Analysis Report

Project Data

Project Title:**TR 20525**

Designer:

Project Date: Tuesday, August 30, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Street Capacity - El Rose Place @ 3.04%

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	0.70	0.0170
10.00	0.50	0.0150
10.08	0.00	0.0150
11.50	0.12	0.0150
30.00	0.49	0.0150
48.50	0.12	0.0150
49.92	0.00	0.0150
50.00	0.50	0.0170
60.00	0.70	-----

Longitudinal Slope: 0.0304 ft/ft

Flow: 26.1000 cfs

Result Parameters

Depth: 0.4058 ft

Area of Flow: 5.1535 ft^2

Wetted Perimeter: 32.4591 ft

Hydraulic Radius: 0.1588 ft

Average Velocity: 5.0645 ft/s

Top Width: 31.7535 ft

Froude Number: 2.2154

Critical Depth: 0.5261 ft

Critical Velocity: 2.7018 ft/s

Critical Slope: 0.0051 ft/ft

Critical Top Width: 42.61 ft

Calculated Max Shear Stress: 0.7699 lb/ft^2

Calculated Avg Shear Stress: 0.3012 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Hydraulic Analysis Report

Project Data

Project Title:**TR 20525**

Designer:

Project Date: Tuesday, August 30, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Street Capacity - El Rose Place @ 1.53%

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	0.70	0.0170
10.00	0.50	0.0150
10.08	0.00	0.0150
11.50	0.12	0.0150
30.00	0.49	0.0150
48.50	0.12	0.0150
49.92	0.00	0.0150
50.00	0.50	0.0170
60.00	0.70	-----

Longitudinal Slope: 0.0153 ft/ft

Flow: 26.1000 cfs

Result Parameters

Depth: 0.4506 ft

Area of Flow: 6.6745 ft^2

Wetted Perimeter: 37.0244 ft

Hydraulic Radius: 0.1803 ft

Average Velocity: 3.9104 ft/s

Top Width: 36.2418 ft

Froude Number: 1.6058

Critical Depth: 0.5261 ft

Critical Velocity: 2.7018 ft/s

Critical Slope: 0.0051 ft/ft

Critical Top Width: 42.61 ft

Calculated Max Shear Stress: 0.4302 lb/ft^2

Calculated Avg Shear Stress: 0.1721 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Hydraulic Analysis Report

Project Data

Project Title: **TR 20525**

Designer:

Project Date: Wednesday, September 7, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Channel Analysis

Notes:

Input Parameters

Channel Type: **Amethyst Road Existing Street Capacity**

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.34	2940.32	0.0300
22.39	2939.94	0.0300
27.05	2939.06	0.0150
30.37	2939.27	0.0150
45.34	2939.53	0.0150
50.25	2939.55	0.0150
60.45	2939.26	0.0300
62.91	2939.05	0.0300
73.37	2941.63	-----

Longitudinal Slope: 0.0220 ft/ft

Flow: 39.8000 cfs

Result Parameters

Depth: 0.5411 ft

Area of Flow: 8.8381 ft^2

Wetted Perimeter: 41.0037 ft

Hydraulic Radius: 0.2155 ft

Average Velocity: 4.5032 ft/s

Top Width: 40.8663 ft

Froude Number: 1.7065

Critical Depth: 0.6349 ft

Critical Velocity: 3.1313 ft/s

Critical Slope: 0.0065 ft/ft

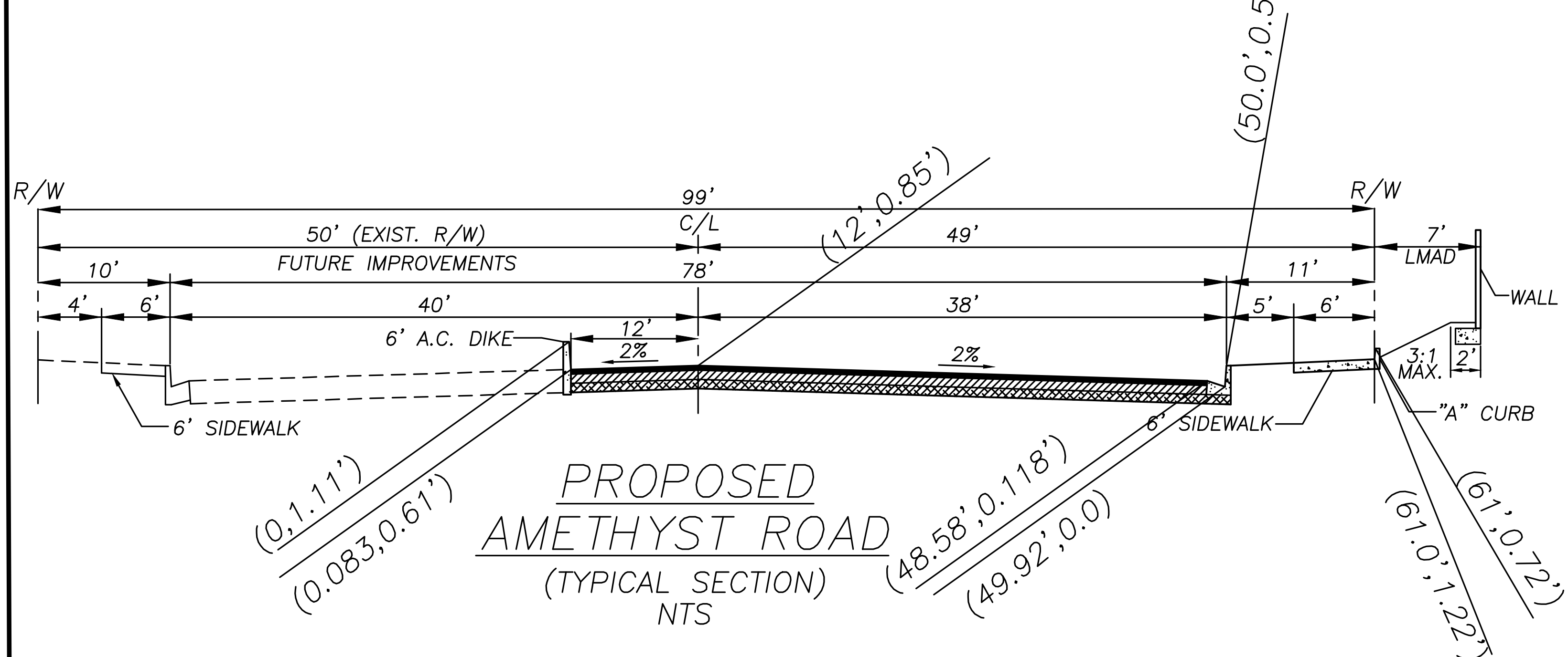
Critical Top Width: 41.74 ft

Calculated Max Shear Stress: 0.7428 lb/ft^2

Calculated Avg Shear Stress: 0.2959 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0176



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Civil Engineering • Surveying • Planning
109 East Third Street
San Bernardino, CA 92410
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Fax: 909-341-7447

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Wednesday, September 7, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Amethyst Rd Proposed Capacity @ 1.5%

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	1.11	0.0150
0.08	0.61	0.0150
12.00	0.85	0.0150
48.58	0.12	0.0150
49.92	0.00	0.0150
50.00	0.50	0.0150
61.00	0.72	0.0170
61.00	1.22	-----

Longitudinal Slope: 0.0150 ft/ft

Depth: 0.8500 ft

Result Parameters

Flow: 101.3045 cfs

Area of Flow: 18.5710 ft^2

Wetted Perimeter: 61.7338 ft

Hydraulic Radius: 0.3008 ft

Average Velocity: 5.4550 ft/s

Top Width: 60.9568 ft

Froude Number: 1.7416

Critical Depth: 0.9864 ft

Critical Velocity: 3.7679 ft/s

Critical Slope: 0.0044 ft/ft

Critical Top Width: 60.98 ft

Calculated Max Shear Stress: 0.7956 lb/ft^2

Calculated Avg Shear Stress: 0.2816 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Wednesday, September 7, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Amethyst Rd Proposed Capacity @ 0.5%

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	1.11	0.0150
0.08	0.61	0.0150
12.00	0.85	0.0150
48.58	0.12	0.0150
49.92	0.00	0.0150
50.00	0.50	0.0150
61.00	0.72	0.0170
61.00	1.22	-----

Longitudinal Slope: 0.0050 ft/ft

Depth: 0.8500 ft

Result Parameters

Flow: 58.4882 cfs

Area of Flow: 18.5710 ft^2

Wetted Perimeter: 61.7338 ft

Hydraulic Radius: 0.3008 ft

Average Velocity: 3.1494 ft/s

Top Width: 60.9568 ft

Froude Number: 1.0055

Critical Depth: 0.8511 ft

Critical Velocity: 3.1379 ft/s

Critical Slope: 0.0049 ft/ft

Critical Top Width: 60.96 ft

Calculated Max Shear Stress: 0.2652 lb/ft^2

Calculated Avg Shear Stress: 0.0939 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Wednesday, September 7, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Amethyst Rd Proposed Capacity @ 2.0%

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	1.11	0.0150
0.08	0.61	0.0150
12.00	0.85	0.0150
48.58	0.12	0.0150
49.92	0.00	0.0150
50.00	0.50	0.0150
61.00	0.72	0.0170
61.00	1.22	-----

Longitudinal Slope: 0.0200 ft/ft

Depth: 0.8500 ft

Result Parameters

Flow: 116.9764 cfs

Area of Flow: 18.5710 ft^2

Wetted Perimeter: 61.7338 ft

Hydraulic Radius: 0.3008 ft

Average Velocity: 6.2989 ft/s

Top Width: 60.9568 ft

Froude Number: 2.0111

Critical Depth: 1.0308 ft

Critical Velocity: 3.9528 ft/s

Critical Slope: 0.0042 ft/ft

Critical Top Width: 60.99 ft

Calculated Max Shear Stress: 1.0608 lb/ft^2

Calculated Avg Shear Stress: 0.3754 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Wednesday, September 7, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Amethyst Rd Proposed Capacity @ 3.4%

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	1.11	0.0150
0.08	0.61	0.0150
12.00	0.85	0.0150
48.58	0.12	0.0150
49.92	0.00	0.0150
50.00	0.50	0.0150
61.00	0.72	0.0170
61.00	1.22	-----

Longitudinal Slope: 0.0340 ft/ft

Depth: 0.8500 ft

Result Parameters

Flow: 152.5185 cfs

Area of Flow: 18.5710 ft^2

Wetted Perimeter: 61.7338 ft

Hydraulic Radius: 0.3008 ft

Average Velocity: 8.2127 ft/s

Top Width: 60.9568 ft

Froude Number: 2.6221

Critical Depth: 1.1247 ft

Critical Velocity: 4.3180 ft/s

Critical Slope: 0.0040 ft/ft

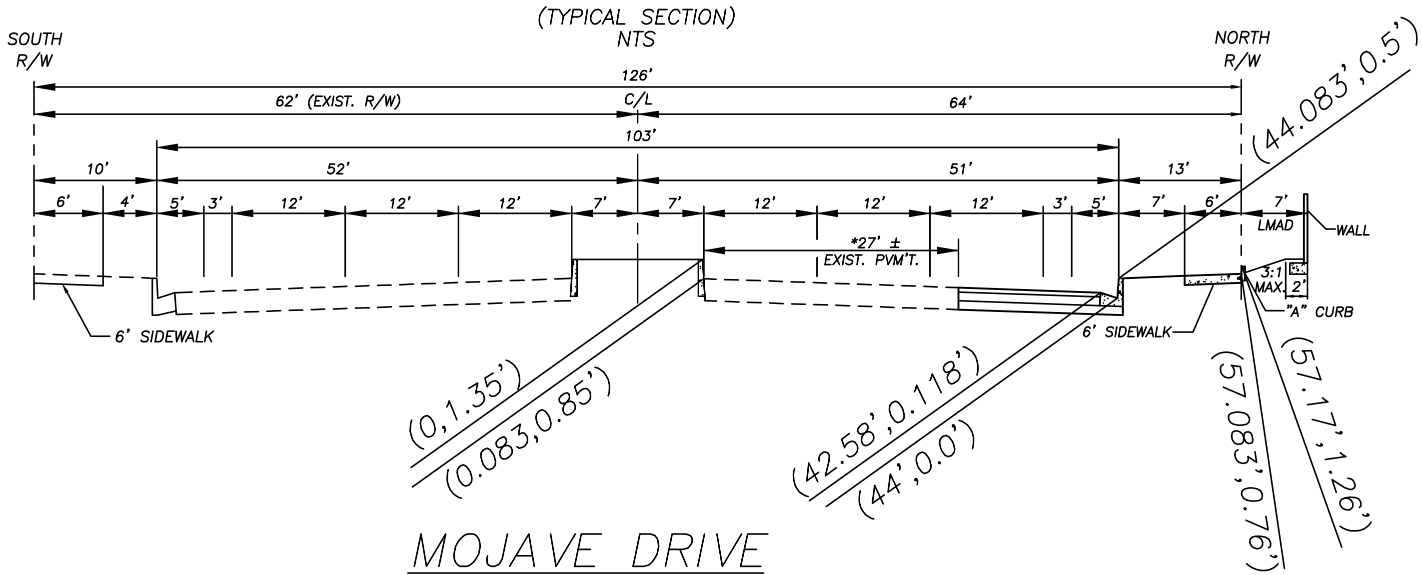
Critical Top Width: 61.00 ft

Calculated Max Shear Stress: 1.8034 lb/ft^2

Calculated Avg Shear Stress: 0.6382 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150



MOJAVE DRIVE

(TYPICAL SECTION)

NTS

Ludwig Engineering ASSOCIATES, INC.

Civil Engineering • Surveying • Planning

109 East Third Street
San Bernardino, CA 92410
Phone: 909-884-8217
Fax: 909-341-7447

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Tuesday, March 14, 2023

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Mojave Drive Half Street Capacity @ 1%

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	1.35	0.0150
0.08	0.85	0.0150
42.58	0.12	0.0150
44.00	0.00	0.0150
44.08	0.50	0.0150
57.08	0.76	0.0170
57.17	1.26	-----

Longitudinal Slope: 0.0100 ft/ft

Depth: 0.7600 ft

Result Parameters

Flow: 62.5008 cfs

Area of Flow: 14.6920 ft^2

Wetted Perimeter: 52.2118 ft

Hydraulic Radius: 0.2814 ft

Average Velocity: 4.2541 ft/s

Top Width: 51.7750 ft

Froude Number: 1.4073

Critical Depth: 0.8394 ft

Critical Velocity: 3.2923 ft/s

Critical Slope: 0.0048 ft/ft

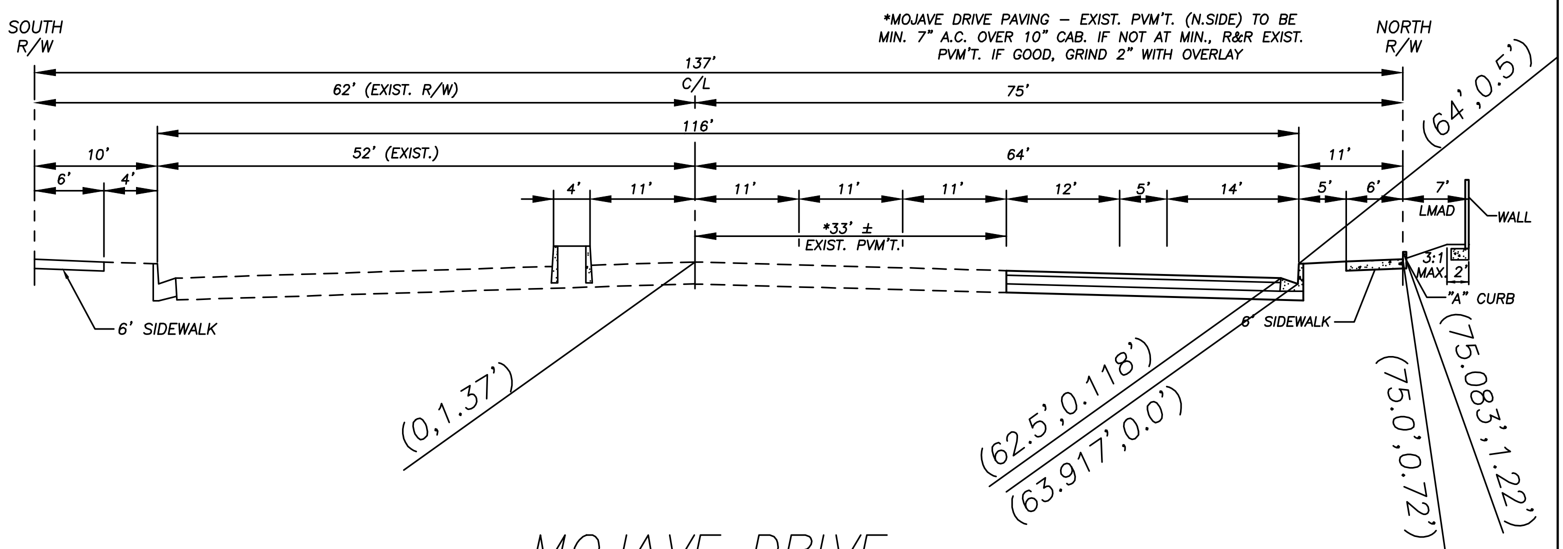
Critical Top Width: 56.40 ft

Calculated Max Shear Stress: 0.4742 lb/ft^2

Calculated Avg Shear Stress: 0.1756 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150



MOJAVE DRIVE

(TURN POCKET AT INTERSECTION)

Ludwig Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
109 East Third Street
San Bernardino, CA 92410
Phone: 909-884-8217
Fax: 909-341-7447

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Tuesday, March 14, 2023

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Mojave Drive Half Street Capacity Turn Pocket @ 1%

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	1.37	0.0150
62.50	0.12	0.0150
63.92	0.00	0.0150
64.00	0.50	0.0150
75.00	0.72	0.0170
75.08	1.22	-----

Longitudinal Slope: 0.0100 ft/ft

Depth: 0.7200 ft

Result Parameters

Flow: 45.1928 cfs

Area of Flow: 11.1848 ft^2

Wetted Perimeter: 42.9396 ft

Hydraulic Radius: 0.2605 ft

Average Velocity: 4.0406 ft/s

Top Width: 42.5000 ft

Froude Number: 1.3880

Critical Depth: 0.7902 ft

Critical Velocity: 3.1622 ft/s

Critical Slope: 0.0049 ft/ft

Critical Top Width: 46.02 ft

Calculated Max Shear Stress: 0.4493 lb/ft^2

Calculated Avg Shear Stress: 0.1625 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

TR. 20525

Pre-Developed Condition

Exhibit 1

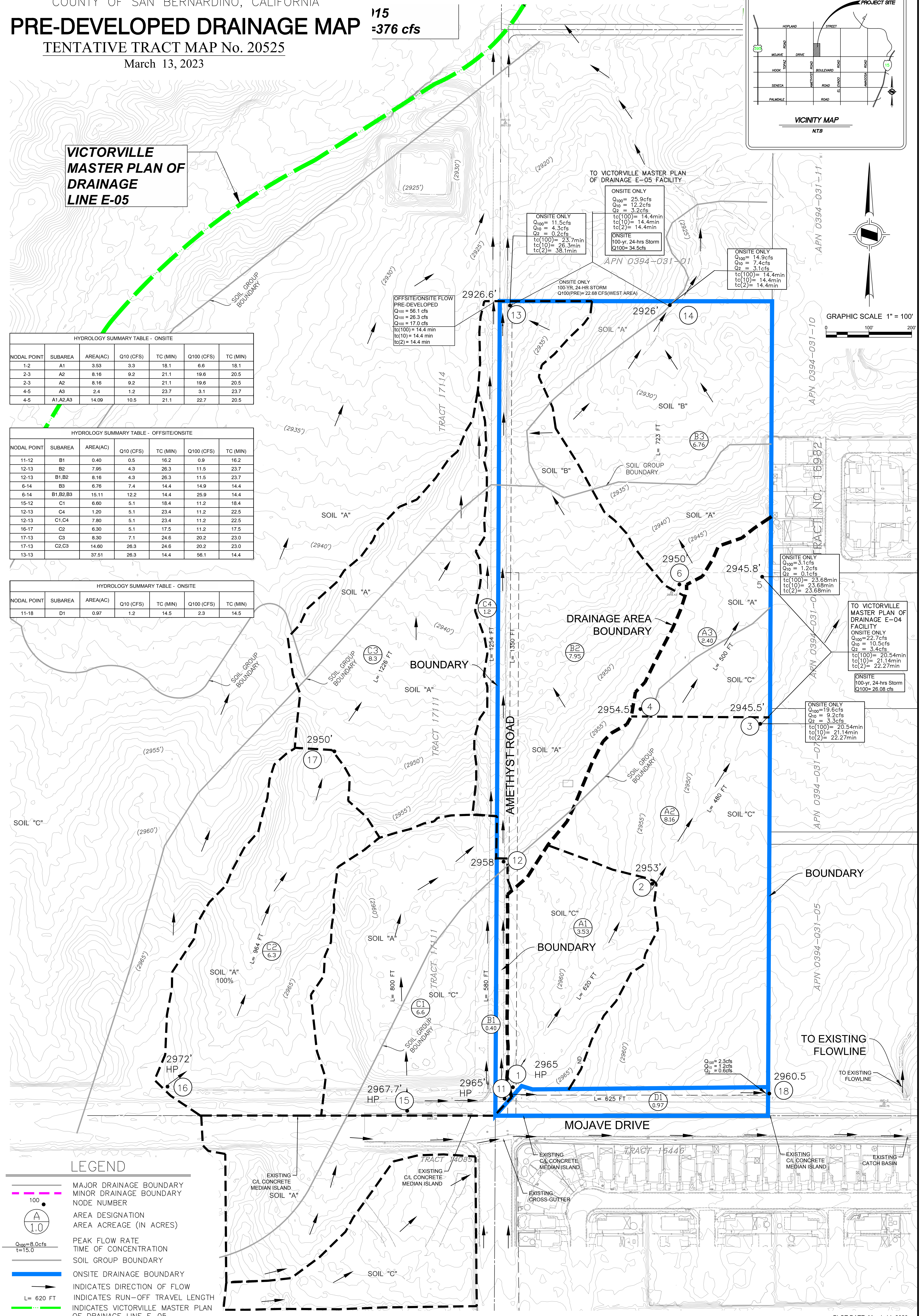
Drainage Map

IN THE CITY OF VICTORVILLE,
COUNTY OF SAN BERNARDINO, CALIFORNIA

PRE-DEVELOPED DRAINAGE MAP

TENTATIVE TRACT MAP No. 20525

March 13, 2023



HYDROLOGY SUMMARY TABLE - ONSITE						
NODAL POINT	SUBAREA	AREA(AC)	Q10 (CFS)	TC (MIN)	Q100 (CFS)	TC (MIN)
1-2	A1	3.53	3.3	18.1	6.6	18.1
2-3	A2	8.16	9.2	21.1	19.6	20.5
2-3	A2	8.16	9.2	21.1	19.6	20.5
4-5	A3	2.4	1.2	23.7	3.1	23.7
4-5	A1,A2,A3	14.09	10.5	21.1	22.7	20.5

HYDROLOGY SUMMARY TABLE - OFFSITE/ONSITE						
NODAL POINT	SUBAREA	AREA(AC)	Q10 (CFS)	TC (MIN)	Q100 (CFS)	TC (MIN)
11-12	B1	0.40	0.5	16.2	0.9	16.2
12-13	B2	7.95	4.3	26.3	11.5	23.7
12-13	B1,B2	8.16	4.3	26.3	11.5	23.7
6-14	B3	6.76	7.4	14.4	14.9	14.4
6-14	B1,B2,B3	15.11	12.2	14.4	25.9	14.4
15-12	C1	6.60	5.1	18.4	11.2	18.4
12-13	C4	1.20	5.1	23.4	11.2	22.5
12-13	C1,C4	7.80	5.1	23.4	11.2	22.5
16-17	C2	6.30	5.1	17.5	11.2	17.5
17-13	C3	8.30	7.1	24.6	20.2	23.0
17-13	C2,C3	14.60	26.3	24.6	20.2	23.0
13-13		37.51	26.3	14.4	56.1	14.4

HYDROLOGY SUMMARY TABLE - ONSITE						
NODAL POINT	SUBAREA	AREA(AC)	Q10 (CFS)	TC (MIN)	Q100 (CFS)	TC (MIN)
11-18	D1	0.97	1.2	14.5	2.3	14.5

LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 100 NODE NUMBER
- A / 1.0 AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs / t=15.0 PEAK FLOW RATE / TIME OF CONCENTRATION
- SOIL GROUP BOUNDARY
- ONSITE DRAINAGE BOUNDARY
- INDICATES DIRECTION OF FLOW
- L= 620 FT INDICATES RUN-OFF TRAVEL LENGTH
- INDICATES VICTORVILLE MASTER PLAN OF DRAINAGE LINE E-05
- INDICATES VICTORVILLE MASTER PLAN OF DRAINAGE LINE E-04

REGISTERED PROFESSIONAL ENGINEER JEFFREY MARTIN ASBAKER No. 91606 CIVIL STATE OF CALIFORNIA

PLOT DATE: March 14, 2023

REV.	DESCRIPTION	DATE	BY

Ludwig Engineering Associates, Inc.
Civil Engineering • Surveying • Planning
109 East Third Street, San Bernardino, CA 92410, Phone: 909-884-8217, Fax: 909-341-7447
5890 Hwy. 95, Ste. B, Fort Mohave, AZ 88426, Phone: 928-768-1857, Fax: 928-768-7086
15252 Seneca Rd., Victorville, CA 92392, Phone: 760-951-7676, Fax: 760-241-0573
2126 McCulloch Blvd., Ste. 8, Lake Havasu City, AZ 86403, Phone: 928-680-6060, Fax: 928-854-6530

CITY OF VICTORVILLE
TR 20525
PRE-DEVELOPED DRAINAGE MAP(OFFSITE - ONSITE)

CLIENT:
THREE ARCH INVESTMENT CORP.
17802 LAKESIDE HAVEN DRIVE, CYPRESS, TEXAS 77433

DESIGNED BY:	DRAWN BY:	CHECKED BY:
BW	LC	JA

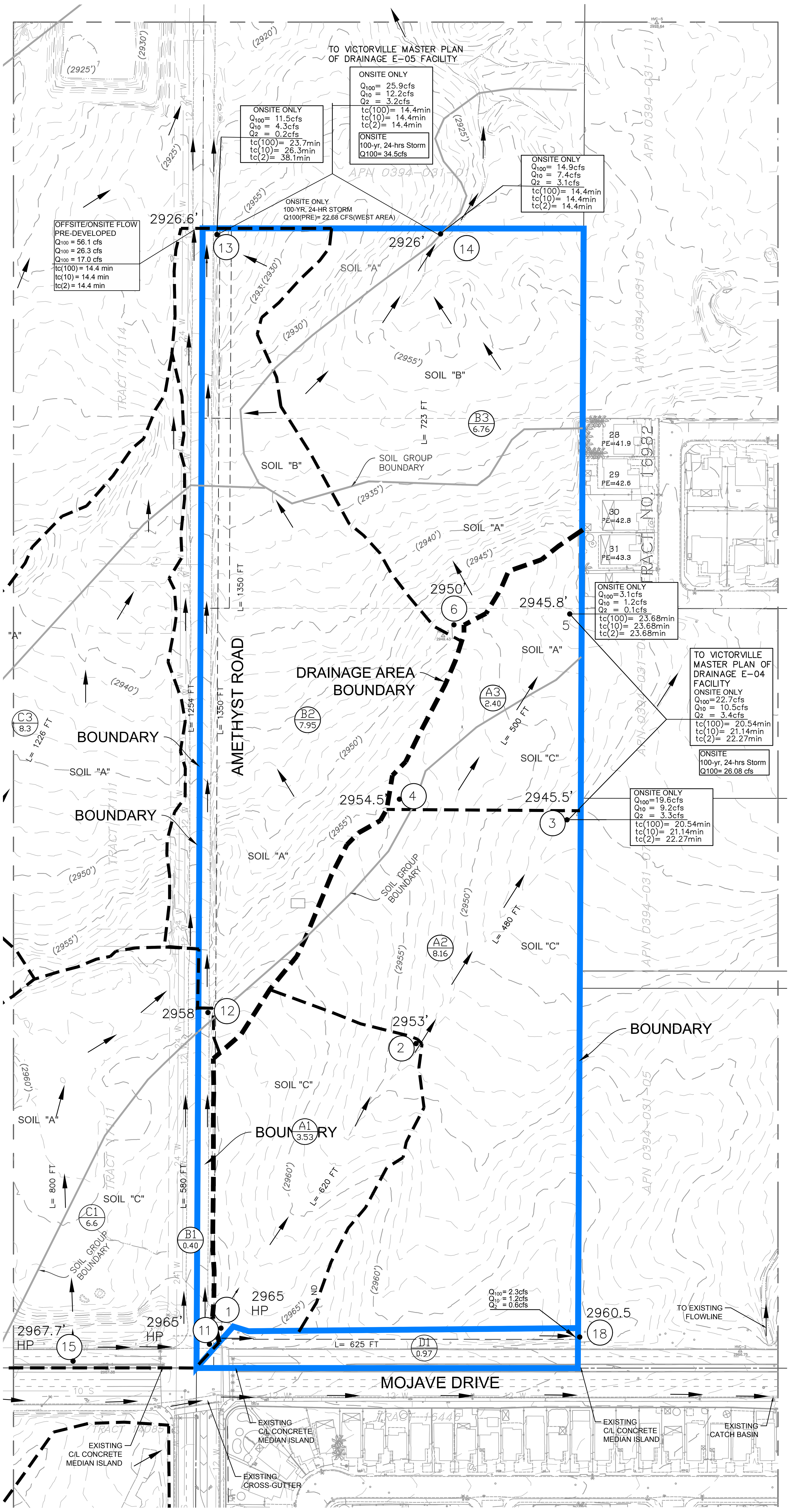
SCALE 1" = 100'
SHEET 1 OF 4
D-1

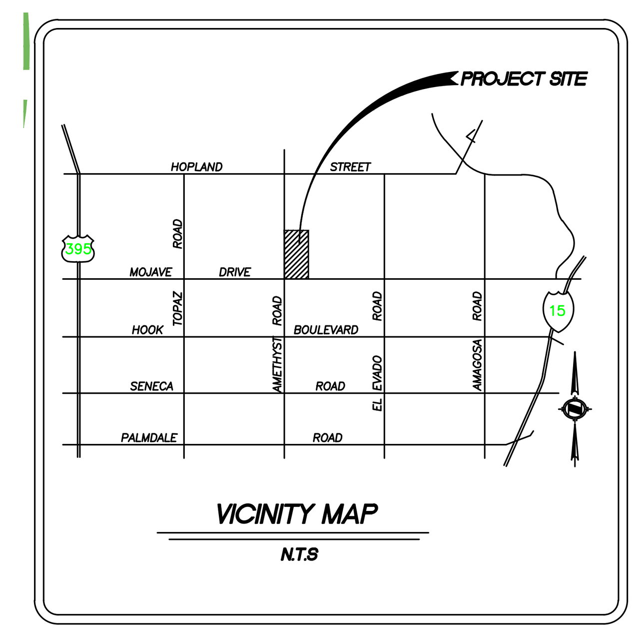
IN THE CITY OF VICTORVILLE,
COUNTY OF SAN BERNARDINO, CALIFORNIA

TENTATIVE TRACT MAP No. 20525

ONSITE PRE-DEVELOPED DRAINAGE MAP

March 13, 2023





GRAPHIC SCALE 1" = 100'

0 100' 200'

LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 100 NODE NUMBER
- A 1.0 AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs t=15.0 PEAK FLOW RATE / TIME OF CONCENTRATION
- SOIL GROUP BOUNDARY
- ONSITE DRAINAGE BOUNDARY
- INDICATES DIRECTION OF FLOW
- L= 620 FT INDICATES RUN-OFF TRAVEL LENGTH
- INDICATES VICTORVILLE MASTER PLAN OF DRAINAGE LINE E-05
- INDICATES VICTORVILLE MASTER PLAN OF DRAINAGE LINE E-04

PLOT DATE: March 14, 2023

REGISTERED PROFESSIONAL ENGINEER JEFFREY MARTIN ASHBAKER No. 91606 CIVIL STATE OF CALIFORNIA

REV.	DESCRIPTION	DATE	BY

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Civil Engineering • Surveying • Planning
109 East Third Street, San Bernardino, CA 92410, Phone: 909-884-8217, Fax: 909-341-7447
5890 Hwy. 95, Ste. B, Fort Mohave, AZ 86426, Phone: 928-768-1857, Fax: 928-768-7086
15252 Seneca Rd., Victorville, CA 92392, Phone: 760-951-7676, Fax: 760-241-0573
2126 McCulloch Blvd., Ste. 8, Lake Havasu City, AZ 86403, Phone: 928-680-6060, Fax: 928-854-6530

CITY OF VICTORVILLE
TR 20525
PRE-DEVELOPED DRAINAGE MAP - (ONSITE)
CLIENT:
THREE ARCH INVESTMENT CORP.
17802 LAKESIDE HAVEN DRIVE, CYPRESS, TEXAS 77433

DESIGNED BY:	DRAWN BY:	CHECKED BY:
BW	LC	JA

SCALE 1" = 100'
SHEET 2 OF 4
D-1

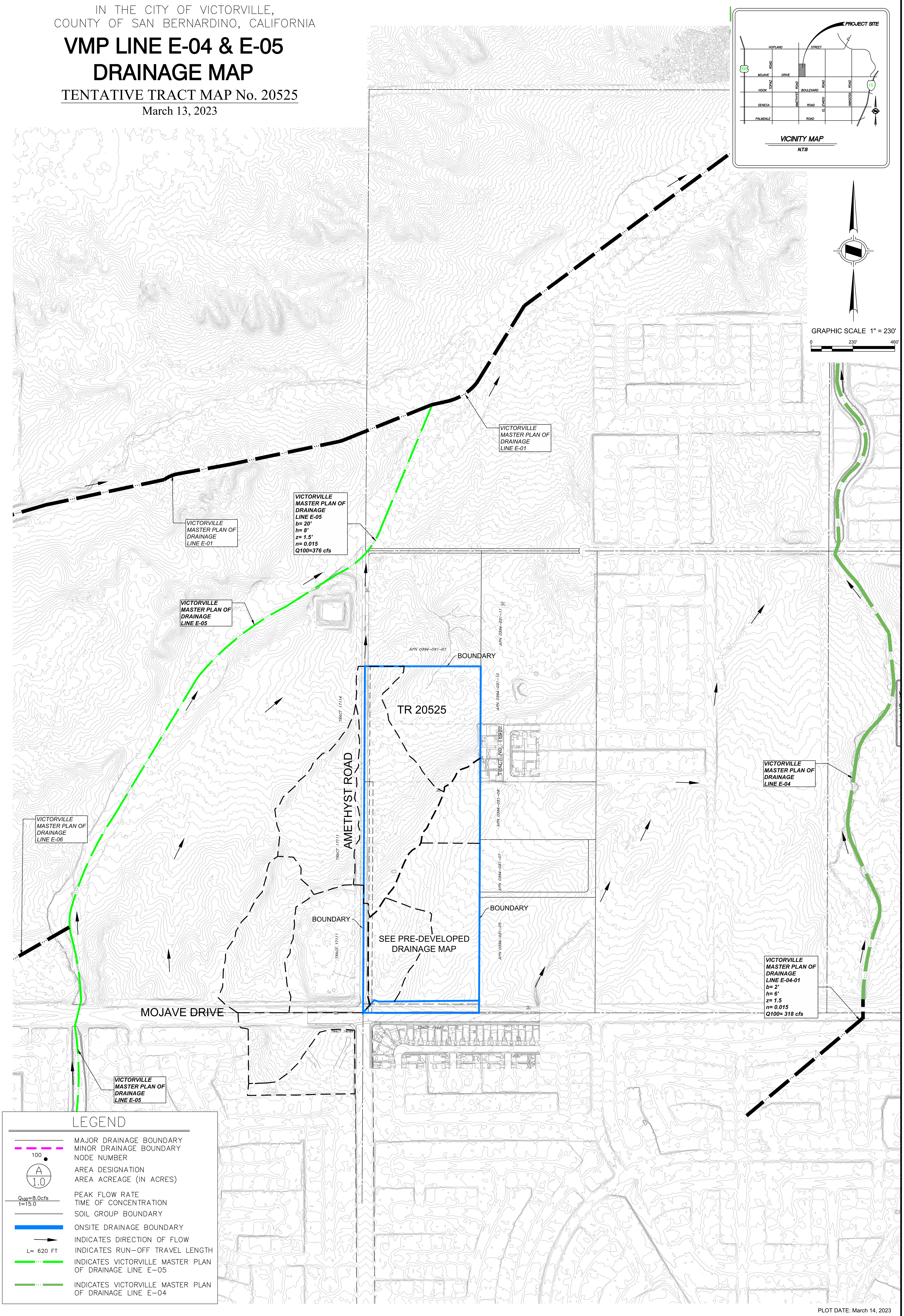
PLOT STYLE: NCS US Standard.stb PROJECT LOCATION & NAME: V:\plans\TR. 17839 Michelson\Engineering\Drainage\ACAD\20525(17839)_Offsite_Onsite Predeveloped Drainage Map_03-14-23.dwg PLOT TIME: Tuesday, March 14, 2023 9:12:00 AM LAYOUT: PRE

IN THE CITY OF VICTORVILLE,
COUNTY OF SAN BERNARDINO, CALIFORNIA

VMP LINE E-04 & E-05 DRAINAGE MAP

TENTATIVE TRACT MAP No. 20525

March 13, 2023



PLOT DATE: March 14, 2023

REGISTERED PROFESSIONAL ENGINEER JEFFREY MARTIN ASHBAKER No. 91606 CIVIL STATE OF CALIFORNIA

REV.	DESCRIPTION	DATE	BY

Ludwig Engineering Associates, Inc.
Civil Engineering • Surveying • Planning
109 East Third Street, San Bernardino, CA 92410, Phone: 909-884-8217, Fax: 909-341-7447
5890 Hwy. 95, Ste. B, Fort Mohave, AZ 88426, Phone: 928-768-1857, Fax: 928-768-7086
15252 Seneca Rd., Victorville, CA 92392, Phone: 760-951-7676, Fax: 760-241-0573
2126 McCulloch Blvd., Ste. 8, Lake Havasu City, AZ 86403, Phone: 928-680-6060, Fax: 928-854-6530

CITY OF VICTORVILLE
TR 20525
PRE-DEVELOPED DRAINAGE MAP(OFFSITE - ONSITE)

CLIENT:
THREE ARCH INVESTMENT CORP.
17802 LAKESIDE HAVEN DRIVE, CYPRESS, TEXAS 77433

DESIGNED BY:	DRAWN BY:	CHECKED BY:
BW	LC	JA

SCALE 1" = 230'

SHEET 3 OF 4

D-1

PLOT STYLE: NCS US Standard.stb PROJECT LOCATION & NAME: V:\plans\TR 17839 Michelson\Engineering\Drainage\ACAD\20525\17839_Offsite_Onsite Predeveloped Drainage Map_03-14-23.dwg PLOT TIME: Tuesday, March 14, 2023 9:17:34 AM LAYOUT: LINE E-05 & E-04

TR. 20525

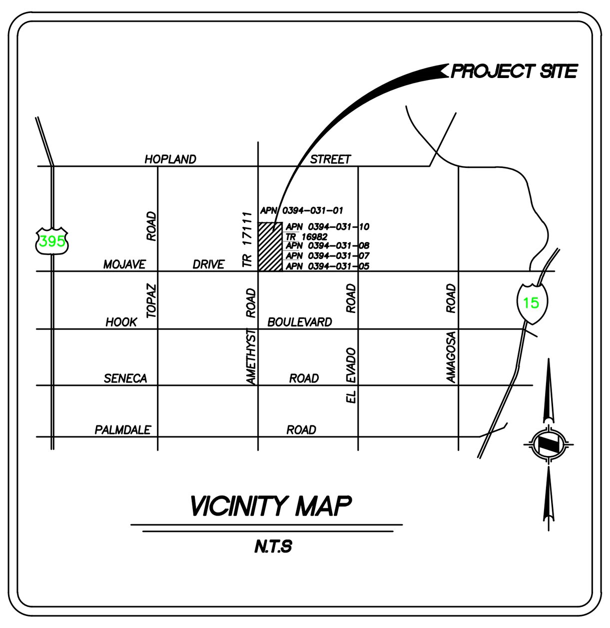
Post-Developed Condition

Exhibit 2

Drainage Map

LEGEND

MAJOR DRAINAGE BOUNDARY
MINOR DRAINAGE BOUNDARY
100 NODE NUMBER
A / 1.0 AREA DESIGNATION / AREA ACREAGE (IN ACRES)
Q_{100}=8.0cfs PEAK FLOW RATE
t=15.0 TIME OF CONCENTRATION
SOIL GROUP BOUNDARY
ONSITE DRAINAGE BOUNDARY
INDICATES DIRECTION OF ONSITE FLOW
INDICATES DIRECTION OF OFFSITE FLOW
L= 620 FT INDICATES RUN-OFF TRAVEL LENGTH



IN THE CITY OF VICTORVILLE,
COUNTY OF SAN BERNARDINO, CALIFORNIA

POST DEVELOPED DRAINAGE MAP

TENTATIVE TRACT MAP No. 20525

December 20, 2022

GRAPHIC SCALE 1" = 100'

WQMP/DETENTION BASIN - STAGE STORAGE TABLE						
ELEV	AREA (sq. ft.)	DEPT H (ft)	AVG END INC. VOL. (cu. ft.)	AVG END TOTAL VOL. (cu. ft.)	AVG END INC. VOL. (ac. ft.)	AVG END TOTAL VOL. (ac. ft.)
2924.3	8,148.46	N/A	N/A	0.00	N/A	0.00
2925.3	9,685.74	1.000	8917.10	8917.10	0.205	0.205
2926.3	11,296.90	1.000	10491.32	19408.42	0.241	0.446
2927.3	12,977.94	1.000	12137.42	31545.84	0.279	0.724
2928.3	14,732.49	1.000	13855.21	45401.05	0.318	1.042
2929.3	16,559.08	1.000	15645.78	61046.83	0.359	1.401
2930.3	18,452.73	1.000	17505.91	78552.74	0.402	1.803

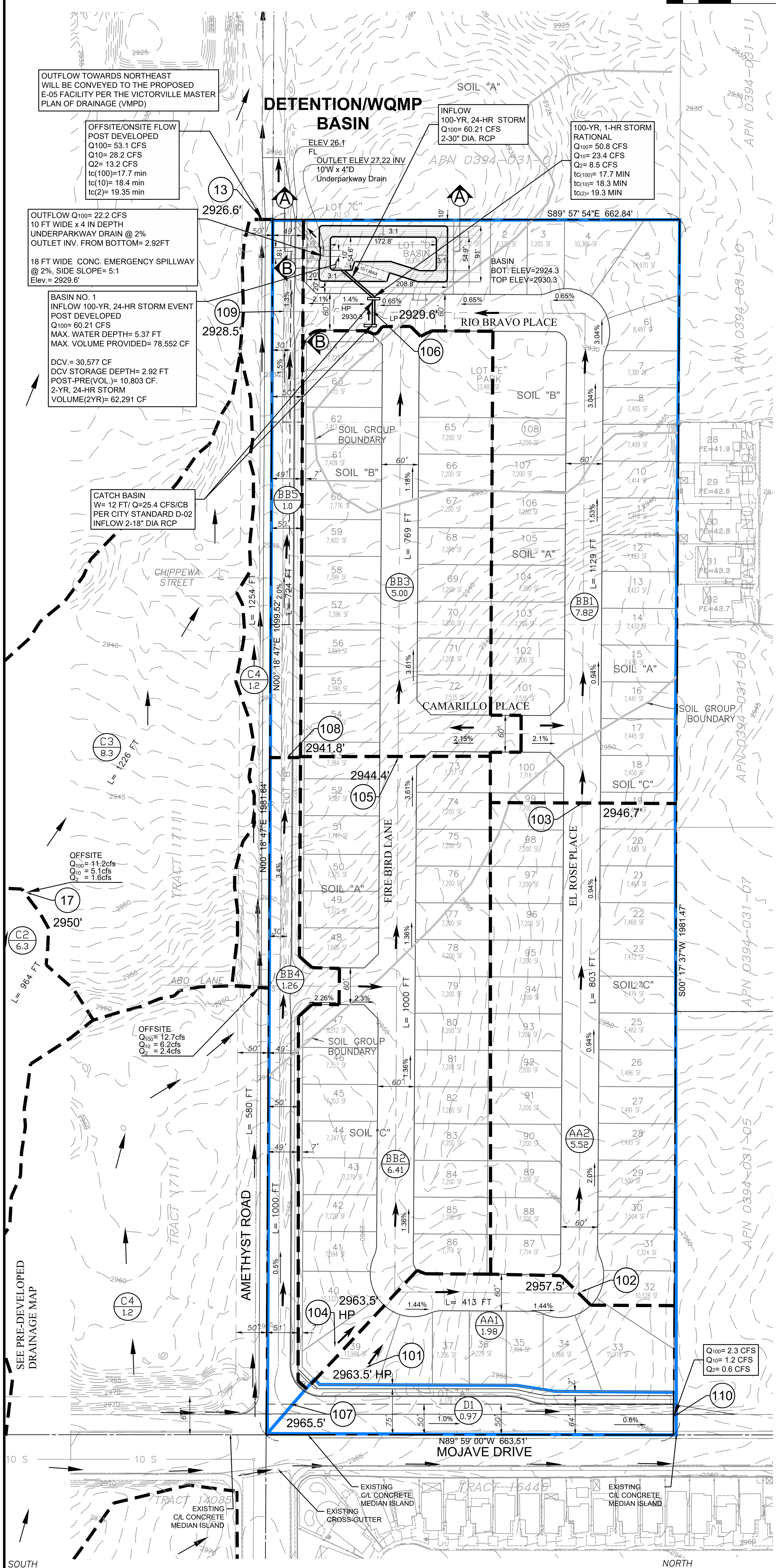
DA - 1 (BASIN No.1) AREA= 1,262,804.40 SF

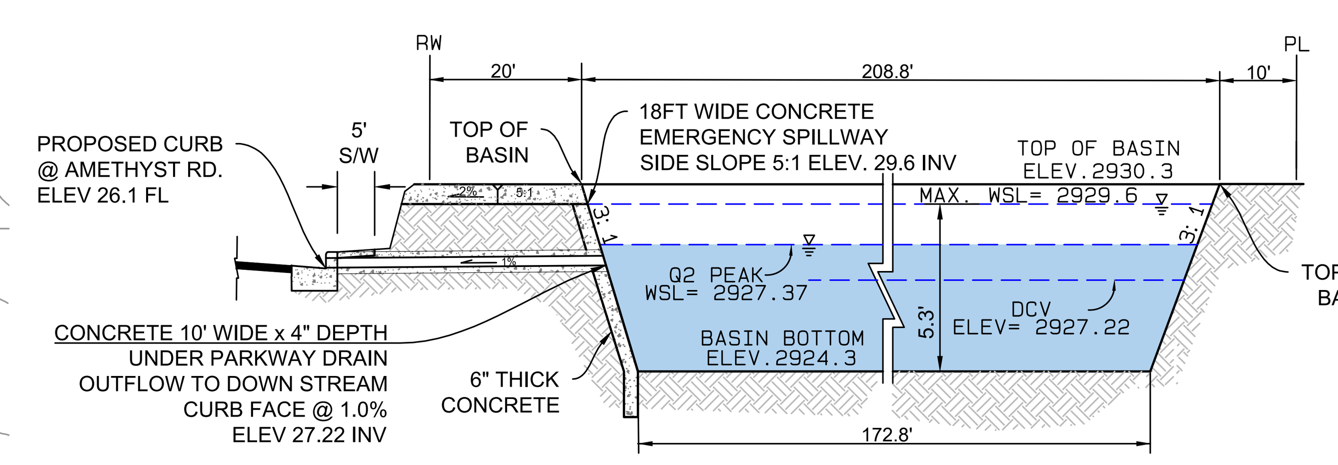
IMP. = 48.18%
IMPERVIOUS:
BLDG: 108 x 2400 = 259,200 SF
DRIVEWAY: 108 x 384 = 41,472 SF
PAVE ROAD,
SIDEWALK, C & G: 307,789 SF
TOTAL IMP.= 608,461 SF
PERVIOUS:
LANDSCAPE: 654,343.4 SF

DCV= 30,577 CU.FT.

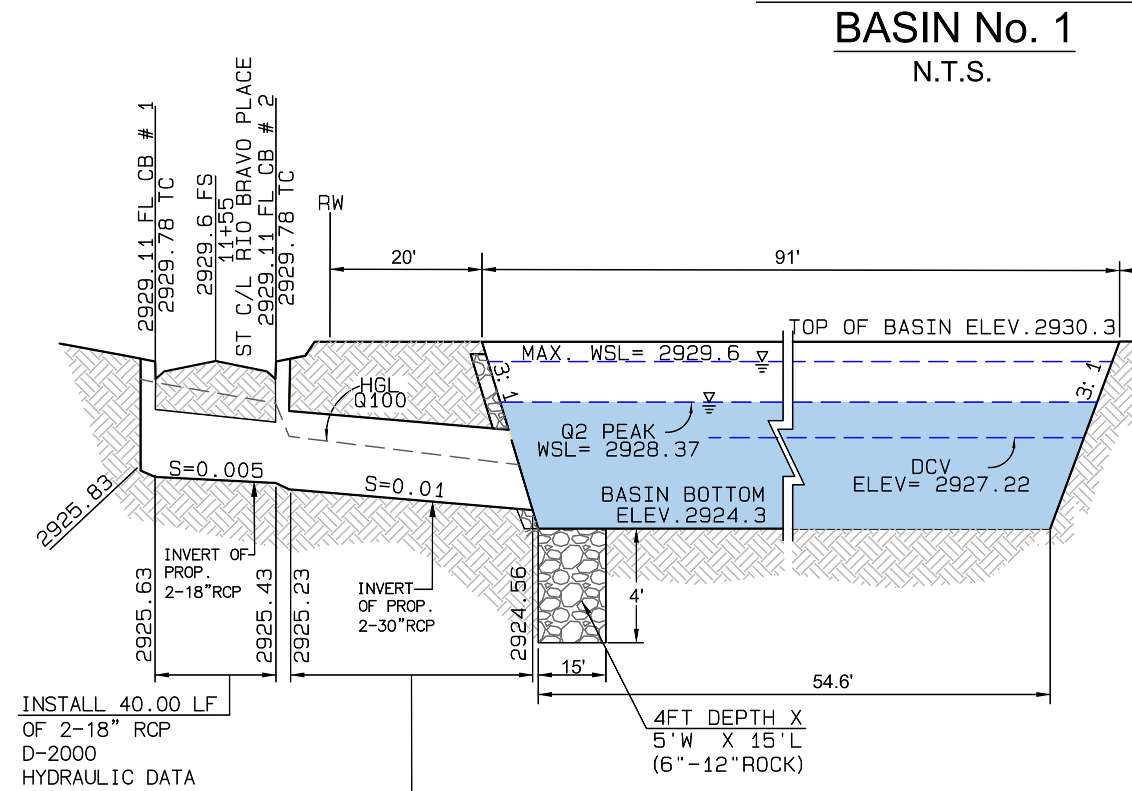
HYDROLOGY SUMMARY TABLE - ONSITE						
NODAL POINT	SUBAREA	AREA(AC)	Q10 (CFS)	TC (MIN)	Q100 (CFS)	TC (MIN)
101-102	AA1	1.98	3.1	10.7	5.8	10.7
102-103	AA2	5.52	8.5	15.9	16.9	15.1
103-106	BB1	7.82	11.6	21.9	26.1	20.1
103-106	AA1,AA2,BB1	15.32	7.3	14.4	14.4	14.4
104-105	BB2	6.41	7.3	14.4	14.4	14.4
105-106	BB3	5.00	9.7	18.4	21.0	17.7
105-106	BB2,BB3	11.41	1.5	13.8	2.9	13.8
107-108	BB4	1.26	1.5	13.8	2.9	13.8
108-106	BB5	1.0	2.0	19.2	4.2	18.4
106-106		28.99	23.4	18.3	50.8	17.7
106-13	BASIN	12.2	14.4	17.0	22.2	17.7
16-17	C2	6.3	5.1	17.5	11.2	17.5
17-13	C3	8.3	7.7	24.6	20.2	23.0
17-13	C2,C3	14.6	7.7	24.6	20.2	23.0
15-12	C1	6.6	5.1	18.4	11.2	18.4
12-13	C4	1.2	5.1	22.9	11.2	22.1
12-13	C1,C4	7.8	5.1	22.9	11.2	22.1
13-13		51.39	28.2	18.4	53.1	14.4

HYDROLOGY SUMMARY TABLE - ONSITE						
NODAL POINT	SUBAREA	AREA(AC)	Q10 (CFS)	TC (MIN)	Q100 (CFS)	TC (MIN)
107-110	D1	0.97	1.2	14.5	2.3	14.5

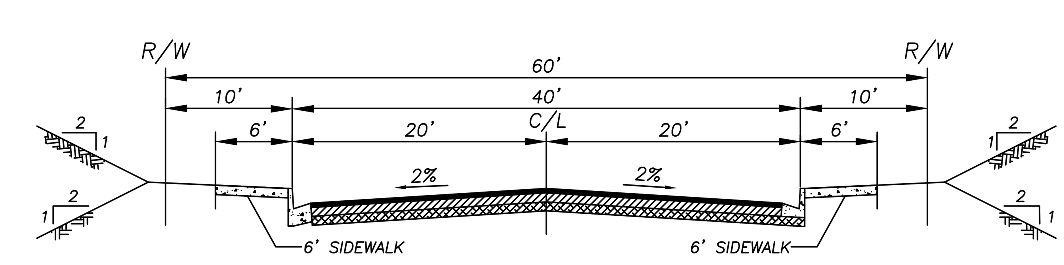




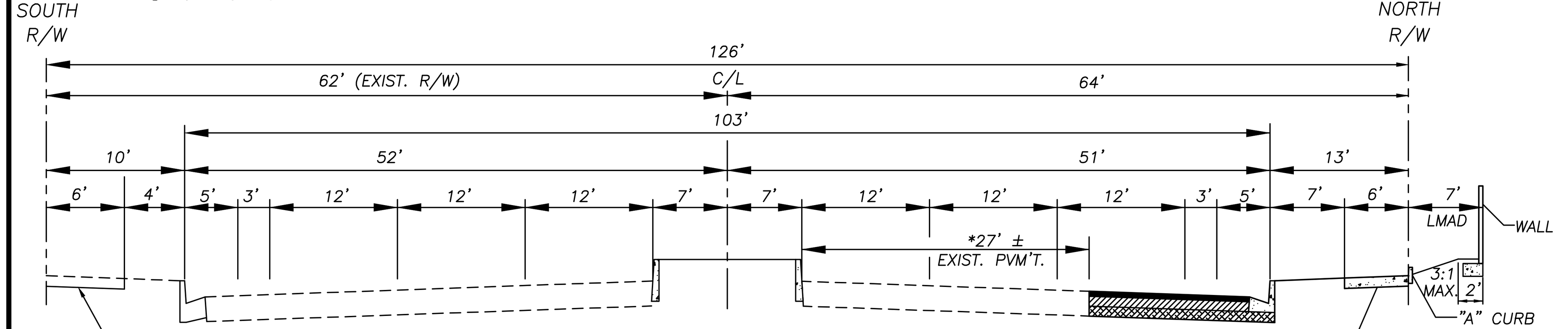
SECTION "A-A"
WQMP/DETENTION
BASIN No. 1
N.T.S.



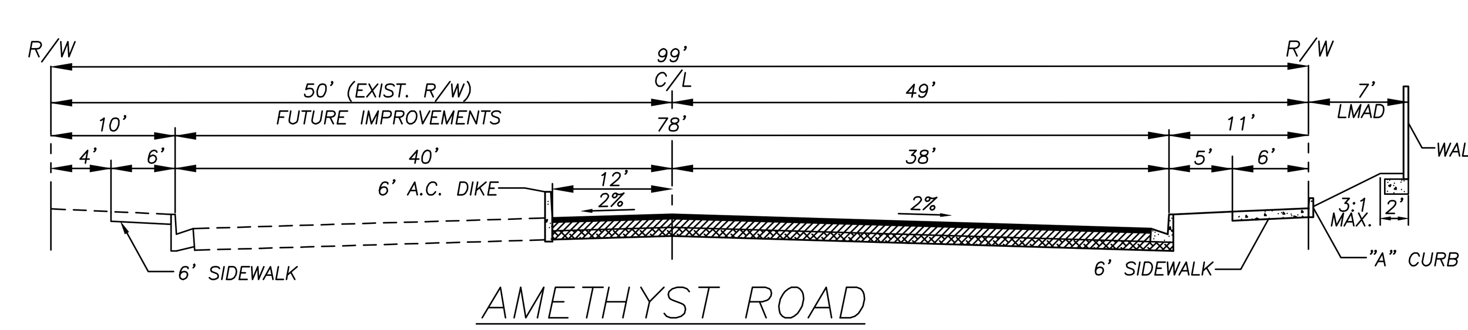
SECTION "B-B"
WQMP/DETENTION
BASIN No. 1
N.T.S.



ABO LANE EAST, RIO BRAVO PLACE, FIRE BIRD LANE
ABIENTO STREET, CAMARILLO PLACE & EL ROSE PLACE
(PUBLIC)
NTS



MOJAVE DRIVE
(TYPICAL SECTION)
NTS



AMETHYST ROAD
(TYPICAL SECTION)
NTS

PLOT DATE: December 27, 2022

REV.	DESCRIPTION	DATE	BY

Ludwig Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning
109 East Third Street, San Bernardino, CA 92410, Phone: 909-884-8217, Fax: 909-341-7447
5890 Hwy. 95, Ste. B, Fort Mohave, AZ 86426, Phone: 928-768-1857, Fax: 928-768-7086
15252 Seneca Rd., Victorville, CA 92392, Phone: 760-951-7676, Fax: 760-241-0573
2126 McCulloch Blvd., Ste. 8, Lake Havasu City, AZ 86403, Phone: 928-680-6060, Fax: 928-854-6530

CITY OF VICTORVILLE
TR 20525
POST DEVELOPED DRAINAGE MAP - ONSITE
CLIENT:
THREE ARCH INVESTMENT CORP.
17802 LAKESIDE HAVEN DRIVE, CYPRESS, TEXAS 77433

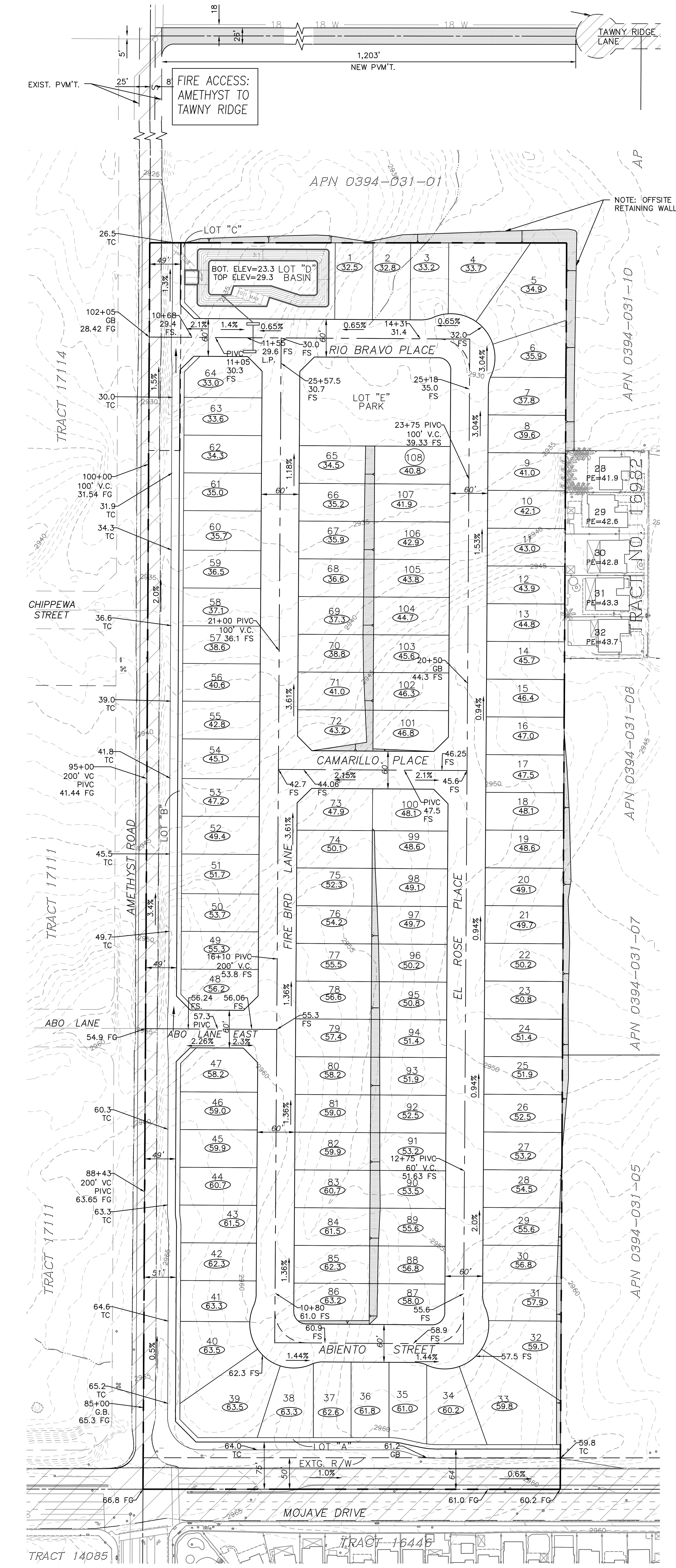
SCALE 1" = 100'
SHEET 4 OF 4
D-1

DESIGNED BY:	DRAWN BY:	CHECKED BY:
BW	LC	JA

PLOT STYLE: NCS US Standard.stb PROJECT LOCATION & NAME: V:\plans\TR 17830 Michelson\Engineering\Drainage\ACAD\20525(17830)_Postdeveloped Drainage Map_12-20-22.dwg PLOT TIME: Tuesday, December 27, 2022 4:00:33 PM LAYOUT: POST

TR. 20525

Grading Plan

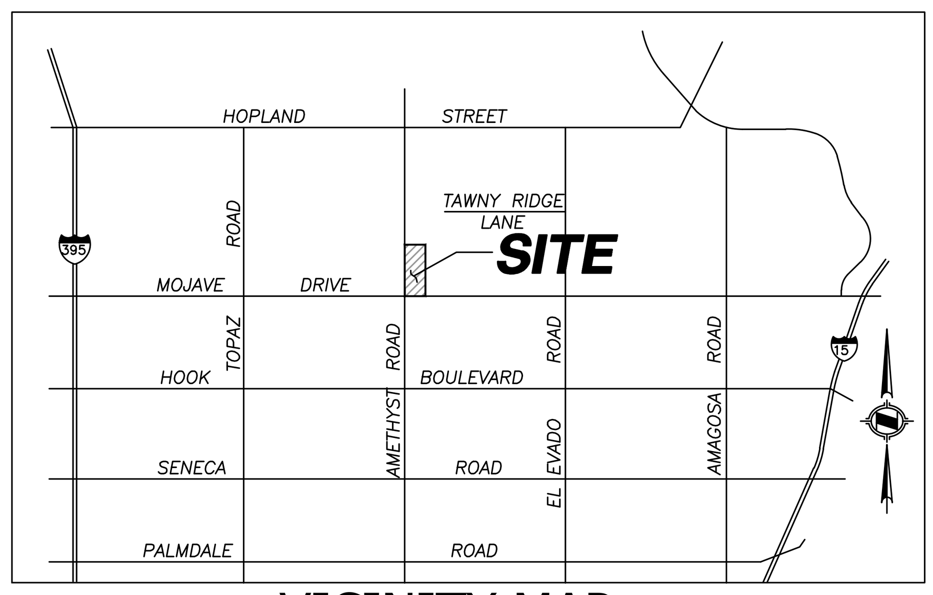


IN THE CITY OF VICTORVILLE,
COUNTY OF SAN BERNARDINO, CALIFORNIA

TENTATIVE TRACT MAP No. 20525

BEING THE WEST HALF OF THE WEST HALF OF THE SOUTHWEST QUARTER OF SECTION 12, TOWNSHIP 5 NORTH, RANGE 5 WEST, S.B.M., IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPTING THE NORTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF THE SOUTHWEST ONE-QUARTER OF SAID SECTION 12.

LUDWIG ENGINEERING — DECEMBER 2022



VICINITY MAP

PROJECT SUMMARY

1. GROSS ACREAGE: 30.1 ACRES
2. NET ACREAGE: 20.87 ACRES
3. PROPOSED DENSITY: 3.85 DU/AC
4. MINIMUM LOT AREA: 7,200 S.F.
5. AVERAGE LOT AREA: 7,692 S.F.
6. MINIMUM LOT DIMENSION FOR INTERIOR LOT: 60'x120'
7. MINIMUM LOT DIMENSION FOR CORNER LOT: 65'x120'

LAND USE SUMMARY

LOT No.	LAND USE	AREAS
A, B, C, D & E	LETTER LOTS (LMAD, PARK & BASIN)	1.80 ACRES
1-108	SINGLE FAMILY RESIDENTIAL LOTS	19.07 ACRES
ROADS	ROADS	9.23 ACRES
TOTAL		30.1 ACRES

EASEMENTS

A REFERS TO AN EASEMENT IN FAVOR OF IAN FREEBAIRN-SMITH FOR ROAD AND INCIDENTAL PURPOSES RECORDED DECEMBER 13, 1967 IN BOOK 6940, PAGE 679 OF OFFICIAL RECORDS.

B REFERS TO AN EASEMENT IN FAVOR OF THE CITY OF VICTORVILLE FOR PUBLIC ROAD, HIGHWAY AND INCIDENTAL PURPOSES RECORDED FEBRUARY 05, 1992 AS INSTRUMENT NO. 92-041866 OF OFFICIAL RECORDS.

C REFERS TO AN OFFER OF DEDICATION OF THE CITY OF VICTORVILLE FOR STREETS, HIGHWAYS, SEWER, DRAINAGE, PUBLIC UTILITIES AND INCIDENTAL PURPOSES RECORDED MAY 01, 1989 AS INSTRUMENT NO. 89-154377 OF OFFICIAL RECORDS.

D REFERS TO AN EASEMENT IN FAVOR OF GEMINI MANAGEMENT COMPANY FOR ROAD AND INCIDENTAL PURPOSES RECORDED DECEMBER 13, 1967 IN BOOK 7120, PAGE 464 OF OFFICIAL RECORDS.

E REFERS TO AN OFFER OF DEDICATION OF THE CITY OF VICTORVILLE FOR HIGHWAY, ROAD AND INCIDENTAL PURPOSES RECORDED OCTOBER 29, 1986 AS INSTRUMENT NO. 86-319270 OF OFFICIAL RECORDS.

F REFERS TO AN EASEMENT IN FAVOR OF THE CITY OF VICTORVILLE FOR PUBLIC ROAD, HIGHWAY AND INCIDENTAL PURPOSES RECORDED MARCH 24, 1992 AS INSTRUMENT NO. 92-125359 OF OFFICIAL RECORDS.

NOTES

1. AP MAP NOS. 0394-031-02, 0394-031-03 & 0394-031-04
2. EXISTING LAND USE: VACANT
3. PROPOSED LAND USE: RESIDENTIAL
4. EXISTING GENERAL PLAN: LOW DENSITY RESIDENTIAL
5. EXISTING ZONING: R-1T (4) SINGLE FAMILY TRANSITIONAL
6. PROPOSED ZONING: R-1T (4) SINGLE FAMILY TRANSITIONAL
7. STREETS: PUBLIC
8. LOTS 1-109. ARE SINGLE FAMILY RESIDENTIAL, LOTS D & E ARE BASIN & PARK
9. TOTAL LOTS: 109 NUMBERED LOTS AND 5 LETTERED LOTS
10. SCHOOL DISTRICTS: VICTOR ELEMENTARY SCHOOL DISTRICT AND VICTOR VALLEY UNION HIGH SCHOOL DISTRICT
11. THOMAS BROTHERS REFERENCE, SAN BERNARDINO 2005: PAGE 4295, G5 & G6
12. SETBACKS: FRONT YARD = 20'; SIDE YARD = 5'; STREET SIDE YARD = 10; REAR YARD = 20'
13. A 7 FOOT WIDE LMAD WILL BE DEDICATED ALONG AMETHYST ROAD AND MOJAVE DRIVE.

DATE 8-24-22
W.O. MI-0508
GROSS AREA 30.1 AC. +/-
CONTOUR INTERVAL 1'
TOTAL LOTS 108 NUMBERED, 5 LETTER

UTILITIES

WATER	CITY OF VICTORVILLE	(760) 245-6424
SEWER	CITY OF VICTORVILLE	(760) 955-5087
GAS	SOUTHWEST GAS CORPORATION	(760) 241-9321
ELECTRIC	SOUTHERN CALIFORNIA EDISON COMPANY	(800) 655-4555
TELEPHONE	VERIZON CALIFORNIA, INC.	(800) 483-5000
CABLE T.V.	CHARTER COMMUNICATION	(760) 241-7848

BENCHMARK

CITY OF VICTORVILLE B.M., V-214

BEING A 3" BRASS CAP IN SOUTH TOP OF CURB AT INTERSECTION OF MOJAVE DRIVE AND AMETHYST ROAD @ 2 FEET WEST OF SOUTHWEST BCR

ELEVATION: 2967.28

PREPARED FOR:

THREE ARCH INVESTMENT CORP.1
17802 LAKESIDE HAVEN DRIVE
CYPRESS, TEXAS, 77433
DAVID MICHELSON: (949)322-6983

PROPERTY OWNER:

1. APN. 0394-031-02,03,04
MOJAVE AMETHYST 40, L.P.
17802 LAKESIDE HAVEN DRIVE
CYPRESS, TX 77433

______________________ DATE ________

JEFFREY MARTIN ASHBAKER, P.E. 91606

REGISTERED PROFESSIONAL ENGINEER JEFFREY MARTIN ASHBAKER No. 91606 CIVIL STATE OF CALIFORNIA

LOT SUMMARY TABLE

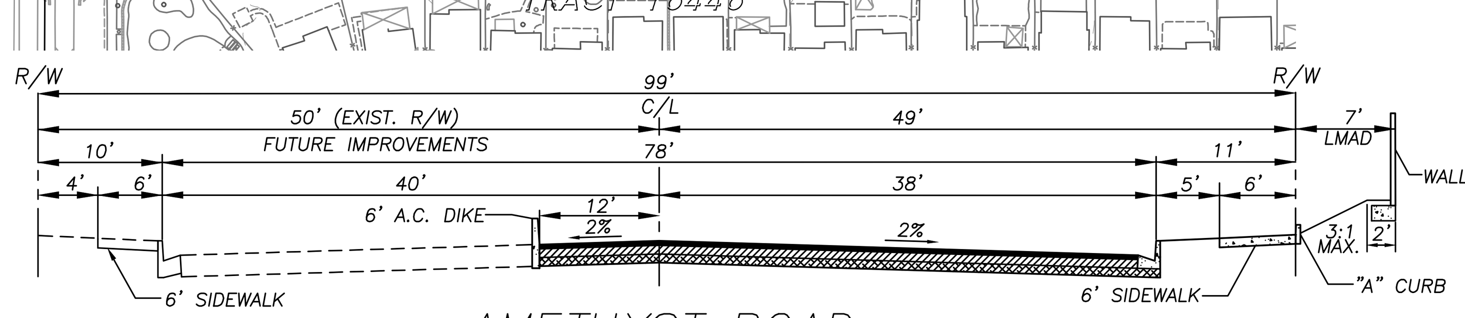
AREAS
(7,200 S.F. MIN)

LOT NO.	GROSS SQ.FT	LOT NO.	GROSS SQ.FT	LOT NO.	GROSS SQ.FT	LOT NO.	GROSS SQ.FT
1	7,312	31	7,324	61	7,409	91	7,200
2	7,332	32	10,528	62	7,412	92	7,200
3	7,205	33	15,918	63	7,415	93	7,200
4	10,386	34	9,066	64	7,524	94	7,200
5	14,970	35	7,404	65	7,200	95	7,200
6	8,497	36	7,229	66	7,200	96	7,200
7	7,381	37	7,206	67	7,200	97	7,200
8	7,405	38	8,023	68	7,200	98	7,200
9	7,409	39	13,994	69	7,200	99	7,200
10	7,414	40	10,332	70	7,200	100	7,718
11	7,418	41	7,594	71	7,200	101	7,535
12	7,423	42	7,220	72	7,535	102	7,200
13	7,427	43	7,270	73	7,717	103	7,200
14	7,432	44	7,347	74	7,200	104	7,200
15	7,436	45	7,353	75	7,200	105	7,200
16	7,441	46	7,357	76	7,200	106	7,200
17	7,445	47	8,014	77	7,200	107	7,200
18	7,450	48	7,407	78	7,200	108	7,200
19	7,454	49	7,372	79	7,200	-	-
20	7,459	50	7,375	80	7,200	-	-
21	7,463	51	7,747	81	7,200	-	-
22	7,468	52	7,381	82	7,200	-	-
23	7,472	53	7,384	83	7,200	-	-
24	7,479	54	7,757	84	7,200	-	-
25	7,482	55	7,390	85	7,200	LETTER LOTS	
26	7,486	56	7,393	86	7,714	"A"	8,576
27	7,491	57	7,396	87	7,714	"B"	7,413
28	7,495	58	7,399	88	7,200	"C"	910
29	7,500	59	7,402	89	7,200	"D"	28,578
30	7,504	60	7,776	90	7,200	"E"	33,489

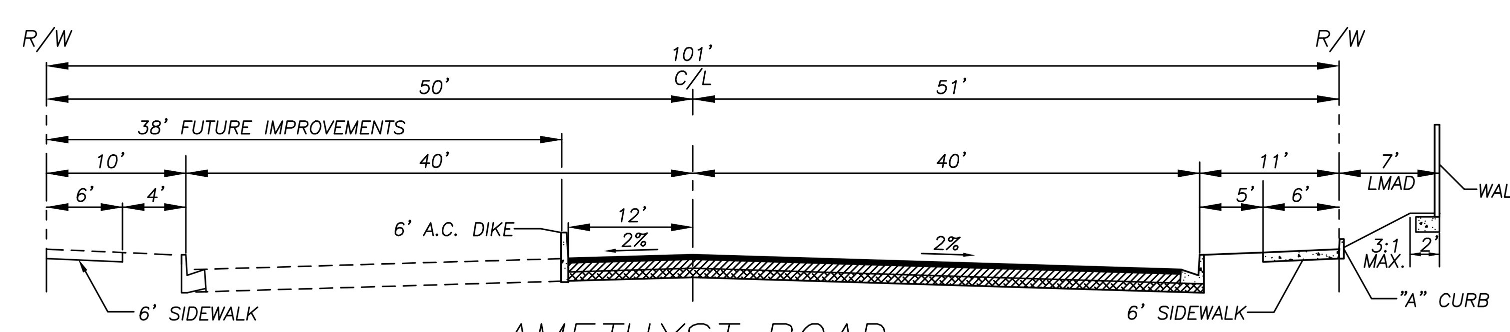
LOTS - 108	830,188 S.F.
LETTER LOTS - 5	78,966 S.F.
TOTAL LOTS - 113	909,154 S.F.
TOTAL	20.87 Acres
AVERAGE - RESIDENTIAL LOTS	7,692 S.F.

GRADING NOTES

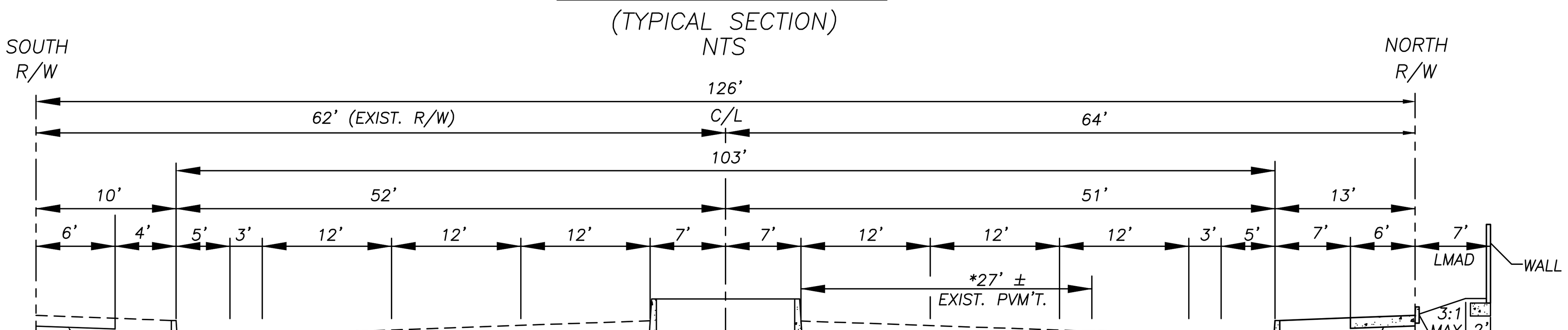
XX.X = PROPOSED PAD ELEVATION
G.B. = GRADE BREAK
PIVC = POINT OF INTERSECTION VERTICAL CURVE
F.G = FINISH GRADE
V.C. = VERTICAL CURVE
H.P. = HIGH POINT
INDICATES 2:1 SLOPE
APPROX. EARTHWORK QUANTITIES
CUT = 77,855 C.Y., FILL = 50,942 C.Y.



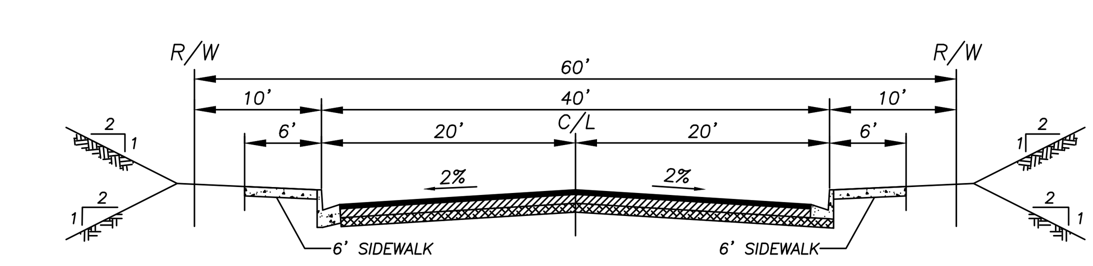
AMETHYST ROAD
(TYPICAL SECTION)
NTS



AMETHYST ROAD
(TRANSITION AT INTERSECTION)
NTS

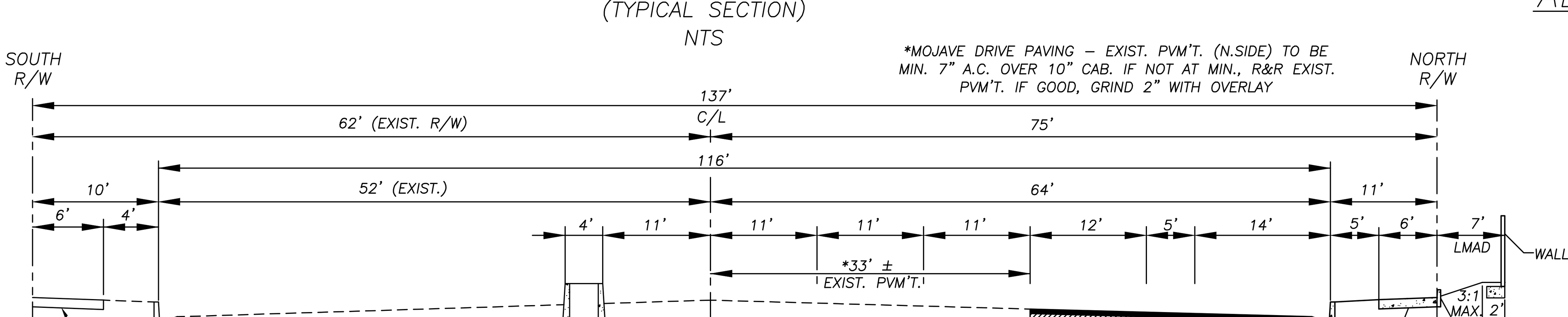


MOJAVE DRIVE
(TYPICAL SECTION)
NTS



ABO LANE EAST, RIO BRAVO PLACE, FIRE BIRD LANE
ABIENTO STREET, CAMARILLO PLACE & EL ROSE PLACE
(PUBLIC)
NTS

*MOJAVE DRIVE PAVING - EXIST. PVM'T. (N.SIDE) TO BE MIN. 7" A.C. OVER 10" CAB. IF NOT AT MIN., R&R EXIST. PVM'T. IF GOOD, GRIND 2" WITH OVERLAY



MOJAVE DRIVE
(TURN POCKET AT INTERSECTION)
NTS

Ludwig Engineering ASSOCIATES, INC.
Civil Engineering • Surveying • Planning

109 East Third Street San Bernardino, CA 92410 Phone: 909-884-8217 Fax: 909-889-0153	5890 Hwy. 95, Ste. B Fort Mohave, AZ 88426 Phone: 928-768-1857 Fax: 928-768-7086
15252 Seneca Rd. Victorville, CA 92392 Phone: 760-951-7676 Fax: 760-241-0573	2126 McCulloch Blvd., Ste. 8 Lake Havasu City, AZ 86403 Phone: 928-680-6060 Fax: 928-854-6530

AMETHYST ROAD AND MOJAVE DRIVE

PRELIMINARY GRADING
TTM NO. 20525

DATE: AUGUST 2022

SHEET 2 OF 3

PROJECT NUMBER
MI-0508