PRELIMINARY HYDROLOGY STUDY

AMETHYST CROSSING

(Southeast corner of Amethyst Road and Bear Valley Road)

Prepared for:

High Desert Ventures LLC
5567 Reseda Boulevard, Suite 318
Tarzana, CA 91356
Tel: (818) 881-5868
Attn: Bobby Younessi

August 2021

Prepared by:

David Evans and Associates
18484 Outer Highway 18 North, Suite 225
Apple Valley, CA 92307
(760) 524-9100
Bret Jensen Thorpe, PE

Prepared under the supervision of:

Bret Jensen Thorpe, P.E. R.C.E. 82754

DEA Job No: HIGP0000-0002

TUSTIN
17782 East 17th Street
Suite 200
Tustin, CA 92780
714.665.4500
Fax: 714.665.4501

SANTA CLARITA
25152 Springfield Court
Suite350
Santa Clarita, CA 91355-1096
661.284.7400
Fax 661.284.7401

TEMECULA
41951 Remington Avenue
Suite 130
Temecula, CA 92590-2553
951.294.9300
Fax: 951.294-9301

APPLE VALLEY
18484 Outer Highway 18 North
Suite 225
Apple Valley, CA 92307
760.524.9100
Fax 760.524.9101

www.deainc.com

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APPENDICES

Introduction and Background

Amethyst Crossing is a proposed commercial development on approximately an 11.42-acre (net) site that is proposed to be developed into retail stores and restaurants. The Project site is bounded on the north by Bear Valley Road, Amethyst Road on the west, the southerly extension of Pluto Drive on the east and undeveloped land on the south located in the City of Victorville, California

The existing site slopes slightly to the northeast with an average grade across the site of 1.7%. The Project site lies entirely in HSG A and there is some brush and dry grasses and is considered barren.

Study Criteria

Bonadiman Civil Design Software, Version 7.0 & 7.1 was used for the 10-year & 100-year Hydrological Analysis.

- 10-year AMC II Unit hydrograph Method (developed and undeveloped)
- 100-year AMC II Unit Hydrograph Method (developed and undeveloped)
- Soil Type A
- Mannings Values Used
- Existing Surface n=0.035
- Proposed Surface n=0.013
- Unit Hydrograph n=0.020
- Project is in the City of Victorville, CA

Drainage boundaries were derived using field topography, USGS Map for Victorville as shown on the existing hydrology map, provided in Appendix A of this report. See Reference Documents in Appendix F for San Bernardino County Hydrology Manual and City of Victorville technical references.

Off-Site Hydrology:

Visits to the site were conducted to determine what, if any, off-site storm run-on would be entering the Project site. Since a small portion of the upstream development has taken place and major streets have been constructed, it was determined that the undeveloped upstream area south of the Project site was approximately 20 acres draining toward the Project site. See existing Hydrology Map in Appendix A.

All the storm run-off generated by the Project (approximately 11.42 acres) will be accepted into the existing storm drain in Bear Valley Road, City of Victorville Plan No. S-000830. See storm drain plan located in Appendix F, References. The following table shows the offsite on onsite existing condition flows referenced on the Existing condition Hydrology Map in Appendix A.

Rational Method

Existing Condition

Offsite and Onsite Areas

Areas	Area (acres)	Q10 (cfs)	Q100 (cfs)	Comments
A1	4.8	4.77	9.54	Off-site area
A2	13.5	13.4	26.8	Off-site area
A3	12.7	12.6	25.3	On-site area
	31.0	**30.8**	**61.6**	

Offsite Street Areas

Area	Area ((Acres)	Q10 (cfs)	Q100 (cfs)	Comments
B1	0.6	1.36	2.25	Amethyst
B2	3.19	3.5	6.2	Amethyst
B3	0.33	0.45	0.74	Bear Valley
B4	0.47	0.03	0.18	Bear Valley
		5.4	**9.4**	Q10=5.3 cfs and Q100=9.2 cfs intercepted by CB #9 City storm drain.

Offsite flows enter the Project site at its south boundary in a sheet flow manner in the existing condition. In the developed condition the south boundary area will be graded to accept the offsite flows and divert them to Pluto Dr. Once the upstream land develops the drainage flows will flow to Amethyst Road or the logical extension of Pluto Drive or a combination thereof.

On-Site Hydrology:

The Project site is broken down into the component sub-drainage areas to allow for the computation of storm run-off with Bonadiman Civil Design Software. The Project site will incorporate a Storm Tech underground retention system in compliance with the requirements of the State Storm Water permit requirements. .

The results of computer analysis will provide 10 and 100-year run-off quantities for sizing and design of proposed catch basins, parkway culverts, retention system, and storm drain system. See Appendix C for the Rational Method Hydrology calculations and Appendix F for the Hydraulic calculations. As previously mentioned the majority of storm run-off generated by the Project will be accepted into proposed catch basins and conveyed to an on-site retention system. Overflows will drain into the existing storm drain in Bear Valley Road or into Pluto Drive. The following table is a summary of the developed condition onsite flows.

Developed Condition

Onsite

Areas	Area (acres)	Q10 (cfs)	Q100 (cfs	Comments
A1	0.60	1.62	2.75	CB#1
A2	0.37	1.0	1.7	CB#2
A3	0.06	0.014	0.05	CB#3
A4	0.07	0.12	0.22	CB#4
A5	0.07	0.14	0.24	CB#5
A6	0.07	0.13	0.23	CB#6
A7	0.09	0.18	0.31	CB#7
	1.33	**3.02**	**5.50**	Area A drains to UG Basin A-2
C1	0.33	1.3	2.17	CB#9
C2	1.03	4.04	6.77	CB#10
	1.36	5.3	8.94	Area C drains to UG Basin A-2
		8.3	**14.5**	Total of Area A&C to common inlet in UG Basin A-2
D	**0.59**	**1.7**	**2.9**	Area D drains to thru a curb opening into Bioretention Basin A then drains into UG Basin A-2 at a different inlet (than Areas A and C). Riser inlet.
	3.28	**10.0**	**17.4**	**Total to UG Basin A-2 (28.7% of site) (out 7.3 cfs max)**
B1	**4.74**	**9.2**	**15.6**	CB#8 Drains into UG Basin A-1 **Total to UG Basin A-1 (41.5% of site)(out 10.5 cfs max)**
E	**0.51**	**1.62**	**2.72**	Area E drains to thru a curb opening into Bioretention Basin B then drains into UG Basin B. Riser inlet.
F	**0.37**	**1.27**	**2.13**	Area F drains to thru a curb opening into Bioretention Basin C then drains into UG Basin B. Riser inlet.
G1	0.19	0.76	1.27	Drains to UG Basin B CB#11
G2	0.13	0.52	0.87	CB#12 ,CB# 13, and CB#14
G3	0.11	0.31	0.55	CB#15
	0.43	**1.59**	**2.69**	Total Area G
	1.31	**4.48**	**7.54**	**Total to UG Basin B (11.5% of site)(out 2.90 max)**
H1	0.85	2.3	3.9	CB#16, CB#17
H2	0.20	0.37	0.66	CB#18 thru CB#21
		2.7	**4.6**	Drains to UG Basin C
H3	1.04	**3.2**	**5.3**	Drains to UG Basin C, CB#22 thru CB#27
	2.09	**5.9**	**9.9**	**Total into UG Basin C (18.3% of site)(out 4.6 cfs max)**
	11.42			**Total Project Site Area**

Each underground basin is design to outlet at the existing condition flows, mitigate 10-year, 24-hour pre vs post volumes and provide for the Design Capture Volume (DCV). For purposes of this preliminary study, the existing flow from the site will be prorated by area for each underground basin outflow since hydrologic characteristics are the same for the entire site.

Hydraulics

Appendix E of this report includes various hydraulic calculations to size the catch basin inlets and parkway drain widths for the storm drain systems. It should be noted, the facilities are sized using 100-year storm events. Should the catch basin plug storm flows would flow out into the streets before water would rise to the elevation of the building pads.

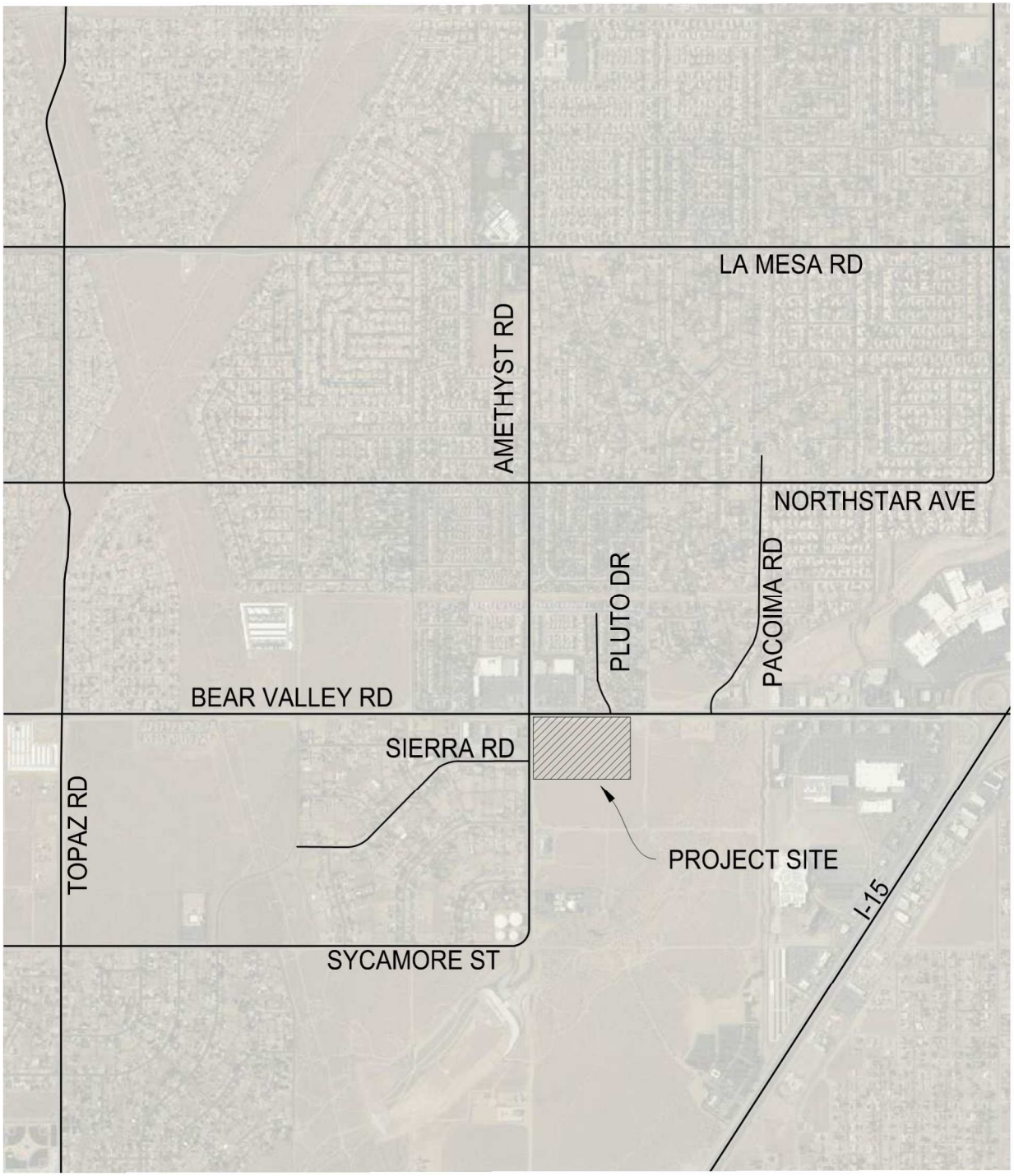
Conclusion

Based on the hydrology evaluations and calculations of the off-site and on-site run-off for the Project as stated within this report, once the Project is completed, and the proposed grading and storm drain facilities are properly constructed, the Project will be protected from flood hazard. Since the drainage patterns with and adjacent to the Project are not being altered and the Project is mitigating the increased run-off, there should be no significant impact down stream due to this development.

APPENDIX 'A'

Figures

- Figure 1- Vicinity Map
- Figure 2 – Existing Condition Hydrology Map
- Figure 3 – Developed Condition Hydrology Map



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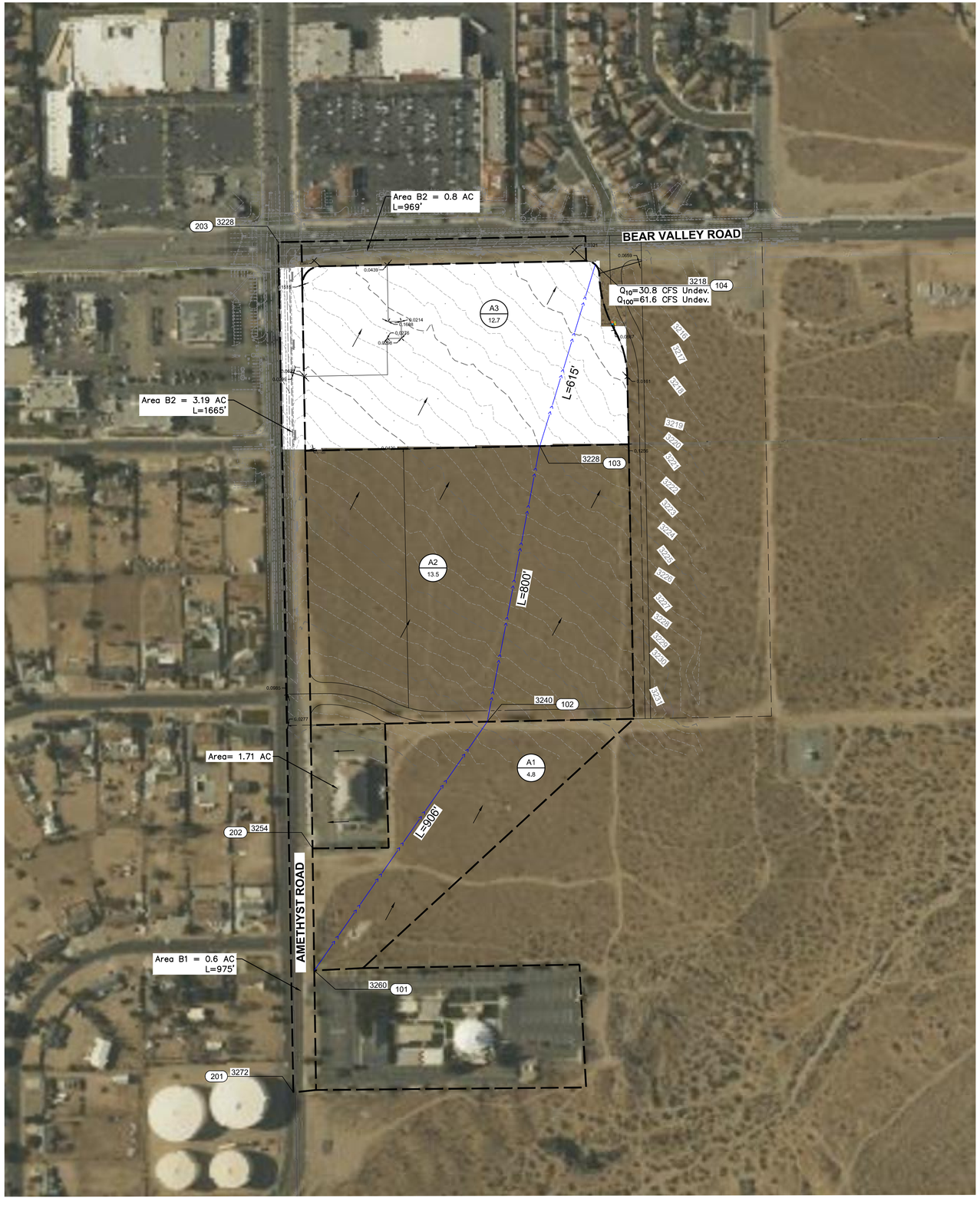
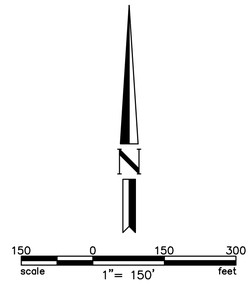
NOT TO SCALE

DAVID EVANS AND ASSOCIATES INC.

Figure 2 : VICINITY MAP
AMETHYST CROSSING
VICTORVILLE, CALIFORNIA





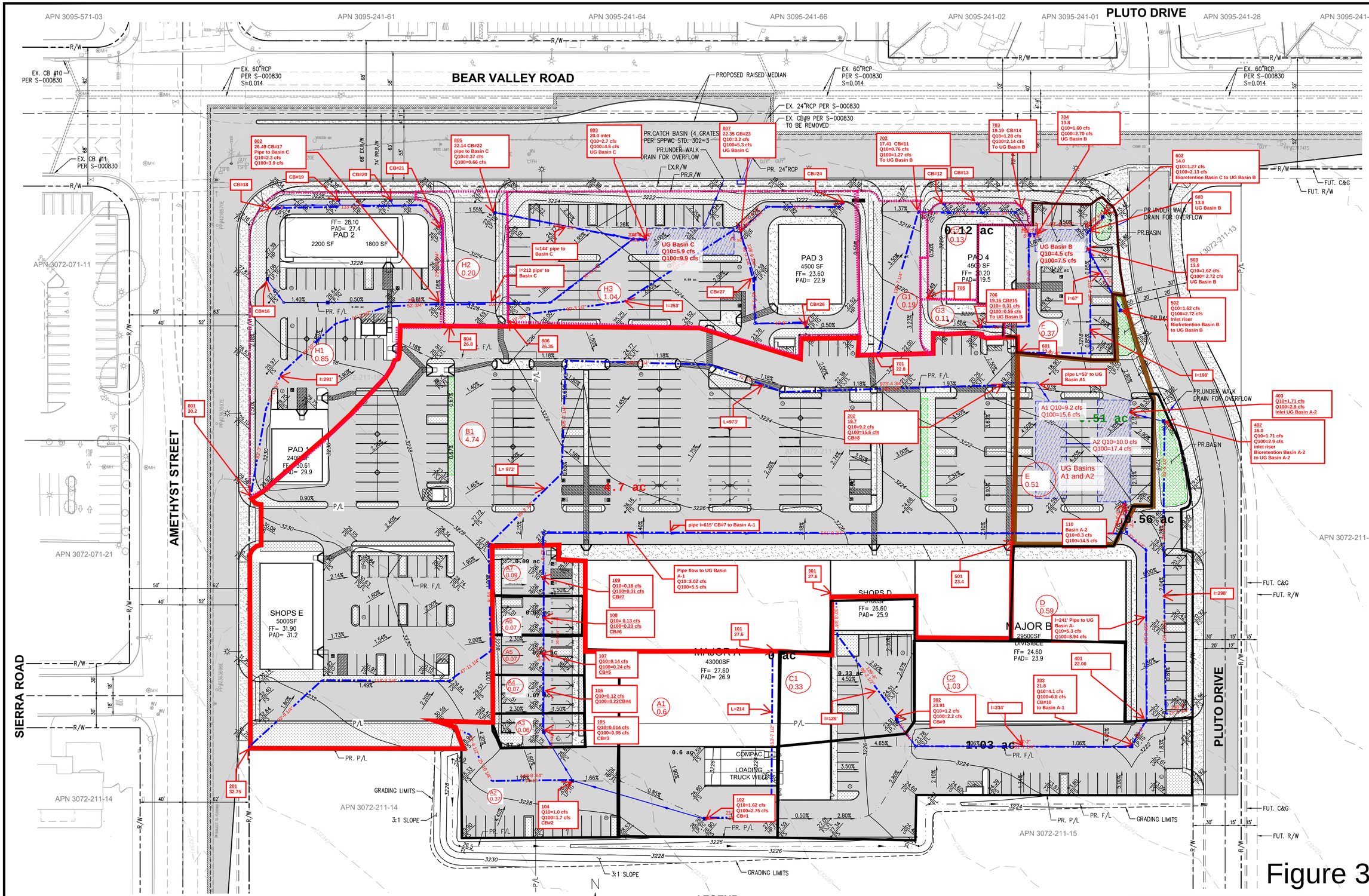
LEGEND:

- HYDROLOGY BOUNDARY
- FLOWLINE
- A / 7.96 — DRAINAGE AREA ID / TOTAL ACREAGE
- FLOW DIRECTION
- FS ELEVATION / INV ELEVATION (NODE #) — CONCENTRATION/NODE ID

Amethyst Crossing IN THE CITY OF VICTORVILLE

Figure 2

Offsite Existing Condition Hydrology Map



ABBREVIATIONS

BFP	BACK FLOW PREVENTER	FG	FINISH GRADE	LF	LINEAR FEET	SWR	SEWER
C/L	CENTERLINE	FL	FLOW LINE	LP	LOW POINT	TG	TOP OF GRATE
C&G	CURB AND GUTTER	FH	FIRE HYDRANT	P/L	PROPERTY LINE	TYP	TYPICAL
CB	CATCH BASIN	FS	FINISH SURFACE	PE	PAD ELEVATION	WTR	WATER
EG	EXISTING GROUND	FUT.	FUTURE	PP	POWER POLE		
EL.	ELEVATION	GB	GRADE BREAK	PS	PIPE SLOPE		
ELEC.	ELECTRIC	GUY	GUY ANCHOR	PR.	PROPOSED		
EX.	EXISTING	HP	HIGH POINT	R/W	RIGHT OF WAY		
FF	FINISH FLOOR	INV	INVERT	ST.	STREET		

LEGEND

- PROPOSED LANDSCAPE AREA
- PROPOSED UNDERGROUND DETENTION AREA
- PROPOSED WQMP TREATMENT AREA
- PROPOSED AC PAVEMENT
- PROPOSED PCC PAVEMENT
- PROPOSED STORM DRAIN PIPE
- PROPOSED STORM DRAIN PIPE FLOW DIRECTION

DAVID EVANS AND ASSOCIATES INC.
18484 Outer Highway 18 N Suite 225
Apple Valley California 92307
Phone: 760.524.9100
SSchubert@deainc.com

IN THE CITY OF VICTORVILLE
AMETHYST CROSSINGS

DEVELOPED CONDITION HYDROLOGY MAP

FILE NO.

DRAWING NO. SH. 1 OF 1

DATE: 08/14/2021

Figure 3

By: Shane Schubert
By: Srnsc File: P:\HH\GP00000002\0400CAD\SHEETS\ECI\CONCEPT PLANS\SHEET 2.dwg
Plot Date: 8/14/2021 6:34 PM
Save Date: 8/14/2021 6:27 PM

APPENDIX 'B'

Rational Method Existing Condition

Offsite and On-Site, 10 and 100-year Storm Event

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 06/29/21

Amethyst Crossing
10-year undeveloped
ACud10

Program License Serial Number 6385

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.700 (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 ****

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 = 906.000(Ft.)
Top (of initial area) elevation = 3260.000(Ft.)
Bottom (of initial area) elevation = 3240.000(Ft.)
Difference in elevation = 20.000(Ft.)
Slope = 0.02208 s(%)= 2.21
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.149 min.
Rainfall intensity = 1.682(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.591

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Subarea runoff =      4.768(CFS)
Total initial stream area =        4.800(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.578(In/Hr)


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Process from Point/Station      102.000 to Point/Station      103.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
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)
Time of concentration =    17.15 min.
Rainfall intensity =      1.682(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.591
Subarea runoff =     13.410(CFS) for   13.500(Ac.)
Total runoff =     18.179(CFS)
Effective area this stream =       18.30(Ac.)
Total Study Area (Main Stream No. 1) =       18.30(Ac.)
Area averaged Fm value =    0.578(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
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)
Time of concentration =    17.15 min.
Rainfall intensity =      1.682(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.591
Subarea runoff =     12.616(CFS) for   12.700(Ac.)
Total runoff =     30.794(CFS)
Effective area this stream =       31.00(Ac.)
Total Study Area (Main Stream No. 1) =       31.00(Ac.)
Area averaged Fm value =    0.578(In/Hr)
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Process from Point/Station      103.000 to Point/Station      104.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     31.000(Ac.)
Runoff from this stream =     30.794(CFS)
Time of concentration =   17.15 min.
Rainfall intensity =     1.682(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     30.79    31.000     17.15    0.578      1.682
Qmax(1) =
           1.000 *    1.000 *    30.794) + =      30.794

Total of 1 streams to confluence:
Flow rates before confluence point:
      30.794
Maximum flow rates at confluence using above data:
       30.794
Area of streams before confluence:
       31.000
Effective area values after confluence:
       31.000
Results of confluence:
Total flow rate =     30.794(CFS)
Time of concentration =    17.149 min.
Effective stream area after confluence =     31.000(Ac.)
Study area average Pervious fraction(Ap) =  1.000
Study area average soil loss rate(Fm) =    0.578(In/Hr)
Study area total (this main stream) =      31.00(Ac.)
End of computations, Total Study Area =           31.00 (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 =  67.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 06/29/21

Amethyst Crossing
100-year undeveloped
Area A1-A3
ACud100

Program License Serial Number 6385

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.160 (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 ****

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 = 906.000(Ft.)
Top (of initial area) elevation = 3260.000(Ft.)
Bottom (of initial area) elevation = 3240.000(Ft.)
Difference in elevation = 20.000(Ft.)
Slope = 0.02208 s(%)= 2.21
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.149 min.
Rainfall intensity = 2.787(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.713
Subarea runoff = 9.543(CFS)

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Total initial stream area =        4.800(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.578(In/Hr)


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Process from Point/Station      102.000 to Point/Station      103.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
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)
Time of concentration =    17.15 min.
Rainfall intensity =      2.787(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.713
Subarea runoff =     26.841(CFS) for   13.500(Ac.)
Total runoff =     36.384(CFS)
Effective area this stream =       18.30(Ac.)
Total Study Area (Main Stream No. 1) =       18.30(Ac.)
Area averaged Fm value =    0.578(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
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)
Time of concentration =    17.15 min.
Rainfall intensity =      2.787(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.713
Subarea runoff =     25.250(CFS) for   12.700(Ac.)
Total runoff =     61.634(CFS)
Effective area this stream =       31.00(Ac.)
Total Study Area (Main Stream No. 1) =       31.00(Ac.)
Area averaged Fm value =    0.578(In/Hr)


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Process from Point/Station      103.000 to Point/Station      104.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     31.000(Ac.)
Runoff from this stream =     61.634(CFS)
Time of concentration =   17.15 min.
Rainfall intensity =     2.787(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     61.63    31.000     17.15    0.578      2.787
Qmax(1) =
           1.000 *    1.000 *    61.634) + =      61.634

Total of 1 streams to confluence:
Flow rates before confluence point:
      61.634
Maximum flow rates at confluence using above data:
       61.634
Area of streams before confluence:
       31.000
Effective area values after confluence:
       31.000
Results of confluence:
Total flow rate =     61.634(CFS)
Time of concentration =    17.149 min.
Effective stream area after confluence =     31.000(Ac.)
Study area average Pervious fraction(Ap) =  1.000
Study area average soil loss rate(Fm) =    0.578(In/Hr)
Study area total (this main stream) =      31.00(Ac.)
End of computations, Total Study Area =           31.00 (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 =  67.0
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San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 06/30/21

Amethyst Crossing
10-year street area
Area B1-B5
ACud10street

Program License Serial Number 6385

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.700 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

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Process from Point/Station 201.000 to Point/Station 202.000
**** 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) = 67.00
Pervious ratio(Ap) = 0.0100 Max loss rate(Fm)= 0.006(In/Hr)
Initial subarea data:
Initial area flow distance = 975.000(Ft.)
Top (of initial area) elevation = 3272.000(Ft.)
Bottom (of initial area) elevation = 3254.000(Ft.)
Difference in elevation = 18.000(Ft.)
Slope = 0.01846 s(%)= 1.85
TC = k(0.277)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.655 min.
Rainfall intensity = 2.515(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.898
Subarea runoff = 1.355(CFS)
Total initial stream area = 0.600(Ac.)
Pervious area fraction = 0.010
Initial area Fm value = 0.006(In/Hr)

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Process from Point/Station      202.000 to Point/Station      203.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  3254.000(Ft.)
End of street segment elevation =  3228.000(Ft.)
Length of street segment  =  1665.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  28.000(Ft.)
Distance from crown to crossfall grade break  =  27.990(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 [1] side(s) of the street
Distance from curb to property line  =   0.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   0.000(Ft.)
Gutter hike from flowline =  2.000(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 =      3.162(CFS)
Depth of flow =   0.383(Ft.), Average velocity =   2.715(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.793(Ft.)
Flow velocity =   2.71(Ft/s)
Travel time =   10.22 min.     TC =   19.88  min.
 Adding area flow to street
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Rainfall intensity =      1.517(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.851
Subarea runoff =      3.535(CFS) for    3.190(Ac.)
Total runoff =      4.890(CFS)
Effective area this stream =        3.79(Ac.)
Total Study Area (Main Stream No. 1) =        3.79(Ac.)
Area averaged Fm value =    0.083(In/Hr)
Street flow at end of street =      4.890(CFS)
Half street flow at end of street =      4.890(CFS)
Depth of flow =   0.421(Ft.), Average velocity =   3.034(Ft/s)
Flow width (from curb towards crown)=  12.696(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 67.00
Pervious ratio(Ap) = 0.0100     Max loss rate(Fm)=     0.006(In/Hr)
Time of concentration =    19.88 min.
Rainfall intensity =      1.517(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.854
Subarea runoff =      0.449(CFS) for    0.330(Ac.)
Total runoff =      5.339(CFS)
Effective area this stream =        4.12(Ac.)
Total Study Area (Main Stream No. 1) =        4.12(Ac.)
Area averaged Fm value =    0.077(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      104.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  3222.000(Ft.)
End of street segment elevation =  3218.000(Ft.)
Length of street segment  =   467.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  32.000(Ft.)
Distance from crown to crossfall grade break  =  30.000(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 [1] side(s) of the street
Distance from curb to property line  =   0.000(Ft.)
Slope from curb to property line (v/hz) =   0.000
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  0.125(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 =      5.393(CFS)
Depth of flow =   0.266(Ft.), Average velocity =   2.508(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  14.765(Ft.)
Flow velocity =   2.51(Ft/s)
Travel time =    3.10 min.     TC =   22.98  min.
 Adding area flow to street
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 67.00
Pervious ratio(Ap) = 0.0100     Max loss rate(Fm)=     0.006(In/Hr)
```

```
Rainfall intensity =      1.370(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.854
Subarea runoff =      0.034(CFS) for    0.470(Ac.)
Total runoff =      5.373(CFS)
Effective area this stream =        4.59(Ac.)
Total Study Area (Main Stream No. 1) =        4.59(Ac.)
Area averaged Fm value =    0.070(In/Hr)
Street flow at end of street =      5.373(CFS)
Half street flow at end of street =      5.373(CFS)
Depth of flow =   0.265(Ft.), Average velocity =   2.505(Ft/s)
Flow width (from curb towards crown)=  14.745(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      4.590(Ac.)
Runoff from this stream =      5.373(CFS)
Time of concentration =   22.98 min.
Rainfall intensity =     1.370(In/Hr)
Area averaged loss rate (Fm) =    0.0697(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0725
Summary of stream data:

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


1      5.37     4.590     22.98    0.070      1.370
Qmax(1) =
           1.000 *    1.000 *     5.373) + =       5.373

Total of 1 streams to confluence:
Flow rates before confluence point:
       5.373
Maximum flow rates at confluence using above data:
        5.373
Area of streams before confluence:
        4.590
Effective area values after confluence:
        4.590
Results of confluence:
Total flow rate =      5.373(CFS)
Time of concentration =    22.982 min.
Effective stream area after confluence =      4.590(Ac.)
Study area average Pervious fraction(Ap) =  0.073
Study area average soil loss rate(Fm) =    0.070(In/Hr)
```

Study area total (this main stream) = 4.59(Ac.)
End of computations, Total Study Area = 4.59 (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) = 0.073
Area averaged SCS curve number = 42.7

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 06/30/21

Amethyst Crossing
100-year street area
Area B1-B5
ACud100street

Program License Serial Number 6385

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.160 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 201.000 to Point/Station 202.000
**** 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) = 67.00
Pervious ratio(Ap) = 0.0100 Max loss rate(Fm)= 0.006(In/Hr)
Initial subarea data:
Initial area flow distance = 975.000(Ft.)
Top (of initial area) elevation = 3272.000(Ft.)
Bottom (of initial area) elevation = 3254.000(Ft.)
Difference in elevation = 18.000(Ft.)
Slope = 0.01846 s(%)= 1.85
TC = k(0.277)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.655 min.
Rainfall intensity = 4.167(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.899
Subarea runoff = 2.247(CFS)
Total initial stream area = 0.600(Ac.)
Pervious area fraction = 0.010
Initial area Fm value = 0.006(In/Hr)

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  3254.000(Ft.)
End of street segment elevation =  3228.000(Ft.)
Length of street segment  =  1665.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  32.000(Ft.)
Distance from crown to crossfall grade break  =  30.000(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  =   0.000(Ft.)
Slope from curb to property line (v/hz) =   0.000
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  0.125(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 =      5.417(CFS)
Depth of flow =   0.176(Ft.), Average velocity =   2.636(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.282(Ft.)
Flow velocity =   2.64(Ft/s)
Travel time =   10.53 min.     TC =   20.18  min.
 Adding area flow to street
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 67.00
Pervious ratio(Ap) = 0.0100     Max loss rate(Fm)=     0.006(In/Hr)
Rainfall intensity =      2.487(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.898
Subarea runoff =      6.216(CFS) for    3.190(Ac.)
Total runoff =      8.463(CFS)
Effective area this stream =        3.79(Ac.)
Total Study Area (Main Stream No. 1) =        3.79(Ac.)
Area averaged Fm value =    0.006(In/Hr)
Street flow at end of street =      8.463(CFS)
Half street flow at end of street =      4.232(CFS)
Depth of flow =   0.212(Ft.), Average velocity =   2.952(Ft/s)
Flow width (from curb towards crown)=  12.096(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** SUBAREA FLOW ADDITION ****
```

```
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 67.00
Pervious ratio(Ap) = 0.0100     Max loss rate(Fm)=     0.006(In/Hr)
Time of concentration =    20.18 min.
Rainfall intensity =      2.487(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.898
Subarea runoff =      0.737(CFS) for    0.330(Ac.)
Total runoff =      9.200(CFS)
Effective area this stream =        4.12(Ac.)
Total Study Area (Main Stream No. 1) =        4.12(Ac.)
Area averaged Fm value =    0.006(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      104.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  3222.000(Ft.)
End of street segment elevation =  3218.000(Ft.)
Length of street segment  =   467.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  32.000(Ft.)
Distance from crown to crossfall grade break  =  30.000(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 [1] side(s) of the street
Distance from curb to property line  =   0.000(Ft.)
Slope from curb to property line (v/hz) =   0.000
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  0.125(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 =      9.320(CFS)
Depth of flow =   0.332(Ft.), Average velocity =   2.878(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  18.077(Ft.)
Flow velocity =   2.88(Ft/s)
Travel time =    2.70 min.     TC =   22.89  min.
 Adding area flow to street
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 67.00
Pervious ratio(Ap) = 0.0100     Max loss rate(Fm)=     0.006(In/Hr)
Rainfall intensity =      2.277(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.898
```

```
Subarea runoff =      0.184(CFS) for    0.470(Ac.)
Total runoff =      9.384(CFS)
Effective area this stream =        4.59(Ac.)
Total Study Area (Main Stream No. 1) =        4.59(Ac.)
Area averaged Fm value =    0.006(In/Hr)
Street flow at end of street =      9.384(CFS)
Half street flow at end of street =      9.384(CFS)
Depth of flow =   0.333(Ft.), Average velocity =   2.883(Ft/s)
Flow width (from curb towards crown)=  18.123(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      104.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      4.590(Ac.)
Runoff from this stream =      9.384(CFS)
Time of concentration =   22.89 min.
Rainfall intensity =     2.277(In/Hr)
Area averaged loss rate (Fm) =    0.0058(In/Hr)
Area averaged Pervious ratio (Ap) = 0.0100
Summary of stream data:

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


1      9.38     4.590     22.89    0.006      2.277
Qmax(1) =
           1.000 *    1.000 *     9.384) + =       9.384

Total of 1 streams to confluence:
Flow rates before confluence point:
       9.384
Maximum flow rates at confluence using above data:
        9.384
Area of streams before confluence:
        4.590
Effective area values after confluence:
        4.590
Results of confluence:
Total flow rate =      9.384(CFS)
Time of concentration =    22.888 min.
Effective stream area after confluence =      4.590(Ac.)
Study area average Pervious fraction(Ap) =  0.010
Study area average soil loss rate(Fm) =    0.006(In/Hr)
Study area total (this main stream) =       4.59(Ac.)
End of computations, Total Study Area =            4.59 (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) = 0.010
Area averaged SCS curve number = 67.0

APPENDIX 'C'

Rational Method Developed Condition

On-Site, 10, and 100-year Storm Event

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/17/21

Amethyst Crossing
Developed, 10-year
Area A1-A3 to Basin A

Program License Serial Number 6385

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.700 (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 ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 214.000(Ft.)
Top (of initial area) elevation = 27.600(Ft.)
Bottom (of initial area) elevation = 26.260(Ft.)
Difference in elevation = 1.340(Ft.)
Slope = 0.00626 s(%)= 0.63
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.173 min.
Rainfall intensity = 3.096(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.872

```
Subarea runoff =      1.619(CFS)
Total initial stream area =        0.600(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      104.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Time of concentration =     7.17 min.
Rainfall intensity =      3.096(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.872
Subarea runoff =      0.998(CFS) for    0.370(Ac.)
Total runoff =      2.618(CFS)
Effective area this stream =        0.97(Ac.)
Total Study Area (Main Stream No. 1) =        0.97(Ac.)
Area averaged Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    24.240(Ft.)
Downstream point/station elevation =    23.590(Ft.)
Pipe length  =   130.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.618(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.618(CFS)
Normal flow depth in pipe =    8.14(In.)
Flow top width inside pipe =   14.94(In.)
Critical Depth =    7.78(In.)
Pipe flow velocity =      3.85(Ft/s)
Travel time through pipe =    0.56 min.
Time of concentration (TC) =     7.74 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
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```
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Time of concentration =     7.74 min.
Rainfall intensity =      2.937(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.870
Subarea runoff =      0.014(CFS) for    0.060(Ac.)
Total runoff =      2.632(CFS)
Effective area this stream =        1.03(Ac.)
Total Study Area (Main Stream No. 1) =        1.03(Ac.)
Area averaged Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    23.590(Ft.)
Downstream point/station elevation =    23.320(Ft.)
Pipe length  =    53.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.632(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.632(CFS)
Normal flow depth in pipe =    8.12(In.)
Flow top width inside pipe =   14.95(In.)
Critical Depth =    7.80(In.)
Pipe flow velocity =      3.88(Ft/s)
Travel time through pipe =    0.23 min.
Time of concentration (TC) =     7.96 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Time of concentration =     7.96 min.
Rainfall intensity =      2.878(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
```

```
rational method)(Q=KCIA) is C = 0.869
Subarea runoff =      0.120(CFS) for    0.070(Ac.)
Total runoff =      2.752(CFS)
Effective area this stream =        1.10(Ac.)
Total Study Area (Main Stream No. 1) =        1.10(Ac.)
Area averaged Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    23.320(Ft.)
Downstream point/station elevation =    23.150(Ft.)
Pipe length  =    34.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.752(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.752(CFS)
Normal flow depth in pipe =    8.40(In.)
Flow top width inside pipe =   14.89(In.)
Critical Depth =    7.98(In.)
Pipe flow velocity =      3.89(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =     8.11 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Time of concentration =     8.11 min.
Rainfall intensity =      2.841(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.869
Subarea runoff =      0.137(CFS) for    0.070(Ac.)
Total runoff =      2.889(CFS)
Effective area this stream =        1.17(Ac.)
Total Study Area (Main Stream No. 1) =        1.17(Ac.)
Area averaged Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
```

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 23.150(Ft.)
Downstream point/station elevation = 22.970(Ft.)
Pipe length = 37.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.889(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 2.889(CFS)
Normal flow depth in pipe = 8.73(In.)
Flow top width inside pipe = 14.80(In.)
Critical Depth = 8.19(In.)
Pipe flow velocity = 3.90(Ft/s)
Travel time through pipe = 0.16 min.
Time of concentration (TC) = 8.27 min.

++

Process from Point/Station 107.000 to Point/Station 108.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Time of concentration = 8.27 min.
Rainfall intensity = 2.803(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified rational method)(Q=KCIA) is C = 0.869
Subarea runoff = 0.130(CFS) for 0.070(Ac.)
Total runoff = 3.019(CFS)
Effective area this stream = 1.24(Ac.)
Total Study Area (Main Stream No. 1) = 1.24(Ac.)
Area averaged Fm value = 0.098(In/Hr)

++

Process from Point/Station 107.000 to Point/Station 108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 22.970(Ft.)
Downstream point/station elevation = 22.800(Ft.)
Pipe length = 36.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.019(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 3.019(CFS)
Normal flow depth in pipe = 9.07(In.)
Flow top width inside pipe = 14.67(In.)

```
Critical Depth =    8.38(In.)
Pipe flow velocity =      3.89(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =     8.42 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Time of concentration =     8.42 min.
Rainfall intensity =      2.767(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.868
Subarea runoff =      0.176(CFS) for    0.090(Ac.)
Total runoff =      3.195(CFS)
Effective area this stream =        1.33(Ac.)
Total Study Area (Main Stream No. 1) =        1.33(Ac.)
Area averaged Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    22.800(Ft.)
Downstream point/station elevation =    22.600(Ft.)
Pipe length  =    37.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.195(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.195(CFS)
Normal flow depth in pipe =    9.01(In.)
Flow top width inside pipe =   14.69(In.)
Critical Depth =    8.64(In.)
Pipe flow velocity =      4.15(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =     8.57 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      110.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
```

```
Upstream point/station elevation =    22.600(Ft.)
Downstream point/station elevation =    16.300(Ft.)
Pipe length  =   615.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.195(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.195(CFS)
Normal flow depth in pipe =    8.79(In.)
Flow top width inside pipe =   10.62(In.)
Critical Depth =    9.19(In.)
Pipe flow velocity =      5.19(Ft/s)
Travel time through pipe =    1.98 min.
Time of concentration (TC) =    10.55 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.330(Ac.)
Runoff from this stream =      3.195(CFS)
Time of concentration =   10.55 min.
Rainfall intensity =     2.364(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

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


1      3.20     1.330     10.55    0.098      2.364
Qmax(1) =
           1.000 *    1.000 *     3.195) + =       3.195

Total of 1 streams to confluence:
Flow rates before confluence point:
       3.195
Maximum flow rates at confluence using above data:
        3.195
Area of streams before confluence:
        1.330
Effective area values after confluence:
        1.330
Results of confluence:
Total flow rate =      3.195(CFS)
Time of concentration =    10.547 min.
Effective stream area after confluence =      1.330(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.098(In/Hr)
```

Study area total (this main stream) = 1.33(Ac.)
End of computations, Total Study Area = 1.33 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

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

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/17/21

Amethyst Crossing
Developed 10-year
Area B to CB8 and Basin A-1

Program License Serial Number 6385

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.700 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 973.000(Ft.)
Top (of initial area) elevation = 32.750(Ft.)
Bottom (of initial area) elevation = 19.700(Ft.)
Difference in elevation = 13.050(Ft.)
Slope = 0.01341 s(%)= 1.34
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.288 min.
Rainfall intensity = 2.254(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.861

```
Subarea runoff =      9.199(CFS)
Total initial stream area =        4.740(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      202.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      4.740(Ac.)
Runoff from this stream =      9.199(CFS)
Time of concentration =   11.29 min.
Rainfall intensity =     2.254(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

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


1      9.20     4.740     11.29    0.098      2.254
Qmax(1) =
           1.000 *    1.000 *     9.199) + =       9.199

Total of 1 streams to confluence:
Flow rates before confluence point:
       9.199
Maximum flow rates at confluence using above data:
        9.199
Area of streams before confluence:
        4.740
Effective area values after confluence:
        4.740
Results of confluence:
Total flow rate =      9.199(CFS)
Time of concentration =    11.288 min.
Effective stream area after confluence =      4.740(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.098(In/Hr)
Study area total (this main stream) =       4.74(Ac.)
End of computations, Total Study Area =            4.74 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
```

Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/17/21

Amethyst Crossing
Developed 10-year
Area C to UG Basin A-2

Program License Serial Number 6385

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.700 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 126.000(Ft.)
Top (of initial area) elevation = 27.600(Ft.)
Bottom (of initial area) elevation = 23.910(Ft.)
Difference in elevation = 3.690(Ft.)
Slope = 0.02929 s(%)= 2.93
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 4.263 min.
Rainfall intensity = 4.457(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.880

```
Subarea runoff =      1.295(CFS)
Total initial stream area =        0.330(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Time of concentration =     4.26 min.
Rainfall intensity =      4.457(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.880
Subarea runoff =      4.041(CFS) for    1.030(Ac.)
Total runoff =      5.335(CFS)
Effective area this stream =        1.36(Ac.)
Total Study Area (Main Stream No. 1) =        1.36(Ac.)
Area averaged Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    21.910(Ft.)
Downstream point/station elevation =    19.800(Ft.)
Pipe length  =   234.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.335(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.335(CFS)
Normal flow depth in pipe =   10.82(In.)
Flow top width inside pipe =   13.45(In.)
Critical Depth =   11.24(In.)
Pipe flow velocity =      5.63(Ft/s)
Travel time through pipe =    0.69 min.
Time of concentration (TC) =     4.96 min.


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Process from Point/Station      303.000 to Point/Station      110.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
```

Upstream point/station elevation = 19.800(Ft.)
Downstream point/station elevation = 16.300(Ft.)
Pipe length = 241.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.335(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 5.335(CFS)
Normal flow depth in pipe = 9.12(In.)
Flow top width inside pipe = 14.65(In.)
Critical Depth = 11.24(In.)
Pipe flow velocity = 6.83(Ft/s)
Travel time through pipe = 0.59 min.
Time of concentration (TC) = 5.54 min.
End of computations, Total Study Area = 1.36 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

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

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/17/21

Amethyst Crossing
Developed 10-year
Area D to Bioretention A to Basin A

Program License Serial Number 6385

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.700 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 401.000 to Point/Station 402.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 298.000(Ft.)
Top (of initial area) elevation = 22.000(Ft.)
Bottom (of initial area) elevation = 16.000(Ft.)
Difference in elevation = 6.000(Ft.)
Slope = 0.02013 s(%)= 2.01
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.483 min.
Rainfall intensity = 3.323(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.874

```
Subarea runoff =      1.713(CFS)
Total initial stream area =        0.590(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    16.000(Ft.)
Downstream point/station elevation =    15.400(Ft.)
Pipe length  =    33.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.713(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.713(CFS)
Normal flow depth in pipe =    5.91(In.)
Flow top width inside pipe =    8.55(In.)
Critical Depth =    7.21(In.)
Pipe flow velocity =      5.57(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =     6.58 min.
End of computations, Total Study Area =            0.59 (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) = 0.100
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/18/21

Amethyst Crossing
Developed 10-year
Area E to Biofiltration B to UG Basin B

Program License Serial Number 6385

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.700 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 501.000 to Point/Station 502.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 265.000(Ft.)
Top (of initial area) elevation = 23.400(Ft.)
Bottom (of initial area) elevation = 15.500(Ft.)
Difference in elevation = 7.900(Ft.)
Slope = 0.02981 s(%)= 2.98
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.719 min.
Rainfall intensity = 3.628(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.876

```
Subarea runoff =      1.620(CFS)
Total initial stream area =        0.510(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    15.500(Ft.)
Downstream point/station elevation =    13.800(Ft.)
Pipe length  =    67.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.620(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.620(CFS)
Normal flow depth in pipe =    5.10(In.)
Flow top width inside pipe =    8.92(In.)
Critical Depth =    7.02(In.)
Pipe flow velocity =      6.27(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =     5.90 min.
End of computations, Total Study Area =            0.51 (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) = 0.100
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/18/21

Amethyst Crossing
Developed 10-year
Area F to Bioretention C to UG Basin B

Program License Serial Number 6385

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.700 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

++
Process from Point/Station 601.000 to Point/Station 602.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 198.000(Ft.)
Top (of initial area) elevation = 19.500(Ft.)
Bottom (of initial area) elevation = 14.000(Ft.)
Difference in elevation = 5.500(Ft.)
Slope = 0.02778 s(%)= 2.78
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.162 min.
Rainfall intensity = 3.898(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.877

```
Subarea runoff =      1.265(CFS)
Total initial stream area =        0.370(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      603.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    14.000(Ft.)
Downstream point/station elevation =     1.380(Ft.)
Pipe length  =    20.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.265(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     1.265(CFS)
Normal flow depth in pipe =    2.19(In.)
Flow top width inside pipe =    5.78(In.)
Critical depth could not be calculated.
Pipe flow velocity =     19.54(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     5.18 min.
End of computations, Total Study Area =            0.37 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

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

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/18/21

Amethyst Crossing
Developed 10-year
Area G to UG Basin B

Program License Serial Number 6385

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.700 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 701.000 to Point/Station 702.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 137.000(Ft.)
Top (of initial area) elevation = 22.800(Ft.)
Bottom (of initial area) elevation = 17.410(Ft.)
Difference in elevation = 5.390(Ft.)
Slope = 0.03934 s(%)= 3.93
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 4.155 min.
Rainfall intensity = 4.537(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.881

```
Subarea runoff =      0.759(CFS)
Total initial stream area =        0.190(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      702.000 to Point/Station      703.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Time of concentration =     4.16 min.
Rainfall intensity =      4.537(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.881
Subarea runoff =      0.519(CFS) for    0.130(Ac.)
Total runoff =      1.279(CFS)
Effective area this stream =        0.32(Ac.)
Total Study Area (Main Stream No. 1) =        0.32(Ac.)
Area averaged Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      702.000 to Point/Station      703.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    15.400(Ft.)
Downstream point/station elevation =    14.500(Ft.)
Pipe length  =    91.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.279(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.279(CFS)
Normal flow depth in pipe =    5.96(In.)
Flow top width inside pipe =    8.51(In.)
Critical Depth =    6.25(In.)
Pipe flow velocity =      4.12(Ft/s)
Travel time through pipe =    0.37 min.
Time of concentration (TC) =     4.52 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      703.000 to Point/Station      704.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
```

Upstream point/station elevation = 14.500(Ft.)
Downstream point/station elevation = 13.800(Ft.)
Pipe length = 36.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.279(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 1.279(CFS)
Normal flow depth in pipe = 4.79(In.)
Flow top width inside pipe = 8.98(In.)
Critical Depth = 6.25(In.)
Pipe flow velocity = 5.36(Ft/s)
Travel time through pipe = 0.11 min.
Time of concentration (TC) = 4.64 min.

++
Process from Point/Station 705.000 to Point/Station 704.000
**** SUBAREA FLOW ADDITION ****
_____
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Time of concentration = 4.64 min.
Rainfall intensity = 4.203(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.879
Subarea runoff = 0.310(CFS) for 0.110(Ac.)
Total runoff = 1.589(CFS)
Effective area this stream = 0.43(Ac.)
Total Study Area (Main Stream No. 1) = 0.43(Ac.)
Area averaged Fm value = 0.098(In/Hr)
End of computations, Total Study Area = 0.43 (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) = 0.100
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/18/21

Amethyst Crossing
Developed 10- year
Area H to UG Basin C

Program License Serial Number 6385

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.700 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 801.000 to Point/Station 802.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 291.000(Ft.)
Top (of initial area) elevation = 30.200(Ft.)
Bottom (of initial area) elevation = 26.490(Ft.)
Difference in elevation = 3.710(Ft.)
Slope = 0.01275 s(%)= 1.27
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.036 min.
Rainfall intensity = 3.138(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.872

```
Subarea runoff =      2.326(CFS)
Total initial stream area =        0.850(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


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Process from Point/Station      802.000 to Point/Station      803.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    23.000(Ft.)
Downstream point/station elevation =    20.000(Ft.)
Pipe length  =   213.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.326(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.326(CFS)
Normal flow depth in pipe =    6.35(In.)
Flow top width inside pipe =   11.98(In.)
Critical Depth =    7.83(In.)
Pipe flow velocity =      5.51(Ft/s)
Travel time through pipe =    0.64 min.
Time of concentration (TC) =     7.68 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      804.000 to Point/Station      805.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Time of concentration =     7.68 min.
Rainfall intensity =      2.951(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.870
Subarea runoff =      0.371(CFS) for    0.200(Ac.)
Total runoff =      2.697(CFS)
Effective area this stream =        1.05(Ac.)
Total Study Area (Main Stream No. 1) =        1.05(Ac.)
Area averaged Fm value =    0.098(In/Hr)


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Process from Point/Station      805.000 to Point/Station      803.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
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Upstream point/station elevation =    21.000(Ft.)
Downstream point/station elevation =    20.000(Ft.)
Pipe length  =   144.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.697(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.697(CFS)
Normal flow depth in pipe =    8.98(In.)
Flow top width inside pipe =   10.42(In.)
Critical Depth =    8.45(In.)
Pipe flow velocity =      4.28(Ft/s)
Travel time through pipe =    0.56 min.
Time of concentration (TC) =     8.24 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      803.000 to Point/Station      803.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.050(Ac.)
Runoff from this stream =      2.697(CFS)
Time of concentration =    8.24 min.
Rainfall intensity =     2.810(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

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


1      2.70     1.050      8.24    0.098      2.810
Qmax(1) =
           1.000 *    1.000 *     2.697) + =       2.697

Total of 1 streams to confluence:
Flow rates before confluence point:
       2.697
Maximum flow rates at confluence using above data:
        2.697
Area of streams before confluence:
        1.050
Effective area values after confluence:
        1.050
Results of confluence:
Total flow rate =      2.697(CFS)
Time of concentration =     8.241 min.
Effective stream area after confluence =      1.050(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.098(In/Hr)
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Study area total (this main stream) =       1.05(Ac.)


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Process from Point/Station      806.000 to Point/Station      807.000
**** INITIAL AREA EVALUATION ****
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COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Initial subarea data:
Initial area flow distance =   235.000(Ft.)
Top (of initial area) elevation =    26.350(Ft.)
Bottom (of initial area) elevation =    22.350(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.01702  s(%)=       1.70
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.097 min.
Rainfall intensity =      3.469(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.875
Subarea runoff =      3.156(CFS)
Total initial stream area =        1.040(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)
End of computations, Total Study Area =            2.09 (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) = 0.100
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/17/21

Amethyst Crossing
Developed Condition 100-year
Area A1-A3 to Basin A

Program License Serial Number 6385

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.160 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

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

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 214.000(Ft.)
Top (of initial area) elevation = 27.600(Ft.)
Bottom (of initial area) elevation = 26.200(Ft.)
Difference in elevation = 1.400(Ft.)
Slope = 0.00654 s(%)= 0.65
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.110 min.
Rainfall intensity = 5.162(In/Hr) for a 100.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.886
Subarea runoff =      2.745(CFS)
Total initial stream area =        0.600(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


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Process from Point/Station      102.000 to Point/Station      104.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     7.11 min.
Rainfall intensity =      5.162(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.886
Subarea runoff =      1.693(CFS) for    0.370(Ac.)
Total runoff =      4.438(CFS)
Effective area this stream =        0.97(Ac.)
Total Study Area (Main Stream No. 1) =        0.97(Ac.)
Area averaged Fm value =    0.079(In/Hr)


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Process from Point/Station      102.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    24.240(Ft.)
Downstream point/station elevation =    23.590(Ft.)
Pipe length  =   130.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.438(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.438(CFS)
Normal flow depth in pipe =   11.93(In.)
Flow top width inside pipe =   12.10(In.)
Critical Depth =   10.24(In.)
Pipe flow velocity =      4.24(Ft/s)
Travel time through pipe =    0.51 min.
Time of concentration (TC) =     7.62 min.


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Process from Point/Station      104.000 to Point/Station      105.000
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**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     7.62 min.
Rainfall intensity =      4.918(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.886
Subarea runoff =      0.048(CFS) for    0.060(Ac.)
Total runoff =      4.486(CFS)
Effective area this stream =        1.03(Ac.)
Total Study Area (Main Stream No. 1) =        1.03(Ac.)
Area averaged Fm value =    0.079(In/Hr)


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Process from Point/Station      104.000 to Point/Station      105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =    23.590(Ft.)
Downstream point/station elevation =    23.320(Ft.)
Pipe length  =    53.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.486(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.486(CFS)
Normal flow depth in pipe =   11.95(In.)
Flow top width inside pipe =   12.07(In.)
Critical Depth =   10.30(In.)
Pipe flow velocity =      4.28(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =     7.83 min.


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Process from Point/Station      105.000 to Point/Station      106.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
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Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     7.83 min.
Rainfall intensity =      4.826(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.885
Subarea runoff =      0.215(CFS) for    0.070(Ac.)
Total runoff =      4.700(CFS)
Effective area this stream =        1.10(Ac.)
Total Study Area (Main Stream No. 1) =        1.10(Ac.)
Area averaged Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    23.320(Ft.)
Downstream point/station elevation =    23.150(Ft.)
Pipe length  =    34.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.700(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     4.700(CFS)
Normal flow depth in pipe =   10.39(In.)
Flow top width inside pipe =   17.78(In.)
Critical Depth =   10.00(In.)
Pipe flow velocity =      4.45(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =     7.95 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     7.95 min.
Rainfall intensity =      4.772(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.885
Subarea runoff =      0.242(CFS) for    0.070(Ac.)
Total runoff =      4.942(CFS)
Effective area this stream =        1.17(Ac.)
Total Study Area (Main Stream No. 1) =        1.17(Ac.)
```

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Area averaged Fm value =    0.079(In/Hr)


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Process from Point/Station      106.000 to Point/Station      107.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =    23.150(Ft.)
Downstream point/station elevation =    22.970(Ft.)
Pipe length  =    37.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.942(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     4.942(CFS)
Normal flow depth in pipe =   10.83(In.)
Flow top width inside pipe =   17.62(In.)
Critical Depth =   10.25(In.)
Pipe flow velocity =      4.45(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =     8.09 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     8.09 min.
Rainfall intensity =      4.715(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.885
Subarea runoff =      0.232(CFS) for    0.070(Ac.)
Total runoff =      5.174(CFS)
Effective area this stream =        1.24(Ac.)
Total Study Area (Main Stream No. 1) =        1.24(Ac.)
Area averaged Fm value =    0.079(In/Hr)


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Process from Point/Station      107.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =    22.970(Ft.)
Downstream point/station elevation =    22.800(Ft.)
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Pipe length  =    36.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.174(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.174(CFS)
Normal flow depth in pipe =   11.27(In.)
Flow top width inside pipe =   17.42(In.)
Critical Depth =   10.50(In.)
Pipe flow velocity =      4.44(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =     8.23 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     8.23 min.
Rainfall intensity =      4.661(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.885
Subarea runoff =      0.311(CFS) for    0.090(Ac.)
Total runoff =      5.485(CFS)
Effective area this stream =        1.33(Ac.)
Total Study Area (Main Stream No. 1) =        1.33(Ac.)
Area averaged Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =    22.800(Ft.)
Downstream point/station elevation =    22.600(Ft.)
Pipe length  =    37.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.485(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.485(CFS)
Normal flow depth in pipe =   11.20(In.)
Flow top width inside pipe =   17.45(In.)
Critical Depth =   10.84(In.)
Pipe flow velocity =      4.74(Ft/s)
Travel time through pipe =    0.13 min.
```

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Time of concentration (TC) =     8.36 min.


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Process from Point/Station      109.000 to Point/Station      110.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =    22.600(Ft.)
Downstream point/station elevation =    16.300(Ft.)
Pipe length  =   615.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.485(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.485(CFS)
Normal flow depth in pipe =   10.52(In.)
Flow top width inside pipe =   13.73(In.)
Critical Depth =   11.38(In.)
Pipe flow velocity =      5.97(Ft/s)
Travel time through pipe =    1.72 min.
Time of concentration (TC) =    10.08 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.330(Ac.)
Runoff from this stream =      5.485(CFS)
Time of concentration =   10.08 min.
Rainfall intensity =     4.044(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

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


1      5.48     1.330     10.08    0.079      4.044
Qmax(1) =
           1.000 *    1.000 *     5.485) + =       5.485

Total of 1 streams to confluence:
Flow rates before confluence point:
       5.485
Maximum flow rates at confluence using above data:
        5.485
Area of streams before confluence:
        1.330
Effective area values after confluence:
```

1.330
Results of confluence:
Total flow rate = 5.485(CFS)
Time of concentration = 10.076 min.
Effective stream area after confluence = 1.330(Ac.)
Study area average Pervious fraction(Ap) = 0.100
Study area average soil loss rate(Fm) = 0.079(In/Hr)
Study area total (this main stream) = 1.33(Ac.)
End of computations, Total Study Area = 1.33 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

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

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/17/21

Amethyst Crossing
Developed 100-year
Area B to CB 8 to Basin A

Program License Serial Number 6385

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.160 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++
Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 973.000(Ft.)
Top (of initial area) elevation = 32.750(Ft.)
Bottom (of initial area) elevation = 19.700(Ft.)
Difference in elevation = 13.050(Ft.)
Slope = 0.01341 s(%)= 1.34
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.288 min.
Rainfall intensity = 3.735(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.881

```
Subarea runoff =     15.600(CFS)
Total initial stream area =        4.740(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


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Process from Point/Station      202.000 to Point/Station      202.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      4.740(Ac.)
Runoff from this stream =     15.600(CFS)
Time of concentration =   11.29 min.
Rainfall intensity =     3.735(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

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


1     15.60     4.740     11.29    0.079      3.735
Qmax(1) =
           1.000 *    1.000 *    15.600) + =      15.600

Total of 1 streams to confluence:
Flow rates before confluence point:
      15.600
Maximum flow rates at confluence using above data:
       15.600
Area of streams before confluence:
        4.740
Effective area values after confluence:
        4.740
Results of confluence:
Total flow rate =     15.600(CFS)
Time of concentration =    11.288 min.
Effective stream area after confluence =      4.740(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.079(In/Hr)
Study area total (this main stream) =       4.74(Ac.)
End of computations, Total Study Area =            4.74 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
```

Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/17/21

Amethyst Crossing
Developed 100-year
Area C to Basin A

Program License Serial Number 6385

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.160 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 126.000(Ft.)
Top (of initial area) elevation = 27.600(Ft.)
Bottom (of initial area) elevation = 23.910(Ft.)
Difference in elevation = 3.690(Ft.)
Slope = 0.02929 s(%)= 2.93
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 4.263 min.
Rainfall intensity = 7.386(In/Hr) for a 100.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.890
Subarea runoff =      2.170(CFS)
Total initial stream area =        0.330(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     4.26 min.
Rainfall intensity =      7.386(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.890
Subarea runoff =      6.774(CFS) for    1.030(Ac.)
Total runoff =      8.944(CFS)
Effective area this stream =        1.36(Ac.)
Total Study Area (Main Stream No. 1) =        1.36(Ac.)
Area averaged Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    21.910(Ft.)
Downstream point/station elevation =    19.800(Ft.)
Pipe length  =   234.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.944(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     8.944(CFS)
Normal flow depth in pipe =   13.31(In.)
Flow top width inside pipe =   15.80(In.)
Critical Depth =   13.88(In.)
Pipe flow velocity =      6.39(Ft/s)
Travel time through pipe =    0.61 min.
Time of concentration (TC) =     4.87 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      303.000 to Point/Station      110.000
```

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 19.800(Ft.)
Downstream point/station elevation = 16.300(Ft.)
Pipe length = 241.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.944(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 8.944(CFS)
Normal flow depth in pipe = 11.17(In.)
Flow top width inside pipe = 17.47(In.)
Critical Depth = 13.88(In.)
Pipe flow velocity = 7.77(Ft/s)
Travel time through pipe = 0.52 min.
Time of concentration (TC) = 5.39 min.
End of computations, Total Study Area = 1.36 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

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

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/17/21

Amethyst Crossing
Developed 100-year
Area D to Bioretention A to Basin A

Program License Serial Number 6385

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.160 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 401.000 to Point/Station 402.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 298.000(Ft.)
Top (of initial area) elevation = 22.000(Ft.)
Bottom (of initial area) elevation = 16.000(Ft.)
Difference in elevation = 6.000(Ft.)
Slope = 0.02013 s(%)= 2.01
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.483 min.
Rainfall intensity = 5.507(In/Hr) for a 100.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.887
Subarea runoff =      2.883(CFS)
Total initial stream area =        0.590(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    16.000(Ft.)
Downstream point/station elevation =    15.400(Ft.)
Pipe length  =    33.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.883(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.883(CFS)
Normal flow depth in pipe =    6.70(In.)
Flow top width inside pipe =   11.92(In.)
Critical Depth =    8.73(In.)
Pipe flow velocity =      6.39(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =     6.57 min.
End of computations, Total Study Area =            0.59 (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) = 0.100
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/18/21

Amethyst Crossing
Developed 100- year
Area E to Biofiltration B to Basin B

Program License Serial Number 6385

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.160 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 501.000 to Point/Station 502.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 265.000(Ft.)
Top (of initial area) elevation = 23.400(Ft.)
Bottom (of initial area) elevation = 15.500(Ft.)
Difference in elevation = 7.900(Ft.)
Slope = 0.02981 s(%)= 2.98
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.719 min.
Rainfall intensity = 6.013(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.888

```
Subarea runoff =      2.724(CFS)
Total initial stream area =        0.510(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    15.500(Ft.)
Downstream point/station elevation =    13.800(Ft.)
Pipe length  =    67.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.724(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.724(CFS)
Normal flow depth in pipe =    5.86(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    8.48(In.)
Pipe flow velocity =      7.15(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =     5.87 min.
End of computations, Total Study Area =            0.51 (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) = 0.100
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/18/21

Amethyst Crossing
Developed 100-year
Area F to Bioretention C to UG Basin B

Program License Serial Number 6385

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.160 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 601.000 to Point/Station 602.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 198.000(Ft.)
Top (of initial area) elevation = 19.500(Ft.)
Bottom (of initial area) elevation = 14.000(Ft.)
Difference in elevation = 5.500(Ft.)
Slope = 0.02778 s(%)= 2.78
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.162 min.
Rainfall intensity = 6.460(In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.889
Subarea runoff = 2.125(CFS)
Total initial stream area = 0.370(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)
End of computations, Total Study Area = 0.37 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

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

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/18/21

Amethyst Crossing
Developed 100-year
Area G to UG Basin B

Program License Serial Number 6385

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.160 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 701.000 to Point/Station 702.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 137.000(Ft.)
Top (of initial area) elevation = 22.800(Ft.)
Bottom (of initial area) elevation = 17.410(Ft.)
Difference in elevation = 5.390(Ft.)
Slope = 0.03934 s(%)= 3.93
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 4.155 min.
Rainfall intensity = 7.519(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.891

```
Subarea runoff =      1.272(CFS)
Total initial stream area =        0.190(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      702.000 to Point/Station      703.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     4.16 min.
Rainfall intensity =      7.519(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.891
Subarea runoff =      0.871(CFS) for    0.130(Ac.)
Total runoff =      2.143(CFS)
Effective area this stream =        0.32(Ac.)
Total Study Area (Main Stream No. 1) =        0.32(Ac.)
Area averaged Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      702.000 to Point/Station      703.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    15.400(Ft.)
Downstream point/station elevation =    14.500(Ft.)
Pipe length  =    91.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.143(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.143(CFS)
Normal flow depth in pipe =    6.73(In.)
Flow top width inside pipe =   11.91(In.)
Critical Depth =    7.51(In.)
Pipe flow velocity =      4.72(Ft/s)
Travel time through pipe =    0.32 min.
Time of concentration (TC) =     4.48 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      703.000 to Point/Station      704.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =    14.500(Ft.)
Downstream point/station elevation =    13.800(Ft.)
Pipe length  =    36.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.143(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.143(CFS)
Normal flow depth in pipe =    6.86(In.)
Flow top width inside pipe =    7.67(In.)
Critical Depth =    7.91(In.)
Pipe flow velocity =      5.93(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =     4.58 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      705.000 to Point/Station      704.000
**** SUBAREA FLOW ADDITION ****
```

```
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     4.58 min.
Rainfall intensity =      7.026(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.890
Subarea runoff =      0.546(CFS) for    0.110(Ac.)
Total runoff =      2.689(CFS)
Effective area this stream =        0.43(Ac.)
Total Study Area (Main Stream No. 1) =        0.43(Ac.)
Area averaged Fm value =    0.079(In/Hr)
End of computations, Total Study Area =            0.43 (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) = 0.100
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 08/18/21

Amethyst Crossing
Developed 100-year
Area H to UG Basin C

Program License Serial Number 6385

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.160 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 801.000 to Point/Station 802.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 291.000(Ft.)
Top (of initial area) elevation = 30.200(Ft.)
Bottom (of initial area) elevation = 26.490(Ft.)
Difference in elevation = 3.710(Ft.)
Slope = 0.01275 s(%)= 1.27
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.036 min.
Rainfall intensity = 5.200(In/Hr) for a 100.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.886
Subarea runoff =      3.918(CFS)
Total initial stream area =        0.850(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      802.000 to Point/Station      803.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    23.000(Ft.)
Downstream point/station elevation =    20.000(Ft.)
Pipe length  =   213.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.918(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.918(CFS)
Normal flow depth in pipe =    9.13(In.)
Flow top width inside pipe =   10.24(In.)
Critical Depth =   10.08(In.)
Pipe flow velocity =      6.11(Ft/s)
Travel time through pipe =    0.58 min.
Time of concentration (TC) =     7.62 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      804.000 to Point/Station      805.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     7.62 min.
Rainfall intensity =      4.919(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.886
Subarea runoff =      0.657(CFS) for    0.200(Ac.)
Total runoff =      4.575(CFS)
Effective area this stream =        1.05(Ac.)
Total Study Area (Main Stream No. 1) =        1.05(Ac.)
Area averaged Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      805.000 to Point/Station      803.000
```

```
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =    31.000(Ft.)
Downstream point/station elevation =    20.000(Ft.)
Pipe length  =   144.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.575(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     4.575(CFS)
Normal flow depth in pipe =    7.38(In.)
Flow top width inside pipe =    6.92(In.)
Critical depth could not be calculated.
Pipe flow velocity =     11.80(Ft/s)
Travel time through pipe =    0.20 min.
Time of concentration (TC) =     7.82 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      803.000 to Point/Station      803.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.050(Ac.)
Runoff from this stream =      4.575(CFS)
Time of concentration =    7.82 min.
Rainfall intensity =     4.830(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

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


1      4.57     1.050      7.82    0.079      4.830
Qmax(1) =
           1.000 *    1.000 *     4.575) + =       4.575

Total of 1 streams to confluence:
Flow rates before confluence point:
       4.575
Maximum flow rates at confluence using above data:
        4.575
Area of streams before confluence:
        1.050
Effective area values after confluence:
        1.050
Results of confluence:
Total flow rate =      4.575(CFS)
Time of concentration =     7.820 min.
Effective stream area after confluence =      1.050(Ac.)
```

```
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.079(In/Hr)
Study area total (this main stream) =       1.05(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      806.000 to Point/Station      807.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Initial subarea data:
Initial area flow distance =   235.000(Ft.)
Top (of initial area) elevation =    26.350(Ft.)
Bottom (of initial area) elevation =    22.350(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.01702  s(%)=       1.70
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.097 min.
Rainfall intensity =      5.749(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.888
Subarea runoff =      5.308(CFS)
Total initial stream area =        1.040(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)
End of computations, Total Study Area =            2.09 (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) = 0.100
Area averaged SCS curve number =  32.0
```

APPENDIX 'D'

Unit Hydrograph Analysis

Existing Area 10-year and 100-year
Developed Area 10-year and 100-year

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

Study date 07/12/21

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

Program License Serial Number 6385

Amethyst Crossing
10-year undeveloped
ACud10

Storm Event Year = 10

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
11.42	1	0.70
Rainfall data for year 10		
11.42	6	1.47
Rainfall data for year 10		
11.42	24	2.98

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


SCS curve  SCS curve     Area     Area     Fp(Fig C6)    Ap      Fm
No.(AMCII) NO.(AMC 2)    (Ac.)    Fraction     (In/Hr)  (dec.)   (In/Hr)
 78.0      78.0         11.42      1.000     0.404    0.980    0.395

Area-averaged adjusted loss rate Fm (In/Hr) =  0.395

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

Area       Area          SCS CN    SCS CN      S     Pervious
 (Ac.)      Fract         (AMC2)    (AMC2)           Yield Fr
    11.19   0.980         78.0      78.0       2.82     0.374
     0.23   0.020         98.0      98.0       0.20     0.922

Area-averaged catchment yield fraction, Y =  0.385
Area-averaged low loss fraction, Yb =  0.615
User entry of time of concentration  =   0.265 (hours)
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Watershed area =      11.42(Ac.)
Catchment Lag time =   0.212 hours
Unit interval =   5.000 minutes
Unit interval percentage of lag time = 39.3082
Hydrograph baseflow =     0.00(CFS)
Average maximum watershed loss rate(Fm) =  0.395(In/Hr)
Average low loss rate fraction (Yb) = 0.615 (decimal)
DESERT S-Graph Selected
Computed peak 5-minute rainfall =  0.199(In)
Computed peak 30-minute rainfall =  0.519(In)
Specified peak 1-hour rainfall =  0.700(In)
Computed peak 3-hour rainfall =  1.080(In)
Specified peak 6-hour rainfall =  1.470(In)
Specified peak 24-hour rainfall =  2.980(In)


Note: user specified rainfall values used.
Rainfall depth area reduction factors:
Using a total area of      11.42(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999     Adjusted rainfall =  0.199(In)
30-minute factor = 0.999    Adjusted rainfall =  0.519(In)
1-hour factor = 0.999       Adjusted rainfall =  0.700(In)
3-hour factor = 1.000       Adjusted rainfall =  1.080(In)
6-hour factor = 1.000       Adjusted rainfall =  1.470(In)
24-hour factor = 1.000      Adjusted rainfall =  2.980(In)
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U n i t H y d r o g r a p h

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 138.11 (CFS))	
1	2.673	3.692
2	17.919	21.056
3	48.135	41.732
4	64.925	23.189
5	74.213	12.828
6	80.396	8.539
7	84.798	6.079
8	88.232	4.743
9	90.704	3.414
10	92.708	2.768
11	94.327	2.236
12	95.622	1.788
13	96.663	1.438
14	97.452	1.090
15	98.000	0.757
16	98.414	0.572
17	98.883	0.648
18	99.351	0.646
19	99.670	0.441
20	100.000	0.221

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.1989	0.1989
2	0.2882	0.0893
3	0.3580	0.0698
4	0.4176	0.0596
5	0.4705	0.0529
6	0.5187	0.0482
7	0.5544	0.0357
8	0.5873	0.0329
9	0.6179	0.0306
10	0.6467	0.0287
11	0.6738	0.0272
12	0.6996	0.0258
13	0.7221	0.0225
14	0.7436	0.0215
15	0.7641	0.0205
16	0.7839	0.0197
17	0.8029	0.0190
18	0.8212	0.0183
19	0.8389	0.0177
20	0.8561	0.0172

21	0.8728	0.0167
22	0.8890	0.0162
23	0.9047	0.0158
24	0.9201	0.0153
25	0.9350	0.0150
26	0.9496	0.0146
27	0.9639	0.0143
28	0.9778	0.0140
29	0.9915	0.0137
30	1.0049	0.0134
31	1.0180	0.0131
32	1.0308	0.0129
33	1.0434	0.0126
34	1.0558	0.0124
35	1.0680	0.0122
36	1.0799	0.0120
37	1.0932	0.0132
38	1.1062	0.0130
39	1.1191	0.0129
40	1.1317	0.0127
41	1.1442	0.0125
42	1.1566	0.0123
43	1.1687	0.0122
44	1.1808	0.0120
45	1.1926	0.0119
46	1.2043	0.0117
47	1.2159	0.0116
48	1.2274	0.0114
49	1.2387	0.0113
50	1.2498	0.0112
51	1.2609	0.0111
52	1.2718	0.0109
53	1.2827	0.0108
54	1.2934	0.0107
55	1.3040	0.0106
56	1.3145	0.0105
57	1.3249	0.0104
58	1.3352	0.0103
59	1.3453	0.0102
60	1.3554	0.0101
61	1.3654	0.0100
62	1.3754	0.0099
63	1.3852	0.0098
64	1.3949	0.0097
65	1.4046	0.0097
66	1.4141	0.0096
67	1.4236	0.0095
68	1.4330	0.0094
69	1.4424	0.0093
70	1.4516	0.0093

71	1.4608	0.0092
72	1.4699	0.0091
73	1.4803	0.0104
74	1.4906	0.0103
75	1.5009	0.0102
76	1.5110	0.0102
77	1.5211	0.0101
78	1.5312	0.0100
79	1.5411	0.0100
80	1.5511	0.0099
81	1.5609	0.0099
82	1.5707	0.0098
83	1.5804	0.0097
84	1.5901	0.0097
85	1.5997	0.0096
86	1.6093	0.0096
87	1.6188	0.0095
88	1.6283	0.0095
89	1.6377	0.0094
90	1.6470	0.0094
91	1.6563	0.0093
92	1.6656	0.0093
93	1.6748	0.0092
94	1.6840	0.0092
95	1.6931	0.0091
96	1.7021	0.0091
97	1.7111	0.0090
98	1.7201	0.0090
99	1.7290	0.0089
100	1.7379	0.0089
101	1.7468	0.0088
102	1.7555	0.0088
103	1.7643	0.0088
104	1.7730	0.0087
105	1.7817	0.0087
106	1.7903	0.0086
107	1.7989	0.0086
108	1.8075	0.0086
109	1.8160	0.0085
110	1.8244	0.0085
111	1.8329	0.0084
112	1.8413	0.0084
113	1.8496	0.0084
114	1.8580	0.0083
115	1.8663	0.0083
116	1.8745	0.0083
117	1.8827	0.0082
118	1.8909	0.0082
119	1.8991	0.0082
120	1.9072	0.0081

121	1.9153	0.0081
122	1.9233	0.0081
123	1.9313	0.0080
124	1.9393	0.0080
125	1.9473	0.0080
126	1.9552	0.0079
127	1.9631	0.0079
128	1.9710	0.0079
129	1.9788	0.0078
130	1.9866	0.0078
131	1.9944	0.0078
132	2.0021	0.0077
133	2.0098	0.0077
134	2.0175	0.0077
135	2.0252	0.0077
136	2.0328	0.0076
137	2.0404	0.0076
138	2.0480	0.0076
139	2.0556	0.0076
140	2.0631	0.0075
141	2.0706	0.0075
142	2.0781	0.0075
143	2.0855	0.0074
144	2.0929	0.0074
145	2.1003	0.0074
146	2.1077	0.0074
147	2.1151	0.0073
148	2.1224	0.0073
149	2.1297	0.0073
150	2.1369	0.0073
151	2.1442	0.0073
152	2.1514	0.0072
153	2.1586	0.0072
154	2.1658	0.0072
155	2.1730	0.0072
156	2.1801	0.0071
157	2.1872	0.0071
158	2.1943	0.0071
159	2.2014	0.0071
160	2.2084	0.0070
161	2.2154	0.0070
162	2.2224	0.0070
163	2.2294	0.0070
164	2.2364	0.0070
165	2.2433	0.0069
166	2.2503	0.0069
167	2.2572	0.0069
168	2.2640	0.0069
169	2.2709	0.0069
170	2.2777	0.0068

171	2.2846	0.0068
172	2.2914	0.0068
173	2.2981	0.0068
174	2.3049	0.0068
175	2.3116	0.0067
176	2.3184	0.0067
177	2.3251	0.0067
178	2.3318	0.0067
179	2.3384	0.0067
180	2.3451	0.0067
181	2.3517	0.0066
182	2.3583	0.0066
183	2.3649	0.0066
184	2.3715	0.0066
185	2.3781	0.0066
186	2.3846	0.0065
187	2.3911	0.0065
188	2.3976	0.0065
189	2.4041	0.0065
190	2.4106	0.0065
191	2.4171	0.0065
192	2.4235	0.0064
193	2.4299	0.0064
194	2.4363	0.0064
195	2.4427	0.0064
196	2.4491	0.0064
197	2.4555	0.0064
198	2.4618	0.0063
199	2.4682	0.0063
200	2.4745	0.0063
201	2.4808	0.0063
202	2.4871	0.0063
203	2.4933	0.0063
204	2.4996	0.0063
205	2.5058	0.0062
206	2.5120	0.0062
207	2.5182	0.0062
208	2.5244	0.0062
209	2.5306	0.0062
210	2.5368	0.0062
211	2.5429	0.0062
212	2.5491	0.0061
213	2.5552	0.0061
214	2.5613	0.0061
215	2.5674	0.0061
216	2.5735	0.0061
217	2.5795	0.0061
218	2.5856	0.0061
219	2.5916	0.0060
220	2.5977	0.0060

221	2.6037	0.0060
222	2.6097	0.0060
223	2.6157	0.0060
224	2.6216	0.0060
225	2.6276	0.0060
226	2.6335	0.0059
227	2.6395	0.0059
228	2.6454	0.0059
229	2.6513	0.0059
230	2.6572	0.0059
231	2.6631	0.0059
232	2.6690	0.0059
233	2.6748	0.0059
234	2.6807	0.0058
235	2.6865	0.0058
236	2.6923	0.0058
237	2.6981	0.0058
238	2.7039	0.0058
239	2.7097	0.0058
240	2.7155	0.0058
241	2.7212	0.0058
242	2.7270	0.0058
243	2.7327	0.0057
244	2.7385	0.0057
245	2.7442	0.0057
246	2.7499	0.0057
247	2.7556	0.0057
248	2.7612	0.0057
249	2.7669	0.0057
250	2.7726	0.0057
251	2.7782	0.0056
252	2.7839	0.0056
253	2.7895	0.0056
254	2.7951	0.0056
255	2.8007	0.0056
256	2.8063	0.0056
257	2.8119	0.0056
258	2.8175	0.0056
259	2.8230	0.0056
260	2.8286	0.0056
261	2.8341	0.0055
262	2.8396	0.0055
263	2.8452	0.0055
264	2.8507	0.0055
265	2.8562	0.0055
266	2.8617	0.0055
267	2.8671	0.0055
268	2.8726	0.0055
269	2.8781	0.0055
270	2.8835	0.0054

271	2.8890	0.0054
272	2.8944	0.0054
273	2.8998	0.0054
274	2.9052	0.0054
275	2.9106	0.0054
276	2.9160	0.0054
277	2.9214	0.0054
278	2.9268	0.0054
279	2.9321	0.0054
280	2.9375	0.0054
281	2.9428	0.0053
282	2.9481	0.0053
283	2.9535	0.0053
284	2.9588	0.0053
285	2.9641	0.0053
286	2.9694	0.0053
287	2.9747	0.0053
288	2.9800	0.0053

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0053	0.0032	0.0020
2	0.0053	0.0033	0.0020
3	0.0053	0.0033	0.0020
4	0.0053	0.0033	0.0020
5	0.0053	0.0033	0.0021
6	0.0053	0.0033	0.0021
7	0.0054	0.0033	0.0021
8	0.0054	0.0033	0.0021
9	0.0054	0.0033	0.0021
10	0.0054	0.0033	0.0021
11	0.0054	0.0033	0.0021
12	0.0054	0.0033	0.0021
13	0.0054	0.0034	0.0021
14	0.0055	0.0034	0.0021
15	0.0055	0.0034	0.0021
16	0.0055	0.0034	0.0021
17	0.0055	0.0034	0.0021
18	0.0055	0.0034	0.0021
19	0.0055	0.0034	0.0021
20	0.0056	0.0034	0.0021
21	0.0056	0.0034	0.0021
22	0.0056	0.0034	0.0021
23	0.0056	0.0034	0.0022
24	0.0056	0.0035	0.0022
25	0.0056	0.0035	0.0022
26	0.0056	0.0035	0.0022
27	0.0057	0.0035	0.0022

28	0.0057	0.0035	0.0022
29	0.0057	0.0035	0.0022
30	0.0057	0.0035	0.0022
31	0.0057	0.0035	0.0022
32	0.0058	0.0035	0.0022
33	0.0058	0.0036	0.0022
34	0.0058	0.0036	0.0022
35	0.0058	0.0036	0.0022
36	0.0058	0.0036	0.0022
37	0.0058	0.0036	0.0023
38	0.0059	0.0036	0.0023
39	0.0059	0.0036	0.0023
40	0.0059	0.0036	0.0023
41	0.0059	0.0036	0.0023
42	0.0059	0.0036	0.0023
43	0.0060	0.0037	0.0023
44	0.0060	0.0037	0.0023
45	0.0060	0.0037	0.0023
46	0.0060	0.0037	0.0023
47	0.0060	0.0037	0.0023
48	0.0061	0.0037	0.0023
49	0.0061	0.0037	0.0023
50	0.0061	0.0037	0.0023
51	0.0061	0.0038	0.0024
52	0.0061	0.0038	0.0024
53	0.0062	0.0038	0.0024
54	0.0062	0.0038	0.0024
55	0.0062	0.0038	0.0024
56	0.0062	0.0038	0.0024
57	0.0063	0.0038	0.0024
58	0.0063	0.0039	0.0024
59	0.0063	0.0039	0.0024
60	0.0063	0.0039	0.0024
61	0.0063	0.0039	0.0024
62	0.0064	0.0039	0.0024
63	0.0064	0.0039	0.0025
64	0.0064	0.0039	0.0025
65	0.0064	0.0040	0.0025
66	0.0065	0.0040	0.0025
67	0.0065	0.0040	0.0025
68	0.0065	0.0040	0.0025
69	0.0065	0.0040	0.0025
70	0.0066	0.0040	0.0025
71	0.0066	0.0041	0.0025
72	0.0066	0.0041	0.0025
73	0.0067	0.0041	0.0026
74	0.0067	0.0041	0.0026
75	0.0067	0.0041	0.0026
76	0.0067	0.0041	0.0026
77	0.0068	0.0042	0.0026

78	0.0068	0.0042	0.0026
79	0.0068	0.0042	0.0026
80	0.0068	0.0042	0.0026
81	0.0069	0.0042	0.0026
82	0.0069	0.0042	0.0027
83	0.0069	0.0043	0.0027
84	0.0070	0.0043	0.0027
85	0.0070	0.0043	0.0027
86	0.0070	0.0043	0.0027
87	0.0071	0.0043	0.0027
88	0.0071	0.0044	0.0027
89	0.0071	0.0044	0.0027
90	0.0072	0.0044	0.0028
91	0.0072	0.0044	0.0028
92	0.0072	0.0044	0.0028
93	0.0073	0.0045	0.0028
94	0.0073	0.0045	0.0028
95	0.0073	0.0045	0.0028
96	0.0074	0.0045	0.0028
97	0.0074	0.0046	0.0029
98	0.0074	0.0046	0.0029
99	0.0075	0.0046	0.0029
100	0.0075	0.0046	0.0029
101	0.0076	0.0047	0.0029
102	0.0076	0.0047	0.0029
103	0.0077	0.0047	0.0029
104	0.0077	0.0047	0.0030
105	0.0077	0.0048	0.0030
106	0.0078	0.0048	0.0030
107	0.0078	0.0048	0.0030
108	0.0079	0.0048	0.0030
109	0.0079	0.0049	0.0031
110	0.0080	0.0049	0.0031
111	0.0080	0.0049	0.0031
112	0.0081	0.0050	0.0031
113	0.0081	0.0050	0.0031
114	0.0082	0.0050	0.0031
115	0.0082	0.0051	0.0032
116	0.0083	0.0051	0.0032
117	0.0083	0.0051	0.0032
118	0.0084	0.0051	0.0032
119	0.0084	0.0052	0.0032
120	0.0085	0.0052	0.0033
121	0.0086	0.0053	0.0033
122	0.0086	0.0053	0.0033
123	0.0087	0.0053	0.0033
124	0.0087	0.0054	0.0034
125	0.0088	0.0054	0.0034
126	0.0088	0.0054	0.0034
127	0.0089	0.0055	0.0034

128	0.0090	0.0055	0.0035
129	0.0091	0.0056	0.0035
130	0.0091	0.0056	0.0035
131	0.0092	0.0057	0.0035
132	0.0093	0.0057	0.0036
133	0.0094	0.0058	0.0036
134	0.0094	0.0058	0.0036
135	0.0095	0.0058	0.0037
136	0.0096	0.0059	0.0037
137	0.0097	0.0060	0.0037
138	0.0097	0.0060	0.0037
139	0.0099	0.0061	0.0038
140	0.0099	0.0061	0.0038
141	0.0100	0.0062	0.0039
142	0.0101	0.0062	0.0039
143	0.0102	0.0063	0.0039
144	0.0103	0.0063	0.0040
145	0.0091	0.0056	0.0035
146	0.0092	0.0057	0.0035
147	0.0093	0.0057	0.0036
148	0.0094	0.0058	0.0036
149	0.0096	0.0059	0.0037
150	0.0097	0.0059	0.0037
151	0.0098	0.0060	0.0038
152	0.0099	0.0061	0.0038
153	0.0101	0.0062	0.0039
154	0.0102	0.0063	0.0039
155	0.0104	0.0064	0.0040
156	0.0105	0.0065	0.0040
157	0.0107	0.0066	0.0041
158	0.0108	0.0067	0.0042
159	0.0111	0.0068	0.0043
160	0.0112	0.0069	0.0043
161	0.0114	0.0070	0.0044
162	0.0116	0.0071	0.0045
163	0.0119	0.0073	0.0046
164	0.0120	0.0074	0.0046
165	0.0123	0.0076	0.0047
166	0.0125	0.0077	0.0048
167	0.0129	0.0079	0.0049
168	0.0130	0.0080	0.0050
169	0.0120	0.0074	0.0046
170	0.0122	0.0075	0.0047
171	0.0126	0.0078	0.0049
172	0.0129	0.0079	0.0049
173	0.0134	0.0082	0.0051
174	0.0137	0.0084	0.0053
175	0.0143	0.0088	0.0055
176	0.0146	0.0090	0.0056
177	0.0153	0.0094	0.0059

178	0.0158	0.0097	0.0061
179	0.0167	0.0102	0.0064
180	0.0172	0.0106	0.0066
181	0.0183	0.0113	0.0071
182	0.0190	0.0117	0.0073
183	0.0205	0.0126	0.0079
184	0.0215	0.0132	0.0083
185	0.0258	0.0159	0.0099
186	0.0272	0.0167	0.0105
187	0.0306	0.0188	0.0118
188	0.0329	0.0202	0.0127
189	0.0482	0.0296	0.0186
190	0.0529	0.0326	0.0204
191	0.0698	0.0330	0.0369
192	0.0893	0.0330	0.0563
193	0.1989	0.0330	0.1659
194	0.0596	0.0330	0.0266
195	0.0357	0.0219	0.0137
196	0.0287	0.0177	0.0111
197	0.0225	0.0138	0.0087
198	0.0197	0.0121	0.0076
199	0.0177	0.0109	0.0068
200	0.0162	0.0100	0.0062
201	0.0150	0.0092	0.0058
202	0.0140	0.0086	0.0054
203	0.0131	0.0081	0.0050
204	0.0124	0.0076	0.0048
205	0.0132	0.0081	0.0051
206	0.0127	0.0078	0.0049
207	0.0122	0.0075	0.0047
208	0.0117	0.0072	0.0045
209	0.0113	0.0070	0.0044
210	0.0109	0.0067	0.0042
211	0.0106	0.0065	0.0041
212	0.0103	0.0063	0.0040
213	0.0100	0.0062	0.0039
214	0.0097	0.0060	0.0037
215	0.0095	0.0058	0.0037
216	0.0093	0.0057	0.0036
217	0.0104	0.0064	0.0040
218	0.0102	0.0063	0.0039
219	0.0100	0.0061	0.0038
220	0.0098	0.0060	0.0038
221	0.0096	0.0059	0.0037
222	0.0095	0.0058	0.0036
223	0.0093	0.0057	0.0036
224	0.0092	0.0056	0.0035
225	0.0090	0.0055	0.0035
226	0.0089	0.0055	0.0034
227	0.0088	0.0054	0.0034

228	0.0086	0.0053	0.0033
229	0.0085	0.0052	0.0033
230	0.0084	0.0052	0.0032
231	0.0083	0.0051	0.0032
232	0.0082	0.0050	0.0032
233	0.0081	0.0050	0.0031
234	0.0080	0.0049	0.0031
235	0.0079	0.0049	0.0030
236	0.0078	0.0048	0.0030
237	0.0077	0.0047	0.0030
238	0.0076	0.0047	0.0029
239	0.0076	0.0046	0.0029
240	0.0075	0.0046	0.0029
241	0.0074	0.0045	0.0028
242	0.0073	0.0045	0.0028
243	0.0073	0.0045	0.0028
244	0.0072	0.0044	0.0028
245	0.0071	0.0044	0.0027
246	0.0070	0.0043	0.0027
247	0.0070	0.0043	0.0027
248	0.0069	0.0043	0.0027
249	0.0069	0.0042	0.0026
250	0.0068	0.0042	0.0026
251	0.0067	0.0041	0.0026
252	0.0067	0.0041	0.0026
253	0.0066	0.0041	0.0026
254	0.0066	0.0040	0.0025
255	0.0065	0.0040	0.0025
256	0.0065	0.0040	0.0025
257	0.0064	0.0040	0.0025
258	0.0064	0.0039	0.0025
259	0.0063	0.0039	0.0024
260	0.0063	0.0039	0.0024
261	0.0062	0.0038	0.0024
262	0.0062	0.0038	0.0024
263	0.0062	0.0038	0.0024
264	0.0061	0.0038	0.0024
265	0.0061	0.0037	0.0023
266	0.0060	0.0037	0.0023
267	0.0060	0.0037	0.0023
268	0.0059	0.0037	0.0023
269	0.0059	0.0036	0.0023
270	0.0059	0.0036	0.0023
271	0.0058	0.0036	0.0022
272	0.0058	0.0036	0.0022
273	0.0058	0.0035	0.0022
274	0.0057	0.0035	0.0022
275	0.0057	0.0035	0.0022
276	0.0057	0.0035	0.0022
277	0.0056	0.0035	0.0022

278	0.0056	0.0034	0.0022
279	0.0056	0.0034	0.0021
280	0.0055	0.0034	0.0021
281	0.0055	0.0034	0.0021
282	0.0055	0.0034	0.0021
283	0.0054	0.0033	0.0021
284	0.0054	0.0033	0.0021
285	0.0054	0.0033	0.0021
286	0.0054	0.0033	0.0021
287	0.0053	0.0033	0.0020
288	0.0053	0.0033	0.0020

Total soil rain loss = 1.71(In)
Total effective rainfall = 1.27(In)
Peak flow rate in flood hydrograph = 9.81(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

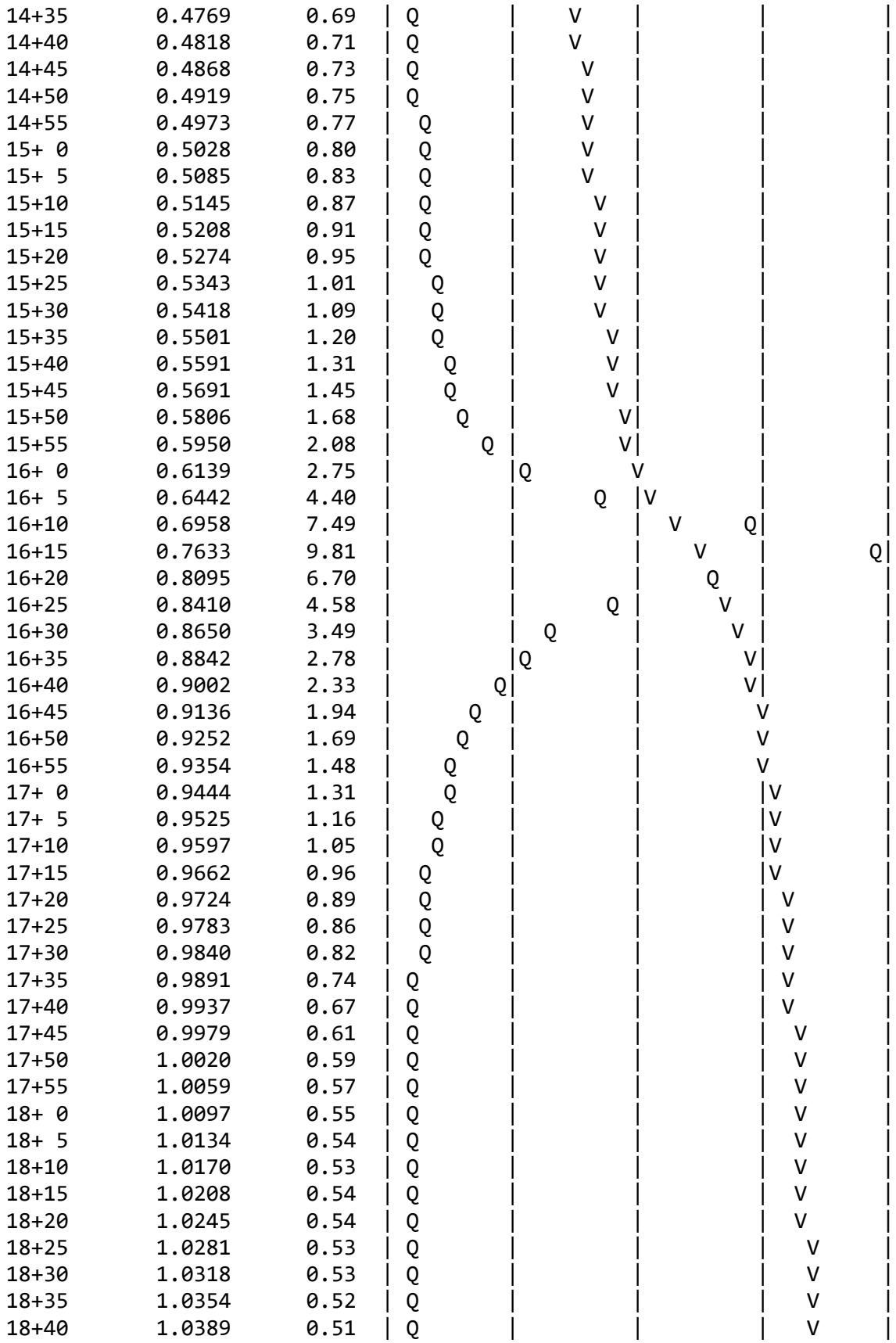
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.01	Q				
0+10	0.0004	0.05	Q				
0+15	0.0013	0.14	Q				
0+20	0.0026	0.18	Q				
0+25	0.0040	0.21	Q				
0+30	0.0056	0.23	Q				
0+35	0.0072	0.24	Q				
0+40	0.0090	0.25	VQ				
0+45	0.0107	0.26	VQ				
0+50	0.0126	0.26	VQ				
0+55	0.0144	0.27	VQ				
1+ 0	0.0163	0.27	VQ				
1+ 5	0.0182	0.28	VQ				
1+10	0.0201	0.28	VQ				
1+15	0.0221	0.28	VQ				
1+20	0.0241	0.28	VQ				
1+25	0.0260	0.29	VQ				
1+30	0.0280	0.29	VQ				
1+35	0.0300	0.29	VQ				
1+40	0.0320	0.29	|Q				
1+45	0.0340	0.29	|Q				
1+50	0.0361	0.29	|Q				
1+55	0.0381	0.29	|Q				
2+ 0	0.0401	0.30	|Q				

```
2+ 5       0.0422      0.30  |Q        |         |         |         |
2+10       0.0442      0.30  |Q        |         |         |         |
2+15       0.0463      0.30  |Q        |         |         |         |
2+20       0.0483      0.30  |Q        |         |         |         |
2+25       0.0504      0.30  |Q        |         |         |         |
2+30       0.0524      0.30  |Q        |         |         |         |
2+35       0.0545      0.30  |Q        |         |         |         |
2+40       0.0566      0.30  |Q        |         |         |         |
2+45       0.0587      0.30  |Q        |         |         |         |
2+50       0.0608      0.30  |QV       |         |         |         |
2+55       0.0629      0.30  |QV       |         |         |         |
3+ 0       0.0650      0.31  |QV       |         |         |         |
3+ 5       0.0671      0.31  |QV       |         |         |         |
3+10       0.0692      0.31  |QV       |         |         |         |
3+15       0.0713      0.31  |QV       |         |         |         |
3+20       0.0735      0.31  |QV       |         |         |         |
3+25       0.0756      0.31  |QV       |         |         |         |
3+30       0.0777      0.31  |QV       |         |         |         |
3+35       0.0799      0.31  |QV       |         |         |         |
3+40       0.0821      0.31  |QV       |         |         |         |
3+45       0.0842      0.31  |QV       |         |         |         |
3+50       0.0864      0.32  |QV       |         |         |         |
3+55       0.0886      0.32  |QV       |         |         |         |
4+ 0       0.0908      0.32  |Q V      |         |         |         |
4+ 5       0.0930      0.32  |Q V      |         |         |         |
4+10       0.0952      0.32  |Q V      |         |         |         |
4+15       0.0974      0.32  |Q V      |         |         |         |
4+20       0.0996      0.32  |Q V      |         |         |         |
4+25       0.1018      0.32  |Q V      |         |         |         |
4+30       0.1040      0.32  |Q V      |         |         |         |
4+35       0.1063      0.33  |Q V      |         |         |         |
4+40       0.1085      0.33  |Q V      |         |         |         |
4+45       0.1108      0.33  |Q V      |         |         |         |
4+50       0.1130      0.33  |Q V      |         |         |         |
4+55       0.1153      0.33  |Q V      |         |         |         |
5+ 0       0.1176      0.33  |Q V      |         |         |         |
5+ 5       0.1199      0.33  |Q V      |         |         |         |
5+10       0.1222      0.33  |Q  V     |         |         |         |
5+15       0.1245      0.33  |Q  V     |         |         |         |
5+20       0.1268      0.34  |Q  V     |         |         |         |
5+25       0.1291      0.34  |Q  V     |         |         |         |
5+30       0.1314      0.34  |Q  V     |         |         |         |
5+35       0.1338      0.34  |Q  V     |         |         |         |
5+40       0.1361      0.34  |Q  V     |         |         |         |
5+45       0.1385      0.34  |Q  V     |         |         |         |
5+50       0.1408      0.34  |Q  V     |         |         |         |
5+55       0.1432      0.34  |Q  V     |         |         |         |
6+ 0       0.1456      0.35  |Q  V     |         |         |         |
6+ 5       0.1480      0.35  |Q  V     |         |         |         |
6+10       0.1504      0.35  |Q  V     |         |         |         |
```

6+15	0.1528	0.35	Q V				
6+20	0.1552	0.35	Q V				
6+25	0.1577	0.35	Q V				
6+30	0.1601	0.35	Q V				
6+35	0.1626	0.36	Q V				
6+40	0.1650	0.36	Q V				
6+45	0.1675	0.36	Q V				
6+50	0.1700	0.36	Q V				
6+55	0.1725	0.36	Q V				
7+ 0	0.1750	0.36	Q V				
7+ 5	0.1775	0.37	Q V				
7+10	0.1800	0.37	Q V				
7+15	0.1826	0.37	Q V				
7+20	0.1851	0.37	Q V				
7+25	0.1877	0.37	Q V				
7+30	0.1903	0.37	Q V				
7+35	0.1928	0.38	Q V				
7+40	0.1954	0.38	Q V				
7+45	0.1981	0.38	Q V				
7+50	0.2007	0.38	Q V				
7+55	0.2033	0.38	Q V				
8+ 0	0.2060	0.38	Q V				
8+ 5	0.2086	0.39	Q V				
8+10	0.2113	0.39	Q V				
8+15	0.2140	0.39	Q V				
8+20	0.2167	0.39	Q V				
8+25	0.2194	0.39	Q V				
8+30	0.2221	0.40	Q V				
8+35	0.2249	0.40	Q V				
8+40	0.2276	0.40	Q V				
8+45	0.2304	0.40	Q V				
8+50	0.2332	0.40	Q V				
8+55	0.2360	0.41	Q V				
9+ 0	0.2388	0.41	Q V				
9+ 5	0.2417	0.41	Q V				
9+10	0.2445	0.41	Q V				
9+15	0.2474	0.42	Q V				
9+20	0.2503	0.42	Q V				
9+25	0.2532	0.42	Q V				
9+30	0.2561	0.42	Q V				
9+35	0.2590	0.43	Q V				
9+40	0.2620	0.43	Q V				
9+45	0.2649	0.43	Q V				
9+50	0.2679	0.43	Q V				
9+55	0.2709	0.44	Q V				
10+ 0	0.2740	0.44	Q V				
10+ 5	0.2770	0.44	Q V				
10+10	0.2801	0.45	Q V				
10+15	0.2832	0.45	Q V				
10+20	0.2863	0.45	Q V				

```
10+25       0.2894      0.45  |Q       V|         |          |          |
10+30       0.2926      0.46  |Q       V|         |          |          |
10+35       0.2957      0.46  |Q       V|         |          |          |
10+40       0.2989      0.46  |Q       V|         |          |          |
10+45       0.3021      0.47  |Q        V         |          |          |
10+50       0.3054      0.47  |Q        V         |          |          |
10+55       0.3087      0.47  |Q        V         |          |          |
11+ 0       0.3119      0.48  |Q        V         |          |          |
11+ 5       0.3153      0.48  |Q        V         |          |          |
11+10       0.3186      0.49  |Q        V         |          |          |
11+15       0.3220      0.49  |Q        V         |          |          |
11+20       0.3254      0.49  |Q        V         |          |          |
11+25       0.3288      0.50  |Q        V         |          |          |
11+30       0.3323      0.50  | Q       |V         |          |          |
11+35       0.3357      0.51  | Q       |V         |          |          |
11+40       0.3393      0.51  | Q       |V         |          |          |
11+45       0.3428      0.51  | Q       |V         |          |          |
11+50       0.3464      0.52  | Q       |V         |          |          |
11+55       0.3500      0.52  | Q       |V         |          |          |
12+ 0       0.3536      0.53  | Q       |V         |          |          |
12+ 5       0.3573      0.53  | Q       |V         |          |          |
12+10       0.3609      0.53  | Q       |V         |          |          |
12+15       0.3644      0.51  | Q       | V        |          |          |
12+20       0.3679      0.50  | Q       | V        |          |          |
12+25       0.3714      0.50  | Q       | V        |          |          |
12+30       0.3749      0.50  | Q       | V        |          |          |
12+35       0.3783      0.51  | Q       | V        |          |          |
12+40       0.3819      0.51  | Q       | V        |          |          |
12+45       0.3854      0.52  | Q       | V        |          |          |
12+50       0.3890      0.52  | Q       | V        |          |          |
12+55       0.3926      0.53  | Q       |  V       |          |          |
13+ 0       0.3963      0.53  | Q       |  V       |          |          |
13+ 5       0.4000      0.54  | Q       |  V       |          |          |
13+10       0.4038      0.55  | Q       |  V       |          |          |
13+15       0.4076      0.56  | Q       |  V       |          |          |
13+20       0.4115      0.56  | Q       |  V       |          |          |
13+25       0.4155      0.57  | Q       |  V       |          |          |
13+30       0.4195      0.58  | Q       |  V       |          |          |
13+35       0.4235      0.59  | Q       |   V      |          |          |
13+40       0.4276      0.60  | Q       |   V      |          |          |
13+45       0.4319      0.61  | Q       |   V      |          |          |
13+50       0.4361      0.62  | Q       |   V      |          |          |
13+55       0.4405      0.63  | Q       |   V      |          |          |
14+ 0       0.4449      0.65  | Q       |   V      |          |          |
14+ 5       0.4495      0.66  | Q       |   V      |          |          |
14+10       0.4540      0.66  | Q       |    V     |          |          |
14+15       0.4585      0.65  | Q       |    V     |          |          |
14+20       0.4630      0.65  | Q       |    V     |          |          |
14+25       0.4675      0.66  | Q       |    V     |          |          |
14+30       0.4722      0.67  | Q       |    V     |          |          |
```



```
18+45       1.0424      0.51  | Q       |         |         |   V     |
18+50       1.0458      0.50  |Q        |         |         |   V     |
18+55       1.0492      0.49  |Q        |         |         |   V     |
19+ 0       1.0525      0.48  |Q        |         |         |   V     |
19+ 5       1.0558      0.48  |Q        |         |         |   V     |
19+10       1.0590      0.47  |Q        |         |         |    V    |
19+15       1.0622      0.46  |Q        |         |         |    V    |
19+20       1.0654      0.46  |Q        |         |         |    V    |
19+25       1.0685      0.45  |Q        |         |         |    V    |
19+30       1.0715      0.45  |Q        |         |         |    V    |
19+35       1.0746      0.44  |Q        |         |         |    V    |
19+40       1.0776      0.43  |Q        |         |         |    V    |
19+45       1.0805      0.43  |Q        |         |         |    V    |
19+50       1.0834      0.42  |Q        |         |         |    V    |
19+55       1.0863      0.42  |Q        |         |         |    V    |
20+ 0       1.0892      0.41  |Q        |         |         |     V   |
20+ 5       1.0920      0.41  |Q        |         |         |     V   |
20+10       1.0948      0.40  |Q        |         |         |     V   |
20+15       1.0975      0.40  |Q        |         |         |     V   |
20+20       1.1003      0.40  |Q        |         |         |     V   |
20+25       1.1030      0.39  |Q        |         |         |     V   |
20+30       1.1056      0.39  |Q        |         |         |     V   |
20+35       1.1083      0.38  |Q        |         |         |     V   |
20+40       1.1109      0.38  |Q        |         |         |     V   |
20+45       1.1135      0.38  |Q        |         |         |     V   |
20+50       1.1161      0.37  |Q        |         |         |     V   |
20+55       1.1186      0.37  |Q        |         |         |      V  |
21+ 0       1.1212      0.37  |Q        |         |         |      V  |
21+ 5       1.1237      0.36  |Q        |         |         |      V  |
21+10       1.1262      0.36  |Q        |         |         |      V  |
21+15       1.1286      0.36  |Q        |         |         |      V  |
21+20       1.1311      0.35  |Q        |         |         |      V  |
21+25       1.1335      0.35  |Q        |         |         |      V  |
21+30       1.1359      0.35  |Q        |         |         |      V  |
21+35       1.1383      0.35  |Q        |         |         |      V  |
21+40       1.1406      0.34  |Q        |         |         |      V  |
21+45       1.1430      0.34  |Q        |         |         |      V  |
21+50       1.1453      0.34  |Q        |         |         |      V  |
21+55       1.1476      0.34  |Q        |         |         |      V  |
22+ 0       1.1499      0.33  |Q        |         |         |       V |
22+ 5       1.1522      0.33  |Q        |         |         |       V |
22+10       1.1545      0.33  |Q        |         |         |       V |
22+15       1.1567      0.33  |Q        |         |         |       V |
22+20       1.1589      0.32  |Q        |         |         |       V |
22+25       1.1612      0.32  |Q        |         |         |       V |
22+30       1.1634      0.32  |Q        |         |         |       V |
22+35       1.1655      0.32  |Q        |         |         |       V |
22+40       1.1677      0.32  |Q        |         |         |       V |
22+45       1.1699      0.31  |Q        |         |         |       V |
22+50       1.1720      0.31  |Q        |         |         |       V |
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   22+55       1.1741      0.31  |Q        |         |         |       V |
   23+ 0       1.1763      0.31  |Q        |         |         |       V |
   23+ 5       1.1784      0.31  |Q        |         |         |        V|
   23+10       1.1805      0.30  |Q        |         |         |        V|
   23+15       1.1825      0.30  |Q        |         |         |        V|
   23+20       1.1846      0.30  |Q        |         |         |        V|
   23+25       1.1867      0.30  |Q        |         |         |        V|
   23+30       1.1887      0.30  |Q        |         |         |        V|
   23+35       1.1907      0.29  |Q        |         |         |        V|
   23+40       1.1928      0.29  |Q        |         |         |        V|
   23+45       1.1948      0.29  |Q        |         |         |        V|
   23+50       1.1968      0.29  |Q        |         |         |        V|
   23+55       1.1987      0.29  |Q        |         |         |        V|
   24+ 0       1.2007      0.29  |Q        |         |         |        V|
-------------------------------------------------------------------------
```

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

Study date 08/12/21

++

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

Program License Serial Number 6385

Amethyst Crossing
Undeveloped 100-year
Onsite

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 100		
11.42	1	1.16
Rainfall data for year 100		
11.42	6	2.53
Rainfall data for year 100		
11.42	24	5.42

++

******** 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)
78.0	92.8	11.42	1.000	0.140	0.980	0.137

Area-averaged adjusted loss rate Fm (In/Hr) = 0.137

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
11.19	0.980	78.0	92.8	0.78	0.847
0.23	0.020	98.0	98.0	0.20	0.956

Area-averaged catchment yield fraction, Y = 0.849
Area-averaged low loss fraction, Yb = 0.151
User entry of time of concentration = 0.265 (hours)
++
Watershed area = 11.42(Ac.)
Catchment Lag time = 0.212 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 39.3082
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.137(In/Hr)
Average low loss rate fraction (Yb) = 0.253 (decimal)
Note: user entry of the Yb value
DESERT S-Graph Selected
Computed peak 5-minute rainfall = 0.550(In)
Computed peak 30-minute rainfall = 0.942(In)
Specified peak 1-hour rainfall = 1.160(In)
Computed peak 3-hour rainfall = 1.871(In)
Specified peak 6-hour rainfall = 2.530(In)
Specified peak 24-hour rainfall = 5.420(In)

Rainfall depth area reduction factors:
Using a total area of 11.42(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.550(In)
30-minute factor = 0.999 Adjusted rainfall = 0.942(In)
1-hour factor = 0.999 Adjusted rainfall = 1.159(In)
3-hour factor = 1.000 Adjusted rainfall = 1.871(In)
6-hour factor = 1.000 Adjusted rainfall = 2.530(In)
24-hour factor = 1.000 Adjusted rainfall = 5.420(In)

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

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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 138.11 (CFS))	
1	2.673	3.692
2	17.919	21.056
3	48.135	41.732
4	64.925	23.189
5	74.213	12.828
6	80.396	8.539
7	84.798	6.079
8	88.232	4.743
9	90.704	3.414
10	92.708	2.768
11	94.327	2.236
12	95.622	1.788
13	96.663	1.438
14	97.452	1.090
15	98.000	0.757
16	98.414	0.572
17	98.883	0.648
18	99.351	0.646
19	99.670	0.441
20	100.000	0.221

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5501	0.5501
2	0.6773	0.1272
3	0.7649	0.0876
4	0.8339	0.0689
5	0.8916	0.0577
6	0.9417	0.0501
7	0.9863	0.0446
8	1.0266	0.0403
9	1.0635	0.0369
10	1.0977	0.0342
11	1.1295	0.0318
12	1.1594	0.0299
13	1.2005	0.0411
14	1.2399	0.0394
15	1.2777	0.0378
16	1.3142	0.0364
17	1.3493	0.0352
18	1.3834	0.0340
19	1.4163	0.0330
20	1.4483	0.0320
21	1.4795	0.0311

22	1.5097	0.0303
23	1.5393	0.0295
24	1.5681	0.0288
25	1.5962	0.0281
26	1.6237	0.0275
27	1.6506	0.0269
28	1.6770	0.0264
29	1.7028	0.0258
30	1.7282	0.0253
31	1.7530	0.0249
32	1.7774	0.0244
33	1.8014	0.0240
34	1.8250	0.0236
35	1.8482	0.0232
36	1.8710	0.0228
37	1.8935	0.0224
38	1.9156	0.0221
39	1.9374	0.0218
40	1.9588	0.0215
41	1.9800	0.0212
42	2.0009	0.0209
43	2.0215	0.0206
44	2.0418	0.0203
45	2.0619	0.0201
46	2.0817	0.0198
47	2.1013	0.0196
48	2.1206	0.0193
49	2.1397	0.0191
50	2.1586	0.0189
51	2.1773	0.0187
52	2.1958	0.0185
53	2.2141	0.0183
54	2.2322	0.0181
55	2.2501	0.0179
56	2.2678	0.0177
57	2.2853	0.0175
58	2.3027	0.0174
59	2.3199	0.0172
60	2.3369	0.0170
61	2.3538	0.0169
62	2.3705	0.0167
63	2.3871	0.0166
64	2.4035	0.0164
65	2.4198	0.0163
66	2.4359	0.0161
67	2.4519	0.0160
68	2.4677	0.0159
69	2.4835	0.0157
70	2.4991	0.0156
71	2.5146	0.0155

72	2.5299	0.0154
73	2.5492	0.0193
74	2.5683	0.0191
75	2.5873	0.0190
76	2.6062	0.0189
77	2.6250	0.0188
78	2.6437	0.0187
79	2.6623	0.0186
80	2.6807	0.0185
81	2.6991	0.0184
82	2.7174	0.0183
83	2.7355	0.0182
84	2.7536	0.0181
85	2.7716	0.0180
86	2.7894	0.0179
87	2.8072	0.0178
88	2.8249	0.0177
89	2.8425	0.0176
90	2.8600	0.0175
91	2.8774	0.0174
92	2.8948	0.0173
93	2.9120	0.0173
94	2.9292	0.0172
95	2.9463	0.0171
96	2.9633	0.0170
97	2.9802	0.0169
98	2.9970	0.0168
99	3.0138	0.0168
100	3.0305	0.0167
101	3.0471	0.0166
102	3.0637	0.0165
103	3.0801	0.0165
104	3.0965	0.0164
105	3.1129	0.0163
106	3.1291	0.0163
107	3.1453	0.0162
108	3.1614	0.0161
109	3.1775	0.0161
110	3.1935	0.0160
111	3.2094	0.0159
112	3.2253	0.0159
113	3.2410	0.0158
114	3.2568	0.0157
115	3.2725	0.0157
116	3.2881	0.0156
117	3.3036	0.0155
118	3.3191	0.0155
119	3.3345	0.0154
120	3.3499	0.0154
121	3.3652	0.0153

122	3.3805	0.0153
123	3.3957	0.0152
124	3.4108	0.0151
125	3.4259	0.0151
126	3.4409	0.0150
127	3.4559	0.0150
128	3.4709	0.0149
129	3.4857	0.0149
130	3.5006	0.0148
131	3.5153	0.0148
132	3.5300	0.0147
133	3.5447	0.0147
134	3.5593	0.0146
135	3.5739	0.0146
136	3.5884	0.0145
137	3.6029	0.0145
138	3.6174	0.0144
139	3.6317	0.0144
140	3.6461	0.0143
141	3.6604	0.0143
142	3.6746	0.0142
143	3.6888	0.0142
144	3.7030	0.0142
145	3.7171	0.0141
146	3.7311	0.0141
147	3.7452	0.0140
148	3.7591	0.0140
149	3.7731	0.0139
150	3.7870	0.0139
151	3.8008	0.0139
152	3.8146	0.0138
153	3.8284	0.0138
154	3.8421	0.0137
155	3.8558	0.0137
156	3.8695	0.0137
157	3.8831	0.0136
158	3.8967	0.0136
159	3.9102	0.0135
160	3.9237	0.0135
161	3.9372	0.0135
162	3.9506	0.0134
163	3.9640	0.0134
164	3.9773	0.0133
165	3.9906	0.0133
166	4.0039	0.0133
167	4.0171	0.0132
168	4.0303	0.0132
169	4.0435	0.0132
170	4.0566	0.0131
171	4.0697	0.0131

172	4.0828	0.0131
173	4.0958	0.0130
174	4.1088	0.0130
175	4.1218	0.0130
176	4.1347	0.0129
177	4.1476	0.0129
178	4.1605	0.0129
179	4.1733	0.0128
180	4.1861	0.0128
181	4.1989	0.0128
182	4.2116	0.0127
183	4.2243	0.0127
184	4.2370	0.0127
185	4.2496	0.0126
186	4.2622	0.0126
187	4.2748	0.0126
188	4.2874	0.0125
189	4.2999	0.0125
190	4.3124	0.0125
191	4.3248	0.0125
192	4.3373	0.0124
193	4.3497	0.0124
194	4.3620	0.0124
195	4.3744	0.0123
196	4.3867	0.0123
197	4.3990	0.0123
198	4.4112	0.0123
199	4.4235	0.0122
200	4.4357	0.0122
201	4.4478	0.0122
202	4.4600	0.0121
203	4.4721	0.0121
204	4.4842	0.0121
205	4.4963	0.0121
206	4.5083	0.0120
207	4.5203	0.0120
208	4.5323	0.0120
209	4.5443	0.0120
210	4.5562	0.0119
211	4.5681	0.0119
212	4.5800	0.0119
213	4.5919	0.0119
214	4.6037	0.0118
215	4.6155	0.0118
216	4.6273	0.0118
217	4.6391	0.0118
218	4.6508	0.0117
219	4.6625	0.0117
220	4.6742	0.0117
221	4.6859	0.0117

222	4.6975	0.0116
223	4.7091	0.0116
224	4.7207	0.0116
225	4.7323	0.0116
226	4.7438	0.0115
227	4.7554	0.0115
228	4.7669	0.0115
229	4.7783	0.0115
230	4.7898	0.0115
231	4.8012	0.0114
232	4.8126	0.0114
233	4.8240	0.0114
234	4.8354	0.0114
235	4.8467	0.0113
236	4.8581	0.0113
237	4.8694	0.0113
238	4.8807	0.0113
239	4.8919	0.0113
240	4.9032	0.0112
241	4.9144	0.0112
242	4.9256	0.0112
243	4.9367	0.0112
244	4.9479	0.0112
245	4.9590	0.0111
246	4.9701	0.0111
247	4.9812	0.0111
248	4.9923	0.0111
249	5.0034	0.0111
250	5.0144	0.0110
251	5.0254	0.0110
252	5.0364	0.0110
253	5.0474	0.0110
254	5.0583	0.0110
255	5.0693	0.0109
256	5.0802	0.0109
257	5.0911	0.0109
258	5.1020	0.0109
259	5.1128	0.0109
260	5.1237	0.0108
261	5.1345	0.0108
262	5.1453	0.0108
263	5.1561	0.0108
264	5.1668	0.0108
265	5.1776	0.0107
266	5.1883	0.0107
267	5.1990	0.0107
268	5.2097	0.0107
269	5.2204	0.0107
270	5.2310	0.0107
271	5.2417	0.0106

272	5.2523	0.0106
273	5.2629	0.0106
274	5.2735	0.0106
275	5.2841	0.0106
276	5.2946	0.0106
277	5.3052	0.0105
278	5.3157	0.0105
279	5.3262	0.0105
280	5.3367	0.0105
281	5.3471	0.0105
282	5.3576	0.0104
283	5.3680	0.0104
284	5.3784	0.0104
285	5.3888	0.0104
286	5.3992	0.0104
287	5.4096	0.0104
288	5.4199	0.0104

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0104	0.0026	0.0077
2	0.0104	0.0026	0.0077
3	0.0104	0.0026	0.0078
4	0.0104	0.0026	0.0078
5	0.0104	0.0026	0.0078
6	0.0105	0.0026	0.0078
7	0.0105	0.0027	0.0078
8	0.0105	0.0027	0.0079
9	0.0106	0.0027	0.0079
10	0.0106	0.0027	0.0079
11	0.0106	0.0027	0.0079
12	0.0106	0.0027	0.0079
13	0.0107	0.0027	0.0080
14	0.0107	0.0027	0.0080
15	0.0107	0.0027	0.0080
16	0.0107	0.0027	0.0080
17	0.0108	0.0027	0.0080
18	0.0108	0.0027	0.0081
19	0.0108	0.0027	0.0081
20	0.0108	0.0027	0.0081
21	0.0109	0.0027	0.0081
22	0.0109	0.0028	0.0081
23	0.0109	0.0028	0.0082
24	0.0110	0.0028	0.0082
25	0.0110	0.0028	0.0082
26	0.0110	0.0028	0.0082
27	0.0111	0.0028	0.0083
28	0.0111	0.0028	0.0083

29	0.0111	0.0028	0.0083
30	0.0111	0.0028	0.0083
31	0.0112	0.0028	0.0084
32	0.0112	0.0028	0.0084
33	0.0112	0.0028	0.0084
34	0.0113	0.0028	0.0084
35	0.0113	0.0029	0.0084
36	0.0113	0.0029	0.0085
37	0.0114	0.0029	0.0085
38	0.0114	0.0029	0.0085
39	0.0114	0.0029	0.0085
40	0.0115	0.0029	0.0086
41	0.0115	0.0029	0.0086
42	0.0115	0.0029	0.0086
43	0.0116	0.0029	0.0086
44	0.0116	0.0029	0.0087
45	0.0116	0.0029	0.0087
46	0.0117	0.0029	0.0087
47	0.0117	0.0030	0.0088
48	0.0117	0.0030	0.0088
49	0.0118	0.0030	0.0088
50	0.0118	0.0030	0.0088
51	0.0119	0.0030	0.0089
52	0.0119	0.0030	0.0089
53	0.0119	0.0030	0.0089
54	0.0120	0.0030	0.0089
55	0.0120	0.0030	0.0090
56	0.0120	0.0030	0.0090
57	0.0121	0.0031	0.0090
58	0.0121	0.0031	0.0091
59	0.0122	0.0031	0.0091
60	0.0122	0.0031	0.0091
61	0.0123	0.0031	0.0092
62	0.0123	0.0031	0.0092
63	0.0123	0.0031	0.0092
64	0.0124	0.0031	0.0092
65	0.0124	0.0031	0.0093
66	0.0125	0.0031	0.0093
67	0.0125	0.0032	0.0094
68	0.0125	0.0032	0.0094
69	0.0126	0.0032	0.0094
70	0.0126	0.0032	0.0094
71	0.0127	0.0032	0.0095
72	0.0127	0.0032	0.0095
73	0.0128	0.0032	0.0096
74	0.0128	0.0032	0.0096
75	0.0129	0.0033	0.0096
76	0.0129	0.0033	0.0097
77	0.0130	0.0033	0.0097
78	0.0130	0.0033	0.0097

79	0.0131	0.0033	0.0098
80	0.0131	0.0033	0.0098
81	0.0132	0.0033	0.0099
82	0.0132	0.0033	0.0099
83	0.0133	0.0034	0.0099
84	0.0133	0.0034	0.0100
85	0.0134	0.0034	0.0100
86	0.0135	0.0034	0.0101
87	0.0135	0.0034	0.0101
88	0.0136	0.0034	0.0101
89	0.0137	0.0035	0.0102
90	0.0137	0.0035	0.0102
91	0.0138	0.0035	0.0103
92	0.0138	0.0035	0.0103
93	0.0139	0.0035	0.0104
94	0.0139	0.0035	0.0104
95	0.0140	0.0035	0.0105
96	0.0141	0.0036	0.0105
97	0.0142	0.0036	0.0106
98	0.0142	0.0036	0.0106
99	0.0143	0.0036	0.0107
100	0.0143	0.0036	0.0107
101	0.0144	0.0036	0.0108
102	0.0145	0.0037	0.0108
103	0.0146	0.0037	0.0109
104	0.0146	0.0037	0.0109
105	0.0147	0.0037	0.0110
106	0.0148	0.0037	0.0110
107	0.0149	0.0038	0.0111
108	0.0149	0.0038	0.0112
109	0.0150	0.0038	0.0112
110	0.0151	0.0038	0.0113
111	0.0152	0.0038	0.0114
112	0.0153	0.0039	0.0114
113	0.0154	0.0039	0.0115
114	0.0154	0.0039	0.0115
115	0.0155	0.0039	0.0116
116	0.0156	0.0039	0.0117
117	0.0157	0.0040	0.0118
118	0.0158	0.0040	0.0118
119	0.0159	0.0040	0.0119
120	0.0160	0.0040	0.0119
121	0.0161	0.0041	0.0120
122	0.0162	0.0041	0.0121
123	0.0163	0.0041	0.0122
124	0.0164	0.0041	0.0123
125	0.0165	0.0042	0.0124
126	0.0166	0.0042	0.0124
127	0.0168	0.0042	0.0125
128	0.0168	0.0043	0.0126

129	0.0170	0.0043	0.0127
130	0.0171	0.0043	0.0128
131	0.0173	0.0044	0.0129
132	0.0173	0.0044	0.0130
133	0.0175	0.0044	0.0131
134	0.0176	0.0044	0.0131
135	0.0178	0.0045	0.0133
136	0.0179	0.0045	0.0134
137	0.0181	0.0046	0.0135
138	0.0182	0.0046	0.0136
139	0.0184	0.0046	0.0137
140	0.0185	0.0047	0.0138
141	0.0187	0.0047	0.0140
142	0.0188	0.0047	0.0140
143	0.0190	0.0048	0.0142
144	0.0191	0.0048	0.0143
145	0.0154	0.0039	0.0115
146	0.0155	0.0039	0.0116
147	0.0157	0.0040	0.0118
148	0.0159	0.0040	0.0119
149	0.0161	0.0041	0.0121
150	0.0163	0.0041	0.0122
151	0.0166	0.0042	0.0124
152	0.0167	0.0042	0.0125
153	0.0170	0.0043	0.0127
154	0.0172	0.0043	0.0129
155	0.0175	0.0044	0.0131
156	0.0177	0.0045	0.0132
157	0.0181	0.0046	0.0135
158	0.0183	0.0046	0.0137
159	0.0187	0.0047	0.0140
160	0.0189	0.0048	0.0141
161	0.0193	0.0049	0.0145
162	0.0196	0.0049	0.0146
163	0.0201	0.0051	0.0150
164	0.0203	0.0051	0.0152
165	0.0209	0.0053	0.0156
166	0.0212	0.0053	0.0158
167	0.0218	0.0055	0.0163
168	0.0221	0.0056	0.0165
169	0.0228	0.0058	0.0171
170	0.0232	0.0059	0.0173
171	0.0240	0.0061	0.0179
172	0.0244	0.0062	0.0182
173	0.0253	0.0064	0.0189
174	0.0258	0.0065	0.0193
175	0.0269	0.0068	0.0201
176	0.0275	0.0070	0.0206
177	0.0288	0.0073	0.0215
178	0.0295	0.0075	0.0221

179	0.0311	0.0079	0.0232
180	0.0320	0.0081	0.0239
181	0.0340	0.0086	0.0254
182	0.0352	0.0089	0.0263
183	0.0378	0.0096	0.0283
184	0.0394	0.0100	0.0294
185	0.0299	0.0076	0.0223
186	0.0318	0.0080	0.0238
187	0.0369	0.0093	0.0276
188	0.0403	0.0102	0.0301
189	0.0501	0.0114	0.0387
190	0.0577	0.0114	0.0463
191	0.0876	0.0114	0.0762
192	0.1272	0.0114	0.1157
193	0.5501	0.0114	0.5387
194	0.0689	0.0114	0.0575
195	0.0446	0.0113	0.0333
196	0.0342	0.0086	0.0255
197	0.0411	0.0104	0.0307
198	0.0364	0.0092	0.0272
199	0.0330	0.0083	0.0246
200	0.0303	0.0077	0.0226
201	0.0281	0.0071	0.0210
202	0.0264	0.0067	0.0197
203	0.0249	0.0063	0.0186
204	0.0236	0.0060	0.0176
205	0.0224	0.0057	0.0168
206	0.0215	0.0054	0.0160
207	0.0206	0.0052	0.0154
208	0.0198	0.0050	0.0148
209	0.0191	0.0048	0.0143
210	0.0185	0.0047	0.0138
211	0.0179	0.0045	0.0134
212	0.0174	0.0044	0.0130
213	0.0169	0.0043	0.0126
214	0.0164	0.0041	0.0123
215	0.0160	0.0040	0.0120
216	0.0156	0.0039	0.0117
217	0.0193	0.0049	0.0144
218	0.0189	0.0048	0.0141
219	0.0186	0.0047	0.0139
220	0.0183	0.0046	0.0136
221	0.0180	0.0045	0.0134
222	0.0177	0.0045	0.0132
223	0.0174	0.0044	0.0130
224	0.0172	0.0043	0.0128
225	0.0169	0.0043	0.0126
226	0.0167	0.0042	0.0125
227	0.0165	0.0042	0.0123
228	0.0163	0.0041	0.0121

229	0.0161	0.0041	0.0120
230	0.0159	0.0040	0.0119
231	0.0157	0.0040	0.0117
232	0.0155	0.0039	0.0116
233	0.0153	0.0039	0.0114
234	0.0151	0.0038	0.0113
235	0.0150	0.0038	0.0112
236	0.0148	0.0037	0.0111
237	0.0147	0.0037	0.0110
238	0.0145	0.0037	0.0109
239	0.0144	0.0036	0.0107
240	0.0142	0.0036	0.0106
241	0.0141	0.0036	0.0105
242	0.0140	0.0035	0.0104
243	0.0139	0.0035	0.0104
244	0.0137	0.0035	0.0103
245	0.0136	0.0034	0.0102
246	0.0135	0.0034	0.0101
247	0.0134	0.0034	0.0100
248	0.0133	0.0034	0.0099
249	0.0132	0.0033	0.0098
250	0.0131	0.0033	0.0098
251	0.0130	0.0033	0.0097
252	0.0129	0.0033	0.0096
253	0.0128	0.0032	0.0095
254	0.0127	0.0032	0.0095
255	0.0126	0.0032	0.0094
256	0.0125	0.0032	0.0093
257	0.0124	0.0031	0.0093
258	0.0123	0.0031	0.0092
259	0.0122	0.0031	0.0091
260	0.0121	0.0031	0.0091
261	0.0121	0.0031	0.0090
262	0.0120	0.0030	0.0090
263	0.0119	0.0030	0.0089
264	0.0118	0.0030	0.0088
265	0.0118	0.0030	0.0088
266	0.0117	0.0030	0.0087
267	0.0116	0.0029	0.0087
268	0.0115	0.0029	0.0086
269	0.0115	0.0029	0.0086
270	0.0114	0.0029	0.0085
271	0.0113	0.0029	0.0085
272	0.0113	0.0029	0.0084
273	0.0112	0.0028	0.0084
274	0.0112	0.0028	0.0083
275	0.0111	0.0028	0.0083
276	0.0110	0.0028	0.0082
277	0.0110	0.0028	0.0082
278	0.0109	0.0028	0.0082

279	0.0109	0.0027	0.0081
280	0.0108	0.0027	0.0081
281	0.0107	0.0027	0.0080
282	0.0107	0.0027	0.0080
283	0.0106	0.0027	0.0080
284	0.0106	0.0027	0.0079
285	0.0105	0.0027	0.0079
286	0.0105	0.0026	0.0078
287	0.0104	0.0026	0.0078
288	0.0104	0.0026	0.0078

Total soil rain loss = 1.20(In)
Total effective rainfall = 4.22(In)
Peak flow rate in flood hydrograph = 28.66(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	0.0002	0.03	Q				
0+10	0.0015	0.19	Q				
0+15	0.0051	0.51	Q				
0+20	0.0098	0.70	Q				
0+25	0.0153	0.80	VQ				
0+30	0.0213	0.86	VQ				
0+35	0.0276	0.91	VQ				
0+40	0.0341	0.95	VQ				
0+45	0.0409	0.98	VQ				
0+50	0.0478	1.00	VQ				
0+55	0.0548	1.02	VQ				
1+ 0	0.0620	1.04	VQ				
1+ 5	0.0693	1.05	VQ				
1+10	0.0766	1.06	VQ				
1+15	0.0840	1.07	VQ				
1+20	0.0914	1.08	VQ				
1+25	0.0989	1.09	VQ				
1+30	0.1065	1.10	|Q				
1+35	0.1141	1.10	|Q				
1+40	0.1217	1.11	|Q				
1+45	0.1293	1.11	|Q				
1+50	0.1370	1.11	|Q				
1+55	0.1447	1.12	|Q				
2+ 0	0.1524	1.12	|Q				
2+ 5	0.1601	1.12	|Q				

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2+10       0.1678      1.12  |Q         |          |          |          |
2+15       0.1756      1.13  |Q         |          |          |          |
2+20       0.1834      1.13  |Q         |          |          |          |
2+25       0.1912      1.13  |Q         |          |          |          |
2+30       0.1990      1.14  |Q         |          |          |          |
2+35       0.2068      1.14  |QV        |          |          |          |
2+40       0.2147      1.14  |QV        |          |          |          |
2+45       0.2226      1.15  |QV        |          |          |          |
2+50       0.2305      1.15  |QV        |          |          |          |
2+55       0.2384      1.15  |QV        |          |          |          |
3+ 0       0.2464      1.16  |QV        |          |          |          |
3+ 5       0.2544      1.16  |QV        |          |          |          |
3+10       0.2624      1.16  |QV        |          |          |          |
3+15       0.2704      1.16  |QV        |          |          |          |
3+20       0.2784      1.17  |QV        |          |          |          |
3+25       0.2865      1.17  |QV        |          |          |          |
3+30       0.2946      1.18  |QV        |          |          |          |
3+35       0.3027      1.18  |Q V       |          |          |          |
3+40       0.3109      1.18  |Q V       |          |          |          |
3+45       0.3190      1.19  |Q V       |          |          |          |
3+50       0.3272      1.19  |Q V       |          |          |          |
3+55       0.3354      1.19  |Q V       |          |          |          |
4+ 0       0.3437      1.20  |Q V       |          |          |          |
4+ 5       0.3519      1.20  |Q V       |          |          |          |
4+10       0.3602      1.20  |Q V       |          |          |          |
4+15       0.3685      1.21  |Q V       |          |          |          |
4+20       0.3769      1.21  |Q V       |          |          |          |
4+25       0.3852      1.21  |Q V       |          |          |          |
4+30       0.3936      1.22  |Q V       |          |          |          |
4+35       0.4021      1.22  |Q  V      |          |          |          |
4+40       0.4105      1.23  |Q  V      |          |          |          |
4+45       0.4190      1.23  |Q  V      |          |          |          |
4+50       0.4275      1.23  |Q  V      |          |          |          |
4+55       0.4360      1.24  |Q  V      |          |          |          |
5+ 0       0.4446      1.24  |Q  V      |          |          |          |
5+ 5       0.4532      1.25  |Q  V      |          |          |          |
5+10       0.4618      1.25  |Q  V      |          |          |          |
5+15       0.4704      1.26  |Q  V      |          |          |          |
5+20       0.4791      1.26  |Q  V      |          |          |          |
5+25       0.4878      1.26  |Q  V      |          |          |          |
5+30       0.4965      1.27  |Q  V      |          |          |          |
5+35       0.5053      1.27  |Q   V     |          |          |          |
5+40       0.5141      1.28  |Q   V     |          |          |          |
5+45       0.5229      1.28  |Q   V     |          |          |          |
5+50       0.5318      1.29  |Q   V     |          |          |          |
5+55       0.5406      1.29  |Q   V     |          |          |          |
6+ 0       0.5496      1.30  |Q   V     |          |          |          |
6+ 5       0.5585      1.30  |Q   V     |          |          |          |
6+10       0.5675      1.30  |Q   V     |          |          |          |
6+15       0.5765      1.31  |Q   V     |          |          |          |
```

6+20	0.5856	1.31	|Q V |	|	|	|
6+25	0.5947	1.32	|Q V |	|	|	|
6+30	0.6038	1.32	|Q V |	|	|	|
6+35	0.6129	1.33	|Q V |	|	|	|
6+40	0.6221	1.33	|Q V |	|	|	|
6+45	0.6313	1.34	|Q V |	|	|	|
6+50	0.6406	1.34	|Q V |	|	|	|
6+55	0.6499	1.35	|Q V |	|	|	|
7+ 0	0.6592	1.36	|Q V |	|	|	|
7+ 5	0.6686	1.36	|Q V |	|	|	|
7+10	0.6780	1.37	|Q V |	|	|	|
7+15	0.6875	1.37	|Q V |	|	|	|
7+20	0.6970	1.38	|Q V |	|	|	|
7+25	0.7065	1.38	|Q V |	|	|	|
7+30	0.7161	1.39	|Q V |	|	|	|
7+35	0.7257	1.40	|Q V |	|	|	|
7+40	0.7353	1.40	|Q V |	|	|	|
7+45	0.7450	1.41	|Q V |	|	|	|
7+50	0.7548	1.41	|Q V |	|	|	|
7+55	0.7645	1.42	|Q V |	|	|	|
8+ 0	0.7744	1.43	|Q V |	|	|	|
8+ 5	0.7842	1.43	|Q V |	|	|	|
8+10	0.7941	1.44	|Q V |	|	|	|
8+15	0.8041	1.45	|Q V |	|	|	|
8+20	0.8141	1.45	|Q V |	|	|	|
8+25	0.8242	1.46	|Q V |	|	|	|
8+30	0.8343	1.47	|Q V |	|	|	|
8+35	0.8444	1.47	|Q V |	|	|	|
8+40	0.8546	1.48	|Q V |	|	|	|
8+45	0.8648	1.49	|Q V |	|	|	|
8+50	0.8751	1.50	|Q V |	|	|	|
8+55	0.8855	1.50	| Q V |	|	|	|
9+ 0	0.8959	1.51	| Q V |	|	|	|
9+ 5	0.9064	1.52	| Q V|	|	|	|
9+10	0.9169	1.53	| Q V|	|	|	|
9+15	0.9274	1.53	| Q V|	|	|	|
9+20	0.9380	1.54	| Q V|	|	|	|
9+25	0.9487	1.55	| Q V|	|	|	|
9+30	0.9595	1.56	| Q V|	|	|	|
9+35	0.9703	1.57	| Q V|	|	|	|
9+40	0.9811	1.58	| Q V|	|	|	|
9+45	0.9920	1.59	| Q V|	|	|	|
9+50	1.0030	1.59	| Q V |	|	|	|
9+55	1.0141	1.60	| Q V |	|	|	|
10+ 0	1.0252	1.61	| Q V |	|	|	|
10+ 5	1.0363	1.62	| Q V |	|	|	|
10+10	1.0476	1.63	| Q V |	|	|	|
10+15	1.0589	1.64	| Q V |	|	|	|
10+20	1.0703	1.65	| Q V |	|	|	|
10+25	1.0817	1.66	| Q V |	|	|	|

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10+30       1.0933      1.67  | Q       V         |         |         |
10+35       1.1049      1.68  | Q       |V        |         |         |
10+40       1.1165      1.70  | Q       |V        |         |         |
10+45       1.1283      1.71  | Q       |V        |         |         |
10+50       1.1401      1.72  | Q       |V        |         |         |
10+55       1.1520      1.73  | Q       |V        |         |         |
11+ 0       1.1640      1.74  | Q       |V        |         |         |
11+ 5       1.1761      1.75  | Q       |V        |         |         |
11+10       1.1883      1.77  | Q       |V        |         |         |
11+15       1.2005      1.78  | Q       |V        |         |         |
11+20       1.2129      1.79  | Q       | V       |         |         |
11+25       1.2253      1.81  | Q       | V       |         |         |
11+30       1.2379      1.82  | Q       | V       |         |         |
11+35       1.2505      1.84  | Q       | V       |         |         |
11+40       1.2633      1.85  | Q       | V       |         |         |
11+45       1.2761      1.86  | Q       | V       |         |         |
11+50       1.2890      1.88  | Q       | V       |         |         |
11+55       1.3021      1.90  | Q       | V       |         |         |
12+ 0       1.3153      1.91  | Q       |  V      |         |         |
12+ 5       1.3285      1.92  | Q       |  V      |         |         |
12+10       1.3414      1.87  | Q       |  V      |         |         |
12+15       1.3535      1.76  | Q       |  V      |         |         |
12+20       1.3653      1.71  | Q       |  V      |         |         |
12+25       1.3770      1.69  | Q       |  V      |         |         |
12+30       1.3886      1.69  | Q       |  V      |         |         |
12+35       1.4002      1.69  | Q       |  V      |         |         |
12+40       1.4119      1.69  | Q       |   V     |         |         |
12+45       1.4236      1.71  | Q       |   V     |         |         |
12+50       1.4354      1.72  | Q       |   V     |         |         |
12+55       1.4474      1.74  | Q       |   V     |         |         |
13+ 0       1.4595      1.75  | Q       |   V     |         |         |
13+ 5       1.4717      1.78  | Q       |   V     |         |         |
13+10       1.4841      1.80  | Q       |   V     |         |         |
13+15       1.4966      1.82  | Q       |   V     |         |         |
13+20       1.5094      1.85  | Q       |    V    |         |         |
13+25       1.5223      1.88  | Q       |    V    |         |         |
13+30       1.5354      1.90  | Q       |    V    |         |         |
13+35       1.5487      1.94  | Q       |    V    |         |         |
13+40       1.5623      1.97  | Q       |    V    |         |         |
13+45       1.5761      2.00  | Q       |    V    |         |         |
13+50       1.5902      2.04  | Q       |    V    |         |         |
13+55       1.6045      2.08  | Q       |     V   |         |         |
14+ 0       1.6191      2.12  | Q       |     V   |         |         |
14+ 5       1.6340      2.17  | Q       |     V   |         |         |
14+10       1.6493      2.21  | Q       |     V   |         |         |
14+15       1.6649      2.26  |  Q      |     V   |         |         |
14+20       1.6808      2.32  |  Q      |     V   |         |         |
14+25       1.6972      2.37  |  Q      |     V   |         |         |
14+30       1.7139      2.43  |  Q      |      V  |         |         |
14+35       1.7311      2.50  |  Q      |      V  |         |         |
```

14+40	1.7488	2.57	Q	V			
14+45	1.7670	2.64	Q	V			
14+50	1.7858	2.72	Q	V			
14+55	1.8052	2.82	Q	V			
15+ 0	1.8252	2.91	Q	V			
15+ 5	1.8461	3.02	Q	V			
15+10	1.8677	3.14	Q	V			
15+15	1.8903	3.28	Q	V			
15+20	1.9140	3.43	Q	V			
15+25	1.9386	3.58	Q	V			
15+30	1.9632	3.57	Q	V			
15+35	1.9867	3.41	Q	V			
15+40	2.0104	3.45	Q	V			
15+45	2.0357	3.67	Q	V			
15+50	2.0637	4.07	Q	V			
15+55	2.0968	4.79	Q	V			
16+ 0	2.1391	6.14	Q	V			
16+ 5	2.2087	10.11	Q	V			
16+10	2.3450	19.79	V Q				
16+15	2.5424	28.66	V				Q
16+20	2.6712	18.71	Q V				
16+25	2.7568	12.42	Q	V			
16+30	2.8223	9.52	Q	V			
16+35	2.8771	7.96	Q	V			
16+40	2.9247	6.90	Q	V			
16+45	2.9653	5.89	Q	V			
16+50	3.0013	5.23	Q	V			
16+55	3.0336	4.68	Q	V			
17+ 0	3.0625	4.21	Q	V			
17+ 5	3.0888	3.81	Q	V			
17+10	3.1124	3.44	Q	V			
17+15	3.1338	3.11	Q	V			
17+20	3.1536	2.88	Q	V			
17+25	3.1728	2.79	Q	V			
17+30	3.1911	2.66	Q	V			
17+35	3.2079	2.43	Q	V			
17+40	3.2231	2.21	Q	V			
17+45	3.2369	2.01	Q	V			
17+50	3.2503	1.94	Q	V			
17+55	3.2632	1.87	Q	V			
18+ 0	3.2756	1.81	Q	V			
18+ 5	3.2878	1.77	Q	V			
18+10	3.3001	1.78	Q	V			
18+15	3.3129	1.86	Q	V			
18+20	3.3259	1.89	Q	V			
18+25	3.3389	1.88	Q	V			
18+30	3.3518	1.87	Q	V			
18+35	3.3645	1.86	Q	V			
18+40	3.3772	1.84	Q	V			
18+45	3.3897	1.82	Q	V			

```
18+50       3.4021      1.79  | Q       |         |         |  V      |
18+55       3.4143      1.77  | Q       |         |         |   V     |
19+ 0       3.4263      1.75  | Q       |         |         |   V     |
19+ 5       3.4383      1.73  | Q       |         |         |   V     |
19+10       3.4501      1.71  | Q       |         |         |   V     |
19+15       3.4617      1.69  | Q       |         |         |   V     |
19+20       3.4732      1.67  | Q       |         |         |   V     |
19+25       3.4845      1.65  | Q       |         |         |   V     |
19+30       3.4958      1.63  | Q       |         |         |   V     |
19+35       3.5069      1.61  | Q       |         |         |    V    |
19+40       3.5179      1.60  | Q       |         |         |    V    |
19+45       3.5287      1.58  | Q       |         |         |    V    |
19+50       3.5395      1.56  | Q       |         |         |    V    |
19+55       3.5501      1.54  | Q       |         |         |    V    |
20+ 0       3.5606      1.53  | Q       |         |         |    V    |
20+ 5       3.5710      1.51  | Q       |         |         |    V    |
20+10       3.5813      1.50  |Q        |         |         |    V    |
20+15       3.5915      1.48  |Q        |         |         |    V    |
20+20       3.6016      1.47  |Q        |         |         |    V    |
20+25       3.6116      1.45  |Q        |         |         |     V   |
20+30       3.6215      1.44  |Q        |         |         |     V   |
20+35       3.6314      1.43  |Q        |         |         |     V   |
20+40       3.6411      1.41  |Q        |         |         |     V   |
20+45       3.6508      1.40  |Q        |         |         |     V   |
20+50       3.6603      1.39  |Q        |         |         |     V   |
20+55       3.6698      1.38  |Q        |         |         |     V   |
21+ 0       3.6792      1.37  |Q        |         |         |     V   |
21+ 5       3.6886      1.36  |Q        |         |         |     V   |
21+10       3.6978      1.34  |Q        |         |         |     V   |
21+15       3.7070      1.33  |Q        |         |         |      V  |
21+20       3.7161      1.32  |Q        |         |         |      V  |
21+25       3.7252      1.31  |Q        |         |         |      V  |
21+30       3.7342      1.30  |Q        |         |         |      V  |
21+35       3.7431      1.29  |Q        |         |         |      V  |
21+40       3.7519      1.29  |Q        |         |         |      V  |
21+45       3.7607      1.28  |Q        |         |         |      V  |
21+50       3.7695      1.27  |Q        |         |         |      V  |
21+55       3.7781      1.26  |Q        |         |         |      V  |
22+ 0       3.7867      1.25  |Q        |         |         |      V  |
22+ 5       3.7953      1.24  |Q        |         |         |      V  |
22+10       3.8038      1.23  |Q        |         |         |      V  |
22+15       3.8122      1.23  |Q        |         |         |       V |
22+20       3.8206      1.22  |Q        |         |         |       V |
22+25       3.8290      1.21  |Q        |         |         |       V |
22+30       3.8372      1.20  |Q        |         |         |       V |
22+35       3.8455      1.20  |Q        |         |         |       V |
22+40       3.8537      1.19  |Q        |         |         |       V |
22+45       3.8618      1.18  |Q        |         |         |       V |
22+50       3.8699      1.17  |Q        |         |         |       V |
22+55       3.8779      1.17  |Q        |         |         |       V |
```

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   23+ 0       3.8859      1.16  |Q        |         |         |       V |
   23+ 5       3.8939      1.15  |Q        |         |         |       V |
   23+10       3.9018      1.15  |Q        |         |         |       V |
   23+15       3.9097      1.14  |Q        |         |         |        V|
   23+20       3.9175      1.14  |Q        |         |         |        V|
   23+25       3.9253      1.13  |Q        |         |         |        V|
   23+30       3.9330      1.12  |Q        |         |         |        V|
   23+35       3.9407      1.12  |Q        |         |         |        V|
   23+40       3.9484      1.11  |Q        |         |         |        V|
   23+45       3.9560      1.11  |Q        |         |         |        V|
   23+50       3.9636      1.10  |Q        |         |         |        V|
   23+55       3.9711      1.10  |Q        |         |         |        V|
   24+ 0       3.9786      1.09  |Q        |         |         |        V|
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U n i t H y d r o g r a p h A n a l y s i s

Study date 07/12/21

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

Program License Serial Number 6385

Amethyst Crossing
10-year developed
ACdev10

Storm Event Year = 10

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
11.42	1	0.70
Rainfall data for year 10		
11.42	6	1.47
Rainfall data for year 10		
11.42	24	2.98

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	11.42	1.000	0.978	0.120	0.117

Area-averaged adjusted loss rate Fm (In/Hr) = 0.117

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
1.37	0.120	32.0	32.0	14.90	0.000
10.05	0.880	98.0	98.0	0.20	0.922

Area-averaged catchment yield fraction, Y = 0.812
Area-averaged low loss fraction, Yb = 0.188
User entry of time of concentration = 0.303 (hours)
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Watershed area = 11.42(Ac.)
Catchment Lag time = 0.242 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 34.3784
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.117(In/Hr)
Average low loss rate fraction (Yb) = 0.188 (decimal)
DESERT S-Graph Selected
Computed peak 5-minute rainfall = 0.199(In)
Computed peak 30-minute rainfall = 0.519(In)
Specified peak 1-hour rainfall = 0.700(In)
Computed peak 3-hour rainfall = 1.080(In)
Specified peak 6-hour rainfall = 1.470(In)
Specified peak 24-hour rainfall = 2.980(In)

Note: user specified rainfall values used.
Rainfall depth area reduction factors:
Using a total area of 11.42(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.199(In)
30-minute factor = 0.999 Adjusted rainfall = 0.519(In)
1-hour factor = 0.999 Adjusted rainfall = 0.700(In)
3-hour factor = 1.000 Adjusted rainfall = 1.080(In)
6-hour factor = 1.000 Adjusted rainfall = 1.470(In)
24-hour factor = 1.000 Adjusted rainfall = 2.980(In)

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

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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 138.11 (CFS))	
1	2.172	3.000
2	12.813	14.697
3	39.789	37.257
4	59.167	26.763
5	69.523	14.302
6	76.413	9.516
7	81.311	6.764
8	85.037	5.146
9	88.052	4.163
10	90.275	3.071
11	92.122	2.550
12	93.673	2.142
13	94.911	1.710
14	95.966	1.457
15	96.832	1.197
16	97.492	0.911
17	97.972	0.664
18	98.327	0.489
19	98.732	0.560
20	99.145	0.570
21	99.517	0.514
22	99.745	0.315
23	100.000	0.157

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.1989	0.1989
2	0.2882	0.0893
3	0.3580	0.0698
4	0.4176	0.0596
5	0.4705	0.0529
6	0.5187	0.0482
7	0.5544	0.0357
8	0.5873	0.0329
9	0.6179	0.0306
10	0.6467	0.0287
11	0.6738	0.0272
12	0.6996	0.0258
13	0.7221	0.0225
14	0.7436	0.0215
15	0.7641	0.0205
16	0.7839	0.0197
17	0.8029	0.0190
18	0.8212	0.0183

19	0.8389	0.0177
20	0.8561	0.0172
21	0.8728	0.0167
22	0.8890	0.0162
23	0.9047	0.0158
24	0.9201	0.0153
25	0.9350	0.0150
26	0.9496	0.0146
27	0.9639	0.0143
28	0.9778	0.0140
29	0.9915	0.0137
30	1.0049	0.0134
31	1.0180	0.0131
32	1.0308	0.0129
33	1.0434	0.0126
34	1.0558	0.0124
35	1.0680	0.0122
36	1.0799	0.0120
37	1.0932	0.0132
38	1.1062	0.0130
39	1.1191	0.0129
40	1.1317	0.0127
41	1.1442	0.0125
42	1.1566	0.0123
43	1.1687	0.0122
44	1.1808	0.0120
45	1.1926	0.0119
46	1.2043	0.0117
47	1.2159	0.0116
48	1.2274	0.0114
49	1.2387	0.0113
50	1.2498	0.0112
51	1.2609	0.0111
52	1.2718	0.0109
53	1.2827	0.0108
54	1.2934	0.0107
55	1.3040	0.0106
56	1.3145	0.0105
57	1.3249	0.0104
58	1.3352	0.0103
59	1.3453	0.0102
60	1.3554	0.0101
61	1.3654	0.0100
62	1.3754	0.0099
63	1.3852	0.0098
64	1.3949	0.0097
65	1.4046	0.0097
66	1.4141	0.0096
67	1.4236	0.0095
68	1.4330	0.0094

69	1.4424	0.0093
70	1.4516	0.0093
71	1.4608	0.0092
72	1.4699	0.0091
73	1.4803	0.0104
74	1.4906	0.0103
75	1.5009	0.0102
76	1.5110	0.0102
77	1.5211	0.0101
78	1.5312	0.0100
79	1.5411	0.0100
80	1.5511	0.0099
81	1.5609	0.0099
82	1.5707	0.0098
83	1.5804	0.0097
84	1.5901	0.0097
85	1.5997	0.0096
86	1.6093	0.0096
87	1.6188	0.0095
88	1.6283	0.0095
89	1.6377	0.0094
90	1.6470	0.0094
91	1.6563	0.0093
92	1.6656	0.0093
93	1.6748	0.0092
94	1.6840	0.0092
95	1.6931	0.0091
96	1.7021	0.0091
97	1.7111	0.0090
98	1.7201	0.0090
99	1.7290	0.0089
100	1.7379	0.0089
101	1.7468	0.0088
102	1.7555	0.0088
103	1.7643	0.0088
104	1.7730	0.0087
105	1.7817	0.0087
106	1.7903	0.0086
107	1.7989	0.0086
108	1.8075	0.0086
109	1.8160	0.0085
110	1.8244	0.0085
111	1.8329	0.0084
112	1.8413	0.0084
113	1.8496	0.0084
114	1.8580	0.0083
115	1.8663	0.0083
116	1.8745	0.0083
117	1.8827	0.0082
118	1.8909	0.0082

119	1.8991	0.0082
120	1.9072	0.0081
121	1.9153	0.0081
122	1.9233	0.0081
123	1.9313	0.0080
124	1.9393	0.0080
125	1.9473	0.0080
126	1.9552	0.0079
127	1.9631	0.0079
128	1.9710	0.0079
129	1.9788	0.0078
130	1.9866	0.0078
131	1.9944	0.0078
132	2.0021	0.0077
133	2.0098	0.0077
134	2.0175	0.0077
135	2.0252	0.0077
136	2.0328	0.0076
137	2.0404	0.0076
138	2.0480	0.0076
139	2.0556	0.0076
140	2.0631	0.0075
141	2.0706	0.0075
142	2.0781	0.0075
143	2.0855	0.0074
144	2.0929	0.0074
145	2.1003	0.0074
146	2.1077	0.0074
147	2.1151	0.0073
148	2.1224	0.0073
149	2.1297	0.0073
150	2.1369	0.0073
151	2.1442	0.0073
152	2.1514	0.0072
153	2.1586	0.0072
154	2.1658	0.0072
155	2.1730	0.0072
156	2.1801	0.0071
157	2.1872	0.0071
158	2.1943	0.0071
159	2.2014	0.0071
160	2.2084	0.0070
161	2.2154	0.0070
162	2.2224	0.0070
163	2.2294	0.0070
164	2.2364	0.0070
165	2.2433	0.0069
166	2.2503	0.0069
167	2.2572	0.0069
168	2.2640	0.0069

169	2.2709	0.0069
170	2.2777	0.0068
171	2.2846	0.0068
172	2.2914	0.0068
173	2.2981	0.0068
174	2.3049	0.0068
175	2.3116	0.0067
176	2.3184	0.0067
177	2.3251	0.0067
178	2.3318	0.0067
179	2.3384	0.0067
180	2.3451	0.0067
181	2.3517	0.0066
182	2.3583	0.0066
183	2.3649	0.0066
184	2.3715	0.0066
185	2.3781	0.0066
186	2.3846	0.0065
187	2.3911	0.0065
188	2.3976	0.0065
189	2.4041	0.0065
190	2.4106	0.0065
191	2.4171	0.0065
192	2.4235	0.0064
193	2.4299	0.0064
194	2.4363	0.0064
195	2.4427	0.0064
196	2.4491	0.0064
197	2.4555	0.0064
198	2.4618	0.0063
199	2.4682	0.0063
200	2.4745	0.0063
201	2.4808	0.0063
202	2.4871	0.0063
203	2.4933	0.0063
204	2.4996	0.0063
205	2.5058	0.0062
206	2.5120	0.0062
207	2.5182	0.0062
208	2.5244	0.0062
209	2.5306	0.0062
210	2.5368	0.0062
211	2.5429	0.0062
212	2.5491	0.0061
213	2.5552	0.0061
214	2.5613	0.0061
215	2.5674	0.0061
216	2.5735	0.0061
217	2.5795	0.0061
218	2.5856	0.0061

219	2.5916	0.0060
220	2.5977	0.0060
221	2.6037	0.0060
222	2.6097	0.0060
223	2.6157	0.0060
224	2.6216	0.0060
225	2.6276	0.0060
226	2.6335	0.0059
227	2.6395	0.0059
228	2.6454	0.0059
229	2.6513	0.0059
230	2.6572	0.0059
231	2.6631	0.0059
232	2.6690	0.0059
233	2.6748	0.0059
234	2.6807	0.0058
235	2.6865	0.0058
236	2.6923	0.0058
237	2.6981	0.0058
238	2.7039	0.0058
239	2.7097	0.0058
240	2.7155	0.0058
241	2.7212	0.0058
242	2.7270	0.0058
243	2.7327	0.0057
244	2.7385	0.0057
245	2.7442	0.0057
246	2.7499	0.0057
247	2.7556	0.0057
248	2.7612	0.0057
249	2.7669	0.0057
250	2.7726	0.0057
251	2.7782	0.0056
252	2.7839	0.0056
253	2.7895	0.0056
254	2.7951	0.0056
255	2.8007	0.0056
256	2.8063	0.0056
257	2.8119	0.0056
258	2.8175	0.0056
259	2.8230	0.0056
260	2.8286	0.0056
261	2.8341	0.0055
262	2.8396	0.0055
263	2.8452	0.0055
264	2.8507	0.0055
265	2.8562	0.0055
266	2.8617	0.0055
267	2.8671	0.0055
268	2.8726	0.0055

269	2.8781	0.0055
270	2.8835	0.0054
271	2.8890	0.0054
272	2.8944	0.0054
273	2.8998	0.0054
274	2.9052	0.0054
275	2.9106	0.0054
276	2.9160	0.0054
277	2.9214	0.0054
278	2.9268	0.0054
279	2.9321	0.0054
280	2.9375	0.0054
281	2.9428	0.0053
282	2.9481	0.0053
283	2.9535	0.0053
284	2.9588	0.0053
285	2.9641	0.0053
286	2.9694	0.0053
287	2.9747	0.0053
288	2.9800	0.0053

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0053	0.0010	0.0043
2	0.0053	0.0010	0.0043
3	0.0053	0.0010	0.0043
4	0.0053	0.0010	0.0043
5	0.0053	0.0010	0.0043
6	0.0053	0.0010	0.0043
7	0.0054	0.0010	0.0044
8	0.0054	0.0010	0.0044
9	0.0054	0.0010	0.0044
10	0.0054	0.0010	0.0044
11	0.0054	0.0010	0.0044
12	0.0054	0.0010	0.0044
13	0.0054	0.0010	0.0044
14	0.0055	0.0010	0.0044
15	0.0055	0.0010	0.0044
16	0.0055	0.0010	0.0045
17	0.0055	0.0010	0.0045
18	0.0055	0.0010	0.0045
19	0.0055	0.0010	0.0045
20	0.0056	0.0010	0.0045
21	0.0056	0.0010	0.0045
22	0.0056	0.0011	0.0045
23	0.0056	0.0011	0.0045
24	0.0056	0.0011	0.0046
25	0.0056	0.0011	0.0046

26	0.0056	0.0011	0.0046
27	0.0057	0.0011	0.0046
28	0.0057	0.0011	0.0046
29	0.0057	0.0011	0.0046
30	0.0057	0.0011	0.0046
31	0.0057	0.0011	0.0047
32	0.0058	0.0011	0.0047
33	0.0058	0.0011	0.0047
34	0.0058	0.0011	0.0047
35	0.0058	0.0011	0.0047
36	0.0058	0.0011	0.0047
37	0.0058	0.0011	0.0047
38	0.0059	0.0011	0.0048
39	0.0059	0.0011	0.0048
40	0.0059	0.0011	0.0048
41	0.0059	0.0011	0.0048
42	0.0059	0.0011	0.0048
43	0.0060	0.0011	0.0048
44	0.0060	0.0011	0.0048
45	0.0060	0.0011	0.0049
46	0.0060	0.0011	0.0049
47	0.0060	0.0011	0.0049
48	0.0061	0.0011	0.0049
49	0.0061	0.0011	0.0049
50	0.0061	0.0011	0.0049
51	0.0061	0.0012	0.0050
52	0.0061	0.0012	0.0050
53	0.0062	0.0012	0.0050
54	0.0062	0.0012	0.0050
55	0.0062	0.0012	0.0050
56	0.0062	0.0012	0.0051
57	0.0063	0.0012	0.0051
58	0.0063	0.0012	0.0051
59	0.0063	0.0012	0.0051
60	0.0063	0.0012	0.0051
61	0.0063	0.0012	0.0052
62	0.0064	0.0012	0.0052
63	0.0064	0.0012	0.0052
64	0.0064	0.0012	0.0052
65	0.0064	0.0012	0.0052
66	0.0065	0.0012	0.0052
67	0.0065	0.0012	0.0053
68	0.0065	0.0012	0.0053
69	0.0065	0.0012	0.0053
70	0.0066	0.0012	0.0053
71	0.0066	0.0012	0.0054
72	0.0066	0.0012	0.0054
73	0.0067	0.0013	0.0054
74	0.0067	0.0013	0.0054
75	0.0067	0.0013	0.0054

76	0.0067	0.0013	0.0055
77	0.0068	0.0013	0.0055
78	0.0068	0.0013	0.0055
79	0.0068	0.0013	0.0055
80	0.0068	0.0013	0.0056
81	0.0069	0.0013	0.0056
82	0.0069	0.0013	0.0056
83	0.0069	0.0013	0.0056
84	0.0070	0.0013	0.0057
85	0.0070	0.0013	0.0057
86	0.0070	0.0013	0.0057
87	0.0071	0.0013	0.0057
88	0.0071	0.0013	0.0058
89	0.0071	0.0013	0.0058
90	0.0072	0.0013	0.0058
91	0.0072	0.0014	0.0058
92	0.0072	0.0014	0.0059
93	0.0073	0.0014	0.0059
94	0.0073	0.0014	0.0059
95	0.0073	0.0014	0.0060
96	0.0074	0.0014	0.0060
97	0.0074	0.0014	0.0060
98	0.0074	0.0014	0.0060
99	0.0075	0.0014	0.0061
100	0.0075	0.0014	0.0061
101	0.0076	0.0014	0.0062
102	0.0076	0.0014	0.0062
103	0.0077	0.0014	0.0062
104	0.0077	0.0014	0.0062
105	0.0077	0.0015	0.0063
106	0.0078	0.0015	0.0063
107	0.0078	0.0015	0.0064
108	0.0079	0.0015	0.0064
109	0.0079	0.0015	0.0064
110	0.0080	0.0015	0.0065
111	0.0080	0.0015	0.0065
112	0.0081	0.0015	0.0065
113	0.0081	0.0015	0.0066
114	0.0082	0.0015	0.0066
115	0.0082	0.0015	0.0067
116	0.0083	0.0016	0.0067
117	0.0083	0.0016	0.0068
118	0.0084	0.0016	0.0068
119	0.0084	0.0016	0.0068
120	0.0085	0.0016	0.0069
121	0.0086	0.0016	0.0069
122	0.0086	0.0016	0.0070
123	0.0087	0.0016	0.0070
124	0.0087	0.0016	0.0071
125	0.0088	0.0017	0.0071

126	0.0088	0.0017	0.0072
127	0.0089	0.0017	0.0072
128	0.0090	0.0017	0.0073
129	0.0091	0.0017	0.0074
130	0.0091	0.0017	0.0074
131	0.0092	0.0017	0.0075
132	0.0093	0.0017	0.0075
133	0.0094	0.0018	0.0076
134	0.0094	0.0018	0.0076
135	0.0095	0.0018	0.0077
136	0.0096	0.0018	0.0078
137	0.0097	0.0018	0.0079
138	0.0097	0.0018	0.0079
139	0.0099	0.0019	0.0080
140	0.0099	0.0019	0.0080
141	0.0100	0.0019	0.0081
142	0.0101	0.0019	0.0082
143	0.0102	0.0019	0.0083
144	0.0103	0.0019	0.0084
145	0.0091	0.0017	0.0074
146	0.0092	0.0017	0.0075
147	0.0093	0.0018	0.0076
148	0.0094	0.0018	0.0076
149	0.0096	0.0018	0.0078
150	0.0097	0.0018	0.0078
151	0.0098	0.0019	0.0080
152	0.0099	0.0019	0.0080
153	0.0101	0.0019	0.0082
154	0.0102	0.0019	0.0083
155	0.0104	0.0020	0.0084
156	0.0105	0.0020	0.0085
157	0.0107	0.0020	0.0087
158	0.0108	0.0020	0.0088
159	0.0111	0.0021	0.0090
160	0.0112	0.0021	0.0091
161	0.0114	0.0022	0.0093
162	0.0116	0.0022	0.0094
163	0.0119	0.0022	0.0096
164	0.0120	0.0023	0.0098
165	0.0123	0.0023	0.0100
166	0.0125	0.0024	0.0101
167	0.0129	0.0024	0.0104
168	0.0130	0.0025	0.0106
169	0.0120	0.0023	0.0097
170	0.0122	0.0023	0.0099
171	0.0126	0.0024	0.0102
172	0.0129	0.0024	0.0104
173	0.0134	0.0025	0.0109
174	0.0137	0.0026	0.0111
175	0.0143	0.0027	0.0116

176	0.0146	0.0028	0.0119
177	0.0153	0.0029	0.0125
178	0.0158	0.0030	0.0128
179	0.0167	0.0031	0.0135
180	0.0172	0.0032	0.0139
181	0.0183	0.0035	0.0149
182	0.0190	0.0036	0.0154
183	0.0205	0.0039	0.0167
184	0.0215	0.0040	0.0174
185	0.0258	0.0049	0.0209
186	0.0272	0.0051	0.0220
187	0.0306	0.0058	0.0249
188	0.0329	0.0062	0.0267
189	0.0482	0.0091	0.0391
190	0.0529	0.0098	0.0432
191	0.0698	0.0098	0.0600
192	0.0893	0.0098	0.0795
193	0.1989	0.0098	0.1891
194	0.0596	0.0098	0.0498
195	0.0357	0.0067	0.0290
196	0.0287	0.0054	0.0233
197	0.0225	0.0042	0.0182
198	0.0197	0.0037	0.0160
199	0.0177	0.0033	0.0144
200	0.0162	0.0031	0.0131
201	0.0150	0.0028	0.0121
202	0.0140	0.0026	0.0113
203	0.0131	0.0025	0.0106
204	0.0124	0.0023	0.0100
205	0.0132	0.0025	0.0107
206	0.0127	0.0024	0.0103
207	0.0122	0.0023	0.0099
208	0.0117	0.0022	0.0095
209	0.0113	0.0021	0.0092
210	0.0109	0.0021	0.0089
211	0.0106	0.0020	0.0086
212	0.0103	0.0019	0.0084
213	0.0100	0.0019	0.0081
214	0.0097	0.0018	0.0079
215	0.0095	0.0018	0.0077
216	0.0093	0.0017	0.0075
217	0.0104	0.0020	0.0084
218	0.0102	0.0019	0.0083
219	0.0100	0.0019	0.0081
220	0.0098	0.0018	0.0079
221	0.0096	0.0018	0.0078
222	0.0095	0.0018	0.0077
223	0.0093	0.0018	0.0076
224	0.0092	0.0017	0.0074
225	0.0090	0.0017	0.0073

226	0.0089	0.0017	0.0072
227	0.0088	0.0016	0.0071
228	0.0086	0.0016	0.0070
229	0.0085	0.0016	0.0069
230	0.0084	0.0016	0.0068
231	0.0083	0.0016	0.0067
232	0.0082	0.0015	0.0066
233	0.0081	0.0015	0.0066
234	0.0080	0.0015	0.0065
235	0.0079	0.0015	0.0064
236	0.0078	0.0015	0.0063
237	0.0077	0.0015	0.0063
238	0.0076	0.0014	0.0062
239	0.0076	0.0014	0.0061
240	0.0075	0.0014	0.0061
241	0.0074	0.0014	0.0060
242	0.0073	0.0014	0.0059
243	0.0073	0.0014	0.0059
244	0.0072	0.0014	0.0058
245	0.0071	0.0013	0.0058
246	0.0070	0.0013	0.0057
247	0.0070	0.0013	0.0057
248	0.0069	0.0013	0.0056
249	0.0069	0.0013	0.0056
250	0.0068	0.0013	0.0055
251	0.0067	0.0013	0.0055
252	0.0067	0.0013	0.0054
253	0.0066	0.0012	0.0054
254	0.0066	0.0012	0.0053
255	0.0065	0.0012	0.0053
256	0.0065	0.0012	0.0053
257	0.0064	0.0012	0.0052
258	0.0064	0.0012	0.0052
259	0.0063	0.0012	0.0051
260	0.0063	0.0012	0.0051
261	0.0062	0.0012	0.0051
262	0.0062	0.0012	0.0050
263	0.0062	0.0012	0.0050
264	0.0061	0.0012	0.0050
265	0.0061	0.0011	0.0049
266	0.0060	0.0011	0.0049
267	0.0060	0.0011	0.0049
268	0.0059	0.0011	0.0048
269	0.0059	0.0011	0.0048
270	0.0059	0.0011	0.0048
271	0.0058	0.0011	0.0047
272	0.0058	0.0011	0.0047
273	0.0058	0.0011	0.0047
274	0.0057	0.0011	0.0046
275	0.0057	0.0011	0.0046

276	0.0057	0.0011	0.0046
277	0.0056	0.0011	0.0046
278	0.0056	0.0011	0.0045
279	0.0056	0.0010	0.0045
280	0.0055	0.0010	0.0045
281	0.0055	0.0010	0.0045
282	0.0055	0.0010	0.0044
283	0.0054	0.0010	0.0044
284	0.0054	0.0010	0.0044
285	0.0054	0.0010	0.0044
286	0.0054	0.0010	0.0043
287	0.0053	0.0010	0.0043
288	0.0053	0.0010	0.0043

Total soil rain loss = 0.52(In)
Total effective rainfall = 2.46(In)
Peak flow rate in flood hydrograph = 12.05(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

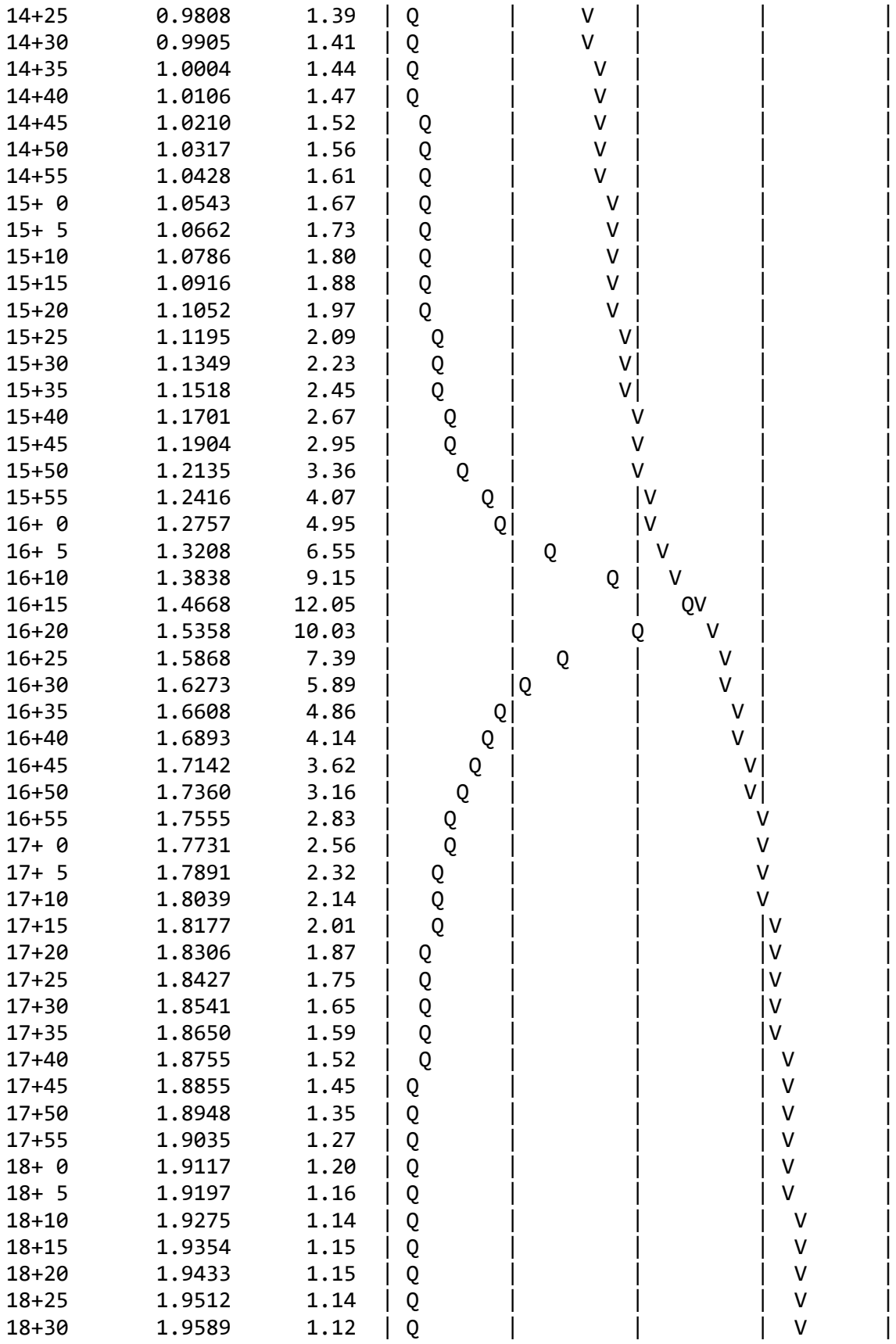
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0001	0.01	Q	|	|	|	|
0+10	0.0006	0.08	Q	|	|	|	|
0+15	0.0022	0.24	Q	|	|	|	|
0+20	0.0046	0.35	Q	|	|	|	|
0+25	0.0075	0.41	Q	|	|	|	|
0+30	0.0106	0.45	Q	|	|	|	|
0+35	0.0140	0.48	Q	|	|	|	|
0+40	0.0175	0.51	VQ	|	|	|	|
0+45	0.0211	0.53	VQ	|	|	|	|
0+50	0.0248	0.54	VQ	|	|	|	|
0+55	0.0286	0.55	VQ	|	|	|	|
1+ 0	0.0325	0.56	VQ	|	|	|	|
1+ 5	0.0365	0.57	VQ	|	|	|	|
1+10	0.0405	0.58	VQ	|	|	|	|
1+15	0.0445	0.59	VQ	|	|	|	|
1+20	0.0486	0.59	VQ	|	|	|	|
1+25	0.0528	0.60	VQ	|	|	|	|
1+30	0.0569	0.60	VQ	|	|	|	|
1+35	0.0611	0.61	|Q	|	|	|	|
1+40	0.0653	0.61	|Q	|	|	|	|
1+45	0.0695	0.61	|Q	|	|	|	|
1+50	0.0738	0.62	|Q	|	|	|	|

1+55	0.0780	0.62	|Q	|	|	|	|
2+ 0	0.0823	0.62	|Q	|	|	|	|
2+ 5	0.0866	0.62	|Q	|	|	|	|
2+10	0.0909	0.62	|Q	|	|	|	|
2+15	0.0952	0.63	|Q	|	|	|	|
2+20	0.0995	0.63	|Q	|	|	|	|
2+25	0.1039	0.63	|Q	|	|	|	|
2+30	0.1082	0.63	|Q	|	|	|	|
2+35	0.1126	0.63	|Q	|	|	|	|
2+40	0.1170	0.64	|QV	|	|	|	|
2+45	0.1214	0.64	|QV	|	|	|	|
2+50	0.1258	0.64	|QV	|	|	|	|
2+55	0.1302	0.64	|QV	|	|	|	|
3+ 0	0.1346	0.64	|QV	|	|	|	|
3+ 5	0.1391	0.65	|QV	|	|	|	|
3+10	0.1435	0.65	|QV	|	|	|	|
3+15	0.1480	0.65	|QV	|	|	|	|
3+20	0.1525	0.65	|QV	|	|	|	|
3+25	0.1570	0.65	|QV	|	|	|	|
3+30	0.1615	0.66	|QV	|	|	|	|
3+35	0.1660	0.66	|QV	|	|	|	|
3+40	0.1706	0.66	|QV	|	|	|	|
3+45	0.1751	0.66	|Q V	|	|	|	|
3+50	0.1797	0.66	|Q V	|	|	|	|
3+55	0.1843	0.67	|Q V	|	|	|	|
4+ 0	0.1889	0.67	|Q V	|	|	|	|
4+ 5	0.1935	0.67	|Q V	|	|	|	|
4+10	0.1982	0.67	|Q V	|	|	|	|
4+15	0.2028	0.68	|Q V	|	|	|	|
4+20	0.2075	0.68	|Q V	|	|	|	|
4+25	0.2121	0.68	|Q V	|	|	|	|
4+30	0.2168	0.68	|Q V	|	|	|	|
4+35	0.2216	0.68	|Q V	|	|	|	|
4+40	0.2263	0.69	|Q V	|	|	|	|
4+45	0.2310	0.69	|Q V	|	|	|	|
4+50	0.2358	0.69	|Q V	|	|	|	|
4+55	0.2406	0.69	|Q V	|	|	|	|
5+ 0	0.2454	0.70	|Q V	|	|	|	|
5+ 5	0.2502	0.70	|Q V	|	|	|	|
5+10	0.2550	0.70	|Q V	|	|	|	|
5+15	0.2599	0.70	|Q V	|	|	|	|
5+20	0.2647	0.71	|Q V	|	|	|	|
5+25	0.2696	0.71	|Q V	|	|	|	|
5+30	0.2745	0.71	|Q V	|	|	|	|
5+35	0.2794	0.71	|Q V	|	|	|	|
5+40	0.2844	0.72	|Q V	|	|	|	|
5+45	0.2893	0.72	|Q V	|	|	|	|
5+50	0.2943	0.72	|Q V	|	|	|	|
5+55	0.2993	0.73	|Q V	|	|	|	|
6+ 0	0.3043	0.73	|Q V	|	|	|	|

6+ 5	0.3094	0.73	|Q V |	|	|	|
6+10	0.3144	0.73	|Q V |	|	|	|
6+15	0.3195	0.74	|Q V |	|	|	|
6+20	0.3246	0.74	|Q V |	|	|	|
6+25	0.3297	0.74	|Q V |	|	|	|
6+30	0.3349	0.75	|Q V |	|	|	|
6+35	0.3400	0.75	|Q V |	|	|	|
6+40	0.3452	0.75	|Q V |	|	|	|
6+45	0.3504	0.76	|Q V |	|	|	|
6+50	0.3556	0.76	|Q V |	|	|	|
6+55	0.3609	0.76	|Q V |	|	|	|
7+ 0	0.3662	0.77	|Q V |	|	|	|
7+ 5	0.3715	0.77	|Q V |	|	|	|
7+10	0.3768	0.77	|Q V |	|	|	|
7+15	0.3821	0.78	|Q V |	|	|	|
7+20	0.3875	0.78	|Q V |	|	|	|
7+25	0.3929	0.78	|Q V |	|	|	|
7+30	0.3983	0.79	|Q V |	|	|	|
7+35	0.4037	0.79	|Q V |	|	|	|
7+40	0.4092	0.79	|Q V |	|	|	|
7+45	0.4147	0.80	|Q V |	|	|	|
7+50	0.4202	0.80	|Q V |	|	|	|
7+55	0.4257	0.80	|Q V |	|	|	|
8+ 0	0.4313	0.81	|Q V |	|	|	|
8+ 5	0.4369	0.81	|Q V |	|	|	|
8+10	0.4425	0.82	|Q V |	|	|	|
8+15	0.4482	0.82	|Q V |	|	|	|
8+20	0.4539	0.82	|Q V |	|	|	|
8+25	0.4596	0.83	|Q V |	|	|	|
8+30	0.4653	0.83	|Q V |	|	|	|
8+35	0.4711	0.84	|Q V |	|	|	|
8+40	0.4769	0.84	|Q V |	|	|	|
8+45	0.4827	0.85	|Q V |	|	|	|
8+50	0.4886	0.85	|Q V |	|	|	|
8+55	0.4945	0.86	|Q V |	|	|	|
9+ 0	0.5004	0.86	|Q V |	|	|	|
9+ 5	0.5064	0.87	|Q V |	|	|	|
9+10	0.5124	0.87	|Q V |	|	|	|
9+15	0.5184	0.88	|Q V |	|	|	|
9+20	0.5245	0.88	|Q V |	|	|	|
9+25	0.5306	0.89	|Q V|	|	|	|
9+30	0.5367	0.89	|Q V|	|	|	|
9+35	0.5429	0.90	|Q V|	|	|	|
9+40	0.5491	0.90	|Q V|	|	|	|
9+45	0.5553	0.91	|Q V|	|	|	|
9+50	0.5616	0.91	|Q V|	|	|	|
9+55	0.5679	0.92	|Q V|	|	|	|
10+ 0	0.5743	0.92	|Q V|	|	|	|
10+ 5	0.5807	0.93	|Q V|	|	|	|
10+10	0.5871	0.94	|Q V |	|	|	|

```
10+15       0.5936      0.94  |Q        V         |         |         |
10+20       0.6002      0.95  |Q        V         |         |         |
10+25       0.6067      0.96  |Q        V         |         |         |
10+30       0.6134      0.96  |Q        V         |         |         |
10+35       0.6200      0.97  |Q        V         |         |         |
10+40       0.6267      0.98  |Q        V         |         |         |
10+45       0.6335      0.98  |Q        V         |         |         |
10+50       0.6403      0.99  |Q        V         |         |         |
10+55       0.6472      1.00  |Q        |V        |         |         |
11+ 0       0.6541      1.00  | Q       |V        |         |         |
11+ 5       0.6611      1.01  | Q       |V        |         |         |
11+10       0.6681      1.02  | Q       |V        |         |         |
11+15       0.6752      1.03  | Q       |V        |         |         |
11+20       0.6823      1.04  | Q       |V        |         |         |
11+25       0.6895      1.04  | Q       |V        |         |         |
11+30       0.6968      1.05  | Q       |V        |         |         |
11+35       0.7041      1.06  | Q       | V       |         |         |
11+40       0.7114      1.07  | Q       | V       |         |         |
11+45       0.7189      1.08  | Q       | V       |         |         |
11+50       0.7264      1.09  | Q       | V       |         |         |
11+55       0.7340      1.10  | Q       | V       |         |         |
12+ 0       0.7416      1.11  | Q       | V       |         |         |
12+ 5       0.7493      1.12  | Q       | V       |         |         |
12+10       0.7570      1.11  | Q       | V       |         |         |
12+15       0.7644      1.08  | Q       |  V      |         |         |
12+20       0.7718      1.07  | Q       |  V      |         |         |
12+25       0.7791      1.06  | Q       |  V      |         |         |
12+30       0.7864      1.06  | Q       |  V      |         |         |
12+35       0.7938      1.07  | Q       |  V      |         |         |
12+40       0.8012      1.08  | Q       |  V      |         |         |
12+45       0.8087      1.09  | Q       |  V      |         |         |
12+50       0.8162      1.10  | Q       |  V      |         |         |
12+55       0.8239      1.11  | Q       |   V     |         |         |
13+ 0       0.8316      1.12  | Q       |   V     |         |         |
13+ 5       0.8394      1.13  | Q       |   V     |         |         |
13+10       0.8473      1.15  | Q       |   V     |         |         |
13+15       0.8553      1.16  | Q       |   V     |         |         |
13+20       0.8634      1.18  | Q       |   V     |         |         |
13+25       0.8717      1.20  | Q       |   V     |         |         |
13+30       0.8801      1.22  | Q       |    V    |         |         |
13+35       0.8886      1.24  | Q       |    V    |         |         |
13+40       0.8972      1.26  | Q       |    V    |         |         |
13+45       0.9060      1.28  | Q       |    V    |         |         |
13+50       0.9150      1.30  | Q       |    V    |         |         |
13+55       0.9241      1.32  | Q       |    V    |         |         |
14+ 0       0.9334      1.35  | Q       |    V    |         |         |
14+ 5       0.9429      1.37  | Q       |     V   |         |         |
14+10       0.9524      1.38  | Q       |     V   |         |         |
14+15       0.9618      1.37  | Q       |     V   |         |         |
14+20       0.9712      1.37  | Q       |     V   |         |         |
```



```
18+35       1.9665      1.11  | Q       |         |         |  V      |
18+40       1.9740      1.09  | Q       |         |         |  V      |
18+45       1.9814      1.07  | Q       |         |         |  V      |
18+50       1.9887      1.06  | Q       |         |         |   V     |
18+55       1.9959      1.04  | Q       |         |         |   V     |
19+ 0       2.0029      1.03  | Q       |         |         |   V     |
19+ 5       2.0099      1.01  | Q       |         |         |   V     |
19+10       2.0168      1.00  |Q        |         |         |   V     |
19+15       2.0236      0.98  |Q        |         |         |   V     |
19+20       2.0303      0.97  |Q        |         |         |   V     |
19+25       2.0369      0.96  |Q        |         |         |   V     |
19+30       2.0434      0.95  |Q        |         |         |    V    |
19+35       2.0498      0.93  |Q        |         |         |    V    |
19+40       2.0562      0.92  |Q        |         |         |    V    |
19+45       2.0624      0.91  |Q        |         |         |    V    |
19+50       2.0686      0.90  |Q        |         |         |    V    |
19+55       2.0748      0.89  |Q        |         |         |    V    |
20+ 0       2.0808      0.88  |Q        |         |         |    V    |
20+ 5       2.0868      0.87  |Q        |         |         |    V    |
20+10       2.0927      0.86  |Q        |         |         |    V    |
20+15       2.0986      0.85  |Q        |         |         |    V    |
20+20       2.1044      0.84  |Q        |         |         |     V   |
20+25       2.1101      0.83  |Q        |         |         |     V   |
20+30       2.1158      0.82  |Q        |         |         |     V   |
20+35       2.1214      0.82  |Q        |         |         |     V   |
20+40       2.1270      0.81  |Q        |         |         |     V   |
20+45       2.1325      0.80  |Q        |         |         |     V   |
20+50       2.1379      0.79  |Q        |         |         |     V   |
20+55       2.1433      0.79  |Q        |         |         |     V   |
21+ 0       2.1487      0.78  |Q        |         |         |     V   |
21+ 5       2.1540      0.77  |Q        |         |         |     V   |
21+10       2.1593      0.76  |Q        |         |         |     V   |
21+15       2.1645      0.76  |Q        |         |         |      V  |
21+20       2.1697      0.75  |Q        |         |         |      V  |
21+25       2.1748      0.75  |Q        |         |         |      V  |
21+30       2.1799      0.74  |Q        |         |         |      V  |
21+35       2.1849      0.73  |Q        |         |         |      V  |
21+40       2.1900      0.73  |Q        |         |         |      V  |
21+45       2.1949      0.72  |Q        |         |         |      V  |
21+50       2.1999      0.72  |Q        |         |         |      V  |
21+55       2.2048      0.71  |Q        |         |         |      V  |
22+ 0       2.2096      0.71  |Q        |         |         |      V  |
22+ 5       2.2144      0.70  |Q        |         |         |      V  |
22+10       2.2192      0.70  |Q        |         |         |       V |
22+15       2.2240      0.69  |Q        |         |         |       V |
22+20       2.2287      0.69  |Q        |         |         |       V |
22+25       2.2334      0.68  |Q        |         |         |       V |
22+30       2.2381      0.68  |Q        |         |         |       V |
22+35       2.2427      0.67  |Q        |         |         |       V |
22+40       2.2473      0.67  |Q        |         |         |       V |
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   22+45       2.2519      0.66  |Q        |         |         |       V |
   22+50       2.2564      0.66  |Q        |         |         |       V |
   22+55       2.2609      0.65  |Q        |         |         |       V |
   23+ 0       2.2654      0.65  |Q        |         |         |       V |
   23+ 5       2.2698      0.65  |Q        |         |         |       V |
   23+10       2.2743      0.64  |Q        |         |         |       V |
   23+15       2.2787      0.64  |Q        |         |         |        V|
   23+20       2.2830      0.63  |Q        |         |         |        V|
   23+25       2.2874      0.63  |Q        |         |         |        V|
   23+30       2.2917      0.63  |Q        |         |         |        V|
   23+35       2.2960      0.62  |Q        |         |         |        V|
   23+40       2.3003      0.62  |Q        |         |         |        V|
   23+45       2.3045      0.62  |Q        |         |         |        V|
   23+50       2.3087      0.61  |Q        |         |         |        V|
   23+55       2.3129      0.61  |Q        |         |         |        V|
   24+ 0       2.3171      0.61  |Q        |         |         |        V|
-------------------------------------------------------------------------
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U n i t H y d r o g r a p h A n a l y s i s

Study date 08/12/21

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

Program License Serial Number 6385

Amethyst Crossing
Developed 100- year
Onsite

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 100		
11.42	1	1.16
Rainfall data for year 100		
11.42	6	2.53
Rainfall data for year 100		
11.42	24	5.42

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	52.0	11.42	1.000	0.785	0.120	0.094

Area-averaged adjusted loss rate Fm (In/Hr) = 0.094

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
1.37	0.120	32.0	52.0	9.23	0.184
10.05	0.880	98.0	98.0	0.20	0.956

Area-averaged catchment yield fraction, Y = 0.864
Area-averaged low loss fraction, Yb = 0.136
User entry of time of concentration = 0.303 (hours)
++
Watershed area = 11.42(Ac.)
Catchment Lag time = 0.242 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 34.3784
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.094(In/Hr)
Average low loss rate fraction (Yb) = 0.136 (decimal)
DESERT S-Graph Selected
Computed peak 5-minute rainfall = 0.550(In)
Computed peak 30-minute rainfall = 0.942(In)
Specified peak 1-hour rainfall = 1.160(In)
Computed peak 3-hour rainfall = 1.871(In)
Specified peak 6-hour rainfall = 2.530(In)
Specified peak 24-hour rainfall = 5.420(In)

Rainfall depth area reduction factors:
Using a total area of 11.42(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.550(In)
30-minute factor = 0.999 Adjusted rainfall = 0.942(In)
1-hour factor = 0.999 Adjusted rainfall = 1.159(In)
3-hour factor = 1.000 Adjusted rainfall = 1.871(In)
6-hour factor = 1.000 Adjusted rainfall = 2.530(In)
24-hour factor = 1.000 Adjusted rainfall = 5.420(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 = 138.11 (CFS))	
1	2.172	3.000
2	12.813	14.697
3	39.789	37.257
4	59.167	26.763
5	69.523	14.302
6	76.413	9.516
7	81.311	6.764
8	85.037	5.146
9	88.052	4.163
10	90.275	3.071
11	92.122	2.550
12	93.673	2.142
13	94.911	1.710
14	95.966	1.457
15	96.832	1.197
16	97.492	0.911
17	97.972	0.664
18	98.327	0.489
19	98.732	0.560
20	99.145	0.570
21	99.517	0.514
22	99.745	0.315
23	100.000	0.157

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5501	0.5501
2	0.6773	0.1272
3	0.7649	0.0876
4	0.8339	0.0689
5	0.8916	0.0577
6	0.9417	0.0501
7	0.9863	0.0446
8	1.0266	0.0403
9	1.0635	0.0369
10	1.0977	0.0342
11	1.1295	0.0318
12	1.1594	0.0299
13	1.2005	0.0411
14	1.2399	0.0394
15	1.2777	0.0378
16	1.3142	0.0364
17	1.3493	0.0352
18	1.3834	0.0340
19	1.4163	0.0330

20	1.4483	0.0320
21	1.4795	0.0311
22	1.5097	0.0303
23	1.5393	0.0295
24	1.5681	0.0288
25	1.5962	0.0281
26	1.6237	0.0275
27	1.6506	0.0269
28	1.6770	0.0264
29	1.7028	0.0258
30	1.7282	0.0253
31	1.7530	0.0249
32	1.7774	0.0244
33	1.8014	0.0240
34	1.8250	0.0236
35	1.8482	0.0232
36	1.8710	0.0228
37	1.8935	0.0224
38	1.9156	0.0221
39	1.9374	0.0218
40	1.9588	0.0215
41	1.9800	0.0212
42	2.0009	0.0209
43	2.0215	0.0206
44	2.0418	0.0203
45	2.0619	0.0201
46	2.0817	0.0198
47	2.1013	0.0196
48	2.1206	0.0193
49	2.1397	0.0191
50	2.1586	0.0189
51	2.1773	0.0187
52	2.1958	0.0185
53	2.2141	0.0183
54	2.2322	0.0181
55	2.2501	0.0179
56	2.2678	0.0177
57	2.2853	0.0175
58	2.3027	0.0174
59	2.3199	0.0172
60	2.3369	0.0170
61	2.3538	0.0169
62	2.3705	0.0167
63	2.3871	0.0166
64	2.4035	0.0164
65	2.4198	0.0163
66	2.4359	0.0161
67	2.4519	0.0160
68	2.4677	0.0159
69	2.4835	0.0157

70	2.4991	0.0156
71	2.5146	0.0155
72	2.5299	0.0154
73	2.5492	0.0193
74	2.5683	0.0191
75	2.5873	0.0190
76	2.6062	0.0189
77	2.6250	0.0188
78	2.6437	0.0187
79	2.6623	0.0186
80	2.6807	0.0185
81	2.6991	0.0184
82	2.7174	0.0183
83	2.7355	0.0182
84	2.7536	0.0181
85	2.7716	0.0180
86	2.7894	0.0179
87	2.8072	0.0178
88	2.8249	0.0177
89	2.8425	0.0176
90	2.8600	0.0175
91	2.8774	0.0174
92	2.8948	0.0173
93	2.9120	0.0173
94	2.9292	0.0172
95	2.9463	0.0171
96	2.9633	0.0170
97	2.9802	0.0169
98	2.9970	0.0168
99	3.0138	0.0168
100	3.0305	0.0167
101	3.0471	0.0166
102	3.0637	0.0165
103	3.0801	0.0165
104	3.0965	0.0164
105	3.1129	0.0163
106	3.1291	0.0163
107	3.1453	0.0162
108	3.1614	0.0161
109	3.1775	0.0161
110	3.1935	0.0160
111	3.2094	0.0159
112	3.2253	0.0159
113	3.2410	0.0158
114	3.2568	0.0157
115	3.2725	0.0157
116	3.2881	0.0156
117	3.3036	0.0155
118	3.3191	0.0155
119	3.3345	0.0154

120	3.3499	0.0154
121	3.3652	0.0153
122	3.3805	0.0153
123	3.3957	0.0152
124	3.4108	0.0151
125	3.4259	0.0151
126	3.4409	0.0150
127	3.4559	0.0150
128	3.4709	0.0149
129	3.4857	0.0149
130	3.5006	0.0148
131	3.5153	0.0148
132	3.5300	0.0147
133	3.5447	0.0147
134	3.5593	0.0146
135	3.5739	0.0146
136	3.5884	0.0145
137	3.6029	0.0145
138	3.6174	0.0144
139	3.6317	0.0144
140	3.6461	0.0143
141	3.6604	0.0143
142	3.6746	0.0142
143	3.6888	0.0142
144	3.7030	0.0142
145	3.7171	0.0141
146	3.7311	0.0141
147	3.7452	0.0140
148	3.7591	0.0140
149	3.7731	0.0139
150	3.7870	0.0139
151	3.8008	0.0139
152	3.8146	0.0138
153	3.8284	0.0138
154	3.8421	0.0137
155	3.8558	0.0137
156	3.8695	0.0137
157	3.8831	0.0136
158	3.8967	0.0136
159	3.9102	0.0135
160	3.9237	0.0135
161	3.9372	0.0135
162	3.9506	0.0134
163	3.9640	0.0134
164	3.9773	0.0133
165	3.9906	0.0133
166	4.0039	0.0133
167	4.0171	0.0132
168	4.0303	0.0132
169	4.0435	0.0132

170	4.0566	0.0131
171	4.0697	0.0131
172	4.0828	0.0131
173	4.0958	0.0130
174	4.1088	0.0130
175	4.1218	0.0130
176	4.1347	0.0129
177	4.1476	0.0129
178	4.1605	0.0129
179	4.1733	0.0128
180	4.1861	0.0128
181	4.1989	0.0128
182	4.2116	0.0127
183	4.2243	0.0127
184	4.2370	0.0127
185	4.2496	0.0126
186	4.2622	0.0126
187	4.2748	0.0126
188	4.2874	0.0125
189	4.2999	0.0125
190	4.3124	0.0125
191	4.3248	0.0125
192	4.3373	0.0124
193	4.3497	0.0124
194	4.3620	0.0124
195	4.3744	0.0123
196	4.3867	0.0123
197	4.3990	0.0123
198	4.4112	0.0123
199	4.4235	0.0122
200	4.4357	0.0122
201	4.4478	0.0122
202	4.4600	0.0121
203	4.4721	0.0121
204	4.4842	0.0121
205	4.4963	0.0121
206	4.5083	0.0120
207	4.5203	0.0120
208	4.5323	0.0120
209	4.5443	0.0120
210	4.5562	0.0119
211	4.5681	0.0119
212	4.5800	0.0119
213	4.5919	0.0119
214	4.6037	0.0118
215	4.6155	0.0118
216	4.6273	0.0118
217	4.6391	0.0118
218	4.6508	0.0117
219	4.6625	0.0117

220	4.6742	0.0117
221	4.6859	0.0117
222	4.6975	0.0116
223	4.7091	0.0116
224	4.7207	0.0116
225	4.7323	0.0116
226	4.7438	0.0115
227	4.7554	0.0115
228	4.7669	0.0115
229	4.7783	0.0115
230	4.7898	0.0115
231	4.8012	0.0114
232	4.8126	0.0114
233	4.8240	0.0114
234	4.8354	0.0114
235	4.8467	0.0113
236	4.8581	0.0113
237	4.8694	0.0113
238	4.8807	0.0113
239	4.8919	0.0113
240	4.9032	0.0112
241	4.9144	0.0112
242	4.9256	0.0112
243	4.9367	0.0112
244	4.9479	0.0112
245	4.9590	0.0111
246	4.9701	0.0111
247	4.9812	0.0111
248	4.9923	0.0111
249	5.0034	0.0111
250	5.0144	0.0110
251	5.0254	0.0110
252	5.0364	0.0110
253	5.0474	0.0110
254	5.0583	0.0110
255	5.0693	0.0109
256	5.0802	0.0109
257	5.0911	0.0109
258	5.1020	0.0109
259	5.1128	0.0109
260	5.1237	0.0108
261	5.1345	0.0108
262	5.1453	0.0108
263	5.1561	0.0108
264	5.1668	0.0108
265	5.1776	0.0107
266	5.1883	0.0107
267	5.1990	0.0107
268	5.2097	0.0107
269	5.2204	0.0107

270	5.2310	0.0107
271	5.2417	0.0106
272	5.2523	0.0106
273	5.2629	0.0106
274	5.2735	0.0106
275	5.2841	0.0106
276	5.2946	0.0106
277	5.3052	0.0105
278	5.3157	0.0105
279	5.3262	0.0105
280	5.3367	0.0105
281	5.3471	0.0105
282	5.3576	0.0104
283	5.3680	0.0104
284	5.3784	0.0104
285	5.3888	0.0104
286	5.3992	0.0104
287	5.4096	0.0104
288	5.4199	0.0104

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0104	0.0014	0.0089
2	0.0104	0.0014	0.0090
3	0.0104	0.0014	0.0090
4	0.0104	0.0014	0.0090
5	0.0104	0.0014	0.0090
6	0.0105	0.0014	0.0090
7	0.0105	0.0014	0.0091
8	0.0105	0.0014	0.0091
9	0.0106	0.0014	0.0091
10	0.0106	0.0014	0.0091
11	0.0106	0.0014	0.0092
12	0.0106	0.0014	0.0092
13	0.0107	0.0015	0.0092
14	0.0107	0.0015	0.0092
15	0.0107	0.0015	0.0092
16	0.0107	0.0015	0.0093
17	0.0108	0.0015	0.0093
18	0.0108	0.0015	0.0093
19	0.0108	0.0015	0.0093
20	0.0108	0.0015	0.0094
21	0.0109	0.0015	0.0094
22	0.0109	0.0015	0.0094
23	0.0109	0.0015	0.0094
24	0.0110	0.0015	0.0095
25	0.0110	0.0015	0.0095
26	0.0110	0.0015	0.0095

27	0.0111	0.0015	0.0095
28	0.0111	0.0015	0.0096
29	0.0111	0.0015	0.0096
30	0.0111	0.0015	0.0096
31	0.0112	0.0015	0.0097
32	0.0112	0.0015	0.0097
33	0.0112	0.0015	0.0097
34	0.0113	0.0015	0.0097
35	0.0113	0.0015	0.0098
36	0.0113	0.0015	0.0098
37	0.0114	0.0016	0.0098
38	0.0114	0.0016	0.0098
39	0.0114	0.0016	0.0099
40	0.0115	0.0016	0.0099
41	0.0115	0.0016	0.0099
42	0.0115	0.0016	0.0100
43	0.0116	0.0016	0.0100
44	0.0116	0.0016	0.0100
45	0.0116	0.0016	0.0101
46	0.0117	0.0016	0.0101
47	0.0117	0.0016	0.0101
48	0.0117	0.0016	0.0101
49	0.0118	0.0016	0.0102
50	0.0118	0.0016	0.0102
51	0.0119	0.0016	0.0102
52	0.0119	0.0016	0.0103
53	0.0119	0.0016	0.0103
54	0.0120	0.0016	0.0103
55	0.0120	0.0016	0.0104
56	0.0120	0.0016	0.0104
57	0.0121	0.0017	0.0104
58	0.0121	0.0017	0.0105
59	0.0122	0.0017	0.0105
60	0.0122	0.0017	0.0105
61	0.0123	0.0017	0.0106
62	0.0123	0.0017	0.0106
63	0.0123	0.0017	0.0107
64	0.0124	0.0017	0.0107
65	0.0124	0.0017	0.0107
66	0.0125	0.0017	0.0108
67	0.0125	0.0017	0.0108
68	0.0125	0.0017	0.0108
69	0.0126	0.0017	0.0109
70	0.0126	0.0017	0.0109
71	0.0127	0.0017	0.0110
72	0.0127	0.0017	0.0110
73	0.0128	0.0017	0.0111
74	0.0128	0.0018	0.0111
75	0.0129	0.0018	0.0111
76	0.0129	0.0018	0.0112

77	0.0130	0.0018	0.0112
78	0.0130	0.0018	0.0113
79	0.0131	0.0018	0.0113
80	0.0131	0.0018	0.0113
81	0.0132	0.0018	0.0114
82	0.0132	0.0018	0.0114
83	0.0133	0.0018	0.0115
84	0.0133	0.0018	0.0115
85	0.0134	0.0018	0.0116
86	0.0135	0.0018	0.0116
87	0.0135	0.0018	0.0117
88	0.0136	0.0019	0.0117
89	0.0137	0.0019	0.0118
90	0.0137	0.0019	0.0118
91	0.0138	0.0019	0.0119
92	0.0138	0.0019	0.0119
93	0.0139	0.0019	0.0120
94	0.0139	0.0019	0.0120
95	0.0140	0.0019	0.0121
96	0.0141	0.0019	0.0121
97	0.0142	0.0019	0.0122
98	0.0142	0.0019	0.0123
99	0.0143	0.0020	0.0123
100	0.0143	0.0020	0.0124
101	0.0144	0.0020	0.0125
102	0.0145	0.0020	0.0125
103	0.0146	0.0020	0.0126
104	0.0146	0.0020	0.0126
105	0.0147	0.0020	0.0127
106	0.0148	0.0020	0.0128
107	0.0149	0.0020	0.0128
108	0.0149	0.0020	0.0129
109	0.0150	0.0021	0.0130
110	0.0151	0.0021	0.0130
111	0.0152	0.0021	0.0131
112	0.0153	0.0021	0.0132
113	0.0154	0.0021	0.0133
114	0.0154	0.0021	0.0133
115	0.0155	0.0021	0.0134
116	0.0156	0.0021	0.0135
117	0.0157	0.0021	0.0136
118	0.0158	0.0022	0.0136
119	0.0159	0.0022	0.0138
120	0.0160	0.0022	0.0138
121	0.0161	0.0022	0.0139
122	0.0162	0.0022	0.0140
123	0.0163	0.0022	0.0141
124	0.0164	0.0022	0.0142
125	0.0165	0.0023	0.0143
126	0.0166	0.0023	0.0144

127	0.0168	0.0023	0.0145
128	0.0168	0.0023	0.0145
129	0.0170	0.0023	0.0147
130	0.0171	0.0023	0.0148
131	0.0173	0.0024	0.0149
132	0.0173	0.0024	0.0150
133	0.0175	0.0024	0.0151
134	0.0176	0.0024	0.0152
135	0.0178	0.0024	0.0154
136	0.0179	0.0024	0.0154
137	0.0181	0.0025	0.0156
138	0.0182	0.0025	0.0157
139	0.0184	0.0025	0.0159
140	0.0185	0.0025	0.0159
141	0.0187	0.0025	0.0161
142	0.0188	0.0026	0.0162
143	0.0190	0.0026	0.0164
144	0.0191	0.0026	0.0165
145	0.0154	0.0021	0.0133
146	0.0155	0.0021	0.0134
147	0.0157	0.0021	0.0136
148	0.0159	0.0022	0.0137
149	0.0161	0.0022	0.0139
150	0.0163	0.0022	0.0141
151	0.0166	0.0023	0.0143
152	0.0167	0.0023	0.0144
153	0.0170	0.0023	0.0147
154	0.0172	0.0023	0.0149
155	0.0175	0.0024	0.0151
156	0.0177	0.0024	0.0153
157	0.0181	0.0025	0.0156
158	0.0183	0.0025	0.0158
159	0.0187	0.0026	0.0161
160	0.0189	0.0026	0.0163
161	0.0193	0.0026	0.0167
162	0.0196	0.0027	0.0169
163	0.0201	0.0027	0.0173
164	0.0203	0.0028	0.0176
165	0.0209	0.0028	0.0180
166	0.0212	0.0029	0.0183
167	0.0218	0.0030	0.0188
168	0.0221	0.0030	0.0191
169	0.0228	0.0031	0.0197
170	0.0232	0.0032	0.0200
171	0.0240	0.0033	0.0207
172	0.0244	0.0033	0.0211
173	0.0253	0.0035	0.0219
174	0.0258	0.0035	0.0223
175	0.0269	0.0037	0.0232
176	0.0275	0.0038	0.0238

177	0.0288	0.0039	0.0249
178	0.0295	0.0040	0.0255
179	0.0311	0.0042	0.0269
180	0.0320	0.0044	0.0276
181	0.0340	0.0046	0.0294
182	0.0352	0.0048	0.0304
183	0.0378	0.0052	0.0327
184	0.0394	0.0054	0.0340
185	0.0299	0.0041	0.0258
186	0.0318	0.0043	0.0275
187	0.0369	0.0050	0.0319
188	0.0403	0.0055	0.0348
189	0.0501	0.0068	0.0433
190	0.0577	0.0079	0.0499
191	0.0876	0.0079	0.0798
192	0.1272	0.0079	0.1193
193	0.5501	0.0079	0.5423
194	0.0689	0.0079	0.0611
195	0.0446	0.0061	0.0385
196	0.0342	0.0047	0.0295
197	0.0411	0.0056	0.0355
198	0.0364	0.0050	0.0315
199	0.0330	0.0045	0.0285
200	0.0303	0.0041	0.0262
201	0.0281	0.0038	0.0243
202	0.0264	0.0036	0.0228
203	0.0249	0.0034	0.0215
204	0.0236	0.0032	0.0204
205	0.0224	0.0031	0.0194
206	0.0215	0.0029	0.0185
207	0.0206	0.0028	0.0178
208	0.0198	0.0027	0.0171
209	0.0191	0.0026	0.0165
210	0.0185	0.0025	0.0160
211	0.0179	0.0024	0.0155
212	0.0174	0.0024	0.0150
213	0.0169	0.0023	0.0146
214	0.0164	0.0022	0.0142
215	0.0160	0.0022	0.0138
216	0.0156	0.0021	0.0135
217	0.0193	0.0026	0.0166
218	0.0189	0.0026	0.0163
219	0.0186	0.0025	0.0160
220	0.0183	0.0025	0.0158
221	0.0180	0.0025	0.0155
222	0.0177	0.0024	0.0153
223	0.0174	0.0024	0.0150
224	0.0172	0.0023	0.0148
225	0.0169	0.0023	0.0146
226	0.0167	0.0023	0.0144

227	0.0165	0.0022	0.0142
228	0.0163	0.0022	0.0140
229	0.0161	0.0022	0.0139
230	0.0159	0.0022	0.0137
231	0.0157	0.0021	0.0135
232	0.0155	0.0021	0.0134
233	0.0153	0.0021	0.0132
234	0.0151	0.0021	0.0131
235	0.0150	0.0020	0.0129
236	0.0148	0.0020	0.0128
237	0.0147	0.0020	0.0127
238	0.0145	0.0020	0.0125
239	0.0144	0.0020	0.0124
240	0.0142	0.0019	0.0123
241	0.0141	0.0019	0.0122
242	0.0140	0.0019	0.0121
243	0.0139	0.0019	0.0120
244	0.0137	0.0019	0.0119
245	0.0136	0.0019	0.0118
246	0.0135	0.0018	0.0117
247	0.0134	0.0018	0.0116
248	0.0133	0.0018	0.0115
249	0.0132	0.0018	0.0114
250	0.0131	0.0018	0.0113
251	0.0130	0.0018	0.0112
252	0.0129	0.0018	0.0111
253	0.0128	0.0017	0.0110
254	0.0127	0.0017	0.0109
255	0.0126	0.0017	0.0109
256	0.0125	0.0017	0.0108
257	0.0124	0.0017	0.0107
258	0.0123	0.0017	0.0106
259	0.0122	0.0017	0.0106
260	0.0121	0.0017	0.0105
261	0.0121	0.0016	0.0104
262	0.0120	0.0016	0.0104
263	0.0119	0.0016	0.0103
264	0.0118	0.0016	0.0102
265	0.0118	0.0016	0.0102
266	0.0117	0.0016	0.0101
267	0.0116	0.0016	0.0100
268	0.0115	0.0016	0.0100
269	0.0115	0.0016	0.0099
270	0.0114	0.0016	0.0099
271	0.0113	0.0015	0.0098
272	0.0113	0.0015	0.0097
273	0.0112	0.0015	0.0097
274	0.0112	0.0015	0.0096
275	0.0111	0.0015	0.0096
276	0.0110	0.0015	0.0095

277	0.0110	0.0015	0.0095
278	0.0109	0.0015	0.0094
279	0.0109	0.0015	0.0094
280	0.0108	0.0015	0.0093
281	0.0107	0.0015	0.0093
282	0.0107	0.0015	0.0092
283	0.0106	0.0015	0.0092
284	0.0106	0.0014	0.0091
285	0.0105	0.0014	0.0091
286	0.0105	0.0014	0.0091
287	0.0104	0.0014	0.0090
288	0.0104	0.0014	0.0090

Total soil rain loss = 0.66(In)
Total effective rainfall = 4.76(In)
Peak flow rate in flood hydrograph = 27.09(CFS)

++

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

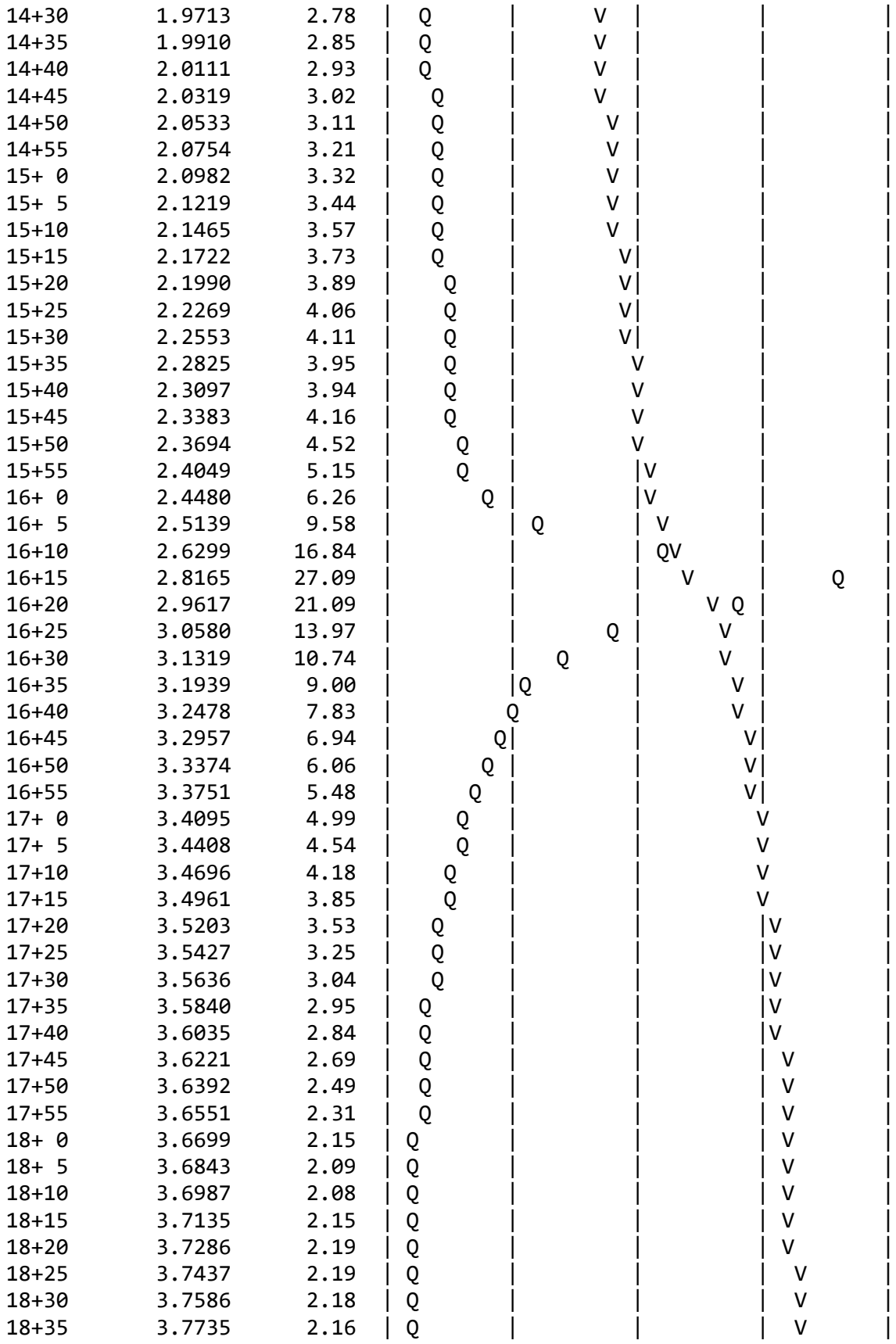
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0002	0.03	Q	|	|	|	|
0+10	0.0013	0.16	Q	|	|	|	|
0+15	0.0047	0.49	Q	|	|	|	|
0+20	0.0097	0.73	Q	|	|	|	|
0+25	0.0156	0.86	VQ	|	|	|	|
0+30	0.0222	0.95	VQ	|	|	|	|
0+35	0.0291	1.01	VQ	|	|	|	|
0+40	0.0364	1.06	VQ	|	|	|	|
0+45	0.0440	1.10	VQ	|	|	|	|
0+50	0.0518	1.13	VQ	|	|	|	|
0+55	0.0597	1.15	VQ	|	|	|	|
1+ 0	0.0678	1.18	VQ	|	|	|	|
1+ 5	0.0761	1.19	VQ	|	|	|	|
1+10	0.0844	1.21	VQ	|	|	|	|
1+15	0.0928	1.22	VQ	|	|	|	|
1+20	0.1013	1.24	VQ	|	|	|	|
1+25	0.1099	1.24	VQ	|	|	|	|
1+30	0.1185	1.25	|Q	|	|	|	|
1+35	0.1272	1.26	|Q	|	|	|	|
1+40	0.1360	1.27	|Q	|	|	|	|
1+45	0.1447	1.28	|Q	|	|	|	|
1+50	0.1536	1.28	|Q	|	|	|	|
1+55	0.1624	1.29	|Q	|	|	|	|

```
2+ 0       0.1713      1.29  |Q        |         |         |         |
2+ 5       0.1803      1.29  |Q        |         |         |         |
2+10       0.1892      1.30  |Q        |         |         |         |
2+15       0.1981      1.30  |Q        |         |         |         |
2+20       0.2071      1.30  |Q        |         |         |         |
2+25       0.2161      1.31  |Q        |         |         |         |
2+30       0.2252      1.31  |Q        |         |         |         |
2+35       0.2342      1.32  |QV       |         |         |         |
2+40       0.2433      1.32  |QV       |         |         |         |
2+45       0.2524      1.32  |QV       |         |         |         |
2+50       0.2615      1.33  |QV       |         |         |         |
2+55       0.2707      1.33  |QV       |         |         |         |
3+ 0       0.2799      1.33  |QV       |         |         |         |
3+ 5       0.2891      1.34  |QV       |         |         |         |
3+10       0.2983      1.34  |QV       |         |         |         |
3+15       0.3076      1.34  |QV       |         |         |         |
3+20       0.3169      1.35  |QV       |         |         |         |
3+25       0.3262      1.35  |QV       |         |         |         |
3+30       0.3355      1.36  |QV       |         |         |         |
3+35       0.3449      1.36  |Q V      |         |         |         |
3+40       0.3543      1.36  |Q V      |         |         |         |
3+45       0.3637      1.37  |Q V      |         |         |         |
3+50       0.3732      1.37  |Q V      |         |         |         |
3+55       0.3826      1.38  |Q V      |         |         |         |
4+ 0       0.3922      1.38  |Q V      |         |         |         |
4+ 5       0.4017      1.38  |Q V      |         |         |         |
4+10       0.4113      1.39  |Q V      |         |         |         |
4+15       0.4209      1.39  |Q V      |         |         |         |
4+20       0.4305      1.40  |Q V      |         |         |         |
4+25       0.4401      1.40  |Q V      |         |         |         |
4+30       0.4498      1.41  |Q V      |         |         |         |
4+35       0.4595      1.41  |Q  V     |         |         |         |
4+40       0.4693      1.42  |Q  V     |         |         |         |
4+45       0.4791      1.42  |Q  V     |         |         |         |
4+50       0.4889      1.42  |Q  V     |         |         |         |
4+55       0.4987      1.43  |Q  V     |         |         |         |
5+ 0       0.5086      1.43  |Q  V     |         |         |         |
5+ 5       0.5185      1.44  |Q  V     |         |         |         |
5+10       0.5284      1.44  |Q  V     |         |         |         |
5+15       0.5384      1.45  |Q  V     |         |         |         |
5+20       0.5484      1.45  |Q  V     |         |         |         |
5+25       0.5585      1.46  |Q  V     |         |         |         |
5+30       0.5685      1.46  |Q   V    |         |         |         |
5+35       0.5786      1.47  |Q   V    |         |         |         |
5+40       0.5888      1.47  |Q   V    |         |         |         |
5+45       0.5990      1.48  |Q   V    |         |         |         |
5+50       0.6092      1.48  |Q   V    |         |         |         |
5+55       0.6194      1.49  |Q   V    |         |         |         |
6+ 0       0.6297      1.49  |Q   V    |         |         |         |
6+ 5       0.6401      1.50  |Q   V    |         |         |         |
```

6+10	0.6504	1.51	Q V				
6+15	0.6608	1.51	Q V				
6+20	0.6713	1.52	Q V				
6+25	0.6818	1.52	Q V				
6+30	0.6923	1.53	Q V				
6+35	0.7028	1.53	Q V				
6+40	0.7134	1.54	Q V				
6+45	0.7241	1.55	Q V				
6+50	0.7348	1.55	Q V				
6+55	0.7455	1.56	Q V				
7+ 0	0.7563	1.56	Q V				
7+ 5	0.7671	1.57	Q V				
7+10	0.7779	1.58	Q V				
7+15	0.7888	1.58	Q V				
7+20	0.7998	1.59	Q V				
7+25	0.8108	1.60	Q V				
7+30	0.8218	1.60	Q V				
7+35	0.8329	1.61	Q V				
7+40	0.8440	1.62	Q V				
7+45	0.8552	1.62	Q V				
7+50	0.8664	1.63	Q V				
7+55	0.8777	1.64	Q V				
8+ 0	0.8890	1.64	Q V				
8+ 5	0.9004	1.65	Q V				
8+10	0.9119	1.66	Q V				
8+15	0.9233	1.67	Q V				
8+20	0.9349	1.68	Q V				
8+25	0.9465	1.68	Q V				
8+30	0.9581	1.69	Q V				
8+35	0.9698	1.70	Q V				
8+40	0.9816	1.71	Q V				
8+45	0.9934	1.72	Q V				
8+50	1.0053	1.72	Q V				
8+55	1.0172	1.73	Q V				
9+ 0	1.0292	1.74	Q V				
9+ 5	1.0412	1.75	Q V				
9+10	1.0534	1.76	Q V				
9+15	1.0655	1.77	Q V				
9+20	1.0778	1.78	Q V				
9+25	1.0901	1.79	Q V				
9+30	1.1025	1.80	Q V				
9+35	1.1149	1.81	Q V				
9+40	1.1274	1.82	Q V				
9+45	1.1400	1.83	Q V				
9+50	1.1527	1.84	Q V				
9+55	1.1654	1.85	Q V				
10+ 0	1.1782	1.86	Q V				
10+ 5	1.1911	1.87	Q V				
10+10	1.2040	1.88	Q V				
10+15	1.2171	1.89	Q V				

```
10+20       1.2302      1.90  | Q       V         |         |         |
10+25       1.2434      1.92  | Q       V         |         |         |
10+30       1.2567      1.93  | Q       |V        |         |         |
10+35       1.2700      1.94  | Q       |V        |         |         |
10+40       1.2835      1.95  | Q       |V        |         |         |
10+45       1.2970      1.97  | Q       |V        |         |         |
10+50       1.3106      1.98  | Q       |V        |         |         |
10+55       1.3244      1.99  | Q       |V        |         |         |
11+ 0       1.3382      2.01  | Q       |V        |         |         |
11+ 5       1.3521      2.02  | Q       |V        |         |         |
11+10       1.3661      2.04  | Q       | V       |         |         |
11+15       1.3802      2.05  | Q       | V       |         |         |
11+20       1.3945      2.06  | Q       | V       |         |         |
11+25       1.4088      2.08  | Q       | V       |         |         |
11+30       1.4232      2.10  | Q       | V       |         |         |
11+35       1.4378      2.11  | Q       | V       |         |         |
11+40       1.4524      2.13  | Q       | V       |         |         |
11+45       1.4672      2.15  | Q       | V       |         |         |
11+50       1.4821      2.16  | Q       |  V      |         |         |
11+55       1.4972      2.18  | Q       |  V      |         |         |
12+ 0       1.5123      2.20  | Q       |  V      |         |         |
12+ 5       1.5275      2.21  | Q       |  V      |         |         |
12+10       1.5425      2.18  | Q       |  V      |         |         |
12+15       1.5568      2.07  | Q       |  V      |         |         |
12+20       1.5705      2.00  | Q       |  V      |         |         |
12+25       1.5841      1.97  | Q       |   V     |         |         |
12+30       1.5976      1.96  | Q       |   V     |         |         |
12+35       1.6110      1.96  | Q       |   V     |         |         |
12+40       1.6245      1.96  | Q       |   V     |         |         |
12+45       1.6381      1.97  | Q       |   V     |         |         |
12+50       1.6518      1.99  | Q       |   V     |         |         |
12+55       1.6656      2.00  | Q       |   V     |         |         |
13+ 0       1.6795      2.02  | Q       |   V     |         |         |
13+ 5       1.6936      2.05  | Q       |   V     |         |         |
13+10       1.7079      2.07  | Q       |    V    |         |         |
13+15       1.7223      2.10  | Q       |    V    |         |         |
13+20       1.7370      2.13  | Q       |    V    |         |         |
13+25       1.7518      2.16  | Q       |    V    |         |         |
13+30       1.7669      2.19  | Q       |    V    |         |         |
13+35       1.7822      2.22  | Q       |    V    |         |         |
13+40       1.7978      2.26  |  Q      |    V    |         |         |
13+45       1.8136      2.30  |  Q      |     V   |         |         |
13+50       1.8297      2.34  |  Q      |     V   |         |         |
13+55       1.8462      2.38  |  Q      |     V   |         |         |
14+ 0       1.8629      2.43  |  Q      |     V   |         |         |
14+ 5       1.8800      2.48  |  Q      |     V   |         |         |
14+10       1.8974      2.53  |  Q      |     V   |         |         |
14+15       1.9153      2.59  |  Q      |     V   |         |         |
14+20       1.9335      2.65  |  Q      |      V  |         |         |
14+25       1.9522      2.71  |  Q      |      V  |         |         |
```



18+40	3.7882	2.13	Q			V	
18+45	3.8027	2.11	Q			V	
18+50	3.8171	2.09	Q			V	
18+55	3.8313	2.06	Q			V	
19+ 0	3.8453	2.04	Q			V	
19+ 5	3.8592	2.01	Q			V	
19+10	3.8729	1.99	Q			V	
19+15	3.8864	1.96	Q			V	
19+20	3.8998	1.94	Q			V	
19+25	3.9130	1.92	Q			V	
19+30	3.9260	1.90	Q			V	
19+35	3.9389	1.87	Q			V	
19+40	3.9517	1.85	Q			V	
19+45	3.9643	1.83	Q			V	
19+50	3.9768	1.81	Q			V	
19+55	3.9892	1.80	Q			V	
20+ 0	4.0014	1.78	Q			V	
20+ 5	4.0135	1.76	Q			V	
20+10	4.0255	1.74	Q			V	
20+15	4.0374	1.72	Q			V	
20+20	4.0491	1.71	Q			V	
20+25	4.0608	1.69	Q			V	
20+30	4.0723	1.67	Q			V	
20+35	4.0837	1.66	Q			V	
20+40	4.0950	1.64	Q			V	
20+45	4.1062	1.63	Q			V	
20+50	4.1173	1.61	Q			V	
20+55	4.1284	1.60	Q			V	
21+ 0	4.1393	1.59	Q			V	
21+ 5	4.1501	1.57	Q			V	
21+10	4.1609	1.56	Q			V	
21+15	4.1716	1.55	Q			V	
21+20	4.1822	1.54	Q			V	
21+25	4.1927	1.53	Q			V	
21+30	4.2031	1.51	Q			V	
21+35	4.2134	1.50	Q			V	
21+40	4.2237	1.49	Q			V	
21+45	4.2339	1.48	Q			V	
21+50	4.2441	1.47	Q			V	
21+55	4.2541	1.46	Q			V	
22+ 0	4.2641	1.45	Q			V	
22+ 5	4.2740	1.44	Q			V	
22+10	4.2839	1.43	Q			V	
22+15	4.2937	1.42	Q			V	
22+20	4.3034	1.41	Q			V	
22+25	4.3131	1.40	Q			V	
22+30	4.3227	1.40	Q			V	
22+35	4.3323	1.39	Q			V	
22+40	4.3418	1.38	Q			V	
22+45	4.3512	1.37	Q			V	

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   22+50       4.3606      1.36  |Q        |         |         |       V |
   22+55       4.3699      1.35  |Q        |         |         |       V |
   23+ 0       4.3792      1.35  |Q        |         |         |       V |
   23+ 5       4.3884      1.34  |Q        |         |         |       V |
   23+10       4.3976      1.33  |Q        |         |         |       V |
   23+15       4.4067      1.32  |Q        |         |         |       V |
   23+20       4.4158      1.32  |Q        |         |         |        V|
   23+25       4.4248      1.31  |Q        |         |         |        V|
   23+30       4.4338      1.30  |Q        |         |         |        V|
   23+35       4.4427      1.30  |Q        |         |         |        V|
   23+40       4.4516      1.29  |Q        |         |         |        V|
   23+45       4.4604      1.28  |Q        |         |         |        V|
   23+50       4.4692      1.28  |Q        |         |         |        V|
   23+55       4.4780      1.27  |Q        |         |         |        V|
   24+ 0       4.4867      1.26  |Q        |         |         |        V|
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APPENDIX 'E'

Hydraulic Analysis

Storm Drain Facilities Exhibit

Catch Basin Worksheets for CB #1, CB#8 and CB#10

Storm Tech retention vaults

APN 3095-571-03 | APN 3095-241-61 | APN 3095-241-64 | APN 3095-241-66 | APN 3095-241-02 | APN 3095-241-01 | APN 3095-241-28 | APN 3095-241-33

BEAR VALLEY ROAD | **PLUTO DRIVE**

EX. 60"RCP PER S-000830 S=0.014 | EX. 12"WTR | EX. 14"WTR | EX. 16"WTR | EX.TRAFFIC SIGNAL TO BE RELOCATED | RELOCATE EX. FH | EX. OVERHEAD ELEC. | PR. ST.LIGHT | PROPOSED RAISED MEDIAN | EX. CB#9 PER S-000830 TO BE REMOVED | PR.CB (4 GRATES) PER SPPWC STD. 302-3 | PR.UNDER WALK DRAIN FOR OVERFLOW | EX. 8"SWR | CONNECT PR. 12"WTR TO EX. 14"WTR | CONNECT PR. 8"SWR TO EX. 8"SWR | EX. OVERHEAD ELEC. | FUT. C&G | FUT. R/W

APN 3072-071-11 | APN 3072-071-21 | APN 3072-211-16 | APN 3072-211-13 | APN 3072-211-14 | APN 3072-211-15 | APN 3072-211-04

AMETHYST STREET | **SIERRA ROAD** | **PLUTO DRIVE**

PAD 1 2400 SF | PAD 2 2200 SF 1800 SF | PAD 3 4500 SF | PAD 4 4500 SF | SHOPS E 5000SF | SHOPS D 5100SF | MAJOR A 43000SF | MAJOR B 29500SF DIVISIBLE

UNDERGROUND DETENTION AREA | DWM/BFP(3) | DWM/BFP(5) | FDC/PIV | FH | DDCA | GI | P/L | PR. P/L | SD line A | COMPAC | LOADING TRUCK WELL

NOT FOR CONSTRUCTION

N

scale 1"= 40' — 40 0 40 80 feet

UTILITY LEGEND

- PROPOSED FIRE WATER SERVICE
- PROPOSED DOMESTIC WATER SERVICE/MAIN
- PROPOSED SEWER SERVICE/MAIN
- PROPOSED STORM DRAIN
- PROPOSED SEWER PIPE FLOW DIRECTION
- PROPOSED STORM DRAIN PIPE FLOW DIRECTION

ABBREVIATIONS

BFP	BACK FLOW PREVENTER	GUY	GUY ANCHOR
C/L	CENTERLINE	INV	INVERT
C&G	CURB AND GUTTER	P/L	PROPERTY LINE
CB	CATCH BASIN	PIV	POST INDICATOR VALVE
DDCA	DOUBLE DETECTOR CHECK ASSEMBLY	PP	POWER POLE
DWM	DOMESTIC WATER METER	PS	PIPE SLOPE
EG	EXISTING GROUND	PR.	PROPOSED
EL.	ELEVATION	R/W	RIGHT OF WAY
ELEC.	ELECTRIC	ST.	STREET
EX.	EXISTING	SWR	SEWER
FDC	FIRE DEPARTMENT CONNECTION	TG	TOP OF GRATE
FF	FINISH FLOOR	TYP	TYPICAL
FH	FIRE HYDRANT	WTR	WATER
FUT.	FUTURE		

DAVID EVANS AND ASSOCIATES INC.
18484 Outer Highway 18 N Suite 225
Apple Valley California 92307
Phone: 760.524.9100
SSchubert@deainc.com

DATE: 08/14/2021

IN THE CITY OF VICTORVILLE
AMETHYST CROSSINGS

CONCEPTUAL COMPOSITE WET UTILITY PLAN

FILE NO.

DRAWING NO.

SH. 1 OF 1

Plot Date: 8/14/2021 6:39 PM By: Shane Schubert
Save Date: 8/14/2021 6:38 PM By: Smsc File: P:\HHIG\P00000\00204000\CAD\SHEETS\EC\CONCEPT PLANS\SHEET 3.dwg

Worksheet for Catch Basin #1

Project Description	
Solve For	Spread

Input Data	
Discharge	2.75 cfs
Gutter Width	0.00 ft
Gutter Cross Slope	0.010 ft/ft
Road Cross Slope	0.010 ft/ft
Grate Width	2.00 ft
Grate Length	1.0 ft
Local Depression	2.0 in
Local Depression Width	48.0 in
Grate Type	P-50 mm (P-1 -7/8")
Clogging	0.0 %

Results	
Spread	21.8 ft
Depth	2.6 in
Gutter Depression	0.0 in
Total Depression	2.0 in
Open Grate Area	1.8 ft²
Active Grate Weir Length	5.0 ft

Amethyst Crossing CB#10 Worksheet

Project Description	
Solve For	Spread

Input Data	
Discharge	6.77 cfs
Gutter Width	4.00 ft
Gutter Cross Slope	0.010 ft/ft
Road Cross Slope	0.010 ft/ft
Grate Width	2.00 ft
Grate Length	2.0 ft
Local Depression	6.0 in
Local Depression Width	4.0 in
Grate Type	P-50 mm (P-1 -7/8")
Clogging	0.0 %

Results	
Spread	36.0 ft
Depth	4.3 in
Gutter Depression	0.0 in
Total Depression	6.0 in
Open Grate Area	3.6 ft²
Active Grate Weir Length	6.0 ft

Amethyst Crossing CB#8

Project Description	
Solve For	Efficiency

Input Data	
Discharge	15.60 cfs
Slope	0.019 ft/ft
Gutter Width	2.00 ft
Gutter Cross Slope	0.083 ft/ft
Road Cross Slope	0.025 ft/ft
Roughness Coefficient	0.013
Local Depression	4.0 in
Local Depression Width	12.0 in
Grate Width	2.00 ft
Grate Length	24.0 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	0.0 %
Curb Opening Length	24.0 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	94.22 %
Intercepted Flow	14.70 cfs
Bypass Flow	0.90 cfs
Spread	13.8 ft
Depth	5.5 in
Flow Area	2.5 ft²
Gutter Depression	1.4 in
Total Depression	5.4 in
Velocity	6.23 ft/s
Splash Over Velocity	493.59 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.902
Grate Flow Ratio	0.408
Equivalent Cross Slope	0.117 ft/ft
Active Grate Length	24.0 ft
Length Factor	0.000
Total Interception Length	28.6 ft

UG Basin A-1

User Inputs

Chamber Model:	MC-3500
Outlet Control Structure:	Yes
Project Name:	Amethyst Crossing
Engineer:	N/A
Project Location:	California
Measurement Type:	Imperial
Required Storage Volume:	20100 cubic ft.
Stone Porosity:	40%
Stone Foundation Depth:	9 in.
Stone Above Chambers:	12 in.
Average Cover Over Chambers:	18 in.
Design Constraint Dimensions:	(30 ft. x 200 ft.)

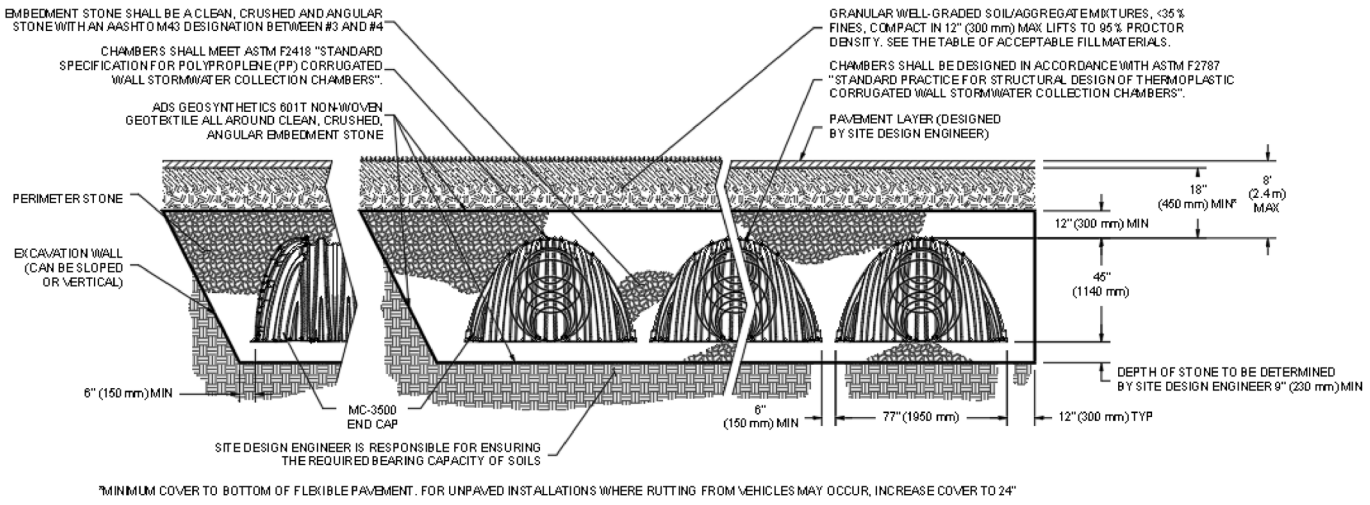
Results

System Volume and Bed Size

Installed Storage Volume:	20633.32 cubic ft.
Storage Volume Per Chamber:	109.90 cubic ft.
Number Of Chambers Required:	108
Number Of End Caps Required:	8
Chamber Rows:	4
Maximum Length:	207.52 ft.
Maximum Width:	29.77 ft.
Approx. Bed Size Required:	6109.22 square ft.

System Components

Amount Of Stone Required:	800.46 cubic yards
Volume Of Excavation (Not Including Fill):	1244.47 cubic yards
Total Non-woven Geotextile Required:	1977.14 square yards
Woven Geotextile Required (excluding Isolator Row):	50.19 square yards
Woven Geotextile Required (Isolator Row):	230.13 square yards
Total Woven Geotextile Required:	280.32 square yards



UG Basin A-2

User Inputs

Chamber Model:	MC-3500
Outlet Control Structure:	Yes
Project Name:	Amethyst Crossing
Engineer:	N/A
Project Location:	California
Measurement Type:	Imperial
Required Storage Volume:	13900 cubic ft.
Stone Porosity:	40%
Stone Foundation Depth:	9 in.
Stone Above Chambers:	12 in.
Average Cover Over Chambers:	18 in.
Design Constraint Dimensions:	(30 ft. x 200 ft.)

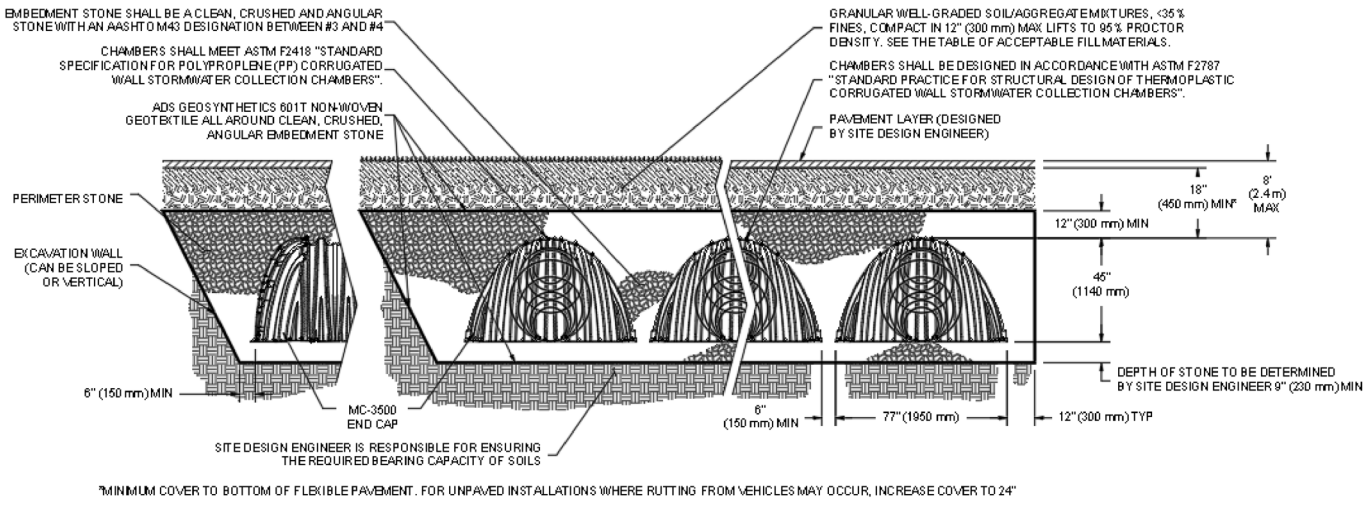
Results

System Volume and Bed Size

Installed Storage Volume:	14274.42 cubic ft.
Storage Volume Per Chamber:	109.90 cubic ft.
Number Of Chambers Required:	73
Number Of End Caps Required:	6
Chamber Rows:	3
Maximum Length:	189.05 ft.
Maximum Width:	22.85 ft.
Approx. Bed Size Required:	4275.98 square ft.

System Components

Amount Of Stone Required:	570.58 cubic yards
Volume Of Excavation (Not Including Fill):	871.03 cubic yards
Total Non-woven Geotextile Required:	1451.05 square yards
Woven Geotextile Required (excluding Isolator Row):	33.46 square yards
Woven Geotextile Required (Isolator Row):	213.40 square yards
Total Woven Geotextile Required:	246.86 square yards



UG Basin B

User Inputs

Chamber Model:	MC-3500
Outlet Control Structure:	Yes
Project Name:	Amethyst Crossing
Engineer:	N/A
Project Location:	California
Measurement Type:	Imperial
Required Storage Volume:	5500 cubic ft.
Stone Porosity:	40%
Stone Foundation Depth:	9 in.
Stone Above Chambers:	12 in.
Average Cover Over Chambers:	18 in.
Design Constraint Dimensions:	(37 ft. x 55 ft.)

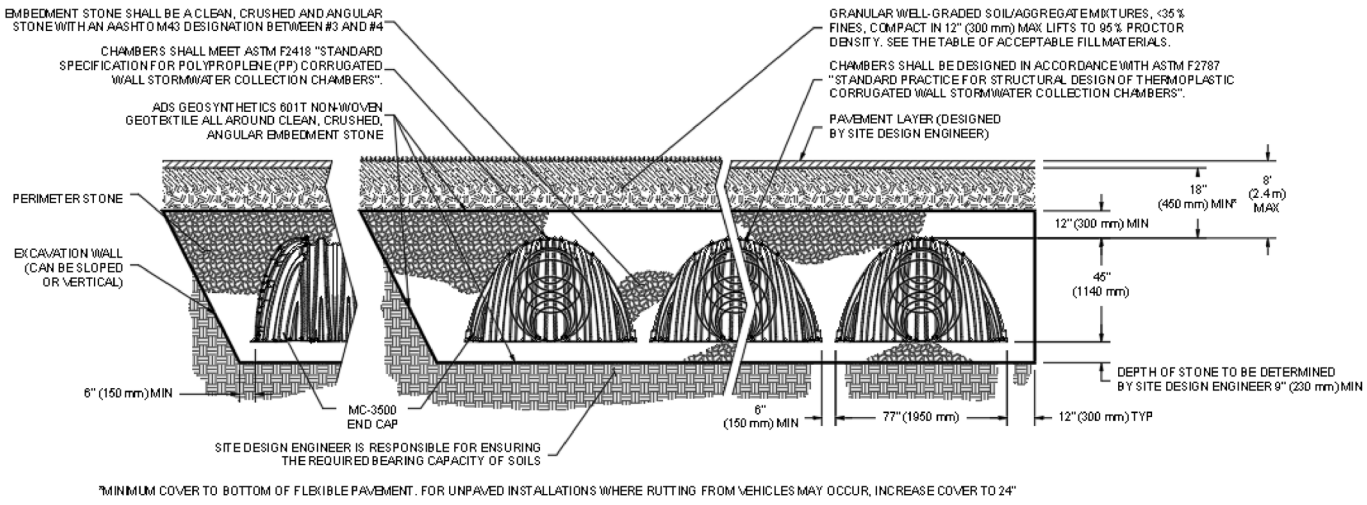
Results

System Volume and Bed Size

Installed Storage Volume:	5869.27 cubic ft.
Storage Volume Per Chamber:	109.90 cubic ft.
Number Of Chambers Required:	28
Number Of End Caps Required:	10
Chamber Rows:	5
Maximum Length:	52.68 ft.
Maximum Width:	36.68 ft.
Approx. Bed Size Required:	1787.98 square ft.

System Components

Amount Of Stone Required:	244.73 cubic yards
Volume Of Excavation (Not Including Fill):	364.22 cubic yards
Total Non-woven Geotextile Required:	607.86 square yards
Woven Geotextile Required (excluding Isolator Row):	50.19 square yards
Woven Geotextile Required (Isolator Row):	54.54 square yards
Total Woven Geotextile Required:	104.73 square yards



UG Basin C

User Inputs

Chamber Model:	MC-3500
Outlet Control Structure:	Yes
Project Name:	Amethyst Crossing
Engineer:	N/A
Project Location:	California
Measurement Type:	Imperial
Required Storage Volume:	8900 cubic ft.
Stone Porosity:	40%
Stone Foundation Depth:	9 in.
Stone Above Chambers:	12 in.
Average Cover Over Chambers:	18 in.
Design Constraint Dimensions:	(24 ft. x 115 ft.)

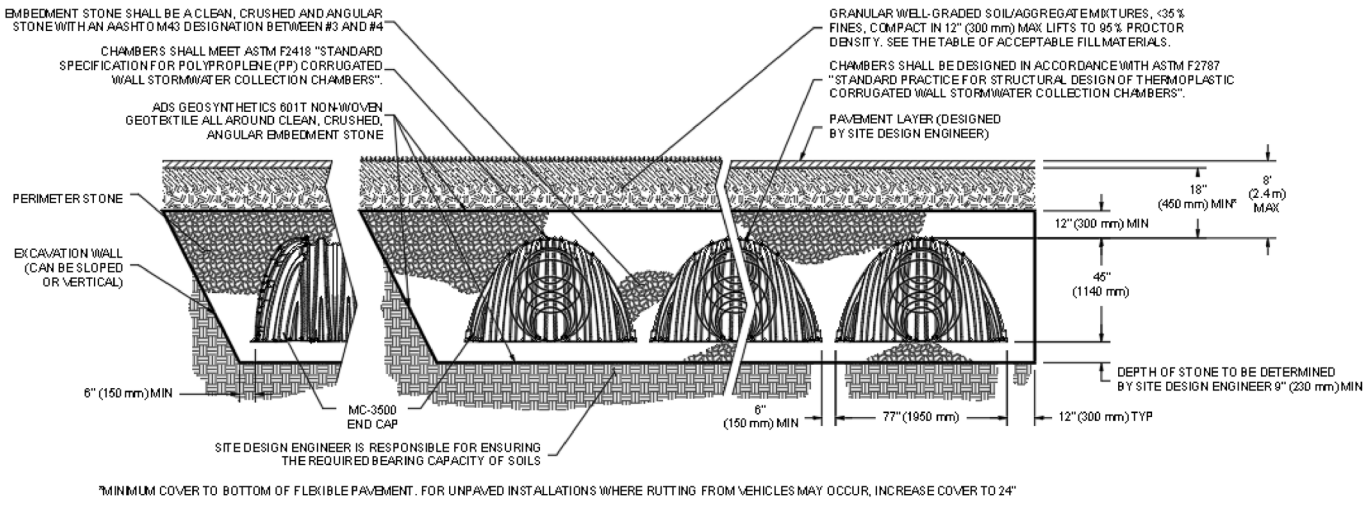
Results

System Volume and Bed Size

Installed Storage Volume:	9043.20 cubic ft.
Storage Volume Per Chamber:	109.90 cubic ft.
Number Of Chambers Required:	45
Number Of End Caps Required:	6
Chamber Rows:	3
Maximum Length:	121.52 ft.
Maximum Width:	22.85 ft.
Approx. Bed Size Required:	2737.39 square ft.

System Components

Amount Of Stone Required:	371.14 cubic yards
Volume Of Excavation (Not Including Fill):	557.62 cubic yards
Total Non-woven Geotextile Required:	941.71 square yards
Woven Geotextile Required (excluding Isolator Row):	33.46 square yards
Woven Geotextile Required (Isolator Row):	129.79 square yards
Total Woven Geotextile Required:	163.25 square yards



APPENDIX 'F'

Reference Documents

NOAA Point Precipitation chart
NRCS Soils Survey
Figure C-3, Curve Number (SBC Hydrology Manual)
TC Nomograph
City of Victorville Master Plan of Drain Map
Existing Storm Drain (Plan No. S-000830)

NOAA Atlas 14, Volume 6, Version 2
Location name: Victorville, California, USA*
Latitude: 34.4696°, Longitude: -117.3626°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.079 (0.065-0.097)	0.115 (0.095-0.140)	0.161 (0.133-0.197)	0.199 (0.162-0.246)	0.250 (0.198-0.320)	0.290 (0.224-0.378)	0.330 (0.249-0.441)	0.371 (0.273-0.511)	0.427 (0.301-0.613)	0.471 (0.320-0.699)
10-min	0.114 (0.094-0.139)	0.164 (0.136-0.201)	0.231 (0.190-0.283)	0.285 (0.233-0.352)	0.359 (0.283-0.458)	0.415 (0.321-0.542)	0.473 (0.357-0.633)	0.532 (0.391-0.732)	0.612 (0.431-0.878)	0.675 (0.459-1.00)
15-min	0.137 (0.113-0.168)	0.199 (0.164-0.243)	0.279 (0.230-0.342)	0.344 (0.281-0.426)	0.434 (0.343-0.554)	0.502 (0.388-0.656)	0.572 (0.432-0.765)	0.643 (0.472-0.885)	0.741 (0.522-1.06)	0.816 (0.555-1.21)
30-min	0.207 (0.171-0.253)	0.299 (0.247-0.366)	0.421 (0.346-0.516)	0.519 (0.424-0.642)	0.653 (0.516-0.835)	0.757 (0.585-0.988)	0.862 (0.651-1.15)	0.970 (0.712-1.33)	1.12 (0.786-1.60)	1.23 (0.837-1.83)
60-min	0.279 (0.231-0.341)	0.404 (0.333-0.494)	0.567 (0.467-0.696)	0.700 (0.572-0.866)	0.881 (0.696-1.13)	1.02 (0.790-1.33)	1.16 (0.878-1.56)	1.31 (0.961-1.80)	1.51 (1.06-2.16)	1.66 (1.13-2.46)
2-hr	0.393 (0.325-0.480)	0.535 (0.441-0.654)	0.727 (0.599-0.892)	0.889 (0.726-1.10)	1.12 (0.882-1.43)	1.30 (1.00-1.70)	1.49 (1.12-1.99)	1.69 (1.24-2.32)	1.97 (1.39-2.83)	2.19 (1.49-3.26)
3-hr	0.493 (0.408-0.602)	0.658 (0.544-0.805)	0.887 (0.730-1.09)	1.08 (0.884-1.34)	1.36 (1.08-1.74)	1.59 (1.23-2.07)	1.83 (1.38-2.44)	2.08 (1.53-2.87)	2.45 (1.73-3.52)	2.75 (1.87-4.08)
6-hr	0.675 (0.558-0.825)	0.894 (0.738-1.09)	1.20 (0.990-1.47)	1.47 (1.20-1.82)	1.86 (1.47-2.38)	2.18 (1.69-2.85)	2.53 (1.91-3.39)	2.92 (2.14-4.01)	3.47 (2.44-4.98)	3.93 (2.68-5.84)
12-hr	0.843 (0.697-1.03)	1.16 (0.958-1.42)	1.61 (1.33-1.97)	2.00 (1.63-2.47)	2.57 (2.03-3.29)	3.04 (2.36-3.97)	3.56 (2.69-4.76)	4.12 (3.02-5.66)	4.93 (3.47-7.07)	5.61 (3.82-8.33)
24-hr	1.15 (1.02-1.32)	1.65 (1.46-1.90)	2.36 (2.09-2.73)	2.98 (2.61-3.47)	3.88 (3.28-4.67)	4.62 (3.83-5.68)	5.42 (4.39-6.83)	6.29 (4.96-8.15)	7.57 (5.72-10.2)	8.63 (6.30-12.1)
2-day	1.24 (1.10-1.43)	1.78 (1.57-2.05)	2.53 (2.24-2.93)	3.20 (2.80-3.72)	4.17 (3.53-5.02)	4.98 (4.13-6.12)	5.86 (4.75-7.38)	6.83 (5.38-8.85)	8.26 (6.24-11.1)	9.45 (6.91-13.2)
3-day	1.33 (1.18-1.53)	1.88 (1.67-2.17)	2.67 (2.36-3.09)	3.37 (2.95-3.92)	4.39 (3.72-5.29)	5.25 (4.35-6.45)	6.18 (5.00-7.78)	7.21 (5.68-9.34)	8.73 (6.60-11.8)	10.0 (7.31-14.0)
4-day	1.43 (1.27-1.65)	2.02 (1.79-2.33)	2.86 (2.52-3.30)	3.59 (3.15-4.19)	4.68 (3.97-5.63)	5.59 (4.64-6.87)	6.57 (5.33-8.28)	7.67 (6.04-9.93)	9.28 (7.01-12.5)	10.6 (7.77-14.9)
7-day	1.56 (1.38-1.79)	2.17 (1.93-2.51)	3.05 (2.70-3.53)	3.82 (3.35-4.45)	4.94 (4.19-5.95)	5.87 (4.88-7.22)	6.88 (5.58-8.67)	7.99 (6.30-10.3)	9.61 (7.27-13.0)	11.0 (8.01-15.3)
10-day	1.67 (1.48-1.92)	2.32 (2.05-2.67)	3.23 (2.85-3.74)	4.03 (3.53-4.70)	5.20 (4.41-6.26)	6.16 (5.11-7.57)	7.20 (5.83-9.07)	8.34 (6.57-10.8)	9.99 (7.55-13.5)	11.4 (8.30-15.9)
20-day	2.02 (1.79-2.33)	2.79 (2.47-3.21)	3.86 (3.41-4.46)	4.80 (4.20-5.59)	6.16 (5.22-7.42)	7.28 (6.04-8.95)	8.49 (6.87-10.7)	9.79 (7.72-12.7)	11.7 (8.83-15.8)	13.2 (9.67-18.5)
30-day	2.37 (2.10-2.73)	3.24 (2.87-3.73)	4.46 (3.94-5.16)	5.53 (4.84-6.44)	7.08 (6.00-8.53)	8.35 (6.93-10.3)	9.72 (7.87-12.2)	11.2 (8.82-14.5)	13.3 (10.1-18.0)	15.1 (11.0-21.1)
45-day	2.79 (2.48-3.21)	3.76 (3.33-4.33)	5.13 (4.53-5.93)	6.33 (5.54-7.37)	8.07 (6.84-9.72)	9.50 (7.89-11.7)	11.0 (8.94-13.9)	12.7 (10.0-16.4)	15.1 (11.4-20.4)	17.0 (12.4-23.8)
60-day	3.15 (2.79-3.62)	4.18 (3.70-4.82)	5.65 (4.99-6.52)	6.92 (6.07-8.07)	8.79 (7.45-10.6)	10.3 (8.58-12.7)	12.0 (9.71-15.1)	13.8 (10.8-17.8)	16.3 (12.3-22.0)	18.4 (13.5-25.7)

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

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

Please refer to NOAA Atlas 14 document for more information.

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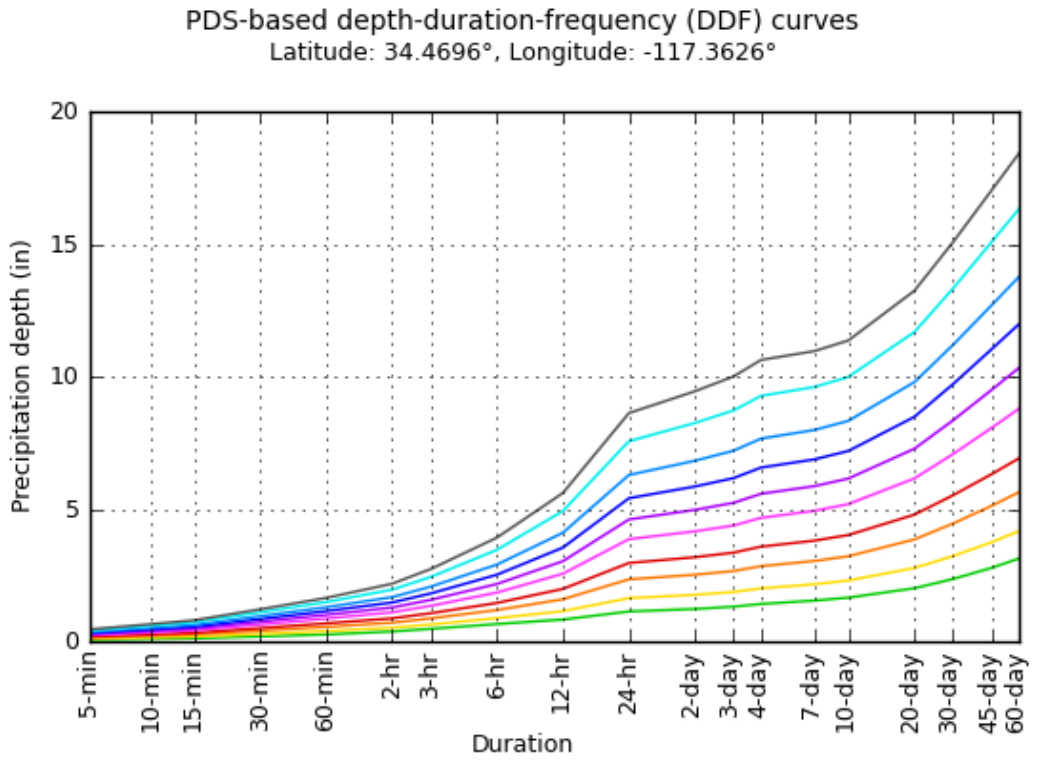
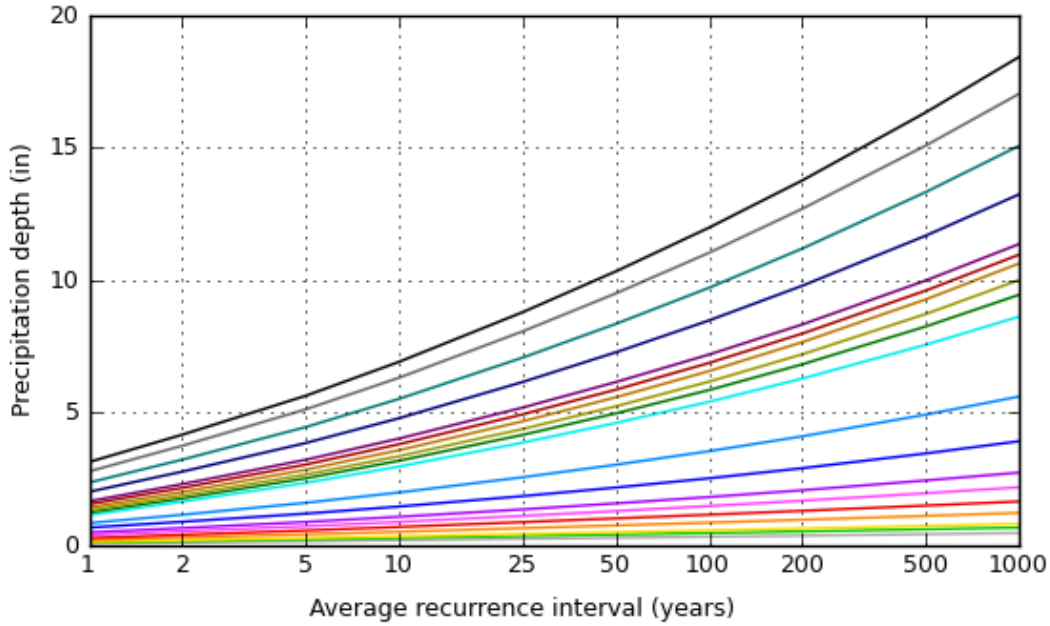
PF graphical





NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Tue Jun 29 05:20:24 2021

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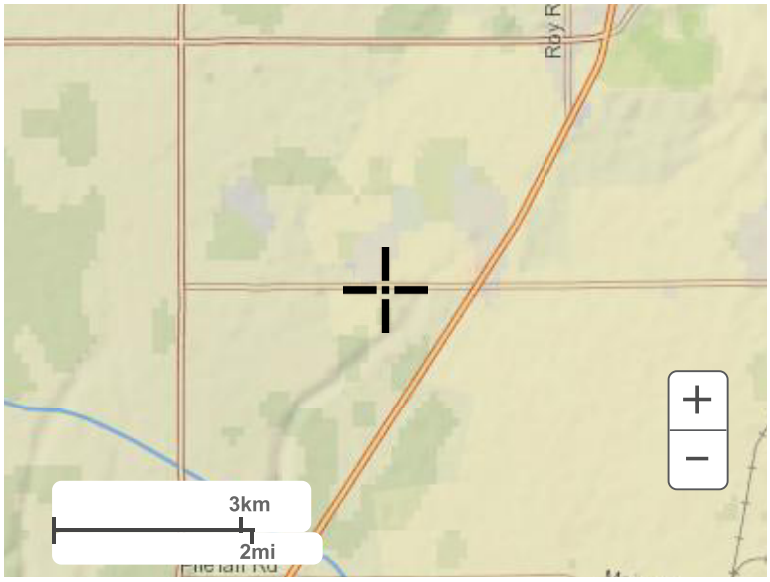
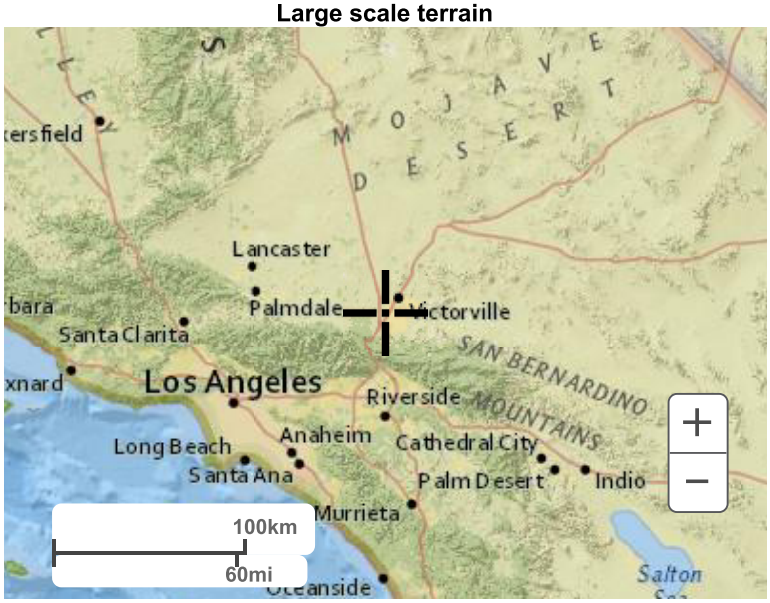
Maps & aerials

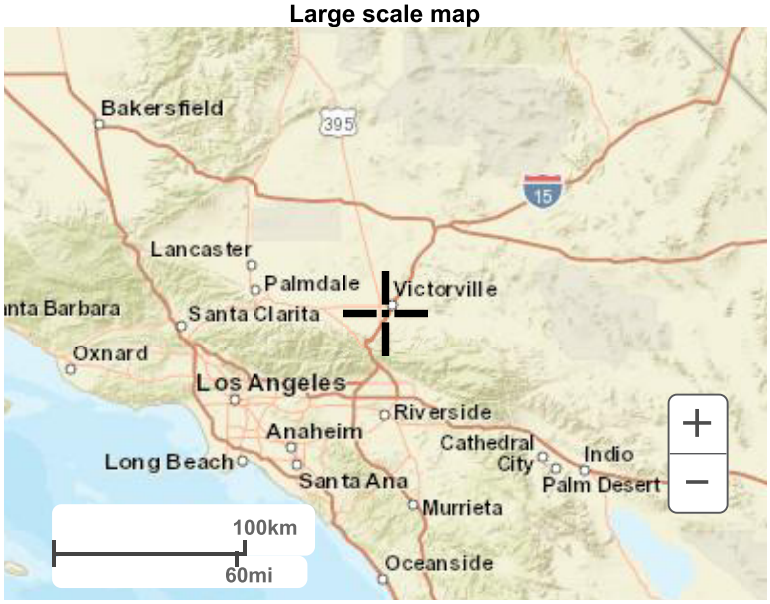
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

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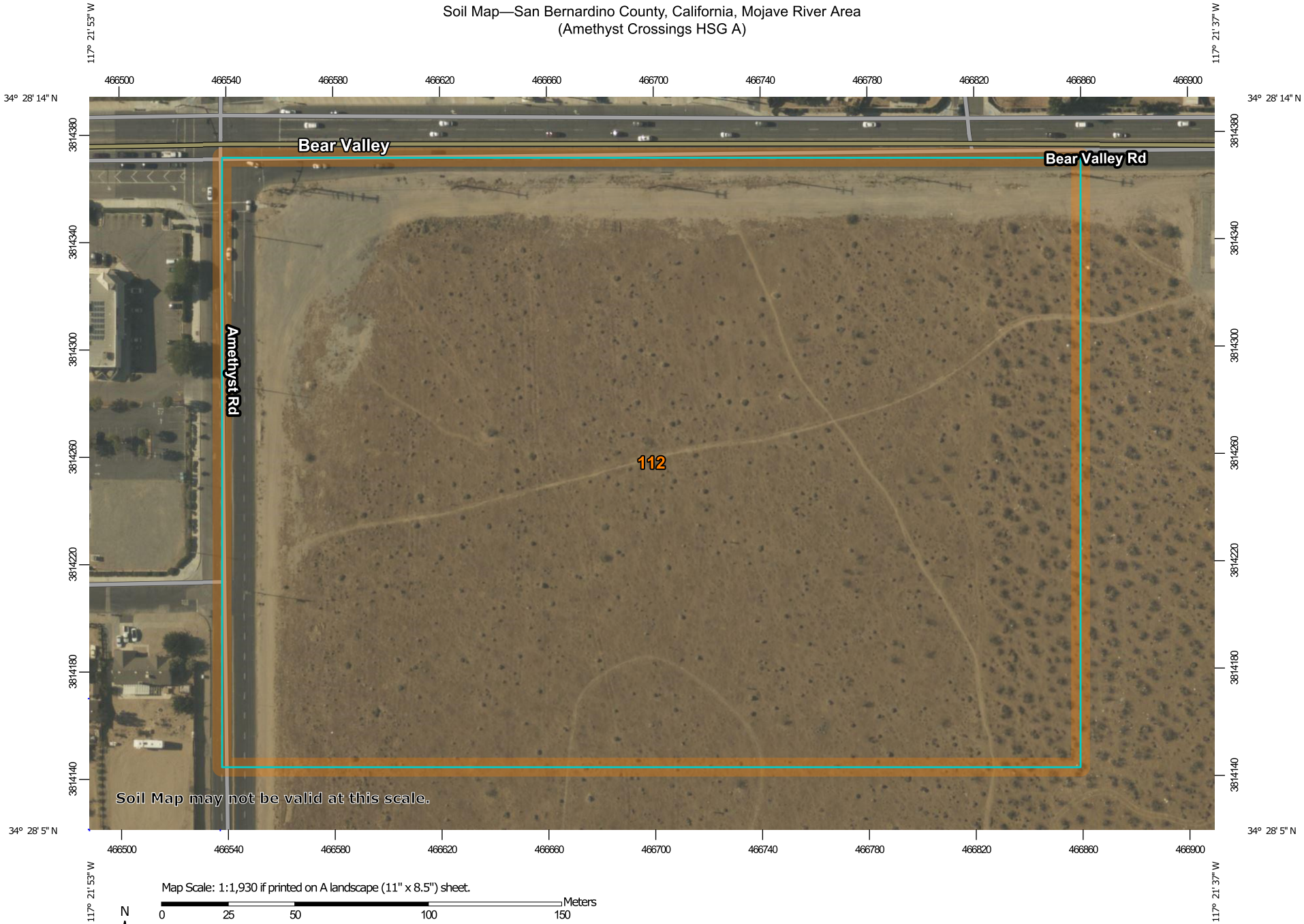
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Soil Map—San Bernardino County, California, Mojave River Area
(Amethyst Crossings HSG A)



Map Scale: 1:1,930 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

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

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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 12, May 27, 2020

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
112	CAJON SAND, 0 TO 2 PERCENT SLOPES	18.1	100.0%
Totals for Area of Interest		**18.1**	**100.0%**

San Bernardino County, California, Mojave River Area

112—CAJON SAND, 0 TO 2 PERCENT SLOPES

Map Unit Setting

National map unit symbol: hkrj
Elevation: 1,800 to 3,200 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 59 to 66 degrees F
Frost-free period: 180 to 290 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cajon and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cajon

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 7 inches: sand
H2 - 7 to 25 inches: sand
H3 - 25 to 45 inches: gravelly sand
H4 - 45 to 60 inches: stratified sand to loamy fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water capacity: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R030XF012CA - Sandy
Hydric soil rating: No

Minor Components

Helendale
Percent of map unit: 5 percent

Manet
Percent of map unit: 5 percent
Landform: Playas
Hydric soil rating: Yes

Kimberlina
Percent of map unit: 5 percent

Data Source Information

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 12, May 27, 2020

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

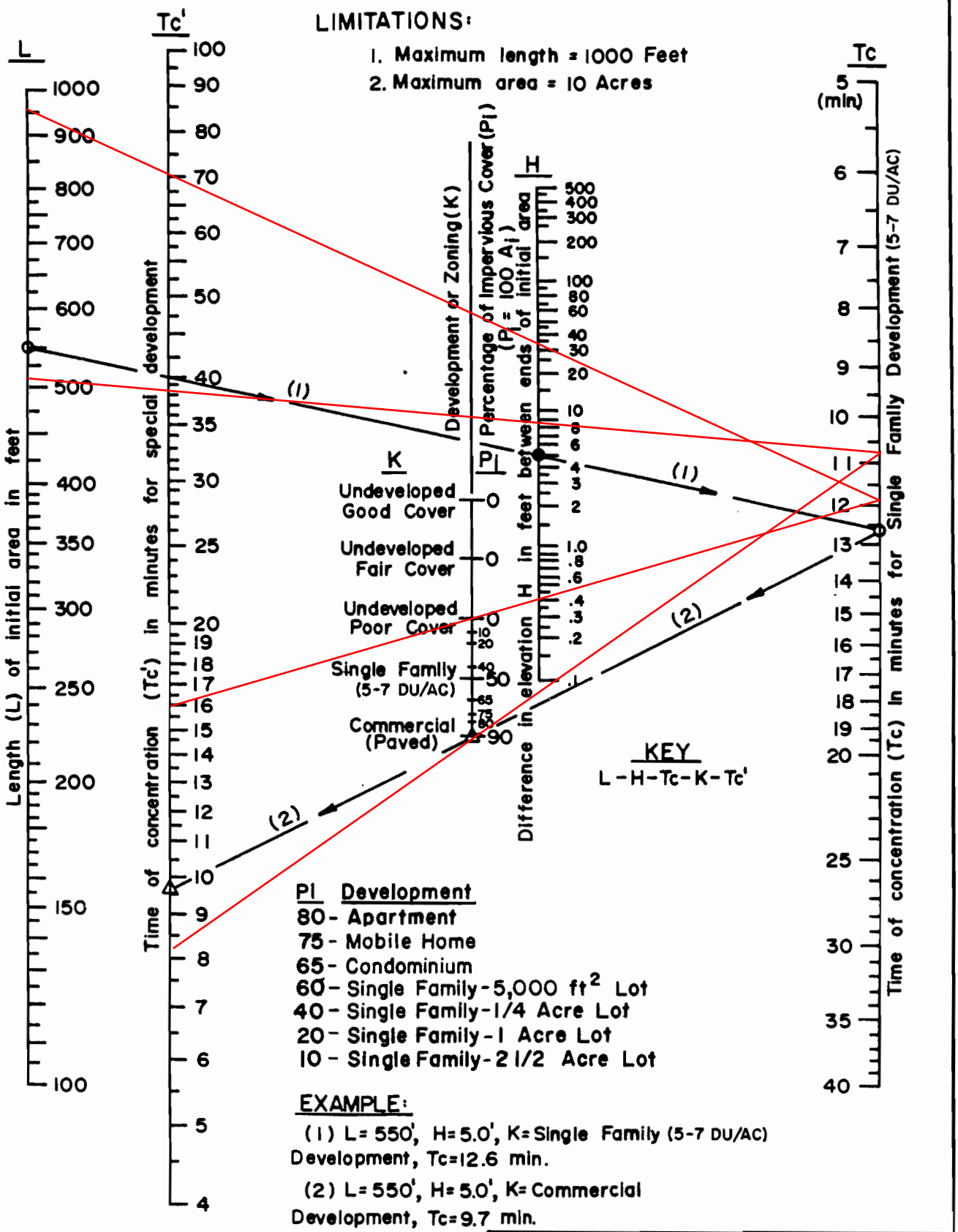
Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparral, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparral, Narrowleaf (Chamise and redshank)	Poor	71	82	88	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

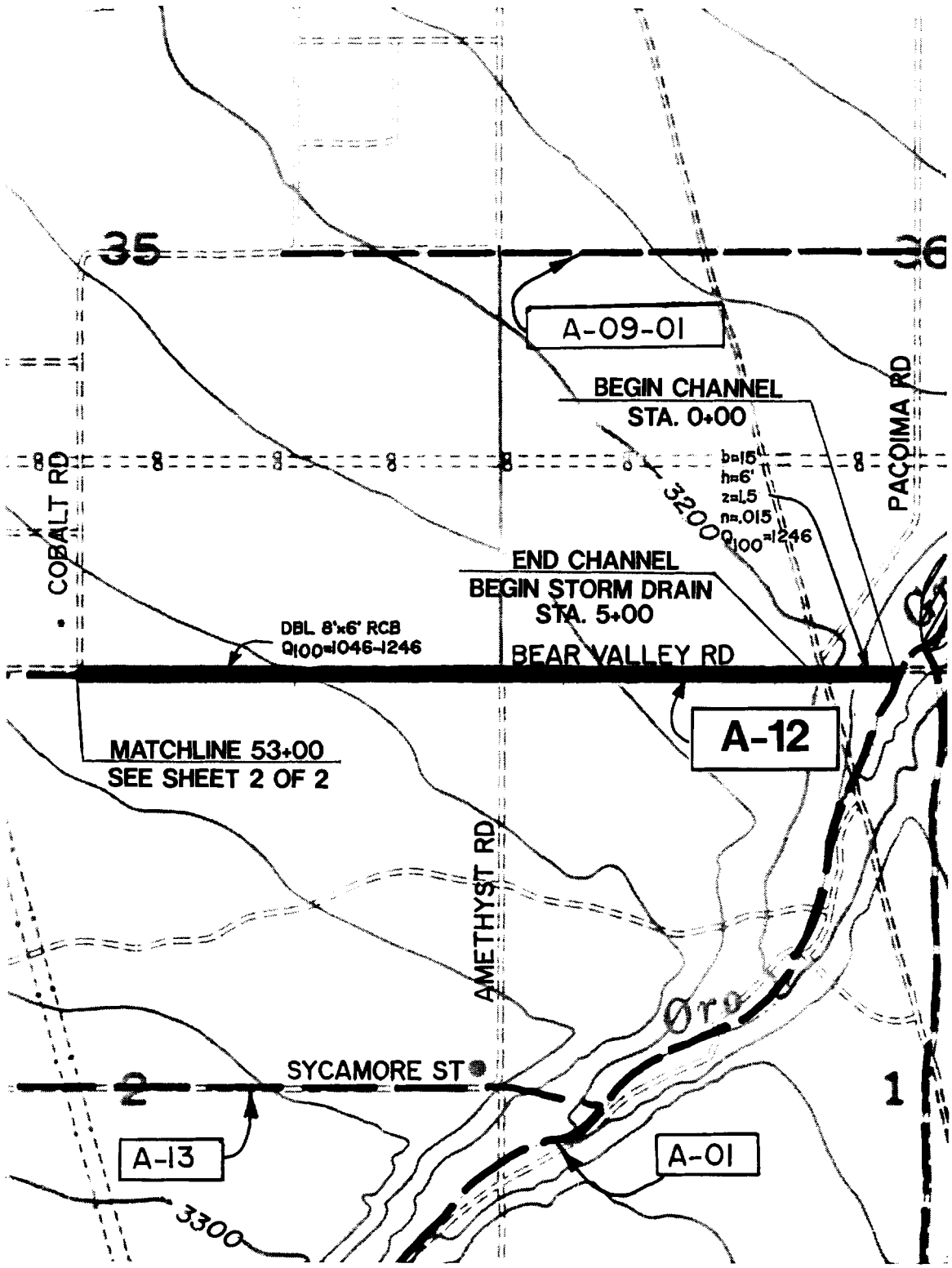
Figure C-3 (1 of 2)



SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

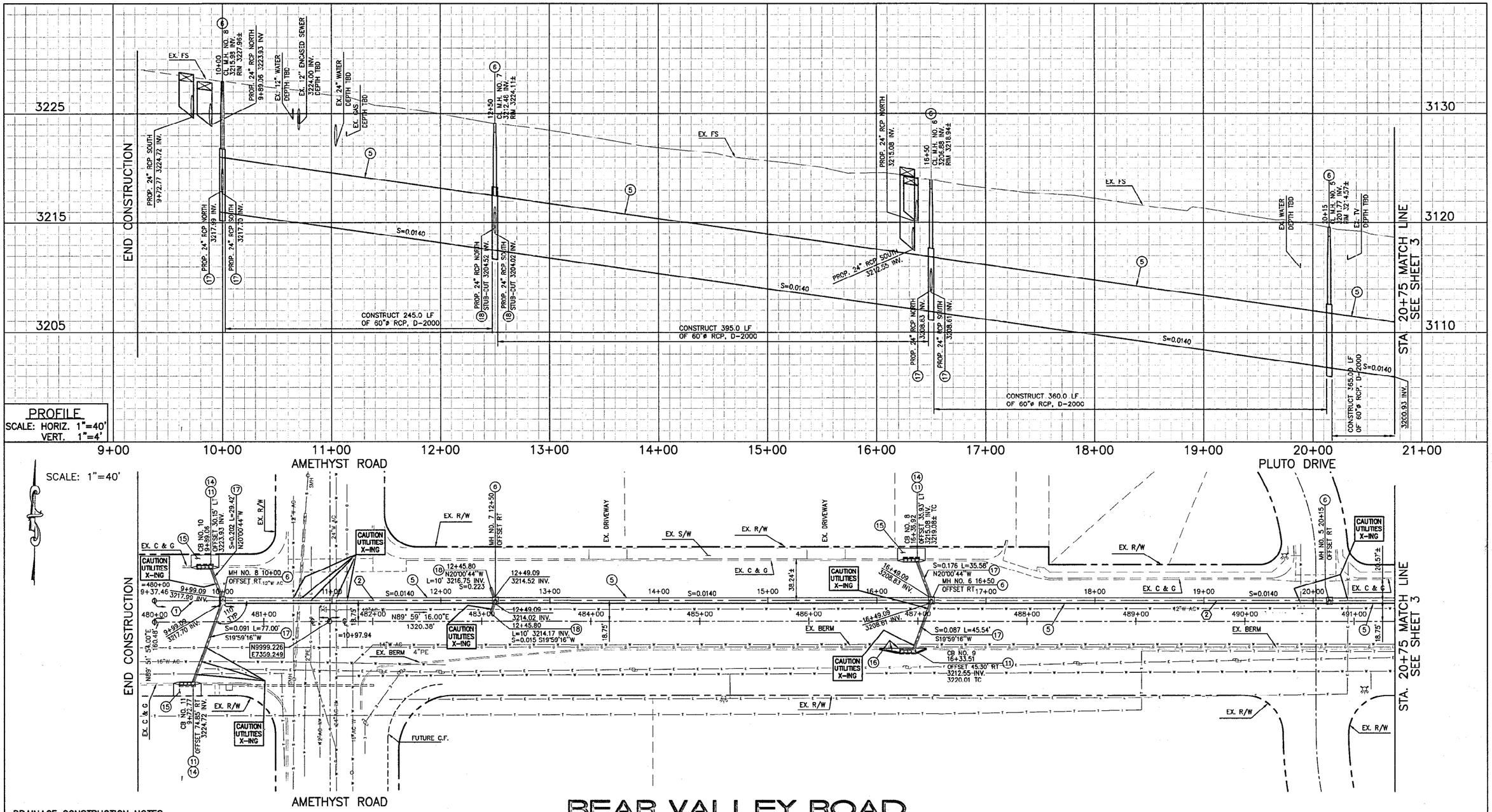
TIME OF CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA

Figure D-1



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

VICTORVILLE MASTER PLAN OF DRAINAGE	COMPREHENSIVE STORM DRAIN PLAN LINE A-12 SHEET 1 OF 2	SCALE 1"=1000' WILLIAMSON & SCHMID



DRAINAGE CONSTRUCTION NOTES:

(5) INSTALL 60" INCH RCP, D-2000, STORM DRAIN.

(6) CONSTRUCT MANHOLE PER SPPWC 320-2. MANHOLE SHAFT SHALL BE CONSTRUCTED WITH 36" OPENING PER SPPWC 326-2. OFFSET MANHOLE LID LEFT OR RIGHT AS INDICATED IN PLAN SET. FINAL RIM ELEVATIONS SHALL BE FLUSH TO FINAL FINISHED ROAD ELEVATIONS AFTER PROPOSED PAVEMENT OVERLAY.

(11) CONSTRUCT CURB OPENING CATCH BASIN, H=+2" PER STD SPPWC 302-3 WITH 3 GRATES. EXACT ELEVATION AND LOCATION SHALL BE DETERMINED IN FIELD. INSTALL FLUSH TO TOP OF BERM / DIKE OR CURB, AND FLUSH TO FACE OF ADJACENT BERM / DIKE / CURB. IF NECESSARY, ADJUST SPECIFIED CATCH BASIN DEPTH TO MEET TOP OF BERM / DIKE / CURB ELEVATIONS.

(14) CONSTRUCT PROPOSED CATCH BASIN WITH LOCAL DEPRESSION, PER SPPWC 313-3, TYPE F.

(15) REPLACE EXISTING CONCRETE SIDEWALK PANELS, WITH EQUIVALENT OR BETTER, AS REQUIRED FOR PROPOSED CATCH BASIN INSTALLATION(S).

(16) REMOVE EXISTING AC BERM AS SHOWN IN DETAIL, CONSTRUCT LOCAL DEPRESSION USING 4 INCH THICK AC PAVEMENT OVER NATIVE. FORM AREA OF DEPRESSION, MATCHING FLUSH AT EXISTING PAVEMENT, THEN SLOPING AT 5 PERCENT TOWARDS PROPOSED CATCH BASIN. INSTALL NEW AC BERM PER DETAILS SHOWN ON SHEET 4. TRANSITION AC BERM TAPERED FACE TO MATCH FLOW-LINE WITH PROPOSED CATCH BASIN CURB FLOW-LINE.

(17) INSTALL 24 INCH RCP LATERAL, D-2000. ADJUST CATCH BASIN DEPTHS AS NEEDED TO INSURE MINIMUM CLEARANCES BETWEEN PIPE AND EXISTING IN-GROUND UTILITIES. ALL ADJUSTMENTS MUST INSURE A MINIMUM LATERAL SLOPE OF 2 PERCENT.

(18) CONSTRUCT 24 INCH RCP, D-2000, L=10' STUB-OUT. EXACT PIPE LENGTH OF STUB-OUT TO BE DETERMINED BY CITY ENGINEER. BRICK AND MORTAR PLUG END OF EACH 24 INCH RCP STUB-OUT OUTLET.

BEAR VALLEY ROAD

SPECIAL NOTES TO THE CONTRACTOR:

1. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF ALL AVAILABLE RECORDS, TO THE BEST OF OUR KNOWLEDGE. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINE NOT OF RECORD OR NOT SHOWN ON THESE PLANS. PRIOR TO EXCAVATION, THE CONTRACTOR SHALL CALL TOLL FREE 1-800-422-4133 TO VERIFY THE UNDERGROUND LOCATION OF ALL UTILITIES.
2. TRENCH BACKFILL SHALL BE PER CITY OF VICTORVILLE STANDARD S-10 WHERE ALLOWABLE. IN THOSE AREAS WHERE THE EROSION IS WIDER THAN THE STANDARD TRENCH WIDTH, THE CONTRACTOR SHALL MAKE THE TRENCH WIDE ENOUGH TO FILL IN THE ENTIRE VOID REGION. THE NECESSARY WIDTH OF THE TRENCH WILL BE DETERMINED BY THE ENGINEER.

LINE / CURVE DATA:

	Δ	R	L	T
(1)	N89°59'16"E	–	62.54'	–
(2)	N89°59'16"E	–	2504.00'	–
(3)	N54°34'49"E	90.00'	111.24'	63.98'

DIGALERT
800-227-2600
Call 2 full working Days in Advance

REGISTERED PROFESSIONAL ENGINEER
BRIAN W. GENGLER
No. 44730
CIVIL
STATE OF CALIFORNIA

CITY OF VICTORVILLE
ENGINEERING DEPARTMENT
14343 Civic Drive, Victorville, Ca. 92392 (760) 955-5158

NO.	REVISIONS	BY	DATE

STREET / DRAINAGE IMPROVEMENT PLAN
BEAR VALLEY ROAD
FROM STA. 20+75 TO END CONSTRUCTION

FIELD BOOK NO. (S)

BENCH MARK:
CITY OF VICTORVILLE BM V-118
LOCATED AT THE NORTHWEST CORNER OF BEAR VALLEY ROAD AND AMETHYST ROAD AT BCR
RADIUS ELEV. = 3227.52

DESIGN BY: S. LONGORIA
DRAWN BY: W.D
CHECKED BY: S.L. LONGORIA
DATE: 08/04/14

SHEET NO. 2 OF 10

DRAWING No. S-830

PROJECT No.

APPROVED BY: CITY ENGINEER Brian W. Gengler BRIAN W. GENGLER
DATE: 2-11-15 R.C.E. 44730

Plot Date: 02/9/2015 9:59:39 AM User: Wdoran File Name: N:\CAD\CIP\Bear Valley Pocoima\dwg\Masterasheets_SD.dwg Last Update: 2/4/2015 10:03:02 AM