APPENDIX I3B: PRELIMINARY HYDROLOGY STUDY SITE 3

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PRELIMINARY DRAINAGE STUDY

BLOOMINGTON BUSINESS PARK SP SITE 3
APN # 0256-101-02, -03, -10, -11, -12, -14, -15, -34, -35, -37, -38, -60

Bloomington, San Bernardino County, California
MAY 7, 2021

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This report has been prepared by or under the direction of the following registered civil engineer who attests to the technical information contained herein. The registered civil engineer has also judged the qualifications of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.



	5/7/2021	
Francisco Martinez RCE Registered Civil Engineer	Date	Seal

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I. PURPOSE AND SCOPE

The purpose of this study is to determine the necessary drainage and increased runoff mitigation improvements required for the Bloomington Commerce Center SP3 project proposed for industrial development.

The scope of this study includes the following:

1. Determination of points of flow concentration and watershed subareas for onsite and offsite areas.
2. Determination of the 10, 25, & 100-year peak storm flows based upon the post-project onsite and existing condition offsite areas utilizing the Rational Method (1-Hour) as outlined in the San Bernardino County Flood Control Hydrology Manual.
3. Determination of the 25-year peak storm flows for the 24-hr duration based on the existing condition utilizing the Unit Hydrograph Method as outlined in the San Bernardino County Flood Control Hydrology Manual.
4. Determine the 100-year peak storm flows based upon the pre-project and post-project condition for the 24-hour storm duration utilizing the Unit Hydrograph Method as outlined in the San Bernardino County Flood Control Hydrology Manual.
5. Determine the required underground retention facilities and outlet control structure to mitigate the 100-year peak storm flows for the 24-hour storm duration in the post-project condition to flows less than or equal to 90% of the 25-year peak flow rate for existing conditions.
6. Determine the required storm drain infrastructure to flood protect the project site for the 100-year, 1-hour storm event.
7. Determine the required outlet control structure to safely by-pass the 100-year peak storm event.
8. Preparation of a hydrology report, which consists of hydrological and analytical results and exhibits.

II. PROJECT SITE AND DRAINAGE AREA OVERVIEW

The project site is comprised of 12 residential parcels that will be merged into a single parcel, and a combined total of 30.58 gross acres; located in Bloomington, an unincorporated area of the County of San Bernardino, more precisely bounded by Santa Ana Avenue to the north, Locust Avenue to the East, private properties to the south, and Laurel Avenue to the west (see Figure 1). The current land use is rural residential and proposed for development for an industrial/distribution warehouse facility. The proposed development is comprised of onsite 479,651 SF building, docks and truck and auto parking lot, landscaped areas, an onsite storm drain system with a retention/infiltration subsurface system and frontage street improvements.

Existing Conditions

The project site is part of a larger watershed of approximately 871 acres that is tributary to an existing low point at Jurupa Avenue, and within the San Bernardino County "*Comprehensive Storm Drain Plan No. 3, Project 3-4 (CSDP 3-4)"*. See excerpt under Appendix G.8. The watershed's upper limits are roughly at the south side of the I-10 freeway and railroad tracks, it is comprised primarily of rural residential parcels and public streets that vary in widths, lacking full improvements and no storm drain system. All storm water flows developed from the watershed area travel predominantly in a southerly direction, where it ultimately drains onto Jurupa Avenue. There are a few local street curb type inlets with 18"-24" diameter culverts that help collect and convey storm flows at street intersections but then released immediately downstream to roadside ditches, passing through driveway culvert crossings and onto the streets.

A culvert system can be found west of the site at the street intersections of Santa Ana Avenue and Laurel Avenue; see google imagery photos below.



Photo 1. Santa Ana and Locust Ave, Looking North



Photo 2(a) Laurel Street South of Santa Ana Ave, Looking North



The street inlets located on Laurel Avenue are tributary to approximately 95.8 acres, and they partially intercept storm flows which are conveyed to the south of the intersection on Laurel, all other flows in excess of inlet and culvert capacity will overtop Santa Ana and continue south on Laurel Avenue. See photo 1. Santa Ana Avenue between Laurel and Locust is a crown street but does not have curb or gutter either north or south side of the street; a high point roughly 250 feet east of Laurel will cause drainage to travel to the west and east towards Laurel and Locust Avenue, respectively. However, the lack of curb will allow the storm water runoff from the south half of the street to continue unobstructed beyond the edge of pavement, and beyond road right-of-way across residential lots. The surface and culvert storm water flows on Laurel do not enter the site but continue to travel south beyond the project boundary, then easterly towards Locust Avenue to two existing sump inlets located 400 feet north of Jurupa. At the northeast section of the project site, approximately 4.52 acres drain across the site but immediately outlets into Locust Avenue. The storm water on Locust that is developed from the areas to the north of Santa Ana Avenue, which is approximately 249.8 acres will continue traveling south on Locust Avenue past the street intersection of Santa Ana Avenue and further south beyond the project site to the two sump inlets located 400 feet north of Jurupa.

From this location, flows are conveyed via combination of a shallow culvert system that discharges into an earthen ditch located between two residential parcels. The earthen ditch travels easterly but then it changes to a southerly direction along the back of the lots; further downstream it transitions to a paved drainage ditch out-letting at the north side of Jurupa, approximately 225 feet east of Locust Avenue. However, flows that exceed channel capacity over-top upstream of Jurupa and disperse across existing easterly parcels where they pond at an existing low point on Jurupa Avenue at the intersection of Birch Street, this is located about 665 feet east of Locust Avenue. Ultimately, storm water runoff ponds at the low point and overtops Jurupa Avenue where they continue traveling south beyond the project limits towards an existing private sump basin located on the northeast corner of Locust Avenue

and 11th street in the City of Fontana.

Post Developed Conditions

There will be no run-on/offsite flows comingling and/or entering the project site. The combined offsite areas of approximately 4.5 acres that drains towards the site on the northeast quadrant will be intercepted and directed to Locust Avenue via the use of an underground pipe and concrete channel. The onsite storm water flows will be collected via the proposed onsite storm drain system and directed to an underground retention system for water quality treatment and increased runoff mitigation.

The water quality treatment for the project site is provided under the preliminary Water Quality Management Plan. The required increased runoff mitigation for the project has been estimated by modifying the "*input parameters (procedures)*" described in the County Manual to those that are shown in the "*San Bernardino County Detention Basin Criteria*" memorandum (See Appendix G.7). More specific and for purposes of this preliminary drainage report, the 100-year 24-hour peak flow rates for the post developed condition and the 25-year 24-hour peak flow rates in the predeveloped condition were the only storm events analyzed for mitigation applying the County's basin criteria; this requires that the 100-year 24-hour design storm peak flow rate be mitigated to levels "at or less" than the 90% of the predeveloped 25-year 24-hour peak flow rate. The project storm mitigation is provided by utilizing the underground storm drain detention system and the outlet control structures. Smaller storm events were analyzed in this preliminary phase however, since the storm volume demand to mitigate the storm flows from the 100-year 24hour event to the 90% of the 25-year predeveloped storm event is expected to be considerably larger than volumes produced by the smaller storm events, thus a conservative approach.

III. HYDROLOGY

The San Bernardino County Hydrology Manual (Reference 1) was used to develop the hydrological parameters for the hydrology analyses. The rational method and unit hydrograph method were used for the analyses and the computations were performed using the computer program developed by Civil CADD/Civil Design.

The rainfall depths for used in the hydrology calculations for the rational method and the unit hydrograph method are as follows:

Storm Event & Duration	Rainfall (inches)
2-Year, 6-Hour	**1.33**
2-Year, 24-Hour	**2.41**
10-Year, 1-Hour	**0.813**
10-Year, 6-Hour	**2.02**
10-Year, -Hour	**3.71**
25-Year, 1-Hour	**0.998**
25-Year, 6-Hour	**2.43**
25-Year, 24-Hour	**4.48**
100-Year, 1-Hour	**1.30**
100-Year, 6-Hour	**3.07**
100-Year, 24-Hour	**5.64**

The rainfall depths were obtained from NOAA Atlas 14, which has been included in Appendix G.

The existing soil classification for the area consists of Hydrologic Soil Group "A", as shown in Appendix G; in the Soils Map obtained from the USDA Websoil Survey. For 10-year, 25-year and for the 100-year storm events AMC II was used.

The hydrology utilized the following land use covers:

Land Use Cover	Runoff Index Number (Soil "A")	Pervious Ratio
Urban Covers – Residential or Commercial landscaping	32	0.8
Commercial	98	0.1

The pre-project condition and post-project condition for offsite and onsite undeveloped, natural ground or areas restored to natural ground were analyzed as Urban Covers for "Residential or Commercial Landscaping", and all impervious onsite offsite areas were analyzed as commercial.

Rational Method Analyses

The Rational Method analysis for the existing conditions considered a single onsite watershed area designated as "A" that is tributary to Locust Ave; and a single offsite area designated as "B" that is tributary to Laurel Ave (westerly boundary). Both "A" and "B" areas are considered a sub-watershed to the larger watershed of approximately 871 acres that drains to two (2) existing street sump inlets/low points located on Laurel Avenue, about 400 feet north of Jurupa Avenue.

The Rational Method Analysis results are shown in the table below:

TABLE 1. RATIONAL METHOD - OVERALL ONSITE & OFFSITE

WATERSHED AREA	STORM EVENT	EXISTING CONDITIONS Q (CFS)	ADJUSTED Q (CFS)	PROPOSED CONDITIONS Q (CFS)	DELTA Q(CFS)
*A	10	20.68	Q_5=17.49	54.59	33.91
	25	28.47	Q_{10}=20.68	69.18	40.71
	100	42.21	Q_{25}=28.47	93.48	51.27
*B	10	17.75	Q_5=22.50	19.02	1.27
	25	22.55	Q_{10}=17.75	24.09	1.54
	100	35.41	Q_{25}=22.55	36.00	0.59

*Watershed Area "A" is tributary to Locust Ave and only includes offsite areas from south of the centerline of Santa Ana Ave, east of Laurel Ave and West of the Locust street centerline; Watershed Area "B" is tributary to Laurel Ave.

TABLE 2. RATIONAL METHOD - ONSITE AREAS TRIBUTARY TO U/G RETENTION SYSTEM

WATERSHED AREA	INFILTRATION SYSTEM(S)	STORM EVENT	EXISTING CONDITIONS Q (CFS)	ADJUSTED Q (CFS)	PROPOSED CONDITIONS Q (CFS)	DELTA Q(CFS)
*A	N'LY	10	7.93	Q_5=4.37	31.78	23.85
		25	12.79	Q_{10}=7.93	39.18	26.39
		100	20.7	Q_{25}=12.79	51.64	30.94
	S'LY	10	3.56	Q_5=2.47	19.16	15.6
		25	6.06	Q_{10}=3.56	24.59	18.53
		100	13.32	Q_{25}=6.06	33.61	20.29

*Watershed Area "A" is tributary to Locust Ave and only includes offsite areas from south of the centerline of Santa Ana Ave, east of Laurel Ave and

West of the Locust street centerline; Watershed Area "B" is tributary to Laurel Ave.

Unit Hydrograph Analyses

To determine the increased runoff mitigation required for the project, a Unit Hydrograph calculation was performed for the existing and the proposed conditions for watershed area "A".

The unit hydrographs were performed using a lag time that was calculated by the following formula:

Lag (hrs) = TC_{RM} (hrs) × 80%, where TC_{RM} is the corresponding rational method time of concentration.

The pre-project unit hydrograph calculations utilized urban residential or commercial landscaping, good cover, with a pervious ratio of 0.8. The post project condition perviousness was calculated using a unit area method to determine the average perviousness for each subarea.

The following tables summarize the unit hydrograph calculations:

TABLE 3. UNIT HYDROGRAPH - ONSITE & OFFSITE

WATERSHED AREA	STORM EVENT	EXISTING CONDITIONS PEAK Q (CFS)	[2]ADJUSTED PEAK Q (CFS)	[1]MAXIMUM ALLOWABLE DISCHARGE (CFS)	PROPOSED CONDITIONS PEAK Q (CFS)
*A	10	34.46	Q_5=25.65	23.09	68.62
	25	46.97	Q_{10}=34.46	31.01	80.84
	100	68.94	Q_{25}=46.96	42.26	114.3
*B	10	29.52	Q_5=22.16	19.94	31.52
	25	40.63	Q_{10}=29.52	26.57	43.12
	100	46.42	Q_{25}=40.63	36.57	63.45

*Watershed Area "A" is tributary to Locust Ave and only includes offsite areas from south of the centerline of Santa Ana Ave, east of Laurel Ave and West of the Locust street centerline; Watershed Area "B" is tributary to Laurel Ave.
[1]Maximum allowable discharge is equal to 90% of the adjusted peak Q per the San Bernardino Memorandum (Appendix G.7)
[2]Rainfall shift per the San Bernardino County Memorandum (Appendix G.7)

TABLE 4. UNIT HYDROGRAPH - ONSITE

WATERSHED AREA	INFILTRATION SYSTEM(S)	STORM EVENT	EXISTING CONDITIONS PEAK Q (CFS)	[2]ADJUSTED PEAK Q (CFS)	[1]MAXIMUM ALLOWABLE DISCHARGE (CFS)	PROPOSED CONDITIONS PEAK Q (CFS)
*A	N'LY	10	11.39	Q_5=8.20	7.38	29.89
		25	15.5	Q_{10}=11.38	10.24	37.67
		100	22.59	Q_{25}=15.50	13.95	50.97
	S'LY	10	7.1	Q_5=5.04	4.54	27.71
		25	10.39	Q_{10}=7.10	6.39	34.71
		100	16.81	Q_{25}=10.39	9.35	46.47

*Watershed Area "A" is tributary to Locust Ave and only includes offsite areas from south of the centerline of Santa Ana Ave, east of Laurel Ave and West of the Locust street centerline; Watershed Area "B" is tributary to Laurel Ave.
[1]Maximum allowable discharge is equal to 90% of the adjusted peak Q per the San Bernardino Memorandum (Appendix G.7)
[2]Rainfall shift per the San Bernardino County Memorandum (Appendix G.7)

The pre-project unit hydrograph calculations have been included in Appendix D and the post-project unit hydrograph calculations have been included in Appendix E. The pre-project unit hydrograph watershed is based on the total area "A" of 40.02 acres. The post-project unit hydrograph watersheds are based upon the total onsite area tributary to the northerly and southerly detention basin systems of 15.31 acres and 14.15 respectively.

The pre-project and post-project rational method hydrology calculations have been included in Appendix A, B, & C. The pre-project rational method hydrology map has been included as Figure 2, and the post-project rational method hydrology map has been included as Figure 3. The pre-project and post-project unit hydrograph hydrology calculations have been included in Appendix B and C, respectively.

IV. HYDRAULICS

The project will utilize a combination of surface improvements, subsurface storm drain, drainage inlets and two underground infiltration systems to collect, convey peak flows and mitigate increased runoff and water quality. These underground retention/infiltration systems will have a weir outlet control structure. Both the weir outlet control structure and outlet pipes are preliminarily sized to safely by-pass the 100-year storm flow in case of an emergency. Ultimately, the outlet pipes will connect to a 78-inch storm drainpipe on Locust as shown on Figure 6 of Bloomington Business Park Master Storm Drain Plan (future by others). A normal depth analysis was used for the 36-inch outlet pipe assuming soffit control at the connection point. A WSPG analysis for onsite storm drainpipe system will be performed during final engineering.

The offsite street flows for both the 100-year and 10-year, (1- hr) storm was analyzed for both Laurel and Locust Avenue for any impacts the development would have on the existing street section. An analysis was performed on Locust Ave with the existing street section and the pre-project condition flow from the overall watershed "A". Both the 10-year and 100-year storm flows are topping the right of way in the existing street section. In order to reduce the water surface elevation to be at or below top of curb and right of way respectively, the project will construct half width street improvements on the westerly side of Locust Avenue, roadside earthen channels along its frontage that will intercept storm flows and four catch basins upstream of the site, just south of Santa Ana Ave; comprised of a 28-foot catch basin on the westerly side of Locust Ave, and a 14-foot catch basin on the easterly side. Another set of street inlet catch basins are proposed on Locust Ave immediately upstream of the northerly property boundary. The preliminary sizes are 28-foot catch basin on the westerly half of Locust Ave and a 3.5-foot catch basin on the easterly half are being proposed. The bypass flow from the series of catch basin systems described will help maintain the 10-year storm within both the existing and proposed top of curb. The 100-year storm flow for the developed condition, however, will exceed the proposed right of way. Therefore, an earthen roadside channel is being proposed that will extend along the frontage road as to intercept storm flows and direct them to an outlet pipe that will connect and discharge at Locust Ave to the Bloomington Business Park SP master storm drain (by others).

Similarly, an analysis was performed on Laurel Avenue with the existing street section and the pre-project condition flow rates from the overall watershed "B". Both the 10-year and 100-year storm flows were found to exceed the existing street right-of-way. In order to contain the 10-year and 100-year storm at or below top of curb and right of way respectively, the project will construct a combination of two street inlet catch basins and a roadside earthen channel along its frontage that will intercept storm flows and direct them to the Bloomington Business Park SP master storm drain (by others). The street inlet catch basins have been preliminarily sized and proposed at the northerly project boundary; with a 28 and 21-foot wide street inlets, east and west of Laurel Ave, respectively. In addition, the 100-year storm flow for the developed condition will also exceed the proposed right of way, therefore, an earthen roadside channel is being proposed and will extend along the frontage road to collect storm water.

Storm water will be directed to an outlet pipe that will connect and discharge at Laurel Ave to the Bloomington Business Park SP master storm drain (by others).

V. INCREASED RUNOFF MITIGATION

In accordance with the "San Bernardino County Detention Basin Criteria" memorandum (Appendix G.7), when a basin is to be used, "the County should be at least 50% confident a detention basin outflow will not adversely impact properties downstream of the basin." Therefore, the basin's capacity and outlet drain system shall be sized such that the post-development 10, 25 and 100-year peak flow rates generated by the site be less than or equal to 90% of the predevelopment 10, 25 and 100-year peak flow rates, except that the predevelopment peak flow rates shall be calculated using the 5, 10 and 25-year rainfall values, respectively. That is, the predeveloped 10-year peak flow rate shall be estimated by using the 5-year rainfall data, the 25-year peak flow rate calculated using the 10-year rainfall and 100-year using the 25-year rainfall values (see adjusted peak flow rates under Table 4).

The project site will utilize two separate subsurface infiltration systems (CMP retention system, 2 total) to mitigate flows for increased runoff and serve as the water quality treatment facility for the project site. The water quality calculations and discussion have been provided in the Water Quality Management Plan. The required water quality volume for Watershed Area "A" is 126,871 ft^3. The calculation for the Design Capture Volume (DCV) has been included in Appendix G. Infiltration testing were performed within the two retention system locations and referenced as northerly and southerly retention system. An excerpt of the Soils Infiltration test report has been included in Appendix G. The area tested in the northerly retention system provides a rate of approximately 11.4 in/hr, after applying a safety factor in accordance with the technical guidance manual, the design infiltration rate is calculated to be **3.8** in/hr; a worksheet has been included in Appendix G. For the area tested in the southerly retention system, a rate of approximately 20 in/hr is estimated, applying a safety factor the design infiltration is **6.7** in/hr. To determine a flow rate through the soil that could be utilized in the basin routing calculations (to be performed in the final engineering phase), the infiltration rate was multiplied by the bottom surface area of the subsurface infiltration system. The bottom surface area of the northerly infiltration system is 60,936 ft^2 and the southerly infiltration system is 47,710 ft^2, converting the calculated design infiltration rate to the appropriate units and multiplying by the surface area, the equivalent flow rate for the northerly infiltration system and southerly infiltration system is 5.36 ft^3/s and 7.40 ft^3/s, respectively. These flow rates will be utilized in the basin routing analyses during final engineering phase.

Since the water quality volume (DCV) must infiltrate through the chamber bottom, the underground basin outlet structure did not include outlets below the DCV elevations. This would allow the water quality volume to pond and infiltrate through the soil. To control the discharge rates, each retention and infiltration system will have an outlet weir control structure.

Stormwater mitigation information for watershed "A" can be seen in the table provided below:

TABLE 5. UNIT HYDROGRAPH VOLUME ANALYSIS - ONSITE										
WATERSHED AREA	INFILTRATION SYSTEM(S)	STORM EVENT	EXISTING PEAK Q (CFS)	PROPOSED PEAK Q (CFS)	[1]MITIGATED PEAK/ALLOWABLE Q (CFS)	MITIGATED DISCHARGE Q (CFS)	MITIGATED DISCHARGE VOLUME (AF)	U/G RETENTION VOLUME (AF)	TOTAL STORM VOLUME (AF)	STORM CAPTURE (%)
*A	N'LY	10	11.39	29.89	7.38	6.64	2.89	4.53	3.91	100%
		25	15.50	37.67	10.24	8.13	3.53		4.78	95%
		100	22.59	50.97	13.95	10.46	4.53		6.11	74%
	S'LY	10	7.10	27.71	4.54	3.95	2.64	4.11	3.46	100%
		25	10.39	34.71	6.39	6.30	3.18		4.24	97%
		100	16.81	46.47	9.35	8.30	4.11		5.47	75%

*Watershed Area "A" is tributary to Locust Ave and only includes offsite areas from south of the centerline of Santa Ana Ave, east of Laurel Ave and West of the Locust street centerline; Watershed Area "B" is tributary to Laurel Ave.

[1]Maximum allowable discharge is equal to 90% of the adjusted peak Q per the San Bernardino Memorandum (Appendix G.7)

TABLE 6. RATIONAL METHOD SUMMARY TABLE FOR $Q_{100\text{-YEAR}}$					
DESCRIPTION	*WATERSHED "A" - ONSITE ONLY			*WATERSHED "B"	*WATERSHED "A" &"B"
	N'LY INFILTRATION SYSTEM Q (CFS)	S'LY INFILTRATION SYSTEM Q (CFS)	ONSITE TOTAL Q (CFS)	OFFSITE TOTAL Q (CFS)	TOTAL COMBINED Q (CFS)
EXISTING CONDITIONS	20.7	13.32	34.02	35.41	69.43
PROPOSED DEVELOPED CONDITIONS	51.64	33.61	85.25	36	121.25
Q_{100} DELTA	30.94	20.29	51.23	0.59	51.82

*Watershed Area "A" is tributary to Locust Ave and only includes offsite areas from south of the centerline of Santa Ana Ave, east of Laurel Ave and West of the Locust street centerline; Watershed Area "B" is tributary to Laurel Ave.

The total mitigation volume required for watershed area "A" was determined by finding the "mitigated peak/allowable" (see Table 5) flow rates for the northerly and southerly retention systems. We then selected the flow rates from the recess limb of the proposed unit hydrograph runs that are equal or less than the "mitigated peak/allowable"; and they were compiled and shown in Table 5 under the "Mitigated Discharge" column. Since the storm volume demand to mitigate the storm flows from the 100-year 24hour event to the 90% of the 25-year predeveloped storm event is larger than volumes produced by the smaller storm events, the proposed underground retention system has been sized to accommodate this volume which corresponds to the "Mitigated Discharge Volume" column from table 5 (e.g. northerly underground retention system, V=4.53 Acre-ft), thus a conservative approach.

VI. FINDINGS

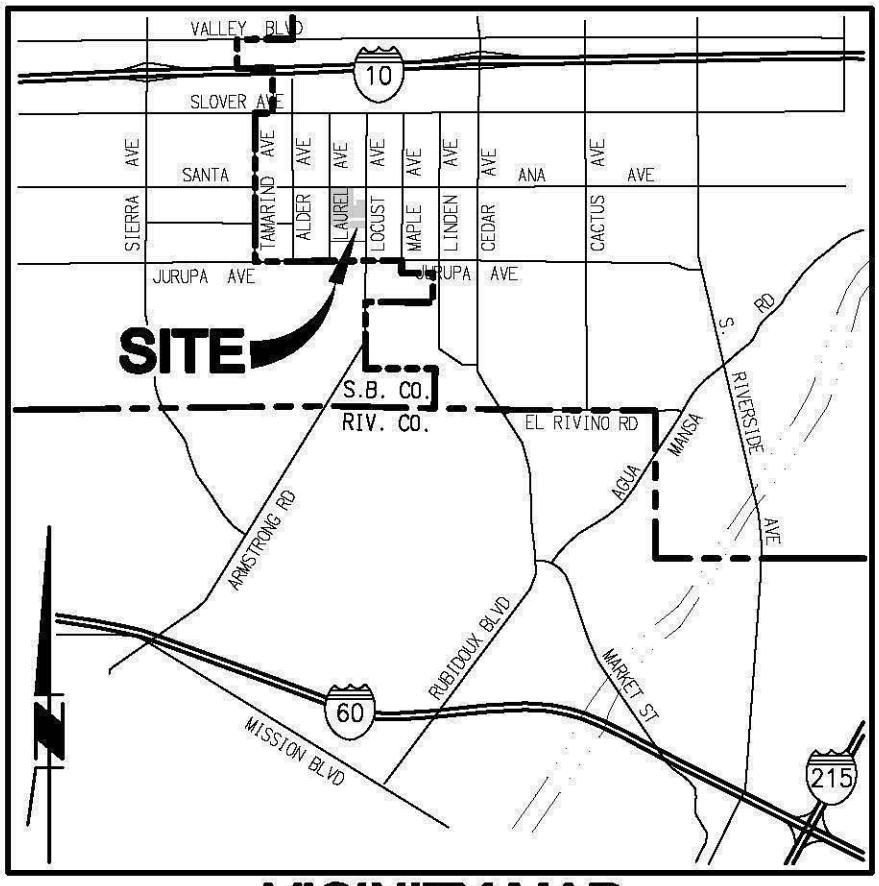
The hydrology analyses evaluated the proposed development to determine the necessary drainage improvements required to mitigate flows for increased runoff. It has been concluded that:

1. The proposed drainage facilities will adequately convey the 100-year flows and provide flood protection to the project site.
2. The proposed retention/infiltration subsurface system will adequately mitigate for water quality and increased runoff.

VII. REFERENCES

1. San Bernardino Flood Control Hydrology Manual, August 1986.
2. Brater, Ernest F., and Horace Williams King. 1976. *Handbook of Hydraulics for the Solution of Hydraulic Engineering Problems.* 6th ed. McGraw-Hill, Inc.
3. San Bernardino Rational Method and Unit Hydrograph modules, CivilDesign Engineering Software Version 9.0.

FIGURE 1:
VICINITY MAP



VICINITY MAP

T01S, R05W, SEC. 28
NOT TO SCALE

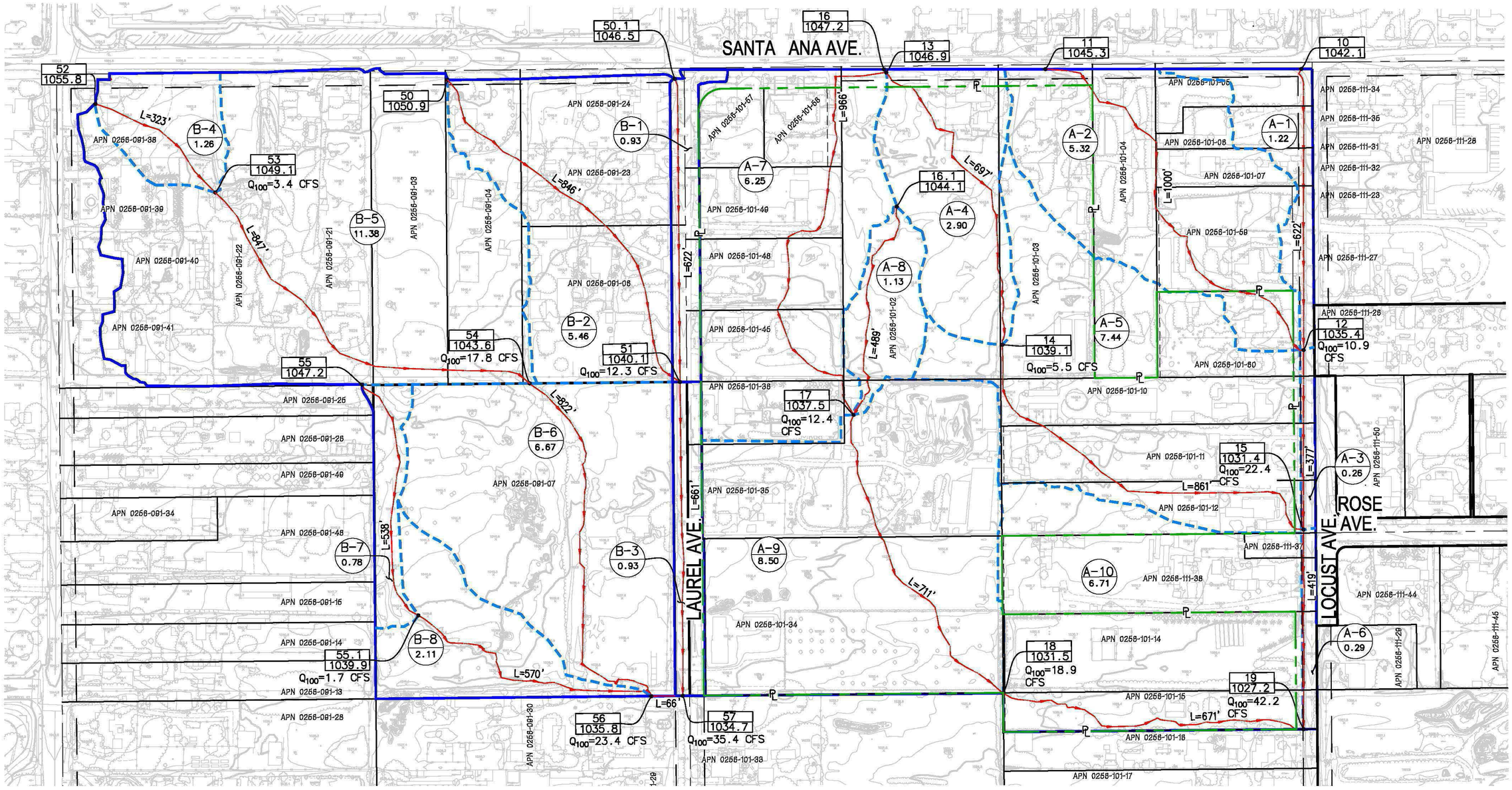
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BLOOMINGTON BUSINESS PARK SP3

FIGURE 1
VICINITY MAP

H:\PDATA\17-006 BLOOMINGTON\DOCS\WQMP\SITE 3\SCHEME 1 APPENDICES_SECTION 6.1_VICINITY MAP AND WQMP EXHIBIT\CAD\17-006-SCH1-SP3-VICINITY.DWG HECTOR 3/12/2021 4:29 AM

FIGURE 2:
EXISTING CONDITION HYDROLOGY MAP



LEGEND

- D-2 / 2.16 — DRAINAGE BASIN NAME / DRAINAGE BASIN AREA(AC.)
- 11 / 1027.0 — NODE I.D. / SURFACE ELEVATION
- DRAINAGE BOUNDARY
- DRAINAGE SUB-BOUNDARY
- FLOW DIRECTION
- PROPOSED STORM DRAIN
- PROPERTY LINE

SCALE 1"=150'

150 75 0 150

SCALE: 1"=150'

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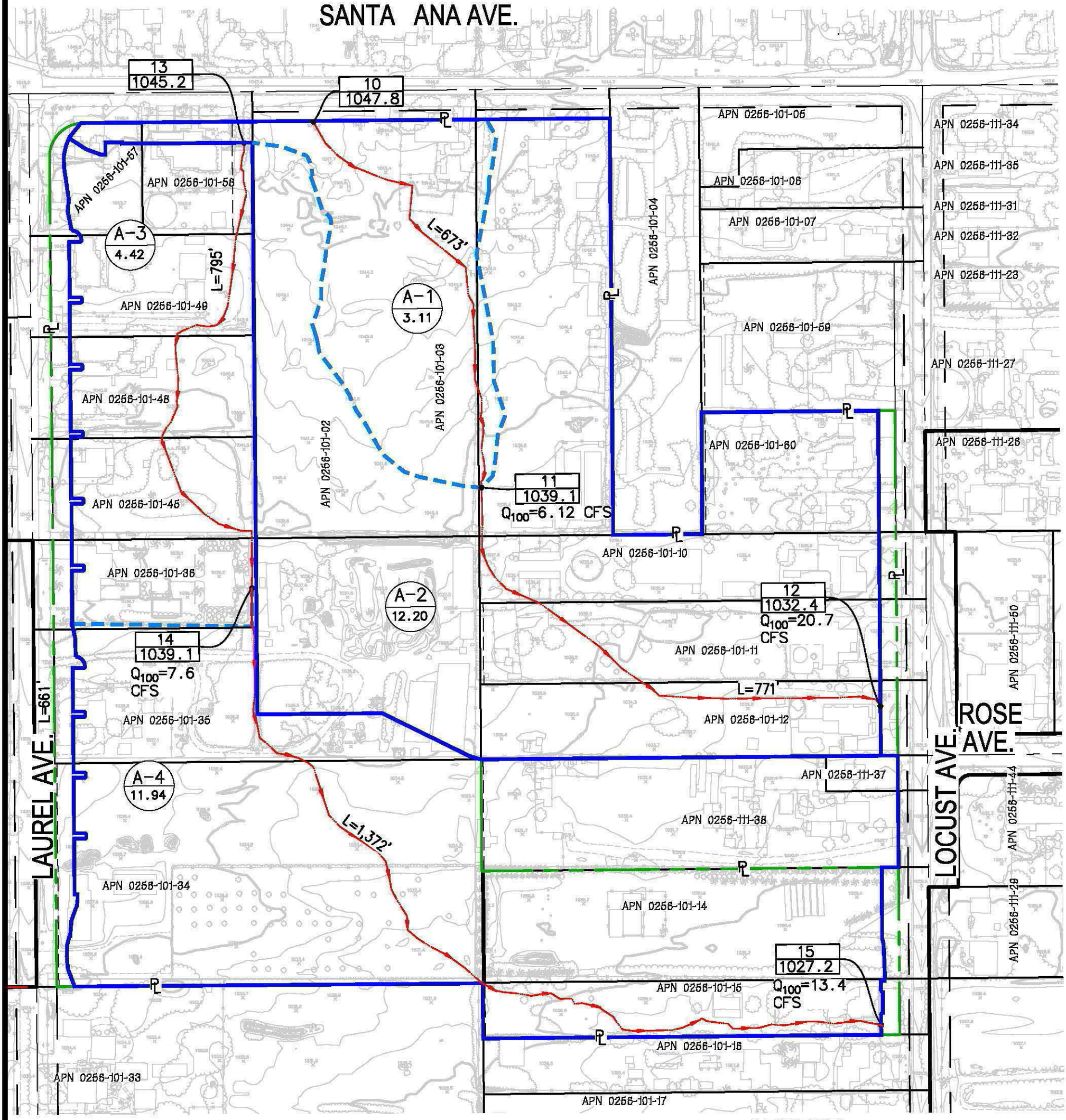
BLOOMINGTON BUSINESS PARK SITE 3

EXISTING CONDITION W/ OFFSITES HYDROLOGY MAP

H:\PROJECTS\17-008 BLOOMINGTON\DWGS\HYDRO\SITE 3_PRELIMINARY\FIGURES\CAD\SSH-17-008-EX-OFFSITE-ALT-SITE3-ZOOM.DWG HECTOR 4/28/2021 1:39 PM

FIGURE 3:

EXISTING CONDITION HYDROLOGY MAP – ONSITE CHAMBERS



LEGEND

- D-2 / 2.16 — DRAINAGE BASIN NAME / DRAINAGE BASIN AREA(AC.)
- 11 / 1027.0 — NODE I.D. / SURFACE ELEVATION
- DRAINAGE BOUNDARY
- DRAINAGE SUB-BOUNDARY
- FLOW DIRECTION
- PROPERTY LINE

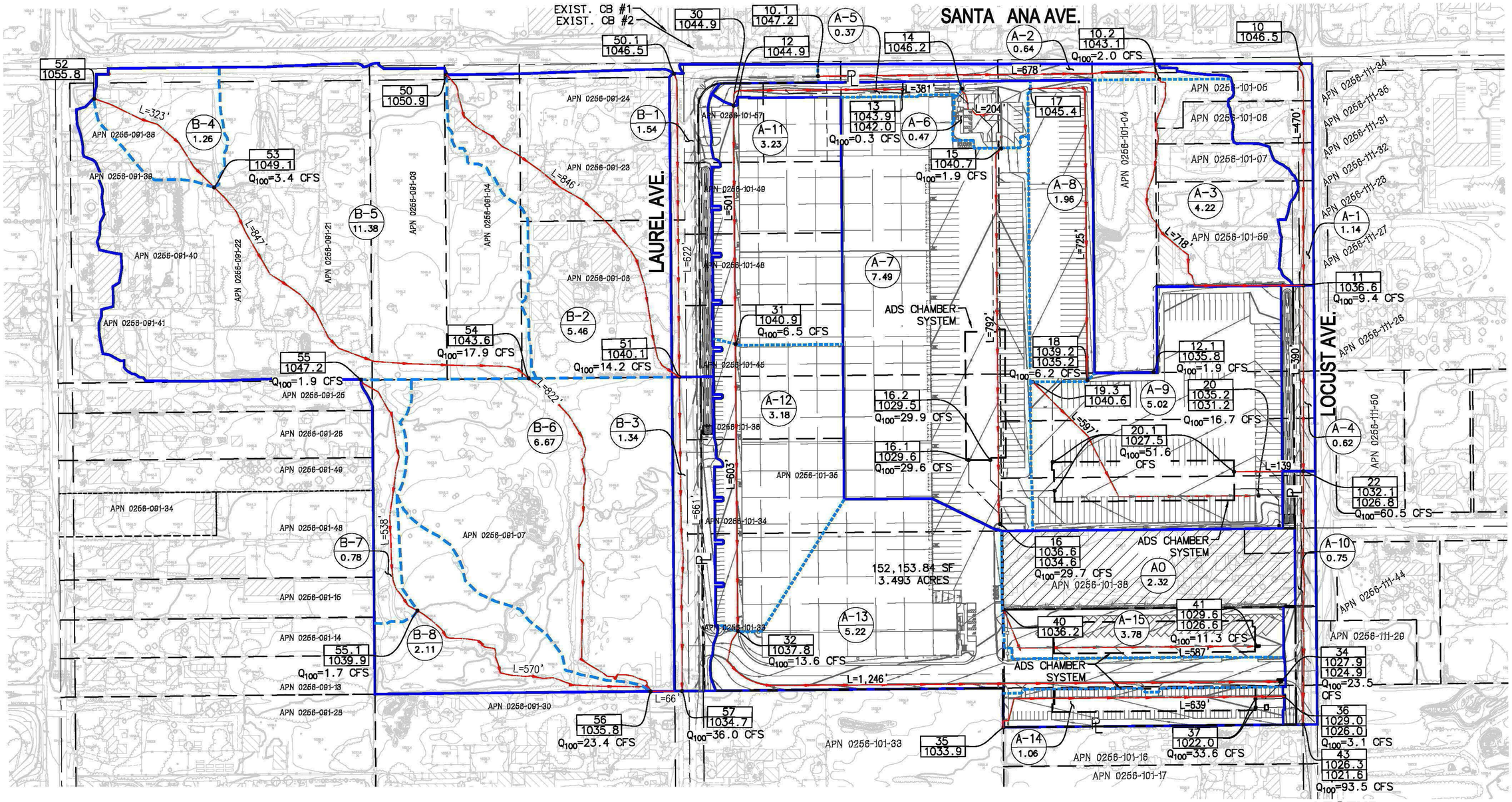
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BLOOMINGTON BUSINESS PARK SITE 3

EXISTING CONDITION ONSITE WATERSHED A - HYDROLOGY MAP

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FIGURE 4:
PROPOSED CONDITION HYDROLOGY MAP



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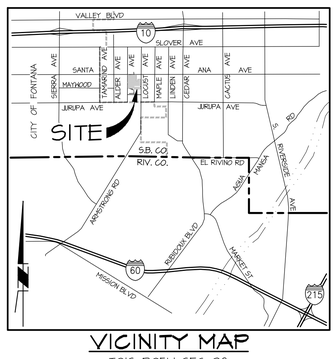
BLOOMINGTON BUSINESS PARK SITE 3

PROPOSED CONDITION W/ OFFSITES HYDROLOGY MAP

FIGURE 5:
PROPOSED CONCEPTUAL GRADING PLANS

IN THE UNINCORPORATED AREA OF THE
COUNTY OF SAN BERNARDINO, CALIFORNIA

VESTING TENTATIVE PARCEL MAP NO. 20340



VICINITY MAP
T01S, R05W, SEC. 28
NOT TO SCALE

APPLICANT/OWNER
HOWARD INDUSTRIAL PARTNERS
1944 NORTH TUSTIN STREET, SUITE 122
ORANGE, CA 92865
CONTACT: TIM HOWARD
(TEL)714-769-9155

ENGINEER
FMCIVIL ENGINEERS INC.
29995 TECHNOLOGY DRIVE, SUITE 306
MURRIETA, CA 92563
CONTACT: FRANCISCO MARTINEZ
(TEL)951-331-9873

ARCHITECT
AO ARCHITECTURE
144 NORTH STREET
ORANGE, CA 92866
CONTACT: STEPHEN PRZYBYLOWSKI
(TEL)714-634-9860

ASSESSOR'S PARCEL NUMBER

PARCEL NUMBER AS NOTED PER LEGAL DESCRIPTION	APN
PARCEL 1	0256-101-57
PARCEL 2	0256-101-58
PARCEL 3	0256-101-44
PARCEL 4	0256-101-48
PARCEL 5	0256-101-45
PARCEL 6	0256-101-36
PARCEL 7	0256-101-35
PARCEL 8	0256-101-34
PARCEL 9	0256-101-04
PARCEL 10	0256-101-05
PARCEL 11	0256-101-06
PARCEL 12	0256-101-07
PARCEL 13	0256-101-59
PARCEL 14	0256-101-60
PARCEL 15	0256-101-10
PARCEL 16	0256-101-11
PARCEL 17	0256-101-12
PARCEL 18	0256-101-37
PARCEL 19	0256-101-38
PARCEL 20	0256-101-14
PARCEL 21	0256-101-15
PARCEL 22	0256-101-02,-03

LEGAL DESCRIPTION
SEE SHEET 2

EASEMENT NOTES
SEE SHEET 2

PROJECT DESCRIPTION:
A DISTRIBUTION WAREHOUSE FACILITY CONSISTING OF A WAREHOUSE TOTALING 477,000 SQUARE FEET ON 10.95 NET ACRES.

PROJECT DATA:

GROSS SITE AREA:	1,413,834 S.F.	32.46 AC.
NET SITE AREA:	1,328,168 S.F.	30.49 AC

BUILDING AREA

OFFICE	5,000	S.F.
WAREHOUSE	474,000	S.F.
TOTAL BUILDING AREA	479,000	S.F.

LOT COVERAGE: PROPOSED: 36.1%

PARKING REQUIREMENTS

5,000 SF OFFICE (1/250 SF)	20	STALLS
0-40,000 SF WAREHOUSE (1/1000 SF)	40	STALLS
40,000 SF + WAREHOUSE (1/4000 SF)	109	STALLS
TOTAL PARKING REQUIRED	169	STALLS

PARKING PROVIDED

ACCESSIBLE (9' X 18')	6	STALLS
VAN ACCESSIBLE (9' X 18')	2	STALLS
STANDARD (9' X 18')	224	STALLS
TOTAL PARKING PROVIDED	232	STALLS

TRAILER PARKING PROVIDED
TRAILER (12' X 55') 253 STALLS

SETBACKS
FRONT = 25' SIDE STREET = 25'
SIDE INTERIOR = 10' REAR = 10'

UTILITY COMPANIES:

WATER:	WEST VALLEY WATER DISTRICT PHONE: (909) 875-1322I
ELECTRIC:	SOUTHERN CALIFORNIA EDISON PHONE: (909) 357-6585
TELEPHONE:	AT&T PHONE: (858) 886-1288
CABLE:	CHARTER COMMUNICATIONS PHONE: (909) 634-3224
GAS:	SOUTHERN CALIFORNIA GAS COMPANY PHONE: (800) 427-2200
SCHOOL:	COLTON JOINT UNIFIED SCHOOL DISTRICT PHONE: (909) 580-5000
SEWER:	PRIVATE SEPTIC SYSTEM

SEWER
EXISTING SEWER:
PRIVATE SEPTIC SYSTEMS

PROPOSED SEWER:
PUBLIC SEWER TO LIFT STATION

EARTHWORK ESTIMATE:

RAW CUT:	16,155 CY	
RAW FILL:	105,375 CY	
NET:	89,220 CY	IMPORT

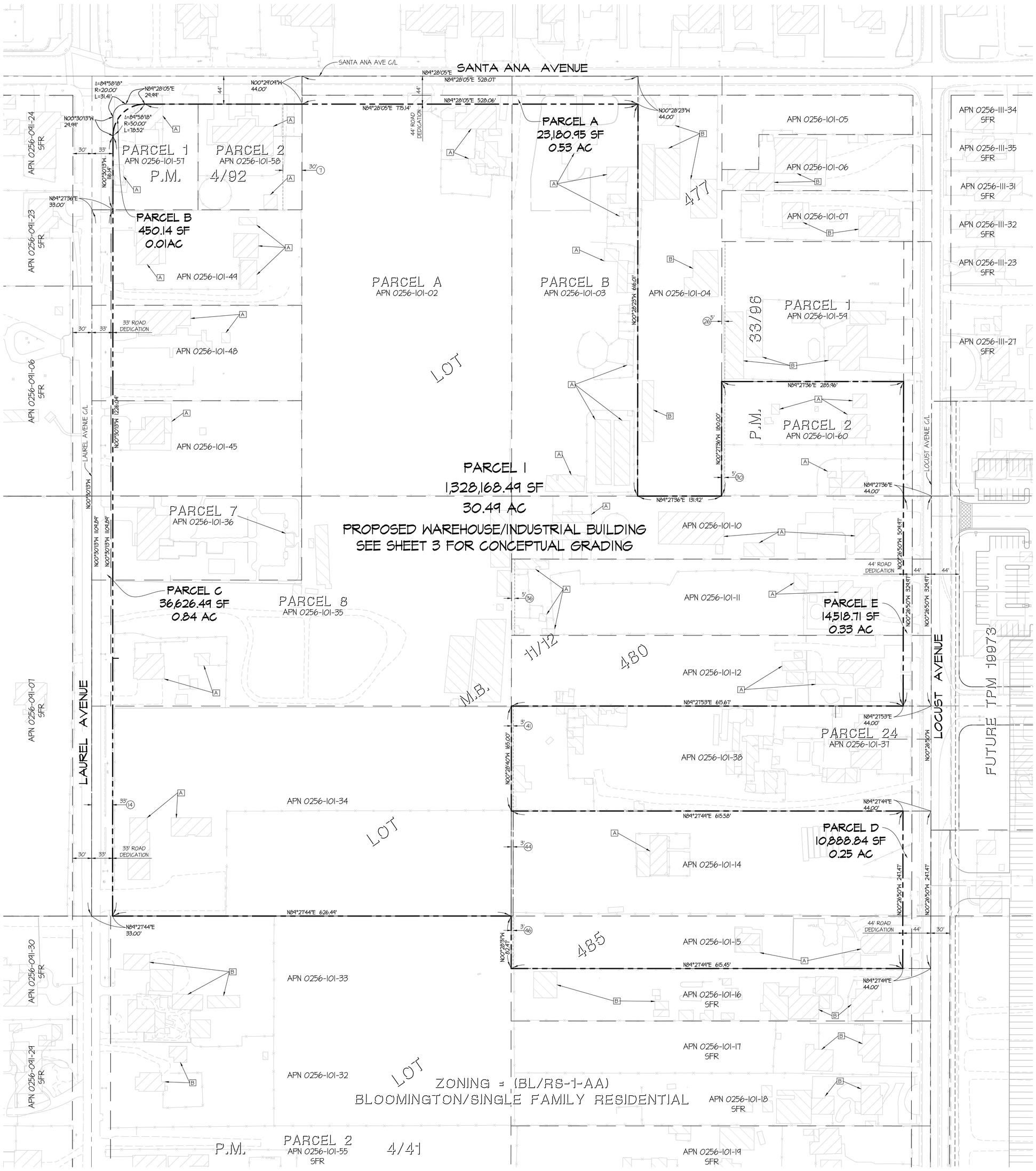
HAUL TRIPS:
ASSUMED (13 CY PER TRIP) = 6,863

ZONING ORDINANCE
EXISTING ZONING:
BLOOMINGTON/SINGLE FAMILY RESIDENTIAL (BL/RS-1-AA)

PROPOSED ZONING:
REGIONAL INDUSTRIAL (IR)

TOPOGRAPHY:
PROVIDED BY ROBERT J. LUNG & ASSOCIATES, INC.
FLOWN ON 11/14/17.
2832 WALNUT AVE E, TUSTIN, CA 92780
TEL: (714) 832-2077

FLOOD ZONE:
THE SITE LIES WITHIN FLOOD ZONE "X" AREAS OF 0.2% ANNUAL CHANCE FLOOD AND AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; INUNDATION BY THE 1% ANNUAL CHANCE FLOOD, BASE FLOOD ELEVATIONS DETERMINED AS SHOWN ON FLOOD INSURANCE RATE MAP NUMBER 06071C8666H, EFFECTIVE DATE AUGUST 28, 2008



PARCEL DATA

PROPOSED PARCEL	AREA	USE
PARCEL 1	1,328,168.49 SF 30.49 AC	WAREHOUSE
PARCEL A	23,180.95 SF 0.53 AC	RIGHT OF WAY DEDICATION
PARCEL B	450.14 SF 0.01 AC	RIGHT OF WAY DEDICATION
PARCEL C	36,626.49 SF 0.84 AC	RIGHT OF WAY DEDICATION
PARCEL D	10,888.84 SF 0.25 AC	RIGHT OF WAY DEDICATION
PARCEL E	14,518.71 SF 0.33 AC	RIGHT OF WAY DEDICATION
TOTAL	1,413,834.62 SF 32.46 AC	

LEGEND
- [A] EXISTING STRUCTURE(S) TO BE REMOVED
- [B] EXISTING STRUCTURE(S) TO REMAIN
- (16) EASEMENT NUMBER AS SHOWN ON TITLE REPORT

NOTES:
1. THERE ARE NO-KNOWN WATER WELLS; HOWEVER IF ANY WATER WELLS ARE TO BE FOUND ON-SITE THEY ARE TO BE ABANDONED PER STATE OF CALIFORNIA STANDARDS.
2. ALL EXISTING ON-SITE SEPTIC SYSTEMS SHALL BE REMOVED IN ACCORDANCE TO THE REQUIREMENTS OF COUNTY SAN BERNARDINO DEPT. ENVIRONMENTAL HEALTH SERVICES.

SCALE 1"=60'

60 30 0 60 120 180
SCALE: 1"=60'

REGISTERED PROFESSIONAL ENGINEER
FRANCISCO MARTINEZ JR.
C-84640
CIVIL
STATE OF CALIFORNIA

PREPARED BY:
FMCIVIL ENGINEERS INC.
29995 TECHNOLOGY DRIVE, SUITE 306 | MURRIETA | CA 92563
951.973.0201 - FMCIVIL.COM

#84640 3/31/22
FRANCISCO MARTINEZ JR. R.C.E. / EXP. DATE

BENCHMARK
BM UF 628 NAVD88 EL. = 1006.35 FEET
FOUND STANDARD MNDSC 3-1/4 INCH ALUMINUM DISC, STAMPED "UF 628 1992" SET IN TOP OF HEADWALL. MONUMENT IS LOCATED 0.1 MILE (0.2 KM) SOUTH FROM THE INTERSECTION OF POPLAR AVE AND JURUPA AVE, 55 FEET (16.8 M) SOUTH OF NICOLE WAY, 26.5 FEET (8.1 M) WEST OF POPLAR AVE AT THE NORTH END OF A 44 FOOT (13.4 M) LONG FLOOD CONTROL CHANNEL WALL.

BASIS OF BEARING
THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA COORDINATE SYSTEM, ZONE V, NAD83 (EPOCH 2011.00) AS DETERMINED LOCALLY BY A LINE BETWEEN CONTINUOUS OPERATING REFERENCE STATIONS (CORS) MLFP AND EHPP BEING N43-16-17.55W AS DERIVED FROM GEODETIC VALUES PUBLISHED BY THE CALIFORNIA SPATIAL REFERENCE CENTER (CSRC) AND/OR NATIONAL GEODETIC SURVEY (NGS), RESPECTIVELY.

COUNTY OF SAN BERNARDINO

BLOOMINGTON BUSINESS PARK SP3
VESTING TENTATIVE PARCEL
MAP NO. 20340

SCALE:	AS SHOWN
DATE:	APRIL 2021
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

FMCIVIL ENGINEERS INC.
29995 TECHNOLOGY DRIVE, SUITE 306
MURRIETA | CA 92563
951.973.0201 - FMCIVIL.COM

SHEET 1 OF 3 SHEETS

H:\PDATA\17-006 BLOOMINGTON\DWGS\PLNG\ENTITLEMENT\CONCEPT\SITE-3\SCHEME_1\17-006-TPM-SP3-SCH1-001.DWG ALLAN 4/6/2021 9:23 AM

IN THE UNINCORPORATED AREA OF THE
COUNTY OF SAN BERNARDINO, CALIFORNIA

VESTING TENTATIVE PARCEL MAP NO. 20340

LEGAL DESCRIPTION:

PARCEL 1 (APN: 0256-101-57)

PARCEL 1 OF PARCEL MAP NO. 405, IN THE UNINCORPORATED AREA OF SAN BERNARDINO COUNTY, STATE OF CALIFORNIA, AS PER MAP FILED IN BOOK 4, PAGE 92 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

PARCEL 2 (APN: 0256-101-58)

PARCEL 2 OF PARCEL MAP NO. 405, IN THE UNINCORPORATED AREA OF SAN BERNARDINO COUNTY, STATE OF CALIFORNIA, AS PER MAP FILED IN BOOK 4, PAGE 92 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

PARCEL 3 (APN: 0256-101-49)

THE NORTH 150 FEET OF THE SOUTH 450 FEET OF THE WEST HALF OF THE WEST HALF OF FARM LOT 477, SEMI-TROPIC LAND AND WATER COMPANY, AS SHOWN BY MAP ON FILE IN BOOK 11, PAGE(S) 12, OF MAPS, RECORDS OF SAID COUNTY.

PARCEL 4 (APN: 0256-101-48)

THE NORTH 150 FEET OF THE SOUTH 300 FEET OF THE WEST 1/2 OF THE WEST 1/2 OF FARM LOT 477, ACCORDING TO MAP OF SUBDIVISION OF LANDS BELONGING TO THE SEMI-TROPIC LAND AND WATER IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER PLAT RECORDED IN BOOK 11 OF MAPS, PAGE 12, RECORDS OF SAID COUNTY.

NOTE: AREA AND DISTANCES AS SHOWN ON MAP OF ABOVE DESCRIBED SUBDIVISION INDICATE SAME ARE COMPUTED TO STREET CENTERS.

PARCEL 5 (APN: 0256-101-45)

THE SOUTH 150 FEET OF THE WEST ½ OF THE WEST ½ OF FARM LOT 477, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ACCORDING TO MAP OF SUBDIVISION OF LANDS BELONGING TO THE SEMI-TROPIC LAND AND WATER COMPANY, AS PER PLAT RECORDED IN BOOK 11, PAGE 12 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

NOTE: AREA AND DISTANCES COMPUTED TO STREET CENTERS.

PARCEL 6 (APN: 0256-101-36)

THE NORTH 132 FEET OF THE WEST 330 FEET OF THE NORTH 1/2 OF THE WEST 1/2 OF FARM LOT 480, ACCORDING TO MAP SHOWING THE SUBDIVISION OF LANDS BELONGING TO SEMI-TROPIC LAND AND WATER COMPANY, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER PLAT RECORDED IN BOOK 11, PAGE 12 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

AREAS AND DISTANCES ARE COMPUTED TO THE CENTER OF ADJOINING STREETS.

PARCEL 7 (APN: 0256-101-35)

THE NORTH HALF OF THE WEST HALF OF FARM LOT 480, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ACCORDING TO MAP SHOWING SUBDIVISION OF LANDS BELONGING TO THE SEMI-TROPIC LAND AND WATER COMPANY, AS PER PLAT RECORDED IN BOOK 11, PAGE(S) 12, OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPTING THEREFROM THE NORTH 132 FEET OF THE WEST 330 FEET THEREOF.

PARCEL 8 (APN: 0256-101-34)

THE SOUTH HALF OF THE WEST HALF OF FARM LOT 480, ACCORDING TO MAP SHOWING SUBDIVISIONS OF LAND BELONGING TO THE SEMI-TROPIC LAND AND WATER COMPANY, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER PLAT RECORDED IN BOOK 11, PAGE 12 OF MAPS, RECORDS OF SAID COUNTY.

PARCEL 9 (APN: 0256-101-04)

THE WEST HALF OF THE EAST HALF OF LOT 477, ACCORDING TO PLAT SHOWING SUBDIVISION OF LANDS BELONGING TO THE SEMI-TROPIC LAND AND WATER COMPANY, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER PLAT RECORDED IN BOOK 11, PAGE 12 OF MAPS, RECORDS OF SAID COUNTY.

EXCEPTING THEREFROM THE WEST 3 ACRES.

PARCEL 10 (APN: 0256-101-05)

THE EAST 1/2 OF THE EAST 1/2 OF LOT 477 OF SUBDIVISION OF LANDS BELONGING TO SEMI-TROPIC LAND AND WATER COMPANY, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 11, PAGE(S) 12 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE CENTERLINE OF LOCUST AVENUE AND SANTA ANA AVENUE;

THENCE SOUTH ALONG THE CENTER LINE OF LOCUST AVENUE, A DISTANCE OF 91.75 FEET;

THENCE WEST PARALLEL TO THE CENTER LINE OF SANTA ANA AVENUE, A DISTANCE OF 272.12 FEET;

THENCE SOUTH 55 FEET;

THENCE WEST PARALLEL TO THE CENTERLINE OF SANTA ANA 58 FEET TO A POINT IN THE WEST LINE OF THE EAST 1/2 OF THE EAST 1/2 OF SAID LOT 477;

THENCE EAST ALONG THE CENTER LINE OF SANTA ANA AVENUE 330.39 FEET TO THE POINT OF BEGINNING.

AREAS AND DISTANCES AREA COMPUTED TO STREET CENTERS.

PARCEL 11 (APN: 0256-101-06)

THAT PORTION OF THE EAST HALF OF THE EAST HALF OF FARM LOT 477 ACCORDING TO PLAT SHOWING SUBDIVISION OF LANDS BELONGING TO THE SEMITROPIC LAND AND WATER COMPANY, AS PER PLAT RECORDED IN BOOK 11, OF MAPS, PAGE 12, RECORDS OF SAID COUNTY, DESCRIBED AS FOLLOWS; BEGINNING AT A POINT IN THE CENTER LINE OF LOCUST AVENUE 91.75 FEET SOUTH OF THE INTERSECTION OF THE CENTER LINE OF SANTA ANA LOCUST AVENUE; THENCE WEST PARALLEL WITH THE CENTER LINE OF SANTA ANA 272.12 FEET; THENCE SOUTH PARALLEL WITH THE CENTER LINE OF LOCUST AVENUE A DISTANCE OF 55 FEET; THENCE WEST PARALLEL WITH THE CENTER LINE OF SANTA ANA AVENUE 58 FEET, MORE OR LESS TO THE WEST LINE OF SAID EAST HALF OF THE EAST HALF OF SAID LOT 477; THENCE SOUTH ALONG THE WEST LINE OF SAID EAST HALF OF THE EAST HALF OF SAID LOT 477, A DISTANCE OF 33.25 FEET TO A POINT 480 FEET NORTH OF THE SOUTH LINE OF SAID LOT; THENCE EAST PARALLEL TO THE CENTER LINE OF SANTA ANA AVENUE 330 FEET, MORE OR LESS, TO THE CENTERLINE OF LOCUST AVENUE; THENCE NORTH ALONG THE CENTERLINE OF LOCUST AVENUE; THENCE NORTH ALONG THE CENTERLINE OF LOCUST AVENUE A DISTANCE OF 88.25 FEET, TO THE TRUE POINT OF BEGINNING.

PARCEL 12 (APN: 0256-101-07)

THE NORTH 80 FEET OF THE SOUTH 480 FEET OF THE EAST ½ OF THE EAST ½ OF LOT 477, ACCORDING TO SUBDIVISION OF LANDS BELONGING TO SEMI-TROPIC LAND AND WATER COMPANY, AS PER MAP RECORDED IN BOOK 11, PAGE 12 OF MAPS, RECORDS OF SAID COUNTY.

NOTE: AREAS AND DISTANCES ARE COMPUTED STREET CENTERS.

PARCEL 13 (APN: 0256-101-59)

PARCEL 1 OF PARCEL MAP NO. 3652, IN THE CITY OF BLOOMINGTON, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER PLAT RECORDED IN BOOK 33 PAGE 96 OF PARCEL MAPS, RECORDS OF SAID COUNTY.

PARCEL 14 (APN: 0256-101-60)

PARCEL 2 OF PARCEL MAP NO. 3652, IN THE CITY OF BLOOMINGTON, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER PLAT RECORDED IN BOOK 33 PAGE 96 OF PARCEL MAPS, RECORDS OF SAID COUNTY.

PARCEL 15 (APN: 0256-101-10)

THE NORTH ½ OF THE EAST ½ OF FARM LOT 480, SEMI TROPIC LAND AND WATER COMPANY SUBDIVISION, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER PLAT RECORDED IN BOOK 11 OF MAPS, PAGE 12, RECORDS OF SAN BERNARDINO COUNTY.

EXCEPTING THEREFROM THE SOUTH 231 FEET.

PARCEL 16 (APN: 0256-101-11)

THE NORTH 120 FEET OF THE SOUTH 231 FEET OF THE NORTH ½ OF THE EAST ½ OF LOT 480, ACCORDING TO MAP SHOWING SUBDIVISION OF LANDS BELONGING TO THE SEMI-TROPIC LAND AND WATER COMPANY, AS PER MAP RECORDED IN BOOK 11, PAGE 12 OF MAPS, RECORDS IN THE OFFICE OF THE COUNTY RECORDER IN SAID COUNTY.

PARCEL 17 (APN: 0256-101-12)

THE SOUTH 111 FEET OF THE NORTH ONE-HALF OF THE EAST ONE-HALF OF LOT 480, ACCORDING TO MAP SHOWING SUBDIVISION OF LANDS BELONGING TO SEMI-TROPIC LAND AND WATER COMPANY, AS PER PLAT RECORDED IN BOOK 11 OF MAPS, PAGE 12, RECORDS OF SAID COUNTY.

NOTE: AREA AND DISTANCES ARE COMPUTED TO STREET CENTERS.

PARCEL 18 (APN: 0256-101-37)

THE NORTH 52 FEET OF THE EAST 150 FEET OF THE SOUTH ½ OF LOT 480, ACCORDING TO MAP SHOWING SUBDIVISION OF LANDS BELONG TO THE SEMI-TROPIC LAND AND WATER COMPANY, AS PER PLAT RECORDED IN BOOK 11, PAGE 12 OF MAPS, RECORDS OF SAID COUNTY.

NOTE: AREAS AND DISTANCES COMPUTED TO STREET CENTERS.

PARCEL 19 (APN: 0256-101-38)

THE NORTH 1/2 OF THE SOUTH 1/2 OF THE EAST 1/2 OF LOT 480, ACCORDING TO THE MAP SHOWING SUBDIVISION OF LANDS BELONGING TO SEMI-TROPIC LAND AND WATER COMPANY, AS PER PLAT RECORDED IN BOOK 11 OF MAPS, PAGE 12, RECORDS OF SAID COUNTY. EXCEPTING THE NORTH 52 FEET OF THE EAST 150 FEET.

NOTE: THE AREA AND DISTANCES OF THE ABOVE DESCRIBED PROPERTY ARE COMPUTED TO THE CENTERS OF THE ADJOINING STREETS SHOWN ON SAID MAP.

PARCEL 20 (APN: 0256-101-14)

THE SOUTH 1/2 OF THE SOUTH 1/2 OF THE EAST 1/2 OF LOT 480 ACCORDING TO MAP SHOWING SUBDIVISION OF LANDS BELONGING TO THE SEMI TROPIC LAND AND WATER COMPANY, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 11, PAGE 12 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AREAS AND DISTANCES COMPUTED TO STREET CENTERS AS SHOWN ON THE MAP OF SAID TRACT.

EXCEPTING THEREFROM THE WESTERLY 3 FEET.

ALSO EXCEPTING THE MOBILE/MANUFACTURED HOME LOCATED THEREON.

PARCEL 21 (APN: 0256-101-15)

THE NORTH 1/2 OF THE NORTH 1/2 OF THE NORTH 1/2 OF THE EAST 1/2 OF LOT 485, ACCORDING TO MAP SHOWING SUBDIVISION OF LANDS BELONGING TO SEMI-TROPIC LAND AND WATER COMPANY, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER PLAT RECORDED IN BOOK 11 OF MAPS, PAGE 12, RECORDS OF SAID COUNTY.

NOTE: AREAS AND DISTANCES ARE MEASURED TO STREET CORNERS, AS SHOWN ON THE RECORDED MAP THEREOF.

PARCEL 22 (APN: 0256-101-02 AND 0256-101-03)

PARCEL A:

THE EAST ONE-HALF OF THE WEST ONE-HALF OF FARM LOT 477, ACCORDING TO MAP SHOWING SUBDIVISION OF LANDS BELONGING TO THE SEMI-TROPIC LAND AND WATER COMPANY, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 11, PAGE 12 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

AREAS AND DISTANCES COMPUTED TO STREET CENTERS.

PARCEL B:

THE WEST 3 ACRES OF THE WEST 1/2 OF THE EAST 1/2 OF LOT 477, ACCORDING TO MAP SHOWING SUBDIVISION OF LANDS BELONGING TO THE SEMI-TROPIC LAND AND WATER COMPANY, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 11 OF MAPS, PAGE 12 IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

AREAS AND DISTANCES ARE COMPUTER TO STREET CENTERS.

EASEMENT NOTES

1. WATER RIGHTS, CLAIMS OR TITLE TO WATER AND HIGHWAYS, ROADS, STREETS OR OTHERWAYS, WHETHER OR NOT DISCLOSED BY THE PUBLIC RECORDS.

2. EASEMENT(S) IN FAVOR OF THE PUBLIC OVER ANY EXISTING ROADS LYING WITHIN SAID LAND

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 405, PARCEL 2: APN 0256-101-58

3. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
PURPOSE: PIPELINES, INGRESS AND EGRESS AND INCIDENTAL PURPOSES
RECORDING DATE: AUGUST 31, 1892
RECORDING NO: BOOK 163, PAGE 219 OF DEEDS
AFFECTS: SAID LAND AS SET FORTH IN THE ABOVE DOCUMENT. THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD.

4. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: SEMI-TROPIC LAND AND WATER COMPANY
PURPOSE: AGREEMENTS, CONDITIONS AND RESERVATIONS AS TO WATER AND EASEMENTS
RECORDING DATE: JUNE 14, 1892
RECORDING NO: BOOK 204, PAGE 103 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

5. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: SEMI-TROPIC LAND AND WATER COMPANY
PURPOSE: AGREEMENTS, CONDITIONS AND RESERVATIONS AS TO WATER AND EASEMENTS
RECORDING DATE: SEPTEMBER 27, 1897
RECORDING NO: BOOK 241, PAGE 246 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

6. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: BLOOMINGTON TOWN AND LAND COMPANY
PURPOSE: AGREEMENTS, CONDITIONS AND RESERVATIONS AS TO WATER AND EASEMENTS
RECORDING DATE: FEBRUARY 13, 1912
RECORDING NO: BOOK 494, PAGE 273 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

7. EASEMENT(S) FOR PURPOSES(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS GRANTED IN A DOCUMENT:
GRANTED TO: PUBLIC
PURPOSE: HIGHWAY, ROAD AND INCIDENTAL PURPOSES
RECORDING DATE: OCTOBER 6, 1989
RECORDING NO: 1989-375918
AFFECTS: ALONG THE EAST 30.00 FEET OF THE WEST ONE-HALF OF THE WEST ONE-HALF OF FARM LOT 477

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 405, PARCEL 4: APN 0256-101-48

8. EASEMENT(S) FOR PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS GRANTED IN A DOCUMENT:
PURPOSE: PIPE LINES
RECORDING NO: BOOK 746, PAGE 212 OF DEEDS
AFFECTS: SAID LAND MORE PARTICULARLY SET FORTH THEREIN. EASEMENT IS NOT LOCATEABLE FROM RECORD

9. EASEMENT(S) FOR PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS GRANTED IN A DOCUMENT:
PURPOSE: PIPELINES
RECORDING NO: BOOK 502, PAGE 366 OF DEEDS
AFFECTS: SAID LAND MORE PARTICULARLY SET FORTH THEREIN

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 405, PARCEL 5: APN 0256-101-45

10. EASEMENT(S) FOR PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS GRANTED IN A DOCUMENT:
PURPOSE: PIPELINES
RECORDING DATE: APRIL 22, 1922
RECORDING NO: BOOK 746, PAGE 212 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 405, PARCEL 6: APN 0256-101-3

11. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: SEMI-TROPIC LAND AND WATER COMPANY
PURPOSE: PUBLIC UTILITIES
RECORDING NO: BOOK 161, PAGE 26 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD.

12. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: CURTIS RANCH COMPANY
PURPOSE: PIPES, DITCHES
RECORDING NO: BOOK 596, PAGE 332 OF OFFICIAL RECORDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 405, PARCEL 8: APN 0256-101-34

13. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS SET FORTH IN A DOCUMENT:
PURPOSE: PIPE LINES AND INCIDENTAL PURPOSES
RECORDING NO: BOOK 596, PAGE 322 AND IN BOOK 206, PAGE 150, BOTH OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD.

14. EASEMENT(S) FOR THE PURPOSES SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS SET FORTH IN A DOCUMENT:
IN FAVOR OF: COUNTY OF SAN BERNARDINO
PURPOSE: HIGHWAY, ROAD AND INCIDENTAL PURPOSES
RECORDING DATE: JUNE 07, 2011
RECORDING NO: AS INSTRUMENT NO. 2011-0229672 OF OFFICIAL RECORDS
AFFECTS: AS DESCRIBED THEREIN

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 405, PARCEL 9: APN 0256-101-04

15. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS SHOWN IN THE DOCUMENT:
RECORDING DATE: AUGUST 31, 1892
RECORDING NO: BOOK 163, PAGE 219 OF DEEDS
PURPOSE: RIGHT OF WAY AND COVENANTS
AFFECTS: A PORTION OF SAID LAND AS MORE PARTICULARLY DESCRIBED IN SAID DOCUMENT. THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 405, PARCEL 10: APN 0256-101-05

16. EASEMENT(S) FOR THE PURPOSES SHOWN AND INCIDENTAL PURPOSES A SET FORTH IN THE ABOVE DEEDS:
PURPOSE: PIPELINES
THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

17. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: W.P. MARTIN AND STANLEY J. CASTLEMAN AS TRUSTEES
PURPOSE: PIPE LINES
RECORDING DATE: OCTOBER 4, 1916
RECORDING NO: BOOK 596, PAGE 332 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 405, PARCEL 11: APN 0256-101-06

18. EASEMENT(S) FOR THE PURPOSES(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:
PURPOSE: PIPE LINES
RECORDING DATE: OCTOBER 4, 1916
RECORDING NO: BOOK 596, PAGE 332 OF DEEDS
AFFECTS: A PORTION OF SAID LAND AS DESCRIBED THEREIN

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 405, PARCEL 12: APN 0256-101-07

19. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:
PURPOSE: PIPE LINES
RECORDING NO: BOOK 494, PAGE 273 OF DEEDS
AFFECTS: SAID LAND MORE PARTICULARLY SET FORTH THEREIN
THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

20. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:
PURPOSE: PIPE LINES
RECORDING NO: BOOK 502, PAGE 363 OF DEEDS
AFFECTS: SAID LAND MORE PARTICULARLY SET FORTH THEREIN
THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

21. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:
PURPOSE: PIPE LINES
RECORDING NO: BOOK 596, PAGE 332 OF DEEDS
AFFECTS: SAID LAND MORE PARTICULARLY SET FORTH THEREIN
THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

22. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:
PURPOSE: DITCHES, PIE LINES OR OTHER CONDUITS FOR DISTRIBUTION OF WATER
RECORDING NO: BOOK 2052, PAGE 133, OF OFFICIAL RECORDS
AFFECTS: SAID LAND MORE PARTICULARLY SET FORTH THEREIN.

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 405, PARCEL 13: APN 0256-101-59

23. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:
PURPOSE: PIPE LINES AND INCIDENTAL PURPOSES
RECORDING NO: BOOK BOOK 163, PAGE 219 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED FOR RECORD

24. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:
PURPOSE: PIPELINES AND INCIDENTAL PURPOSES
RECORDING NO: BOOK 502, PAGE 336 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

25. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT
PURPOSE: PIPE LINES AND INCIDENTAL PURPOSES
RECORDING NO: IN BOOK 596, PAGE 332 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

26. EASEMENT(S) FOR THE PURPOSES SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:
PURPOSE: PIPE LINES AND CONDUITS FOR THE DISTRIBUTION OF WATER AND INCIDENTAL PURPOSES
RECORDING NO: IN BOOK 2054, PAGE 198 OF OFFICIAL RECORDS
AFFECTS: THE WEST 5 FEET OF SAID LAND

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 405, PARCEL 14: APN 0256-101-60

27. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
PURPOSE: PIPE LINES AND INCIDENTAL PURPOSES
RECORDING DATE: AUGUST 31, 1892
RECORDING NO: BOOK 163, PAGE 219 OF DEEDS
AFFECTS: THE EXACT EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

28. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
PURPOSE: PIPE LINES
RECORDING DATE: JUNE 20, 1912
RECORDING NO.: BOOK 502 PAGE 366
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

29. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
PURPOSE: PIPE LINES
RECORDING DATE: OCTOBER 4, 1916
RECORDING NO: BOOK 596, PAGE 332 OF DEEDS
AFFECTS: THE EXACT LOCATIN OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

30. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS SHOWN IN A DOCUMENT:
GRANTED TO: ARTHUR W. SCRUGGS, AN UNMARRIED MAN
PURPOSE: DITCHES, PIPE LINES AND OTHER CONDUITS
RECORDING DATE: APRIL 23, 1947
RECORDING NO: BOOK 2054, PAGE 198 OF OFFICIAL RECORDS
AFFECTS: ALONG THE WEST 5 FEET

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 405, PARCEL 15: APN 0256-101-10

31. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:
PURPOSE: A RIGHT OF WAY TO DITCH AND LAY PIPES FOR THE DISTRIBUTION OF WATER, WITH THE RIGHT OF ENTRY TO INSPECT, REPAIR, REPLACE AND MAINTAIN SAME AND INCIDENTAL PURPOSES
RECORDING NO: BOOK 161, PAGE 38 AND IN BOOK 206, PAGE 150 BOTH OF DEEDS
AFFECTS: A PORTION OF SAID LAND AS MORE PARTICULARLY DESCRIBED IN SAID DOCUMENT

32. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHT INCIDENTAL THERETO AS DELINEATED OR AS OFFERED FOR DEDICATION, ON THE MAP OF SAID TRACT/PLAT
PURPOSE: PIPES, FLUMES, DITCHES, METERS, WIRES, GATES, BOXES, PIPE LINES AND ALL OTHER APPURTENANCES
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

33. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:
PURPOSE: PIPES, FLUMES, DITCHES, WIRES, GATES, BOXES, PIPE LINES AND ALL OTHER APPURTENANCES AND INCIDENTAL PURPOSES
RECORDING NO: BOOK 596, PAGE 332 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 405, PARCEL 16: APN 0256-101-11

34. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: WILLARD M. SHELDON
PURPOSE: PIPELINES
RECORDING DATE: DECEMBER 26, 1895
RECORDING NO: BOOK 206, PAGE 150 OF DEEDS
AFFECTS: UNDISCLOSED PORTION OF THE LAND

35. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: W. P. MARTIN
PURPOSE: PIPELINES
RECORDING DATE: OCTOBER 4, 1916
RECORDING NUMBER: BOOK 596, PAGE 332 OF DEEDS
AFFECTS: UNDISCLOSED PORTION OF THE LAND

36. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW FOR RIGHT INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: CHARLES H. CALKINS, ET UX
PURPOSE: DITCHES, PIPE LINES OR OTHER CONDUITS
RECORDING DATE: MAY 20, 1947
RECORDING NO: BOOK 2061, PAGE 75 OF OFFICIAL RECORDS
AFFECTS: THE WESTERLY 5 FEET

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 40, PARCEL 18: APN 0256-101-37-0-000

37. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:
PURPOSE: TO DITCH AND LAY PIPES FOR THE DISTRIBUTION OF WATER, WITH THE RIGHT OF ENTRY TO INSPECT REPAIR, REPLACE, AND MAINTAIN THE SAME
RECORDING DATE: JANUARY 14, 1895
RECORDING NO: BOOK 204, PAGE 103 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

38. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:
PURPOSE: PIPE LINES
RECORDING NO: BOOK 596, PAGE 332 OF DEEDS AND BOOK 206, PAGE 150 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 40, PARCEL 19: APN 0256-101-38

39. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SHOWN IN THE DOCUMENT:
RECORDING DATE: JANUARY 14, 1895
RECORDING NO: IN BOOK 204, PAGE 103 IF DEEDS
PURPOSE: PIPE LINES
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

40. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SHOWN IN THE DOCUMENT
PURPOSE: WATER
RECORDING DATE: OCTOBER 4, 1916
RECORDING NO: IN BOOK 596, PAGE 332 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

41. EASEMENT(S) FOR THE PURPOSE95) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: FRANK LIPPERT AND CORA LIPPERT, HUSBAND AND WIFE
PURPOSE: PIPE LINES
RECORDING DATE: JUNE 3RD, 1946
RECORDING NO: IN BOOK 1909, PAGE 63 OF OFFICIAL RECORDS
AFFECTS: THE WESTERLY 3 FEET OF SAID LAND

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 40, PARCEL 20: APN 0256-101-14

42. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS GRANTED IN A DOCUMENT:
GRANTED TO: SEMI-TROPIC LAND AND WATER CO.
PURPOSE: DITCH AND LAY PIPES FOR THE DISTRIBUTION OF WATER
RECORDING DATE: JANUARY 14, 1895
RECORDING NO: BOOK 204, PAGE 103 OF OFFICIAL RECORDS
AFFECTS: SAID LAND MORE PARTICULARLY DESCRIBED THEREIN. EASEMENT IS NOT LOCATABLE FROM RECORD. THE USE AND CONTROL OF CIENEGAS AND NATURAL STREAMS OF WATER IF ANY, NATURALLY UPON, FLOWING ACROSS, INTO OR BY SAID DESCRIBED TRACT, AND THE RIGHT OF WAY FOR AND TO CONSTRUCT IRRIGATION OR DRAINAGE DITCHES THROUGH SAID TRACT TO IRRIGATE OR DRAIN THE ADJACENT LAND, AS RESERVED IN DEEDS OF RECORD

43. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHT INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
PURPOSE: AGREEMENTS, CONDITIONS, AND RESERVATIONS TO WATER
GRANTED TO: W.P. MARTIN, ET AL
RECORDING DATE: OCTOBER 4, 1916
RECORDING NO: BOOK 596, PAGE 332 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD.

44. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS GRANTED IN A DOCUMENT:
GRANTED TO: FRANK LIPPERT AND CORA LIPPERT, HUSBAND AND WIFE
PURPOSE: IRRIGATION PIPE LINES WITH RIGHT OF INGRESS AND EGRESS
RECORDING DATE: JUNE 3, 1946
RECORDING NO: BOOK 1909, PAGE 63, OF OFFICIAL RECORDS
AFFECTS: SAID LAND MORE PARTICULARLY DESCRIBED THEREIN

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 40, PARCEL 21: APN 0256-101-15

45. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT:
PURPOSE: WATER PIPE LINES
RECORDING NO: BOOK 596, PAGE 332 OF DEEDS
AFFECTS: THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD

46. EASEMENT(S) FOR THE PURPOSE95) SHOWN BELOW AND RIGHT INCIDENTAL THERETO SET FORTH IN A DOCUMENT:
PURPOSE: WATER PIPE LINES AND INGRESS AND EGRESS AND INCIDENTAL PURPOSES
RECORDING NO: BOOK 1896, PAGE 421 OF OFFICIAL RECORDS

THE FOLLOWING ITEMS AFFECT PARCEL MAP NO. 40, PARCEL 22: APN 0256-101-03

47. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS RESERVED IN A DOCUMENT:
RESERVED BY: WILLARD M. SHELDON
PURPOSE: PIPE LINES
RECORDING DATE: DECEMBER 26, 1895
RECORDING NO: BOOK 206, PAGE 150 OF DEEDS
AFFECTS: THAT PORTION OF SAID LAND

48. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS RESERVED IN A DOCUMENT:
RESERVED BY: W. F. MARTIN, ET AL
PURPOSE: PIPE LINES
RECORDING DATE: OCTOBER 4, 1916
RECORDING NO: BOOK 596, PAGE 332 OF DEEDS
AFFECTS: THAT PORTION OF SAID LAND

REGISTERED PROFESSIONAL ENGINEER
FRANCISCO MARTINEZ JR.
C-84640
CIVIL
STATE OF CALIFORNIA

PREPARED BY:
FMCIVIL ENGINEERS INC.
29995 TECHNOLOGY DRIVE, SUITE 306 | MURRIETA | CA 92563
951.973.0201 - FMCIVIL.COM

FRANCISCO MARTINEZ JR. #84640 3/31/22
R.C.E. / EXP. DATE

BENCHMARK

BM UF 628 NAVD88 EL. = 1006.35 FEET

FOUND STANDARD MWDSC 3-1/4 INCH ALUMINUM DISC, STAMPED "UF 628 1992" SET IN TOP OF HEADWALL. MONUMENT IS LOCATED 0.1 MILE (0.2 KM) SOUTH FROM THE INTERSECTION OF POPLAR AVE AND JURUPA AVE, 55 FEET (16.8 M) SOUTH OF NICOLE WAY, 26.5 FEET (8.1 M) WEST OF POPLAR AVE AT THE NORTH END OF A 44 FOOT (13.4 M) LONG FLOOD CONTROL CHANNEL WALL.

BASIS OF BEARING

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA COORDINATE SYSTEM, ZONE V, NAD83 (EPOCH 2011.00) AS DETERMINED LOCALLY BY A LINE BETWEEN CONTINUOUS OPERATING REFERENCE STATIONS (CORS) MLFP AND EWPP BEING N43-16-17.55W AS DERIVED FROM GEODETIC VALUES PUBLISHED BY THE CALIFORNIA SPATIAL REFERENCE CENTER (CSRC) AND/OR NATIONAL GEODETIC SURVEY (NGS), RESPECTIVELY.

COUNTY OF SAN BERNARDINO

BLOOMINGTON BUSINESS PARK SP3
VESTING TENTATIVE PARCEL
MAP NO. 20340

SCALE:	AS SHOWN
DATE:	APRIL 2021
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

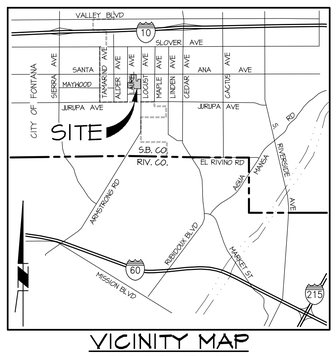
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SHEET 2 OF 3 SHEETS

H: \PDATA\17-006 BLOOMINGTON\DWGS\PLNG\ENTITLEMENT\CONCEPT\SITE-3\SCHEME_1\17-006-TPM-SP3-SCH1-002.DWG ALLAN 4/6/2021 9: 24 AM

IN THE UNINCORPORATED AREA OF THE
COUNTY OF SAN BERNARDINO, CALIFORNIA

VESTING TENTATIVE PARCEL MAP NO. 20340
CONCEPTUAL GRADING



VICINITY MAP
T01S, R05W, SEC. 28
NOT TO SCALE

SITE PLAN KEYNOTES

1. PAINTED CONCRETE TILT-UP WAREHOUSE / OFFICE / MANUFACTURING FACILITY. BUILDING TO BE DESIGNED PER ARCHITECT'S PLANS
2. ON SITE ACCESSIBLE SIDEWALK AND CURB RAMPS.
3. CONCRETE CURB
4. CONCRETE CURB & GUTTER
5. STANDARD PARKING STALL MIN. 9' X 18' - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
6. HANDICAP PARKING STALL MIN. 9' X 18' - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
7. TRAILER PARKING STALL MIN. 12' X 55' - STRIPE PER STANDARDS SHOWN ON ARCHITECT'S PLANS
8. ACCESSIBLE BUILDING ENTRY WITH ADJACENT BICYCLE RACKS PER ARCHITECT'S PLANS
9. PORTLAND CONC. CEMENT (PCC) PAVED TRUCK YARD ARCHITECT'S PLANS
10. ASPHALT CONCRETE (AC) PAVED PARKING PER ARCHITECT'S PLANS
11. DOCK HIGH TRUCK DOOR PER ARCHITECT'S PLANS
12. GRADE LEVEL RAMP DOOR PER ARCHITECT'S PLANS
13. EXTERIOR MAN DOOR AND STAIRS W/GUARD POST PER ARCHITECT'S PLANS
14. COMMERCIAL DRIVEWAY APPROACH PER SAN BERNARDINO COUNTY STD. 129B, LOCATED PER STD. 130, WITH DECORATIVE CONCRETE PAVING PER ARCHITECT'S PLANS
16. UNDERGROUND STORM WATER CHAMBER SYSTEM
17. PROPOSED COMBINATION SCREEN- CONCRETE RETAINING WALL PER ARCHITECT'S PLANS
18. CONCRETE DRAINAGE SWALE
19. VEGETATED SWALE
20. SEWER LIFT STATION
21. APPROXIMATE LOCATION OF TRASH ENCLOSURE PER ARCHITECT'S PLANS
22. METAL, MANUAL OPERATED SECURITY GATE WITH KNOX-PAD LOCK FOR FIRE DEPARTMENT ACCESS PER ARCHITECT'S PLANS
23. LANDSCAPE AREA PER LANDSCAPE ARCHITECT'S PLANS
24. CONCRETE SCREEN WALL PER ARCHITECT'S PLANS
25. CONCRETE DRAINAGE CHANNEL
27. RETAINING WALL

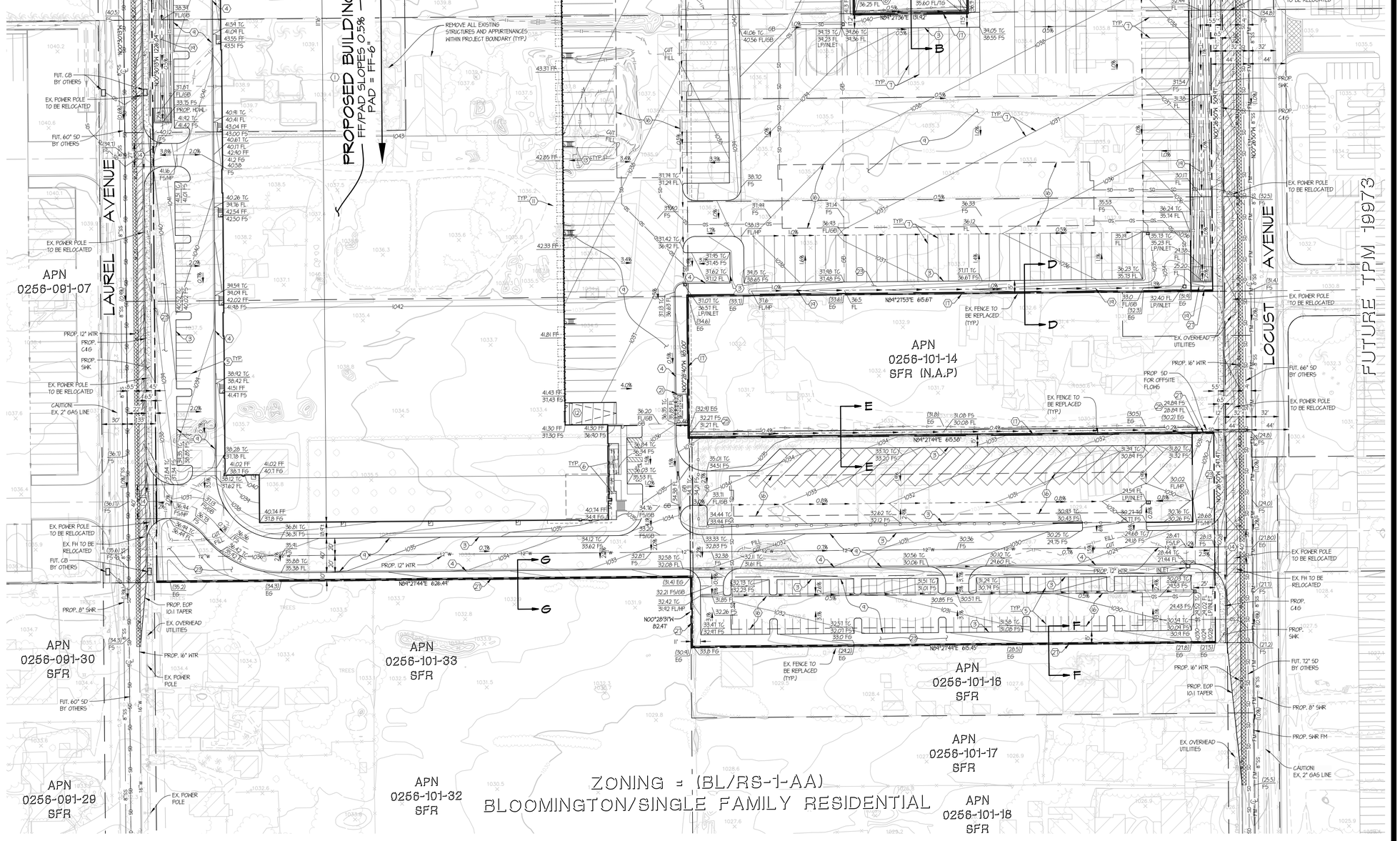
LEGEND

- 1025 — INDEX CONTOUR
- RETAINING WALL
- FENCE
- EDGE OF PAVEMENT
- SIGN
- MH — MANHOLE
- RIGHT OF WAY
- EASEMENT
- PARCEL LINE
- PARCEL MAP BOUNDARY
- STREET CENTER LINE
- SCREEN WALL
- COMBINATION SCREEN/RETAINING WALL
- EXISTING LOT LINE
- RIDGE LINE
- RIBBON GUTTER
- FLOW ARROW
- PROPOSED EDGE OF PAVEMENT
- EX W — EXISTING WATER LINE
- EX SS — EXISTING SWR LINE
- SD — EXISTING STORM DRAIN PIPE
- SD — PROPOSED STORM DRAIN PIPE
- CUT/FILL LINE
- SLOPE SYMBOL
- PROPOSED STREET AC PAVEMENT
- GRIND AND OVERLAY

EARTHWORK ESTIMATE:

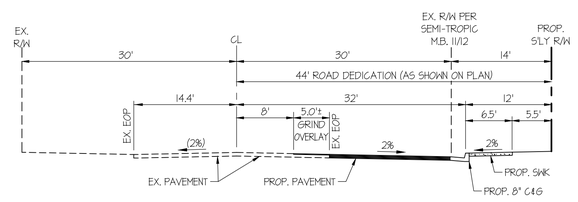
RAW CUT:	16,155 CY
RAW FILL:	105,375 CY
NET:	89,220 CY IMPORT

HAUL TRIPS:
ASSUMED (13 CY PER TRIP) = 6,863



SCALE 1"=60'

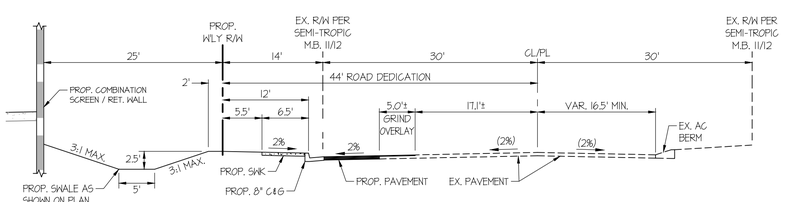
60 30 0 60 120 180
SCALE: 1"=60'



*TYPICAL SECONDARY HIGHWAY PER SAN BERNARDINO COUNTY STD. NO. 102

TYPICAL SECTION SANTA ANA AVENUE

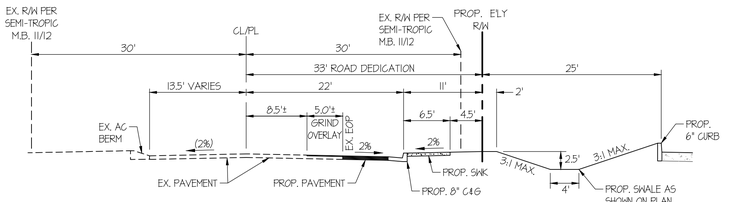
*SECONDARY HIGHWAY
HOR. SCALE: 1"=10'



*TYPICAL SECONDARY HIGHWAY PER SAN BERNARDINO COUNTY STD. NO. 102

TYPICAL SECTION LOCUST AVENUE

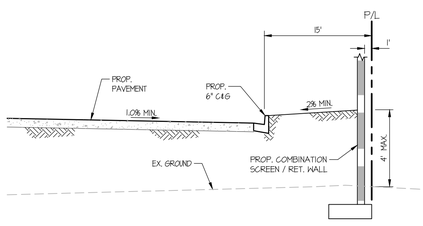
*SECONDARY HIGHWAY
HOR. SCALE: 1"=10'



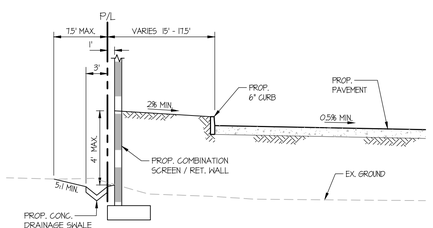
*TYPICAL COLLECTOR STREET PER SAN BERNARDINO COUNTY STD. NO. 103

TYPICAL SECTION LAUREL AVENUE

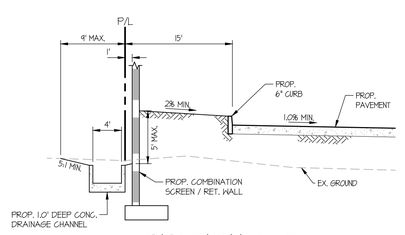
*COLLECTOR STREET
HOR. SCALE: 1"=10'



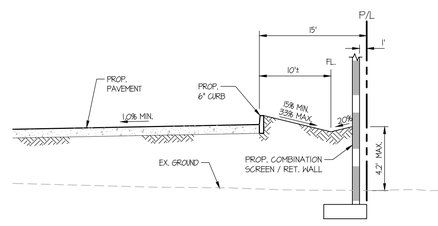
SECTION A-A
N.T.S.



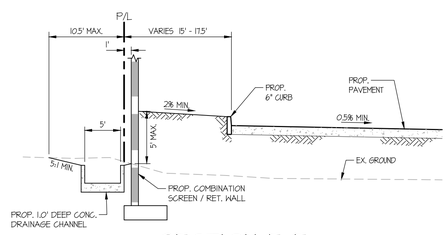
SECTION B-B
N.T.S.



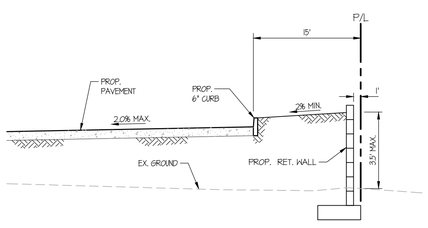
SECTION C-C
N.T.S.



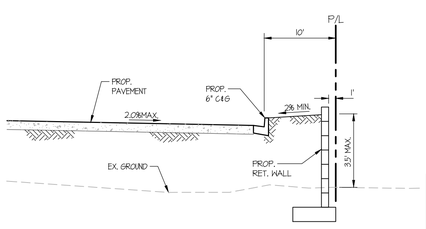
SECTION D-D
N.T.S.



SECTION E-E
N.T.S.



SECTION F-F
N.T.S.



SECTION G-G
N.T.S.

REGISTERED PROFESSIONAL ENGINEER
FRANCISCO MARTINEZ JR.
C-84640
CIVIL
STATE OF CALIFORNIA

PREPARED BY:
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29995 TECHNOLOGY DRIVE, SUITE 306 | MURRIETA | CA 92563
951.973.0201 - FMCIVIL.COM

FRANCISCO MARTINEZ JR. — #84640 — 3/31/22 — R.C.E. / EXP. DATE

BENCHMARK

BM UF 628 NAVD88 EL. = 1006.35 FEET

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COUNTY OF SAN BERNARDINO

BLOOMINGTON BUSINESS PARK SP3
CONCEPTUAL GRADING
VESTING TENTATIVE PARCEL MAP NO. 20340

SCALE:	AS SHOWN
DATE:	APRIL 2021
DESIGNED:	AJ
CHECKED:	FM
PLN CK REF:	

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SHEET 3 OF 3 SHEETS

H:\PDATA\17-006 BLOOMINGTON\DWGS\PLNG\ENTITLEMENT\CONCEPTUAL\SITE-3\SCHEME_1\17-006-TPM-SP3-SCH1-003.DWG ALLAN 4/6/2021 9:25 AM

FIGURE 6:
MASTER STORM DRAIN FACILITIES

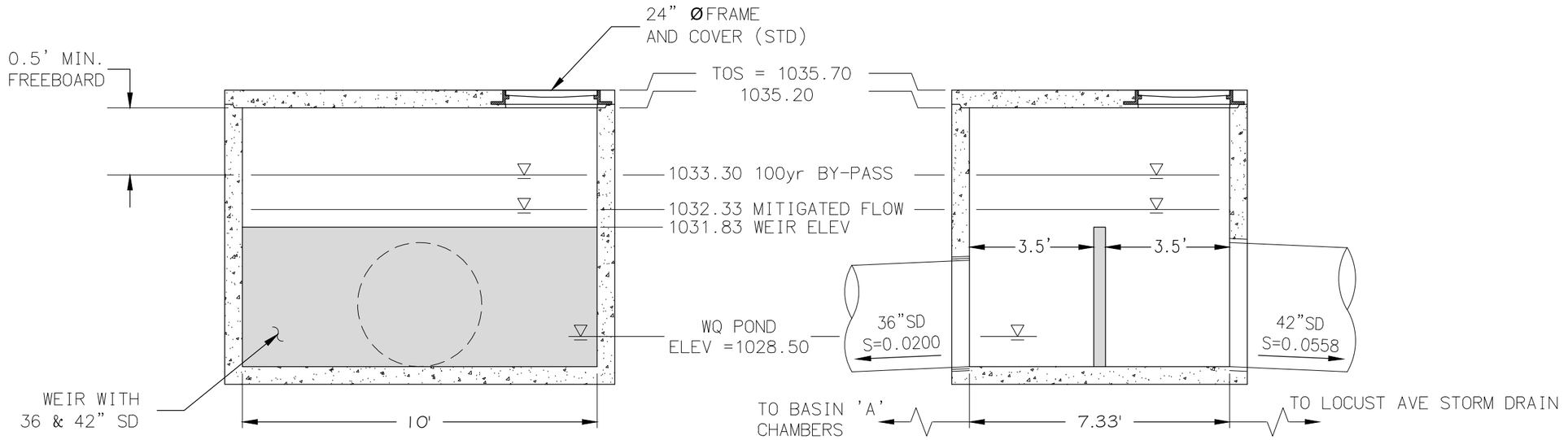
SP BOUNDARY
SANTA ANA AVE.
66" SD
SPECIFIC PLAN AREA
+/-213 ACRES
SP BOUNDARY
78" SD
78" SD
LAUREL AVE.
72" SD - FUTURE
BY OTHERS
LOCUST AVE.
±1000'
MAPLE AVE.
54" SD
SP BOUNDARY
SP BOUNDARY
JURUPA AVE.
78" SD
BUBBLERS (TYP.)
LINDEN AVE.
OAK ST.
CEDAR AVE.
11TH ST.
9TH ST.
54" SD
±6300 LF
CONNECT TO
EXISTING CATCH
BASIN ON 5TH STREET
7TH ST.
EXISTING CATCH
BASIN AND STORM
DRAIN
EXISTING FLOW PATH
ALONG PAVED GUTTER
LINDEN AVE.
5TH ST.
DISCHARGE POINT
EXISTING
STORM DRAIN
EXISTING BASIN
EXISTING TRAP
CHANNEL TO
DAYLIGHT
STREET FLOW
EL RIVINO RD.
SCALE 1"=400.001'
400.001 200 0 400.001
SCALE: 1"=400.001'

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BLOOMINGTON BUSINESS PARK SP

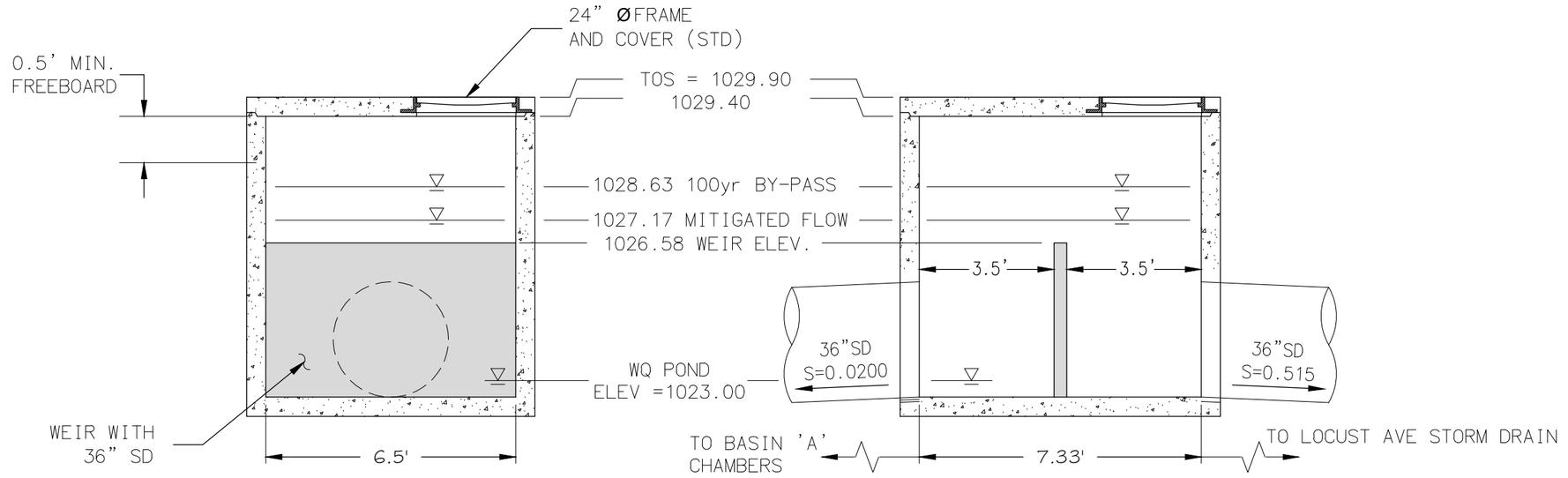
MASTER STORM DRAIN PLAN
ALTERNATE ALIGNMENT #1

FIGURE 7:
OUTLET CONTROL STRUCTURE DETAIL



BASIN "A" STRUCTURE

BASIN BTM = 1027.5



BASIN "B" STRUCTURE

BASIN BTM = 1022.0

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BLOOMINGTON BUSINESS PARK-SITE 3

OUTLET CONTROL STRUCTURE DETAIL

1

OF 1 SHEETS

H: \PDATA\17-006 BLOOMINGTON\DOCS\HYDRO\SITE 3_PRELIMINARY\FIGURES\CAD\17-006-OUTLET-DETAIL.DWG HECTOR 4/29/2021 9:10 AM

APPENDIX A

RATIONAL METHOD HYDROLOGY (WATERSHED A)

A.1: EXISITNG CONDITION - 100 YR

A.2: EXISTING CONDITION – 100 YR - ADJUSTED 25 YR RAINFALL

A.3: PROPOSED CONDITION - 100 YR

A.4: EXISTING CONDITION - 25 YR

A.5: EXISTING CONDITION - 25 YR – ADJUSTED 10 YR RAINFALL

A.6: PROPOSED CONDITION - 25 YR

A.7: EXISTING CONDITION – 10 YR

A.8: PROPOSED CONDITION – 10 YR – ADJUSTED 5 YR RAINFALL

A.9: PROPOSED CONDITION – 10 YR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/05/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISITNG CONDITION
100-YEAR STORM ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.300 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   622.000(Ft.)
Top (of initial area) elevation =  1042.100(Ft.)
Bottom (of initial area) elevation =  1035.400(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.01077  s(%)=       1.08
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.214 min.
Rainfall intensity =      2.961(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.662
Subarea runoff =      2.393(CFS)
Total initial stream area =        1.220(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.220(Ac.)
Runoff from this stream =      2.393(CFS)
Time of concentration =   15.21 min.
Rainfall intensity =     2.961(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1045.300(Ft.)
Bottom (of initial area) elevation =  1035.400(Ft.)
Difference in elevation =     9.900(Ft.)
Slope =    0.00990  s(%)=       0.99
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.709 min.
Rainfall intensity =      2.616(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.631
Subarea runoff =      8.779(CFS)
Total initial stream area =        5.320(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.320(Ac.)
Runoff from this stream =      8.779(CFS)
Time of concentration =   18.71 min.
Rainfall intensity =     2.616(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      2.39     1.220     15.21    0.782      2.961
2      8.78     5.320     18.71    0.782      2.616
Qmax(1) =
         1.000 *    1.000 *     2.393) +
         1.188 *    0.813 *     8.779) + =      10.877
Qmax(2) =
         0.841 *    1.000 *     2.393) +
         1.000 *    1.000 *     8.779) + =      10.792

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.393       9.779
Maximum flow rates at confluence using above data:
       10.877       10.792
Area of streams before confluence:
        1.220        5.320
Effective area values after confluence:
        5.546        6.540


Results of confluence:
Total flow rate =     10.877(CFS)
Time of concentration =    15.214 min.
Effective stream area after confluence  =      5.546(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =       6.54(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       15.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1035.400(Ft.)
End of street segment elevation =  1031.400(Ft.)
Length of street segment  =   377.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     10.941(CFS)
Depth of flow =   0.372(Ft.), Average velocity =   2.749(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  13.852(Ft.)
Flow velocity =   2.75(Ft/s)
Travel time =    2.29 min.     TC =   17.50  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     10.141(CFS)
therefore the upstream flow rate of Q =     10.877(CFS) is being used
Rainfall intensity =      2.723(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.641
Subarea runoff =      0.000(CFS) for    0.260(Ac.)
Total runoff =     10.877(CFS)
Effective area this stream =        5.81(Ac.)
Total Study Area (Main Stream No. 1) =        6.80(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Street flow at end of street =     10.877(CFS)
Half street flow at end of street =      5.439(CFS)
Depth of flow =   0.371(Ft.), Average velocity =   2.745(Ft/s)
Flow width (from curb towards crown)=  13.820(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.806(Ac.)
Runoff from this stream =     10.877(CFS)
Time of concentration =   17.50 min.
Rainfall intensity =     2.723(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   697.000(Ft.)
Top (of initial area) elevation =  1046.900(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     7.800(Ft.)
Slope =    0.01119  s(%)=       1.12
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.801 min.
Rainfall intensity =      2.895(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.657
Subarea runoff =      5.514(CFS)
Total initial stream area =        2.900(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =     17.642(CFS)
Depth of flow =   0.268(Ft.), Average velocity =   1.227(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
--------------------------------------------------------------
Sub-Channel flow  =      8.821(CFS)
  '     '    flow top width =     53.625(Ft.)
  '     '    velocity=    1.227(Ft/s)
  '     '    area =      7.189(Sq.Ft)
  '     '    Froude number =     0.591

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1031.400(Ft.)
Flow length =   861.000(Ft.)
Travel time  =   11.70 min.
Time of concentration =   27.50 min.
Depth of flow =   0.268(Ft.)
Average velocity =   1.227(Ft/s)
Total irregular channel flow =     8.821(CFS)
Irregular channel normal depth above invert elev. =   0.268(Ft.)
Average velocity of channel(s) =   1.227(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      2.076(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.561
Subarea runoff =      6.528(CFS) for    7.440(Ac.)
Total runoff =     12.041(CFS)
Effective area this stream =       10.34(Ac.)
Total Study Area (Main Stream No. 2) =       17.14(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.301(Ft.), Average velocity =   1.326(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     10.340(Ac.)
Runoff from this stream =     12.041(CFS)
Time of concentration =   27.50 min.
Rainfall intensity =     2.076(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     10.88     5.806     17.50    0.782      2.723
2     12.04    10.340     27.50    0.782      2.076
Qmax(1) =
         1.000 *    1.000 *    10.877) +
         1.500 *    0.636 *    12.041) + =      22.370
Qmax(2) =
         0.667 *    1.000 *    10.877) +
         1.000 *    1.000 *    12.041) + =      19.294

Total of 2 main streams to confluence:
Flow rates before confluence point:
      11.877      13.041
Maximum flow rates at confluence using above data:
       22.370       19.294
Area of streams before confluence:
        5.806       10.340
Effective area values after confluence:
       12.387       16.146


Results of confluence:
Total flow rate =     22.370(CFS)
Time of concentration =    17.499 min.
Effective stream area after confluence  =     12.387(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =      16.15(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       19.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of street segment elevation =  1031.400(Ft.)
End of street segment elevation =  1027.200(Ft.)
Length of street segment  =   419.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(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 =     22.436(CFS)
Depth of flow =   0.356(Ft.), Average velocity =   3.201(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  18.760(Ft.)
Flow velocity =   3.20(Ft/s)
Travel time =    2.18 min.     TC =   19.68  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     20.025(CFS)
therefore the upstream flow rate of Q =     22.370(CFS) is being used
Rainfall intensity =      2.537(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.623
Subarea runoff =      0.000(CFS) for    0.290(Ac.)
Total runoff =     22.370(CFS)
Effective area this stream =       12.68(Ac.)
Total Study Area (Main Stream No. 1) =       17.43(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Street flow at end of street =     22.370(CFS)
Half street flow at end of street =     11.185(CFS)
Depth of flow =   0.355(Ft.), Average velocity =   3.198(Ft/s)
Flow width (from curb towards crown)=  18.740(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       19.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     12.677(Ac.)
Runoff from this stream =     22.370(CFS)
Time of concentration =   19.68 min.
Rainfall intensity =     2.537(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   966.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1037.500(Ft.)
Difference in elevation =     9.700(Ft.)
Slope =    0.01004  s(%)=       1.00
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.399 min.
Rainfall intensity =      2.642(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.634
Subarea runoff =     10.462(CFS)
Total initial stream area =        6.250(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      6.250(Ac.)
Runoff from this stream =     10.462(CFS)
Time of concentration =   18.40 min.
Rainfall intensity =     2.642(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   489.000(Ft.)
Top (of initial area) elevation =  1044.100(Ft.)
Bottom (of initial area) elevation =  1037.500(Ft.)
Difference in elevation =     6.600(Ft.)
Slope =    0.01350  s(%)=       1.35
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.208 min.
Rainfall intensity =      3.223(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.682
Subarea runoff =      2.483(CFS)
Total initial stream area =        1.130(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       17.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.130(Ac.)
Runoff from this stream =      2.483(CFS)
Time of concentration =   13.21 min.
Rainfall intensity =     3.223(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     10.46     6.250     18.40    0.782      2.642
2      2.48     1.130     13.21    0.782      3.223
Qmax(1) =
         1.000 *    1.000 *    10.462) +
         0.762 *    1.000 *     2.483) + =      12.353
Qmax(2) =
         1.313 *    0.718 *    10.462) +
         1.000 *    1.000 *     2.483) + =      12.340

Total of 2 streams to confluence:
Flow rates before confluence point:
      10.462       2.483
Maximum flow rates at confluence using above data:
       12.353       12.340
Area of streams before confluence:
        6.250        1.130
Effective area values after confluence:
        7.380        5.617
Results of confluence:
Total flow rate =     12.353(CFS)
Time of concentration =    18.399 min.
Effective stream area after confluence =      7.380(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =       7.38(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       18.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     31.282(CFS)
Depth of flow =   0.336(Ft.), Average velocity =   1.385(Ft/s)
      ******* Irregular Channel Data ***********
----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
----------------------------------------------------------------
Sub-Channel flow  =     15.641(CFS)
  '     '    flow top width =     67.201(Ft.)
  '     '    velocity=    1.385(Ft/s)
  '     '    area =     11.290(Sq.Ft)
  '     '    Froude number =     0.596

Upstream point elevation =  1037.500(Ft.)
Downstream point elevation =  1031.500(Ft.)
Flow length =   711.000(Ft.)
Travel time  =    8.55 min.
Time of concentration =   26.95 min.
Depth of flow =   0.336(Ft.)
Average velocity =   1.385(Ft/s)
Total irregular channel flow =    15.641(CFS)
Irregular channel normal depth above invert elev. =   0.336(Ft.)
Average velocity of channel(s) =   1.385(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      2.101(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.565
Subarea runoff =      6.497(CFS) for    8.500(Ac.)
Total runoff =     18.851(CFS)
Effective area this stream =       15.88(Ac.)
Total Study Area (Main Stream No. 2) =       33.31(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.360(Ft.), Average velocity =   1.452(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       19.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =     39.276(CFS)
Depth of flow =   0.385(Ft.), Average velocity =   1.323(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     19.638(CFS)
  '     '    flow top width =     77.065(Ft.)
  '     '    velocity=    1.323(Ft/s)
  '     '    area =     14.847(Sq.Ft)
  '     '    Froude number =     0.531

Upstream point elevation =  1031.500(Ft.)
Downstream point elevation =  1027.200(Ft.)
Flow length =   671.000(Ft.)
Travel time  =    8.46 min.
Time of concentration =   35.41 min.
Depth of flow =   0.385(Ft.)
Average velocity =   1.323(Ft/s)
Total irregular channel flow =    19.638(CFS)
Irregular channel normal depth above invert elev. =   0.385(Ft.)
Average velocity of channel(s) =   1.323(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.784(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.505
Subarea runoff =      1.514(CFS) for    6.710(Ac.)
Total runoff =     20.365(CFS)
Effective area this stream =       22.59(Ac.)
Total Study Area (Main Stream No. 2) =       40.02(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.391(Ft.), Average velocity =   1.335(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       19.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     22.590(Ac.)
Runoff from this stream =     20.365(CFS)
Time of concentration =   35.41 min.
Rainfall intensity =     1.784(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     22.37    12.677     19.68    0.782      2.537
2     20.36    22.590     35.41    0.782      1.784
Qmax(1) =
         1.000 *    1.000 *    22.370) +
         1.752 *    0.556 *    20.365) + =      42.206
Qmax(2) =
         0.571 *    1.000 *    22.370) +
         1.000 *    1.000 *    20.365) + =      33.131

Total of 2 main streams to confluence:
Flow rates before confluence point:
      23.370      21.365
Maximum flow rates at confluence using above data:
       42.206       33.131
Area of streams before confluence:
       12.677       22.590
Effective area values after confluence:
       25.233       35.267


Results of confluence:
Total flow rate =     42.206(CFS)
Time of concentration =    19.681 min.
Effective stream area after confluence  =     25.233(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =      35.27(Ac.)
End of computations, Total Study Area =           40.02 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/20/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISTING CONDITION
100-YEAR STORM ANALYSIS WITH ADJUSTED 25 YEAR RAINFALL DATA

Program License Serial Number 6405

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 0.998 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   622.000(Ft.)
Top (of initial area) elevation =  1042.100(Ft.)
Bottom (of initial area) elevation =  1035.400(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.01077  s(%)=       1.08
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.214 min.
Rainfall intensity =      2.273(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.590
Subarea runoff =      1.637(CFS)
Total initial stream area =        1.220(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.220(Ac.)
Runoff from this stream =      1.637(CFS)
Time of concentration =   15.21 min.
Rainfall intensity =     2.273(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1045.300(Ft.)
Bottom (of initial area) elevation =  1035.400(Ft.)
Difference in elevation =     9.900(Ft.)
Slope =    0.00990  s(%)=       0.99
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.709 min.
Rainfall intensity =      2.008(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.549
Subarea runoff =      5.870(CFS)
Total initial stream area =        5.320(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.320(Ac.)
Runoff from this stream =      5.870(CFS)
Time of concentration =   18.71 min.
Rainfall intensity =     2.008(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      1.64     1.220     15.21    0.782      2.273
2      5.87     5.320     18.71    0.782      2.008
Qmax(1) =
         1.000 *    1.000 *     1.637) +
         1.216 *    0.813 *     5.870) + =       7.443
Qmax(2) =
         0.822 *    1.000 *     1.637) +
         1.000 *    1.000 *     5.870) + =       7.216

Total of 2 main streams to confluence:
Flow rates before confluence point:
       2.637       6.870
Maximum flow rates at confluence using above data:
        7.443        7.216
Area of streams before confluence:
        1.220        5.320
Effective area values after confluence:
        5.546        6.540


Results of confluence:
Total flow rate =      7.443(CFS)
Time of concentration =    15.214 min.
Effective stream area after confluence  =      5.546(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =       6.54(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       15.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1035.400(Ft.)
End of street segment elevation =  1031.400(Ft.)
Length of street segment  =   377.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =      7.530(CFS)
Depth of flow =   0.334(Ft.), Average velocity =   2.510(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  11.953(Ft.)
Flow velocity =   2.51(Ft/s)
Travel time =    2.50 min.     TC =   17.72  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      6.755(CFS)
therefore the upstream flow rate of Q =      7.443(CFS) is being used
Rainfall intensity =      2.075(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.561
Subarea runoff =      0.000(CFS) for    0.260(Ac.)
Total runoff =      7.443(CFS)
Effective area this stream =        5.81(Ac.)
Total Study Area (Main Stream No. 1) =        6.80(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Street flow at end of street =      7.443(CFS)
Half street flow at end of street =      3.722(CFS)
Depth of flow =   0.333(Ft.), Average velocity =   2.503(Ft/s)
Flow width (from curb towards crown)=  11.898(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.806(Ac.)
Runoff from this stream =      7.443(CFS)
Time of concentration =   17.72 min.
Rainfall intensity =     2.075(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   697.000(Ft.)
Top (of initial area) elevation =  1046.900(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     7.800(Ft.)
Slope =    0.01119  s(%)=       1.12
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.801 min.
Rainfall intensity =      2.222(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.583
Subarea runoff =      3.759(CFS)
Total initial stream area =        2.900(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     10.929(CFS)
Depth of flow =   0.224(Ft.), Average velocity =   1.089(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      5.464(CFS)
  '     '    flow top width =     44.810(Ft.)
  '     '    velocity=    1.089(Ft/s)
  '     '    area =      5.020(Sq.Ft)
  '     '    Froude number =     0.573

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1031.400(Ft.)
Flow length =   861.000(Ft.)
Travel time  =   13.18 min.
Time of concentration =   28.98 min.
Depth of flow =   0.224(Ft.)
Average velocity =   1.089(Ft/s)
Total irregular channel flow =     5.464(CFS)
Irregular channel normal depth above invert elev. =   0.224(Ft.)
Average velocity of channel(s) =   1.089(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.544(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.444
Subarea runoff =      3.333(CFS) for    7.440(Ac.)
Total runoff =      7.091(CFS)
Effective area this stream =       10.34(Ac.)
Total Study Area (Main Stream No. 2) =       17.14(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.247(Ft.), Average velocity =   1.162(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     10.340(Ac.)
Runoff from this stream =      7.091(CFS)
Time of concentration =   28.98 min.
Rainfall intensity =     1.544(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      7.44     5.806     17.72    0.782      2.075
2      7.09    10.340     28.98    0.782      1.544
Qmax(1) =
         1.000 *    1.000 *     7.443) +
         1.696 *    0.611 *     7.091) + =      14.796
Qmax(2) =
         0.590 *    1.000 *     7.443) +
         1.000 *    1.000 *     7.091) + =      11.479

Total of 2 main streams to confluence:
Flow rates before confluence point:
       8.443       8.091
Maximum flow rates at confluence using above data:
       14.796       11.479
Area of streams before confluence:
        5.806       10.340
Effective area values after confluence:
       12.126       16.146


Results of confluence:
Total flow rate =     14.796(CFS)
Time of concentration =    17.717 min.
Effective stream area after confluence  =     12.126(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =      16.15(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       19.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1031.400(Ft.)
End of street segment elevation =  1027.200(Ft.)
Length of street segment  =   419.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(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 =     14.885(CFS)
Depth of flow =   0.302(Ft.), Average velocity =   2.888(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.099(Ft.)
Flow velocity =   2.89(Ft/s)
Travel time =    2.42 min.     TC =   20.13  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     12.731(CFS)
therefore the upstream flow rate of Q =     14.796(CFS) is being used
Rainfall intensity =      1.922(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.534
Subarea runoff =      0.000(CFS) for    0.290(Ac.)
Total runoff =     14.796(CFS)
Effective area this stream =       12.42(Ac.)
Total Study Area (Main Stream No. 1) =       17.43(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Street flow at end of street =     14.796(CFS)
Half street flow at end of street =      7.398(CFS)
Depth of flow =   0.302(Ft.), Average velocity =   2.883(Ft/s)
Flow width (from curb towards crown)=  16.064(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       19.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     12.416(Ac.)
Runoff from this stream =     14.796(CFS)
Time of concentration =   20.13 min.
Rainfall intensity =     1.922(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   966.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1037.500(Ft.)
Difference in elevation =     9.700(Ft.)
Slope =    0.01004  s(%)=       1.00
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.399 min.
Rainfall intensity =      2.028(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.553
Subarea runoff =      7.009(CFS)
Total initial stream area =        6.250(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      6.250(Ac.)
Runoff from this stream =      7.009(CFS)
Time of concentration =   18.40 min.
Rainfall intensity =     2.028(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   489.000(Ft.)
Top (of initial area) elevation =  1044.100(Ft.)
Bottom (of initial area) elevation =  1037.500(Ft.)
Difference in elevation =     6.600(Ft.)
Slope =    0.01350  s(%)=       1.35
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.208 min.
Rainfall intensity =      2.475(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.616
Subarea runoff =      1.721(CFS)
Total initial stream area =        1.130(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       17.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.130(Ac.)
Runoff from this stream =      1.721(CFS)
Time of concentration =   13.21 min.
Rainfall intensity =     2.475(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      7.01     6.250     18.40    0.782      2.028
2      1.72     1.130     13.21    0.782      2.475
Qmax(1) =
         1.000 *    1.000 *     7.009) +
         0.736 *    1.000 *     1.721) + =       8.276
Qmax(2) =
         1.358 *    0.718 *     7.009) +
         1.000 *    1.000 *     1.721) + =       8.555

Total of 2 streams to confluence:
Flow rates before confluence point:
       7.009       1.721
Maximum flow rates at confluence using above data:
        8.276        8.555
Area of streams before confluence:
        6.250        1.130
Effective area values after confluence:
        7.380        5.617
Results of confluence:
Total flow rate =      8.555(CFS)
Time of concentration =    13.208 min.
Effective stream area after confluence =      5.617(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =       7.38(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       18.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =     21.490(CFS)
Depth of flow =   0.292(Ft.), Average velocity =   1.261(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
--------------------------------------------------------------
Sub-Channel flow  =     10.745(CFS)
  '     '    flow top width =     58.376(Ft.)
  '     '    velocity=    1.261(Ft/s)
  '     '    area =      8.519(Sq.Ft)
  '     '    Froude number =     0.582

Upstream point elevation =  1037.500(Ft.)
Downstream point elevation =  1031.500(Ft.)
Flow length =   711.000(Ft.)
Travel time  =    9.40 min.
Time of concentration =   22.60 min.
Depth of flow =   0.292(Ft.)
Average velocity =   1.261(Ft/s)
Total irregular channel flow =    10.745(CFS)
Irregular channel normal depth above invert elev. =   0.292(Ft.)
Average velocity of channel(s) =   1.261(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.793(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.507
Subarea runoff =      4.283(CFS) for    8.500(Ac.)
Total runoff =     12.838(CFS)
Effective area this stream =       14.12(Ac.)
Total Study Area (Main Stream No. 2) =       33.31(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.312(Ft.), Average velocity =   1.319(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       19.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =     25.772(CFS)
Depth of flow =   0.329(Ft.), Average velocity =   1.190(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
--------------------------------------------------------------
Sub-Channel flow  =     12.886(CFS)
  '     '    flow top width =     65.802(Ft.)
  '     '    velocity=    1.190(Ft/s)
  '     '    area =     10.825(Sq.Ft)
  '     '    Froude number =     0.517

Upstream point elevation =  1031.500(Ft.)
Downstream point elevation =  1027.200(Ft.)
Flow length =   671.000(Ft.)
Travel time  =    9.39 min.
Time of concentration =   32.00 min.
Depth of flow =   0.329(Ft.)
Average velocity =   1.190(Ft/s)
Total irregular channel flow =    12.886(CFS)
Irregular channel normal depth above invert elev. =   0.329(Ft.)
Average velocity of channel(s) =   1.190(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     12.615(CFS)
therefore the upstream flow rate of Q =     12.838(CFS) is being used
Rainfall intensity =      1.455(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.416
Subarea runoff =      0.000(CFS) for    6.710(Ac.)
Total runoff =     12.838(CFS)
Effective area this stream =       20.83(Ac.)
Total Study Area (Main Stream No. 2) =       40.02(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.329(Ft.), Average velocity =   1.189(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       19.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     20.827(Ac.)
Runoff from this stream =     12.838(CFS)
Time of concentration =   32.00 min.
Rainfall intensity =     1.455(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     14.80    12.416     20.13    0.782      1.922
2     12.84    20.827     32.00    0.782      1.455
Qmax(1) =
         1.000 *    1.000 *    14.796) +
         1.693 *    0.629 *    12.838) + =      28.471
Qmax(2) =
         0.591 *    1.000 *    14.796) +
         1.000 *    1.000 *    12.838) + =      21.579

Total of 2 main streams to confluence:
Flow rates before confluence point:
      15.796      13.838
Maximum flow rates at confluence using above data:
       28.471       21.579
Area of streams before confluence:
       12.416       20.827
Effective area values after confluence:
       25.522       33.243


Results of confluence:
Total flow rate =     28.471(CFS)
Time of concentration =    20.135 min.
Effective stream area after confluence  =     25.522(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =      33.24(Ac.)
End of computations, Total Study Area =           40.02 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/06/21

BLOOMINGTON COMMERCE CENTER SITE 3
PROPOSED CONDITION
100-YEAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.300 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   470.000(Ft.)
Top (of initial area) elevation =  1046.500(Ft.)
Bottom (of initial area) elevation =  1036.600(Ft.)
Difference in elevation =     9.900(Ft.)
Slope =    0.02106  s(%)=       2.11
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.893 min.
Rainfall intensity =      3.433(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.695
Subarea runoff =      2.719(CFS)
Total initial stream area =        1.140(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.140(Ac.)
Runoff from this stream =      2.719(CFS)
Time of concentration =   11.89 min.
Rainfall intensity =     3.433(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.100 to Point/Station       10.200
**** 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 =   678.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1043.100(Ft.)
Difference in elevation =     4.100(Ft.)
Slope =    0.00605  s(%)=       0.60
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.457 min.
Rainfall intensity =      3.511(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.875
Subarea runoff =      1.966(CFS)
Total initial stream area =        0.640(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       11.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.199(Ft.), Average velocity =   1.214(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.025
--------------------------------------------------------------
Sub-Channel flow  =      4.802(CFS)
  '     '    flow top width =     39.780(Ft.)
  '     '    velocity=    1.214(Ft/s)
  '     '    area =      3.956(Sq.Ft)
  '     '    Froude number =     0.678

Upstream point elevation =  1043.100(Ft.)
Downstream point elevation =  1036.600(Ft.)
Flow length =   718.000(Ft.)
Travel time  =    9.86 min.
Time of concentration =   21.31 min.
Depth of flow =   0.199(Ft.)
Average velocity =   1.214(Ft/s)
Total irregular channel flow =     4.802(CFS)
Irregular channel normal depth above invert elev. =   0.199(Ft.)
Average velocity of channel(s) =   1.214(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      2.419(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.642
Subarea runoff =      5.587(CFS) for    4.220(Ac.)
Total runoff =      7.553(CFS)
Effective area this stream =        4.86(Ac.)
Total Study Area (Main Stream No. 2) =        6.00(Ac.)
Area averaged Fm value =    0.692(In/Hr)
Depth of flow =   0.236(Ft.), Average velocity =   1.359(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       11.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.860(Ac.)
Runoff from this stream =      7.553(CFS)
Time of concentration =   21.31 min.
Rainfall intensity =     2.419(In/Hr)
Area averaged loss rate (Fm) =    0.6921(In/Hr)
Area averaged Pervious ratio (Ap) = 0.7078
Summary of stream data:

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


1      2.72     1.140     11.89    0.782      3.433
2      7.55     4.860     21.31    0.692      2.419
Qmax(1) =
         1.000 *    1.000 *     2.719) +
         1.587 *    0.558 *     7.553) + =       9.409
Qmax(2) =
         0.617 *    1.000 *     2.719) +
         1.000 *    1.000 *     7.553) + =       9.232

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.719       8.553
Maximum flow rates at confluence using above data:
        9.409        9.232
Area of streams before confluence:
        1.140        4.860
Effective area values after confluence:
        3.852        6.000


Results of confluence:
Total flow rate =      9.409(CFS)
Time of concentration =    11.893 min.
Effective stream area after confluence  =      3.852(Ac.)
Study area average Pervious fraction(Ap) =  0.725
Study area average soil loss rate(Fm) =    0.709(In/Hr)
Study area total =       6.00(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       22.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1036.600(Ft.)
End of street segment elevation =  1032.100(Ft.)
Length of street segment  =   390.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =      9.712(CFS)
Depth of flow =   0.355(Ft.), Average velocity =   2.756(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  13.002(Ft.)
Flow velocity =   2.76(Ft/s)
Travel time =    2.36 min.     TC =   14.25  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 =      3.080(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.718
Subarea runoff =      0.473(CFS) for    0.620(Ac.)
Total runoff =      9.882(CFS)
Effective area this stream =        4.47(Ac.)
Total Study Area (Main Stream No. 1) =        6.62(Ac.)
Area averaged Fm value =    0.624(In/Hr)
Street flow at end of street =      9.882(CFS)
Half street flow at end of street =      4.941(CFS)
Depth of flow =   0.357(Ft.), Average velocity =   2.768(Ft/s)
Flow width (from curb towards crown)=  13.091(Ft.)
```

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Process from Point/Station       11.000 to Point/Station       22.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      4.472(Ac.)
Runoff from this stream =      9.882(CFS)
Time of concentration =   14.25 min.
Rainfall intensity =     3.080(In/Hr)
Area averaged loss rate (Fm) =    0.6245(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6386
Program is now starting with Main Stream No. 2


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Process from Point/Station       12.000 to Point/Station       13.000
**** 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)  = 32.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.978(In/Hr)
Initial subarea data:
Initial area flow distance =   381.000(Ft.)
Top (of initial area) elevation =  1044.900(Ft.)
Bottom (of initial area) elevation =  1043.900(Ft.)
Difference in elevation =     1.000(Ft.)
Slope =    0.00262  s(%)=       0.26
TC = k(0.950)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   33.595 min.
Rainfall intensity =      1.841(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.422
Subarea runoff =      0.287(CFS)
Total initial stream area =        0.370(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.978(In/Hr)


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Process from Point/Station       13.000 to Point/Station       16.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1042.000(Ft.)
Downstream point/station elevation =  1029.500(Ft.)
Pipe length  =   926.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.287(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.287(CFS)
Normal flow depth in pipe =    2.79(In.)
Flow top width inside pipe =    5.99(In.)
Critical Depth =    3.25(In.)
Pipe flow velocity =      3.22(Ft/s)
Travel time through pipe =    4.80 min.
Time of concentration (TC) =    38.39 min.
```

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Process from Point/Station       13.000 to Point/Station       16.200
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      0.370(Ac.)
Runoff from this stream =      0.287(CFS)
Time of concentration =   38.39 min.
Rainfall intensity =     1.699(In/Hr)
Area averaged loss rate (Fm) =    0.9778(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000



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Process from Point/Station       14.000 to Point/Station       15.000
**** 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)  = 32.00
Pervious ratio(Ap) = 0.4700     Max loss rate(Fm)=     0.460(In/Hr)
Initial subarea data:
Initial area flow distance =   204.000(Ft.)
Top (of initial area) elevation =  1046.200(Ft.)
Bottom (of initial area) elevation =  1040.700(Ft.)
Difference in elevation =     5.500(Ft.)
Slope =    0.02696  s(%)=       2.70
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.749 min.
Rainfall intensity =      4.823(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.814
Subarea runoff =      1.846(CFS)
Total initial stream area =        0.470(Ac.)
Pervious area fraction = 0.470
Initial area Fm value =    0.460(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       16.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1040.700(Ft.)
Downstream point elevation =  1036.600(Ft.)
Channel length thru subarea  =   792.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   0.020
Slope or 'Z' of right channel bank =   0.020
Estimated mean flow rate at midpoint of channel =     15.770(CFS)
Manning's 'N'    = 0.005
Maximum depth of channel  =    3.770(Ft.)
Flow(q) thru subarea =     15.770(CFS)
Depth of flow =  14.280(Ft.), Average velocity =   8.437(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =    0.151(Ft.)
Flow Velocity =    8.44(Ft/s)
Travel time  =    1.56 min.
Time of concentration =    8.31 min.
Critical depth =      8.875(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
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 =      4.256(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.875
Subarea runoff =     27.789(CFS) for    7.490(Ac.)
Total runoff =     29.635(CFS)
Effective area this stream =        7.96(Ac.)
Total Study Area (Main Stream No. 2) =       14.95(Ac.)
Area averaged Fm value =    0.119(In/Hr)
Depth of flow =  19.982(Ft.), Average velocity =  10.859(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth =     12.500(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       16.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1034.600(Ft.)
Downstream point/station elevation =  1029.600(Ft.)
Pipe length  =   157.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    29.635(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    29.635(CFS)
Normal flow depth in pipe =   15.28(In.)
Flow top width inside pipe =   23.09(In.)
Critical Depth =   22.28(In.)
Pipe flow velocity =     14.04(Ft/s)
Travel time through pipe =    0.19 min.
Time of concentration (TC) =     8.50 min.


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Process from Point/Station       16.100 to Point/Station       16.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1029.600(Ft.)
Downstream point/station elevation =  1029.500(Ft.)
Pipe length  =    45.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    29.635(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    29.635(CFS)
Normal flow depth in pipe =   27.80(In.)
Flow top width inside pipe =   30.20(In.)
Critical Depth =   21.15(In.)
Pipe flow velocity =      5.06(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =     8.65 min.
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       16.200
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      7.960(Ac.)
Runoff from this stream =     29.635(CFS)
Time of concentration =    8.65 min.
Rainfall intensity =     4.156(In/Hr)
Area averaged loss rate (Fm) =    0.1191(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1218
Summary of stream data:

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


1      0.29     0.370     38.39    0.978      1.699
2     29.63     7.960      8.65    0.119      4.156
Qmax(1) =
         1.000 *    1.000 *     0.287) +
         0.391 *    1.000 *    29.635) + =      11.888
Qmax(2) =
         4.405 *    0.225 *     0.287) +
         1.000 *    1.000 *    29.635) + =      29.920

Total of 2 streams to confluence:
Flow rates before confluence point:
       0.287      29.635
Maximum flow rates at confluence using above data:
       11.888       29.920
Area of streams before confluence:
        0.370        7.960
Effective area values after confluence:
        8.330        8.043
Results of confluence:
Total flow rate =     29.920(CFS)
Time of concentration =     8.648 min.
Effective stream area after confluence =      8.043(Ac.)
Study area average Pervious fraction(Ap) =  0.161
Study area average soil loss rate(Fm) =    0.157(In/Hr)
Study area total (this main stream) =       8.33(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.200 to Point/Station       20.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1029.500(Ft.)
Downstream point/station elevation =  1027.500(Ft.)
Pipe length  =   217.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    29.920(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    29.920(CFS)
Normal flow depth in pipe =   19.57(In.)
Flow top width inside pipe =   28.57(In.)
Critical Depth =   22.38(In.)
Pipe flow velocity =      8.83(Ft/s)
Travel time through pipe =    0.41 min.
Time of concentration (TC) =     9.06 min.


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Process from Point/Station       16.200 to Point/Station       20.100
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      8.043(Ac.)
Runoff from this stream =     29.920(CFS)
Time of concentration =    9.06 min.
Rainfall intensity =     4.042(In/Hr)
Area averaged loss rate (Fm) =    0.1573(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1609


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Process from Point/Station       17.000 to Point/Station       18.000
**** 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)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Initial subarea data:
Initial area flow distance =   725.000(Ft.)
Top (of initial area) elevation =  1045.400(Ft.)
Bottom (of initial area) elevation =  1039.200(Ft.)
Difference in elevation =     6.200(Ft.)
Slope =    0.00855  s(%)=       0.86
TC = k(0.299)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.805 min.
Rainfall intensity =      3.636(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.876
Subarea runoff =      6.242(CFS)
Total initial stream area =        1.960(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)
```

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Process from Point/Station       18.000 to Point/Station       20.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1035.200(Ft.)
Downstream point/station elevation =  1027.500(Ft.)
Pipe length  =   257.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.242(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     6.242(CFS)
Normal flow depth in pipe =    8.02(In.)
Flow top width inside pipe =   14.96(In.)
Critical Depth =   12.11(In.)
Pipe flow velocity =      9.36(Ft/s)
Travel time through pipe =    0.46 min.
Time of concentration (TC) =    11.26 min.


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Process from Point/Station       18.000 to Point/Station       20.100
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.960(Ac.)
Runoff from this stream =      6.242(CFS)
Time of concentration =   11.26 min.
Rainfall intensity =     3.547(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000


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Process from Point/Station       19.300 to Point/Station       20.000
**** 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 =   597.000(Ft.)
Top (of initial area) elevation =  1040.600(Ft.)
Bottom (of initial area) elevation =  1035.200(Ft.)
Difference in elevation =     5.400(Ft.)
Slope =    0.00905  s(%)=       0.90
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.046 min.
Rainfall intensity =      3.799(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.877
Subarea runoff =     16.721(CFS)
Total initial stream area =        5.020(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       20.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1031.200(Ft.)
Downstream point/station elevation =  1027.500(Ft.)
Pipe length  =   111.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.721(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    16.721(CFS)
Normal flow depth in pipe =   13.01(In.)
Flow top width inside pipe =   16.12(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.23(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =    10.20 min.
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       20.100
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 3
Stream flow area =      5.020(Ac.)
Runoff from this stream =     16.721(CFS)
Time of concentration =   10.20 min.
Rainfall intensity =     3.765(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     29.92     8.043      9.06    0.157      4.042
2      6.24     1.960     11.26    0.098      3.547
3     16.72     5.020     10.20    0.098      3.765
Qmax(1) =
         1.000 *    1.000 *    29.920) +
         1.144 *    0.804 *     6.242) +
         1.076 *    0.888 *    16.721) + =      51.637
Qmax(2) =
         0.872 *    1.000 *    29.920) +
         1.000 *    1.000 *     6.242) +
         0.941 *    1.000 *    16.721) + =      48.074
Qmax(3) =
         0.929 *    1.000 *    29.920) +
         1.063 *    0.905 *     6.242) +
         1.000 *    1.000 *    16.721) + =      50.513

Total of 3 streams to confluence:
Flow rates before confluence point:
      29.920       6.242      16.721
Maximum flow rates at confluence using above data:
       51.637       48.074       50.513
Area of streams before confluence:
        8.043        1.960        5.020
Effective area values after confluence:
       14.079       15.023       14.838
Results of confluence:
Total flow rate =     51.637(CFS)
Time of concentration =     9.057 min.
Effective stream area after confluence =     14.079(Ac.)
Study area average Pervious fraction(Ap) =  0.133
Study area average soil loss rate(Fm) =    0.130(In/Hr)
Study area total (this main stream) =      15.02(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.100 to Point/Station       22.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1027.500(Ft.)
Downstream point/station elevation =  1026.810(Ft.)
Pipe length  =   139.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    51.637(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    51.637(CFS)
Normal flow depth in pipe =   28.59(In.)
Flow top width inside pipe =   34.50(In.)
Critical Depth =   27.51(In.)
Pipe flow velocity =      7.92(Ft/s)
Travel time through pipe =    0.29 min.
Time of concentration (TC) =     9.35 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.100 to Point/Station       22.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     14.079(Ac.)
Runoff from this stream =     51.637(CFS)
Time of concentration =    9.35 min.
Rainfall intensity =     3.966(In/Hr)
Area averaged loss rate (Fm) =    0.1296(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1326
Summary of stream data:

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


1      9.88     4.472     14.25    0.624      3.080
2     51.64    14.079      9.35    0.130      3.966
Qmax(1) =
         1.000 *    1.000 *     9.882) +
         0.769 *    1.000 *    51.637) + =      49.590
Qmax(2) =
         1.361 *    0.656 *     9.882) +
         1.000 *    1.000 *    51.637) + =      60.460

Total of 2 main streams to confluence:
Flow rates before confluence point:
      10.882      52.637
Maximum flow rates at confluence using above data:
       49.590       60.460
Area of streams before confluence:
        4.472       14.079
Effective area values after confluence:
       18.550       17.012


Results of confluence:
Total flow rate =     60.460(CFS)
Time of concentration =     9.350 min.
Effective stream area after confluence  =     17.012(Ac.)
Study area average Pervious fraction(Ap) =  0.255
Study area average soil loss rate(Fm) =    0.249(In/Hr)
Study area total =      18.55(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       43.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1032.100(Ft.)
End of street segment elevation =  1026.300(Ft.)
Length of street segment  =   532.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =     60.543(CFS)
Depth of flow =   0.627(Ft.), Average velocity =   4.239(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  26.591(Ft.)
Flow velocity =   4.24(Ft/s)
Travel time =    2.09 min.     TC =   11.44  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)
The area added to the existing stream causes a
a lower flow rate of Q =     52.290(CFS)
therefore the upstream flow rate of Q =     60.460(CFS) is being used
Rainfall intensity =      3.513(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.838
Subarea runoff =      0.000(CFS) for    0.750(Ac.)
Total runoff =     60.460(CFS)
Effective area this stream =       17.76(Ac.)
Total Study Area (Main Stream No. 1) =       22.68(Ac.)
Area averaged Fm value =    0.243(In/Hr)
Street flow at end of street =     60.460(CFS)
Half street flow at end of street =     30.230(CFS)
Depth of flow =   0.627(Ft.), Average velocity =   4.237(Ft/s)
Flow width (from curb towards crown)=  26.577(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       43.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     17.762(Ac.)
Runoff from this stream =     60.460(CFS)
Time of concentration =   11.44 min.
Rainfall intensity =     3.513(In/Hr)
Area averaged loss rate (Fm) =    0.2425(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2480
Program is now starting with Main Stream No. 2



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       31.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   501.000(Ft.)
Top (of initial area) elevation =  1044.900(Ft.)
Bottom (of initial area) elevation =  1040.900(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.00798  s(%)=       0.80
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.814 min.
Rainfall intensity =      3.009(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.666
Subarea runoff =      6.473(CFS)
Total initial stream area =        3.230(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       31.000 to Point/Station       32.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____________________________________________________________________________
Upstream point elevation =  1040.900(Ft.)
Downstream point elevation =  1037.800(Ft.)
Channel length thru subarea  =   603.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   0.010
Slope or 'Z' of right channel bank =   0.010
Estimated mean flow rate at midpoint of channel =      9.980(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.500(Ft.)
Flow(q) thru subarea =      9.980(CFS)
Depth of flow =  64.188(Ft.), Average velocity =   5.244(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =    0.030(Ft.)
Flow Velocity =    5.24(Ft/s)
Travel time  =    1.92 min.
Time of concentration =   16.73 min.
Critical depth =     15.750(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
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 =      2.797(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.758
Subarea runoff =      7.110(CFS) for    3.180(Ac.)
Total runoff =     13.584(CFS)
Effective area this stream =        6.41(Ac.)
Total Study Area (Main Stream No. 2) =       29.09(Ac.)
Area averaged Fm value =    0.443(In/Hr)
Depth of flow =  77.076(Ft.), Average velocity =   5.932(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth =     19.250(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       32.000 to Point/Station       34.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1037.800(Ft.)
Downstream point elevation =  1027.900(Ft.)
Channel length thru subarea  =  1246.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   0.010
Slope or 'Z' of right channel bank =   0.010
Estimated mean flow rate at midpoint of channel =     18.568(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     18.568(CFS)
Depth of flow =  68.990(Ft.), Average velocity =   6.828(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =    0.040(Ft.)
Flow Velocity =    6.83(Ft/s)
Travel time  =    3.04 min.
Time of concentration =   19.77 min.
Critical depth =     19.750(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
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 =      2.531(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.798
Subarea runoff =      9.890(CFS) for    5.220(Ac.)
Total runoff =     23.474(CFS)
Effective area this stream =       11.63(Ac.)
Total Study Area (Main Stream No. 2) =       34.31(Ac.)
Area averaged Fm value =    0.288(In/Hr)
Depth of flow =  79.258(Ft.), Average velocity =   7.499(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth =     23.000(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       34.000 to Point/Station       37.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1024.900(Ft.)
Downstream point/station elevation =  1022.000(Ft.)
Pipe length  =    47.61(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    23.474(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    23.474(CFS)
Normal flow depth in pipe =   13.43(In.)
Flow top width inside pipe =   15.67(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.62(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    19.82 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       34.000 to Point/Station       37.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     11.630(Ac.)
Runoff from this stream =     23.474(CFS)
Time of concentration =   19.82 min.
Rainfall intensity =     2.527(In/Hr)
Area averaged loss rate (Fm) =    0.2879(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2944


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       35.000 to Point/Station       36.000
**** 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)  = 32.00
Pervious ratio(Ap) = 0.2500     Max loss rate(Fm)=     0.244(In/Hr)
Initial subarea data:
Initial area flow distance =   639.000(Ft.)
Top (of initial area) elevation =  1033.900(Ft.)
Bottom (of initial area) elevation =  1029.000(Ft.)
Difference in elevation =     4.900(Ft.)
Slope =    0.00767  s(%)=       0.77
TC = k(0.336)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.798 min.
Rainfall intensity =      3.450(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.836
Subarea runoff =      3.058(CFS)
Total initial stream area =        1.060(Ac.)
Pervious area fraction = 0.250
Initial area Fm value =    0.244(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       36.000 to Point/Station       37.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1026.000(Ft.)
Downstream point/station elevation =  1022.000(Ft.)
Pipe length  =    41.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.058(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.058(CFS)
Normal flow depth in pipe =    4.98(In.)
Flow top width inside pipe =    8.95(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.18(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    11.85 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       36.000 to Point/Station       37.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.060(Ac.)
Runoff from this stream =      3.058(CFS)
Time of concentration =   11.85 min.
Rainfall intensity =     3.440(In/Hr)
Area averaged loss rate (Fm) =    0.2445(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       40.000 to Point/Station       41.000
**** 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)  = 32.00
Pervious ratio(Ap) = 0.3000     Max loss rate(Fm)=     0.293(In/Hr)
Initial subarea data:
Initial area flow distance =   587.000(Ft.)
Top (of initial area) elevation =  1036.200(Ft.)
Bottom (of initial area) elevation =  1029.600(Ft.)
Difference in elevation =     6.600(Ft.)
Slope =    0.01124  s(%)=       1.12
TC = k(0.348)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.951 min.
Rainfall intensity =      3.607(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.827
Subarea runoff =     11.274(CFS)
Total initial stream area =        3.780(Ac.)
Pervious area fraction = 0.300
Initial area Fm value =    0.293(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       41.000 to Point/Station       37.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1026.600(Ft.)
Downstream point/station elevation =  1022.000(Ft.)
Pipe length  =    99.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.274(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    11.274(CFS)
Normal flow depth in pipe =   10.24(In.)
Flow top width inside pipe =   13.96(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.63(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    11.08 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       41.000 to Point/Station       37.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 3
Stream flow area =      3.780(Ac.)
Runoff from this stream =     11.274(CFS)
Time of concentration =   11.08 min.
Rainfall intensity =     3.582(In/Hr)
Area averaged loss rate (Fm) =    0.2933(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3000
Summary of stream data:

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


1     23.47    11.630     19.82    0.288      2.527
2      3.06     1.060     11.85    0.244      3.440
3     11.27     3.780     11.08    0.293      3.582
Qmax(1) =
         1.000 *    1.000 *    23.474) +
         0.714 *    1.000 *     3.058) +
         0.679 *    1.000 *    11.274) + =      33.315
Qmax(2) =
         1.408 *    0.598 *    23.474) +
         1.000 *    1.000 *     3.058) +
         0.957 *    1.000 *    11.274) + =      33.608
Qmax(3) =
         1.471 *    0.559 *    23.474) +
         1.044 *    0.935 *     3.058) +
         1.000 *    1.000 *    11.274) + =      33.566

Total of 3 streams to confluence:
Flow rates before confluence point:
      23.474       3.058      11.274
Maximum flow rates at confluence using above data:
       33.315       33.608       33.566
Area of streams before confluence:
       11.630        1.060        3.780
Effective area values after confluence:
       16.470       11.796       11.274
Results of confluence:
Total flow rate =     33.608(CFS)
Time of concentration =    11.854 min.
Effective stream area after confluence =     11.796(Ac.)
Study area average Pervious fraction(Ap) =  0.293
Study area average soil loss rate(Fm) =    0.286(In/Hr)
Study area total (this main stream) =      16.47(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       37.000 to Point/Station       43.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1022.000(Ft.)
Downstream point/station elevation =  1021.600(Ft.)
Pipe length  =    80.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    33.608(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    33.608(CFS)
Normal flow depth in pipe =   24.45(In.)
Flow top width inside pipe =   28.92(In.)
Critical Depth =   23.15(In.)
Pipe flow velocity =      7.12(Ft/s)
Travel time through pipe =    0.19 min.
Time of concentration (TC) =    12.04 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       37.000 to Point/Station       43.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     11.796(Ac.)
Runoff from this stream =     33.608(CFS)
Time of concentration =   12.04 min.
Rainfall intensity =     3.408(In/Hr)
Area averaged loss rate (Fm) =    0.2863(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2928
Summary of stream data:

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


1     60.46    17.762     11.44    0.243      3.513
2     33.61    11.796     12.04    0.286      3.408
Qmax(1) =
         1.000 *    1.000 *    60.460) +
         1.034 *    0.950 *    33.608) + =      93.480
Qmax(2) =
         0.968 *    1.000 *    60.460) +
         1.000 *    1.000 *    33.608) + =      92.109

Total of 2 main streams to confluence:
Flow rates before confluence point:
      61.460      34.608
Maximum flow rates at confluence using above data:
       93.480       92.109
Area of streams before confluence:
       17.762       11.796
Effective area values after confluence:
       28.971       29.558


Results of confluence:
Total flow rate =     93.480(CFS)
Time of concentration =    11.442 min.
Effective stream area after confluence  =     28.971(Ac.)
Study area average Pervious fraction(Ap) =  0.266
Study area average soil loss rate(Fm) =    0.260(In/Hr)
Study area total =      29.56(Ac.)
End of computations, Total Study Area =           39.15 (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) = 0.290
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/05/21

- BLOOMINGTON COMMERCE CENTER - SITE 3
EXISTING CONDITION
25-YEAR STORM EVENT ANALYSIS

-

Program License Serial Number 6405

-

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

-

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.998 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   622.000(Ft.)
Top (of initial area) elevation =  1042.100(Ft.)
Bottom (of initial area) elevation =  1035.400(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.01077  s(%)=       1.08
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.214 min.
Rainfall intensity =      2.273(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.590
Subarea runoff =      1.637(CFS)
Total initial stream area =        1.220(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.220(Ac.)
Runoff from this stream =      1.637(CFS)
Time of concentration =   15.21 min.
Rainfall intensity =     2.273(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1045.300(Ft.)
Bottom (of initial area) elevation =  1035.400(Ft.)
Difference in elevation =     9.900(Ft.)
Slope =    0.00990  s(%)=       0.99
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.709 min.
Rainfall intensity =      2.008(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.549
Subarea runoff =      5.870(CFS)
Total initial stream area =        5.320(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.320(Ac.)
Runoff from this stream =      5.870(CFS)
Time of concentration =   18.71 min.
Rainfall intensity =     2.008(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      1.64     1.220     15.21    0.782      2.273
2      5.87     5.320     18.71    0.782      2.008
Qmax(1) =
         1.000 *    1.000 *     1.637) +
         1.216 *    0.813 *     5.870) + =       7.443
Qmax(2) =
         0.822 *    1.000 *     1.637) +
         1.000 *    1.000 *     5.870) + =       7.216

Total of 2 main streams to confluence:
Flow rates before confluence point:
       2.637       6.870
Maximum flow rates at confluence using above data:
        7.443        7.216
Area of streams before confluence:
        1.220        5.320
Effective area values after confluence:
        5.546        6.540


Results of confluence:
Total flow rate =      7.443(CFS)
Time of concentration =    15.214 min.
Effective stream area after confluence  =      5.546(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =       6.54(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       15.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1035.400(Ft.)
End of street segment elevation =  1031.400(Ft.)
Length of street segment  =   377.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =      7.530(CFS)
Depth of flow =   0.334(Ft.), Average velocity =   2.510(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  11.953(Ft.)
Flow velocity =   2.51(Ft/s)
Travel time =    2.50 min.     TC =   17.72  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      6.755(CFS)
therefore the upstream flow rate of Q =      7.443(CFS) is being used
Rainfall intensity =      2.075(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.561
Subarea runoff =      0.000(CFS) for    0.260(Ac.)
Total runoff =      7.443(CFS)
Effective area this stream =        5.81(Ac.)
Total Study Area (Main Stream No. 1) =        6.80(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Street flow at end of street =      7.443(CFS)
Half street flow at end of street =      3.722(CFS)
Depth of flow =   0.333(Ft.), Average velocity =   2.503(Ft/s)
Flow width (from curb towards crown)=  11.898(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.806(Ac.)
Runoff from this stream =      7.443(CFS)
Time of concentration =   17.72 min.
Rainfall intensity =     2.075(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   697.000(Ft.)
Top (of initial area) elevation =  1046.900(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     7.800(Ft.)
Slope =    0.01119  s(%)=       1.12
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.801 min.
Rainfall intensity =      2.222(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.583
Subarea runoff =      3.759(CFS)
Total initial stream area =        2.900(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     10.929(CFS)
Depth of flow =   0.224(Ft.), Average velocity =   1.089(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      5.464(CFS)
  '     '    flow top width =     44.810(Ft.)
  '     '    velocity=    1.089(Ft/s)
  '     '    area =      5.020(Sq.Ft)
  '     '    Froude number =     0.573

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1031.400(Ft.)
Flow length =   861.000(Ft.)
Travel time  =   13.18 min.
Time of concentration =   28.98 min.
Depth of flow =   0.224(Ft.)
Average velocity =   1.089(Ft/s)
Total irregular channel flow =     5.464(CFS)
Irregular channel normal depth above invert elev. =   0.224(Ft.)
Average velocity of channel(s) =   1.089(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.544(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.444
Subarea runoff =      3.333(CFS) for    7.440(Ac.)
Total runoff =      7.091(CFS)
Effective area this stream =       10.34(Ac.)
Total Study Area (Main Stream No. 2) =       17.14(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.247(Ft.), Average velocity =   1.162(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     10.340(Ac.)
Runoff from this stream =      7.091(CFS)
Time of concentration =   28.98 min.
Rainfall intensity =     1.544(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      7.44     5.806     17.72    0.782      2.075
2      7.09    10.340     28.98    0.782      1.544
Qmax(1) =
         1.000 *    1.000 *     7.443) +
         1.696 *    0.611 *     7.091) + =      14.796
Qmax(2) =
         0.590 *    1.000 *     7.443) +
         1.000 *    1.000 *     7.091) + =      11.479

Total of 2 main streams to confluence:
Flow rates before confluence point:
       8.443       8.091
Maximum flow rates at confluence using above data:
       14.796       11.479
Area of streams before confluence:
        5.806       10.340
Effective area values after confluence:
       12.126       16.146


Results of confluence:
Total flow rate =     14.796(CFS)
Time of concentration =    17.717 min.
Effective stream area after confluence  =     12.126(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =      16.15(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       19.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1031.400(Ft.)
End of street segment elevation =  1027.200(Ft.)
Length of street segment  =   419.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(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 =     14.885(CFS)
Depth of flow =   0.302(Ft.), Average velocity =   2.888(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.099(Ft.)
Flow velocity =   2.89(Ft/s)
Travel time =    2.42 min.     TC =   20.13  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     12.731(CFS)
therefore the upstream flow rate of Q =     14.796(CFS) is being used
Rainfall intensity =      1.922(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.534
Subarea runoff =      0.000(CFS) for    0.290(Ac.)
Total runoff =     14.796(CFS)
Effective area this stream =       12.42(Ac.)
Total Study Area (Main Stream No. 1) =       17.43(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Street flow at end of street =     14.796(CFS)
Half street flow at end of street =      7.398(CFS)
Depth of flow =   0.302(Ft.), Average velocity =   2.883(Ft/s)
Flow width (from curb towards crown)=  16.064(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       19.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     12.416(Ac.)
Runoff from this stream =     14.796(CFS)
Time of concentration =   20.13 min.
Rainfall intensity =     1.922(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   966.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1037.500(Ft.)
Difference in elevation =     9.700(Ft.)
Slope =    0.01004  s(%)=       1.00
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.399 min.
Rainfall intensity =      2.028(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.553
Subarea runoff =      7.009(CFS)
Total initial stream area =        6.250(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      6.250(Ac.)
Runoff from this stream =      7.009(CFS)
Time of concentration =   18.40 min.
Rainfall intensity =     2.028(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   489.000(Ft.)
Top (of initial area) elevation =  1044.100(Ft.)
Bottom (of initial area) elevation =  1037.500(Ft.)
Difference in elevation =     6.600(Ft.)
Slope =    0.01350  s(%)=       1.35
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.208 min.
Rainfall intensity =      2.475(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.616
Subarea runoff =      1.721(CFS)
Total initial stream area =        1.130(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       17.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.130(Ac.)
Runoff from this stream =      1.721(CFS)
Time of concentration =   13.21 min.
Rainfall intensity =     2.475(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      7.01     6.250     18.40    0.782      2.028
2      1.72     1.130     13.21    0.782      2.475
Qmax(1) =
         1.000 *    1.000 *     7.009) +
         0.736 *    1.000 *     1.721) + =       8.276
Qmax(2) =
         1.358 *    0.718 *     7.009) +
         1.000 *    1.000 *     1.721) + =       8.555

Total of 2 streams to confluence:
Flow rates before confluence point:
       7.009       1.721
Maximum flow rates at confluence using above data:
        8.276        8.555
Area of streams before confluence:
        6.250        1.130
Effective area values after confluence:
        7.380        5.617
Results of confluence:
Total flow rate =      8.555(CFS)
Time of concentration =    13.208 min.
Effective stream area after confluence =      5.617(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =       7.38(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       18.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =     21.490(CFS)
Depth of flow =   0.292(Ft.), Average velocity =   1.261(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
--------------------------------------------------------------
Sub-Channel flow  =     10.745(CFS)
  '     '    flow top width =     58.376(Ft.)
  '     '    velocity=    1.261(Ft/s)
  '     '    area =      8.519(Sq.Ft)
  '     '    Froude number =     0.582

Upstream point elevation =  1037.500(Ft.)
Downstream point elevation =  1031.500(Ft.)
Flow length =   711.000(Ft.)
Travel time  =    9.40 min.
Time of concentration =   22.60 min.
Depth of flow =   0.292(Ft.)
Average velocity =   1.261(Ft/s)
Total irregular channel flow =    10.745(CFS)
Irregular channel normal depth above invert elev. =   0.292(Ft.)
Average velocity of channel(s) =   1.261(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.793(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.507
Subarea runoff =      4.283(CFS) for    8.500(Ac.)
Total runoff =     12.838(CFS)
Effective area this stream =       14.12(Ac.)
Total Study Area (Main Stream No. 2) =       33.31(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.312(Ft.), Average velocity =   1.319(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       19.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     25.772(CFS)
Depth of flow =   0.329(Ft.), Average velocity =   1.190(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     12.886(CFS)
  '     '    flow top width =     65.802(Ft.)
  '     '    velocity=    1.190(Ft/s)
  '     '    area =     10.825(Sq.Ft)
  '     '    Froude number =     0.517

Upstream point elevation =  1031.500(Ft.)
Downstream point elevation =  1027.200(Ft.)
Flow length =   671.000(Ft.)
Travel time  =    9.39 min.
Time of concentration =   32.00 min.
Depth of flow =   0.329(Ft.)
Average velocity =   1.190(Ft/s)
Total irregular channel flow =    12.886(CFS)
Irregular channel normal depth above invert elev. =   0.329(Ft.)
Average velocity of channel(s) =   1.190(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     12.615(CFS)
therefore the upstream flow rate of Q =     12.838(CFS) is being used
Rainfall intensity =      1.455(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.416
Subarea runoff =      0.000(CFS) for    6.710(Ac.)
Total runoff =     12.838(CFS)
Effective area this stream =       20.83(Ac.)
Total Study Area (Main Stream No. 2) =       40.02(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.329(Ft.), Average velocity =   1.189(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       19.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     20.827(Ac.)
Runoff from this stream =     12.838(CFS)
Time of concentration =   32.00 min.
Rainfall intensity =     1.455(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     14.80    12.416     20.13    0.782      1.922
2     12.84    20.827     32.00    0.782      1.455
Qmax(1) =
         1.000 *    1.000 *    14.796) +
         1.693 *    0.629 *    12.838) + =      28.471
Qmax(2) =
         0.591 *    1.000 *    14.796) +
         1.000 *    1.000 *    12.838) + =      21.579

Total of 2 main streams to confluence:
Flow rates before confluence point:
      15.796      13.838
Maximum flow rates at confluence using above data:
       28.471       21.579
Area of streams before confluence:
       12.416       20.827
Effective area values after confluence:
       25.522       33.243


Results of confluence:
Total flow rate =     28.471(CFS)
Time of concentration =    20.135 min.
Effective stream area after confluence  =     25.522(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =      33.24(Ac.)
End of computations, Total Study Area =           40.02 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/19/21

BLOOMINGTON COMMERCE CENTER
EXISTING CONDITION
25-YEAR STORM ANALYSIS WITH ADJUSTED 10 YEAR RAINFALL DATA

Program License Serial Number 6405

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

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.813 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   622.000(Ft.)
Top (of initial area) elevation =  1042.100(Ft.)
Bottom (of initial area) elevation =  1035.400(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.01077  s(%)=       1.08
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.214 min.
Rainfall intensity =      1.852(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.520
Subarea runoff =      1.175(CFS)
Total initial stream area =        1.220(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.220(Ac.)
Runoff from this stream =      1.175(CFS)
Time of concentration =   15.21 min.
Rainfall intensity =     1.852(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1045.300(Ft.)
Bottom (of initial area) elevation =  1035.400(Ft.)
Difference in elevation =     9.900(Ft.)
Slope =    0.00990  s(%)=       0.99
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.709 min.
Rainfall intensity =      1.636(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.470
Subarea runoff =      4.087(CFS)
Total initial stream area =        5.320(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.320(Ac.)
Runoff from this stream =      4.087(CFS)
Time of concentration =   18.71 min.
Rainfall intensity =     1.636(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      1.17     1.220     15.21    0.782      1.852
2      4.09     5.320     18.71    0.782      1.636
Qmax(1) =
         1.000 *    1.000 *     1.175) +
         1.253 *    0.813 *     4.087) + =       5.340
Qmax(2) =
         0.798 *    1.000 *     1.175) +
         1.000 *    1.000 *     4.087) + =       5.025

Total of 2 main streams to confluence:
Flow rates before confluence point:
       2.175       5.087
Maximum flow rates at confluence using above data:
        5.340        5.025
Area of streams before confluence:
        1.220        5.320
Effective area values after confluence:
        5.546        6.540


Results of confluence:
Total flow rate =      5.340(CFS)
Time of concentration =    15.214 min.
Effective stream area after confluence  =      5.546(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =       6.54(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       15.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of street segment elevation =  1035.400(Ft.)
End of street segment elevation =  1031.400(Ft.)
Length of street segment  =   377.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =      5.402(CFS)
Depth of flow =   0.304(Ft.), Average velocity =   2.317(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.462(Ft.)
Flow velocity =   2.32(Ft/s)
Travel time =    2.71 min.     TC =   17.93  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      4.683(CFS)
therefore the upstream flow rate of Q =      5.340(CFS) is being used
Rainfall intensity =      1.678(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.481
Subarea runoff =      0.000(CFS) for    0.260(Ac.)
Total runoff =      5.340(CFS)
Effective area this stream =        5.81(Ac.)
Total Study Area (Main Stream No. 1) =        6.80(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Street flow at end of street =      5.340(CFS)
Half street flow at end of street =      2.670(CFS)
Depth of flow =   0.303(Ft.), Average velocity =   2.311(Ft/s)
Flow width (from curb towards crown)=  10.412(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.806(Ac.)
Runoff from this stream =      5.340(CFS)
Time of concentration =   17.93 min.
Rainfall intensity =     1.678(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   697.000(Ft.)
Top (of initial area) elevation =  1046.900(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     7.800(Ft.)
Slope =    0.01119  s(%)=       1.12
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.801 min.
Rainfall intensity =      1.810(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.511
Subarea runoff =      2.683(CFS)
Total initial stream area =        2.900(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      6.806(CFS)
Depth of flow =   0.188(Ft.), Average velocity =   0.967(Ft/s)
      ******* Irregular Channel Data ***********
----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
----------------------------------------------------------------
Sub-Channel flow  =      3.403(CFS)
  '     '    flow top width =     37.518(Ft.)
  '     '    velocity=    0.967(Ft/s)
  '     '    area =      3.519(Sq.Ft)
  '     '    Froude number =     0.556

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1031.400(Ft.)
Flow length =   861.000(Ft.)
Travel time  =   14.84 min.
Time of concentration =   30.64 min.
Depth of flow =   0.188(Ft.)
Average velocity =   0.967(Ft/s)
Total irregular channel flow =     3.403(CFS)
Irregular channel normal depth above invert elev. =   0.188(Ft.)
Average velocity of channel(s) =   0.967(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.217(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.321
Subarea runoff =      1.360(CFS) for    7.440(Ac.)
Total runoff =      4.043(CFS)
Effective area this stream =       10.34(Ac.)
Total Study Area (Main Stream No. 2) =       17.14(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.200(Ft.), Average velocity =   1.010(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     10.340(Ac.)
Runoff from this stream =      4.043(CFS)
Time of concentration =   30.64 min.
Rainfall intensity =     1.217(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      5.34     5.806     17.93    0.782      1.678
2      4.04    10.340     30.64    0.782      1.217
Qmax(1) =
         1.000 *    1.000 *     5.340) +
         2.063 *    0.585 *     4.043) + =      10.219
Qmax(2) =
         0.485 *    1.000 *     5.340) +
         1.000 *    1.000 *     4.043) + =       6.632

Total of 2 main streams to confluence:
Flow rates before confluence point:
       6.340       5.043
Maximum flow rates at confluence using above data:
       10.219        6.632
Area of streams before confluence:
        5.806       10.340
Effective area values after confluence:
       11.855       16.146


Results of confluence:
Total flow rate =     10.219(CFS)
Time of concentration =    17.925 min.
Effective stream area after confluence  =     11.855(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =      16.15(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       19.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1031.400(Ft.)
End of street segment elevation =  1027.200(Ft.)
Length of street segment  =   419.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(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 =     10.281(CFS)
Depth of flow =   0.261(Ft.), Average velocity =   2.632(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  14.029(Ft.)
Flow velocity =   2.63(Ft/s)
Travel time =    2.65 min.     TC =   20.58  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      8.337(CFS)
therefore the upstream flow rate of Q =     10.219(CFS) is being used
Rainfall intensity =      1.545(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.444
Subarea runoff =      0.000(CFS) for    0.290(Ac.)
Total runoff =     10.219(CFS)
Effective area this stream =       12.14(Ac.)
Total Study Area (Main Stream No. 1) =       17.43(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Street flow at end of street =     10.219(CFS)
Half street flow at end of street =      5.109(CFS)
Depth of flow =   0.260(Ft.), Average velocity =   2.628(Ft/s)
Flow width (from curb towards crown)=  13.997(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       19.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     12.145(Ac.)
Runoff from this stream =     10.219(CFS)
Time of concentration =   20.58 min.
Rainfall intensity =     1.545(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   966.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1037.500(Ft.)
Difference in elevation =     9.700(Ft.)
Slope =    0.01004  s(%)=       1.00
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.399 min.
Rainfall intensity =      1.652(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.474
Subarea runoff =      4.894(CFS)
Total initial stream area =        6.250(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      6.250(Ac.)
Runoff from this stream =      4.894(CFS)
Time of concentration =   18.40 min.
Rainfall intensity =     1.652(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   489.000(Ft.)
Top (of initial area) elevation =  1044.100(Ft.)
Bottom (of initial area) elevation =  1037.500(Ft.)
Difference in elevation =     6.600(Ft.)
Slope =    0.01350  s(%)=       1.35
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.208 min.
Rainfall intensity =      2.016(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.551
Subarea runoff =      1.255(CFS)
Total initial stream area =        1.130(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       17.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.130(Ac.)
Runoff from this stream =      1.255(CFS)
Time of concentration =   13.21 min.
Rainfall intensity =     2.016(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      4.89     6.250     18.40    0.782      1.652
2      1.25     1.130     13.21    0.782      2.016
Qmax(1) =
         1.000 *    1.000 *     4.894) +
         0.705 *    1.000 *     1.255) + =       5.779
Qmax(2) =
         1.418 *    0.718 *     4.894) +
         1.000 *    1.000 *     1.255) + =       6.236

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.894       1.255
Maximum flow rates at confluence using above data:
        5.779        6.236
Area of streams before confluence:
        6.250        1.130
Effective area values after confluence:
        7.380        5.617
Results of confluence:
Total flow rate =      6.236(CFS)
Time of concentration =    13.208 min.
Effective stream area after confluence =      5.617(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =       7.38(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       18.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     14.479(CFS)
Depth of flow =   0.252(Ft.), Average velocity =   1.143(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      7.239(CFS)
  '     '    flow top width =     50.341(Ft.)
  '     '    velocity=    1.143(Ft/s)
  '     '    area =      6.335(Sq.Ft)
  '     '    Froude number =     0.568

Upstream point elevation =  1037.500(Ft.)
Downstream point elevation =  1031.500(Ft.)
Flow length =   711.000(Ft.)
Travel time  =   10.37 min.
Time of concentration =   23.58 min.
Depth of flow =   0.252(Ft.)
Average velocity =   1.143(Ft/s)
Total irregular channel flow =     7.239(CFS)
Irregular channel normal depth above invert elev. =   0.252(Ft.)
Average velocity of channel(s) =   1.143(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.424(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.406
Subarea runoff =      1.916(CFS) for    8.500(Ac.)
Total runoff =      8.152(CFS)
Effective area this stream =       14.12(Ac.)
Total Study Area (Main Stream No. 2) =       33.31(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.263(Ft.), Average velocity =   1.177(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       19.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_____________________________________________________________________
Estimated mean flow rate at midpoint of channel =     16.364(CFS)
Depth of flow =   0.277(Ft.), Average velocity =   1.063(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      8.182(CFS)
  '     '    flow top width =     55.497(Ft.)
  '     '    velocity=    1.063(Ft/s)
  '     '    area =      7.700(Sq.Ft)
  '     '    Froude number =     0.503

Upstream point elevation =  1031.500(Ft.)
Downstream point elevation =  1027.200(Ft.)
Flow length =   671.000(Ft.)
Travel time  =   10.52 min.
Time of concentration =   34.10 min.
Depth of flow =   0.277(Ft.)
Average velocity =   1.063(Ft/s)
Total irregular channel flow =     8.182(CFS)
Irregular channel normal depth above invert elev. =   0.277(Ft.)
Average velocity of channel(s) =   1.063(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      6.726(CFS)
therefore the upstream flow rate of Q =      8.152(CFS) is being used
Rainfall intensity =      1.141(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.283
Subarea runoff =      0.000(CFS) for    6.710(Ac.)
Total runoff =      8.152(CFS)
Effective area this stream =       20.83(Ac.)
Total Study Area (Main Stream No. 2) =       40.02(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.277(Ft.), Average velocity =   1.062(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       19.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     20.827(Ac.)
Runoff from this stream =      8.152(CFS)
Time of concentration =   34.10 min.
Rainfall intensity =     1.141(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     10.22    12.145     20.58    0.782      1.545
2      8.15    20.827     34.10    0.782      1.141
Qmax(1) =
         1.000 *    1.000 *    10.219) +
         2.126 *    0.603 *     8.152) + =      20.675
Qmax(2) =
         0.470 *    1.000 *    10.219) +
         1.000 *    1.000 *     8.152) + =      12.959

Total of 2 main streams to confluence:
Flow rates before confluence point:
      11.219       9.152
Maximum flow rates at confluence using above data:
       20.675       12.959
Area of streams before confluence:
       12.145       20.827
Effective area values after confluence:
       24.713       32.972


Results of confluence:
Total flow rate =     20.675(CFS)
Time of concentration =    20.579 min.
Effective stream area after confluence  =     24.713(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =      32.97(Ac.)
End of computations, Total Study Area =           40.02 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/07/21

- BLOOMINGTON COMMERCE CENTER - SITE 3
PROPOSED CONDITION
100-YEAR STORM EVENT ANALYSIS

-

Program License Serial Number 6405

-

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

-

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.998 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   470.000(Ft.)
Top (of initial area) elevation =  1046.500(Ft.)
Bottom (of initial area) elevation =  1036.600(Ft.)
Difference in elevation =     9.900(Ft.)
Slope =    0.02106  s(%)=       2.11
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.893 min.
Rainfall intensity =      2.635(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.633
Subarea runoff =      1.901(CFS)
Total initial stream area =        1.140(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.140(Ac.)
Runoff from this stream =      1.901(CFS)
Time of concentration =   11.89 min.
Rainfall intensity =     2.635(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.100 to Point/Station       10.200
**** 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 =   678.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1043.100(Ft.)
Difference in elevation =     4.100(Ft.)
Slope =    0.00605  s(%)=       0.60
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.457 min.
Rainfall intensity =      2.695(In/Hr) for a    25.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.867
Subarea runoff =      1.496(CFS)
Total initial stream area =        0.640(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       11.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.171(Ft.), Average velocity =   1.099(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      3.222(CFS)
  '     '    flow top width =     34.248(Ft.)
  '     '    velocity=    1.099(Ft/s)
  '     '    area =      2.932(Sq.Ft)
  '     '    Froude number =     0.662

Upstream point elevation =  1043.100(Ft.)
Downstream point elevation =  1036.600(Ft.)
Flow length =   718.000(Ft.)
Travel time  =   10.89 min.
Time of concentration =   22.35 min.
Depth of flow =   0.171(Ft.)
Average velocity =   1.099(Ft/s)
Total irregular channel flow =     3.221(CFS)
Irregular channel normal depth above invert elev. =   0.171(Ft.)
Average velocity of channel(s) =   1.099(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.805(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.555
Subarea runoff =      3.371(CFS) for    4.220(Ac.)
Total runoff =      4.868(CFS)
Effective area this stream =        4.86(Ac.)
Total Study Area (Main Stream No. 2) =        6.00(Ac.)
Area averaged Fm value =    0.692(In/Hr)
Depth of flow =   0.200(Ft.), Average velocity =   1.218(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       11.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.860(Ac.)
Runoff from this stream =      4.868(CFS)
Time of concentration =   22.35 min.
Rainfall intensity =     1.805(In/Hr)
Area averaged loss rate (Fm) =    0.6921(In/Hr)
Area averaged Pervious ratio (Ap) = 0.7078
Summary of stream data:

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


1      1.90     1.140     11.89    0.782      2.635
2      4.87     4.860     22.35    0.692      1.805
Qmax(1) =
         1.000 *    1.000 *     1.901) +
         1.746 *    0.532 *     4.868) + =       6.424
Qmax(2) =
         0.552 *    1.000 *     1.901) +
         1.000 *    1.000 *     4.868) + =       5.917

Total of 2 main streams to confluence:
Flow rates before confluence point:
       2.901       5.868
Maximum flow rates at confluence using above data:
        6.424        5.917
Area of streams before confluence:
        1.140        4.860
Effective area values after confluence:
        3.726        6.000


Results of confluence:
Total flow rate =      6.424(CFS)
Time of concentration =    11.893 min.
Effective stream area after confluence  =      3.726(Ac.)
Study area average Pervious fraction(Ap) =  0.725
Study area average soil loss rate(Fm) =    0.709(In/Hr)
Study area total =       6.00(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       22.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1036.600(Ft.)
End of street segment elevation =  1032.100(Ft.)
Length of street segment  =   390.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =      6.674(CFS)
Depth of flow =   0.319(Ft.), Average velocity =   2.517(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  11.201(Ft.)
Flow velocity =   2.52(Ft/s)
Travel time =    2.58 min.     TC =   14.48  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 =      2.342(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.661
Subarea runoff =      0.304(CFS) for    0.620(Ac.)
Total runoff =      6.729(CFS)
Effective area this stream =        4.35(Ac.)
Total Study Area (Main Stream No. 1) =        6.62(Ac.)
Area averaged Fm value =    0.622(In/Hr)
Street flow at end of street =      6.729(CFS)
Half street flow at end of street =      3.364(CFS)
Depth of flow =   0.320(Ft.), Average velocity =   2.522(Ft/s)
Flow width (from curb towards crown)=  11.238(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       22.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      4.346(Ac.)
Runoff from this stream =      6.729(CFS)
Time of concentration =   14.48 min.
Rainfall intensity =     2.342(In/Hr)
Area averaged loss rate (Fm) =    0.6220(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6361
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** 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)  = 32.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.978(In/Hr)
Initial subarea data:
Initial area flow distance =   381.000(Ft.)
Top (of initial area) elevation =  1044.900(Ft.)
Bottom (of initial area) elevation =  1043.900(Ft.)
Difference in elevation =     1.000(Ft.)
Slope =    0.00262  s(%)=       0.26
TC = k(0.950)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   33.595 min.
Rainfall intensity =      1.413(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.277
Subarea runoff =      0.145(CFS)
Total initial stream area =        0.370(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.978(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       16.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1042.000(Ft.)
Downstream point/station elevation =  1029.500(Ft.)
Pipe length  =   926.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.145(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.145(CFS)
Normal flow depth in pipe =    1.93(In.)
Flow top width inside pipe =    5.60(In.)
Critical Depth =    2.27(In.)
Pipe flow velocity =      2.67(Ft/s)
Travel time through pipe =    5.77 min.
Time of concentration (TC) =    39.37 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       16.200
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      0.370(Ac.)
Runoff from this stream =      0.145(CFS)
Time of concentration =   39.37 min.
Rainfall intensity =     1.285(In/Hr)
Area averaged loss rate (Fm) =    0.9778(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** 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)  = 32.00
Pervious ratio(Ap) = 0.4700     Max loss rate(Fm)=     0.460(In/Hr)
Initial subarea data:
Initial area flow distance =   204.000(Ft.)
Top (of initial area) elevation =  1046.200(Ft.)
Bottom (of initial area) elevation =  1040.700(Ft.)
Difference in elevation =     5.500(Ft.)
Slope =    0.02696  s(%)=       2.70
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.749 min.
Rainfall intensity =      3.702(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.788
Subarea runoff =      1.372(CFS)
Total initial stream area =        0.470(Ac.)
Pervious area fraction = 0.470
Initial area Fm value =    0.460(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       16.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1040.700(Ft.)
Downstream point elevation =  1036.600(Ft.)
Channel length thru subarea  =   792.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   0.020
Slope or 'Z' of right channel bank =   0.020
Estimated mean flow rate at midpoint of channel =     11.840(CFS)
Manning's 'N'    = 0.005
Maximum depth of channel  =    3.770(Ft.)
Flow(q) thru subarea =     11.840(CFS)
Depth of flow =  12.321(Ft.), Average velocity =   7.523(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =    0.151(Ft.)
Flow Velocity =    7.52(Ft/s)
Travel time  =    1.75 min.
Time of concentration =    8.50 min.
Critical depth =      7.625(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
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 =      3.223(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.867
Subarea runoff =     20.865(CFS) for    7.490(Ac.)
Total runoff =     22.237(CFS)
Effective area this stream =        7.96(Ac.)
Total Study Area (Main Stream No. 2) =       14.95(Ac.)
Area averaged Fm value =    0.119(In/Hr)
Depth of flow =  17.118(Ft.), Average velocity =   9.680(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth =     10.625(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       16.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =  1034.600(Ft.)
Downstream point/station elevation =  1029.600(Ft.)
Pipe length  =   157.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    22.237(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    22.237(CFS)
Normal flow depth in pipe =   14.04(In.)
Flow top width inside pipe =   19.77(In.)
Critical Depth =   19.70(In.)
Pipe flow velocity =     13.02(Ft/s)
Travel time through pipe =    0.20 min.
Time of concentration (TC) =     8.70 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       16.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =  1029.600(Ft.)
Downstream point/station elevation =  1029.500(Ft.)
Pipe length  =    45.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    22.237(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    22.237(CFS)
Normal flow depth in pipe =   24.28(In.)
Flow top width inside pipe =   29.10(In.)
Critical Depth =   18.69(In.)
Pipe flow velocity =      4.74(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =     8.86 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       16.200
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      7.960(Ac.)
Runoff from this stream =     22.237(CFS)
Time of concentration =    8.86 min.
Rainfall intensity =     3.144(In/Hr)
Area averaged loss rate (Fm) =    0.1191(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1218
Summary of stream data:

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


1      0.15     0.370     39.37    0.978      1.285
2     22.24     7.960      8.86    0.119      3.144
Qmax(1) =
         1.000 *    1.000 *     0.145) +
         0.385 *    1.000 *    22.237) + =       8.716
Qmax(2) =
         7.049 *    0.225 *     0.145) +
         1.000 *    1.000 *    22.237) + =      22.467

Total of 2 streams to confluence:
Flow rates before confluence point:
       0.145      22.237
Maximum flow rates at confluence using above data:
        8.716       22.467
Area of streams before confluence:
        0.370        7.960
Effective area values after confluence:
        8.330        8.043
Results of confluence:
Total flow rate =     22.467(CFS)
Time of concentration =     8.862 min.
Effective stream area after confluence =      8.043(Ac.)
Study area average Pervious fraction(Ap) =  0.161
Study area average soil loss rate(Fm) =    0.157(In/Hr)
Study area total (this main stream) =       8.33(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.200 to Point/Station       20.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =  1029.500(Ft.)
Downstream point/station elevation =  1027.500(Ft.)
Pipe length  =   217.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    22.467(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    22.467(CFS)
Normal flow depth in pipe =   17.53(In.)
Flow top width inside pipe =   25.77(In.)
Critical Depth =   19.91(In.)
Pipe flow velocity =      8.22(Ft/s)
Travel time through pipe =    0.44 min.
Time of concentration (TC) =     9.30 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.200 to Point/Station       20.100
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      8.043(Ac.)
Runoff from this stream =     22.467(CFS)
Time of concentration =    9.30 min.
Rainfall intensity =     3.054(In/Hr)
Area averaged loss rate (Fm) =    0.1573(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1609
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       18.000
**** 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)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Initial subarea data:
Initial area flow distance =   725.000(Ft.)
Top (of initial area) elevation =  1045.400(Ft.)
Bottom (of initial area) elevation =  1039.200(Ft.)
Difference in elevation =     6.200(Ft.)
Slope =    0.00855  s(%)=       0.86
TC = k(0.299)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.805 min.
Rainfall intensity =      2.792(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.868
Subarea runoff =      4.752(CFS)
Total initial stream area =        1.960(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       20.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1035.200(Ft.)
Downstream point/station elevation =  1027.500(Ft.)
Pipe length  =   257.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.752(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.752(CFS)
Normal flow depth in pipe =    7.90(In.)
Flow top width inside pipe =   11.38(In.)
Critical Depth =   10.83(In.)
Pipe flow velocity =      8.66(Ft/s)
Travel time through pipe =    0.49 min.
Time of concentration (TC) =    11.30 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       20.100
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.960(Ac.)
Runoff from this stream =      4.752(CFS)
Time of concentration =   11.30 min.
Rainfall intensity =     2.718(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       19.300 to Point/Station       20.000
**** 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 =   597.000(Ft.)
Top (of initial area) elevation =  1040.600(Ft.)
Bottom (of initial area) elevation =  1035.200(Ft.)
Difference in elevation =     5.400(Ft.)
Slope =    0.00905  s(%)=       0.90
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.046 min.
Rainfall intensity =      2.916(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.870
Subarea runoff =     12.734(CFS)
Total initial stream area =        5.020(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       20.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1031.200(Ft.)
Downstream point/station elevation =  1027.500(Ft.)
Pipe length  =   111.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.734(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    12.734(CFS)
Normal flow depth in pipe =   10.71(In.)
Flow top width inside pipe =   17.67(In.)
Critical Depth =   16.10(In.)
Pipe flow velocity =     11.61(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =    10.21 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       20.100
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 3
Stream flow area =      5.020(Ac.)
Runoff from this stream =     12.734(CFS)
Time of concentration =   10.21 min.
Rainfall intensity =     2.889(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     22.47     8.043      9.30    0.157      3.054
2      4.75     1.960     11.30    0.098      2.718
3     12.73     5.020     10.21    0.098      2.889
Qmax(1) =
         1.000 *    1.000 *    22.467) +
         1.128 *    0.823 *     4.752) +
         1.059 *    0.912 *    12.734) + =      39.175
Qmax(2) =
         0.884 *    1.000 *    22.467) +
         1.000 *    1.000 *     4.752) +
         0.939 *    1.000 *    12.734) + =      36.562
Qmax(3) =
         0.943 *    1.000 *    22.467) +
         1.065 *    0.903 *     4.752) +
         1.000 *    1.000 *    12.734) + =      38.493

Total of 3 streams to confluence:
Flow rates before confluence point:
      22.467       4.752      12.734
Maximum flow rates at confluence using above data:
       39.175       36.562       38.493
Area of streams before confluence:
        8.043        1.960        5.020
Effective area values after confluence:
       14.233       15.023       14.833
Results of confluence:
Total flow rate =     39.175(CFS)
Time of concentration =     9.302 min.
Effective stream area after confluence =     14.233(Ac.)
Study area average Pervious fraction(Ap) =  0.133
Study area average soil loss rate(Fm) =    0.130(In/Hr)
Study area total (this main stream) =      15.02(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.100 to Point/Station       22.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1027.500(Ft.)
Downstream point/station elevation =  1026.810(Ft.)
Pipe length  =   139.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    39.175(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    39.175(CFS)
Normal flow depth in pipe =   25.13(In.)
Flow top width inside pipe =   33.06(In.)
Critical Depth =   24.44(In.)
Pipe flow velocity =      7.44(Ft/s)
Travel time through pipe =    0.31 min.
Time of concentration (TC) =     9.61 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.100 to Point/Station       22.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     14.233(Ac.)
Runoff from this stream =     39.175(CFS)
Time of concentration =    9.61 min.
Rainfall intensity =     2.994(In/Hr)
Area averaged loss rate (Fm) =    0.1296(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1326
Summary of stream data:

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


1      6.73     4.346     14.48    0.622      2.342
2     39.18    14.233      9.61    0.130      2.994
Qmax(1) =
         1.000 *    1.000 *     6.729) +
         0.772 *    1.000 *    39.175) + =      36.988
Qmax(2) =
         1.379 *    0.664 *     6.729) +
         1.000 *    1.000 *    39.175) + =      45.338

Total of 2 main streams to confluence:
Flow rates before confluence point:
       7.729      40.175
Maximum flow rates at confluence using above data:
       36.988       45.338
Area of streams before confluence:
        4.346       14.233
Effective area values after confluence:
       18.579       17.119


Results of confluence:
Total flow rate =     45.338(CFS)
Time of concentration =     9.614 min.
Effective stream area after confluence  =     17.119(Ac.)
Study area average Pervious fraction(Ap) =  0.250
Study area average soil loss rate(Fm) =    0.245(In/Hr)
Study area total =      18.58(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       43.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of street segment elevation =  1032.100(Ft.)
End of street segment elevation =  1026.300(Ft.)
Length of street segment  =   532.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =     45.400(CFS)
Depth of flow =   0.572(Ft.), Average velocity =   3.946(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  23.836(Ft.)
Flow velocity =   3.95(Ft/s)
Travel time =    2.25 min.     TC =   11.86  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)
The area added to the existing stream causes a
a lower flow rate of Q =     38.614(CFS)
therefore the upstream flow rate of Q =     45.338(CFS) is being used
Rainfall intensity =      2.640(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.819
Subarea runoff =      0.000(CFS) for    0.750(Ac.)
Total runoff =     45.338(CFS)
Effective area this stream =       17.87(Ac.)
Total Study Area (Main Stream No. 1) =       22.68(Ac.)
Area averaged Fm value =    0.239(In/Hr)
Street flow at end of street =     45.338(CFS)
Half street flow at end of street =     22.669(CFS)
Depth of flow =   0.571(Ft.), Average velocity =   3.944(Ft/s)
Flow width (from curb towards crown)=  23.824(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       43.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     17.869(Ac.)
Runoff from this stream =     45.338(CFS)
Time of concentration =   11.86 min.
Rainfall intensity =     2.640(In/Hr)
Area averaged loss rate (Fm) =    0.2386(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2441
Program is now starting with Main Stream No. 2


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Process from Point/Station       30.000 to Point/Station       31.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   501.000(Ft.)
Top (of initial area) elevation =  1044.900(Ft.)
Bottom (of initial area) elevation =  1040.900(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.00798  s(%)=       0.80
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.814 min.
Rainfall intensity =      2.310(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.595
Subarea runoff =      4.441(CFS)
Total initial stream area =        3.230(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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Process from Point/Station       31.000 to Point/Station       32.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____________________________________________________________________________
Upstream point elevation =  1040.900(Ft.)
Downstream point elevation =  1037.800(Ft.)
Channel length thru subarea  =   603.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   0.010
Slope or 'Z' of right channel bank =   0.010
Estimated mean flow rate at midpoint of channel =      7.045(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.500(Ft.)
Flow(q) thru subarea =      7.045(CFS)
Depth of flow =  52.224(Ft.), Average velocity =   4.562(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =    0.030(Ft.)
Flow Velocity =    4.56(Ft/s)
Travel time  =    2.20 min.
Time of concentration =   17.02 min.
Critical depth =     12.750(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
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 =      2.126(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.713
Subarea runoff =      5.268(CFS) for    3.180(Ac.)
Total runoff =      9.709(CFS)
Effective area this stream =        6.41(Ac.)
Total Study Area (Main Stream No. 2) =       29.09(Ac.)
Area averaged Fm value =    0.443(In/Hr)
Depth of flow =  63.149(Ft.), Average velocity =   5.187(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth =     15.500(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       32.000 to Point/Station       34.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1037.800(Ft.)
Downstream point elevation =  1027.900(Ft.)
Channel length thru subarea  =  1246.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   0.010
Slope or 'Z' of right channel bank =   0.010
Estimated mean flow rate at midpoint of channel =     13.348(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     13.348(CFS)
Depth of flow =  56.775(Ft.), Average velocity =   5.983(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =    0.040(Ft.)
Flow Velocity =    5.98(Ft/s)
Travel time  =    3.47 min.
Time of concentration =   20.49 min.
Critical depth =     16.125(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
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 =      1.902(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.764
Subarea runoff =      7.182(CFS) for    5.220(Ac.)
Total runoff =     16.891(CFS)
Effective area this stream =       11.63(Ac.)
Total Study Area (Main Stream No. 2) =       34.31(Ac.)
Area averaged Fm value =    0.288(In/Hr)
Depth of flow =  65.236(Ft.), Average velocity =   6.574(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth =     18.750(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       34.000 to Point/Station       37.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1024.900(Ft.)
Downstream point/station elevation =  1022.000(Ft.)
Pipe length  =    47.61(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.891(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    16.891(CFS)
Normal flow depth in pipe =   10.59(In.)
Flow top width inside pipe =   17.72(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.63(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    20.54 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       34.000 to Point/Station       37.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     11.630(Ac.)
Runoff from this stream =     16.891(CFS)
Time of concentration =   20.54 min.
Rainfall intensity =     1.899(In/Hr)
Area averaged loss rate (Fm) =    0.2879(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2944


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       35.000 to Point/Station       36.000
**** 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)  = 32.00
Pervious ratio(Ap) = 0.2500     Max loss rate(Fm)=     0.244(In/Hr)
Initial subarea data:
Initial area flow distance =   639.000(Ft.)
Top (of initial area) elevation =  1033.900(Ft.)
Bottom (of initial area) elevation =  1029.000(Ft.)
Difference in elevation =     4.900(Ft.)
Slope =    0.00767  s(%)=       0.77
TC = k(0.336)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.798 min.
Rainfall intensity =      2.648(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.817
Subarea runoff =      2.293(CFS)
Total initial stream area =        1.060(Ac.)
Pervious area fraction = 0.250
Initial area Fm value =    0.244(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       36.000 to Point/Station       37.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1026.000(Ft.)
Downstream point/station elevation =  1022.000(Ft.)
Pipe length  =    41.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.293(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.293(CFS)
Normal flow depth in pipe =    4.20(In.)
Flow top width inside pipe =    8.98(In.)
Critical Depth =    8.10(In.)
Pipe flow velocity =     11.35(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    11.86 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       36.000 to Point/Station       37.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.060(Ac.)
Runoff from this stream =      2.293(CFS)
Time of concentration =   11.86 min.
Rainfall intensity =     2.640(In/Hr)
Area averaged loss rate (Fm) =    0.2445(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2500


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Process from Point/Station       40.000 to Point/Station       41.000
**** 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)  = 32.00
Pervious ratio(Ap) = 0.3000     Max loss rate(Fm)=     0.293(In/Hr)
Initial subarea data:
Initial area flow distance =   587.000(Ft.)
Top (of initial area) elevation =  1036.200(Ft.)
Bottom (of initial area) elevation =  1029.600(Ft.)
Difference in elevation =     6.600(Ft.)
Slope =    0.01124  s(%)=       1.12
TC = k(0.348)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.951 min.
Rainfall intensity =      2.769(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.805
Subarea runoff =      8.423(CFS)
Total initial stream area =        3.780(Ac.)
Pervious area fraction = 0.300
Initial area Fm value =    0.293(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       41.000 to Point/Station       37.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1026.600(Ft.)
Downstream point/station elevation =  1022.000(Ft.)
Pipe length  =    99.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.423(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     8.423(CFS)
Normal flow depth in pipe =    8.41(In.)
Flow top width inside pipe =   14.89(In.)
Critical Depth =   13.61(In.)
Pipe flow velocity =     11.88(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =    11.09 min.
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       41.000 to Point/Station       37.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 3
Stream flow area =      3.780(Ac.)
Runoff from this stream =      8.423(CFS)
Time of concentration =   11.09 min.
Rainfall intensity =     2.748(In/Hr)
Area averaged loss rate (Fm) =    0.2933(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3000
Summary of stream data:

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


1     16.89    11.630     20.54    0.288      1.899
2      2.29     1.060     11.86    0.244      2.640
3      8.42     3.780     11.09    0.293      2.748
Qmax(1) =
         1.000 *    1.000 *    16.891) +
         0.691 *    1.000 *     2.293) +
         0.654 *    1.000 *     8.423) + =      23.983
Qmax(2) =
         1.460 *    0.577 *    16.891) +
         1.000 *    1.000 *     2.293) +
         0.956 *    1.000 *     8.423) + =      24.584
Qmax(3) =
         1.527 *    0.540 *    16.891) +
         1.045 *    0.935 *     2.293) +
         1.000 *    1.000 *     8.423) + =      24.594

Total of 3 streams to confluence:
Flow rates before confluence point:
      16.891       2.293       8.423
Maximum flow rates at confluence using above data:
       23.983       24.584       24.594
Area of streams before confluence:
       11.630        1.060        3.780
Effective area values after confluence:
       16.470       11.555       11.051
Results of confluence:
Total flow rate =     24.594(CFS)
Time of concentration =    11.090 min.
Effective stream area after confluence =     11.051(Ac.)
Study area average Pervious fraction(Ap) =  0.293
Study area average soil loss rate(Fm) =    0.286(In/Hr)
Study area total (this main stream) =      16.47(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       37.000 to Point/Station       43.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1022.000(Ft.)
Downstream point/station elevation =  1021.600(Ft.)
Pipe length  =    80.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.594(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    24.594(CFS)
Normal flow depth in pipe =   21.21(In.)
Flow top width inside pipe =   27.31(In.)
Critical Depth =   20.27(In.)
Pipe flow velocity =      6.63(Ft/s)
Travel time through pipe =    0.20 min.
Time of concentration (TC) =    11.29 min.
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       37.000 to Point/Station       43.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     11.051(Ac.)
Runoff from this stream =     24.594(CFS)
Time of concentration =   11.29 min.
Rainfall intensity =     2.719(In/Hr)
Area averaged loss rate (Fm) =    0.2863(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2928
Summary of stream data:

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


1     45.34    17.869     11.86    0.239      2.640
2     24.59    11.051     11.29    0.286      2.719
Qmax(1) =
         1.000 *    1.000 *    45.338) +
         0.967 *    1.000 *    24.594) + =      69.132
Qmax(2) =
         1.033 *    0.952 *    45.338) +
         1.000 *    1.000 *    24.594) + =      69.177

Total of 2 main streams to confluence:
Flow rates before confluence point:
      46.338      25.594
Maximum flow rates at confluence using above data:
       69.132       69.177
Area of streams before confluence:
       17.869       11.051
Effective area values after confluence:
       28.920       28.062


Results of confluence:
Total flow rate =     69.177(CFS)
Time of concentration =    11.291 min.
Effective stream area after confluence  =     28.062(Ac.)
Study area average Pervious fraction(Ap) =  0.263
Study area average soil loss rate(Fm) =    0.257(In/Hr)
Study area total =      28.92(Ac.)
End of computations, Total Study Area =           39.15 (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) = 0.290
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/07/21

BLOOMINGTON COMMERCE CENTER - SITE 3
EXISITNG CONDITION
10-YEAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.813 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   622.000(Ft.)
Top (of initial area) elevation =  1042.100(Ft.)
Bottom (of initial area) elevation =  1035.400(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.01077  s(%)=       1.08
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.214 min.
Rainfall intensity =      1.852(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.520
Subarea runoff =      1.175(CFS)
Total initial stream area =        1.220(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.220(Ac.)
Runoff from this stream =      1.175(CFS)
Time of concentration =   15.21 min.
Rainfall intensity =     1.852(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1045.300(Ft.)
Bottom (of initial area) elevation =  1035.400(Ft.)
Difference in elevation =     9.900(Ft.)
Slope =    0.00990  s(%)=       0.99
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.709 min.
Rainfall intensity =      1.636(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.470
Subarea runoff =      4.087(CFS)
Total initial stream area =        5.320(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.320(Ac.)
Runoff from this stream =      4.087(CFS)
Time of concentration =   18.71 min.
Rainfall intensity =     1.636(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      1.17     1.220     15.21    0.782      1.852
2      4.09     5.320     18.71    0.782      1.636
Qmax(1) =
         1.000 *    1.000 *     1.175) +
         1.253 *    0.813 *     4.087) + =       5.340
Qmax(2) =
         0.798 *    1.000 *     1.175) +
         1.000 *    1.000 *     4.087) + =       5.025

Total of 2 main streams to confluence:
Flow rates before confluence point:
       2.175       5.087
Maximum flow rates at confluence using above data:
        5.340        5.025
Area of streams before confluence:
        1.220        5.320
Effective area values after confluence:
        5.546        6.540


Results of confluence:
Total flow rate =      5.340(CFS)
Time of concentration =    15.214 min.
Effective stream area after confluence  =      5.546(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =       6.54(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       15.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1035.400(Ft.)
End of street segment elevation =  1031.400(Ft.)
Length of street segment  =   377.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =      5.402(CFS)
Depth of flow =   0.304(Ft.), Average velocity =   2.317(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.462(Ft.)
Flow velocity =   2.32(Ft/s)
Travel time =    2.71 min.     TC =   17.93  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      4.683(CFS)
therefore the upstream flow rate of Q =      5.340(CFS) is being used
Rainfall intensity =      1.678(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.481
Subarea runoff =      0.000(CFS) for    0.260(Ac.)
Total runoff =      5.340(CFS)
Effective area this stream =        5.81(Ac.)
Total Study Area (Main Stream No. 1) =        6.80(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Street flow at end of street =      5.340(CFS)
Half street flow at end of street =      2.670(CFS)
Depth of flow =   0.303(Ft.), Average velocity =   2.311(Ft/s)
Flow width (from curb towards crown)=  10.412(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.806(Ac.)
Runoff from this stream =      5.340(CFS)
Time of concentration =   17.93 min.
Rainfall intensity =     1.678(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   697.000(Ft.)
Top (of initial area) elevation =  1046.900(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     7.800(Ft.)
Slope =    0.01119  s(%)=       1.12
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.801 min.
Rainfall intensity =      1.810(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.511
Subarea runoff =      2.683(CFS)
Total initial stream area =        2.900(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      6.806(CFS)
Depth of flow =   0.188(Ft.), Average velocity =   0.967(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      3.403(CFS)
  '     '    flow top width =     37.518(Ft.)
  '     '    velocity=    0.967(Ft/s)
  '     '    area =      3.519(Sq.Ft)
  '     '    Froude number =     0.556

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1031.400(Ft.)
Flow length =   861.000(Ft.)
Travel time  =   14.84 min.
Time of concentration =   30.64 min.
Depth of flow =   0.188(Ft.)
Average velocity =   0.967(Ft/s)
Total irregular channel flow =     3.403(CFS)
Irregular channel normal depth above invert elev. =   0.188(Ft.)
Average velocity of channel(s) =   0.967(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.217(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.321
Subarea runoff =      1.360(CFS) for    7.440(Ac.)
Total runoff =      4.043(CFS)
Effective area this stream =       10.34(Ac.)
Total Study Area (Main Stream No. 2) =       17.14(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.200(Ft.), Average velocity =   1.010(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     10.340(Ac.)
Runoff from this stream =      4.043(CFS)
Time of concentration =   30.64 min.
Rainfall intensity =     1.217(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      5.34     5.806     17.93    0.782      1.678
2      4.04    10.340     30.64    0.782      1.217
Qmax(1) =
         1.000 *    1.000 *     5.340) +
         2.063 *    0.585 *     4.043) + =      10.219
Qmax(2) =
         0.485 *    1.000 *     5.340) +
         1.000 *    1.000 *     4.043) + =       6.632

Total of 2 main streams to confluence:
Flow rates before confluence point:
       6.340       5.043
Maximum flow rates at confluence using above data:
       10.219        6.632
Area of streams before confluence:
        5.806       10.340
Effective area values after confluence:
       11.855       16.146


Results of confluence:
Total flow rate =     10.219(CFS)
Time of concentration =    17.925 min.
Effective stream area after confluence  =     11.855(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =      16.15(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       19.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1031.400(Ft.)
End of street segment elevation =  1027.200(Ft.)
Length of street segment  =   419.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(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 =     10.281(CFS)
Depth of flow =   0.261(Ft.), Average velocity =   2.632(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  14.029(Ft.)
Flow velocity =   2.63(Ft/s)
Travel time =    2.65 min.     TC =   20.58  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      8.337(CFS)
therefore the upstream flow rate of Q =     10.219(CFS) is being used
Rainfall intensity =      1.545(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.444
Subarea runoff =      0.000(CFS) for    0.290(Ac.)
Total runoff =     10.219(CFS)
Effective area this stream =       12.14(Ac.)
Total Study Area (Main Stream No. 1) =       17.43(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Street flow at end of street =     10.219(CFS)
Half street flow at end of street =      5.109(CFS)
Depth of flow =   0.260(Ft.), Average velocity =   2.628(Ft/s)
Flow width (from curb towards crown)=  13.997(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       19.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     12.145(Ac.)
Runoff from this stream =     10.219(CFS)
Time of concentration =   20.58 min.
Rainfall intensity =     1.545(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   966.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1037.500(Ft.)
Difference in elevation =     9.700(Ft.)
Slope =    0.01004  s(%)=       1.00
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.399 min.
Rainfall intensity =      1.652(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.474
Subarea runoff =      4.894(CFS)
Total initial stream area =        6.250(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      6.250(Ac.)
Runoff from this stream =      4.894(CFS)
Time of concentration =   18.40 min.
Rainfall intensity =     1.652(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   489.000(Ft.)
Top (of initial area) elevation =  1044.100(Ft.)
Bottom (of initial area) elevation =  1037.500(Ft.)
Difference in elevation =     6.600(Ft.)
Slope =    0.01350  s(%)=       1.35
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.208 min.
Rainfall intensity =      2.016(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.551
Subarea runoff =      1.255(CFS)
Total initial stream area =        1.130(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       17.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.130(Ac.)
Runoff from this stream =      1.255(CFS)
Time of concentration =   13.21 min.
Rainfall intensity =     2.016(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      4.89     6.250     18.40    0.782      1.652
2      1.25     1.130     13.21    0.782      2.016
Qmax(1) =
         1.000 *    1.000 *     4.894) +
         0.705 *    1.000 *     1.255) + =       5.779
Qmax(2) =
         1.418 *    0.718 *     4.894) +
         1.000 *    1.000 *     1.255) + =       6.236

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.894       1.255
Maximum flow rates at confluence using above data:
        5.779        6.236
Area of streams before confluence:
        6.250        1.130
Effective area values after confluence:
        7.380        5.617
Results of confluence:
Total flow rate =      6.236(CFS)
Time of concentration =    13.208 min.
Effective stream area after confluence =      5.617(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =       7.38(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       18.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     14.479(CFS)
Depth of flow =   0.252(Ft.), Average velocity =   1.143(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      7.239(CFS)
  '     '    flow top width =     50.341(Ft.)
  '     '    velocity=    1.143(Ft/s)
  '     '    area =      6.335(Sq.Ft)
  '     '    Froude number =     0.568

Upstream point elevation =  1037.500(Ft.)
Downstream point elevation =  1031.500(Ft.)
Flow length =   711.000(Ft.)
Travel time  =   10.37 min.
Time of concentration =   23.58 min.
Depth of flow =   0.252(Ft.)
Average velocity =   1.143(Ft/s)
Total irregular channel flow =     7.239(CFS)
Irregular channel normal depth above invert elev. =   0.252(Ft.)
Average velocity of channel(s) =   1.143(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.424(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.406
Subarea runoff =      1.916(CFS) for    8.500(Ac.)
Total runoff =      8.152(CFS)
Effective area this stream =       14.12(Ac.)
Total Study Area (Main Stream No. 2) =       33.31(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.263(Ft.), Average velocity =   1.177(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       19.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =     16.364(CFS)
Depth of flow =   0.277(Ft.), Average velocity =   1.063(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
--------------------------------------------------------------
Sub-Channel flow  =      8.182(CFS)
  '     '    flow top width =     55.497(Ft.)
  '     '    velocity=    1.063(Ft/s)
  '     '    area =      7.700(Sq.Ft)
  '     '    Froude number =     0.503

Upstream point elevation =  1031.500(Ft.)
Downstream point elevation =  1027.200(Ft.)
Flow length =   671.000(Ft.)
Travel time  =   10.52 min.
Time of concentration =   34.10 min.
Depth of flow =   0.277(Ft.)
Average velocity =   1.063(Ft/s)
Total irregular channel flow =     8.182(CFS)
Irregular channel normal depth above invert elev. =   0.277(Ft.)
Average velocity of channel(s) =   1.063(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      6.726(CFS)
therefore the upstream flow rate of Q =      8.152(CFS) is being used
Rainfall intensity =      1.141(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.283
Subarea runoff =      0.000(CFS) for    6.710(Ac.)
Total runoff =      8.152(CFS)
Effective area this stream =       20.83(Ac.)
Total Study Area (Main Stream No. 2) =       40.02(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.277(Ft.), Average velocity =   1.062(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       19.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     20.827(Ac.)
Runoff from this stream =      8.152(CFS)
Time of concentration =   34.10 min.
Rainfall intensity =     1.141(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     10.22    12.145     20.58    0.782      1.545
2      8.15    20.827     34.10    0.782      1.141
Qmax(1) =
         1.000 *    1.000 *    10.219) +
         2.126 *    0.603 *     8.152) + =      20.675
Qmax(2) =
         0.470 *    1.000 *    10.219) +
         1.000 *    1.000 *     8.152) + =      12.959

Total of 2 main streams to confluence:
Flow rates before confluence point:
      11.219       9.152
Maximum flow rates at confluence using above data:
       20.675       12.959
Area of streams before confluence:
       12.145       20.827
Effective area values after confluence:
       24.713       32.972


Results of confluence:
Total flow rate =     20.675(CFS)
Time of concentration =    20.579 min.
Effective stream area after confluence  =     24.713(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =      32.97(Ac.)
End of computations, Total Study Area =           40.02 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/20/21

BLOOMINGTON COMMERCE CENTER
EXISTING CONDITION
10-YEAR STORM ANALYSIS WITH ADJUSTED 5 YEAR RAINFALL DATA

Program License Serial Number 6405

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.680 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   622.000(Ft.)
Top (of initial area) elevation =  1042.100(Ft.)
Bottom (of initial area) elevation =  1035.400(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.01077  s(%)=       1.08
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.214 min.
Rainfall intensity =      1.549(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.446
Subarea runoff =      0.842(CFS)
Total initial stream area =        1.220(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.220(Ac.)
Runoff from this stream =      0.842(CFS)
Time of concentration =   15.21 min.
Rainfall intensity =     1.549(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =  1045.300(Ft.)
Bottom (of initial area) elevation =  1035.400(Ft.)
Difference in elevation =     9.900(Ft.)
Slope =    0.00990  s(%)=       0.99
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.709 min.
Rainfall intensity =      1.368(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.385
Subarea runoff =      2.806(CFS)
Total initial stream area =        5.320(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.320(Ac.)
Runoff from this stream =      2.806(CFS)
Time of concentration =   18.71 min.
Rainfall intensity =     1.368(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      0.84     1.220     15.21    0.782      1.549
2      2.81     5.320     18.71    0.782      1.368
Qmax(1) =
         1.000 *    1.000 *     0.842) +
         1.308 *    0.813 *     2.806) + =       3.827
Qmax(2) =
         0.764 *    1.000 *     0.842) +
         1.000 *    1.000 *     2.806) + =       3.449

Total of 2 main streams to confluence:
Flow rates before confluence point:
       1.842       3.806
Maximum flow rates at confluence using above data:
        3.827        3.449
Area of streams before confluence:
        1.220        5.320
Effective area values after confluence:
        5.546        6.540


Results of confluence:
Total flow rate =      3.827(CFS)
Time of concentration =    15.214 min.
Effective stream area after confluence  =      5.546(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =       6.54(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       15.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1035.400(Ft.)
End of street segment elevation =  1031.400(Ft.)
Length of street segment  =   377.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =      3.917(CFS)
Depth of flow =   0.278(Ft.), Average velocity =   2.147(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   9.171(Ft.)
Flow velocity =   2.15(Ft/s)
Travel time =    2.93 min.     TC =   18.14  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      3.196(CFS)
therefore the upstream flow rate of Q =      3.827(CFS) is being used
Rainfall intensity =      1.394(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.395
Subarea runoff =      0.000(CFS) for    0.260(Ac.)
Total runoff =      3.827(CFS)
Effective area this stream =        5.81(Ac.)
Total Study Area (Main Stream No. 1) =        6.80(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Street flow at end of street =      3.827(CFS)
Half street flow at end of street =      1.914(CFS)
Depth of flow =   0.277(Ft.), Average velocity =   2.135(Ft/s)
Flow width (from curb towards crown)=   9.084(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.806(Ac.)
Runoff from this stream =      3.827(CFS)
Time of concentration =   18.14 min.
Rainfall intensity =     1.394(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   697.000(Ft.)
Top (of initial area) elevation =  1046.900(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     7.800(Ft.)
Slope =    0.01119  s(%)=       1.12
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.801 min.
Rainfall intensity =      1.514(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.435
Subarea runoff =      1.910(CFS)
Total initial stream area =        2.900(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      3.920(CFS)
Depth of flow =   0.153(Ft.), Average velocity =   0.842(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      1.960(CFS)
  '     '    flow top width =     30.507(Ft.)
  '     '    velocity=    0.842(Ft/s)
  '     '    area =      2.327(Sq.Ft)
  '     '    Froude number =     0.538

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1031.400(Ft.)
Flow length =   861.000(Ft.)
Travel time  =   17.04 min.
Time of concentration =   32.84 min.
Depth of flow =   0.153(Ft.)
Average velocity =   0.842(Ft/s)
Total irregular channel flow =     1.960(CFS)
Irregular channel normal depth above invert elev. =   0.153(Ft.)
Average velocity of channel(s) =   0.842(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      1.817(CFS)
therefore the upstream flow rate of Q =      1.910(CFS) is being used
Rainfall intensity =      0.976(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.180
Subarea runoff =      0.000(CFS) for    7.440(Ac.)
Total runoff =      1.910(CFS)
Effective area this stream =       10.34(Ac.)
Total Study Area (Main Stream No. 2) =       17.14(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.151(Ft.), Average velocity =   0.837(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     10.340(Ac.)
Runoff from this stream =      1.910(CFS)
Time of concentration =   32.84 min.
Rainfall intensity =     0.976(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      3.83     5.806     18.14    0.782      1.394
2      1.91    10.340     32.84    0.782      0.976
Qmax(1) =
         1.000 *    1.000 *     3.827) +
         3.151 *    0.552 *     1.910) + =       7.154
Qmax(2) =
         0.317 *    1.000 *     3.827) +
         1.000 *    1.000 *     1.910) + =       3.125

Total of 2 main streams to confluence:
Flow rates before confluence point:
       4.827       2.910
Maximum flow rates at confluence using above data:
        7.154        3.125
Area of streams before confluence:
        5.806       10.340
Effective area values after confluence:
       11.519       16.146


Results of confluence:
Total flow rate =      7.154(CFS)
Time of concentration =    18.141 min.
Effective stream area after confluence  =     11.519(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =      16.15(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       19.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1031.400(Ft.)
End of street segment elevation =  1027.200(Ft.)
Length of street segment  =   419.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(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 =      7.244(CFS)
Depth of flow =   0.227(Ft.), Average velocity =   2.410(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  12.319(Ft.)
Flow velocity =   2.41(Ft/s)
Travel time =    2.90 min.     TC =   21.04  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      5.239(CFS)
therefore the upstream flow rate of Q =      7.154(CFS) is being used
Rainfall intensity =      1.275(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.348
Subarea runoff =      0.000(CFS) for    0.290(Ac.)
Total runoff =      7.154(CFS)
Effective area this stream =       11.81(Ac.)
Total Study Area (Main Stream No. 1) =       17.43(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Street flow at end of street =      7.154(CFS)
Half street flow at end of street =      3.577(CFS)
Depth of flow =   0.226(Ft.), Average velocity =   2.402(Ft/s)
Flow width (from curb towards crown)=  12.262(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       19.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     11.809(Ac.)
Runoff from this stream =      7.154(CFS)
Time of concentration =   21.04 min.
Rainfall intensity =     1.275(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   966.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1037.500(Ft.)
Difference in elevation =     9.700(Ft.)
Slope =    0.01004  s(%)=       1.00
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.399 min.
Rainfall intensity =      1.382(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.391
Subarea runoff =      3.374(CFS)
Total initial stream area =        6.250(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      6.250(Ac.)
Runoff from this stream =      3.374(CFS)
Time of concentration =   18.40 min.
Rainfall intensity =     1.382(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   489.000(Ft.)
Top (of initial area) elevation =  1044.100(Ft.)
Bottom (of initial area) elevation =  1037.500(Ft.)
Difference in elevation =     6.600(Ft.)
Slope =    0.01350  s(%)=       1.35
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.208 min.
Rainfall intensity =      1.686(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.482
Subarea runoff =      0.919(CFS)
Total initial stream area =        1.130(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
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Process from Point/Station       16.100 to Point/Station       17.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.130(Ac.)
Runoff from this stream =      0.919(CFS)
Time of concentration =   13.21 min.
Rainfall intensity =     1.686(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      3.37     6.250     18.40    0.782      1.382
2      0.92     1.130     13.21    0.782      1.686
Qmax(1) =
         1.000 *    1.000 *     3.374) +
         0.664 *    1.000 *     0.919) + =       3.984
Qmax(2) =
         1.507 *    0.718 *     3.374) +
         1.000 *    1.000 *     0.919) + =       4.569

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.374       0.919
Maximum flow rates at confluence using above data:
        3.984        4.569
Area of streams before confluence:
        6.250        1.130
Effective area values after confluence:
        7.380        5.617
Results of confluence:
Total flow rate =      4.569(CFS)
Time of concentration =    13.208 min.
Effective stream area after confluence =      5.617(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =       7.38(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       18.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      9.417(CFS)
Depth of flow =   0.214(Ft.), Average velocity =   1.026(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      4.708(CFS)
  '     '    flow top width =     42.841(Ft.)
  '     '    velocity=    1.026(Ft/s)
  '     '    area =      4.588(Sq.Ft)
  '     '    Froude number =     0.553

Upstream point elevation =  1037.500(Ft.)
Downstream point elevation =  1031.500(Ft.)
Flow length =   711.000(Ft.)
Travel time  =   11.55 min.
Time of concentration =   24.76 min.
Depth of flow =   0.214(Ft.)
Average velocity =   1.026(Ft/s)
Total irregular channel flow =     4.708(CFS)
Irregular channel normal depth above invert elev. =   0.214(Ft.)
Average velocity of channel(s) =   1.026(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.157(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.291
Subarea runoff =      0.187(CFS) for    8.500(Ac.)
Total runoff =      4.756(CFS)
Effective area this stream =       14.12(Ac.)
Total Study Area (Main Stream No. 2) =       33.31(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.215(Ft.), Average velocity =   1.029(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       19.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      9.583(CFS)
Depth of flow =   0.227(Ft.), Average velocity =   0.930(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
--------------------------------------------------------------
Sub-Channel flow  =      4.792(CFS)
  '     '    flow top width =     45.407(Ft.)
  '     '    velocity=    0.930(Ft/s)
  '     '    area =      5.155(Sq.Ft)
  '     '    Froude number =     0.486

Upstream point elevation =  1031.500(Ft.)
Downstream point elevation =  1027.200(Ft.)
Flow length =   671.000(Ft.)
Travel time  =   12.03 min.
Time of concentration =   36.79 min.
Depth of flow =   0.227(Ft.)
Average velocity =   0.930(Ft/s)
Total irregular channel flow =     4.792(CFS)
Irregular channel normal depth above invert elev. =   0.227(Ft.)
Average velocity of channel(s) =   0.930(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      3.419(CFS)
therefore the upstream flow rate of Q =      4.756(CFS) is being used
Rainfall intensity =      0.912(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.180
Subarea runoff =      0.000(CFS) for    6.710(Ac.)
Total runoff =      4.756(CFS)
Effective area this stream =       20.83(Ac.)
Total Study Area (Main Stream No. 2) =       40.02(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.226(Ft.), Average velocity =   0.928(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       19.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     20.827(Ac.)
Runoff from this stream =      4.756(CFS)
Time of concentration =   36.79 min.
Rainfall intensity =     0.912(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      7.15    11.809     21.04    0.782      1.275
2      4.76    20.827     36.79    0.782      0.912
Qmax(1) =
         1.000 *    1.000 *     7.154) +
         3.800 *    0.572 *     4.756) + =      17.490
Qmax(2) =
         0.263 *    1.000 *     7.154) +
         1.000 *    1.000 *     4.756) + =       6.639

Total of 2 main streams to confluence:
Flow rates before confluence point:
       8.154       5.756
Maximum flow rates at confluence using above data:
       17.490        6.639
Area of streams before confluence:
       11.809       20.827
Effective area values after confluence:
       23.720       32.635


Results of confluence:
Total flow rate =     17.490(CFS)
Time of concentration =    21.038 min.
Effective stream area after confluence  =     23.720(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total =      32.64(Ac.)
End of computations, Total Study Area =           40.02 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/07/21

BLOOMINGTON COMMERCE CENTER - SITE 3
PROPOSED CONDITION
10-YEAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.813 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   470.000(Ft.)
Top (of initial area) elevation =  1046.500(Ft.)
Bottom (of initial area) elevation =  1036.600(Ft.)
Difference in elevation =     9.900(Ft.)
Slope =    0.02106  s(%)=       2.11
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.893 min.
Rainfall intensity =      2.147(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.572
Subarea runoff =      1.400(CFS)
Total initial stream area =        1.140(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.140(Ac.)
Runoff from this stream =      1.400(CFS)
Time of concentration =   11.89 min.
Rainfall intensity =     2.147(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Program is now starting with Main Stream No. 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.100 to Point/Station       10.200
**** 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 =   678.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1043.100(Ft.)
Difference in elevation =     4.100(Ft.)
Slope =    0.00605  s(%)=       0.60
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.457 min.
Rainfall intensity =      2.196(In/Hr) for a    10.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.860
Subarea runoff =      1.208(CFS)
Total initial stream area =        0.640(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       11.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.150(Ft.), Average velocity =   1.006(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      2.261(CFS)
  '     '    flow top width =     29.989(Ft.)
  '     '    velocity=    1.006(Ft/s)
  '     '    area =      2.248(Sq.Ft)
  '     '    Froude number =     0.647

Upstream point elevation =  1043.100(Ft.)
Downstream point elevation =  1036.600(Ft.)
Flow length =   718.000(Ft.)
Travel time  =   11.90 min.
Time of concentration =   23.36 min.
Depth of flow =   0.150(Ft.)
Average velocity =   1.006(Ft/s)
Total irregular channel flow =     2.261(CFS)
Irregular channel normal depth above invert elev. =   0.150(Ft.)
Average velocity of channel(s) =   1.006(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.432(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.465
Subarea runoff =      2.028(CFS) for    4.220(Ac.)
Total runoff =      3.236(CFS)
Effective area this stream =        4.86(Ac.)
Total Study Area (Main Stream No. 2) =        6.00(Ac.)
Area averaged Fm value =    0.692(In/Hr)
Depth of flow =   0.172(Ft.), Average velocity =   1.100(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       11.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.860(Ac.)
Runoff from this stream =      3.236(CFS)
Time of concentration =   23.36 min.
Rainfall intensity =     1.432(In/Hr)
Area averaged loss rate (Fm) =    0.6921(In/Hr)
Area averaged Pervious ratio (Ap) = 0.7078
Summary of stream data:

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


1      1.40     1.140     11.89    0.782      2.147
2      3.24     4.860     23.36    0.692      1.432
Qmax(1) =
         1.000 *    1.000 *     1.400) +
         1.966 *    0.509 *     3.236) + =       4.640
Qmax(2) =
         0.476 *    1.000 *     1.400) +
         1.000 *    1.000 *     3.236) + =       3.903

Total of 2 main streams to confluence:
Flow rates before confluence point:
       2.400       4.236
Maximum flow rates at confluence using above data:
        4.640        3.903
Area of streams before confluence:
        1.140        4.860
Effective area values after confluence:
        3.615        6.000


Results of confluence:
Total flow rate =      4.640(CFS)
Time of concentration =    11.893 min.
Effective stream area after confluence  =      3.615(Ac.)
Study area average Pervious fraction(Ap) =  0.725
Study area average soil loss rate(Fm) =    0.709(In/Hr)
Study area total =       6.00(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       22.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1036.600(Ft.)
End of street segment elevation =  1032.100(Ft.)
Length of street segment  =   390.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =      4.819(CFS)
Depth of flow =   0.291(Ft.), Average velocity =   2.328(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   9.817(Ft.)
Flow velocity =   2.33(Ft/s)
Travel time =    2.79 min.     TC =   14.69  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 =      1.892(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.605
Subarea runoff =      0.208(CFS) for    0.620(Ac.)
Total runoff =      4.848(CFS)
Effective area this stream =        4.23(Ac.)
Total Study Area (Main Stream No. 1) =        6.62(Ac.)
Area averaged Fm value =    0.620(In/Hr)
Street flow at end of street =      4.848(CFS)
Half street flow at end of street =      2.424(CFS)
Depth of flow =   0.292(Ft.), Average velocity =   2.331(Ft/s)
Flow width (from curb towards crown)=   9.841(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       22.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      4.235(Ac.)
Runoff from this stream =      4.848(CFS)
Time of concentration =   14.69 min.
Rainfall intensity =     1.892(In/Hr)
Area averaged loss rate (Fm) =    0.6197(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6338
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** 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)  = 32.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.978(In/Hr)
Initial subarea data:
Initial area flow distance =   381.000(Ft.)
Top (of initial area) elevation =  1044.900(Ft.)
Bottom (of initial area) elevation =  1043.900(Ft.)
Difference in elevation =     1.000(Ft.)
Slope =    0.00262  s(%)=       0.26
TC = k(0.950)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   33.595 min.
Rainfall intensity =      1.151(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.136
Subarea runoff =      0.058(CFS)
Total initial stream area =        0.370(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.978(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       16.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1042.000(Ft.)
Downstream point/station elevation =  1029.500(Ft.)
Pipe length  =   926.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.058(CFS)
Nearest computed pipe diameter  =      3.00(In.)
Calculated individual pipe flow  =     0.058(CFS)
Normal flow depth in pipe =    1.62(In.)
Flow top width inside pipe =    2.99(In.)
Critical Depth =    1.74(In.)
Pipe flow velocity =      2.16(Ft/s)
Travel time through pipe =    7.15 min.
Time of concentration (TC) =    40.74 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       16.200
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      0.370(Ac.)
Runoff from this stream =      0.058(CFS)
Time of concentration =   40.74 min.
Rainfall intensity =     1.026(In/Hr)
Area averaged loss rate (Fm) =    0.9778(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** 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)  = 32.00
Pervious ratio(Ap) = 0.4700     Max loss rate(Fm)=     0.460(In/Hr)
Initial subarea data:
Initial area flow distance =   204.000(Ft.)
Top (of initial area) elevation =  1046.200(Ft.)
Bottom (of initial area) elevation =  1040.700(Ft.)
Difference in elevation =     5.500(Ft.)
Slope =    0.02696  s(%)=       2.70
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.749 min.
Rainfall intensity =      3.016(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.763
Subarea runoff =      1.081(CFS)
Total initial stream area =        0.470(Ac.)
Pervious area fraction = 0.470
Initial area Fm value =    0.460(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       16.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1040.700(Ft.)
Downstream point elevation =  1036.600(Ft.)
Channel length thru subarea  =   792.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   0.020
Slope or 'Z' of right channel bank =   0.020
Estimated mean flow rate at midpoint of channel =      9.451(CFS)
Manning's 'N'    = 0.005
Maximum depth of channel  =    3.770(Ft.)
Flow(q) thru subarea =      9.451(CFS)
Depth of flow =  11.001(Ft.), Average velocity =   6.875(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =    0.151(Ft.)
Flow Velocity =    6.87(Ft/s)
Travel time  =    1.92 min.
Time of concentration =    8.67 min.
Critical depth =      6.875(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
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 =      2.595(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.859
Subarea runoff =     16.659(CFS) for    7.490(Ac.)
Total runoff =     17.740(CFS)
Effective area this stream =        7.96(Ac.)
Total Study Area (Main Stream No. 2) =       14.95(Ac.)
Area averaged Fm value =    0.119(In/Hr)
Depth of flow =  15.187(Ft.), Average velocity =   8.844(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth =      9.438(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       16.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1034.600(Ft.)
Downstream point/station elevation =  1029.600(Ft.)
Pipe length  =   157.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.740(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    17.740(CFS)
Normal flow depth in pipe =   13.95(In.)
Flow top width inside pipe =   15.04(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.07(Ft/s)
Travel time through pipe =    0.22 min.
Time of concentration (TC) =     8.89 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       16.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1029.600(Ft.)
Downstream point/station elevation =  1029.500(Ft.)
Pipe length  =    45.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.740(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    17.740(CFS)
Normal flow depth in pipe =   22.62(In.)
Flow top width inside pipe =   25.84(In.)
Critical Depth =   17.11(In.)
Pipe flow velocity =      4.47(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =     9.05 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       16.200
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      7.960(Ac.)
Runoff from this stream =     17.740(CFS)
Time of concentration =    9.05 min.
Rainfall intensity =     2.529(In/Hr)
Area averaged loss rate (Fm) =    0.1191(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1218
Summary of stream data:

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


1      0.06     0.370     40.74    0.978      1.026
2     17.74     7.960      9.05    0.119      2.529
Qmax(1) =
         1.000 *    1.000 *     0.058) +
         0.376 *    1.000 *    17.740) + =       6.731
Qmax(2) =
        32.489 *    0.222 *     0.058) +
         1.000 *    1.000 *    17.740) + =      18.157

Total of 2 streams to confluence:
Flow rates before confluence point:
       0.058      17.740
Maximum flow rates at confluence using above data:
        6.731       18.157
Area of streams before confluence:
        0.370        7.960
Effective area values after confluence:
        8.330        8.042
Results of confluence:
Total flow rate =     18.157(CFS)
Time of concentration =     9.053 min.
Effective stream area after confluence =      8.042(Ac.)
Study area average Pervious fraction(Ap) =  0.161
Study area average soil loss rate(Fm) =    0.157(In/Hr)
Study area total (this main stream) =       8.33(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.200 to Point/Station       20.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1029.500(Ft.)
Downstream point/station elevation =  1027.500(Ft.)
Pipe length  =   217.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.157(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    18.157(CFS)
Normal flow depth in pipe =   16.78(In.)
Flow top width inside pipe =   22.01(In.)
Critical Depth =   18.41(In.)
Pipe flow velocity =      7.74(Ft/s)
Travel time through pipe =    0.47 min.
Time of concentration (TC) =     9.52 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.200 to Point/Station       20.100
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      8.042(Ac.)
Runoff from this stream =     18.157(CFS)
Time of concentration =    9.52 min.
Rainfall intensity =     2.453(In/Hr)
Area averaged loss rate (Fm) =    0.1573(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1609


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       18.000
**** 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)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Initial subarea data:
Initial area flow distance =   725.000(Ft.)
Top (of initial area) elevation =  1045.400(Ft.)
Bottom (of initial area) elevation =  1039.200(Ft.)
Difference in elevation =     6.200(Ft.)
Slope =    0.00855  s(%)=       0.86
TC = k(0.299)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.805 min.
Rainfall intensity =      2.274(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.861
Subarea runoff =      3.839(CFS)
Total initial stream area =        1.960(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       20.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =  1035.200(Ft.)
Downstream point/station elevation =  1027.500(Ft.)
Pipe length  =   257.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.839(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.839(CFS)
Normal flow depth in pipe =    6.86(In.)
Flow top width inside pipe =   11.88(In.)
Critical Depth =    9.99(In.)
Pipe flow velocity =      8.28(Ft/s)
Travel time through pipe =    0.52 min.
Time of concentration (TC) =    11.32 min.


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Process from Point/Station       18.000 to Point/Station       20.100
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.960(Ac.)
Runoff from this stream =      3.839(CFS)
Time of concentration =   11.32 min.
Rainfall intensity =     2.211(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       19.300 to Point/Station       20.000
**** 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 =   597.000(Ft.)
Top (of initial area) elevation =  1040.600(Ft.)
Bottom (of initial area) elevation =  1035.200(Ft.)
Difference in elevation =     5.400(Ft.)
Slope =    0.00905  s(%)=       0.90
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.046 min.
Rainfall intensity =      2.376(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.863
Subarea runoff =     10.292(CFS)
Total initial stream area =        5.020(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       20.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1031.200(Ft.)
Downstream point/station elevation =  1027.500(Ft.)
Pipe length  =   111.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.292(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    10.292(CFS)
Normal flow depth in pipe =   10.85(In.)
Flow top width inside pipe =   13.42(In.)
Critical depth could not be calculated.
Pipe flow velocity =     10.83(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =    10.22 min.
```

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Process from Point/Station       20.000 to Point/Station       20.100
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 3
Stream flow area =      5.020(Ac.)
Runoff from this stream =     10.292(CFS)
Time of concentration =   10.22 min.
Rainfall intensity =     2.352(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     18.16     8.042      9.52    0.157      2.453
2      3.84     1.960     11.32    0.098      2.211
3     10.29     5.020     10.22    0.098      2.352
Qmax(1) =
         1.000 *    1.000 *    18.157) +
         1.115 *    0.841 *     3.839) +
         1.045 *    0.932 *    10.292) + =      31.779
Qmax(2) =
         0.894 *    1.000 *    18.157) +
         1.000 *    1.000 *     3.839) +
         0.938 *    1.000 *    10.292) + =      29.729
Qmax(3) =
         0.956 *    1.000 *    18.157) +
         1.067 *    0.902 *     3.839) +
         1.000 *    1.000 *    10.292) + =      31.340

Total of 3 streams to confluence:
Flow rates before confluence point:
      18.157       3.839      10.292
Maximum flow rates at confluence using above data:
       31.779       29.729       31.340
Area of streams before confluence:
        8.042        1.960        5.020
Effective area values after confluence:
       14.368       15.022       14.831
Results of confluence:
Total flow rate =     31.779(CFS)
Time of concentration =     9.521 min.
Effective stream area after confluence =     14.368(Ac.)
Study area average Pervious fraction(Ap) =  0.133
Study area average soil loss rate(Fm) =    0.130(In/Hr)
Study area total (this main stream) =      15.02(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.100 to Point/Station       22.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1027.500(Ft.)
Downstream point/station elevation =  1026.810(Ft.)
Pipe length  =   139.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    31.779(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    31.779(CFS)
Normal flow depth in pipe =   23.44(In.)
Flow top width inside pipe =   29.94(In.)
Critical Depth =   22.51(In.)
Pipe flow velocity =      7.05(Ft/s)
Travel time through pipe =    0.33 min.
Time of concentration (TC) =     9.85 min.
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.100 to Point/Station       22.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     14.368(Ac.)
Runoff from this stream =     31.779(CFS)
Time of concentration =    9.85 min.
Rainfall intensity =     2.404(In/Hr)
Area averaged loss rate (Fm) =    0.1296(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1326
Summary of stream data:

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


1      4.85     4.235     14.69    0.620      1.892
2     31.78    14.368      9.85    0.130      2.404
Qmax(1) =
         1.000 *    1.000 *     4.848) +
         0.775 *    1.000 *    31.779) + =      29.468
Qmax(2) =
         1.403 *    0.671 *     4.848) +
         1.000 *    1.000 *    31.779) + =      36.340

Total of 2 main streams to confluence:
Flow rates before confluence point:
       5.848      32.779
Maximum flow rates at confluence using above data:
       29.468       36.340
Area of streams before confluence:
        4.235       14.368
Effective area values after confluence:
       18.603       17.209


Results of confluence:
Total flow rate =     36.340(CFS)
Time of concentration =     9.850 min.
Effective stream area after confluence  =     17.209(Ac.)
Study area average Pervious fraction(Ap) =  0.247
Study area average soil loss rate(Fm) =    0.241(In/Hr)
Study area total =      18.60(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       43.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1032.100(Ft.)
End of street segment elevation =  1026.300(Ft.)
Length of street segment  =   532.000(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  =  30.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  12.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =     36.439(CFS)
Depth of flow =   0.533(Ft.), Average velocity =   3.736(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  21.921(Ft.)
Flow velocity =   3.74(Ft/s)
Travel time =    2.37 min.     TC =   12.22  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)
The area added to the existing stream causes a
a lower flow rate of Q =     30.333(CFS)
therefore the upstream flow rate of Q =     36.340(CFS) is being used
Rainfall intensity =      2.112(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.800
Subarea runoff =      0.000(CFS) for    0.750(Ac.)
Total runoff =     36.340(CFS)
Effective area this stream =       17.96(Ac.)
Total Study Area (Main Stream No. 1) =       22.68(Ac.)
Area averaged Fm value =    0.235(In/Hr)
Street flow at end of street =     36.340(CFS)
Half street flow at end of street =     18.170(CFS)
Depth of flow =   0.533(Ft.), Average velocity =   3.734(Ft/s)
Flow width (from curb towards crown)=  21.898(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       43.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     17.959(Ac.)
Runoff from this stream =     36.340(CFS)
Time of concentration =   12.22 min.
Rainfall intensity =     2.112(In/Hr)
Area averaged loss rate (Fm) =    0.2352(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2405
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       31.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   501.000(Ft.)
Top (of initial area) elevation =  1044.900(Ft.)
Bottom (of initial area) elevation =  1040.900(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.00798  s(%)=       0.80
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.814 min.
Rainfall intensity =      1.882(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.526
Subarea runoff =      3.197(CFS)
Total initial stream area =        3.230(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       31.000 to Point/Station       32.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1040.900(Ft.)
Downstream point elevation =  1037.800(Ft.)
Channel length thru subarea  =   603.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   0.010
Slope or 'Z' of right channel bank =   0.010
Estimated mean flow rate at midpoint of channel =      5.234(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.500(Ft.)
Flow(q) thru subarea =      5.234(CFS)
Depth of flow =  43.817(Ft.), Average velocity =   4.051(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =    0.030(Ft.)
Flow Velocity =    4.05(Ft/s)
Travel time  =    2.48 min.
Time of concentration =   17.29 min.
Critical depth =     10.500(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
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 =      1.715(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.668
Subarea runoff =      4.143(CFS) for    3.180(Ac.)
Total runoff =      7.339(CFS)
Effective area this stream =        6.41(Ac.)
Total Study Area (Main Stream No. 2) =       29.09(Ac.)
Area averaged Fm value =    0.443(In/Hr)
Depth of flow =  53.504(Ft.), Average velocity =   4.637(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth =     13.000(Ft.)
```

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Process from Point/Station       32.000 to Point/Station       34.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1037.800(Ft.)
Downstream point elevation =  1027.900(Ft.)
Channel length thru subarea  =  1246.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   0.010
Slope or 'Z' of right channel bank =   0.010
Estimated mean flow rate at midpoint of channel =     10.142(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     10.142(CFS)
Depth of flow =  48.298(Ft.), Average velocity =   5.360(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =    0.040(Ft.)
Flow Velocity =    5.36(Ft/s)
Travel time  =    3.87 min.
Time of concentration =   21.17 min.
Critical depth =     13.625(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
 Adding area flow to channel
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 =      1.519(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.729
Subarea runoff =      5.547(CFS) for    5.220(Ac.)
Total runoff =     12.886(CFS)
Effective area this stream =       11.63(Ac.)
Total Study Area (Main Stream No. 2) =       34.31(Ac.)
Area averaged Fm value =    0.288(In/Hr)
Depth of flow =  55.608(Ft.), Average velocity =   5.899(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth =     15.750(Ft.)
```

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Process from Point/Station       34.000 to Point/Station       37.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1024.900(Ft.)
Downstream point/station elevation =  1022.000(Ft.)
Pipe length  =    47.61(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.886(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    12.886(CFS)
Normal flow depth in pipe =   10.22(In.)
Flow top width inside pipe =   13.98(In.)
Critical depth could not be calculated.
Pipe flow velocity =     14.46(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    21.22 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       34.000 to Point/Station       37.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     11.630(Ac.)
Runoff from this stream =     12.886(CFS)
Time of concentration =   21.22 min.
Rainfall intensity =     1.517(In/Hr)
Area averaged loss rate (Fm) =    0.2879(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2944


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Process from Point/Station       35.000 to Point/Station       36.000
**** 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)  = 32.00
Pervious ratio(Ap) = 0.2500     Max loss rate(Fm)=     0.244(In/Hr)
Initial subarea data:
Initial area flow distance =   639.000(Ft.)
Top (of initial area) elevation =  1033.900(Ft.)
Bottom (of initial area) elevation =  1029.000(Ft.)
Difference in elevation =     4.900(Ft.)
Slope =    0.00767  s(%)=       0.77
TC = k(0.336)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.798 min.
Rainfall intensity =      2.157(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.798
Subarea runoff =      1.825(CFS)
Total initial stream area =        1.060(Ac.)
Pervious area fraction = 0.250
Initial area Fm value =    0.244(In/Hr)
```

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Process from Point/Station       36.000 to Point/Station       37.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1026.000(Ft.)
Downstream point/station elevation =  1022.000(Ft.)
Pipe length  =    41.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.825(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.825(CFS)
Normal flow depth in pipe =    3.69(In.)
Flow top width inside pipe =    8.85(In.)
Critical Depth =    7.42(In.)
Pipe flow velocity =     10.69(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    11.86 min.


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Process from Point/Station       36.000 to Point/Station       37.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.060(Ac.)
Runoff from this stream =      1.825(CFS)
Time of concentration =   11.86 min.
Rainfall intensity =     2.150(In/Hr)
Area averaged loss rate (Fm) =    0.2445(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2500


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Process from Point/Station       40.000 to Point/Station       41.000
**** 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)  = 32.00
Pervious ratio(Ap) = 0.3000     Max loss rate(Fm)=     0.293(In/Hr)
Initial subarea data:
Initial area flow distance =   587.000(Ft.)
Top (of initial area) elevation =  1036.200(Ft.)
Bottom (of initial area) elevation =  1029.600(Ft.)
Difference in elevation =     6.600(Ft.)
Slope =    0.01124  s(%)=       1.12
TC = k(0.348)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.951 min.
Rainfall intensity =      2.256(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.783
Subarea runoff =      6.676(CFS)
Total initial stream area =        3.780(Ac.)
Pervious area fraction = 0.300
Initial area Fm value =    0.293(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       41.000 to Point/Station       37.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1026.600(Ft.)
Downstream point/station elevation =  1022.000(Ft.)
Pipe length  =    99.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.676(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     6.676(CFS)
Normal flow depth in pipe =    8.65(In.)
Flow top width inside pipe =   10.77(In.)
Critical depth could not be calculated.
Pipe flow velocity =     11.01(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =    11.10 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       41.000 to Point/Station       37.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 3
Stream flow area =      3.780(Ac.)
Runoff from this stream =      6.676(CFS)
Time of concentration =   11.10 min.
Rainfall intensity =     2.238(In/Hr)
Area averaged loss rate (Fm) =    0.2933(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3000
Summary of stream data:

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


1     12.89    11.630     21.22    0.288      1.517
2      1.82     1.060     11.86    0.244      2.150
3      6.68     3.780     11.10    0.293      2.238
Qmax(1) =
         1.000 *    1.000 *    12.886) +
         0.668 *    1.000 *     1.825) +
         0.629 *    1.000 *     6.676) + =      18.305
Qmax(2) =
         1.516 *    0.559 *    12.886) +
         1.000 *    1.000 *     1.825) +
         0.955 *    1.000 *     6.676) + =      19.117
Qmax(3) =
         1.587 *    0.523 *    12.886) +
         1.046 *    0.936 *     1.825) +
         1.000 *    1.000 *     6.676) + =      19.157

Total of 3 streams to confluence:
Flow rates before confluence point:
      12.886       1.825       6.676
Maximum flow rates at confluence using above data:
       18.305       19.117       19.157
Area of streams before confluence:
       11.630        1.060        3.780
Effective area values after confluence:
       16.470       11.340       10.855
Results of confluence:
Total flow rate =     19.157(CFS)
Time of concentration =    11.101 min.
Effective stream area after confluence =     10.855(Ac.)
Study area average Pervious fraction(Ap) =  0.293
Study area average soil loss rate(Fm) =    0.286(In/Hr)
Study area total (this main stream) =      16.47(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       37.000 to Point/Station       43.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1022.000(Ft.)
Downstream point/station elevation =  1021.600(Ft.)
Pipe length  =    80.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.157(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    19.157(CFS)
Normal flow depth in pipe =   19.55(In.)
Flow top width inside pipe =   24.14(In.)
Critical Depth =   18.37(In.)
Pipe flow velocity =      6.21(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =    11.32 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       37.000 to Point/Station       43.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     10.855(Ac.)
Runoff from this stream =     19.157(CFS)
Time of concentration =   11.32 min.
Rainfall intensity =     2.212(In/Hr)
Area averaged loss rate (Fm) =    0.2863(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2928
Summary of stream data:

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


1     36.34    17.959     12.22    0.235      2.112
2     19.16    10.855     11.32    0.286      2.212
Qmax(1) =
         1.000 *    1.000 *    36.340) +
         0.948 *    1.000 *    19.157) + =      54.501
Qmax(2) =
         1.053 *    0.926 *    36.340) +
         1.000 *    1.000 *    19.157) + =      54.592

Total of 2 main streams to confluence:
Flow rates before confluence point:
      37.340      20.157
Maximum flow rates at confluence using above data:
       54.501       54.592
Area of streams before confluence:
       17.959       10.855
Effective area values after confluence:
       28.814       27.481


Results of confluence:
Total flow rate =     54.592(CFS)
Time of concentration =    11.316 min.
Effective stream area after confluence  =     27.481(Ac.)
Study area average Pervious fraction(Ap) =  0.260
Study area average soil loss rate(Fm) =    0.254(In/Hr)
Study area total =      28.81(Ac.)
End of computations, Total Study Area =           39.15 (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) = 0.290
Area averaged SCS curve number =  32.0
```

APPENDIX B

RATIONAL METHOD HYDROLOGY (WATERSHED B)

B.1: EXISTING CONDITION – 100 YR

B.2: EXISTING CONDITION – 100 YR – ADJUSTED 25 YR RAINFALL

B.3: PROPOSED CONDITION – 100 YR

B.4: EXISTING CONDITION – 25 YR

B.5: EXISTING CONDITION – 25 YR – ADJUSTED 10 YR RAINFALL

B.6: PROPOSED CONDITION – 25 YR

B.7: EXISTING CONDITION – 10 YR

B.8: EXISTING CONDITION – 10 YR – ADJUSTED 5 YR RAINFALL

B.9: PROPOSED CONDITION – 10 YR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/07/21

BLOOMINGTON COMMERCE CENTER - SITE 3
EXISITNG CONDITION - LAUREL AVE
100-YEAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.310 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** 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 =   622.000(Ft.)
Top (of initial area) elevation =  1046.500(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =     6.400(Ft.)
Slope =    0.01029  s(%)=       1.03
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.952 min.
Rainfall intensity =      3.850(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.877
Subarea runoff =      3.140(CFS)
Total initial stream area =        0.930(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      0.930(Ac.)
Runoff from this stream =      3.140(CFS)
Time of concentration =    9.95 min.
Rainfall intensity =     3.850(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   846.000(Ft.)
Top (of initial area) elevation =  1050.900(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =    10.800(Ft.)
Slope =    0.01277  s(%)=       1.28
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.631 min.
Rainfall intensity =      2.829(In/Hr) for a   100.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.651
Subarea runoff =     10.057(CFS)
Total initial stream area =        5.460(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.460(Ac.)
Runoff from this stream =     10.057(CFS)
Time of concentration =   16.63 min.
Rainfall intensity =     2.829(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      3.14     0.930      9.95    0.098      3.850
2     10.06     5.460     16.63    0.782      2.829
Qmax(1) =
         1.000 *    1.000 *     3.140) +
         1.499 *    0.598 *    10.057) + =      12.160
Qmax(2) =
         0.728 *    1.000 *     3.140) +
         1.000 *    1.000 *    10.057) + =      12.343

Total of 2 main streams to confluence:
Flow rates before confluence point:
       4.140      11.057
Maximum flow rates at confluence using above data:
       12.160       12.343
Area of streams before confluence:
        0.930        5.460
Effective area values after confluence:
        4.197        6.390


Results of confluence:
Total flow rate =     12.343(CFS)
Time of concentration =    16.631 min.
Effective stream area after confluence  =      6.390(Ac.)
Study area average Pervious fraction(Ap) =  0.698
Study area average soil loss rate(Fm) =    0.683(In/Hr)
Study area total =       6.39(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1040.100(Ft.)
End of street segment elevation =  1034.700(Ft.)
Length of street segment  =   661.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  20.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =  0.0200
Estimated mean flow rate at midpoint of street =     12.399(CFS)
Depth of flow =   0.434(Ft.), Average velocity =   2.107(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.945(Ft.)
Flow velocity =   2.11(Ft/s)
Travel time =    5.23 min.     TC =   21.86  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     11.237(CFS)
therefore the upstream flow rate of Q =     12.343(CFS) is being used
Rainfall intensity =      2.401(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.639
Subarea runoff =      0.000(CFS) for    0.930(Ac.)
Total runoff =     12.343(CFS)
Effective area this stream =        7.32(Ac.)
Total Study Area (Main Stream No. 1) =        7.32(Ac.)
Area averaged Fm value =    0.695(In/Hr)
Street flow at end of street =     12.343(CFS)
Half street flow at end of street =      6.172(CFS)
Depth of flow =   0.433(Ft.), Average velocity =   2.104(Ft/s)
Flow width (from curb towards crown)=  16.915(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      7.320(Ac.)
Runoff from this stream =     12.343(CFS)
Time of concentration =   21.86 min.
Rainfall intensity =     2.401(In/Hr)
Area averaged loss rate (Fm) =    0.6953(In/Hr)
Area averaged Pervious ratio (Ap) = 0.7111
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       52.000 to Point/Station       53.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   323.000(Ft.)
Top (of initial area) elevation =  1055.800(Ft.)
Bottom (of initial area) elevation =  1049.100(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.02074  s(%)=       2.07
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.268 min.
Rainfall intensity =      3.778(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.714
Subarea runoff =      3.397(CFS)
Total initial stream area =        1.260(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       53.000 to Point/Station       54.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     21.305(CFS)
Depth of flow =   0.306(Ft.), Average velocity =   1.141(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     10.653(CFS)
  '     '    flow top width =     61.117(Ft.)
  '     '    velocity=    1.141(Ft/s)
  '     '    area =      9.338(Sq.Ft)
  '     '    Froude number =     0.514

Upstream point elevation =  1049.100(Ft.)
Downstream point elevation =  1043.600(Ft.)
Flow length =   847.000(Ft.)
Travel time  =   12.37 min.
Time of concentration =   22.64 min.
Depth of flow =   0.306(Ft.)
Average velocity =   1.141(Ft/s)
Total irregular channel flow =    10.653(CFS)
Irregular channel normal depth above invert elev. =   0.306(Ft.)
Average velocity of channel(s) =   1.141(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      2.351(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.601
Subarea runoff =     14.446(CFS) for   11.380(Ac.)
Total runoff =     17.843(CFS)
Effective area this stream =       12.64(Ac.)
Total Study Area (Main Stream No. 2) =       19.96(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.371(Ft.), Average velocity =   1.298(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =     37.722(CFS)
Depth of flow =   0.353(Ft.), Average velocity =   1.517(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
--------------------------------------------------------------
Sub-Channel flow  =     18.861(CFS)
  '     '    flow top width =     70.521(Ft.)
  '     '    velocity=    1.517(Ft/s)
  '     '    area =     12.433(Sq.Ft)
  '     '    Froude number =     0.637

Upstream point elevation =  1043.600(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   822.000(Ft.)
Travel time  =    9.03 min.
Time of concentration =   31.67 min.
Depth of flow =   0.353(Ft.)
Average velocity =   1.517(Ft/s)
Total irregular channel flow =    18.861(CFS)
Irregular channel normal depth above invert elev. =   0.353(Ft.)
Average velocity of channel(s) =   1.517(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.922(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.534
Subarea runoff =      1.964(CFS) for    6.670(Ac.)
Total runoff =     19.807(CFS)
Effective area this stream =       19.31(Ac.)
Total Study Area (Main Stream No. 2) =       26.63(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.359(Ft.), Average velocity =   1.536(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     19.310(Ac.)
Runoff from this stream =     19.807(CFS)
Time of concentration =   31.67 min.
Rainfall intensity =     1.922(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.000 to Point/Station       55.100
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   538.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1039.900(Ft.)
Difference in elevation =     7.300(Ft.)
Slope =    0.01357  s(%)=       1.36
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.708 min.
Rainfall intensity =      3.177(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.678
Subarea runoff =      1.681(CFS)
Total initial stream area =        0.780(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      5.516(CFS)
Depth of flow =   0.181(Ft.), Average velocity =   0.846(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      2.758(CFS)
  '     '    flow top width =     36.120(Ft.)
  '     '    velocity=    0.846(Ft/s)
  '     '    area =      3.262(Sq.Ft)
  '     '    Froude number =     0.496

Upstream point elevation =  1039.900(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   570.000(Ft.)
Travel time  =   11.24 min.
Time of concentration =   24.94 min.
Depth of flow =   0.181(Ft.)
Average velocity =   0.846(Ft/s)
Total irregular channel flow =     2.758(CFS)
Irregular channel normal depth above invert elev. =   0.181(Ft.)
Average velocity of channel(s) =   0.846(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      2.218(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.583
Subarea runoff =      2.054(CFS) for    2.110(Ac.)
Total runoff =      3.735(CFS)
Effective area this stream =        2.89(Ac.)
Total Study Area (Main Stream No. 2) =       29.52(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.202(Ft.), Average velocity =   0.912(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.890(Ac.)
Runoff from this stream =      3.735(CFS)
Time of concentration =   24.94 min.
Rainfall intensity =     2.218(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     19.81    19.310     31.67    0.782      1.922
2      3.73     2.890     24.94    0.782      2.218
Qmax(1) =
         1.000 *    1.000 *    19.807) +
         0.794 *    1.000 *     3.735) + =      22.771
Qmax(2) =
         1.260 *    0.788 *    19.807) +
         1.000 *    1.000 *     3.735) + =      23.387

Total of 2 streams to confluence:
Flow rates before confluence point:
      19.807       3.735
Maximum flow rates at confluence using above data:
       22.771       23.387
Area of streams before confluence:
       19.310        2.890
Effective area values after confluence:
       22.200       18.097
Results of confluence:
Total flow rate =     23.387(CFS)
Time of concentration =    24.944 min.
Effective stream area after confluence =     18.097(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =      22.20(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   0.344(Ft.), Average velocity =   1.977(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     23.387(CFS)
  '     '    flow top width =     68.782(Ft.)
  '     '    velocity=    1.977(Ft/s)
  '     '    area =     11.827(Sq.Ft)
  '     '    Froude number =     0.840

Upstream point elevation =  1035.800(Ft.)
Downstream point elevation =  1034.700(Ft.)
Flow length =    66.000(Ft.)
Travel time  =    0.56 min.
Time of concentration =   25.50 min.
Depth of flow =   0.344(Ft.)
Average velocity =   1.977(Ft/s)
Total irregular channel flow =    23.387(CFS)
Irregular channel normal depth above invert elev. =   0.344(Ft.)
Average velocity of channel(s) =   1.977(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     18.097(Ac.)
Runoff from this stream =     23.387(CFS)
Time of concentration =   25.50 min.
Rainfall intensity =     2.189(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     12.34     7.320     21.86    0.695      2.401
2     23.39    18.097     25.50    0.782      2.189
Qmax(1) =
         1.000 *    1.000 *    12.343) +
         1.151 *    0.857 *    23.387) + =      35.412
Qmax(2) =
         0.876 *    1.000 *    12.343) +
         1.000 *    1.000 *    23.387) + =      34.196

Total of 2 main streams to confluence:
Flow rates before confluence point:
      13.343      24.387
Maximum flow rates at confluence using above data:
       35.412       34.196
Area of streams before confluence:
        7.320       18.097
Effective area values after confluence:
       22.834       25.417


Results of confluence:
Total flow rate =     35.412(CFS)
Time of concentration =    21.860 min.
Effective stream area after confluence  =     22.834(Ac.)
Study area average Pervious fraction(Ap) =  0.774
Study area average soil loss rate(Fm) =    0.757(In/Hr)
Study area total =      25.42(Ac.)
End of computations, Total Study Area =           29.52 (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) = 0.778
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/26/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISTING CONDITION
100-YEAR STORM ANALYSIS WITH ADJUSTED 25 YEAR RAINFALL DATA

Program License Serial Number 6405

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 0.998 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** 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 =   622.000(Ft.)
Top (of initial area) elevation =  1046.500(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =     6.400(Ft.)
Slope =    0.01029  s(%)=       1.03
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.952 min.
Rainfall intensity =      2.933(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.870
Subarea runoff =      2.373(CFS)
Total initial stream area =        0.930(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      0.930(Ac.)
Runoff from this stream =      2.373(CFS)
Time of concentration =    9.95 min.
Rainfall intensity =     2.933(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   846.000(Ft.)
Top (of initial area) elevation =  1050.900(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =    10.800(Ft.)
Slope =    0.01277  s(%)=       1.28
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.631 min.
Rainfall intensity =      2.155(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.573
Subarea runoff =      6.746(CFS)
Total initial stream area =        5.460(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.460(Ac.)
Runoff from this stream =      6.746(CFS)
Time of concentration =   16.63 min.
Rainfall intensity =     2.155(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      2.37     0.930      9.95    0.098      2.933
2      6.75     5.460     16.63    0.782      2.155
Qmax(1) =
         1.000 *    1.000 *     2.373) +
         1.566 *    0.598 *     6.746) + =       8.697
Qmax(2) =
         0.726 *    1.000 *     2.373) +
         1.000 *    1.000 *     6.746) + =       8.468

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.373       7.746
Maximum flow rates at confluence using above data:
        8.697        8.468
Area of streams before confluence:
        0.930        5.460
Effective area values after confluence:
        4.197        6.390


Results of confluence:
Total flow rate =      8.697(CFS)
Time of concentration =     9.952 min.
Effective stream area after confluence  =      4.197(Ac.)
Study area average Pervious fraction(Ap) =  0.698
Study area average soil loss rate(Fm) =    0.683(In/Hr)
Study area total =       6.39(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of street segment elevation =  1040.100(Ft.)
End of street segment elevation =  1034.700(Ft.)
Length of street segment  =   661.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  20.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =  0.0200
Estimated mean flow rate at midpoint of street =      8.757(CFS)
Depth of flow =   0.391(Ft.), Average velocity =   1.939(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  14.789(Ft.)
Flow velocity =   1.94(Ft/s)
Travel time =    5.68 min.     TC =   15.63  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      7.087(CFS)
therefore the upstream flow rate of Q =      8.697(CFS) is being used
Rainfall intensity =      2.236(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.618
Subarea runoff =      0.000(CFS) for    0.930(Ac.)
Total runoff =      8.697(CFS)
Effective area this stream =        5.13(Ac.)
Total Study Area (Main Stream No. 1) =        7.32(Ac.)
Area averaged Fm value =    0.701(In/Hr)
Street flow at end of street =      8.697(CFS)
Half street flow at end of street =      4.348(CFS)
Depth of flow =   0.390(Ft.), Average velocity =   1.935(Ft/s)
Flow width (from curb towards crown)=  14.749(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.127(Ac.)
Runoff from this stream =      8.697(CFS)
Time of concentration =   15.63 min.
Rainfall intensity =     2.236(In/Hr)
Area averaged loss rate (Fm) =    0.7007(In/Hr)
Area averaged Pervious ratio (Ap) = 0.7166
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       52.000 to Point/Station       53.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   323.000(Ft.)
Top (of initial area) elevation =  1055.800(Ft.)
Bottom (of initial area) elevation =  1049.100(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.02074  s(%)=       2.07
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.268 min.
Rainfall intensity =      2.878(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.655
Subarea runoff =      2.377(CFS)
Total initial stream area =        1.260(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       53.000 to Point/Station       54.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =     13.094(CFS)
Depth of flow =   0.255(Ft.), Average velocity =   1.010(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
--------------------------------------------------------------
Sub-Channel flow  =      6.547(CFS)
  '     '    flow top width =     50.919(Ft.)
  '     '    velocity=    1.010(Ft/s)
  '     '    area =      6.482(Sq.Ft)
  '     '    Froude number =     0.499

Upstream point elevation =  1049.100(Ft.)
Downstream point elevation =  1043.600(Ft.)
Flow length =   847.000(Ft.)
Travel time  =   13.98 min.
Time of concentration =   24.24 min.
Depth of flow =   0.255(Ft.)
Average velocity =   1.010(Ft/s)
Total irregular channel flow =     6.547(CFS)
Irregular channel normal depth above invert elev. =   0.255(Ft.)
Average velocity of channel(s) =   1.010(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.719(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.490
Subarea runoff =      8.279(CFS) for   11.380(Ac.)
Total runoff =     10.655(CFS)
Effective area this stream =       12.64(Ac.)
Total Study Area (Main Stream No. 2) =       19.96(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.306(Ft.), Average velocity =   1.141(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     21.401(CFS)
Depth of flow =   0.285(Ft.), Average velocity =   1.317(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     10.700(CFS)
  '     '    flow top width =     57.017(Ft.)
  '     '    velocity=    1.317(Ft/s)
  '     '    area =      8.127(Sq.Ft)
  '     '    Froude number =     0.615

Upstream point elevation =  1043.600(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   822.000(Ft.)
Travel time  =   10.41 min.
Time of concentration =   34.65 min.
Depth of flow =   0.285(Ft.)
Average velocity =   1.317(Ft/s)
Total irregular channel flow =    10.700(CFS)
Irregular channel normal depth above invert elev. =   0.285(Ft.)
Average velocity of channel(s) =   1.317(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     10.517(CFS)
therefore the upstream flow rate of Q =     10.655(CFS) is being used
Rainfall intensity =      1.387(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.393
Subarea runoff =      0.000(CFS) for    6.670(Ac.)
Total runoff =     10.655(CFS)
Effective area this stream =       19.31(Ac.)
Total Study Area (Main Stream No. 2) =       26.63(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.285(Ft.), Average velocity =   1.315(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     19.310(Ac.)
Runoff from this stream =     10.655(CFS)
Time of concentration =   34.65 min.
Rainfall intensity =     1.387(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.000 to Point/Station       55.100
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   538.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1039.900(Ft.)
Difference in elevation =     7.300(Ft.)
Slope =    0.01357  s(%)=       1.36
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.708 min.
Rainfall intensity =      2.420(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.609
Subarea runoff =      1.150(CFS)
Total initial stream area =        0.780(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      3.456(CFS)
Depth of flow =   0.152(Ft.), Average velocity =   0.752(Ft/s)
      ******* Irregular Channel Data ***********
----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
----------------------------------------------------------------
Sub-Channel flow  =      1.728(CFS)
  '     '    flow top width =     30.311(Ft.)
  '     '    velocity=    0.752(Ft/s)
  '     '    area =      2.297(Sq.Ft)
  '     '    Froude number =     0.482

Upstream point elevation =  1039.900(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   570.000(Ft.)
Travel time  =   12.63 min.
Time of concentration =   26.34 min.
Depth of flow =   0.152(Ft.)
Average velocity =   0.752(Ft/s)
Total irregular channel flow =     1.728(CFS)
Irregular channel normal depth above invert elev. =   0.152(Ft.)
Average velocity of channel(s) =   0.752(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.636(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.470
Subarea runoff =      1.070(CFS) for    2.110(Ac.)
Total runoff =      2.220(CFS)
Effective area this stream =        2.89(Ac.)
Total Study Area (Main Stream No. 2) =       29.52(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.166(Ft.), Average velocity =   0.801(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.890(Ac.)
Runoff from this stream =      2.220(CFS)
Time of concentration =   26.34 min.
Rainfall intensity =     1.636(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     10.66    19.310     34.65    0.782      1.387
2      2.22     2.890     26.34    0.782      1.636
Qmax(1) =
         1.000 *    1.000 *    10.655) +
         0.709 *    1.000 *     2.220) + =      12.229
Qmax(2) =
         1.410 *    0.760 *    10.655) +
         1.000 *    1.000 *     2.220) + =      13.641

Total of 2 streams to confluence:
Flow rates before confluence point:
      10.655       2.220
Maximum flow rates at confluence using above data:
       12.229       13.641
Area of streams before confluence:
       19.310        2.890
Effective area values after confluence:
       22.200       17.567
Results of confluence:
Total flow rate =     13.641(CFS)
Time of concentration =    26.337 min.
Effective stream area after confluence =     17.567(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =      22.20(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   0.281(Ft.), Average velocity =   1.728(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     13.641(CFS)
  '     '    flow top width =     56.192(Ft.)
  '     '    velocity=    1.728(Ft/s)
  '     '    area =      7.894(Sq.Ft)
  '     '    Froude number =     0.812

Upstream point elevation =  1035.800(Ft.)
Downstream point elevation =  1034.700(Ft.)
Flow length =    66.000(Ft.)
Travel time  =    0.64 min.
Time of concentration =   26.97 min.
Depth of flow =   0.281(Ft.)
Average velocity =   1.728(Ft/s)
Total irregular channel flow =    13.641(CFS)
Irregular channel normal depth above invert elev. =   0.281(Ft.)
Average velocity of channel(s) =   1.728(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     17.567(Ac.)
Runoff from this stream =     13.641(CFS)
Time of concentration =   26.97 min.
Rainfall intensity =     1.612(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      8.70     5.127     15.63    0.701      2.236
2     13.64    17.567     26.97    0.782      1.612
Qmax(1) =
         1.000 *    1.000 *     8.697) +
         1.752 *    0.580 *    13.641) + =      22.548
Qmax(2) =
         0.594 *    1.000 *     8.697) +
         1.000 *    1.000 *    13.641) + =      18.803

Total of 2 main streams to confluence:
Flow rates before confluence point:
       9.697      14.641
Maximum flow rates at confluence using above data:
       22.548       18.803
Area of streams before confluence:
        5.127       17.567
Effective area values after confluence:
       15.310       22.694


Results of confluence:
Total flow rate =     22.548(CFS)
Time of concentration =    15.635 min.
Effective stream area after confluence  =     15.310(Ac.)
Study area average Pervious fraction(Ap) =  0.781
Study area average soil loss rate(Fm) =    0.764(In/Hr)
Study area total =      22.69(Ac.)
End of computations, Total Study Area =           29.52 (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) = 0.778
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/07/21

BLOOMINGTON COMMERCE CENTER SITE 3
PROPOSED CONDITION – LAUREL AVE
100-EAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.310 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** 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 =   622.000(Ft.)
Top (of initial area) elevation =  1046.500(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =     6.400(Ft.)
Slope =    0.01029  s(%)=       1.03
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.952 min.
Rainfall intensity =      3.850(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.877
Subarea runoff =      5.200(CFS)
Total initial stream area =        1.540(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.540(Ac.)
Runoff from this stream =      5.200(CFS)
Time of concentration =    9.95 min.
Rainfall intensity =     3.850(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   846.000(Ft.)
Top (of initial area) elevation =  1050.900(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =    10.800(Ft.)
Slope =    0.01277  s(%)=       1.28
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.631 min.
Rainfall intensity =      2.829(In/Hr) for a   100.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.651
Subarea runoff =     10.057(CFS)
Total initial stream area =        5.460(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.460(Ac.)
Runoff from this stream =     10.057(CFS)
Time of concentration =   16.63 min.
Rainfall intensity =     2.829(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      5.20     1.540      9.95    0.098      3.850
2     10.06     5.460     16.63    0.782      2.829
Qmax(1) =
         1.000 *    1.000 *     5.200) +
         1.499 *    0.598 *    10.057) + =      14.220
Qmax(2) =
         0.728 *    1.000 *     5.200) +
         1.000 *    1.000 *    10.057) + =      13.843

Total of 2 main streams to confluence:
Flow rates before confluence point:
       6.200      11.057
Maximum flow rates at confluence using above data:
       14.220       13.843
Area of streams before confluence:
        1.540        5.460
Effective area values after confluence:
        4.807        7.000


Results of confluence:
Total flow rate =     14.220(CFS)
Time of concentration =     9.952 min.
Effective stream area after confluence  =      4.807(Ac.)
Study area average Pervious fraction(Ap) =  0.646
Study area average soil loss rate(Fm) =    0.632(In/Hr)
Study area total =       7.00(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of street segment elevation =  1040.100(Ft.)
End of street segment elevation =  1034.700(Ft.)
Length of street segment  =   661.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  20.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =  0.0200
Estimated mean flow rate at midpoint of street =     14.282(CFS)
Depth of flow =   0.453(Ft.), Average velocity =   2.180(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  17.902(Ft.)
Flow velocity =   2.18(Ft/s)
Travel time =    5.05 min.     TC =   15.01  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     12.970(CFS)
therefore the upstream flow rate of Q =     14.220(CFS) is being used
Rainfall intensity =      3.009(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.701
Subarea runoff =      0.000(CFS) for    1.340(Ac.)
Total runoff =     14.220(CFS)
Effective area this stream =        6.15(Ac.)
Total Study Area (Main Stream No. 1) =        8.34(Ac.)
Area averaged Fm value =    0.664(In/Hr)
Street flow at end of street =     14.220(CFS)
Half street flow at end of street =      7.110(CFS)
Depth of flow =   0.452(Ft.), Average velocity =   2.177(Ft/s)
Flow width (from curb towards crown)=  17.872(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      6.147(Ac.)
Runoff from this stream =     14.220(CFS)
Time of concentration =   15.01 min.
Rainfall intensity =     3.009(In/Hr)
Area averaged loss rate (Fm) =    0.6645(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6796
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       52.000 to Point/Station       53.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   323.000(Ft.)
Top (of initial area) elevation =  1055.800(Ft.)
Bottom (of initial area) elevation =  1049.100(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.02074  s(%)=       2.07
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.268 min.
Rainfall intensity =      3.778(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.714
Subarea runoff =      3.397(CFS)
Total initial stream area =        1.260(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       53.000 to Point/Station       54.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     21.305(CFS)
Depth of flow =   0.306(Ft.), Average velocity =   1.141(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     10.653(CFS)
  '     '    flow top width =     61.117(Ft.)
  '     '    velocity=    1.141(Ft/s)
  '     '    area =      9.338(Sq.Ft)
  '     '    Froude number =     0.514

Upstream point elevation =  1049.100(Ft.)
Downstream point elevation =  1043.600(Ft.)
Flow length =   847.000(Ft.)
Travel time  =   12.37 min.
Time of concentration =   22.64 min.
Depth of flow =   0.306(Ft.)
Average velocity =   1.141(Ft/s)
Total irregular channel flow =    10.653(CFS)
Irregular channel normal depth above invert elev. =   0.306(Ft.)
Average velocity of channel(s) =   1.141(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      2.351(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.601
Subarea runoff =     14.446(CFS) for   11.380(Ac.)
Total runoff =     17.843(CFS)
Effective area this stream =       12.64(Ac.)
Total Study Area (Main Stream No. 2) =       20.98(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.371(Ft.), Average velocity =   1.298(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =     37.722(CFS)
Depth of flow =   0.353(Ft.), Average velocity =   1.517(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
--------------------------------------------------------------
Sub-Channel flow  =     18.861(CFS)
  '     '    flow top width =     70.521(Ft.)
  '     '    velocity=    1.517(Ft/s)
  '     '    area =     12.433(Sq.Ft)
  '     '    Froude number =     0.637

Upstream point elevation =  1043.600(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   822.000(Ft.)
Travel time  =    9.03 min.
Time of concentration =   31.67 min.
Depth of flow =   0.353(Ft.)
Average velocity =   1.517(Ft/s)
Total irregular channel flow =    18.861(CFS)
Irregular channel normal depth above invert elev. =   0.353(Ft.)
Average velocity of channel(s) =   1.517(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.922(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.534
Subarea runoff =      1.964(CFS) for    6.670(Ac.)
Total runoff =     19.807(CFS)
Effective area this stream =       19.31(Ac.)
Total Study Area (Main Stream No. 2) =       27.65(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.359(Ft.), Average velocity =   1.536(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     19.310(Ac.)
Runoff from this stream =     19.807(CFS)
Time of concentration =   31.67 min.
Rainfall intensity =     1.922(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.000 to Point/Station       55.100
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   538.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1039.900(Ft.)
Difference in elevation =     7.300(Ft.)
Slope =    0.01357  s(%)=       1.36
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.708 min.
Rainfall intensity =      3.177(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.678
Subarea runoff =      1.681(CFS)
Total initial stream area =        0.780(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      5.516(CFS)
Depth of flow =   0.181(Ft.), Average velocity =   0.846(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      2.758(CFS)
  '     '    flow top width =     36.120(Ft.)
  '     '    velocity=    0.846(Ft/s)
  '     '    area =      3.262(Sq.Ft)
  '     '    Froude number =     0.496

Upstream point elevation =  1039.900(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   570.000(Ft.)
Travel time  =   11.24 min.
Time of concentration =   24.94 min.
Depth of flow =   0.181(Ft.)
Average velocity =   0.846(Ft/s)
Total irregular channel flow =     2.758(CFS)
Irregular channel normal depth above invert elev. =   0.181(Ft.)
Average velocity of channel(s) =   0.846(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      2.218(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.583
Subarea runoff =      2.054(CFS) for    2.110(Ac.)
Total runoff =      3.735(CFS)
Effective area this stream =        2.89(Ac.)
Total Study Area (Main Stream No. 2) =       30.54(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.202(Ft.), Average velocity =   0.912(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.890(Ac.)
Runoff from this stream =      3.735(CFS)
Time of concentration =   24.94 min.
Rainfall intensity =     2.218(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     19.81    19.310     31.67    0.782      1.922
2      3.73     2.890     24.94    0.782      2.218
Qmax(1) =
         1.000 *    1.000 *    19.807) +
         0.794 *    1.000 *     3.735) + =      22.771
Qmax(2) =
         1.260 *    0.788 *    19.807) +
         1.000 *    1.000 *     3.735) + =      23.387

Total of 2 streams to confluence:
Flow rates before confluence point:
      19.807       3.735
Maximum flow rates at confluence using above data:
       22.771       23.387
Area of streams before confluence:
       19.310        2.890
Effective area values after confluence:
       22.200       18.097
Results of confluence:
Total flow rate =     23.387(CFS)
Time of concentration =    24.944 min.
Effective stream area after confluence =     18.097(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =      22.20(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   0.344(Ft.), Average velocity =   1.977(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     23.387(CFS)
  '     '    flow top width =     68.782(Ft.)
  '     '    velocity=    1.977(Ft/s)
  '     '    area =     11.827(Sq.Ft)
  '     '    Froude number =     0.840

Upstream point elevation =  1035.800(Ft.)
Downstream point elevation =  1034.700(Ft.)
Flow length =    66.000(Ft.)
Travel time  =    0.56 min.
Time of concentration =   25.50 min.
Depth of flow =   0.344(Ft.)
Average velocity =   1.977(Ft/s)
Total irregular channel flow =    23.387(CFS)
Irregular channel normal depth above invert elev. =   0.344(Ft.)
Average velocity of channel(s) =   1.977(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     18.097(Ac.)
Runoff from this stream =     23.387(CFS)
Time of concentration =   25.50 min.
Rainfall intensity =     2.189(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     14.22     6.147     15.01    0.664      3.009
2     23.39    18.097     25.50    0.782      2.189
Qmax(1) =
         1.000 *    1.000 *    14.220) +
         1.583 *    0.588 *    23.387) + =      36.004
Qmax(2) =
         0.650 *    1.000 *    14.220) +
         1.000 *    1.000 *    23.387) + =      32.633

Total of 2 main streams to confluence:
Flow rates before confluence point:
      15.220      24.387
Maximum flow rates at confluence using above data:
       36.004       32.633
Area of streams before confluence:
        6.147       18.097
Effective area values after confluence:
       16.797       24.244


Results of confluence:
Total flow rate =     36.004(CFS)
Time of concentration =    15.006 min.
Effective stream area after confluence  =     16.797(Ac.)
Study area average Pervious fraction(Ap) =  0.769
Study area average soil loss rate(Fm) =    0.752(In/Hr)
Study area total =      24.24(Ac.)
End of computations, Total Study Area =           30.54 (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) = 0.765
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/07/21

BLOOMINGTON COMMERCE CENTER - SITE 3
EXISTING CONDITION - LAUREL AVE
25-YEAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.998 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** 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 =   622.000(Ft.)
Top (of initial area) elevation =  1046.500(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =     6.400(Ft.)
Slope =    0.01029  s(%)=       1.03
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.952 min.
Rainfall intensity =      2.933(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.870
Subarea runoff =      2.373(CFS)
Total initial stream area =        0.930(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      0.930(Ac.)
Runoff from this stream =      2.373(CFS)
Time of concentration =    9.95 min.
Rainfall intensity =     2.933(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   846.000(Ft.)
Top (of initial area) elevation =  1050.900(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =    10.800(Ft.)
Slope =    0.01277  s(%)=       1.28
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.631 min.
Rainfall intensity =      2.155(In/Hr) for a    25.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.573
Subarea runoff =      6.746(CFS)
Total initial stream area =        5.460(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.460(Ac.)
Runoff from this stream =      6.746(CFS)
Time of concentration =   16.63 min.
Rainfall intensity =     2.155(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      2.37     0.930      9.95    0.098      2.933
2      6.75     5.460     16.63    0.782      2.155
Qmax(1) =
         1.000 *    1.000 *     2.373) +
         1.566 *    0.598 *     6.746) + =       8.697
Qmax(2) =
         0.726 *    1.000 *     2.373) +
         1.000 *    1.000 *     6.746) + =       8.468

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.373       7.746
Maximum flow rates at confluence using above data:
        8.697        8.468
Area of streams before confluence:
        0.930        5.460
Effective area values after confluence:
        4.197        6.390


Results of confluence:
Total flow rate =      8.697(CFS)
Time of concentration =     9.952 min.
Effective stream area after confluence  =      4.197(Ac.)
Study area average Pervious fraction(Ap) =  0.698
Study area average soil loss rate(Fm) =    0.683(In/Hr)
Study area total =       6.39(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of street segment elevation =  1040.100(Ft.)
End of street segment elevation =  1034.700(Ft.)
Length of street segment  =   661.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  20.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =  0.0200
Estimated mean flow rate at midpoint of street =      8.757(CFS)
Depth of flow =   0.391(Ft.), Average velocity =   1.939(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  14.789(Ft.)
Flow velocity =   1.94(Ft/s)
Travel time =    5.68 min.     TC =   15.63  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      7.087(CFS)
therefore the upstream flow rate of Q =      8.697(CFS) is being used
Rainfall intensity =      2.236(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.618
Subarea runoff =      0.000(CFS) for    0.930(Ac.)
Total runoff =      8.697(CFS)
Effective area this stream =        5.13(Ac.)
Total Study Area (Main Stream No. 1) =        7.32(Ac.)
Area averaged Fm value =    0.701(In/Hr)
Street flow at end of street =      8.697(CFS)
Half street flow at end of street =      4.348(CFS)
Depth of flow =   0.390(Ft.), Average velocity =   1.935(Ft/s)
Flow width (from curb towards crown)=  14.749(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.127(Ac.)
Runoff from this stream =      8.697(CFS)
Time of concentration =   15.63 min.
Rainfall intensity =     2.236(In/Hr)
Area averaged loss rate (Fm) =    0.7007(In/Hr)
Area averaged Pervious ratio (Ap) = 0.7166
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       52.000 to Point/Station       53.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   323.000(Ft.)
Top (of initial area) elevation =  1055.800(Ft.)
Bottom (of initial area) elevation =  1049.100(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.02074  s(%)=       2.07
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.268 min.
Rainfall intensity =      2.878(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.655
Subarea runoff =      2.377(CFS)
Total initial stream area =        1.260(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       53.000 to Point/Station       54.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     13.094(CFS)
Depth of flow =   0.255(Ft.), Average velocity =   1.010(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      6.547(CFS)
  '     '    flow top width =     50.919(Ft.)
  '     '    velocity=    1.010(Ft/s)
  '     '    area =      6.482(Sq.Ft)
  '     '    Froude number =     0.499

Upstream point elevation =  1049.100(Ft.)
Downstream point elevation =  1043.600(Ft.)
Flow length =   847.000(Ft.)
Travel time  =   13.98 min.
Time of concentration =   24.24 min.
Depth of flow =   0.255(Ft.)
Average velocity =   1.010(Ft/s)
Total irregular channel flow =     6.547(CFS)
Irregular channel normal depth above invert elev. =   0.255(Ft.)
Average velocity of channel(s) =   1.010(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.719(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.490
Subarea runoff =      8.279(CFS) for   11.380(Ac.)
Total runoff =     10.655(CFS)
Effective area this stream =       12.64(Ac.)
Total Study Area (Main Stream No. 2) =       19.96(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.306(Ft.), Average velocity =   1.141(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     21.401(CFS)
Depth of flow =   0.285(Ft.), Average velocity =   1.317(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     10.700(CFS)
  '     '    flow top width =     57.017(Ft.)
  '     '    velocity=    1.317(Ft/s)
  '     '    area =      8.127(Sq.Ft)
  '     '    Froude number =     0.615

Upstream point elevation =  1043.600(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   822.000(Ft.)
Travel time  =   10.41 min.
Time of concentration =   34.65 min.
Depth of flow =   0.285(Ft.)
Average velocity =   1.317(Ft/s)
Total irregular channel flow =    10.700(CFS)
Irregular channel normal depth above invert elev. =   0.285(Ft.)
Average velocity of channel(s) =   1.317(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     10.517(CFS)
therefore the upstream flow rate of Q =     10.655(CFS) is being used
Rainfall intensity =      1.387(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.393
Subarea runoff =      0.000(CFS) for    6.670(Ac.)
Total runoff =     10.655(CFS)
Effective area this stream =       19.31(Ac.)
Total Study Area (Main Stream No. 2) =       26.63(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.285(Ft.), Average velocity =   1.315(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     19.310(Ac.)
Runoff from this stream =     10.655(CFS)
Time of concentration =   34.65 min.
Rainfall intensity =     1.387(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.000 to Point/Station       55.100
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   538.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1039.900(Ft.)
Difference in elevation =     7.300(Ft.)
Slope =    0.01357  s(%)=       1.36
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.708 min.
Rainfall intensity =      2.420(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.609
Subarea runoff =      1.150(CFS)
Total initial stream area =        0.780(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      3.456(CFS)
Depth of flow =   0.152(Ft.), Average velocity =   0.752(Ft/s)
      ******* Irregular Channel Data ***********
----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
----------------------------------------------------------------
Sub-Channel flow  =      1.728(CFS)
  '     '    flow top width =     30.311(Ft.)
  '     '    velocity=    0.752(Ft/s)
  '     '    area =      2.297(Sq.Ft)
  '     '    Froude number =     0.482

Upstream point elevation =  1039.900(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   570.000(Ft.)
Travel time  =   12.63 min.
Time of concentration =   26.34 min.
Depth of flow =   0.152(Ft.)
Average velocity =   0.752(Ft/s)
Total irregular channel flow =     1.728(CFS)
Irregular channel normal depth above invert elev. =   0.152(Ft.)
Average velocity of channel(s) =   0.752(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.636(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.470
Subarea runoff =      1.070(CFS) for    2.110(Ac.)
Total runoff =      2.220(CFS)
Effective area this stream =        2.89(Ac.)
Total Study Area (Main Stream No. 2) =       29.52(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.166(Ft.), Average velocity =   0.801(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.890(Ac.)
Runoff from this stream =      2.220(CFS)
Time of concentration =   26.34 min.
Rainfall intensity =     1.636(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     10.66    19.310     34.65    0.782      1.387
2      2.22     2.890     26.34    0.782      1.636
Qmax(1) =
         1.000 *    1.000 *    10.655) +
         0.709 *    1.000 *     2.220) + =      12.229
Qmax(2) =
         1.410 *    0.760 *    10.655) +
         1.000 *    1.000 *     2.220) + =      13.641

Total of 2 streams to confluence:
Flow rates before confluence point:
      10.655       2.220
Maximum flow rates at confluence using above data:
       12.229       13.641
Area of streams before confluence:
       19.310        2.890
Effective area values after confluence:
       22.200       17.567
Results of confluence:
Total flow rate =     13.641(CFS)
Time of concentration =    26.337 min.
Effective stream area after confluence =     17.567(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =      22.20(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   0.281(Ft.), Average velocity =   1.728(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     13.641(CFS)
  '     '    flow top width =     56.192(Ft.)
  '     '    velocity=    1.728(Ft/s)
  '     '    area =      7.894(Sq.Ft)
  '     '    Froude number =     0.812

Upstream point elevation =  1035.800(Ft.)
Downstream point elevation =  1034.700(Ft.)
Flow length =    66.000(Ft.)
Travel time  =    0.64 min.
Time of concentration =   26.97 min.
Depth of flow =   0.281(Ft.)
Average velocity =   1.728(Ft/s)
Total irregular channel flow =    13.641(CFS)
Irregular channel normal depth above invert elev. =   0.281(Ft.)
Average velocity of channel(s) =   1.728(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     17.567(Ac.)
Runoff from this stream =     13.641(CFS)
Time of concentration =   26.97 min.
Rainfall intensity =     1.612(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      8.70     5.127     15.63    0.701      2.236
2     13.64    17.567     26.97    0.782      1.612
Qmax(1) =
         1.000 *    1.000 *     8.697) +
         1.752 *    0.580 *    13.641) + =      22.548
Qmax(2) =
         0.594 *    1.000 *     8.697) +
         1.000 *    1.000 *    13.641) + =      18.803

Total of 2 main streams to confluence:
Flow rates before confluence point:
       9.697      14.641
Maximum flow rates at confluence using above data:
       22.548       18.803
Area of streams before confluence:
        5.127       17.567
Effective area values after confluence:
       15.310       22.694


Results of confluence:
Total flow rate =     22.548(CFS)
Time of concentration =    15.635 min.
Effective stream area after confluence  =     15.310(Ac.)
Study area average Pervious fraction(Ap) =  0.781
Study area average soil loss rate(Fm) =    0.764(In/Hr)
Study area total =      22.69(Ac.)
End of computations, Total Study Area =           29.52 (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) = 0.778
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/26/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISITNG CONDITION - LAUREL AVENUE
25-YEAR STORM EVENT ANALYSIS WITH ADJUSTED 10 YEAR RAINFALL DATA

Program License Serial Number 6405

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

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.813 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** 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 =   622.000(Ft.)
Top (of initial area) elevation =  1046.500(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =     6.400(Ft.)
Slope =    0.01029  s(%)=       1.03
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.952 min.
Rainfall intensity =      2.389(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.863
Subarea runoff =      1.918(CFS)
Total initial stream area =        0.930(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      0.930(Ac.)
Runoff from this stream =      1.918(CFS)
Time of concentration =    9.95 min.
Rainfall intensity =     2.389(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   846.000(Ft.)
Top (of initial area) elevation =  1050.900(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =    10.800(Ft.)
Slope =    0.01277  s(%)=       1.28
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.631 min.
Rainfall intensity =      1.756(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.499
Subarea runoff =      4.783(CFS)
Total initial stream area =        5.460(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.460(Ac.)
Runoff from this stream =      4.783(CFS)
Time of concentration =   16.63 min.
Rainfall intensity =     1.756(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      1.92     0.930      9.95    0.098      2.389
2      4.78     5.460     16.63    0.782      1.756
Qmax(1) =
         1.000 *    1.000 *     1.918) +
         1.651 *    0.598 *     4.783) + =       6.643
Qmax(2) =
         0.724 *    1.000 *     1.918) +
         1.000 *    1.000 *     4.783) + =       6.171

Total of 2 main streams to confluence:
Flow rates before confluence point:
       2.918       5.783
Maximum flow rates at confluence using above data:
        6.643        6.171
Area of streams before confluence:
        0.930        5.460
Effective area values after confluence:
        4.197        6.390


Results of confluence:
Total flow rate =      6.643(CFS)
Time of concentration =     9.952 min.
Effective stream area after confluence  =      4.197(Ac.)
Study area average Pervious fraction(Ap) =  0.698
Study area average soil loss rate(Fm) =    0.683(In/Hr)
Study area total =       6.39(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1040.100(Ft.)
End of street segment elevation =  1034.700(Ft.)
Length of street segment  =   661.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  20.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =  0.0200
Estimated mean flow rate at midpoint of street =      6.735(CFS)
Depth of flow =   0.362(Ft.), Average velocity =   1.822(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  13.331(Ft.)
Flow velocity =   1.82(Ft/s)
Travel time =    6.05 min.     TC =   16.00  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      5.058(CFS)
therefore the upstream flow rate of Q =      6.643(CFS) is being used
Rainfall intensity =      1.797(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.549
Subarea runoff =      0.000(CFS) for    0.930(Ac.)
Total runoff =      6.643(CFS)
Effective area this stream =        5.13(Ac.)
Total Study Area (Main Stream No. 1) =        7.32(Ac.)
Area averaged Fm value =    0.701(In/Hr)
Street flow at end of street =      6.643(CFS)
Half street flow at end of street =      3.321(CFS)
Depth of flow =   0.360(Ft.), Average velocity =   1.816(Ft/s)
Flow width (from curb towards crown)=  13.259(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.127(Ac.)
Runoff from this stream =      6.643(CFS)
Time of concentration =   16.00 min.
Rainfall intensity =     1.797(In/Hr)
Area averaged loss rate (Fm) =    0.7007(In/Hr)
Area averaged Pervious ratio (Ap) = 0.7166
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       52.000 to Point/Station       53.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   323.000(Ft.)
Top (of initial area) elevation =  1055.800(Ft.)
Bottom (of initial area) elevation =  1049.100(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.02074  s(%)=       2.07
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.268 min.
Rainfall intensity =      2.345(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =      1.772(CFS)
Total initial stream area =        1.260(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       53.000 to Point/Station       54.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      8.225(CFS)
Depth of flow =   0.214(Ft.), Average velocity =   0.899(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      4.112(CFS)
  '     '    flow top width =     42.771(Ft.)
  '     '    velocity=    0.899(Ft/s)
  '     '    area =      4.573(Sq.Ft)
  '     '    Froude number =     0.485

Upstream point elevation =  1049.100(Ft.)
Downstream point elevation =  1043.600(Ft.)
Flow length =   847.000(Ft.)
Travel time  =   15.70 min.
Time of concentration =   25.97 min.
Depth of flow =   0.214(Ft.)
Average velocity =   0.899(Ft/s)
Total irregular channel flow =     4.112(CFS)
Irregular channel normal depth above invert elev. =   0.214(Ft.)
Average velocity of channel(s) =   0.899(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.344(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.376
Subarea runoff =      4.616(CFS) for   11.380(Ac.)
Total runoff =      6.388(CFS)
Effective area this stream =       12.64(Ac.)
Total Study Area (Main Stream No. 2) =       19.96(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.252(Ft.), Average velocity =   1.004(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =     12.828(CFS)
Depth of flow =   0.235(Ft.), Average velocity =   1.158(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
--------------------------------------------------------------
Sub-Channel flow  =      6.414(CFS)
  '     '    flow top width =     47.061(Ft.)
  '     '    velocity=    1.158(Ft/s)
  '     '    area =      5.537(Sq.Ft)
  '     '    Froude number =     0.595

Upstream point elevation =  1043.600(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   822.000(Ft.)
Travel time  =   11.83 min.
Time of concentration =   37.79 min.
Depth of flow =   0.235(Ft.)
Average velocity =   1.158(Ft/s)
Total irregular channel flow =     6.414(CFS)
Irregular channel normal depth above invert elev. =   0.235(Ft.)
Average velocity of channel(s) =   1.158(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      5.050(CFS)
therefore the upstream flow rate of Q =      6.388(CFS) is being used
Rainfall intensity =      1.073(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.244
Subarea runoff =      0.000(CFS) for    6.670(Ac.)
Total runoff =      6.388(CFS)
Effective area this stream =       19.31(Ac.)
Total Study Area (Main Stream No. 2) =       26.63(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.235(Ft.), Average velocity =   1.157(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     19.310(Ac.)
Runoff from this stream =      6.388(CFS)
Time of concentration =   37.79 min.
Rainfall intensity =     1.073(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.000 to Point/Station       55.100
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   538.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1039.900(Ft.)
Difference in elevation =     7.300(Ft.)
Slope =    0.01357  s(%)=       1.36
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.708 min.
Rainfall intensity =      1.971(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.543
Subarea runoff =      0.835(CFS)
Total initial stream area =        0.780(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      2.236(CFS)
Depth of flow =   0.129(Ft.), Average velocity =   0.675(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      1.118(CFS)
  '     '    flow top width =     25.747(Ft.)
  '     '    velocity=    0.675(Ft/s)
  '     '    area =      1.657(Sq.Ft)
  '     '    Froude number =     0.469

Upstream point elevation =  1039.900(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   570.000(Ft.)
Travel time  =   14.08 min.
Time of concentration =   27.79 min.
Depth of flow =   0.129(Ft.)
Average velocity =   0.675(Ft/s)
Total irregular channel flow =     1.118(CFS)
Irregular channel normal depth above invert elev. =   0.129(Ft.)
Average velocity of channel(s) =   0.675(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.290(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.354
Subarea runoff =      0.486(CFS) for    2.110(Ac.)
Total runoff =      1.321(CFS)
Effective area this stream =        2.89(Ac.)
Total Study Area (Main Stream No. 2) =       29.52(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.137(Ft.), Average velocity =   0.703(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.890(Ac.)
Runoff from this stream =      1.321(CFS)
Time of concentration =   27.79 min.
Rainfall intensity =     1.290(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      6.39    19.310     37.79    0.782      1.073
2      1.32     2.890     27.79    0.782      1.290
Qmax(1) =
         1.000 *    1.000 *     6.388) +
         0.572 *    1.000 *     1.321) + =       7.144
Qmax(2) =
         1.748 *    0.735 *     6.388) +
         1.000 *    1.000 *     1.321) + =       9.532

Total of 2 streams to confluence:
Flow rates before confluence point:
       6.388       1.321
Maximum flow rates at confluence using above data:
        7.144        9.532
Area of streams before confluence:
       19.310        2.890
Effective area values after confluence:
       22.200       17.088
Results of confluence:
Total flow rate =      9.532(CFS)
Time of concentration =    27.788 min.
Effective stream area after confluence =     17.088(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =      22.20(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Depth of flow =   0.246(Ft.), Average velocity =   1.580(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      9.532(CFS)
  '     '    flow top width =     49.125(Ft.)
  '     '    velocity=    1.580(Ft/s)
  '     '    area =      6.033(Sq.Ft)
  '     '    Froude number =     0.794

Upstream point elevation =  1035.800(Ft.)
Downstream point elevation =  1034.700(Ft.)
Flow length =    66.000(Ft.)
Travel time  =    0.70 min.
Time of concentration =   28.48 min.
Depth of flow =   0.246(Ft.)
Average velocity =   1.580(Ft/s)
Total irregular channel flow =     9.532(CFS)
Irregular channel normal depth above invert elev. =   0.246(Ft.)
Average velocity of channel(s) =   1.580(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     17.088(Ac.)
Runoff from this stream =      9.532(CFS)
Time of concentration =   28.48 min.
Rainfall intensity =     1.271(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      6.64     5.127     16.00    0.701      1.797
2      9.53    17.088     28.48    0.782      1.271
Qmax(1) =
         1.000 *    1.000 *     6.643) +
         2.075 *    0.562 *     9.532) + =      17.753
Qmax(2) =
         0.520 *    1.000 *     6.643) +
         1.000 *    1.000 *     9.532) + =      12.989

Total of 2 main streams to confluence:
Flow rates before confluence point:
       7.643      10.532
Maximum flow rates at confluence using above data:
       17.753       12.989
Area of streams before confluence:
        5.127       17.088
Effective area values after confluence:
       14.726       22.215


Results of confluence:
Total flow rate =     17.753(CFS)
Time of concentration =    15.999 min.
Effective stream area after confluence  =     14.726(Ac.)
Study area average Pervious fraction(Ap) =  0.781
Study area average soil loss rate(Fm) =    0.763(In/Hr)
Study area total =      22.22(Ac.)
End of computations, Total Study Area =           29.52 (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) = 0.778
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/07/21

BLOOMINGTON COMMERCE CENTER - SITE 3
PROPOSED CONDITION - LAUREL AVE
100-YEAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.998 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** 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 =   622.000(Ft.)
Top (of initial area) elevation =  1046.500(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =     6.400(Ft.)
Slope =    0.01029  s(%)=       1.03
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.952 min.
Rainfall intensity =      2.933(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.870
Subarea runoff =      3.929(CFS)
Total initial stream area =        1.540(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.540(Ac.)
Runoff from this stream =      3.929(CFS)
Time of concentration =    9.95 min.
Rainfall intensity =     2.933(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   846.000(Ft.)
Top (of initial area) elevation =  1050.900(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =    10.800(Ft.)
Slope =    0.01277  s(%)=       1.28
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.631 min.
Rainfall intensity =      2.155(In/Hr) for a    25.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.573
Subarea runoff =      6.746(CFS)
Total initial stream area =        5.460(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.460(Ac.)
Runoff from this stream =      6.746(CFS)
Time of concentration =   16.63 min.
Rainfall intensity =     2.155(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      3.93     1.540      9.95    0.098      2.933
2      6.75     5.460     16.63    0.782      2.155
Qmax(1) =
         1.000 *    1.000 *     3.929) +
         1.566 *    0.598 *     6.746) + =      10.253
Qmax(2) =
         0.726 *    1.000 *     3.929) +
         1.000 *    1.000 *     6.746) + =       9.598

Total of 2 main streams to confluence:
Flow rates before confluence point:
       4.929       7.746
Maximum flow rates at confluence using above data:
       10.253        9.598
Area of streams before confluence:
        1.540        5.460
Effective area values after confluence:
        4.807        7.000


Results of confluence:
Total flow rate =     10.253(CFS)
Time of concentration =     9.952 min.
Effective stream area after confluence  =      4.807(Ac.)
Study area average Pervious fraction(Ap) =  0.646
Study area average soil loss rate(Fm) =    0.632(In/Hr)
Study area total =       7.00(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1040.100(Ft.)
End of street segment elevation =  1034.700(Ft.)
Length of street segment  =   661.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  20.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =  0.0200
Estimated mean flow rate at midpoint of street =     10.342(CFS)
Depth of flow =   0.411(Ft.), Average velocity =   2.017(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  15.787(Ft.)
Flow velocity =   2.02(Ft/s)
Travel time =    5.46 min.     TC =   15.41  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      8.803(CFS)
therefore the upstream flow rate of Q =     10.253(CFS) is being used
Rainfall intensity =      2.256(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.635
Subarea runoff =      0.000(CFS) for    1.340(Ac.)
Total runoff =     10.253(CFS)
Effective area this stream =        6.15(Ac.)
Total Study Area (Main Stream No. 1) =        8.34(Ac.)
Area averaged Fm value =    0.664(In/Hr)
Street flow at end of street =     10.253(CFS)
Half street flow at end of street =      5.127(CFS)
Depth of flow =   0.410(Ft.), Average velocity =   2.013(Ft/s)
Flow width (from curb towards crown)=  15.734(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      6.147(Ac.)
Runoff from this stream =     10.253(CFS)
Time of concentration =   15.41 min.
Rainfall intensity =     2.256(In/Hr)
Area averaged loss rate (Fm) =    0.6645(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6796
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       52.000 to Point/Station       53.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   323.000(Ft.)
Top (of initial area) elevation =  1055.800(Ft.)
Bottom (of initial area) elevation =  1049.100(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.02074  s(%)=       2.07
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.268 min.
Rainfall intensity =      2.878(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.655
Subarea runoff =      2.377(CFS)
Total initial stream area =        1.260(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       53.000 to Point/Station       54.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     13.094(CFS)
Depth of flow =   0.255(Ft.), Average velocity =   1.010(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      6.547(CFS)
  '     '    flow top width =     50.919(Ft.)
  '     '    velocity=    1.010(Ft/s)
  '     '    area =      6.482(Sq.Ft)
  '     '    Froude number =     0.499

Upstream point elevation =  1049.100(Ft.)
Downstream point elevation =  1043.600(Ft.)
Flow length =   847.000(Ft.)
Travel time  =   13.98 min.
Time of concentration =   24.24 min.
Depth of flow =   0.255(Ft.)
Average velocity =   1.010(Ft/s)
Total irregular channel flow =     6.547(CFS)
Irregular channel normal depth above invert elev. =   0.255(Ft.)
Average velocity of channel(s) =   1.010(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.719(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.490
Subarea runoff =      8.279(CFS) for   11.380(Ac.)
Total runoff =     10.655(CFS)
Effective area this stream =       12.64(Ac.)
Total Study Area (Main Stream No. 2) =       20.98(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.306(Ft.), Average velocity =   1.141(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =     21.401(CFS)
Depth of flow =   0.285(Ft.), Average velocity =   1.317(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     10.700(CFS)
  '     '    flow top width =     57.017(Ft.)
  '     '    velocity=    1.317(Ft/s)
  '     '    area =      8.127(Sq.Ft)
  '     '    Froude number =     0.615

Upstream point elevation =  1043.600(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   822.000(Ft.)
Travel time  =   10.41 min.
Time of concentration =   34.65 min.
Depth of flow =   0.285(Ft.)
Average velocity =   1.317(Ft/s)
Total irregular channel flow =    10.700(CFS)
Irregular channel normal depth above invert elev. =   0.285(Ft.)
Average velocity of channel(s) =   1.317(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     10.517(CFS)
therefore the upstream flow rate of Q =     10.655(CFS) is being used
Rainfall intensity =      1.387(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.393
Subarea runoff =      0.000(CFS) for    6.670(Ac.)
Total runoff =     10.655(CFS)
Effective area this stream =       19.31(Ac.)
Total Study Area (Main Stream No. 2) =       27.65(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.285(Ft.), Average velocity =   1.315(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     19.310(Ac.)
Runoff from this stream =     10.655(CFS)
Time of concentration =   34.65 min.
Rainfall intensity =     1.387(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.000 to Point/Station       55.100
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   538.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1039.900(Ft.)
Difference in elevation =     7.300(Ft.)
Slope =    0.01357  s(%)=       1.36
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.708 min.
Rainfall intensity =      2.420(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.609
Subarea runoff =      1.150(CFS)
Total initial stream area =        0.780(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      3.456(CFS)
Depth of flow =   0.152(Ft.), Average velocity =   0.752(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      1.728(CFS)
  '     '    flow top width =     30.311(Ft.)
  '     '    velocity=    0.752(Ft/s)
  '     '    area =      2.297(Sq.Ft)
  '     '    Froude number =     0.482

Upstream point elevation =  1039.900(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   570.000(Ft.)
Travel time  =   12.63 min.
Time of concentration =   26.34 min.
Depth of flow =   0.152(Ft.)
Average velocity =   0.752(Ft/s)
Total irregular channel flow =     1.728(CFS)
Irregular channel normal depth above invert elev. =   0.152(Ft.)
Average velocity of channel(s) =   0.752(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.636(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.470
Subarea runoff =      1.070(CFS) for    2.110(Ac.)
Total runoff =      2.220(CFS)
Effective area this stream =        2.89(Ac.)
Total Study Area (Main Stream No. 2) =       30.54(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.166(Ft.), Average velocity =   0.801(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.890(Ac.)
Runoff from this stream =      2.220(CFS)
Time of concentration =   26.34 min.
Rainfall intensity =     1.636(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     10.66    19.310     34.65    0.782      1.387
2      2.22     2.890     26.34    0.782      1.636
Qmax(1) =
         1.000 *    1.000 *    10.655) +
         0.709 *    1.000 *     2.220) + =      12.229
Qmax(2) =
         1.410 *    0.760 *    10.655) +
         1.000 *    1.000 *     2.220) + =      13.641

Total of 2 streams to confluence:
Flow rates before confluence point:
      10.655       2.220
Maximum flow rates at confluence using above data:
       12.229       13.641
Area of streams before confluence:
       19.310        2.890
Effective area values after confluence:
       22.200       17.567
Results of confluence:
Total flow rate =     13.641(CFS)
Time of concentration =    26.337 min.
Effective stream area after confluence =     17.567(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =      22.20(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   0.281(Ft.), Average velocity =   1.728(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     13.641(CFS)
  '     '    flow top width =     56.192(Ft.)
  '     '    velocity=    1.728(Ft/s)
  '     '    area =      7.894(Sq.Ft)
  '     '    Froude number =     0.812

Upstream point elevation =  1035.800(Ft.)
Downstream point elevation =  1034.700(Ft.)
Flow length =    66.000(Ft.)
Travel time  =    0.64 min.
Time of concentration =   26.97 min.
Depth of flow =   0.281(Ft.)
Average velocity =   1.728(Ft/s)
Total irregular channel flow =    13.641(CFS)
Irregular channel normal depth above invert elev. =   0.281(Ft.)
Average velocity of channel(s) =   1.728(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     17.567(Ac.)
Runoff from this stream =     13.641(CFS)
Time of concentration =   26.97 min.
Rainfall intensity =     1.612(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1     10.25     6.147     15.41    0.664      2.256
2     13.64    17.567     26.97    0.782      1.612
Qmax(1) =
         1.000 *    1.000 *    10.253) +
         1.775 *    0.571 *    13.641) + =      24.089
Qmax(2) =
         0.596 *    1.000 *    10.253) +
         1.000 *    1.000 *    13.641) + =      19.749

Total of 2 main streams to confluence:
Flow rates before confluence point:
      11.253      14.641
Maximum flow rates at confluence using above data:
       24.089       19.749
Area of streams before confluence:
        6.147       17.567
Effective area values after confluence:
       16.186       23.714


Results of confluence:
Total flow rate =     24.089(CFS)
Time of concentration =    15.414 min.
Effective stream area after confluence  =     16.186(Ac.)
Study area average Pervious fraction(Ap) =  0.769
Study area average soil loss rate(Fm) =    0.752(In/Hr)
Study area total =      23.71(Ac.)
End of computations, Total Study Area =           30.54 (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) = 0.765
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/07/21

BLOOMINGTON COMMERCE CENTER
EXISTING CONDITION – LAUREL AVE
10 -YEAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.813 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** 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 =   622.000(Ft.)
Top (of initial area) elevation =  1046.500(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =     6.400(Ft.)
Slope =    0.01029  s(%)=       1.03
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.952 min.
Rainfall intensity =      2.389(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.863
Subarea runoff =      1.918(CFS)
Total initial stream area =        0.930(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      0.930(Ac.)
Runoff from this stream =      1.918(CFS)
Time of concentration =    9.95 min.
Rainfall intensity =     2.389(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   846.000(Ft.)
Top (of initial area) elevation =  1050.900(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =    10.800(Ft.)
Slope =    0.01277  s(%)=       1.28
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.631 min.
Rainfall intensity =      1.756(In/Hr) for a    10.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.499
Subarea runoff =      4.783(CFS)
Total initial stream area =        5.460(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.460(Ac.)
Runoff from this stream =      4.783(CFS)
Time of concentration =   16.63 min.
Rainfall intensity =     1.756(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      1.92     0.930      9.95    0.098      2.389
2      4.78     5.460     16.63    0.782      1.756
Qmax(1) =
         1.000 *    1.000 *     1.918) +
         1.651 *    0.598 *     4.783) + =       6.643
Qmax(2) =
         0.724 *    1.000 *     1.918) +
         1.000 *    1.000 *     4.783) + =       6.171

Total of 2 main streams to confluence:
Flow rates before confluence point:
       2.918       5.783
Maximum flow rates at confluence using above data:
        6.643        6.171
Area of streams before confluence:
        0.930        5.460
Effective area values after confluence:
        4.197        6.390


Results of confluence:
Total flow rate =      6.643(CFS)
Time of concentration =     9.952 min.
Effective stream area after confluence  =      4.197(Ac.)
Study area average Pervious fraction(Ap) =  0.698
Study area average soil loss rate(Fm) =    0.683(In/Hr)
Study area total =       6.39(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1040.100(Ft.)
End of street segment elevation =  1034.700(Ft.)
Length of street segment  =   661.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  20.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =  0.0200
Estimated mean flow rate at midpoint of street =      6.735(CFS)
Depth of flow =   0.362(Ft.), Average velocity =   1.822(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  13.331(Ft.)
Flow velocity =   1.82(Ft/s)
Travel time =    6.05 min.     TC =   16.00  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      5.058(CFS)
therefore the upstream flow rate of Q =      6.643(CFS) is being used
Rainfall intensity =      1.797(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.549
Subarea runoff =      0.000(CFS) for    0.930(Ac.)
Total runoff =      6.643(CFS)
Effective area this stream =        5.13(Ac.)
Total Study Area (Main Stream No. 1) =        7.32(Ac.)
Area averaged Fm value =    0.701(In/Hr)
Street flow at end of street =      6.643(CFS)
Half street flow at end of street =      3.321(CFS)
Depth of flow =   0.360(Ft.), Average velocity =   1.816(Ft/s)
Flow width (from curb towards crown)=  13.259(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.127(Ac.)
Runoff from this stream =      6.643(CFS)
Time of concentration =   16.00 min.
Rainfall intensity =     1.797(In/Hr)
Area averaged loss rate (Fm) =    0.7007(In/Hr)
Area averaged Pervious ratio (Ap) = 0.7166
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       52.000 to Point/Station       53.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   323.000(Ft.)
Top (of initial area) elevation =  1055.800(Ft.)
Bottom (of initial area) elevation =  1049.100(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.02074  s(%)=       2.07
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.268 min.
Rainfall intensity =      2.345(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =      1.772(CFS)
Total initial stream area =        1.260(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       53.000 to Point/Station       54.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      8.225(CFS)
Depth of flow =   0.214(Ft.), Average velocity =   0.899(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      4.112(CFS)
  '     '    flow top width =     42.771(Ft.)
  '     '    velocity=    0.899(Ft/s)
  '     '    area =      4.573(Sq.Ft)
  '     '    Froude number =     0.485

Upstream point elevation =  1049.100(Ft.)
Downstream point elevation =  1043.600(Ft.)
Flow length =   847.000(Ft.)
Travel time  =   15.70 min.
Time of concentration =   25.97 min.
Depth of flow =   0.214(Ft.)
Average velocity =   0.899(Ft/s)
Total irregular channel flow =     4.112(CFS)
Irregular channel normal depth above invert elev. =   0.214(Ft.)
Average velocity of channel(s) =   0.899(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.344(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.376
Subarea runoff =      4.616(CFS) for   11.380(Ac.)
Total runoff =      6.388(CFS)
Effective area this stream =       12.64(Ac.)
Total Study Area (Main Stream No. 2) =       19.96(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.252(Ft.), Average velocity =   1.004(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =     12.828(CFS)
Depth of flow =   0.235(Ft.), Average velocity =   1.158(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
--------------------------------------------------------------
Sub-Channel flow  =      6.414(CFS)
  '     '    flow top width =     47.061(Ft.)
  '     '    velocity=    1.158(Ft/s)
  '     '    area =      5.537(Sq.Ft)
  '     '    Froude number =     0.595

Upstream point elevation =  1043.600(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   822.000(Ft.)
Travel time  =   11.83 min.
Time of concentration =   37.79 min.
Depth of flow =   0.235(Ft.)
Average velocity =   1.158(Ft/s)
Total irregular channel flow =     6.414(CFS)
Irregular channel normal depth above invert elev. =   0.235(Ft.)
Average velocity of channel(s) =   1.158(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      5.050(CFS)
therefore the upstream flow rate of Q =      6.388(CFS) is being used
Rainfall intensity =      1.073(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.244
Subarea runoff =      0.000(CFS) for    6.670(Ac.)
Total runoff =      6.388(CFS)
Effective area this stream =       19.31(Ac.)
Total Study Area (Main Stream No. 2) =       26.63(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.235(Ft.), Average velocity =   1.157(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     19.310(Ac.)
Runoff from this stream =      6.388(CFS)
Time of concentration =   37.79 min.
Rainfall intensity =     1.073(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.000 to Point/Station       55.100
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   538.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1039.900(Ft.)
Difference in elevation =     7.300(Ft.)
Slope =    0.01357  s(%)=       1.36
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.708 min.
Rainfall intensity =      1.971(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.543
Subarea runoff =      0.835(CFS)
Total initial stream area =        0.780(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      2.236(CFS)
Depth of flow =   0.129(Ft.), Average velocity =   0.675(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      1.118(CFS)
  '     '    flow top width =     25.747(Ft.)
  '     '    velocity=    0.675(Ft/s)
  '     '    area =      1.657(Sq.Ft)
  '     '    Froude number =     0.469

Upstream point elevation =  1039.900(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   570.000(Ft.)
Travel time  =   14.08 min.
Time of concentration =   27.79 min.
Depth of flow =   0.129(Ft.)
Average velocity =   0.675(Ft/s)
Total irregular channel flow =     1.118(CFS)
Irregular channel normal depth above invert elev. =   0.129(Ft.)
Average velocity of channel(s) =   0.675(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.290(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.354
Subarea runoff =      0.486(CFS) for    2.110(Ac.)
Total runoff =      1.321(CFS)
Effective area this stream =        2.89(Ac.)
Total Study Area (Main Stream No. 2) =       29.52(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.137(Ft.), Average velocity =   0.703(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.890(Ac.)
Runoff from this stream =      1.321(CFS)
Time of concentration =   27.79 min.
Rainfall intensity =     1.290(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      6.39    19.310     37.79    0.782      1.073
2      1.32     2.890     27.79    0.782      1.290
Qmax(1) =
         1.000 *    1.000 *     6.388) +
         0.572 *    1.000 *     1.321) + =       7.144
Qmax(2) =
         1.748 *    0.735 *     6.388) +
         1.000 *    1.000 *     1.321) + =       9.532

Total of 2 streams to confluence:
Flow rates before confluence point:
       6.388       1.321
Maximum flow rates at confluence using above data:
        7.144        9.532
Area of streams before confluence:
       19.310        2.890
Effective area values after confluence:
       22.200       17.088
Results of confluence:
Total flow rate =      9.532(CFS)
Time of concentration =    27.788 min.
Effective stream area after confluence =     17.088(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =      22.20(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Depth of flow =   0.246(Ft.), Average velocity =   1.580(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      9.532(CFS)
  '     '    flow top width =     49.125(Ft.)
  '     '    velocity=    1.580(Ft/s)
  '     '    area =      6.033(Sq.Ft)
  '     '    Froude number =     0.794

Upstream point elevation =  1035.800(Ft.)
Downstream point elevation =  1034.700(Ft.)
Flow length =    66.000(Ft.)
Travel time  =    0.70 min.
Time of concentration =   28.48 min.
Depth of flow =   0.246(Ft.)
Average velocity =   1.580(Ft/s)
Total irregular channel flow =     9.532(CFS)
Irregular channel normal depth above invert elev. =   0.246(Ft.)
Average velocity of channel(s) =   1.580(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     17.088(Ac.)
Runoff from this stream =      9.532(CFS)
Time of concentration =   28.48 min.
Rainfall intensity =     1.271(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      6.64     5.127     16.00    0.701      1.797
2      9.53    17.088     28.48    0.782      1.271
Qmax(1) =
         1.000 *    1.000 *     6.643) +
         2.075 *    0.562 *     9.532) + =      17.753
Qmax(2) =
         0.520 *    1.000 *     6.643) +
         1.000 *    1.000 *     9.532) + =      12.989

Total of 2 main streams to confluence:
Flow rates before confluence point:
       7.643      10.532
Maximum flow rates at confluence using above data:
       17.753       12.989
Area of streams before confluence:
        5.127       17.088
Effective area values after confluence:
       14.726       22.215


Results of confluence:
Total flow rate =     17.753(CFS)
Time of concentration =    15.999 min.
Effective stream area after confluence  =     14.726(Ac.)
Study area average Pervious fraction(Ap) =  0.781
Study area average soil loss rate(Fm) =    0.763(In/Hr)
Study area total =      22.22(Ac.)
End of computations, Total Study Area =           29.52 (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) = 0.778
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/26/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISITNG CONDITION - LAUREL AVENUE
10-YEAR STORM EVENT ANALYSIS WITH ADJUSTED 5 YEAR RAINFALL DATA

Program License Serial Number 6405

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.680 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** 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 =   622.000(Ft.)
Top (of initial area) elevation =  1046.500(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =     6.400(Ft.)
Slope =    0.01029  s(%)=       1.03
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.952 min.
Rainfall intensity =      1.998(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.856
Subarea runoff =      1.591(CFS)
Total initial stream area =        0.930(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      0.930(Ac.)
Runoff from this stream =      1.591(CFS)
Time of concentration =    9.95 min.
Rainfall intensity =     1.998(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   846.000(Ft.)
Top (of initial area) elevation =  1050.900(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =    10.800(Ft.)
Slope =    0.01277  s(%)=       1.28
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.631 min.
Rainfall intensity =      1.468(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.421
Subarea runoff =      3.372(CFS)
Total initial stream area =        5.460(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.460(Ac.)
Runoff from this stream =      3.372(CFS)
Time of concentration =   16.63 min.
Rainfall intensity =     1.468(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      1.59     0.930      9.95    0.098      1.998
2      3.37     5.460     16.63    0.782      1.468
Qmax(1) =
         1.000 *    1.000 *     1.591) +
         1.772 *    0.598 *     3.372) + =       5.167
Qmax(2) =
         0.721 *    1.000 *     1.591) +
         1.000 *    1.000 *     3.372) + =       4.519

Total of 2 main streams to confluence:
Flow rates before confluence point:
       2.591       4.372
Maximum flow rates at confluence using above data:
        5.167        4.519
Area of streams before confluence:
        0.930        5.460
Effective area values after confluence:
        4.197        6.390


Results of confluence:
Total flow rate =      5.167(CFS)
Time of concentration =     9.952 min.
Effective stream area after confluence  =      4.197(Ac.)
Study area average Pervious fraction(Ap) =  0.698
Study area average soil loss rate(Fm) =    0.683(In/Hr)
Study area total =       6.39(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of street segment elevation =  1040.100(Ft.)
End of street segment elevation =  1034.700(Ft.)
Length of street segment  =   661.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  20.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =  0.0200
Estimated mean flow rate at midpoint of street =      5.238(CFS)
Depth of flow =   0.336(Ft.), Average velocity =   1.717(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  12.057(Ft.)
Flow velocity =   1.72(Ft/s)
Travel time =    6.41 min.     TC =   16.37  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      3.608(CFS)
therefore the upstream flow rate of Q =      5.167(CFS) is being used
Rainfall intensity =      1.483(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.475
Subarea runoff =      0.000(CFS) for    0.930(Ac.)
Total runoff =      5.167(CFS)
Effective area this stream =        5.13(Ac.)
Total Study Area (Main Stream No. 1) =        7.32(Ac.)
Area averaged Fm value =    0.701(In/Hr)
Street flow at end of street =      5.167(CFS)
Half street flow at end of street =      2.583(CFS)
Depth of flow =   0.335(Ft.), Average velocity =   1.712(Ft/s)
Flow width (from curb towards crown)=  11.990(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.127(Ac.)
Runoff from this stream =      5.167(CFS)
Time of concentration =   16.37 min.
Rainfall intensity =     1.483(In/Hr)
Area averaged loss rate (Fm) =    0.7007(In/Hr)
Area averaged Pervious ratio (Ap) = 0.7166
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       52.000 to Point/Station       53.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   323.000(Ft.)
Top (of initial area) elevation =  1055.800(Ft.)
Bottom (of initial area) elevation =  1049.100(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.02074  s(%)=       2.07
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.268 min.
Rainfall intensity =      1.961(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.541
Subarea runoff =      1.337(CFS)
Total initial stream area =        1.260(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       53.000 to Point/Station       54.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      4.644(CFS)
Depth of flow =   0.173(Ft.), Average velocity =   0.779(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
--------------------------------------------------------------
Sub-Channel flow  =      2.322(CFS)
  '     '    flow top width =     34.521(Ft.)
  '     '    velocity=    0.779(Ft/s)
  '     '    area =      2.979(Sq.Ft)
  '     '    Froude number =     0.468

Upstream point elevation =  1049.100(Ft.)
Downstream point elevation =  1043.600(Ft.)
Flow length =   847.000(Ft.)
Travel time  =   18.11 min.
Time of concentration =   28.38 min.
Depth of flow =   0.173(Ft.)
Average velocity =   0.779(Ft/s)
Total irregular channel flow =     2.322(CFS)
Irregular channel normal depth above invert elev. =   0.173(Ft.)
Average velocity of channel(s) =   0.779(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.066(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.239
Subarea runoff =      1.887(CFS) for   11.380(Ac.)
Total runoff =      3.224(CFS)
Effective area this stream =       12.64(Ac.)
Total Study Area (Main Stream No. 2) =       19.96(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.195(Ft.), Average velocity =   0.846(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      6.501(CFS)
Depth of flow =   0.182(Ft.), Average velocity =   0.977(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
--------------------------------------------------------------------
Sub-Channel flow  =      3.250(CFS)
  '     '    flow top width =     36.471(Ft.)
  '     '    velocity=    0.977(Ft/s)
  '     '    area =      3.325(Sq.Ft)
  '     '    Froude number =     0.570

Upstream point elevation =  1043.600(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   822.000(Ft.)
Travel time  =   14.02 min.
Time of concentration =   42.39 min.
Depth of flow =   0.182(Ft.)
Average velocity =   0.977(Ft/s)
Total irregular channel flow =     3.250(CFS)
Irregular channel normal depth above invert elev. =   0.182(Ft.)
Average velocity of channel(s) =   0.977(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      2.911(CFS)
therefore the upstream flow rate of Q =      3.224(CFS) is being used
Rainfall intensity =      0.838(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.180
Subarea runoff =      0.000(CFS) for    6.670(Ac.)
Total runoff =      3.224(CFS)
Effective area this stream =       19.31(Ac.)
Total Study Area (Main Stream No. 2) =       26.63(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.182(Ft.), Average velocity =   0.975(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     19.310(Ac.)
Runoff from this stream =      3.224(CFS)
Time of concentration =   42.39 min.
Rainfall intensity =     0.838(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.000 to Point/Station       55.100
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   538.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1039.900(Ft.)
Difference in elevation =     7.300(Ft.)
Slope =    0.01357  s(%)=       1.36
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.708 min.
Rainfall intensity =      1.649(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.473
Subarea runoff =      0.608(CFS)
Total initial stream area =        0.780(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      1.353(CFS)
Depth of flow =   0.107(Ft.), Average velocity =   0.595(Ft/s)
      ******* Irregular Channel Data ***********
-------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
-------------------------------------------------------------------
Sub-Channel flow  =      0.677(CFS)
  '     '    flow top width =     21.325(Ft.)
  '     '    velocity=    0.595(Ft/s)
  '     '    area =      1.137(Sq.Ft)
  '     '    Froude number =     0.454

Upstream point elevation =  1039.900(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   570.000(Ft.)
Travel time  =   15.96 min.
Time of concentration =   29.67 min.
Depth of flow =   0.107(Ft.)
Average velocity =   0.595(Ft/s)
Total irregular channel flow =     0.677(CFS)
Irregular channel normal depth above invert elev. =   0.107(Ft.)
Average velocity of channel(s) =   0.595(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.037(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.221
Subarea runoff =      0.055(CFS) for    2.110(Ac.)
Total runoff =      0.664(CFS)
Effective area this stream =        2.89(Ac.)
Total Study Area (Main Stream No. 2) =       29.52(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.106(Ft.), Average velocity =   0.592(Ft/s)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.890(Ac.)
Runoff from this stream =      0.664(CFS)
Time of concentration =   29.67 min.
Rainfall intensity =     1.037(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      3.22    19.310     42.39    0.782      0.838
2      0.66     2.890     29.67    0.782      1.037
Qmax(1) =
         1.000 *    1.000 *     3.224) +
         0.217 *    1.000 *     0.664) + =       3.368
Qmax(2) =
         4.615 *    0.700 *     3.224) +
         1.000 *    1.000 *     0.664) + =      11.077

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.224       0.664
Maximum flow rates at confluence using above data:
        3.368       11.077
Area of streams before confluence:
       19.310        2.890
Effective area values after confluence:
       22.200       16.406
Results of confluence:
Total flow rate =     11.077(CFS)
Time of concentration =    29.673 min.
Effective stream area after confluence =     16.406(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =      22.20(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________________
Depth of flow =   0.260(Ft.), Average velocity =   1.640(Ft/s)
      ******* Irregular Channel Data ***********
----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
----------------------------------------------------------------
Sub-Channel flow  =     11.077(CFS)
  '     '    flow top width =     51.972(Ft.)
  '     '    velocity=    1.640(Ft/s)
  '     '    area =      6.753(Sq.Ft)
  '     '    Froude number =     0.802

Upstream point elevation =  1035.800(Ft.)
Downstream point elevation =  1034.700(Ft.)
Flow length =    66.000(Ft.)
Travel time  =    0.67 min.
Time of concentration =   30.34 min.
Depth of flow =   0.260(Ft.)
Average velocity =   1.640(Ft/s)
Total irregular channel flow =    11.077(CFS)
Irregular channel normal depth above invert elev. =   0.260(Ft.)
Average velocity of channel(s) =   1.640(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     16.406(Ac.)
Runoff from this stream =     11.077(CFS)
Time of concentration =   30.34 min.
Rainfall intensity =     1.024(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      5.17     5.127     16.37    0.701      1.483
2     11.08    16.406     30.34    0.782      1.024
Qmax(1) =
         1.000 *    1.000 *     5.167) +
         2.901 *    0.539 *    11.077) + =      22.499
Qmax(2) =
         0.413 *    1.000 *     5.167) +
         1.000 *    1.000 *    11.077) + =      13.211

Total of 2 main streams to confluence:
Flow rates before confluence point:
       6.167      12.077
Maximum flow rates at confluence using above data:
       22.499       13.211
Area of streams before confluence:
        5.127       16.406
Effective area values after confluence:
       13.976       21.533


Results of confluence:
Total flow rate =     22.499(CFS)
Time of concentration =    16.367 min.
Effective stream area after confluence  =     13.976(Ac.)
Study area average Pervious fraction(Ap) =  0.780
Study area average soil loss rate(Fm) =    0.763(In/Hr)
Study area total =      21.53(Ac.)
End of computations, Total Study Area =           29.52 (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) = 0.778
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/07/21

BLOOMINGTON COMMERCE CENTER - SITE 3
PROPOSED CONDITION - LAUREL AVE
10-YEAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.813 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** 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 =   622.000(Ft.)
Top (of initial area) elevation =  1046.500(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =     6.400(Ft.)
Slope =    0.01029  s(%)=       1.03
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.952 min.
Rainfall intensity =      2.389(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.863
Subarea runoff =      3.176(CFS)
Total initial stream area =        1.540(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.100 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.540(Ac.)
Runoff from this stream =      3.176(CFS)
Time of concentration =    9.95 min.
Rainfall intensity =     2.389(In/Hr)
Area averaged loss rate (Fm) =    0.0978(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   846.000(Ft.)
Top (of initial area) elevation =  1050.900(Ft.)
Bottom (of initial area) elevation =  1040.100(Ft.)
Difference in elevation =    10.800(Ft.)
Slope =    0.01277  s(%)=       1.28
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.631 min.
Rainfall intensity =      1.756(In/Hr) for a    10.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.499
Subarea runoff =      4.783(CFS)
Total initial stream area =        5.460(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       51.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.460(Ac.)
Runoff from this stream =      4.783(CFS)
Time of concentration =   16.63 min.
Rainfall intensity =     1.756(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      3.18     1.540      9.95    0.098      2.389
2      4.78     5.460     16.63    0.782      1.756
Qmax(1) =
         1.000 *    1.000 *     3.176) +
         1.651 *    0.598 *     4.783) + =       7.901
Qmax(2) =
         0.724 *    1.000 *     3.176) +
         1.000 *    1.000 *     4.783) + =       7.081

Total of 2 main streams to confluence:
Flow rates before confluence point:
       4.176       5.783
Maximum flow rates at confluence using above data:
        7.901        7.081
Area of streams before confluence:
        1.540        5.460
Effective area values after confluence:
        4.807        7.000


Results of confluence:
Total flow rate =      7.901(CFS)
Time of concentration =     9.952 min.
Effective stream area after confluence  =      4.807(Ac.)
Study area average Pervious fraction(Ap) =  0.646
Study area average soil loss rate(Fm) =    0.632(In/Hr)
Study area total =       7.00(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of street segment elevation =  1040.100(Ft.)
End of street segment elevation =  1034.700(Ft.)
Length of street segment  =   661.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  20.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
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  =  11.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(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 =  0.0200
Estimated mean flow rate at midpoint of street =      7.970(CFS)
Depth of flow =   0.380(Ft.), Average velocity =   1.896(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  14.251(Ft.)
Flow velocity =   1.90(Ft/s)
Travel time =    5.81 min.     TC =   15.76  min.
 Adding area flow to street
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      6.354(CFS)
therefore the upstream flow rate of Q =      7.901(CFS) is being used
Rainfall intensity =      1.813(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.570
Subarea runoff =      0.000(CFS) for    1.340(Ac.)
Total runoff =      7.901(CFS)
Effective area this stream =        6.15(Ac.)
Total Study Area (Main Stream No. 1) =        8.34(Ac.)
Area averaged Fm value =    0.664(In/Hr)
Street flow at end of street =      7.901(CFS)
Half street flow at end of street =      3.950(CFS)
Depth of flow =   0.379(Ft.), Average velocity =   1.892(Ft/s)
Flow width (from curb towards crown)=  14.202(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       51.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      6.147(Ac.)
Runoff from this stream =      7.901(CFS)
Time of concentration =   15.76 min.
Rainfall intensity =     1.813(In/Hr)
Area averaged loss rate (Fm) =    0.6645(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6796
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       52.000 to Point/Station       53.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   323.000(Ft.)
Top (of initial area) elevation =  1055.800(Ft.)
Bottom (of initial area) elevation =  1049.100(Ft.)
Difference in elevation =     6.700(Ft.)
Slope =    0.02074  s(%)=       2.07
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.268 min.
Rainfall intensity =      2.345(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =      1.772(CFS)
Total initial stream area =        1.260(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       53.000 to Point/Station       54.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      8.225(CFS)
Depth of flow =   0.214(Ft.), Average velocity =   0.899(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      4.112(CFS)
  '     '    flow top width =     42.771(Ft.)
  '     '    velocity=    0.899(Ft/s)
  '     '    area =      4.573(Sq.Ft)
  '     '    Froude number =     0.485

Upstream point elevation =  1049.100(Ft.)
Downstream point elevation =  1043.600(Ft.)
Flow length =   847.000(Ft.)
Travel time  =   15.70 min.
Time of concentration =   25.97 min.
Depth of flow =   0.214(Ft.)
Average velocity =   0.899(Ft/s)
Total irregular channel flow =     4.112(CFS)
Irregular channel normal depth above invert elev. =   0.214(Ft.)
Average velocity of channel(s) =   0.899(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.344(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.376
Subarea runoff =      4.616(CFS) for   11.380(Ac.)
Total runoff =      6.388(CFS)
Effective area this stream =       12.64(Ac.)
Total Study Area (Main Stream No. 2) =       20.98(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.252(Ft.), Average velocity =   1.004(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =     12.828(CFS)
Depth of flow =   0.235(Ft.), Average velocity =   1.158(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      6.414(CFS)
  '     '    flow top width =     47.061(Ft.)
  '     '    velocity=    1.158(Ft/s)
  '     '    area =      5.537(Sq.Ft)
  '     '    Froude number =     0.595

Upstream point elevation =  1043.600(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   822.000(Ft.)
Travel time  =   11.83 min.
Time of concentration =   37.79 min.
Depth of flow =   0.235(Ft.)
Average velocity =   1.158(Ft/s)
Total irregular channel flow =     6.414(CFS)
Irregular channel normal depth above invert elev. =   0.235(Ft.)
Average velocity of channel(s) =   1.158(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      5.050(CFS)
therefore the upstream flow rate of Q =      6.388(CFS) is being used
Rainfall intensity =      1.073(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.244
Subarea runoff =      0.000(CFS) for    6.670(Ac.)
Total runoff =      6.388(CFS)
Effective area this stream =       19.31(Ac.)
Total Study Area (Main Stream No. 2) =       27.65(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.235(Ft.), Average velocity =   1.157(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     19.310(Ac.)
Runoff from this stream =      6.388(CFS)
Time of concentration =   37.79 min.
Rainfall intensity =     1.073(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.000 to Point/Station       55.100
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   538.000(Ft.)
Top (of initial area) elevation =  1047.200(Ft.)
Bottom (of initial area) elevation =  1039.900(Ft.)
Difference in elevation =     7.300(Ft.)
Slope =    0.01357  s(%)=       1.36
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.708 min.
Rainfall intensity =      1.971(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.543
Subarea runoff =      0.835(CFS)
Total initial stream area =        0.780(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      2.236(CFS)
Depth of flow =   0.129(Ft.), Average velocity =   0.675(Ft/s)
      ******* Irregular Channel Data ***********
----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
----------------------------------------------------------------
Sub-Channel flow  =      1.118(CFS)
  '     '    flow top width =     25.747(Ft.)
  '     '    velocity=    0.675(Ft/s)
  '     '    area =      1.657(Sq.Ft)
  '     '    Froude number =     0.469

Upstream point elevation =  1039.900(Ft.)
Downstream point elevation =  1035.800(Ft.)
Flow length =   570.000(Ft.)
Travel time  =   14.08 min.
Time of concentration =   27.79 min.
Depth of flow =   0.129(Ft.)
Average velocity =   0.675(Ft/s)
Total irregular channel flow =     1.118(CFS)
Irregular channel normal depth above invert elev. =   0.129(Ft.)
Average velocity of channel(s) =   0.675(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.290(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.354
Subarea runoff =      0.486(CFS) for    2.110(Ac.)
Total runoff =      1.321(CFS)
Effective area this stream =        2.89(Ac.)
Total Study Area (Main Stream No. 2) =       30.54(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.137(Ft.), Average velocity =   0.703(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       55.100 to Point/Station       56.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.890(Ac.)
Runoff from this stream =      1.321(CFS)
Time of concentration =   27.79 min.
Rainfall intensity =     1.290(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      6.39    19.310     37.79    0.782      1.073
2      1.32     2.890     27.79    0.782      1.290
Qmax(1) =
         1.000 *    1.000 *     6.388) +
         0.572 *    1.000 *     1.321) + =       7.144
Qmax(2) =
         1.748 *    0.735 *     6.388) +
         1.000 *    1.000 *     1.321) + =       9.532

Total of 2 streams to confluence:
Flow rates before confluence point:
       6.388       1.321
Maximum flow rates at confluence using above data:
        7.144        9.532
Area of streams before confluence:
       19.310        2.890
Effective area values after confluence:
       22.200       17.088
Results of confluence:
Total flow rate =      9.532(CFS)
Time of concentration =    27.788 min.
Effective stream area after confluence =     17.088(Ac.)
Study area average Pervious fraction(Ap) =  0.800
Study area average soil loss rate(Fm) =    0.782(In/Hr)
Study area total (this main stream) =      22.20(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Depth of flow =   0.246(Ft.), Average velocity =   1.580(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      9.532(CFS)
  '     '    flow top width =     49.125(Ft.)
  '     '    velocity=    1.580(Ft/s)
  '     '    area =      6.033(Sq.Ft)
  '     '    Froude number =     0.794

Upstream point elevation =  1035.800(Ft.)
Downstream point elevation =  1034.700(Ft.)
Flow length =    66.000(Ft.)
Travel time  =    0.70 min.
Time of concentration =   28.48 min.
Depth of flow =   0.246(Ft.)
Average velocity =   1.580(Ft/s)
Total irregular channel flow =     9.532(CFS)
Irregular channel normal depth above invert elev. =   0.246(Ft.)
Average velocity of channel(s) =   1.580(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       57.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     17.088(Ac.)
Runoff from this stream =      9.532(CFS)
Time of concentration =   28.48 min.
Rainfall intensity =     1.271(In/Hr)
Area averaged loss rate (Fm) =    0.7822(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8000
Summary of stream data:

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


1      7.90     6.147     15.76    0.664      1.813
2      9.53    17.088     28.48    0.782      1.271
Qmax(1) =
         1.000 *    1.000 *     7.901) +
         2.108 *    0.553 *     9.532) + =      19.020
Qmax(2) =
         0.528 *    1.000 *     7.901) +
         1.000 *    1.000 *     9.532) + =      13.706

Total of 2 main streams to confluence:
Flow rates before confluence point:
       8.901      10.532
Maximum flow rates at confluence using above data:
       19.020       13.706
Area of streams before confluence:
        6.147       17.088
Effective area values after confluence:
       15.604       23.235


Results of confluence:
Total flow rate =     19.020(CFS)
Time of concentration =    15.763 min.
Effective stream area after confluence  =     15.604(Ac.)
Study area average Pervious fraction(Ap) =  0.768
Study area average soil loss rate(Fm) =    0.751(In/Hr)
Study area total =      23.24(Ac.)
End of computations, Total Study Area =           30.54 (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) = 0.765
Area averaged SCS curve number =  32.0
```

APPENDIX C

RATIONAL METHOD HYDROLOGY (EXISTING ONSITE CHAMBER SYSTEM)

C.1: EXISTING CONDITION – NORTHERLY CHAMBERS – 100 YR

C.2: EXISTING CONDITION – NORTHERLY CHAMBERS - 100 YR – ADJUSTED 25 YR RAINFALL

C.3: EXISTING CONDITION – SOUTHERLY CHAMBERS - 100 YR

C.4: EXISTING CONDITION – SOUTERLY CHAMBERS - 100 YR – ADJUSTED 25 YR RAINFALL

C.5: EXISTING CONDITION – NORTHERLY CHAMBERS - 25 YR

C.6: EXISTING CONDITION – NORTHERLY CHAMBERS – 25 YR – ADJUSTED 10 YR RAINFALL

C.7: EXISTING CONDITION – SOUTHERLY CHAMBERS - 25 YR

C.8: EXISTING CONDITION – SOUTHERLY CHAMBERS - 25 YR – ADJUSTED 10 YR RAINFALL

C.9: EXISTING CONDITION – NORTHERLY CHAMBERS - 10 YR

C.10: EXISTING CONDITION – NORTHERLY CHAMBERS - 10 YR – ADJUSTED 5 YR RAINFALL

C.11: EXISTING CONDITION – SOUTHERLY CHAMBERS - 10 YR

C.12: EXISTING CONDITION – SOUTHERLY CHAMBERS – 10 YR – ADJUSTED 5 YR RAINFALL

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/23/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISTING CONDITION - ONSITE NORTHERLY CHAMBER SYSTEM
100-YEAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.300 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   673.000(Ft.)
Top (of initial area) elevation =  1047.800(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     8.700(Ft.)
Slope =    0.01293  s(%)=       1.29
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.138 min.
Rainfall intensity =      2.970(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.663
Subarea runoff =      6.124(CFS)
Total initial stream area =        3.110(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.295(Ft.), Average velocity =   1.546(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.025
-----------------------------------------------------------------
Sub-Channel flow  =     13.438(CFS)
  '     '    flow top width =     58.962(Ft.)
  '     '    velocity=    1.546(Ft/s)
  '     '    area =      8.691(Sq.Ft)
  '     '    Froude number =     0.710

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1032.400(Ft.)
Flow length =   771.000(Ft.)
Travel time  =    8.31 min.
Time of concentration =   23.45 min.
Depth of flow =   0.295(Ft.)
Average velocity =   1.546(Ft/s)
Total irregular channel flow =    13.438(CFS)
Irregular channel normal depth above invert elev. =   0.295(Ft.)
Average velocity of channel(s) =   1.546(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      2.284(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.592
Subarea runoff =     14.573(CFS) for   12.200(Ac.)
Total runoff =     20.697(CFS)
Effective area this stream =       15.31(Ac.)
Total Study Area (Main Stream No. 1) =       15.31(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.347(Ft.), Average velocity =   1.722(Ft/s)
End of computations, Total Study Area =           15.31 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/23/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISTING CONDITION - ONSITE NORTHERLY CHAMBER SYSTEM
100-YEAR STORM EVENT ANALYIS WITH 25 YEAR ADJUSTED RAINFALL DATA

Program License Serial Number 6405

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

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.998 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   673.000(Ft.)
Top (of initial area) elevation =  1047.800(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     8.700(Ft.)
Slope =    0.01293  s(%)=       1.29
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.138 min.
Rainfall intensity =      2.280(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.591
Subarea runoff =      4.193(CFS)
Total initial stream area =        3.110(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.249(Ft.), Average velocity =   1.380(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      8.537(CFS)
  '     '    flow top width =     49.738(Ft.)
  '     '    velocity=    1.380(Ft/s)
  '     '    area =      6.185(Sq.Ft)
  '     '    Froude number =     0.690

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1032.400(Ft.)
Flow length =   771.000(Ft.)
Travel time  =    9.31 min.
Time of concentration =   24.45 min.
Depth of flow =   0.249(Ft.)
Average velocity =   1.380(Ft/s)
Total irregular channel flow =     8.537(CFS)
Irregular channel normal depth above invert elev. =   0.249(Ft.)
Average velocity of channel(s) =   1.380(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.710(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.488
Subarea runoff =      8.595(CFS) for   12.200(Ac.)
Total runoff =     12.788(CFS)
Effective area this stream =       15.31(Ac.)
Total Study Area (Main Stream No. 1) =       15.31(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.289(Ft.), Average velocity =   1.527(Ft/s)
End of computations, Total Study Area =           15.31 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/23/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISTING CONDITION - ONSITE SOUTHERLY CHAMBER SYSTEM
100-YEAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.300 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   795.000(Ft.)
Top (of initial area) elevation =  1045.200(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     6.100(Ft.)
Slope =    0.00767  s(%)=       0.77
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.961 min.
Rainfall intensity =      2.681(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.637
Subarea runoff =      7.552(CFS)
Total initial stream area =        4.420(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.092(Ft.), Average velocity =   1.093(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              0.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =     10.472(CFS)
  '     '    flow top width =    109.160(Ft.)
  '     '    velocity=    1.093(Ft/s)
  '     '    area =      9.579(Sq.Ft)
  '     '    Froude number =     0.650

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1027.200(Ft.)
Flow length =  1372.000(Ft.)
Travel time  =   20.92 min.
Time of concentration =   38.88 min.
Depth of flow =   0.092(Ft.)
Average velocity =   1.093(Ft/s)
Total irregular channel flow =    10.472(CFS)
Irregular channel normal depth above invert elev. =   0.092(Ft.)
Average velocity of channel(s) =   1.093(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.687(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.483
Subarea runoff =      5.764(CFS) for   11.940(Ac.)
Total runoff =     13.315(CFS)
Effective area this stream =       16.36(Ac.)
Total Study Area (Main Stream No. 1) =       16.36(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.106(Ft.), Average velocity =   1.197(Ft/s)
End of computations, Total Study Area =           16.36 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/26/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISTING CONDITION - ONSITE SOUTHERLY CHAMBER SYSTEM
100-YEAR STORM EVENT ANALYSIS WITH 25 YEAR ADJUSTED RAINFALL DATA

Program License Serial Number 6405

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 0.998 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   795.000(Ft.)
Top (of initial area) elevation =  1045.200(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     6.100(Ft.)
Slope =    0.00767  s(%)=       0.77
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.961 min.
Rainfall intensity =      2.058(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.558
Subarea runoff =      5.075(CFS)
Total initial stream area =        4.420(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.063(Ft.), Average velocity =   0.861(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              0.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      5.614(CFS)
  '     '    flow top width =    106.321(Ft.)
  '     '    velocity=    0.861(Ft/s)
  '     '    area =      6.521(Sq.Ft)
  '     '    Froude number =     0.613

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1027.200(Ft.)
Flow length =  1372.000(Ft.)
Travel time  =   26.56 min.
Time of concentration =   44.52 min.
Depth of flow =   0.063(Ft.)
Average velocity =   0.861(Ft/s)
Total irregular channel flow =     5.614(CFS)
Irregular channel normal depth above invert elev. =   0.063(Ft.)
Average velocity of channel(s) =   0.861(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.194(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.310
Subarea runoff =      0.983(CFS) for   11.940(Ac.)
Total runoff =      6.058(CFS)
Effective area this stream =       16.36(Ac.)
Total Study Area (Main Stream No. 1) =       16.36(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.066(Ft.), Average velocity =   0.887(Ft/s)
End of computations, Total Study Area =           16.36 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/23/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISTING CONDITION - ONSITE NORTHERLY CHAMBER SYSTEM
25-YEAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.998 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   673.000(Ft.)
Top (of initial area) elevation =  1047.800(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     8.700(Ft.)
Slope =    0.01293  s(%)=       1.29
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.138 min.
Rainfall intensity =      2.280(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.591
Subarea runoff =      4.193(CFS)
Total initial stream area =        3.110(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.249(Ft.), Average velocity =   1.380(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      8.537(CFS)
  '     '    flow top width =     49.738(Ft.)
  '     '    velocity=    1.380(Ft/s)
  '     '    area =      6.185(Sq.Ft)
  '     '    Froude number =     0.690

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1032.400(Ft.)
Flow length =   771.000(Ft.)
Travel time  =    9.31 min.
Time of concentration =   24.45 min.
Depth of flow =   0.249(Ft.)
Average velocity =   1.380(Ft/s)
Total irregular channel flow =     8.537(CFS)
Irregular channel normal depth above invert elev. =   0.249(Ft.)
Average velocity of channel(s) =   1.380(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.710(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.488
Subarea runoff =      8.595(CFS) for   12.200(Ac.)
Total runoff =     12.788(CFS)
Effective area this stream =       15.31(Ac.)
Total Study Area (Main Stream No. 1) =       15.31(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.289(Ft.), Average velocity =   1.527(Ft/s)
End of computations, Total Study Area =           15.31 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/23/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISTING CONDITION - ONSITE NORTHERLY CHAMBER SYSTEM
25-YEAR STORM EVENT ANALYSIS WITH 10 YEAR ADJUSTED RAINFALL DATA

Program License Serial Number 6405

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

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.813 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   673.000(Ft.)
Top (of initial area) elevation =  1047.800(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     8.700(Ft.)
Slope =    0.01293  s(%)=       1.29
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.138 min.
Rainfall intensity =      1.858(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.521
Subarea runoff =      3.010(CFS)
Total initial stream area =        3.110(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.211(Ft.), Average velocity =   1.238(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      5.516(CFS)
  '     '    flow top width =     42.224(Ft.)
  '     '    velocity=    1.238(Ft/s)
  '     '    area =      4.457(Sq.Ft)
  '     '    Froude number =     0.671

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1032.400(Ft.)
Flow length =   771.000(Ft.)
Travel time  =   10.38 min.
Time of concentration =   25.52 min.
Depth of flow =   0.211(Ft.)
Average velocity =   1.238(Ft/s)
Total irregular channel flow =     5.516(CFS)
Irregular channel normal depth above invert elev. =   0.211(Ft.)
Average velocity of channel(s) =   1.238(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.358(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.381
Subarea runoff =      4.921(CFS) for   12.200(Ac.)
Total runoff =      7.931(CFS)
Effective area this stream =       15.31(Ac.)
Total Study Area (Main Stream No. 1) =       15.31(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.242(Ft.), Average velocity =   1.355(Ft/s)
End of computations, Total Study Area =           15.31 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/23/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISTING CONDITION - ONSITE SOUTHERLY CHAMBER SYSTEM
25-YEAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.998 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   795.000(Ft.)
Top (of initial area) elevation =  1045.200(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     6.100(Ft.)
Slope =    0.00767  s(%)=       0.77
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.961 min.
Rainfall intensity =      2.058(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.558
Subarea runoff =      5.075(CFS)
Total initial stream area =        4.420(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.063(Ft.), Average velocity =   0.861(Ft/s)
      ******* Irregular Channel Data ***********
----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              0.00
Manning's 'N' friction factor =   0.025
----------------------------------------------------------------
Sub-Channel flow  =      5.614(CFS)
  '     '    flow top width =    106.321(Ft.)
  '     '    velocity=    0.861(Ft/s)
  '     '    area =      6.521(Sq.Ft)
  '     '    Froude number =     0.613

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1027.200(Ft.)
Flow length =  1372.000(Ft.)
Travel time  =   26.56 min.
Time of concentration =   44.52 min.
Depth of flow =   0.063(Ft.)
Average velocity =   0.861(Ft/s)
Total irregular channel flow =     5.614(CFS)
Irregular channel normal depth above invert elev. =   0.063(Ft.)
Average velocity of channel(s) =   0.861(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.194(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.310
Subarea runoff =      0.983(CFS) for   11.940(Ac.)
Total runoff =      6.058(CFS)
Effective area this stream =       16.36(Ac.)
Total Study Area (Main Stream No. 1) =       16.36(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.066(Ft.), Average velocity =   0.887(Ft/s)
End of computations, Total Study Area =           16.36 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/26/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISITNG CONDITION - ONSITE SOUTHERLY CHAMBER SYSTEM
25-YEAR STORM EVENT ANALYSIS WITH 10 YEAR ADJUSTED RAINFALL DATA

Program License Serial Number 6405

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

Rational hydrology study storm event year is 25.0
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.813 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   795.000(Ft.)
Top (of initial area) elevation =  1045.200(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     6.100(Ft.)
Slope =    0.00767  s(%)=       0.77
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.961 min.
Rainfall intensity =      1.676(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.480
Subarea runoff =      3.557(CFS)
Total initial stream area =        4.420(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.048(Ft.), Average velocity =   0.724(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              0.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      3.595(CFS)
  '     '    flow top width =    104.845(Ft.)
  '     '    velocity=    0.724(Ft/s)
  '     '    area =      4.963(Sq.Ft)
  '     '    Froude number =     0.587

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1027.200(Ft.)
Flow length =  1372.000(Ft.)
Travel time  =   31.57 min.
Time of concentration =   49.53 min.
Depth of flow =   0.048(Ft.)
Average velocity =   0.724(Ft/s)
Total irregular channel flow =     3.595(CFS)
Irregular channel normal depth above invert elev. =   0.048(Ft.)
Average velocity of channel(s) =   0.724(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      2.686(CFS)
therefore the upstream flow rate of Q =      3.557(CFS) is being used
Rainfall intensity =      0.912(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.180
Subarea runoff =      0.000(CFS) for   11.940(Ac.)
Total runoff =      3.557(CFS)
Effective area this stream =       16.36(Ac.)
Total Study Area (Main Stream No. 1) =       16.36(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.048(Ft.), Average velocity =   0.721(Ft/s)
End of computations, Total Study Area =           16.36 (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) = 0.800
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/23/21

BLOOMINGTOM COMMERCE CENTER SITE 3
EXISITNG CONDITION - ONSITE NORTHERLY CHAMBER SYSTEM
10-YEAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.813 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   673.000(Ft.)
Top (of initial area) elevation =  1047.800(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     8.700(Ft.)
Slope =    0.01293  s(%)=       1.29
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.138 min.
Rainfall intensity =      1.858(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.521
Subarea runoff =      3.010(CFS)
Total initial stream area =        3.110(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.211(Ft.), Average velocity =   1.238(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      5.516(CFS)
  '     '    flow top width =     42.224(Ft.)
  '     '    velocity=    1.238(Ft/s)
  '     '    area =      4.457(Sq.Ft)
  '     '    Froude number =     0.671

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1032.400(Ft.)
Flow length =   771.000(Ft.)
Travel time  =   10.38 min.
Time of concentration =   25.52 min.
Depth of flow =   0.211(Ft.)
Average velocity =   1.238(Ft/s)
Total irregular channel flow =     5.516(CFS)
Irregular channel normal depth above invert elev. =   0.211(Ft.)
Average velocity of channel(s) =   1.238(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.358(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.381
Subarea runoff =      4.921(CFS) for   12.200(Ac.)
Total runoff =      7.931(CFS)
Effective area this stream =       15.31(Ac.)
Total Study Area (Main Stream No. 1) =       15.31(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.242(Ft.), Average velocity =   1.355(Ft/s)
End of computations, Total Study Area =           15.31 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/23/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISTING CONDITION - ONSITE NORTHERLY CHAMBER SYSTEM
10-YEAR STORM EVENT ANALYSIS WITH 5 YEAR ADJUSTED RAINFALL DATA

Program License Serial Number 6405

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.680 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   673.000(Ft.)
Top (of initial area) elevation =  1047.800(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     8.700(Ft.)
Slope =    0.01293  s(%)=       1.29
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.138 min.
Rainfall intensity =      1.554(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.447
Subarea runoff =      2.159(CFS)
Total initial stream area =        3.110(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.174(Ft.), Average velocity =   1.088(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      3.292(CFS)
  '     '    flow top width =     34.792(Ft.)
  '     '    velocity=    1.088(Ft/s)
  '     '    area =      3.026(Sq.Ft)
  '     '    Froude number =     0.650

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1032.400(Ft.)
Flow length =   771.000(Ft.)
Travel time  =   11.81 min.
Time of concentration =   26.95 min.
Depth of flow =   0.174(Ft.)
Average velocity =   1.088(Ft/s)
Total irregular channel flow =     3.292(CFS)
Irregular channel normal depth above invert elev. =   0.174(Ft.)
Average velocity of channel(s) =   1.088(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Rainfall intensity =      1.099(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.259
Subarea runoff =      2.207(CFS) for   12.200(Ac.)
Total runoff =      4.366(CFS)
Effective area this stream =       15.31(Ac.)
Total Study Area (Main Stream No. 1) =       15.31(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.193(Ft.), Average velocity =   1.167(Ft/s)
End of computations, Total Study Area =           15.31 (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) = 0.800
Area averaged SCS curve number =  32.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/23/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISTING CONDITION - ONSITE SOUTHERLY CHAMBER SYSTEM
10-YEAR STORM EVENT ANALYSIS

Program License Serial Number 6405

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.813 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   795.000(Ft.)
Top (of initial area) elevation =  1045.200(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     6.100(Ft.)
Slope =    0.00767  s(%)=       0.77
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.961 min.
Rainfall intensity =      1.676(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.480
Subarea runoff =      3.557(CFS)
Total initial stream area =        4.420(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.048(Ft.), Average velocity =   0.724(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              0.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      3.595(CFS)
  '     '    flow top width =    104.845(Ft.)
  '     '    velocity=    0.724(Ft/s)
  '     '    area =      4.963(Sq.Ft)
  '     '    Froude number =     0.587

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1027.200(Ft.)
Flow length =  1372.000(Ft.)
Travel time  =   31.57 min.
Time of concentration =   49.53 min.
Depth of flow =   0.048(Ft.)
Average velocity =   0.724(Ft/s)
Total irregular channel flow =     3.595(CFS)
Irregular channel normal depth above invert elev. =   0.048(Ft.)
Average velocity of channel(s) =   0.724(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      2.686(CFS)
therefore the upstream flow rate of Q =      3.557(CFS) is being used
Rainfall intensity =      0.912(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.180
Subarea runoff =      0.000(CFS) for   11.940(Ac.)
Total runoff =      3.557(CFS)
Effective area this stream =       16.36(Ac.)
Total Study Area (Main Stream No. 1) =       16.36(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.048(Ft.), Average velocity =   0.721(Ft/s)
End of computations, Total Study Area =           16.36 (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) = 0.800
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 04/26/21

BLOOMINGTON COMMERCE CENTER SITE 3
EXISTING CONDITION - ONSITE SOUTHERLY CHAMBER SYSTEM
10-YEAR STORM EVENT ANALYSIS WITH 5 YEAR ADJUSTED RAINFALL DATA

Program License Serial Number 6405

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.680 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
Initial subarea data:
Initial area flow distance =   795.000(Ft.)
Top (of initial area) elevation =  1045.200(Ft.)
Bottom (of initial area) elevation =  1039.100(Ft.)
Difference in elevation =     6.100(Ft.)
Slope =    0.00767  s(%)=       0.77
TC = k(0.469)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.961 min.
Rainfall intensity =      1.402(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.398
Subarea runoff =      2.466(CFS)
Total initial stream area =        4.420(Ac.)
Pervious area fraction = 0.800
Initial area Fm value =    0.782(In/Hr)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.039(Ft.), Average velocity =   0.628(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2            100.00              0.00
      3            200.00              0.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      2.492(CFS)
  '     '    flow top width =    103.893(Ft.)
  '     '    velocity=    0.628(Ft/s)
  '     '    area =      3.969(Sq.Ft)
  '     '    Froude number =     0.566

Upstream point elevation =  1039.100(Ft.)
Downstream point elevation =  1027.200(Ft.)
Flow length =  1372.000(Ft.)
Travel time  =   36.42 min.
Time of concentration =   54.38 min.
Depth of flow =   0.039(Ft.)
Average velocity =   0.628(Ft/s)
Total irregular channel flow =     2.492(CFS)
Irregular channel normal depth above invert elev. =   0.039(Ft.)
Average velocity of channel(s) =   0.628(Ft/s)
 Adding area flow to channel
RESIDENTIAL(1 acre lot)
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) = 0.8000     Max loss rate(Fm)=     0.782(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      2.124(CFS)
therefore the upstream flow rate of Q =      2.466(CFS) is being used
Rainfall intensity =      0.721(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.180
Subarea runoff =      0.000(CFS) for   11.940(Ac.)
Total runoff =      2.466(CFS)
Effective area this stream =       16.36(Ac.)
Total Study Area (Main Stream No. 1) =       16.36(Ac.)
Area averaged Fm value =    0.782(In/Hr)
Depth of flow =   0.039(Ft.), Average velocity =   0.625(Ft/s)
End of computations, Total Study Area =           16.36 (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) = 0.800
Area averaged SCS curve number = 32.0

APPENDIX D

PRE – PROJECT CONDITION UNIT HYDROGRAPH HYDROLOGY

D.1: UNIT HYDROGRAPH ANALYSIS, 100 YEAR, 24 HOUR STORM DURATION, WATERSHED A

D.2: UNIT HYDROGRAPH ANALYSIS, 100 YEAR, 24 HOUR STORM DURATION, ADJUSTED 25 YEAR RAINFALL DATA, WATERSHED A

D.3: UNIT HYDROGRAPH ANALYSIS, 25 YEAR, 24 HOUR STORM DURATION, WATERSHED A

D.4: UNIT HYDROGRAPH ANALYSIS, 25 YEAR, 24 HOUR STORM DURATION, ADJUSTED 10 YEAR RAINFALL DATA, WATERSHED A

D.5: UNIT HYDROGRAPH ANALYSIS, 10 YEAR, 24 HOUR STORM DURATION, WATERSHED A

D.6: UNIT HYDROGRAPH ANALYSIS, 10 YEAR, 24 HOUR STORM DURATION, ADJUSTED 5 YEAR RAINFALL DATA, WATERSHED A

D.7: UNIT HYDROGRAPH ANALYSIS, 100 YEAR, 24 HOUR STORM DURATION, NORTHERLY CHAMBERS

D.8: UNIT HYDROGRAPH ANALYSIS, 100 YEAR, 24 HOUR STORM DURATION, ADJUSTED 25 YEAR RAINFALL DATA, NORTHERLY CHAMBERS

D.9: UNIT HYDROGRAPH ANALYSIS, 25 YEAR, 24 HOUR STORM DURATION, NORTHERLY CHAMBERS

D.10: UNIT HYDROGRAPH ANALYSIS, 25 YEAR, 24 HOUR STORM DURATION, ADJUSTED 10 YEAR RAINFALL DATA, NORTHERLY CHAMBERS

D.11: UNIT HYDROGRAPH ANALYSIS, 10 YEAR, 24 HOUR STORM DURATION, NORTHERLY CHAMBERS

D.12: UNIT HYDROGRAPH ANALYSIS, 10 YEAR, 24 HOUR STORM DURATION, ADJUSTED 5 YEAR RAINFALL DATA, NORTHERLY CHAMBERS

D.13: UNIT HYDROGRAPH ANALYSIS, 100 YEAR, 24 HOUR STORM DURATION, SOUTHERLY CHAMBERS

D.14 UNIT HYDROGRAPH ANALYSIS, 100 YEAR, 24 HOUR STORM DURATION, ADJUSTED 25 YEAR RAINFALL DATA, SOUTHERLY CHAMBERS

D.15 UNIT HYDROGRAPH ANALYSIS, 25 YEAR, 24 HOUR STORM DURATION, SOUTHERLY CHAMBERS

D.16 UNIT HYDROGRAPH ANALYSIS, 25 YEAR, 24 HOUR STORM DURATION, ADJUSTED 10 YEAR RAINFALL DATA, SOUTHERLY CHAMBERS

D.17 UNIT HYDROGRAPH ANALYSIS, 10 YEAR, 24 HOUR STORM DURATION, SOUTHERLY CHAMBERS

D.18 UNIT HYDROGRAPH ANALYSIS, 10 YEAR, 24 HOUR STORM DURATION, ADJUSTED 5 YEAR RAINFALL DATA, SOUTHERLY CHAMBERS

D.19 UNIT HYDROGRAPH ANALYSIS, 100 YEAR, 24 HOUR STORM DURATION, WATERSHED B

D.20 UNIT HYDROGRAPH ANALYSIS, 100 YEAR, 24 HOUR STORM DURATION, ADJUSTED 25 YEAR RAINFALL DATA, WATERSHED B

D.21 UNIT HYDROGRAPH ANALYSIS, 25 YEAR, 24 HOUR STORM DURATION, WATERSHED B

D.22 UNIT HYDROGRAPH ANALYSIS, 25 YEAR, 24 HOUR STORM DURATION, ADJUSTED 10 YEAR RAINFALL DATA, WATERSHED B

D.23 UNIT HYDROGRAPH ANALYSIS, 10 YEAR, 24 HOUR STORM DURATION, WATERSHED B

D.24 UNIT HYDROGRAPH ANALYSIS, 10 YEAR, 24 HOUR STORM DURATION, ADJUSTED 5 YEAR RAINFALL DATA, WATERSHED B

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

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Study date 04/05/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION
100-YEAR STORM EVENT ANALYSIS

Storm Event Year = 100

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 100		
40.02	1	1.30
Rainfall data for year 100		
40.02	6	3.07
Rainfall data for year 100		
40.02	24	5.64

++

******** 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)
32.0	32.0	40.02	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
32.02	0.800	32.0	32.0	21.25	0.015
8.00	0.200	98.0	98.0	0.20	0.958

Area-averaged catchment yield fraction, Y = 0.204
Area-averaged low loss fraction, Yb = 0.796
User entry of time of concentration = 0.328 (hours)
++
Watershed area = 40.02(Ac.)
Catchment Lag time = 0.262 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 31.7581
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.796 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.481(In)
Computed peak 30-minute rainfall = 0.985(In)
Specified peak 1-hour rainfall = 1.300(In)
Computed peak 3-hour rainfall = 2.202(In)
Specified peak 6-hour rainfall = 3.070(In)
Specified peak 24-hour rainfall = 5.640(In)

Rainfall depth area reduction factors:
Using a total area of 40.02(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.480(In)
30-minute factor = 0.998 Adjusted rainfall = 0.983(In)
1-hour factor = 0.998 Adjusted rainfall = 1.298(In)
3-hour factor = 1.000 Adjusted rainfall = 2.201(In)
6-hour factor = 1.000 Adjusted rainfall = 3.070(In)
24-hour factor = 1.000 Adjusted rainfall = 5.640(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 = 483.99 (CFS))		
1	2.111	10.216
2	12.445	50.016
3	32.498	97.054
4	59.419	130.295
5	79.359	96.512
6	90.202	52.475
7	95.434	25.327

8	97.888	11.877
9	98.659	3.731
10	99.231	2.767
11	99.787	2.692
12	100.000	1.032

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.4802	0.4802
2	0.6337	0.1534
3	0.7453	0.1116
4	0.8361	0.0909
5	0.9142	0.0781
6	0.9834	0.0692
7	1.0459	0.0625
8	1.1033	0.0574
9	1.1565	0.0532
10	1.2063	0.0498
11	1.2532	0.0469
12	1.2976	0.0444
13	1.3485	0.0509
14	1.3974	0.0489
15	1.4446	0.0472
16	1.4902	0.0456
17	1.5343	0.0441
18	1.5770	0.0428
19	1.6186	0.0416
20	1.6590	0.0404
21	1.6984	0.0394
22	1.7369	0.0384
23	1.7744	0.0375
24	1.8111	0.0367
25	1.8470	0.0359
26	1.8822	0.0352
27	1.9167	0.0345
28	1.9505	0.0338
29	1.9838	0.0332
30	2.0164	0.0326
31	2.0484	0.0321
32	2.0800	0.0315
33	2.1110	0.0310
34	2.1415	0.0305
35	2.1716	0.0301
36	2.2012	0.0296
37	2.2303	0.0291
38	2.2591	0.0287
39	2.2874	0.0283
40	2.3153	0.0280
41	2.3429	0.0276
42	2.3702	0.0272
43	2.3971	0.0269
44	2.4237	0.0266
45	2.4499	0.0263
46	2.4759	0.0260
47	2.5016	0.0257
48	2.5270	0.0254
49	2.5521	0.0251

50	2.5770	0.0249
51	2.6016	0.0246
52	2.6259	0.0243
53	2.6500	0.0241
54	2.6739	0.0239
55	2.6975	0.0236
56	2.7210	0.0234
57	2.7442	0.0232
58	2.7672	0.0230
59	2.7899	0.0228
60	2.8125	0.0226
61	2.8349	0.0224
62	2.8571	0.0222
63	2.8791	0.0220
64	2.9010	0.0218
65	2.9226	0.0217
66	2.9441	0.0215
67	2.9654	0.0213
68	2.9866	0.0212
69	3.0076	0.0210
70	3.0284	0.0208
71	3.0491	0.0207
72	3.0696	0.0205
73	3.0883	0.0186
74	3.1067	0.0185
75	3.1251	0.0184
76	3.1433	0.0182
77	3.1614	0.0181
78	3.1793	0.0179
79	3.1972	0.0178
80	3.2149	0.0177
81	3.2324	0.0176
82	3.2499	0.0175
83	3.2672	0.0173
84	3.2844	0.0172
85	3.3015	0.0171
86	3.3185	0.0170
87	3.3354	0.0169
88	3.3522	0.0168
89	3.3688	0.0167
90	3.3854	0.0166
91	3.4018	0.0165
92	3.4182	0.0164
93	3.4344	0.0163
94	3.4506	0.0162
95	3.4666	0.0161
96	3.4826	0.0160
97	3.4985	0.0159
98	3.5143	0.0158
99	3.5300	0.0157
100	3.5456	0.0156
101	3.5611	0.0155
102	3.5765	0.0154
103	3.5918	0.0153
104	3.6071	0.0153
105	3.6223	0.0152
106	3.6374	0.0151

107	3.6524	0.0150
108	3.6673	0.0149
109	3.6822	0.0149
110	3.6970	0.0148
111	3.7117	0.0147
112	3.7263	0.0146
113	3.7409	0.0146
114	3.7554	0.0145
115	3.7698	0.0144
116	3.7841	0.0143
117	3.7984	0.0143
118	3.8126	0.0142
119	3.8268	0.0141
120	3.8409	0.0141
121	3.8549	0.0140
122	3.8688	0.0139
123	3.8827	0.0139
124	3.8965	0.0138
125	3.9103	0.0138
126	3.9240	0.0137
127	3.9376	0.0136
128	3.9512	0.0136
129	3.9647	0.0135
130	3.9781	0.0135
131	3.9915	0.0134
132	4.0049	0.0133
133	4.0182	0.0133
134	4.0314	0.0132
135	4.0446	0.0132
136	4.0577	0.0131
137	4.0708	0.0131
138	4.0838	0.0130
139	4.0967	0.0130
140	4.1096	0.0129
141	4.1225	0.0129
142	4.1353	0.0128
143	4.1480	0.0128
144	4.1607	0.0127
145	4.1734	0.0127
146	4.1860	0.0126
147	4.1986	0.0126
148	4.2111	0.0125
149	4.2235	0.0125
150	4.2359	0.0124
151	4.2483	0.0124
152	4.2606	0.0123
153	4.2729	0.0123
154	4.2851	0.0122
155	4.2973	0.0122
156	4.3095	0.0121
157	4.3216	0.0121
158	4.3336	0.0121
159	4.3456	0.0120
160	4.3576	0.0120
161	4.3695	0.0119
162	4.3814	0.0119
163	4.3933	0.0118

164	4.4051	0.0118
165	4.4168	0.0118
166	4.4286	0.0117
167	4.4403	0.0117
168	4.4519	0.0116
169	4.4635	0.0116
170	4.4751	0.0116
171	4.4866	0.0115
172	4.4981	0.0115
173	4.5096	0.0115
174	4.5210	0.0114
175	4.5324	0.0114
176	4.5437	0.0113
177	4.5550	0.0113
178	4.5663	0.0113
179	4.5775	0.0112
180	4.5887	0.0112
181	4.5999	0.0112
182	4.6110	0.0111
183	4.6221	0.0111
184	4.6332	0.0111
185	4.6442	0.0110
186	4.6552	0.0110
187	4.6662	0.0110
188	4.6771	0.0109
189	4.6880	0.0109
190	4.6989	0.0109
191	4.7097	0.0108
192	4.7205	0.0108
193	4.7313	0.0108
194	4.7421	0.0107
195	4.7528	0.0107
196	4.7634	0.0107
197	4.7741	0.0106
198	4.7847	0.0106
199	4.7953	0.0106
200	4.8059	0.0106
201	4.8164	0.0105
202	4.8269	0.0105
203	4.8374	0.0105
204	4.8478	0.0104
205	4.8582	0.0104
206	4.8686	0.0104
207	4.8789	0.0104
208	4.8893	0.0103
209	4.8996	0.0103
210	4.9098	0.0103
211	4.9201	0.0102
212	4.9303	0.0102
213	4.9405	0.0102
214	4.9507	0.0102
215	4.9608	0.0101
216	4.9709	0.0101
217	4.9810	0.0101
218	4.9911	0.0101
219	5.0011	0.0100
220	5.0111	0.0100

221	5.0211	0.0100
222	5.0310	0.0100
223	5.0410	0.0099
224	5.0509	0.0099
225	5.0608	0.0099
226	5.0706	0.0099
227	5.0804	0.0098
228	5.0903	0.0098
229	5.1000	0.0098
230	5.1098	0.0098
231	5.1195	0.0097
232	5.1292	0.0097
233	5.1389	0.0097
234	5.1486	0.0097
235	5.1582	0.0096
236	5.1679	0.0096
237	5.1775	0.0096
238	5.1870	0.0096
239	5.1966	0.0096
240	5.2061	0.0095
241	5.2156	0.0095
242	5.2251	0.0095
243	5.2346	0.0095
244	5.2440	0.0094
245	5.2534	0.0094
246	5.2628	0.0094
247	5.2722	0.0094
248	5.2816	0.0094
249	5.2909	0.0093
250	5.3002	0.0093
251	5.3095	0.0093
252	5.3188	0.0093
253	5.3280	0.0093
254	5.3373	0.0092
255	5.3465	0.0092
256	5.3557	0.0092
257	5.3648	0.0092
258	5.3740	0.0091
259	5.3831	0.0091
260	5.3922	0.0091
261	5.4013	0.0091
262	5.4104	0.0091
263	5.4194	0.0091
264	5.4285	0.0090
265	5.4375	0.0090
266	5.4465	0.0090
267	5.4554	0.0090
268	5.4644	0.0090
269	5.4733	0.0089
270	5.4823	0.0089
271	5.4912	0.0089
272	5.5000	0.0089
273	5.5089	0.0089
274	5.5177	0.0088
275	5.5266	0.0088
276	5.5354	0.0088
277	5.5442	0.0088

278	5.5529	0.0088
279	5.5617	0.0088
280	5.5704	0.0087
281	5.5792	0.0087
282	5.5879	0.0087
283	5.5965	0.0087
284	5.6052	0.0087
285	5.6139	0.0087
286	5.6225	0.0086
287	5.6311	0.0086
288	5.6397	0.0086

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0086	0.0068	0.0018
2	0.0086	0.0069	0.0018
3	0.0087	0.0069	0.0018
4	0.0087	0.0069	0.0018
5	0.0087	0.0069	0.0018
6	0.0087	0.0069	0.0018
7	0.0088	0.0070	0.0018
8	0.0088	0.0070	0.0018
9	0.0088	0.0070	0.0018
10	0.0088	0.0070	0.0018
11	0.0089	0.0071	0.0018
12	0.0089	0.0071	0.0018
13	0.0089	0.0071	0.0018
14	0.0089	0.0071	0.0018
15	0.0090	0.0071	0.0018
16	0.0090	0.0072	0.0018
17	0.0090	0.0072	0.0018
18	0.0091	0.0072	0.0018
19	0.0091	0.0072	0.0019
20	0.0091	0.0073	0.0019
21	0.0091	0.0073	0.0019
22	0.0092	0.0073	0.0019
23	0.0092	0.0073	0.0019
24	0.0092	0.0074	0.0019
25	0.0093	0.0074	0.0019
26	0.0093	0.0074	0.0019
27	0.0093	0.0074	0.0019
28	0.0094	0.0074	0.0019
29	0.0094	0.0075	0.0019
30	0.0094	0.0075	0.0019
31	0.0095	0.0075	0.0019
32	0.0095	0.0076	0.0019
33	0.0095	0.0076	0.0019
34	0.0096	0.0076	0.0019
35	0.0096	0.0076	0.0020
36	0.0096	0.0077	0.0020
37	0.0097	0.0077	0.0020
38	0.0097	0.0077	0.0020
39	0.0097	0.0078	0.0020
40	0.0098	0.0078	0.0020
41	0.0098	0.0078	0.0020

42	0.0098	0.0078	0.0020
43	0.0099	0.0079	0.0020
44	0.0099	0.0079	0.0020
45	0.0100	0.0079	0.0020
46	0.0100	0.0079	0.0020
47	0.0100	0.0080	0.0020
48	0.0101	0.0080	0.0020
49	0.0101	0.0081	0.0021
50	0.0101	0.0081	0.0021
51	0.0102	0.0081	0.0021
52	0.0102	0.0081	0.0021
53	0.0103	0.0082	0.0021
54	0.0103	0.0082	0.0021
55	0.0104	0.0082	0.0021
56	0.0104	0.0083	0.0021
57	0.0104	0.0083	0.0021
58	0.0105	0.0083	0.0021
59	0.0105	0.0084	0.0021
60	0.0106	0.0084	0.0022
61	0.0106	0.0085	0.0022
62	0.0106	0.0085	0.0022
63	0.0107	0.0085	0.0022
64	0.0107	0.0086	0.0022
65	0.0108	0.0086	0.0022
66	0.0108	0.0086	0.0022
67	0.0109	0.0087	0.0022
68	0.0109	0.0087	0.0022
69	0.0110	0.0088	0.0022
70	0.0110	0.0088	0.0022
71	0.0111	0.0088	0.0023
72	0.0111	0.0089	0.0023
73	0.0112	0.0089	0.0023
74	0.0112	0.0089	0.0023
75	0.0113	0.0090	0.0023
76	0.0113	0.0090	0.0023
77	0.0114	0.0091	0.0023
78	0.0115	0.0091	0.0023
79	0.0115	0.0092	0.0023
80	0.0116	0.0092	0.0024
81	0.0116	0.0093	0.0024
82	0.0117	0.0093	0.0024
83	0.0118	0.0094	0.0024
84	0.0118	0.0094	0.0024
85	0.0119	0.0095	0.0024
86	0.0119	0.0095	0.0024
87	0.0120	0.0096	0.0024
88	0.0121	0.0096	0.0025
89	0.0121	0.0097	0.0025
90	0.0122	0.0097	0.0025
91	0.0123	0.0098	0.0025
92	0.0123	0.0098	0.0025
93	0.0124	0.0099	0.0025
94	0.0125	0.0099	0.0025
95	0.0126	0.0100	0.0026
96	0.0126	0.0100	0.0026
97	0.0127	0.0101	0.0026
98	0.0128	0.0102	0.0026

99	0.0129	0.0102	0.0026
100	0.0129	0.0103	0.0026
101	0.0130	0.0104	0.0027
102	0.0131	0.0104	0.0027
103	0.0132	0.0105	0.0027
104	0.0132	0.0105	0.0027
105	0.0133	0.0106	0.0027
106	0.0134	0.0107	0.0027
107	0.0135	0.0108	0.0028
108	0.0136	0.0108	0.0028
109	0.0137	0.0109	0.0028
110	0.0138	0.0110	0.0028
111	0.0139	0.0111	0.0028
112	0.0139	0.0111	0.0028
113	0.0141	0.0112	0.0029
114	0.0141	0.0113	0.0029
115	0.0143	0.0114	0.0029
116	0.0143	0.0114	0.0029
117	0.0145	0.0115	0.0030
118	0.0146	0.0116	0.0030
119	0.0147	0.0117	0.0030
120	0.0148	0.0118	0.0030
121	0.0149	0.0119	0.0030
122	0.0150	0.0120	0.0031
123	0.0152	0.0121	0.0031
124	0.0153	0.0122	0.0031
125	0.0154	0.0123	0.0031
126	0.0155	0.0124	0.0032
127	0.0157	0.0125	0.0032
128	0.0158	0.0126	0.0032
129	0.0160	0.0127	0.0033
130	0.0161	0.0128	0.0033
131	0.0163	0.0129	0.0033
132	0.0164	0.0130	0.0033
133	0.0166	0.0132	0.0034
134	0.0167	0.0133	0.0034
135	0.0169	0.0134	0.0034
136	0.0170	0.0135	0.0035
137	0.0172	0.0137	0.0035
138	0.0173	0.0138	0.0035
139	0.0176	0.0140	0.0036
140	0.0177	0.0141	0.0036
141	0.0179	0.0143	0.0037
142	0.0181	0.0144	0.0037
143	0.0184	0.0146	0.0037
144	0.0185	0.0147	0.0038
145	0.0205	0.0163	0.0042
146	0.0207	0.0165	0.0042
147	0.0210	0.0167	0.0043
148	0.0212	0.0168	0.0043
149	0.0215	0.0171	0.0044
150	0.0217	0.0172	0.0044
151	0.0220	0.0175	0.0045
152	0.0222	0.0177	0.0045
153	0.0226	0.0180	0.0046
154	0.0228	0.0181	0.0046
155	0.0232	0.0185	0.0047

156	0.0234	0.0186	0.0048
157	0.0239	0.0190	0.0049
158	0.0241	0.0192	0.0049
159	0.0246	0.0196	0.0050
160	0.0249	0.0198	0.0051
161	0.0254	0.0202	0.0052
162	0.0257	0.0204	0.0052
163	0.0263	0.0209	0.0054
164	0.0266	0.0212	0.0054
165	0.0272	0.0217	0.0055
166	0.0276	0.0220	0.0056
167	0.0283	0.0226	0.0058
168	0.0287	0.0229	0.0058
169	0.0296	0.0236	0.0060
170	0.0301	0.0239	0.0061
171	0.0310	0.0247	0.0063
172	0.0315	0.0251	0.0064
173	0.0326	0.0260	0.0066
174	0.0332	0.0264	0.0068
175	0.0345	0.0275	0.0070
176	0.0352	0.0280	0.0072
177	0.0367	0.0292	0.0075
178	0.0375	0.0299	0.0076
179	0.0394	0.0314	0.0080
180	0.0404	0.0322	0.0082
181	0.0428	0.0341	0.0087
182	0.0441	0.0351	0.0090
183	0.0472	0.0376	0.0096
184	0.0489	0.0390	0.0100
185	0.0444	0.0353	0.0090
186	0.0469	0.0373	0.0095
187	0.0532	0.0424	0.0108
188	0.0574	0.0457	0.0117
189	0.0692	0.0551	0.0141
190	0.0781	0.0622	0.0159
191	0.1116	0.0652	0.0464
192	0.1534	0.0652	0.0883
193	0.4802	0.0652	0.4150
194	0.0909	0.0652	0.0257
195	0.0625	0.0498	0.0127
196	0.0498	0.0396	0.0101
197	0.0509	0.0406	0.0104
198	0.0456	0.0363	0.0093
199	0.0416	0.0331	0.0085
200	0.0384	0.0306	0.0078
201	0.0359	0.0286	0.0073
202	0.0338	0.0269	0.0069
203	0.0321	0.0255	0.0065
204	0.0305	0.0243	0.0062
205	0.0291	0.0232	0.0059
206	0.0280	0.0223	0.0057
207	0.0269	0.0214	0.0055
208	0.0260	0.0207	0.0053
209	0.0251	0.0200	0.0051
210	0.0243	0.0194	0.0050
211	0.0236	0.0188	0.0048
212	0.0230	0.0183	0.0047

213	0.0224	0.0178	0.0046
214	0.0218	0.0174	0.0044
215	0.0213	0.0170	0.0043
216	0.0208	0.0166	0.0042
217	0.0186	0.0148	0.0038
218	0.0182	0.0145	0.0037
219	0.0178	0.0142	0.0036
220	0.0175	0.0139	0.0036
221	0.0171	0.0136	0.0035
222	0.0168	0.0134	0.0034
223	0.0165	0.0131	0.0034
224	0.0162	0.0129	0.0033
225	0.0159	0.0126	0.0032
226	0.0156	0.0124	0.0032
227	0.0153	0.0122	0.0031
228	0.0151	0.0120	0.0031
229	0.0149	0.0118	0.0030
230	0.0146	0.0117	0.0030
231	0.0144	0.0115	0.0029
232	0.0142	0.0113	0.0029
233	0.0140	0.0112	0.0029
234	0.0138	0.0110	0.0028
235	0.0136	0.0109	0.0028
236	0.0135	0.0107	0.0027
237	0.0133	0.0106	0.0027
238	0.0131	0.0104	0.0027
239	0.0130	0.0103	0.0026
240	0.0128	0.0102	0.0026
241	0.0127	0.0101	0.0026
242	0.0125	0.0100	0.0025
243	0.0124	0.0098	0.0025
244	0.0122	0.0097	0.0025
245	0.0121	0.0096	0.0025
246	0.0120	0.0095	0.0024
247	0.0118	0.0094	0.0024
248	0.0117	0.0093	0.0024
249	0.0116	0.0092	0.0024
250	0.0115	0.0092	0.0023
251	0.0114	0.0091	0.0023
252	0.0113	0.0090	0.0023
253	0.0112	0.0089	0.0023
254	0.0111	0.0088	0.0023
255	0.0110	0.0087	0.0022
256	0.0109	0.0087	0.0022
257	0.0108	0.0086	0.0022
258	0.0107	0.0085	0.0022
259	0.0106	0.0084	0.0022
260	0.0105	0.0084	0.0021
261	0.0104	0.0083	0.0021
262	0.0103	0.0082	0.0021
263	0.0102	0.0082	0.0021
264	0.0102	0.0081	0.0021
265	0.0101	0.0080	0.0021
266	0.0100	0.0080	0.0020
267	0.0099	0.0079	0.0020
268	0.0099	0.0078	0.0020
269	0.0098	0.0078	0.0020

270	0.0097	0.0077	0.0020
271	0.0096	0.0077	0.0020
272	0.0096	0.0076	0.0020
273	0.0095	0.0076	0.0019
274	0.0094	0.0075	0.0019
275	0.0094	0.0075	0.0019
276	0.0093	0.0074	0.0019
277	0.0093	0.0074	0.0019
278	0.0092	0.0073	0.0019
279	0.0091	0.0073	0.0019
280	0.0091	0.0072	0.0018
281	0.0090	0.0072	0.0018
282	0.0090	0.0071	0.0018
283	0.0089	0.0071	0.0018
284	0.0088	0.0070	0.0018
285	0.0088	0.0070	0.0018
286	0.0087	0.0070	0.0018
287	0.0087	0.0069	0.0018
288	0.0086	0.0069	0.0018

Total soil rain loss = 4.09(In)
Total effective rainfall = 1.55(In)
Peak flow rate in flood hydrograph = 68.94(CFS)

++

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

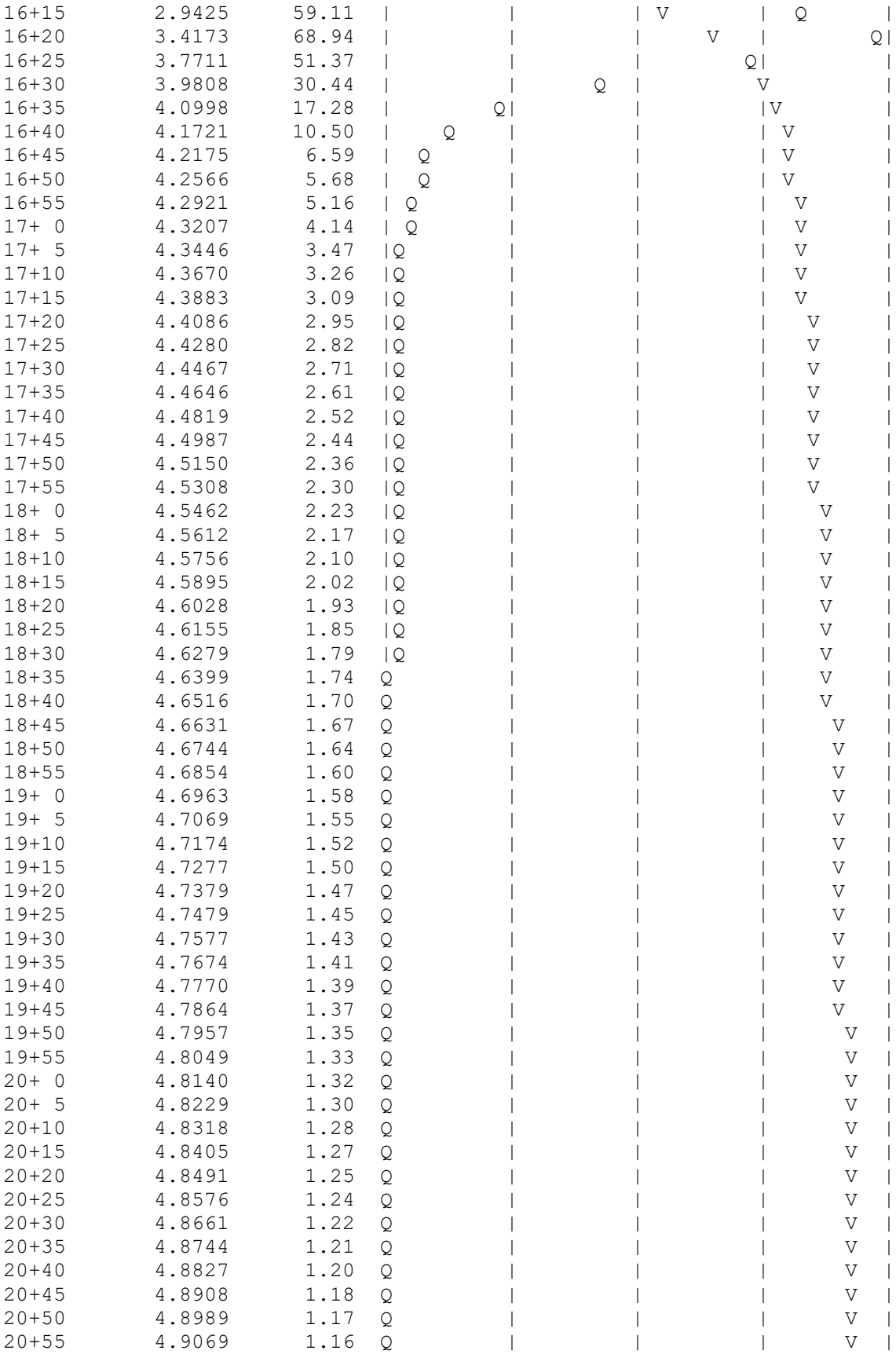
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	17.5	35.0	52.5	70.0
0+ 5	0.0001	0.02	Q	|	|	|	|
0+10	0.0009	0.11	Q	|	|	|	|
0+15	0.0027	0.28	Q	|	|	|	|
0+20	0.0062	0.50	Q	|	|	|	|
0+25	0.0109	0.68	Q	|	|	|	|
0+30	0.0162	0.77	Q	|	|	|	|
0+35	0.0218	0.82	Q	|	|	|	|
0+40	0.0276	0.84	Q	|	|	|	|
0+45	0.0334	0.85	Q	|	|	|	|
0+50	0.0393	0.86	Q	|	|	|	|
0+55	0.0452	0.86	Q	|	|	|	|
1+ 0	0.0512	0.87	Q	|	|	|	|
1+ 5	0.0572	0.87	Q	|	|	|	|
1+10	0.0632	0.87	Q	|	|	|	|
1+15	0.0692	0.88	Q	|	|	|	|
1+20	0.0753	0.88	Q	|	|	|	|
1+25	0.0813	0.88	Q	|	|	|	|
1+30	0.0874	0.88	Q	|	|	|	|
1+35	0.0935	0.89	Q	|	|	|	|
1+40	0.0997	0.89	Q	|	|	|	|
1+45	0.1058	0.89	Q	|	|	|	|
1+50	0.1120	0.89	Q	|	|	|	|
1+55	0.1181	0.90	Q	|	|	|	|

2+ 0	0.1243	0.90	Q	|	|	|	|
2+ 5	0.1306	0.90	QV	|	|	|	|
2+10	0.1368	0.91	QV	|	|	|	|
2+15	0.1431	0.91	QV	|	|	|	|
2+20	0.1494	0.91	QV	|	|	|	|
2+25	0.1557	0.92	QV	|	|	|	|
2+30	0.1620	0.92	QV	|	|	|	|
2+35	0.1683	0.92	QV	|	|	|	|
2+40	0.1747	0.92	QV	|	|	|	|
2+45	0.1811	0.93	QV	|	|	|	|
2+50	0.1875	0.93	QV	|	|	|	|
2+55	0.1939	0.93	QV	|	|	|	|
3+ 0	0.2004	0.94	QV	|	|	|	|
3+ 5	0.2069	0.94	QV	|	|	|	|
3+10	0.2134	0.94	QV	|	|	|	|
3+15	0.2199	0.95	QV	|	|	|	|
3+20	0.2265	0.95	QV	|	|	|	|
3+25	0.2330	0.95	QV	|	|	|	|
3+30	0.2396	0.96	QV	|	|	|	|
3+35	0.2463	0.96	QV	|	|	|	|
3+40	0.2529	0.97	QV	|	|	|	|
3+45	0.2596	0.97	Q V	|	|	|	|
3+50	0.2663	0.97	Q V	|	|	|	|
3+55	0.2730	0.98	Q V	|	|	|	|
4+ 0	0.2798	0.98	Q V	|	|	|	|
4+ 5	0.2865	0.98	Q V	|	|	|	|
4+10	0.2933	0.99	Q V	|	|	|	|
4+15	0.3001	0.99	Q V	|	|	|	|
4+20	0.3070	0.99	Q V	|	|	|	|
4+25	0.3139	1.00	Q V	|	|	|	|
4+30	0.3208	1.00	Q V	|	|	|	|
4+35	0.3277	1.01	Q V	|	|	|	|
4+40	0.3347	1.01	Q V	|	|	|	|
4+45	0.3417	1.01	Q V	|	|	|	|
4+50	0.3487	1.02	Q V	|	|	|	|
4+55	0.3557	1.02	Q V	|	|	|	|
5+ 0	0.3628	1.03	Q V	|	|	|	|
5+ 5	0.3699	1.03	Q V	|	|	|	|
5+10	0.3770	1.04	Q V	|	|	|	|
5+15	0.3842	1.04	Q V	|	|	|	|
5+20	0.3914	1.04	Q V	|	|	|	|
5+25	0.3986	1.05	Q V	|	|	|	|
5+30	0.4059	1.05	Q V	|	|	|	|
5+35	0.4132	1.06	Q V	|	|	|	|
5+40	0.4205	1.06	Q V	|	|	|	|
5+45	0.4278	1.07	Q V	|	|	|	|
5+50	0.4352	1.07	Q V	|	|	|	|
5+55	0.4426	1.08	Q V	|	|	|	|
6+ 0	0.4501	1.08	Q V	|	|	|	|
6+ 5	0.4576	1.09	Q V	|	|	|	|
6+10	0.4651	1.09	Q V	|	|	|	|
6+15	0.4726	1.10	Q V	|	|	|	|
6+20	0.4802	1.10	Q V	|	|	|	|
6+25	0.4879	1.11	Q V	|	|	|	|
6+30	0.4955	1.11	Q V	|	|	|	|
6+35	0.5032	1.12	Q V	|	|	|	|
6+40	0.5110	1.12	Q V	|	|	|	|

6+45	0.5187	1.13	Q	V				
6+50	0.5265	1.13	Q	V				
6+55	0.5344	1.14	Q	V				
7+ 0	0.5423	1.15	Q	V				
7+ 5	0.5502	1.15	Q	V				
7+10	0.5582	1.16	Q	V				
7+15	0.5662	1.16	Q	V				
7+20	0.5742	1.17	Q	V				
7+25	0.5823	1.18	Q	V				
7+30	0.5905	1.18	Q	V				
7+35	0.5986	1.19	Q	V				
7+40	0.6069	1.19	Q	V				
7+45	0.6151	1.20	Q	V				
7+50	0.6234	1.21	Q	V				
7+55	0.6318	1.21	Q	V				
8+ 0	0.6402	1.22	Q	V				
8+ 5	0.6487	1.23	Q	V				
8+10	0.6572	1.23	Q	V				
8+15	0.6657	1.24	Q	V				
8+20	0.6743	1.25	Q	V				
8+25	0.6830	1.26	Q	V				
8+30	0.6917	1.26	Q	V				
8+35	0.7004	1.27	Q	V				
8+40	0.7092	1.28	Q	V				
8+45	0.7181	1.29	Q	V				
8+50	0.7270	1.29	Q	V				
8+55	0.7360	1.30	Q	V				
9+ 0	0.7450	1.31	Q	V				
9+ 5	0.7541	1.32	Q	V				
9+10	0.7632	1.33	Q	V				
9+15	0.7725	1.34	Q	V				
9+20	0.7817	1.35	Q	V				
9+25	0.7911	1.35	Q	V				
9+30	0.8005	1.36	Q	V				
9+35	0.8099	1.37	Q	V				
9+40	0.8194	1.38	Q	V				
9+45	0.8290	1.39	Q	V				
9+50	0.8387	1.40	Q	V				
9+55	0.8484	1.41	Q	V				
10+ 0	0.8582	1.42	Q	V				
10+ 5	0.8681	1.43	Q	V				
10+10	0.8781	1.44	Q	V				
10+15	0.8881	1.46	Q	V				
10+20	0.8982	1.47	Q	V				
10+25	0.9084	1.48	Q	V				
10+30	0.9186	1.49	Q	V				
10+35	0.9290	1.50	Q	V				
10+40	0.9394	1.52	Q	V				
10+45	0.9499	1.53	Q	V				
10+50	0.9606	1.54	Q	V				
10+55	0.9713	1.55	Q	V				
11+ 0	0.9820	1.57	Q	V				
11+ 5	0.9929	1.58	Q	V				
11+10	1.0039	1.60	Q	V				
11+15	1.0150	1.61	Q	V				
11+20	1.0262	1.63	Q	V				
11+25	1.0375	1.64	Q	V				

11+30	1.0489	1.66	Q	V |	|	|	|
11+35	1.0604	1.67	Q	V |	|	|	|
11+40	1.0721	1.69	Q	V |	|	|	|
11+45	1.0838	1.71	Q	V |	|	|	|
11+50	1.0957	1.72	Q	V |	|	|	|
11+55	1.1077	1.74	Q	V |	|	|	|
12+ 0	1.1198	1.76	|Q	V |	|	|	|
12+ 5	1.1321	1.78	|Q	V |	|	|	|
12+10	1.1446	1.82	|Q	V |	|	|	|
12+15	1.1576	1.88	|Q	V |	|	|	|
12+20	1.1710	1.94	|Q	V|	|	|	|
12+25	1.1847	2.00	|Q	V|	|	|	|
12+30	1.1988	2.04	|Q	V|	|	|	|
12+35	1.2131	2.07	|Q	V|	|	|	|
12+40	1.2276	2.10	|Q	V|	|	|	|
12+45	1.2422	2.13	|Q	V|	|	|	|
12+50	1.2571	2.16	|Q	V|	|	|	|
12+55	1.2721	2.19	|Q	V|	|	|	|
13+ 0	1.2874	2.21	|Q	V|	|	|	|
13+ 5	1.3028	2.24	|Q	V	|	|	|
13+10	1.3185	2.27	|Q	V	|	|	|
13+15	1.3344	2.31	|Q	V	|	|	|
13+20	1.3505	2.34	|Q	V	|	|	|
13+25	1.3668	2.37	|Q	V	|	|	|
13+30	1.3834	2.41	|Q	V	|	|	|
13+35	1.4003	2.45	|Q	V	|	|	|
13+40	1.4174	2.49	|Q	V	|	|	|
13+45	1.4348	2.53	|Q	|V	|	|	|
13+50	1.4525	2.57	|Q	|V	|	|	|
13+55	1.4705	2.62	|Q	|V	|	|	|
14+ 0	1.4889	2.66	|Q	|V	|	|	|
14+ 5	1.5076	2.72	|Q	|V	|	|	|
14+10	1.5267	2.77	|Q	|V	|	|	|
14+15	1.5461	2.83	|Q	|V	|	|	|
14+20	1.5661	2.89	|Q	| V	|	|	|
14+25	1.5864	2.96	|Q	| V	|	|	|
14+30	1.6073	3.03	|Q	| V	|	|	|
14+35	1.6287	3.10	|Q	| V	|	|	|
14+40	1.6506	3.18	|Q	| V	|	|	|
14+45	1.6731	3.27	|Q	| V	|	|	|
14+50	1.6962	3.36	|Q	| V	|	|	|
14+55	1.7201	3.46	|Q	| V	|	|	|
15+ 0	1.7447	3.58	| Q	| V	|	|	|
15+ 5	1.7702	3.70	| Q	| V	|	|	|
15+10	1.7966	3.84	| Q	| V	|	|	|
15+15	1.8241	3.99	| Q	| V	|	|	|
15+20	1.8527	4.16	| Q	| V	|	|	|
15+25	1.8826	4.33	| Q	| V	|	|	|
15+30	1.9134	4.47	| Q	| V	|	|	|
15+35	1.9448	4.56	| Q	| V	|	|	|
15+40	1.9768	4.64	| Q	| V	|	|	|
15+45	2.0102	4.85	| Q	| V	|	|	|
15+50	2.0464	5.26	| Q	| V	|	|	|
15+55	2.0888	6.15	| Q	| V	|	|	|
16+ 0	2.1490	8.74	| Q	| V	|	|	|
16+ 5	2.2708	17.69	| Q	V	|	|	|
16+10	2.5354	38.43	|	| V|Q	|	|	|



21+ 0	4.9148	1.15	Q	|	|	|	V |
21+ 5	4.9226	1.14	Q	|	|	|	V |
21+10	4.9304	1.13	Q	|	|	|	V |
21+15	4.9381	1.12	Q	|	|	|	V |
21+20	4.9457	1.10	Q	|	|	|	V |
21+25	4.9532	1.09	Q	|	|	|	V |
21+30	4.9607	1.08	Q	|	|	|	V |
21+35	4.9681	1.07	Q	|	|	|	V |
21+40	4.9754	1.07	Q	|	|	|	V |
21+45	4.9827	1.06	Q	|	|	|	V |
21+50	4.9899	1.05	Q	|	|	|	V |
21+55	4.9971	1.04	Q	|	|	|	V |
22+ 0	5.0041	1.03	Q	|	|	|	V |
22+ 5	5.0112	1.02	Q	|	|	|	V |
22+10	5.0182	1.01	Q	|	|	|	V |
22+15	5.0251	1.00	Q	|	|	|	V |
22+20	5.0319	1.00	Q	|	|	|	V |
22+25	5.0388	0.99	Q	|	|	|	V |
22+30	5.0455	0.98	Q	|	|	|	V |
22+35	5.0522	0.97	Q	|	|	|	V|
22+40	5.0589	0.97	Q	|	|	|	V|
22+45	5.0655	0.96	Q	|	|	|	V|
22+50	5.0721	0.95	Q	|	|	|	V|
22+55	5.0786	0.95	Q	|	|	|	V|
23+ 0	5.0850	0.94	Q	|	|	|	V|
23+ 5	5.0915	0.93	Q	|	|	|	V|
23+10	5.0979	0.93	Q	|	|	|	V|
23+15	5.1042	0.92	Q	|	|	|	V|
23+20	5.1105	0.91	Q	|	|	|	V|
23+25	5.1167	0.91	Q	|	|	|	V|
23+30	5.1230	0.90	Q	|	|	|	V|
23+35	5.1291	0.90	Q	|	|	|	V|
23+40	5.1353	0.89	Q	|	|	|	V|
23+45	5.1414	0.88	Q	|	|	|	V|
23+50	5.1474	0.88	Q	|	|	|	V|
23+55	5.1534	0.87	Q	|	|	|	V|
24+ 0	5.1594	0.87	Q	|	|	|	V|
24+ 5	5.1652	0.85	Q	|	|	|	V|
24+10	5.1704	0.75	Q	|	|	|	V|
24+15	5.1744	0.58	Q	|	|	|	V|
24+20	5.1768	0.35	Q	|	|	|	V|
24+25	5.1780	0.18	Q	|	|	|	V|
24+30	5.1786	0.08	Q	|	|	|	V|
24+35	5.1789	0.04	Q	|	|	|	V|
24+40	5.1790	0.02	Q	|	|	|	V|
24+45	5.1791	0.01	Q	|	|	|	V|
24+50	5.1791	0.01	Q	|	|	|	V|
24+55	5.1791	0.00	Q	|	|	|	V|

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

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Study date 04/20/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION
100-YEAR STORM EVENT ANALYSIS WITH ADJUSTED 25 YEAR RAINFALL DATA

Storm Event Year = 100

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 100		
40.02	1	1.00
Rainfall data for year 100		
40.02	6	2.43
Rainfall data for year 100		
40.02	24	4.48

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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)
32.0	32.0	40.02	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
32.02	0.800	32.0	32.0	21.25	0.001
8.00	0.200	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.190
Area-averaged low loss fraction, Yb = 0.810
User entry of time of concentration = 0.336 (hours)
++
Watershed area = 40.02(Ac.)
Catchment Lag time = 0.268 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 31.0389
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.810 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.369(In)
Computed peak 30-minute rainfall = 0.756(In)
Specified peak 1-hour rainfall = 0.998(In)
Computed peak 3-hour rainfall = 1.722(In)
Specified peak 6-hour rainfall = 2.430(In)
Specified peak 24-hour rainfall = 4.480(In)

Rainfall depth area reduction factors:
Using a total area of 40.02(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.369(In)
30-minute factor = 0.998 Adjusted rainfall = 0.755(In)
1-hour factor = 0.998 Adjusted rainfall = 0.996(In)
3-hour factor = 1.000 Adjusted rainfall = 1.722(In)
6-hour factor = 1.000 Adjusted rainfall = 2.430(In)
24-hour factor = 1.000 Adjusted rainfall = 4.480(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 = 483.99 (CFS))	
1	2.041	9.880
2	11.883	47.633
3	31.158	93.289
4	57.236	126.216
5	77.885	99.941
6	89.307	55.282
7	94.858	26.865

8	97.635	13.442
9	98.549	4.422
10	99.108	2.704
11	99.665	2.699
12	100.000	1.620

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3687	0.3687
2	0.4865	0.1178
3	0.5721	0.0857
4	0.6419	0.0698
5	0.7018	0.0599
6	0.7549	0.0531
7	0.8029	0.0480
8	0.8470	0.0441
9	0.8878	0.0409
10	0.9261	0.0382
11	0.9621	0.0360
12	0.9961	0.0341
13	1.0366	0.0405
14	1.0756	0.0390
15	1.1132	0.0376
16	1.1496	0.0364
17	1.1849	0.0352
18	1.2191	0.0342
19	1.2524	0.0333
20	1.2848	0.0324
21	1.3164	0.0316
22	1.3473	0.0309
23	1.3774	0.0302
24	1.4069	0.0295
25	1.4358	0.0289
26	1.4642	0.0283
27	1.4920	0.0278
28	1.5192	0.0273
29	1.5460	0.0268
30	1.5724	0.0263
31	1.5982	0.0259
32	1.6237	0.0255
33	1.6488	0.0251
34	1.6735	0.0247
35	1.6978	0.0243
36	1.7218	0.0240
37	1.7454	0.0236
38	1.7687	0.0233
39	1.7917	0.0230
40	1.8144	0.0227
41	1.8368	0.0224
42	1.8589	0.0221
43	1.8808	0.0219
44	1.9024	0.0216
45	1.9237	0.0214
46	1.9448	0.0211
47	1.9657	0.0209
48	1.9864	0.0207
49	2.0069	0.0205

50	2.0271	0.0202
51	2.0471	0.0200
52	2.0670	0.0198
53	2.0866	0.0197
54	2.1061	0.0195
55	2.1254	0.0193
56	2.1445	0.0191
57	2.1634	0.0189
58	2.1822	0.0188
59	2.2008	0.0186
60	2.2193	0.0185
61	2.2376	0.0183
62	2.2557	0.0181
63	2.2737	0.0180
64	2.2916	0.0179
65	2.3093	0.0177
66	2.3269	0.0176
67	2.3444	0.0174
68	2.3617	0.0173
69	2.3789	0.0172
70	2.3959	0.0171
71	2.4129	0.0169
72	2.4297	0.0168
73	2.4445	0.0148
74	2.4593	0.0147
75	2.4739	0.0146
76	2.4884	0.0145
77	2.5028	0.0144
78	2.5171	0.0143
79	2.5312	0.0142
80	2.5453	0.0141
81	2.5593	0.0140
82	2.5732	0.0139
83	2.5870	0.0138
84	2.6007	0.0137
85	2.6144	0.0136
86	2.6279	0.0135
87	2.6413	0.0134
88	2.6547	0.0134
89	2.6680	0.0133
90	2.6811	0.0132
91	2.6943	0.0131
92	2.7073	0.0130
93	2.7202	0.0129
94	2.7331	0.0129
95	2.7459	0.0128
96	2.7586	0.0127
97	2.7713	0.0126
98	2.7838	0.0126
99	2.7963	0.0125
100	2.8088	0.0124
101	2.8211	0.0124
102	2.8334	0.0123
103	2.8456	0.0122
104	2.8578	0.0122
105	2.8699	0.0121
106	2.8819	0.0120

107	2.8939	0.0120
108	2.9058	0.0119
109	2.9176	0.0118
110	2.9294	0.0118
111	2.9411	0.0117
112	2.9528	0.0117
113	2.9644	0.0116
114	2.9760	0.0115
115	2.9875	0.0115
116	2.9989	0.0114
117	3.0103	0.0114
118	3.0216	0.0113
119	3.0329	0.0113
120	3.0441	0.0112
121	3.0553	0.0112
122	3.0664	0.0111
123	3.0775	0.0111
124	3.0885	0.0110
125	3.0994	0.0110
126	3.1104	0.0109
127	3.1212	0.0109
128	3.1321	0.0108
129	3.1428	0.0108
130	3.1536	0.0107
131	3.1642	0.0107
132	3.1749	0.0106
133	3.1855	0.0106
134	3.1960	0.0105
135	3.2065	0.0105
136	3.2170	0.0105
137	3.2274	0.0104
138	3.2378	0.0104
139	3.2481	0.0103
140	3.2584	0.0103
141	3.2687	0.0103
142	3.2789	0.0102
143	3.2890	0.0102
144	3.2992	0.0101
145	3.3093	0.0101
146	3.3193	0.0101
147	3.3293	0.0100
148	3.3393	0.0100
149	3.3492	0.0099
150	3.3591	0.0099
151	3.3690	0.0099
152	3.3788	0.0098
153	3.3886	0.0098
154	3.3984	0.0098
155	3.4081	0.0097
156	3.4178	0.0097
157	3.4274	0.0097
158	3.4371	0.0096
159	3.4466	0.0096
160	3.4562	0.0095
161	3.4657	0.0095
162	3.4752	0.0095
163	3.4846	0.0095

164	3.4941	0.0094
165	3.5034	0.0094
166	3.5128	0.0094
167	3.5221	0.0093
168	3.5314	0.0093
169	3.5407	0.0093
170	3.5499	0.0092
171	3.5591	0.0092
172	3.5683	0.0092
173	3.5774	0.0091
174	3.5865	0.0091
175	3.5956	0.0091
176	3.6047	0.0091
177	3.6137	0.0090
178	3.6227	0.0090
179	3.6317	0.0090
180	3.6406	0.0089
181	3.6495	0.0089
182	3.6584	0.0089
183	3.6673	0.0089
184	3.6761	0.0088
185	3.6849	0.0088
186	3.6937	0.0088
187	3.7024	0.0088
188	3.7111	0.0087
189	3.7198	0.0087
190	3.7285	0.0087
191	3.7372	0.0086
192	3.7458	0.0086
193	3.7544	0.0086
194	3.7630	0.0086
195	3.7715	0.0085
196	3.7800	0.0085
197	3.7885	0.0085
198	3.7970	0.0085
199	3.8055	0.0085
200	3.8139	0.0084
201	3.8223	0.0084
202	3.8307	0.0084
203	3.8390	0.0084
204	3.8474	0.0083
205	3.8557	0.0083
206	3.8640	0.0083
207	3.8722	0.0083
208	3.8805	0.0082
209	3.8887	0.0082
210	3.8969	0.0082
211	3.9051	0.0082
212	3.9132	0.0082
213	3.9214	0.0081
214	3.9295	0.0081
215	3.9376	0.0081
216	3.9456	0.0081
217	3.9537	0.0081
218	3.9617	0.0080
219	3.9697	0.0080
220	3.9777	0.0080

221	3.9857	0.0080
222	3.9936	0.0079
223	4.0016	0.0079
224	4.0095	0.0079
225	4.0174	0.0079
226	4.0252	0.0079
227	4.0331	0.0079
228	4.0409	0.0078
229	4.0487	0.0078
230	4.0565	0.0078
231	4.0643	0.0078
232	4.0721	0.0078
233	4.0798	0.0077
234	4.0875	0.0077
235	4.0952	0.0077
236	4.1029	0.0077
237	4.1106	0.0077
238	4.1182	0.0076
239	4.1258	0.0076
240	4.1334	0.0076
241	4.1410	0.0076
242	4.1486	0.0076
243	4.1562	0.0076
244	4.1637	0.0075
245	4.1712	0.0075
246	4.1787	0.0075
247	4.1862	0.0075
248	4.1937	0.0075
249	4.2011	0.0075
250	4.2086	0.0074
251	4.2160	0.0074
252	4.2234	0.0074
253	4.2308	0.0074
254	4.2382	0.0074
255	4.2455	0.0074
256	4.2529	0.0073
257	4.2602	0.0073
258	4.2675	0.0073
259	4.2748	0.0073
260	4.2821	0.0073
261	4.2893	0.0073
262	4.2966	0.0072
263	4.3038	0.0072
264	4.3110	0.0072
265	4.3182	0.0072
266	4.3254	0.0072
267	4.3326	0.0072
268	4.3397	0.0072
269	4.3469	0.0071
270	4.3540	0.0071
271	4.3611	0.0071
272	4.3682	0.0071
273	4.3753	0.0071
274	4.3823	0.0071
275	4.3894	0.0071
276	4.3964	0.0070
277	4.4034	0.0070

278	4.4105	0.0070
279	4.4174	0.0070
280	4.4244	0.0070
281	4.4314	0.0070
282	4.4383	0.0070
283	4.4453	0.0069
284	4.4522	0.0069
285	4.4591	0.0069
286	4.4660	0.0069
287	4.4729	0.0069
288	4.4798	0.0069

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0069	0.0056	0.0013
2	0.0069	0.0056	0.0013
3	0.0069	0.0056	0.0013
4	0.0069	0.0056	0.0013
5	0.0070	0.0056	0.0013
6	0.0070	0.0056	0.0013
7	0.0070	0.0057	0.0013
8	0.0070	0.0057	0.0013
9	0.0070	0.0057	0.0013
10	0.0071	0.0057	0.0013
11	0.0071	0.0057	0.0013
12	0.0071	0.0057	0.0013
13	0.0071	0.0058	0.0014
14	0.0071	0.0058	0.0014
15	0.0072	0.0058	0.0014
16	0.0072	0.0058	0.0014
17	0.0072	0.0058	0.0014
18	0.0072	0.0059	0.0014
19	0.0073	0.0059	0.0014
20	0.0073	0.0059	0.0014
21	0.0073	0.0059	0.0014
22	0.0073	0.0059	0.0014
23	0.0074	0.0060	0.0014
24	0.0074	0.0060	0.0014
25	0.0074	0.0060	0.0014
26	0.0074	0.0060	0.0014
27	0.0075	0.0060	0.0014
28	0.0075	0.0061	0.0014
29	0.0075	0.0061	0.0014
30	0.0075	0.0061	0.0014
31	0.0076	0.0061	0.0014
32	0.0076	0.0061	0.0014
33	0.0076	0.0062	0.0014
34	0.0076	0.0062	0.0014
35	0.0077	0.0062	0.0015
36	0.0077	0.0062	0.0015
37	0.0077	0.0063	0.0015
38	0.0077	0.0063	0.0015
39	0.0078	0.0063	0.0015
40	0.0078	0.0063	0.0015
41	0.0078	0.0063	0.0015

42	0.0079	0.0064	0.0015
43	0.0079	0.0064	0.0015
44	0.0079	0.0064	0.0015
45	0.0079	0.0064	0.0015
46	0.0080	0.0065	0.0015
47	0.0080	0.0065	0.0015
48	0.0080	0.0065	0.0015
49	0.0081	0.0065	0.0015
50	0.0081	0.0066	0.0015
51	0.0081	0.0066	0.0015
52	0.0082	0.0066	0.0015
53	0.0082	0.0066	0.0016
54	0.0082	0.0067	0.0016
55	0.0083	0.0067	0.0016
56	0.0083	0.0067	0.0016
57	0.0083	0.0068	0.0016
58	0.0084	0.0068	0.0016
59	0.0084	0.0068	0.0016
60	0.0084	0.0068	0.0016
61	0.0085	0.0069	0.0016
62	0.0085	0.0069	0.0016
63	0.0085	0.0069	0.0016
64	0.0086	0.0069	0.0016
65	0.0086	0.0070	0.0016
66	0.0086	0.0070	0.0016
67	0.0087	0.0070	0.0017
68	0.0087	0.0071	0.0017
69	0.0088	0.0071	0.0017
70	0.0088	0.0071	0.0017
71	0.0089	0.0072	0.0017
72	0.0089	0.0072	0.0017
73	0.0089	0.0072	0.0017
74	0.0090	0.0073	0.0017
75	0.0090	0.0073	0.0017
76	0.0091	0.0073	0.0017
77	0.0091	0.0074	0.0017
78	0.0091	0.0074	0.0017
79	0.0092	0.0075	0.0017
80	0.0092	0.0075	0.0018
81	0.0093	0.0075	0.0018
82	0.0093	0.0076	0.0018
83	0.0094	0.0076	0.0018
84	0.0094	0.0076	0.0018
85	0.0095	0.0077	0.0018
86	0.0095	0.0077	0.0018
87	0.0096	0.0078	0.0018
88	0.0096	0.0078	0.0018
89	0.0097	0.0078	0.0018
90	0.0097	0.0079	0.0018
91	0.0098	0.0079	0.0019
92	0.0098	0.0080	0.0019
93	0.0099	0.0080	0.0019
94	0.0099	0.0081	0.0019
95	0.0100	0.0081	0.0019
96	0.0101	0.0081	0.0019
97	0.0101	0.0082	0.0019
98	0.0102	0.0082	0.0019

99	0.0103	0.0083	0.0019
100	0.0103	0.0083	0.0020
101	0.0104	0.0084	0.0020
102	0.0104	0.0084	0.0020
103	0.0105	0.0085	0.0020
104	0.0105	0.0085	0.0020
105	0.0106	0.0086	0.0020
106	0.0107	0.0087	0.0020
107	0.0108	0.0087	0.0020
108	0.0108	0.0088	0.0021
109	0.0109	0.0088	0.0021
110	0.0110	0.0089	0.0021
111	0.0111	0.0090	0.0021
112	0.0111	0.0090	0.0021
113	0.0112	0.0091	0.0021
114	0.0113	0.0091	0.0021
115	0.0114	0.0092	0.0022
116	0.0114	0.0093	0.0022
117	0.0115	0.0094	0.0022
118	0.0116	0.0094	0.0022
119	0.0117	0.0095	0.0022
120	0.0118	0.0095	0.0022
121	0.0119	0.0096	0.0023
122	0.0120	0.0097	0.0023
123	0.0121	0.0098	0.0023
124	0.0122	0.0099	0.0023
125	0.0123	0.0100	0.0023
126	0.0124	0.0100	0.0023
127	0.0125	0.0101	0.0024
128	0.0126	0.0102	0.0024
129	0.0127	0.0103	0.0024
130	0.0128	0.0104	0.0024
131	0.0129	0.0105	0.0025
132	0.0130	0.0106	0.0025
133	0.0132	0.0107	0.0025
134	0.0133	0.0108	0.0025
135	0.0134	0.0109	0.0026
136	0.0135	0.0110	0.0026
137	0.0137	0.0111	0.0026
138	0.0138	0.0112	0.0026
139	0.0140	0.0113	0.0027
140	0.0141	0.0114	0.0027
141	0.0143	0.0116	0.0027
142	0.0144	0.0117	0.0027
143	0.0146	0.0118	0.0028
144	0.0147	0.0119	0.0028
145	0.0168	0.0136	0.0032
146	0.0169	0.0137	0.0032
147	0.0172	0.0139	0.0033
148	0.0173	0.0140	0.0033
149	0.0176	0.0142	0.0033
150	0.0177	0.0144	0.0034
151	0.0180	0.0146	0.0034
152	0.0181	0.0147	0.0034
153	0.0185	0.0149	0.0035
154	0.0186	0.0151	0.0035
155	0.0189	0.0153	0.0036

156	0.0191	0.0155	0.0036
157	0.0195	0.0158	0.0037
158	0.0197	0.0159	0.0037
159	0.0200	0.0162	0.0038
160	0.0202	0.0164	0.0038
161	0.0207	0.0167	0.0039
162	0.0209	0.0169	0.0040
163	0.0214	0.0173	0.0041
164	0.0216	0.0175	0.0041
165	0.0221	0.0179	0.0042
166	0.0224	0.0181	0.0043
167	0.0230	0.0186	0.0044
168	0.0233	0.0189	0.0044
169	0.0240	0.0194	0.0046
170	0.0243	0.0197	0.0046
171	0.0251	0.0203	0.0048
172	0.0255	0.0206	0.0048
173	0.0263	0.0213	0.0050
174	0.0268	0.0217	0.0051
175	0.0278	0.0225	0.0053
176	0.0283	0.0229	0.0054
177	0.0295	0.0239	0.0056
178	0.0302	0.0244	0.0057
179	0.0316	0.0256	0.0060
180	0.0324	0.0263	0.0062
181	0.0342	0.0277	0.0065
182	0.0352	0.0286	0.0067
183	0.0376	0.0305	0.0071
184	0.0390	0.0316	0.0074
185	0.0341	0.0276	0.0065
186	0.0360	0.0292	0.0068
187	0.0409	0.0331	0.0078
188	0.0441	0.0357	0.0084
189	0.0531	0.0430	0.0101
190	0.0599	0.0485	0.0114
191	0.0857	0.0652	0.0205
192	0.1178	0.0652	0.0526
193	0.3687	0.0652	0.3035
194	0.0698	0.0565	0.0133
195	0.0480	0.0389	0.0091
196	0.0382	0.0310	0.0073
197	0.0405	0.0328	0.0077
198	0.0364	0.0295	0.0069
199	0.0333	0.0270	0.0063
200	0.0309	0.0250	0.0059
201	0.0289	0.0234	0.0055
202	0.0273	0.0221	0.0052
203	0.0259	0.0210	0.0049
204	0.0247	0.0200	0.0047
205	0.0236	0.0191	0.0045
206	0.0227	0.0184	0.0043
207	0.0219	0.0177	0.0042
208	0.0211	0.0171	0.0040
209	0.0205	0.0166	0.0039
210	0.0198	0.0161	0.0038
211	0.0193	0.0156	0.0037
212	0.0188	0.0152	0.0036

213	0.0183	0.0148	0.0035
214	0.0179	0.0145	0.0034
215	0.0174	0.0141	0.0033
216	0.0171	0.0138	0.0032
217	0.0148	0.0120	0.0028
218	0.0145	0.0117	0.0028
219	0.0142	0.0115	0.0027
220	0.0139	0.0113	0.0026
221	0.0136	0.0110	0.0026
222	0.0134	0.0108	0.0025
223	0.0131	0.0106	0.0025
224	0.0129	0.0104	0.0024
225	0.0126	0.0102	0.0024
226	0.0124	0.0101	0.0024
227	0.0122	0.0099	0.0023
228	0.0120	0.0097	0.0023
229	0.0118	0.0096	0.0022
230	0.0117	0.0094	0.0022
231	0.0115	0.0093	0.0022
232	0.0113	0.0092	0.0022
233	0.0112	0.0090	0.0021
234	0.0110	0.0089	0.0021
235	0.0109	0.0088	0.0021
236	0.0107	0.0087	0.0020
237	0.0106	0.0086	0.0020
238	0.0105	0.0085	0.0020
239	0.0103	0.0084	0.0020
240	0.0102	0.0083	0.0019
241	0.0101	0.0082	0.0019
242	0.0100	0.0081	0.0019
243	0.0099	0.0080	0.0019
244	0.0098	0.0079	0.0019
245	0.0097	0.0078	0.0018
246	0.0095	0.0077	0.0018
247	0.0095	0.0077	0.0018
248	0.0094	0.0076	0.0018
249	0.0093	0.0075	0.0018
250	0.0092	0.0074	0.0017
251	0.0091	0.0074	0.0017
252	0.0090	0.0073	0.0017
253	0.0089	0.0072	0.0017
254	0.0088	0.0072	0.0017
255	0.0088	0.0071	0.0017
256	0.0087	0.0070	0.0016
257	0.0086	0.0070	0.0016
258	0.0085	0.0069	0.0016
259	0.0085	0.0068	0.0016
260	0.0084	0.0068	0.0016
261	0.0083	0.0067	0.0016
262	0.0082	0.0067	0.0016
263	0.0082	0.0066	0.0016
264	0.0081	0.0066	0.0015
265	0.0081	0.0065	0.0015
266	0.0080	0.0065	0.0015
267	0.0079	0.0064	0.0015
268	0.0079	0.0064	0.0015
269	0.0078	0.0063	0.0015

270	0.0078	0.0063	0.0015
271	0.0077	0.0062	0.0015
272	0.0076	0.0062	0.0015
273	0.0076	0.0062	0.0014
274	0.0075	0.0061	0.0014
275	0.0075	0.0061	0.0014
276	0.0074	0.0060	0.0014
277	0.0074	0.0060	0.0014
278	0.0073	0.0059	0.0014
279	0.0073	0.0059	0.0014
280	0.0072	0.0059	0.0014
281	0.0072	0.0058	0.0014
282	0.0072	0.0058	0.0014
283	0.0071	0.0058	0.0014
284	0.0071	0.0057	0.0013
285	0.0070	0.0057	0.0013
286	0.0070	0.0057	0.0013
287	0.0069	0.0056	0.0013
288	0.0069	0.0056	0.0013

Total soil rain loss = 3.36(In)
Total effective rainfall = 1.12(In)
Peak flow rate in flood hydrograph = 46.96(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

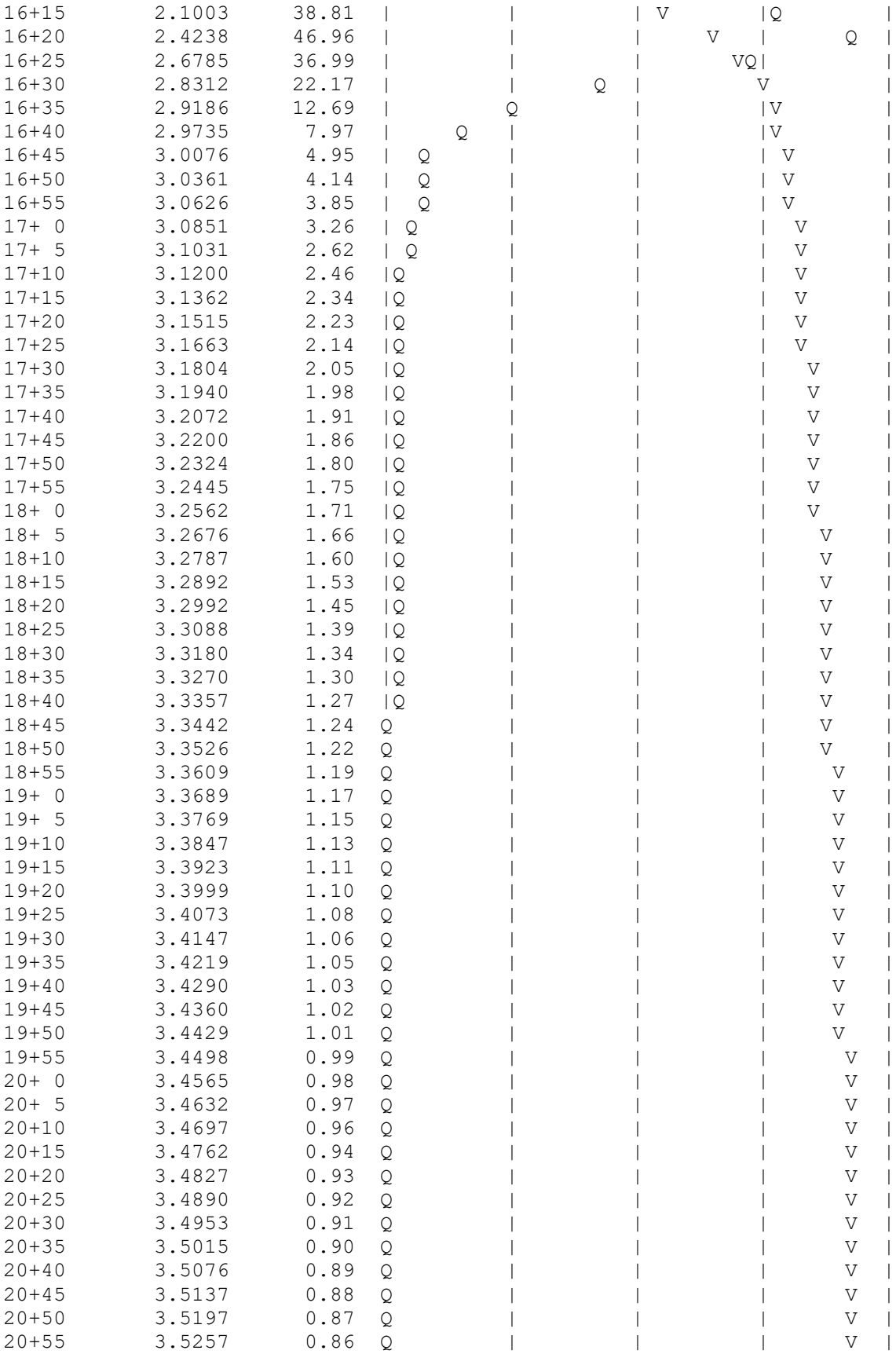
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0001	0.01	Q				
0+10	0.0006	0.08	Q				
0+15	0.0020	0.20	Q				
0+20	0.0045	0.36	Q				
0+25	0.0079	0.49	Q				
0+30	0.0118	0.57	Q				
0+35	0.0159	0.60	Q				
0+40	0.0202	0.62	Q				
0+45	0.0246	0.63	Q				
0+50	0.0289	0.64	Q				
0+55	0.0334	0.64	Q				
1+ 0	0.0378	0.65	Q				
1+ 5	0.0423	0.65	Q				
1+10	0.0467	0.65	Q				
1+15	0.0512	0.65	Q				
1+20	0.0557	0.65	Q				
1+25	0.0602	0.66	Q				
1+30	0.0648	0.66	Q				
1+35	0.0693	0.66	Q				
1+40	0.0739	0.66	Q				
1+45	0.0785	0.66	Q				
1+50	0.0830	0.67	Q				
1+55	0.0876	0.67	Q				

2+ 0	0.0923	0.67	Q	|	|	|	|
2+ 5	0.0969	0.67	QV	|	|	|	|
2+10	0.1015	0.67	QV	|	|	|	|
2+15	0.1062	0.68	QV	|	|	|	|
2+20	0.1109	0.68	QV	|	|	|	|
2+25	0.1156	0.68	QV	|	|	|	|
2+30	0.1203	0.68	QV	|	|	|	|
2+35	0.1250	0.69	QV	|	|	|	|
2+40	0.1298	0.69	QV	|	|	|	|
2+45	0.1345	0.69	QV	|	|	|	|
2+50	0.1393	0.69	QV	|	|	|	|
2+55	0.1441	0.70	QV	|	|	|	|
3+ 0	0.1489	0.70	QV	|	|	|	|
3+ 5	0.1537	0.70	QV	|	|	|	|
3+10	0.1585	0.70	QV	|	|	|	|
3+15	0.1634	0.71	QV	|	|	|	|
3+20	0.1683	0.71	QV	|	|	|	|
3+25	0.1732	0.71	QV	|	|	|	|
3+30	0.1781	0.71	QV	|	|	|	|
3+35	0.1830	0.72	QV	|	|	|	|
3+40	0.1880	0.72	Q V	|	|	|	|
3+45	0.1929	0.72	Q V	|	|	|	|
3+50	0.1979	0.72	Q V	|	|	|	|
3+55	0.2029	0.73	Q V	|	|	|	|
4+ 0	0.2079	0.73	Q V	|	|	|	|
4+ 5	0.2130	0.73	Q V	|	|	|	|
4+10	0.2180	0.73	Q V	|	|	|	|
4+15	0.2231	0.74	Q V	|	|	|	|
4+20	0.2282	0.74	Q V	|	|	|	|
4+25	0.2333	0.74	Q V	|	|	|	|
4+30	0.2385	0.75	Q V	|	|	|	|
4+35	0.2436	0.75	Q V	|	|	|	|
4+40	0.2488	0.75	Q V	|	|	|	|
4+45	0.2540	0.76	Q V	|	|	|	|
4+50	0.2592	0.76	Q V	|	|	|	|
4+55	0.2645	0.76	Q V	|	|	|	|
5+ 0	0.2697	0.76	Q V	|	|	|	|
5+ 5	0.2750	0.77	Q V	|	|	|	|
5+10	0.2803	0.77	Q V	|	|	|	|
5+15	0.2857	0.77	Q V	|	|	|	|
5+20	0.2910	0.78	Q V	|	|	|	|
5+25	0.2964	0.78	Q V	|	|	|	|
5+30	0.3018	0.78	Q V	|	|	|	|
5+35	0.3072	0.79	Q V	|	|	|	|
5+40	0.3127	0.79	Q V	|	|	|	|
5+45	0.3181	0.79	Q V	|	|	|	|
5+50	0.3236	0.80	Q V	|	|	|	|
5+55	0.3291	0.80	Q V	|	|	|	|
6+ 0	0.3347	0.80	Q V	|	|	|	|
6+ 5	0.3402	0.81	Q V	|	|	|	|
6+10	0.3458	0.81	Q V	|	|	|	|
6+15	0.3515	0.82	Q V	|	|	|	|
6+20	0.3571	0.82	Q V	|	|	|	|
6+25	0.3628	0.82	Q V	|	|	|	|
6+30	0.3685	0.83	Q V	|	|	|	|
6+35	0.3742	0.83	Q V	|	|	|	|
6+40	0.3799	0.84	Q V	|	|	|	|

6+45	0.3857	0.84	Q	V	|	|	|	|
6+50	0.3915	0.84	Q	V	|	|	|	|
6+55	0.3974	0.85	Q	V	|	|	|	|
7+ 0	0.4032	0.85	Q	V	|	|	|	|
7+ 5	0.4091	0.86	Q	V	|	|	|	|
7+10	0.4151	0.86	Q	V	|	|	|	|
7+15	0.4210	0.86	Q	V	|	|	|	|
7+20	0.4270	0.87	Q	V	|	|	|	|
7+25	0.4330	0.87	Q	V	|	|	|	|
7+30	0.4391	0.88	Q	V	|	|	|	|
7+35	0.4451	0.88	Q	V	|	|	|	|
7+40	0.4513	0.89	Q	V	|	|	|	|
7+45	0.4574	0.89	Q	V	|	|	|	|
7+50	0.4636	0.90	Q	V	|	|	|	|
7+55	0.4698	0.90	Q	V	|	|	|	|
8+ 0	0.4760	0.91	Q	V	|	|	|	|
8+ 5	0.4823	0.91	Q	V	|	|	|	|
8+10	0.4887	0.92	Q	V	|	|	|	|
8+15	0.4950	0.92	Q	V	|	|	|	|
8+20	0.5014	0.93	Q	V	|	|	|	|
8+25	0.5078	0.93	Q	V	|	|	|	|
8+30	0.5143	0.94	Q	V	|	|	|	|
8+35	0.5208	0.94	Q	V	|	|	|	|
8+40	0.5274	0.95	Q	V	|	|	|	|
8+45	0.5339	0.96	Q	V	|	|	|	|
8+50	0.5406	0.96	Q	V	|	|	|	|
8+55	0.5472	0.97	Q	V	|	|	|	|
9+ 0	0.5539	0.97	Q	V	|	|	|	|
9+ 5	0.5607	0.98	Q	V	|	|	|	|
9+10	0.5675	0.99	Q	V	|	|	|	|
9+15	0.5743	0.99	Q	V	|	|	|	|
9+20	0.5812	1.00	Q	V	|	|	|	|
9+25	0.5882	1.01	Q	V	|	|	|	|
9+30	0.5951	1.01	Q	V	|	|	|	|
9+35	0.6022	1.02	Q	V	|	|	|	|
9+40	0.6092	1.03	Q	V	|	|	|	|
9+45	0.6164	1.03	Q	V	|	|	|	|
9+50	0.6235	1.04	Q	V	|	|	|	|
9+55	0.6308	1.05	Q	V	|	|	|	|
10+ 0	0.6380	1.06	Q	V	|	|	|	|
10+ 5	0.6454	1.07	Q	V	|	|	|	|
10+10	0.6528	1.07	Q	V	|	|	|	|
10+15	0.6602	1.08	Q	V	|	|	|	|
10+20	0.6677	1.09	Q	V	|	|	|	|
10+25	0.6753	1.10	Q	V	|	|	|	|
10+30	0.6829	1.11	Q	V	|	|	|	|
10+35	0.6906	1.12	Q	V	|	|	|	|
10+40	0.6983	1.12	Q	V	|	|	|	|
10+45	0.7062	1.13	Q	V	|	|	|	|
10+50	0.7140	1.14	Q	V	|	|	|	|
10+55	0.7220	1.15	Q	V	|	|	|	|
11+ 0	0.7300	1.16	Q	V	|	|	|	|
11+ 5	0.7381	1.17	Q	V	|	|	|	|
11+10	0.7462	1.18	Q	V	|	|	|	|
11+15	0.7545	1.20	Q	V	|	|	|	|
11+20	0.7628	1.21	Q	V	|	|	|	|
11+25	0.7712	1.22	Q	V	|	|	|	|

11+30	0.7796	1.23	Q	V |	|	|	|
11+35	0.7882	1.24	Q	V |	|	|	|
11+40	0.7968	1.25	|Q	V |	|	|	|
11+45	0.8055	1.27	|Q	V |	|	|	|
11+50	0.8143	1.28	|Q	V |	|	|	|
11+55	0.8232	1.29	|Q	V |	|	|	|
12+ 0	0.8322	1.31	|Q	V |	|	|	|
12+ 5	0.8413	1.32	|Q	V|	|	|	|
12+10	0.8507	1.36	|Q	V|	|	|	|
12+15	0.8604	1.40	|Q	V|	|	|	|
12+20	0.8704	1.46	|Q	V|	|	|	|
12+25	0.8809	1.52	|Q	V|	|	|	|
12+30	0.8916	1.55	|Q	V|	|	|	|
12+35	0.9025	1.58	|Q	V|	|	|	|
12+40	0.9135	1.60	|Q	V|	|	|	|
12+45	0.9247	1.62	|Q	V|	|	|	|
12+50	0.9360	1.64	|Q	V	|	|	|
12+55	0.9474	1.66	|Q	V	|	|	|
13+ 0	0.9590	1.69	|Q	V	|	|	|
13+ 5	0.9708	1.71	|Q	V	|	|	|
13+10	0.9827	1.73	|Q	V	|	|	|
13+15	0.9948	1.75	|Q	V	|	|	|
13+20	1.0070	1.78	|Q	V	|	|	|
13+25	1.0194	1.80	|Q	V	|	|	|
13+30	1.0320	1.83	|Q	|V	|	|	|
13+35	1.0448	1.86	|Q	|V	|	|	|
13+40	1.0578	1.88	|Q	|V	|	|	|
13+45	1.0710	1.91	|Q	|V	|	|	|
13+50	1.0844	1.95	|Q	|V	|	|	|
13+55	1.0980	1.98	|Q	|V	|	|	|
14+ 0	1.1119	2.02	|Q	|V	|	|	|
14+ 5	1.1260	2.05	|Q	| V	|	|	|
14+10	1.1404	2.09	|Q	| V	|	|	|
14+15	1.1551	2.13	|Q	| V	|	|	|
14+20	1.1702	2.18	|Q	| V	|	|	|
14+25	1.1855	2.23	|Q	| V	|	|	|
14+30	1.2012	2.28	|Q	| V	|	|	|
14+35	1.2173	2.33	|Q	| V	|	|	|
14+40	1.2338	2.39	|Q	| V	|	|	|
14+45	1.2507	2.45	|Q	| V	|	|	|
14+50	1.2680	2.52	| Q	| V	|	|	|
14+55	1.2859	2.60	| Q	| V	|	|	|
15+ 0	1.3043	2.68	| Q	| V	|	|	|
15+ 5	1.3234	2.76	| Q	| V	|	|	|
15+10	1.3431	2.86	| Q	| V	|	|	|
15+15	1.3635	2.97	| Q	| V	|	|	|
15+20	1.3849	3.09	| Q	| V	|	|	|
15+25	1.4070	3.22	| Q	| V	|	|	|
15+30	1.4298	3.31	| Q	| V	|	|	|
15+35	1.4528	3.35	| Q	| V	|	|	|
15+40	1.4761	3.38	| Q	| V	|	|	|
15+45	1.5002	3.49	| Q	| V	|	|	|
15+50	1.5261	3.76	| Q	| V	|	|	|
15+55	1.5553	4.24	| Q	| V	|	|	|
16+ 0	1.5928	5.45	| Q	| V	|	|	|
16+ 5	1.6665	10.70	| Q	| V	|	|	|
16+10	1.8330	24.18	|	| Q|	|	|	|



21+ 0	3.5316	0.86	Q	|	|	|	V |
21+ 5	3.5374	0.85	Q	|	|	|	V |
21+10	3.5432	0.84	Q	|	|	|	V |
21+15	3.5489	0.83	Q	|	|	|	V |
21+20	3.5546	0.82	Q	|	|	|	V |
21+25	3.5602	0.81	Q	|	|	|	V |
21+30	3.5657	0.81	Q	|	|	|	V |
21+35	3.5712	0.80	Q	|	|	|	V |
21+40	3.5767	0.79	Q	|	|	|	V |
21+45	3.5821	0.79	Q	|	|	|	V |
21+50	3.5875	0.78	Q	|	|	|	V |
21+55	3.5928	0.77	Q	|	|	|	V |
22+ 0	3.5981	0.77	Q	|	|	|	V |
22+ 5	3.6033	0.76	Q	|	|	|	V |
22+10	3.6085	0.75	Q	|	|	|	V |
22+15	3.6137	0.75	Q	|	|	|	V |
22+20	3.6188	0.74	Q	|	|	|	V |
22+25	3.6239	0.74	Q	|	|	|	V |
22+30	3.6289	0.73	Q	|	|	|	V |
22+35	3.6339	0.73	Q	|	|	|	V |
22+40	3.6389	0.72	Q	|	|	|	V|
22+45	3.6438	0.72	Q	|	|	|	V|
22+50	3.6487	0.71	Q	|	|	|	V|
22+55	3.6535	0.70	Q	|	|	|	V|
23+ 0	3.6584	0.70	Q	|	|	|	V|
23+ 5	3.6631	0.70	Q	|	|	|	V|
23+10	3.6679	0.69	Q	|	|	|	V|
23+15	3.6726	0.69	Q	|	|	|	V|
23+20	3.6773	0.68	Q	|	|	|	V|
23+25	3.6820	0.68	Q	|	|	|	V|
23+30	3.6866	0.67	Q	|	|	|	V|
23+35	3.6912	0.67	Q	|	|	|	V|
23+40	3.6958	0.66	Q	|	|	|	V|
23+45	3.7003	0.66	Q	|	|	|	V|
23+50	3.7048	0.66	Q	|	|	|	V|
23+55	3.7093	0.65	Q	|	|	|	V|
24+ 0	3.7138	0.65	Q	|	|	|	V|
24+ 5	3.7181	0.63	Q	|	|	|	V|
24+10	3.7220	0.56	Q	|	|	|	V|
24+15	3.7250	0.44	Q	|	|	|	V|
24+20	3.7269	0.27	Q	|	|	|	V|
24+25	3.7279	0.14	Q	|	|	|	V|
24+30	3.7283	0.07	Q	|	|	|	V|
24+35	3.7286	0.03	Q	|	|	|	V|
24+40	3.7287	0.02	Q	|	|	|	V|
24+45	3.7287	0.01	Q	|	|	|	V|
24+50	3.7288	0.01	Q	|	|	|	V|
24+55	3.7288	0.00	Q	|	|	|	V|

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

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Study date 04/07/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER
ONSITE EXISTING CONDITION
25-YEAR STORM EVENT ANALYSIS

Storm Event Year = 25

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 25		
40.02	1	1.00
Rainfall data for year 25		
40.02	6	2.43
Rainfall data for year 25		
40.02	24	4.48

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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)
32.0	32.0	40.02	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
32.02	0.800	32.0	32.0	21.25	0.001
8.00	0.200	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.190
Area-averaged low loss fraction, Yb = 0.810
User entry of time of concentration = 0.336 (hours)
++
Watershed area = 40.02(Ac.)
Catchment Lag time = 0.268 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 31.0408
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.810 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.369(In)
Computed peak 30-minute rainfall = 0.756(In)
Specified peak 1-hour rainfall = 0.998(In)
Computed peak 3-hour rainfall = 1.722(In)
Specified peak 6-hour rainfall = 2.430(In)
Specified peak 24-hour rainfall = 4.480(In)

Rainfall depth area reduction factors:
Using a total area of 40.02(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.369(In)
30-minute factor = 0.998 Adjusted rainfall = 0.755(In)
1-hour factor = 0.998 Adjusted rainfall = 0.996(In)
3-hour factor = 1.000 Adjusted rainfall = 1.722(In)
6-hour factor = 1.000 Adjusted rainfall = 2.430(In)
24-hour factor = 1.000 Adjusted rainfall = 4.480(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 = 483.99 (CFS))	
1	2.042	9.881
2	11.885	47.639
3	31.161	93.298
4	57.242	126.227
5	77.889	99.932
6	89.310	55.275
7	94.860	26.860

8	97.636	13.438
9	98.549	4.419
10	99.108	2.704
11	99.666	2.699
12	100.000	1.618

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3687	0.3687
2	0.4865	0.1178
3	0.5721	0.0857
4	0.6419	0.0698
5	0.7018	0.0599
6	0.7549	0.0531
7	0.8029	0.0480
8	0.8470	0.0441
9	0.8878	0.0409
10	0.9261	0.0382
11	0.9621	0.0360
12	0.9961	0.0341
13	1.0366	0.0405
14	1.0756	0.0390
15	1.1132	0.0376
16	1.1496	0.0364
17	1.1849	0.0352
18	1.2191	0.0342
19	1.2524	0.0333
20	1.2848	0.0324
21	1.3164	0.0316
22	1.3473	0.0309
23	1.3774	0.0302
24	1.4069	0.0295
25	1.4358	0.0289
26	1.4642	0.0283
27	1.4920	0.0278
28	1.5192	0.0273
29	1.5460	0.0268
30	1.5724	0.0263
31	1.5982	0.0259
32	1.6237	0.0255
33	1.6488	0.0251
34	1.6735	0.0247
35	1.6978	0.0243
36	1.7218	0.0240
37	1.7454	0.0236
38	1.7687	0.0233
39	1.7917	0.0230
40	1.8144	0.0227
41	1.8368	0.0224
42	1.8589	0.0221
43	1.8808	0.0219
44	1.9024	0.0216
45	1.9237	0.0214
46	1.9448	0.0211
47	1.9657	0.0209
48	1.9864	0.0207
49	2.0069	0.0205

50	2.0271	0.0202
51	2.0471	0.0200
52	2.0670	0.0198
53	2.0866	0.0197
54	2.1061	0.0195
55	2.1254	0.0193
56	2.1445	0.0191
57	2.1634	0.0189
58	2.1822	0.0188
59	2.2008	0.0186
60	2.2193	0.0185
61	2.2376	0.0183
62	2.2557	0.0181
63	2.2737	0.0180
64	2.2916	0.0179
65	2.3093	0.0177
66	2.3269	0.0176
67	2.3444	0.0174
68	2.3617	0.0173
69	2.3789	0.0172
70	2.3959	0.0171
71	2.4129	0.0169
72	2.4297	0.0168
73	2.4445	0.0148
74	2.4593	0.0147
75	2.4739	0.0146
76	2.4884	0.0145
77	2.5028	0.0144
78	2.5171	0.0143
79	2.5312	0.0142
80	2.5453	0.0141
81	2.5593	0.0140
82	2.5732	0.0139
83	2.5870	0.0138
84	2.6007	0.0137
85	2.6144	0.0136
86	2.6279	0.0135
87	2.6413	0.0134
88	2.6547	0.0134
89	2.6680	0.0133
90	2.6811	0.0132
91	2.6943	0.0131
92	2.7073	0.0130
93	2.7202	0.0129
94	2.7331	0.0129
95	2.7459	0.0128
96	2.7586	0.0127
97	2.7713	0.0126
98	2.7838	0.0126
99	2.7963	0.0125
100	2.8088	0.0124
101	2.8211	0.0124
102	2.8334	0.0123
103	2.8456	0.0122
104	2.8578	0.0122
105	2.8699	0.0121
106	2.8819	0.0120

107	2.8939	0.0120
108	2.9058	0.0119
109	2.9176	0.0118
110	2.9294	0.0118
111	2.9411	0.0117
112	2.9528	0.0117
113	2.9644	0.0116
114	2.9760	0.0115
115	2.9875	0.0115
116	2.9989	0.0114
117	3.0103	0.0114
118	3.0216	0.0113
119	3.0329	0.0113
120	3.0441	0.0112
121	3.0553	0.0112
122	3.0664	0.0111
123	3.0775	0.0111
124	3.0885	0.0110
125	3.0994	0.0110
126	3.1104	0.0109
127	3.1212	0.0109
128	3.1321	0.0108
129	3.1428	0.0108
130	3.1536	0.0107
131	3.1642	0.0107
132	3.1749	0.0106
133	3.1855	0.0106
134	3.1960	0.0105
135	3.2065	0.0105
136	3.2170	0.0105
137	3.2274	0.0104
138	3.2378	0.0104
139	3.2481	0.0103
140	3.2584	0.0103
141	3.2687	0.0103
142	3.2789	0.0102
143	3.2890	0.0102
144	3.2992	0.0101
145	3.3093	0.0101
146	3.3193	0.0101
147	3.3293	0.0100
148	3.3393	0.0100
149	3.3492	0.0099
150	3.3591	0.0099
151	3.3690	0.0099
152	3.3788	0.0098
153	3.3886	0.0098
154	3.3984	0.0098
155	3.4081	0.0097
156	3.4178	0.0097
157	3.4274	0.0097
158	3.4371	0.0096
159	3.4466	0.0096
160	3.4562	0.0095
161	3.4657	0.0095
162	3.4752	0.0095
163	3.4846	0.0095

164	3.4941	0.0094
165	3.5034	0.0094
166	3.5128	0.0094
167	3.5221	0.0093
168	3.5314	0.0093
169	3.5407	0.0093
170	3.5499	0.0092
171	3.5591	0.0092
172	3.5683	0.0092
173	3.5774	0.0091
174	3.5865	0.0091
175	3.5956	0.0091
176	3.6047	0.0091
177	3.6137	0.0090
178	3.6227	0.0090
179	3.6317	0.0090
180	3.6406	0.0089
181	3.6495	0.0089
182	3.6584	0.0089
183	3.6673	0.0089
184	3.6761	0.0088
185	3.6849	0.0088
186	3.6937	0.0088
187	3.7024	0.0088
188	3.7111	0.0087
189	3.7198	0.0087
190	3.7285	0.0087
191	3.7372	0.0086
192	3.7458	0.0086
193	3.7544	0.0086
194	3.7630	0.0086
195	3.7715	0.0085
196	3.7800	0.0085
197	3.7885	0.0085
198	3.7970	0.0085
199	3.8055	0.0085
200	3.8139	0.0084
201	3.8223	0.0084
202	3.8307	0.0084
203	3.8390	0.0084
204	3.8474	0.0083
205	3.8557	0.0083
206	3.8640	0.0083
207	3.8722	0.0083
208	3.8805	0.0082
209	3.8887	0.0082
210	3.8969	0.0082
211	3.9051	0.0082
212	3.9132	0.0082
213	3.9214	0.0081
214	3.9295	0.0081
215	3.9376	0.0081
216	3.9456	0.0081
217	3.9537	0.0081
218	3.9617	0.0080
219	3.9697	0.0080
220	3.9777	0.0080

221	3.9857	0.0080
222	3.9936	0.0079
223	4.0016	0.0079
224	4.0095	0.0079
225	4.0174	0.0079
226	4.0252	0.0079
227	4.0331	0.0079
228	4.0409	0.0078
229	4.0487	0.0078
230	4.0565	0.0078
231	4.0643	0.0078
232	4.0721	0.0078
233	4.0798	0.0077
234	4.0875	0.0077
235	4.0952	0.0077
236	4.1029	0.0077
237	4.1106	0.0077
238	4.1182	0.0076
239	4.1258	0.0076
240	4.1334	0.0076
241	4.1410	0.0076
242	4.1486	0.0076
243	4.1562	0.0076
244	4.1637	0.0075
245	4.1712	0.0075
246	4.1787	0.0075
247	4.1862	0.0075
248	4.1937	0.0075
249	4.2011	0.0075
250	4.2086	0.0074
251	4.2160	0.0074
252	4.2234	0.0074
253	4.2308	0.0074
254	4.2382	0.0074
255	4.2455	0.0074
256	4.2529	0.0073
257	4.2602	0.0073
258	4.2675	0.0073
259	4.2748	0.0073
260	4.2821	0.0073
261	4.2893	0.0073
262	4.2966	0.0072
263	4.3038	0.0072
264	4.3110	0.0072
265	4.3182	0.0072
266	4.3254	0.0072
267	4.3326	0.0072
268	4.3397	0.0072
269	4.3469	0.0071
270	4.3540	0.0071
271	4.3611	0.0071
272	4.3682	0.0071
273	4.3753	0.0071
274	4.3823	0.0071
275	4.3894	0.0071
276	4.3964	0.0070
277	4.4034	0.0070

278	4.4105	0.0070
279	4.4174	0.0070
280	4.4244	0.0070
281	4.4314	0.0070
282	4.4383	0.0070
283	4.4453	0.0069
284	4.4522	0.0069
285	4.4591	0.0069
286	4.4660	0.0069
287	4.4729	0.0069
288	4.4798	0.0069

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0069	0.0056	0.0013
2	0.0069	0.0056	0.0013
3	0.0069	0.0056	0.0013
4	0.0069	0.0056	0.0013
5	0.0070	0.0056	0.0013
6	0.0070	0.0056	0.0013
7	0.0070	0.0057	0.0013
8	0.0070	0.0057	0.0013
9	0.0070	0.0057	0.0013
10	0.0071	0.0057	0.0013
11	0.0071	0.0057	0.0013
12	0.0071	0.0057	0.0013
13	0.0071	0.0058	0.0014
14	0.0071	0.0058	0.0014
15	0.0072	0.0058	0.0014
16	0.0072	0.0058	0.0014
17	0.0072	0.0058	0.0014
18	0.0072	0.0059	0.0014
19	0.0073	0.0059	0.0014
20	0.0073	0.0059	0.0014
21	0.0073	0.0059	0.0014
22	0.0073	0.0059	0.0014
23	0.0074	0.0060	0.0014
24	0.0074	0.0060	0.0014
25	0.0074	0.0060	0.0014
26	0.0074	0.0060	0.0014
27	0.0075	0.0060	0.0014
28	0.0075	0.0061	0.0014
29	0.0075	0.0061	0.0014
30	0.0075	0.0061	0.0014
31	0.0076	0.0061	0.0014
32	0.0076	0.0061	0.0014
33	0.0076	0.0062	0.0014
34	0.0076	0.0062	0.0014
35	0.0077	0.0062	0.0015
36	0.0077	0.0062	0.0015
37	0.0077	0.0063	0.0015
38	0.0077	0.0063	0.0015
39	0.0078	0.0063	0.0015
40	0.0078	0.0063	0.0015
41	0.0078	0.0063	0.0015

42	0.0079	0.0064	0.0015
43	0.0079	0.0064	0.0015
44	0.0079	0.0064	0.0015
45	0.0079	0.0064	0.0015
46	0.0080	0.0065	0.0015
47	0.0080	0.0065	0.0015
48	0.0080	0.0065	0.0015
49	0.0081	0.0065	0.0015
50	0.0081	0.0066	0.0015
51	0.0081	0.0066	0.0015
52	0.0082	0.0066	0.0015
53	0.0082	0.0066	0.0016
54	0.0082	0.0067	0.0016
55	0.0083	0.0067	0.0016
56	0.0083	0.0067	0.0016
57	0.0083	0.0068	0.0016
58	0.0084	0.0068	0.0016
59	0.0084	0.0068	0.0016
60	0.0084	0.0068	0.0016
61	0.0085	0.0069	0.0016
62	0.0085	0.0069	0.0016
63	0.0085	0.0069	0.0016
64	0.0086	0.0069	0.0016
65	0.0086	0.0070	0.0016
66	0.0086	0.0070	0.0016
67	0.0087	0.0070	0.0017
68	0.0087	0.0071	0.0017
69	0.0088	0.0071	0.0017
70	0.0088	0.0071	0.0017
71	0.0089	0.0072	0.0017
72	0.0089	0.0072	0.0017
73	0.0089	0.0072	0.0017
74	0.0090	0.0073	0.0017
75	0.0090	0.0073	0.0017
76	0.0091	0.0073	0.0017
77	0.0091	0.0074	0.0017
78	0.0091	0.0074	0.0017
79	0.0092	0.0075	0.0017
80	0.0092	0.0075	0.0018
81	0.0093	0.0075	0.0018
82	0.0093	0.0076	0.0018
83	0.0094	0.0076	0.0018
84	0.0094	0.0076	0.0018
85	0.0095	0.0077	0.0018
86	0.0095	0.0077	0.0018
87	0.0096	0.0078	0.0018
88	0.0096	0.0078	0.0018
89	0.0097	0.0078	0.0018
90	0.0097	0.0079	0.0018
91	0.0098	0.0079	0.0019
92	0.0098	0.0080	0.0019
93	0.0099	0.0080	0.0019
94	0.0099	0.0081	0.0019
95	0.0100	0.0081	0.0019
96	0.0101	0.0081	0.0019
97	0.0101	0.0082	0.0019
98	0.0102	0.0082	0.0019

99	0.0103	0.0083	0.0019
100	0.0103	0.0083	0.0020
101	0.0104	0.0084	0.0020
102	0.0104	0.0084	0.0020
103	0.0105	0.0085	0.0020
104	0.0105	0.0085	0.0020
105	0.0106	0.0086	0.0020
106	0.0107	0.0087	0.0020
107	0.0108	0.0087	0.0020
108	0.0108	0.0088	0.0021
109	0.0109	0.0088	0.0021
110	0.0110	0.0089	0.0021
111	0.0111	0.0090	0.0021
112	0.0111	0.0090	0.0021
113	0.0112	0.0091	0.0021
114	0.0113	0.0091	0.0021
115	0.0114	0.0092	0.0022
116	0.0114	0.0093	0.0022
117	0.0115	0.0094	0.0022
118	0.0116	0.0094	0.0022
119	0.0117	0.0095	0.0022
120	0.0118	0.0095	0.0022
121	0.0119	0.0096	0.0023
122	0.0120	0.0097	0.0023
123	0.0121	0.0098	0.0023
124	0.0122	0.0099	0.0023
125	0.0123	0.0100	0.0023
126	0.0124	0.0100	0.0023
127	0.0125	0.0101	0.0024
128	0.0126	0.0102	0.0024
129	0.0127	0.0103	0.0024
130	0.0128	0.0104	0.0024
131	0.0129	0.0105	0.0025
132	0.0130	0.0106	0.0025
133	0.0132	0.0107	0.0025
134	0.0133	0.0108	0.0025
135	0.0134	0.0109	0.0026
136	0.0135	0.0110	0.0026
137	0.0137	0.0111	0.0026
138	0.0138	0.0112	0.0026
139	0.0140	0.0113	0.0027
140	0.0141	0.0114	0.0027
141	0.0143	0.0116	0.0027
142	0.0144	0.0117	0.0027
143	0.0146	0.0118	0.0028
144	0.0147	0.0119	0.0028
145	0.0168	0.0136	0.0032
146	0.0169	0.0137	0.0032
147	0.0172	0.0139	0.0033
148	0.0173	0.0140	0.0033
149	0.0176	0.0142	0.0033
150	0.0177	0.0144	0.0034
151	0.0180	0.0146	0.0034
152	0.0181	0.0147	0.0034
153	0.0185	0.0149	0.0035
154	0.0186	0.0151	0.0035
155	0.0189	0.0153	0.0036

156	0.0191	0.0155	0.0036
157	0.0195	0.0158	0.0037
158	0.0197	0.0159	0.0037
159	0.0200	0.0162	0.0038
160	0.0202	0.0164	0.0038
161	0.0207	0.0167	0.0039
162	0.0209	0.0169	0.0040
163	0.0214	0.0173	0.0041
164	0.0216	0.0175	0.0041
165	0.0221	0.0179	0.0042
166	0.0224	0.0181	0.0043
167	0.0230	0.0186	0.0044
168	0.0233	0.0189	0.0044
169	0.0240	0.0194	0.0046
170	0.0243	0.0197	0.0046
171	0.0251	0.0203	0.0048
172	0.0255	0.0206	0.0048
173	0.0263	0.0213	0.0050
174	0.0268	0.0217	0.0051
175	0.0278	0.0225	0.0053
176	0.0283	0.0229	0.0054
177	0.0295	0.0239	0.0056
178	0.0302	0.0244	0.0057
179	0.0316	0.0256	0.0060
180	0.0324	0.0263	0.0062
181	0.0342	0.0277	0.0065
182	0.0352	0.0286	0.0067
183	0.0376	0.0305	0.0071
184	0.0390	0.0316	0.0074
185	0.0341	0.0276	0.0065
186	0.0360	0.0292	0.0068
187	0.0409	0.0331	0.0078
188	0.0441	0.0357	0.0084
189	0.0531	0.0430	0.0101
190	0.0599	0.0485	0.0114
191	0.0857	0.0652	0.0205
192	0.1178	0.0652	0.0526
193	0.3687	0.0652	0.3035
194	0.0698	0.0565	0.0133
195	0.0480	0.0389	0.0091
196	0.0382	0.0310	0.0073
197	0.0405	0.0328	0.0077
198	0.0364	0.0295	0.0069
199	0.0333	0.0270	0.0063
200	0.0309	0.0250	0.0059
201	0.0289	0.0234	0.0055
202	0.0273	0.0221	0.0052
203	0.0259	0.0210	0.0049
204	0.0247	0.0200	0.0047
205	0.0236	0.0191	0.0045
206	0.0227	0.0184	0.0043
207	0.0219	0.0177	0.0042
208	0.0211	0.0171	0.0040
209	0.0205	0.0166	0.0039
210	0.0198	0.0161	0.0038
211	0.0193	0.0156	0.0037
212	0.0188	0.0152	0.0036

213	0.0183	0.0148	0.0035
214	0.0179	0.0145	0.0034
215	0.0174	0.0141	0.0033
216	0.0171	0.0138	0.0032
217	0.0148	0.0120	0.0028
218	0.0145	0.0117	0.0028
219	0.0142	0.0115	0.0027
220	0.0139	0.0113	0.0026
221	0.0136	0.0110	0.0026
222	0.0134	0.0108	0.0025
223	0.0131	0.0106	0.0025
224	0.0129	0.0104	0.0024
225	0.0126	0.0102	0.0024
226	0.0124	0.0101	0.0024
227	0.0122	0.0099	0.0023
228	0.0120	0.0097	0.0023
229	0.0118	0.0096	0.0022
230	0.0117	0.0094	0.0022
231	0.0115	0.0093	0.0022
232	0.0113	0.0092	0.0022
233	0.0112	0.0090	0.0021
234	0.0110	0.0089	0.0021
235	0.0109	0.0088	0.0021
236	0.0107	0.0087	0.0020
237	0.0106	0.0086	0.0020
238	0.0105	0.0085	0.0020
239	0.0103	0.0084	0.0020
240	0.0102	0.0083	0.0019
241	0.0101	0.0082	0.0019
242	0.0100	0.0081	0.0019
243	0.0099	0.0080	0.0019
244	0.0098	0.0079	0.0019
245	0.0097	0.0078	0.0018
246	0.0095	0.0077	0.0018
247	0.0095	0.0077	0.0018
248	0.0094	0.0076	0.0018
249	0.0093	0.0075	0.0018
250	0.0092	0.0074	0.0017
251	0.0091	0.0074	0.0017
252	0.0090	0.0073	0.0017
253	0.0089	0.0072	0.0017
254	0.0088	0.0072	0.0017
255	0.0088	0.0071	0.0017
256	0.0087	0.0070	0.0016
257	0.0086	0.0070	0.0016
258	0.0085	0.0069	0.0016
259	0.0085	0.0068	0.0016
260	0.0084	0.0068	0.0016
261	0.0083	0.0067	0.0016
262	0.0082	0.0067	0.0016
263	0.0082	0.0066	0.0016
264	0.0081	0.0066	0.0015
265	0.0081	0.0065	0.0015
266	0.0080	0.0065	0.0015
267	0.0079	0.0064	0.0015
268	0.0079	0.0064	0.0015
269	0.0078	0.0063	0.0015

270	0.0078	0.0063	0.0015
271	0.0077	0.0062	0.0015
272	0.0076	0.0062	0.0015
273	0.0076	0.0062	0.0014
274	0.0075	0.0061	0.0014
275	0.0075	0.0061	0.0014
276	0.0074	0.0060	0.0014
277	0.0074	0.0060	0.0014
278	0.0073	0.0059	0.0014
279	0.0073	0.0059	0.0014
280	0.0072	0.0059	0.0014
281	0.0072	0.0058	0.0014
282	0.0072	0.0058	0.0014
283	0.0071	0.0058	0.0014
284	0.0071	0.0057	0.0013
285	0.0070	0.0057	0.0013
286	0.0070	0.0057	0.0013
287	0.0069	0.0056	0.0013
288	0.0069	0.0056	0.0013

Total soil rain loss = 3.36(In)
Total effective rainfall = 1.12(In)
Peak flow rate in flood hydrograph = 46.97(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	12.5	25.0	37.5	50.0
0+ 5	0.0001	0.01	Q	|	|	|	|
0+10	0.0006	0.08	Q	|	|	|	|
0+15	0.0020	0.20	Q	|	|	|	|
0+20	0.0045	0.36	Q	|	|	|	|
0+25	0.0079	0.49	Q	|	|	|	|
0+30	0.0118	0.57	Q	|	|	|	|
0+35	0.0159	0.60	Q	|	|	|	|
0+40	0.0202	0.62	Q	|	|	|	|
0+45	0.0246	0.63	Q	|	|	|	|
0+50	0.0289	0.64	Q	|	|	|	|
0+55	0.0334	0.64	Q	|	|	|	|
1+ 0	0.0378	0.65	Q	|	|	|	|
1+ 5	0.0423	0.65	Q	|	|	|	|
1+10	0.0467	0.65	Q	|	|	|	|
1+15	0.0512	0.65	Q	|	|	|	|
1+20	0.0557	0.65	Q	|	|	|	|
1+25	0.0602	0.66	Q	|	|	|	|
1+30	0.0648	0.66	Q	|	|	|	|
1+35	0.0693	0.66	Q	|	|	|	|
1+40	0.0739	0.66	Q	|	|	|	|
1+45	0.0785	0.66	Q	|	|	|	|
1+50	0.0830	0.67	Q	|	|	|	|
1+55	0.0876	0.67	Q	|	|	|	|

2+ 0	0.0923	0.67	Q	|	|	|	|
2+ 5	0.0969	0.67	QV	|	|	|	|
2+10	0.1015	0.67	QV	|	|	|	|
2+15	0.1062	0.68	QV	|	|	|	|
2+20	0.1109	0.68	QV	|	|	|	|
2+25	0.1156	0.68	QV	|	|	|	|
2+30	0.1203	0.68	QV	|	|	|	|
2+35	0.1250	0.69	QV	|	|	|	|
2+40	0.1298	0.69	QV	|	|	|	|
2+45	0.1345	0.69	QV	|	|	|	|
2+50	0.1393	0.69	QV	|	|	|	|
2+55	0.1441	0.70	QV	|	|	|	|
3+ 0	0.1489	0.70	QV	|	|	|	|
3+ 5	0.1537	0.70	QV	|	|	|	|
3+10	0.1586	0.70	QV	|	|	|	|
3+15	0.1634	0.71	QV	|	|	|	|
3+20	0.1683	0.71	QV	|	|	|	|
3+25	0.1732	0.71	QV	|	|	|	|
3+30	0.1781	0.71	QV	|	|	|	|
3+35	0.1830	0.72	QV	|	|	|	|
3+40	0.1880	0.72	Q V	|	|	|	|
3+45	0.1929	0.72	Q V	|	|	|	|
3+50	0.1979	0.72	Q V	|	|	|	|
3+55	0.2029	0.73	Q V	|	|	|	|
4+ 0	0.2079	0.73	Q V	|	|	|	|
4+ 5	0.2130	0.73	Q V	|	|	|	|
4+10	0.2180	0.73	Q V	|	|	|	|
4+15	0.2231	0.74	Q V	|	|	|	|
4+20	0.2282	0.74	Q V	|	|	|	|
4+25	0.2333	0.74	Q V	|	|	|	|
4+30	0.2385	0.75	Q V	|	|	|	|
4+35	0.2436	0.75	Q V	|	|	|	|
4+40	0.2488	0.75	Q V	|	|	|	|
4+45	0.2540	0.76	Q V	|	|	|	|
4+50	0.2592	0.76	Q V	|	|	|	|
4+55	0.2645	0.76	Q V	|	|	|	|
5+ 0	0.2697	0.76	Q V	|	|	|	|
5+ 5	0.2750	0.77	Q V	|	|	|	|
5+10	0.2803	0.77	Q V	|	|	|	|
5+15	0.2857	0.77	Q V	|	|	|	|
5+20	0.2910	0.78	Q V	|	|	|	|
5+25	0.2964	0.78	Q V	|	|	|	|
5+30	0.3018	0.78	Q V	|	|	|	|
5+35	0.3072	0.79	Q V	|	|	|	|
5+40	0.3127	0.79	Q V	|	|	|	|
5+45	0.3181	0.79	Q V	|	|	|	|
5+50	0.3236	0.80	Q V	|	|	|	|
5+55	0.3291	0.80	Q V	|	|	|	|
6+ 0	0.3347	0.80	Q V	|	|	|	|
6+ 5	0.3402	0.81	Q V	|	|	|	|
6+10	0.3458	0.81	Q V	|	|	|	|
6+15	0.3515	0.82	Q V	|	|	|	|
6+20	0.3571	0.82	Q V	|	|	|	|
6+25	0.3628	0.82	Q V	|	|	|	|
6+30	0.3685	0.83	Q V	|	|	|	|
6+35	0.3742	0.83	Q V	|	|	|	|
6+40	0.3799	0.84	Q V	|	|	|	|

6+45	0.3857	0.84	Q	V	|	|	|	|
6+50	0.3915	0.84	Q	V	|	|	|	|
6+55	0.3974	0.85	Q	V	|	|	|	|
7+ 0	0.4032	0.85	Q	V	|	|	|	|
7+ 5	0.4091	0.86	Q	V	|	|	|	|
7+10	0.4151	0.86	Q	V	|	|	|	|
7+15	0.4210	0.86	Q	V	|	|	|	|
7+20	0.4270	0.87	Q	V	|	|	|	|
7+25	0.4330	0.87	Q	V	|	|	|	|
7+30	0.4391	0.88	Q	V	|	|	|	|
7+35	0.4451	0.88	Q	V	|	|	|	|
7+40	0.4513	0.89	Q	V	|	|	|	|
7+45	0.4574	0.89	Q	V	|	|	|	|
7+50	0.4636	0.90	Q	V	|	|	|	|
7+55	0.4698	0.90	Q	V	|	|	|	|
8+ 0	0.4760	0.91	Q	V	|	|	|	|
8+ 5	0.4823	0.91	Q	V	|	|	|	|
8+10	0.4887	0.92	Q	V	|	|	|	|
8+15	0.4950	0.92	Q	V	|	|	|	|
8+20	0.5014	0.93	Q	V	|	|	|	|
8+25	0.5078	0.93	Q	V	|	|	|	|
8+30	0.5143	0.94	Q	V	|	|	|	|
8+35	0.5208	0.94	Q	V	|	|	|	|
8+40	0.5274	0.95	Q	V	|	|	|	|
8+45	0.5339	0.96	Q	V	|	|	|	|
8+50	0.5406	0.96	Q	V	|	|	|	|
8+55	0.5472	0.97	Q	V	|	|	|	|
9+ 0	0.5539	0.97	Q	V	|	|	|	|
9+ 5	0.5607	0.98	Q	V	|	|	|	|
9+10	0.5675	0.99	Q	V	|	|	|	|
9+15	0.5743	0.99	Q	V	|	|	|	|
9+20	0.5812	1.00	Q	V	|	|	|	|
9+25	0.5882	1.01	Q	V	|	|	|	|
9+30	0.5951	1.01	Q	V	|	|	|	|
9+35	0.6022	1.02	Q	V	|	|	|	|
9+40	0.6092	1.03	Q	V	|	|	|	|
9+45	0.6164	1.03	Q	V	|	|	|	|
9+50	0.6235	1.04	Q	V	|	|	|	|
9+55	0.6308	1.05	Q	V	|	|	|	|
10+ 0	0.6381	1.06	Q	V	|	|	|	|
10+ 5	0.6454	1.07	Q	V	|	|	|	|
10+10	0.6528	1.07	Q	V	|	|	|	|
10+15	0.6602	1.08	Q	V	|	|	|	|
10+20	0.6677	1.09	Q	V	|	|	|	|
10+25	0.6753	1.10	Q	V	|	|	|	|
10+30	0.6829	1.11	Q	V	|	|	|	|
10+35	0.6906	1.12	Q	V	|	|	|	|
10+40	0.6983	1.12	Q	V	|	|	|	|
10+45	0.7062	1.13	Q	V	|	|	|	|
10+50	0.7140	1.14	Q	V	|	|	|	|
10+55	0.7220	1.15	Q	V	|	|	|	|
11+ 0	0.7300	1.16	Q	V	|	|	|	|
11+ 5	0.7381	1.17	Q	V	|	|	|	|
11+10	0.7462	1.18	Q	V	|	|	|	|
11+15	0.7545	1.20	Q	V	|	|	|	|
11+20	0.7628	1.21	Q	V	|	|	|	|
11+25	0.7712	1.22	Q	V	|	|	|	|

11+30	0.7796	1.23	Q	V |	|	|	|
11+35	0.7882	1.24	Q	V |	|	|	|
11+40	0.7968	1.25	|Q	V |	|	|	|
11+45	0.8055	1.27	|Q	V |	|	|	|
11+50	0.8143	1.28	|Q	V |	|	|	|
11+55	0.8232	1.29	|Q	V |	|	|	|
12+ 0	0.8322	1.31	|Q	V |	|	|	|
12+ 5	0.8413	1.32	|Q	V|	|	|	|
12+10	0.8507	1.36	|Q	V|	|	|	|
12+15	0.8604	1.40	|Q	V|	|	|	|
12+20	0.8704	1.46	|Q	V|	|	|	|
12+25	0.8809	1.52	|Q	V|	|	|	|
12+30	0.8916	1.55	|Q	V|	|	|	|
12+35	0.9025	1.58	|Q	V|	|	|	|
12+40	0.9135	1.60	|Q	V|	|	|	|
12+45	0.9247	1.62	|Q	V|	|	|	|
12+50	0.9360	1.64	|Q	V	|	|	|
12+55	0.9474	1.66	|Q	V	|	|	|
13+ 0	0.9590	1.69	|Q	V	|	|	|
13+ 5	0.9708	1.71	|Q	V	|	|	|
13+10	0.9827	1.73	|Q	V	|	|	|
13+15	0.9948	1.75	|Q	V	|	|	|
13+20	1.0070	1.78	|Q	V	|	|	|
13+25	1.0194	1.80	|Q	V	|	|	|
13+30	1.0320	1.83	|Q	|V	|	|	|
13+35	1.0448	1.86	|Q	|V	|	|	|
13+40	1.0578	1.88	|Q	|V	|	|	|
13+45	1.0710	1.91	|Q	|V	|	|	|
13+50	1.0844	1.95	|Q	|V	|	|	|
13+55	1.0980	1.98	|Q	|V	|	|	|
14+ 0	1.1119	2.02	|Q	|V	|	|	|
14+ 5	1.1260	2.05	|Q	| V	|	|	|
14+10	1.1404	2.09	|Q	| V	|	|	|
14+15	1.1551	2.13	|Q	| V	|	|	|
14+20	1.1702	2.18	|Q	| V	|	|	|
14+25	1.1855	2.23	|Q	| V	|	|	|
14+30	1.2012	2.28	|Q	| V	|	|	|
14+35	1.2173	2.33	|Q	| V	|	|	|
14+40	1.2338	2.39	|Q	| V	|	|	|
14+45	1.2507	2.45	|Q	| V	|	|	|
14+50	1.2680	2.52	| Q	| V	|	|	|
14+55	1.2859	2.60	| Q	| V	|	|	|
15+ 0	1.3043	2.68	| Q	| V	|	|	|
15+ 5	1.3234	2.76	| Q	| V	|	|	|
15+10	1.3431	2.86	| Q	| V	|	|	|
15+15	1.3636	2.97	| Q	| V	|	|	|
15+20	1.3849	3.09	| Q	| V	|	|	|
15+25	1.4070	3.22	| Q	| V	|	|	|
15+30	1.4298	3.31	| Q	| V	|	|	|
15+35	1.4528	3.35	| Q	| V	|	|	|
15+40	1.4761	3.38	| Q	| V	|	|	|
15+45	1.5002	3.49	| Q	| V	|	|	|
15+50	1.5261	3.76	| Q	| V	|	|	|
15+55	1.5553	4.24	| Q	| V	|	|	|
16+ 0	1.5928	5.45	| Q	| V	|	|	|
16+ 5	1.6665	10.70	| Q	| V	|	|	|
16+10	1.8331	24.18	|	| Q|	|	|	|

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16+15       2.1004     38.82  |         |         | V       |Q        |
16+20       2.4239     46.97  |         |         |     V   |      Q  |
16+25       2.6786     36.98  |         |         |       VQ|         |
16+30       2.8312     22.16  |         |      Q  |         V         |
16+35       2.9186     12.69  |         Q         |         |V        |
16+40       2.9735      7.97  |     Q   |         |         |V        |
16+45       3.0076      4.95  |  Q      |         |         | V       |
16+50       3.0361      4.14  |  Q      |         |         | V       |
16+55       3.0626      3.85  |  Q      |         |         | V       |
17+ 0       3.0851      3.26  | Q       |         |         |  V      |
17+ 5       3.1031      2.62  | Q       |         |         |  V      |
17+10       3.1200      2.46  |Q        |         |         |  V      |
17+15       3.1362      2.34  |Q        |         |         |  V      |
17+20       3.1515      2.23  |Q        |         |         |  V      |
17+25       3.1663      2.14  |Q        |         |         |  V      |
17+30       3.1804      2.05  |Q        |         |         |   V     |
17+35       3.1940      1.98  |Q        |         |         |   V     |
17+40       3.2072      1.91  |Q        |         |         |   V     |
17+45       3.2200      1.86  |Q        |         |         |   V     |
17+50       3.2324      1.80  |Q        |         |         |   V     |
17+55       3.2445      1.75  |Q        |         |         |   V     |
18+ 0       3.2562      1.71  |Q        |         |         |   V     |
18+ 5       3.2676      1.66  |Q        |         |         |    V    |
18+10       3.2787      1.60  |Q        |         |         |    V    |
18+15       3.2892      1.53  |Q        |         |         |    V    |
18+20       3.2992      1.45  |Q        |         |         |    V    |
18+25       3.3088      1.39  |Q        |         |         |    V    |
18+30       3.3180      1.34  |Q        |         |         |    V    |
18+35       3.3270      1.30  |Q        |         |         |    V    |
18+40       3.3357      1.27  |Q        |         |         |    V    |
18+45       3.3442      1.24  Q         |         |         |    V    |
18+50       3.3526      1.22  Q         |         |         |    V    |
18+55       3.3609      1.19  Q         |         |         |     V   |
19+ 0       3.3689      1.17  Q         |         |         |     V   |
19+ 5       3.3769      1.15  Q         |         |         |     V   |
19+10       3.3847      1.13  Q         |         |         |     V   |
19+15       3.3923      1.11  Q         |         |         |     V   |
19+20       3.3999      1.10  Q         |         |         |     V   |
19+25       3.4073      1.08  Q         |         |         |     V   |
19+30       3.4147      1.06  Q         |         |         |     V   |
19+35       3.4219      1.05  Q         |         |         |     V   |
19+40       3.4290      1.03  Q         |         |         |     V   |
19+45       3.4360      1.02  Q         |         |         |     V   |
19+50       3.4429      1.01  Q         |         |         |     V   |
19+55       3.4498      0.99  Q         |         |         |      V  |
20+ 0       3.4565      0.98  Q         |         |         |      V  |
20+ 5       3.4632      0.97  Q         |         |         |      V  |
20+10       3.4697      0.96  Q         |         |         |      V  |
20+15       3.4762      0.94  Q         |         |         |      V  |
20+20       3.4827      0.93  Q         |         |         |      V  |
20+25       3.4890      0.92  Q         |         |         |      V  |
20+30       3.4953      0.91  Q         |         |         |      V  |
20+35       3.5015      0.90  Q         |         |         |      V  |
20+40       3.5076      0.89  Q         |         |         |      V  |
20+45       3.5137      0.88  Q         |         |         |      V  |
20+50       3.5197      0.87  Q         |         |         |      V  |
20+55       3.5257      0.86  Q         |         |         |      V  |
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21+ 0	3.5316	0.86	Q	|	|	|	V |
21+ 5	3.5374	0.85	Q	|	|	|	V |
21+10	3.5432	0.84	Q	|	|	|	V |
21+15	3.5489	0.83	Q	|	|	|	V |
21+20	3.5546	0.82	Q	|	|	|	V |
21+25	3.5602	0.81	Q	|	|	|	V |
21+30	3.5657	0.81	Q	|	|	|	V |
21+35	3.5712	0.80	Q	|	|	|	V |
21+40	3.5767	0.79	Q	|	|	|	V |
21+45	3.5821	0.79	Q	|	|	|	V |
21+50	3.5875	0.78	Q	|	|	|	V |
21+55	3.5928	0.77	Q	|	|	|	V |
22+ 0	3.5981	0.77	Q	|	|	|	V |
22+ 5	3.6033	0.76	Q	|	|	|	V |
22+10	3.6085	0.75	Q	|	|	|	V |
22+15	3.6137	0.75	Q	|	|	|	V |
22+20	3.6188	0.74	Q	|	|	|	V |
22+25	3.6239	0.74	Q	|	|	|	V |
22+30	3.6289	0.73	Q	|	|	|	V |
22+35	3.6339	0.73	Q	|	|	|	V |
22+40	3.6389	0.72	Q	|	|	|	V|
22+45	3.6438	0.72	Q	|	|	|	V|
22+50	3.6487	0.71	Q	|	|	|	V|
22+55	3.6535	0.70	Q	|	|	|	V|
23+ 0	3.6584	0.70	Q	|	|	|	V|
23+ 5	3.6631	0.70	Q	|	|	|	V|
23+10	3.6679	0.69	Q	|	|	|	V|
23+15	3.6726	0.69	Q	|	|	|	V|
23+20	3.6773	0.68	Q	|	|	|	V|
23+25	3.6820	0.68	Q	|	|	|	V|
23+30	3.6866	0.67	Q	|	|	|	V|
23+35	3.6912	0.67	Q	|	|	|	V|
23+40	3.6958	0.66	Q	|	|	|	V|
23+45	3.7003	0.66	Q	|	|	|	V|
23+50	3.7048	0.66	Q	|	|	|	V|
23+55	3.7093	0.65	Q	|	|	|	V|
24+ 0	3.7138	0.65	Q	|	|	|	V|
24+ 5	3.7181	0.63	Q	|	|	|	V|
24+10	3.7220	0.56	Q	|	|	|	V|
24+15	3.7250	0.44	Q	|	|	|	V|
24+20	3.7269	0.27	Q	|	|	|	V|
24+25	3.7279	0.14	Q	|	|	|	V|
24+30	3.7283	0.07	Q	|	|	|	V|
24+35	3.7286	0.03	Q	|	|	|	V|
24+40	3.7287	0.02	Q	|	|	|	V|
24+45	3.7287	0.01	Q	|	|	|	V|
24+50	3.7288	0.01	Q	|	|	|	V|
24+55	3.7288	0.00	Q	|	|	|	V

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

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Study date 04/19/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION
25-YEAR STORM EVENT ANALYSIS WITH ADJUSTED 10 YEAR RAINFALL DATA

Storm Event Year = 25

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 25		
40.02	1	0.81
Rainfall data for year 25		
40.02	6	2.02
Rainfall data for year 25		
40.02	24	3.71

++

******** 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)
32.0	32.0	40.02	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
32.02	0.800	32.0	32.0	18.55	0.000
8.00	0.200	98.0	98.0	0.20	0.937

Area-averaged catchment yield fraction, Y = 0.187
Area-averaged low loss fraction, Yb = 0.813
User entry of time of concentration = 0.343 (hours)
++
Watershed area = 40.02(Ac.)
Catchment Lag time = 0.274 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 30.3711
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.813 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.301(In)
Computed peak 30-minute rainfall = 0.616(In)
Specified peak 1-hour rainfall = 0.813(In)
Computed peak 3-hour rainfall = 1.421(In)
Specified peak 6-hour rainfall = 2.020(In)
Specified peak 24-hour rainfall = 3.710(In)

Rainfall depth area reduction factors:
Using a total area of 40.02(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.300(In)
30-minute factor = 0.998 Adjusted rainfall = 0.615(In)
1-hour factor = 0.998 Adjusted rainfall = 0.811(In)
3-hour factor = 1.000 Adjusted rainfall = 1.420(In)
6-hour factor = 1.000 Adjusted rainfall = 2.020(In)
24-hour factor = 1.000 Adjusted rainfall = 3.710(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 = 483.99 (CFS))		
1	1.979	9.579
2	11.372	45.462
3	29.934	89.837
4	55.177	122.173
5	76.460	103.011
6	88.357	57.579
7	94.260	28.571

8	97.346	14.937
9	98.447	5.326
10	98.993	2.646
11	99.540	2.645
12	100.000	2.226

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3003	0.3003
2	0.3963	0.0960
3	0.4661	0.0698
4	0.5229	0.0568
5	0.5717	0.0488
6	0.6150	0.0433
7	0.6541	0.0391
8	0.6900	0.0359
9	0.7233	0.0333
10	0.7544	0.0311
11	0.7837	0.0293
12	0.8115	0.0278
13	0.8452	0.0338
14	0.8778	0.0325
15	0.9092	0.0314
16	0.9396	0.0304
17	0.9690	0.0295
18	0.9977	0.0286
19	1.0255	0.0279
20	1.0527	0.0272
21	1.0792	0.0265
22	1.1050	0.0259
23	1.1304	0.0253
24	1.1551	0.0248
25	1.1794	0.0243
26	1.2032	0.0238
27	1.2266	0.0234
28	1.2495	0.0229
29	1.2720	0.0225
30	1.2942	0.0222
31	1.3160	0.0218
32	1.3375	0.0215
33	1.3586	0.0211
34	1.3794	0.0208
35	1.3999	0.0205
36	1.4202	0.0202
37	1.4401	0.0199
38	1.4597	0.0196
39	1.4791	0.0194
40	1.4983	0.0192
41	1.5172	0.0189
42	1.5359	0.0187
43	1.5544	0.0185
44	1.5726	0.0183
45	1.5907	0.0181
46	1.6085	0.0179
47	1.6262	0.0177
48	1.6437	0.0175
49	1.6610	0.0173

50	1.6782	0.0171
51	1.6951	0.0170
52	1.7119	0.0168
53	1.7286	0.0166
54	1.7451	0.0165
55	1.7614	0.0163
56	1.7776	0.0162
57	1.7937	0.0161
58	1.8096	0.0159
59	1.8254	0.0158
60	1.8410	0.0157
61	1.8566	0.0155
62	1.8720	0.0154
63	1.8873	0.0153
64	1.9024	0.0152
65	1.9175	0.0150
66	1.9324	0.0149
67	1.9472	0.0148
68	1.9619	0.0147
69	1.9765	0.0146
70	1.9910	0.0145
71	2.0054	0.0144
72	2.0197	0.0143
73	2.0320	0.0123
74	2.0442	0.0122
75	2.0562	0.0121
76	2.0682	0.0120
77	2.0801	0.0119
78	2.0919	0.0118
79	2.1036	0.0117
80	2.1153	0.0116
81	2.1268	0.0116
82	2.1383	0.0115
83	2.1497	0.0114
84	2.1610	0.0113
85	2.1723	0.0112
86	2.1834	0.0112
87	2.1945	0.0111
88	2.2056	0.0110
89	2.2165	0.0110
90	2.2274	0.0109
91	2.2382	0.0108
92	2.2490	0.0108
93	2.2597	0.0107
94	2.2703	0.0106
95	2.2809	0.0106
96	2.2914	0.0105
97	2.3018	0.0104
98	2.3122	0.0104
99	2.3225	0.0103
100	2.3328	0.0103
101	2.3430	0.0102
102	2.3531	0.0101
103	2.3632	0.0101
104	2.3732	0.0100
105	2.3832	0.0100
106	2.3931	0.0099

107	2.4030	0.0099
108	2.4128	0.0098
109	2.4226	0.0098
110	2.4323	0.0097
111	2.4420	0.0097
112	2.4516	0.0096
113	2.4612	0.0096
114	2.4707	0.0095
115	2.4802	0.0095
116	2.4897	0.0094
117	2.4990	0.0094
118	2.5084	0.0093
119	2.5177	0.0093
120	2.5270	0.0093
121	2.5362	0.0092
122	2.5453	0.0092
123	2.5545	0.0091
124	2.5636	0.0091
125	2.5726	0.0090
126	2.5816	0.0090
127	2.5906	0.0090
128	2.5995	0.0089
129	2.6084	0.0089
130	2.6172	0.0088
131	2.6260	0.0088
132	2.6348	0.0088
133	2.6436	0.0087
134	2.6523	0.0087
135	2.6609	0.0087
136	2.6695	0.0086
137	2.6781	0.0086
138	2.6867	0.0086
139	2.6952	0.0085
140	2.7037	0.0085
141	2.7122	0.0085
142	2.7206	0.0084
143	2.7290	0.0084
144	2.7373	0.0084
145	2.7456	0.0083
146	2.7539	0.0083
147	2.7622	0.0083
148	2.7704	0.0082
149	2.7786	0.0082
150	2.7868	0.0082
151	2.7949	0.0081
152	2.8030	0.0081
153	2.8111	0.0081
154	2.8191	0.0080
155	2.8271	0.0080
156	2.8351	0.0080
157	2.8431	0.0080
158	2.8510	0.0079
159	2.8589	0.0079
160	2.8668	0.0079
161	2.8746	0.0078
162	2.8824	0.0078
163	2.8902	0.0078

164	2.8980	0.0078
165	2.9057	0.0077
166	2.9134	0.0077
167	2.9211	0.0077
168	2.9288	0.0077
169	2.9364	0.0076
170	2.9440	0.0076
171	2.9516	0.0076
172	2.9592	0.0076
173	2.9667	0.0075
174	2.9742	0.0075
175	2.9817	0.0075
176	2.9891	0.0075
177	2.9966	0.0074
178	3.0040	0.0074
179	3.0114	0.0074
180	3.0188	0.0074
181	3.0261	0.0073
182	3.0334	0.0073
183	3.0407	0.0073
184	3.0480	0.0073
185	3.0553	0.0073
186	3.0625	0.0072
187	3.0697	0.0072
188	3.0769	0.0072
189	3.0840	0.0072
190	3.0912	0.0071
191	3.0983	0.0071
192	3.1054	0.0071
193	3.1125	0.0071
194	3.1196	0.0071
195	3.1266	0.0070
196	3.1336	0.0070
197	3.1406	0.0070
198	3.1476	0.0070
199	3.1546	0.0070
200	3.1615	0.0069
201	3.1684	0.0069
202	3.1754	0.0069
203	3.1822	0.0069
204	3.1891	0.0069
205	3.1959	0.0068
206	3.2028	0.0068
207	3.2096	0.0068
208	3.2164	0.0068
209	3.2232	0.0068
210	3.2299	0.0068
211	3.2366	0.0067
212	3.2434	0.0067
213	3.2501	0.0067
214	3.2567	0.0067
215	3.2634	0.0067
216	3.2701	0.0066
217	3.2767	0.0066
218	3.2833	0.0066
219	3.2899	0.0066
220	3.2965	0.0066

221	3.3030	0.0066
222	3.3096	0.0065
223	3.3161	0.0065
224	3.3226	0.0065
225	3.3291	0.0065
226	3.3356	0.0065
227	3.3421	0.0065
228	3.3485	0.0064
229	3.3550	0.0064
230	3.3614	0.0064
231	3.3678	0.0064
232	3.3742	0.0064
233	3.3805	0.0064
234	3.3869	0.0064
235	3.3932	0.0063
236	3.3996	0.0063
237	3.4059	0.0063
238	3.4122	0.0063
239	3.4184	0.0063
240	3.4247	0.0063
241	3.4310	0.0063
242	3.4372	0.0062
243	3.4434	0.0062
244	3.4496	0.0062
245	3.4558	0.0062
246	3.4620	0.0062
247	3.4682	0.0062
248	3.4743	0.0062
249	3.4805	0.0061
250	3.4866	0.0061
251	3.4927	0.0061
252	3.4988	0.0061
253	3.5049	0.0061
254	3.5109	0.0061
255	3.5170	0.0061
256	3.5230	0.0060
257	3.5291	0.0060
258	3.5351	0.0060
259	3.5411	0.0060
260	3.5471	0.0060
261	3.5531	0.0060
262	3.5590	0.0060
263	3.5650	0.0060
264	3.5709	0.0059
265	3.5768	0.0059
266	3.5827	0.0059
267	3.5886	0.0059
268	3.5945	0.0059
269	3.6004	0.0059
270	3.6063	0.0059
271	3.6121	0.0059
272	3.6180	0.0058
273	3.6238	0.0058
274	3.6296	0.0058
275	3.6354	0.0058
276	3.6412	0.0058
277	3.6470	0.0058

278	3.6528	0.0058
279	3.6585	0.0058
280	3.6643	0.0057
281	3.6700	0.0057
282	3.6757	0.0057
283	3.6814	0.0057
284	3.6871	0.0057
285	3.6928	0.0057
286	3.6985	0.0057
287	3.7042	0.0057
288	3.7098	0.0057

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0057	0.0046	0.0011
2	0.0057	0.0046	0.0011
3	0.0057	0.0046	0.0011
4	0.0057	0.0046	0.0011
5	0.0057	0.0047	0.0011
6	0.0057	0.0047	0.0011
7	0.0058	0.0047	0.0011
8	0.0058	0.0047	0.0011
9	0.0058	0.0047	0.0011
10	0.0058	0.0047	0.0011
11	0.0058	0.0047	0.0011
12	0.0058	0.0047	0.0011
13	0.0059	0.0048	0.0011
14	0.0059	0.0048	0.0011
15	0.0059	0.0048	0.0011
16	0.0059	0.0048	0.0011
17	0.0059	0.0048	0.0011
18	0.0060	0.0048	0.0011
19	0.0060	0.0049	0.0011
20	0.0060	0.0049	0.0011
21	0.0060	0.0049	0.0011
22	0.0060	0.0049	0.0011
23	0.0061	0.0049	0.0011
24	0.0061	0.0049	0.0011
25	0.0061	0.0050	0.0011
26	0.0061	0.0050	0.0011
27	0.0061	0.0050	0.0012
28	0.0062	0.0050	0.0012
29	0.0062	0.0050	0.0012
30	0.0062	0.0050	0.0012
31	0.0062	0.0051	0.0012
32	0.0062	0.0051	0.0012
33	0.0063	0.0051	0.0012
34	0.0063	0.0051	0.0012
35	0.0063	0.0051	0.0012
36	0.0063	0.0051	0.0012
37	0.0064	0.0052	0.0012
38	0.0064	0.0052	0.0012
39	0.0064	0.0052	0.0012
40	0.0064	0.0052	0.0012
41	0.0064	0.0052	0.0012

42	0.0065	0.0053	0.0012
43	0.0065	0.0053	0.0012
44	0.0065	0.0053	0.0012
45	0.0065	0.0053	0.0012
46	0.0066	0.0053	0.0012
47	0.0066	0.0054	0.0012
48	0.0066	0.0054	0.0012
49	0.0066	0.0054	0.0012
50	0.0067	0.0054	0.0012
51	0.0067	0.0054	0.0013
52	0.0067	0.0055	0.0013
53	0.0068	0.0055	0.0013
54	0.0068	0.0055	0.0013
55	0.0068	0.0055	0.0013
56	0.0068	0.0055	0.0013
57	0.0069	0.0056	0.0013
58	0.0069	0.0056	0.0013
59	0.0069	0.0056	0.0013
60	0.0069	0.0056	0.0013
61	0.0070	0.0057	0.0013
62	0.0070	0.0057	0.0013
63	0.0070	0.0057	0.0013
64	0.0071	0.0057	0.0013
65	0.0071	0.0058	0.0013
66	0.0071	0.0058	0.0013
67	0.0072	0.0058	0.0013
68	0.0072	0.0058	0.0013
69	0.0072	0.0059	0.0014
70	0.0073	0.0059	0.0014
71	0.0073	0.0059	0.0014
72	0.0073	0.0059	0.0014
73	0.0074	0.0060	0.0014
74	0.0074	0.0060	0.0014
75	0.0074	0.0060	0.0014
76	0.0075	0.0061	0.0014
77	0.0075	0.0061	0.0014
78	0.0075	0.0061	0.0014
79	0.0076	0.0062	0.0014
80	0.0076	0.0062	0.0014
81	0.0077	0.0062	0.0014
82	0.0077	0.0062	0.0014
83	0.0077	0.0063	0.0014
84	0.0078	0.0063	0.0015
85	0.0078	0.0064	0.0015
86	0.0078	0.0064	0.0015
87	0.0079	0.0064	0.0015
88	0.0079	0.0064	0.0015
89	0.0080	0.0065	0.0015
90	0.0080	0.0065	0.0015
91	0.0081	0.0066	0.0015
92	0.0081	0.0066	0.0015
93	0.0082	0.0066	0.0015
94	0.0082	0.0067	0.0015
95	0.0083	0.0067	0.0015
96	0.0083	0.0067	0.0016
97	0.0084	0.0068	0.0016
98	0.0084	0.0068	0.0016

99	0.0085	0.0069	0.0016
100	0.0085	0.0069	0.0016
101	0.0086	0.0070	0.0016
102	0.0086	0.0070	0.0016
103	0.0087	0.0070	0.0016
104	0.0087	0.0071	0.0016
105	0.0088	0.0071	0.0016
106	0.0088	0.0072	0.0017
107	0.0089	0.0072	0.0017
108	0.0089	0.0073	0.0017
109	0.0090	0.0073	0.0017
110	0.0090	0.0074	0.0017
111	0.0091	0.0074	0.0017
112	0.0092	0.0075	0.0017
113	0.0093	0.0075	0.0017
114	0.0093	0.0076	0.0017
115	0.0094	0.0076	0.0018
116	0.0094	0.0077	0.0018
117	0.0095	0.0077	0.0018
118	0.0096	0.0078	0.0018
119	0.0097	0.0079	0.0018
120	0.0097	0.0079	0.0018
121	0.0098	0.0080	0.0018
122	0.0099	0.0080	0.0019
123	0.0100	0.0081	0.0019
124	0.0100	0.0082	0.0019
125	0.0101	0.0082	0.0019
126	0.0102	0.0083	0.0019
127	0.0103	0.0084	0.0019
128	0.0104	0.0084	0.0019
129	0.0105	0.0085	0.0020
130	0.0106	0.0086	0.0020
131	0.0107	0.0087	0.0020
132	0.0108	0.0087	0.0020
133	0.0109	0.0088	0.0020
134	0.0110	0.0089	0.0021
135	0.0111	0.0090	0.0021
136	0.0112	0.0091	0.0021
137	0.0113	0.0092	0.0021
138	0.0114	0.0093	0.0021
139	0.0116	0.0094	0.0022
140	0.0116	0.0095	0.0022
141	0.0118	0.0096	0.0022
142	0.0119	0.0097	0.0022
143	0.0121	0.0098	0.0023
144	0.0122	0.0099	0.0023
145	0.0143	0.0116	0.0027
146	0.0144	0.0117	0.0027
147	0.0146	0.0119	0.0027
148	0.0147	0.0120	0.0028
149	0.0149	0.0121	0.0028
150	0.0150	0.0122	0.0028
151	0.0153	0.0124	0.0029
152	0.0154	0.0125	0.0029
153	0.0157	0.0127	0.0029
154	0.0158	0.0128	0.0030
155	0.0161	0.0130	0.0030

156	0.0162	0.0132	0.0030
157	0.0165	0.0134	0.0031
158	0.0166	0.0135	0.0031
159	0.0170	0.0138	0.0032
160	0.0171	0.0139	0.0032
161	0.0175	0.0142	0.0033
162	0.0177	0.0144	0.0033
163	0.0181	0.0147	0.0034
164	0.0183	0.0148	0.0034
165	0.0187	0.0152	0.0035
166	0.0189	0.0154	0.0035
167	0.0194	0.0158	0.0036
168	0.0196	0.0160	0.0037
169	0.0202	0.0164	0.0038
170	0.0205	0.0167	0.0038
171	0.0211	0.0172	0.0040
172	0.0215	0.0174	0.0040
173	0.0222	0.0180	0.0042
174	0.0225	0.0183	0.0042
175	0.0234	0.0190	0.0044
176	0.0238	0.0193	0.0045
177	0.0248	0.0201	0.0046
178	0.0253	0.0206	0.0047
179	0.0265	0.0215	0.0050
180	0.0272	0.0221	0.0051
181	0.0286	0.0233	0.0054
182	0.0295	0.0239	0.0055
183	0.0314	0.0255	0.0059
184	0.0325	0.0264	0.0061
185	0.0278	0.0226	0.0052
186	0.0293	0.0238	0.0055
187	0.0333	0.0270	0.0062
188	0.0359	0.0292	0.0067
189	0.0433	0.0351	0.0081
190	0.0488	0.0397	0.0091
191	0.0698	0.0567	0.0131
192	0.0960	0.0652	0.0308
193	0.3003	0.0652	0.2351
194	0.0568	0.0462	0.0107
195	0.0391	0.0318	0.0073
196	0.0311	0.0253	0.0058
197	0.0338	0.0274	0.0063
198	0.0304	0.0247	0.0057
199	0.0279	0.0226	0.0052
200	0.0259	0.0210	0.0048
201	0.0243	0.0197	0.0045
202	0.0229	0.0186	0.0043
203	0.0218	0.0177	0.0041
204	0.0208	0.0169	0.0039
205	0.0199	0.0162	0.0037
206	0.0192	0.0156	0.0036
207	0.0185	0.0150	0.0035
208	0.0179	0.0145	0.0033
209	0.0173	0.0141	0.0032
210	0.0168	0.0137	0.0031
211	0.0163	0.0133	0.0031
212	0.0159	0.0129	0.0030

213	0.0155	0.0126	0.0029
214	0.0152	0.0123	0.0028
215	0.0148	0.0120	0.0028
216	0.0145	0.0118	0.0027
217	0.0123	0.0100	0.0023
218	0.0120	0.0097	0.0022
219	0.0117	0.0095	0.0022
220	0.0115	0.0093	0.0022
221	0.0112	0.0091	0.0021
222	0.0110	0.0090	0.0021
223	0.0108	0.0088	0.0020
224	0.0106	0.0086	0.0020
225	0.0104	0.0085	0.0020
226	0.0103	0.0083	0.0019
227	0.0101	0.0082	0.0019
228	0.0099	0.0081	0.0019
229	0.0098	0.0079	0.0018
230	0.0096	0.0078	0.0018
231	0.0095	0.0077	0.0018
232	0.0093	0.0076	0.0018
233	0.0092	0.0075	0.0017
234	0.0091	0.0074	0.0017
235	0.0090	0.0073	0.0017
236	0.0088	0.0072	0.0017
237	0.0087	0.0071	0.0016
238	0.0086	0.0070	0.0016
239	0.0085	0.0069	0.0016
240	0.0084	0.0068	0.0016
241	0.0083	0.0068	0.0016
242	0.0082	0.0067	0.0015
243	0.0081	0.0066	0.0015
244	0.0080	0.0065	0.0015
245	0.0080	0.0065	0.0015
246	0.0079	0.0064	0.0015
247	0.0078	0.0063	0.0015
248	0.0077	0.0063	0.0014
249	0.0076	0.0062	0.0014
250	0.0076	0.0061	0.0014
251	0.0075	0.0061	0.0014
252	0.0074	0.0060	0.0014
253	0.0073	0.0060	0.0014
254	0.0073	0.0059	0.0014
255	0.0072	0.0059	0.0014
256	0.0071	0.0058	0.0013
257	0.0071	0.0058	0.0013
258	0.0070	0.0057	0.0013
259	0.0070	0.0057	0.0013
260	0.0069	0.0056	0.0013
261	0.0068	0.0056	0.0013
262	0.0068	0.0055	0.0013
263	0.0067	0.0055	0.0013
264	0.0067	0.0054	0.0013
265	0.0066	0.0054	0.0012
266	0.0066	0.0053	0.0012
267	0.0065	0.0053	0.0012
268	0.0065	0.0053	0.0012
269	0.0064	0.0052	0.0012

270	0.0064	0.0052	0.0012
271	0.0063	0.0052	0.0012
272	0.0063	0.0051	0.0012
273	0.0063	0.0051	0.0012
274	0.0062	0.0050	0.0012
275	0.0062	0.0050	0.0012
276	0.0061	0.0050	0.0011
277	0.0061	0.0049	0.0011
278	0.0060	0.0049	0.0011
279	0.0060	0.0049	0.0011
280	0.0060	0.0048	0.0011
281	0.0059	0.0048	0.0011
282	0.0059	0.0048	0.0011
283	0.0059	0.0048	0.0011
284	0.0058	0.0047	0.0011
285	0.0058	0.0047	0.0011
286	0.0057	0.0047	0.0011
287	0.0057	0.0046	0.0011
288	0.0057	0.0046	0.0011

Total soil rain loss = 2.82(In)
Total effective rainfall = 0.89(In)
Peak flow rate in flood hydrograph = 34.46(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

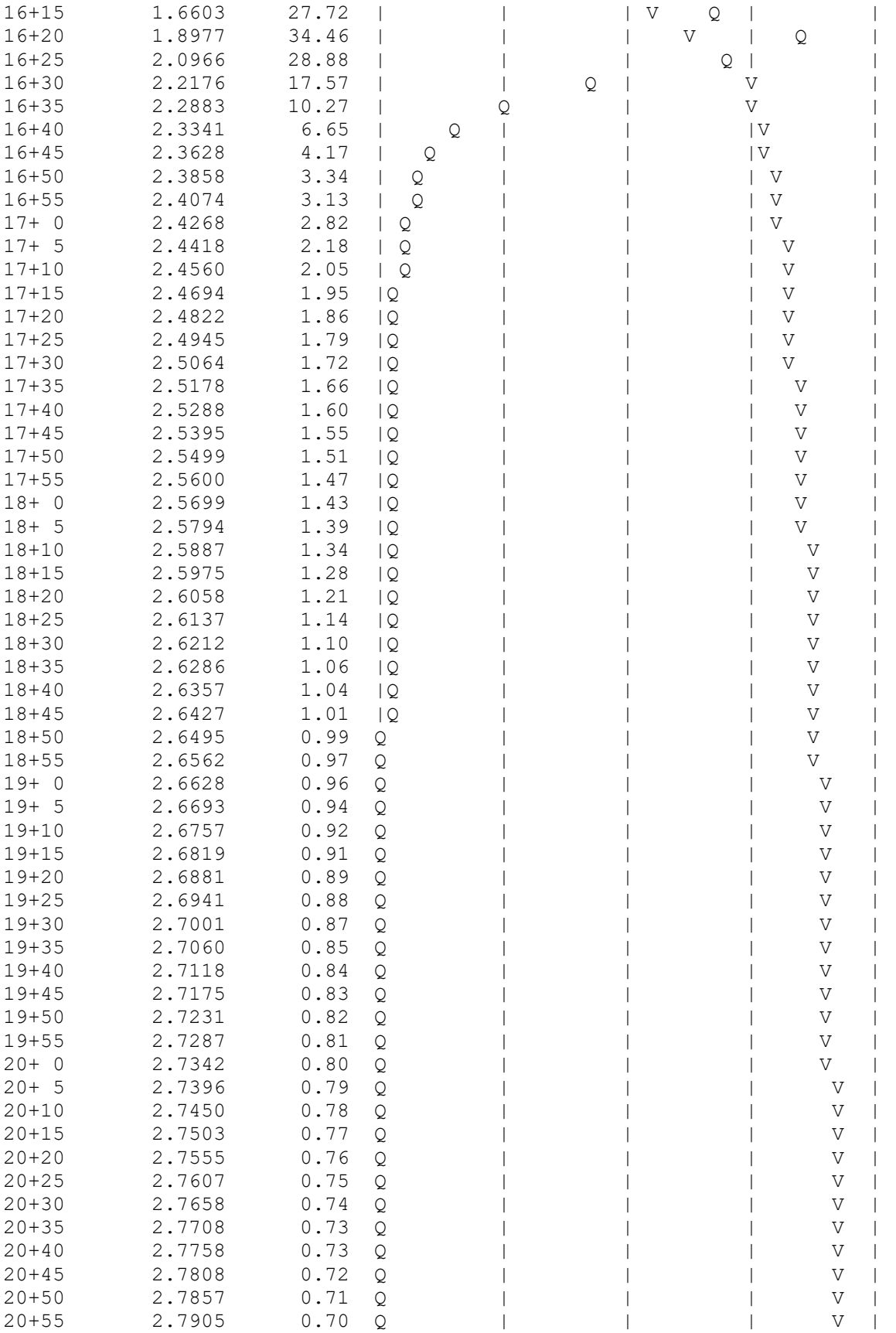
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0001	0.01	Q	|	|	|	|
0+10	0.0005	0.06	Q	|	|	|	|
0+15	0.0015	0.15	Q	|	|	|	|
0+20	0.0035	0.28	Q	|	|	|	|
0+25	0.0062	0.39	Q	|	|	|	|
0+30	0.0093	0.46	Q	|	|	|	|
0+35	0.0127	0.49	Q	|	|	|	|
0+40	0.0162	0.50	Q	|	|	|	|
0+45	0.0197	0.51	Q	|	|	|	|
0+50	0.0232	0.52	Q	|	|	|	|
0+55	0.0268	0.52	Q	|	|	|	|
1+ 0	0.0304	0.52	Q	|	|	|	|
1+ 5	0.0341	0.53	Q	|	|	|	|
1+10	0.0377	0.53	Q	|	|	|	|
1+15	0.0413	0.53	Q	|	|	|	|
1+20	0.0450	0.53	Q	|	|	|	|
1+25	0.0487	0.53	Q	|	|	|	|
1+30	0.0523	0.53	Q	|	|	|	|
1+35	0.0560	0.54	Q	|	|	|	|
1+40	0.0597	0.54	Q	|	|	|	|
1+45	0.0634	0.54	Q	|	|	|	|
1+50	0.0672	0.54	Q	|	|	|	|
1+55	0.0709	0.54	Q	|	|	|	|

2+ 0	0.0746	0.54	QV	|	|	|	|
2+ 5	0.0784	0.55	QV	|	|	|	|
2+10	0.0822	0.55	QV	|	|	|	|
2+15	0.0860	0.55	QV	|	|	|	|
2+20	0.0898	0.55	QV	|	|	|	|
2+25	0.0936	0.55	QV	|	|	|	|
2+30	0.0974	0.56	QV	|	|	|	|
2+35	0.1012	0.56	QV	|	|	|	|
2+40	0.1051	0.56	QV	|	|	|	|
2+45	0.1090	0.56	QV	|	|	|	|
2+50	0.1128	0.56	QV	|	|	|	|
2+55	0.1167	0.57	QV	|	|	|	|
3+ 0	0.1206	0.57	QV	|	|	|	|
3+ 5	0.1246	0.57	QV	|	|	|	|
3+10	0.1285	0.57	QV	|	|	|	|
3+15	0.1324	0.57	QV	|	|	|	|
3+20	0.1364	0.58	QV	|	|	|	|
3+25	0.1404	0.58	QV	|	|	|	|
3+30	0.1444	0.58	QV	|	|	|	|
3+35	0.1484	0.58	Q V	|	|	|	|
3+40	0.1524	0.58	Q V	|	|	|	|
3+45	0.1564	0.59	Q V	|	|	|	|
3+50	0.1605	0.59	Q V	|	|	|	|
3+55	0.1645	0.59	Q V	|	|	|	|
4+ 0	0.1686	0.59	Q V	|	|	|	|
4+ 5	0.1727	0.59	Q V	|	|	|	|
4+10	0.1768	0.60	Q V	|	|	|	|
4+15	0.1809	0.60	Q V	|	|	|	|
4+20	0.1851	0.60	Q V	|	|	|	|
4+25	0.1892	0.60	Q V	|	|	|	|
4+30	0.1934	0.61	Q V	|	|	|	|
4+35	0.1976	0.61	Q V	|	|	|	|
4+40	0.2018	0.61	Q V	|	|	|	|
4+45	0.2060	0.61	Q V	|	|	|	|
4+50	0.2103	0.62	Q V	|	|	|	|
4+55	0.2145	0.62	Q V	|	|	|	|
5+ 0	0.2188	0.62	Q V	|	|	|	|
5+ 5	0.2231	0.62	Q V	|	|	|	|
5+10	0.2274	0.63	Q V	|	|	|	|
5+15	0.2318	0.63	Q V	|	|	|	|
5+20	0.2361	0.63	Q V	|	|	|	|
5+25	0.2405	0.63	Q V	|	|	|	|
5+30	0.2449	0.64	Q V	|	|	|	|
5+35	0.2493	0.64	Q V	|	|	|	|
5+40	0.2537	0.64	Q V	|	|	|	|
5+45	0.2581	0.65	Q V	|	|	|	|
5+50	0.2626	0.65	Q V	|	|	|	|
5+55	0.2671	0.65	Q V	|	|	|	|
6+ 0	0.2716	0.65	Q V	|	|	|	|
6+ 5	0.2761	0.66	Q V	|	|	|	|
6+10	0.2807	0.66	Q V	|	|	|	|
6+15	0.2852	0.66	Q V	|	|	|	|
6+20	0.2898	0.67	Q V	|	|	|	|
6+25	0.2944	0.67	Q V	|	|	|	|
6+30	0.2991	0.67	Q V	|	|	|	|
6+35	0.3037	0.68	Q V	|	|	|	|
6+40	0.3084	0.68	Q V	|	|	|	|

6+45	0.3131	0.68	Q	V				
6+50	0.3178	0.69	Q	V				
6+55	0.3225	0.69	Q	V				
7+ 0	0.3273	0.69	Q	V				
7+ 5	0.3321	0.70	Q	V				
7+10	0.3369	0.70	Q	V				
7+15	0.3418	0.70	Q	V				
7+20	0.3466	0.71	Q	V				
7+25	0.3515	0.71	Q	V				
7+30	0.3564	0.71	Q	V				
7+35	0.3614	0.72	Q	V				
7+40	0.3664	0.72	Q	V				
7+45	0.3714	0.73	Q	V				
7+50	0.3764	0.73	Q	V				
7+55	0.3814	0.73	Q	V				
8+ 0	0.3865	0.74	Q	V				
8+ 5	0.3916	0.74	Q	V				
8+10	0.3968	0.75	Q	V				
8+15	0.4019	0.75	Q	V				
8+20	0.4071	0.75	Q	V				
8+25	0.4124	0.76	Q	V				
8+30	0.4176	0.76	Q	V				
8+35	0.4229	0.77	Q	V				
8+40	0.4282	0.77	Q	V				
8+45	0.4336	0.78	Q	V				
8+50	0.4390	0.78	Q	V				
8+55	0.4444	0.79	Q	V				
9+ 0	0.4499	0.79	Q	V				
9+ 5	0.4554	0.80	Q	V				
9+10	0.4609	0.80	Q	V				
9+15	0.4664	0.81	Q	V				
9+20	0.4720	0.81	Q	V				
9+25	0.4777	0.82	Q	V				
9+30	0.4834	0.82	Q	V				
9+35	0.4891	0.83	Q	V				
9+40	0.4948	0.84	Q	V				
9+45	0.5006	0.84	Q	V				
9+50	0.5065	0.85	Q	V				
9+55	0.5124	0.85	Q	V				
10+ 0	0.5183	0.86	Q	V				
10+ 5	0.5243	0.87	Q	V				
10+10	0.5303	0.87	Q	V				
10+15	0.5363	0.88	Q	V				
10+20	0.5424	0.89	Q	V				
10+25	0.5486	0.89	Q	V				
10+30	0.5548	0.90	Q	V				
10+35	0.5610	0.91	Q	V				
10+40	0.5674	0.92	Q	V				
10+45	0.5737	0.92	Q	V				
10+50	0.5801	0.93	Q	V				
10+55	0.5866	0.94	Q	V				
11+ 0	0.5931	0.95	Q	V				
11+ 5	0.5997	0.96	Q	V				
11+10	0.6063	0.96	Q	V				
11+15	0.6130	0.97	Q	V				
11+20	0.6198	0.98	Q	V				
11+25	0.6266	0.99	Q	V				

11+30	0.6335	1.00	|Q V |	|	|	|
11+35	0.6405	1.01	|Q V |	|	|	|
11+40	0.6475	1.02	|Q V |	|	|	|
11+45	0.6546	1.03	|Q V |	|	|	|
11+50	0.6618	1.04	|Q V |	|	|	|
11+55	0.6690	1.05	|Q V|	|	|	|
12+ 0	0.6763	1.06	|Q V|	|	|	|
12+ 5	0.6838	1.08	|Q V|	|	|	|
12+10	0.6914	1.11	|Q V|	|	|	|
12+15	0.6993	1.15	|Q V|	|	|	|
12+20	0.7077	1.21	|Q V|	|	|	|
12+25	0.7164	1.26	|Q V|	|	|	|
12+30	0.7253	1.30	|Q V|	|	|	|
12+35	0.7344	1.32	|Q V|	|	|	|
12+40	0.7436	1.34	|Q V	|	|	|
12+45	0.7530	1.36	|Q V	|	|	|
12+50	0.7624	1.37	|Q V	|	|	|
12+55	0.7720	1.39	|Q V	|	|	|
13+ 0	0.7817	1.41	|Q V	|	|	|
13+ 5	0.7915	1.43	|Q V	|	|	|
13+10	0.8015	1.45	|Q V	|	|	|
13+15	0.8116	1.46	|Q V	|	|	|
13+20	0.8218	1.48	|Q |V	|	|	|
13+25	0.8322	1.50	|Q |V	|	|	|
13+30	0.8427	1.53	|Q |V	|	|	|
13+35	0.8533	1.55	|Q |V	|	|	|
13+40	0.8642	1.57	|Q |V	|	|	|
13+45	0.8752	1.60	|Q |V	|	|	|
13+50	0.8863	1.62	|Q |V	|	|	|
13+55	0.8977	1.65	|Q | V	|	|	|
14+ 0	0.9093	1.68	|Q | V	|	|	|
14+ 5	0.9210	1.71	|Q | V	|	|	|
14+10	0.9330	1.74	|Q | V	|	|	|
14+15	0.9452	1.78	|Q | V	|	|	|
14+20	0.9577	1.81	|Q | V	|	|	|
14+25	0.9705	1.85	|Q | V	|	|	|
14+30	0.9835	1.89	|Q | V	|	|	|
14+35	0.9969	1.94	|Q | V	|	|	|
14+40	1.0105	1.98	|Q | V	|	|	|
14+45	1.0245	2.03	| Q | V	|	|	|
14+50	1.0389	2.09	| Q | V	|	|	|
14+55	1.0537	2.15	| Q | V	|	|	|
15+ 0	1.0689	2.21	| Q | V	|	|	|
15+ 5	1.0846	2.28	| Q | V	|	|	|
15+10	1.1009	2.36	| Q | V	|	|	|
15+15	1.1178	2.45	| Q | V	|	|	|
15+20	1.1353	2.55	| Q | V	|	|	|
15+25	1.1536	2.65	| Q | V	|	|	|
15+30	1.1722	2.71	| Q | V	|	|	|
15+35	1.1911	2.74	| Q | V	|	|	|
15+40	1.2100	2.74	| Q | V	|	|	|
15+45	1.2294	2.82	| Q | V	|	|	|
15+50	1.2502	3.02	| Q | V	|	|	|
15+55	1.2733	3.36	| Q | V	|	|	|
16+ 0	1.3013	4.06	| Q | V	|	|	|
16+ 5	1.3529	7.50	| Q | V	|	|	|
16+10	1.4694	16.92	| | Q V|	|	|	|



21+ 0	2.7953	0.70	Q	|	|	|	V |
21+ 5	2.8001	0.69	Q	|	|	|	V |
21+10	2.8048	0.68	Q	|	|	|	V |
21+15	2.8094	0.68	Q	|	|	|	V |
21+20	2.8140	0.67	Q	|	|	|	V |
21+25	2.8186	0.66	Q	|	|	|	V |
21+30	2.8231	0.66	Q	|	|	|	V |
21+35	2.8276	0.65	Q	|	|	|	V |
21+40	2.8320	0.65	Q	|	|	|	V |
21+45	2.8365	0.64	Q	|	|	|	V |
21+50	2.8408	0.63	Q	|	|	|	V |
21+55	2.8451	0.63	Q	|	|	|	V |
22+ 0	2.8494	0.62	Q	|	|	|	V |
22+ 5	2.8537	0.62	Q	|	|	|	V |
22+10	2.8579	0.61	Q	|	|	|	V |
22+15	2.8621	0.61	Q	|	|	|	V |
22+20	2.8663	0.60	Q	|	|	|	V |
22+25	2.8704	0.60	Q	|	|	|	V |
22+30	2.8745	0.59	Q	|	|	|	V |
22+35	2.8786	0.59	Q	|	|	|	V |
22+40	2.8826	0.59	Q	|	|	|	V|
22+45	2.8866	0.58	Q	|	|	|	V|
22+50	2.8906	0.58	Q	|	|	|	V|
22+55	2.8945	0.57	Q	|	|	|	V|
23+ 0	2.8984	0.57	Q	|	|	|	V|
23+ 5	2.9023	0.56	Q	|	|	|	V|
23+10	2.9062	0.56	Q	|	|	|	V|
23+15	2.9100	0.56	Q	|	|	|	V|
23+20	2.9138	0.55	Q	|	|	|	V|
23+25	2.9176	0.55	Q	|	|	|	V|
23+30	2.9214	0.55	Q	|	|	|	V|
23+35	2.9251	0.54	Q	|	|	|	V|
23+40	2.9288	0.54	Q	|	|	|	V|
23+45	2.9325	0.54	Q	|	|	|	V|
23+50	2.9362	0.53	Q	|	|	|	V|
23+55	2.9398	0.53	Q	|	|	|	V|
24+ 0	2.9435	0.53	Q	|	|	|	V|
24+ 5	2.9470	0.51	Q	|	|	|	V|
24+10	2.9502	0.46	Q	|	|	|	V|
24+15	2.9527	0.36	Q	|	|	|	V|
24+20	2.9543	0.23	Q	|	|	|	V|
24+25	2.9551	0.12	Q	|	|	|	V|
24+30	2.9555	0.06	Q	|	|	|	V|
24+35	2.9557	0.03	Q	|	|	|	V|
24+40	2.9558	0.01	Q	|	|	|	V|
24+45	2.9559	0.01	Q	|	|	|	V|
24+50	2.9559	0.01	Q	|	|	|	V|
24+55	2.9559	0.00	Q	|	|	|	V

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

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Study date 05/04/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER
ONSITE EXISTING CONDITION
10-YEAR STORM EVENT ANALYSIS

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		
40.02	1	0.81
Rainfall data for year 10		
40.02	6	2.02
Rainfall data for year 10		
40.02	24	3.71

++

******** 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)
32.0	32.0	40.02	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
32.02	0.800	32.0	32.0	18.55	0.000
8.00	0.200	98.0	98.0	0.20	0.937

Area-averaged catchment yield fraction, Y = 0.187
Area-averaged low loss fraction, Yb = 0.813
User entry of time of concentration = 0.351 (hours)
++
Watershed area = 40.02(Ac.)
Catchment Lag time = 0.281 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 29.7084
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.815 (decimal)
Note: user entry of the Yb value
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.301(In)
Computed peak 30-minute rainfall = 0.616(In)
Specified peak 1-hour rainfall = 0.813(In)
Computed peak 3-hour rainfall = 1.421(In)
Specified peak 6-hour rainfall = 2.020(In)
Specified peak 24-hour rainfall = 3.710(In)

Rainfall depth area reduction factors:
Using a total area of 40.02(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.300(In)
30-minute factor = 0.998 Adjusted rainfall = 0.615(In)
1-hour factor = 0.998 Adjusted rainfall = 0.811(In)
3-hour factor = 1.000 Adjusted rainfall = 1.420(In)
6-hour factor = 1.000 Adjusted rainfall = 2.020(In)
24-hour factor = 1.000 Adjusted rainfall = 3.710(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 = 483.99 (CFS))	
1	1.920	9.290
2	10.873	43.335
3	28.740	86.472
4	53.102	117.913
5	74.988	105.925
6	87.306	59.618

7	93.602	30.471
8	96.993	16.414
9	98.344	6.540
10	98.880	2.594
11	99.415	2.588
12	100.000	1.294

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3003	0.3003
2	0.3963	0.0960
3	0.4661	0.0698
4	0.5229	0.0568
5	0.5717	0.0488
6	0.6150	0.0433
7	0.6541	0.0391
8	0.6900	0.0359
9	0.7233	0.0333
10	0.7544	0.0311
11	0.7837	0.0293
12	0.8115	0.0278
13	0.8452	0.0338
14	0.8778	0.0325
15	0.9092	0.0314
16	0.9396	0.0304
17	0.9690	0.0295
18	0.9977	0.0286
19	1.0255	0.0279
20	1.0527	0.0272
21	1.0792	0.0265
22	1.1050	0.0259
23	1.1304	0.0253
24	1.1551	0.0248
25	1.1794	0.0243
26	1.2032	0.0238
27	1.2266	0.0234
28	1.2495	0.0229
29	1.2720	0.0225
30	1.2942	0.0222
31	1.3160	0.0218
32	1.3375	0.0215
33	1.3586	0.0211
34	1.3794	0.0208
35	1.3999	0.0205
36	1.4202	0.0202
37	1.4401	0.0199
38	1.4597	0.0196
39	1.4791	0.0194
40	1.4983	0.0192
41	1.5172	0.0189
42	1.5359	0.0187
43	1.5544	0.0185
44	1.5726	0.0183
45	1.5907	0.0181
46	1.6085	0.0179
47	1.6262	0.0177
48	1.6437	0.0175

49	1.6610	0.0173
50	1.6782	0.0171
51	1.6951	0.0170
52	1.7119	0.0168
53	1.7286	0.0166
54	1.7451	0.0165
55	1.7614	0.0163
56	1.7776	0.0162
57	1.7937	0.0161
58	1.8096	0.0159
59	1.8254	0.0158
60	1.8410	0.0157
61	1.8566	0.0155
62	1.8720	0.0154
63	1.8873	0.0153
64	1.9024	0.0152
65	1.9175	0.0150
66	1.9324	0.0149
67	1.9472	0.0148
68	1.9619	0.0147
69	1.9765	0.0146
70	1.9910	0.0145
71	2.0054	0.0144
72	2.0197	0.0143
73	2.0320	0.0123
74	2.0442	0.0122
75	2.0562	0.0121
76	2.0682	0.0120
77	2.0801	0.0119
78	2.0919	0.0118
79	2.1036	0.0117
80	2.1153	0.0116
81	2.1268	0.0116
82	2.1383	0.0115
83	2.1497	0.0114
84	2.1610	0.0113
85	2.1723	0.0112
86	2.1834	0.0112
87	2.1945	0.0111
88	2.2056	0.0110
89	2.2165	0.0110
90	2.2274	0.0109
91	2.2382	0.0108
92	2.2490	0.0108
93	2.2597	0.0107
94	2.2703	0.0106
95	2.2809	0.0106
96	2.2914	0.0105
97	2.3018	0.0104
98	2.3122	0.0104
99	2.3225	0.0103
100	2.3328	0.0103
101	2.3430	0.0102
102	2.3531	0.0101
103	2.3632	0.0101
104	2.3732	0.0100
105	2.3832	0.0100

106	2.3931	0.0099
107	2.4030	0.0099
108	2.4128	0.0098
109	2.4226	0.0098
110	2.4323	0.0097
111	2.4420	0.0097
112	2.4516	0.0096
113	2.4612	0.0096
114	2.4707	0.0095
115	2.4802	0.0095
116	2.4897	0.0094
117	2.4990	0.0094
118	2.5084	0.0093
119	2.5177	0.0093
120	2.5270	0.0093
121	2.5362	0.0092
122	2.5453	0.0092
123	2.5545	0.0091
124	2.5636	0.0091
125	2.5726	0.0090
126	2.5816	0.0090
127	2.5906	0.0090
128	2.5995	0.0089
129	2.6084	0.0089
130	2.6172	0.0088
131	2.6260	0.0088
132	2.6348	0.0088
133	2.6436	0.0087
134	2.6523	0.0087
135	2.6609	0.0087
136	2.6695	0.0086
137	2.6781	0.0086
138	2.6867	0.0086
139	2.6952	0.0085
140	2.7037	0.0085
141	2.7122	0.0085
142	2.7206	0.0084
143	2.7290	0.0084
144	2.7373	0.0084
145	2.7456	0.0083
146	2.7539	0.0083
147	2.7622	0.0083
148	2.7704	0.0082
149	2.7786	0.0082
150	2.7868	0.0082
151	2.7949	0.0081
152	2.8030	0.0081
153	2.8111	0.0081
154	2.8191	0.0080
155	2.8271	0.0080
156	2.8351	0.0080
157	2.8431	0.0080
158	2.8510	0.0079
159	2.8589	0.0079
160	2.8668	0.0079
161	2.8746	0.0078
162	2.8824	0.0078

163	2.8902	0.0078
164	2.8980	0.0078
165	2.9057	0.0077
166	2.9134	0.0077
167	2.9211	0.0077
168	2.9288	0.0077
169	2.9364	0.0076
170	2.9440	0.0076
171	2.9516	0.0076
172	2.9592	0.0076
173	2.9667	0.0075
174	2.9742	0.0075
175	2.9817	0.0075
176	2.9891	0.0075
177	2.9966	0.0074
178	3.0040	0.0074
179	3.0114	0.0074
180	3.0188	0.0074
181	3.0261	0.0073
182	3.0334	0.0073
183	3.0407	0.0073
184	3.0480	0.0073
185	3.0553	0.0073
186	3.0625	0.0072
187	3.0697	0.0072
188	3.0769	0.0072
189	3.0840	0.0072
190	3.0912	0.0071
191	3.0983	0.0071
192	3.1054	0.0071
193	3.1125	0.0071
194	3.1196	0.0071
195	3.1266	0.0070
196	3.1336	0.0070
197	3.1406	0.0070
198	3.1476	0.0070
199	3.1546	0.0070
200	3.1615	0.0069
201	3.1684	0.0069
202	3.1754	0.0069
203	3.1822	0.0069
204	3.1891	0.0069
205	3.1959	0.0068
206	3.2028	0.0068
207	3.2096	0.0068
208	3.2164	0.0068
209	3.2232	0.0068
210	3.2299	0.0068
211	3.2366	0.0067
212	3.2434	0.0067
213	3.2501	0.0067
214	3.2567	0.0067
215	3.2634	0.0067
216	3.2701	0.0066
217	3.2767	0.0066
218	3.2833	0.0066
219	3.2899	0.0066

220	3.2965	0.0066
221	3.3030	0.0066
222	3.3096	0.0065
223	3.3161	0.0065
224	3.3226	0.0065
225	3.3291	0.0065
226	3.3356	0.0065
227	3.3421	0.0065
228	3.3485	0.0064
229	3.3550	0.0064
230	3.3614	0.0064
231	3.3678	0.0064
232	3.3742	0.0064
233	3.3805	0.0064
234	3.3869	0.0064
235	3.3932	0.0063
236	3.3996	0.0063
237	3.4059	0.0063
238	3.4122	0.0063
239	3.4184	0.0063
240	3.4247	0.0063
241	3.4310	0.0063
242	3.4372	0.0062
243	3.4434	0.0062
244	3.4496	0.0062
245	3.4558	0.0062
246	3.4620	0.0062
247	3.4682	0.0062
248	3.4743	0.0062
249	3.4805	0.0061
250	3.4866	0.0061
251	3.4927	0.0061
252	3.4988	0.0061
253	3.5049	0.0061
254	3.5109	0.0061
255	3.5170	0.0061
256	3.5230	0.0060
257	3.5291	0.0060
258	3.5351	0.0060
259	3.5411	0.0060
260	3.5471	0.0060
261	3.5531	0.0060
262	3.5590	0.0060
263	3.5650	0.0060
264	3.5709	0.0059
265	3.5768	0.0059
266	3.5827	0.0059
267	3.5886	0.0059
268	3.5945	0.0059
269	3.6004	0.0059
270	3.6063	0.0059
271	3.6121	0.0059
272	3.6180	0.0058
273	3.6238	0.0058
274	3.6296	0.0058
275	3.6354	0.0058
276	3.6412	0.0058

277	3.6470	0.0058
278	3.6528	0.0058
279	3.6585	0.0058
280	3.6643	0.0057
281	3.6700	0.0057
282	3.6757	0.0057
283	3.6814	0.0057
284	3.6871	0.0057
285	3.6928	0.0057
286	3.6985	0.0057
287	3.7042	0.0057
288	3.7098	0.0057

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0057	0.0046	0.0010
2	0.0057	0.0046	0.0010
3	0.0057	0.0046	0.0011
4	0.0057	0.0046	0.0011
5	0.0057	0.0047	0.0011
6	0.0057	0.0047	0.0011
7	0.0058	0.0047	0.0011
8	0.0058	0.0047	0.0011
9	0.0058	0.0047	0.0011
10	0.0058	0.0047	0.0011
11	0.0058	0.0047	0.0011
12	0.0058	0.0048	0.0011
13	0.0059	0.0048	0.0011
14	0.0059	0.0048	0.0011
15	0.0059	0.0048	0.0011
16	0.0059	0.0048	0.0011
17	0.0059	0.0048	0.0011
18	0.0060	0.0048	0.0011
19	0.0060	0.0049	0.0011
20	0.0060	0.0049	0.0011
21	0.0060	0.0049	0.0011
22	0.0060	0.0049	0.0011
23	0.0061	0.0049	0.0011
24	0.0061	0.0049	0.0011
25	0.0061	0.0050	0.0011
26	0.0061	0.0050	0.0011
27	0.0061	0.0050	0.0011
28	0.0062	0.0050	0.0011
29	0.0062	0.0050	0.0011
30	0.0062	0.0050	0.0011
31	0.0062	0.0051	0.0012
32	0.0062	0.0051	0.0012
33	0.0063	0.0051	0.0012
34	0.0063	0.0051	0.0012
35	0.0063	0.0051	0.0012
36	0.0063	0.0052	0.0012
37	0.0064	0.0052	0.0012
38	0.0064	0.0052	0.0012
39	0.0064	0.0052	0.0012
40	0.0064	0.0052	0.0012

41	0.0064	0.0053	0.0012
42	0.0065	0.0053	0.0012
43	0.0065	0.0053	0.0012
44	0.0065	0.0053	0.0012
45	0.0065	0.0053	0.0012
46	0.0066	0.0053	0.0012
47	0.0066	0.0054	0.0012
48	0.0066	0.0054	0.0012
49	0.0066	0.0054	0.0012
50	0.0067	0.0054	0.0012
51	0.0067	0.0055	0.0012
52	0.0067	0.0055	0.0012
53	0.0068	0.0055	0.0013
54	0.0068	0.0055	0.0013
55	0.0068	0.0055	0.0013
56	0.0068	0.0056	0.0013
57	0.0069	0.0056	0.0013
58	0.0069	0.0056	0.0013
59	0.0069	0.0056	0.0013
60	0.0069	0.0057	0.0013
61	0.0070	0.0057	0.0013
62	0.0070	0.0057	0.0013
63	0.0070	0.0057	0.0013
64	0.0071	0.0058	0.0013
65	0.0071	0.0058	0.0013
66	0.0071	0.0058	0.0013
67	0.0072	0.0058	0.0013
68	0.0072	0.0059	0.0013
69	0.0072	0.0059	0.0013
70	0.0073	0.0059	0.0013
71	0.0073	0.0059	0.0014
72	0.0073	0.0060	0.0014
73	0.0074	0.0060	0.0014
74	0.0074	0.0060	0.0014
75	0.0074	0.0061	0.0014
76	0.0075	0.0061	0.0014
77	0.0075	0.0061	0.0014
78	0.0075	0.0061	0.0014
79	0.0076	0.0062	0.0014
80	0.0076	0.0062	0.0014
81	0.0077	0.0062	0.0014
82	0.0077	0.0063	0.0014
83	0.0077	0.0063	0.0014
84	0.0078	0.0063	0.0014
85	0.0078	0.0064	0.0014
86	0.0078	0.0064	0.0015
87	0.0079	0.0064	0.0015
88	0.0079	0.0065	0.0015
89	0.0080	0.0065	0.0015
90	0.0080	0.0065	0.0015
91	0.0081	0.0066	0.0015
92	0.0081	0.0066	0.0015
93	0.0082	0.0067	0.0015
94	0.0082	0.0067	0.0015
95	0.0083	0.0067	0.0015
96	0.0083	0.0068	0.0015
97	0.0084	0.0068	0.0015

98	0.0084	0.0068	0.0016
99	0.0085	0.0069	0.0016
100	0.0085	0.0069	0.0016
101	0.0086	0.0070	0.0016
102	0.0086	0.0070	0.0016
103	0.0087	0.0071	0.0016
104	0.0087	0.0071	0.0016
105	0.0088	0.0071	0.0016
106	0.0088	0.0072	0.0016
107	0.0089	0.0072	0.0016
108	0.0089	0.0073	0.0017
109	0.0090	0.0073	0.0017
110	0.0090	0.0074	0.0017
111	0.0091	0.0074	0.0017
112	0.0092	0.0075	0.0017
113	0.0093	0.0075	0.0017
114	0.0093	0.0076	0.0017
115	0.0094	0.0077	0.0017
116	0.0094	0.0077	0.0017
117	0.0095	0.0078	0.0018
118	0.0096	0.0078	0.0018
119	0.0097	0.0079	0.0018
120	0.0097	0.0079	0.0018
121	0.0098	0.0080	0.0018
122	0.0099	0.0080	0.0018
123	0.0100	0.0081	0.0018
124	0.0100	0.0082	0.0019
125	0.0101	0.0083	0.0019
126	0.0102	0.0083	0.0019
127	0.0103	0.0084	0.0019
128	0.0104	0.0085	0.0019
129	0.0105	0.0086	0.0019
130	0.0106	0.0086	0.0020
131	0.0107	0.0087	0.0020
132	0.0108	0.0088	0.0020
133	0.0109	0.0089	0.0020
134	0.0110	0.0089	0.0020
135	0.0111	0.0090	0.0021
136	0.0112	0.0091	0.0021
137	0.0113	0.0092	0.0021
138	0.0114	0.0093	0.0021
139	0.0116	0.0094	0.0021
140	0.0116	0.0095	0.0022
141	0.0118	0.0096	0.0022
142	0.0119	0.0097	0.0022
143	0.0121	0.0098	0.0022
144	0.0122	0.0099	0.0023
145	0.0143	0.0117	0.0026
146	0.0144	0.0117	0.0027
147	0.0146	0.0119	0.0027
148	0.0147	0.0120	0.0027
149	0.0149	0.0122	0.0028
150	0.0150	0.0123	0.0028
151	0.0153	0.0125	0.0028
152	0.0154	0.0126	0.0029
153	0.0157	0.0128	0.0029
154	0.0158	0.0129	0.0029

155	0.0161	0.0131	0.0030
156	0.0162	0.0132	0.0030
157	0.0165	0.0134	0.0031
158	0.0166	0.0136	0.0031
159	0.0170	0.0138	0.0031
160	0.0171	0.0140	0.0032
161	0.0175	0.0143	0.0032
162	0.0177	0.0144	0.0033
163	0.0181	0.0147	0.0033
164	0.0183	0.0149	0.0034
165	0.0187	0.0152	0.0035
166	0.0189	0.0154	0.0035
167	0.0194	0.0158	0.0036
168	0.0196	0.0160	0.0036
169	0.0202	0.0165	0.0037
170	0.0205	0.0167	0.0038
171	0.0211	0.0172	0.0039
172	0.0215	0.0175	0.0040
173	0.0222	0.0181	0.0041
174	0.0225	0.0184	0.0042
175	0.0234	0.0190	0.0043
176	0.0238	0.0194	0.0044
177	0.0248	0.0202	0.0046
178	0.0253	0.0206	0.0047
179	0.0265	0.0216	0.0049
180	0.0272	0.0221	0.0050
181	0.0286	0.0233	0.0053
182	0.0295	0.0240	0.0055
183	0.0314	0.0256	0.0058
184	0.0325	0.0265	0.0060
185	0.0278	0.0226	0.0051
186	0.0293	0.0239	0.0054
187	0.0333	0.0271	0.0062
188	0.0359	0.0292	0.0066
189	0.0433	0.0352	0.0080
190	0.0488	0.0398	0.0090
191	0.0698	0.0569	0.0129
192	0.0960	0.0652	0.0308
193	0.3003	0.0652	0.2351
194	0.0568	0.0463	0.0105
195	0.0391	0.0319	0.0072
196	0.0311	0.0254	0.0058
197	0.0338	0.0275	0.0063
198	0.0304	0.0248	0.0056
199	0.0279	0.0227	0.0052
200	0.0259	0.0211	0.0048
201	0.0243	0.0198	0.0045
202	0.0229	0.0187	0.0042
203	0.0218	0.0178	0.0040
204	0.0208	0.0170	0.0039
205	0.0199	0.0162	0.0037
206	0.0192	0.0156	0.0035
207	0.0185	0.0151	0.0034
208	0.0179	0.0146	0.0033
209	0.0173	0.0141	0.0032
210	0.0168	0.0137	0.0031
211	0.0163	0.0133	0.0030

212	0.0159	0.0130	0.0029
213	0.0155	0.0127	0.0029
214	0.0152	0.0124	0.0028
215	0.0148	0.0121	0.0027
216	0.0145	0.0118	0.0027
217	0.0123	0.0100	0.0023
218	0.0120	0.0098	0.0022
219	0.0117	0.0096	0.0022
220	0.0115	0.0094	0.0021
221	0.0112	0.0092	0.0021
222	0.0110	0.0090	0.0020
223	0.0108	0.0088	0.0020
224	0.0106	0.0087	0.0020
225	0.0104	0.0085	0.0019
226	0.0103	0.0084	0.0019
227	0.0101	0.0082	0.0019
228	0.0099	0.0081	0.0018
229	0.0098	0.0080	0.0018
230	0.0096	0.0078	0.0018
231	0.0095	0.0077	0.0018
232	0.0093	0.0076	0.0017
233	0.0092	0.0075	0.0017
234	0.0091	0.0074	0.0017
235	0.0090	0.0073	0.0017
236	0.0088	0.0072	0.0016
237	0.0087	0.0071	0.0016
238	0.0086	0.0070	0.0016
239	0.0085	0.0069	0.0016
240	0.0084	0.0069	0.0016
241	0.0083	0.0068	0.0015
242	0.0082	0.0067	0.0015
243	0.0081	0.0066	0.0015
244	0.0080	0.0066	0.0015
245	0.0080	0.0065	0.0015
246	0.0079	0.0064	0.0015
247	0.0078	0.0063	0.0014
248	0.0077	0.0063	0.0014
249	0.0076	0.0062	0.0014
250	0.0076	0.0062	0.0014
251	0.0075	0.0061	0.0014
252	0.0074	0.0060	0.0014
253	0.0073	0.0060	0.0014
254	0.0073	0.0059	0.0013
255	0.0072	0.0059	0.0013
256	0.0071	0.0058	0.0013
257	0.0071	0.0058	0.0013
258	0.0070	0.0057	0.0013
259	0.0070	0.0057	0.0013
260	0.0069	0.0056	0.0013
261	0.0068	0.0056	0.0013
262	0.0068	0.0055	0.0013
263	0.0067	0.0055	0.0012
264	0.0067	0.0054	0.0012
265	0.0066	0.0054	0.0012
266	0.0066	0.0054	0.0012
267	0.0065	0.0053	0.0012
268	0.0065	0.0053	0.0012

269	0.0064	0.0052	0.0012
270	0.0064	0.0052	0.0012
271	0.0063	0.0052	0.0012
272	0.0063	0.0051	0.0012
273	0.0063	0.0051	0.0012
274	0.0062	0.0051	0.0011
275	0.0062	0.0050	0.0011
276	0.0061	0.0050	0.0011
277	0.0061	0.0050	0.0011
278	0.0060	0.0049	0.0011
279	0.0060	0.0049	0.0011
280	0.0060	0.0049	0.0011
281	0.0059	0.0048	0.0011
282	0.0059	0.0048	0.0011
283	0.0059	0.0048	0.0011
284	0.0058	0.0047	0.0011
285	0.0058	0.0047	0.0011
286	0.0057	0.0047	0.0011
287	0.0057	0.0047	0.0011
288	0.0057	0.0046	0.0011

Total soil rain loss = 2.83(In)
Total effective rainfall = 0.88(In)
Peak flow rate in flood hydrograph = 33.52(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

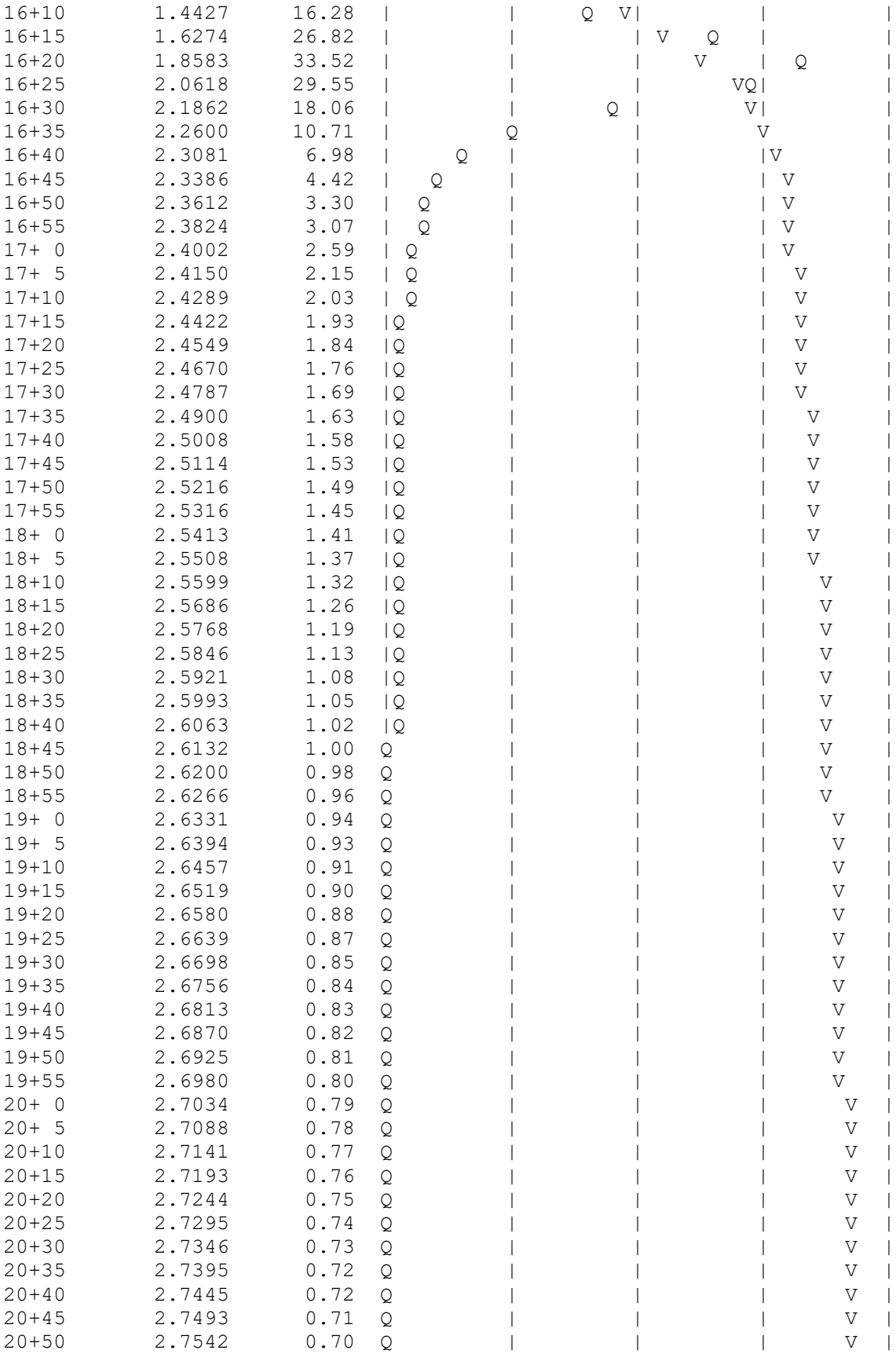
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0001	0.01	Q	|	|	|	|
0+10	0.0004	0.06	Q	|	|	|	|
0+15	0.0015	0.15	Q	|	|	|	|
0+20	0.0033	0.27	Q	|	|	|	|
0+25	0.0059	0.38	Q	|	|	|	|
0+30	0.0090	0.44	Q	|	|	|	|
0+35	0.0123	0.48	Q	|	|	|	|
0+40	0.0157	0.50	Q	|	|	|	|
0+45	0.0192	0.50	Q	|	|	|	|
0+50	0.0227	0.51	Q	|	|	|	|
0+55	0.0262	0.51	Q	|	|	|	|
1+ 0	0.0298	0.52	Q	|	|	|	|
1+ 5	0.0334	0.52	Q	|	|	|	|
1+10	0.0369	0.52	Q	|	|	|	|
1+15	0.0405	0.52	Q	|	|	|	|
1+20	0.0441	0.52	Q	|	|	|	|
1+25	0.0477	0.52	Q	|	|	|	|
1+30	0.0514	0.53	Q	|	|	|	|
1+35	0.0550	0.53	Q	|	|	|	|
1+40	0.0586	0.53	Q	|	|	|	|
1+45	0.0623	0.53	Q	|	|	|	|
1+50	0.0660	0.53	Q	|	|	|	|

1+55	0.0696	0.53	Q	|	|	|	|
2+ 0	0.0733	0.54	QV	|	|	|	|
2+ 5	0.0770	0.54	QV	|	|	|	|
2+10	0.0808	0.54	QV	|	|	|	|
2+15	0.0845	0.54	QV	|	|	|	|
2+20	0.0882	0.54	QV	|	|	|	|
2+25	0.0920	0.55	QV	|	|	|	|
2+30	0.0957	0.55	QV	|	|	|	|
2+35	0.0995	0.55	QV	|	|	|	|
2+40	0.1033	0.55	QV	|	|	|	|
2+45	0.1071	0.55	QV	|	|	|	|
2+50	0.1109	0.55	QV	|	|	|	|
2+55	0.1148	0.56	QV	|	|	|	|
3+ 0	0.1186	0.56	QV	|	|	|	|
3+ 5	0.1225	0.56	QV	|	|	|	|
3+10	0.1264	0.56	QV	|	|	|	|
3+15	0.1302	0.56	QV	|	|	|	|
3+20	0.1341	0.57	QV	|	|	|	|
3+25	0.1381	0.57	QV	|	|	|	|
3+30	0.1420	0.57	QV	|	|	|	|
3+35	0.1459	0.57	QV	|	|	|	|
3+40	0.1499	0.57	Q V	|	|	|	|
3+45	0.1539	0.58	Q V	|	|	|	|
3+50	0.1578	0.58	Q V	|	|	|	|
3+55	0.1618	0.58	Q V	|	|	|	|
4+ 0	0.1659	0.58	Q V	|	|	|	|
4+ 5	0.1699	0.59	Q V	|	|	|	|
4+10	0.1739	0.59	Q V	|	|	|	|
4+15	0.1780	0.59	Q V	|	|	|	|
4+20	0.1821	0.59	Q V	|	|	|	|
4+25	0.1862	0.59	Q V	|	|	|	|
4+30	0.1903	0.60	Q V	|	|	|	|
4+35	0.1944	0.60	Q V	|	|	|	|
4+40	0.1986	0.60	Q V	|	|	|	|
4+45	0.2027	0.60	Q V	|	|	|	|
4+50	0.2069	0.61	Q V	|	|	|	|
4+55	0.2111	0.61	Q V	|	|	|	|
5+ 0	0.2153	0.61	Q V	|	|	|	|
5+ 5	0.2195	0.61	Q V	|	|	|	|
5+10	0.2238	0.62	Q V	|	|	|	|
5+15	0.2281	0.62	Q V	|	|	|	|
5+20	0.2323	0.62	Q V	|	|	|	|
5+25	0.2366	0.62	Q V	|	|	|	|
5+30	0.2410	0.63	Q V	|	|	|	|
5+35	0.2453	0.63	Q V	|	|	|	|
5+40	0.2497	0.63	Q V	|	|	|	|
5+45	0.2540	0.64	Q V	|	|	|	|
5+50	0.2584	0.64	Q V	|	|	|	|
5+55	0.2628	0.64	Q V	|	|	|	|
6+ 0	0.2673	0.64	Q V	|	|	|	|
6+ 5	0.2717	0.65	Q V	|	|	|	|
6+10	0.2762	0.65	Q V	|	|	|	|
6+15	0.2807	0.65	Q V	|	|	|	|
6+20	0.2852	0.66	Q V	|	|	|	|
6+25	0.2898	0.66	Q V	|	|	|	|
6+30	0.2943	0.66	Q V	|	|	|	|
6+35	0.2989	0.67	Q V	|	|	|	|

6+40	0.3035	0.67	Q	V				
6+45	0.3081	0.67	Q	V				
6+50	0.3128	0.68	Q	V				
6+55	0.3175	0.68	Q	V				
7+ 0	0.3222	0.68	Q	V				
7+ 5	0.3269	0.69	Q	V				
7+10	0.3316	0.69	Q	V				
7+15	0.3364	0.69	Q	V				
7+20	0.3412	0.70	Q	V				
7+25	0.3460	0.70	Q	V				
7+30	0.3508	0.70	Q	V				
7+35	0.3557	0.71	Q	V				
7+40	0.3606	0.71	Q	V				
7+45	0.3655	0.71	Q	V				
7+50	0.3705	0.72	Q	V				
7+55	0.3755	0.72	Q	V				
8+ 0	0.3805	0.73	Q	V				
8+ 5	0.3855	0.73	Q	V				
8+10	0.3905	0.73	Q	V				
8+15	0.3956	0.74	Q	V				
8+20	0.4008	0.74	Q	V				
8+25	0.4059	0.75	Q	V				
8+30	0.4111	0.75	Q	V				
8+35	0.4163	0.76	Q	V				
8+40	0.4215	0.76	Q	V				
8+45	0.4268	0.77	Q	V				
8+50	0.4321	0.77	Q	V				
8+55	0.4375	0.78	Q	V				
9+ 0	0.4428	0.78	Q	V				
9+ 5	0.4482	0.79	Q	V				
9+10	0.4537	0.79	Q	V				
9+15	0.4592	0.80	Q	V				
9+20	0.4647	0.80	Q	V				
9+25	0.4702	0.81	Q	V				
9+30	0.4758	0.81	Q	V				
9+35	0.4815	0.82	Q	V				
9+40	0.4871	0.82	Q	V				
9+45	0.4928	0.83	Q	V				
9+50	0.4986	0.83	Q	V				
9+55	0.5044	0.84	Q	V				
10+ 0	0.5102	0.85	Q	V				
10+ 5	0.5161	0.85	Q	V				
10+10	0.5220	0.86	Q	V				
10+15	0.5280	0.87	Q	V				
10+20	0.5340	0.87	Q	V				
10+25	0.5400	0.88	Q	V				
10+30	0.5462	0.89	Q	V				
10+35	0.5523	0.89	Q	V				
10+40	0.5585	0.90	Q	V				
10+45	0.5648	0.91	Q	V				
10+50	0.5711	0.92	Q	V				
10+55	0.5775	0.92	Q	V				
11+ 0	0.5839	0.93	Q	V				
11+ 5	0.5904	0.94	Q	V				
11+10	0.5969	0.95	Q	V				
11+15	0.6035	0.96	Q	V				
11+20	0.6101	0.97	Q	V				

11+25	0.6169	0.98	Q	V |	|	|	|
11+30	0.6237	0.99	Q	V |	|	|	|
11+35	0.6305	0.99	Q	V |	|	|	|
11+40	0.6374	1.00	|Q	V |	|	|	|
11+45	0.6444	1.01	|Q	V |	|	|	|
11+50	0.6515	1.03	|Q	V |	|	|	|
11+55	0.6586	1.04	|Q	V|	|	|	|
12+ 0	0.6658	1.05	|Q	V|	|	|	|
12+ 5	0.6731	1.06	|Q	V|	|	|	|
12+10	0.6806	1.09	|Q	V|	|	|	|
12+15	0.6884	1.13	|Q	V|	|	|	|
12+20	0.6966	1.19	|Q	V|	|	|	|
12+25	0.7052	1.24	|Q	V|	|	|	|
12+30	0.7139	1.27	|Q	V|	|	|	|
12+35	0.7229	1.30	|Q	V|	|	|	|
12+40	0.7320	1.32	|Q	V	|	|	|
12+45	0.7412	1.34	|Q	V	|	|	|
12+50	0.7505	1.35	|Q	V	|	|	|
12+55	0.7599	1.37	|Q	V	|	|	|
13+ 0	0.7695	1.39	|Q	V	|	|	|
13+ 5	0.7792	1.40	|Q	V	|	|	|
13+10	0.7890	1.42	|Q	V	|	|	|
13+15	0.7989	1.44	|Q	V	|	|	|
13+20	0.8090	1.46	|Q	|V	|	|	|
13+25	0.8192	1.48	|Q	|V	|	|	|
13+30	0.8295	1.50	|Q	|V	|	|	|
13+35	0.8400	1.52	|Q	|V	|	|	|
13+40	0.8507	1.55	|Q	|V	|	|	|
13+45	0.8615	1.57	|Q	|V	|	|	|
13+50	0.8725	1.60	|Q	|V	|	|	|
13+55	0.8837	1.62	|Q	| V	|	|	|
14+ 0	0.8950	1.65	|Q	| V	|	|	|
14+ 5	0.9066	1.68	|Q	| V	|	|	|
14+10	0.9184	1.71	|Q	| V	|	|	|
14+15	0.9304	1.75	|Q	| V	|	|	|
14+20	0.9427	1.78	|Q	| V	|	|	|
14+25	0.9553	1.82	|Q	| V	|	|	|
14+30	0.9681	1.86	|Q	| V	|	|	|
14+35	0.9812	1.91	|Q	| V	|	|	|
14+40	0.9946	1.95	|Q	| V	|	|	|
14+45	1.0084	2.00	| Q	| V	|	|	|
14+50	1.0226	2.05	| Q	| V	|	|	|
14+55	1.0371	2.11	| Q	| V	|	|	|
15+ 0	1.0521	2.18	| Q	| V	|	|	|
15+ 5	1.0676	2.25	| Q	| V	|	|	|
15+10	1.0836	2.32	| Q	| V	|	|	|
15+15	1.1001	2.41	| Q	| V	|	|	|
15+20	1.1174	2.50	| Q	| V	|	|	|
15+25	1.1353	2.60	| Q	| V	|	|	|
15+30	1.1537	2.67	| Q	| V	|	|	|
15+35	1.1722	2.69	| Q	| V	|	|	|
15+40	1.1908	2.71	| Q	| V	|	|	|
15+45	1.2099	2.77	| Q	| V	|	|	|
15+50	1.2303	2.96	| Q	| V	|	|	|
15+55	1.2530	3.29	| Q	| V	|	|	|
16+ 0	1.2803	3.97	| Q	| V	|	|	|
16+ 5	1.3306	7.29	| Q	| V	|	|	|



20+55	2.7589	0.69	Q	|	|	|	V |
21+ 0	2.7637	0.69	Q	|	|	|	V |
21+ 5	2.7683	0.68	Q	|	|	|	V |
21+10	2.7730	0.67	Q	|	|	|	V |
21+15	2.7776	0.67	Q	|	|	|	V |
21+20	2.7821	0.66	Q	|	|	|	V |
21+25	2.7866	0.65	Q	|	|	|	V |
21+30	2.7911	0.65	Q	|	|	|	V |
21+35	2.7955	0.64	Q	|	|	|	V |
21+40	2.7999	0.64	Q	|	|	|	V |
21+45	2.8042	0.63	Q	|	|	|	V |
21+50	2.8085	0.63	Q	|	|	|	V |
21+55	2.8128	0.62	Q	|	|	|	V |
22+ 0	2.8170	0.61	Q	|	|	|	V |
22+ 5	2.8212	0.61	Q	|	|	|	V |
22+10	2.8254	0.60	Q	|	|	|	V |
22+15	2.8295	0.60	Q	|	|	|	V |
22+20	2.8336	0.60	Q	|	|	|	V |
22+25	2.8377	0.59	Q	|	|	|	V |
22+30	2.8417	0.59	Q	|	|	|	V |
22+35	2.8457	0.58	Q	|	|	|	V |
22+40	2.8497	0.58	Q	|	|	|	V|
22+45	2.8536	0.57	Q	|	|	|	V|
22+50	2.8575	0.57	Q	|	|	|	V|
22+55	2.8614	0.56	Q	|	|	|	V|
23+ 0	2.8653	0.56	Q	|	|	|	V|
23+ 5	2.8691	0.56	Q	|	|	|	V|
23+10	2.8729	0.55	Q	|	|	|	V|
23+15	2.8767	0.55	Q	|	|	|	V|
23+20	2.8805	0.55	Q	|	|	|	V|
23+25	2.8842	0.54	Q	|	|	|	V|
23+30	2.8879	0.54	Q	|	|	|	V|
23+35	2.8916	0.53	Q	|	|	|	V|
23+40	2.8952	0.53	Q	|	|	|	V|
23+45	2.8989	0.53	Q	|	|	|	V|
23+50	2.9025	0.52	Q	|	|	|	V|
23+55	2.9061	0.52	Q	|	|	|	V|
24+ 0	2.9097	0.52	Q	|	|	|	V|
24+ 5	2.9131	0.51	Q	|	|	|	V|
24+10	2.9163	0.46	Q	|	|	|	V|
24+15	2.9188	0.36	Q	|	|	|	V|
24+20	2.9204	0.24	Q	|	|	|	V|
24+25	2.9213	0.13	Q	|	|	|	V|
24+30	2.9217	0.06	Q	|	|	|	V|
24+35	2.9219	0.03	Q	|	|	|	V|
24+40	2.9220	0.01	Q	|	|	|	V|
24+45	2.9221	0.01	Q	|	|	|	V|
24+50	2.9221	0.00	Q	|	|	|	V|
24+55	2.9221	0.00	Q	|	|	|	V|

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

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Study date 04/20/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION
10-YEAR STORM EVENT ANALYSIS WITH ADJUSTED 5 YEAR RAINFALL DATA

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		
40.02	1	0.68
Rainfall data for year 10		
40.02	6	1.71
Rainfall data for year 10		
40.02	24	3.13

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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)
32.0	32.0	40.02	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
32.02	0.800	32.0	32.0	15.65	0.000
8.00	0.200	98.0	98.0	0.20	0.926

Area-averaged catchment yield fraction, Y = 0.185
Area-averaged low loss fraction, Yb = 0.815
User entry of time of concentration = 0.351 (hours)
++
Watershed area = 40.02(Ac.)
Catchment Lag time = 0.281 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 29.7084
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.815 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.252(In)
Computed peak 30-minute rainfall = 0.515(In)
Specified peak 1-hour rainfall = 0.680(In)
Computed peak 3-hour rainfall = 1.197(In)
Specified peak 6-hour rainfall = 1.710(In)
Specified peak 24-hour rainfall = 3.130(In)

Rainfall depth area reduction factors:
Using a total area of 40.02(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.251(In)
30-minute factor = 0.998 Adjusted rainfall = 0.514(In)
1-hour factor = 0.998 Adjusted rainfall = 0.679(In)
3-hour factor = 1.000 Adjusted rainfall = 1.197(In)
6-hour factor = 1.000 Adjusted rainfall = 1.710(In)
24-hour factor = 1.000 Adjusted rainfall = 3.130(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 = 483.99 (CFS))		
1	1.920	9.290
2	10.873	43.335
3	28.740	86.472
4	53.102	117.913
5	74.988	105.925
6	87.306	59.618
7	93.602	30.471

8	96.993	16.414
9	98.344	6.540
10	98.880	2.594
11	99.415	2.588
12	100.000	1.294

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.2512	0.2512
2	0.3315	0.0803
3	0.3898	0.0584
4	0.4374	0.0475
5	0.4782	0.0408
6	0.5144	0.0362
7	0.5471	0.0327
8	0.5771	0.0300
9	0.6049	0.0278
10	0.6310	0.0260
11	0.6555	0.0245
12	0.6787	0.0232
13	0.7074	0.0286
14	0.7349	0.0276
15	0.7616	0.0266
16	0.7874	0.0258
17	0.8124	0.0250
18	0.8367	0.0243
19	0.8604	0.0237
20	0.8835	0.0231
21	0.9060	0.0225
22	0.9280	0.0220
23	0.9496	0.0215
24	0.9707	0.0211
25	0.9913	0.0207
26	1.0116	0.0203
27	1.0315	0.0199
28	1.0511	0.0195
29	1.0703	0.0192
30	1.0892	0.0189
31	1.1078	0.0186
32	1.1261	0.0183
33	1.1441	0.0180
34	1.1619	0.0178
35	1.1794	0.0175
36	1.1966	0.0173
37	1.2136	0.0170
38	1.2304	0.0168
39	1.2470	0.0166
40	1.2633	0.0164
41	1.2795	0.0162
42	1.2955	0.0160
43	1.3113	0.0158
44	1.3269	0.0156
45	1.3423	0.0154
46	1.3576	0.0153
47	1.3727	0.0151
48	1.3877	0.0150
49	1.4025	0.0148

50	1.4171	0.0147
51	1.4317	0.0145
52	1.4460	0.0144
53	1.4603	0.0143
54	1.4744	0.0141
55	1.4884	0.0140
56	1.5023	0.0139
57	1.5160	0.0138
58	1.5297	0.0136
59	1.5432	0.0135
60	1.5566	0.0134
61	1.5699	0.0133
62	1.5831	0.0132
63	1.5962	0.0131
64	1.6092	0.0130
65	1.6221	0.0129
66	1.6349	0.0128
67	1.6476	0.0127
68	1.6602	0.0126
69	1.6727	0.0125
70	1.6852	0.0124
71	1.6975	0.0124
72	1.7098	0.0123
73	1.7201	0.0103
74	1.7303	0.0102
75	1.7405	0.0102
76	1.7506	0.0101
77	1.7606	0.0100
78	1.7705	0.0099
79	1.7804	0.0099
80	1.7902	0.0098
81	1.7999	0.0097
82	1.8096	0.0097
83	1.8192	0.0096
84	1.8287	0.0095
85	1.8382	0.0095
86	1.8476	0.0094
87	1.8569	0.0093
88	1.8662	0.0093
89	1.8754	0.0092
90	1.8846	0.0092
91	1.8937	0.0091
92	1.9027	0.0090
93	1.9117	0.0090
94	1.9206	0.0089
95	1.9295	0.0089
96	1.9384	0.0088
97	1.9471	0.0088
98	1.9559	0.0087
99	1.9645	0.0087
100	1.9732	0.0086
101	1.9818	0.0086
102	1.9903	0.0085
103	1.9988	0.0085
104	2.0072	0.0084
105	2.0156	0.0084
106	2.0240	0.0083

107	2.0323	0.0083
108	2.0405	0.0083
109	2.0487	0.0082
110	2.0569	0.0082
111	2.0651	0.0081
112	2.0731	0.0081
113	2.0812	0.0081
114	2.0892	0.0080
115	2.0972	0.0080
116	2.1051	0.0079
117	2.1130	0.0079
118	2.1209	0.0079
119	2.1287	0.0078
120	2.1365	0.0078
121	2.1442	0.0077
122	2.1519	0.0077
123	2.1596	0.0077
124	2.1673	0.0076
125	2.1749	0.0076
126	2.1824	0.0076
127	2.1900	0.0075
128	2.1975	0.0075
129	2.2049	0.0075
130	2.2124	0.0074
131	2.2198	0.0074
132	2.2272	0.0074
133	2.2345	0.0073
134	2.2418	0.0073
135	2.2491	0.0073
136	2.2563	0.0073
137	2.2636	0.0072
138	2.2708	0.0072
139	2.2779	0.0072
140	2.2851	0.0071
141	2.2922	0.0071
142	2.2992	0.0071
143	2.3063	0.0070
144	2.3133	0.0070
145	2.3203	0.0070
146	2.3273	0.0070
147	2.3342	0.0069
148	2.3411	0.0069
149	2.3480	0.0069
150	2.3549	0.0069
151	2.3617	0.0068
152	2.3685	0.0068
153	2.3753	0.0068
154	2.3820	0.0068
155	2.3888	0.0067
156	2.3955	0.0067
157	2.4022	0.0067
158	2.4088	0.0067
159	2.4155	0.0066
160	2.4221	0.0066
161	2.4287	0.0066
162	2.4352	0.0066
163	2.4418	0.0065

164	2.4483	0.0065
165	2.4548	0.0065
166	2.4613	0.0065
167	2.4677	0.0065
168	2.4742	0.0064
169	2.4806	0.0064
170	2.4870	0.0064
171	2.4933	0.0064
172	2.4997	0.0063
173	2.5060	0.0063
174	2.5123	0.0063
175	2.5186	0.0063
176	2.5249	0.0063
177	2.5311	0.0062
178	2.5374	0.0062
179	2.5436	0.0062
180	2.5498	0.0062
181	2.5559	0.0062
182	2.5621	0.0061
183	2.5682	0.0061
184	2.5743	0.0061
185	2.5804	0.0061
186	2.5865	0.0061
187	2.5925	0.0061
188	2.5986	0.0060
189	2.6046	0.0060
190	2.6106	0.0060
191	2.6166	0.0060
192	2.6225	0.0060
193	2.6285	0.0059
194	2.6344	0.0059
195	2.6403	0.0059
196	2.6462	0.0059
197	2.6521	0.0059
198	2.6580	0.0059
199	2.6638	0.0058
200	2.6697	0.0058
201	2.6755	0.0058
202	2.6813	0.0058
203	2.6870	0.0058
204	2.6928	0.0058
205	2.6986	0.0057
206	2.7043	0.0057
207	2.7100	0.0057
208	2.7157	0.0057
209	2.7214	0.0057
210	2.7271	0.0057
211	2.7327	0.0057
212	2.7384	0.0056
213	2.7440	0.0056
214	2.7496	0.0056
215	2.7552	0.0056
216	2.7608	0.0056
217	2.7663	0.0056
218	2.7719	0.0056
219	2.7774	0.0055
220	2.7830	0.0055

221	2.7885	0.0055
222	2.7940	0.0055
223	2.7995	0.0055
224	2.8049	0.0055
225	2.8104	0.0055
226	2.8158	0.0054
227	2.8212	0.0054
228	2.8267	0.0054
229	2.8321	0.0054
230	2.8374	0.0054
231	2.8428	0.0054
232	2.8482	0.0054
233	2.8535	0.0053
234	2.8589	0.0053
235	2.8642	0.0053
236	2.8695	0.0053
237	2.8748	0.0053
238	2.8801	0.0053
239	2.8853	0.0053
240	2.8906	0.0053
241	2.8959	0.0052
242	2.9011	0.0052
243	2.9063	0.0052
244	2.9115	0.0052
245	2.9167	0.0052
246	2.9219	0.0052
247	2.9271	0.0052
248	2.9322	0.0052
249	2.9374	0.0052
250	2.9425	0.0051
251	2.9477	0.0051
252	2.9528	0.0051
253	2.9579	0.0051
254	2.9630	0.0051
255	2.9681	0.0051
256	2.9731	0.0051
257	2.9782	0.0051
258	2.9832	0.0050
259	2.9883	0.0050
260	2.9933	0.0050
261	2.9983	0.0050
262	3.0033	0.0050
263	3.0083	0.0050
264	3.0133	0.0050
265	3.0183	0.0050
266	3.0232	0.0050
267	3.0282	0.0050
268	3.0331	0.0049
269	3.0381	0.0049
270	3.0430	0.0049
271	3.0479	0.0049
272	3.0528	0.0049
273	3.0577	0.0049
274	3.0626	0.0049
275	3.0674	0.0049
276	3.0723	0.0049
277	3.0771	0.0048

278	3.0820	0.0048
279	3.0868	0.0048
280	3.0916	0.0048
281	3.0964	0.0048
282	3.1012	0.0048
283	3.1060	0.0048
284	3.1108	0.0048
285	3.1156	0.0048
286	3.1203	0.0048
287	3.1251	0.0048
288	3.1298	0.0047

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0047	0.0039	0.0009
2	0.0048	0.0039	0.0009
3	0.0048	0.0039	0.0009
4	0.0048	0.0039	0.0009
5	0.0048	0.0039	0.0009
6	0.0048	0.0039	0.0009
7	0.0048	0.0039	0.0009
8	0.0048	0.0039	0.0009
9	0.0049	0.0040	0.0009
10	0.0049	0.0040	0.0009
11	0.0049	0.0040	0.0009
12	0.0049	0.0040	0.0009
13	0.0049	0.0040	0.0009
14	0.0049	0.0040	0.0009
15	0.0050	0.0040	0.0009
16	0.0050	0.0040	0.0009
17	0.0050	0.0041	0.0009
18	0.0050	0.0041	0.0009
19	0.0050	0.0041	0.0009
20	0.0050	0.0041	0.0009
21	0.0050	0.0041	0.0009
22	0.0051	0.0041	0.0009
23	0.0051	0.0041	0.0009
24	0.0051	0.0042	0.0009
25	0.0051	0.0042	0.0009
26	0.0051	0.0042	0.0009
27	0.0052	0.0042	0.0010
28	0.0052	0.0042	0.0010
29	0.0052	0.0042	0.0010
30	0.0052	0.0042	0.0010
31	0.0052	0.0043	0.0010
32	0.0052	0.0043	0.0010
33	0.0053	0.0043	0.0010
34	0.0053	0.0043	0.0010
35	0.0053	0.0043	0.0010
36	0.0053	0.0043	0.0010
37	0.0053	0.0043	0.0010
38	0.0053	0.0044	0.0010
39	0.0054	0.0044	0.0010
40	0.0054	0.0044	0.0010
41	0.0054	0.0044	0.0010

42	0.0054	0.0044	0.0010
43	0.0055	0.0044	0.0010
44	0.0055	0.0045	0.0010
45	0.0055	0.0045	0.0010
46	0.0055	0.0045	0.0010
47	0.0055	0.0045	0.0010
48	0.0056	0.0045	0.0010
49	0.0056	0.0045	0.0010
50	0.0056	0.0046	0.0010
51	0.0056	0.0046	0.0010
52	0.0056	0.0046	0.0010
53	0.0057	0.0046	0.0011
54	0.0057	0.0046	0.0011
55	0.0057	0.0047	0.0011
56	0.0057	0.0047	0.0011
57	0.0058	0.0047	0.0011
58	0.0058	0.0047	0.0011
59	0.0058	0.0047	0.0011
60	0.0058	0.0048	0.0011
61	0.0059	0.0048	0.0011
62	0.0059	0.0048	0.0011
63	0.0059	0.0048	0.0011
64	0.0059	0.0048	0.0011
65	0.0060	0.0049	0.0011
66	0.0060	0.0049	0.0011
67	0.0060	0.0049	0.0011
68	0.0060	0.0049	0.0011
69	0.0061	0.0049	0.0011
70	0.0061	0.0050	0.0011
71	0.0061	0.0050	0.0011
72	0.0061	0.0050	0.0011
73	0.0062	0.0050	0.0011
74	0.0062	0.0051	0.0011
75	0.0062	0.0051	0.0012
76	0.0063	0.0051	0.0012
77	0.0063	0.0051	0.0012
78	0.0063	0.0052	0.0012
79	0.0064	0.0052	0.0012
80	0.0064	0.0052	0.0012
81	0.0064	0.0052	0.0012
82	0.0065	0.0053	0.0012
83	0.0065	0.0053	0.0012
84	0.0065	0.0053	0.0012
85	0.0066	0.0054	0.0012
86	0.0066	0.0054	0.0012
87	0.0066	0.0054	0.0012
88	0.0067	0.0054	0.0012
89	0.0067	0.0055	0.0012
90	0.0067	0.0055	0.0012
91	0.0068	0.0055	0.0013
92	0.0068	0.0055	0.0013
93	0.0069	0.0056	0.0013
94	0.0069	0.0056	0.0013
95	0.0069	0.0057	0.0013
96	0.0070	0.0057	0.0013
97	0.0070	0.0057	0.0013
98	0.0070	0.0057	0.0013

99	0.0071	0.0058	0.0013
100	0.0071	0.0058	0.0013
101	0.0072	0.0059	0.0013
102	0.0072	0.0059	0.0013
103	0.0073	0.0059	0.0013
104	0.0073	0.0060	0.0014
105	0.0074	0.0060	0.0014
106	0.0074	0.0060	0.0014
107	0.0075	0.0061	0.0014
108	0.0075	0.0061	0.0014
109	0.0076	0.0062	0.0014
110	0.0076	0.0062	0.0014
111	0.0077	0.0063	0.0014
112	0.0077	0.0063	0.0014
113	0.0078	0.0063	0.0014
114	0.0078	0.0064	0.0014
115	0.0079	0.0064	0.0015
116	0.0079	0.0065	0.0015
117	0.0080	0.0065	0.0015
118	0.0081	0.0066	0.0015
119	0.0081	0.0066	0.0015
120	0.0082	0.0067	0.0015
121	0.0083	0.0067	0.0015
122	0.0083	0.0068	0.0015
123	0.0084	0.0068	0.0016
124	0.0084	0.0069	0.0016
125	0.0085	0.0070	0.0016
126	0.0086	0.0070	0.0016
127	0.0087	0.0071	0.0016
128	0.0087	0.0071	0.0016
129	0.0088	0.0072	0.0016
130	0.0089	0.0072	0.0016
131	0.0090	0.0073	0.0017
132	0.0090	0.0074	0.0017
133	0.0092	0.0075	0.0017
134	0.0092	0.0075	0.0017
135	0.0093	0.0076	0.0017
136	0.0094	0.0077	0.0017
137	0.0095	0.0078	0.0018
138	0.0096	0.0078	0.0018
139	0.0097	0.0079	0.0018
140	0.0098	0.0080	0.0018
141	0.0099	0.0081	0.0018
142	0.0100	0.0082	0.0019
143	0.0102	0.0083	0.0019
144	0.0102	0.0083	0.0019
145	0.0123	0.0100	0.0023
146	0.0124	0.0101	0.0023
147	0.0125	0.0102	0.0023
148	0.0126	0.0103	0.0023
149	0.0128	0.0104	0.0024
150	0.0129	0.0105	0.0024
151	0.0131	0.0107	0.0024
152	0.0132	0.0108	0.0024
153	0.0134	0.0109	0.0025
154	0.0135	0.0110	0.0025
155	0.0138	0.0112	0.0025

156	0.0139	0.0113	0.0026
157	0.0141	0.0115	0.0026
158	0.0143	0.0116	0.0026
159	0.0145	0.0118	0.0027
160	0.0147	0.0119	0.0027
161	0.0150	0.0122	0.0028
162	0.0151	0.0123	0.0028
163	0.0154	0.0126	0.0029
164	0.0156	0.0127	0.0029
165	0.0160	0.0130	0.0030
166	0.0162	0.0132	0.0030
167	0.0166	0.0135	0.0031
168	0.0168	0.0137	0.0031
169	0.0173	0.0141	0.0032
170	0.0175	0.0143	0.0032
171	0.0180	0.0147	0.0033
172	0.0183	0.0149	0.0034
173	0.0189	0.0154	0.0035
174	0.0192	0.0157	0.0036
175	0.0199	0.0162	0.0037
176	0.0203	0.0165	0.0038
177	0.0211	0.0172	0.0039
178	0.0215	0.0176	0.0040
179	0.0225	0.0184	0.0042
180	0.0231	0.0188	0.0043
181	0.0243	0.0198	0.0045
182	0.0250	0.0204	0.0046
183	0.0266	0.0217	0.0049
184	0.0276	0.0225	0.0051
185	0.0232	0.0189	0.0043
186	0.0245	0.0200	0.0045
187	0.0278	0.0227	0.0052
188	0.0300	0.0245	0.0056
189	0.0362	0.0295	0.0067
190	0.0408	0.0333	0.0076
191	0.0584	0.0476	0.0108
192	0.0803	0.0652	0.0151
193	0.2512	0.0652	0.1860
194	0.0475	0.0387	0.0088
195	0.0327	0.0267	0.0061
196	0.0260	0.0212	0.0048
197	0.0286	0.0233	0.0053
198	0.0258	0.0210	0.0048
199	0.0237	0.0193	0.0044
200	0.0220	0.0179	0.0041
201	0.0207	0.0168	0.0038
202	0.0195	0.0159	0.0036
203	0.0186	0.0151	0.0034
204	0.0178	0.0145	0.0033
205	0.0170	0.0139	0.0031
206	0.0164	0.0133	0.0030
207	0.0158	0.0129	0.0029
208	0.0153	0.0124	0.0028
209	0.0148	0.0121	0.0027
210	0.0144	0.0117	0.0027
211	0.0140	0.0114	0.0026
212	0.0136	0.0111	0.0025

213	0.0133	0.0108	0.0025
214	0.0130	0.0106	0.0024
215	0.0127	0.0104	0.0024
216	0.0124	0.0101	0.0023
217	0.0103	0.0084	0.0019
218	0.0101	0.0082	0.0019
219	0.0099	0.0080	0.0018
220	0.0097	0.0079	0.0018
221	0.0095	0.0077	0.0018
222	0.0093	0.0076	0.0017
223	0.0091	0.0074	0.0017
224	0.0089	0.0073	0.0017
225	0.0088	0.0072	0.0016
226	0.0086	0.0070	0.0016
227	0.0085	0.0069	0.0016
228	0.0083	0.0068	0.0015
229	0.0082	0.0067	0.0015
230	0.0081	0.0066	0.0015
231	0.0080	0.0065	0.0015
232	0.0079	0.0064	0.0015
233	0.0077	0.0063	0.0014
234	0.0076	0.0062	0.0014
235	0.0075	0.0061	0.0014
236	0.0074	0.0061	0.0014
237	0.0073	0.0060	0.0014
238	0.0073	0.0059	0.0013
239	0.0072	0.0058	0.0013
240	0.0071	0.0058	0.0013
241	0.0070	0.0057	0.0013
242	0.0069	0.0056	0.0013
243	0.0068	0.0056	0.0013
244	0.0068	0.0055	0.0013
245	0.0067	0.0054	0.0012
246	0.0066	0.0054	0.0012
247	0.0065	0.0053	0.0012
248	0.0065	0.0053	0.0012
249	0.0064	0.0052	0.0012
250	0.0063	0.0052	0.0012
251	0.0063	0.0051	0.0012
252	0.0062	0.0051	0.0012
253	0.0062	0.0050	0.0011
254	0.0061	0.0050	0.0011
255	0.0061	0.0049	0.0011
256	0.0060	0.0049	0.0011
257	0.0059	0.0048	0.0011
258	0.0059	0.0048	0.0011
259	0.0058	0.0048	0.0011
260	0.0058	0.0047	0.0011
261	0.0057	0.0047	0.0011
262	0.0057	0.0046	0.0011
263	0.0057	0.0046	0.0010
264	0.0056	0.0046	0.0010
265	0.0056	0.0045	0.0010
266	0.0055	0.0045	0.0010
267	0.0055	0.0045	0.0010
268	0.0054	0.0044	0.0010
269	0.0054	0.0044	0.0010

270	0.0054	0.0044	0.0010
271	0.0053	0.0043	0.0010
272	0.0053	0.0043	0.0010
273	0.0052	0.0043	0.0010
274	0.0052	0.0042	0.0010
275	0.0052	0.0042	0.0010
276	0.0051	0.0042	0.0010
277	0.0051	0.0042	0.0009
278	0.0051	0.0041	0.0009
279	0.0050	0.0041	0.0009
280	0.0050	0.0041	0.0009
281	0.0050	0.0041	0.0009
282	0.0049	0.0040	0.0009
283	0.0049	0.0040	0.0009
284	0.0049	0.0040	0.0009
285	0.0048	0.0040	0.0009
286	0.0048	0.0039	0.0009
287	0.0048	0.0039	0.0009
288	0.0048	0.0039	0.0009

Total soil rain loss = 2.41(In)
Total effective rainfall = 0.72(In)
Peak flow rate in flood hydrograph = 25.65(CFS)

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

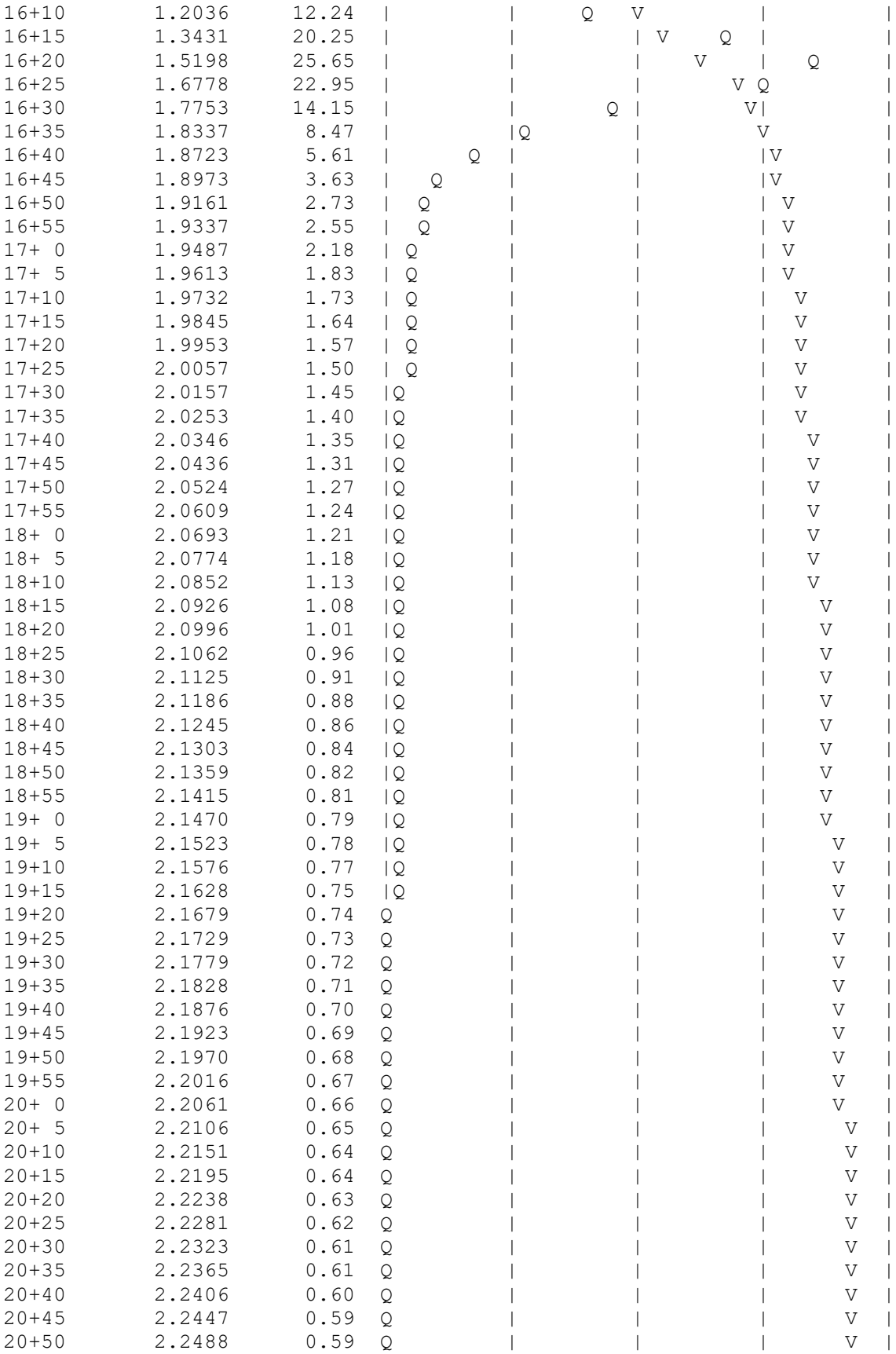
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0001	0.01	Q	|	|	|	|
0+10	0.0004	0.05	Q	|	|	|	|
0+15	0.0012	0.12	Q	|	|	|	|
0+20	0.0028	0.23	Q	|	|	|	|
0+25	0.0050	0.32	Q	|	|	|	|
0+30	0.0075	0.37	Q	|	|	|	|
0+35	0.0103	0.40	Q	|	|	|	|
0+40	0.0132	0.42	Q	|	|	|	|
0+45	0.0161	0.42	Q	|	|	|	|
0+50	0.0190	0.43	Q	|	|	|	|
0+55	0.0220	0.43	Q	|	|	|	|
1+ 0	0.0250	0.43	Q	|	|	|	|
1+ 5	0.0280	0.43	Q	|	|	|	|
1+10	0.0310	0.44	Q	|	|	|	|
1+15	0.0340	0.44	Q	|	|	|	|
1+20	0.0370	0.44	Q	|	|	|	|
1+25	0.0400	0.44	Q	|	|	|	|
1+30	0.0431	0.44	Q	|	|	|	|
1+35	0.0461	0.44	Q	|	|	|	|
1+40	0.0492	0.44	Q	|	|	|	|
1+45	0.0523	0.45	Q	|	|	|	|
1+50	0.0553	0.45	Q	|	|	|	|
1+55	0.0584	0.45	Q	|	|	|	|

2+ 0	0.0615	0.45	QV				
2+ 5	0.0646	0.45	QV				
2+10	0.0678	0.45	QV				
2+15	0.0709	0.45	QV				
2+20	0.0740	0.46	QV				
2+25	0.0772	0.46	QV				
2+30	0.0803	0.46	QV				
2+35	0.0835	0.46	QV				
2+40	0.0867	0.46	QV				
2+45	0.0899	0.46	QV				
2+50	0.0931	0.47	QV				
2+55	0.0963	0.47	QV				
3+ 0	0.0995	0.47	QV				
3+ 5	0.1028	0.47	QV				
3+10	0.1060	0.47	QV				
3+15	0.1093	0.47	QV				
3+20	0.1126	0.48	QV				
3+25	0.1159	0.48	QV				
3+30	0.1192	0.48	QV				
3+35	0.1225	0.48	Q V				
3+40	0.1258	0.48	Q V				
3+45	0.1291	0.48	Q V				
3+50	0.1325	0.49	Q V				
3+55	0.1358	0.49	Q V				
4+ 0	0.1392	0.49	Q V				
4+ 5	0.1426	0.49	Q V				
4+10	0.1460	0.49	Q V				
4+15	0.1494	0.50	Q V				
4+20	0.1528	0.50	Q V				
4+25	0.1563	0.50	Q V				
4+30	0.1597	0.50	Q V				
4+35	0.1632	0.50	Q V				
4+40	0.1667	0.51	Q V				
4+45	0.1701	0.51	Q V				
4+50	0.1737	0.51	Q V				
4+55	0.1772	0.51	Q V				
5+ 0	0.1807	0.51	Q V				
5+ 5	0.1843	0.52	Q V				
5+10	0.1878	0.52	Q V				
5+15	0.1914	0.52	Q V				
5+20	0.1950	0.52	Q V				
5+25	0.1986	0.52	Q V				
5+30	0.2022	0.53	Q V				
5+35	0.2059	0.53	Q V				
5+40	0.2096	0.53	Q V				
5+45	0.2132	0.53	Q V				
5+50	0.2169	0.54	Q V				
5+55	0.2206	0.54	Q V				
6+ 0	0.2244	0.54	Q V				
6+ 5	0.2281	0.54	Q V				
6+10	0.2319	0.55	Q V				
6+15	0.2356	0.55	Q V				
6+20	0.2394	0.55	Q V				
6+25	0.2432	0.55	Q V				
6+30	0.2471	0.56	Q V				
6+35	0.2509	0.56	Q V				
6+40	0.2548	0.56	Q V				

6+45	0.2587	0.56	Q	V				
6+50	0.2626	0.57	Q	V				
6+55	0.2665	0.57	Q	V				
7+ 0	0.2704	0.57	Q	V				
7+ 5	0.2744	0.58	Q	V				
7+10	0.2784	0.58	Q	V				
7+15	0.2824	0.58	Q	V				
7+20	0.2864	0.58	Q	V				
7+25	0.2905	0.59	Q	V				
7+30	0.2945	0.59	Q	V				
7+35	0.2986	0.59	Q	V				
7+40	0.3028	0.60	Q	V				
7+45	0.3069	0.60	Q	V				
7+50	0.3110	0.60	Q	V				
7+55	0.3152	0.61	Q	V				
8+ 0	0.3194	0.61	Q	V				
8+ 5	0.3237	0.61	Q	V				
8+10	0.3279	0.62	Q	V				
8+15	0.3322	0.62	Q	V				
8+20	0.3365	0.62	Q	V				
8+25	0.3408	0.63	Q	V				
8+30	0.3452	0.63	Q	V				
8+35	0.3495	0.64	Q	V				
8+40	0.3540	0.64	Q	V				
8+45	0.3584	0.64	Q	V				
8+50	0.3628	0.65	Q	V				
8+55	0.3673	0.65	Q	V				
9+ 0	0.3719	0.66	Q	V				
9+ 5	0.3764	0.66	Q	V				
9+10	0.3810	0.66	Q	V				
9+15	0.3856	0.67	Q	V				
9+20	0.3902	0.67	Q	V				
9+25	0.3949	0.68	Q	V				
9+30	0.3996	0.68	Q	V				
9+35	0.4043	0.69	Q	V				
9+40	0.4091	0.69	Q	V				
9+45	0.4139	0.70	Q	V				
9+50	0.4187	0.70	Q	V				
9+55	0.4236	0.71	Q	V				
10+ 0	0.4285	0.71	Q	V				
10+ 5	0.4334	0.72	Q	V				
10+10	0.4384	0.72	Q	V				
10+15	0.4434	0.73	Q	V				
10+20	0.4485	0.73	Q	V				
10+25	0.4536	0.74	Q	V				
10+30	0.4587	0.75	Q	V				
10+35	0.4639	0.75	|Q	V				
10+40	0.4691	0.76	|Q	V				
10+45	0.4744	0.76	|Q	V				
10+50	0.4797	0.77	|Q	V				
10+55	0.4851	0.78	|Q	V				
11+ 0	0.4905	0.78	|Q	V				
11+ 5	0.4959	0.79	|Q	V				
11+10	0.5014	0.80	|Q	V				
11+15	0.5070	0.81	|Q	V				
11+20	0.5126	0.81	|Q	V				

11+25	0.5182	0.82	|Q V |	|	|	|
11+30	0.5239	0.83	|Q V |	|	|	|
11+35	0.5297	0.84	|Q V |	|	|	|
11+40	0.5355	0.85	|Q V |	|	|	|
11+45	0.5414	0.85	|Q V|	|	|	|
11+50	0.5473	0.86	|Q V|	|	|	|
11+55	0.5533	0.87	|Q V|	|	|	|
12+ 0	0.5594	0.88	|Q V|	|	|	|
12+ 5	0.5656	0.89	|Q V|	|	|	|
12+10	0.5719	0.92	|Q V|	|	|	|
12+15	0.5785	0.96	|Q V|	|	|	|
12+20	0.5855	1.01	|Q V|	|	|	|
12+25	0.5928	1.06	|Q V|	|	|	|
12+30	0.6003	1.09	|Q V	|	|	|
12+35	0.6079	1.11	|Q V	|	|	|
12+40	0.6157	1.13	|Q V	|	|	|
12+45	0.6236	1.15	|Q V	|	|	|
12+50	0.6316	1.16	|Q V	|	|	|
12+55	0.6397	1.17	|Q V	|	|	|
13+ 0	0.6479	1.19	|Q V	|	|	|
13+ 5	0.6562	1.20	|Q V	|	|	|
13+10	0.6645	1.22	|Q |V	|	|	|
13+15	0.6730	1.23	|Q |V	|	|	|
13+20	0.6817	1.25	|Q |V	|	|	|
13+25	0.6904	1.27	|Q |V	|	|	|
13+30	0.6992	1.29	|Q |V	|	|	|
13+35	0.7082	1.30	|Q |V	|	|	|
13+40	0.7173	1.32	|Q | V	|	|	|
13+45	0.7266	1.34	|Q | V	|	|	|
13+50	0.7360	1.37	|Q | V	|	|	|
13+55	0.7456	1.39	|Q | V	|	|	|
14+ 0	0.7553	1.41	|Q | V	|	|	|
14+ 5	0.7652	1.44	|Q | V	|	|	|
14+10	0.7753	1.46	|Q | V	|	|	|
14+15	0.7855	1.49	|Q | V	|	|	|
14+20	0.7960	1.52	| Q | V	|	|	|
14+25	0.8067	1.55	| Q | V	|	|	|
14+30	0.8177	1.59	| Q | V	|	|	|
14+35	0.8289	1.63	| Q | V	|	|	|
14+40	0.8403	1.66	| Q | V	|	|	|
14+45	0.8521	1.71	| Q | V	|	|	|
14+50	0.8641	1.75	| Q | V	|	|	|
14+55	0.8765	1.80	| Q | V	|	|	|
15+ 0	0.8893	1.85	| Q | V	|	|	|
15+ 5	0.9024	1.91	| Q | V	|	|	|
15+10	0.9160	1.98	| Q | V	|	|	|
15+15	0.9301	2.05	| Q | V	|	|	|
15+20	0.9448	2.13	| Q | V	|	|	|
15+25	0.9600	2.21	| Q | V	|	|	|
15+30	0.9756	2.26	| Q | V	|	|	|
15+35	0.9912	2.28	| Q | V	|	|	|
15+40	1.0069	2.28	| Q | V	|	|	|
15+45	1.0230	2.33	| Q | V	|	|	|
15+50	1.0400	2.48	| Q | V	|	|	|
15+55	1.0590	2.76	| Q | V	|	|	|
16+ 0	1.0812	3.22	| Q | V	|	|	|
16+ 5	1.1194	5.54	| Q | V	|	|	|



20+55	2.2528	0.58	Q	|	|	|	V |
21+ 0	2.2568	0.58	Q	|	|	|	V |
21+ 5	2.2607	0.57	Q	|	|	|	V |
21+10	2.2646	0.56	Q	|	|	|	V |
21+15	2.2684	0.56	Q	|	|	|	V |
21+20	2.2722	0.55	Q	|	|	|	V |
21+25	2.2760	0.55	Q	|	|	|	V |
21+30	2.2798	0.54	Q	|	|	|	V |
21+35	2.2835	0.54	Q	|	|	|	V |
21+40	2.2872	0.53	Q	|	|	|	V |
21+45	2.2908	0.53	Q	|	|	|	V |
21+50	2.2944	0.52	Q	|	|	|	V |
21+55	2.2980	0.52	Q	|	|	|	V |
22+ 0	2.3016	0.52	Q	|	|	|	V |
22+ 5	2.3051	0.51	Q	|	|	|	V |
22+10	2.3086	0.51	Q	|	|	|	V |
22+15	2.3120	0.50	Q	|	|	|	V |
22+20	2.3155	0.50	Q	|	|	|	V |
22+25	2.3189	0.50	Q	|	|	|	V |
22+30	2.3223	0.49	Q	|	|	|	V |
22+35	2.3256	0.49	Q	|	|	|	V |
22+40	2.3290	0.48	Q	|	|	|	V |
22+45	2.3323	0.48	Q	|	|	|	V|
22+50	2.3356	0.48	Q	|	|	|	V|
22+55	2.3388	0.47	Q	|	|	|	V|
23+ 0	2.3421	0.47	Q	|	|	|	V|
23+ 5	2.3453	0.47	Q	|	|	|	V|
23+10	2.3485	0.46	Q	|	|	|	V|
23+15	2.3517	0.46	Q	|	|	|	V|
23+20	2.3548	0.46	Q	|	|	|	V|
23+25	2.3580	0.45	Q	|	|	|	V|
23+30	2.3611	0.45	Q	|	|	|	V|
23+35	2.3642	0.45	Q	|	|	|	V|
23+40	2.3672	0.45	Q	|	|	|	V|
23+45	2.3703	0.44	Q	|	|	|	V|
23+50	2.3733	0.44	Q	|	|	|	V|
23+55	2.3763	0.44	Q	|	|	|	V|
24+ 0	2.3793	0.43	Q	|	|	|	V|
24+ 5	2.3822	0.42	Q	|	|	|	V|
24+10	2.3849	0.38	Q	|	|	|	V|
24+15	2.3870	0.31	Q	|	|	|	V|
24+20	2.3884	0.20	Q	|	|	|	V|
24+25	2.3891	0.11	Q	|	|	|	V|
24+30	2.3895	0.05	Q	|	|	|	V|
24+35	2.3896	0.03	Q	|	|	|	V|
24+40	2.3897	0.01	Q	|	|	|	V|
24+45	2.3898	0.01	Q	|	|	|	V|
24+50	2.3898	0.00	Q	|	|	|	V|
24+55	2.3898	0.00	Q	|	|	|	V

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

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Study date 04/23/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION - NORTHERLY CHAMBERS
100-YEAR STORM EVENT ANALYSIS

Storm Event Year = 100

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 100		
15.31	1	1.30
Rainfall data for year 100		
15.31	6	3.07
Rainfall data for year 100		
15.31	24	5.64

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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)
32.0	32.0	15.31	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
12.25	0.800	32.0	32.0	21.25	0.015
3.06	0.200	98.0	98.0	0.20	0.958

Area-averaged catchment yield fraction, Y = 0.204
Area-averaged low loss fraction, Yb = 0.796
User entry of time of concentration = 0.391 (hours)
++
Watershed area = 15.31(Ac.)
Catchment Lag time = 0.313 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 26.6411
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.796 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.481(In)
Computed peak 30-minute rainfall = 0.985(In)
Specified peak 1-hour rainfall = 1.300(In)
Computed peak 3-hour rainfall = 2.202(In)
Specified peak 6-hour rainfall = 3.070(In)
Specified peak 24-hour rainfall = 5.640(In)

Rainfall depth area reduction factors:
Using a total area of 15.31(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.481(In)
30-minute factor = 0.999 Adjusted rainfall = 0.985(In)
1-hour factor = 0.999 Adjusted rainfall = 1.299(In)
3-hour factor = 1.000 Adjusted rainfall = 2.202(In)
6-hour factor = 1.000 Adjusted rainfall = 3.070(In)
24-hour factor = 1.000 Adjusted rainfall = 5.640(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 = 185.16 (CFS))		
1	1.672	3.097
2	8.675	12.966
3	23.512	27.472
4	43.570	37.137
5	66.618	42.676
6	80.918	26.477
7	89.918	16.663

8	94.632	8.728
9	97.273	4.890
10	98.356	2.005
11	98.835	0.888
12	99.315	0.888
13	99.785	0.871
14	100.000	0.398

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.4808	0.4808
2	0.6344	0.1536
3	0.7461	0.1117
4	0.8371	0.0910
5	0.9153	0.0782
6	0.9845	0.0692
7	1.0471	0.0626
8	1.1046	0.0575
9	1.1579	0.0533
10	1.2077	0.0498
11	1.2546	0.0469
12	1.2991	0.0444
13	1.3500	0.0509
14	1.3989	0.0489
15	1.4460	0.0471
16	1.4915	0.0455
17	1.5356	0.0441
18	1.5783	0.0427
19	1.6198	0.0415
20	1.6602	0.0404
21	1.6995	0.0394
22	1.7379	0.0384
23	1.7754	0.0375
24	1.8121	0.0367
25	1.8479	0.0359
26	1.8831	0.0351
27	1.9175	0.0344
28	1.9513	0.0338
29	1.9844	0.0332
30	2.0170	0.0326
31	2.0490	0.0320
32	2.0805	0.0315
33	2.1115	0.0310
34	2.1419	0.0305
35	2.1720	0.0300
36	2.2015	0.0296
37	2.2307	0.0291
38	2.2594	0.0287
39	2.2877	0.0283
40	2.3157	0.0280
41	2.3433	0.0276
42	2.3705	0.0272
43	2.3974	0.0269
44	2.4240	0.0266
45	2.4503	0.0263
46	2.4762	0.0260
47	2.5019	0.0257

48	2.5273	0.0254
49	2.5524	0.0251
50	2.5773	0.0249
51	2.6019	0.0246
52	2.6262	0.0243
53	2.6503	0.0241
54	2.6742	0.0239
55	2.6978	0.0236
56	2.7212	0.0234
57	2.7444	0.0232
58	2.7674	0.0230
59	2.7902	0.0228
60	2.8128	0.0226
61	2.8352	0.0224
62	2.8574	0.0222
63	2.8794	0.0220
64	2.9012	0.0218
65	2.9229	0.0217
66	2.9444	0.0215
67	2.9657	0.0213
68	2.9868	0.0211
69	3.0078	0.0210
70	3.0287	0.0208
71	3.0493	0.0207
72	3.0699	0.0205
73	3.0885	0.0186
74	3.1070	0.0185
75	3.1253	0.0184
76	3.1435	0.0182
77	3.1616	0.0181
78	3.1796	0.0179
79	3.1974	0.0178
80	3.2151	0.0177
81	3.2327	0.0176
82	3.2501	0.0174
83	3.2674	0.0173
84	3.2847	0.0172
85	3.3018	0.0171
86	3.3187	0.0170
87	3.3356	0.0169
88	3.3524	0.0168
89	3.3691	0.0167
90	3.3856	0.0166
91	3.4021	0.0165
92	3.4184	0.0164
93	3.4347	0.0163
94	3.4508	0.0162
95	3.4669	0.0161
96	3.4828	0.0160
97	3.4987	0.0159
98	3.5145	0.0158
99	3.5302	0.0157
100	3.5458	0.0156
101	3.5613	0.0155
102	3.5767	0.0154
103	3.5921	0.0153
104	3.6073	0.0153

105	3.6225	0.0152
106	3.6376	0.0151
107	3.6526	0.0150
108	3.6676	0.0149
109	3.6824	0.0149
110	3.6972	0.0148
111	3.7119	0.0147
112	3.7266	0.0146
113	3.7411	0.0146
114	3.7556	0.0145
115	3.7700	0.0144
116	3.7844	0.0143
117	3.7987	0.0143
118	3.8129	0.0142
119	3.8270	0.0141
120	3.8411	0.0141
121	3.8551	0.0140
122	3.8690	0.0139
123	3.8829	0.0139
124	3.8967	0.0138
125	3.9105	0.0138
126	3.9242	0.0137
127	3.9378	0.0136
128	3.9514	0.0136
129	3.9649	0.0135
130	3.9784	0.0135
131	3.9918	0.0134
132	4.0051	0.0133
133	4.0184	0.0133
134	4.0316	0.0132
135	4.0448	0.0132
136	4.0579	0.0131
137	4.0710	0.0131
138	4.0840	0.0130
139	4.0969	0.0130
140	4.1099	0.0129
141	4.1227	0.0129
142	4.1355	0.0128
143	4.1483	0.0128
144	4.1610	0.0127
145	4.1736	0.0127
146	4.1862	0.0126
147	4.1988	0.0126
148	4.2113	0.0125
149	4.2237	0.0125
150	4.2362	0.0124
151	4.2485	0.0124
152	4.2609	0.0123
153	4.2731	0.0123
154	4.2854	0.0122
155	4.2975	0.0122
156	4.3097	0.0121
157	4.3218	0.0121
158	4.3338	0.0121
159	4.3459	0.0120
160	4.3578	0.0120
161	4.3698	0.0119

162	4.3816	0.0119
163	4.3935	0.0118
164	4.4053	0.0118
165	4.4171	0.0118
166	4.4288	0.0117
167	4.4405	0.0117
168	4.4521	0.0116
169	4.4637	0.0116
170	4.4753	0.0116
171	4.4868	0.0115
172	4.4983	0.0115
173	4.5098	0.0115
174	4.5212	0.0114
175	4.5326	0.0114
176	4.5439	0.0113
177	4.5552	0.0113
178	4.5665	0.0113
179	4.5777	0.0112
180	4.5890	0.0112
181	4.6001	0.0112
182	4.6113	0.0111
183	4.6224	0.0111
184	4.6334	0.0111
185	4.6444	0.0110
186	4.6554	0.0110
187	4.6664	0.0110
188	4.6773	0.0109
189	4.6882	0.0109
190	4.6991	0.0109
191	4.7099	0.0108
192	4.7207	0.0108
193	4.7315	0.0108
194	4.7423	0.0107
195	4.7530	0.0107
196	4.7637	0.0107
197	4.7743	0.0106
198	4.7849	0.0106
199	4.7955	0.0106
200	4.8061	0.0106
201	4.8166	0.0105
202	4.8271	0.0105
203	4.8376	0.0105
204	4.8480	0.0104
205	4.8584	0.0104
206	4.8688	0.0104
207	4.8792	0.0104
208	4.8895	0.0103
209	4.8998	0.0103
210	4.9101	0.0103
211	4.9203	0.0102
212	4.9305	0.0102
213	4.9407	0.0102
214	4.9509	0.0102
215	4.9610	0.0101
216	4.9711	0.0101
217	4.9812	0.0101
218	4.9913	0.0101

219	5.0013	0.0100
220	5.0113	0.0100
221	5.0213	0.0100
222	5.0312	0.0100
223	5.0412	0.0099
224	5.0511	0.0099
225	5.0610	0.0099
226	5.0708	0.0099
227	5.0806	0.0098
228	5.0905	0.0098
229	5.1002	0.0098
230	5.1100	0.0098
231	5.1197	0.0097
232	5.1294	0.0097
233	5.1391	0.0097
234	5.1488	0.0097
235	5.1584	0.0096
236	5.1681	0.0096
237	5.1777	0.0096
238	5.1872	0.0096
239	5.1968	0.0096
240	5.2063	0.0095
241	5.2158	0.0095
242	5.2253	0.0095
243	5.2348	0.0095
244	5.2442	0.0094
245	5.2536	0.0094
246	5.2630	0.0094
247	5.2724	0.0094
248	5.2818	0.0094
249	5.2911	0.0093
250	5.3004	0.0093
251	5.3097	0.0093
252	5.3190	0.0093
253	5.3282	0.0093
254	5.3374	0.0092
255	5.3467	0.0092
256	5.3558	0.0092
257	5.3650	0.0092
258	5.3742	0.0091
259	5.3833	0.0091
260	5.3924	0.0091
261	5.4015	0.0091
262	5.4106	0.0091
263	5.4196	0.0091
264	5.4286	0.0090
265	5.4377	0.0090
266	5.4466	0.0090
267	5.4556	0.0090
268	5.4646	0.0090
269	5.4735	0.0089
270	5.4824	0.0089
271	5.4913	0.0089
272	5.5002	0.0089
273	5.5091	0.0089
274	5.5179	0.0088
275	5.5267	0.0088

276	5.5356	0.0088
277	5.5443	0.0088
278	5.5531	0.0088
279	5.5619	0.0088
280	5.5706	0.0087
281	5.5793	0.0087
282	5.5880	0.0087
283	5.5967	0.0087
284	5.6054	0.0087
285	5.6140	0.0087
286	5.6227	0.0086
287	5.6313	0.0086
288	5.6399	0.0086

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0086	0.0068	0.0018
2	0.0086	0.0069	0.0018
3	0.0087	0.0069	0.0018
4	0.0087	0.0069	0.0018
5	0.0087	0.0069	0.0018
6	0.0087	0.0069	0.0018
7	0.0088	0.0070	0.0018
8	0.0088	0.0070	0.0018
9	0.0088	0.0070	0.0018
10	0.0088	0.0070	0.0018
11	0.0089	0.0071	0.0018
12	0.0089	0.0071	0.0018
13	0.0089	0.0071	0.0018
14	0.0089	0.0071	0.0018
15	0.0090	0.0071	0.0018
16	0.0090	0.0072	0.0018
17	0.0090	0.0072	0.0018
18	0.0091	0.0072	0.0018
19	0.0091	0.0072	0.0019
20	0.0091	0.0073	0.0019
21	0.0091	0.0073	0.0019
22	0.0092	0.0073	0.0019
23	0.0092	0.0073	0.0019
24	0.0092	0.0073	0.0019
25	0.0093	0.0074	0.0019
26	0.0093	0.0074	0.0019
27	0.0093	0.0074	0.0019
28	0.0094	0.0074	0.0019
29	0.0094	0.0075	0.0019
30	0.0094	0.0075	0.0019
31	0.0095	0.0075	0.0019
32	0.0095	0.0076	0.0019
33	0.0095	0.0076	0.0019
34	0.0096	0.0076	0.0019
35	0.0096	0.0076	0.0020
36	0.0096	0.0077	0.0020
37	0.0097	0.0077	0.0020
38	0.0097	0.0077	0.0020
39	0.0097	0.0078	0.0020

40	0.0098	0.0078	0.0020
41	0.0098	0.0078	0.0020
42	0.0098	0.0078	0.0020
43	0.0099	0.0079	0.0020
44	0.0099	0.0079	0.0020
45	0.0100	0.0079	0.0020
46	0.0100	0.0079	0.0020
47	0.0100	0.0080	0.0020
48	0.0101	0.0080	0.0020
49	0.0101	0.0081	0.0021
50	0.0101	0.0081	0.0021
51	0.0102	0.0081	0.0021
52	0.0102	0.0081	0.0021
53	0.0103	0.0082	0.0021
54	0.0103	0.0082	0.0021
55	0.0104	0.0082	0.0021
56	0.0104	0.0083	0.0021
57	0.0104	0.0083	0.0021
58	0.0105	0.0083	0.0021
59	0.0105	0.0084	0.0021
60	0.0106	0.0084	0.0022
61	0.0106	0.0085	0.0022
62	0.0106	0.0085	0.0022
63	0.0107	0.0085	0.0022
64	0.0107	0.0086	0.0022
65	0.0108	0.0086	0.0022
66	0.0108	0.0086	0.0022
67	0.0109	0.0087	0.0022
68	0.0109	0.0087	0.0022
69	0.0110	0.0088	0.0022
70	0.0110	0.0088	0.0022
71	0.0111	0.0088	0.0023
72	0.0111	0.0089	0.0023
73	0.0112	0.0089	0.0023
74	0.0112	0.0089	0.0023
75	0.0113	0.0090	0.0023
76	0.0113	0.0090	0.0023
77	0.0114	0.0091	0.0023
78	0.0115	0.0091	0.0023
79	0.0115	0.0092	0.0023
80	0.0116	0.0092	0.0024
81	0.0116	0.0093	0.0024
82	0.0117	0.0093	0.0024
83	0.0118	0.0094	0.0024
84	0.0118	0.0094	0.0024
85	0.0119	0.0095	0.0024
86	0.0119	0.0095	0.0024
87	0.0120	0.0096	0.0024
88	0.0121	0.0096	0.0025
89	0.0121	0.0097	0.0025
90	0.0122	0.0097	0.0025
91	0.0123	0.0098	0.0025
92	0.0123	0.0098	0.0025
93	0.0124	0.0099	0.0025
94	0.0125	0.0099	0.0025
95	0.0126	0.0100	0.0026
96	0.0126	0.0100	0.0026

97	0.0127	0.0101	0.0026
98	0.0128	0.0102	0.0026
99	0.0129	0.0102	0.0026
100	0.0129	0.0103	0.0026
101	0.0130	0.0104	0.0026
102	0.0131	0.0104	0.0027
103	0.0132	0.0105	0.0027
104	0.0132	0.0105	0.0027
105	0.0133	0.0106	0.0027
106	0.0134	0.0107	0.0027
107	0.0135	0.0108	0.0028
108	0.0136	0.0108	0.0028
109	0.0137	0.0109	0.0028
110	0.0138	0.0110	0.0028
111	0.0139	0.0111	0.0028
112	0.0139	0.0111	0.0028
113	0.0141	0.0112	0.0029
114	0.0141	0.0113	0.0029
115	0.0143	0.0114	0.0029
116	0.0143	0.0114	0.0029
117	0.0145	0.0115	0.0030
118	0.0146	0.0116	0.0030
119	0.0147	0.0117	0.0030
120	0.0148	0.0118	0.0030
121	0.0149	0.0119	0.0030
122	0.0150	0.0120	0.0031
123	0.0152	0.0121	0.0031
124	0.0153	0.0122	0.0031
125	0.0154	0.0123	0.0031
126	0.0155	0.0124	0.0032
127	0.0157	0.0125	0.0032
128	0.0158	0.0126	0.0032
129	0.0160	0.0127	0.0033
130	0.0161	0.0128	0.0033
131	0.0163	0.0129	0.0033
132	0.0164	0.0130	0.0033
133	0.0166	0.0132	0.0034
134	0.0167	0.0133	0.0034
135	0.0169	0.0134	0.0034
136	0.0170	0.0135	0.0035
137	0.0172	0.0137	0.0035
138	0.0173	0.0138	0.0035
139	0.0176	0.0140	0.0036
140	0.0177	0.0141	0.0036
141	0.0179	0.0143	0.0037
142	0.0181	0.0144	0.0037
143	0.0184	0.0146	0.0037
144	0.0185	0.0147	0.0038
145	0.0205	0.0163	0.0042
146	0.0207	0.0165	0.0042
147	0.0210	0.0167	0.0043
148	0.0211	0.0168	0.0043
149	0.0215	0.0171	0.0044
150	0.0217	0.0172	0.0044
151	0.0220	0.0175	0.0045
152	0.0222	0.0177	0.0045
153	0.0226	0.0180	0.0046

154	0.0228	0.0181	0.0046
155	0.0232	0.0185	0.0047
156	0.0234	0.0186	0.0048
157	0.0239	0.0190	0.0049
158	0.0241	0.0192	0.0049
159	0.0246	0.0196	0.0050
160	0.0249	0.0198	0.0051
161	0.0254	0.0202	0.0052
162	0.0257	0.0204	0.0052
163	0.0263	0.0209	0.0054
164	0.0266	0.0212	0.0054
165	0.0272	0.0217	0.0055
166	0.0276	0.0220	0.0056
167	0.0283	0.0226	0.0058
168	0.0287	0.0229	0.0058
169	0.0296	0.0236	0.0060
170	0.0300	0.0239	0.0061
171	0.0310	0.0247	0.0063
172	0.0315	0.0251	0.0064
173	0.0326	0.0259	0.0066
174	0.0332	0.0264	0.0068
175	0.0344	0.0274	0.0070
176	0.0351	0.0280	0.0072
177	0.0367	0.0292	0.0075
178	0.0375	0.0299	0.0076
179	0.0394	0.0313	0.0080
180	0.0404	0.0322	0.0082
181	0.0427	0.0340	0.0087
182	0.0441	0.0351	0.0090
183	0.0471	0.0375	0.0096
184	0.0489	0.0389	0.0100
185	0.0444	0.0354	0.0091
186	0.0469	0.0374	0.0096
187	0.0533	0.0424	0.0109
188	0.0575	0.0457	0.0117
189	0.0692	0.0551	0.0141
190	0.0782	0.0622	0.0159
191	0.1117	0.0652	0.0465
192	0.1536	0.0652	0.0884
193	0.4808	0.0652	0.4156
194	0.0910	0.0652	0.0258
195	0.0626	0.0499	0.0128
196	0.0498	0.0397	0.0102
197	0.0509	0.0405	0.0104
198	0.0455	0.0362	0.0093
199	0.0415	0.0331	0.0085
200	0.0384	0.0306	0.0078
201	0.0359	0.0286	0.0073
202	0.0338	0.0269	0.0069
203	0.0320	0.0255	0.0065
204	0.0305	0.0243	0.0062
205	0.0291	0.0232	0.0059
206	0.0280	0.0223	0.0057
207	0.0269	0.0214	0.0055
208	0.0260	0.0207	0.0053
209	0.0251	0.0200	0.0051
210	0.0243	0.0194	0.0050

211	0.0236	0.0188	0.0048
212	0.0230	0.0183	0.0047
213	0.0224	0.0178	0.0046
214	0.0218	0.0174	0.0044
215	0.0213	0.0170	0.0043
216	0.0208	0.0166	0.0042
217	0.0186	0.0148	0.0038
218	0.0182	0.0145	0.0037
219	0.0178	0.0142	0.0036
220	0.0174	0.0139	0.0036
221	0.0171	0.0136	0.0035
222	0.0168	0.0134	0.0034
223	0.0165	0.0131	0.0034
224	0.0162	0.0129	0.0033
225	0.0159	0.0126	0.0032
226	0.0156	0.0124	0.0032
227	0.0153	0.0122	0.0031
228	0.0151	0.0120	0.0031
229	0.0149	0.0118	0.0030
230	0.0146	0.0117	0.0030
231	0.0144	0.0115	0.0029
232	0.0142	0.0113	0.0029
233	0.0140	0.0112	0.0029
234	0.0138	0.0110	0.0028
235	0.0136	0.0109	0.0028
236	0.0135	0.0107	0.0027
237	0.0133	0.0106	0.0027
238	0.0131	0.0104	0.0027
239	0.0130	0.0103	0.0026
240	0.0128	0.0102	0.0026
241	0.0127	0.0101	0.0026
242	0.0125	0.0100	0.0025
243	0.0124	0.0098	0.0025
244	0.0122	0.0097	0.0025
245	0.0121	0.0096	0.0025
246	0.0120	0.0095	0.0024
247	0.0118	0.0094	0.0024
248	0.0117	0.0093	0.0024
249	0.0116	0.0092	0.0024
250	0.0115	0.0092	0.0023
251	0.0114	0.0091	0.0023
252	0.0113	0.0090	0.0023
253	0.0112	0.0089	0.0023
254	0.0111	0.0088	0.0023
255	0.0110	0.0087	0.0022
256	0.0109	0.0087	0.0022
257	0.0108	0.0086	0.0022
258	0.0107	0.0085	0.0022
259	0.0106	0.0084	0.0022
260	0.0105	0.0084	0.0021
261	0.0104	0.0083	0.0021
262	0.0103	0.0082	0.0021
263	0.0102	0.0082	0.0021
264	0.0102	0.0081	0.0021
265	0.0101	0.0080	0.0021
266	0.0100	0.0080	0.0020

267	0.0099	0.0079	0.0020
268	0.0099	0.0078	0.0020
269	0.0098	0.0078	0.0020
270	0.0097	0.0077	0.0020
271	0.0096	0.0077	0.0020
272	0.0096	0.0076	0.0019
273	0.0095	0.0076	0.0019
274	0.0094	0.0075	0.0019
275	0.0094	0.0075	0.0019
276	0.0093	0.0074	0.0019
277	0.0093	0.0074	0.0019
278	0.0092	0.0073	0.0019
279	0.0091	0.0073	0.0019
280	0.0091	0.0072	0.0018
281	0.0090	0.0072	0.0018
282	0.0090	0.0071	0.0018
283	0.0089	0.0071	0.0018
284	0.0088	0.0070	0.0018
285	0.0088	0.0070	0.0018
286	0.0087	0.0070	0.0018
287	0.0087	0.0069	0.0018
288	0.0086	0.0069	0.0018

Total soil rain loss = 4.09(In)
Total effective rainfall = 1.55(In)
Peak flow rate in flood hydrograph = 22.59(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

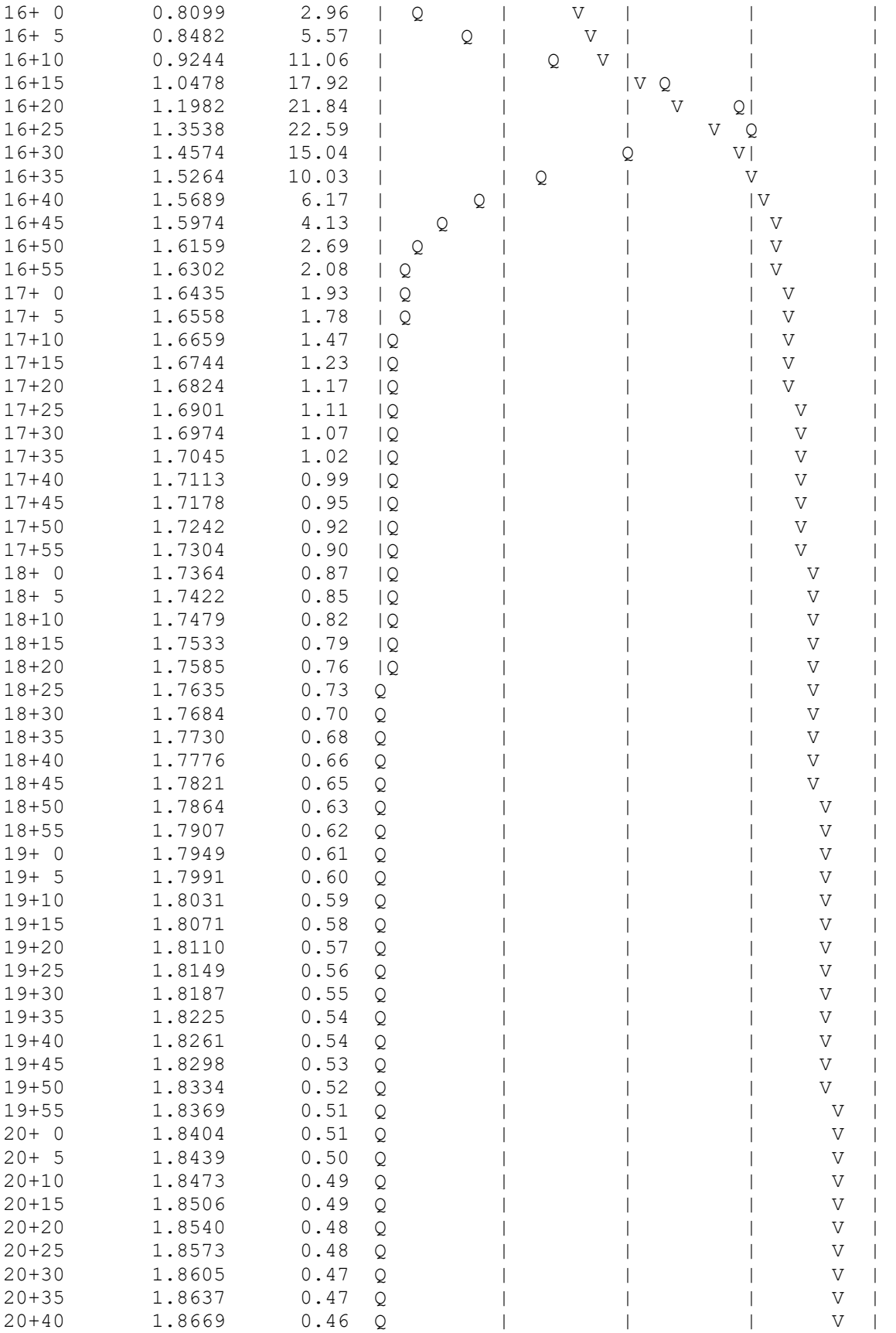
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0000	0.01	Q				
0+10	0.0002	0.03	Q				
0+15	0.0008	0.08	Q				
0+20	0.0017	0.14	Q				
0+25	0.0032	0.22	Q				
0+30	0.0050	0.26	Q				
0+35	0.0071	0.29	Q				
0+40	0.0092	0.31	Q				
0+45	0.0114	0.32	Q				
0+50	0.0136	0.32	Q				
0+55	0.0159	0.33	Q				
1+ 0	0.0181	0.33	Q				
1+ 5	0.0204	0.33	Q				
1+10	0.0227	0.33	Q				
1+15	0.0250	0.33	Q				
1+20	0.0273	0.34	Q				
1+25	0.0296	0.34	Q				
1+30	0.0320	0.34	Q				
1+35	0.0343	0.34	Q				
1+40	0.0366	0.34	Q				

1+45	0.0390	0.34	Q	|	|	|	|
1+50	0.0413	0.34	Q	|	|	|	|
1+55	0.0437	0.34	Q	|	|	|	|
2+ 0	0.0461	0.34	Q	|	|	|	|
2+ 5	0.0484	0.34	Q	|	|	|	|
2+10	0.0508	0.35	QV	|	|	|	|
2+15	0.0532	0.35	QV	|	|	|	|
2+20	0.0556	0.35	QV	|	|	|	|
2+25	0.0580	0.35	QV	|	|	|	|
2+30	0.0604	0.35	QV	|	|	|	|
2+35	0.0628	0.35	QV	|	|	|	|
2+40	0.0653	0.35	QV	|	|	|	|
2+45	0.0677	0.35	QV	|	|	|	|
2+50	0.0702	0.36	QV	|	|	|	|
2+55	0.0726	0.36	QV	|	|	|	|
3+ 0	0.0751	0.36	QV	|	|	|	|
3+ 5	0.0776	0.36	QV	|	|	|	|
3+10	0.0800	0.36	QV	|	|	|	|
3+15	0.0825	0.36	QV	|	|	|	|
3+20	0.0850	0.36	QV	|	|	|	|
3+25	0.0875	0.36	QV	|	|	|	|
3+30	0.0901	0.37	QV	|	|	|	|
3+35	0.0926	0.37	QV	|	|	|	|
3+40	0.0951	0.37	QV	|	|	|	|
3+45	0.0977	0.37	QV	|	|	|	|
3+50	0.1002	0.37	Q V	|	|	|	|
3+55	0.1028	0.37	Q V	|	|	|	|
4+ 0	0.1054	0.37	Q V	|	|	|	|
4+ 5	0.1080	0.38	Q V	|	|	|	|
4+10	0.1105	0.38	Q V	|	|	|	|
4+15	0.1132	0.38	Q V	|	|	|	|
4+20	0.1158	0.38	Q V	|	|	|	|
4+25	0.1184	0.38	Q V	|	|	|	|
4+30	0.1210	0.38	Q V	|	|	|	|
4+35	0.1237	0.38	Q V	|	|	|	|
4+40	0.1263	0.39	Q V	|	|	|	|
4+45	0.1290	0.39	Q V	|	|	|	|
4+50	0.1317	0.39	Q V	|	|	|	|
4+55	0.1344	0.39	Q V	|	|	|	|
5+ 0	0.1371	0.39	Q V	|	|	|	|
5+ 5	0.1398	0.39	Q V	|	|	|	|
5+10	0.1425	0.40	Q V	|	|	|	|
5+15	0.1452	0.40	Q V	|	|	|	|
5+20	0.1480	0.40	Q V	|	|	|	|
5+25	0.1507	0.40	Q V	|	|	|	|
5+30	0.1535	0.40	Q V	|	|	|	|
5+35	0.1563	0.40	Q V	|	|	|	|
5+40	0.1591	0.41	Q V	|	|	|	|
5+45	0.1619	0.41	Q V	|	|	|	|
5+50	0.1647	0.41	Q V	|	|	|	|
5+55	0.1675	0.41	Q V	|	|	|	|
6+ 0	0.1704	0.41	Q V	|	|	|	|
6+ 5	0.1732	0.41	Q V	|	|	|	|
6+10	0.1761	0.42	Q V	|	|	|	|
6+15	0.1790	0.42	Q V	|	|	|	|
6+20	0.1819	0.42	Q V	|	|	|	|
6+25	0.1848	0.42	Q V	|	|	|	|

6+30	0.1877	0.42	Q	V				
6+35	0.1906	0.43	Q	V				
6+40	0.1936	0.43	Q	V				
6+45	0.1965	0.43	Q	V				
6+50	0.1995	0.43	Q	V				
6+55	0.2025	0.43	Q	V				
7+ 0	0.2055	0.44	Q	V				
7+ 5	0.2085	0.44	Q	V				
7+10	0.2116	0.44	Q	V				
7+15	0.2146	0.44	Q	V				
7+20	0.2177	0.45	Q	V				
7+25	0.2208	0.45	Q	V				
7+30	0.2239	0.45	Q	V				
7+35	0.2270	0.45	Q	V				
7+40	0.2301	0.46	Q	V				
7+45	0.2333	0.46	Q	V				
7+50	0.2365	0.46	Q	V				
7+55	0.2397	0.46	Q	V				
8+ 0	0.2429	0.47	Q	V				
8+ 5	0.2461	0.47	Q	V				
8+10	0.2493	0.47	Q	V				
8+15	0.2526	0.47	Q	V				
8+20	0.2559	0.48	Q	V				
8+25	0.2592	0.48	Q	V				
8+30	0.2625	0.48	Q	V				
8+35	0.2658	0.48	Q	V				
8+40	0.2692	0.49	Q	V				
8+45	0.2725	0.49	Q	V				
8+50	0.2759	0.49	Q	V				
8+55	0.2794	0.50	Q	V				
9+ 0	0.2828	0.50	Q	V				
9+ 5	0.2863	0.50	Q	V				
9+10	0.2898	0.51	Q	V				
9+15	0.2933	0.51	Q	V				
9+20	0.2968	0.51	Q	V				
9+25	0.3003	0.52	Q	V				
9+30	0.3039	0.52	Q	V				
9+35	0.3075	0.52	Q	V				
9+40	0.3112	0.53	Q	V				
9+45	0.3148	0.53	Q	V				
9+50	0.3185	0.53	Q	V				
9+55	0.3222	0.54	Q	V				
10+ 0	0.3259	0.54	Q	V				
10+ 5	0.3297	0.55	Q	V				
10+10	0.3335	0.55	Q	V				
10+15	0.3373	0.55	Q	V				
10+20	0.3411	0.56	Q	V				
10+25	0.3450	0.56	Q	V				
10+30	0.3489	0.57	Q	V				
10+35	0.3529	0.57	Q	V				
10+40	0.3568	0.58	Q	V				
10+45	0.3608	0.58	Q	V				
10+50	0.3649	0.59	Q	V				
10+55	0.3689	0.59	Q	V				
11+ 0	0.3731	0.60	Q	V				
11+ 5	0.3772	0.60	Q	V				
11+10	0.3814	0.61	Q	V				

11+15	0.3856	0.61	Q	V	|	|	|
11+20	0.3899	0.62	Q	V	|	|	|
11+25	0.3942	0.62	Q	V	|	|	|
11+30	0.3985	0.63	Q	V	|	|	|
11+35	0.4029	0.64	Q	V	|	|	|
11+40	0.4073	0.64	Q	V	|	|	|
11+45	0.4118	0.65	Q	V	|	|	|
11+50	0.4163	0.66	Q	V	|	|	|
11+55	0.4208	0.66	Q	V	|	|	|
12+ 0	0.4254	0.67	Q	V	|	|	|
12+ 5	0.4301	0.68	Q	V	|	|	|
12+10	0.4349	0.69	Q	V	|	|	|
12+15	0.4397	0.71	Q	V	|	|	|
12+20	0.4447	0.73	Q	V	|	|	|
12+25	0.4499	0.75	|Q	V|	|	|	|
12+30	0.4552	0.77	|Q	V|	|	|	|
12+35	0.4606	0.78	|Q	V|	|	|	|
12+40	0.4661	0.80	|Q	V|	|	|	|
12+45	0.4717	0.81	|Q	V|	|	|	|
12+50	0.4773	0.82	|Q	V|	|	|	|
12+55	0.4830	0.83	|Q	V|	|	|	|
13+ 0	0.4888	0.84	|Q	V|	|	|	|
13+ 5	0.4947	0.85	|Q	V|	|	|	|
13+10	0.5006	0.86	|Q	V	|	|	|
13+15	0.5066	0.87	|Q	V	|	|	|
13+20	0.5127	0.89	|Q	V	|	|	|
13+25	0.5189	0.90	|Q	V	|	|	|
13+30	0.5252	0.91	|Q	V	|	|	|
13+35	0.5316	0.93	|Q	V	|	|	|
13+40	0.5381	0.94	|Q	V	|	|	|
13+45	0.5447	0.96	|Q	V	|	|	|
13+50	0.5514	0.97	|Q	|V	|	|	|
13+55	0.5582	0.99	|Q	|V	|	|	|
14+ 0	0.5651	1.01	|Q	|V	|	|	|
14+ 5	0.5722	1.03	|Q	|V	|	|	|
14+10	0.5794	1.05	|Q	|V	|	|	|
14+15	0.5868	1.07	|Q	|V	|	|	|
14+20	0.5943	1.09	|Q	|V	|	|	|
14+25	0.6020	1.12	|Q	| V	|	|	|
14+30	0.6098	1.14	|Q	| V	|	|	|
14+35	0.6179	1.17	|Q	| V	|	|	|
14+40	0.6261	1.20	|Q	| V	|	|	|
14+45	0.6346	1.23	|Q	| V	|	|	|
14+50	0.6433	1.26	|Q	| V	|	|	|
14+55	0.6522	1.30	|Q	| V	|	|	|
15+ 0	0.6614	1.34	|Q	| V	|	|	|
15+ 5	0.6710	1.39	|Q	| V	|	|	|
15+10	0.6808	1.43	|Q	| V	|	|	|
15+15	0.6911	1.49	|Q	| V	|	|	|
15+20	0.7018	1.55	| Q	| V	|	|	|
15+25	0.7129	1.61	| Q	| V	|	|	|
15+30	0.7244	1.67	| Q	| V	|	|	|
15+35	0.7362	1.72	| Q	| V	|	|	|
15+40	0.7483	1.76	| Q	| V	|	|	|
15+45	0.7609	1.82	| Q	| V	|	|	|
15+50	0.7742	1.94	| Q	| V	|	|	|
15+55	0.7895	2.22	| Q	| V	|	|	|



20+45	1.8700	0.46	Q	|	|	|	V |
20+50	1.8732	0.45	Q	|	|	|	V |
20+55	1.8762	0.45	Q	|	|	|	V |
21+ 0	1.8793	0.44	Q	|	|	|	V |
21+ 5	1.8823	0.44	Q	|	|	|	V |
21+10	1.8853	0.43	Q	|	|	|	V |
21+15	1.8882	0.43	Q	|	|	|	V |
21+20	1.8912	0.43	Q	|	|	|	V |
21+25	1.8941	0.42	Q	|	|	|	V |
21+30	1.8969	0.42	Q	|	|	|	V |
21+35	1.8998	0.41	Q	|	|	|	V |
21+40	1.9026	0.41	Q	|	|	|	V |
21+45	1.9054	0.41	Q	|	|	|	V |
21+50	1.9082	0.40	Q	|	|	|	V |
21+55	1.9109	0.40	Q	|	|	|	V |
22+ 0	1.9137	0.40	Q	|	|	|	V |
22+ 5	1.9164	0.39	Q	|	|	|	V |
22+10	1.9191	0.39	Q	|	|	|	V |
22+15	1.9217	0.39	Q	|	|	|	V |
22+20	1.9244	0.38	Q	|	|	|	V |
22+25	1.9270	0.38	Q	|	|	|	V |
22+30	1.9296	0.38	Q	|	|	|	V |
22+35	1.9322	0.37	Q	|	|	|	V |
22+40	1.9347	0.37	Q	|	|	|	V|
22+45	1.9373	0.37	Q	|	|	|	V|
22+50	1.9398	0.37	Q	|	|	|	V|
22+55	1.9423	0.36	Q	|	|	|	V|
23+ 0	1.9448	0.36	Q	|	|	|	V|
23+ 5	1.9472	0.36	Q	|	|	|	V|
23+10	1.9497	0.36	Q	|	|	|	V|
23+15	1.9521	0.35	Q	|	|	|	V|
23+20	1.9545	0.35	Q	|	|	|	V|
23+25	1.9569	0.35	Q	|	|	|	V|
23+30	1.9593	0.35	Q	|	|	|	V|
23+35	1.9617	0.34	Q	|	|	|	V|
23+40	1.9641	0.34	Q	|	|	|	V|
23+45	1.9664	0.34	Q	|	|	|	V|
23+50	1.9687	0.34	Q	|	|	|	V|
23+55	1.9710	0.34	Q	|	|	|	V|
24+ 0	1.9733	0.33	Q	|	|	|	V|
24+ 5	1.9756	0.33	Q	|	|	|	V|
24+10	1.9777	0.30	Q	|	|	|	V|
24+15	1.9794	0.25	Q	|	|	|	V|
24+20	1.9807	0.19	Q	|	|	|	V|
24+25	1.9814	0.11	Q	|	|	|	V|
24+30	1.9819	0.06	Q	|	|	|	V|
24+35	1.9821	0.03	Q	|	|	|	V|
24+40	1.9822	0.02	Q	|	|	|	V|
24+45	1.9823	0.01	Q	|	|	|	V|
24+50	1.9823	0.01	Q	|	|	|	V|
24+55	1.9823	0.00	Q	|	|	|	V|
25+ 0	1.9823	0.00	Q	|	|	|	V|
25+ 5	1.9823	0.00	Q	|	|	|	V

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

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Study date 04/23/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION - NORTHERLY CHAMBERS
100-YEAR STORM EVENT ANALYSIS WITH ADJUSTED 25 YEAR RAINFALL DATA

Storm Event Year = 100

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 100		
15.31	1	1.00
Rainfall data for year 100		
15.31	6	2.43
Rainfall data for year 100		
15.31	24	4.48

++

******** 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)
32.0	32.0	15.31	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
12.25	0.800	32.0	32.0	21.25	0.001
3.06	0.200	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.190
Area-averaged low loss fraction, Yb = 0.810
User entry of time of concentration = 0.407 (hours)
++
Watershed area = 15.31(Ac.)
Catchment Lag time = 0.326 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 25.5624
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.810 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.369(In)
Computed peak 30-minute rainfall = 0.756(In)
Specified peak 1-hour rainfall = 0.998(In)
Computed peak 3-hour rainfall = 1.722(In)
Specified peak 6-hour rainfall = 2.430(In)
Specified peak 24-hour rainfall = 4.480(In)

Rainfall depth area reduction factors:
Using a total area of 15.31(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.369(In)
30-minute factor = 0.999 Adjusted rainfall = 0.756(In)
1-hour factor = 0.999 Adjusted rainfall = 0.997(In)
3-hour factor = 1.000 Adjusted rainfall = 1.722(In)
6-hour factor = 1.000 Adjusted rainfall = 2.430(In)
24-hour factor = 1.000 Adjusted rainfall = 4.480(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 = 185.16 (CFS))	
1	1.591	2.945
2	7.962	11.798
3	21.763	25.552
4	40.401	34.509
5	62.779	41.435
6	78.302	28.741
7	88.244	18.409

8	93.407	9.559
9	96.564	5.845
10	98.103	2.849
11	98.631	0.979
12	99.091	0.852
13	99.551	0.852
14	100.000	0.830

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3691	0.3691
2	0.4870	0.1179
3	0.5728	0.0858
4	0.6426	0.0699
5	0.7026	0.0600
6	0.7558	0.0532
7	0.8039	0.0481
8	0.8480	0.0441
9	0.8889	0.0409
10	0.9271	0.0383
11	0.9632	0.0360
12	0.9973	0.0341
13	1.0378	0.0405
14	1.0767	0.0390
15	1.1143	0.0376
16	1.1506	0.0363
17	1.1859	0.0352
18	1.2200	0.0342
19	1.2533	0.0332
20	1.2857	0.0324
21	1.3172	0.0316
22	1.3481	0.0308
23	1.3782	0.0301
24	1.4077	0.0295
25	1.4365	0.0289
26	1.4648	0.0283
27	1.4926	0.0277
28	1.5198	0.0272
29	1.5466	0.0268
30	1.5728	0.0263
31	1.5987	0.0259
32	1.6241	0.0254
33	1.6492	0.0250
34	1.6738	0.0247
35	1.6981	0.0243
36	1.7221	0.0240
37	1.7457	0.0236
38	1.7690	0.0233
39	1.7919	0.0230
40	1.8146	0.0227
41	1.8370	0.0224
42	1.8591	0.0221
43	1.8810	0.0219
44	1.9026	0.0216
45	1.9240	0.0214
46	1.9451	0.0211
47	1.9660	0.0209

48	1.9866	0.0207
49	2.0071	0.0205
50	2.0273	0.0202
51	2.0474	0.0200
52	2.0672	0.0198
53	2.0869	0.0197
54	2.1063	0.0195
55	2.1256	0.0193
56	2.1447	0.0191
57	2.1637	0.0189
58	2.1824	0.0188
59	2.2010	0.0186
60	2.2195	0.0185
61	2.2378	0.0183
62	2.2559	0.0181
63	2.2739	0.0180
64	2.2918	0.0179
65	2.3095	0.0177
66	2.3271	0.0176
67	2.3445	0.0174
68	2.3619	0.0173
69	2.3791	0.0172
70	2.3961	0.0171
71	2.4131	0.0169
72	2.4299	0.0168
73	2.4447	0.0148
74	2.4594	0.0147
75	2.4741	0.0146
76	2.4886	0.0145
77	2.5030	0.0144
78	2.5172	0.0143
79	2.5314	0.0142
80	2.5455	0.0141
81	2.5595	0.0140
82	2.5734	0.0139
83	2.5872	0.0138
84	2.6009	0.0137
85	2.6145	0.0136
86	2.6281	0.0135
87	2.6415	0.0134
88	2.6549	0.0134
89	2.6681	0.0133
90	2.6813	0.0132
91	2.6944	0.0131
92	2.7075	0.0130
93	2.7204	0.0129
94	2.7333	0.0129
95	2.7461	0.0128
96	2.7588	0.0127
97	2.7714	0.0126
98	2.7840	0.0126
99	2.7965	0.0125
100	2.8089	0.0124
101	2.8213	0.0124
102	2.8336	0.0123
103	2.8458	0.0122
104	2.8580	0.0122

105	2.8701	0.0121
106	2.8821	0.0120
107	2.8941	0.0120
108	2.9060	0.0119
109	2.9178	0.0118
110	2.9296	0.0118
111	2.9413	0.0117
112	2.9530	0.0117
113	2.9646	0.0116
114	2.9762	0.0115
115	2.9876	0.0115
116	2.9991	0.0114
117	3.0105	0.0114
118	3.0218	0.0113
119	3.0331	0.0113
120	3.0443	0.0112
121	3.0555	0.0112
122	3.0666	0.0111
123	3.0776	0.0111
124	3.0887	0.0110
125	3.0996	0.0110
126	3.1105	0.0109
127	3.1214	0.0109
128	3.1322	0.0108
129	3.1430	0.0108
130	3.1537	0.0107
131	3.1644	0.0107
132	3.1751	0.0106
133	3.1857	0.0106
134	3.1962	0.0105
135	3.2067	0.0105
136	3.2172	0.0105
137	3.2276	0.0104
138	3.2380	0.0104
139	3.2483	0.0103
140	3.2586	0.0103
141	3.2688	0.0103
142	3.2790	0.0102
143	3.2892	0.0102
144	3.2993	0.0101
145	3.3094	0.0101
146	3.3195	0.0101
147	3.3295	0.0100
148	3.3395	0.0100
149	3.3494	0.0099
150	3.3593	0.0099
151	3.3692	0.0099
152	3.3790	0.0098
153	3.3888	0.0098
154	3.3986	0.0098
155	3.4083	0.0097
156	3.4180	0.0097
157	3.4276	0.0097
158	3.4372	0.0096
159	3.4468	0.0096
160	3.4564	0.0095
161	3.4659	0.0095

162	3.4754	0.0095
163	3.4848	0.0095
164	3.4942	0.0094
165	3.5036	0.0094
166	3.5130	0.0094
167	3.5223	0.0093
168	3.5316	0.0093
169	3.5409	0.0093
170	3.5501	0.0092
171	3.5593	0.0092
172	3.5685	0.0092
173	3.5776	0.0091
174	3.5867	0.0091
175	3.5958	0.0091
176	3.6048	0.0091
177	3.6139	0.0090
178	3.6229	0.0090
179	3.6318	0.0090
180	3.6408	0.0089
181	3.6497	0.0089
182	3.6586	0.0089
183	3.6674	0.0089
184	3.6763	0.0088
185	3.6851	0.0088
186	3.6938	0.0088
187	3.7026	0.0088
188	3.7113	0.0087
189	3.7200	0.0087
190	3.7287	0.0087
191	3.7373	0.0086
192	3.7460	0.0086
193	3.7545	0.0086
194	3.7631	0.0086
195	3.7717	0.0085
196	3.7802	0.0085
197	3.7887	0.0085
198	3.7972	0.0085
199	3.8056	0.0085
200	3.8140	0.0084
201	3.8224	0.0084
202	3.8308	0.0084
203	3.8392	0.0084
204	3.8475	0.0083
205	3.8558	0.0083
206	3.8641	0.0083
207	3.8724	0.0083
208	3.8806	0.0082
209	3.8889	0.0082
210	3.8971	0.0082
211	3.9052	0.0082
212	3.9134	0.0082
213	3.9215	0.0081
214	3.9296	0.0081
215	3.9377	0.0081
216	3.9458	0.0081
217	3.9539	0.0081
218	3.9619	0.0080

219	3.9699	0.0080
220	3.9779	0.0080
221	3.9859	0.0080
222	3.9938	0.0079
223	4.0017	0.0079
224	4.0096	0.0079
225	4.0175	0.0079
226	4.0254	0.0079
227	4.0332	0.0079
228	4.0411	0.0078
229	4.0489	0.0078
230	4.0567	0.0078
231	4.0645	0.0078
232	4.0722	0.0078
233	4.0799	0.0077
234	4.0877	0.0077
235	4.0954	0.0077
236	4.1030	0.0077
237	4.1107	0.0077
238	4.1184	0.0076
239	4.1260	0.0076
240	4.1336	0.0076
241	4.1412	0.0076
242	4.1488	0.0076
243	4.1563	0.0076
244	4.1639	0.0075
245	4.1714	0.0075
246	4.1789	0.0075
247	4.1864	0.0075
248	4.1938	0.0075
249	4.2013	0.0075
250	4.2087	0.0074
251	4.2162	0.0074
252	4.2236	0.0074
253	4.2309	0.0074
254	4.2383	0.0074
255	4.2457	0.0074
256	4.2530	0.0073
257	4.2603	0.0073
258	4.2676	0.0073
259	4.2749	0.0073
260	4.2822	0.0073
261	4.2895	0.0073
262	4.2967	0.0072
263	4.3039	0.0072
264	4.3112	0.0072
265	4.3184	0.0072
266	4.3255	0.0072
267	4.3327	0.0072
268	4.3399	0.0072
269	4.3470	0.0071
270	4.3541	0.0071
271	4.3612	0.0071
272	4.3683	0.0071
273	4.3754	0.0071
274	4.3825	0.0071
275	4.3895	0.0071

276	4.3966	0.0070
277	4.4036	0.0070
278	4.4106	0.0070
279	4.4176	0.0070
280	4.4246	0.0070
281	4.4315	0.0070
282	4.4385	0.0070
283	4.4454	0.0069
284	4.4523	0.0069
285	4.4593	0.0069
286	4.4662	0.0069
287	4.4730	0.0069
288	4.4799	0.0069

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0069	0.0056	0.0013
2	0.0069	0.0056	0.0013
3	0.0069	0.0056	0.0013
4	0.0069	0.0056	0.0013
5	0.0070	0.0056	0.0013
6	0.0070	0.0056	0.0013
7	0.0070	0.0057	0.0013
8	0.0070	0.0057	0.0013
9	0.0070	0.0057	0.0013
10	0.0071	0.0057	0.0013
11	0.0071	0.0057	0.0013
12	0.0071	0.0057	0.0013
13	0.0071	0.0058	0.0014
14	0.0071	0.0058	0.0014
15	0.0072	0.0058	0.0014
16	0.0072	0.0058	0.0014
17	0.0072	0.0058	0.0014
18	0.0072	0.0059	0.0014
19	0.0073	0.0059	0.0014
20	0.0073	0.0059	0.0014
21	0.0073	0.0059	0.0014
22	0.0073	0.0059	0.0014
23	0.0074	0.0060	0.0014
24	0.0074	0.0060	0.0014
25	0.0074	0.0060	0.0014
26	0.0074	0.0060	0.0014
27	0.0075	0.0060	0.0014
28	0.0075	0.0061	0.0014
29	0.0075	0.0061	0.0014
30	0.0075	0.0061	0.0014
31	0.0076	0.0061	0.0014
32	0.0076	0.0061	0.0014
33	0.0076	0.0062	0.0014
34	0.0076	0.0062	0.0014
35	0.0077	0.0062	0.0015
36	0.0077	0.0062	0.0015
37	0.0077	0.0063	0.0015
38	0.0077	0.0063	0.0015
39	0.0078	0.0063	0.0015

40	0.0078	0.0063	0.0015
41	0.0078	0.0063	0.0015
42	0.0079	0.0064	0.0015
43	0.0079	0.0064	0.0015
44	0.0079	0.0064	0.0015
45	0.0079	0.0064	0.0015
46	0.0080	0.0065	0.0015
47	0.0080	0.0065	0.0015
48	0.0080	0.0065	0.0015
49	0.0081	0.0065	0.0015
50	0.0081	0.0066	0.0015
51	0.0081	0.0066	0.0015
52	0.0082	0.0066	0.0015
53	0.0082	0.0066	0.0016
54	0.0082	0.0067	0.0016
55	0.0083	0.0067	0.0016
56	0.0083	0.0067	0.0016
57	0.0083	0.0068	0.0016
58	0.0084	0.0068	0.0016
59	0.0084	0.0068	0.0016
60	0.0084	0.0068	0.0016
61	0.0085	0.0069	0.0016
62	0.0085	0.0069	0.0016
63	0.0085	0.0069	0.0016
64	0.0086	0.0069	0.0016
65	0.0086	0.0070	0.0016
66	0.0086	0.0070	0.0016
67	0.0087	0.0070	0.0017
68	0.0087	0.0071	0.0017
69	0.0088	0.0071	0.0017
70	0.0088	0.0071	0.0017
71	0.0089	0.0072	0.0017
72	0.0089	0.0072	0.0017
73	0.0089	0.0072	0.0017
74	0.0090	0.0073	0.0017
75	0.0090	0.0073	0.0017
76	0.0091	0.0073	0.0017
77	0.0091	0.0074	0.0017
78	0.0091	0.0074	0.0017
79	0.0092	0.0075	0.0017
80	0.0092	0.0075	0.0018
81	0.0093	0.0075	0.0018
82	0.0093	0.0076	0.0018
83	0.0094	0.0076	0.0018
84	0.0094	0.0076	0.0018
85	0.0095	0.0077	0.0018
86	0.0095	0.0077	0.0018
87	0.0096	0.0078	0.0018
88	0.0096	0.0078	0.0018
89	0.0097	0.0078	0.0018
90	0.0097	0.0079	0.0018
91	0.0098	0.0079	0.0019
92	0.0098	0.0080	0.0019
93	0.0099	0.0080	0.0019
94	0.0099	0.0081	0.0019
95	0.0100	0.0081	0.0019
96	0.0101	0.0081	0.0019

97	0.0101	0.0082	0.0019
98	0.0102	0.0082	0.0019
99	0.0103	0.0083	0.0019
100	0.0103	0.0083	0.0020
101	0.0104	0.0084	0.0020
102	0.0104	0.0084	0.0020
103	0.0105	0.0085	0.0020
104	0.0105	0.0085	0.0020
105	0.0106	0.0086	0.0020
106	0.0107	0.0087	0.0020
107	0.0108	0.0087	0.0020
108	0.0108	0.0088	0.0021
109	0.0109	0.0088	0.0021
110	0.0110	0.0089	0.0021
111	0.0111	0.0090	0.0021
112	0.0111	0.0090	0.0021
113	0.0112	0.0091	0.0021
114	0.0113	0.0091	0.0021
115	0.0114	0.0092	0.0022
116	0.0114	0.0093	0.0022
117	0.0115	0.0094	0.0022
118	0.0116	0.0094	0.0022
119	0.0117	0.0095	0.0022
120	0.0118	0.0095	0.0022
121	0.0119	0.0096	0.0023
122	0.0120	0.0097	0.0023
123	0.0121	0.0098	0.0023
124	0.0122	0.0099	0.0023
125	0.0123	0.0100	0.0023
126	0.0124	0.0100	0.0023
127	0.0125	0.0101	0.0024
128	0.0126	0.0102	0.0024
129	0.0127	0.0103	0.0024
130	0.0128	0.0104	0.0024
131	0.0129	0.0105	0.0025
132	0.0130	0.0106	0.0025
133	0.0132	0.0107	0.0025
134	0.0133	0.0108	0.0025
135	0.0134	0.0109	0.0026
136	0.0135	0.0110	0.0026
137	0.0137	0.0111	0.0026
138	0.0138	0.0112	0.0026
139	0.0140	0.0113	0.0027
140	0.0141	0.0114	0.0027
141	0.0143	0.0116	0.0027
142	0.0144	0.0117	0.0027
143	0.0146	0.0118	0.0028
144	0.0147	0.0119	0.0028
145	0.0168	0.0136	0.0032
146	0.0169	0.0137	0.0032
147	0.0172	0.0139	0.0033
148	0.0173	0.0140	0.0033
149	0.0176	0.0142	0.0033
150	0.0177	0.0144	0.0034
151	0.0180	0.0146	0.0034
152	0.0181	0.0147	0.0034
153	0.0185	0.0149	0.0035

154	0.0186	0.0151	0.0035
155	0.0189	0.0153	0.0036
156	0.0191	0.0155	0.0036
157	0.0195	0.0158	0.0037
158	0.0197	0.0159	0.0037
159	0.0200	0.0162	0.0038
160	0.0202	0.0164	0.0038
161	0.0207	0.0167	0.0039
162	0.0209	0.0169	0.0040
163	0.0214	0.0173	0.0041
164	0.0216	0.0175	0.0041
165	0.0221	0.0179	0.0042
166	0.0224	0.0181	0.0043
167	0.0230	0.0186	0.0044
168	0.0233	0.0189	0.0044
169	0.0240	0.0194	0.0045
170	0.0243	0.0197	0.0046
171	0.0250	0.0203	0.0048
172	0.0254	0.0206	0.0048
173	0.0263	0.0213	0.0050
174	0.0268	0.0217	0.0051
175	0.0277	0.0225	0.0053
176	0.0283	0.0229	0.0054
177	0.0295	0.0239	0.0056
178	0.0301	0.0244	0.0057
179	0.0316	0.0256	0.0060
180	0.0324	0.0262	0.0061
181	0.0342	0.0277	0.0065
182	0.0352	0.0285	0.0067
183	0.0376	0.0304	0.0071
184	0.0390	0.0316	0.0074
185	0.0341	0.0276	0.0065
186	0.0360	0.0292	0.0068
187	0.0409	0.0331	0.0078
188	0.0441	0.0357	0.0084
189	0.0532	0.0431	0.0101
190	0.0600	0.0486	0.0114
191	0.0858	0.0652	0.0206
192	0.1179	0.0652	0.0527
193	0.3691	0.0652	0.3039
194	0.0699	0.0566	0.0133
195	0.0481	0.0389	0.0091
196	0.0383	0.0310	0.0073
197	0.0405	0.0328	0.0077
198	0.0363	0.0294	0.0069
199	0.0332	0.0269	0.0063
200	0.0308	0.0250	0.0059
201	0.0289	0.0234	0.0055
202	0.0272	0.0221	0.0052
203	0.0259	0.0209	0.0049
204	0.0247	0.0200	0.0047
205	0.0236	0.0191	0.0045
206	0.0227	0.0184	0.0043
207	0.0219	0.0177	0.0042
208	0.0211	0.0171	0.0040
209	0.0205	0.0166	0.0039
210	0.0198	0.0161	0.0038

211	0.0193	0.0156	0.0037
212	0.0188	0.0152	0.0036
213	0.0183	0.0148	0.0035
214	0.0179	0.0145	0.0034
215	0.0174	0.0141	0.0033
216	0.0171	0.0138	0.0032
217	0.0148	0.0120	0.0028
218	0.0145	0.0117	0.0028
219	0.0142	0.0115	0.0027
220	0.0139	0.0113	0.0026
221	0.0136	0.0110	0.0026
222	0.0134	0.0108	0.0025
223	0.0131	0.0106	0.0025
224	0.0129	0.0104	0.0024
225	0.0126	0.0102	0.0024
226	0.0124	0.0101	0.0024
227	0.0122	0.0099	0.0023
228	0.0120	0.0097	0.0023
229	0.0118	0.0096	0.0022
230	0.0117	0.0094	0.0022
231	0.0115	0.0093	0.0022
232	0.0113	0.0092	0.0022
233	0.0112	0.0090	0.0021
234	0.0110	0.0089	0.0021
235	0.0109	0.0088	0.0021
236	0.0107	0.0087	0.0020
237	0.0106	0.0086	0.0020
238	0.0105	0.0085	0.0020
239	0.0103	0.0084	0.0020
240	0.0102	0.0083	0.0019
241	0.0101	0.0082	0.0019
242	0.0100	0.0081	0.0019
243	0.0099	0.0080	0.0019
244	0.0098	0.0079	0.0019
245	0.0097	0.0078	0.0018
246	0.0095	0.0077	0.0018
247	0.0095	0.0077	0.0018
248	0.0094	0.0076	0.0018
249	0.0093	0.0075	0.0018
250	0.0092	0.0074	0.0017
251	0.0091	0.0074	0.0017
252	0.0090	0.0073	0.0017
253	0.0089	0.0072	0.0017
254	0.0088	0.0072	0.0017
255	0.0088	0.0071	0.0017
256	0.0087	0.0070	0.0016
257	0.0086	0.0070	0.0016
258	0.0085	0.0069	0.0016
259	0.0085	0.0068	0.0016
260	0.0084	0.0068	0.0016
261	0.0083	0.0067	0.0016
262	0.0082	0.0067	0.0016
263	0.0082	0.0066	0.0016
264	0.0081	0.0066	0.0015
265	0.0081	0.0065	0.0015
266	0.0080	0.0065	0.0015
267	0.0079	0.0064	0.0015

268	0.0079	0.0064	0.0015
269	0.0078	0.0063	0.0015
270	0.0078	0.0063	0.0015
271	0.0077	0.0062	0.0015
272	0.0076	0.0062	0.0015
273	0.0076	0.0061	0.0014
274	0.0075	0.0061	0.0014
275	0.0075	0.0061	0.0014
276	0.0074	0.0060	0.0014
277	0.0074	0.0060	0.0014
278	0.0073	0.0059	0.0014
279	0.0073	0.0059	0.0014
280	0.0072	0.0059	0.0014
281	0.0072	0.0058	0.0014
282	0.0072	0.0058	0.0014
283	0.0071	0.0058	0.0014
284	0.0071	0.0057	0.0013
285	0.0070	0.0057	0.0013
286	0.0070	0.0057	0.0013
287	0.0069	0.0056	0.0013
288	0.0069	0.0056	0.0013

Total soil rain loss = 3.36(In)
Total effective rainfall = 1.12(In)
Peak flow rate in flood hydrograph = 15.50(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

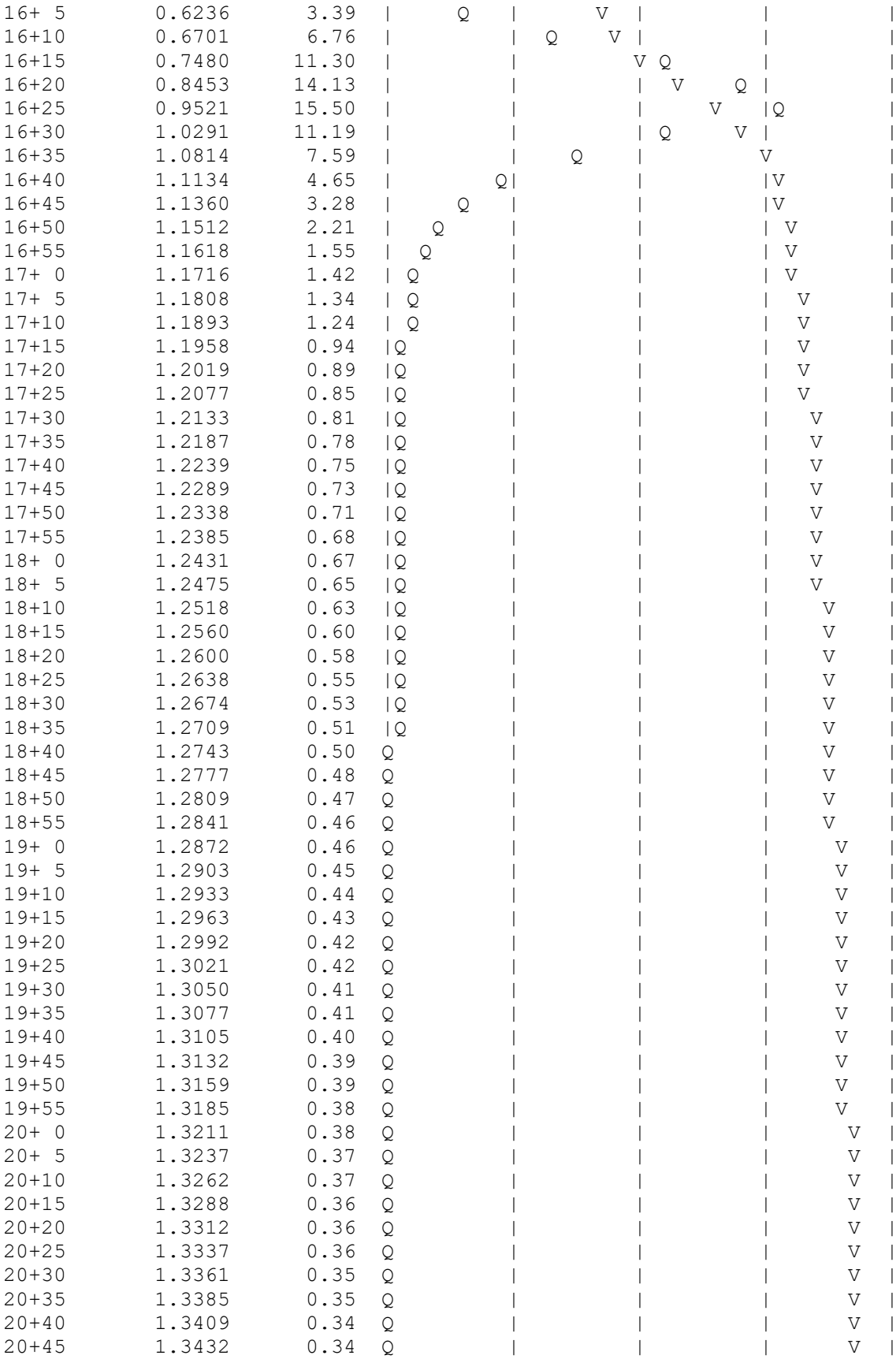
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0002	0.02	Q	|	|	|	|
0+15	0.0005	0.05	Q	|	|	|	|
0+20	0.0012	0.10	Q	|	|	|	|
0+25	0.0022	0.15	Q	|	|	|	|
0+30	0.0036	0.19	Q	|	|	|	|
0+35	0.0050	0.21	Q	|	|	|	|
0+40	0.0066	0.23	Q	|	|	|	|
0+45	0.0082	0.24	Q	|	|	|	|
0+50	0.0099	0.24	Q	|	|	|	|
0+55	0.0115	0.24	Q	|	|	|	|
1+ 0	0.0132	0.24	Q	|	|	|	|
1+ 5	0.0149	0.25	Q	|	|	|	|
1+10	0.0166	0.25	Q	|	|	|	|
1+15	0.0183	0.25	Q	|	|	|	|
1+20	0.0201	0.25	Q	|	|	|	|
1+25	0.0218	0.25	Q	|	|	|	|
1+30	0.0235	0.25	Q	|	|	|	|
1+35	0.0253	0.25	Q	|	|	|	|
1+40	0.0270	0.25	Q	|	|	|	|
1+45	0.0287	0.25	Q	|	|	|	|

1+50	0.0305	0.25	Q				
1+55	0.0322	0.26	Q				
2+ 0	0.0340	0.26	Q				
2+ 5	0.0358	0.26	QV				
2+10	0.0375	0.26	QV				
2+15	0.0393	0.26	QV				
2+20	0.0411	0.26	QV				
2+25	0.0429	0.26	QV				
2+30	0.0447	0.26	QV				
2+35	0.0465	0.26	QV				
2+40	0.0483	0.26	QV				
2+45	0.0501	0.26	QV				
2+50	0.0520	0.26	QV				
2+55	0.0538	0.27	QV				
3+ 0	0.0556	0.27	QV				
3+ 5	0.0575	0.27	QV				
3+10	0.0593	0.27	QV				
3+15	0.0612	0.27	QV				
3+20	0.0630	0.27	QV				
3+25	0.0649	0.27	QV				
3+30	0.0668	0.27	QV				
3+35	0.0686	0.27	QV				
3+40	0.0705	0.27	QV				
3+45	0.0724	0.28	Q V				
3+50	0.0743	0.28	Q V				
3+55	0.0762	0.28	Q V				
4+ 0	0.0781	0.28	Q V				
4+ 5	0.0801	0.28	Q V				
4+10	0.0820	0.28	Q V				
4+15	0.0839	0.28	Q V				
4+20	0.0859	0.28	Q V				
4+25	0.0878	0.28	Q V				
4+30	0.0898	0.28	Q V				
4+35	0.0918	0.29	Q V				
4+40	0.0937	0.29	Q V				
4+45	0.0957	0.29	Q V				
4+50	0.0977	0.29	Q V				
4+55	0.0997	0.29	Q V				
5+ 0	0.1017	0.29	Q V				
5+ 5	0.1037	0.29	Q V				
5+10	0.1058	0.29	Q V				
5+15	0.1078	0.30	Q V				
5+20	0.1098	0.30	Q V				
5+25	0.1119	0.30	Q V				
5+30	0.1139	0.30	Q V				
5+35	0.1160	0.30	Q V				
5+40	0.1181	0.30	Q V				
5+45	0.1202	0.30	Q V				
5+50	0.1223	0.30	Q V				
5+55	0.1244	0.31	Q V				
6+ 0	0.1265	0.31	Q V				
6+ 5	0.1286	0.31	Q V				
6+10	0.1307	0.31	Q V				
6+15	0.1329	0.31	Q V				
6+20	0.1350	0.31	Q V				
6+25	0.1372	0.31	Q V				
6+30	0.1394	0.32	Q V				

6+35	0.1416	0.32	Q	V	|	|	|	|
6+40	0.1437	0.32	Q	V	|	|	|	|
6+45	0.1460	0.32	Q	V	|	|	|	|
6+50	0.1482	0.32	Q	V	|	|	|	|
6+55	0.1504	0.32	Q	V	|	|	|	|
7+ 0	0.1526	0.32	Q	V	|	|	|	|
7+ 5	0.1549	0.33	Q	V	|	|	|	|
7+10	0.1571	0.33	Q	V	|	|	|	|
7+15	0.1594	0.33	Q	V	|	|	|	|
7+20	0.1617	0.33	Q	V	|	|	|	|
7+25	0.1640	0.33	Q	V	|	|	|	|
7+30	0.1663	0.33	Q	V	|	|	|	|
7+35	0.1686	0.34	Q	V	|	|	|	|
7+40	0.1709	0.34	Q	V	|	|	|	|
7+45	0.1733	0.34	Q	V	|	|	|	|
7+50	0.1756	0.34	Q	V	|	|	|	|
7+55	0.1780	0.34	Q	V	|	|	|	|
8+ 0	0.1804	0.35	Q	V	|	|	|	|
8+ 5	0.1828	0.35	Q	V	|	|	|	|
8+10	0.1852	0.35	Q	V	|	|	|	|
8+15	0.1876	0.35	Q	V	|	|	|	|
8+20	0.1900	0.35	Q	V	|	|	|	|
8+25	0.1925	0.36	Q	V	|	|	|	|
8+30	0.1949	0.36	Q	V	|	|	|	|
8+35	0.1974	0.36	Q	V	|	|	|	|
8+40	0.1999	0.36	Q	V	|	|	|	|
8+45	0.2024	0.36	Q	V	|	|	|	|
8+50	0.2050	0.37	Q	V	|	|	|	|
8+55	0.2075	0.37	Q	V	|	|	|	|
9+ 0	0.2100	0.37	Q	V	|	|	|	|
9+ 5	0.2126	0.37	Q	V	|	|	|	|
9+10	0.2152	0.38	Q	V	|	|	|	|
9+15	0.2178	0.38	Q	V	|	|	|	|
9+20	0.2204	0.38	Q	V	|	|	|	|
9+25	0.2231	0.38	Q	V	|	|	|	|
9+30	0.2257	0.39	Q	V	|	|	|	|
9+35	0.2284	0.39	Q	V	|	|	|	|
9+40	0.2311	0.39	Q	V	|	|	|	|
9+45	0.2338	0.39	Q	V	|	|	|	|
9+50	0.2365	0.40	Q	V	|	|	|	|
9+55	0.2393	0.40	Q	V	|	|	|	|
10+ 0	0.2421	0.40	Q	V	|	|	|	|
10+ 5	0.2449	0.41	Q	V	|	|	|	|
10+10	0.2477	0.41	Q	V	|	|	|	|
10+15	0.2505	0.41	Q	V	|	|	|	|
10+20	0.2534	0.41	Q	V	|	|	|	|
10+25	0.2562	0.42	Q	V	|	|	|	|
10+30	0.2591	0.42	Q	V	|	|	|	|
10+35	0.2621	0.42	Q	V	|	|	|	|
10+40	0.2650	0.43	Q	V	|	|	|	|
10+45	0.2680	0.43	Q	V	|	|	|	|
10+50	0.2710	0.43	Q	V	|	|	|	|
10+55	0.2740	0.44	Q	V	|	|	|	|
11+ 0	0.2770	0.44	Q	V	|	|	|	|
11+ 5	0.2801	0.45	Q	V	|	|	|	|
11+10	0.2832	0.45	Q	V	|	|	|	|
11+15	0.2863	0.45	Q	V	|	|	|	|

11+20	0.2895	0.46	Q	V	|	|	|
11+25	0.2927	0.46	Q	V	|	|	|
11+30	0.2959	0.47	Q	V	|	|	|
11+35	0.2991	0.47	Q	V	|	|	|
11+40	0.3024	0.48	Q	V	|	|	|
11+45	0.3057	0.48	Q	V	|	|	|
11+50	0.3091	0.49	Q	V	|	|	|
11+55	0.3125	0.49	Q	V	|	|	|
12+ 0	0.3159	0.50	Q	V	|	|	|
12+ 5	0.3193	0.50	|Q	V	|	|	|
12+10	0.3229	0.51	|Q	V	|	|	|
12+15	0.3265	0.53	|Q	V	|	|	|
12+20	0.3302	0.54	|Q	V	|	|	|
12+25	0.3341	0.57	|Q	V	|	|	|
12+30	0.3382	0.58	|Q	V	|	|	|
12+35	0.3423	0.60	|Q	V	|	|	|
12+40	0.3464	0.61	|Q	V	|	|	|
12+45	0.3507	0.61	|Q	V	|	|	|
12+50	0.3549	0.62	|Q	V	|	|	|
12+55	0.3593	0.63	|Q	V	|	|	|
13+ 0	0.3637	0.64	|Q	V	|	|	|
13+ 5	0.3681	0.65	|Q	V	|	|	|
13+10	0.3726	0.66	|Q	V	|	|	|
13+15	0.3772	0.66	|Q	V	|	|	|
13+20	0.3819	0.67	|Q	V	|	|	|
13+25	0.3866	0.68	|Q	V	|	|	|
13+30	0.3913	0.69	|Q	V	|	|	|
13+35	0.3962	0.70	|Q	|V	|	|	|
13+40	0.4011	0.71	|Q	|V	|	|	|
13+45	0.4061	0.72	|Q	|V	|	|	|
13+50	0.4111	0.74	|Q	|V	|	|	|
13+55	0.4163	0.75	|Q	|V	|	|	|
14+ 0	0.4215	0.76	|Q	|V	|	|	|
14+ 5	0.4269	0.78	|Q	|V	|	|	|
14+10	0.4323	0.79	|Q	| V	|	|	|
14+15	0.4379	0.81	|Q	| V	|	|	|
14+20	0.4435	0.82	|Q	| V	|	|	|
14+25	0.4493	0.84	|Q	| V	|	|	|
14+30	0.4552	0.86	|Q	| V	|	|	|
14+35	0.4612	0.88	|Q	| V	|	|	|
14+40	0.4674	0.90	|Q	| V	|	|	|
14+45	0.4738	0.92	|Q	| V	|	|	|
14+50	0.4803	0.95	|Q	| V	|	|	|
14+55	0.4870	0.97	|Q	| V	|	|	|
15+ 0	0.4939	1.00	| Q	| V	|	|	|
15+ 5	0.5010	1.03	| Q	| V	|	|	|
15+10	0.5083	1.07	| Q	| V	|	|	|
15+15	0.5160	1.11	| Q	| V	|	|	|
15+20	0.5239	1.15	| Q	| V	|	|	|
15+25	0.5321	1.20	| Q	| V	|	|	|
15+30	0.5406	1.23	| Q	| V	|	|	|
15+35	0.5493	1.26	| Q	| V	|	|	|
15+40	0.5581	1.28	| Q	| V	|	|	|
15+45	0.5672	1.31	| Q	| V	|	|	|
15+50	0.5768	1.39	| Q	| V	|	|	|
15+55	0.5873	1.53	| Q	| V	|	|	|
16+ 0	0.6003	1.88	| Q	| V	|	|	|



20+50	1.3455	0.34	Q	|	|	|	V |
20+55	1.3478	0.33	Q	|	|	|	V |
21+ 0	1.3501	0.33	Q	|	|	|	V |
21+ 5	1.3523	0.33	Q	|	|	|	V |
21+10	1.3546	0.32	Q	|	|	|	V |
21+15	1.3568	0.32	Q	|	|	|	V |
21+20	1.3590	0.32	Q	|	|	|	V |
21+25	1.3611	0.31	Q	|	|	|	V |
21+30	1.3633	0.31	Q	|	|	|	V |
21+35	1.3654	0.31	Q	|	|	|	V |
21+40	1.3675	0.31	Q	|	|	|	V |
21+45	1.3696	0.30	Q	|	|	|	V |
21+50	1.3716	0.30	Q	|	|	|	V |
21+55	1.3737	0.30	Q	|	|	|	V |
22+ 0	1.3757	0.30	Q	|	|	|	V |
22+ 5	1.3777	0.29	Q	|	|	|	V |
22+10	1.3797	0.29	Q	|	|	|	V |
22+15	1.3817	0.29	Q	|	|	|	V |
22+20	1.3837	0.29	Q	|	|	|	V |
22+25	1.3856	0.28	Q	|	|	|	V |
22+30	1.3876	0.28	Q	|	|	|	V |
22+35	1.3895	0.28	Q	|	|	|	V |
22+40	1.3914	0.28	Q	|	|	|	V |
22+45	1.3933	0.28	Q	|	|	|	V|
22+50	1.3952	0.27	Q	|	|	|	V|
22+55	1.3970	0.27	Q	|	|	|	V|
23+ 0	1.3989	0.27	Q	|	|	|	V|
23+ 5	1.4007	0.27	Q	|	|	|	V|
23+10	1.4026	0.27	Q	|	|	|	V|
23+15	1.4044	0.26	Q	|	|	|	V|
23+20	1.4062	0.26	Q	|	|	|	V|
23+25	1.4080	0.26	Q	|	|	|	V|
23+30	1.4098	0.26	Q	|	|	|	V|
23+35	1.4115	0.26	Q	|	|	|	V|
23+40	1.4133	0.26	Q	|	|	|	V|
23+45	1.4150	0.25	Q	|	|	|	V|
23+50	1.4168	0.25	Q	|	|	|	V|
23+55	1.4185	0.25	Q	|	|	|	V|
24+ 0	1.4202	0.25	Q	|	|	|	V|
24+ 5	1.4219	0.24	Q	|	|	|	V|
24+10	1.4234	0.23	Q	|	|	|	V|
24+15	1.4248	0.19	Q	|	|	|	V|
24+20	1.4258	0.15	Q	|	|	|	V|
24+25	1.4264	0.09	Q	|	|	|	V|
24+30	1.4268	0.05	Q	|	|	|	V|
24+35	1.4270	0.03	Q	|	|	|	V|
24+40	1.4271	0.02	Q	|	|	|	V|
24+45	1.4271	0.01	Q	|	|	|	V|
24+50	1.4272	0.00	Q	|	|	|	V|
24+55	1.4272	0.00	Q	|	|	|	V|
25+ 0	1.4272	0.00	Q	|	|	|	V|
25+ 5	1.4272	0.00	Q	|	|	|	V|

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

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Study date 04/23/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION - NORTHERLY CHAMBERS
25-YEAR STORM EVENT ANALYSIS

Storm Event Year = 25

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 25		
15.31	1	1.00
Rainfall data for year 25		
15.31	6	2.43
Rainfall data for year 25		
15.31	24	4.48

++

******** 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)
32.0	32.0	15.31	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
12.25	0.800	32.0	32.0	21.25	0.001
3.06	0.200	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.190
Area-averaged low loss fraction, Yb = 0.810
User entry of time of concentration = 0.407 (hours)
++
Watershed area = 15.31(Ac.)
Catchment Lag time = 0.326 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 25.5624
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.810 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.369(In)
Computed peak 30-minute rainfall = 0.756(In)
Specified peak 1-hour rainfall = 0.998(In)
Computed peak 3-hour rainfall = 1.722(In)
Specified peak 6-hour rainfall = 2.430(In)
Specified peak 24-hour rainfall = 4.480(In)

Rainfall depth area reduction factors:
Using a total area of 15.31(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.369(In)
30-minute factor = 0.999 Adjusted rainfall = 0.756(In)
1-hour factor = 0.999 Adjusted rainfall = 0.997(In)
3-hour factor = 1.000 Adjusted rainfall = 1.722(In)
6-hour factor = 1.000 Adjusted rainfall = 2.430(In)
24-hour factor = 1.000 Adjusted rainfall = 4.480(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 = 185.16 (CFS))	
1	1.591	2.945
2	7.962	11.798
3	21.763	25.552
4	40.401	34.509
5	62.779	41.435
6	78.302	28.741
7	88.244	18.409

8	93.407	9.559
9	96.564	5.845
10	98.103	2.849
11	98.631	0.979
12	99.091	0.852
13	99.551	0.852
14	100.000	0.830

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3691	0.3691
2	0.4870	0.1179
3	0.5728	0.0858
4	0.6426	0.0699
5	0.7026	0.0600
6	0.7558	0.0532
7	0.8039	0.0481
8	0.8480	0.0441
9	0.8889	0.0409
10	0.9271	0.0383
11	0.9632	0.0360
12	0.9973	0.0341
13	1.0378	0.0405
14	1.0767	0.0390
15	1.1143	0.0376
16	1.1506	0.0363
17	1.1859	0.0352
18	1.2200	0.0342
19	1.2533	0.0332
20	1.2857	0.0324
21	1.3172	0.0316
22	1.3481	0.0308
23	1.3782	0.0301
24	1.4077	0.0295
25	1.4365	0.0289
26	1.4648	0.0283
27	1.4926	0.0277
28	1.5198	0.0272
29	1.5466	0.0268
30	1.5728	0.0263
31	1.5987	0.0259
32	1.6241	0.0254
33	1.6492	0.0250
34	1.6738	0.0247
35	1.6981	0.0243
36	1.7221	0.0240
37	1.7457	0.0236
38	1.7690	0.0233
39	1.7919	0.0230
40	1.8146	0.0227
41	1.8370	0.0224
42	1.8591	0.0221
43	1.8810	0.0219
44	1.9026	0.0216
45	1.9240	0.0214
46	1.9451	0.0211
47	1.9660	0.0209

48	1.9866	0.0207
49	2.0071	0.0205
50	2.0273	0.0202
51	2.0474	0.0200
52	2.0672	0.0198
53	2.0869	0.0197
54	2.1063	0.0195
55	2.1256	0.0193
56	2.1447	0.0191
57	2.1637	0.0189
58	2.1824	0.0188
59	2.2010	0.0186
60	2.2195	0.0185
61	2.2378	0.0183
62	2.2559	0.0181
63	2.2739	0.0180
64	2.2918	0.0179
65	2.3095	0.0177
66	2.3271	0.0176
67	2.3445	0.0174
68	2.3619	0.0173
69	2.3791	0.0172
70	2.3961	0.0171
71	2.4131	0.0169
72	2.4299	0.0168
73	2.4447	0.0148
74	2.4594	0.0147
75	2.4741	0.0146
76	2.4886	0.0145
77	2.5030	0.0144
78	2.5172	0.0143
79	2.5314	0.0142
80	2.5455	0.0141
81	2.5595	0.0140
82	2.5734	0.0139
83	2.5872	0.0138
84	2.6009	0.0137
85	2.6145	0.0136
86	2.6281	0.0135
87	2.6415	0.0134
88	2.6549	0.0134
89	2.6681	0.0133
90	2.6813	0.0132
91	2.6944	0.0131
92	2.7075	0.0130
93	2.7204	0.0129
94	2.7333	0.0129
95	2.7461	0.0128
96	2.7588	0.0127
97	2.7714	0.0126
98	2.7840	0.0126
99	2.7965	0.0125
100	2.8089	0.0124
101	2.8213	0.0124
102	2.8336	0.0123
103	2.8458	0.0122
104	2.8580	0.0122

105	2.8701	0.0121
106	2.8821	0.0120
107	2.8941	0.0120
108	2.9060	0.0119
109	2.9178	0.0118
110	2.9296	0.0118
111	2.9413	0.0117
112	2.9530	0.0117
113	2.9646	0.0116
114	2.9762	0.0115
115	2.9876	0.0115
116	2.9991	0.0114
117	3.0105	0.0114
118	3.0218	0.0113
119	3.0331	0.0113
120	3.0443	0.0112
121	3.0555	0.0112
122	3.0666	0.0111
123	3.0776	0.0111
124	3.0887	0.0110
125	3.0996	0.0110
126	3.1105	0.0109
127	3.1214	0.0109
128	3.1322	0.0108
129	3.1430	0.0108
130	3.1537	0.0107
131	3.1644	0.0107
132	3.1751	0.0106
133	3.1857	0.0106
134	3.1962	0.0105
135	3.2067	0.0105
136	3.2172	0.0105
137	3.2276	0.0104
138	3.2380	0.0104
139	3.2483	0.0103
140	3.2586	0.0103
141	3.2688	0.0103
142	3.2790	0.0102
143	3.2892	0.0102
144	3.2993	0.0101
145	3.3094	0.0101
146	3.3195	0.0101
147	3.3295	0.0100
148	3.3395	0.0100
149	3.3494	0.0099
150	3.3593	0.0099
151	3.3692	0.0099
152	3.3790	0.0098
153	3.3888	0.0098
154	3.3986	0.0098
155	3.4083	0.0097
156	3.4180	0.0097
157	3.4276	0.0097
158	3.4372	0.0096
159	3.4468	0.0096
160	3.4564	0.0095
161	3.4659	0.0095

162	3.4754	0.0095
163	3.4848	0.0095
164	3.4942	0.0094
165	3.5036	0.0094
166	3.5130	0.0094
167	3.5223	0.0093
168	3.5316	0.0093
169	3.5409	0.0093
170	3.5501	0.0092
171	3.5593	0.0092
172	3.5685	0.0092
173	3.5776	0.0091
174	3.5867	0.0091
175	3.5958	0.0091
176	3.6048	0.0091
177	3.6139	0.0090
178	3.6229	0.0090
179	3.6318	0.0090
180	3.6408	0.0089
181	3.6497	0.0089
182	3.6586	0.0089
183	3.6674	0.0089
184	3.6763	0.0088
185	3.6851	0.0088
186	3.6938	0.0088
187	3.7026	0.0088
188	3.7113	0.0087
189	3.7200	0.0087
190	3.7287	0.0087
191	3.7373	0.0086
192	3.7460	0.0086
193	3.7545	0.0086
194	3.7631	0.0086
195	3.7717	0.0085
196	3.7802	0.0085
197	3.7887	0.0085
198	3.7972	0.0085
199	3.8056	0.0085
200	3.8140	0.0084
201	3.8224	0.0084
202	3.8308	0.0084
203	3.8392	0.0084
204	3.8475	0.0083
205	3.8558	0.0083
206	3.8641	0.0083
207	3.8724	0.0083
208	3.8806	0.0082
209	3.8889	0.0082
210	3.8971	0.0082
211	3.9052	0.0082
212	3.9134	0.0082
213	3.9215	0.0081
214	3.9296	0.0081
215	3.9377	0.0081
216	3.9458	0.0081
217	3.9539	0.0081
218	3.9619	0.0080

219	3.9699	0.0080
220	3.9779	0.0080
221	3.9859	0.0080
222	3.9938	0.0079
223	4.0017	0.0079
224	4.0096	0.0079
225	4.0175	0.0079
226	4.0254	0.0079
227	4.0332	0.0079
228	4.0411	0.0078
229	4.0489	0.0078
230	4.0567	0.0078
231	4.0645	0.0078
232	4.0722	0.0078
233	4.0799	0.0077
234	4.0877	0.0077
235	4.0954	0.0077
236	4.1030	0.0077
237	4.1107	0.0077
238	4.1184	0.0076
239	4.1260	0.0076
240	4.1336	0.0076
241	4.1412	0.0076
242	4.1488	0.0076
243	4.1563	0.0076
244	4.1639	0.0075
245	4.1714	0.0075
246	4.1789	0.0075
247	4.1864	0.0075
248	4.1938	0.0075
249	4.2013	0.0075
250	4.2087	0.0074
251	4.2162	0.0074
252	4.2236	0.0074
253	4.2309	0.0074
254	4.2383	0.0074
255	4.2457	0.0074
256	4.2530	0.0073
257	4.2603	0.0073
258	4.2676	0.0073
259	4.2749	0.0073
260	4.2822	0.0073
261	4.2895	0.0073
262	4.2967	0.0072
263	4.3039	0.0072
264	4.3112	0.0072
265	4.3184	0.0072
266	4.3255	0.0072
267	4.3327	0.0072
268	4.3399	0.0072
269	4.3470	0.0071
270	4.3541	0.0071
271	4.3612	0.0071
272	4.3683	0.0071
273	4.3754	0.0071
274	4.3825	0.0071
275	4.3895	0.0071

276	4.3966	0.0070
277	4.4036	0.0070
278	4.4106	0.0070
279	4.4176	0.0070
280	4.4246	0.0070
281	4.4315	0.0070
282	4.4385	0.0070
283	4.4454	0.0069
284	4.4523	0.0069
285	4.4593	0.0069
286	4.4662	0.0069
287	4.4730	0.0069
288	4.4799	0.0069

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0069	0.0056	0.0013
2	0.0069	0.0056	0.0013
3	0.0069	0.0056	0.0013
4	0.0069	0.0056	0.0013
5	0.0070	0.0056	0.0013
6	0.0070	0.0056	0.0013
7	0.0070	0.0057	0.0013
8	0.0070	0.0057	0.0013
9	0.0070	0.0057	0.0013
10	0.0071	0.0057	0.0013
11	0.0071	0.0057	0.0013
12	0.0071	0.0057	0.0013
13	0.0071	0.0058	0.0014
14	0.0071	0.0058	0.0014
15	0.0072	0.0058	0.0014
16	0.0072	0.0058	0.0014
17	0.0072	0.0058	0.0014
18	0.0072	0.0059	0.0014
19	0.0073	0.0059	0.0014
20	0.0073	0.0059	0.0014
21	0.0073	0.0059	0.0014
22	0.0073	0.0059	0.0014
23	0.0074	0.0060	0.0014
24	0.0074	0.0060	0.0014
25	0.0074	0.0060	0.0014
26	0.0074	0.0060	0.0014
27	0.0075	0.0060	0.0014
28	0.0075	0.0061	0.0014
29	0.0075	0.0061	0.0014
30	0.0075	0.0061	0.0014
31	0.0076	0.0061	0.0014
32	0.0076	0.0061	0.0014
33	0.0076	0.0062	0.0014
34	0.0076	0.0062	0.0014
35	0.0077	0.0062	0.0015
36	0.0077	0.0062	0.0015
37	0.0077	0.0063	0.0015
38	0.0077	0.0063	0.0015
39	0.0078	0.0063	0.0015

40	0.0078	0.0063	0.0015
41	0.0078	0.0063	0.0015
42	0.0079	0.0064	0.0015
43	0.0079	0.0064	0.0015
44	0.0079	0.0064	0.0015
45	0.0079	0.0064	0.0015
46	0.0080	0.0065	0.0015
47	0.0080	0.0065	0.0015
48	0.0080	0.0065	0.0015
49	0.0081	0.0065	0.0015
50	0.0081	0.0066	0.0015
51	0.0081	0.0066	0.0015
52	0.0082	0.0066	0.0015
53	0.0082	0.0066	0.0016
54	0.0082	0.0067	0.0016
55	0.0083	0.0067	0.0016
56	0.0083	0.0067	0.0016
57	0.0083	0.0068	0.0016
58	0.0084	0.0068	0.0016
59	0.0084	0.0068	0.0016
60	0.0084	0.0068	0.0016
61	0.0085	0.0069	0.0016
62	0.0085	0.0069	0.0016
63	0.0085	0.0069	0.0016
64	0.0086	0.0069	0.0016
65	0.0086	0.0070	0.0016
66	0.0086	0.0070	0.0016
67	0.0087	0.0070	0.0017
68	0.0087	0.0071	0.0017
69	0.0088	0.0071	0.0017
70	0.0088	0.0071	0.0017
71	0.0089	0.0072	0.0017
72	0.0089	0.0072	0.0017
73	0.0089	0.0072	0.0017
74	0.0090	0.0073	0.0017
75	0.0090	0.0073	0.0017
76	0.0091	0.0073	0.0017
77	0.0091	0.0074	0.0017
78	0.0091	0.0074	0.0017
79	0.0092	0.0075	0.0017
80	0.0092	0.0075	0.0018
81	0.0093	0.0075	0.0018
82	0.0093	0.0076	0.0018
83	0.0094	0.0076	0.0018
84	0.0094	0.0076	0.0018
85	0.0095	0.0077	0.0018
86	0.0095	0.0077	0.0018
87	0.0096	0.0078	0.0018
88	0.0096	0.0078	0.0018
89	0.0097	0.0078	0.0018
90	0.0097	0.0079	0.0018
91	0.0098	0.0079	0.0019
92	0.0098	0.0080	0.0019
93	0.0099	0.0080	0.0019
94	0.0099	0.0081	0.0019
95	0.0100	0.0081	0.0019
96	0.0101	0.0081	0.0019

97	0.0101	0.0082	0.0019
98	0.0102	0.0082	0.0019
99	0.0103	0.0083	0.0019
100	0.0103	0.0083	0.0020
101	0.0104	0.0084	0.0020
102	0.0104	0.0084	0.0020
103	0.0105	0.0085	0.0020
104	0.0105	0.0085	0.0020
105	0.0106	0.0086	0.0020
106	0.0107	0.0087	0.0020
107	0.0108	0.0087	0.0020
108	0.0108	0.0088	0.0021
109	0.0109	0.0088	0.0021
110	0.0110	0.0089	0.0021
111	0.0111	0.0090	0.0021
112	0.0111	0.0090	0.0021
113	0.0112	0.0091	0.0021
114	0.0113	0.0091	0.0021
115	0.0114	0.0092	0.0022
116	0.0114	0.0093	0.0022
117	0.0115	0.0094	0.0022
118	0.0116	0.0094	0.0022
119	0.0117	0.0095	0.0022
120	0.0118	0.0095	0.0022
121	0.0119	0.0096	0.0023
122	0.0120	0.0097	0.0023
123	0.0121	0.0098	0.0023
124	0.0122	0.0099	0.0023
125	0.0123	0.0100	0.0023
126	0.0124	0.0100	0.0023
127	0.0125	0.0101	0.0024
128	0.0126	0.0102	0.0024
129	0.0127	0.0103	0.0024
130	0.0128	0.0104	0.0024
131	0.0129	0.0105	0.0025
132	0.0130	0.0106	0.0025
133	0.0132	0.0107	0.0025
134	0.0133	0.0108	0.0025
135	0.0134	0.0109	0.0026
136	0.0135	0.0110	0.0026
137	0.0137	0.0111	0.0026
138	0.0138	0.0112	0.0026
139	0.0140	0.0113	0.0027
140	0.0141	0.0114	0.0027
141	0.0143	0.0116	0.0027
142	0.0144	0.0117	0.0027
143	0.0146	0.0118	0.0028
144	0.0147	0.0119	0.0028
145	0.0168	0.0136	0.0032
146	0.0169	0.0137	0.0032
147	0.0172	0.0139	0.0033
148	0.0173	0.0140	0.0033
149	0.0176	0.0142	0.0033
150	0.0177	0.0144	0.0034
151	0.0180	0.0146	0.0034
152	0.0181	0.0147	0.0034
153	0.0185	0.0149	0.0035

154	0.0186	0.0151	0.0035
155	0.0189	0.0153	0.0036
156	0.0191	0.0155	0.0036
157	0.0195	0.0158	0.0037
158	0.0197	0.0159	0.0037
159	0.0200	0.0162	0.0038
160	0.0202	0.0164	0.0038
161	0.0207	0.0167	0.0039
162	0.0209	0.0169	0.0040
163	0.0214	0.0173	0.0041
164	0.0216	0.0175	0.0041
165	0.0221	0.0179	0.0042
166	0.0224	0.0181	0.0043
167	0.0230	0.0186	0.0044
168	0.0233	0.0189	0.0044
169	0.0240	0.0194	0.0045
170	0.0243	0.0197	0.0046
171	0.0250	0.0203	0.0048
172	0.0254	0.0206	0.0048
173	0.0263	0.0213	0.0050
174	0.0268	0.0217	0.0051
175	0.0277	0.0225	0.0053
176	0.0283	0.0229	0.0054
177	0.0295	0.0239	0.0056
178	0.0301	0.0244	0.0057
179	0.0316	0.0256	0.0060
180	0.0324	0.0262	0.0061
181	0.0342	0.0277	0.0065
182	0.0352	0.0285	0.0067
183	0.0376	0.0304	0.0071
184	0.0390	0.0316	0.0074
185	0.0341	0.0276	0.0065
186	0.0360	0.0292	0.0068
187	0.0409	0.0331	0.0078
188	0.0441	0.0357	0.0084
189	0.0532	0.0431	0.0101
190	0.0600	0.0486	0.0114
191	0.0858	0.0652	0.0206
192	0.1179	0.0652	0.0527
193	0.3691	0.0652	0.3039
194	0.0699	0.0566	0.0133
195	0.0481	0.0389	0.0091
196	0.0383	0.0310	0.0073
197	0.0405	0.0328	0.0077
198	0.0363	0.0294	0.0069
199	0.0332	0.0269	0.0063
200	0.0308	0.0250	0.0059
201	0.0289	0.0234	0.0055
202	0.0272	0.0221	0.0052
203	0.0259	0.0209	0.0049
204	0.0247	0.0200	0.0047
205	0.0236	0.0191	0.0045
206	0.0227	0.0184	0.0043
207	0.0219	0.0177	0.0042
208	0.0211	0.0171	0.0040
209	0.0205	0.0166	0.0039
210	0.0198	0.0161	0.0038

211	0.0193	0.0156	0.0037
212	0.0188	0.0152	0.0036
213	0.0183	0.0148	0.0035
214	0.0179	0.0145	0.0034
215	0.0174	0.0141	0.0033
216	0.0171	0.0138	0.0032
217	0.0148	0.0120	0.0028
218	0.0145	0.0117	0.0028
219	0.0142	0.0115	0.0027
220	0.0139	0.0113	0.0026
221	0.0136	0.0110	0.0026
222	0.0134	0.0108	0.0025
223	0.0131	0.0106	0.0025
224	0.0129	0.0104	0.0024
225	0.0126	0.0102	0.0024
226	0.0124	0.0101	0.0024
227	0.0122	0.0099	0.0023
228	0.0120	0.0097	0.0023
229	0.0118	0.0096	0.0022
230	0.0117	0.0094	0.0022
231	0.0115	0.0093	0.0022
232	0.0113	0.0092	0.0022
233	0.0112	0.0090	0.0021
234	0.0110	0.0089	0.0021
235	0.0109	0.0088	0.0021
236	0.0107	0.0087	0.0020
237	0.0106	0.0086	0.0020
238	0.0105	0.0085	0.0020
239	0.0103	0.0084	0.0020
240	0.0102	0.0083	0.0019
241	0.0101	0.0082	0.0019
242	0.0100	0.0081	0.0019
243	0.0099	0.0080	0.0019
244	0.0098	0.0079	0.0019
245	0.0097	0.0078	0.0018
246	0.0095	0.0077	0.0018
247	0.0095	0.0077	0.0018
248	0.0094	0.0076	0.0018
249	0.0093	0.0075	0.0018
250	0.0092	0.0074	0.0017
251	0.0091	0.0074	0.0017
252	0.0090	0.0073	0.0017
253	0.0089	0.0072	0.0017
254	0.0088	0.0072	0.0017
255	0.0088	0.0071	0.0017
256	0.0087	0.0070	0.0016
257	0.0086	0.0070	0.0016
258	0.0085	0.0069	0.0016
259	0.0085	0.0068	0.0016
260	0.0084	0.0068	0.0016
261	0.0083	0.0067	0.0016
262	0.0082	0.0067	0.0016
263	0.0082	0.0066	0.0016
264	0.0081	0.0066	0.0015
265	0.0081	0.0065	0.0015
266	0.0080	0.0065	0.0015
267	0.0079	0.0064	0.0015

268	0.0079	0.0064	0.0015
269	0.0078	0.0063	0.0015
270	0.0078	0.0063	0.0015
271	0.0077	0.0062	0.0015
272	0.0076	0.0062	0.0015
273	0.0076	0.0061	0.0014
274	0.0075	0.0061	0.0014
275	0.0075	0.0061	0.0014
276	0.0074	0.0060	0.0014
277	0.0074	0.0060	0.0014
278	0.0073	0.0059	0.0014
279	0.0073	0.0059	0.0014
280	0.0072	0.0059	0.0014
281	0.0072	0.0058	0.0014
282	0.0072	0.0058	0.0014
283	0.0071	0.0058	0.0014
284	0.0071	0.0057	0.0013
285	0.0070	0.0057	0.0013
286	0.0070	0.0057	0.0013
287	0.0069	0.0056	0.0013
288	0.0069	0.0056	0.0013

Total soil rain loss = 3.36(In)
Total effective rainfall = 1.12(In)
Peak flow rate in flood hydrograph = 15.50(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

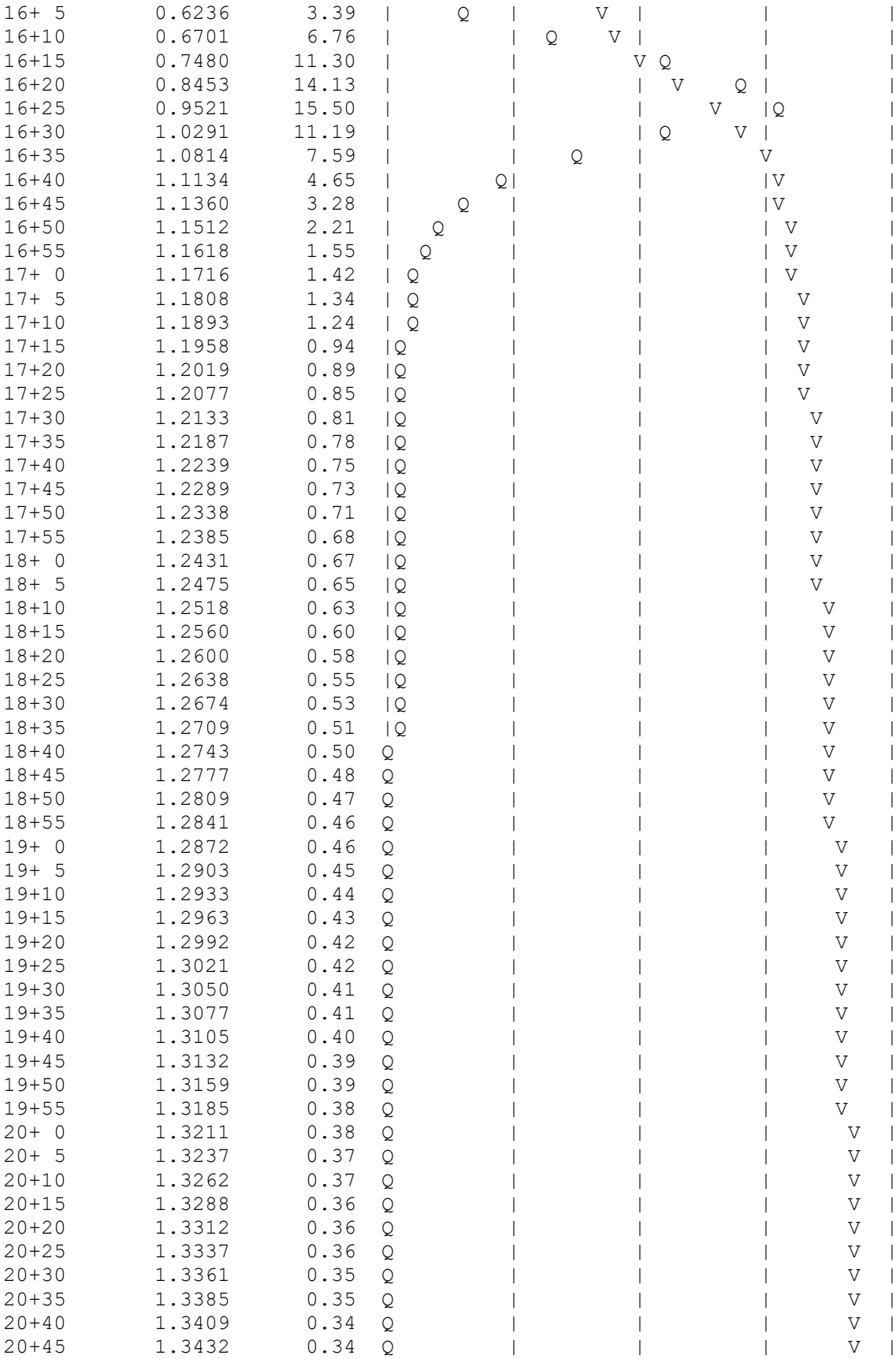
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0002	0.02	Q	|	|	|	|
0+15	0.0005	0.05	Q	|	|	|	|
0+20	0.0012	0.10	Q	|	|	|	|
0+25	0.0022	0.15	Q	|	|	|	|
0+30	0.0036	0.19	Q	|	|	|	|
0+35	0.0050	0.21	Q	|	|	|	|
0+40	0.0066	0.23	Q	|	|	|	|
0+45	0.0082	0.24	Q	|	|	|	|
0+50	0.0099	0.24	Q	|	|	|	|
0+55	0.0115	0.24	Q	|	|	|	|
1+ 0	0.0132	0.24	Q	|	|	|	|
1+ 5	0.0149	0.25	Q	|	|	|	|
1+10	0.0166	0.25	Q	|	|	|	|
1+15	0.0183	0.25	Q	|	|	|	|
1+20	0.0201	0.25	Q	|	|	|	|
1+25	0.0218	0.25	Q	|	|	|	|
1+30	0.0235	0.25	Q	|	|	|	|
1+35	0.0253	0.25	Q	|	|	|	|
1+40	0.0270	0.25	Q	|	|	|	|
1+45	0.0287	0.25	Q	|	|	|	|

1+50	0.0305	0.25	Q				
1+55	0.0322	0.26	Q				
2+ 0	0.0340	0.26	Q				
2+ 5	0.0358	0.26	QV				
2+10	0.0375	0.26	QV				
2+15	0.0393	0.26	QV				
2+20	0.0411	0.26	QV				
2+25	0.0429	0.26	QV				
2+30	0.0447	0.26	QV				
2+35	0.0465	0.26	QV				
2+40	0.0483	0.26	QV				
2+45	0.0501	0.26	QV				
2+50	0.0520	0.26	QV				
2+55	0.0538	0.27	QV				
3+ 0	0.0556	0.27	QV				
3+ 5	0.0575	0.27	QV				
3+10	0.0593	0.27	QV				
3+15	0.0612	0.27	QV				
3+20	0.0630	0.27	QV				
3+25	0.0649	0.27	QV				
3+30	0.0668	0.27	QV				
3+35	0.0686	0.27	QV				
3+40	0.0705	0.27	QV				
3+45	0.0724	0.28	Q V				
3+50	0.0743	0.28	Q V				
3+55	0.0762	0.28	Q V				
4+ 0	0.0781	0.28	Q V				
4+ 5	0.0801	0.28	Q V				
4+10	0.0820	0.28	Q V				
4+15	0.0839	0.28	Q V				
4+20	0.0859	0.28	Q V				
4+25	0.0878	0.28	Q V				
4+30	0.0898	0.28	Q V				
4+35	0.0918	0.29	Q V				
4+40	0.0937	0.29	Q V				
4+45	0.0957	0.29	Q V				
4+50	0.0977	0.29	Q V				
4+55	0.0997	0.29	Q V				
5+ 0	0.1017	0.29	Q V				
5+ 5	0.1037	0.29	Q V				
5+10	0.1058	0.29	Q V				
5+15	0.1078	0.30	Q V				
5+20	0.1098	0.30	Q V				
5+25	0.1119	0.30	Q V				
5+30	0.1139	0.30	Q V				
5+35	0.1160	0.30	Q V				
5+40	0.1181	0.30	Q V				
5+45	0.1202	0.30	Q V				
5+50	0.1223	0.30	Q V				
5+55	0.1244	0.31	Q V				
6+ 0	0.1265	0.31	Q V				
6+ 5	0.1286	0.31	Q V				
6+10	0.1307	0.31	Q V				
6+15	0.1329	0.31	Q V				
6+20	0.1350	0.31	Q V				
6+25	0.1372	0.31	Q V				
6+30	0.1394	0.32	Q V				

6+35	0.1416	0.32	Q	V	|	|	|	|
6+40	0.1437	0.32	Q	V	|	|	|	|
6+45	0.1460	0.32	Q	V	|	|	|	|
6+50	0.1482	0.32	Q	V	|	|	|	|
6+55	0.1504	0.32	Q	V	|	|	|	|
7+ 0	0.1526	0.32	Q	V	|	|	|	|
7+ 5	0.1549	0.33	Q	V	|	|	|	|
7+10	0.1571	0.33	Q	V	|	|	|	|
7+15	0.1594	0.33	Q	V	|	|	|	|
7+20	0.1617	0.33	Q	V	|	|	|	|
7+25	0.1640	0.33	Q	V	|	|	|	|
7+30	0.1663	0.33	Q	V	|	|	|	|
7+35	0.1686	0.34	Q	V	|	|	|	|
7+40	0.1709	0.34	Q	V	|	|	|	|
7+45	0.1733	0.34	Q	V	|	|	|	|
7+50	0.1756	0.34	Q	V	|	|	|	|
7+55	0.1780	0.34	Q	V	|	|	|	|
8+ 0	0.1804	0.35	Q	V	|	|	|	|
8+ 5	0.1828	0.35	Q	V	|	|	|	|
8+10	0.1852	0.35	Q	V	|	|	|	|
8+15	0.1876	0.35	Q	V	|	|	|	|
8+20	0.1900	0.35	Q	V	|	|	|	|
8+25	0.1925	0.36	Q	V	|	|	|	|
8+30	0.1949	0.36	Q	V	|	|	|	|
8+35	0.1974	0.36	Q	V	|	|	|	|
8+40	0.1999	0.36	Q	V	|	|	|	|
8+45	0.2024	0.36	Q	V	|	|	|	|
8+50	0.2050	0.37	Q	V	|	|	|	|
8+55	0.2075	0.37	Q	V	|	|	|	|
9+ 0	0.2100	0.37	Q	V	|	|	|	|
9+ 5	0.2126	0.37	Q	V	|	|	|	|
9+10	0.2152	0.38	Q	V	|	|	|	|
9+15	0.2178	0.38	Q	V	|	|	|	|
9+20	0.2204	0.38	Q	V	|	|	|	|
9+25	0.2231	0.38	Q	V	|	|	|	|
9+30	0.2257	0.39	Q	V	|	|	|	|
9+35	0.2284	0.39	Q	V	|	|	|	|
9+40	0.2311	0.39	Q	V	|	|	|	|
9+45	0.2338	0.39	Q	V	|	|	|	|
9+50	0.2365	0.40	Q	V	|	|	|	|
9+55	0.2393	0.40	Q	V	|	|	|	|
10+ 0	0.2421	0.40	Q	V	|	|	|	|
10+ 5	0.2449	0.41	Q	V	|	|	|	|
10+10	0.2477	0.41	Q	V	|	|	|	|
10+15	0.2505	0.41	Q	V	|	|	|	|
10+20	0.2534	0.41	Q	V	|	|	|	|
10+25	0.2562	0.42	Q	V	|	|	|	|
10+30	0.2591	0.42	Q	V	|	|	|	|
10+35	0.2621	0.42	Q	V	|	|	|	|
10+40	0.2650	0.43	Q	V	|	|	|	|
10+45	0.2680	0.43	Q	V	|	|	|	|
10+50	0.2710	0.43	Q	V	|	|	|	|
10+55	0.2740	0.44	Q	V	|	|	|	|
11+ 0	0.2770	0.44	Q	V	|	|	|	|
11+ 5	0.2801	0.45	Q	V	|	|	|	|
11+10	0.2832	0.45	Q	V	|	|	|	|
11+15	0.2863	0.45	Q	V	|	|	|	|

11+20	0.2895	0.46	Q	V	|	|	|
11+25	0.2927	0.46	Q	V	|	|	|
11+30	0.2959	0.47	Q	V	|	|	|
11+35	0.2991	0.47	Q	V	|	|	|
11+40	0.3024	0.48	Q	V	|	|	|
11+45	0.3057	0.48	Q	V	|	|	|
11+50	0.3091	0.49	Q	V	|	|	|
11+55	0.3125	0.49	Q	V	|	|	|
12+ 0	0.3159	0.50	Q	V	|	|	|
12+ 5	0.3193	0.50	|Q	V	|	|	|
12+10	0.3229	0.51	|Q	V	|	|	|
12+15	0.3265	0.53	|Q	V	|	|	|
12+20	0.3302	0.54	|Q	V	|	|	|
12+25	0.3341	0.57	|Q	V	|	|	|
12+30	0.3382	0.58	|Q	V	|	|	|
12+35	0.3423	0.60	|Q	V	|	|	|
12+40	0.3464	0.61	|Q	V	|	|	|
12+45	0.3507	0.61	|Q	V	|	|	|
12+50	0.3549	0.62	|Q	V	|	|	|
12+55	0.3593	0.63	|Q	V	|	|	|
13+ 0	0.3637	0.64	|Q	V	|	|	|
13+ 5	0.3681	0.65	|Q	V	|	|	|
13+10	0.3726	0.66	|Q	V	|	|	|
13+15	0.3772	0.66	|Q	V	|	|	|
13+20	0.3819	0.67	|Q	V	|	|	|
13+25	0.3866	0.68	|Q	V	|	|	|
13+30	0.3913	0.69	|Q	V	|	|	|
13+35	0.3962	0.70	|Q	|V	|	|	|
13+40	0.4011	0.71	|Q	|V	|	|	|
13+45	0.4061	0.72	|Q	|V	|	|	|
13+50	0.4111	0.74	|Q	|V	|	|	|
13+55	0.4163	0.75	|Q	|V	|	|	|
14+ 0	0.4215	0.76	|Q	|V	|	|	|
14+ 5	0.4269	0.78	|Q	|V	|	|	|
14+10	0.4323	0.79	|Q	| V	|	|	|
14+15	0.4379	0.81	|Q	| V	|	|	|
14+20	0.4435	0.82	|Q	| V	|	|	|
14+25	0.4493	0.84	|Q	| V	|	|	|
14+30	0.4552	0.86	|Q	| V	|	|	|
14+35	0.4612	0.88	|Q	| V	|	|	|
14+40	0.4674	0.90	|Q	| V	|	|	|
14+45	0.4738	0.92	|Q	| V	|	|	|
14+50	0.4803	0.95	|Q	| V	|	|	|
14+55	0.4870	0.97	|Q	| V	|	|	|
15+ 0	0.4939	1.00	| Q	| V	|	|	|
15+ 5	0.5010	1.03	| Q	| V	|	|	|
15+10	0.5083	1.07	| Q	| V	|	|	|
15+15	0.5160	1.11	| Q	| V	|	|	|
15+20	0.5239	1.15	| Q	| V	|	|	|
15+25	0.5321	1.20	| Q	| V	|	|	|
15+30	0.5406	1.23	| Q	| V	|	|	|
15+35	0.5493	1.26	| Q	| V	|	|	|
15+40	0.5581	1.28	| Q	| V	|	|	|
15+45	0.5672	1.31	| Q	| V	|	|	|
15+50	0.5768	1.39	| Q	| V	|	|	|
15+55	0.5873	1.53	| Q	| V	|	|	|
16+ 0	0.6003	1.88	| Q	| V	|	|	|



20+50	1.3455	0.34	Q	|	|	|	V |
20+55	1.3478	0.33	Q	|	|	|	V |
21+ 0	1.3501	0.33	Q	|	|	|	V |
21+ 5	1.3523	0.33	Q	|	|	|	V |
21+10	1.3546	0.32	Q	|	|	|	V |
21+15	1.3568	0.32	Q	|	|	|	V |
21+20	1.3590	0.32	Q	|	|	|	V |
21+25	1.3611	0.31	Q	|	|	|	V |
21+30	1.3633	0.31	Q	|	|	|	V |
21+35	1.3654	0.31	Q	|	|	|	V |
21+40	1.3675	0.31	Q	|	|	|	V |
21+45	1.3696	0.30	Q	|	|	|	V |
21+50	1.3716	0.30	Q	|	|	|	V |
21+55	1.3737	0.30	Q	|	|	|	V |
22+ 0	1.3757	0.30	Q	|	|	|	V |
22+ 5	1.3777	0.29	Q	|	|	|	V |
22+10	1.3797	0.29	Q	|	|	|	V |
22+15	1.3817	0.29	Q	|	|	|	V |
22+20	1.3837	0.29	Q	|	|	|	V |
22+25	1.3856	0.28	Q	|	|	|	V |
22+30	1.3876	0.28	Q	|	|	|	V |
22+35	1.3895	0.28	Q	|	|	|	V |
22+40	1.3914	0.28	Q	|	|	|	V |
22+45	1.3933	0.28	Q	|	|	|	V|
22+50	1.3952	0.27	Q	|	|	|	V|
22+55	1.3970	0.27	Q	|	|	|	V|
23+ 0	1.3989	0.27	Q	|	|	|	V|
23+ 5	1.4007	0.27	Q	|	|	|	V|
23+10	1.4026	0.27	Q	|	|	|	V|
23+15	1.4044	0.26	Q	|	|	|	V|
23+20	1.4062	0.26	Q	|	|	|	V|
23+25	1.4080	0.26	Q	|	|	|	V|
23+30	1.4098	0.26	Q	|	|	|	V|
23+35	1.4115	0.26	Q	|	|	|	V|
23+40	1.4133	0.26	Q	|	|	|	V|
23+45	1.4150	0.25	Q	|	|	|	V|
23+50	1.4168	0.25	Q	|	|	|	V|
23+55	1.4185	0.25	Q	|	|	|	V|
24+ 0	1.4202	0.25	Q	|	|	|	V|
24+ 5	1.4219	0.24	Q	|	|	|	V|
24+10	1.4234	0.23	Q	|	|	|	V|
24+15	1.4248	0.19	Q	|	|	|	V|
24+20	1.4258	0.15	Q	|	|	|	V|
24+25	1.4264	0.09	Q	|	|	|	V|
24+30	1.4268	0.05	Q	|	|	|	V|
24+35	1.4270	0.03	Q	|	|	|	V|
24+40	1.4271	0.02	Q	|	|	|	V|
24+45	1.4271	0.01	Q	|	|	|	V|
24+50	1.4272	0.00	Q	|	|	|	V|
24+55	1.4272	0.00	Q	|	|	|	V|
25+ 0	1.4272	0.00	Q	|	|	|	V|
25+ 5	1.4272	0.00	Q	|	|	|	V|

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

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Study date 04/23/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION - NORTHERLY CHAMBERS
25-YEAR STORM EVENT ANALYSIS WITH ADJUSTED 10 YEAR RAINFALL DATA

Storm Event Year = 25

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 25		
15.31	1	0.81
Rainfall data for year 25		
15.31	6	2.02
Rainfall data for year 25		
15.31	24	3.71

++

******** 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)
32.0	32.0	15.31	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
12.25	0.800	32.0	32.0	18.55	0.000
3.06	0.200	98.0	98.0	0.20	0.937

Area-averaged catchment yield fraction, Y = 0.187
Area-averaged low loss fraction, Yb = 0.813
User entry of time of concentration = 0.425 (hours)
++
Watershed area = 15.31(Ac.)
Catchment Lag time = 0.340 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 24.4925
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.813 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.301(In)
Computed peak 30-minute rainfall = 0.616(In)
Specified peak 1-hour rainfall = 0.813(In)
Computed peak 3-hour rainfall = 1.421(In)
Specified peak 6-hour rainfall = 2.020(In)
Specified peak 24-hour rainfall = 3.710(In)

Rainfall depth area reduction factors:
Using a total area of 15.31(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.301(In)
30-minute factor = 0.999 Adjusted rainfall = 0.616(In)
1-hour factor = 0.999 Adjusted rainfall = 0.812(In)
3-hour factor = 1.000 Adjusted rainfall = 1.420(In)
6-hour factor = 1.000 Adjusted rainfall = 2.020(In)
24-hour factor = 1.000 Adjusted rainfall = 3.710(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 = 185.16 (CFS))	
1	1.510	2.796
2	7.294	10.709
3	20.072	23.659
4	37.251	31.809
5	58.716	39.744
6	75.629	31.314
7	86.127	19.438

8	91.960	10.801
9	95.684	6.896
10	97.665	3.668
11	98.429	1.414
12	98.870	0.816
13	99.311	0.816
14	99.749	0.811
15	100.000	0.465

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3007	0.3007
2	0.3968	0.0961
3	0.4666	0.0699
4	0.5235	0.0569
5	0.5724	0.0489
6	0.6157	0.0433
7	0.6549	0.0392
8	0.6908	0.0359
9	0.7241	0.0333
10	0.7553	0.0312
11	0.7846	0.0294
12	0.8124	0.0278
13	0.8462	0.0338
14	0.8787	0.0325
15	0.9100	0.0314
16	0.9404	0.0304
17	0.9698	0.0294
18	0.9984	0.0286
19	1.0263	0.0278
20	1.0534	0.0271
21	1.0799	0.0265
22	1.1057	0.0259
23	1.1310	0.0253
24	1.1557	0.0247
25	1.1800	0.0242
26	1.2037	0.0238
27	1.2271	0.0233
28	1.2500	0.0229
29	1.2725	0.0225
30	1.2946	0.0221
31	1.3164	0.0218
32	1.3378	0.0214
33	1.3589	0.0211
34	1.3797	0.0208
35	1.4002	0.0205
36	1.4204	0.0202
37	1.4403	0.0199
38	1.4599	0.0196
39	1.4793	0.0194
40	1.4985	0.0191
41	1.5174	0.0189
42	1.5361	0.0187
43	1.5546	0.0185
44	1.5728	0.0183
45	1.5909	0.0181
46	1.6087	0.0179

47	1.6264	0.0177
48	1.6439	0.0175
49	1.6612	0.0173
50	1.6783	0.0171
51	1.6953	0.0170
52	1.7121	0.0168
53	1.7288	0.0166
54	1.7453	0.0165
55	1.7616	0.0163
56	1.7778	0.0162
57	1.7939	0.0161
58	1.8098	0.0159
59	1.8256	0.0158
60	1.8412	0.0157
61	1.8567	0.0155
62	1.8721	0.0154
63	1.8874	0.0153
64	1.9026	0.0152
65	1.9176	0.0150
66	1.9326	0.0149
67	1.9474	0.0148
68	1.9621	0.0147
69	1.9767	0.0146
70	1.9912	0.0145
71	2.0056	0.0144
72	2.0199	0.0143
73	2.0322	0.0123
74	2.0443	0.0122
75	2.0564	0.0121
76	2.0684	0.0120
77	2.0803	0.0119
78	2.0921	0.0118
79	2.1038	0.0117
80	2.1154	0.0116
81	2.1270	0.0116
82	2.1385	0.0115
83	2.1499	0.0114
84	2.1612	0.0113
85	2.1724	0.0112
86	2.1836	0.0112
87	2.1947	0.0111
88	2.2057	0.0110
89	2.2167	0.0110
90	2.2276	0.0109
91	2.2384	0.0108
92	2.2491	0.0108
93	2.2598	0.0107
94	2.2705	0.0106
95	2.2810	0.0106
96	2.2915	0.0105
97	2.3020	0.0104
98	2.3123	0.0104
99	2.3226	0.0103
100	2.3329	0.0103
101	2.3431	0.0102
102	2.3533	0.0101
103	2.3633	0.0101

104	2.3734	0.0100
105	2.3834	0.0100
106	2.3933	0.0099
107	2.4032	0.0099
108	2.4130	0.0098
109	2.4228	0.0098
110	2.4325	0.0097
111	2.4422	0.0097
112	2.4518	0.0096
113	2.4614	0.0096
114	2.4709	0.0095
115	2.4804	0.0095
116	2.4898	0.0094
117	2.4992	0.0094
118	2.5085	0.0093
119	2.5178	0.0093
120	2.5271	0.0093
121	2.5363	0.0092
122	2.5455	0.0092
123	2.5546	0.0091
124	2.5637	0.0091
125	2.5728	0.0090
126	2.5818	0.0090
127	2.5907	0.0090
128	2.5997	0.0089
129	2.6085	0.0089
130	2.6174	0.0088
131	2.6262	0.0088
132	2.6350	0.0088
133	2.6437	0.0087
134	2.6524	0.0087
135	2.6611	0.0087
136	2.6697	0.0086
137	2.6783	0.0086
138	2.6868	0.0086
139	2.6954	0.0085
140	2.7039	0.0085
141	2.7123	0.0085
142	2.7207	0.0084
143	2.7291	0.0084
144	2.7375	0.0084
145	2.7458	0.0083
146	2.7541	0.0083
147	2.7623	0.0083
148	2.7706	0.0082
149	2.7787	0.0082
150	2.7869	0.0082
151	2.7950	0.0081
152	2.8031	0.0081
153	2.8112	0.0081
154	2.8193	0.0080
155	2.8273	0.0080
156	2.8353	0.0080
157	2.8432	0.0080
158	2.8511	0.0079
159	2.8590	0.0079
160	2.8669	0.0079

161	2.8748	0.0078
162	2.8826	0.0078
163	2.8904	0.0078
164	2.8981	0.0078
165	2.9059	0.0077
166	2.9136	0.0077
167	2.9213	0.0077
168	2.9289	0.0077
169	2.9366	0.0076
170	2.9442	0.0076
171	2.9517	0.0076
172	2.9593	0.0076
173	2.9668	0.0075
174	2.9743	0.0075
175	2.9818	0.0075
176	2.9893	0.0075
177	2.9967	0.0074
178	3.0041	0.0074
179	3.0115	0.0074
180	3.0189	0.0074
181	3.0262	0.0073
182	3.0336	0.0073
183	3.0409	0.0073
184	3.0481	0.0073
185	3.0554	0.0073
186	3.0626	0.0072
187	3.0698	0.0072
188	3.0770	0.0072
189	3.0842	0.0072
190	3.0913	0.0071
191	3.0985	0.0071
192	3.1056	0.0071
193	3.1126	0.0071
194	3.1197	0.0071
195	3.1268	0.0070
196	3.1338	0.0070
197	3.1408	0.0070
198	3.1478	0.0070
199	3.1547	0.0070
200	3.1617	0.0069
201	3.1686	0.0069
202	3.1755	0.0069
203	3.1824	0.0069
204	3.1892	0.0069
205	3.1961	0.0068
206	3.2029	0.0068
207	3.2097	0.0068
208	3.2165	0.0068
209	3.2233	0.0068
210	3.2300	0.0068
211	3.2368	0.0067
212	3.2435	0.0067
213	3.2502	0.0067
214	3.2569	0.0067
215	3.2635	0.0067
216	3.2702	0.0066
217	3.2768	0.0066

218	3.2834	0.0066
219	3.2900	0.0066
220	3.2966	0.0066
221	3.3032	0.0066
222	3.3097	0.0065
223	3.3163	0.0065
224	3.3228	0.0065
225	3.3293	0.0065
226	3.3357	0.0065
227	3.3422	0.0065
228	3.3487	0.0064
229	3.3551	0.0064
230	3.3615	0.0064
231	3.3679	0.0064
232	3.3743	0.0064
233	3.3807	0.0064
234	3.3870	0.0064
235	3.3934	0.0063
236	3.3997	0.0063
237	3.4060	0.0063
238	3.4123	0.0063
239	3.4186	0.0063
240	3.4248	0.0063
241	3.4311	0.0063
242	3.4373	0.0062
243	3.4436	0.0062
244	3.4498	0.0062
245	3.4560	0.0062
246	3.4621	0.0062
247	3.4683	0.0062
248	3.4744	0.0062
249	3.4806	0.0061
250	3.4867	0.0061
251	3.4928	0.0061
252	3.4989	0.0061
253	3.5050	0.0061
254	3.5111	0.0061
255	3.5171	0.0061
256	3.5232	0.0060
257	3.5292	0.0060
258	3.5352	0.0060
259	3.5412	0.0060
260	3.5472	0.0060
261	3.5532	0.0060
262	3.5591	0.0060
263	3.5651	0.0060
264	3.5710	0.0059
265	3.5770	0.0059
266	3.5829	0.0059
267	3.5888	0.0059
268	3.5947	0.0059
269	3.6005	0.0059
270	3.6064	0.0059
271	3.6122	0.0059
272	3.6181	0.0058
273	3.6239	0.0058

274	3.6297	0.0058
275	3.6355	0.0058
276	3.6413	0.0058
277	3.6471	0.0058
278	3.6529	0.0058
279	3.6586	0.0058
280	3.6644	0.0057
281	3.6701	0.0057
282	3.6758	0.0057
283	3.6815	0.0057
284	3.6872	0.0057
285	3.6929	0.0057
286	3.6986	0.0057
287	3.7043	0.0057
288	3.7099	0.0057

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0057	0.0046	0.0011
2	0.0057	0.0046	0.0011
3	0.0057	0.0046	0.0011
4	0.0057	0.0046	0.0011
5	0.0057	0.0046	0.0011
6	0.0057	0.0047	0.0011
7	0.0058	0.0047	0.0011
8	0.0058	0.0047	0.0011
9	0.0058	0.0047	0.0011
10	0.0058	0.0047	0.0011
11	0.0058	0.0047	0.0011
12	0.0058	0.0047	0.0011
13	0.0059	0.0048	0.0011
14	0.0059	0.0048	0.0011
15	0.0059	0.0048	0.0011
16	0.0059	0.0048	0.0011
17	0.0059	0.0048	0.0011
18	0.0060	0.0048	0.0011
19	0.0060	0.0049	0.0011
20	0.0060	0.0049	0.0011
21	0.0060	0.0049	0.0011
22	0.0060	0.0049	0.0011
23	0.0061	0.0049	0.0011
24	0.0061	0.0049	0.0011
25	0.0061	0.0050	0.0011
26	0.0061	0.0050	0.0011
27	0.0061	0.0050	0.0011
28	0.0062	0.0050	0.0012
29	0.0062	0.0050	0.0012
30	0.0062	0.0050	0.0012
31	0.0062	0.0051	0.0012
32	0.0062	0.0051	0.0012
33	0.0063	0.0051	0.0012
34	0.0063	0.0051	0.0012
35	0.0063	0.0051	0.0012
36	0.0063	0.0051	0.0012
37	0.0064	0.0052	0.0012

38	0.0064	0.0052	0.0012
39	0.0064	0.0052	0.0012
40	0.0064	0.0052	0.0012
41	0.0064	0.0052	0.0012
42	0.0065	0.0053	0.0012
43	0.0065	0.0053	0.0012
44	0.0065	0.0053	0.0012
45	0.0065	0.0053	0.0012
46	0.0066	0.0053	0.0012
47	0.0066	0.0054	0.0012
48	0.0066	0.0054	0.0012
49	0.0066	0.0054	0.0012
50	0.0067	0.0054	0.0012
51	0.0067	0.0054	0.0013
52	0.0067	0.0055	0.0013
53	0.0068	0.0055	0.0013
54	0.0068	0.0055	0.0013
55	0.0068	0.0055	0.0013
56	0.0068	0.0055	0.0013
57	0.0069	0.0056	0.0013
58	0.0069	0.0056	0.0013
59	0.0069	0.0056	0.0013
60	0.0069	0.0056	0.0013
61	0.0070	0.0057	0.0013
62	0.0070	0.0057	0.0013
63	0.0070	0.0057	0.0013
64	0.0071	0.0057	0.0013
65	0.0071	0.0058	0.0013
66	0.0071	0.0058	0.0013
67	0.0072	0.0058	0.0013
68	0.0072	0.0058	0.0013
69	0.0072	0.0059	0.0014
70	0.0073	0.0059	0.0014
71	0.0073	0.0059	0.0014
72	0.0073	0.0059	0.0014
73	0.0074	0.0060	0.0014
74	0.0074	0.0060	0.0014
75	0.0074	0.0060	0.0014
76	0.0075	0.0061	0.0014
77	0.0075	0.0061	0.0014
78	0.0075	0.0061	0.0014
79	0.0076	0.0062	0.0014
80	0.0076	0.0062	0.0014
81	0.0077	0.0062	0.0014
82	0.0077	0.0062	0.0014
83	0.0077	0.0063	0.0014
84	0.0078	0.0063	0.0015
85	0.0078	0.0064	0.0015
86	0.0078	0.0064	0.0015
87	0.0079	0.0064	0.0015
88	0.0079	0.0064	0.0015
89	0.0080	0.0065	0.0015
90	0.0080	0.0065	0.0015
91	0.0081	0.0066	0.0015
92	0.0081	0.0066	0.0015
93	0.0082	0.0066	0.0015
94	0.0082	0.0067	0.0015

95	0.0083	0.0067	0.0015
96	0.0083	0.0067	0.0016
97	0.0084	0.0068	0.0016
98	0.0084	0.0068	0.0016
99	0.0085	0.0069	0.0016
100	0.0085	0.0069	0.0016
101	0.0086	0.0070	0.0016
102	0.0086	0.0070	0.0016
103	0.0087	0.0070	0.0016
104	0.0087	0.0071	0.0016
105	0.0088	0.0071	0.0016
106	0.0088	0.0072	0.0017
107	0.0089	0.0072	0.0017
108	0.0089	0.0073	0.0017
109	0.0090	0.0073	0.0017
110	0.0090	0.0074	0.0017
111	0.0091	0.0074	0.0017
112	0.0092	0.0075	0.0017
113	0.0093	0.0075	0.0017
114	0.0093	0.0076	0.0017
115	0.0094	0.0076	0.0018
116	0.0094	0.0077	0.0018
117	0.0095	0.0077	0.0018
118	0.0096	0.0078	0.0018
119	0.0097	0.0079	0.0018
120	0.0097	0.0079	0.0018
121	0.0098	0.0080	0.0018
122	0.0099	0.0080	0.0019
123	0.0100	0.0081	0.0019
124	0.0100	0.0082	0.0019
125	0.0101	0.0082	0.0019
126	0.0102	0.0083	0.0019
127	0.0103	0.0084	0.0019
128	0.0104	0.0084	0.0019
129	0.0105	0.0085	0.0020
130	0.0106	0.0086	0.0020
131	0.0107	0.0087	0.0020
132	0.0108	0.0087	0.0020
133	0.0109	0.0088	0.0020
134	0.0110	0.0089	0.0021
135	0.0111	0.0090	0.0021
136	0.0112	0.0091	0.0021
137	0.0113	0.0092	0.0021
138	0.0114	0.0093	0.0021
139	0.0116	0.0094	0.0022
140	0.0116	0.0095	0.0022
141	0.0118	0.0096	0.0022
142	0.0119	0.0097	0.0022
143	0.0121	0.0098	0.0023
144	0.0122	0.0099	0.0023
145	0.0143	0.0116	0.0027
146	0.0144	0.0117	0.0027
147	0.0146	0.0119	0.0027
148	0.0147	0.0120	0.0028
149	0.0149	0.0121	0.0028
150	0.0150	0.0122	0.0028
151	0.0153	0.0124	0.0029

152	0.0154	0.0125	0.0029
153	0.0157	0.0127	0.0029
154	0.0158	0.0128	0.0030
155	0.0161	0.0130	0.0030
156	0.0162	0.0132	0.0030
157	0.0165	0.0134	0.0031
158	0.0166	0.0135	0.0031
159	0.0170	0.0138	0.0032
160	0.0171	0.0139	0.0032
161	0.0175	0.0142	0.0033
162	0.0177	0.0144	0.0033
163	0.0181	0.0147	0.0034
164	0.0183	0.0148	0.0034
165	0.0187	0.0152	0.0035
166	0.0189	0.0154	0.0035
167	0.0194	0.0158	0.0036
168	0.0196	0.0160	0.0037
169	0.0202	0.0164	0.0038
170	0.0205	0.0166	0.0038
171	0.0211	0.0171	0.0040
172	0.0214	0.0174	0.0040
173	0.0221	0.0180	0.0041
174	0.0225	0.0183	0.0042
175	0.0233	0.0190	0.0044
176	0.0238	0.0193	0.0045
177	0.0247	0.0201	0.0046
178	0.0253	0.0205	0.0047
179	0.0265	0.0215	0.0050
180	0.0271	0.0220	0.0051
181	0.0286	0.0232	0.0054
182	0.0294	0.0239	0.0055
183	0.0314	0.0255	0.0059
184	0.0325	0.0264	0.0061
185	0.0278	0.0226	0.0052
186	0.0294	0.0239	0.0055
187	0.0333	0.0271	0.0062
188	0.0359	0.0292	0.0067
189	0.0433	0.0352	0.0081
190	0.0489	0.0397	0.0092
191	0.0699	0.0568	0.0131
192	0.0961	0.0652	0.0309
193	0.3007	0.0652	0.2355
194	0.0569	0.0462	0.0107
195	0.0392	0.0318	0.0073
196	0.0312	0.0253	0.0058
197	0.0338	0.0274	0.0063
198	0.0304	0.0247	0.0057
199	0.0278	0.0226	0.0052
200	0.0259	0.0210	0.0048
201	0.0242	0.0197	0.0045
202	0.0229	0.0186	0.0043
203	0.0218	0.0177	0.0041
204	0.0208	0.0169	0.0039
205	0.0199	0.0162	0.0037
206	0.0191	0.0156	0.0036
207	0.0185	0.0150	0.0035
208	0.0179	0.0145	0.0033

209	0.0173	0.0141	0.0032
210	0.0168	0.0137	0.0031
211	0.0163	0.0133	0.0031
212	0.0159	0.0129	0.0030
213	0.0155	0.0126	0.0029
214	0.0152	0.0123	0.0028
215	0.0148	0.0120	0.0028
216	0.0145	0.0118	0.0027
217	0.0123	0.0100	0.0023
218	0.0120	0.0097	0.0022
219	0.0117	0.0095	0.0022
220	0.0115	0.0093	0.0022
221	0.0112	0.0091	0.0021
222	0.0110	0.0090	0.0021
223	0.0108	0.0088	0.0020
224	0.0106	0.0086	0.0020
225	0.0104	0.0085	0.0020
226	0.0103	0.0083	0.0019
227	0.0101	0.0082	0.0019
228	0.0099	0.0081	0.0019
229	0.0098	0.0079	0.0018
230	0.0096	0.0078	0.0018
231	0.0095	0.0077	0.0018
232	0.0093	0.0076	0.0018
233	0.0092	0.0075	0.0017
234	0.0091	0.0074	0.0017
235	0.0090	0.0073	0.0017
236	0.0088	0.0072	0.0017
237	0.0087	0.0071	0.0016
238	0.0086	0.0070	0.0016
239	0.0085	0.0069	0.0016
240	0.0084	0.0068	0.0016
241	0.0083	0.0068	0.0016
242	0.0082	0.0067	0.0015
243	0.0081	0.0066	0.0015
244	0.0080	0.0065	0.0015
245	0.0080	0.0065	0.0015
246	0.0079	0.0064	0.0015
247	0.0078	0.0063	0.0015
248	0.0077	0.0063	0.0014
249	0.0076	0.0062	0.0014
250	0.0076	0.0061	0.0014
251	0.0075	0.0061	0.0014
252	0.0074	0.0060	0.0014
253	0.0073	0.0060	0.0014
254	0.0073	0.0059	0.0014
255	0.0072	0.0059	0.0014
256	0.0071	0.0058	0.0013
257	0.0071	0.0058	0.0013
258	0.0070	0.0057	0.0013
259	0.0070	0.0057	0.0013
260	0.0069	0.0056	0.0013
261	0.0068	0.0056	0.0013
262	0.0068	0.0055	0.0013
263	0.0067	0.0055	0.0013
264	0.0067	0.0054	0.0013
265	0.0066	0.0054	0.0012

266	0.0066	0.0053	0.0012
267	0.0065	0.0053	0.0012
268	0.0065	0.0053	0.0012
269	0.0064	0.0052	0.0012
270	0.0064	0.0052	0.0012
271	0.0063	0.0052	0.0012
272	0.0063	0.0051	0.0012
273	0.0063	0.0051	0.0012
274	0.0062	0.0050	0.0012
275	0.0062	0.0050	0.0012
276	0.0061	0.0050	0.0011
277	0.0061	0.0049	0.0011
278	0.0060	0.0049	0.0011
279	0.0060	0.0049	0.0011
280	0.0060	0.0048	0.0011
281	0.0059	0.0048	0.0011
282	0.0059	0.0048	0.0011
283	0.0059	0.0048	0.0011
284	0.0058	0.0047	0.0011
285	0.0058	0.0047	0.0011
286	0.0057	0.0047	0.0011
287	0.0057	0.0046	0.0011
288	0.0057	0.0046	0.0011

Total soil rain loss = 2.82(In)
Total effective rainfall = 0.89(In)
Peak flow rate in flood hydrograph = 11.38(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

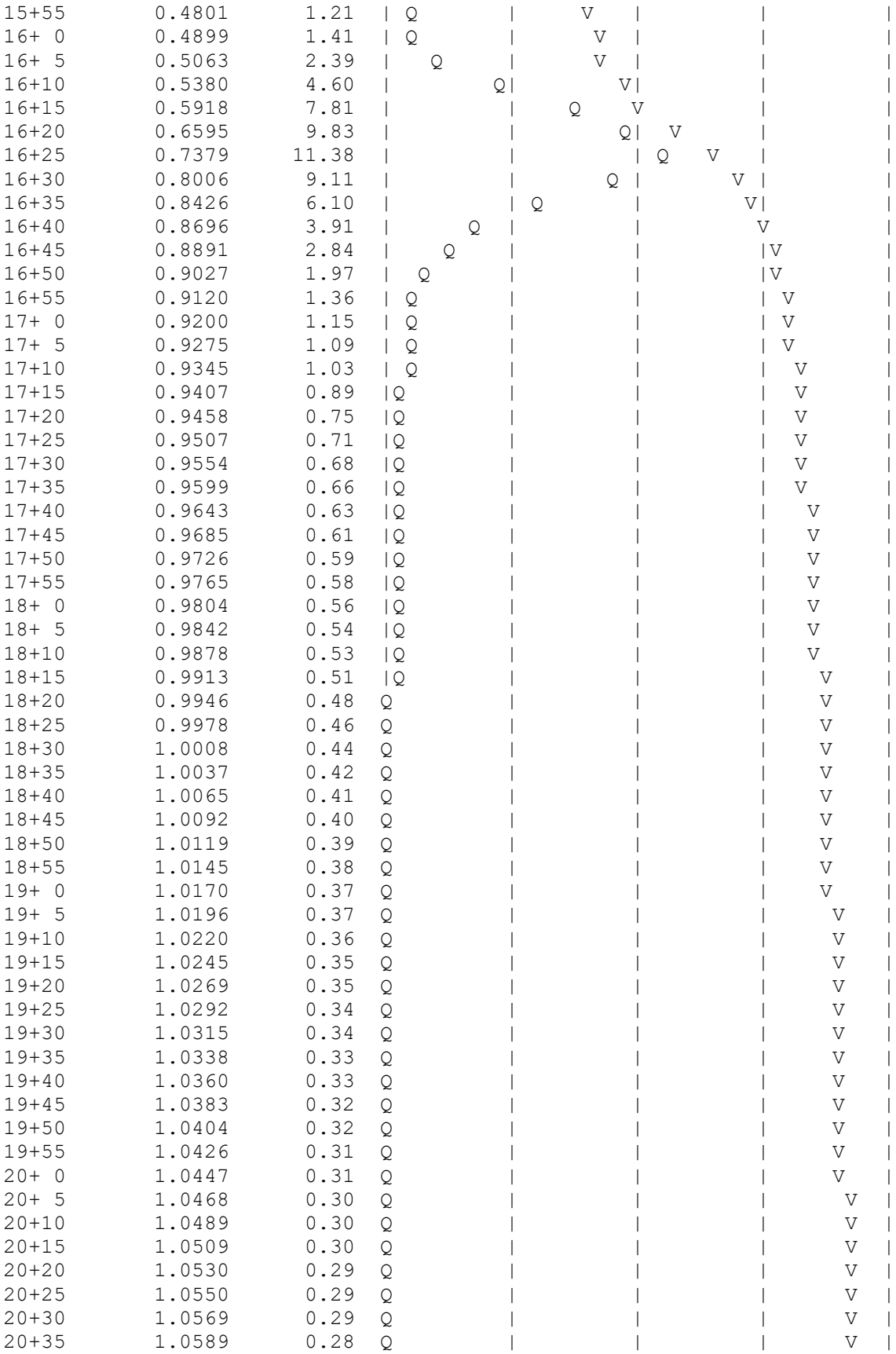
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0000	0.00	Q				
0+10	0.0001	0.01	Q				
0+15	0.0004	0.04	Q				
0+20	0.0009	0.07	Q				
0+25	0.0017	0.12	Q				
0+30	0.0027	0.15	Q				
0+35	0.0039	0.17	Q				
0+40	0.0051	0.18	Q				
0+45	0.0064	0.19	Q				
0+50	0.0078	0.19	Q				
0+55	0.0091	0.20	Q				
1+ 0	0.0105	0.20	Q				
1+ 5	0.0119	0.20	Q				
1+10	0.0133	0.20	Q				
1+15	0.0146	0.20	Q				
1+20	0.0160	0.20	Q				
1+25	0.0174	0.20	Q				
1+30	0.0188	0.20	Q				
1+35	0.0203	0.20	Q				

1+40	0.0217	0.21	Q				
1+45	0.0231	0.21	Q				
1+50	0.0245	0.21	Q				
1+55	0.0259	0.21	Q				
2+ 0	0.0274	0.21	Q				
2+ 5	0.0288	0.21	QV				
2+10	0.0302	0.21	QV				
2+15	0.0317	0.21	QV				
2+20	0.0331	0.21	QV				
2+25	0.0346	0.21	QV				
2+30	0.0360	0.21	QV				
2+35	0.0375	0.21	QV				
2+40	0.0390	0.21	QV				
2+45	0.0405	0.21	QV				
2+50	0.0419	0.21	QV				
2+55	0.0434	0.22	QV				
3+ 0	0.0449	0.22	QV				
3+ 5	0.0464	0.22	QV				
3+10	0.0479	0.22	QV				
3+15	0.0494	0.22	QV				
3+20	0.0509	0.22	QV				
3+25	0.0524	0.22	QV				
3+30	0.0540	0.22	QV				
3+35	0.0555	0.22	QV				
3+40	0.0570	0.22	Q V				
3+45	0.0585	0.22	Q V				
3+50	0.0601	0.22	Q V				
3+55	0.0616	0.23	Q V				
4+ 0	0.0632	0.23	Q V				
4+ 5	0.0648	0.23	Q V				
4+10	0.0663	0.23	Q V				
4+15	0.0679	0.23	Q V				
4+20	0.0695	0.23	Q V				
4+25	0.0711	0.23	Q V				
4+30	0.0727	0.23	Q V				
4+35	0.0743	0.23	Q V				
4+40	0.0759	0.23	Q V				
4+45	0.0775	0.23	Q V				
4+50	0.0791	0.23	Q V				
4+55	0.0807	0.24	Q V				
5+ 0	0.0823	0.24	Q V				
5+ 5	0.0840	0.24	Q V				
5+10	0.0856	0.24	Q V				
5+15	0.0873	0.24	Q V				
5+20	0.0889	0.24	Q V				
5+25	0.0906	0.24	Q V				
5+30	0.0923	0.24	Q V				
5+35	0.0940	0.24	Q V				
5+40	0.0956	0.24	Q V				
5+45	0.0973	0.25	Q V				
5+50	0.0990	0.25	Q V				
5+55	0.1007	0.25	Q V				
6+ 0	0.1025	0.25	Q V				
6+ 5	0.1042	0.25	Q V				
6+10	0.1059	0.25	Q V				
6+15	0.1077	0.25	Q V				
6+20	0.1094	0.25	Q V				

6+25	0.1112	0.26	Q	V				
6+30	0.1129	0.26	Q	V				
6+35	0.1147	0.26	Q	V				
6+40	0.1165	0.26	Q	V				
6+45	0.1183	0.26	Q	V				
6+50	0.1201	0.26	Q	V				
6+55	0.1219	0.26	Q	V				
7+ 0	0.1237	0.26	Q	V				
7+ 5	0.1255	0.27	Q	V				
7+10	0.1274	0.27	Q	V				
7+15	0.1292	0.27	Q	V				
7+20	0.1311	0.27	Q	V				
7+25	0.1329	0.27	Q	V				
7+30	0.1348	0.27	Q	V				
7+35	0.1367	0.27	Q	V				
7+40	0.1386	0.27	Q	V				
7+45	0.1405	0.28	Q	V				
7+50	0.1424	0.28	Q	V				
7+55	0.1443	0.28	Q	V				
8+ 0	0.1462	0.28	Q	V				
8+ 5	0.1482	0.28	Q	V				
8+10	0.1501	0.28	Q	V				
8+15	0.1521	0.29	Q	V				
8+20	0.1541	0.29	Q	V				
8+25	0.1561	0.29	Q	V				
8+30	0.1581	0.29	Q	V				
8+35	0.1601	0.29	Q	V				
8+40	0.1621	0.29	Q	V				
8+45	0.1642	0.30	Q	V				
8+50	0.1662	0.30	Q	V				
8+55	0.1683	0.30	Q	V				
9+ 0	0.1704	0.30	Q	V				
9+ 5	0.1724	0.30	Q	V				
9+10	0.1746	0.31	Q	V				
9+15	0.1767	0.31	Q	V				
9+20	0.1788	0.31	Q	V				
9+25	0.1809	0.31	Q	V				
9+30	0.1831	0.31	Q	V				
9+35	0.1853	0.32	Q	V				
9+40	0.1875	0.32	Q	V				
9+45	0.1897	0.32	Q	V				
9+50	0.1919	0.32	Q	V				
9+55	0.1941	0.32	Q	V				
10+ 0	0.1964	0.33	Q	V				
10+ 5	0.1987	0.33	Q	V				
10+10	0.2009	0.33	Q	V				
10+15	0.2032	0.33	Q	V				
10+20	0.2056	0.34	Q	V				
10+25	0.2079	0.34	Q	V				
10+30	0.2103	0.34	Q	V				
10+35	0.2126	0.35	Q	V				
10+40	0.2150	0.35	Q	V				
10+45	0.2175	0.35	Q	V				
10+50	0.2199	0.35	Q	V				
10+55	0.2223	0.36	Q	V				
11+ 0	0.2248	0.36	Q	V				
11+ 5	0.2273	0.36	Q	V				

11+10	0.2298	0.37	Q	V |			
11+15	0.2324	0.37	Q	V |			
11+20	0.2350	0.37	Q	V |			
11+25	0.2375	0.38	Q	V |			
11+30	0.2402	0.38	Q	V |			
11+35	0.2428	0.38	Q	V |			
11+40	0.2455	0.39	Q	V |			
11+45	0.2482	0.39	Q	V |			
11+50	0.2509	0.40	Q	V |			
11+55	0.2536	0.40	Q	V |			
12+ 0	0.2564	0.40	Q	V|			
12+ 5	0.2592	0.41	Q	V|			
12+10	0.2621	0.42	Q	V|			
12+15	0.2651	0.43	Q	V|			
12+20	0.2681	0.45	Q	V|			
12+25	0.2714	0.47	Q	V|			
12+30	0.2747	0.48	Q	V|			
12+35	0.2781	0.50	Q	V|			
12+40	0.2816	0.50	|Q	V|			
12+45	0.2851	0.51	|Q	V			
12+50	0.2887	0.52	|Q	V			
12+55	0.2923	0.53	|Q	V			
13+ 0	0.2960	0.53	|Q	V			
13+ 5	0.2997	0.54	|Q	V			
13+10	0.3035	0.55	|Q	V			
13+15	0.3073	0.55	|Q	V			
13+20	0.3111	0.56	|Q	|V			
13+25	0.3151	0.57	|Q	|V			
13+30	0.3190	0.58	|Q	|V			
13+35	0.3231	0.59	|Q	|V			
13+40	0.3272	0.59	|Q	|V			
13+45	0.3313	0.60	|Q	|V			
13+50	0.3355	0.61	|Q	|V			
13+55	0.3398	0.62	|Q	| V			
14+ 0	0.3442	0.63	|Q	| V			
14+ 5	0.3486	0.64	|Q	| V			
14+10	0.3531	0.66	|Q	| V			
14+15	0.3578	0.67	|Q	| V			
14+20	0.3624	0.68	|Q	| V			
14+25	0.3672	0.70	|Q	| V			
14+30	0.3721	0.71	|Q	| V			
14+35	0.3771	0.73	|Q	| V			
14+40	0.3823	0.74	|Q	| V			
14+45	0.3875	0.76	|Q	| V			
14+50	0.3929	0.78	|Q	| V			
14+55	0.3984	0.80	|Q	| V			
15+ 0	0.4041	0.83	|Q	| V			
15+ 5	0.4100	0.85	|Q	| V			
15+10	0.4160	0.88	|Q	| V			
15+15	0.4223	0.91	|Q	| V			
15+20	0.4288	0.94	|Q	| V			
15+25	0.4355	0.98	|Q	| V			
15+30	0.4425	1.01	| Q	| V			
15+35	0.4496	1.03	| Q	| V			
15+40	0.4568	1.05	| Q	| V			
15+45	0.4641	1.06	| Q	| V			
15+50	0.4718	1.11	| Q	| V			



20+40	1.0608	0.28	Q	|	|	|	V |
20+45	1.0627	0.28	Q	|	|	|	V |
20+50	1.0646	0.27	Q	|	|	|	V |
20+55	1.0665	0.27	Q	|	|	|	V |
21+ 0	1.0683	0.27	Q	|	|	|	V |
21+ 5	1.0702	0.27	Q	|	|	|	V |
21+10	1.0720	0.26	Q	|	|	|	V |
21+15	1.0738	0.26	Q	|	|	|	V |
21+20	1.0755	0.26	Q	|	|	|	V |
21+25	1.0773	0.26	Q	|	|	|	V |
21+30	1.0791	0.25	Q	|	|	|	V |
21+35	1.0808	0.25	Q	|	|	|	V |
21+40	1.0825	0.25	Q	|	|	|	V |
21+45	1.0842	0.25	Q	|	|	|	V |
21+50	1.0859	0.24	Q	|	|	|	V |
21+55	1.0875	0.24	Q	|	|	|	V |
22+ 0	1.0892	0.24	Q	|	|	|	V |
22+ 5	1.0908	0.24	Q	|	|	|	V |
22+10	1.0925	0.24	Q	|	|	|	V |
22+15	1.0941	0.23	Q	|	|	|	V |
22+20	1.0957	0.23	Q	|	|	|	V |
22+25	1.0973	0.23	Q	|	|	|	V |
22+30	1.0989	0.23	Q	|	|	|	V |
22+35	1.1004	0.23	Q	|	|	|	V |
22+40	1.1020	0.23	Q	|	|	|	V |
22+45	1.1035	0.22	Q	|	|	|	V|
22+50	1.1050	0.22	Q	|	|	|	V|
22+55	1.1066	0.22	Q	|	|	|	V|
23+ 0	1.1081	0.22	Q	|	|	|	V|
23+ 5	1.1096	0.22	Q	|	|	|	V|
23+10	1.1111	0.22	Q	|	|	|	V|
23+15	1.1125	0.21	Q	|	|	|	V|
23+20	1.1140	0.21	Q	|	|	|	V|
23+25	1.1155	0.21	Q	|	|	|	V|
23+30	1.1169	0.21	Q	|	|	|	V|
23+35	1.1183	0.21	Q	|	|	|	V|
23+40	1.1198	0.21	Q	|	|	|	V|
23+45	1.1212	0.21	Q	|	|	|	V|
23+50	1.1226	0.20	Q	|	|	|	V|
23+55	1.1240	0.20	Q	|	|	|	V|
24+ 0	1.1254	0.20	Q	|	|	|	V|
24+ 5	1.1268	0.20	Q	|	|	|	V|
24+10	1.1280	0.19	Q	|	|	|	V|
24+15	1.1291	0.16	Q	|	|	|	V|
24+20	1.1300	0.12	Q	|	|	|	V|
24+25	1.1306	0.08	Q	|	|	|	V|
24+30	1.1309	0.05	Q	|	|	|	V|
24+35	1.1311	0.03	Q	|	|	|	V|
24+40	1.1312	0.02	Q	|	|	|	V|
24+45	1.1312	0.01	Q	|	|	|	V|
24+50	1.1313	0.00	Q	|	|	|	V|
24+55	1.1313	0.00	Q	|	|	|	V|
25+ 0	1.1313	0.00	Q	|	|	|	V|
25+ 5	1.1313	0.00	Q	|	|	|	V|
25+10	1.1313	0.00	Q	|	|	|	V

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

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Study date 04/23/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION - NORTHERLY CHAMBERS
10-YEAR STORM EVENT ANALYSIS

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		
15.31	1	0.81
Rainfall data for year 10		
15.31	6	2.02
Rainfall data for year 10		
15.31	24	3.71

++

******** 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)
32.0	32.0	15.31	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
12.25	0.800	32.0	32.0	18.55	0.000
3.06	0.200	98.0	98.0	0.20	0.937

Area-averaged catchment yield fraction, Y = 0.187
Area-averaged low loss fraction, Yb = 0.813
User entry of time of concentration = 0.425 (hours)
++
Watershed area = 15.31(Ac.)
Catchment Lag time = 0.340 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 24.5098
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.813 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.301(In)
Computed peak 30-minute rainfall = 0.616(In)
Specified peak 1-hour rainfall = 0.813(In)
Computed peak 3-hour rainfall = 1.421(In)
Specified peak 6-hour rainfall = 2.020(In)
Specified peak 24-hour rainfall = 3.710(In)

Rainfall depth area reduction factors:
Using a total area of 15.31(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.301(In)
30-minute factor = 0.999 Adjusted rainfall = 0.616(In)
1-hour factor = 0.999 Adjusted rainfall = 0.812(In)
3-hour factor = 1.000 Adjusted rainfall = 1.420(In)
6-hour factor = 1.000 Adjusted rainfall = 2.020(In)
24-hour factor = 1.000 Adjusted rainfall = 3.710(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 = 185.16 (CFS))		
1	1.511	2.799
2	7.304	10.726
3	20.098	23.689
4	37.301	31.851
5	58.784	39.777
6	75.674	31.274
7	86.165	19.424

8	91.985	10.776
9	95.700	6.879
10	97.674	3.655
11	98.432	1.404
12	98.874	0.817
13	99.315	0.817
14	99.753	0.811
15	100.000	0.458

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3007	0.3007
2	0.3968	0.0961
3	0.4666	0.0699
4	0.5235	0.0569
5	0.5724	0.0489
6	0.6157	0.0433
7	0.6549	0.0392
8	0.6908	0.0359
9	0.7241	0.0333
10	0.7553	0.0312
11	0.7846	0.0294
12	0.8124	0.0278
13	0.8462	0.0338
14	0.8787	0.0325
15	0.9100	0.0314
16	0.9404	0.0304
17	0.9698	0.0294
18	0.9984	0.0286
19	1.0263	0.0278
20	1.0534	0.0271
21	1.0799	0.0265
22	1.1057	0.0259
23	1.1310	0.0253
24	1.1557	0.0247
25	1.1800	0.0242
26	1.2037	0.0238
27	1.2271	0.0233
28	1.2500	0.0229
29	1.2725	0.0225
30	1.2946	0.0221
31	1.3164	0.0218
32	1.3378	0.0214
33	1.3589	0.0211
34	1.3797	0.0208
35	1.4002	0.0205
36	1.4204	0.0202
37	1.4403	0.0199
38	1.4599	0.0196
39	1.4793	0.0194
40	1.4985	0.0191
41	1.5174	0.0189
42	1.5361	0.0187
43	1.5546	0.0185
44	1.5728	0.0183
45	1.5909	0.0181
46	1.6087	0.0179

47	1.6264	0.0177
48	1.6439	0.0175
49	1.6612	0.0173
50	1.6783	0.0171
51	1.6953	0.0170
52	1.7121	0.0168
53	1.7288	0.0166
54	1.7453	0.0165
55	1.7616	0.0163
56	1.7778	0.0162
57	1.7939	0.0161
58	1.8098	0.0159
59	1.8256	0.0158
60	1.8412	0.0157
61	1.8567	0.0155
62	1.8721	0.0154
63	1.8874	0.0153
64	1.9026	0.0152
65	1.9176	0.0150
66	1.9326	0.0149
67	1.9474	0.0148
68	1.9621	0.0147
69	1.9767	0.0146
70	1.9912	0.0145
71	2.0056	0.0144
72	2.0199	0.0143
73	2.0322	0.0123
74	2.0443	0.0122
75	2.0564	0.0121
76	2.0684	0.0120
77	2.0803	0.0119
78	2.0921	0.0118
79	2.1038	0.0117
80	2.1154	0.0116
81	2.1270	0.0116
82	2.1385	0.0115
83	2.1499	0.0114
84	2.1612	0.0113
85	2.1724	0.0112
86	2.1836	0.0112
87	2.1947	0.0111
88	2.2057	0.0110
89	2.2167	0.0110
90	2.2276	0.0109
91	2.2384	0.0108
92	2.2491	0.0108
93	2.2598	0.0107
94	2.2705	0.0106
95	2.2810	0.0106
96	2.2915	0.0105
97	2.3020	0.0104
98	2.3123	0.0104
99	2.3226	0.0103
100	2.3329	0.0103
101	2.3431	0.0102
102	2.3533	0.0101
103	2.3633	0.0101

104	2.3734	0.0100
105	2.3834	0.0100
106	2.3933	0.0099
107	2.4032	0.0099
108	2.4130	0.0098
109	2.4228	0.0098
110	2.4325	0.0097
111	2.4422	0.0097
112	2.4518	0.0096
113	2.4614	0.0096
114	2.4709	0.0095
115	2.4804	0.0095
116	2.4898	0.0094
117	2.4992	0.0094
118	2.5085	0.0093
119	2.5178	0.0093
120	2.5271	0.0093
121	2.5363	0.0092
122	2.5455	0.0092
123	2.5546	0.0091
124	2.5637	0.0091
125	2.5728	0.0090
126	2.5818	0.0090
127	2.5907	0.0090
128	2.5997	0.0089
129	2.6085	0.0089
130	2.6174	0.0088
131	2.6262	0.0088
132	2.6350	0.0088
133	2.6437	0.0087
134	2.6524	0.0087
135	2.6611	0.0087
136	2.6697	0.0086
137	2.6783	0.0086
138	2.6868	0.0086
139	2.6954	0.0085
140	2.7039	0.0085
141	2.7123	0.0085
142	2.7207	0.0084
143	2.7291	0.0084
144	2.7375	0.0084
145	2.7458	0.0083
146	2.7541	0.0083
147	2.7623	0.0083
148	2.7706	0.0082
149	2.7787	0.0082
150	2.7869	0.0082
151	2.7950	0.0081
152	2.8031	0.0081
153	2.8112	0.0081
154	2.8193	0.0080
155	2.8273	0.0080
156	2.8353	0.0080
157	2.8432	0.0080
158	2.8511	0.0079
159	2.8590	0.0079
160	2.8669	0.0079

161	2.8748	0.0078
162	2.8826	0.0078
163	2.8904	0.0078
164	2.8981	0.0078
165	2.9059	0.0077
166	2.9136	0.0077
167	2.9213	0.0077
168	2.9289	0.0077
169	2.9366	0.0076
170	2.9442	0.0076
171	2.9517	0.0076
172	2.9593	0.0076
173	2.9668	0.0075
174	2.9743	0.0075
175	2.9818	0.0075
176	2.9893	0.0075
177	2.9967	0.0074
178	3.0041	0.0074
179	3.0115	0.0074
180	3.0189	0.0074
181	3.0262	0.0073
182	3.0336	0.0073
183	3.0409	0.0073
184	3.0481	0.0073
185	3.0554	0.0073
186	3.0626	0.0072
187	3.0698	0.0072
188	3.0770	0.0072
189	3.0842	0.0072
190	3.0913	0.0071
191	3.0985	0.0071
192	3.1056	0.0071
193	3.1126	0.0071
194	3.1197	0.0071
195	3.1268	0.0070
196	3.1338	0.0070
197	3.1408	0.0070
198	3.1478	0.0070
199	3.1547	0.0070
200	3.1617	0.0069
201	3.1686	0.0069
202	3.1755	0.0069
203	3.1824	0.0069
204	3.1892	0.0069
205	3.1961	0.0068
206	3.2029	0.0068
207	3.2097	0.0068
208	3.2165	0.0068
209	3.2233	0.0068
210	3.2300	0.0068
211	3.2368	0.0067
212	3.2435	0.0067
213	3.2502	0.0067
214	3.2569	0.0067
215	3.2635	0.0067
216	3.2702	0.0066
217	3.2768	0.0066

218	3.2834	0.0066
219	3.2900	0.0066
220	3.2966	0.0066
221	3.3032	0.0066
222	3.3097	0.0065
223	3.3163	0.0065
224	3.3228	0.0065
225	3.3293	0.0065
226	3.3357	0.0065
227	3.3422	0.0065
228	3.3487	0.0064
229	3.3551	0.0064
230	3.3615	0.0064
231	3.3679	0.0064
232	3.3743	0.0064
233	3.3807	0.0064
234	3.3870	0.0064
235	3.3934	0.0063
236	3.3997	0.0063
237	3.4060	0.0063
238	3.4123	0.0063
239	3.4186	0.0063
240	3.4248	0.0063
241	3.4311	0.0063
242	3.4373	0.0062
243	3.4436	0.0062
244	3.4498	0.0062
245	3.4560	0.0062
246	3.4621	0.0062
247	3.4683	0.0062
248	3.4744	0.0062
249	3.4806	0.0061
250	3.4867	0.0061
251	3.4928	0.0061
252	3.4989	0.0061
253	3.5050	0.0061
254	3.5111	0.0061
255	3.5171	0.0061
256	3.5232	0.0060
257	3.5292	0.0060
258	3.5352	0.0060
259	3.5412	0.0060
260	3.5472	0.0060
261	3.5532	0.0060
262	3.5591	0.0060
263	3.5651	0.0060
264	3.5710	0.0059
265	3.5770	0.0059
266	3.5829	0.0059
267	3.5888	0.0059
268	3.5947	0.0059
269	3.6005	0.0059
270	3.6064	0.0059
271	3.6122	0.0059
272	3.6181	0.0058
273	3.6239	0.0058
274	3.6297	0.0058

275	3.6355	0.0058
276	3.6413	0.0058
277	3.6471	0.0058
278	3.6529	0.0058
279	3.6586	0.0058
280	3.6644	0.0057
281	3.6701	0.0057
282	3.6758	0.0057
283	3.6815	0.0057
284	3.6872	0.0057
285	3.6929	0.0057
286	3.6986	0.0057
287	3.7043	0.0057
288	3.7099	0.0057

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0057	0.0046	0.0011
2	0.0057	0.0046	0.0011
3	0.0057	0.0046	0.0011
4	0.0057	0.0046	0.0011
5	0.0057	0.0046	0.0011
6	0.0057	0.0047	0.0011
7	0.0058	0.0047	0.0011
8	0.0058	0.0047	0.0011
9	0.0058	0.0047	0.0011
10	0.0058	0.0047	0.0011
11	0.0058	0.0047	0.0011
12	0.0058	0.0047	0.0011
13	0.0059	0.0048	0.0011
14	0.0059	0.0048	0.0011
15	0.0059	0.0048	0.0011
16	0.0059	0.0048	0.0011
17	0.0059	0.0048	0.0011
18	0.0060	0.0048	0.0011
19	0.0060	0.0049	0.0011
20	0.0060	0.0049	0.0011
21	0.0060	0.0049	0.0011
22	0.0060	0.0049	0.0011
23	0.0061	0.0049	0.0011
24	0.0061	0.0049	0.0011
25	0.0061	0.0050	0.0011
26	0.0061	0.0050	0.0011
27	0.0061	0.0050	0.0011
28	0.0062	0.0050	0.0012
29	0.0062	0.0050	0.0012
30	0.0062	0.0050	0.0012
31	0.0062	0.0051	0.0012
32	0.0062	0.0051	0.0012
33	0.0063	0.0051	0.0012
34	0.0063	0.0051	0.0012
35	0.0063	0.0051	0.0012
36	0.0063	0.0051	0.0012
37	0.0064	0.0052	0.0012
38	0.0064	0.0052	0.0012

39	0.0064	0.0052	0.0012
40	0.0064	0.0052	0.0012
41	0.0064	0.0052	0.0012
42	0.0065	0.0053	0.0012
43	0.0065	0.0053	0.0012
44	0.0065	0.0053	0.0012
45	0.0065	0.0053	0.0012
46	0.0066	0.0053	0.0012
47	0.0066	0.0054	0.0012
48	0.0066	0.0054	0.0012
49	0.0066	0.0054	0.0012
50	0.0067	0.0054	0.0012
51	0.0067	0.0054	0.0013
52	0.0067	0.0055	0.0013
53	0.0068	0.0055	0.0013
54	0.0068	0.0055	0.0013
55	0.0068	0.0055	0.0013
56	0.0068	0.0055	0.0013
57	0.0069	0.0056	0.0013
58	0.0069	0.0056	0.0013
59	0.0069	0.0056	0.0013
60	0.0069	0.0056	0.0013
61	0.0070	0.0057	0.0013
62	0.0070	0.0057	0.0013
63	0.0070	0.0057	0.0013
64	0.0071	0.0057	0.0013
65	0.0071	0.0058	0.0013
66	0.0071	0.0058	0.0013
67	0.0072	0.0058	0.0013
68	0.0072	0.0058	0.0013
69	0.0072	0.0059	0.0014
70	0.0073	0.0059	0.0014
71	0.0073	0.0059	0.0014
72	0.0073	0.0059	0.0014
73	0.0074	0.0060	0.0014
74	0.0074	0.0060	0.0014
75	0.0074	0.0060	0.0014
76	0.0075	0.0061	0.0014
77	0.0075	0.0061	0.0014
78	0.0075	0.0061	0.0014
79	0.0076	0.0062	0.0014
80	0.0076	0.0062	0.0014
81	0.0077	0.0062	0.0014
82	0.0077	0.0062	0.0014
83	0.0077	0.0063	0.0014
84	0.0078	0.0063	0.0015
85	0.0078	0.0064	0.0015
86	0.0078	0.0064	0.0015
87	0.0079	0.0064	0.0015
88	0.0079	0.0064	0.0015
89	0.0080	0.0065	0.0015
90	0.0080	0.0065	0.0015
91	0.0081	0.0066	0.0015
92	0.0081	0.0066	0.0015
93	0.0082	0.0066	0.0015
94	0.0082	0.0067	0.0015
95	0.0083	0.0067	0.0015

96	0.0083	0.0067	0.0016
97	0.0084	0.0068	0.0016
98	0.0084	0.0068	0.0016
99	0.0085	0.0069	0.0016
100	0.0085	0.0069	0.0016
101	0.0086	0.0070	0.0016
102	0.0086	0.0070	0.0016
103	0.0087	0.0070	0.0016
104	0.0087	0.0071	0.0016
105	0.0088	0.0071	0.0016
106	0.0088	0.0072	0.0017
107	0.0089	0.0072	0.0017
108	0.0089	0.0073	0.0017
109	0.0090	0.0073	0.0017
110	0.0090	0.0074	0.0017
111	0.0091	0.0074	0.0017
112	0.0092	0.0075	0.0017
113	0.0093	0.0075	0.0017
114	0.0093	0.0076	0.0017
115	0.0094	0.0076	0.0018
116	0.0094	0.0077	0.0018
117	0.0095	0.0077	0.0018
118	0.0096	0.0078	0.0018
119	0.0097	0.0079	0.0018
120	0.0097	0.0079	0.0018
121	0.0098	0.0080	0.0018
122	0.0099	0.0080	0.0019
123	0.0100	0.0081	0.0019
124	0.0100	0.0082	0.0019
125	0.0101	0.0082	0.0019
126	0.0102	0.0083	0.0019
127	0.0103	0.0084	0.0019
128	0.0104	0.0084	0.0019
129	0.0105	0.0085	0.0020
130	0.0106	0.0086	0.0020
131	0.0107	0.0087	0.0020
132	0.0108	0.0087	0.0020
133	0.0109	0.0088	0.0020
134	0.0110	0.0089	0.0021
135	0.0111	0.0090	0.0021
136	0.0112	0.0091	0.0021
137	0.0113	0.0092	0.0021
138	0.0114	0.0093	0.0021
139	0.0116	0.0094	0.0022
140	0.0116	0.0095	0.0022
141	0.0118	0.0096	0.0022
142	0.0119	0.0097	0.0022
143	0.0121	0.0098	0.0023
144	0.0122	0.0099	0.0023
145	0.0143	0.0116	0.0027
146	0.0144	0.0117	0.0027
147	0.0146	0.0119	0.0027
148	0.0147	0.0120	0.0028
149	0.0149	0.0121	0.0028
150	0.0150	0.0122	0.0028
151	0.0153	0.0124	0.0029
152	0.0154	0.0125	0.0029

153	0.0157	0.0127	0.0029
154	0.0158	0.0128	0.0030
155	0.0161	0.0130	0.0030
156	0.0162	0.0132	0.0030
157	0.0165	0.0134	0.0031
158	0.0166	0.0135	0.0031
159	0.0170	0.0138	0.0032
160	0.0171	0.0139	0.0032
161	0.0175	0.0142	0.0033
162	0.0177	0.0144	0.0033
163	0.0181	0.0147	0.0034
164	0.0183	0.0148	0.0034
165	0.0187	0.0152	0.0035
166	0.0189	0.0154	0.0035
167	0.0194	0.0158	0.0036
168	0.0196	0.0160	0.0037
169	0.0202	0.0164	0.0038
170	0.0205	0.0166	0.0038
171	0.0211	0.0171	0.0040
172	0.0214	0.0174	0.0040
173	0.0221	0.0180	0.0041
174	0.0225	0.0183	0.0042
175	0.0233	0.0190	0.0044
176	0.0238	0.0193	0.0045
177	0.0247	0.0201	0.0046
178	0.0253	0.0205	0.0047
179	0.0265	0.0215	0.0050
180	0.0271	0.0220	0.0051
181	0.0286	0.0232	0.0054
182	0.0294	0.0239	0.0055
183	0.0314	0.0255	0.0059
184	0.0325	0.0264	0.0061
185	0.0278	0.0226	0.0052
186	0.0294	0.0239	0.0055
187	0.0333	0.0271	0.0062
188	0.0359	0.0292	0.0067
189	0.0433	0.0352	0.0081
190	0.0489	0.0397	0.0092
191	0.0699	0.0568	0.0131
192	0.0961	0.0652	0.0309
193	0.3007	0.0652	0.2355
194	0.0569	0.0462	0.0107
195	0.0392	0.0318	0.0073
196	0.0312	0.0253	0.0058
197	0.0338	0.0274	0.0063
198	0.0304	0.0247	0.0057
199	0.0278	0.0226	0.0052
200	0.0259	0.0210	0.0048
201	0.0242	0.0197	0.0045
202	0.0229	0.0186	0.0043
203	0.0218	0.0177	0.0041
204	0.0208	0.0169	0.0039
205	0.0199	0.0162	0.0037
206	0.0191	0.0156	0.0036
207	0.0185	0.0150	0.0035
208	0.0179	0.0145	0.0033
209	0.0173	0.0141	0.0032

210	0.0168	0.0137	0.0031
211	0.0163	0.0133	0.0031
212	0.0159	0.0129	0.0030
213	0.0155	0.0126	0.0029
214	0.0152	0.0123	0.0028
215	0.0148	0.0120	0.0028
216	0.0145	0.0118	0.0027
217	0.0123	0.0100	0.0023
218	0.0120	0.0097	0.0022
219	0.0117	0.0095	0.0022
220	0.0115	0.0093	0.0022
221	0.0112	0.0091	0.0021
222	0.0110	0.0090	0.0021
223	0.0108	0.0088	0.0020
224	0.0106	0.0086	0.0020
225	0.0104	0.0085	0.0020
226	0.0103	0.0083	0.0019
227	0.0101	0.0082	0.0019
228	0.0099	0.0081	0.0019
229	0.0098	0.0079	0.0018
230	0.0096	0.0078	0.0018
231	0.0095	0.0077	0.0018
232	0.0093	0.0076	0.0018
233	0.0092	0.0075	0.0017
234	0.0091	0.0074	0.0017
235	0.0090	0.0073	0.0017
236	0.0088	0.0072	0.0017
237	0.0087	0.0071	0.0016
238	0.0086	0.0070	0.0016
239	0.0085	0.0069	0.0016
240	0.0084	0.0068	0.0016
241	0.0083	0.0068	0.0016
242	0.0082	0.0067	0.0015
243	0.0081	0.0066	0.0015
244	0.0080	0.0065	0.0015
245	0.0080	0.0065	0.0015
246	0.0079	0.0064	0.0015
247	0.0078	0.0063	0.0015
248	0.0077	0.0063	0.0014
249	0.0076	0.0062	0.0014
250	0.0076	0.0061	0.0014
251	0.0075	0.0061	0.0014
252	0.0074	0.0060	0.0014
253	0.0073	0.0060	0.0014
254	0.0073	0.0059	0.0014
255	0.0072	0.0059	0.0014
256	0.0071	0.0058	0.0013
257	0.0071	0.0058	0.0013
258	0.0070	0.0057	0.0013
259	0.0070	0.0057	0.0013
260	0.0069	0.0056	0.0013
261	0.0068	0.0056	0.0013
262	0.0068	0.0055	0.0013
263	0.0067	0.0055	0.0013
264	0.0067	0.0054	0.0013
265	0.0066	0.0054	0.0012
266	0.0066	0.0053	0.0012

267	0.0065	0.0053	0.0012
268	0.0065	0.0053	0.0012
269	0.0064	0.0052	0.0012
270	0.0064	0.0052	0.0012
271	0.0063	0.0052	0.0012
272	0.0063	0.0051	0.0012
273	0.0063	0.0051	0.0012
274	0.0062	0.0050	0.0012
275	0.0062	0.0050	0.0012
276	0.0061	0.0050	0.0011
277	0.0061	0.0049	0.0011
278	0.0060	0.0049	0.0011
279	0.0060	0.0049	0.0011
280	0.0060	0.0048	0.0011
281	0.0059	0.0048	0.0011
282	0.0059	0.0048	0.0011
283	0.0059	0.0048	0.0011
284	0.0058	0.0047	0.0011
285	0.0058	0.0047	0.0011
286	0.0057	0.0047	0.0011
287	0.0057	0.0046	0.0011
288	0.0057	0.0046	0.0011

Total soil rain loss = 2.82(In)
Total effective rainfall = 0.89(In)
Peak flow rate in flood hydrograph = 11.39(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

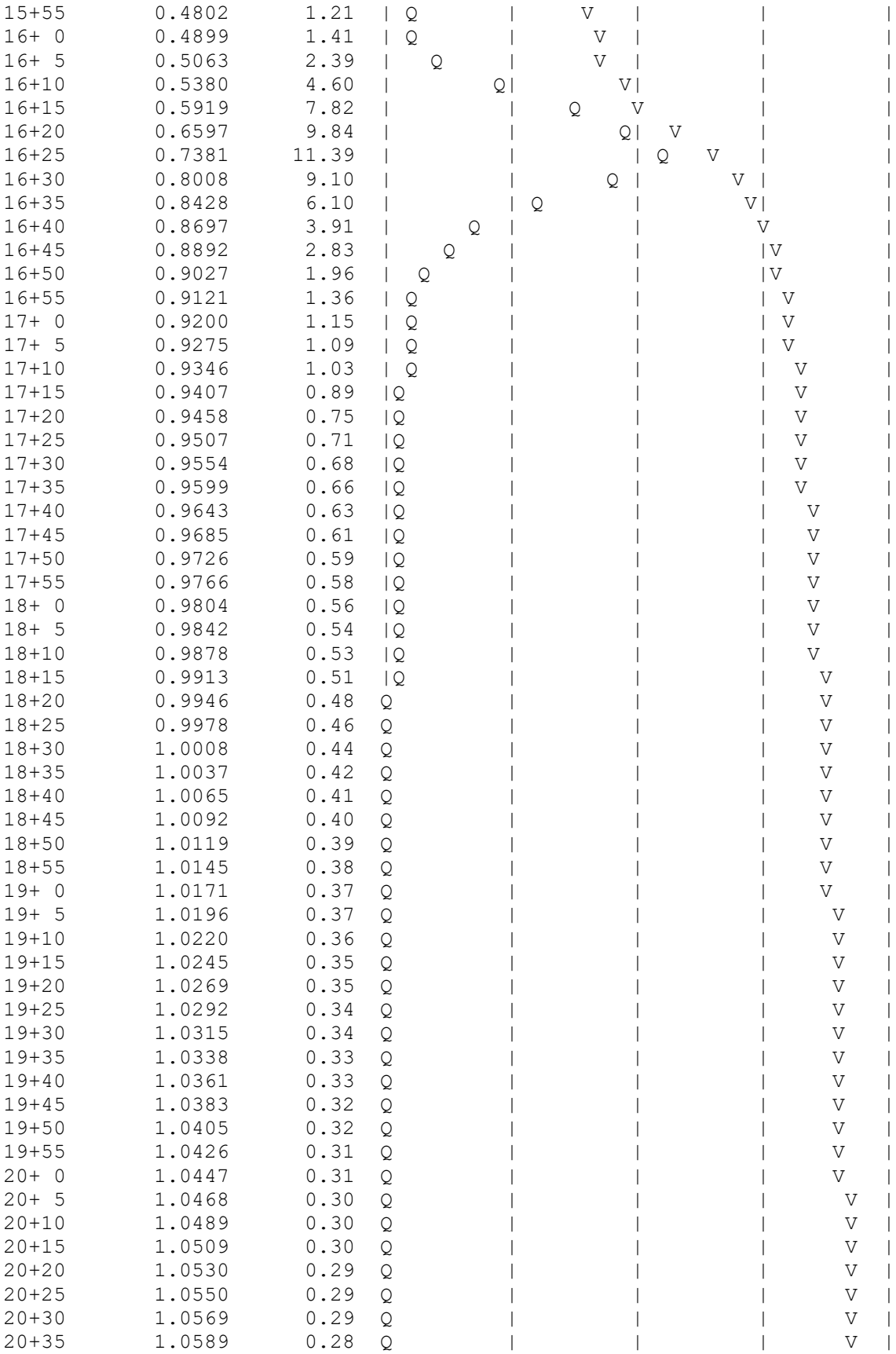
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0001	0.01	Q	|	|	|	|
0+15	0.0004	0.04	Q	|	|	|	|
0+20	0.0009	0.07	Q	|	|	|	|
0+25	0.0017	0.12	Q	|	|	|	|
0+30	0.0027	0.15	Q	|	|	|	|
0+35	0.0039	0.17	Q	|	|	|	|
0+40	0.0051	0.18	Q	|	|	|	|
0+45	0.0065	0.19	Q	|	|	|	|
0+50	0.0078	0.19	Q	|	|	|	|
0+55	0.0091	0.20	Q	|	|	|	|
1+ 0	0.0105	0.20	Q	|	|	|	|
1+ 5	0.0119	0.20	Q	|	|	|	|
1+10	0.0133	0.20	Q	|	|	|	|
1+15	0.0147	0.20	Q	|	|	|	|
1+20	0.0160	0.20	Q	|	|	|	|
1+25	0.0174	0.20	Q	|	|	|	|
1+30	0.0188	0.20	Q	|	|	|	|
1+35	0.0203	0.20	Q	|	|	|	|
1+40	0.0217	0.21	Q	|	|	|	|

1+45	0.0231	0.21	Q				
1+50	0.0245	0.21	Q				
1+55	0.0259	0.21	Q				
2+ 0	0.0274	0.21	Q				
2+ 5	0.0288	0.21	QV				
2+10	0.0302	0.21	QV				
2+15	0.0317	0.21	QV				
2+20	0.0331	0.21	QV				
2+25	0.0346	0.21	QV				
2+30	0.0360	0.21	QV				
2+35	0.0375	0.21	QV				
2+40	0.0390	0.21	QV				
2+45	0.0405	0.21	QV				
2+50	0.0419	0.21	QV				
2+55	0.0434	0.22	QV				
3+ 0	0.0449	0.22	QV				
3+ 5	0.0464	0.22	QV				
3+10	0.0479	0.22	QV				
3+15	0.0494	0.22	QV				
3+20	0.0509	0.22	QV				
3+25	0.0524	0.22	QV				
3+30	0.0540	0.22	QV				
3+35	0.0555	0.22	QV				
3+40	0.0570	0.22	Q V				
3+45	0.0586	0.22	Q V				
3+50	0.0601	0.22	Q V				
3+55	0.0616	0.23	Q V				
4+ 0	0.0632	0.23	Q V				
4+ 5	0.0648	0.23	Q V				
4+10	0.0663	0.23	Q V				
4+15	0.0679	0.23	Q V				
4+20	0.0695	0.23	Q V				
4+25	0.0711	0.23	Q V				
4+30	0.0727	0.23	Q V				
4+35	0.0743	0.23	Q V				
4+40	0.0759	0.23	Q V				
4+45	0.0775	0.23	Q V				
4+50	0.0791	0.23	Q V				
4+55	0.0807	0.24	Q V				
5+ 0	0.0823	0.24	Q V				
5+ 5	0.0840	0.24	Q V				
5+10	0.0856	0.24	Q V				
5+15	0.0873	0.24	Q V				
5+20	0.0889	0.24	Q V				
5+25	0.0906	0.24	Q V				
5+30	0.0923	0.24	Q V				
5+35	0.0940	0.24	Q V				
5+40	0.0956	0.24	Q V				
5+45	0.0973	0.25	Q V				
5+50	0.0990	0.25	Q V				
5+55	0.1007	0.25	Q V				
6+ 0	0.1025	0.25	Q V				
6+ 5	0.1042	0.25	Q V				
6+10	0.1059	0.25	Q V				
6+15	0.1077	0.25	Q V				
6+20	0.1094	0.25	Q V				

6+25	0.1112	0.26	Q	V				
6+30	0.1129	0.26	Q	V				
6+35	0.1147	0.26	Q	V				
6+40	0.1165	0.26	Q	V				
6+45	0.1183	0.26	Q	V				
6+50	0.1201	0.26	Q	V				
6+55	0.1219	0.26	Q	V				
7+ 0	0.1237	0.26	Q	V				
7+ 5	0.1255	0.27	Q	V				
7+10	0.1274	0.27	Q	V				
7+15	0.1292	0.27	Q	V				
7+20	0.1311	0.27	Q	V				
7+25	0.1329	0.27	Q	V				
7+30	0.1348	0.27	Q	V				
7+35	0.1367	0.27	Q	V				
7+40	0.1386	0.27	Q	V				
7+45	0.1405	0.28	Q	V				
7+50	0.1424	0.28	Q	V				
7+55	0.1443	0.28	Q	V				
8+ 0	0.1462	0.28	Q	V				
8+ 5	0.1482	0.28	Q	V				
8+10	0.1502	0.28	Q	V				
8+15	0.1521	0.29	Q	V				
8+20	0.1541	0.29	Q	V				
8+25	0.1561	0.29	Q	V				
8+30	0.1581	0.29	Q	V				
8+35	0.1601	0.29	Q	V				
8+40	0.1621	0.29	Q	V				
8+45	0.1642	0.30	Q	V				
8+50	0.1662	0.30	Q	V				
8+55	0.1683	0.30	Q	V				
9+ 0	0.1704	0.30	Q	V				
9+ 5	0.1725	0.30	Q	V				
9+10	0.1746	0.31	Q	V				
9+15	0.1767	0.31	Q	V				
9+20	0.1788	0.31	Q	V				
9+25	0.1810	0.31	Q	V				
9+30	0.1831	0.31	Q	V				
9+35	0.1853	0.32	Q	V				
9+40	0.1875	0.32	Q	V				
9+45	0.1897	0.32	Q	V				
9+50	0.1919	0.32	Q	V				
9+55	0.1941	0.32	Q	V				
10+ 0	0.1964	0.33	Q	V				
10+ 5	0.1987	0.33	Q	V				
10+10	0.2009	0.33	Q	V				
10+15	0.2033	0.33	Q	V				
10+20	0.2056	0.34	Q	V				
10+25	0.2079	0.34	Q	V				
10+30	0.2103	0.34	Q	V				
10+35	0.2126	0.35	Q	V				
10+40	0.2150	0.35	Q	V				
10+45	0.2175	0.35	Q	V				
10+50	0.2199	0.35	Q	V				
10+55	0.2224	0.36	Q	V				
11+ 0	0.2248	0.36	Q	V				
11+ 5	0.2273	0.36	Q	V				

11+10	0.2299	0.37	Q	V |			
11+15	0.2324	0.37	Q	V |			
11+20	0.2350	0.37	Q	V |			
11+25	0.2376	0.38	Q	V |			
11+30	0.2402	0.38	Q	V |			
11+35	0.2428	0.38	Q	V |			
11+40	0.2455	0.39	Q	V |			
11+45	0.2482	0.39	Q	V |			
11+50	0.2509	0.40	Q	V |			
11+55	0.2536	0.40	Q	V |			
12+ 0	0.2564	0.40	Q	V|			
12+ 5	0.2592	0.41	Q	V|			
12+10	0.2621	0.42	Q	V|			
12+15	0.2651	0.43	Q	V|			
12+20	0.2682	0.45	Q	V|			
12+25	0.2714	0.47	Q	V|			
12+30	0.2747	0.48	Q	V|			
12+35	0.2781	0.50	Q	V|			
12+40	0.2816	0.50	|Q	V|			
12+45	0.2851	0.51	|Q	V			
12+50	0.2887	0.52	|Q	V			
12+55	0.2923	0.53	|Q	V			
13+ 0	0.2960	0.53	|Q	V			
13+ 5	0.2997	0.54	|Q	V			
13+10	0.3035	0.55	|Q	V			
13+15	0.3073	0.55	|Q	V			
13+20	0.3112	0.56	|Q	|V			
13+25	0.3151	0.57	|Q	|V			
13+30	0.3191	0.58	|Q	|V			
13+35	0.3231	0.59	|Q	|V			
13+40	0.3272	0.59	|Q	|V			
13+45	0.3313	0.60	|Q	|V			
13+50	0.3356	0.61	|Q	|V			
13+55	0.3398	0.62	|Q	| V			
14+ 0	0.3442	0.63	|Q	| V			
14+ 5	0.3486	0.64	|Q	| V			
14+10	0.3532	0.66	|Q	| V			
14+15	0.3578	0.67	|Q	| V			
14+20	0.3625	0.68	|Q	| V			
14+25	0.3673	0.70	|Q	| V			
14+30	0.3721	0.71	|Q	| V			
14+35	0.3772	0.73	|Q	| V			
14+40	0.3823	0.74	|Q	| V			
14+45	0.3875	0.76	|Q	| V			
14+50	0.3929	0.78	|Q	| V			
14+55	0.3984	0.80	|Q	| V			
15+ 0	0.4041	0.83	|Q	| V			
15+ 5	0.4100	0.85	|Q	| V			
15+10	0.4160	0.88	|Q	| V			
15+15	0.4223	0.91	|Q	| V			
15+20	0.4288	0.94	|Q	| V			
15+25	0.4356	0.98	|Q	| V			
15+30	0.4425	1.01	| Q	| V			
15+35	0.4496	1.03	| Q	| V			
15+40	0.4568	1.05	| Q	| V			
15+45	0.4641	1.06	| Q	| V			
15+50	0.4718	1.11	| Q	| V			



20+40	1.0608	0.28	Q	|	|	|	V |
20+45	1.0627	0.28	Q	|	|	|	V |
20+50	1.0646	0.27	Q	|	|	|	V |
20+55	1.0665	0.27	Q	|	|	|	V |
21+ 0	1.0683	0.27	Q	|	|	|	V |
21+ 5	1.0702	0.27	Q	|	|	|	V |
21+10	1.0720	0.26	Q	|	|	|	V |
21+15	1.0738	0.26	Q	|	|	|	V |
21+20	1.0756	0.26	Q	|	|	|	V |
21+25	1.0773	0.26	Q	|	|	|	V |
21+30	1.0791	0.25	Q	|	|	|	V |
21+35	1.0808	0.25	Q	|	|	|	V |
21+40	1.0825	0.25	Q	|	|	|	V |
21+45	1.0842	0.25	Q	|	|	|	V |
21+50	1.0859	0.24	Q	|	|	|	V |
21+55	1.0876	0.24	Q	|	|	|	V |
22+ 0	1.0892	0.24	Q	|	|	|	V |
22+ 5	1.0908	0.24	Q	|	|	|	V |
22+10	1.0925	0.24	Q	|	|	|	V |
22+15	1.0941	0.23	Q	|	|	|	V |
22+20	1.0957	0.23	Q	|	|	|	V |
22+25	1.0973	0.23	Q	|	|	|	V |
22+30	1.0989	0.23	Q	|	|	|	V |
22+35	1.1004	0.23	Q	|	|	|	V |
22+40	1.1020	0.23	Q	|	|	|	V |
22+45	1.1035	0.22	Q	|	|	|	V|
22+50	1.1050	0.22	Q	|	|	|	V|
22+55	1.1066	0.22	Q	|	|	|	V|
23+ 0	1.1081	0.22	Q	|	|	|	V|
23+ 5	1.1096	0.22	Q	|	|	|	V|
23+10	1.1111	0.22	Q	|	|	|	V|
23+15	1.1125	0.21	Q	|	|	|	V|
23+20	1.1140	0.21	Q	|	|	|	V|
23+25	1.1155	0.21	Q	|	|	|	V|
23+30	1.1169	0.21	Q	|	|	|	V|
23+35	1.1183	0.21	Q	|	|	|	V|
23+40	1.1198	0.21	Q	|	|	|	V|
23+45	1.1212	0.21	Q	|	|	|	V|
23+50	1.1226	0.20	Q	|	|	|	V|
23+55	1.1240	0.20	Q	|	|	|	V|
24+ 0	1.1254	0.20	Q	|	|	|	V|
24+ 5	1.1268	0.20	Q	|	|	|	V|
24+10	1.1280	0.19	Q	|	|	|	V|
24+15	1.1291	0.16	Q	|	|	|	V|
24+20	1.1300	0.12	Q	|	|	|	V|
24+25	1.1306	0.08	Q	|	|	|	V|
24+30	1.1309	0.05	Q	|	|	|	V|
24+35	1.1311	0.03	Q	|	|	|	V|
24+40	1.1312	0.02	Q	|	|	|	V|
24+45	1.1312	0.01	Q	|	|	|	V|
24+50	1.1313	0.00	Q	|	|	|	V|
24+55	1.1313	0.00	Q	|	|	|	V|
25+ 0	1.1313	0.00	Q	|	|	|	V|
25+ 5	1.1313	0.00	Q	|	|	|	V|
25+10	1.1313	0.00	Q	|	|	|	V

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

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Study date 04/23/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION - NORTHERLY CHAMBERS
10-YEAR STORM EVENT ANALYSIS WITH ADJUSTED 5 YEAR RAINFALL DATA

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		
15.31	1	0.68
Rainfall data for year 10		
15.31	6	1.71
Rainfall data for year 10		
15.31	24	3.13

++

******** 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)
32.0	32.0	15.31	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
12.25	0.800	32.0	32.0	15.65	0.000
3.06	0.200	98.0	98.0	0.20	0.926

Area-averaged catchment yield fraction, Y = 0.185
Area-averaged low loss fraction, Yb = 0.815
User entry of time of concentration = 0.449 (hours)
++
Watershed area = 15.31(Ac.)
Catchment Lag time = 0.359 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 23.1894
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.815 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.252(In)
Computed peak 30-minute rainfall = 0.515(In)
Specified peak 1-hour rainfall = 0.680(In)
Computed peak 3-hour rainfall = 1.197(In)
Specified peak 6-hour rainfall = 1.710(In)
Specified peak 24-hour rainfall = 3.130(In)

Rainfall depth area reduction factors:
Using a total area of 15.31(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.251(In)
30-minute factor = 0.999 Adjusted rainfall = 0.515(In)
1-hour factor = 0.999 Adjusted rainfall = 0.680(In)
3-hour factor = 1.000 Adjusted rainfall = 1.197(In)
6-hour factor = 1.000 Adjusted rainfall = 1.710(In)
24-hour factor = 1.000 Adjusted rainfall = 3.130(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 = 185.16 (CFS))	
1	1.414	2.618
2	6.524	9.462
3	18.082	21.401
4	33.657	28.838
5	53.408	36.569
6	71.924	34.284
7	82.808	20.151

8	90.059	13.426
9	94.275	7.807
10	96.821	4.714
11	98.135	2.433
12	98.600	0.861
13	99.018	0.773
14	99.435	0.773
15	99.837	0.744
16	100.000	0.302

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.2515	0.2515
2	0.3318	0.0804
3	0.3903	0.0584
4	0.4379	0.0476
5	0.4788	0.0409
6	0.5150	0.0362
7	0.5477	0.0328
8	0.5778	0.0301
9	0.6056	0.0279
10	0.6317	0.0261
11	0.6563	0.0245
12	0.6795	0.0232
13	0.7081	0.0286
14	0.7357	0.0276
15	0.7623	0.0266
16	0.7881	0.0258
17	0.8131	0.0250
18	0.8374	0.0243
19	0.8610	0.0237
20	0.8841	0.0231
21	0.9066	0.0225
22	0.9286	0.0220
23	0.9501	0.0215
24	0.9712	0.0211
25	0.9918	0.0206
26	1.0121	0.0202
27	1.0319	0.0199
28	1.0515	0.0195
29	1.0706	0.0192
30	1.0895	0.0189
31	1.1081	0.0186
32	1.1263	0.0183
33	1.1443	0.0180
34	1.1621	0.0177
35	1.1796	0.0175
36	1.1968	0.0172
37	1.2138	0.0170
38	1.2306	0.0168
39	1.2472	0.0166
40	1.2635	0.0164
41	1.2797	0.0162
42	1.2956	0.0160
43	1.3114	0.0158
44	1.3270	0.0156
45	1.3425	0.0154

46	1.3578	0.0153
47	1.3729	0.0151
48	1.3878	0.0150
49	1.4026	0.0148
50	1.4173	0.0147
51	1.4318	0.0145
52	1.4462	0.0144
53	1.4605	0.0142
54	1.4746	0.0141
55	1.4886	0.0140
56	1.5024	0.0139
57	1.5162	0.0138
58	1.5298	0.0136
59	1.5433	0.0135
60	1.5567	0.0134
61	1.5701	0.0133
62	1.5832	0.0132
63	1.5963	0.0131
64	1.6093	0.0130
65	1.6222	0.0129
66	1.6350	0.0128
67	1.6477	0.0127
68	1.6603	0.0126
69	1.6729	0.0125
70	1.6853	0.0124
71	1.6977	0.0123
72	1.7099	0.0123
73	1.7202	0.0103
74	1.7305	0.0102
75	1.7406	0.0102
76	1.7507	0.0101
77	1.7607	0.0100
78	1.7707	0.0099
79	1.7805	0.0099
80	1.7903	0.0098
81	1.8000	0.0097
82	1.8097	0.0097
83	1.8193	0.0096
84	1.8288	0.0095
85	1.8383	0.0095
86	1.8477	0.0094
87	1.8570	0.0093
88	1.8663	0.0093
89	1.8755	0.0092
90	1.8847	0.0092
91	1.8938	0.0091
92	1.9028	0.0090
93	1.9118	0.0090
94	1.9208	0.0089
95	1.9296	0.0089
96	1.9385	0.0088
97	1.9473	0.0088
98	1.9560	0.0087
99	1.9647	0.0087
100	1.9733	0.0086
101	1.9819	0.0086
102	1.9904	0.0085

103	1.9989	0.0085
104	2.0073	0.0084
105	2.0157	0.0084
106	2.0241	0.0083
107	2.0324	0.0083
108	2.0407	0.0083
109	2.0489	0.0082
110	2.0570	0.0082
111	2.0652	0.0081
112	2.0733	0.0081
113	2.0813	0.0081
114	2.0893	0.0080
115	2.0973	0.0080
116	2.1052	0.0079
117	2.1131	0.0079
118	2.1210	0.0079
119	2.1288	0.0078
120	2.1366	0.0078
121	2.1444	0.0077
122	2.1521	0.0077
123	2.1597	0.0077
124	2.1674	0.0076
125	2.1750	0.0076
126	2.1826	0.0076
127	2.1901	0.0075
128	2.1976	0.0075
129	2.2051	0.0075
130	2.2125	0.0074
131	2.2199	0.0074
132	2.2273	0.0074
133	2.2346	0.0073
134	2.2419	0.0073
135	2.2492	0.0073
136	2.2565	0.0073
137	2.2637	0.0072
138	2.2709	0.0072
139	2.2780	0.0072
140	2.2852	0.0071
141	2.2923	0.0071
142	2.2994	0.0071
143	2.3064	0.0070
144	2.3134	0.0070
145	2.3204	0.0070
146	2.3274	0.0070
147	2.3343	0.0069
148	2.3412	0.0069
149	2.3481	0.0069
150	2.3550	0.0069
151	2.3618	0.0068
152	2.3686	0.0068
153	2.3754	0.0068
154	2.3822	0.0068
155	2.3889	0.0067
156	2.3956	0.0067
157	2.4023	0.0067
158	2.4090	0.0067
159	2.4156	0.0066

160	2.4222	0.0066
161	2.4288	0.0066
162	2.4354	0.0066
163	2.4419	0.0065
164	2.4484	0.0065
165	2.4549	0.0065
166	2.4614	0.0065
167	2.4679	0.0065
168	2.4743	0.0064
169	2.4807	0.0064
170	2.4871	0.0064
171	2.4935	0.0064
172	2.4998	0.0063
173	2.5061	0.0063
174	2.5125	0.0063
175	2.5187	0.0063
176	2.5250	0.0063
177	2.5313	0.0062
178	2.5375	0.0062
179	2.5437	0.0062
180	2.5499	0.0062
181	2.5560	0.0062
182	2.5622	0.0061
183	2.5683	0.0061
184	2.5744	0.0061
185	2.5805	0.0061
186	2.5866	0.0061
187	2.5927	0.0061
188	2.5987	0.0060
189	2.6047	0.0060
190	2.6107	0.0060
191	2.6167	0.0060
192	2.6227	0.0060
193	2.6286	0.0059
194	2.6345	0.0059
195	2.6405	0.0059
196	2.6463	0.0059
197	2.6522	0.0059
198	2.6581	0.0059
199	2.6639	0.0058
200	2.6698	0.0058
201	2.6756	0.0058
202	2.6814	0.0058
203	2.6872	0.0058
204	2.6929	0.0058
205	2.6987	0.0057
206	2.7044	0.0057
207	2.7101	0.0057
208	2.7158	0.0057
209	2.7215	0.0057
210	2.7272	0.0057
211	2.7328	0.0057
212	2.7385	0.0056
213	2.7441	0.0056
214	2.7497	0.0056
215	2.7553	0.0056
216	2.7609	0.0056

217	2.7665	0.0056
218	2.7720	0.0056
219	2.7776	0.0055
220	2.7831	0.0055
221	2.7886	0.0055
222	2.7941	0.0055
223	2.7996	0.0055
224	2.8050	0.0055
225	2.8105	0.0055
226	2.8159	0.0054
227	2.8214	0.0054
228	2.8268	0.0054
229	2.8322	0.0054
230	2.8376	0.0054
231	2.8429	0.0054
232	2.8483	0.0054
233	2.8536	0.0053
234	2.8590	0.0053
235	2.8643	0.0053
236	2.8696	0.0053
237	2.8749	0.0053
238	2.8802	0.0053
239	2.8855	0.0053
240	2.8907	0.0053
241	2.8960	0.0052
242	2.9012	0.0052
243	2.9064	0.0052
244	2.9116	0.0052
245	2.9168	0.0052
246	2.9220	0.0052
247	2.9272	0.0052
248	2.9323	0.0052
249	2.9375	0.0052
250	2.9426	0.0051
251	2.9478	0.0051
252	2.9529	0.0051
253	2.9580	0.0051
254	2.9631	0.0051
255	2.9682	0.0051
256	2.9732	0.0051
257	2.9783	0.0051
258	2.9833	0.0050
259	2.9884	0.0050
260	2.9934	0.0050
261	2.9984	0.0050
262	3.0034	0.0050
263	3.0084	0.0050
264	3.0134	0.0050
265	3.0184	0.0050
266	3.0233	0.0050
267	3.0283	0.0050
268	3.0332	0.0049
269	3.0382	0.0049
270	3.0431	0.0049
271	3.0480	0.0049
272	3.0529	0.0049
273	3.0578	0.0049

274	3.0627	0.0049
275	3.0675	0.0049
276	3.0724	0.0049
277	3.0772	0.0048
278	3.0821	0.0048
279	3.0869	0.0048
280	3.0917	0.0048
281	3.0965	0.0048
282	3.1013	0.0048
283	3.1061	0.0048
284	3.1109	0.0048
285	3.1157	0.0048
286	3.1204	0.0048
287	3.1252	0.0048
288	3.1299	0.0047

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0047	0.0039	0.0009
2	0.0048	0.0039	0.0009
3	0.0048	0.0039	0.0009
4	0.0048	0.0039	0.0009
5	0.0048	0.0039	0.0009
6	0.0048	0.0039	0.0009
7	0.0048	0.0039	0.0009
8	0.0048	0.0039	0.0009
9	0.0049	0.0040	0.0009
10	0.0049	0.0040	0.0009
11	0.0049	0.0040	0.0009
12	0.0049	0.0040	0.0009
13	0.0049	0.0040	0.0009
14	0.0049	0.0040	0.0009
15	0.0050	0.0040	0.0009
16	0.0050	0.0040	0.0009
17	0.0050	0.0041	0.0009
18	0.0050	0.0041	0.0009
19	0.0050	0.0041	0.0009
20	0.0050	0.0041	0.0009
21	0.0050	0.0041	0.0009
22	0.0051	0.0041	0.0009
23	0.0051	0.0041	0.0009
24	0.0051	0.0042	0.0009
25	0.0051	0.0042	0.0009
26	0.0051	0.0042	0.0009
27	0.0052	0.0042	0.0010
28	0.0052	0.0042	0.0010
29	0.0052	0.0042	0.0010
30	0.0052	0.0042	0.0010
31	0.0052	0.0043	0.0010
32	0.0052	0.0043	0.0010
33	0.0053	0.0043	0.0010
34	0.0053	0.0043	0.0010
35	0.0053	0.0043	0.0010
36	0.0053	0.0043	0.0010
37	0.0053	0.0043	0.0010

38	0.0053	0.0044	0.0010
39	0.0054	0.0044	0.0010
40	0.0054	0.0044	0.0010
41	0.0054	0.0044	0.0010
42	0.0054	0.0044	0.0010
43	0.0055	0.0044	0.0010
44	0.0055	0.0045	0.0010
45	0.0055	0.0045	0.0010
46	0.0055	0.0045	0.0010
47	0.0055	0.0045	0.0010
48	0.0056	0.0045	0.0010
49	0.0056	0.0045	0.0010
50	0.0056	0.0046	0.0010
51	0.0056	0.0046	0.0010
52	0.0056	0.0046	0.0010
53	0.0057	0.0046	0.0011
54	0.0057	0.0046	0.0011
55	0.0057	0.0047	0.0011
56	0.0057	0.0047	0.0011
57	0.0058	0.0047	0.0011
58	0.0058	0.0047	0.0011
59	0.0058	0.0047	0.0011
60	0.0058	0.0048	0.0011
61	0.0059	0.0048	0.0011
62	0.0059	0.0048	0.0011
63	0.0059	0.0048	0.0011
64	0.0059	0.0048	0.0011
65	0.0060	0.0049	0.0011
66	0.0060	0.0049	0.0011
67	0.0060	0.0049	0.0011
68	0.0060	0.0049	0.0011
69	0.0061	0.0049	0.0011
70	0.0061	0.0050	0.0011
71	0.0061	0.0050	0.0011
72	0.0061	0.0050	0.0011
73	0.0062	0.0050	0.0011
74	0.0062	0.0051	0.0011
75	0.0062	0.0051	0.0012
76	0.0063	0.0051	0.0012
77	0.0063	0.0051	0.0012
78	0.0063	0.0052	0.0012
79	0.0064	0.0052	0.0012
80	0.0064	0.0052	0.0012
81	0.0064	0.0052	0.0012
82	0.0065	0.0053	0.0012
83	0.0065	0.0053	0.0012
84	0.0065	0.0053	0.0012
85	0.0066	0.0054	0.0012
86	0.0066	0.0054	0.0012
87	0.0066	0.0054	0.0012
88	0.0067	0.0054	0.0012
89	0.0067	0.0055	0.0012
90	0.0067	0.0055	0.0012
91	0.0068	0.0055	0.0013
92	0.0068	0.0055	0.0013
93	0.0069	0.0056	0.0013
94	0.0069	0.0056	0.0013

95	0.0069	0.0057	0.0013
96	0.0070	0.0057	0.0013
97	0.0070	0.0057	0.0013
98	0.0070	0.0057	0.0013
99	0.0071	0.0058	0.0013
100	0.0071	0.0058	0.0013
101	0.0072	0.0059	0.0013
102	0.0072	0.0059	0.0013
103	0.0073	0.0059	0.0013
104	0.0073	0.0060	0.0014
105	0.0074	0.0060	0.0014
106	0.0074	0.0060	0.0014
107	0.0075	0.0061	0.0014
108	0.0075	0.0061	0.0014
109	0.0076	0.0062	0.0014
110	0.0076	0.0062	0.0014
111	0.0077	0.0063	0.0014
112	0.0077	0.0063	0.0014
113	0.0078	0.0063	0.0014
114	0.0078	0.0064	0.0014
115	0.0079	0.0064	0.0015
116	0.0079	0.0065	0.0015
117	0.0080	0.0065	0.0015
118	0.0081	0.0066	0.0015
119	0.0081	0.0066	0.0015
120	0.0082	0.0067	0.0015
121	0.0083	0.0067	0.0015
122	0.0083	0.0068	0.0015
123	0.0084	0.0068	0.0016
124	0.0084	0.0069	0.0016
125	0.0085	0.0070	0.0016
126	0.0086	0.0070	0.0016
127	0.0087	0.0071	0.0016
128	0.0087	0.0071	0.0016
129	0.0088	0.0072	0.0016
130	0.0089	0.0072	0.0016
131	0.0090	0.0073	0.0017
132	0.0090	0.0074	0.0017
133	0.0092	0.0075	0.0017
134	0.0092	0.0075	0.0017
135	0.0093	0.0076	0.0017
136	0.0094	0.0077	0.0017
137	0.0095	0.0078	0.0018
138	0.0096	0.0078	0.0018
139	0.0097	0.0079	0.0018
140	0.0098	0.0080	0.0018
141	0.0099	0.0081	0.0018
142	0.0100	0.0082	0.0019
143	0.0102	0.0083	0.0019
144	0.0102	0.0083	0.0019
145	0.0123	0.0100	0.0023
146	0.0123	0.0101	0.0023
147	0.0125	0.0102	0.0023
148	0.0126	0.0103	0.0023
149	0.0128	0.0104	0.0024
150	0.0129	0.0105	0.0024
151	0.0131	0.0107	0.0024

152	0.0132	0.0108	0.0024
153	0.0134	0.0109	0.0025
154	0.0135	0.0110	0.0025
155	0.0138	0.0112	0.0025
156	0.0139	0.0113	0.0026
157	0.0141	0.0115	0.0026
158	0.0142	0.0116	0.0026
159	0.0145	0.0118	0.0027
160	0.0147	0.0119	0.0027
161	0.0150	0.0122	0.0028
162	0.0151	0.0123	0.0028
163	0.0154	0.0126	0.0029
164	0.0156	0.0127	0.0029
165	0.0160	0.0130	0.0030
166	0.0162	0.0132	0.0030
167	0.0166	0.0135	0.0031
168	0.0168	0.0137	0.0031
169	0.0172	0.0141	0.0032
170	0.0175	0.0142	0.0032
171	0.0180	0.0147	0.0033
172	0.0183	0.0149	0.0034
173	0.0189	0.0154	0.0035
174	0.0192	0.0156	0.0036
175	0.0199	0.0162	0.0037
176	0.0202	0.0165	0.0037
177	0.0211	0.0172	0.0039
178	0.0215	0.0175	0.0040
179	0.0225	0.0183	0.0042
180	0.0231	0.0188	0.0043
181	0.0243	0.0198	0.0045
182	0.0250	0.0204	0.0046
183	0.0266	0.0217	0.0049
184	0.0276	0.0225	0.0051
185	0.0232	0.0189	0.0043
186	0.0245	0.0200	0.0045
187	0.0279	0.0227	0.0052
188	0.0301	0.0245	0.0056
189	0.0362	0.0295	0.0067
190	0.0409	0.0333	0.0076
191	0.0584	0.0476	0.0108
192	0.0804	0.0652	0.0152
193	0.2515	0.0652	0.1863
194	0.0476	0.0388	0.0088
195	0.0328	0.0267	0.0061
196	0.0261	0.0212	0.0048
197	0.0286	0.0233	0.0053
198	0.0258	0.0210	0.0048
199	0.0237	0.0193	0.0044
200	0.0220	0.0179	0.0041
201	0.0206	0.0168	0.0038
202	0.0195	0.0159	0.0036
203	0.0186	0.0151	0.0034
204	0.0177	0.0145	0.0033
205	0.0170	0.0139	0.0031
206	0.0164	0.0133	0.0030
207	0.0158	0.0129	0.0029
208	0.0153	0.0124	0.0028

209	0.0148	0.0121	0.0027
210	0.0144	0.0117	0.0027
211	0.0140	0.0114	0.0026
212	0.0136	0.0111	0.0025
213	0.0133	0.0108	0.0025
214	0.0130	0.0106	0.0024
215	0.0127	0.0104	0.0024
216	0.0124	0.0101	0.0023
217	0.0103	0.0084	0.0019
218	0.0101	0.0082	0.0019
219	0.0099	0.0080	0.0018
220	0.0097	0.0079	0.0018
221	0.0095	0.0077	0.0018
222	0.0093	0.0076	0.0017
223	0.0091	0.0074	0.0017
224	0.0089	0.0073	0.0017
225	0.0088	0.0072	0.0016
226	0.0086	0.0070	0.0016
227	0.0085	0.0069	0.0016
228	0.0083	0.0068	0.0015
229	0.0082	0.0067	0.0015
230	0.0081	0.0066	0.0015
231	0.0080	0.0065	0.0015
232	0.0079	0.0064	0.0015
233	0.0077	0.0063	0.0014
234	0.0076	0.0062	0.0014
235	0.0075	0.0061	0.0014
236	0.0074	0.0061	0.0014
237	0.0073	0.0060	0.0014
238	0.0073	0.0059	0.0013
239	0.0072	0.0058	0.0013
240	0.0071	0.0058	0.0013
241	0.0070	0.0057	0.0013
242	0.0069	0.0056	0.0013
243	0.0068	0.0056	0.0013
244	0.0068	0.0055	0.0013
245	0.0067	0.0054	0.0012
246	0.0066	0.0054	0.0012
247	0.0065	0.0053	0.0012
248	0.0065	0.0053	0.0012
249	0.0064	0.0052	0.0012
250	0.0063	0.0052	0.0012
251	0.0063	0.0051	0.0012
252	0.0062	0.0051	0.0012
253	0.0062	0.0050	0.0011
254	0.0061	0.0050	0.0011
255	0.0061	0.0049	0.0011
256	0.0060	0.0049	0.0011
257	0.0059	0.0048	0.0011
258	0.0059	0.0048	0.0011
259	0.0058	0.0048	0.0011
260	0.0058	0.0047	0.0011
261	0.0057	0.0047	0.0011
262	0.0057	0.0046	0.0011
263	0.0057	0.0046	0.0010
264	0.0056	0.0046	0.0010
265	0.0056	0.0045	0.0010

266	0.0055	0.0045	0.0010
267	0.0055	0.0045	0.0010
268	0.0054	0.0044	0.0010
269	0.0054	0.0044	0.0010
270	0.0054	0.0044	0.0010
271	0.0053	0.0043	0.0010
272	0.0053	0.0043	0.0010
273	0.0052	0.0043	0.0010
274	0.0052	0.0042	0.0010
275	0.0052	0.0042	0.0010
276	0.0051	0.0042	0.0010
277	0.0051	0.0042	0.0009
278	0.0051	0.0041	0.0009
279	0.0050	0.0041	0.0009
280	0.0050	0.0041	0.0009
281	0.0050	0.0041	0.0009
282	0.0049	0.0040	0.0009
283	0.0049	0.0040	0.0009
284	0.0049	0.0040	0.0009
285	0.0048	0.0040	0.0009
286	0.0048	0.0039	0.0009
287	0.0048	0.0039	0.0009
288	0.0048	0.0039	0.0009

Total soil rain loss = 2.41(In)
Total effective rainfall = 0.72(In)
Peak flow rate in flood hydrograph = 8.20(CFS)

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

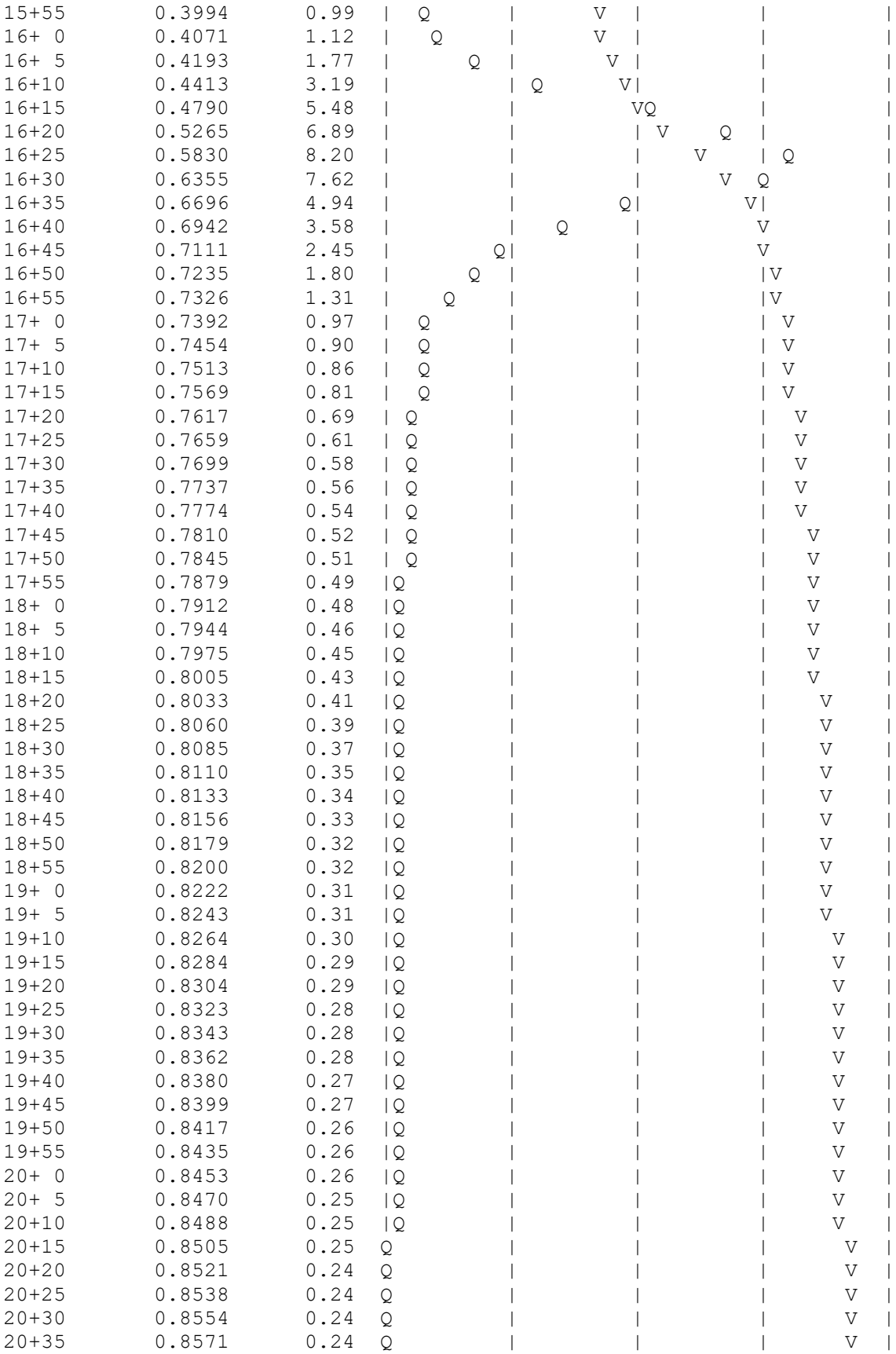
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q				
0+10	0.0001	0.01	Q				
0+15	0.0003	0.03	Q				
0+20	0.0007	0.05	Q				
0+25	0.0013	0.09	Q				
0+30	0.0021	0.12	Q				
0+35	0.0030	0.14	Q				
0+40	0.0040	0.15	Q				
0+45	0.0051	0.16	Q				
0+50	0.0062	0.16	Q				
0+55	0.0073	0.16	Q				
1+ 0	0.0084	0.16	Q				
1+ 5	0.0096	0.16	Q				
1+10	0.0107	0.17	Q				
1+15	0.0119	0.17	Q				
1+20	0.0130	0.17	Q				
1+25	0.0142	0.17	Q				
1+30	0.0153	0.17	Q				
1+35	0.0165	0.17	Q				

1+40	0.0177	0.17	Q	|	|	|	|
1+45	0.0189	0.17	Q	|	|	|	|
1+50	0.0200	0.17	Q	|	|	|	|
1+55	0.0212	0.17	Q	|	|	|	|
2+ 0	0.0224	0.17	Q	|	|	|	|
2+ 5	0.0236	0.17	QV	|	|	|	|
2+10	0.0248	0.17	QV	|	|	|	|
2+15	0.0260	0.17	QV	|	|	|	|
2+20	0.0272	0.17	QV	|	|	|	|
2+25	0.0284	0.17	QV	|	|	|	|
2+30	0.0296	0.18	QV	|	|	|	|
2+35	0.0308	0.18	QV	|	|	|	|
2+40	0.0320	0.18	QV	|	|	|	|
2+45	0.0332	0.18	QV	|	|	|	|
2+50	0.0345	0.18	QV	|	|	|	|
2+55	0.0357	0.18	QV	|	|	|	|
3+ 0	0.0369	0.18	QV	|	|	|	|
3+ 5	0.0382	0.18	QV	|	|	|	|
3+10	0.0394	0.18	QV	|	|	|	|
3+15	0.0407	0.18	QV	|	|	|	|
3+20	0.0419	0.18	QV	|	|	|	|
3+25	0.0432	0.18	QV	|	|	|	|
3+30	0.0444	0.18	QV	|	|	|	|
3+35	0.0457	0.18	QV	|	|	|	|
3+40	0.0470	0.18	Q V	|	|	|	|
3+45	0.0482	0.19	Q V	|	|	|	|
3+50	0.0495	0.19	Q V	|	|	|	|
3+55	0.0508	0.19	Q V	|	|	|	|
4+ 0	0.0521	0.19	Q V	|	|	|	|
4+ 5	0.0534	0.19	Q V	|	|	|	|
4+10	0.0547	0.19	Q V	|	|	|	|
4+15	0.0560	0.19	Q V	|	|	|	|
4+20	0.0573	0.19	Q V	|	|	|	|
4+25	0.0586	0.19	Q V	|	|	|	|
4+30	0.0599	0.19	Q V	|	|	|	|
4+35	0.0613	0.19	Q V	|	|	|	|
4+40	0.0626	0.19	Q V	|	|	|	|
4+45	0.0639	0.19	Q V	|	|	|	|
4+50	0.0653	0.19	Q V	|	|	|	|
4+55	0.0666	0.20	Q V	|	|	|	|
5+ 0	0.0680	0.20	Q V	|	|	|	|
5+ 5	0.0693	0.20	Q V	|	|	|	|
5+10	0.0707	0.20	Q V	|	|	|	|
5+15	0.0721	0.20	Q V	|	|	|	|
5+20	0.0734	0.20	Q V	|	|	|	|
5+25	0.0748	0.20	Q V	|	|	|	|
5+30	0.0762	0.20	Q V	|	|	|	|
5+35	0.0776	0.20	Q V	|	|	|	|
5+40	0.0790	0.20	Q V	|	|	|	|
5+45	0.0804	0.20	Q V	|	|	|	|
5+50	0.0818	0.20	Q V	|	|	|	|
5+55	0.0832	0.21	Q V	|	|	|	|
6+ 0	0.0846	0.21	Q V	|	|	|	|
6+ 5	0.0861	0.21	Q V	|	|	|	|
6+10	0.0875	0.21	Q V	|	|	|	|
6+15	0.0889	0.21	Q V	|	|	|	|
6+20	0.0904	0.21	Q V	|	|	|	|

6+25	0.0919	0.21	Q V	|	|	|	|
6+30	0.0933	0.21	Q V	|	|	|	|
6+35	0.0948	0.21	Q V	|	|	|	|
6+40	0.0963	0.21	Q V	|	|	|	|
6+45	0.0977	0.22	Q V	|	|	|	|
6+50	0.0992	0.22	Q V	|	|	|	|
6+55	0.1007	0.22	Q V	|	|	|	|
7+ 0	0.1022	0.22	Q V	|	|	|	|
7+ 5	0.1038	0.22	Q V	|	|	|	|
7+10	0.1053	0.22	Q V	|	|	|	|
7+15	0.1068	0.22	Q V	|	|	|	|
7+20	0.1083	0.22	Q V	|	|	|	|
7+25	0.1099	0.22	Q V	|	|	|	|
7+30	0.1114	0.23	Q V	|	|	|	|
7+35	0.1130	0.23	Q V	|	|	|	|
7+40	0.1146	0.23	Q V	|	|	|	|
7+45	0.1162	0.23	Q V	|	|	|	|
7+50	0.1177	0.23	Q V	|	|	|	|
7+55	0.1193	0.23	Q V	|	|	|	|
8+ 0	0.1209	0.23	Q V	|	|	|	|
8+ 5	0.1226	0.23	Q V	|	|	|	|
8+10	0.1242	0.24	Q V	|	|	|	|
8+15	0.1258	0.24	Q V	|	|	|	|
8+20	0.1275	0.24	Q V	|	|	|	|
8+25	0.1291	0.24	Q V	|	|	|	|
8+30	0.1308	0.24	Q V	|	|	|	|
8+35	0.1324	0.24	Q V	|	|	|	|
8+40	0.1341	0.24	Q V	|	|	|	|
8+45	0.1358	0.25	Q V	|	|	|	|
8+50	0.1375	0.25	Q V	|	|	|	|
8+55	0.1392	0.25	Q V	|	|	|	|
9+ 0	0.1409	0.25	|Q V	|	|	|	|
9+ 5	0.1427	0.25	|Q V	|	|	|	|
9+10	0.1444	0.25	|Q V	|	|	|	|
9+15	0.1462	0.25	|Q V	|	|	|	|
9+20	0.1479	0.26	|Q V	|	|	|	|
9+25	0.1497	0.26	|Q V	|	|	|	|
9+30	0.1515	0.26	|Q V	|	|	|	|
9+35	0.1533	0.26	|Q V	|	|	|	|
9+40	0.1551	0.26	|Q V	|	|	|	|
9+45	0.1570	0.27	|Q V	|	|	|	|
9+50	0.1588	0.27	|Q V	|	|	|	|
9+55	0.1607	0.27	|Q V	|	|	|	|
10+ 0	0.1625	0.27	|Q V	|	|	|	|
10+ 5	0.1644	0.27	|Q V	|	|	|	|
10+10	0.1663	0.28	|Q V	|	|	|	|
10+15	0.1682	0.28	|Q V	|	|	|	|
10+20	0.1701	0.28	|Q V	|	|	|	|
10+25	0.1721	0.28	|Q V	|	|	|	|
10+30	0.1740	0.28	|Q V	|	|	|	|
10+35	0.1760	0.29	|Q V	|	|	|	|
10+40	0.1780	0.29	|Q V	|	|	|	|
10+45	0.1800	0.29	|Q V	|	|	|	|
10+50	0.1820	0.29	|Q V	|	|	|	|
10+55	0.1841	0.30	|Q V	|	|	|	|
11+ 0	0.1861	0.30	|Q V	|	|	|	|
11+ 5	0.1882	0.30	|Q V	|	|	|	|

11+10	0.1903	0.30	|Q V |	|	|	|
11+15	0.1924	0.31	|Q V |	|	|	|
11+20	0.1945	0.31	|Q V |	|	|	|
11+25	0.1967	0.31	|Q V |	|	|	|
11+30	0.1988	0.32	|Q V |	|	|	|
11+35	0.2010	0.32	|Q V |	|	|	|
11+40	0.2032	0.32	|Q V |	|	|	|
11+45	0.2055	0.32	|Q V |	|	|	|
11+50	0.2077	0.33	|Q V|	|	|	|
11+55	0.2100	0.33	|Q V|	|	|	|
12+ 0	0.2123	0.33	|Q V|	|	|	|
12+ 5	0.2147	0.34	|Q V|	|	|	|
12+10	0.2170	0.35	|Q V|	|	|	|
12+15	0.2195	0.36	|Q V|	|	|	|
12+20	0.2221	0.37	|Q V|	|	|	|
12+25	0.2247	0.39	|Q V|	|	|	|
12+30	0.2275	0.40	|Q V|	|	|	|
12+35	0.2304	0.42	|Q V	|	|	|
12+40	0.2333	0.42	|Q V	|	|	|
12+45	0.2363	0.43	|Q V	|	|	|
12+50	0.2393	0.44	|Q V	|	|	|
12+55	0.2424	0.44	|Q V	|	|	|
13+ 0	0.2455	0.45	|Q V	|	|	|
13+ 5	0.2486	0.46	|Q V	|	|	|
13+10	0.2518	0.46	|Q V	|	|	|
13+15	0.2550	0.47	|Q |V	|	|	|
13+20	0.2583	0.47	|Q |V	|	|	|
13+25	0.2616	0.48	|Q |V	|	|	|
13+30	0.2649	0.49	|Q |V	|	|	|
13+35	0.2683	0.49	|Q |V	|	|	|
13+40	0.2718	0.50	| Q |V	|	|	|
13+45	0.2753	0.51	| Q |V	|	|	|
13+50	0.2788	0.52	| Q | V	|	|	|
13+55	0.2824	0.52	| Q | V	|	|	|
14+ 0	0.2861	0.53	| Q | V	|	|	|
14+ 5	0.2898	0.54	| Q | V	|	|	|
14+10	0.2936	0.55	| Q | V	|	|	|
14+15	0.2975	0.56	| Q | V	|	|	|
14+20	0.3014	0.57	| Q | V	|	|	|
14+25	0.3055	0.58	| Q | V	|	|	|
14+30	0.3096	0.60	| Q | V	|	|	|
14+35	0.3138	0.61	| Q | V	|	|	|
14+40	0.3181	0.62	| Q | V	|	|	|
14+45	0.3225	0.64	| Q | V	|	|	|
14+50	0.3270	0.65	| Q | V	|	|	|
14+55	0.3316	0.67	| Q | V	|	|	|
15+ 0	0.3363	0.69	| Q | V	|	|	|
15+ 5	0.3412	0.71	| Q | V	|	|	|
15+10	0.3463	0.73	| Q | V	|	|	|
15+15	0.3515	0.76	| Q | V	|	|	|
15+20	0.3570	0.79	| Q | V	|	|	|
15+25	0.3626	0.82	| Q | V	|	|	|
15+30	0.3684	0.84	| Q | V	|	|	|
15+35	0.3743	0.86	| Q | V	|	|	|
15+40	0.3802	0.87	| Q | V	|	|	|
15+45	0.3863	0.88	| Q | V	|	|	|
15+50	0.3926	0.92	| Q | V	|	|	|



20+40	0.8587	0.23	Q	|	|	|	V |
20+45	0.8603	0.23	Q	|	|	|	V |
20+50	0.8618	0.23	Q	|	|	|	V |
20+55	0.8634	0.23	Q	|	|	|	V |
21+ 0	0.8649	0.22	Q	|	|	|	V |
21+ 5	0.8665	0.22	Q	|	|	|	V |
21+10	0.8680	0.22	Q	|	|	|	V |
21+15	0.8695	0.22	Q	|	|	|	V |
21+20	0.8709	0.21	Q	|	|	|	V |
21+25	0.8724	0.21	Q	|	|	|	V |
21+30	0.8739	0.21	Q	|	|	|	V |
21+35	0.8753	0.21	Q	|	|	|	V |
21+40	0.8767	0.21	Q	|	|	|	V |
21+45	0.8781	0.21	Q	|	|	|	V |
21+50	0.8795	0.20	Q	|	|	|	V |
21+55	0.8809	0.20	Q	|	|	|	V |
22+ 0	0.8823	0.20	Q	|	|	|	V |
22+ 5	0.8837	0.20	Q	|	|	|	V |
22+10	0.8850	0.20	Q	|	|	|	V |
22+15	0.8864	0.19	Q	|	|	|	V |
22+20	0.8877	0.19	Q	|	|	|	V |
22+25	0.8890	0.19	Q	|	|	|	V |
22+30	0.8903	0.19	Q	|	|	|	V |
22+35	0.8916	0.19	Q	|	|	|	V |
22+40	0.8929	0.19	Q	|	|	|	V |
22+45	0.8942	0.19	Q	|	|	|	V |
22+50	0.8955	0.18	Q	|	|	|	V|
22+55	0.8967	0.18	Q	|	|	|	V|
23+ 0	0.8980	0.18	Q	|	|	|	V|
23+ 5	0.8992	0.18	Q	|	|	|	V|
23+10	0.9005	0.18	Q	|	|	|	V|
23+15	0.9017	0.18	Q	|	|	|	V|
23+20	0.9029	0.18	Q	|	|	|	V|
23+25	0.9041	0.18	Q	|	|	|	V|
23+30	0.9053	0.17	Q	|	|	|	V|
23+35	0.9065	0.17	Q	|	|	|	V|
23+40	0.9077	0.17	Q	|	|	|	V|
23+45	0.9089	0.17	Q	|	|	|	V|
23+50	0.9100	0.17	Q	|	|	|	V|
23+55	0.9112	0.17	Q	|	|	|	V|
24+ 0	0.9124	0.17	Q	|	|	|	V|
24+ 5	0.9135	0.16	Q	|	|	|	V|
24+10	0.9146	0.16	Q	|	|	|	V|
24+15	0.9155	0.14	Q	|	|	|	V|
24+20	0.9163	0.11	Q	|	|	|	V|
24+25	0.9168	0.08	Q	|	|	|	V|
24+30	0.9171	0.05	Q	|	|	|	V|
24+35	0.9173	0.03	Q	|	|	|	V|
24+40	0.9174	0.02	Q	|	|	|	V|
24+45	0.9175	0.01	Q	|	|	|	V|
24+50	0.9175	0.01	Q	|	|	|	V|
24+55	0.9175	0.00	Q	|	|	|	V|
25+ 0	0.9176	0.00	Q	|	|	|	V|
25+ 5	0.9176	0.00	Q	|	|	|	V|
25+10	0.9176	0.00	Q	|	|	|	V|
25+15	0.9176	0.00	Q	|	|	|	V|

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

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Study date 04/23/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION - SOUTHERLY CHAMBERS
100-YEAR STORM EVENT ANALYSIS

Storm Event Year = 100

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 100		
16.36	1	1.30
Rainfall data for year 100		
16.36	6	3.07
Rainfall data for year 100		
16.36	24	5.64

++

******** 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)
32.0	32.0	16.36	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
13.09	0.800	32.0	32.0	21.25	0.015
3.27	0.200	98.0	98.0	0.20	0.958

Area-averaged catchment yield fraction, Y = 0.204
Area-averaged low loss fraction, Yb = 0.796
User entry of time of concentration = 0.648 (hours)
++
Watershed area = 16.36(Ac.)
Catchment Lag time = 0.518 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 16.0751
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.796 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.481(In)
Computed peak 30-minute rainfall = 0.985(In)
Specified peak 1-hour rainfall = 1.300(In)
Computed peak 3-hour rainfall = 2.202(In)
Specified peak 6-hour rainfall = 3.070(In)
Specified peak 24-hour rainfall = 5.640(In)

Rainfall depth area reduction factors:
Using a total area of 16.36(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.481(In)
30-minute factor = 0.999 Adjusted rainfall = 0.984(In)
1-hour factor = 0.999 Adjusted rainfall = 1.299(In)
3-hour factor = 1.000 Adjusted rainfall = 2.202(In)
6-hour factor = 1.000 Adjusted rainfall = 3.070(In)
24-hour factor = 1.000 Adjusted rainfall = 5.640(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 = 197.85 (CFS))	
1	0.930	1.839
2	3.370	4.828
3	8.520	10.191
4	16.991	16.760
5	27.225	20.249
6	39.266	23.822
7	53.511	28.184

8	67.652	27.980
9	76.565	17.633
10	83.718	14.154
11	89.042	10.532
12	92.229	6.306
13	94.860	5.207
14	96.575	3.393
15	97.725	2.276
16	98.285	1.107
17	98.574	0.573
18	98.864	0.573
19	99.153	0.572
20	99.442	0.572
21	99.732	0.573
22	100.000	0.531

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.4808	0.4808
2	0.6344	0.1536
3	0.7461	0.1117
4	0.8371	0.0910
5	0.9152	0.0782
6	0.9845	0.0692
7	1.0471	0.0626
8	1.1045	0.0574
9	1.1578	0.0533
10	1.2076	0.0498
11	1.2546	0.0469
12	1.2990	0.0444
13	1.3499	0.0509
14	1.3988	0.0489
15	1.4459	0.0471
16	1.4914	0.0455
17	1.5355	0.0441
18	1.5782	0.0427
19	1.6197	0.0415
20	1.6601	0.0404
21	1.6995	0.0394
22	1.7379	0.0384
23	1.7754	0.0375
24	1.8120	0.0367
25	1.8479	0.0359
26	1.8830	0.0351
27	1.9175	0.0344
28	1.9513	0.0338
29	1.9844	0.0332
30	2.0170	0.0326
31	2.0490	0.0320
32	2.0805	0.0315
33	2.1114	0.0310
34	2.1419	0.0305
35	2.1719	0.0300
36	2.2015	0.0296
37	2.2307	0.0291
38	2.2594	0.0287
39	2.2877	0.0283

40	2.3156	0.0280
41	2.3432	0.0276
42	2.3705	0.0272
43	2.3974	0.0269
44	2.4240	0.0266
45	2.4502	0.0263
46	2.4762	0.0260
47	2.5019	0.0257
48	2.5273	0.0254
49	2.5524	0.0251
50	2.5772	0.0249
51	2.6018	0.0246
52	2.6262	0.0243
53	2.6503	0.0241
54	2.6742	0.0239
55	2.6978	0.0236
56	2.7212	0.0234
57	2.7444	0.0232
58	2.7674	0.0230
59	2.7902	0.0228
60	2.8128	0.0226
61	2.8352	0.0224
62	2.8574	0.0222
63	2.8794	0.0220
64	2.9012	0.0218
65	2.9229	0.0217
66	2.9444	0.0215
67	2.9657	0.0213
68	2.9868	0.0211
69	3.0078	0.0210
70	3.0286	0.0208
71	3.0493	0.0207
72	3.0698	0.0205
73	3.0885	0.0186
74	3.1070	0.0185
75	3.1253	0.0184
76	3.1435	0.0182
77	3.1616	0.0181
78	3.1796	0.0179
79	3.1974	0.0178
80	3.2151	0.0177
81	3.2327	0.0176
82	3.2501	0.0174
83	3.2674	0.0173
84	3.2847	0.0172
85	3.3017	0.0171
86	3.3187	0.0170
87	3.3356	0.0169
88	3.3524	0.0168
89	3.3690	0.0167
90	3.3856	0.0166
91	3.4021	0.0165
92	3.4184	0.0164
93	3.4347	0.0163
94	3.4508	0.0162
95	3.4669	0.0161
96	3.4828	0.0160

97	3.4987	0.0159
98	3.5145	0.0158
99	3.5302	0.0157
100	3.5458	0.0156
101	3.5613	0.0155
102	3.5767	0.0154
103	3.5921	0.0153
104	3.6073	0.0153
105	3.6225	0.0152
106	3.6376	0.0151
107	3.6526	0.0150
108	3.6676	0.0149
109	3.6824	0.0149
110	3.6972	0.0148
111	3.7119	0.0147
112	3.7265	0.0146
113	3.7411	0.0146
114	3.7556	0.0145
115	3.7700	0.0144
116	3.7844	0.0143
117	3.7986	0.0143
118	3.8129	0.0142
119	3.8270	0.0141
120	3.8411	0.0141
121	3.8551	0.0140
122	3.8690	0.0139
123	3.8829	0.0139
124	3.8967	0.0138
125	3.9105	0.0138
126	3.9242	0.0137
127	3.9378	0.0136
128	3.9514	0.0136
129	3.9649	0.0135
130	3.9784	0.0135
131	3.9918	0.0134
132	4.0051	0.0133
133	4.0184	0.0133
134	4.0316	0.0132
135	4.0448	0.0132
136	4.0579	0.0131
137	4.0710	0.0131
138	4.0840	0.0130
139	4.0969	0.0130
140	4.1098	0.0129
141	4.1227	0.0129
142	4.1355	0.0128
143	4.1483	0.0128
144	4.1610	0.0127
145	4.1736	0.0127
146	4.1862	0.0126
147	4.1988	0.0126
148	4.2113	0.0125
149	4.2237	0.0125
150	4.2362	0.0124
151	4.2485	0.0124
152	4.2608	0.0123
153	4.2731	0.0123

154	4.2854	0.0122
155	4.2975	0.0122
156	4.3097	0.0121
157	4.3218	0.0121
158	4.3338	0.0121
159	4.3458	0.0120
160	4.3578	0.0120
161	4.3697	0.0119
162	4.3816	0.0119
163	4.3935	0.0118
164	4.4053	0.0118
165	4.4171	0.0118
166	4.4288	0.0117
167	4.4405	0.0117
168	4.4521	0.0116
169	4.4637	0.0116
170	4.4753	0.0116
171	4.4868	0.0115
172	4.4983	0.0115
173	4.5098	0.0115
174	4.5212	0.0114
175	4.5326	0.0114
176	4.5439	0.0113
177	4.5552	0.0113
178	4.5665	0.0113
179	4.5777	0.0112
180	4.5889	0.0112
181	4.6001	0.0112
182	4.6112	0.0111
183	4.6223	0.0111
184	4.6334	0.0111
185	4.6444	0.0110
186	4.6554	0.0110
187	4.6664	0.0110
188	4.6773	0.0109
189	4.6882	0.0109
190	4.6991	0.0109
191	4.7099	0.0108
192	4.7207	0.0108
193	4.7315	0.0108
194	4.7423	0.0107
195	4.7530	0.0107
196	4.7636	0.0107
197	4.7743	0.0106
198	4.7849	0.0106
199	4.7955	0.0106
200	4.8061	0.0106
201	4.8166	0.0105
202	4.8271	0.0105
203	4.8376	0.0105
204	4.8480	0.0104
205	4.8584	0.0104
206	4.8688	0.0104
207	4.8791	0.0104
208	4.8895	0.0103
209	4.8998	0.0103
210	4.9100	0.0103

211	4.9203	0.0102
212	4.9305	0.0102
213	4.9407	0.0102
214	4.9509	0.0102
215	4.9610	0.0101
216	4.9711	0.0101
217	4.9812	0.0101
218	4.9913	0.0101
219	5.0013	0.0100
220	5.0113	0.0100
221	5.0213	0.0100
222	5.0312	0.0100
223	5.0412	0.0099
224	5.0511	0.0099
225	5.0609	0.0099
226	5.0708	0.0099
227	5.0806	0.0098
228	5.0904	0.0098
229	5.1002	0.0098
230	5.1100	0.0098
231	5.1197	0.0097
232	5.1294	0.0097
233	5.1391	0.0097
234	5.1488	0.0097
235	5.1584	0.0096
236	5.1681	0.0096
237	5.1776	0.0096
238	5.1872	0.0096
239	5.1968	0.0096
240	5.2063	0.0095
241	5.2158	0.0095
242	5.2253	0.0095
243	5.2348	0.0095
244	5.2442	0.0094
245	5.2536	0.0094
246	5.2630	0.0094
247	5.2724	0.0094
248	5.2817	0.0094
249	5.2911	0.0093
250	5.3004	0.0093
251	5.3097	0.0093
252	5.3190	0.0093
253	5.3282	0.0093
254	5.3374	0.0092
255	5.3466	0.0092
256	5.3558	0.0092
257	5.3650	0.0092
258	5.3742	0.0091
259	5.3833	0.0091
260	5.3924	0.0091
261	5.4015	0.0091
262	5.4106	0.0091
263	5.4196	0.0091
264	5.4286	0.0090
265	5.4376	0.0090
266	5.4466	0.0090
267	5.4556	0.0090

268	5.4646	0.0090
269	5.4735	0.0089
270	5.4824	0.0089
271	5.4913	0.0089
272	5.5002	0.0089
273	5.5091	0.0089
274	5.5179	0.0088
275	5.5267	0.0088
276	5.5355	0.0088
277	5.5443	0.0088
278	5.5531	0.0088
279	5.5619	0.0088
280	5.5706	0.0087
281	5.5793	0.0087
282	5.5880	0.0087
283	5.5967	0.0087
284	5.6054	0.0087
285	5.6140	0.0087
286	5.6227	0.0086
287	5.6313	0.0086
288	5.6399	0.0086

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0086	0.0068	0.0018
2	0.0086	0.0069	0.0018
3	0.0087	0.0069	0.0018
4	0.0087	0.0069	0.0018
5	0.0087	0.0069	0.0018
6	0.0087	0.0069	0.0018
7	0.0088	0.0070	0.0018
8	0.0088	0.0070	0.0018
9	0.0088	0.0070	0.0018
10	0.0088	0.0070	0.0018
11	0.0089	0.0071	0.0018
12	0.0089	0.0071	0.0018
13	0.0089	0.0071	0.0018
14	0.0089	0.0071	0.0018
15	0.0090	0.0071	0.0018
16	0.0090	0.0072	0.0018
17	0.0090	0.0072	0.0018
18	0.0091	0.0072	0.0018
19	0.0091	0.0072	0.0019
20	0.0091	0.0073	0.0019
21	0.0091	0.0073	0.0019
22	0.0092	0.0073	0.0019
23	0.0092	0.0073	0.0019
24	0.0092	0.0073	0.0019
25	0.0093	0.0074	0.0019
26	0.0093	0.0074	0.0019
27	0.0093	0.0074	0.0019
28	0.0094	0.0074	0.0019
29	0.0094	0.0075	0.0019
30	0.0094	0.0075	0.0019
31	0.0095	0.0075	0.0019

32	0.0095	0.0076	0.0019
33	0.0095	0.0076	0.0019
34	0.0096	0.0076	0.0019
35	0.0096	0.0076	0.0020
36	0.0096	0.0077	0.0020
37	0.0097	0.0077	0.0020
38	0.0097	0.0077	0.0020
39	0.0097	0.0078	0.0020
40	0.0098	0.0078	0.0020
41	0.0098	0.0078	0.0020
42	0.0098	0.0078	0.0020
43	0.0099	0.0079	0.0020
44	0.0099	0.0079	0.0020
45	0.0100	0.0079	0.0020
46	0.0100	0.0079	0.0020
47	0.0100	0.0080	0.0020
48	0.0101	0.0080	0.0020
49	0.0101	0.0081	0.0021
50	0.0101	0.0081	0.0021
51	0.0102	0.0081	0.0021
52	0.0102	0.0081	0.0021
53	0.0103	0.0082	0.0021
54	0.0103	0.0082	0.0021
55	0.0104	0.0082	0.0021
56	0.0104	0.0083	0.0021
57	0.0104	0.0083	0.0021
58	0.0105	0.0083	0.0021
59	0.0105	0.0084	0.0021
60	0.0106	0.0084	0.0022
61	0.0106	0.0085	0.0022
62	0.0106	0.0085	0.0022
63	0.0107	0.0085	0.0022
64	0.0107	0.0086	0.0022
65	0.0108	0.0086	0.0022
66	0.0108	0.0086	0.0022
67	0.0109	0.0087	0.0022
68	0.0109	0.0087	0.0022
69	0.0110	0.0088	0.0022
70	0.0110	0.0088	0.0022
71	0.0111	0.0088	0.0023
72	0.0111	0.0089	0.0023
73	0.0112	0.0089	0.0023
74	0.0112	0.0089	0.0023
75	0.0113	0.0090	0.0023
76	0.0113	0.0090	0.0023
77	0.0114	0.0091	0.0023
78	0.0115	0.0091	0.0023
79	0.0115	0.0092	0.0023
80	0.0116	0.0092	0.0024
81	0.0116	0.0093	0.0024
82	0.0117	0.0093	0.0024
83	0.0118	0.0094	0.0024
84	0.0118	0.0094	0.0024
85	0.0119	0.0095	0.0024
86	0.0119	0.0095	0.0024
87	0.0120	0.0096	0.0024
88	0.0121	0.0096	0.0025

89	0.0121	0.0097	0.0025
90	0.0122	0.0097	0.0025
91	0.0123	0.0098	0.0025
92	0.0123	0.0098	0.0025
93	0.0124	0.0099	0.0025
94	0.0125	0.0099	0.0025
95	0.0126	0.0100	0.0026
96	0.0126	0.0100	0.0026
97	0.0127	0.0101	0.0026
98	0.0128	0.0102	0.0026
99	0.0129	0.0102	0.0026
100	0.0129	0.0103	0.0026
101	0.0130	0.0104	0.0026
102	0.0131	0.0104	0.0027
103	0.0132	0.0105	0.0027
104	0.0132	0.0105	0.0027
105	0.0133	0.0106	0.0027
106	0.0134	0.0107	0.0027
107	0.0135	0.0108	0.0028
108	0.0136	0.0108	0.0028
109	0.0137	0.0109	0.0028
110	0.0138	0.0110	0.0028
111	0.0139	0.0111	0.0028
112	0.0139	0.0111	0.0028
113	0.0141	0.0112	0.0029
114	0.0141	0.0113	0.0029
115	0.0143	0.0114	0.0029
116	0.0143	0.0114	0.0029
117	0.0145	0.0115	0.0030
118	0.0146	0.0116	0.0030
119	0.0147	0.0117	0.0030
120	0.0148	0.0118	0.0030
121	0.0149	0.0119	0.0030
122	0.0150	0.0120	0.0031
123	0.0152	0.0121	0.0031
124	0.0153	0.0122	0.0031
125	0.0154	0.0123	0.0031
126	0.0155	0.0124	0.0032
127	0.0157	0.0125	0.0032
128	0.0158	0.0126	0.0032
129	0.0160	0.0127	0.0033
130	0.0161	0.0128	0.0033
131	0.0163	0.0129	0.0033
132	0.0164	0.0130	0.0033
133	0.0166	0.0132	0.0034
134	0.0167	0.0133	0.0034
135	0.0169	0.0134	0.0034
136	0.0170	0.0135	0.0035
137	0.0172	0.0137	0.0035
138	0.0173	0.0138	0.0035
139	0.0176	0.0140	0.0036
140	0.0177	0.0141	0.0036
141	0.0179	0.0143	0.0037
142	0.0181	0.0144	0.0037
143	0.0184	0.0146	0.0037
144	0.0185	0.0147	0.0038
145	0.0205	0.0163	0.0042

146	0.0207	0.0165	0.0042
147	0.0210	0.0167	0.0043
148	0.0211	0.0168	0.0043
149	0.0215	0.0171	0.0044
150	0.0217	0.0172	0.0044
151	0.0220	0.0175	0.0045
152	0.0222	0.0177	0.0045
153	0.0226	0.0180	0.0046
154	0.0228	0.0181	0.0046
155	0.0232	0.0185	0.0047
156	0.0234	0.0186	0.0048
157	0.0239	0.0190	0.0049
158	0.0241	0.0192	0.0049
159	0.0246	0.0196	0.0050
160	0.0249	0.0198	0.0051
161	0.0254	0.0202	0.0052
162	0.0257	0.0204	0.0052
163	0.0263	0.0209	0.0054
164	0.0266	0.0212	0.0054
165	0.0272	0.0217	0.0055
166	0.0276	0.0220	0.0056
167	0.0283	0.0226	0.0058
168	0.0287	0.0229	0.0058
169	0.0296	0.0236	0.0060
170	0.0300	0.0239	0.0061
171	0.0310	0.0247	0.0063
172	0.0315	0.0251	0.0064
173	0.0326	0.0259	0.0066
174	0.0332	0.0264	0.0068
175	0.0344	0.0274	0.0070
176	0.0351	0.0280	0.0072
177	0.0367	0.0292	0.0075
178	0.0375	0.0299	0.0076
179	0.0394	0.0313	0.0080
180	0.0404	0.0322	0.0082
181	0.0427	0.0340	0.0087
182	0.0441	0.0351	0.0090
183	0.0471	0.0375	0.0096
184	0.0489	0.0389	0.0100
185	0.0444	0.0354	0.0090
186	0.0469	0.0374	0.0096
187	0.0533	0.0424	0.0109
188	0.0574	0.0457	0.0117
189	0.0692	0.0551	0.0141
190	0.0782	0.0622	0.0159
191	0.1117	0.0652	0.0465
192	0.1536	0.0652	0.0884
193	0.4808	0.0652	0.4156
194	0.0910	0.0652	0.0258
195	0.0626	0.0499	0.0128
196	0.0498	0.0397	0.0102
197	0.0509	0.0405	0.0104
198	0.0455	0.0362	0.0093
199	0.0415	0.0331	0.0085
200	0.0384	0.0306	0.0078
201	0.0359	0.0286	0.0073
202	0.0338	0.0269	0.0069

203	0.0320	0.0255	0.0065
204	0.0305	0.0243	0.0062
205	0.0291	0.0232	0.0059
206	0.0280	0.0223	0.0057
207	0.0269	0.0214	0.0055
208	0.0260	0.0207	0.0053
209	0.0251	0.0200	0.0051
210	0.0243	0.0194	0.0050
211	0.0236	0.0188	0.0048
212	0.0230	0.0183	0.0047
213	0.0224	0.0178	0.0046
214	0.0218	0.0174	0.0044
215	0.0213	0.0170	0.0043
216	0.0208	0.0166	0.0042
217	0.0186	0.0148	0.0038
218	0.0182	0.0145	0.0037
219	0.0178	0.0142	0.0036
220	0.0174	0.0139	0.0036
221	0.0171	0.0136	0.0035
222	0.0168	0.0134	0.0034
223	0.0165	0.0131	0.0034
224	0.0162	0.0129	0.0033
225	0.0159	0.0126	0.0032
226	0.0156	0.0124	0.0032
227	0.0153	0.0122	0.0031
228	0.0151	0.0120	0.0031
229	0.0149	0.0118	0.0030
230	0.0146	0.0117	0.0030
231	0.0144	0.0115	0.0029
232	0.0142	0.0113	0.0029
233	0.0140	0.0112	0.0029
234	0.0138	0.0110	0.0028
235	0.0136	0.0109	0.0028
236	0.0135	0.0107	0.0027
237	0.0133	0.0106	0.0027
238	0.0131	0.0104	0.0027
239	0.0130	0.0103	0.0026
240	0.0128	0.0102	0.0026
241	0.0127	0.0101	0.0026
242	0.0125	0.0100	0.0025
243	0.0124	0.0098	0.0025
244	0.0122	0.0097	0.0025
245	0.0121	0.0096	0.0025
246	0.0120	0.0095	0.0024
247	0.0118	0.0094	0.0024
248	0.0117	0.0093	0.0024
249	0.0116	0.0092	0.0024
250	0.0115	0.0092	0.0023
251	0.0114	0.0091	0.0023
252	0.0113	0.0090	0.0023
253	0.0112	0.0089	0.0023
254	0.0111	0.0088	0.0023
255	0.0110	0.0087	0.0022
256	0.0109	0.0087	0.0022
257	0.0108	0.0086	0.0022
258	0.0107	0.0085	0.0022
259	0.0106	0.0084	0.0022

260	0.0105	0.0084	0.0021
261	0.0104	0.0083	0.0021
262	0.0103	0.0082	0.0021
263	0.0102	0.0082	0.0021
264	0.0102	0.0081	0.0021
265	0.0101	0.0080	0.0021
266	0.0100	0.0080	0.0020
267	0.0099	0.0079	0.0020
268	0.0099	0.0078	0.0020
269	0.0098	0.0078	0.0020
270	0.0097	0.0077	0.0020
271	0.0096	0.0077	0.0020
272	0.0096	0.0076	0.0019
273	0.0095	0.0076	0.0019
274	0.0094	0.0075	0.0019
275	0.0094	0.0075	0.0019
276	0.0093	0.0074	0.0019
277	0.0093	0.0074	0.0019
278	0.0092	0.0073	0.0019
279	0.0091	0.0073	0.0019
280	0.0091	0.0072	0.0018
281	0.0090	0.0072	0.0018
282	0.0090	0.0071	0.0018
283	0.0089	0.0071	0.0018
284	0.0088	0.0070	0.0018
285	0.0088	0.0070	0.0018
286	0.0087	0.0070	0.0018
287	0.0087	0.0069	0.0018
288	0.0086	0.0069	0.0018

Total soil rain loss = 4.09(In)
Total effective rainfall = 1.55(In)
Peak flow rate in flood hydrograph = 16.81(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

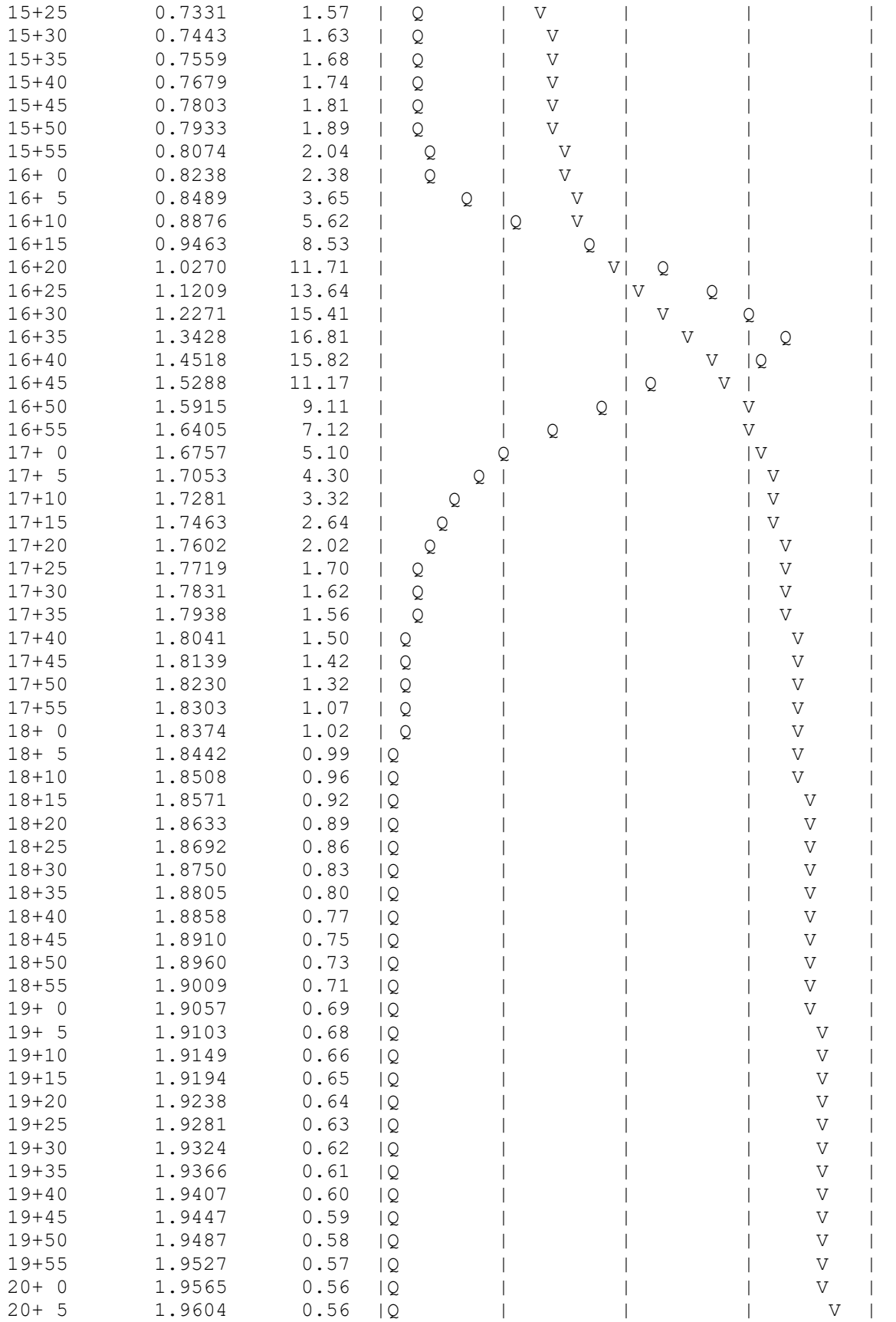
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0001	0.01	Q	|	|	|	|
0+15	0.0003	0.03	Q	|	|	|	|
0+20	0.0007	0.06	Q	|	|	|	|
0+25	0.0014	0.09	Q	|	|	|	|
0+30	0.0023	0.14	Q	|	|	|	|
0+35	0.0036	0.19	Q	|	|	|	|
0+40	0.0052	0.24	Q	|	|	|	|
0+45	0.0071	0.27	Q	|	|	|	|
0+50	0.0091	0.29	Q	|	|	|	|
0+55	0.0112	0.31	Q	|	|	|	|
1+ 0	0.0135	0.32	Q	|	|	|	|
1+ 5	0.0158	0.33	Q	|	|	|	|

1+10	0.0181	0.34	Q	|	|	|	|
1+15	0.0205	0.35	Q	|	|	|	|
1+20	0.0229	0.35	Q	|	|	|	|
1+25	0.0253	0.35	Q	|	|	|	|
1+30	0.0278	0.35	Q	|	|	|	|
1+35	0.0302	0.36	Q	|	|	|	|
1+40	0.0327	0.36	Q	|	|	|	|
1+45	0.0352	0.36	Q	|	|	|	|
1+50	0.0376	0.36	Q	|	|	|	|
1+55	0.0401	0.36	Q	|	|	|	|
2+ 0	0.0427	0.36	Q	|	|	|	|
2+ 5	0.0452	0.37	Q	|	|	|	|
2+10	0.0477	0.37	Q	|	|	|	|
2+15	0.0502	0.37	Q	|	|	|	|
2+20	0.0528	0.37	Q	|	|	|	|
2+25	0.0553	0.37	QV	|	|	|	|
2+30	0.0579	0.37	QV	|	|	|	|
2+35	0.0605	0.37	QV	|	|	|	|
2+40	0.0630	0.37	QV	|	|	|	|
2+45	0.0656	0.38	QV	|	|	|	|
2+50	0.0682	0.38	QV	|	|	|	|
2+55	0.0708	0.38	QV	|	|	|	|
3+ 0	0.0734	0.38	QV	|	|	|	|
3+ 5	0.0760	0.38	QV	|	|	|	|
3+10	0.0787	0.38	QV	|	|	|	|
3+15	0.0813	0.38	QV	|	|	|	|
3+20	0.0840	0.38	QV	|	|	|	|
3+25	0.0866	0.39	QV	|	|	|	|
3+30	0.0893	0.39	QV	|	|	|	|
3+35	0.0920	0.39	QV	|	|	|	|
3+40	0.0946	0.39	QV	|	|	|	|
3+45	0.0973	0.39	QV	|	|	|	|
3+50	0.1000	0.39	QV	|	|	|	|
3+55	0.1028	0.39	QV	|	|	|	|
4+ 0	0.1055	0.40	QV	|	|	|	|
4+ 5	0.1082	0.40	Q V	|	|	|	|
4+10	0.1110	0.40	Q V	|	|	|	|
4+15	0.1137	0.40	Q V	|	|	|	|
4+20	0.1165	0.40	Q V	|	|	|	|
4+25	0.1193	0.40	Q V	|	|	|	|
4+30	0.1220	0.40	Q V	|	|	|	|
4+35	0.1248	0.41	Q V	|	|	|	|
4+40	0.1277	0.41	Q V	|	|	|	|
4+45	0.1305	0.41	Q V	|	|	|	|
4+50	0.1333	0.41	Q V	|	|	|	|
4+55	0.1361	0.41	Q V	|	|	|	|
5+ 0	0.1390	0.41	Q V	|	|	|	|
5+ 5	0.1419	0.42	Q V	|	|	|	|
5+10	0.1447	0.42	Q V	|	|	|	|
5+15	0.1476	0.42	Q V	|	|	|	|
5+20	0.1505	0.42	Q V	|	|	|	|
5+25	0.1535	0.42	Q V	|	|	|	|
5+30	0.1564	0.42	Q V	|	|	|	|
5+35	0.1593	0.43	Q V	|	|	|	|
5+40	0.1623	0.43	Q V	|	|	|	|
5+45	0.1652	0.43	Q V	|	|	|	|
5+50	0.1682	0.43	Q V	|	|	|	|

5+55	0.1712	0.43	Q	V	|	|	|
6+ 0	0.1742	0.44	Q	V	|	|	|
6+ 5	0.1772	0.44	Q	V	|	|	|
6+10	0.1802	0.44	Q	V	|	|	|
6+15	0.1833	0.44	Q	V	|	|	|
6+20	0.1863	0.44	Q	V	|	|	|
6+25	0.1894	0.45	Q	V	|	|	|
6+30	0.1925	0.45	Q	V	|	|	|
6+35	0.1956	0.45	Q	V	|	|	|
6+40	0.1987	0.45	Q	V	|	|	|
6+45	0.2018	0.45	Q	V	|	|	|
6+50	0.2050	0.46	Q	V	|	|	|
6+55	0.2081	0.46	Q	V	|	|	|
7+ 0	0.2113	0.46	Q	V	|	|	|
7+ 5	0.2145	0.46	Q	V	|	|	|
7+10	0.2177	0.47	Q	V	|	|	|
7+15	0.2209	0.47	Q	V	|	|	|
7+20	0.2242	0.47	Q	V	|	|	|
7+25	0.2274	0.47	Q	V	|	|	|
7+30	0.2307	0.47	Q	V	|	|	|
7+35	0.2340	0.48	Q	V	|	|	|
7+40	0.2373	0.48	Q	V	|	|	|
7+45	0.2406	0.48	Q	V	|	|	|
7+50	0.2440	0.48	Q	V	|	|	|
7+55	0.2473	0.49	Q	V	|	|	|
8+ 0	0.2507	0.49	Q	V	|	|	|
8+ 5	0.2541	0.49	Q	V	|	|	|
8+10	0.2575	0.50	Q	V	|	|	|
8+15	0.2609	0.50	Q	V	|	|	|
8+20	0.2644	0.50	|Q	V	|	|	|
8+25	0.2679	0.50	|Q	V	|	|	|
8+30	0.2713	0.51	|Q	V	|	|	|
8+35	0.2749	0.51	|Q	V	|	|	|
8+40	0.2784	0.51	|Q	V	|	|	|
8+45	0.2819	0.52	|Q	V	|	|	|
8+50	0.2855	0.52	|Q	V	|	|	|
8+55	0.2891	0.52	|Q	V	|	|	|
9+ 0	0.2927	0.53	|Q	V	|	|	|
9+ 5	0.2964	0.53	|Q	V	|	|	|
9+10	0.3000	0.53	|Q	V	|	|	|
9+15	0.3037	0.54	|Q	V	|	|	|
9+20	0.3074	0.54	|Q	V	|	|	|
9+25	0.3112	0.54	|Q	V	|	|	|
9+30	0.3149	0.55	|Q	V	|	|	|
9+35	0.3187	0.55	|Q	V	|	|	|
9+40	0.3225	0.55	|Q	V	|	|	|
9+45	0.3264	0.56	|Q	V	|	|	|
9+50	0.3302	0.56	|Q	V	|	|	|
9+55	0.3341	0.56	|Q	V	|	|	|
10+ 0	0.3380	0.57	|Q	V	|	|	|
10+ 5	0.3420	0.57	|Q	V	|	|	|
10+10	0.3459	0.58	|Q	V	|	|	|
10+15	0.3500	0.58	|Q	V	|	|	|
10+20	0.3540	0.59	|Q	V	|	|	|
10+25	0.3580	0.59	|Q	V	|	|	|
10+30	0.3621	0.59	|Q	V	|	|	|
10+35	0.3663	0.60	|Q	V	|	|	|

10+40	0.3704	0.60	|Q V |	|	|	|
10+45	0.3746	0.61	|Q V |	|	|	|
10+50	0.3788	0.61	|Q V |	|	|	|
10+55	0.3831	0.62	|Q V |	|	|	|
11+ 0	0.3874	0.62	|Q V |	|	|	|
11+ 5	0.3917	0.63	|Q V |	|	|	|
11+10	0.3961	0.63	|Q V |	|	|	|
11+15	0.4005	0.64	|Q V |	|	|	|
11+20	0.4049	0.65	|Q V |	|	|	|
11+25	0.4094	0.65	|Q V |	|	|	|
11+30	0.4140	0.66	|Q V |	|	|	|
11+35	0.4185	0.66	|Q V |	|	|	|
11+40	0.4231	0.67	|Q V |	|	|	|
11+45	0.4278	0.68	|Q V |	|	|	|
11+50	0.4325	0.68	|Q V |	|	|	|
11+55	0.4373	0.69	|Q V |	|	|	|
12+ 0	0.4420	0.70	|Q V |	|	|	|
12+ 5	0.4469	0.70	|Q V |	|	|	|
12+10	0.4518	0.71	|Q V |	|	|	|
12+15	0.4568	0.72	|Q V |	|	|	|
12+20	0.4619	0.74	|Q V |	|	|	|
12+25	0.4671	0.75	|Q V |	|	|	|
12+30	0.4724	0.77	|Q V |	|	|	|
12+35	0.4778	0.79	|Q V|	|	|	|
12+40	0.4834	0.81	|Q V|	|	|	|
12+45	0.4891	0.82	|Q V|	|	|	|
12+50	0.4948	0.84	|Q V|	|	|	|
12+55	0.5007	0.85	|Q V|	|	|	|
13+ 0	0.5067	0.86	|Q V|	|	|	|
13+ 5	0.5127	0.88	|Q V|	|	|	|
13+10	0.5188	0.89	|Q V|	|	|	|
13+15	0.5251	0.90	|Q V|	|	|	|
13+20	0.5314	0.91	|Q V |	|	|	|
13+25	0.5377	0.93	|Q V |	|	|	|
13+30	0.5442	0.94	|Q V |	|	|	|
13+35	0.5508	0.95	|Q V |	|	|	|
13+40	0.5575	0.97	|Q V |	|	|	|
13+45	0.5642	0.98	|Q V |	|	|	|
13+50	0.5711	1.00	|Q V |	|	|	|
13+55	0.5781	1.02	| Q V |	|	|	|
14+ 0	0.5852	1.03	| Q |V |	|	|	|
14+ 5	0.5924	1.05	| Q |V |	|	|	|
14+10	0.5998	1.07	| Q |V |	|	|	|
14+15	0.6073	1.09	| Q |V |	|	|	|
14+20	0.6149	1.11	| Q |V |	|	|	|
14+25	0.6227	1.13	| Q |V |	|	|	|
14+30	0.6307	1.16	| Q |V |	|	|	|
14+35	0.6388	1.18	| Q | V |	|	|	|
14+40	0.6471	1.21	| Q | V |	|	|	|
14+45	0.6556	1.24	| Q | V |	|	|	|
14+50	0.6644	1.27	| Q | V |	|	|	|
14+55	0.6733	1.30	| Q | V |	|	|	|
15+ 0	0.6825	1.34	| Q | V |	|	|	|
15+ 5	0.6920	1.37	| Q | V |	|	|	|
15+10	0.7018	1.42	| Q | V |	|	|	|
15+15	0.7118	1.46	| Q | V |	|	|	|
15+20	0.7223	1.52	| Q | V |	|	|	|



20+10	1.9641	0.55	|Q	|	|	|	V |
20+15	1.9679	0.54	|Q	|	|	|	V |
20+20	1.9715	0.53	|Q	|	|	|	V |
20+25	1.9752	0.53	|Q	|	|	|	V |
20+30	1.9788	0.52	|Q	|	|	|	V |
20+35	1.9823	0.51	|Q	|	|	|	V |
20+40	1.9858	0.51	|Q	|	|	|	V |
20+45	1.9893	0.50	|Q	|	|	|	V |
20+50	1.9927	0.50	Q	|	|	|	V |
20+55	1.9961	0.49	Q	|	|	|	V |
21+ 0	1.9994	0.49	Q	|	|	|	V |
21+ 5	2.0027	0.48	Q	|	|	|	V |
21+10	2.0060	0.48	Q	|	|	|	V |
21+15	2.0093	0.47	Q	|	|	|	V |
21+20	2.0125	0.47	Q	|	|	|	V |
21+25	2.0157	0.46	Q	|	|	|	V |
21+30	2.0188	0.46	Q	|	|	|	V |
21+35	2.0219	0.45	Q	|	|	|	V |
21+40	2.0250	0.45	Q	|	|	|	V |
21+45	2.0281	0.44	Q	|	|	|	V |
21+50	2.0311	0.44	Q	|	|	|	V |
21+55	2.0341	0.44	Q	|	|	|	V |
22+ 0	2.0371	0.43	Q	|	|	|	V |
22+ 5	2.0401	0.43	Q	|	|	|	V |
22+10	2.0430	0.43	Q	|	|	|	V |
22+15	2.0459	0.42	Q	|	|	|	V |
22+20	2.0488	0.42	Q	|	|	|	V |
22+25	2.0517	0.42	Q	|	|	|	V |
22+30	2.0545	0.41	Q	|	|	|	V |
22+35	2.0573	0.41	Q	|	|	|	V |
22+40	2.0601	0.41	Q	|	|	|	V |
22+45	2.0629	0.40	Q	|	|	|	V |
22+50	2.0656	0.40	Q	|	|	|	V|
22+55	2.0683	0.40	Q	|	|	|	V|
23+ 0	2.0711	0.39	Q	|	|	|	V|
23+ 5	2.0737	0.39	Q	|	|	|	V|
23+10	2.0764	0.39	Q	|	|	|	V|
23+15	2.0791	0.38	Q	|	|	|	V|
23+20	2.0817	0.38	Q	|	|	|	V|
23+25	2.0843	0.38	Q	|	|	|	V|
23+30	2.0869	0.38	Q	|	|	|	V|
23+35	2.0895	0.37	Q	|	|	|	V|
23+40	2.0921	0.37	Q	|	|	|	V|
23+45	2.0946	0.37	Q	|	|	|	V|
23+50	2.0971	0.37	Q	|	|	|	V|
23+55	2.0996	0.36	Q	|	|	|	V|
24+ 0	2.1021	0.36	Q	|	|	|	V|
24+ 5	2.1046	0.36	Q	|	|	|	V|
24+10	2.1070	0.35	Q	|	|	|	V|
24+15	2.1092	0.33	Q	|	|	|	V|
24+20	2.1113	0.30	Q	|	|	|	V|
24+25	2.1130	0.26	Q	|	|	|	V|
24+30	2.1145	0.21	Q	|	|	|	V|
24+35	2.1156	0.16	Q	|	|	|	V|
24+40	2.1164	0.11	Q	|	|	|	V|
24+45	2.1170	0.08	Q	|	|	|	V|
24+50	2.1174	0.06	Q	|	|	|	V|

24+55	2.1177	0.04	Q	|	|	|	V|
25+ 0	2.1178	0.03	Q	|	|	|	V|
25+ 5	2.1180	0.02	Q	|	|	|	V|
25+10	2.1181	0.01	Q	|	|	|	V|
25+15	2.1181	0.01	Q	|	|	|	V|
25+20	2.1182	0.01	Q	|	|	|	V|
25+25	2.1182	0.01	Q	|	|	|	V|
25+30	2.1182	0.00	Q	|	|	|	V|
25+35	2.1182	0.00	Q	|	|	|	V|
25+40	2.1182	0.00	Q	|	|	|	V|
25+45	2.1183	0.00	Q	|	|	|	V

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION - SOUTHERLY CHAMBERS
100-YEAR STORM EVENT ANALYSIS WITH ADJUSTED 25 YEAR RAINFALL DATA

Storm Event Year = 100

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 100		
16.36	1	1.00
Rainfall data for year 100		
16.36	6	2.43
Rainfall data for year 100		
16.36	24	4.48

++

******** 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)
32.0	32.0	16.36	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
13.09	0.800	32.0	32.0	21.25	0.001
3.27	0.200	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.190
Area-averaged low loss fraction, Yb = 0.810
User entry of time of concentration = 0.742 (hours)
++
Watershed area = 16.36(Ac.)
Catchment Lag time = 0.594 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 14.0386
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.810 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.369(In)
Computed peak 30-minute rainfall = 0.756(In)
Specified peak 1-hour rainfall = 0.998(In)
Computed peak 3-hour rainfall = 1.722(In)
Specified peak 6-hour rainfall = 2.430(In)
Specified peak 24-hour rainfall = 4.480(In)

Rainfall depth area reduction factors:
Using a total area of 16.36(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.369(In)
30-minute factor = 0.999 Adjusted rainfall = 0.756(In)
1-hour factor = 0.999 Adjusted rainfall = 0.997(In)
3-hour factor = 1.000 Adjusted rainfall = 1.722(In)
6-hour factor = 1.000 Adjusted rainfall = 2.430(In)
24-hour factor = 1.000 Adjusted rainfall = 4.480(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 = 197.85 (CFS))		
1	0.804	1.590
2	2.762	3.874
3	6.403	7.205
4	12.953	12.960
5	21.193	16.301
6	30.609	18.630
7	41.672	21.889

8	54.210	24.808
9	66.731	24.774
10	75.193	16.742
11	81.251	11.986
12	87.270	11.908
13	90.327	6.049
14	93.107	5.499
15	95.198	4.138
16	96.631	2.836
17	97.640	1.996
18	98.222	1.152
19	98.475	0.500
20	98.728	0.500
21	98.980	0.500
22	99.233	0.500
23	99.486	0.500
24	99.738	0.500
25	100.000	0.250

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3691	0.3691
2	0.4870	0.1179
3	0.5728	0.0858
4	0.6426	0.0699
5	0.7026	0.0600
6	0.7558	0.0532
7	0.8038	0.0481
8	0.8479	0.0441
9	0.8888	0.0409
10	0.9271	0.0383
11	0.9631	0.0360
12	0.9972	0.0341
13	1.0377	0.0405
14	1.0767	0.0390
15	1.1143	0.0376
16	1.1506	0.0363
17	1.1858	0.0352
18	1.2200	0.0342
19	1.2533	0.0332
20	1.2856	0.0324
21	1.3172	0.0316
22	1.3480	0.0308
23	1.3782	0.0301
24	1.4076	0.0295
25	1.4365	0.0289
26	1.4648	0.0283
27	1.4925	0.0277
28	1.5198	0.0272
29	1.5465	0.0268
30	1.5728	0.0263
31	1.5987	0.0259
32	1.6241	0.0254
33	1.6492	0.0250
34	1.6738	0.0247
35	1.6981	0.0243
36	1.7221	0.0240

37	1.7457	0.0236
38	1.7690	0.0233
39	1.7919	0.0230
40	1.8146	0.0227
41	1.8370	0.0224
42	1.8591	0.0221
43	1.8810	0.0219
44	1.9026	0.0216
45	1.9239	0.0214
46	1.9451	0.0211
47	1.9660	0.0209
48	1.9866	0.0207
49	2.0071	0.0205
50	2.0273	0.0202
51	2.0474	0.0200
52	2.0672	0.0198
53	2.0869	0.0197
54	2.1063	0.0195
55	2.1256	0.0193
56	2.1447	0.0191
57	2.1637	0.0189
58	2.1824	0.0188
59	2.2010	0.0186
60	2.2195	0.0185
61	2.2378	0.0183
62	2.2559	0.0181
63	2.2739	0.0180
64	2.2918	0.0179
65	2.3095	0.0177
66	2.3271	0.0176
67	2.3445	0.0174
68	2.3619	0.0173
69	2.3790	0.0172
70	2.3961	0.0171
71	2.4131	0.0169
72	2.4299	0.0168
73	2.4447	0.0148
74	2.4594	0.0147
75	2.4740	0.0146
76	2.4885	0.0145
77	2.5029	0.0144
78	2.5172	0.0143
79	2.5314	0.0142
80	2.5455	0.0141
81	2.5595	0.0140
82	2.5734	0.0139
83	2.5872	0.0138
84	2.6009	0.0137
85	2.6145	0.0136
86	2.6281	0.0135
87	2.6415	0.0134
88	2.6549	0.0134
89	2.6681	0.0133
90	2.6813	0.0132
91	2.6944	0.0131
92	2.7075	0.0130
93	2.7204	0.0129

94	2.7333	0.0129
95	2.7461	0.0128
96	2.7588	0.0127
97	2.7714	0.0126
98	2.7840	0.0126
99	2.7965	0.0125
100	2.8089	0.0124
101	2.8213	0.0124
102	2.8336	0.0123
103	2.8458	0.0122
104	2.8580	0.0122
105	2.8701	0.0121
106	2.8821	0.0120
107	2.8941	0.0120
108	2.9060	0.0119
109	2.9178	0.0118
110	2.9296	0.0118
111	2.9413	0.0117
112	2.9530	0.0117
113	2.9646	0.0116
114	2.9761	0.0115
115	2.9876	0.0115
116	2.9991	0.0114
117	3.0105	0.0114
118	3.0218	0.0113
119	3.0331	0.0113
120	3.0443	0.0112
121	3.0554	0.0112
122	3.0666	0.0111
123	3.0776	0.0111
124	3.0886	0.0110
125	3.0996	0.0110
126	3.1105	0.0109
127	3.1214	0.0109
128	3.1322	0.0108
129	3.1430	0.0108
130	3.1537	0.0107
131	3.1644	0.0107
132	3.1751	0.0106
133	3.1856	0.0106
134	3.1962	0.0105
135	3.2067	0.0105
136	3.2172	0.0105
137	3.2276	0.0104
138	3.2379	0.0104
139	3.2483	0.0103
140	3.2586	0.0103
141	3.2688	0.0103
142	3.2790	0.0102
143	3.2892	0.0102
144	3.2993	0.0101
145	3.3094	0.0101
146	3.3195	0.0101
147	3.3295	0.0100
148	3.3395	0.0100
149	3.3494	0.0099
150	3.3593	0.0099

151	3.3692	0.0099
152	3.3790	0.0098
153	3.3888	0.0098
154	3.3986	0.0098
155	3.4083	0.0097
156	3.4180	0.0097
157	3.4276	0.0097
158	3.4372	0.0096
159	3.4468	0.0096
160	3.4564	0.0095
161	3.4659	0.0095
162	3.4754	0.0095
163	3.4848	0.0095
164	3.4942	0.0094
165	3.5036	0.0094
166	3.5130	0.0094
167	3.5223	0.0093
168	3.5316	0.0093
169	3.5408	0.0093
170	3.5501	0.0092
171	3.5593	0.0092
172	3.5684	0.0092
173	3.5776	0.0091
174	3.5867	0.0091
175	3.5958	0.0091
176	3.6048	0.0091
177	3.6139	0.0090
178	3.6229	0.0090
179	3.6318	0.0090
180	3.6408	0.0089
181	3.6497	0.0089
182	3.6586	0.0089
183	3.6674	0.0089
184	3.6762	0.0088
185	3.6851	0.0088
186	3.6938	0.0088
187	3.7026	0.0088
188	3.7113	0.0087
189	3.7200	0.0087
190	3.7287	0.0087
191	3.7373	0.0086
192	3.7459	0.0086
193	3.7545	0.0086
194	3.7631	0.0086
195	3.7717	0.0085
196	3.7802	0.0085
197	3.7887	0.0085
198	3.7972	0.0085
199	3.8056	0.0085
200	3.8140	0.0084
201	3.8224	0.0084
202	3.8308	0.0084
203	3.8392	0.0084
204	3.8475	0.0083
205	3.8558	0.0083
206	3.8641	0.0083
207	3.8724	0.0083

208	3.8806	0.0082
209	3.8888	0.0082
210	3.8970	0.0082
211	3.9052	0.0082
212	3.9134	0.0082
213	3.9215	0.0081
214	3.9296	0.0081
215	3.9377	0.0081
216	3.9458	0.0081
217	3.9538	0.0081
218	3.9619	0.0080
219	3.9699	0.0080
220	3.9779	0.0080
221	3.9858	0.0080
222	3.9938	0.0079
223	4.0017	0.0079
224	4.0096	0.0079
225	4.0175	0.0079
226	4.0254	0.0079
227	4.0332	0.0079
228	4.0411	0.0078
229	4.0489	0.0078
230	4.0567	0.0078
231	4.0645	0.0078
232	4.0722	0.0078
233	4.0799	0.0077
234	4.0877	0.0077
235	4.0954	0.0077
236	4.1030	0.0077
237	4.1107	0.0077
238	4.1183	0.0076
239	4.1260	0.0076
240	4.1336	0.0076
241	4.1412	0.0076
242	4.1488	0.0076
243	4.1563	0.0076
244	4.1638	0.0075
245	4.1714	0.0075
246	4.1789	0.0075
247	4.1864	0.0075
248	4.1938	0.0075
249	4.2013	0.0075
250	4.2087	0.0074
251	4.2161	0.0074
252	4.2236	0.0074
253	4.2309	0.0074
254	4.2383	0.0074
255	4.2457	0.0074
256	4.2530	0.0073
257	4.2603	0.0073
258	4.2676	0.0073
259	4.2749	0.0073
260	4.2822	0.0073
261	4.2895	0.0073
262	4.2967	0.0072
263	4.3039	0.0072
264	4.3112	0.0072

265	4.3184	0.0072
266	4.3255	0.0072
267	4.3327	0.0072
268	4.3399	0.0072
269	4.3470	0.0071
270	4.3541	0.0071
271	4.3612	0.0071
272	4.3683	0.0071
273	4.3754	0.0071
274	4.3825	0.0071
275	4.3895	0.0071
276	4.3966	0.0070
277	4.4036	0.0070
278	4.4106	0.0070
279	4.4176	0.0070
280	4.4246	0.0070
281	4.4315	0.0070
282	4.4385	0.0070
283	4.4454	0.0069
284	4.4523	0.0069
285	4.4593	0.0069
286	4.4662	0.0069
287	4.4730	0.0069
288	4.4799	0.0069

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0069	0.0056	0.0013
2	0.0069	0.0056	0.0013
3	0.0069	0.0056	0.0013
4	0.0069	0.0056	0.0013
5	0.0070	0.0056	0.0013
6	0.0070	0.0056	0.0013
7	0.0070	0.0057	0.0013
8	0.0070	0.0057	0.0013
9	0.0070	0.0057	0.0013
10	0.0071	0.0057	0.0013
11	0.0071	0.0057	0.0013
12	0.0071	0.0057	0.0013
13	0.0071	0.0058	0.0014
14	0.0071	0.0058	0.0014
15	0.0072	0.0058	0.0014
16	0.0072	0.0058	0.0014
17	0.0072	0.0058	0.0014
18	0.0072	0.0059	0.0014
19	0.0073	0.0059	0.0014
20	0.0073	0.0059	0.0014
21	0.0073	0.0059	0.0014
22	0.0073	0.0059	0.0014
23	0.0074	0.0060	0.0014
24	0.0074	0.0060	0.0014
25	0.0074	0.0060	0.0014
26	0.0074	0.0060	0.0014
27	0.0075	0.0060	0.0014
28	0.0075	0.0061	0.0014

29	0.0075	0.0061	0.0014
30	0.0075	0.0061	0.0014
31	0.0076	0.0061	0.0014
32	0.0076	0.0061	0.0014
33	0.0076	0.0062	0.0014
34	0.0076	0.0062	0.0014
35	0.0077	0.0062	0.0015
36	0.0077	0.0062	0.0015
37	0.0077	0.0063	0.0015
38	0.0077	0.0063	0.0015
39	0.0078	0.0063	0.0015
40	0.0078	0.0063	0.0015
41	0.0078	0.0063	0.0015
42	0.0079	0.0064	0.0015
43	0.0079	0.0064	0.0015
44	0.0079	0.0064	0.0015
45	0.0079	0.0064	0.0015
46	0.0080	0.0065	0.0015
47	0.0080	0.0065	0.0015
48	0.0080	0.0065	0.0015
49	0.0081	0.0065	0.0015
50	0.0081	0.0066	0.0015
51	0.0081	0.0066	0.0015
52	0.0082	0.0066	0.0015
53	0.0082	0.0066	0.0016
54	0.0082	0.0067	0.0016
55	0.0083	0.0067	0.0016
56	0.0083	0.0067	0.0016
57	0.0083	0.0068	0.0016
58	0.0084	0.0068	0.0016
59	0.0084	0.0068	0.0016
60	0.0084	0.0068	0.0016
61	0.0085	0.0069	0.0016
62	0.0085	0.0069	0.0016
63	0.0085	0.0069	0.0016
64	0.0086	0.0069	0.0016
65	0.0086	0.0070	0.0016
66	0.0086	0.0070	0.0016
67	0.0087	0.0070	0.0017
68	0.0087	0.0071	0.0017
69	0.0088	0.0071	0.0017
70	0.0088	0.0071	0.0017
71	0.0089	0.0072	0.0017
72	0.0089	0.0072	0.0017
73	0.0089	0.0072	0.0017
74	0.0090	0.0073	0.0017
75	0.0090	0.0073	0.0017
76	0.0091	0.0073	0.0017
77	0.0091	0.0074	0.0017
78	0.0091	0.0074	0.0017
79	0.0092	0.0075	0.0017
80	0.0092	0.0075	0.0018
81	0.0093	0.0075	0.0018
82	0.0093	0.0076	0.0018
83	0.0094	0.0076	0.0018
84	0.0094	0.0076	0.0018
85	0.0095	0.0077	0.0018

86	0.0095	0.0077	0.0018
87	0.0096	0.0078	0.0018
88	0.0096	0.0078	0.0018
89	0.0097	0.0078	0.0018
90	0.0097	0.0079	0.0018
91	0.0098	0.0079	0.0019
92	0.0098	0.0080	0.0019
93	0.0099	0.0080	0.0019
94	0.0099	0.0081	0.0019
95	0.0100	0.0081	0.0019
96	0.0101	0.0081	0.0019
97	0.0101	0.0082	0.0019
98	0.0102	0.0082	0.0019
99	0.0103	0.0083	0.0019
100	0.0103	0.0083	0.0020
101	0.0104	0.0084	0.0020
102	0.0104	0.0084	0.0020
103	0.0105	0.0085	0.0020
104	0.0105	0.0085	0.0020
105	0.0106	0.0086	0.0020
106	0.0107	0.0087	0.0020
107	0.0108	0.0087	0.0020
108	0.0108	0.0088	0.0021
109	0.0109	0.0088	0.0021
110	0.0110	0.0089	0.0021
111	0.0111	0.0090	0.0021
112	0.0111	0.0090	0.0021
113	0.0112	0.0091	0.0021
114	0.0113	0.0091	0.0021
115	0.0114	0.0092	0.0022
116	0.0114	0.0093	0.0022
117	0.0115	0.0094	0.0022
118	0.0116	0.0094	0.0022
119	0.0117	0.0095	0.0022
120	0.0118	0.0095	0.0022
121	0.0119	0.0096	0.0023
122	0.0120	0.0097	0.0023
123	0.0121	0.0098	0.0023
124	0.0122	0.0099	0.0023
125	0.0123	0.0100	0.0023
126	0.0124	0.0100	0.0023
127	0.0125	0.0101	0.0024
128	0.0126	0.0102	0.0024
129	0.0127	0.0103	0.0024
130	0.0128	0.0104	0.0024
131	0.0129	0.0105	0.0025
132	0.0130	0.0106	0.0025
133	0.0132	0.0107	0.0025
134	0.0133	0.0108	0.0025
135	0.0134	0.0109	0.0026
136	0.0135	0.0110	0.0026
137	0.0137	0.0111	0.0026
138	0.0138	0.0112	0.0026
139	0.0140	0.0113	0.0027
140	0.0141	0.0114	0.0027
141	0.0143	0.0116	0.0027
142	0.0144	0.0117	0.0027

143	0.0146	0.0118	0.0028
144	0.0147	0.0119	0.0028
145	0.0168	0.0136	0.0032
146	0.0169	0.0137	0.0032
147	0.0172	0.0139	0.0033
148	0.0173	0.0140	0.0033
149	0.0176	0.0142	0.0033
150	0.0177	0.0144	0.0034
151	0.0180	0.0146	0.0034
152	0.0181	0.0147	0.0034
153	0.0185	0.0149	0.0035
154	0.0186	0.0151	0.0035
155	0.0189	0.0153	0.0036
156	0.0191	0.0155	0.0036
157	0.0195	0.0158	0.0037
158	0.0197	0.0159	0.0037
159	0.0200	0.0162	0.0038
160	0.0202	0.0164	0.0038
161	0.0207	0.0167	0.0039
162	0.0209	0.0169	0.0040
163	0.0214	0.0173	0.0041
164	0.0216	0.0175	0.0041
165	0.0221	0.0179	0.0042
166	0.0224	0.0181	0.0043
167	0.0230	0.0186	0.0044
168	0.0233	0.0189	0.0044
169	0.0240	0.0194	0.0045
170	0.0243	0.0197	0.0046
171	0.0250	0.0203	0.0048
172	0.0254	0.0206	0.0048
173	0.0263	0.0213	0.0050
174	0.0268	0.0217	0.0051
175	0.0277	0.0225	0.0053
176	0.0283	0.0229	0.0054
177	0.0295	0.0239	0.0056
178	0.0301	0.0244	0.0057
179	0.0316	0.0256	0.0060
180	0.0324	0.0262	0.0061
181	0.0342	0.0277	0.0065
182	0.0352	0.0285	0.0067
183	0.0376	0.0304	0.0071
184	0.0390	0.0316	0.0074
185	0.0341	0.0276	0.0065
186	0.0360	0.0292	0.0068
187	0.0409	0.0331	0.0078
188	0.0441	0.0357	0.0084
189	0.0532	0.0431	0.0101
190	0.0600	0.0486	0.0114
191	0.0858	0.0652	0.0206
192	0.1179	0.0652	0.0527
193	0.3691	0.0652	0.3039
194	0.0699	0.0566	0.0133
195	0.0481	0.0389	0.0091
196	0.0383	0.0310	0.0073
197	0.0405	0.0328	0.0077
198	0.0363	0.0294	0.0069
199	0.0332	0.0269	0.0063

200	0.0308	0.0250	0.0059
201	0.0289	0.0234	0.0055
202	0.0272	0.0221	0.0052
203	0.0259	0.0209	0.0049
204	0.0247	0.0200	0.0047
205	0.0236	0.0191	0.0045
206	0.0227	0.0184	0.0043
207	0.0219	0.0177	0.0042
208	0.0211	0.0171	0.0040
209	0.0205	0.0166	0.0039
210	0.0198	0.0161	0.0038
211	0.0193	0.0156	0.0037
212	0.0188	0.0152	0.0036
213	0.0183	0.0148	0.0035
214	0.0179	0.0145	0.0034
215	0.0174	0.0141	0.0033
216	0.0171	0.0138	0.0032
217	0.0148	0.0120	0.0028
218	0.0145	0.0117	0.0028
219	0.0142	0.0115	0.0027
220	0.0139	0.0113	0.0026
221	0.0136	0.0110	0.0026
222	0.0134	0.0108	0.0025
223	0.0131	0.0106	0.0025
224	0.0129	0.0104	0.0024
225	0.0126	0.0102	0.0024
226	0.0124	0.0101	0.0024
227	0.0122	0.0099	0.0023
228	0.0120	0.0097	0.0023
229	0.0118	0.0096	0.0022
230	0.0117	0.0094	0.0022
231	0.0115	0.0093	0.0022
232	0.0113	0.0092	0.0022
233	0.0112	0.0090	0.0021
234	0.0110	0.0089	0.0021
235	0.0109	0.0088	0.0021
236	0.0107	0.0087	0.0020
237	0.0106	0.0086	0.0020
238	0.0105	0.0085	0.0020
239	0.0103	0.0084	0.0020
240	0.0102	0.0083	0.0019
241	0.0101	0.0082	0.0019
242	0.0100	0.0081	0.0019
243	0.0099	0.0080	0.0019
244	0.0098	0.0079	0.0019
245	0.0097	0.0078	0.0018
246	0.0095	0.0077	0.0018
247	0.0095	0.0077	0.0018
248	0.0094	0.0076	0.0018
249	0.0093	0.0075	0.0018
250	0.0092	0.0074	0.0017
251	0.0091	0.0074	0.0017
252	0.0090	0.0073	0.0017
253	0.0089	0.0072	0.0017
254	0.0088	0.0072	0.0017
255	0.0088	0.0071	0.0017
256	0.0087	0.0070	0.0016

257	0.0086	0.0070	0.0016
258	0.0085	0.0069	0.0016
259	0.0085	0.0068	0.0016
260	0.0084	0.0068	0.0016
261	0.0083	0.0067	0.0016
262	0.0082	0.0067	0.0016
263	0.0082	0.0066	0.0016
264	0.0081	0.0066	0.0015
265	0.0081	0.0065	0.0015
266	0.0080	0.0065	0.0015
267	0.0079	0.0064	0.0015
268	0.0079	0.0064	0.0015
269	0.0078	0.0063	0.0015
270	0.0078	0.0063	0.0015
271	0.0077	0.0062	0.0015
272	0.0076	0.0062	0.0015
273	0.0076	0.0061	0.0014
274	0.0075	0.0061	0.0014
275	0.0075	0.0061	0.0014
276	0.0074	0.0060	0.0014
277	0.0074	0.0060	0.0014
278	0.0073	0.0059	0.0014
279	0.0073	0.0059	0.0014
280	0.0072	0.0059	0.0014
281	0.0072	0.0058	0.0014
282	0.0072	0.0058	0.0014
283	0.0071	0.0058	0.0014
284	0.0071	0.0057	0.0013
285	0.0070	0.0057	0.0013
286	0.0070	0.0057	0.0013
287	0.0069	0.0056	0.0013
288	0.0069	0.0056	0.0013

Total soil rain loss = 3.36(In)
Total effective rainfall = 1.12(In)
Peak flow rate in flood hydrograph = 10.39(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

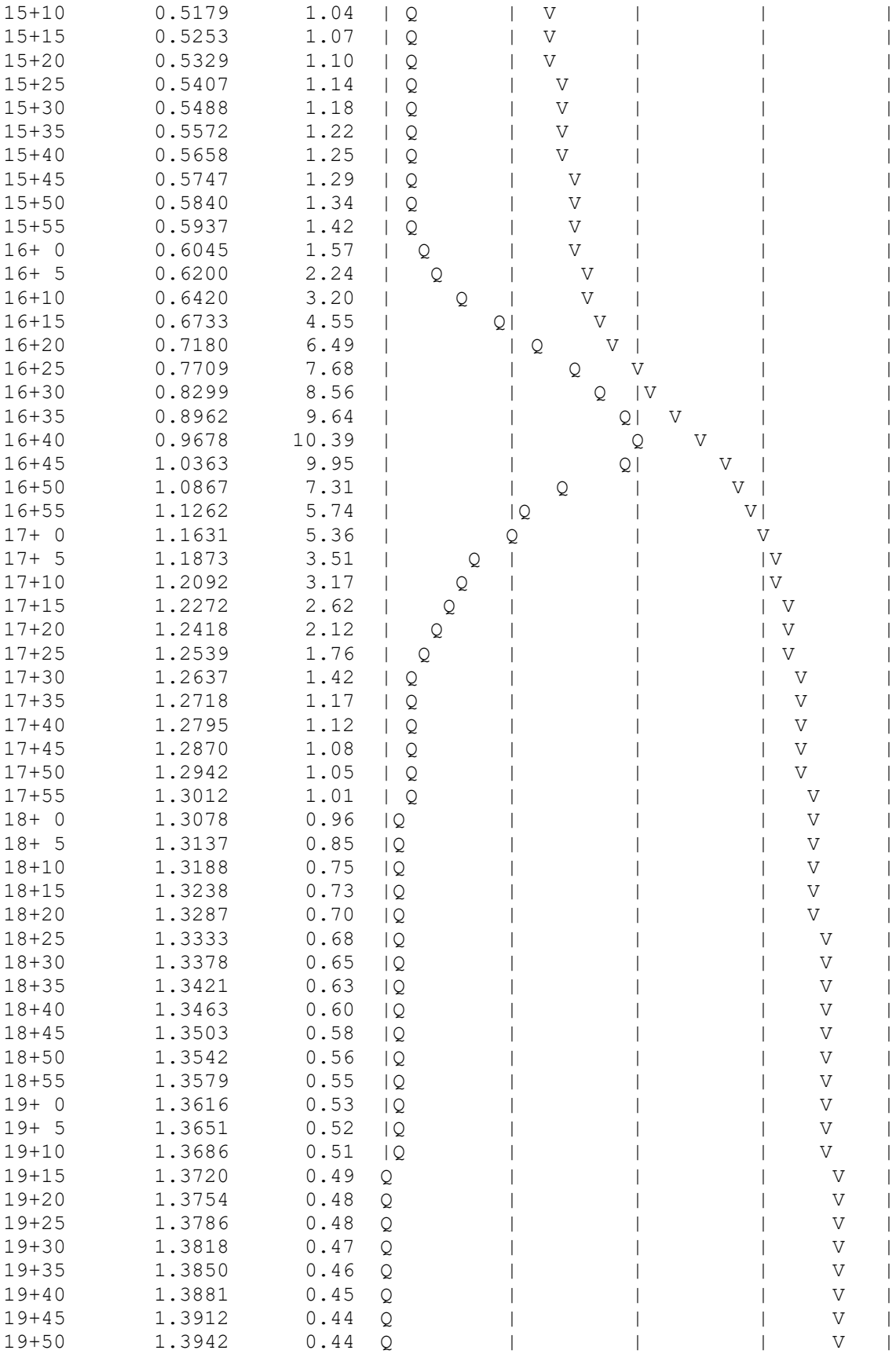
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0001	0.01	Q	|	|	|	|
0+15	0.0002	0.02	Q	|	|	|	|
0+20	0.0004	0.03	Q	|	|	|	|
0+25	0.0008	0.05	Q	|	|	|	|
0+30	0.0013	0.08	Q	|	|	|	|
0+35	0.0021	0.11	Q	|	|	|	|
0+40	0.0030	0.14	Q	|	|	|	|
0+45	0.0042	0.17	Q	|	|	|	|
0+50	0.0056	0.20	Q	|	|	|	|

0+55	0.0071	0.21	Q	|	|	|	|
1+ 0	0.0086	0.23	Q	|	|	|	|
1+ 5	0.0103	0.24	Q	|	|	|	|
1+10	0.0119	0.24	Q	|	|	|	|
1+15	0.0137	0.25	Q	|	|	|	|
1+20	0.0154	0.26	Q	|	|	|	|
1+25	0.0172	0.26	Q	|	|	|	|
1+30	0.0190	0.26	Q	|	|	|	|
1+35	0.0208	0.26	Q	|	|	|	|
1+40	0.0226	0.26	Q	|	|	|	|
1+45	0.0245	0.27	Q	|	|	|	|
1+50	0.0263	0.27	Q	|	|	|	|
1+55	0.0281	0.27	Q	|	|	|	|
2+ 0	0.0300	0.27	Q	|	|	|	|
2+ 5	0.0319	0.27	Q	|	|	|	|
2+10	0.0337	0.27	Q	|	|	|	|
2+15	0.0356	0.27	Q	|	|	|	|
2+20	0.0375	0.27	Q	|	|	|	|
2+25	0.0394	0.27	QV	|	|	|	|
2+30	0.0413	0.28	QV	|	|	|	|
2+35	0.0432	0.28	QV	|	|	|	|
2+40	0.0451	0.28	QV	|	|	|	|
2+45	0.0470	0.28	QV	|	|	|	|
2+50	0.0489	0.28	QV	|	|	|	|
2+55	0.0509	0.28	QV	|	|	|	|
3+ 0	0.0528	0.28	QV	|	|	|	|
3+ 5	0.0547	0.28	QV	|	|	|	|
3+10	0.0567	0.28	QV	|	|	|	|
3+15	0.0587	0.28	QV	|	|	|	|
3+20	0.0606	0.28	QV	|	|	|	|
3+25	0.0626	0.29	QV	|	|	|	|
3+30	0.0646	0.29	QV	|	|	|	|
3+35	0.0665	0.29	QV	|	|	|	|
3+40	0.0685	0.29	QV	|	|	|	|
3+45	0.0705	0.29	QV	|	|	|	|
3+50	0.0725	0.29	QV	|	|	|	|
3+55	0.0745	0.29	QV	|	|	|	|
4+ 0	0.0766	0.29	Q V	|	|	|	|
4+ 5	0.0786	0.29	Q V	|	|	|	|
4+10	0.0806	0.30	Q V	|	|	|	|
4+15	0.0827	0.30	Q V	|	|	|	|
4+20	0.0847	0.30	Q V	|	|	|	|
4+25	0.0868	0.30	Q V	|	|	|	|
4+30	0.0888	0.30	Q V	|	|	|	|
4+35	0.0909	0.30	Q V	|	|	|	|
4+40	0.0930	0.30	Q V	|	|	|	|
4+45	0.0951	0.30	Q V	|	|	|	|
4+50	0.0972	0.30	Q V	|	|	|	|
4+55	0.0993	0.31	Q V	|	|	|	|
5+ 0	0.1014	0.31	Q V	|	|	|	|
5+ 5	0.1035	0.31	Q V	|	|	|	|
5+10	0.1057	0.31	Q V	|	|	|	|
5+15	0.1078	0.31	Q V	|	|	|	|
5+20	0.1099	0.31	Q V	|	|	|	|
5+25	0.1121	0.31	Q V	|	|	|	|
5+30	0.1143	0.31	Q V	|	|	|	|
5+35	0.1164	0.32	Q V	|	|	|	|

5+40	0.1186	0.32	Q	V				
5+45	0.1208	0.32	Q	V				
5+50	0.1230	0.32	Q	V				
5+55	0.1252	0.32	Q	V				
6+ 0	0.1275	0.32	Q	V				
6+ 5	0.1297	0.32	Q	V				
6+10	0.1319	0.33	Q	V				
6+15	0.1342	0.33	Q	V				
6+20	0.1364	0.33	Q	V				
6+25	0.1387	0.33	Q	V				
6+30	0.1410	0.33	Q	V				
6+35	0.1433	0.33	Q	V				
6+40	0.1456	0.33	Q	V				
6+45	0.1479	0.34	Q	V				
6+50	0.1502	0.34	Q	V				
6+55	0.1526	0.34	Q	V				
7+ 0	0.1549	0.34	Q	V				
7+ 5	0.1573	0.34	Q	V				
7+10	0.1597	0.34	Q	V				
7+15	0.1620	0.35	Q	V				
7+20	0.1644	0.35	Q	V				
7+25	0.1668	0.35	Q	V				
7+30	0.1693	0.35	Q	V				
7+35	0.1717	0.35	Q	V				
7+40	0.1741	0.35	Q	V				
7+45	0.1766	0.36	Q	V				
7+50	0.1791	0.36	Q	V				
7+55	0.1815	0.36	Q	V				
8+ 0	0.1840	0.36	Q	V				
8+ 5	0.1865	0.36	Q	V				
8+10	0.1891	0.37	Q	V				
8+15	0.1916	0.37	Q	V				
8+20	0.1942	0.37	Q	V				
8+25	0.1967	0.37	Q	V				
8+30	0.1993	0.37	Q	V				
8+35	0.2019	0.38	Q	V				
8+40	0.2045	0.38	Q	V				
8+45	0.2071	0.38	Q	V				
8+50	0.2098	0.38	Q	V				
8+55	0.2124	0.39	Q	V				
9+ 0	0.2151	0.39	Q	V				
9+ 5	0.2178	0.39	Q	V				
9+10	0.2205	0.39	Q	V				
9+15	0.2232	0.40	Q	V				
9+20	0.2259	0.40	Q	V				
9+25	0.2287	0.40	Q	V				
9+30	0.2315	0.40	Q	V				
9+35	0.2343	0.41	Q	V				
9+40	0.2371	0.41	Q	V				
9+45	0.2399	0.41	Q	V				
9+50	0.2428	0.41	Q	V				
9+55	0.2456	0.42	Q	V				
10+ 0	0.2485	0.42	Q	V				
10+ 5	0.2514	0.42	Q	V				
10+10	0.2544	0.43	Q	V				
10+15	0.2573	0.43	Q	V				
10+20	0.2603	0.43	Q	V				

10+25	0.2633	0.43	Q	V	|	|	|
10+30	0.2663	0.44	Q	V	|	|	|
10+35	0.2693	0.44	Q	V	|	|	|
10+40	0.2724	0.44	Q	V	|	|	|
10+45	0.2755	0.45	Q	V	|	|	|
10+50	0.2786	0.45	Q	V	|	|	|
10+55	0.2817	0.46	Q	V	|	|	|
11+ 0	0.2849	0.46	Q	V	|	|	|
11+ 5	0.2881	0.46	Q	V	|	|	|
11+10	0.2913	0.47	Q	V	|	|	|
11+15	0.2946	0.47	Q	V	|	|	|
11+20	0.2978	0.48	Q	V	|	|	|
11+25	0.3011	0.48	Q	V	|	|	|
11+30	0.3045	0.48	Q	V	|	|	|
11+35	0.3078	0.49	Q	V	|	|	|
11+40	0.3112	0.49	Q	V	|	|	|
11+45	0.3146	0.50	Q	V	|	|	|
11+50	0.3181	0.50	|Q	V	|	|	|
11+55	0.3216	0.51	|Q	V	|	|	|
12+ 0	0.3251	0.51	|Q	V	|	|	|
12+ 5	0.3287	0.52	|Q	V	|	|	|
12+10	0.3323	0.52	|Q	V	|	|	|
12+15	0.3360	0.53	|Q	V	|	|	|
12+20	0.3397	0.54	|Q	V	|	|	|
12+25	0.3435	0.55	|Q	V|		|	|
12+30	0.3474	0.57	|Q	V|		|	|
12+35	0.3514	0.58	|Q	V|		|	|
12+40	0.3555	0.60	|Q	V|		|	|
12+45	0.3597	0.61	|Q	V|		|	|
12+50	0.3640	0.62	|Q	V|		|	|
12+55	0.3684	0.64	|Q	V|		|	|
13+ 0	0.3729	0.65	|Q	V|		|	|
13+ 5	0.3774	0.66	|Q	V|		|	|
13+10	0.3820	0.67	|Q	V		|	|
13+15	0.3867	0.68	|Q	V		|	|
13+20	0.3914	0.69	|Q	V		|	|
13+25	0.3962	0.70	|Q	V		|	|
13+30	0.4010	0.71	|Q	V		|	|
13+35	0.4060	0.72	|Q	V		|	|
13+40	0.4110	0.73	|Q	V		|	|
13+45	0.4160	0.74	|Q	V		|	|
13+50	0.4212	0.75	|Q	|V		|	|
13+55	0.4264	0.76	|Q	|V		|	|
14+ 0	0.4317	0.77	|Q	|V		|	|
14+ 5	0.4371	0.78	|Q	|V		|	|
14+10	0.4426	0.80	|Q	|V		|	|
14+15	0.4482	0.81	|Q	|V		|	|
14+20	0.4539	0.83	|Q	|V		|	|
14+25	0.4597	0.84	|Q	| V		|	|
14+30	0.4656	0.86	|Q	| V		|	|
14+35	0.4716	0.87	|Q	| V		|	|
14+40	0.4777	0.89	|Q	| V		|	|
14+45	0.4840	0.91	|Q	| V		|	|
14+50	0.4905	0.93	|Q	| V		|	|
14+55	0.4971	0.96	|Q	| V		|	|
15+ 0	0.5038	0.98	|Q	| V		|	|
15+ 5	0.5108	1.01	| Q	| V		|	|



19+55	1.3971	0.43	Q	|	|	|	V |
20+ 0	1.4001	0.42	Q	|	|	|	V |
20+ 5	1.4029	0.42	Q	|	|	|	V |
20+10	1.4058	0.41	Q	|	|	|	V |
20+15	1.4086	0.41	Q	|	|	|	V |
20+20	1.4113	0.40	Q	|	|	|	V |
20+25	1.4141	0.40	Q	|	|	|	V |
20+30	1.4168	0.39	Q	|	|	|	V |
20+35	1.4194	0.39	Q	|	|	|	V |
20+40	1.4221	0.38	Q	|	|	|	V |
20+45	1.4247	0.38	Q	|	|	|	V |
20+50	1.4272	0.37	Q	|	|	|	V |
20+55	1.4298	0.37	Q	|	|	|	V |
21+ 0	1.4323	0.37	Q	|	|	|	V |
21+ 5	1.4348	0.36	Q	|	|	|	V |
21+10	1.4372	0.36	Q	|	|	|	V |
21+15	1.4397	0.35	Q	|	|	|	V |
21+20	1.4421	0.35	Q	|	|	|	V |
21+25	1.4445	0.35	Q	|	|	|	V |
21+30	1.4468	0.34	Q	|	|	|	V |
21+35	1.4492	0.34	Q	|	|	|	V |
21+40	1.4515	0.34	Q	|	|	|	V |
21+45	1.4538	0.33	Q	|	|	|	V |
21+50	1.4561	0.33	Q	|	|	|	V |
21+55	1.4583	0.33	Q	|	|	|	V |
22+ 0	1.4606	0.32	Q	|	|	|	V |
22+ 5	1.4628	0.32	Q	|	|	|	V |
22+10	1.4650	0.32	Q	|	|	|	V |
22+15	1.4671	0.32	Q	|	|	|	V |
22+20	1.4693	0.31	Q	|	|	|	V |
22+25	1.4715	0.31	Q	|	|	|	V |
22+30	1.4736	0.31	Q	|	|	|	V |
22+35	1.4757	0.31	Q	|	|	|	V |
22+40	1.4778	0.30	Q	|	|	|	V |
22+45	1.4799	0.30	Q	|	|	|	V |
22+50	1.4819	0.30	Q	|	|	|	V |
22+55	1.4840	0.30	Q	|	|	|	V |
23+ 0	1.4860	0.29	Q	|	|	|	V|
23+ 5	1.4880	0.29	Q	|	|	|	V|
23+10	1.4900	0.29	Q	|	|	|	V|
23+15	1.4920	0.29	Q	|	|	|	V|
23+20	1.4940	0.29	Q	|	|	|	V|
23+25	1.4959	0.28	Q	|	|	|	V|
23+30	1.4979	0.28	Q	|	|	|	V|
23+35	1.4998	0.28	Q	|	|	|	V|
23+40	1.5017	0.28	Q	|	|	|	V|
23+45	1.5036	0.28	Q	|	|	|	V|
23+50	1.5055	0.27	Q	|	|	|	V|
23+55	1.5074	0.27	Q	|	|	|	V|
24+ 0	1.5092	0.27	Q	|	|	|	V|
24+ 5	1.5111	0.27	Q	|	|	|	V|
24+10	1.5129	0.26	Q	|	|	|	V|
24+15	1.5146	0.25	Q	|	|	|	V|
24+20	1.5162	0.23	Q	|	|	|	V|
24+25	1.5176	0.21	Q	|	|	|	V|
24+30	1.5189	0.18	Q	|	|	|	V|
24+35	1.5200	0.15	Q	|	|	|	V|

24+40	1.5208	0.12	Q	|	|	|	V|
24+45	1.5214	0.09	Q	|	|	|	V|
24+50	1.5218	0.06	Q	|	|	|	V|
24+55	1.5222	0.05	Q	|	|	|	V|
25+ 0	1.5224	0.03	Q	|	|	|	V|
25+ 5	1.5226	0.03	Q	|	|	|	V|
25+10	1.5227	0.02	Q	|	|	|	V|
25+15	1.5228	0.01	Q	|	|	|	V|
25+20	1.5228	0.01	Q	|	|	|	V|
25+25	1.5229	0.01	Q	|	|	|	V|
25+30	1.5229	0.00	Q	|	|	|	V|
25+35	1.5229	0.00	Q	|	|	|	V|
25+40	1.5229	0.00	Q	|	|	|	V|
25+45	1.5230	0.00	Q	|	|	|	V|
25+50	1.5230	0.00	Q	|	|	|	V|
25+55	1.5230	0.00	Q	|	|	|	V|
26+ 0	1.5230	0.00	Q	|	|	|	V

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

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Study date 04/23/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION - SOUTHERLY CHAMBERS
25-YEAR STORM EVENT ANALYSIS

Storm Event Year = 25

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 25		
16.36	1	1.00
Rainfall data for year 25		
16.36	6	2.43
Rainfall data for year 25		
16.36	24	4.48

++

******** 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)
32.0	32.0	16.36	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
13.09	0.800	32.0	32.0	21.25	0.001
3.27	0.200	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.190
Area-averaged low loss fraction, Yb = 0.810
User entry of time of concentration = 0.742 (hours)
++
Watershed area = 16.36(Ac.)
Catchment Lag time = 0.594 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 14.0386
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.810 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.369(In)
Computed peak 30-minute rainfall = 0.756(In)
Specified peak 1-hour rainfall = 0.998(In)
Computed peak 3-hour rainfall = 1.722(In)
Specified peak 6-hour rainfall = 2.430(In)
Specified peak 24-hour rainfall = 4.480(In)

Rainfall depth area reduction factors:
Using a total area of 16.36(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.369(In)
30-minute factor = 0.999 Adjusted rainfall = 0.756(In)
1-hour factor = 0.999 Adjusted rainfall = 0.997(In)
3-hour factor = 1.000 Adjusted rainfall = 1.722(In)
6-hour factor = 1.000 Adjusted rainfall = 2.430(In)
24-hour factor = 1.000 Adjusted rainfall = 4.480(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 = 197.85 (CFS))		
1	0.804	1.590
2	2.762	3.874
3	6.403	7.205
4	12.953	12.960
5	21.193	16.301
6	30.609	18.630
7	41.672	21.889

8	54.210	24.808
9	66.731	24.774
10	75.193	16.742
11	81.251	11.986
12	87.270	11.908
13	90.327	6.049
14	93.107	5.499
15	95.198	4.138
16	96.631	2.836
17	97.640	1.996
18	98.222	1.152
19	98.475	0.500
20	98.728	0.500
21	98.980	0.500
22	99.233	0.500
23	99.486	0.500
24	99.738	0.500
25	100.000	0.250

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3691	0.3691
2	0.4870	0.1179
3	0.5728	0.0858
4	0.6426	0.0699
5	0.7026	0.0600
6	0.7558	0.0532
7	0.8038	0.0481
8	0.8479	0.0441
9	0.8888	0.0409
10	0.9271	0.0383
11	0.9631	0.0360
12	0.9972	0.0341
13	1.0377	0.0405
14	1.0767	0.0390
15	1.1143	0.0376
16	1.1506	0.0363
17	1.1858	0.0352
18	1.2200	0.0342
19	1.2533	0.0332
20	1.2856	0.0324
21	1.3172	0.0316
22	1.3480	0.0308
23	1.3782	0.0301
24	1.4076	0.0295
25	1.4365	0.0289
26	1.4648	0.0283
27	1.4925	0.0277
28	1.5198	0.0272
29	1.5465	0.0268
30	1.5728	0.0263
31	1.5987	0.0259
32	1.6241	0.0254
33	1.6492	0.0250
34	1.6738	0.0247
35	1.6981	0.0243
36	1.7221	0.0240

37	1.7457	0.0236
38	1.7690	0.0233
39	1.7919	0.0230
40	1.8146	0.0227
41	1.8370	0.0224
42	1.8591	0.0221
43	1.8810	0.0219
44	1.9026	0.0216
45	1.9239	0.0214
46	1.9451	0.0211
47	1.9660	0.0209
48	1.9866	0.0207
49	2.0071	0.0205
50	2.0273	0.0202
51	2.0474	0.0200
52	2.0672	0.0198
53	2.0869	0.0197
54	2.1063	0.0195
55	2.1256	0.0193
56	2.1447	0.0191
57	2.1637	0.0189
58	2.1824	0.0188
59	2.2010	0.0186
60	2.2195	0.0185
61	2.2378	0.0183
62	2.2559	0.0181
63	2.2739	0.0180
64	2.2918	0.0179
65	2.3095	0.0177
66	2.3271	0.0176
67	2.3445	0.0174
68	2.3619	0.0173
69	2.3790	0.0172
70	2.3961	0.0171
71	2.4131	0.0169
72	2.4299	0.0168
73	2.4447	0.0148
74	2.4594	0.0147
75	2.4740	0.0146
76	2.4885	0.0145
77	2.5029	0.0144
78	2.5172	0.0143
79	2.5314	0.0142
80	2.5455	0.0141
81	2.5595	0.0140
82	2.5734	0.0139
83	2.5872	0.0138
84	2.6009	0.0137
85	2.6145	0.0136
86	2.6281	0.0135
87	2.6415	0.0134
88	2.6549	0.0134
89	2.6681	0.0133
90	2.6813	0.0132
91	2.6944	0.0131
92	2.7075	0.0130
93	2.7204	0.0129

94	2.7333	0.0129
95	2.7461	0.0128
96	2.7588	0.0127
97	2.7714	0.0126
98	2.7840	0.0126
99	2.7965	0.0125
100	2.8089	0.0124
101	2.8213	0.0124
102	2.8336	0.0123
103	2.8458	0.0122
104	2.8580	0.0122
105	2.8701	0.0121
106	2.8821	0.0120
107	2.8941	0.0120
108	2.9060	0.0119
109	2.9178	0.0118
110	2.9296	0.0118
111	2.9413	0.0117
112	2.9530	0.0117
113	2.9646	0.0116
114	2.9761	0.0115
115	2.9876	0.0115
116	2.9991	0.0114
117	3.0105	0.0114
118	3.0218	0.0113
119	3.0331	0.0113
120	3.0443	0.0112
121	3.0554	0.0112
122	3.0666	0.0111
123	3.0776	0.0111
124	3.0886	0.0110
125	3.0996	0.0110
126	3.1105	0.0109
127	3.1214	0.0109
128	3.1322	0.0108
129	3.1430	0.0108
130	3.1537	0.0107
131	3.1644	0.0107
132	3.1751	0.0106
133	3.1856	0.0106
134	3.1962	0.0105
135	3.2067	0.0105
136	3.2172	0.0105
137	3.2276	0.0104
138	3.2379	0.0104
139	3.2483	0.0103
140	3.2586	0.0103
141	3.2688	0.0103
142	3.2790	0.0102
143	3.2892	0.0102
144	3.2993	0.0101
145	3.3094	0.0101
146	3.3195	0.0101
147	3.3295	0.0100
148	3.3395	0.0100
149	3.3494	0.0099
150	3.3593	0.0099

151	3.3692	0.0099
152	3.3790	0.0098
153	3.3888	0.0098
154	3.3986	0.0098
155	3.4083	0.0097
156	3.4180	0.0097
157	3.4276	0.0097
158	3.4372	0.0096
159	3.4468	0.0096
160	3.4564	0.0095
161	3.4659	0.0095
162	3.4754	0.0095
163	3.4848	0.0095
164	3.4942	0.0094
165	3.5036	0.0094
166	3.5130	0.0094
167	3.5223	0.0093
168	3.5316	0.0093
169	3.5408	0.0093
170	3.5501	0.0092
171	3.5593	0.0092
172	3.5684	0.0092
173	3.5776	0.0091
174	3.5867	0.0091
175	3.5958	0.0091
176	3.6048	0.0091
177	3.6139	0.0090
178	3.6229	0.0090
179	3.6318	0.0090
180	3.6408	0.0089
181	3.6497	0.0089
182	3.6586	0.0089
183	3.6674	0.0089
184	3.6762	0.0088
185	3.6851	0.0088
186	3.6938	0.0088
187	3.7026	0.0088
188	3.7113	0.0087
189	3.7200	0.0087
190	3.7287	0.0087
191	3.7373	0.0086
192	3.7459	0.0086
193	3.7545	0.0086
194	3.7631	0.0086
195	3.7717	0.0085
196	3.7802	0.0085
197	3.7887	0.0085
198	3.7972	0.0085
199	3.8056	0.0085
200	3.8140	0.0084
201	3.8224	0.0084
202	3.8308	0.0084
203	3.8392	0.0084
204	3.8475	0.0083
205	3.8558	0.0083
206	3.8641	0.0083
207	3.8724	0.0083

208	3.8806	0.0082
209	3.8888	0.0082
210	3.8970	0.0082
211	3.9052	0.0082
212	3.9134	0.0082
213	3.9215	0.0081
214	3.9296	0.0081
215	3.9377	0.0081
216	3.9458	0.0081
217	3.9538	0.0081
218	3.9619	0.0080
219	3.9699	0.0080
220	3.9779	0.0080
221	3.9858	0.0080
222	3.9938	0.0079
223	4.0017	0.0079
224	4.0096	0.0079
225	4.0175	0.0079
226	4.0254	0.0079
227	4.0332	0.0079
228	4.0411	0.0078
229	4.0489	0.0078
230	4.0567	0.0078
231	4.0645	0.0078
232	4.0722	0.0078
233	4.0799	0.0077
234	4.0877	0.0077
235	4.0954	0.0077
236	4.1030	0.0077
237	4.1107	0.0077
238	4.1183	0.0076
239	4.1260	0.0076
240	4.1336	0.0076
241	4.1412	0.0076
242	4.1488	0.0076
243	4.1563	0.0076
244	4.1638	0.0075
245	4.1714	0.0075
246	4.1789	0.0075
247	4.1864	0.0075
248	4.1938	0.0075
249	4.2013	0.0075
250	4.2087	0.0074
251	4.2161	0.0074
252	4.2236	0.0074
253	4.2309	0.0074
254	4.2383	0.0074
255	4.2457	0.0074
256	4.2530	0.0073
257	4.2603	0.0073
258	4.2676	0.0073
259	4.2749	0.0073
260	4.2822	0.0073
261	4.2895	0.0073
262	4.2967	0.0072
263	4.3039	0.0072
264	4.3112	0.0072

265	4.3184	0.0072
266	4.3255	0.0072
267	4.3327	0.0072
268	4.3399	0.0072
269	4.3470	0.0071
270	4.3541	0.0071
271	4.3612	0.0071
272	4.3683	0.0071
273	4.3754	0.0071
274	4.3825	0.0071
275	4.3895	0.0071
276	4.3966	0.0070
277	4.4036	0.0070
278	4.4106	0.0070
279	4.4176	0.0070
280	4.4246	0.0070
281	4.4315	0.0070
282	4.4385	0.0070
283	4.4454	0.0069
284	4.4523	0.0069
285	4.4593	0.0069
286	4.4662	0.0069
287	4.4730	0.0069
288	4.4799	0.0069

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0069	0.0056	0.0013
2	0.0069	0.0056	0.0013
3	0.0069	0.0056	0.0013
4	0.0069	0.0056	0.0013
5	0.0070	0.0056	0.0013
6	0.0070	0.0056	0.0013
7	0.0070	0.0057	0.0013
8	0.0070	0.0057	0.0013
9	0.0070	0.0057	0.0013
10	0.0071	0.0057	0.0013
11	0.0071	0.0057	0.0013
12	0.0071	0.0057	0.0013
13	0.0071	0.0058	0.0014
14	0.0071	0.0058	0.0014
15	0.0072	0.0058	0.0014
16	0.0072	0.0058	0.0014
17	0.0072	0.0058	0.0014
18	0.0072	0.0059	0.0014
19	0.0073	0.0059	0.0014
20	0.0073	0.0059	0.0014
21	0.0073	0.0059	0.0014
22	0.0073	0.0059	0.0014
23	0.0074	0.0060	0.0014
24	0.0074	0.0060	0.0014
25	0.0074	0.0060	0.0014
26	0.0074	0.0060	0.0014
27	0.0075	0.0060	0.0014
28	0.0075	0.0061	0.0014

29	0.0075	0.0061	0.0014
30	0.0075	0.0061	0.0014
31	0.0076	0.0061	0.0014
32	0.0076	0.0061	0.0014
33	0.0076	0.0062	0.0014
34	0.0076	0.0062	0.0014
35	0.0077	0.0062	0.0015
36	0.0077	0.0062	0.0015
37	0.0077	0.0063	0.0015
38	0.0077	0.0063	0.0015
39	0.0078	0.0063	0.0015
40	0.0078	0.0063	0.0015
41	0.0078	0.0063	0.0015
42	0.0079	0.0064	0.0015
43	0.0079	0.0064	0.0015
44	0.0079	0.0064	0.0015
45	0.0079	0.0064	0.0015
46	0.0080	0.0065	0.0015
47	0.0080	0.0065	0.0015
48	0.0080	0.0065	0.0015
49	0.0081	0.0065	0.0015
50	0.0081	0.0066	0.0015
51	0.0081	0.0066	0.0015
52	0.0082	0.0066	0.0015
53	0.0082	0.0066	0.0016
54	0.0082	0.0067	0.0016
55	0.0083	0.0067	0.0016
56	0.0083	0.0067	0.0016
57	0.0083	0.0068	0.0016
58	0.0084	0.0068	0.0016
59	0.0084	0.0068	0.0016
60	0.0084	0.0068	0.0016
61	0.0085	0.0069	0.0016
62	0.0085	0.0069	0.0016
63	0.0085	0.0069	0.0016
64	0.0086	0.0069	0.0016
65	0.0086	0.0070	0.0016
66	0.0086	0.0070	0.0016
67	0.0087	0.0070	0.0017
68	0.0087	0.0071	0.0017
69	0.0088	0.0071	0.0017
70	0.0088	0.0071	0.0017
71	0.0089	0.0072	0.0017
72	0.0089	0.0072	0.0017
73	0.0089	0.0072	0.0017
74	0.0090	0.0073	0.0017
75	0.0090	0.0073	0.0017
76	0.0091	0.0073	0.0017
77	0.0091	0.0074	0.0017
78	0.0091	0.0074	0.0017
79	0.0092	0.0075	0.0017
80	0.0092	0.0075	0.0018
81	0.0093	0.0075	0.0018
82	0.0093	0.0076	0.0018
83	0.0094	0.0076	0.0018
84	0.0094	0.0076	0.0018
85	0.0095	0.0077	0.0018

86	0.0095	0.0077	0.0018
87	0.0096	0.0078	0.0018
88	0.0096	0.0078	0.0018
89	0.0097	0.0078	0.0018
90	0.0097	0.0079	0.0018
91	0.0098	0.0079	0.0019
92	0.0098	0.0080	0.0019
93	0.0099	0.0080	0.0019
94	0.0099	0.0081	0.0019
95	0.0100	0.0081	0.0019
96	0.0101	0.0081	0.0019
97	0.0101	0.0082	0.0019
98	0.0102	0.0082	0.0019
99	0.0103	0.0083	0.0019
100	0.0103	0.0083	0.0020
101	0.0104	0.0084	0.0020
102	0.0104	0.0084	0.0020
103	0.0105	0.0085	0.0020
104	0.0105	0.0085	0.0020
105	0.0106	0.0086	0.0020
106	0.0107	0.0087	0.0020
107	0.0108	0.0087	0.0020
108	0.0108	0.0088	0.0021
109	0.0109	0.0088	0.0021
110	0.0110	0.0089	0.0021
111	0.0111	0.0090	0.0021
112	0.0111	0.0090	0.0021
113	0.0112	0.0091	0.0021
114	0.0113	0.0091	0.0021
115	0.0114	0.0092	0.0022
116	0.0114	0.0093	0.0022
117	0.0115	0.0094	0.0022
118	0.0116	0.0094	0.0022
119	0.0117	0.0095	0.0022
120	0.0118	0.0095	0.0022
121	0.0119	0.0096	0.0023
122	0.0120	0.0097	0.0023
123	0.0121	0.0098	0.0023
124	0.0122	0.0099	0.0023
125	0.0123	0.0100	0.0023
126	0.0124	0.0100	0.0023
127	0.0125	0.0101	0.0024
128	0.0126	0.0102	0.0024
129	0.0127	0.0103	0.0024
130	0.0128	0.0104	0.0024
131	0.0129	0.0105	0.0025
132	0.0130	0.0106	0.0025
133	0.0132	0.0107	0.0025
134	0.0133	0.0108	0.0025
135	0.0134	0.0109	0.0026
136	0.0135	0.0110	0.0026
137	0.0137	0.0111	0.0026
138	0.0138	0.0112	0.0026
139	0.0140	0.0113	0.0027
140	0.0141	0.0114	0.0027
141	0.0143	0.0116	0.0027
142	0.0144	0.0117	0.0027

143	0.0146	0.0118	0.0028
144	0.0147	0.0119	0.0028
145	0.0168	0.0136	0.0032
146	0.0169	0.0137	0.0032
147	0.0172	0.0139	0.0033
148	0.0173	0.0140	0.0033
149	0.0176	0.0142	0.0033
150	0.0177	0.0144	0.0034
151	0.0180	0.0146	0.0034
152	0.0181	0.0147	0.0034
153	0.0185	0.0149	0.0035
154	0.0186	0.0151	0.0035
155	0.0189	0.0153	0.0036
156	0.0191	0.0155	0.0036
157	0.0195	0.0158	0.0037
158	0.0197	0.0159	0.0037
159	0.0200	0.0162	0.0038
160	0.0202	0.0164	0.0038
161	0.0207	0.0167	0.0039
162	0.0209	0.0169	0.0040
163	0.0214	0.0173	0.0041
164	0.0216	0.0175	0.0041
165	0.0221	0.0179	0.0042
166	0.0224	0.0181	0.0043
167	0.0230	0.0186	0.0044
168	0.0233	0.0189	0.0044
169	0.0240	0.0194	0.0045
170	0.0243	0.0197	0.0046
171	0.0250	0.0203	0.0048
172	0.0254	0.0206	0.0048
173	0.0263	0.0213	0.0050
174	0.0268	0.0217	0.0051
175	0.0277	0.0225	0.0053
176	0.0283	0.0229	0.0054
177	0.0295	0.0239	0.0056
178	0.0301	0.0244	0.0057
179	0.0316	0.0256	0.0060
180	0.0324	0.0262	0.0061
181	0.0342	0.0277	0.0065
182	0.0352	0.0285	0.0067
183	0.0376	0.0304	0.0071
184	0.0390	0.0316	0.0074
185	0.0341	0.0276	0.0065
186	0.0360	0.0292	0.0068
187	0.0409	0.0331	0.0078
188	0.0441	0.0357	0.0084
189	0.0532	0.0431	0.0101
190	0.0600	0.0486	0.0114
191	0.0858	0.0652	0.0206
192	0.1179	0.0652	0.0527
193	0.3691	0.0652	0.3039
194	0.0699	0.0566	0.0133
195	0.0481	0.0389	0.0091
196	0.0383	0.0310	0.0073
197	0.0405	0.0328	0.0077
198	0.0363	0.0294	0.0069
199	0.0332	0.0269	0.0063

200	0.0308	0.0250	0.0059
201	0.0289	0.0234	0.0055
202	0.0272	0.0221	0.0052
203	0.0259	0.0209	0.0049
204	0.0247	0.0200	0.0047
205	0.0236	0.0191	0.0045
206	0.0227	0.0184	0.0043
207	0.0219	0.0177	0.0042
208	0.0211	0.0171	0.0040
209	0.0205	0.0166	0.0039
210	0.0198	0.0161	0.0038
211	0.0193	0.0156	0.0037
212	0.0188	0.0152	0.0036
213	0.0183	0.0148	0.0035
214	0.0179	0.0145	0.0034
215	0.0174	0.0141	0.0033
216	0.0171	0.0138	0.0032
217	0.0148	0.0120	0.0028
218	0.0145	0.0117	0.0028
219	0.0142	0.0115	0.0027
220	0.0139	0.0113	0.0026
221	0.0136	0.0110	0.0026
222	0.0134	0.0108	0.0025
223	0.0131	0.0106	0.0025
224	0.0129	0.0104	0.0024
225	0.0126	0.0102	0.0024
226	0.0124	0.0101	0.0024
227	0.0122	0.0099	0.0023
228	0.0120	0.0097	0.0023
229	0.0118	0.0096	0.0022
230	0.0117	0.0094	0.0022
231	0.0115	0.0093	0.0022
232	0.0113	0.0092	0.0022
233	0.0112	0.0090	0.0021
234	0.0110	0.0089	0.0021
235	0.0109	0.0088	0.0021
236	0.0107	0.0087	0.0020
237	0.0106	0.0086	0.0020
238	0.0105	0.0085	0.0020
239	0.0103	0.0084	0.0020
240	0.0102	0.0083	0.0019
241	0.0101	0.0082	0.0019
242	0.0100	0.0081	0.0019
243	0.0099	0.0080	0.0019
244	0.0098	0.0079	0.0019
245	0.0097	0.0078	0.0018
246	0.0095	0.0077	0.0018
247	0.0095	0.0077	0.0018
248	0.0094	0.0076	0.0018
249	0.0093	0.0075	0.0018
250	0.0092	0.0074	0.0017
251	0.0091	0.0074	0.0017
252	0.0090	0.0073	0.0017
253	0.0089	0.0072	0.0017
254	0.0088	0.0072	0.0017
255	0.0088	0.0071	0.0017
256	0.0087	0.0070	0.0016

257	0.0086	0.0070	0.0016
258	0.0085	0.0069	0.0016
259	0.0085	0.0068	0.0016
260	0.0084	0.0068	0.0016
261	0.0083	0.0067	0.0016
262	0.0082	0.0067	0.0016
263	0.0082	0.0066	0.0016
264	0.0081	0.0066	0.0015
265	0.0081	0.0065	0.0015
266	0.0080	0.0065	0.0015
267	0.0079	0.0064	0.0015
268	0.0079	0.0064	0.0015
269	0.0078	0.0063	0.0015
270	0.0078	0.0063	0.0015
271	0.0077	0.0062	0.0015
272	0.0076	0.0062	0.0015
273	0.0076	0.0061	0.0014
274	0.0075	0.0061	0.0014
275	0.0075	0.0061	0.0014
276	0.0074	0.0060	0.0014
277	0.0074	0.0060	0.0014
278	0.0073	0.0059	0.0014
279	0.0073	0.0059	0.0014
280	0.0072	0.0059	0.0014
281	0.0072	0.0058	0.0014
282	0.0072	0.0058	0.0014
283	0.0071	0.0058	0.0014
284	0.0071	0.0057	0.0013
285	0.0070	0.0057	0.0013
286	0.0070	0.0057	0.0013
287	0.0069	0.0056	0.0013
288	0.0069	0.0056	0.0013

Total soil rain loss = 3.36(In)
Total effective rainfall = 1.12(In)
Peak flow rate in flood hydrograph = 10.39(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

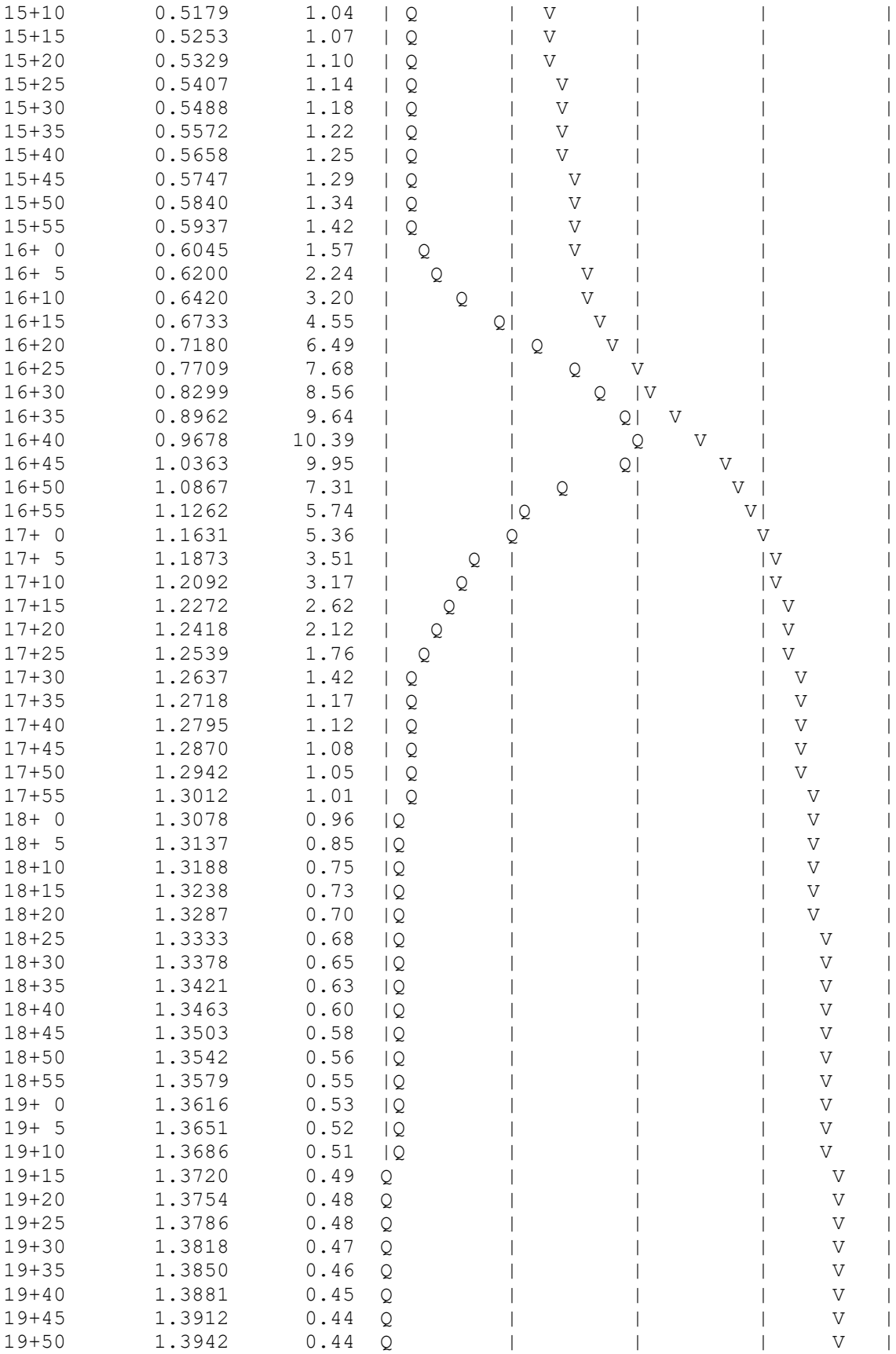
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0001	0.01	Q	|	|	|	|
0+15	0.0002	0.02	Q	|	|	|	|
0+20	0.0004	0.03	Q	|	|	|	|
0+25	0.0008	0.05	Q	|	|	|	|
0+30	0.0013	0.08	Q	|	|	|	|
0+35	0.0021	0.11	Q	|	|	|	|
0+40	0.0030	0.14	Q	|	|	|	|
0+45	0.0042	0.17	Q	|	|	|	|
0+50	0.0056	0.20	Q	|	|	|	|

0+55	0.0071	0.21	Q	|	|	|	|
1+ 0	0.0086	0.23	Q	|	|	|	|
1+ 5	0.0103	0.24	Q	|	|	|	|
1+10	0.0119	0.24	Q	|	|	|	|
1+15	0.0137	0.25	Q	|	|	|	|
1+20	0.0154	0.26	Q	|	|	|	|
1+25	0.0172	0.26	Q	|	|	|	|
1+30	0.0190	0.26	Q	|	|	|	|
1+35	0.0208	0.26	Q	|	|	|	|
1+40	0.0226	0.26	Q	|	|	|	|
1+45	0.0245	0.27	Q	|	|	|	|
1+50	0.0263	0.27	Q	|	|	|	|
1+55	0.0281	0.27	Q	|	|	|	|
2+ 0	0.0300	0.27	Q	|	|	|	|
2+ 5	0.0319	0.27	Q	|	|	|	|
2+10	0.0337	0.27	Q	|	|	|	|
2+15	0.0356	0.27	Q	|	|	|	|
2+20	0.0375	0.27	Q	|	|	|	|
2+25	0.0394	0.27	QV	|	|	|	|
2+30	0.0413	0.28	QV	|	|	|	|
2+35	0.0432	0.28	QV	|	|	|	|
2+40	0.0451	0.28	QV	|	|	|	|
2+45	0.0470	0.28	QV	|	|	|	|
2+50	0.0489	0.28	QV	|	|	|	|
2+55	0.0509	0.28	QV	|	|	|	|
3+ 0	0.0528	0.28	QV	|	|	|	|
3+ 5	0.0547	0.28	QV	|	|	|	|
3+10	0.0567	0.28	QV	|	|	|	|
3+15	0.0587	0.28	QV	|	|	|	|
3+20	0.0606	0.28	QV	|	|	|	|
3+25	0.0626	0.29	QV	|	|	|	|
3+30	0.0646	0.29	QV	|	|	|	|
3+35	0.0665	0.29	QV	|	|	|	|
3+40	0.0685	0.29	QV	|	|	|	|
3+45	0.0705	0.29	QV	|	|	|	|
3+50	0.0725	0.29	QV	|	|	|	|
3+55	0.0745	0.29	QV	|	|	|	|
4+ 0	0.0766	0.29	Q V	|	|	|	|
4+ 5	0.0786	0.29	Q V	|	|	|	|
4+10	0.0806	0.30	Q V	|	|	|	|
4+15	0.0827	0.30	Q V	|	|	|	|
4+20	0.0847	0.30	Q V	|	|	|	|
4+25	0.0868	0.30	Q V	|	|	|	|
4+30	0.0888	0.30	Q V	|	|	|	|
4+35	0.0909	0.30	Q V	|	|	|	|
4+40	0.0930	0.30	Q V	|	|	|	|
4+45	0.0951	0.30	Q V	|	|	|	|
4+50	0.0972	0.30	Q V	|	|	|	|
4+55	0.0993	0.31	Q V	|	|	|	|
5+ 0	0.1014	0.31	Q V	|	|	|	|
5+ 5	0.1035	0.31	Q V	|	|	|	|
5+10	0.1057	0.31	Q V	|	|	|	|
5+15	0.1078	0.31	Q V	|	|	|	|
5+20	0.1099	0.31	Q V	|	|	|	|
5+25	0.1121	0.31	Q V	|	|	|	|
5+30	0.1143	0.31	Q V	|	|	|	|
5+35	0.1164	0.32	Q V	|	|	|	|

5+40	0.1186	0.32	Q	V				
5+45	0.1208	0.32	Q	V				
5+50	0.1230	0.32	Q	V				
5+55	0.1252	0.32	Q	V				
6+ 0	0.1275	0.32	Q	V				
6+ 5	0.1297	0.32	Q	V				
6+10	0.1319	0.33	Q	V				
6+15	0.1342	0.33	Q	V				
6+20	0.1364	0.33	Q	V				
6+25	0.1387	0.33	Q	V				
6+30	0.1410	0.33	Q	V				
6+35	0.1433	0.33	Q	V				
6+40	0.1456	0.33	Q	V				
6+45	0.1479	0.34	Q	V				
6+50	0.1502	0.34	Q	V				
6+55	0.1526	0.34	Q	V				
7+ 0	0.1549	0.34	Q	V				
7+ 5	0.1573	0.34	Q	V				
7+10	0.1597	0.34	Q	V				
7+15	0.1620	0.35	Q	V				
7+20	0.1644	0.35	Q	V				
7+25	0.1668	0.35	Q	V				
7+30	0.1693	0.35	Q	V				
7+35	0.1717	0.35	Q	V				
7+40	0.1741	0.35	Q	V				
7+45	0.1766	0.36	Q	V				
7+50	0.1791	0.36	Q	V				
7+55	0.1815	0.36	Q	V				
8+ 0	0.1840	0.36	Q	V				
8+ 5	0.1865	0.36	Q	V				
8+10	0.1891	0.37	Q	V				
8+15	0.1916	0.37	Q	V				
8+20	0.1942	0.37	Q	V				
8+25	0.1967	0.37	Q	V				
8+30	0.1993	0.37	Q	V				
8+35	0.2019	0.38	Q	V				
8+40	0.2045	0.38	Q	V				
8+45	0.2071	0.38	Q	V				
8+50	0.2098	0.38	Q	V				
8+55	0.2124	0.39	Q	V				
9+ 0	0.2151	0.39	Q	V				
9+ 5	0.2178	0.39	Q	V				
9+10	0.2205	0.39	Q	V				
9+15	0.2232	0.40	Q	V				
9+20	0.2259	0.40	Q	V				
9+25	0.2287	0.40	Q	V				
9+30	0.2315	0.40	Q	V				
9+35	0.2343	0.41	Q	V				
9+40	0.2371	0.41	Q	V				
9+45	0.2399	0.41	Q	V				
9+50	0.2428	0.41	Q	V				
9+55	0.2456	0.42	Q	V				
10+ 0	0.2485	0.42	Q	V				
10+ 5	0.2514	0.42	Q	V				
10+10	0.2544	0.43	Q	V				
10+15	0.2573	0.43	Q	V				
10+20	0.2603	0.43	Q	V				

10+25	0.2633	0.43	Q	V	|	|	|
10+30	0.2663	0.44	Q	V	|	|	|
10+35	0.2693	0.44	Q	V	|	|	|
10+40	0.2724	0.44	Q	V	|	|	|
10+45	0.2755	0.45	Q	V	|	|	|
10+50	0.2786	0.45	Q	V	|	|	|
10+55	0.2817	0.46	Q	V	|	|	|
11+ 0	0.2849	0.46	Q	V	|	|	|
11+ 5	0.2881	0.46	Q	V	|	|	|
11+10	0.2913	0.47	Q	V	|	|	|
11+15	0.2946	0.47	Q	V	|	|	|
11+20	0.2978	0.48	Q	V	|	|	|
11+25	0.3011	0.48	Q	V	|	|	|
11+30	0.3045	0.48	Q	V	|	|	|
11+35	0.3078	0.49	Q	V	|	|	|
11+40	0.3112	0.49	Q	V	|	|	|
11+45	0.3146	0.50	Q	V	|	|	|
11+50	0.3181	0.50	|Q	V	|	|	|
11+55	0.3216	0.51	|Q	V	|	|	|
12+ 0	0.3251	0.51	|Q	V	|	|	|
12+ 5	0.3287	0.52	|Q	V	|	|	|
12+10	0.3323	0.52	|Q	V	|	|	|
12+15	0.3360	0.53	|Q	V	|	|	|
12+20	0.3397	0.54	|Q	V	|	|	|
12+25	0.3435	0.55	|Q	V|		|	|
12+30	0.3474	0.57	|Q	V|		|	|
12+35	0.3514	0.58	|Q	V|		|	|
12+40	0.3555	0.60	|Q	V|		|	|
12+45	0.3597	0.61	|Q	V|		|	|
12+50	0.3640	0.62	|Q	V|		|	|
12+55	0.3684	0.64	|Q	V|		|	|
13+ 0	0.3729	0.65	|Q	V|		|	|
13+ 5	0.3774	0.66	|Q	V|		|	|
13+10	0.3820	0.67	|Q	V		|	|
13+15	0.3867	0.68	|Q	V		|	|
13+20	0.3914	0.69	|Q	V		|	|
13+25	0.3962	0.70	|Q	V		|	|
13+30	0.4010	0.71	|Q	V		|	|
13+35	0.4060	0.72	|Q	V		|	|
13+40	0.4110	0.73	|Q	V		|	|
13+45	0.4160	0.74	|Q	V		|	|
13+50	0.4212	0.75	|Q	|V		|	|
13+55	0.4264	0.76	|Q	|V		|	|
14+ 0	0.4317	0.77	|Q	|V		|	|
14+ 5	0.4371	0.78	|Q	|V		|	|
14+10	0.4426	0.80	|Q	|V		|	|
14+15	0.4482	0.81	|Q	|V		|	|
14+20	0.4539	0.83	|Q	|V		|	|
14+25	0.4597	0.84	|Q	| V		|	|
14+30	0.4656	0.86	|Q	| V		|	|
14+35	0.4716	0.87	|Q	| V		|	|
14+40	0.4777	0.89	|Q	| V		|	|
14+45	0.4840	0.91	|Q	| V		|	|
14+50	0.4905	0.93	|Q	| V		|	|
14+55	0.4971	0.96	|Q	| V		|	|
15+ 0	0.5038	0.98	|Q	| V		|	|
15+ 5	0.5108	1.01	| Q	| V		|	|



19+55	1.3971	0.43	Q	|	|	|	V |
20+ 0	1.4001	0.42	Q	|	|	|	V |
20+ 5	1.4029	0.42	Q	|	|	|	V |
20+10	1.4058	0.41	Q	|	|	|	V |
20+15	1.4086	0.41	Q	|	|	|	V |
20+20	1.4113	0.40	Q	|	|	|	V |
20+25	1.4141	0.40	Q	|	|	|	V |
20+30	1.4168	0.39	Q	|	|	|	V |
20+35	1.4194	0.39	Q	|	|	|	V |
20+40	1.4221	0.38	Q	|	|	|	V |
20+45	1.4247	0.38	Q	|	|	|	V |
20+50	1.4272	0.37	Q	|	|	|	V |
20+55	1.4298	0.37	Q	|	|	|	V |
21+ 0	1.4323	0.37	Q	|	|	|	V |
21+ 5	1.4348	0.36	Q	|	|	|	V |
21+10	1.4372	0.36	Q	|	|	|	V |
21+15	1.4397	0.35	Q	|	|	|	V |
21+20	1.4421	0.35	Q	|	|	|	V |
21+25	1.4445	0.35	Q	|	|	|	V |
21+30	1.4468	0.34	Q	|	|	|	V |
21+35	1.4492	0.34	Q	|	|	|	V |
21+40	1.4515	0.34	Q	|	|	|	V |
21+45	1.4538	0.33	Q	|	|	|	V |
21+50	1.4561	0.33	Q	|	|	|	V |
21+55	1.4583	0.33	Q	|	|	|	V |
22+ 0	1.4606	0.32	Q	|	|	|	V |
22+ 5	1.4628	0.32	Q	|	|	|	V |
22+10	1.4650	0.32	Q	|	|	|	V |
22+15	1.4671	0.32	Q	|	|	|	V |
22+20	1.4693	0.31	Q	|	|	|	V |
22+25	1.4715	0.31	Q	|	|	|	V |
22+30	1.4736	0.31	Q	|	|	|	V |
22+35	1.4757	0.31	Q	|	|	|	V |
22+40	1.4778	0.30	Q	|	|	|	V |
22+45	1.4799	0.30	Q	|	|	|	V |
22+50	1.4819	0.30	Q	|	|	|	V |
22+55	1.4840	0.30	Q	|	|	|	V |
23+ 0	1.4860	0.29	Q	|	|	|	V|
23+ 5	1.4880	0.29	Q	|	|	|	V|
23+10	1.4900	0.29	Q	|	|	|	V|
23+15	1.4920	0.29	Q	|	|	|	V|
23+20	1.4940	0.29	Q	|	|	|	V|
23+25	1.4959	0.28	Q	|	|	|	V|
23+30	1.4979	0.28	Q	|	|	|	V|
23+35	1.4998	0.28	Q	|	|	|	V|
23+40	1.5017	0.28	Q	|	|	|	V|
23+45	1.5036	0.28	Q	|	|	|	V|
23+50	1.5055	0.27	Q	|	|	|	V|
23+55	1.5074	0.27	Q	|	|	|	V|
24+ 0	1.5092	0.27	Q	|	|	|	V|
24+ 5	1.5111	0.27	Q	|	|	|	V|
24+10	1.5129	0.26	Q	|	|	|	V|
24+15	1.5146	0.25	Q	|	|	|	V|
24+20	1.5162	0.23	Q	|	|	|	V|
24+25	1.5176	0.21	Q	|	|	|	V|
24+30	1.5189	0.18	Q	|	|	|	V|
24+35	1.5200	0.15	Q	|	|	|	V|

24+40	1.5208	0.12	Q	|	|	|	V|
24+45	1.5214	0.09	Q	|	|	|	V|
24+50	1.5218	0.06	Q	|	|	|	V|
24+55	1.5222	0.05	Q	|	|	|	V|
25+ 0	1.5224	0.03	Q	|	|	|	V|
25+ 5	1.5226	0.03	Q	|	|	|	V|
25+10	1.5227	0.02	Q	|	|	|	V|
25+15	1.5228	0.01	Q	|	|	|	V|
25+20	1.5228	0.01	Q	|	|	|	V|
25+25	1.5229	0.01	Q	|	|	|	V|
25+30	1.5229	0.00	Q	|	|	|	V|
25+35	1.5229	0.00	Q	|	|	|	V|
25+40	1.5229	0.00	Q	|	|	|	V|
25+45	1.5230	0.00	Q	|	|	|	V|
25+50	1.5230	0.00	Q	|	|	|	V|
25+55	1.5230	0.00	Q	|	|	|	V|
26+ 0	1.5230	0.00	Q	|	|	|	V

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION - SOUTHERLY CHAMBERS
25-YEAR STORM EVENT ANALYSIS WITH ADJUSTED 10 YEAR RAINFALL DATA

Storm Event Year = 25

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 25		
16.36	1	0.81
Rainfall data for year 25		
16.36	6	2.02
Rainfall data for year 25		
16.36	24	3.71

++

******** 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)
32.0	32.0	16.36	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
13.09	0.800	32.0	32.0	18.55	0.000
3.27	0.200	98.0	98.0	0.20	0.937

Area-averaged catchment yield fraction, Y = 0.187
Area-averaged low loss fraction, Yb = 0.813
User entry of time of concentration = 0.826 (hours)
++
Watershed area = 16.36(Ac.)
Catchment Lag time = 0.660 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 12.6186
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.813 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.301(In)
Computed peak 30-minute rainfall = 0.616(In)
Specified peak 1-hour rainfall = 0.813(In)
Computed peak 3-hour rainfall = 1.421(In)
Specified peak 6-hour rainfall = 2.020(In)
Specified peak 24-hour rainfall = 3.710(In)

Rainfall depth area reduction factors:
Using a total area of 16.36(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.301(In)
30-minute factor = 0.999 Adjusted rainfall = 0.616(In)
1-hour factor = 0.999 Adjusted rainfall = 0.812(In)
3-hour factor = 1.000 Adjusted rainfall = 1.420(In)
6-hour factor = 1.000 Adjusted rainfall = 2.020(In)
24-hour factor = 1.000 Adjusted rainfall = 3.710(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 = 197.85 (CFS))		
1	0.717	1.418
2	2.415	3.361
3	5.196	5.501
4	10.315	10.128
5	17.279	13.779
6	25.209	15.690
7	34.164	17.719

8	44.715	20.874
9	55.909	22.149
10	67.206	22.351
11	74.835	15.094
12	80.203	10.622
13	85.985	11.439
14	89.316	6.590
15	91.872	5.057
16	94.107	4.423
17	95.743	3.236
18	96.894	2.278
19	97.755	1.704
20	98.229	0.937
21	98.456	0.449
22	98.683	0.449
23	98.911	0.449
24	99.138	0.449
25	99.365	0.449
26	99.592	0.449
27	99.818	0.447
28	100.000	0.360

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3007	0.3007
2	0.3967	0.0961
3	0.4666	0.0699
4	0.5235	0.0569
5	0.5724	0.0489
6	0.6157	0.0433
7	0.6548	0.0392
8	0.6907	0.0359
9	0.7241	0.0333
10	0.7552	0.0312
11	0.7846	0.0293
12	0.8124	0.0278
13	0.8461	0.0338
14	0.8786	0.0325
15	0.9100	0.0314
16	0.9404	0.0304
17	0.9698	0.0294
18	0.9984	0.0286
19	1.0262	0.0278
20	1.0534	0.0271
21	1.0798	0.0265
22	1.1057	0.0259
23	1.1310	0.0253
24	1.1557	0.0247
25	1.1800	0.0242
26	1.2037	0.0238
27	1.2271	0.0233
28	1.2500	0.0229
29	1.2725	0.0225
30	1.2946	0.0221
31	1.3164	0.0218
32	1.3378	0.0214
33	1.3589	0.0211

34	1.3797	0.0208
35	1.4002	0.0205
36	1.4204	0.0202
37	1.4403	0.0199
38	1.4599	0.0196
39	1.4793	0.0194
40	1.4985	0.0191
41	1.5174	0.0189
42	1.5361	0.0187
43	1.5545	0.0185
44	1.5728	0.0183
45	1.5909	0.0181
46	1.6087	0.0179
47	1.6264	0.0177
48	1.6439	0.0175
49	1.6612	0.0173
50	1.6783	0.0171
51	1.6953	0.0170
52	1.7121	0.0168
53	1.7288	0.0166
54	1.7453	0.0165
55	1.7616	0.0163
56	1.7778	0.0162
57	1.7939	0.0161
58	1.8098	0.0159
59	1.8256	0.0158
60	1.8412	0.0157
61	1.8567	0.0155
62	1.8721	0.0154
63	1.8874	0.0153
64	1.9026	0.0152
65	1.9176	0.0150
66	1.9326	0.0149
67	1.9474	0.0148
68	1.9621	0.0147
69	1.9767	0.0146
70	1.9912	0.0145
71	2.0056	0.0144
72	2.0199	0.0143
73	2.0322	0.0123
74	2.0443	0.0122
75	2.0564	0.0121
76	2.0684	0.0120
77	2.0803	0.0119
78	2.0921	0.0118
79	2.1038	0.0117
80	2.1154	0.0116
81	2.1270	0.0116
82	2.1385	0.0115
83	2.1498	0.0114
84	2.1612	0.0113
85	2.1724	0.0112
86	2.1836	0.0112
87	2.1947	0.0111
88	2.2057	0.0110
89	2.2167	0.0110
90	2.2276	0.0109

91	2.2384	0.0108
92	2.2491	0.0108
93	2.2598	0.0107
94	2.2704	0.0106
95	2.2810	0.0106
96	2.2915	0.0105
97	2.3019	0.0104
98	2.3123	0.0104
99	2.3226	0.0103
100	2.3329	0.0103
101	2.3431	0.0102
102	2.3533	0.0101
103	2.3633	0.0101
104	2.3734	0.0100
105	2.3834	0.0100
106	2.3933	0.0099
107	2.4032	0.0099
108	2.4130	0.0098
109	2.4228	0.0098
110	2.4325	0.0097
111	2.4422	0.0097
112	2.4518	0.0096
113	2.4614	0.0096
114	2.4709	0.0095
115	2.4804	0.0095
116	2.4898	0.0094
117	2.4992	0.0094
118	2.5085	0.0093
119	2.5178	0.0093
120	2.5271	0.0093
121	2.5363	0.0092
122	2.5455	0.0092
123	2.5546	0.0091
124	2.5637	0.0091
125	2.5727	0.0090
126	2.5818	0.0090
127	2.5907	0.0090
128	2.5996	0.0089
129	2.6085	0.0089
130	2.6174	0.0088
131	2.6262	0.0088
132	2.6350	0.0088
133	2.6437	0.0087
134	2.6524	0.0087
135	2.6611	0.0087
136	2.6697	0.0086
137	2.6783	0.0086
138	2.6868	0.0086
139	2.6954	0.0085
140	2.7038	0.0085
141	2.7123	0.0085
142	2.7207	0.0084
143	2.7291	0.0084
144	2.7375	0.0084
145	2.7458	0.0083
146	2.7541	0.0083
147	2.7623	0.0083

148	2.7705	0.0082
149	2.7787	0.0082
150	2.7869	0.0082
151	2.7950	0.0081
152	2.8031	0.0081
153	2.8112	0.0081
154	2.8193	0.0080
155	2.8273	0.0080
156	2.8353	0.0080
157	2.8432	0.0080
158	2.8511	0.0079
159	2.8590	0.0079
160	2.8669	0.0079
161	2.8748	0.0078
162	2.8826	0.0078
163	2.8904	0.0078
164	2.8981	0.0078
165	2.9059	0.0077
166	2.9136	0.0077
167	2.9213	0.0077
168	2.9289	0.0077
169	2.9365	0.0076
170	2.9442	0.0076
171	2.9517	0.0076
172	2.9593	0.0076
173	2.9668	0.0075
174	2.9743	0.0075
175	2.9818	0.0075
176	2.9893	0.0075
177	2.9967	0.0074
178	3.0041	0.0074
179	3.0115	0.0074
180	3.0189	0.0074
181	3.0262	0.0073
182	3.0336	0.0073
183	3.0409	0.0073
184	3.0481	0.0073
185	3.0554	0.0073
186	3.0626	0.0072
187	3.0698	0.0072
188	3.0770	0.0072
189	3.0842	0.0072
190	3.0913	0.0071
191	3.0985	0.0071
192	3.1056	0.0071
193	3.1126	0.0071
194	3.1197	0.0071
195	3.1267	0.0070
196	3.1338	0.0070
197	3.1408	0.0070
198	3.1478	0.0070
199	3.1547	0.0070
200	3.1617	0.0069
201	3.1686	0.0069
202	3.1755	0.0069
203	3.1824	0.0069
204	3.1892	0.0069

205	3.1961	0.0068
206	3.2029	0.0068
207	3.2097	0.0068
208	3.2165	0.0068
209	3.2233	0.0068
210	3.2300	0.0068
211	3.2368	0.0067
212	3.2435	0.0067
213	3.2502	0.0067
214	3.2569	0.0067
215	3.2635	0.0067
216	3.2702	0.0066
217	3.2768	0.0066
218	3.2834	0.0066
219	3.2900	0.0066
220	3.2966	0.0066
221	3.3032	0.0066
222	3.3097	0.0065
223	3.3162	0.0065
224	3.3228	0.0065
225	3.3293	0.0065
226	3.3357	0.0065
227	3.3422	0.0065
228	3.3487	0.0064
229	3.3551	0.0064
230	3.3615	0.0064
231	3.3679	0.0064
232	3.3743	0.0064
233	3.3807	0.0064
234	3.3870	0.0064
235	3.3934	0.0063
236	3.3997	0.0063
237	3.4060	0.0063
238	3.4123	0.0063
239	3.4186	0.0063
240	3.4248	0.0063
241	3.4311	0.0063
242	3.4373	0.0062
243	3.4435	0.0062
244	3.4498	0.0062
245	3.4559	0.0062
246	3.4621	0.0062
247	3.4683	0.0062
248	3.4744	0.0062
249	3.4806	0.0061
250	3.4867	0.0061
251	3.4928	0.0061
252	3.4989	0.0061
253	3.5050	0.0061
254	3.5111	0.0061
255	3.5171	0.0061
256	3.5232	0.0060
257	3.5292	0.0060
258	3.5352	0.0060
259	3.5412	0.0060
260	3.5472	0.0060
261	3.5532	0.0060

262	3.5591	0.0060
263	3.5651	0.0060
264	3.5710	0.0059
265	3.5769	0.0059
266	3.5829	0.0059
267	3.5888	0.0059
268	3.5947	0.0059
269	3.6005	0.0059
270	3.6064	0.0059
271	3.6122	0.0059
272	3.6181	0.0058
273	3.6239	0.0058
274	3.6297	0.0058
275	3.6355	0.0058
276	3.6413	0.0058
277	3.6471	0.0058
278	3.6529	0.0058
279	3.6586	0.0058
280	3.6644	0.0057
281	3.6701	0.0057
282	3.6758	0.0057
283	3.6815	0.0057
284	3.6872	0.0057
285	3.6929	0.0057
286	3.6986	0.0057
287	3.7043	0.0057
288	3.7099	0.0057

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0057	0.0046	0.0011
2	0.0057	0.0046	0.0011
3	0.0057	0.0046	0.0011
4	0.0057	0.0046	0.0011
5	0.0057	0.0046	0.0011
6	0.0057	0.0047	0.0011
7	0.0058	0.0047	0.0011
8	0.0058	0.0047	0.0011
9	0.0058	0.0047	0.0011
10	0.0058	0.0047	0.0011
11	0.0058	0.0047	0.0011
12	0.0058	0.0047	0.0011
13	0.0059	0.0048	0.0011
14	0.0059	0.0048	0.0011
15	0.0059	0.0048	0.0011
16	0.0059	0.0048	0.0011
17	0.0059	0.0048	0.0011
18	0.0060	0.0048	0.0011
19	0.0060	0.0049	0.0011
20	0.0060	0.0049	0.0011
21	0.0060	0.0049	0.0011
22	0.0060	0.0049	0.0011
23	0.0061	0.0049	0.0011
24	0.0061	0.0049	0.0011
25	0.0061	0.0050	0.0011

26	0.0061	0.0050	0.0011
27	0.0061	0.0050	0.0011
28	0.0062	0.0050	0.0012
29	0.0062	0.0050	0.0012
30	0.0062	0.0050	0.0012
31	0.0062	0.0051	0.0012
32	0.0062	0.0051	0.0012
33	0.0063	0.0051	0.0012
34	0.0063	0.0051	0.0012
35	0.0063	0.0051	0.0012
36	0.0063	0.0051	0.0012
37	0.0064	0.0052	0.0012
38	0.0064	0.0052	0.0012
39	0.0064	0.0052	0.0012
40	0.0064	0.0052	0.0012
41	0.0064	0.0052	0.0012
42	0.0065	0.0053	0.0012
43	0.0065	0.0053	0.0012
44	0.0065	0.0053	0.0012
45	0.0065	0.0053	0.0012
46	0.0066	0.0053	0.0012
47	0.0066	0.0054	0.0012
48	0.0066	0.0054	0.0012
49	0.0066	0.0054	0.0012
50	0.0067	0.0054	0.0012
51	0.0067	0.0054	0.0013
52	0.0067	0.0055	0.0013
53	0.0068	0.0055	0.0013
54	0.0068	0.0055	0.0013
55	0.0068	0.0055	0.0013
56	0.0068	0.0055	0.0013
57	0.0069	0.0056	0.0013
58	0.0069	0.0056	0.0013
59	0.0069	0.0056	0.0013
60	0.0069	0.0056	0.0013
61	0.0070	0.0057	0.0013
62	0.0070	0.0057	0.0013
63	0.0070	0.0057	0.0013
64	0.0071	0.0057	0.0013
65	0.0071	0.0058	0.0013
66	0.0071	0.0058	0.0013
67	0.0072	0.0058	0.0013
68	0.0072	0.0058	0.0013
69	0.0072	0.0059	0.0014
70	0.0073	0.0059	0.0014
71	0.0073	0.0059	0.0014
72	0.0073	0.0059	0.0014
73	0.0074	0.0060	0.0014
74	0.0074	0.0060	0.0014
75	0.0074	0.0060	0.0014
76	0.0075	0.0061	0.0014
77	0.0075	0.0061	0.0014
78	0.0075	0.0061	0.0014
79	0.0076	0.0062	0.0014
80	0.0076	0.0062	0.0014
81	0.0077	0.0062	0.0014
82	0.0077	0.0062	0.0014

83	0.0077	0.0063	0.0014
84	0.0078	0.0063	0.0015
85	0.0078	0.0064	0.0015
86	0.0078	0.0064	0.0015
87	0.0079	0.0064	0.0015
88	0.0079	0.0064	0.0015
89	0.0080	0.0065	0.0015
90	0.0080	0.0065	0.0015
91	0.0081	0.0066	0.0015
92	0.0081	0.0066	0.0015
93	0.0082	0.0066	0.0015
94	0.0082	0.0067	0.0015
95	0.0083	0.0067	0.0015
96	0.0083	0.0067	0.0016
97	0.0084	0.0068	0.0016
98	0.0084	0.0068	0.0016
99	0.0085	0.0069	0.0016
100	0.0085	0.0069	0.0016
101	0.0086	0.0070	0.0016
102	0.0086	0.0070	0.0016
103	0.0087	0.0070	0.0016
104	0.0087	0.0071	0.0016
105	0.0088	0.0071	0.0016
106	0.0088	0.0072	0.0017
107	0.0089	0.0072	0.0017
108	0.0089	0.0073	0.0017
109	0.0090	0.0073	0.0017
110	0.0090	0.0074	0.0017
111	0.0091	0.0074	0.0017
112	0.0092	0.0075	0.0017
113	0.0093	0.0075	0.0017
114	0.0093	0.0076	0.0017
115	0.0094	0.0076	0.0018
116	0.0094	0.0077	0.0018
117	0.0095	0.0077	0.0018
118	0.0096	0.0078	0.0018
119	0.0097	0.0079	0.0018
120	0.0097	0.0079	0.0018
121	0.0098	0.0080	0.0018
122	0.0099	0.0080	0.0019
123	0.0100	0.0081	0.0019
124	0.0100	0.0082	0.0019
125	0.0101	0.0082	0.0019
126	0.0102	0.0083	0.0019
127	0.0103	0.0084	0.0019
128	0.0104	0.0084	0.0019
129	0.0105	0.0085	0.0020
130	0.0106	0.0086	0.0020
131	0.0107	0.0087	0.0020
132	0.0108	0.0087	0.0020
133	0.0109	0.0088	0.0020
134	0.0110	0.0089	0.0021
135	0.0111	0.0090	0.0021
136	0.0112	0.0091	0.0021
137	0.0113	0.0092	0.0021
138	0.0114	0.0093	0.0021
139	0.0116	0.0094	0.0022

140	0.0116	0.0095	0.0022
141	0.0118	0.0096	0.0022
142	0.0119	0.0097	0.0022
143	0.0121	0.0098	0.0023
144	0.0122	0.0099	0.0023
145	0.0143	0.0116	0.0027
146	0.0144	0.0117	0.0027
147	0.0146	0.0119	0.0027
148	0.0147	0.0120	0.0028
149	0.0149	0.0121	0.0028
150	0.0150	0.0122	0.0028
151	0.0153	0.0124	0.0029
152	0.0154	0.0125	0.0029
153	0.0157	0.0127	0.0029
154	0.0158	0.0128	0.0030
155	0.0161	0.0130	0.0030
156	0.0162	0.0132	0.0030
157	0.0165	0.0134	0.0031
158	0.0166	0.0135	0.0031
159	0.0170	0.0138	0.0032
160	0.0171	0.0139	0.0032
161	0.0175	0.0142	0.0033
162	0.0177	0.0144	0.0033
163	0.0181	0.0147	0.0034
164	0.0183	0.0148	0.0034
165	0.0187	0.0152	0.0035
166	0.0189	0.0154	0.0035
167	0.0194	0.0158	0.0036
168	0.0196	0.0160	0.0037
169	0.0202	0.0164	0.0038
170	0.0205	0.0167	0.0038
171	0.0211	0.0171	0.0040
172	0.0214	0.0174	0.0040
173	0.0221	0.0180	0.0041
174	0.0225	0.0183	0.0042
175	0.0233	0.0190	0.0044
176	0.0238	0.0193	0.0045
177	0.0247	0.0201	0.0046
178	0.0253	0.0205	0.0047
179	0.0265	0.0215	0.0050
180	0.0271	0.0220	0.0051
181	0.0286	0.0232	0.0054
182	0.0294	0.0239	0.0055
183	0.0314	0.0255	0.0059
184	0.0325	0.0264	0.0061
185	0.0278	0.0226	0.0052
186	0.0293	0.0238	0.0055
187	0.0333	0.0271	0.0062
188	0.0359	0.0292	0.0067
189	0.0433	0.0352	0.0081
190	0.0489	0.0397	0.0092
191	0.0699	0.0568	0.0131
192	0.0961	0.0652	0.0309
193	0.3007	0.0652	0.2355
194	0.0569	0.0462	0.0107
195	0.0392	0.0318	0.0073
196	0.0312	0.0253	0.0058

197	0.0338	0.0274	0.0063
198	0.0304	0.0247	0.0057
199	0.0278	0.0226	0.0052
200	0.0259	0.0210	0.0048
201	0.0242	0.0197	0.0045
202	0.0229	0.0186	0.0043
203	0.0218	0.0177	0.0041
204	0.0208	0.0169	0.0039
205	0.0199	0.0162	0.0037
206	0.0191	0.0156	0.0036
207	0.0185	0.0150	0.0035
208	0.0179	0.0145	0.0033
209	0.0173	0.0141	0.0032
210	0.0168	0.0137	0.0031
211	0.0163	0.0133	0.0031
212	0.0159	0.0129	0.0030
213	0.0155	0.0126	0.0029
214	0.0152	0.0123	0.0028
215	0.0148	0.0120	0.0028
216	0.0145	0.0118	0.0027
217	0.0123	0.0100	0.0023
218	0.0120	0.0097	0.0022
219	0.0117	0.0095	0.0022
220	0.0115	0.0093	0.0022
221	0.0112	0.0091	0.0021
222	0.0110	0.0090	0.0021
223	0.0108	0.0088	0.0020
224	0.0106	0.0086	0.0020
225	0.0104	0.0085	0.0020
226	0.0103	0.0083	0.0019
227	0.0101	0.0082	0.0019
228	0.0099	0.0081	0.0019
229	0.0098	0.0079	0.0018
230	0.0096	0.0078	0.0018
231	0.0095	0.0077	0.0018
232	0.0093	0.0076	0.0018
233	0.0092	0.0075	0.0017
234	0.0091	0.0074	0.0017
235	0.0090	0.0073	0.0017
236	0.0088	0.0072	0.0017
237	0.0087	0.0071	0.0016
238	0.0086	0.0070	0.0016
239	0.0085	0.0069	0.0016
240	0.0084	0.0068	0.0016
241	0.0083	0.0068	0.0016
242	0.0082	0.0067	0.0015
243	0.0081	0.0066	0.0015
244	0.0080	0.0065	0.0015
245	0.0080	0.0065	0.0015
246	0.0079	0.0064	0.0015
247	0.0078	0.0063	0.0015
248	0.0077	0.0063	0.0014
249	0.0076	0.0062	0.0014
250	0.0076	0.0061	0.0014
251	0.0075	0.0061	0.0014
252	0.0074	0.0060	0.0014
253	0.0073	0.0060	0.0014

254	0.0073	0.0059	0.0014
255	0.0072	0.0059	0.0014
256	0.0071	0.0058	0.0013
257	0.0071	0.0058	0.0013
258	0.0070	0.0057	0.0013
259	0.0070	0.0057	0.0013
260	0.0069	0.0056	0.0013
261	0.0068	0.0056	0.0013
262	0.0068	0.0055	0.0013
263	0.0067	0.0055	0.0013
264	0.0067	0.0054	0.0013
265	0.0066	0.0054	0.0012
266	0.0066	0.0053	0.0012
267	0.0065	0.0053	0.0012
268	0.0065	0.0053	0.0012
269	0.0064	0.0052	0.0012
270	0.0064	0.0052	0.0012
271	0.0063	0.0052	0.0012
272	0.0063	0.0051	0.0012
273	0.0063	0.0051	0.0012
274	0.0062	0.0050	0.0012
275	0.0062	0.0050	0.0012
276	0.0061	0.0050	0.0011
277	0.0061	0.0049	0.0011
278	0.0060	0.0049	0.0011
279	0.0060	0.0049	0.0011
280	0.0060	0.0048	0.0011
281	0.0059	0.0048	0.0011
282	0.0059	0.0048	0.0011
283	0.0059	0.0048	0.0011
284	0.0058	0.0047	0.0011
285	0.0058	0.0047	0.0011
286	0.0057	0.0047	0.0011
287	0.0057	0.0046	0.0011
288	0.0057	0.0046	0.0011

Total soil rain loss = 2.82(In)
Total effective rainfall = 0.89(In)
Peak flow rate in flood hydrograph = 7.10(CFS)

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

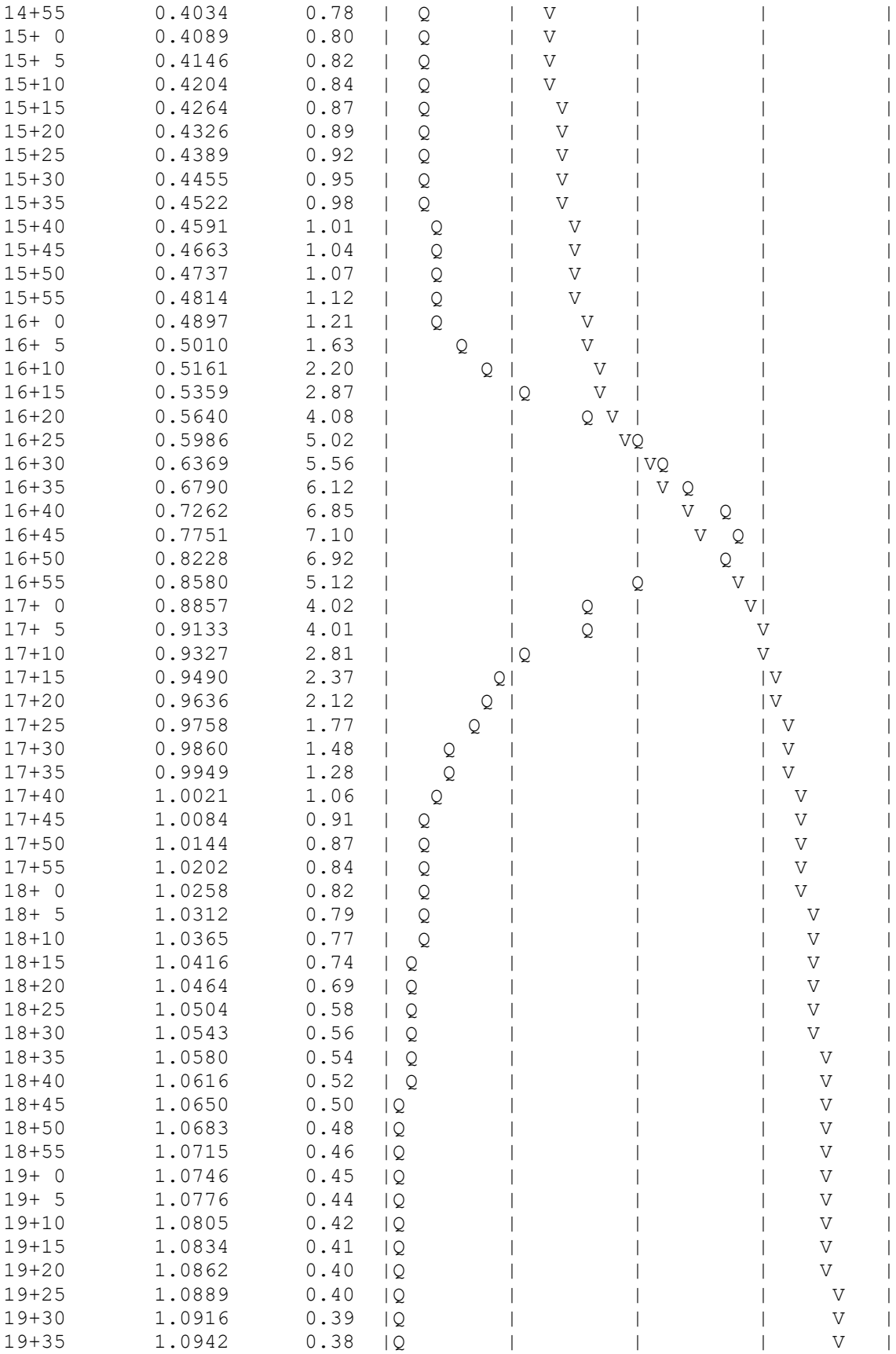
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0000	0.01	Q	|	|	|	|
0+15	0.0001	0.01	Q	|	|	|	|
0+20	0.0003	0.02	Q	|	|	|	|
0+25	0.0005	0.04	Q	|	|	|	|
0+30	0.0009	0.05	Q	|	|	|	|
0+35	0.0014	0.07	Q	|	|	|	|

0+40	0.0020	0.09	Q	|	|	|	|
0+45	0.0028	0.12	Q	|	|	|	|
0+50	0.0038	0.14	Q	|	|	|	|
0+55	0.0049	0.16	Q	|	|	|	|
1+ 0	0.0061	0.17	Q	|	|	|	|
1+ 5	0.0073	0.18	Q	|	|	|	|
1+10	0.0087	0.19	Q	|	|	|	|
1+15	0.0100	0.20	Q	|	|	|	|
1+20	0.0114	0.20	Q	|	|	|	|
1+25	0.0128	0.21	Q	|	|	|	|
1+30	0.0142	0.21	Q	|	|	|	|
1+35	0.0157	0.21	Q	|	|	|	|
1+40	0.0172	0.21	Q	|	|	|	|
1+45	0.0186	0.21	Q	|	|	|	|
1+50	0.0201	0.22	Q	|	|	|	|
1+55	0.0216	0.22	Q	|	|	|	|
2+ 0	0.0231	0.22	Q	|	|	|	|
2+ 5	0.0246	0.22	Q	|	|	|	|
2+10	0.0261	0.22	Q	|	|	|	|
2+15	0.0276	0.22	Q	|	|	|	|
2+20	0.0292	0.22	Q	|	|	|	|
2+25	0.0307	0.22	QV	|	|	|	|
2+30	0.0322	0.22	QV	|	|	|	|
2+35	0.0338	0.22	QV	|	|	|	|
2+40	0.0353	0.22	QV	|	|	|	|
2+45	0.0369	0.23	QV	|	|	|	|
2+50	0.0385	0.23	QV	|	|	|	|
2+55	0.0400	0.23	QV	|	|	|	|
3+ 0	0.0416	0.23	QV	|	|	|	|
3+ 5	0.0432	0.23	QV	|	|	|	|
3+10	0.0447	0.23	QV	|	|	|	|
3+15	0.0463	0.23	QV	|	|	|	|
3+20	0.0479	0.23	QV	|	|	|	|
3+25	0.0495	0.23	QV	|	|	|	|
3+30	0.0511	0.23	QV	|	|	|	|
3+35	0.0527	0.23	QV	|	|	|	|
3+40	0.0543	0.23	QV	|	|	|	|
3+45	0.0560	0.24	QV	|	|	|	|
3+50	0.0576	0.24	QV	|	|	|	|
3+55	0.0592	0.24	QV	|	|	|	|
4+ 0	0.0609	0.24	Q V	|	|	|	|
4+ 5	0.0625	0.24	Q V	|	|	|	|
4+10	0.0642	0.24	Q V	|	|	|	|
4+15	0.0658	0.24	Q V	|	|	|	|
4+20	0.0675	0.24	Q V	|	|	|	|
4+25	0.0691	0.24	Q V	|	|	|	|
4+30	0.0708	0.24	Q V	|	|	|	|
4+35	0.0725	0.24	Q V	|	|	|	|
4+40	0.0742	0.25	Q V	|	|	|	|
4+45	0.0759	0.25	Q V	|	|	|	|
4+50	0.0776	0.25	Q V	|	|	|	|
4+55	0.0793	0.25	Q V	|	|	|	|
5+ 0	0.0810	0.25	Q V	|	|	|	|
5+ 5	0.0827	0.25	Q V	|	|	|	|
5+10	0.0845	0.25	|QV	|	|	|	|
5+15	0.0862	0.25	|QV	|	|	|	|
5+20	0.0879	0.25	|QV	|	|	|	|

5+25	0.0897	0.25	|QV	|	|	|	|
5+30	0.0914	0.26	|Q V	|	|	|	|
5+35	0.0932	0.26	|Q V	|	|	|	|
5+40	0.0950	0.26	|Q V	|	|	|	|
5+45	0.0968	0.26	|Q V	|	|	|	|
5+50	0.0985	0.26	|Q V	|	|	|	|
5+55	0.1003	0.26	|Q V	|	|	|	|
6+ 0	0.1021	0.26	|Q V	|	|	|	|
6+ 5	0.1039	0.26	|Q V	|	|	|	|
6+10	0.1058	0.26	|Q V	|	|	|	|
6+15	0.1076	0.27	|Q V	|	|	|	|
6+20	0.1094	0.27	|Q V	|	|	|	|
6+25	0.1113	0.27	|Q V	|	|	|	|
6+30	0.1131	0.27	|Q V	|	|	|	|
6+35	0.1150	0.27	|Q V	|	|	|	|
6+40	0.1168	0.27	|Q V	|	|	|	|
6+45	0.1187	0.27	|Q V	|	|	|	|
6+50	0.1206	0.27	|Q V	|	|	|	|
6+55	0.1225	0.28	|Q V	|	|	|	|
7+ 0	0.1244	0.28	|Q V	|	|	|	|
7+ 5	0.1263	0.28	|Q V	|	|	|	|
7+10	0.1282	0.28	|Q V	|	|	|	|
7+15	0.1302	0.28	|Q V	|	|	|	|
7+20	0.1321	0.28	|Q V	|	|	|	|
7+25	0.1341	0.28	|Q V	|	|	|	|
7+30	0.1360	0.28	|Q V	|	|	|	|
7+35	0.1380	0.29	|Q V	|	|	|	|
7+40	0.1400	0.29	|Q V	|	|	|	|
7+45	0.1420	0.29	|Q V	|	|	|	|
7+50	0.1440	0.29	|Q V	|	|	|	|
7+55	0.1460	0.29	|Q V	|	|	|	|
8+ 0	0.1480	0.29	|Q V	|	|	|	|
8+ 5	0.1500	0.30	|Q V	|	|	|	|
8+10	0.1521	0.30	|Q V	|	|	|	|
8+15	0.1541	0.30	|Q V	|	|	|	|
8+20	0.1562	0.30	|Q V	|	|	|	|
8+25	0.1583	0.30	|Q V	|	|	|	|
8+30	0.1604	0.30	|Q V	|	|	|	|
8+35	0.1625	0.31	|Q V	|	|	|	|
8+40	0.1646	0.31	|Q V	|	|	|	|
8+45	0.1667	0.31	|Q V	|	|	|	|
8+50	0.1689	0.31	|Q V	|	|	|	|
8+55	0.1710	0.31	|Q V	|	|	|	|
9+ 0	0.1732	0.31	|Q V	|	|	|	|
9+ 5	0.1754	0.32	|Q V	|	|	|	|
9+10	0.1776	0.32	|Q V	|	|	|	|
9+15	0.1798	0.32	|Q V	|	|	|	|
9+20	0.1820	0.32	|Q V	|	|	|	|
9+25	0.1842	0.32	|Q V	|	|	|	|
9+30	0.1865	0.33	|Q V	|	|	|	|
9+35	0.1887	0.33	|Q V	|	|	|	|
9+40	0.1910	0.33	|Q V	|	|	|	|
9+45	0.1933	0.33	|Q V	|	|	|	|
9+50	0.1956	0.34	|Q V	|	|	|	|
9+55	0.1979	0.34	|Q V	|	|	|	|
10+ 0	0.2003	0.34	|Q V	|	|	|	|
10+ 5	0.2026	0.34	|Q V	|	|	|	|

10+10	0.2050	0.34	|Q V |	|	|	|
10+15	0.2074	0.35	|Q V |	|	|	|
10+20	0.2098	0.35	|Q V |	|	|	|
10+25	0.2122	0.35	|Q V |	|	|	|
10+30	0.2147	0.35	|Q V |	|	|	|
10+35	0.2172	0.36	|Q V |	|	|	|
10+40	0.2196	0.36	|Q V |	|	|	|
10+45	0.2221	0.36	|Q V |	|	|	|
10+50	0.2247	0.37	|Q V |	|	|	|
10+55	0.2272	0.37	|Q V |	|	|	|
11+ 0	0.2298	0.37	|Q V |	|	|	|
11+ 5	0.2323	0.38	|Q V |	|	|	|
11+10	0.2349	0.38	|Q V |	|	|	|
11+15	0.2376	0.38	|Q V |	|	|	|
11+20	0.2402	0.38	|Q V |	|	|	|
11+25	0.2429	0.39	|Q V |	|	|	|
11+30	0.2456	0.39	|Q V |	|	|	|
11+35	0.2483	0.40	|Q V |	|	|	|
11+40	0.2511	0.40	|Q V |	|	|	|
11+45	0.2538	0.40	|Q V |	|	|	|
11+50	0.2566	0.41	|Q V |	|	|	|
11+55	0.2595	0.41	|Q V |	|	|	|
12+ 0	0.2623	0.41	|Q V |	|	|	|
12+ 5	0.2652	0.42	|Q V |	|	|	|
12+10	0.2681	0.42	|Q V |	|	|	|
12+15	0.2711	0.43	|Q V |	|	|	|
12+20	0.2741	0.44	|Q V|	|	|	|
12+25	0.2772	0.45	|Q V|	|	|	|
12+30	0.2804	0.46	|Q V|	|	|	|
12+35	0.2836	0.47	|Q V|	|	|	|
12+40	0.2869	0.48	|Q V|	|	|	|
12+45	0.2904	0.50	|Q V|	|	|	|
12+50	0.2939	0.51	| Q V|	|	|	|
12+55	0.2975	0.52	| Q V|	|	|	|
13+ 0	0.3011	0.53	| Q V|	|	|	|
13+ 5	0.3049	0.54	| Q V |	|	|	|
13+10	0.3087	0.55	| Q V |	|	|	|
13+15	0.3125	0.56	| Q V |	|	|	|
13+20	0.3164	0.57	| Q V |	|	|	|
13+25	0.3204	0.58	| Q V |	|	|	|
13+30	0.3244	0.58	| Q V |	|	|	|
13+35	0.3285	0.59	| Q V |	|	|	|
13+40	0.3326	0.60	| Q |V |	|	|	|
13+45	0.3368	0.61	| Q |V |	|	|	|
13+50	0.3411	0.62	| Q |V |	|	|	|
13+55	0.3454	0.63	| Q |V |	|	|	|
14+ 0	0.3498	0.64	| Q |V |	|	|	|
14+ 5	0.3542	0.65	| Q |V |	|	|	|
14+10	0.3587	0.66	| Q |V |	|	|	|
14+15	0.3633	0.67	| Q | V |	|	|	|
14+20	0.3680	0.68	| Q | V |	|	|	|
14+25	0.3728	0.69	| Q | V |	|	|	|
14+30	0.3776	0.70	| Q | V |	|	|	|
14+35	0.3826	0.72	| Q | V |	|	|	|
14+40	0.3876	0.73	| Q | V |	|	|	|
14+45	0.3928	0.75	| Q | V |	|	|	|
14+50	0.3980	0.76	| Q | V |	|	|	|



19+40	1.0968	0.37	|Q	|	|	|	V |
19+45	1.0993	0.37	|Q	|	|	|	V |
19+50	1.1018	0.36	|Q	|	|	|	V |
19+55	1.1043	0.36	|Q	|	|	|	V |
20+ 0	1.1067	0.35	|Q	|	|	|	V |
20+ 5	1.1091	0.35	|Q	|	|	|	V |
20+10	1.1114	0.34	|Q	|	|	|	V |
20+15	1.1137	0.34	|Q	|	|	|	V |
20+20	1.1160	0.33	|Q	|	|	|	V |
20+25	1.1183	0.33	|Q	|	|	|	V |
20+30	1.1205	0.32	|Q	|	|	|	V |
20+35	1.1227	0.32	|Q	|	|	|	V |
20+40	1.1248	0.31	|Q	|	|	|	V |
20+45	1.1270	0.31	|Q	|	|	|	V |
20+50	1.1291	0.31	|Q	|	|	|	V |
20+55	1.1312	0.30	|Q	|	|	|	V |
21+ 0	1.1333	0.30	|Q	|	|	|	V |
21+ 5	1.1353	0.30	|Q	|	|	|	V |
21+10	1.1373	0.29	|Q	|	|	|	V |
21+15	1.1393	0.29	|Q	|	|	|	V |
21+20	1.1413	0.29	|Q	|	|	|	V |
21+25	1.1433	0.28	|Q	|	|	|	V |
21+30	1.1452	0.28	|Q	|	|	|	V |
21+35	1.1471	0.28	|Q	|	|	|	V |
21+40	1.1490	0.28	|Q	|	|	|	V |
21+45	1.1509	0.27	|Q	|	|	|	V |
21+50	1.1528	0.27	|Q	|	|	|	V |
21+55	1.1547	0.27	|Q	|	|	|	V |
22+ 0	1.1565	0.27	|Q	|	|	|	V |
22+ 5	1.1583	0.26	|Q	|	|	|	V |
22+10	1.1601	0.26	|Q	|	|	|	V |
22+15	1.1619	0.26	|Q	|	|	|	V |
22+20	1.1637	0.26	|Q	|	|	|	V |
22+25	1.1654	0.26	|Q	|	|	|	V |
22+30	1.1672	0.25	|Q	|	|	|	V |
22+35	1.1689	0.25	|Q	|	|	|	V |
22+40	1.1706	0.25	Q	|	|	|	V |
22+45	1.1723	0.25	Q	|	|	|	V |
22+50	1.1740	0.25	Q	|	|	|	V |
22+55	1.1757	0.24	Q	|	|	|	V |
23+ 0	1.1773	0.24	Q	|	|	|	V |
23+ 5	1.1790	0.24	Q	|	|	|	V|
23+10	1.1806	0.24	Q	|	|	|	V|
23+15	1.1822	0.24	Q	|	|	|	V|
23+20	1.1839	0.23	Q	|	|	|	V|
23+25	1.1855	0.23	Q	|	|	|	V|
23+30	1.1871	0.23	Q	|	|	|	V|
23+35	1.1886	0.23	Q	|	|	|	V|
23+40	1.1902	0.23	Q	|	|	|	V|
23+45	1.1918	0.23	Q	|	|	|	V|
23+50	1.1933	0.22	Q	|	|	|	V|
23+55	1.1948	0.22	Q	|	|	|	V|
24+ 0	1.1964	0.22	Q	|	|	|	V|
24+ 5	1.1979	0.22	Q	|	|	|	V|
24+10	1.1994	0.21	Q	|	|	|	V|
24+15	1.2008	0.21	Q	|	|	|	V|
24+20	1.2021	0.19	Q	|	|	|	V|

24+25	1.2034	0.18	Q	|	|	|	V|
24+30	1.2045	0.16	Q	|	|	|	V|
24+35	1.2054	0.14	Q	|	|	|	V|
24+40	1.2063	0.12	Q	|	|	|	V|
24+45	1.2069	0.09	Q	|	|	|	V|
24+50	1.2074	0.07	Q	|	|	|	V|
24+55	1.2078	0.05	Q	|	|	|	V|
25+ 0	1.2081	0.04	Q	|	|	|	V|
25+ 5	1.2083	0.03	Q	|	|	|	V|
25+10	1.2084	0.02	Q	|	|	|	V|
25+15	1.2085	0.02	Q	|	|	|	V|
25+20	1.2086	0.01	Q	|	|	|	V|
25+25	1.2087	0.01	Q	|	|	|	V|
25+30	1.2087	0.01	Q	|	|	|	V|
25+35	1.2088	0.00	Q	|	|	|	V|
25+40	1.2088	0.00	Q	|	|	|	V|
25+45	1.2088	0.00	Q	|	|	|	V|
25+50	1.2088	0.00	Q	|	|	|	V|
25+55	1.2089	0.00	Q	|	|	|	V|
26+ 0	1.2089	0.00	Q	|	|	|	V|
26+ 5	1.2089	0.00	Q	|	|	|	V|
26+10	1.2089	0.00	Q	|	|	|	V|
26+15	1.2089	0.00	Q	|	|	|	V

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

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Study date 04/23/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION - SOUTHERLY CHAMBERS
10-YEAR STORM EVENT ANALYSIS

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		
16.36	1	0.81
Rainfall data for year 10		
16.36	6	2.02
Rainfall data for year 10		
16.36	24	3.71

++

******** 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)
32.0	32.0	16.36	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
13.09	0.800	32.0	32.0	18.55	0.000
3.27	0.200	98.0	98.0	0.20	0.937

Area-averaged catchment yield fraction, Y = 0.187
Area-averaged low loss fraction, Yb = 0.813
User entry of time of concentration = 0.826 (hours)
++
Watershed area = 16.36(Ac.)
Catchment Lag time = 0.660 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 12.6186
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.813 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.301(In)
Computed peak 30-minute rainfall = 0.616(In)
Specified peak 1-hour rainfall = 0.813(In)
Computed peak 3-hour rainfall = 1.421(In)
Specified peak 6-hour rainfall = 2.020(In)
Specified peak 24-hour rainfall = 3.710(In)

Rainfall depth area reduction factors:
Using a total area of 16.36(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.301(In)
30-minute factor = 0.999 Adjusted rainfall = 0.616(In)
1-hour factor = 0.999 Adjusted rainfall = 0.812(In)
3-hour factor = 1.000 Adjusted rainfall = 1.420(In)
6-hour factor = 1.000 Adjusted rainfall = 2.020(In)
24-hour factor = 1.000 Adjusted rainfall = 3.710(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 = 197.85 (CFS))		
1	0.717	1.418
2	2.415	3.361
3	5.196	5.501
4	10.315	10.128
5	17.279	13.779
6	25.209	15.690
7	34.164	17.719

8	44.715	20.874
9	55.909	22.149
10	67.206	22.351
11	74.835	15.094
12	80.203	10.622
13	85.985	11.439
14	89.316	6.590
15	91.872	5.057
16	94.107	4.423
17	95.743	3.236
18	96.894	2.278
19	97.755	1.704
20	98.229	0.937
21	98.456	0.449
22	98.683	0.449
23	98.911	0.449
24	99.138	0.449
25	99.365	0.449
26	99.592	0.449
27	99.818	0.447
28	100.000	0.360

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3007	0.3007
2	0.3967	0.0961
3	0.4666	0.0699
4	0.5235	0.0569
5	0.5724	0.0489
6	0.6157	0.0433
7	0.6548	0.0392
8	0.6907	0.0359
9	0.7241	0.0333
10	0.7552	0.0312
11	0.7846	0.0293
12	0.8124	0.0278
13	0.8461	0.0338
14	0.8786	0.0325
15	0.9100	0.0314
16	0.9404	0.0304
17	0.9698	0.0294
18	0.9984	0.0286
19	1.0262	0.0278
20	1.0534	0.0271
21	1.0798	0.0265
22	1.1057	0.0259
23	1.1310	0.0253
24	1.1557	0.0247
25	1.1800	0.0242
26	1.2037	0.0238
27	1.2271	0.0233
28	1.2500	0.0229
29	1.2725	0.0225
30	1.2946	0.0221
31	1.3164	0.0218
32	1.3378	0.0214
33	1.3589	0.0211

34	1.3797	0.0208
35	1.4002	0.0205
36	1.4204	0.0202
37	1.4403	0.0199
38	1.4599	0.0196
39	1.4793	0.0194
40	1.4985	0.0191
41	1.5174	0.0189
42	1.5361	0.0187
43	1.5545	0.0185
44	1.5728	0.0183
45	1.5909	0.0181
46	1.6087	0.0179
47	1.6264	0.0177
48	1.6439	0.0175
49	1.6612	0.0173
50	1.6783	0.0171
51	1.6953	0.0170
52	1.7121	0.0168
53	1.7288	0.0166
54	1.7453	0.0165
55	1.7616	0.0163
56	1.7778	0.0162
57	1.7939	0.0161
58	1.8098	0.0159
59	1.8256	0.0158
60	1.8412	0.0157
61	1.8567	0.0155
62	1.8721	0.0154
63	1.8874	0.0153
64	1.9026	0.0152
65	1.9176	0.0150
66	1.9326	0.0149
67	1.9474	0.0148
68	1.9621	0.0147
69	1.9767	0.0146
70	1.9912	0.0145
71	2.0056	0.0144
72	2.0199	0.0143
73	2.0322	0.0123
74	2.0443	0.0122
75	2.0564	0.0121
76	2.0684	0.0120
77	2.0803	0.0119
78	2.0921	0.0118
79	2.1038	0.0117
80	2.1154	0.0116
81	2.1270	0.0116
82	2.1385	0.0115
83	2.1498	0.0114
84	2.1612	0.0113
85	2.1724	0.0112
86	2.1836	0.0112
87	2.1947	0.0111
88	2.2057	0.0110
89	2.2167	0.0110
90	2.2276	0.0109

91	2.2384	0.0108
92	2.2491	0.0108
93	2.2598	0.0107
94	2.2704	0.0106
95	2.2810	0.0106
96	2.2915	0.0105
97	2.3019	0.0104
98	2.3123	0.0104
99	2.3226	0.0103
100	2.3329	0.0103
101	2.3431	0.0102
102	2.3533	0.0101
103	2.3633	0.0101
104	2.3734	0.0100
105	2.3834	0.0100
106	2.3933	0.0099
107	2.4032	0.0099
108	2.4130	0.0098
109	2.4228	0.0098
110	2.4325	0.0097
111	2.4422	0.0097
112	2.4518	0.0096
113	2.4614	0.0096
114	2.4709	0.0095
115	2.4804	0.0095
116	2.4898	0.0094
117	2.4992	0.0094
118	2.5085	0.0093
119	2.5178	0.0093
120	2.5271	0.0093
121	2.5363	0.0092
122	2.5455	0.0092
123	2.5546	0.0091
124	2.5637	0.0091
125	2.5727	0.0090
126	2.5818	0.0090
127	2.5907	0.0090
128	2.5996	0.0089
129	2.6085	0.0089
130	2.6174	0.0088
131	2.6262	0.0088
132	2.6350	0.0088
133	2.6437	0.0087
134	2.6524	0.0087
135	2.6611	0.0087
136	2.6697	0.0086
137	2.6783	0.0086
138	2.6868	0.0086
139	2.6954	0.0085
140	2.7038	0.0085
141	2.7123	0.0085
142	2.7207	0.0084
143	2.7291	0.0084
144	2.7375	0.0084
145	2.7458	0.0083
146	2.7541	0.0083
147	2.7623	0.0083

148	2.7705	0.0082
149	2.7787	0.0082
150	2.7869	0.0082
151	2.7950	0.0081
152	2.8031	0.0081
153	2.8112	0.0081
154	2.8193	0.0080
155	2.8273	0.0080
156	2.8353	0.0080
157	2.8432	0.0080
158	2.8511	0.0079
159	2.8590	0.0079
160	2.8669	0.0079
161	2.8748	0.0078
162	2.8826	0.0078
163	2.8904	0.0078
164	2.8981	0.0078
165	2.9059	0.0077
166	2.9136	0.0077
167	2.9213	0.0077
168	2.9289	0.0077
169	2.9365	0.0076
170	2.9442	0.0076
171	2.9517	0.0076
172	2.9593	0.0076
173	2.9668	0.0075
174	2.9743	0.0075
175	2.9818	0.0075
176	2.9893	0.0075
177	2.9967	0.0074
178	3.0041	0.0074
179	3.0115	0.0074
180	3.0189	0.0074
181	3.0262	0.0073
182	3.0336	0.0073
183	3.0409	0.0073
184	3.0481	0.0073
185	3.0554	0.0073
186	3.0626	0.0072
187	3.0698	0.0072
188	3.0770	0.0072
189	3.0842	0.0072
190	3.0913	0.0071
191	3.0985	0.0071
192	3.1056	0.0071
193	3.1126	0.0071
194	3.1197	0.0071
195	3.1267	0.0070
196	3.1338	0.0070
197	3.1408	0.0070
198	3.1478	0.0070
199	3.1547	0.0070
200	3.1617	0.0069
201	3.1686	0.0069
202	3.1755	0.0069
203	3.1824	0.0069
204	3.1892	0.0069

205	3.1961	0.0068
206	3.2029	0.0068
207	3.2097	0.0068
208	3.2165	0.0068
209	3.2233	0.0068
210	3.2300	0.0068
211	3.2368	0.0067
212	3.2435	0.0067
213	3.2502	0.0067
214	3.2569	0.0067
215	3.2635	0.0067
216	3.2702	0.0066
217	3.2768	0.0066
218	3.2834	0.0066
219	3.2900	0.0066
220	3.2966	0.0066
221	3.3032	0.0066
222	3.3097	0.0065
223	3.3162	0.0065
224	3.3228	0.0065
225	3.3293	0.0065
226	3.3357	0.0065
227	3.3422	0.0065
228	3.3487	0.0064
229	3.3551	0.0064
230	3.3615	0.0064
231	3.3679	0.0064
232	3.3743	0.0064
233	3.3807	0.0064
234	3.3870	0.0064
235	3.3934	0.0063
236	3.3997	0.0063
237	3.4060	0.0063
238	3.4123	0.0063
239	3.4186	0.0063
240	3.4248	0.0063
241	3.4311	0.0063
242	3.4373	0.0062
243	3.4435	0.0062
244	3.4498	0.0062
245	3.4559	0.0062
246	3.4621	0.0062
247	3.4683	0.0062
248	3.4744	0.0062
249	3.4806	0.0061
250	3.4867	0.0061
251	3.4928	0.0061
252	3.4989	0.0061
253	3.5050	0.0061
254	3.5111	0.0061
255	3.5171	0.0061
256	3.5232	0.0060
257	3.5292	0.0060
258	3.5352	0.0060
259	3.5412	0.0060
260	3.5472	0.0060
261	3.5532	0.0060

262	3.5591	0.0060
263	3.5651	0.0060
264	3.5710	0.0059
265	3.5769	0.0059
266	3.5829	0.0059
267	3.5888	0.0059
268	3.5947	0.0059
269	3.6005	0.0059
270	3.6064	0.0059
271	3.6122	0.0059
272	3.6181	0.0058
273	3.6239	0.0058
274	3.6297	0.0058
275	3.6355	0.0058
276	3.6413	0.0058
277	3.6471	0.0058
278	3.6529	0.0058
279	3.6586	0.0058
280	3.6644	0.0057
281	3.6701	0.0057
282	3.6758	0.0057
283	3.6815	0.0057
284	3.6872	0.0057
285	3.6929	0.0057
286	3.6986	0.0057
287	3.7043	0.0057
288	3.7099	0.0057

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0057	0.0046	0.0011
2	0.0057	0.0046	0.0011
3	0.0057	0.0046	0.0011
4	0.0057	0.0046	0.0011
5	0.0057	0.0046	0.0011
6	0.0057	0.0047	0.0011
7	0.0058	0.0047	0.0011
8	0.0058	0.0047	0.0011
9	0.0058	0.0047	0.0011
10	0.0058	0.0047	0.0011
11	0.0058	0.0047	0.0011
12	0.0058	0.0047	0.0011
13	0.0059	0.0048	0.0011
14	0.0059	0.0048	0.0011
15	0.0059	0.0048	0.0011
16	0.0059	0.0048	0.0011
17	0.0059	0.0048	0.0011
18	0.0060	0.0048	0.0011
19	0.0060	0.0049	0.0011
20	0.0060	0.0049	0.0011
21	0.0060	0.0049	0.0011
22	0.0060	0.0049	0.0011
23	0.0061	0.0049	0.0011
24	0.0061	0.0049	0.0011
25	0.0061	0.0050	0.0011

26	0.0061	0.0050	0.0011
27	0.0061	0.0050	0.0011
28	0.0062	0.0050	0.0012
29	0.0062	0.0050	0.0012
30	0.0062	0.0050	0.0012
31	0.0062	0.0051	0.0012
32	0.0062	0.0051	0.0012
33	0.0063	0.0051	0.0012
34	0.0063	0.0051	0.0012
35	0.0063	0.0051	0.0012
36	0.0063	0.0051	0.0012
37	0.0064	0.0052	0.0012
38	0.0064	0.0052	0.0012
39	0.0064	0.0052	0.0012
40	0.0064	0.0052	0.0012
41	0.0064	0.0052	0.0012
42	0.0065	0.0053	0.0012
43	0.0065	0.0053	0.0012
44	0.0065	0.0053	0.0012
45	0.0065	0.0053	0.0012
46	0.0066	0.0053	0.0012
47	0.0066	0.0054	0.0012
48	0.0066	0.0054	0.0012
49	0.0066	0.0054	0.0012
50	0.0067	0.0054	0.0012
51	0.0067	0.0054	0.0013
52	0.0067	0.0055	0.0013
53	0.0068	0.0055	0.0013
54	0.0068	0.0055	0.0013
55	0.0068	0.0055	0.0013
56	0.0068	0.0055	0.0013
57	0.0069	0.0056	0.0013
58	0.0069	0.0056	0.0013
59	0.0069	0.0056	0.0013
60	0.0069	0.0056	0.0013
61	0.0070	0.0057	0.0013
62	0.0070	0.0057	0.0013
63	0.0070	0.0057	0.0013
64	0.0071	0.0057	0.0013
65	0.0071	0.0058	0.0013
66	0.0071	0.0058	0.0013
67	0.0072	0.0058	0.0013
68	0.0072	0.0058	0.0013
69	0.0072	0.0059	0.0014
70	0.0073	0.0059	0.0014
71	0.0073	0.0059	0.0014
72	0.0073	0.0059	0.0014
73	0.0074	0.0060	0.0014
74	0.0074	0.0060	0.0014
75	0.0074	0.0060	0.0014
76	0.0075	0.0061	0.0014
77	0.0075	0.0061	0.0014
78	0.0075	0.0061	0.0014
79	0.0076	0.0062	0.0014
80	0.0076	0.0062	0.0014
81	0.0077	0.0062	0.0014
82	0.0077	0.0062	0.0014

83	0.0077	0.0063	0.0014
84	0.0078	0.0063	0.0015
85	0.0078	0.0064	0.0015
86	0.0078	0.0064	0.0015
87	0.0079	0.0064	0.0015
88	0.0079	0.0064	0.0015
89	0.0080	0.0065	0.0015
90	0.0080	0.0065	0.0015
91	0.0081	0.0066	0.0015
92	0.0081	0.0066	0.0015
93	0.0082	0.0066	0.0015
94	0.0082	0.0067	0.0015
95	0.0083	0.0067	0.0015
96	0.0083	0.0067	0.0016
97	0.0084	0.0068	0.0016
98	0.0084	0.0068	0.0016
99	0.0085	0.0069	0.0016
100	0.0085	0.0069	0.0016
101	0.0086	0.0070	0.0016
102	0.0086	0.0070	0.0016
103	0.0087	0.0070	0.0016
104	0.0087	0.0071	0.0016
105	0.0088	0.0071	0.0016
106	0.0088	0.0072	0.0017
107	0.0089	0.0072	0.0017
108	0.0089	0.0073	0.0017
109	0.0090	0.0073	0.0017
110	0.0090	0.0074	0.0017
111	0.0091	0.0074	0.0017
112	0.0092	0.0075	0.0017
113	0.0093	0.0075	0.0017
114	0.0093	0.0076	0.0017
115	0.0094	0.0076	0.0018
116	0.0094	0.0077	0.0018
117	0.0095	0.0077	0.0018
118	0.0096	0.0078	0.0018
119	0.0097	0.0079	0.0018
120	0.0097	0.0079	0.0018
121	0.0098	0.0080	0.0018
122	0.0099	0.0080	0.0019
123	0.0100	0.0081	0.0019
124	0.0100	0.0082	0.0019
125	0.0101	0.0082	0.0019
126	0.0102	0.0083	0.0019
127	0.0103	0.0084	0.0019
128	0.0104	0.0084	0.0019
129	0.0105	0.0085	0.0020
130	0.0106	0.0086	0.0020
131	0.0107	0.0087	0.0020
132	0.0108	0.0087	0.0020
133	0.0109	0.0088	0.0020
134	0.0110	0.0089	0.0021
135	0.0111	0.0090	0.0021
136	0.0112	0.0091	0.0021
137	0.0113	0.0092	0.0021
138	0.0114	0.0093	0.0021
139	0.0116	0.0094	0.0022

140	0.0116	0.0095	0.0022
141	0.0118	0.0096	0.0022
142	0.0119	0.0097	0.0022
143	0.0121	0.0098	0.0023
144	0.0122	0.0099	0.0023
145	0.0143	0.0116	0.0027
146	0.0144	0.0117	0.0027
147	0.0146	0.0119	0.0027
148	0.0147	0.0120	0.0028
149	0.0149	0.0121	0.0028
150	0.0150	0.0122	0.0028
151	0.0153	0.0124	0.0029
152	0.0154	0.0125	0.0029
153	0.0157	0.0127	0.0029
154	0.0158	0.0128	0.0030
155	0.0161	0.0130	0.0030
156	0.0162	0.0132	0.0030
157	0.0165	0.0134	0.0031
158	0.0166	0.0135	0.0031
159	0.0170	0.0138	0.0032
160	0.0171	0.0139	0.0032
161	0.0175	0.0142	0.0033
162	0.0177	0.0144	0.0033
163	0.0181	0.0147	0.0034
164	0.0183	0.0148	0.0034
165	0.0187	0.0152	0.0035
166	0.0189	0.0154	0.0035
167	0.0194	0.0158	0.0036
168	0.0196	0.0160	0.0037
169	0.0202	0.0164	0.0038
170	0.0205	0.0167	0.0038
171	0.0211	0.0171	0.0040
172	0.0214	0.0174	0.0040
173	0.0221	0.0180	0.0041
174	0.0225	0.0183	0.0042
175	0.0233	0.0190	0.0044
176	0.0238	0.0193	0.0045
177	0.0247	0.0201	0.0046
178	0.0253	0.0205	0.0047
179	0.0265	0.0215	0.0050
180	0.0271	0.0220	0.0051
181	0.0286	0.0232	0.0054
182	0.0294	0.0239	0.0055
183	0.0314	0.0255	0.0059
184	0.0325	0.0264	0.0061
185	0.0278	0.0226	0.0052
186	0.0293	0.0238	0.0055
187	0.0333	0.0271	0.0062
188	0.0359	0.0292	0.0067
189	0.0433	0.0352	0.0081
190	0.0489	0.0397	0.0092
191	0.0699	0.0568	0.0131
192	0.0961	0.0652	0.0309
193	0.3007	0.0652	0.2355
194	0.0569	0.0462	0.0107
195	0.0392	0.0318	0.0073
196	0.0312	0.0253	0.0058

197	0.0338	0.0274	0.0063
198	0.0304	0.0247	0.0057
199	0.0278	0.0226	0.0052
200	0.0259	0.0210	0.0048
201	0.0242	0.0197	0.0045
202	0.0229	0.0186	0.0043
203	0.0218	0.0177	0.0041
204	0.0208	0.0169	0.0039
205	0.0199	0.0162	0.0037
206	0.0191	0.0156	0.0036
207	0.0185	0.0150	0.0035
208	0.0179	0.0145	0.0033
209	0.0173	0.0141	0.0032
210	0.0168	0.0137	0.0031
211	0.0163	0.0133	0.0031
212	0.0159	0.0129	0.0030
213	0.0155	0.0126	0.0029
214	0.0152	0.0123	0.0028
215	0.0148	0.0120	0.0028
216	0.0145	0.0118	0.0027
217	0.0123	0.0100	0.0023
218	0.0120	0.0097	0.0022
219	0.0117	0.0095	0.0022
220	0.0115	0.0093	0.0022
221	0.0112	0.0091	0.0021
222	0.0110	0.0090	0.0021
223	0.0108	0.0088	0.0020
224	0.0106	0.0086	0.0020
225	0.0104	0.0085	0.0020
226	0.0103	0.0083	0.0019
227	0.0101	0.0082	0.0019
228	0.0099	0.0081	0.0019
229	0.0098	0.0079	0.0018
230	0.0096	0.0078	0.0018
231	0.0095	0.0077	0.0018
232	0.0093	0.0076	0.0018
233	0.0092	0.0075	0.0017
234	0.0091	0.0074	0.0017
235	0.0090	0.0073	0.0017
236	0.0088	0.0072	0.0017
237	0.0087	0.0071	0.0016
238	0.0086	0.0070	0.0016
239	0.0085	0.0069	0.0016
240	0.0084	0.0068	0.0016
241	0.0083	0.0068	0.0016
242	0.0082	0.0067	0.0015
243	0.0081	0.0066	0.0015
244	0.0080	0.0065	0.0015
245	0.0080	0.0065	0.0015
246	0.0079	0.0064	0.0015
247	0.0078	0.0063	0.0015
248	0.0077	0.0063	0.0014
249	0.0076	0.0062	0.0014
250	0.0076	0.0061	0.0014
251	0.0075	0.0061	0.0014
252	0.0074	0.0060	0.0014
253	0.0073	0.0060	0.0014

254	0.0073	0.0059	0.0014
255	0.0072	0.0059	0.0014
256	0.0071	0.0058	0.0013
257	0.0071	0.0058	0.0013
258	0.0070	0.0057	0.0013
259	0.0070	0.0057	0.0013
260	0.0069	0.0056	0.0013
261	0.0068	0.0056	0.0013
262	0.0068	0.0055	0.0013
263	0.0067	0.0055	0.0013
264	0.0067	0.0054	0.0013
265	0.0066	0.0054	0.0012
266	0.0066	0.0053	0.0012
267	0.0065	0.0053	0.0012
268	0.0065	0.0053	0.0012
269	0.0064	0.0052	0.0012
270	0.0064	0.0052	0.0012
271	0.0063	0.0052	0.0012
272	0.0063	0.0051	0.0012
273	0.0063	0.0051	0.0012
274	0.0062	0.0050	0.0012
275	0.0062	0.0050	0.0012
276	0.0061	0.0050	0.0011
277	0.0061	0.0049	0.0011
278	0.0060	0.0049	0.0011
279	0.0060	0.0049	0.0011
280	0.0060	0.0048	0.0011
281	0.0059	0.0048	0.0011
282	0.0059	0.0048	0.0011
283	0.0059	0.0048	0.0011
284	0.0058	0.0047	0.0011
285	0.0058	0.0047	0.0011
286	0.0057	0.0047	0.0011
287	0.0057	0.0046	0.0011
288	0.0057	0.0046	0.0011

Total soil rain loss = 2.82(In)
Total effective rainfall = 0.89(In)
Peak flow rate in flood hydrograph = 7.10(CFS)

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

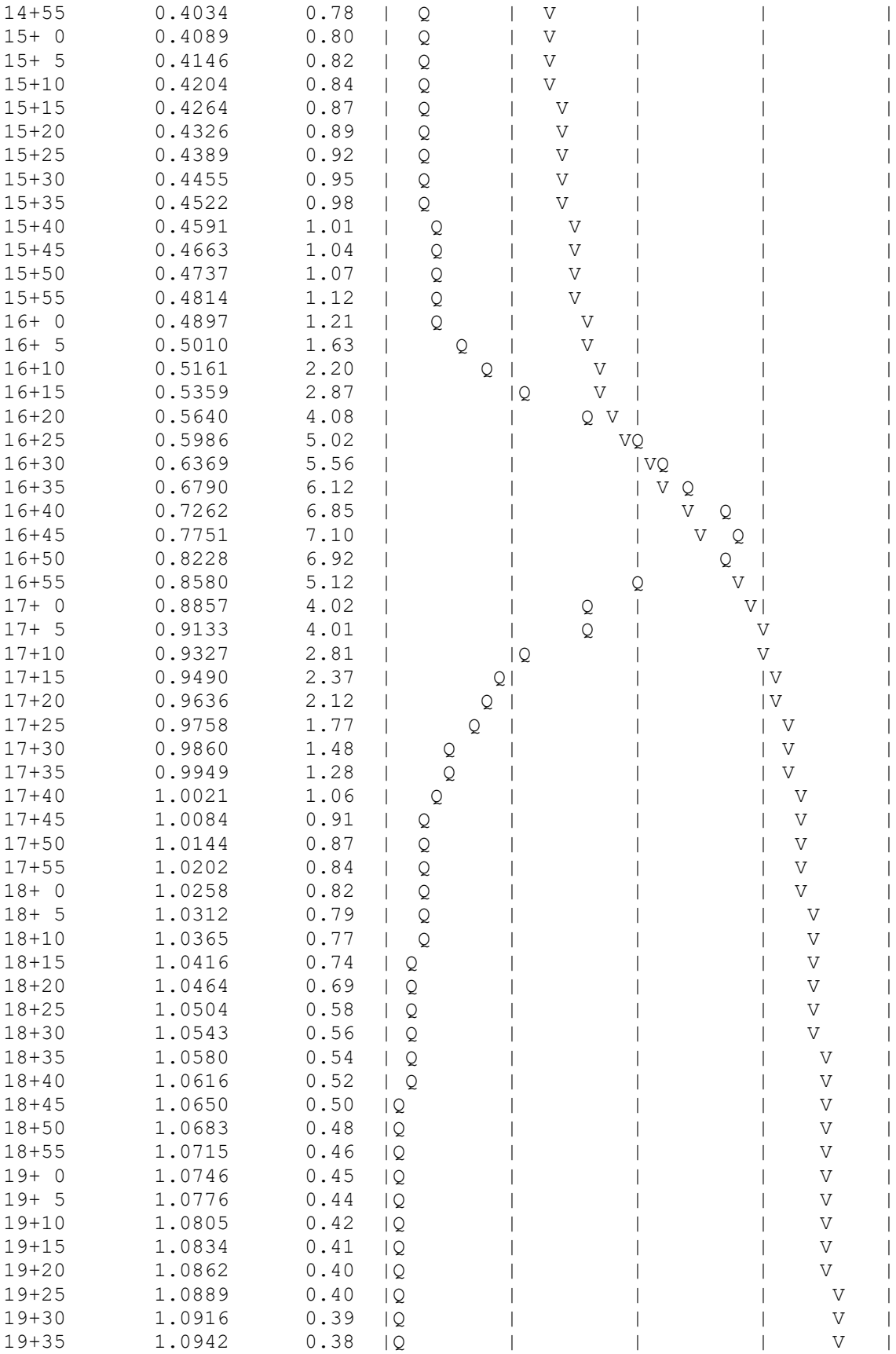
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0000	0.01	Q	|	|	|	|
0+15	0.0001	0.01	Q	|	|	|	|
0+20	0.0003	0.02	Q	|	|	|	|
0+25	0.0005	0.04	Q	|	|	|	|
0+30	0.0009	0.05	Q	|	|	|	|
0+35	0.0014	0.07	Q	|	|	|	|

0+40	0.0020	0.09	Q	|	|	|	|
0+45	0.0028	0.12	Q	|	|	|	|
0+50	0.0038	0.14	Q	|	|	|	|
0+55	0.0049	0.16	Q	|	|	|	|
1+ 0	0.0061	0.17	Q	|	|	|	|
1+ 5	0.0073	0.18	Q	|	|	|	|
1+10	0.0087	0.19	Q	|	|	|	|
1+15	0.0100	0.20	Q	|	|	|	|
1+20	0.0114	0.20	Q	|	|	|	|
1+25	0.0128	0.21	Q	|	|	|	|
1+30	0.0142	0.21	Q	|	|	|	|
1+35	0.0157	0.21	Q	|	|	|	|
1+40	0.0172	0.21	Q	|	|	|	|
1+45	0.0186	0.21	Q	|	|	|	|
1+50	0.0201	0.22	Q	|	|	|	|
1+55	0.0216	0.22	Q	|	|	|	|
2+ 0	0.0231	0.22	Q	|	|	|	|
2+ 5	0.0246	0.22	Q	|	|	|	|
2+10	0.0261	0.22	Q	|	|	|	|
2+15	0.0276	0.22	Q	|	|	|	|
2+20	0.0292	0.22	Q	|	|	|	|
2+25	0.0307	0.22	QV	|	|	|	|
2+30	0.0322	0.22	QV	|	|	|	|
2+35	0.0338	0.22	QV	|	|	|	|
2+40	0.0353	0.22	QV	|	|	|	|
2+45	0.0369	0.23	QV	|	|	|	|
2+50	0.0385	0.23	QV	|	|	|	|
2+55	0.0400	0.23	QV	|	|	|	|
3+ 0	0.0416	0.23	QV	|	|	|	|
3+ 5	0.0432	0.23	QV	|	|	|	|
3+10	0.0447	0.23	QV	|	|	|	|
3+15	0.0463	0.23	QV	|	|	|	|
3+20	0.0479	0.23	QV	|	|	|	|
3+25	0.0495	0.23	QV	|	|	|	|
3+30	0.0511	0.23	QV	|	|	|	|
3+35	0.0527	0.23	QV	|	|	|	|
3+40	0.0543	0.23	QV	|	|	|	|
3+45	0.0560	0.24	QV	|	|	|	|
3+50	0.0576	0.24	QV	|	|	|	|
3+55	0.0592	0.24	QV	|	|	|	|
4+ 0	0.0609	0.24	Q V	|	|	|	|
4+ 5	0.0625	0.24	Q V	|	|	|	|
4+10	0.0642	0.24	Q V	|	|	|	|
4+15	0.0658	0.24	Q V	|	|	|	|
4+20	0.0675	0.24	Q V	|	|	|	|
4+25	0.0691	0.24	Q V	|	|	|	|
4+30	0.0708	0.24	Q V	|	|	|	|
4+35	0.0725	0.24	Q V	|	|	|	|
4+40	0.0742	0.25	Q V	|	|	|	|
4+45	0.0759	0.25	Q V	|	|	|	|
4+50	0.0776	0.25	Q V	|	|	|	|
4+55	0.0793	0.25	Q V	|	|	|	|
5+ 0	0.0810	0.25	Q V	|	|	|	|
5+ 5	0.0827	0.25	Q V	|	|	|	|
5+10	0.0845	0.25	|QV	|	|	|	|
5+15	0.0862	0.25	|QV	|	|	|	|
5+20	0.0879	0.25	|QV	|	|	|	|

5+25	0.0897	0.25	|QV	|	|	|	|
5+30	0.0914	0.26	|Q V	|	|	|	|
5+35	0.0932	0.26	|Q V	|	|	|	|
5+40	0.0950	0.26	|Q V	|	|	|	|
5+45	0.0968	0.26	|Q V	|	|	|	|
5+50	0.0985	0.26	|Q V	|	|	|	|
5+55	0.1003	0.26	|Q V	|	|	|	|
6+ 0	0.1021	0.26	|Q V	|	|	|	|
6+ 5	0.1039	0.26	|Q V	|	|	|	|
6+10	0.1058	0.26	|Q V	|	|	|	|
6+15	0.1076	0.27	|Q V	|	|	|	|
6+20	0.1094	0.27	|Q V	|	|	|	|
6+25	0.1113	0.27	|Q V	|	|	|	|
6+30	0.1131	0.27	|Q V	|	|	|	|
6+35	0.1150	0.27	|Q V	|	|	|	|
6+40	0.1168	0.27	|Q V	|	|	|	|
6+45	0.1187	0.27	|Q V	|	|	|	|
6+50	0.1206	0.27	|Q V	|	|	|	|
6+55	0.1225	0.28	|Q V	|	|	|	|
7+ 0	0.1244	0.28	|Q V	|	|	|	|
7+ 5	0.1263	0.28	|Q V	|	|	|	|
7+10	0.1282	0.28	|Q V	|	|	|	|
7+15	0.1302	0.28	|Q V	|	|	|	|
7+20	0.1321	0.28	|Q V	|	|	|	|
7+25	0.1341	0.28	|Q V	|	|	|	|
7+30	0.1360	0.28	|Q V	|	|	|	|
7+35	0.1380	0.29	|Q V	|	|	|	|
7+40	0.1400	0.29	|Q V	|	|	|	|
7+45	0.1420	0.29	|Q V	|	|	|	|
7+50	0.1440	0.29	|Q V	|	|	|	|
7+55	0.1460	0.29	|Q V	|	|	|	|
8+ 0	0.1480	0.29	|Q V	|	|	|	|
8+ 5	0.1500	0.30	|Q V	|	|	|	|
8+10	0.1521	0.30	|Q V	|	|	|	|
8+15	0.1541	0.30	|Q V	|	|	|	|
8+20	0.1562	0.30	|Q V	|	|	|	|
8+25	0.1583	0.30	|Q V	|	|	|	|
8+30	0.1604	0.30	|Q V	|	|	|	|
8+35	0.1625	0.31	|Q V	|	|	|	|
8+40	0.1646	0.31	|Q V	|	|	|	|
8+45	0.1667	0.31	|Q V	|	|	|	|
8+50	0.1689	0.31	|Q V	|	|	|	|
8+55	0.1710	0.31	|Q V	|	|	|	|
9+ 0	0.1732	0.31	|Q V	|	|	|	|
9+ 5	0.1754	0.32	|Q V	|	|	|	|
9+10	0.1776	0.32	|Q V	|	|	|	|
9+15	0.1798	0.32	|Q V	|	|	|	|
9+20	0.1820	0.32	|Q V	|	|	|	|
9+25	0.1842	0.32	|Q V	|	|	|	|
9+30	0.1865	0.33	|Q V	|	|	|	|
9+35	0.1887	0.33	|Q V	|	|	|	|
9+40	0.1910	0.33	|Q V	|	|	|	|
9+45	0.1933	0.33	|Q V	|	|	|	|
9+50	0.1956	0.34	|Q V	|	|	|	|
9+55	0.1979	0.34	|Q V	|	|	|	|
10+ 0	0.2003	0.34	|Q V	|	|	|	|
10+ 5	0.2026	0.34	|Q V	|	|	|	|

10+10	0.2050	0.34	|Q V |	|	|	|
10+15	0.2074	0.35	|Q V |	|	|	|
10+20	0.2098	0.35	|Q V |	|	|	|
10+25	0.2122	0.35	|Q V |	|	|	|
10+30	0.2147	0.35	|Q V |	|	|	|
10+35	0.2172	0.36	|Q V |	|	|	|
10+40	0.2196	0.36	|Q V |	|	|	|
10+45	0.2221	0.36	|Q V |	|	|	|
10+50	0.2247	0.37	|Q V |	|	|	|
10+55	0.2272	0.37	|Q V |	|	|	|
11+ 0	0.2298	0.37	|Q V |	|	|	|
11+ 5	0.2323	0.38	|Q V |	|	|	|
11+10	0.2349	0.38	|Q V |	|	|	|
11+15	0.2376	0.38	|Q V |	|	|	|
11+20	0.2402	0.38	|Q V |	|	|	|
11+25	0.2429	0.39	|Q V |	|	|	|
11+30	0.2456	0.39	|Q V |	|	|	|
11+35	0.2483	0.40	|Q V |	|	|	|
11+40	0.2511	0.40	|Q V |	|	|	|
11+45	0.2538	0.40	|Q V |	|	|	|
11+50	0.2566	0.41	|Q V |	|	|	|
11+55	0.2595	0.41	|Q V |	|	|	|
12+ 0	0.2623	0.41	|Q V |	|	|	|
12+ 5	0.2652	0.42	|Q V |	|	|	|
12+10	0.2681	0.42	|Q V |	|	|	|
12+15	0.2711	0.43	|Q V |	|	|	|
12+20	0.2741	0.44	|Q V|	|	|	|
12+25	0.2772	0.45	|Q V|	|	|	|
12+30	0.2804	0.46	|Q V|	|	|	|
12+35	0.2836	0.47	|Q V|	|	|	|
12+40	0.2869	0.48	|Q V|	|	|	|
12+45	0.2904	0.50	|Q V|	|	|	|
12+50	0.2939	0.51	| Q V|	|	|	|
12+55	0.2975	0.52	| Q V|	|	|	|
13+ 0	0.3011	0.53	| Q V|	|	|	|
13+ 5	0.3049	0.54	| Q V |	|	|	|
13+10	0.3087	0.55	| Q V |	|	|	|
13+15	0.3125	0.56	| Q V |	|	|	|
13+20	0.3164	0.57	| Q V |	|	|	|
13+25	0.3204	0.58	| Q V |	|	|	|
13+30	0.3244	0.58	| Q V |	|	|	|
13+35	0.3285	0.59	| Q V |	|	|	|
13+40	0.3326	0.60	| Q |V |	|	|	|
13+45	0.3368	0.61	| Q |V |	|	|	|
13+50	0.3411	0.62	| Q |V |	|	|	|
13+55	0.3454	0.63	| Q |V |	|	|	|
14+ 0	0.3498	0.64	| Q |V |	|	|	|
14+ 5	0.3542	0.65	| Q |V |	|	|	|
14+10	0.3587	0.66	| Q |V |	|	|	|
14+15	0.3633	0.67	| Q | V |	|	|	|
14+20	0.3680	0.68	| Q | V |	|	|	|
14+25	0.3728	0.69	| Q | V |	|	|	|
14+30	0.3776	0.70	| Q | V |	|	|	|
14+35	0.3826	0.72	| Q | V |	|	|	|
14+40	0.3876	0.73	| Q | V |	|	|	|
14+45	0.3928	0.75	| Q | V |	|	|	|
14+50	0.3980	0.76	| Q | V |	|	|	|



19+40	1.0968	0.37	|Q	|	|	|	V |
19+45	1.0993	0.37	|Q	|	|	|	V |
19+50	1.1018	0.36	|Q	|	|	|	V |
19+55	1.1043	0.36	|Q	|	|	|	V |
20+ 0	1.1067	0.35	|Q	|	|	|	V |
20+ 5	1.1091	0.35	|Q	|	|	|	V |
20+10	1.1114	0.34	|Q	|	|	|	V |
20+15	1.1137	0.34	|Q	|	|	|	V |
20+20	1.1160	0.33	|Q	|	|	|	V |
20+25	1.1183	0.33	|Q	|	|	|	V |
20+30	1.1205	0.32	|Q	|	|	|	V |
20+35	1.1227	0.32	|Q	|	|	|	V |
20+40	1.1248	0.31	|Q	|	|	|	V |
20+45	1.1270	0.31	|Q	|	|	|	V |
20+50	1.1291	0.31	|Q	|	|	|	V |
20+55	1.1312	0.30	|Q	|	|	|	V |
21+ 0	1.1333	0.30	|Q	|	|	|	V |
21+ 5	1.1353	0.30	|Q	|	|	|	V |
21+10	1.1373	0.29	|Q	|	|	|	V |
21+15	1.1393	0.29	|Q	|	|	|	V |
21+20	1.1413	0.29	|Q	|	|	|	V |
21+25	1.1433	0.28	|Q	|	|	|	V |
21+30	1.1452	0.28	|Q	|	|	|	V |
21+35	1.1471	0.28	|Q	|	|	|	V |
21+40	1.1490	0.28	|Q	|	|	|	V |
21+45	1.1509	0.27	|Q	|	|	|	V |
21+50	1.1528	0.27	|Q	|	|	|	V |
21+55	1.1547	0.27	|Q	|	|	|	V |
22+ 0	1.1565	0.27	|Q	|	|	|	V |
22+ 5	1.1583	0.26	|Q	|	|	|	V |
22+10	1.1601	0.26	|Q	|	|	|	V |
22+15	1.1619	0.26	|Q	|	|	|	V |
22+20	1.1637	0.26	|Q	|	|	|	V |
22+25	1.1654	0.26	|Q	|	|	|	V |
22+30	1.1672	0.25	|Q	|	|	|	V |
22+35	1.1689	0.25	|Q	|	|	|	V |
22+40	1.1706	0.25	Q	|	|	|	V |
22+45	1.1723	0.25	Q	|	|	|	V |
22+50	1.1740	0.25	Q	|	|	|	V |
22+55	1.1757	0.24	Q	|	|	|	V |
23+ 0	1.1773	0.24	Q	|	|	|	V |
23+ 5	1.1790	0.24	Q	|	|	|	V|
23+10	1.1806	0.24	Q	|	|	|	V|
23+15	1.1822	0.24	Q	|	|	|	V|
23+20	1.1839	0.23	Q	|	|	|	V|
23+25	1.1855	0.23	Q	|	|	|	V|
23+30	1.1871	0.23	Q	|	|	|	V|
23+35	1.1886	0.23	Q	|	|	|	V|
23+40	1.1902	0.23	Q	|	|	|	V|
23+45	1.1918	0.23	Q	|	|	|	V|
23+50	1.1933	0.22	Q	|	|	|	V|
23+55	1.1948	0.22	Q	|	|	|	V|
24+ 0	1.1964	0.22	Q	|	|	|	V|
24+ 5	1.1979	0.22	Q	|	|	|	V|
24+10	1.1994	0.21	Q	|	|	|	V|
24+15	1.2008	0.21	Q	|	|	|	V|
24+20	1.2021	0.19	Q	|	|	|	V|

24+25	1.2034	0.18	Q	|	|	|	V|
24+30	1.2045	0.16	Q	|	|	|	V|
24+35	1.2054	0.14	Q	|	|	|	V|
24+40	1.2063	0.12	Q	|	|	|	V|
24+45	1.2069	0.09	Q	|	|	|	V|
24+50	1.2074	0.07	Q	|	|	|	V|
24+55	1.2078	0.05	Q	|	|	|	V|
25+ 0	1.2081	0.04	Q	|	|	|	V|
25+ 5	1.2083	0.03	Q	|	|	|	V|
25+10	1.2084	0.02	Q	|	|	|	V|
25+15	1.2085	0.02	Q	|	|	|	V|
25+20	1.2086	0.01	Q	|	|	|	V|
25+25	1.2087	0.01	Q	|	|	|	V|
25+30	1.2087	0.01	Q	|	|	|	V|
25+35	1.2088	0.00	Q	|	|	|	V|
25+40	1.2088	0.00	Q	|	|	|	V|
25+45	1.2088	0.00	Q	|	|	|	V|
25+50	1.2088	0.00	Q	|	|	|	V|
25+55	1.2089	0.00	Q	|	|	|	V|
26+ 0	1.2089	0.00	Q	|	|	|	V|
26+ 5	1.2089	0.00	Q	|	|	|	V|
26+10	1.2089	0.00	Q	|	|	|	V|
26+15	1.2089	0.00	Q	|	|	|	V

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE EXISTING CONDITION - SOUTHERLY CHAMBERS
10-YEAR STORM EVENT ANALYSIS WITH ADJUSTED 5 YEAR RAINFALL DATA

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		
16.36	1	0.68
Rainfall data for year 10		
16.36	6	1.71
Rainfall data for year 10		
16.36	24	3.13

++

******** 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)
32.0	32.0	16.36	1.000	0.978	0.800	0.782

Area-averaged adjusted loss rate Fm (In/Hr) = 0.782

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
13.09	0.800	32.0	32.0	15.65	0.000
3.27	0.200	98.0	98.0	0.20	0.926

Area-averaged catchment yield fraction, Y = 0.185
Area-averaged low loss fraction, Yb = 0.815
User entry of time of concentration = 0.906 (hours)
++
Watershed area = 16.36(Ac.)
Catchment Lag time = 0.725 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 11.4936
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.782(In/Hr)
Average low loss rate fraction (Yb) = 0.815 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.252(In)
Computed peak 30-minute rainfall = 0.515(In)
Specified peak 1-hour rainfall = 0.680(In)
Computed peak 3-hour rainfall = 1.197(In)
Specified peak 6-hour rainfall = 1.710(In)
Specified peak 24-hour rainfall = 3.130(In)

Rainfall depth area reduction factors:
Using a total area of 16.36(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.251(In)
30-minute factor = 0.999 Adjusted rainfall = 0.515(In)
1-hour factor = 0.999 Adjusted rainfall = 0.679(In)
3-hour factor = 1.000 Adjusted rainfall = 1.197(In)
6-hour factor = 1.000 Adjusted rainfall = 1.710(In)
24-hour factor = 1.000 Adjusted rainfall = 3.130(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 = 197.85 (CFS))		
1	0.648	1.282
2	2.150	2.972
3	4.380	4.411
4	8.439	8.031
5	14.358	11.712
6	21.200	13.538
7	28.825	15.086

8	37.417	17.000
9	47.487	19.924
10	57.646	20.100
11	67.854	20.197
12	74.716	13.575
13	79.554	9.572
14	84.864	10.507
15	88.648	7.488
16	90.881	4.417
17	93.135	4.460
18	94.901	3.494
19	96.197	2.564
20	97.135	1.857
21	97.882	1.478
22	98.248	0.724
23	98.455	0.409
24	98.662	0.409
25	98.869	0.409
26	99.076	0.409
27	99.282	0.409
28	99.489	0.409
29	99.696	0.409
30	99.889	0.382
31	100.000	0.219

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.2515	0.2515
2	0.3318	0.0803
3	0.3903	0.0584
4	0.4379	0.0476
5	0.4787	0.0409
6	0.5149	0.0362
7	0.5477	0.0328
8	0.5777	0.0300
9	0.6056	0.0279
10	0.6317	0.0261
11	0.6562	0.0245
12	0.6795	0.0232
13	0.7081	0.0286
14	0.7357	0.0276
15	0.7623	0.0266
16	0.7880	0.0258
17	0.8131	0.0250
18	0.8374	0.0243
19	0.8610	0.0237
20	0.8841	0.0231
21	0.9066	0.0225
22	0.9286	0.0220
23	0.9501	0.0215
24	0.9712	0.0211
25	0.9918	0.0206
26	1.0120	0.0202
27	1.0319	0.0199
28	1.0514	0.0195
29	1.0706	0.0192
30	1.0895	0.0189

31	1.1081	0.0186
32	1.1263	0.0183
33	1.1443	0.0180
34	1.1621	0.0177
35	1.1796	0.0175
36	1.1968	0.0172
37	1.2138	0.0170
38	1.2306	0.0168
39	1.2471	0.0166
40	1.2635	0.0164
41	1.2797	0.0162
42	1.2956	0.0160
43	1.3114	0.0158
44	1.3270	0.0156
45	1.3425	0.0154
46	1.3578	0.0153
47	1.3729	0.0151
48	1.3878	0.0150
49	1.4026	0.0148
50	1.4173	0.0147
51	1.4318	0.0145
52	1.4462	0.0144
53	1.4604	0.0142
54	1.4746	0.0141
55	1.4886	0.0140
56	1.5024	0.0139
57	1.5162	0.0138
58	1.5298	0.0136
59	1.5433	0.0135
60	1.5567	0.0134
61	1.5700	0.0133
62	1.5832	0.0132
63	1.5963	0.0131
64	1.6093	0.0130
65	1.6222	0.0129
66	1.6350	0.0128
67	1.6477	0.0127
68	1.6603	0.0126
69	1.6729	0.0125
70	1.6853	0.0124
71	1.6976	0.0123
72	1.7099	0.0123
73	1.7202	0.0103
74	1.7305	0.0102
75	1.7406	0.0102
76	1.7507	0.0101
77	1.7607	0.0100
78	1.7707	0.0099
79	1.7805	0.0099
80	1.7903	0.0098
81	1.8000	0.0097
82	1.8097	0.0097
83	1.8193	0.0096
84	1.8288	0.0095
85	1.8383	0.0095
86	1.8477	0.0094
87	1.8570	0.0093

88	1.8663	0.0093
89	1.8755	0.0092
90	1.8847	0.0092
91	1.8938	0.0091
92	1.9028	0.0090
93	1.9118	0.0090
94	1.9208	0.0089
95	1.9296	0.0089
96	1.9385	0.0088
97	1.9473	0.0088
98	1.9560	0.0087
99	1.9647	0.0087
100	1.9733	0.0086
101	1.9819	0.0086
102	1.9904	0.0085
103	1.9989	0.0085
104	2.0073	0.0084
105	2.0157	0.0084
106	2.0241	0.0083
107	2.0324	0.0083
108	2.0406	0.0083
109	2.0489	0.0082
110	2.0570	0.0082
111	2.0652	0.0081
112	2.0733	0.0081
113	2.0813	0.0081
114	2.0893	0.0080
115	2.0973	0.0080
116	2.1052	0.0079
117	2.1131	0.0079
118	2.1210	0.0079
119	2.1288	0.0078
120	2.1366	0.0078
121	2.1443	0.0077
122	2.1521	0.0077
123	2.1597	0.0077
124	2.1674	0.0076
125	2.1750	0.0076
126	2.1825	0.0076
127	2.1901	0.0075
128	2.1976	0.0075
129	2.2051	0.0075
130	2.2125	0.0074
131	2.2199	0.0074
132	2.2273	0.0074
133	2.2346	0.0073
134	2.2419	0.0073
135	2.2492	0.0073
136	2.2565	0.0073
137	2.2637	0.0072
138	2.2709	0.0072
139	2.2780	0.0072
140	2.2852	0.0071
141	2.2923	0.0071
142	2.2994	0.0071
143	2.3064	0.0070
144	2.3134	0.0070

145	2.3204	0.0070
146	2.3274	0.0070
147	2.3343	0.0069
148	2.3412	0.0069
149	2.3481	0.0069
150	2.3550	0.0069
151	2.3618	0.0068
152	2.3686	0.0068
153	2.3754	0.0068
154	2.3822	0.0068
155	2.3889	0.0067
156	2.3956	0.0067
157	2.4023	0.0067
158	2.4089	0.0067
159	2.4156	0.0066
160	2.4222	0.0066
161	2.4288	0.0066
162	2.4354	0.0066
163	2.4419	0.0065
164	2.4484	0.0065
165	2.4549	0.0065
166	2.4614	0.0065
167	2.4679	0.0065
168	2.4743	0.0064
169	2.4807	0.0064
170	2.4871	0.0064
171	2.4935	0.0064
172	2.4998	0.0063
173	2.5061	0.0063
174	2.5124	0.0063
175	2.5187	0.0063
176	2.5250	0.0063
177	2.5312	0.0062
178	2.5375	0.0062
179	2.5437	0.0062
180	2.5499	0.0062
181	2.5560	0.0062
182	2.5622	0.0061
183	2.5683	0.0061
184	2.5744	0.0061
185	2.5805	0.0061
186	2.5866	0.0061
187	2.5926	0.0061
188	2.5987	0.0060
189	2.6047	0.0060
190	2.6107	0.0060
191	2.6167	0.0060
192	2.6227	0.0060
193	2.6286	0.0059
194	2.6345	0.0059
195	2.6404	0.0059
196	2.6463	0.0059
197	2.6522	0.0059
198	2.6581	0.0059
199	2.6639	0.0058
200	2.6698	0.0058
201	2.6756	0.0058

202	2.6814	0.0058
203	2.6872	0.0058
204	2.6929	0.0058
205	2.6987	0.0057
206	2.7044	0.0057
207	2.7101	0.0057
208	2.7158	0.0057
209	2.7215	0.0057
210	2.7272	0.0057
211	2.7328	0.0057
212	2.7385	0.0056
213	2.7441	0.0056
214	2.7497	0.0056
215	2.7553	0.0056
216	2.7609	0.0056
217	2.7665	0.0056
218	2.7720	0.0056
219	2.7775	0.0055
220	2.7831	0.0055
221	2.7886	0.0055
222	2.7941	0.0055
223	2.7996	0.0055
224	2.8050	0.0055
225	2.8105	0.0055
226	2.8159	0.0054
227	2.8213	0.0054
228	2.8268	0.0054
229	2.8322	0.0054
230	2.8375	0.0054
231	2.8429	0.0054
232	2.8483	0.0054
233	2.8536	0.0053
234	2.8590	0.0053
235	2.8643	0.0053
236	2.8696	0.0053
237	2.8749	0.0053
238	2.8802	0.0053
239	2.8854	0.0053
240	2.8907	0.0053
241	2.8960	0.0052
242	2.9012	0.0052
243	2.9064	0.0052
244	2.9116	0.0052
245	2.9168	0.0052
246	2.9220	0.0052
247	2.9272	0.0052
248	2.9323	0.0052
249	2.9375	0.0052
250	2.9426	0.0051
251	2.9478	0.0051
252	2.9529	0.0051
253	2.9580	0.0051
254	2.9631	0.0051
255	2.9682	0.0051
256	2.9732	0.0051
257	2.9783	0.0051
258	2.9833	0.0050

259	2.9884	0.0050
260	2.9934	0.0050
261	2.9984	0.0050
262	3.0034	0.0050
263	3.0084	0.0050
264	3.0134	0.0050
265	3.0184	0.0050
266	3.0233	0.0050
267	3.0283	0.0050
268	3.0332	0.0049
269	3.0381	0.0049
270	3.0431	0.0049
271	3.0480	0.0049
272	3.0529	0.0049
273	3.0578	0.0049
274	3.0626	0.0049
275	3.0675	0.0049
276	3.0724	0.0049
277	3.0772	0.0048
278	3.0821	0.0048
279	3.0869	0.0048
280	3.0917	0.0048
281	3.0965	0.0048
282	3.1013	0.0048
283	3.1061	0.0048
284	3.1109	0.0048
285	3.1157	0.0048
286	3.1204	0.0048
287	3.1252	0.0048
288	3.1299	0.0047

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0047	0.0039	0.0009
2	0.0048	0.0039	0.0009
3	0.0048	0.0039	0.0009
4	0.0048	0.0039	0.0009
5	0.0048	0.0039	0.0009
6	0.0048	0.0039	0.0009
7	0.0048	0.0039	0.0009
8	0.0048	0.0039	0.0009
9	0.0049	0.0040	0.0009
10	0.0049	0.0040	0.0009
11	0.0049	0.0040	0.0009
12	0.0049	0.0040	0.0009
13	0.0049	0.0040	0.0009
14	0.0049	0.0040	0.0009
15	0.0050	0.0040	0.0009
16	0.0050	0.0040	0.0009
17	0.0050	0.0041	0.0009
18	0.0050	0.0041	0.0009
19	0.0050	0.0041	0.0009
20	0.0050	0.0041	0.0009
21	0.0050	0.0041	0.0009
22	0.0051	0.0041	0.0009

23	0.0051	0.0041	0.0009
24	0.0051	0.0042	0.0009
25	0.0051	0.0042	0.0009
26	0.0051	0.0042	0.0009
27	0.0052	0.0042	0.0010
28	0.0052	0.0042	0.0010
29	0.0052	0.0042	0.0010
30	0.0052	0.0042	0.0010
31	0.0052	0.0043	0.0010
32	0.0052	0.0043	0.0010
33	0.0053	0.0043	0.0010
34	0.0053	0.0043	0.0010
35	0.0053	0.0043	0.0010
36	0.0053	0.0043	0.0010
37	0.0053	0.0043	0.0010
38	0.0053	0.0044	0.0010
39	0.0054	0.0044	0.0010
40	0.0054	0.0044	0.0010
41	0.0054	0.0044	0.0010
42	0.0054	0.0044	0.0010
43	0.0055	0.0044	0.0010
44	0.0055	0.0045	0.0010
45	0.0055	0.0045	0.0010
46	0.0055	0.0045	0.0010
47	0.0055	0.0045	0.0010
48	0.0056	0.0045	0.0010
49	0.0056	0.0045	0.0010
50	0.0056	0.0046	0.0010
51	0.0056	0.0046	0.0010
52	0.0056	0.0046	0.0010
53	0.0057	0.0046	0.0011
54	0.0057	0.0046	0.0011
55	0.0057	0.0047	0.0011
56	0.0057	0.0047	0.0011
57	0.0058	0.0047	0.0011
58	0.0058	0.0047	0.0011
59	0.0058	0.0047	0.0011
60	0.0058	0.0048	0.0011
61	0.0059	0.0048	0.0011
62	0.0059	0.0048	0.0011
63	0.0059	0.0048	0.0011
64	0.0059	0.0048	0.0011
65	0.0060	0.0049	0.0011
66	0.0060	0.0049	0.0011
67	0.0060	0.0049	0.0011
68	0.0060	0.0049	0.0011
69	0.0061	0.0049	0.0011
70	0.0061	0.0050	0.0011
71	0.0061	0.0050	0.0011
72	0.0061	0.0050	0.0011
73	0.0062	0.0050	0.0011
74	0.0062	0.0051	0.0011
75	0.0062	0.0051	0.0012
76	0.0063	0.0051	0.0012
77	0.0063	0.0051	0.0012
78	0.0063	0.0052	0.0012
79	0.0064	0.0052	0.0012

80	0.0064	0.0052	0.0012
81	0.0064	0.0052	0.0012
82	0.0065	0.0053	0.0012
83	0.0065	0.0053	0.0012
84	0.0065	0.0053	0.0012
85	0.0066	0.0054	0.0012
86	0.0066	0.0054	0.0012
87	0.0066	0.0054	0.0012
88	0.0067	0.0054	0.0012
89	0.0067	0.0055	0.0012
90	0.0067	0.0055	0.0012
91	0.0068	0.0055	0.0013
92	0.0068	0.0055	0.0013
93	0.0069	0.0056	0.0013
94	0.0069	0.0056	0.0013
95	0.0069	0.0057	0.0013
96	0.0070	0.0057	0.0013
97	0.0070	0.0057	0.0013
98	0.0070	0.0057	0.0013
99	0.0071	0.0058	0.0013
100	0.0071	0.0058	0.0013
101	0.0072	0.0059	0.0013
102	0.0072	0.0059	0.0013
103	0.0073	0.0059	0.0013
104	0.0073	0.0060	0.0014
105	0.0074	0.0060	0.0014
106	0.0074	0.0060	0.0014
107	0.0075	0.0061	0.0014
108	0.0075	0.0061	0.0014
109	0.0076	0.0062	0.0014
110	0.0076	0.0062	0.0014
111	0.0077	0.0063	0.0014
112	0.0077	0.0063	0.0014
113	0.0078	0.0063	0.0014
114	0.0078	0.0064	0.0014
115	0.0079	0.0064	0.0015
116	0.0079	0.0065	0.0015
117	0.0080	0.0065	0.0015
118	0.0081	0.0066	0.0015
119	0.0081	0.0066	0.0015
120	0.0082	0.0067	0.0015
121	0.0083	0.0067	0.0015
122	0.0083	0.0068	0.0015
123	0.0084	0.0068	0.0016
124	0.0084	0.0069	0.0016
125	0.0085	0.0070	0.0016
126	0.0086	0.0070	0.0016
127	0.0087	0.0071	0.0016
128	0.0087	0.0071	0.0016
129	0.0088	0.0072	0.0016
130	0.0089	0.0072	0.0016
131	0.0090	0.0073	0.0017
132	0.0090	0.0074	0.0017
133	0.0092	0.0075	0.0017
134	0.0092	0.0075	0.0017
135	0.0093	0.0076	0.0017
136	0.0094	0.0077	0.0017

137	0.0095	0.0078	0.0018
138	0.0096	0.0078	0.0018
139	0.0097	0.0079	0.0018
140	0.0098	0.0080	0.0018
141	0.0099	0.0081	0.0018
142	0.0100	0.0082	0.0019
143	0.0102	0.0083	0.0019
144	0.0102	0.0083	0.0019
145	0.0123	0.0100	0.0023
146	0.0123	0.0101	0.0023
147	0.0125	0.0102	0.0023
148	0.0126	0.0103	0.0023
149	0.0128	0.0104	0.0024
150	0.0129	0.0105	0.0024
151	0.0131	0.0107	0.0024
152	0.0132	0.0108	0.0024
153	0.0134	0.0109	0.0025
154	0.0135	0.0110	0.0025
155	0.0138	0.0112	0.0025
156	0.0139	0.0113	0.0026
157	0.0141	0.0115	0.0026
158	0.0142	0.0116	0.0026
159	0.0145	0.0118	0.0027
160	0.0147	0.0119	0.0027
161	0.0150	0.0122	0.0028
162	0.0151	0.0123	0.0028
163	0.0154	0.0126	0.0029
164	0.0156	0.0127	0.0029
165	0.0160	0.0130	0.0030
166	0.0162	0.0132	0.0030
167	0.0166	0.0135	0.0031
168	0.0168	0.0137	0.0031
169	0.0172	0.0141	0.0032
170	0.0175	0.0142	0.0032
171	0.0180	0.0147	0.0033
172	0.0183	0.0149	0.0034
173	0.0189	0.0154	0.0035
174	0.0192	0.0156	0.0036
175	0.0199	0.0162	0.0037
176	0.0202	0.0165	0.0037
177	0.0211	0.0172	0.0039
178	0.0215	0.0175	0.0040
179	0.0225	0.0183	0.0042
180	0.0231	0.0188	0.0043
181	0.0243	0.0198	0.0045
182	0.0250	0.0204	0.0046
183	0.0266	0.0217	0.0049
184	0.0276	0.0225	0.0051
185	0.0232	0.0189	0.0043
186	0.0245	0.0200	0.0045
187	0.0279	0.0227	0.0052
188	0.0300	0.0245	0.0056
189	0.0362	0.0295	0.0067
190	0.0409	0.0333	0.0076
191	0.0584	0.0476	0.0108
192	0.0803	0.0652	0.0152
193	0.2515	0.0652	0.1863

194	0.0476	0.0388	0.0088
195	0.0328	0.0267	0.0061
196	0.0261	0.0212	0.0048
197	0.0286	0.0233	0.0053
198	0.0258	0.0210	0.0048
199	0.0237	0.0193	0.0044
200	0.0220	0.0179	0.0041
201	0.0206	0.0168	0.0038
202	0.0195	0.0159	0.0036
203	0.0186	0.0151	0.0034
204	0.0177	0.0145	0.0033
205	0.0170	0.0139	0.0031
206	0.0164	0.0133	0.0030
207	0.0158	0.0129	0.0029
208	0.0153	0.0124	0.0028
209	0.0148	0.0121	0.0027
210	0.0144	0.0117	0.0027
211	0.0140	0.0114	0.0026
212	0.0136	0.0111	0.0025
213	0.0133	0.0108	0.0025
214	0.0130	0.0106	0.0024
215	0.0127	0.0104	0.0024
216	0.0124	0.0101	0.0023
217	0.0103	0.0084	0.0019
218	0.0101	0.0082	0.0019
219	0.0099	0.0080	0.0018
220	0.0097	0.0079	0.0018
221	0.0095	0.0077	0.0018
222	0.0093	0.0076	0.0017
223	0.0091	0.0074	0.0017
224	0.0089	0.0073	0.0017
225	0.0088	0.0072	0.0016
226	0.0086	0.0070	0.0016
227	0.0085	0.0069	0.0016
228	0.0083	0.0068	0.0015
229	0.0082	0.0067	0.0015
230	0.0081	0.0066	0.0015
231	0.0080	0.0065	0.0015
232	0.0079	0.0064	0.0015
233	0.0077	0.0063	0.0014
234	0.0076	0.0062	0.0014
235	0.0075	0.0061	0.0014
236	0.0074	0.0061	0.0014
237	0.0073	0.0060	0.0014
238	0.0073	0.0059	0.0013
239	0.0072	0.0058	0.0013
240	0.0071	0.0058	0.0013
241	0.0070	0.0057	0.0013
242	0.0069	0.0056	0.0013
243	0.0068	0.0056	0.0013
244	0.0068	0.0055	0.0013
245	0.0067	0.0054	0.0012
246	0.0066	0.0054	0.0012
247	0.0065	0.0053	0.0012
248	0.0065	0.0053	0.0012
249	0.0064	0.0052	0.0012
250	0.0063	0.0052	0.0012

251	0.0063	0.0051	0.0012
252	0.0062	0.0051	0.0012
253	0.0062	0.0050	0.0011
254	0.0061	0.0050	0.0011
255	0.0061	0.0049	0.0011
256	0.0060	0.0049	0.0011
257	0.0059	0.0048	0.0011
258	0.0059	0.0048	0.0011
259	0.0058	0.0048	0.0011
260	0.0058	0.0047	0.0011
261	0.0057	0.0047	0.0011
262	0.0057	0.0046	0.0011
263	0.0057	0.0046	0.0010
264	0.0056	0.0046	0.0010
265	0.0056	0.0045	0.0010
266	0.0055	0.0045	0.0010
267	0.0055	0.0045	0.0010
268	0.0054	0.0044	0.0010
269	0.0054	0.0044	0.0010
270	0.0054	0.0044	0.0010
271	0.0053	0.0043	0.0010
272	0.0053	0.0043	0.0010
273	0.0052	0.0043	0.0010
274	0.0052	0.0042	0.0010
275	0.0052	0.0042	0.0010
276	0.0051	0.0042	0.0010
277	0.0051	0.0042	0.0009
278	0.0051	0.0041	0.0009
279	0.0050	0.0041	0.0009
280	0.0050	0.0041	0.0009
281	0.0050	0.0041	0.0009
282	0.0049	0.0040	0.0009
283	0.0049	0.0040	0.0009
284	0.0049	0.0040	0.0009
285	0.0048	0.0040	0.0009
286	0.0048	0.0039	0.0009
287	0.0048	0.0039	0.0009
288	0.0048	0.0039	0.0009

Total soil rain loss = 2.41(In)
Total effective rainfall = 0.72(In)
Peak flow rate in flood hydrograph = 5.04(CFS)

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

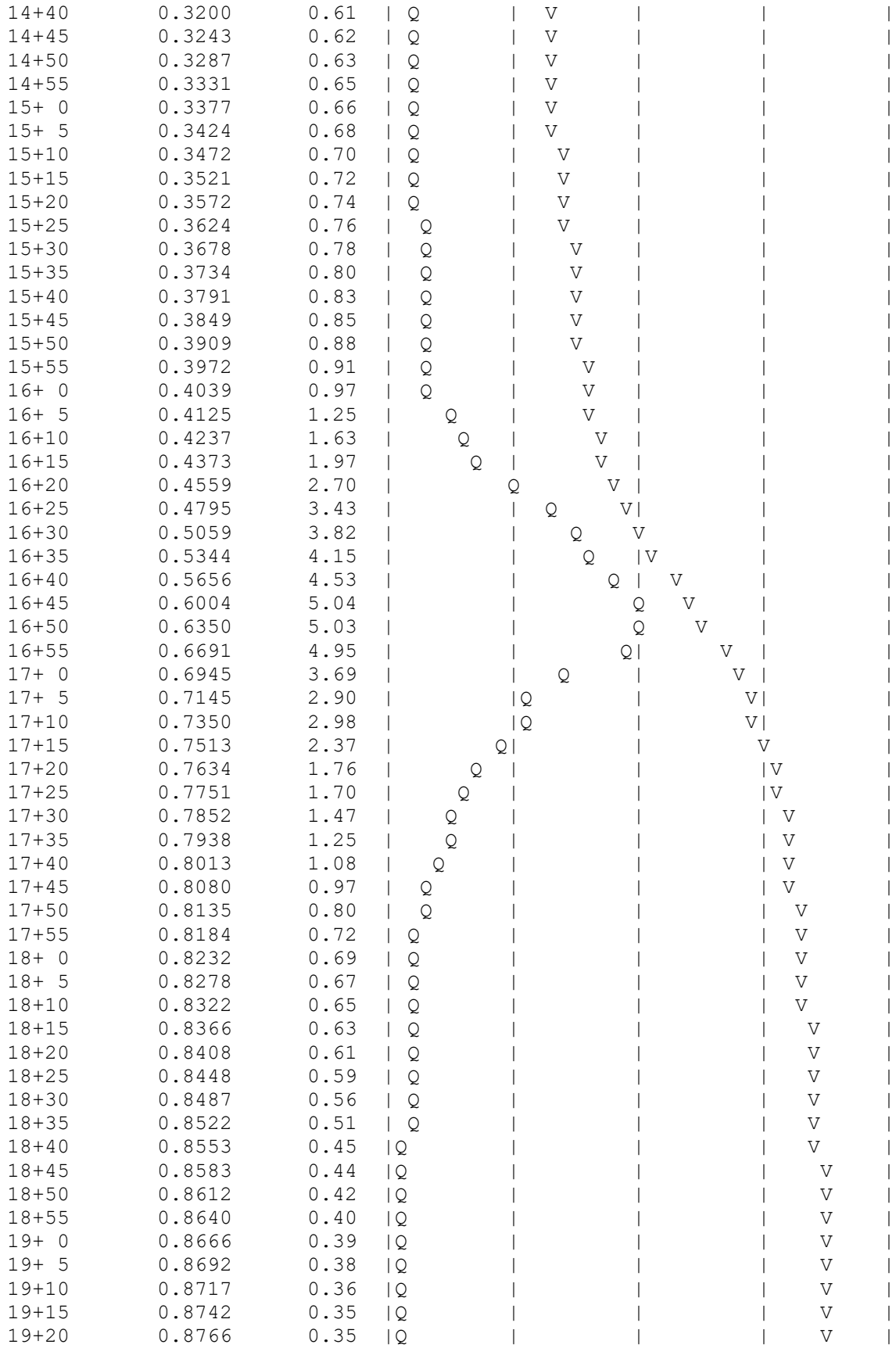
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0000	0.00	Q	|	|	|	|
0+15	0.0001	0.01	Q	|	|	|	|
0+20	0.0002	0.01	Q	|	|	|	|

0+25	0.0004	0.03	Q				
0+30	0.0006	0.04	Q				
0+35	0.0010	0.05	Q				
0+40	0.0014	0.07	Q				
0+45	0.0020	0.08	Q				
0+50	0.0027	0.10	Q				
0+55	0.0035	0.12	Q				
1+ 0	0.0044	0.13	Q				
1+ 5	0.0054	0.14	Q				
1+10	0.0064	0.15	Q				
1+15	0.0075	0.16	Q				
1+20	0.0086	0.16	Q				
1+25	0.0097	0.17	Q				
1+30	0.0109	0.17	Q				
1+35	0.0121	0.17	Q				
1+40	0.0133	0.17	Q				
1+45	0.0145	0.18	Q				
1+50	0.0157	0.18	Q				
1+55	0.0169	0.18	Q				
2+ 0	0.0182	0.18	Q				
2+ 5	0.0194	0.18	Q				
2+10	0.0207	0.18	Q				
2+15	0.0219	0.18	Q				
2+20	0.0232	0.18	Q				
2+25	0.0244	0.18	Q				
2+30	0.0257	0.18	QV				
2+35	0.0270	0.19	QV				
2+40	0.0283	0.19	QV				
2+45	0.0295	0.19	QV				
2+50	0.0308	0.19	QV				
2+55	0.0321	0.19	QV				
3+ 0	0.0334	0.19	QV				
3+ 5	0.0347	0.19	QV				
3+10	0.0360	0.19	QV				
3+15	0.0373	0.19	QV				
3+20	0.0387	0.19	QV				
3+25	0.0400	0.19	QV				
3+30	0.0413	0.19	QV				
3+35	0.0426	0.19	QV				
3+40	0.0440	0.19	QV				
3+45	0.0453	0.19	QV				
3+50	0.0467	0.20	QV				
3+55	0.0480	0.20	QV				
4+ 0	0.0494	0.20	Q V				
4+ 5	0.0507	0.20	Q V				
4+10	0.0521	0.20	Q V				
4+15	0.0535	0.20	Q V				
4+20	0.0548	0.20	Q V				
4+25	0.0562	0.20	Q V				
4+30	0.0576	0.20	Q V				
4+35	0.0590	0.20	Q V				
4+40	0.0604	0.20	Q V				
4+45	0.0618	0.20	Q V				
4+50	0.0632	0.20	Q V				
4+55	0.0646	0.21	Q V				
5+ 0	0.0660	0.21	Q V				
5+ 5	0.0674	0.21	Q V				

5+10	0.0689	0.21	Q V	|	|	|	|
5+15	0.0703	0.21	Q V	|	|	|	|
5+20	0.0717	0.21	Q V	|	|	|	|
5+25	0.0732	0.21	Q V	|	|	|	|
5+30	0.0746	0.21	Q V	|	|	|	|
5+35	0.0761	0.21	Q V	|	|	|	|
5+40	0.0776	0.21	Q V	|	|	|	|
5+45	0.0790	0.21	Q V	|	|	|	|
5+50	0.0805	0.21	Q V	|	|	|	|
5+55	0.0820	0.22	Q V	|	|	|	|
6+ 0	0.0835	0.22	Q V	|	|	|	|
6+ 5	0.0850	0.22	Q V	|	|	|	|
6+10	0.0865	0.22	Q V	|	|	|	|
6+15	0.0880	0.22	Q V	|	|	|	|
6+20	0.0895	0.22	Q V	|	|	|	|
6+25	0.0910	0.22	Q V	|	|	|	|
6+30	0.0926	0.22	Q V	|	|	|	|
6+35	0.0941	0.22	Q V	|	|	|	|
6+40	0.0957	0.22	Q V	|	|	|	|
6+45	0.0972	0.23	Q V	|	|	|	|
6+50	0.0988	0.23	Q V	|	|	|	|
6+55	0.1003	0.23	Q V	|	|	|	|
7+ 0	0.1019	0.23	Q V	|	|	|	|
7+ 5	0.1035	0.23	Q V	|	|	|	|
7+10	0.1051	0.23	Q V	|	|	|	|
7+15	0.1067	0.23	Q V	|	|	|	|
7+20	0.1083	0.23	Q V	|	|	|	|
7+25	0.1099	0.23	Q V	|	|	|	|
7+30	0.1115	0.24	Q V	|	|	|	|
7+35	0.1132	0.24	Q V	|	|	|	|
7+40	0.1148	0.24	Q V	|	|	|	|
7+45	0.1164	0.24	Q V	|	|	|	|
7+50	0.1181	0.24	Q V	|	|	|	|
7+55	0.1198	0.24	Q V	|	|	|	|
8+ 0	0.1214	0.24	Q V	|	|	|	|
8+ 5	0.1231	0.24	Q V	|	|	|	|
8+10	0.1248	0.25	Q V	|	|	|	|
8+15	0.1265	0.25	Q V	|	|	|	|
8+20	0.1282	0.25	Q V	|	|	|	|
8+25	0.1299	0.25	Q V	|	|	|	|
8+30	0.1317	0.25	|Q V	|	|	|	|
8+35	0.1334	0.25	|Q V	|	|	|	|
8+40	0.1351	0.25	|Q V	|	|	|	|
8+45	0.1369	0.26	|Q V	|	|	|	|
8+50	0.1387	0.26	|Q V	|	|	|	|
8+55	0.1405	0.26	|Q V	|	|	|	|
9+ 0	0.1422	0.26	|Q V	|	|	|	|
9+ 5	0.1440	0.26	|Q V	|	|	|	|
9+10	0.1459	0.26	|Q V	|	|	|	|
9+15	0.1477	0.26	|Q V	|	|	|	|
9+20	0.1495	0.27	|Q V	|	|	|	|
9+25	0.1514	0.27	|Q V	|	|	|	|
9+30	0.1532	0.27	|Q V	|	|	|	|
9+35	0.1551	0.27	|Q V	|	|	|	|
9+40	0.1570	0.27	|Q V	|	|	|	|
9+45	0.1589	0.28	|Q V	|	|	|	|
9+50	0.1608	0.28	|Q V	|	|	|	|

9+55	0.1627	0.28	|Q V |				
10+ 0	0.1646	0.28	|Q V |				
10+ 5	0.1666	0.28	|Q V |				
10+10	0.1685	0.28	|Q V |				
10+15	0.1705	0.29	|Q V |				
10+20	0.1725	0.29	|Q V |				
10+25	0.1745	0.29	|Q V |				
10+30	0.1765	0.29	|Q V |				
10+35	0.1786	0.30	|Q V |				
10+40	0.1806	0.30	|Q V |				
10+45	0.1827	0.30	|Q V |				
10+50	0.1848	0.30	|Q V |				
10+55	0.1869	0.30	|Q V |				
11+ 0	0.1890	0.31	|Q V |				
11+ 5	0.1911	0.31	|Q V |				
11+10	0.1933	0.31	|Q V |				
11+15	0.1954	0.31	|Q V |				
11+20	0.1976	0.32	|Q V |				
11+25	0.1998	0.32	|Q V |				
11+30	0.2021	0.32	|Q V |				
11+35	0.2043	0.33	|Q V |				
11+40	0.2066	0.33	|Q V |				
11+45	0.2089	0.33	|Q V |				
11+50	0.2112	0.34	|Q V |				
11+55	0.2135	0.34	|Q V |				
12+ 0	0.2158	0.34	|Q V |				
12+ 5	0.2182	0.35	|Q V |				
12+10	0.2206	0.35	|Q V|				
12+15	0.2231	0.36	|Q V|				
12+20	0.2256	0.36	|Q V|				
12+25	0.2281	0.37	|Q V|				
12+30	0.2307	0.38	|Q V|				
12+35	0.2334	0.39	|Q V|				
12+40	0.2361	0.40	|Q V|				
12+45	0.2390	0.41	|Q V|				
12+50	0.2419	0.42	|Q V|				
12+55	0.2448	0.43	|Q V|				
13+ 0	0.2479	0.44	|Q V				
13+ 5	0.2510	0.45	|Q V				
13+10	0.2541	0.46	|Q V				
13+15	0.2573	0.47	|Q V				
13+20	0.2606	0.47	|Q V				
13+25	0.2639	0.48	|Q V				
13+30	0.2673	0.49	|Q V				
13+35	0.2707	0.49	|Q |V				
13+40	0.2741	0.50	| Q |V				
13+45	0.2776	0.51	| Q |V				
13+50	0.2812	0.52	| Q |V				
13+55	0.2848	0.52	| Q |V				
14+ 0	0.2885	0.53	| Q |V				
14+ 5	0.2922	0.54	| Q |V				
14+10	0.2960	0.55	| Q | V				
14+15	0.2998	0.56	| Q | V				
14+20	0.3037	0.57	| Q | V				
14+25	0.3077	0.58	| Q | V				
14+30	0.3117	0.59	| Q | V				
14+35	0.3158	0.60	| Q | V				



19+25	0.8789	0.34	|Q	|	|	|	V |
19+30	0.8812	0.33	|Q	|	|	|	V |
19+35	0.8834	0.32	|Q	|	|	|	V |
19+40	0.8856	0.32	|Q	|	|	|	V |
19+45	0.8877	0.31	|Q	|	|	|	V |
19+50	0.8898	0.31	|Q	|	|	|	V |
19+55	0.8919	0.30	|Q	|	|	|	V |
20+ 0	0.8939	0.30	|Q	|	|	|	V |
20+ 5	0.8959	0.29	|Q	|	|	|	V |
20+10	0.8979	0.29	|Q	|	|	|	V |
20+15	0.8999	0.28	|Q	|	|	|	V |
20+20	0.9018	0.28	|Q	|	|	|	V |
20+25	0.9037	0.28	|Q	|	|	|	V |
20+30	0.9056	0.27	|Q	|	|	|	V |
20+35	0.9074	0.27	|Q	|	|	|	V |
20+40	0.9092	0.26	|Q	|	|	|	V |
20+45	0.9110	0.26	|Q	|	|	|	V |
20+50	0.9128	0.26	|Q	|	|	|	V |
20+55	0.9146	0.25	|Q	|	|	|	V |
21+ 0	0.9163	0.25	|Q	|	|	|	V |
21+ 5	0.9180	0.25	Q	|	|	|	V |
21+10	0.9197	0.25	Q	|	|	|	V |
21+15	0.9214	0.24	Q	|	|	|	V |
21+20	0.9230	0.24	Q	|	|	|	V |
21+25	0.9247	0.24	Q	|	|	|	V |
21+30	0.9263	0.24	Q	|	|	|	V |
21+35	0.9279	0.23	Q	|	|	|	V |
21+40	0.9295	0.23	Q	|	|	|	V |
21+45	0.9311	0.23	Q	|	|	|	V |
21+50	0.9327	0.23	Q	|	|	|	V |
21+55	0.9342	0.22	Q	|	|	|	V |
22+ 0	0.9357	0.22	Q	|	|	|	V |
22+ 5	0.9373	0.22	Q	|	|	|	V |
22+10	0.9388	0.22	Q	|	|	|	V |
22+15	0.9403	0.22	Q	|	|	|	V |
22+20	0.9417	0.22	Q	|	|	|	V |
22+25	0.9432	0.21	Q	|	|	|	V |
22+30	0.9447	0.21	Q	|	|	|	V |
22+35	0.9461	0.21	Q	|	|	|	V |
22+40	0.9475	0.21	Q	|	|	|	V |
22+45	0.9490	0.21	Q	|	|	|	V |
22+50	0.9504	0.20	Q	|	|	|	V |
22+55	0.9518	0.20	Q	|	|	|	V |
23+ 0	0.9532	0.20	Q	|	|	|	V |
23+ 5	0.9545	0.20	Q	|	|	|	V |
23+10	0.9559	0.20	Q	|	|	|	V |
23+15	0.9573	0.20	Q	|	|	|	V|
23+20	0.9586	0.20	Q	|	|	|	V|
23+25	0.9599	0.19	Q	|	|	|	V|
23+30	0.9613	0.19	Q	|	|	|	V|
23+35	0.9626	0.19	Q	|	|	|	V|
23+40	0.9639	0.19	Q	|	|	|	V|
23+45	0.9652	0.19	Q	|	|	|	V|
23+50	0.9665	0.19	Q	|	|	|	V|
23+55	0.9678	0.19	Q	|	|	|	V|
24+ 0	0.9691	0.19	Q	|	|	|	V|
24+ 5	0.9703	0.18	Q	|	|	|	V|

24+10	0.9715	0.18	Q	|	|	|	V|
24+15	0.9727	0.17	Q	|	|	|	V|
24+20	0.9739	0.17	Q	|	|	|	V|
24+25	0.9749	0.15	Q	|	|	|	V|
24+30	0.9759	0.14	Q	|	|	|	V|
24+35	0.9768	0.13	Q	|	|	|	V|
24+40	0.9776	0.11	Q	|	|	|	V|
24+45	0.9782	0.09	Q	|	|	|	V|
24+50	0.9787	0.08	Q	|	|	|	V|
24+55	0.9791	0.06	Q	|	|	|	V|
25+ 0	0.9794	0.05	Q	|	|	|	V|
25+ 5	0.9797	0.04	Q	|	|	|	V|
25+10	0.9799	0.03	Q	|	|	|	V|
25+15	0.9800	0.02	Q	|	|	|	V|
25+20	0.9801	0.02	Q	|	|	|	V|
25+25	0.9802	0.01	Q	|	|	|	V|
25+30	0.9803	0.01	Q	|	|	|	V|
25+35	0.9803	0.01	Q	|	|	|	V|
25+40	0.9804	0.01	Q	|	|	|	V|
25+45	0.9804	0.00	Q	|	|	|	V|
25+50	0.9804	0.00	Q	|	|	|	V|
25+55	0.9804	0.00	Q	|	|	|	V|
26+ 0	0.9804	0.00	Q	|	|	|	V|
26+ 5	0.9805	0.00	Q	|	|	|	V|
26+10	0.9805	0.00	Q	|	|	|	V|
26+15	0.9805	0.00	Q	|	|	|	V|
26+20	0.9805	0.00	Q	|	|	|	V|
26+25	0.9805	0.00	Q	|	|	|	V|
26+30	0.9805	0.00	Q	|	|	|	V

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
OFFSITE EXISTING CONDITION - WATERSHED B
100-YEAR STORM EVENT ANALYSIS

Storm Event Year = 100

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 100		
29.52	1	1.30
Rainfall data for year 100		
29.52	6	3.07
Rainfall data for year 100		
29.52	24	5.64

++

******** 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)
32.0	32.0	29.52	1.000	0.978	0.778	0.761

Area-averaged adjusted loss rate Fm (In/Hr) = 0.761

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
22.97	0.778	32.0	32.0	21.25	0.015
6.55	0.222	98.0	98.0	0.20	0.958

Area-averaged catchment yield fraction, Y = 0.224
Area-averaged low loss fraction, Yb = 0.776
User entry of time of concentration = 0.364 (hours)
++
Watershed area = 29.52(Ac.)
Catchment Lag time = 0.291 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 28.5936
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.761(In/Hr)
Average low loss rate fraction (Yb) = 0.776 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.481(In)
Computed peak 30-minute rainfall = 0.985(In)
Specified peak 1-hour rainfall = 1.300(In)
Computed peak 3-hour rainfall = 2.202(In)
Specified peak 6-hour rainfall = 3.070(In)
Specified peak 24-hour rainfall = 5.640(In)

Rainfall depth area reduction factors:
Using a total area of 29.52(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.480(In)
30-minute factor = 0.999 Adjusted rainfall = 0.984(In)
1-hour factor = 0.999 Adjusted rainfall = 1.298(In)
3-hour factor = 1.000 Adjusted rainfall = 2.201(In)
6-hour factor = 1.000 Adjusted rainfall = 3.070(In)
24-hour factor = 1.000 Adjusted rainfall = 5.640(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 = 357.01 (CFS))	
1	1.824	6.514
2	10.051	29.370
3	26.783	59.734
4	49.561	81.320
5	72.326	81.271
6	85.305	46.336
7	92.343	25.126

8	96.293	14.103
9	98.094	6.429
10	98.690	2.127
11	99.204	1.837
12	99.716	1.827
13	100.000	1.014

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.4805	0.4805
2	0.6340	0.1535
3	0.7456	0.1116
4	0.8366	0.0909
5	0.9147	0.0781
6	0.9839	0.0692
7	1.0464	0.0626
8	1.1038	0.0574
9	1.1571	0.0532
10	1.2069	0.0498
11	1.2538	0.0469
12	1.2982	0.0444
13	1.3491	0.0509
14	1.3981	0.0489
15	1.4452	0.0471
16	1.4907	0.0455
17	1.5348	0.0441
18	1.5776	0.0428
19	1.6191	0.0415
20	1.6595	0.0404
21	1.6989	0.0394
22	1.7373	0.0384
23	1.7748	0.0375
24	1.8115	0.0367
25	1.8474	0.0359
26	1.8826	0.0352
27	1.9171	0.0345
28	1.9509	0.0338
29	1.9840	0.0332
30	2.0166	0.0326
31	2.0487	0.0320
32	2.0802	0.0315
33	2.1112	0.0310
34	2.1417	0.0305
35	2.1717	0.0301
36	2.2014	0.0296
37	2.2305	0.0291
38	2.2592	0.0287
39	2.2875	0.0283
40	2.3155	0.0280
41	2.3431	0.0276
42	2.3703	0.0272
43	2.3972	0.0269
44	2.4238	0.0266
45	2.4501	0.0263
46	2.4760	0.0260
47	2.5017	0.0257
48	2.5271	0.0254

49	2.5522	0.0251
50	2.5771	0.0249
51	2.6017	0.0246
52	2.6260	0.0243
53	2.6501	0.0241
54	2.6740	0.0239
55	2.6977	0.0236
56	2.7211	0.0234
57	2.7443	0.0232
58	2.7673	0.0230
59	2.7901	0.0228
60	2.8126	0.0226
61	2.8350	0.0224
62	2.8572	0.0222
63	2.8792	0.0220
64	2.9011	0.0218
65	2.9227	0.0217
66	2.9442	0.0215
67	2.9655	0.0213
68	2.9867	0.0212
69	3.0077	0.0210
70	3.0285	0.0208
71	3.0492	0.0207
72	3.0697	0.0205
73	3.0884	0.0186
74	3.1068	0.0185
75	3.1252	0.0184
76	3.1434	0.0182
77	3.1615	0.0181
78	3.1794	0.0179
79	3.1973	0.0178
80	3.2150	0.0177
81	3.2325	0.0176
82	3.2500	0.0174
83	3.2673	0.0173
84	3.2845	0.0172
85	3.3016	0.0171
86	3.3186	0.0170
87	3.3355	0.0169
88	3.3523	0.0168
89	3.3689	0.0167
90	3.3855	0.0166
91	3.4019	0.0165
92	3.4183	0.0164
93	3.4345	0.0163
94	3.4507	0.0162
95	3.4667	0.0161
96	3.4827	0.0160
97	3.4986	0.0159
98	3.5144	0.0158
99	3.5301	0.0157
100	3.5457	0.0156
101	3.5612	0.0155
102	3.5766	0.0154
103	3.5919	0.0153
104	3.6072	0.0153
105	3.6224	0.0152

106	3.6375	0.0151
107	3.6525	0.0150
108	3.6674	0.0149
109	3.6823	0.0149
110	3.6971	0.0148
111	3.7118	0.0147
112	3.7264	0.0146
113	3.7410	0.0146
114	3.7555	0.0145
115	3.7699	0.0144
116	3.7842	0.0143
117	3.7985	0.0143
118	3.8127	0.0142
119	3.8269	0.0141
120	3.8409	0.0141
121	3.8550	0.0140
122	3.8689	0.0139
123	3.8828	0.0139
124	3.8966	0.0138
125	3.9104	0.0138
126	3.9241	0.0137
127	3.9377	0.0136
128	3.9513	0.0136
129	3.9648	0.0135
130	3.9782	0.0135
131	3.9916	0.0134
132	4.0050	0.0133
133	4.0183	0.0133
134	4.0315	0.0132
135	4.0447	0.0132
136	4.0578	0.0131
137	4.0708	0.0131
138	4.0839	0.0130
139	4.0968	0.0130
140	4.1097	0.0129
141	4.1226	0.0129
142	4.1354	0.0128
143	4.1481	0.0128
144	4.1608	0.0127
145	4.1735	0.0127
146	4.1861	0.0126
147	4.1987	0.0126
148	4.2112	0.0125
149	4.2236	0.0125
150	4.2360	0.0124
151	4.2484	0.0124
152	4.2607	0.0123
153	4.2730	0.0123
154	4.2852	0.0122
155	4.2974	0.0122
156	4.3096	0.0121
157	4.3217	0.0121
158	4.3337	0.0121
159	4.3457	0.0120
160	4.3577	0.0120
161	4.3696	0.0119
162	4.3815	0.0119

163	4.3934	0.0118
164	4.4052	0.0118
165	4.4169	0.0118
166	4.4287	0.0117
167	4.4403	0.0117
168	4.4520	0.0116
169	4.4636	0.0116
170	4.4752	0.0116
171	4.4867	0.0115
172	4.4982	0.0115
173	4.5097	0.0115
174	4.5211	0.0114
175	4.5325	0.0114
176	4.5438	0.0113
177	4.5551	0.0113
178	4.5664	0.0113
179	4.5776	0.0112
180	4.5888	0.0112
181	4.6000	0.0112
182	4.6111	0.0111
183	4.6222	0.0111
184	4.6333	0.0111
185	4.6443	0.0110
186	4.6553	0.0110
187	4.6663	0.0110
188	4.6772	0.0109
189	4.6881	0.0109
190	4.6990	0.0109
191	4.7098	0.0108
192	4.7206	0.0108
193	4.7314	0.0108
194	4.7421	0.0107
195	4.7529	0.0107
196	4.7635	0.0107
197	4.7742	0.0106
198	4.7848	0.0106
199	4.7954	0.0106
200	4.8059	0.0106
201	4.8165	0.0105
202	4.8270	0.0105
203	4.8374	0.0105
204	4.8479	0.0104
205	4.8583	0.0104
206	4.8687	0.0104
207	4.8790	0.0104
208	4.8894	0.0103
209	4.8997	0.0103
210	4.9099	0.0103
211	4.9202	0.0102
212	4.9304	0.0102
213	4.9406	0.0102
214	4.9508	0.0102
215	4.9609	0.0101
216	4.9710	0.0101
217	4.9811	0.0101
218	4.9911	0.0101
219	5.0012	0.0100

220	5.0112	0.0100
221	5.0212	0.0100
222	5.0311	0.0100
223	5.0411	0.0099
224	5.0510	0.0099
225	5.0608	0.0099
226	5.0707	0.0099
227	5.0805	0.0098
228	5.0903	0.0098
229	5.1001	0.0098
230	5.1099	0.0098
231	5.1196	0.0097
232	5.1293	0.0097
233	5.1390	0.0097
234	5.1487	0.0097
235	5.1583	0.0096
236	5.1679	0.0096
237	5.1775	0.0096
238	5.1871	0.0096
239	5.1967	0.0096
240	5.2062	0.0095
241	5.2157	0.0095
242	5.2252	0.0095
243	5.2347	0.0095
244	5.2441	0.0094
245	5.2535	0.0094
246	5.2629	0.0094
247	5.2723	0.0094
248	5.2816	0.0094
249	5.2910	0.0093
250	5.3003	0.0093
251	5.3096	0.0093
252	5.3189	0.0093
253	5.3281	0.0093
254	5.3373	0.0092
255	5.3465	0.0092
256	5.3557	0.0092
257	5.3649	0.0092
258	5.3741	0.0091
259	5.3832	0.0091
260	5.3923	0.0091
261	5.4014	0.0091
262	5.4105	0.0091
263	5.4195	0.0091
264	5.4285	0.0090
265	5.4375	0.0090
266	5.4465	0.0090
267	5.4555	0.0090
268	5.4645	0.0090
269	5.4734	0.0089
270	5.4823	0.0089
271	5.4912	0.0089
272	5.5001	0.0089
273	5.5090	0.0089
274	5.5178	0.0088
275	5.5266	0.0088
276	5.5355	0.0088

277	5.5442	0.0088
278	5.5530	0.0088
279	5.5618	0.0088
280	5.5705	0.0087
281	5.5792	0.0087
282	5.5879	0.0087
283	5.5966	0.0087
284	5.6053	0.0087
285	5.6139	0.0087
286	5.6226	0.0086
287	5.6312	0.0086
288	5.6398	0.0086

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0086	0.0067	0.0019
2	0.0086	0.0067	0.0019
3	0.0087	0.0067	0.0019
4	0.0087	0.0067	0.0019
5	0.0087	0.0067	0.0020
6	0.0087	0.0068	0.0020
7	0.0088	0.0068	0.0020
8	0.0088	0.0068	0.0020
9	0.0088	0.0068	0.0020
10	0.0088	0.0068	0.0020
11	0.0089	0.0069	0.0020
12	0.0089	0.0069	0.0020
13	0.0089	0.0069	0.0020
14	0.0089	0.0069	0.0020
15	0.0090	0.0070	0.0020
16	0.0090	0.0070	0.0020
17	0.0090	0.0070	0.0020
18	0.0091	0.0070	0.0020
19	0.0091	0.0071	0.0020
20	0.0091	0.0071	0.0020
21	0.0091	0.0071	0.0021
22	0.0092	0.0071	0.0021
23	0.0092	0.0071	0.0021
24	0.0092	0.0072	0.0021
25	0.0093	0.0072	0.0021
26	0.0093	0.0072	0.0021
27	0.0093	0.0072	0.0021
28	0.0094	0.0073	0.0021
29	0.0094	0.0073	0.0021
30	0.0094	0.0073	0.0021
31	0.0095	0.0073	0.0021
32	0.0095	0.0074	0.0021
33	0.0095	0.0074	0.0021
34	0.0096	0.0074	0.0021
35	0.0096	0.0074	0.0022
36	0.0096	0.0075	0.0022
37	0.0097	0.0075	0.0022
38	0.0097	0.0075	0.0022
39	0.0097	0.0076	0.0022
40	0.0098	0.0076	0.0022

41	0.0098	0.0076	0.0022
42	0.0098	0.0076	0.0022
43	0.0099	0.0077	0.0022
44	0.0099	0.0077	0.0022
45	0.0100	0.0077	0.0022
46	0.0100	0.0077	0.0022
47	0.0100	0.0078	0.0023
48	0.0101	0.0078	0.0023
49	0.0101	0.0078	0.0023
50	0.0101	0.0079	0.0023
51	0.0102	0.0079	0.0023
52	0.0102	0.0079	0.0023
53	0.0103	0.0080	0.0023
54	0.0103	0.0080	0.0023
55	0.0104	0.0080	0.0023
56	0.0104	0.0081	0.0023
57	0.0104	0.0081	0.0023
58	0.0105	0.0081	0.0023
59	0.0105	0.0082	0.0024
60	0.0106	0.0082	0.0024
61	0.0106	0.0082	0.0024
62	0.0106	0.0083	0.0024
63	0.0107	0.0083	0.0024
64	0.0107	0.0083	0.0024
65	0.0108	0.0084	0.0024
66	0.0108	0.0084	0.0024
67	0.0109	0.0085	0.0024
68	0.0109	0.0085	0.0025
69	0.0110	0.0085	0.0025
70	0.0110	0.0086	0.0025
71	0.0111	0.0086	0.0025
72	0.0111	0.0086	0.0025
73	0.0112	0.0087	0.0025
74	0.0112	0.0087	0.0025
75	0.0113	0.0088	0.0025
76	0.0113	0.0088	0.0025
77	0.0114	0.0089	0.0026
78	0.0115	0.0089	0.0026
79	0.0115	0.0089	0.0026
80	0.0116	0.0090	0.0026
81	0.0116	0.0090	0.0026
82	0.0117	0.0091	0.0026
83	0.0118	0.0091	0.0026
84	0.0118	0.0092	0.0026
85	0.0119	0.0092	0.0027
86	0.0119	0.0093	0.0027
87	0.0120	0.0093	0.0027
88	0.0121	0.0094	0.0027
89	0.0121	0.0094	0.0027
90	0.0122	0.0095	0.0027
91	0.0123	0.0095	0.0028
92	0.0123	0.0096	0.0028
93	0.0124	0.0096	0.0028
94	0.0125	0.0097	0.0028
95	0.0126	0.0097	0.0028
96	0.0126	0.0098	0.0028
97	0.0127	0.0099	0.0029

98	0.0128	0.0099	0.0029
99	0.0129	0.0100	0.0029
100	0.0129	0.0100	0.0029
101	0.0130	0.0101	0.0029
102	0.0131	0.0101	0.0029
103	0.0132	0.0102	0.0030
104	0.0132	0.0103	0.0030
105	0.0133	0.0103	0.0030
106	0.0134	0.0104	0.0030
107	0.0135	0.0105	0.0030
108	0.0136	0.0105	0.0030
109	0.0137	0.0106	0.0031
110	0.0138	0.0107	0.0031
111	0.0139	0.0108	0.0031
112	0.0139	0.0108	0.0031
113	0.0141	0.0109	0.0032
114	0.0141	0.0110	0.0032
115	0.0143	0.0111	0.0032
116	0.0143	0.0111	0.0032
117	0.0145	0.0112	0.0033
118	0.0146	0.0113	0.0033
119	0.0147	0.0114	0.0033
120	0.0148	0.0115	0.0033
121	0.0149	0.0116	0.0034
122	0.0150	0.0116	0.0034
123	0.0152	0.0118	0.0034
124	0.0153	0.0118	0.0034
125	0.0154	0.0120	0.0035
126	0.0155	0.0120	0.0035
127	0.0157	0.0122	0.0035
128	0.0158	0.0122	0.0035
129	0.0160	0.0124	0.0036
130	0.0161	0.0125	0.0036
131	0.0163	0.0126	0.0036
132	0.0164	0.0127	0.0037
133	0.0166	0.0128	0.0037
134	0.0167	0.0129	0.0037
135	0.0169	0.0131	0.0038
136	0.0170	0.0132	0.0038
137	0.0172	0.0134	0.0039
138	0.0173	0.0134	0.0039
139	0.0176	0.0136	0.0039
140	0.0177	0.0137	0.0040
141	0.0179	0.0139	0.0040
142	0.0181	0.0140	0.0041
143	0.0184	0.0142	0.0041
144	0.0185	0.0143	0.0041
145	0.0205	0.0159	0.0046
146	0.0207	0.0160	0.0046
147	0.0210	0.0163	0.0047
148	0.0212	0.0164	0.0047
149	0.0215	0.0167	0.0048
150	0.0217	0.0168	0.0049
151	0.0220	0.0171	0.0049
152	0.0222	0.0172	0.0050
153	0.0226	0.0175	0.0051
154	0.0228	0.0177	0.0051

155	0.0232	0.0180	0.0052
156	0.0234	0.0182	0.0053
157	0.0239	0.0185	0.0054
158	0.0241	0.0187	0.0054
159	0.0246	0.0191	0.0055
160	0.0249	0.0193	0.0056
161	0.0254	0.0197	0.0057
162	0.0257	0.0199	0.0058
163	0.0263	0.0204	0.0059
164	0.0266	0.0206	0.0060
165	0.0272	0.0211	0.0061
166	0.0276	0.0214	0.0062
167	0.0283	0.0220	0.0064
168	0.0287	0.0223	0.0064
169	0.0296	0.0230	0.0066
170	0.0301	0.0233	0.0067
171	0.0310	0.0240	0.0070
172	0.0315	0.0244	0.0071
173	0.0326	0.0253	0.0073
174	0.0332	0.0257	0.0074
175	0.0345	0.0267	0.0077
176	0.0352	0.0273	0.0079
177	0.0367	0.0285	0.0082
178	0.0375	0.0291	0.0084
179	0.0394	0.0305	0.0088
180	0.0404	0.0313	0.0091
181	0.0428	0.0332	0.0096
182	0.0441	0.0342	0.0099
183	0.0471	0.0366	0.0106
184	0.0489	0.0379	0.0110
185	0.0444	0.0344	0.0100
186	0.0469	0.0364	0.0105
187	0.0532	0.0413	0.0120
188	0.0574	0.0445	0.0129
189	0.0692	0.0537	0.0155
190	0.0781	0.0606	0.0175
191	0.1116	0.0634	0.0482
192	0.1535	0.0634	0.0901
193	0.4805	0.0634	0.4171
194	0.0909	0.0634	0.0275
195	0.0626	0.0485	0.0140
196	0.0498	0.0386	0.0112
197	0.0509	0.0395	0.0114
198	0.0455	0.0353	0.0102
199	0.0415	0.0322	0.0093
200	0.0384	0.0298	0.0086
201	0.0359	0.0278	0.0081
202	0.0338	0.0262	0.0076
203	0.0320	0.0248	0.0072
204	0.0305	0.0237	0.0068
205	0.0291	0.0226	0.0065
206	0.0280	0.0217	0.0063
207	0.0269	0.0209	0.0060
208	0.0260	0.0201	0.0058
209	0.0251	0.0195	0.0056
210	0.0243	0.0189	0.0055
211	0.0236	0.0183	0.0053

212	0.0230	0.0178	0.0052
213	0.0224	0.0174	0.0050
214	0.0218	0.0169	0.0049
215	0.0213	0.0165	0.0048
216	0.0208	0.0162	0.0047
217	0.0186	0.0145	0.0042
218	0.0182	0.0141	0.0041
219	0.0178	0.0138	0.0040
220	0.0174	0.0135	0.0039
221	0.0171	0.0133	0.0038
222	0.0168	0.0130	0.0038
223	0.0165	0.0128	0.0037
224	0.0162	0.0125	0.0036
225	0.0159	0.0123	0.0036
226	0.0156	0.0121	0.0035
227	0.0153	0.0119	0.0034
228	0.0151	0.0117	0.0034
229	0.0149	0.0115	0.0033
230	0.0146	0.0114	0.0033
231	0.0144	0.0112	0.0032
232	0.0142	0.0110	0.0032
233	0.0140	0.0109	0.0031
234	0.0138	0.0107	0.0031
235	0.0136	0.0106	0.0031
236	0.0135	0.0104	0.0030
237	0.0133	0.0103	0.0030
238	0.0131	0.0102	0.0029
239	0.0130	0.0101	0.0029
240	0.0128	0.0099	0.0029
241	0.0127	0.0098	0.0028
242	0.0125	0.0097	0.0028
243	0.0124	0.0096	0.0028
244	0.0122	0.0095	0.0027
245	0.0121	0.0094	0.0027
246	0.0120	0.0093	0.0027
247	0.0118	0.0092	0.0027
248	0.0117	0.0091	0.0026
249	0.0116	0.0090	0.0026
250	0.0115	0.0089	0.0026
251	0.0114	0.0088	0.0026
252	0.0113	0.0087	0.0025
253	0.0112	0.0087	0.0025
254	0.0111	0.0086	0.0025
255	0.0110	0.0085	0.0025
256	0.0109	0.0084	0.0024
257	0.0108	0.0084	0.0024
258	0.0107	0.0083	0.0024
259	0.0106	0.0082	0.0024
260	0.0105	0.0081	0.0024
261	0.0104	0.0081	0.0023
262	0.0103	0.0080	0.0023
263	0.0102	0.0079	0.0023
264	0.0102	0.0079	0.0023
265	0.0101	0.0078	0.0023
266	0.0100	0.0078	0.0022
267	0.0099	0.0077	0.0022
268	0.0099	0.0076	0.0022

269	0.0098	0.0076	0.0022
270	0.0097	0.0075	0.0022
271	0.0096	0.0075	0.0022
272	0.0096	0.0074	0.0021
273	0.0095	0.0074	0.0021
274	0.0094	0.0073	0.0021
275	0.0094	0.0073	0.0021
276	0.0093	0.0072	0.0021
277	0.0093	0.0072	0.0021
278	0.0092	0.0071	0.0021
279	0.0091	0.0071	0.0020
280	0.0091	0.0070	0.0020
281	0.0090	0.0070	0.0020
282	0.0090	0.0069	0.0020
283	0.0089	0.0069	0.0020
284	0.0088	0.0069	0.0020
285	0.0088	0.0068	0.0020
286	0.0087	0.0068	0.0020
287	0.0087	0.0067	0.0019
288	0.0086	0.0067	0.0019

Total soil rain loss = 3.98(In)
Total effective rainfall = 1.66(In)
Peak flow rate in flood hydrograph = 46.42(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

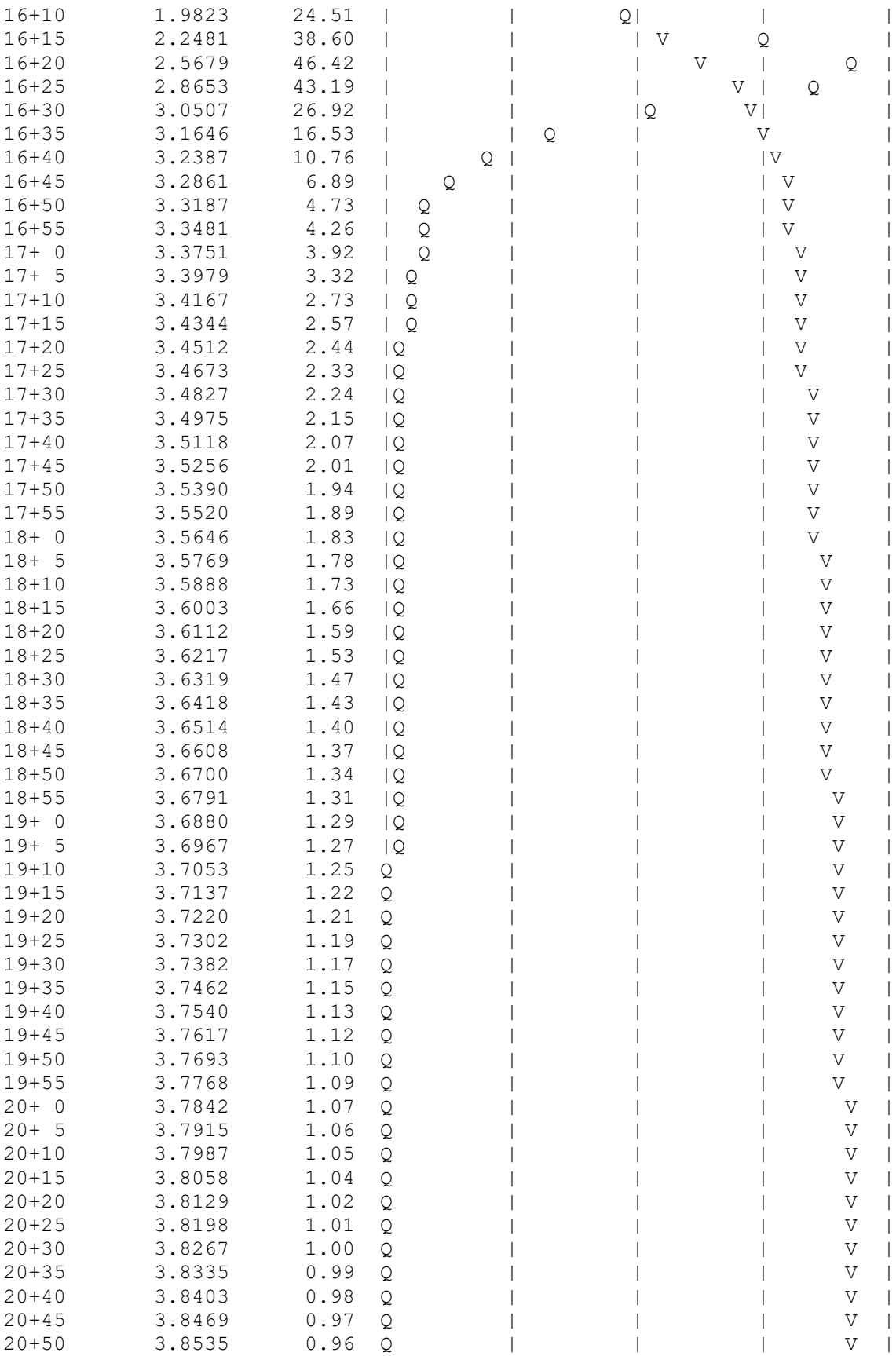
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0001	0.01	Q	|	|	|	|
0+10	0.0006	0.07	Q	|	|	|	|
0+15	0.0018	0.18	Q	|	|	|	|
0+20	0.0042	0.34	Q	|	|	|	|
0+25	0.0076	0.50	Q	|	|	|	|
0+30	0.0117	0.59	Q	|	|	|	|
0+35	0.0161	0.64	Q	|	|	|	|
0+40	0.0207	0.67	Q	|	|	|	|
0+45	0.0254	0.68	Q	|	|	|	|
0+50	0.0302	0.69	Q	|	|	|	|
0+55	0.0350	0.70	Q	|	|	|	|
1+ 0	0.0398	0.70	Q	|	|	|	|
1+ 5	0.0447	0.71	Q	|	|	|	|
1+10	0.0496	0.71	Q	|	|	|	|
1+15	0.0545	0.71	Q	|	|	|	|
1+20	0.0594	0.71	Q	|	|	|	|
1+25	0.0643	0.71	Q	|	|	|	|
1+30	0.0692	0.72	Q	|	|	|	|
1+35	0.0742	0.72	Q	|	|	|	|
1+40	0.0792	0.72	Q	|	|	|	|
1+45	0.0841	0.72	Q	|	|	|	|
1+50	0.0892	0.73	Q	|	|	|	|

1+55	0.0942	0.73	Q	|	|	|	|
2+ 0	0.0992	0.73	Q	|	|	|	|
2+ 5	0.1043	0.73	QV	|	|	|	|
2+10	0.1093	0.74	QV	|	|	|	|
2+15	0.1144	0.74	QV	|	|	|	|
2+20	0.1195	0.74	QV	|	|	|	|
2+25	0.1246	0.74	QV	|	|	|	|
2+30	0.1298	0.75	QV	|	|	|	|
2+35	0.1349	0.75	QV	|	|	|	|
2+40	0.1401	0.75	QV	|	|	|	|
2+45	0.1453	0.75	QV	|	|	|	|
2+50	0.1505	0.76	QV	|	|	|	|
2+55	0.1557	0.76	QV	|	|	|	|
3+ 0	0.1609	0.76	QV	|	|	|	|
3+ 5	0.1662	0.76	QV	|	|	|	|
3+10	0.1715	0.77	QV	|	|	|	|
3+15	0.1768	0.77	QV	|	|	|	|
3+20	0.1821	0.77	QV	|	|	|	|
3+25	0.1874	0.77	QV	|	|	|	|
3+30	0.1928	0.78	QV	|	|	|	|
3+35	0.1982	0.78	QV	|	|	|	|
3+40	0.2036	0.78	QV	|	|	|	|
3+45	0.2090	0.79	Q V	|	|	|	|
3+50	0.2144	0.79	Q V	|	|	|	|
3+55	0.2199	0.79	Q V	|	|	|	|
4+ 0	0.2253	0.80	Q V	|	|	|	|
4+ 5	0.2308	0.80	Q V	|	|	|	|
4+10	0.2364	0.80	Q V	|	|	|	|
4+15	0.2419	0.80	Q V	|	|	|	|
4+20	0.2475	0.81	Q V	|	|	|	|
4+25	0.2530	0.81	Q V	|	|	|	|
4+30	0.2586	0.81	Q V	|	|	|	|
4+35	0.2643	0.82	Q V	|	|	|	|
4+40	0.2699	0.82	Q V	|	|	|	|
4+45	0.2756	0.82	Q V	|	|	|	|
4+50	0.2813	0.83	Q V	|	|	|	|
4+55	0.2870	0.83	Q V	|	|	|	|
5+ 0	0.2927	0.83	Q V	|	|	|	|
5+ 5	0.2985	0.84	Q V	|	|	|	|
5+10	0.3043	0.84	Q V	|	|	|	|
5+15	0.3101	0.84	Q V	|	|	|	|
5+20	0.3160	0.85	Q V	|	|	|	|
5+25	0.3218	0.85	Q V	|	|	|	|
5+30	0.3277	0.85	Q V	|	|	|	|
5+35	0.3336	0.86	Q V	|	|	|	|
5+40	0.3396	0.86	Q V	|	|	|	|
5+45	0.3455	0.87	Q V	|	|	|	|
5+50	0.3515	0.87	Q V	|	|	|	|
5+55	0.3575	0.87	Q V	|	|	|	|
6+ 0	0.3636	0.88	Q V	|	|	|	|
6+ 5	0.3696	0.88	Q V	|	|	|	|
6+10	0.3758	0.89	Q V	|	|	|	|
6+15	0.3819	0.89	Q V	|	|	|	|
6+20	0.3880	0.89	Q V	|	|	|	|
6+25	0.3942	0.90	Q V	|	|	|	|
6+30	0.4004	0.90	Q V	|	|	|	|
6+35	0.4067	0.91	Q V	|	|	|	|

6+40	0.4130	0.91	Q	V	|	|	|	|
6+45	0.4193	0.92	Q	V	|	|	|	|
6+50	0.4256	0.92	Q	V	|	|	|	|
6+55	0.4320	0.92	Q	V	|	|	|	|
7+ 0	0.4384	0.93	Q	V	|	|	|	|
7+ 5	0.4448	0.93	Q	V	|	|	|	|
7+10	0.4513	0.94	Q	V	|	|	|	|
7+15	0.4578	0.94	Q	V	|	|	|	|
7+20	0.4643	0.95	Q	V	|	|	|	|
7+25	0.4709	0.95	Q	V	|	|	|	|
7+30	0.4775	0.96	Q	V	|	|	|	|
7+35	0.4841	0.96	Q	V	|	|	|	|
7+40	0.4908	0.97	Q	V	|	|	|	|
7+45	0.4975	0.97	Q	V	|	|	|	|
7+50	0.5042	0.98	Q	V	|	|	|	|
7+55	0.5110	0.98	Q	V	|	|	|	|
8+ 0	0.5178	0.99	Q	V	|	|	|	|
8+ 5	0.5247	1.00	Q	V	|	|	|	|
8+10	0.5316	1.00	Q	V	|	|	|	|
8+15	0.5385	1.01	Q	V	|	|	|	|
8+20	0.5455	1.01	Q	V	|	|	|	|
8+25	0.5525	1.02	Q	V	|	|	|	|
8+30	0.5595	1.02	Q	V	|	|	|	|
8+35	0.5666	1.03	Q	V	|	|	|	|
8+40	0.5738	1.04	Q	V	|	|	|	|
8+45	0.5810	1.04	Q	V	|	|	|	|
8+50	0.5882	1.05	Q	V	|	|	|	|
8+55	0.5955	1.06	Q	V	|	|	|	|
9+ 0	0.6028	1.06	Q	V	|	|	|	|
9+ 5	0.6102	1.07	Q	V	|	|	|	|
9+10	0.6176	1.08	Q	V	|	|	|	|
9+15	0.6251	1.08	Q	V	|	|	|	|
9+20	0.6326	1.09	Q	V	|	|	|	|
9+25	0.6401	1.10	Q	V	|	|	|	|
9+30	0.6477	1.11	Q	V	|	|	|	|
9+35	0.6554	1.11	Q	V	|	|	|	|
9+40	0.6631	1.12	Q	V	|	|	|	|
9+45	0.6709	1.13	Q	V	|	|	|	|
9+50	0.6787	1.14	Q	V	|	|	|	|
9+55	0.6866	1.15	Q	V	|	|	|	|
10+ 0	0.6946	1.15	Q	V	|	|	|	|
10+ 5	0.7026	1.16	Q	V	|	|	|	|
10+10	0.7107	1.17	Q	V	|	|	|	|
10+15	0.7188	1.18	Q	V	|	|	|	|
10+20	0.7270	1.19	Q	V	|	|	|	|
10+25	0.7352	1.20	Q	V	|	|	|	|
10+30	0.7435	1.21	Q	V	|	|	|	|
10+35	0.7519	1.22	Q	V	|	|	|	|
10+40	0.7604	1.23	Q	V	|	|	|	|
10+45	0.7689	1.24	Q	V	|	|	|	|
10+50	0.7775	1.25	Q	V	|	|	|	|
10+55	0.7862	1.26	|Q	V	|	|	|	|
11+ 0	0.7949	1.27	|Q	V	|	|	|	|
11+ 5	0.8037	1.28	|Q	V	|	|	|	|
11+10	0.8127	1.29	|Q	V	|	|	|	|
11+15	0.8216	1.30	|Q	V	|	|	|	|
11+20	0.8307	1.32	|Q	V	|	|	|	|

11+25	0.8399	1.33	Q V			
11+30	0.8491	1.34	Q V			
11+35	0.8584	1.35	Q V			
11+40	0.8678	1.37	Q V			
11+45	0.8774	1.38	Q V			
11+50	0.8870	1.40	Q V			
11+55	0.8967	1.41	Q V			
12+ 0	0.9065	1.43	Q V			
12+ 5	0.9164	1.44	Q V			
12+10	0.9266	1.47	Q V			
12+15	0.9370	1.51	Q V			
12+20	0.9477	1.56	Q V			
12+25	0.9588	1.61	Q V			
12+30	0.9701	1.65	Q V			
12+35	0.9817	1.67	Q V			
12+40	0.9934	1.70	Q V			
12+45	1.0053	1.72	Q V			
12+50	1.0173	1.74	Q V			
12+55	1.0294	1.77	Q V			
13+ 0	1.0418	1.79	Q V			
13+ 5	1.0543	1.81	Q V			
13+10	1.0669	1.84	Q V			
13+15	1.0798	1.86	Q V			
13+20	1.0928	1.89	Q V			
13+25	1.1060	1.92	Q V			
13+30	1.1194	1.95	Q V			
13+35	1.1330	1.98	Q V			
13+40	1.1469	2.01	Q V			
13+45	1.1609	2.04	Q V			
13+50	1.1752	2.08	Q V			
13+55	1.1898	2.11	Q V			
14+ 0	1.2046	2.15	Q V			
14+ 5	1.2197	2.19	Q V			
14+10	1.2351	2.24	Q V			
14+15	1.2508	2.28	Q V			
14+20	1.2669	2.33	Q V			
14+25	1.2833	2.38	Q V			
14+30	1.3001	2.44	Q V			
14+35	1.3173	2.50	Q V			
14+40	1.3349	2.56	Q V			
14+45	1.3531	2.63	Q V			
14+50	1.3717	2.70	Q V			
14+55	1.3909	2.78	Q V			
15+ 0	1.4106	2.87	Q V			
15+ 5	1.4311	2.97	Q V			
15+10	1.4523	3.08	Q V			
15+15	1.4743	3.20	Q V			
15+20	1.4972	3.33	Q V			
15+25	1.5211	3.47	Q V			
15+30	1.5458	3.59	Q V			
15+35	1.5711	3.67	Q V			
15+40	1.5970	3.76	Q V			
15+45	1.6238	3.89	Q V			
15+50	1.6526	4.18	Q V			
15+55	1.6857	4.80	Q V			
16+ 0	1.7301	6.46	Q V			
16+ 5	1.8135	12.11	Q V			



20+55	3.8600	0.95	Q	|	|	|	V |
21+ 0	3.8665	0.94	Q	|	|	|	V |
21+ 5	3.8729	0.93	Q	|	|	|	V |
21+10	3.8792	0.92	Q	|	|	|	V |
21+15	3.8855	0.91	Q	|	|	|	V |
21+20	3.8917	0.90	Q	|	|	|	V |
21+25	3.8978	0.89	Q	|	|	|	V |
21+30	3.9039	0.88	Q	|	|	|	V |
21+35	3.9099	0.88	Q	|	|	|	V |
21+40	3.9159	0.87	Q	|	|	|	V |
21+45	3.9219	0.86	Q	|	|	|	V |
21+50	3.9277	0.85	Q	|	|	|	V |
21+55	3.9336	0.85	Q	|	|	|	V |
22+ 0	3.9393	0.84	Q	|	|	|	V |
22+ 5	3.9451	0.83	Q	|	|	|	V |
22+10	3.9508	0.83	Q	|	|	|	V |
22+15	3.9564	0.82	Q	|	|	|	V |
22+20	3.9620	0.81	Q	|	|	|	V |
22+25	3.9676	0.81	Q	|	|	|	V |
22+30	3.9731	0.80	Q	|	|	|	V |
22+35	3.9785	0.79	Q	|	|	|	V |
22+40	3.9840	0.79	Q	|	|	|	V|
22+45	3.9894	0.78	Q	|	|	|	V|
22+50	3.9947	0.78	Q	|	|	|	V|
22+55	4.0000	0.77	Q	|	|	|	V|
23+ 0	4.0053	0.77	Q	|	|	|	V|
23+ 5	4.0105	0.76	Q	|	|	|	V|
23+10	4.0157	0.76	Q	|	|	|	V|
23+15	4.0209	0.75	Q	|	|	|	V|
23+20	4.0260	0.74	Q	|	|	|	V|
23+25	4.0311	0.74	Q	|	|	|	V|
23+30	4.0362	0.73	Q	|	|	|	V|
23+35	4.0412	0.73	Q	|	|	|	V|
23+40	4.0462	0.73	Q	|	|	|	V|
23+45	4.0512	0.72	Q	|	|	|	V|
23+50	4.0561	0.72	Q	|	|	|	V|
23+55	4.0610	0.71	Q	|	|	|	V|
24+ 0	4.0659	0.71	Q	|	|	|	V|
24+ 5	4.0706	0.69	Q	|	|	|	V|
24+10	4.0750	0.63	Q	|	|	|	V|
24+15	4.0785	0.51	Q	|	|	|	V|
24+20	4.0809	0.35	Q	|	|	|	V|
24+25	4.0822	0.19	Q	|	|	|	V|
24+30	4.0829	0.10	Q	|	|	|	V|
24+35	4.0833	0.05	Q	|	|	|	V|
24+40	4.0835	0.03	Q	|	|	|	V|
24+45	4.0836	0.01	Q	|	|	|	V|
24+50	4.0836	0.01	Q	|	|	|	V|
24+55	4.0837	0.01	Q	|	|	|	V|
25+ 0	4.0837	0.00	Q	|	|	|	V

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
OFFSITE EXISTING CONDITION - WATERSHED B
100-YEAR STORM EVENT ANALYSIS WITH ADJUSTED 25 YEAR RAINFALL DATA

Storm Event Year = 100

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 100		
29.52	1	1.00
Rainfall data for year 100		
29.52	6	2.43
Rainfall data for year 100		
29.52	24	4.48

++

******** 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)
32.0	32.0	29.52	1.000	0.978	0.778	0.761

Area-averaged adjusted loss rate Fm (In/Hr) = 0.761

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
22.97	0.778	32.0	32.0	21.25	0.001
6.55	0.222	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.211
Area-averaged low loss fraction, Yb = 0.789
User entry of time of concentration = 0.261 (hours)
++
Watershed area = 29.52(Ac.)
Catchment Lag time = 0.208 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 39.9744
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.761(In/Hr)
Average low loss rate fraction (Yb) = 0.789 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.369(In)
Computed peak 30-minute rainfall = 0.756(In)
Specified peak 1-hour rainfall = 0.998(In)
Computed peak 3-hour rainfall = 1.722(In)
Specified peak 6-hour rainfall = 2.430(In)
Specified peak 24-hour rainfall = 4.480(In)

Rainfall depth area reduction factors:
Using a total area of 29.52(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.369(In)
30-minute factor = 0.999 Adjusted rainfall = 0.755(In)
1-hour factor = 0.999 Adjusted rainfall = 0.997(In)
3-hour factor = 1.000 Adjusted rainfall = 1.722(In)
6-hour factor = 1.000 Adjusted rainfall = 2.430(In)
24-hour factor = 1.000 Adjusted rainfall = 4.480(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 = 357.01 (CFS))		
1	3.035	10.834
2	19.552	58.968
3	49.569	107.163
4	77.885	101.091
5	91.196	47.520
6	96.703	19.661
7	98.477	6.334

8	99.197	2.569
9	100.000	1.284

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3689	0.3689
2	0.4867	0.1179
3	0.5724	0.0857
4	0.6422	0.0698
5	0.7022	0.0600
6	0.7553	0.0531
7	0.8033	0.0480
8	0.8474	0.0441
9	0.8883	0.0409
10	0.9265	0.0382
11	0.9625	0.0360
12	0.9966	0.0341
13	1.0371	0.0405
14	1.0761	0.0390
15	1.1137	0.0376
16	1.1501	0.0364
17	1.1853	0.0352
18	1.2195	0.0342
19	1.2528	0.0333
20	1.2852	0.0324
21	1.3168	0.0316
22	1.3476	0.0308
23	1.3777	0.0301
24	1.4072	0.0295
25	1.4361	0.0289
26	1.4644	0.0283
27	1.4922	0.0278
28	1.5195	0.0273
29	1.5462	0.0268
30	1.5726	0.0263
31	1.5984	0.0259
32	1.6239	0.0255
33	1.6490	0.0251
34	1.6737	0.0247
35	1.6980	0.0243
36	1.7220	0.0240
37	1.7455	0.0236
38	1.7688	0.0233
39	1.7918	0.0230
40	1.8145	0.0227
41	1.8369	0.0224
42	1.8590	0.0221
43	1.8809	0.0219
44	1.9025	0.0216
45	1.9238	0.0214
46	1.9449	0.0211
47	1.9658	0.0209
48	1.9865	0.0207
49	2.0069	0.0205
50	2.0272	0.0202
51	2.0472	0.0200
52	2.0671	0.0198

53	2.0867	0.0197
54	2.1062	0.0195
55	2.1255	0.0193
56	2.1446	0.0191
57	2.1635	0.0189
58	2.1823	0.0188
59	2.2009	0.0186
60	2.2194	0.0185
61	2.2377	0.0183
62	2.2558	0.0181
63	2.2738	0.0180
64	2.2917	0.0179
65	2.3094	0.0177
66	2.3270	0.0176
67	2.3444	0.0174
68	2.3618	0.0173
69	2.3789	0.0172
70	2.3960	0.0171
71	2.4130	0.0169
72	2.4298	0.0168
73	2.4446	0.0148
74	2.4593	0.0147
75	2.4739	0.0146
76	2.4884	0.0145
77	2.5028	0.0144
78	2.5171	0.0143
79	2.5313	0.0142
80	2.5454	0.0141
81	2.5594	0.0140
82	2.5733	0.0139
83	2.5871	0.0138
84	2.6008	0.0137
85	2.6144	0.0136
86	2.6280	0.0135
87	2.6414	0.0134
88	2.6548	0.0134
89	2.6680	0.0133
90	2.6812	0.0132
91	2.6943	0.0131
92	2.7074	0.0130
93	2.7203	0.0129
94	2.7332	0.0129
95	2.7460	0.0128
96	2.7587	0.0127
97	2.7713	0.0126
98	2.7839	0.0126
99	2.7964	0.0125
100	2.8088	0.0124
101	2.8212	0.0124
102	2.8335	0.0123
103	2.8457	0.0122
104	2.8579	0.0122
105	2.8700	0.0121
106	2.8820	0.0120
107	2.8940	0.0120
108	2.9059	0.0119
109	2.9177	0.0118

110	2.9295	0.0118
111	2.9412	0.0117
112	2.9529	0.0117
113	2.9645	0.0116
114	2.9760	0.0115
115	2.9875	0.0115
116	2.9990	0.0114
117	3.0104	0.0114
118	3.0217	0.0113
119	3.0330	0.0113
120	3.0442	0.0112
121	3.0554	0.0112
122	3.0665	0.0111
123	3.0775	0.0111
124	3.0886	0.0110
125	3.0995	0.0110
126	3.1104	0.0109
127	3.1213	0.0109
128	3.1321	0.0108
129	3.1429	0.0108
130	3.1536	0.0107
131	3.1643	0.0107
132	3.1750	0.0106
133	3.1855	0.0106
134	3.1961	0.0105
135	3.2066	0.0105
136	3.2171	0.0105
137	3.2275	0.0104
138	3.2379	0.0104
139	3.2482	0.0103
140	3.2585	0.0103
141	3.2687	0.0103
142	3.2789	0.0102
143	3.2891	0.0102
144	3.2992	0.0101
145	3.3093	0.0101
146	3.3194	0.0101
147	3.3294	0.0100
148	3.3394	0.0100
149	3.3493	0.0099
150	3.3592	0.0099
151	3.3691	0.0099
152	3.3789	0.0098
153	3.3887	0.0098
154	3.3985	0.0098
155	3.4082	0.0097
156	3.4179	0.0097
157	3.4275	0.0097
158	3.4371	0.0096
159	3.4467	0.0096
160	3.4563	0.0095
161	3.4658	0.0095
162	3.4753	0.0095
163	3.4847	0.0095
164	3.4941	0.0094
165	3.5035	0.0094
166	3.5129	0.0094

167	3.5222	0.0093
168	3.5315	0.0093
169	3.5408	0.0093
170	3.5500	0.0092
171	3.5592	0.0092
172	3.5684	0.0092
173	3.5775	0.0091
174	3.5866	0.0091
175	3.5957	0.0091
176	3.6047	0.0091
177	3.6138	0.0090
178	3.6228	0.0090
179	3.6317	0.0090
180	3.6407	0.0089
181	3.6496	0.0089
182	3.6585	0.0089
183	3.6673	0.0089
184	3.6762	0.0088
185	3.6850	0.0088
186	3.6937	0.0088
187	3.7025	0.0088
188	3.7112	0.0087
189	3.7199	0.0087
190	3.7286	0.0087
191	3.7372	0.0086
192	3.7459	0.0086
193	3.7545	0.0086
194	3.7630	0.0086
195	3.7716	0.0085
196	3.7801	0.0085
197	3.7886	0.0085
198	3.7971	0.0085
199	3.8055	0.0085
200	3.8139	0.0084
201	3.8224	0.0084
202	3.8307	0.0084
203	3.8391	0.0084
204	3.8474	0.0083
205	3.8557	0.0083
206	3.8640	0.0083
207	3.8723	0.0083
208	3.8805	0.0082
209	3.8888	0.0082
210	3.8970	0.0082
211	3.9051	0.0082
212	3.9133	0.0082
213	3.9214	0.0081
214	3.9295	0.0081
215	3.9376	0.0081
216	3.9457	0.0081
217	3.9538	0.0081
218	3.9618	0.0080
219	3.9698	0.0080
220	3.9778	0.0080
221	3.9858	0.0080
222	3.9937	0.0079
223	4.0016	0.0079

224	4.0095	0.0079
225	4.0174	0.0079
226	4.0253	0.0079
227	4.0332	0.0079
228	4.0410	0.0078
229	4.0488	0.0078
230	4.0566	0.0078
231	4.0644	0.0078
232	4.0721	0.0078
233	4.0799	0.0077
234	4.0876	0.0077
235	4.0953	0.0077
236	4.1030	0.0077
237	4.1106	0.0077
238	4.1183	0.0076
239	4.1259	0.0076
240	4.1335	0.0076
241	4.1411	0.0076
242	4.1487	0.0076
243	4.1562	0.0076
244	4.1638	0.0075
245	4.1713	0.0075
246	4.1788	0.0075
247	4.1863	0.0075
248	4.1938	0.0075
249	4.2012	0.0075
250	4.2086	0.0074
251	4.2161	0.0074
252	4.2235	0.0074
253	4.2309	0.0074
254	4.2382	0.0074
255	4.2456	0.0074
256	4.2529	0.0073
257	4.2602	0.0073
258	4.2676	0.0073
259	4.2748	0.0073
260	4.2821	0.0073
261	4.2894	0.0073
262	4.2966	0.0072
263	4.3039	0.0072
264	4.3111	0.0072
265	4.3183	0.0072
266	4.3255	0.0072
267	4.3326	0.0072
268	4.3398	0.0072
269	4.3469	0.0071
270	4.3540	0.0071
271	4.3612	0.0071
272	4.3682	0.0071
273	4.3753	0.0071
274	4.3824	0.0071
275	4.3894	0.0071
276	4.3965	0.0070
277	4.4035	0.0070
278	4.4105	0.0070
279	4.4175	0.0070
280	4.4245	0.0070

281	4.4315	0.0070
282	4.4384	0.0070
283	4.4453	0.0069
284	4.4523	0.0069
285	4.4592	0.0069
286	4.4661	0.0069
287	4.4730	0.0069
288	4.4798	0.0069

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0069	0.0054	0.0014
2	0.0069	0.0054	0.0015
3	0.0069	0.0055	0.0015
4	0.0069	0.0055	0.0015
5	0.0070	0.0055	0.0015
6	0.0070	0.0055	0.0015
7	0.0070	0.0055	0.0015
8	0.0070	0.0055	0.0015
9	0.0070	0.0056	0.0015
10	0.0071	0.0056	0.0015
11	0.0071	0.0056	0.0015
12	0.0071	0.0056	0.0015
13	0.0071	0.0056	0.0015
14	0.0071	0.0056	0.0015
15	0.0072	0.0057	0.0015
16	0.0072	0.0057	0.0015
17	0.0072	0.0057	0.0015
18	0.0072	0.0057	0.0015
19	0.0073	0.0057	0.0015
20	0.0073	0.0057	0.0015
21	0.0073	0.0058	0.0015
22	0.0073	0.0058	0.0015
23	0.0074	0.0058	0.0016
24	0.0074	0.0058	0.0016
25	0.0074	0.0058	0.0016
26	0.0074	0.0059	0.0016
27	0.0075	0.0059	0.0016
28	0.0075	0.0059	0.0016
29	0.0075	0.0059	0.0016
30	0.0075	0.0059	0.0016
31	0.0076	0.0060	0.0016
32	0.0076	0.0060	0.0016
33	0.0076	0.0060	0.0016
34	0.0076	0.0060	0.0016
35	0.0077	0.0060	0.0016
36	0.0077	0.0061	0.0016
37	0.0077	0.0061	0.0016
38	0.0077	0.0061	0.0016
39	0.0078	0.0061	0.0016
40	0.0078	0.0062	0.0016
41	0.0078	0.0062	0.0017
42	0.0079	0.0062	0.0017
43	0.0079	0.0062	0.0017
44	0.0079	0.0062	0.0017

45	0.0079	0.0063	0.0017
46	0.0080	0.0063	0.0017
47	0.0080	0.0063	0.0017
48	0.0080	0.0063	0.0017
49	0.0081	0.0064	0.0017
50	0.0081	0.0064	0.0017
51	0.0081	0.0064	0.0017
52	0.0082	0.0064	0.0017
53	0.0082	0.0065	0.0017
54	0.0082	0.0065	0.0017
55	0.0083	0.0065	0.0017
56	0.0083	0.0065	0.0017
57	0.0083	0.0066	0.0018
58	0.0084	0.0066	0.0018
59	0.0084	0.0066	0.0018
60	0.0084	0.0067	0.0018
61	0.0085	0.0067	0.0018
62	0.0085	0.0067	0.0018
63	0.0085	0.0067	0.0018
64	0.0086	0.0068	0.0018
65	0.0086	0.0068	0.0018
66	0.0086	0.0068	0.0018
67	0.0087	0.0069	0.0018
68	0.0087	0.0069	0.0018
69	0.0088	0.0069	0.0018
70	0.0088	0.0069	0.0019
71	0.0089	0.0070	0.0019
72	0.0089	0.0070	0.0019
73	0.0089	0.0071	0.0019
74	0.0090	0.0071	0.0019
75	0.0090	0.0071	0.0019
76	0.0091	0.0071	0.0019
77	0.0091	0.0072	0.0019
78	0.0091	0.0072	0.0019
79	0.0092	0.0073	0.0019
80	0.0092	0.0073	0.0019
81	0.0093	0.0073	0.0020
82	0.0093	0.0074	0.0020
83	0.0094	0.0074	0.0020
84	0.0094	0.0074	0.0020
85	0.0095	0.0075	0.0020
86	0.0095	0.0075	0.0020
87	0.0096	0.0076	0.0020
88	0.0096	0.0076	0.0020
89	0.0097	0.0076	0.0020
90	0.0097	0.0077	0.0020
91	0.0098	0.0077	0.0021
92	0.0098	0.0078	0.0021
93	0.0099	0.0078	0.0021
94	0.0099	0.0078	0.0021
95	0.0100	0.0079	0.0021
96	0.0101	0.0079	0.0021
97	0.0101	0.0080	0.0021
98	0.0102	0.0080	0.0021
99	0.0103	0.0081	0.0022
100	0.0103	0.0081	0.0022
101	0.0104	0.0082	0.0022

102	0.0104	0.0082	0.0022
103	0.0105	0.0083	0.0022
104	0.0105	0.0083	0.0022
105	0.0106	0.0084	0.0022
106	0.0107	0.0084	0.0023
107	0.0108	0.0085	0.0023
108	0.0108	0.0085	0.0023
109	0.0109	0.0086	0.0023
110	0.0110	0.0087	0.0023
111	0.0111	0.0087	0.0023
112	0.0111	0.0088	0.0023
113	0.0112	0.0089	0.0024
114	0.0113	0.0089	0.0024
115	0.0114	0.0090	0.0024
116	0.0114	0.0090	0.0024
117	0.0115	0.0091	0.0024
118	0.0116	0.0092	0.0024
119	0.0117	0.0093	0.0025
120	0.0118	0.0093	0.0025
121	0.0119	0.0094	0.0025
122	0.0120	0.0094	0.0025
123	0.0121	0.0095	0.0025
124	0.0122	0.0096	0.0026
125	0.0123	0.0097	0.0026
126	0.0124	0.0098	0.0026
127	0.0125	0.0099	0.0026
128	0.0126	0.0099	0.0026
129	0.0127	0.0100	0.0027
130	0.0128	0.0101	0.0027
131	0.0129	0.0102	0.0027
132	0.0130	0.0103	0.0027
133	0.0132	0.0104	0.0028
134	0.0133	0.0105	0.0028
135	0.0134	0.0106	0.0028
136	0.0135	0.0107	0.0029
137	0.0137	0.0108	0.0029
138	0.0138	0.0109	0.0029
139	0.0140	0.0110	0.0029
140	0.0141	0.0111	0.0030
141	0.0143	0.0113	0.0030
142	0.0144	0.0114	0.0030
143	0.0146	0.0115	0.0031
144	0.0147	0.0116	0.0031
145	0.0168	0.0133	0.0035
146	0.0169	0.0134	0.0036
147	0.0172	0.0136	0.0036
148	0.0173	0.0137	0.0036
149	0.0176	0.0139	0.0037
150	0.0177	0.0140	0.0037
151	0.0180	0.0142	0.0038
152	0.0181	0.0143	0.0038
153	0.0185	0.0146	0.0039
154	0.0186	0.0147	0.0039
155	0.0189	0.0149	0.0040
156	0.0191	0.0151	0.0040
157	0.0195	0.0154	0.0041
158	0.0197	0.0155	0.0041

159	0.0200	0.0158	0.0042
160	0.0202	0.0160	0.0043
161	0.0207	0.0163	0.0044
162	0.0209	0.0165	0.0044
163	0.0214	0.0169	0.0045
164	0.0216	0.0171	0.0046
165	0.0221	0.0175	0.0047
166	0.0224	0.0177	0.0047
167	0.0230	0.0181	0.0048
168	0.0233	0.0184	0.0049
169	0.0240	0.0189	0.0051
170	0.0243	0.0192	0.0051
171	0.0251	0.0198	0.0053
172	0.0255	0.0201	0.0054
173	0.0263	0.0208	0.0055
174	0.0268	0.0211	0.0056
175	0.0278	0.0219	0.0059
176	0.0283	0.0223	0.0060
177	0.0295	0.0233	0.0062
178	0.0301	0.0238	0.0064
179	0.0316	0.0249	0.0067
180	0.0324	0.0256	0.0068
181	0.0342	0.0270	0.0072
182	0.0352	0.0278	0.0074
183	0.0376	0.0297	0.0079
184	0.0390	0.0308	0.0082
185	0.0341	0.0269	0.0072
186	0.0360	0.0284	0.0076
187	0.0409	0.0323	0.0086
188	0.0441	0.0348	0.0093
189	0.0531	0.0419	0.0112
190	0.0600	0.0473	0.0126
191	0.0857	0.0634	0.0223
192	0.1179	0.0634	0.0545
193	0.3689	0.0634	0.3055
194	0.0698	0.0551	0.0147
195	0.0480	0.0379	0.0101
196	0.0382	0.0302	0.0081
197	0.0405	0.0320	0.0085
198	0.0364	0.0287	0.0077
199	0.0333	0.0263	0.0070
200	0.0308	0.0243	0.0065
201	0.0289	0.0228	0.0061
202	0.0273	0.0215	0.0057
203	0.0259	0.0204	0.0055
204	0.0247	0.0195	0.0052
205	0.0236	0.0186	0.0050
206	0.0227	0.0179	0.0048
207	0.0219	0.0173	0.0046
208	0.0211	0.0167	0.0045
209	0.0205	0.0161	0.0043
210	0.0198	0.0157	0.0042
211	0.0193	0.0152	0.0041
212	0.0188	0.0148	0.0040
213	0.0183	0.0144	0.0039
214	0.0179	0.0141	0.0038
215	0.0174	0.0138	0.0037

216	0.0171	0.0135	0.0036
217	0.0148	0.0117	0.0031
218	0.0145	0.0114	0.0031
219	0.0142	0.0112	0.0030
220	0.0139	0.0110	0.0029
221	0.0136	0.0107	0.0029
222	0.0134	0.0105	0.0028
223	0.0131	0.0103	0.0028
224	0.0129	0.0102	0.0027
225	0.0126	0.0100	0.0027
226	0.0124	0.0098	0.0026
227	0.0122	0.0096	0.0026
228	0.0120	0.0095	0.0025
229	0.0118	0.0093	0.0025
230	0.0117	0.0092	0.0025
231	0.0115	0.0091	0.0024
232	0.0113	0.0089	0.0024
233	0.0112	0.0088	0.0024
234	0.0110	0.0087	0.0023
235	0.0109	0.0086	0.0023
236	0.0107	0.0085	0.0023
237	0.0106	0.0084	0.0022
238	0.0105	0.0083	0.0022
239	0.0103	0.0082	0.0022
240	0.0102	0.0081	0.0022
241	0.0101	0.0080	0.0021
242	0.0100	0.0079	0.0021
243	0.0099	0.0078	0.0021
244	0.0098	0.0077	0.0021
245	0.0097	0.0076	0.0020
246	0.0095	0.0075	0.0020
247	0.0095	0.0075	0.0020
248	0.0094	0.0074	0.0020
249	0.0093	0.0073	0.0020
250	0.0092	0.0072	0.0019
251	0.0091	0.0072	0.0019
252	0.0090	0.0071	0.0019
253	0.0089	0.0070	0.0019
254	0.0088	0.0070	0.0019
255	0.0088	0.0069	0.0018
256	0.0087	0.0068	0.0018
257	0.0086	0.0068	0.0018
258	0.0085	0.0067	0.0018
259	0.0085	0.0067	0.0018
260	0.0084	0.0066	0.0018
261	0.0083	0.0066	0.0018
262	0.0082	0.0065	0.0017
263	0.0082	0.0065	0.0017
264	0.0081	0.0064	0.0017
265	0.0081	0.0064	0.0017
266	0.0080	0.0063	0.0017
267	0.0079	0.0063	0.0017
268	0.0079	0.0062	0.0017
269	0.0078	0.0062	0.0016
270	0.0078	0.0061	0.0016
271	0.0077	0.0061	0.0016
272	0.0076	0.0060	0.0016

273	0.0076	0.0060	0.0016
274	0.0075	0.0060	0.0016
275	0.0075	0.0059	0.0016
276	0.0074	0.0059	0.0016
277	0.0074	0.0058	0.0016
278	0.0073	0.0058	0.0015
279	0.0073	0.0058	0.0015
280	0.0072	0.0057	0.0015
281	0.0072	0.0057	0.0015
282	0.0072	0.0056	0.0015
283	0.0071	0.0056	0.0015
284	0.0071	0.0056	0.0015
285	0.0070	0.0055	0.0015
286	0.0070	0.0055	0.0015
287	0.0069	0.0055	0.0015
288	0.0069	0.0054	0.0015

Total soil rain loss = 3.27(In)
Total effective rainfall = 1.21(In)
Peak flow rate in flood hydrograph = 40.63(CFS)

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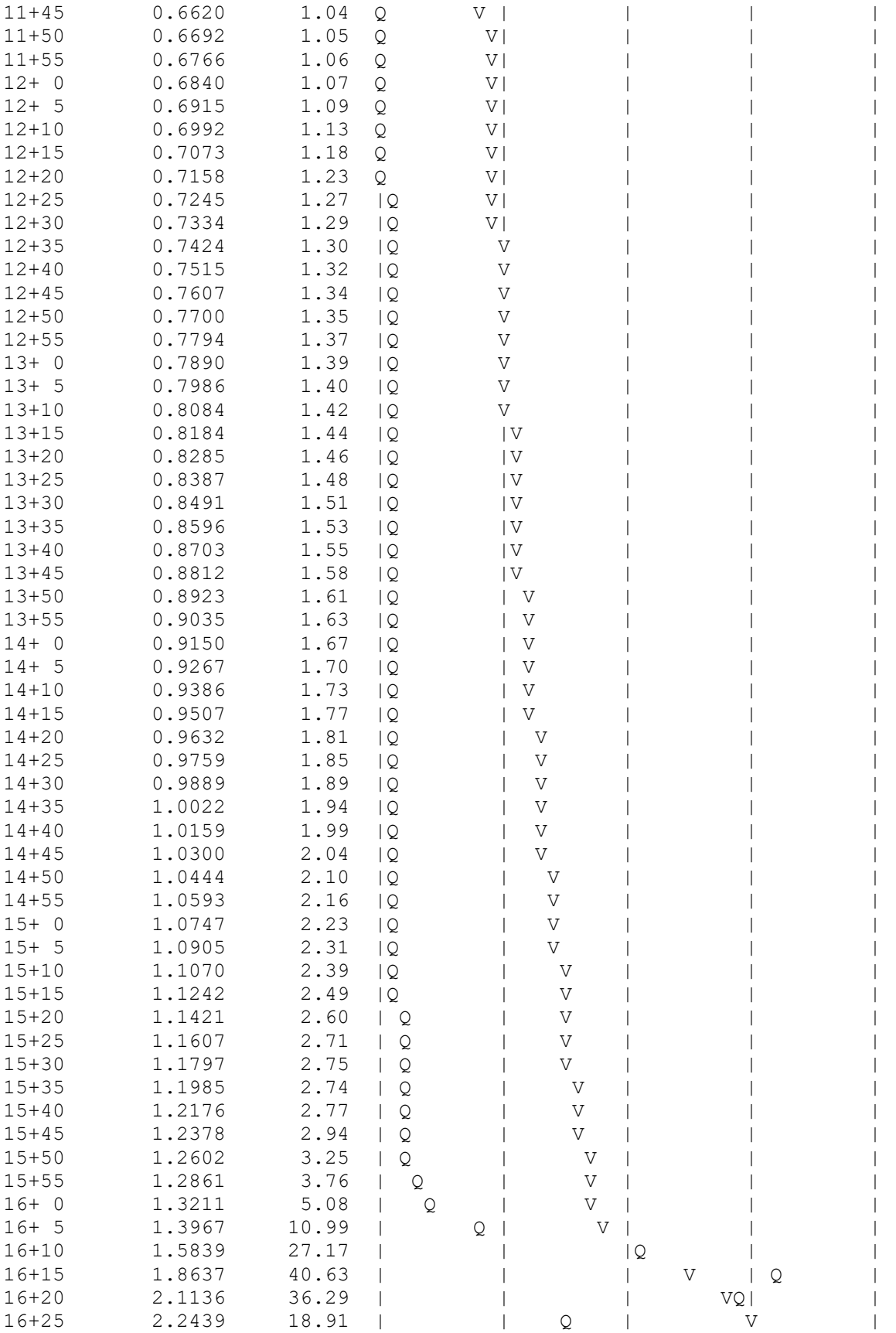
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0001	0.02	Q				
0+10	0.0008	0.10	Q				
0+15	0.0026	0.26	Q				
0+20	0.0054	0.40	Q				
0+25	0.0086	0.47	Q				
0+30	0.0121	0.50	Q				
0+35	0.0156	0.51	Q				
0+40	0.0192	0.52	Q				
0+45	0.0228	0.52	Q				
0+50	0.0264	0.52	Q				
0+55	0.0300	0.53	Q				
1+ 0	0.0337	0.53	Q				
1+ 5	0.0373	0.53	Q				
1+10	0.0410	0.53	Q				
1+15	0.0446	0.53	Q				
1+20	0.0483	0.53	Q				
1+25	0.0520	0.54	Q				
1+30	0.0557	0.54	Q				
1+35	0.0594	0.54	Q				
1+40	0.0631	0.54	Q				
1+45	0.0669	0.54	Q				
1+50	0.0706	0.54	Q				
1+55	0.0744	0.55	QV				
2+ 0	0.0781	0.55	QV				
2+ 5	0.0819	0.55	QV				
2+10	0.0857	0.55	QV				

2+15	0.0895	0.55	QV	|	|	|	|
2+20	0.0934	0.56	QV	|	|	|	|
2+25	0.0972	0.56	QV	|	|	|	|
2+30	0.1010	0.56	QV	|	|	|	|
2+35	0.1049	0.56	QV	|	|	|	|
2+40	0.1088	0.56	QV	|	|	|	|
2+45	0.1127	0.56	QV	|	|	|	|
2+50	0.1166	0.57	QV	|	|	|	|
2+55	0.1205	0.57	QV	|	|	|	|
3+ 0	0.1244	0.57	QV	|	|	|	|
3+ 5	0.1283	0.57	QV	|	|	|	|
3+10	0.1323	0.57	QV	|	|	|	|
3+15	0.1363	0.58	QV	|	|	|	|
3+20	0.1403	0.58	QV	|	|	|	|
3+25	0.1443	0.58	QV	|	|	|	|
3+30	0.1483	0.58	Q V	|	|	|	|
3+35	0.1523	0.58	Q V	|	|	|	|
3+40	0.1563	0.59	Q V	|	|	|	|
3+45	0.1604	0.59	Q V	|	|	|	|
3+50	0.1645	0.59	Q V	|	|	|	|
3+55	0.1686	0.59	Q V	|	|	|	|
4+ 0	0.1727	0.60	Q V	|	|	|	|
4+ 5	0.1768	0.60	Q V	|	|	|	|
4+10	0.1809	0.60	Q V	|	|	|	|
4+15	0.1851	0.60	Q V	|	|	|	|
4+20	0.1892	0.61	Q V	|	|	|	|
4+25	0.1934	0.61	Q V	|	|	|	|
4+30	0.1976	0.61	Q V	|	|	|	|
4+35	0.2018	0.61	Q V	|	|	|	|
4+40	0.2061	0.61	Q V	|	|	|	|
4+45	0.2103	0.62	Q V	|	|	|	|
4+50	0.2146	0.62	Q V	|	|	|	|
4+55	0.2189	0.62	Q V	|	|	|	|
5+ 0	0.2232	0.62	Q V	|	|	|	|
5+ 5	0.2275	0.63	Q V	|	|	|	|
5+10	0.2318	0.63	Q V	|	|	|	|
5+15	0.2362	0.63	Q V	|	|	|	|
5+20	0.2406	0.64	Q V	|	|	|	|
5+25	0.2450	0.64	Q V	|	|	|	|
5+30	0.2494	0.64	Q V	|	|	|	|
5+35	0.2538	0.64	Q V	|	|	|	|
5+40	0.2583	0.65	Q V	|	|	|	|
5+45	0.2627	0.65	Q V	|	|	|	|
5+50	0.2672	0.65	Q V	|	|	|	|
5+55	0.2717	0.66	Q V	|	|	|	|
6+ 0	0.2763	0.66	Q V	|	|	|	|
6+ 5	0.2808	0.66	Q V	|	|	|	|
6+10	0.2854	0.66	Q V	|	|	|	|
6+15	0.2900	0.67	Q V	|	|	|	|
6+20	0.2946	0.67	Q V	|	|	|	|
6+25	0.2993	0.67	Q V	|	|	|	|
6+30	0.3039	0.68	Q V	|	|	|	|
6+35	0.3086	0.68	Q V	|	|	|	|
6+40	0.3133	0.68	Q V	|	|	|	|
6+45	0.3180	0.69	Q V	|	|	|	|
6+50	0.3228	0.69	Q V	|	|	|	|
6+55	0.3276	0.69	Q V	|	|	|	|

7+ 0	0.3324	0.70	Q	V				
7+ 5	0.3372	0.70	Q	V				
7+10	0.3420	0.70	Q	V				
7+15	0.3469	0.71	Q	V				
7+20	0.3518	0.71	Q	V				
7+25	0.3567	0.71	Q	V				
7+30	0.3617	0.72	Q	V				
7+35	0.3666	0.72	Q	V				
7+40	0.3716	0.73	Q	V				
7+45	0.3767	0.73	Q	V				
7+50	0.3817	0.73	Q	V				
7+55	0.3868	0.74	Q	V				
8+ 0	0.3919	0.74	Q	V				
8+ 5	0.3971	0.75	Q	V				
8+10	0.4023	0.75	Q	V				
8+15	0.4075	0.76	Q	V				
8+20	0.4127	0.76	Q	V				
8+25	0.4180	0.76	Q	V				
8+30	0.4232	0.77	Q	V				
8+35	0.4286	0.77	Q	V				
8+40	0.4339	0.78	Q	V				
8+45	0.4393	0.78	Q	V				
8+50	0.4448	0.79	Q	V				
8+55	0.4502	0.79	Q	V				
9+ 0	0.4557	0.80	Q	V				
9+ 5	0.4612	0.80	Q	V				
9+10	0.4668	0.81	Q	V				
9+15	0.4724	0.81	Q	V				
9+20	0.4780	0.82	Q	V				
9+25	0.4837	0.82	Q	V				
9+30	0.4894	0.83	Q	V				
9+35	0.4952	0.84	Q	V				
9+40	0.5010	0.84	Q	V				
9+45	0.5068	0.85	Q	V				
9+50	0.5127	0.85	Q	V				
9+55	0.5186	0.86	Q	V				
10+ 0	0.5246	0.87	Q	V				
10+ 5	0.5306	0.87	Q	V				
10+10	0.5367	0.88	Q	V				
10+15	0.5428	0.89	Q	V				
10+20	0.5489	0.89	Q	V				
10+25	0.5551	0.90	Q	V				
10+30	0.5614	0.91	Q	V				
10+35	0.5677	0.91	Q	V				
10+40	0.5740	0.92	Q	V				
10+45	0.5805	0.93	Q	V				
10+50	0.5869	0.94	Q	V				
10+55	0.5934	0.95	Q	V				
11+ 0	0.6000	0.95	Q	V				
11+ 5	0.6066	0.96	Q	V				
11+10	0.6133	0.97	Q	V				
11+15	0.6201	0.98	Q	V				
11+20	0.6269	0.99	Q	V				
11+25	0.6338	1.00	Q	V				
11+30	0.6407	1.01	Q	V				
11+35	0.6478	1.02	Q	V				
11+40	0.6548	1.03	Q	V				



16+30	2.3100	9.60	| Q |	|	|	|V |
16+35	2.3453	5.13	| Q |	|	|	|V |
16+40	2.3708	3.70	| Q |	|	|	| V |
16+45	2.3916	3.03	| Q |	|	|	| V |
16+50	2.4085	2.45	|Q |	|	|	| V |
16+55	2.4242	2.28	|Q |	|	|	| V |
17+ 0	2.4390	2.14	|Q |	|	|	| V |
17+ 5	2.4529	2.02	|Q |	|	|	| V |
17+10	2.4660	1.92	|Q |	|	|	| V |
17+15	2.4786	1.83	|Q |	|	|	| V |
17+20	2.4907	1.75	|Q |	|	|	| V |
17+25	2.5023	1.68	|Q |	|	|	| V |
17+30	2.5134	1.62	|Q |	|	|	| V |
17+35	2.5242	1.57	|Q |	|	|	| V |
17+40	2.5347	1.52	|Q |	|	|	| V |
17+45	2.5448	1.47	|Q |	|	|	| V |
17+50	2.5547	1.43	|Q |	|	|	| V |
17+55	2.5643	1.39	|Q |	|	|	| V |
18+ 0	2.5737	1.36	|Q |	|	|	| V |
18+ 5	2.5828	1.32	|Q |	|	|	| V |
18+10	2.5915	1.27	|Q |	|	|	| V |
18+15	2.5998	1.20	Q |	|	|	| V |
18+20	2.6076	1.13	Q |	|	|	| V |
18+25	2.6151	1.09	Q |	|	|	| V |
18+30	2.6224	1.06	Q |	|	|	| V |
18+35	2.6295	1.04	Q |	|	|	| V |
18+40	2.6365	1.01	Q |	|	|	| V |
18+45	2.6434	0.99	Q |	|	|	| V |
18+50	2.6501	0.98	Q |	|	|	| V |
18+55	2.6567	0.96	Q |	|	|	| V |
19+ 0	2.6632	0.94	Q |	|	|	| V |
19+ 5	2.6695	0.93	Q |	|	|	| V |
19+10	2.6758	0.91	Q |	|	|	| V |
19+15	2.6820	0.90	Q |	|	|	| V |
19+20	2.6881	0.88	Q |	|	|	| V |
19+25	2.6940	0.87	Q |	|	|	| V |
19+30	2.6999	0.86	Q |	|	|	| V |
19+35	2.7058	0.84	Q |	|	|	| V |
19+40	2.7115	0.83	Q |	|	|	| V |
19+45	2.7172	0.82	Q |	|	|	| V |
19+50	2.7227	0.81	Q |	|	|	| V |
19+55	2.7282	0.80	Q |	|	|	| V |
20+ 0	2.7337	0.79	Q |	|	|	| V |
20+ 5	2.7391	0.78	Q |	|	|	| V |
20+10	2.7444	0.77	Q |	|	|	| V |
20+15	2.7496	0.76	Q |	|	|	| V |
20+20	2.7548	0.75	Q |	|	|	| V |
20+25	2.7599	0.74	Q |	|	|	| V |
20+30	2.7650	0.74	Q |	|	|	| V |
20+35	2.7700	0.73	Q |	|	|	| V |
20+40	2.7750	0.72	Q |	|	|	| V |
20+45	2.7799	0.71	Q |	|	|	| V |
20+50	2.7847	0.71	Q |	|	|	| V |
20+55	2.7895	0.70	Q |	|	|	| V |
21+ 0	2.7943	0.69	Q |	|	|	| V |
21+ 5	2.7990	0.68	Q |	|	|	| V |
21+10	2.8037	0.68	Q |	|	|	| V |

21+15	2.8083	0.67	Q	|	|	|	V |
21+20	2.8129	0.67	Q	|	|	|	V |
21+25	2.8174	0.66	Q	|	|	|	V |
21+30	2.8219	0.65	Q	|	|	|	V |
21+35	2.8264	0.65	Q	|	|	|	V |
21+40	2.8308	0.64	Q	|	|	|	V |
21+45	2.8352	0.64	Q	|	|	|	V |
21+50	2.8395	0.63	Q	|	|	|	V |
21+55	2.8439	0.63	Q	|	|	|	V |
22+ 0	2.8481	0.62	Q	|	|	|	V |
22+ 5	2.8524	0.62	Q	|	|	|	V |
22+10	2.8566	0.61	Q	|	|	|	V |
22+15	2.8607	0.61	Q	|	|	|	V |
22+20	2.8649	0.60	Q	|	|	|	V |
22+25	2.8690	0.60	Q	|	|	|	V |
22+30	2.8731	0.59	Q	|	|	|	V |
22+35	2.8771	0.59	Q	|	|	|	V |
22+40	2.8811	0.58	Q	|	|	|	V|
22+45	2.8851	0.58	Q	|	|	|	V|
22+50	2.8891	0.58	Q	|	|	|	V|
22+55	2.8930	0.57	Q	|	|	|	V|
23+ 0	2.8969	0.57	Q	|	|	|	V|
23+ 5	2.9008	0.56	Q	|	|	|	V|
23+10	2.9047	0.56	Q	|	|	|	V|
23+15	2.9085	0.56	Q	|	|	|	V|
23+20	2.9123	0.55	Q	|	|	|	V|
23+25	2.9161	0.55	Q	|	|	|	V|
23+30	2.9198	0.54	Q	|	|	|	V|
23+35	2.9236	0.54	Q	|	|	|	V|
23+40	2.9273	0.54	Q	|	|	|	V|
23+45	2.9309	0.53	Q	|	|	|	V|
23+50	2.9346	0.53	Q	|	|	|	V|
23+55	2.9382	0.53	Q	|	|	|	V|
24+ 0	2.9419	0.52	Q	|	|	|	V|
24+ 5	2.9453	0.51	Q	|	|	|	V|
24+10	2.9482	0.42	Q	|	|	|	V|
24+15	2.9500	0.26	Q	|	|	|	V|
24+20	2.9508	0.11	Q	|	|	|	V|
24+25	2.9511	0.04	Q	|	|	|	V|
24+30	2.9512	0.01	Q	|	|	|	V|
24+35	2.9512	0.01	Q	|	|	|	V|
24+40	2.9512	0.00	Q	|	|	|	V

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
OFFSITE EXISTING CONDITION - WTAERSHED B
25-YEAR STORM EVENT ANALYSIS

Storm Event Year = 25

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 25		
29.52	1	1.00
Rainfall data for year 25		
29.52	6	2.43
Rainfall data for year 25		
29.52	24	4.48

++

******** 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)
32.0	32.0	29.52	1.000	0.978	0.778	0.761

Area-averaged adjusted loss rate Fm (In/Hr) = 0.761

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
22.97	0.778	32.0	32.0	21.25	0.001
6.55	0.222	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.211
Area-averaged low loss fraction, Yb = 0.789
User entry of time of concentration = 0.261 (hours)
++
Watershed area = 29.52(Ac.)
Catchment Lag time = 0.208 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 39.9744
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.761(In/Hr)
Average low loss rate fraction (Yb) = 0.789 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.369(In)
Computed peak 30-minute rainfall = 0.756(In)
Specified peak 1-hour rainfall = 0.998(In)
Computed peak 3-hour rainfall = 1.722(In)
Specified peak 6-hour rainfall = 2.430(In)
Specified peak 24-hour rainfall = 4.480(In)

Rainfall depth area reduction factors:
Using a total area of 29.52(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.369(In)
30-minute factor = 0.999 Adjusted rainfall = 0.755(In)
1-hour factor = 0.999 Adjusted rainfall = 0.997(In)
3-hour factor = 1.000 Adjusted rainfall = 1.722(In)
6-hour factor = 1.000 Adjusted rainfall = 2.430(In)
24-hour factor = 1.000 Adjusted rainfall = 4.480(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 = 357.01 (CFS))		
1	3.035	10.834
2	19.552	58.968
3	49.569	107.163
4	77.885	101.091
5	91.196	47.520
6	96.703	19.661
7	98.477	6.334

8	99.197	2.569
9	100.000	1.284

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3689	0.3689
2	0.4867	0.1179
3	0.5724	0.0857
4	0.6422	0.0698
5	0.7022	0.0600
6	0.7553	0.0531
7	0.8033	0.0480
8	0.8474	0.0441
9	0.8883	0.0409
10	0.9265	0.0382
11	0.9625	0.0360
12	0.9966	0.0341
13	1.0371	0.0405
14	1.0761	0.0390
15	1.1137	0.0376
16	1.1501	0.0364
17	1.1853	0.0352
18	1.2195	0.0342
19	1.2528	0.0333
20	1.2852	0.0324
21	1.3168	0.0316
22	1.3476	0.0308
23	1.3777	0.0301
24	1.4072	0.0295
25	1.4361	0.0289
26	1.4644	0.0283
27	1.4922	0.0278
28	1.5195	0.0273
29	1.5462	0.0268
30	1.5726	0.0263
31	1.5984	0.0259
32	1.6239	0.0255
33	1.6490	0.0251
34	1.6737	0.0247
35	1.6980	0.0243
36	1.7220	0.0240
37	1.7455	0.0236
38	1.7688	0.0233
39	1.7918	0.0230
40	1.8145	0.0227
41	1.8369	0.0224
42	1.8590	0.0221
43	1.8809	0.0219
44	1.9025	0.0216
45	1.9238	0.0214
46	1.9449	0.0211
47	1.9658	0.0209
48	1.9865	0.0207
49	2.0069	0.0205
50	2.0272	0.0202
51	2.0472	0.0200
52	2.0671	0.0198

53	2.0867	0.0197
54	2.1062	0.0195
55	2.1255	0.0193
56	2.1446	0.0191
57	2.1635	0.0189
58	2.1823	0.0188
59	2.2009	0.0186
60	2.2194	0.0185
61	2.2377	0.0183
62	2.2558	0.0181
63	2.2738	0.0180
64	2.2917	0.0179
65	2.3094	0.0177
66	2.3270	0.0176
67	2.3444	0.0174
68	2.3618	0.0173
69	2.3789	0.0172
70	2.3960	0.0171
71	2.4130	0.0169
72	2.4298	0.0168
73	2.4446	0.0148
74	2.4593	0.0147
75	2.4739	0.0146
76	2.4884	0.0145
77	2.5028	0.0144
78	2.5171	0.0143
79	2.5313	0.0142
80	2.5454	0.0141
81	2.5594	0.0140
82	2.5733	0.0139
83	2.5871	0.0138
84	2.6008	0.0137
85	2.6144	0.0136
86	2.6280	0.0135
87	2.6414	0.0134
88	2.6548	0.0134
89	2.6680	0.0133
90	2.6812	0.0132
91	2.6943	0.0131
92	2.7074	0.0130
93	2.7203	0.0129
94	2.7332	0.0129
95	2.7460	0.0128
96	2.7587	0.0127
97	2.7713	0.0126
98	2.7839	0.0126
99	2.7964	0.0125
100	2.8088	0.0124
101	2.8212	0.0124
102	2.8335	0.0123
103	2.8457	0.0122
104	2.8579	0.0122
105	2.8700	0.0121
106	2.8820	0.0120
107	2.8940	0.0120
108	2.9059	0.0119
109	2.9177	0.0118

110	2.9295	0.0118
111	2.9412	0.0117
112	2.9529	0.0117
113	2.9645	0.0116
114	2.9760	0.0115
115	2.9875	0.0115
116	2.9990	0.0114
117	3.0104	0.0114
118	3.0217	0.0113
119	3.0330	0.0113
120	3.0442	0.0112
121	3.0554	0.0112
122	3.0665	0.0111
123	3.0775	0.0111
124	3.0886	0.0110
125	3.0995	0.0110
126	3.1104	0.0109
127	3.1213	0.0109
128	3.1321	0.0108
129	3.1429	0.0108
130	3.1536	0.0107
131	3.1643	0.0107
132	3.1750	0.0106
133	3.1855	0.0106
134	3.1961	0.0105
135	3.2066	0.0105
136	3.2171	0.0105
137	3.2275	0.0104
138	3.2379	0.0104
139	3.2482	0.0103
140	3.2585	0.0103
141	3.2687	0.0103
142	3.2789	0.0102
143	3.2891	0.0102
144	3.2992	0.0101
145	3.3093	0.0101
146	3.3194	0.0101
147	3.3294	0.0100
148	3.3394	0.0100
149	3.3493	0.0099
150	3.3592	0.0099
151	3.3691	0.0099
152	3.3789	0.0098
153	3.3887	0.0098
154	3.3985	0.0098
155	3.4082	0.0097
156	3.4179	0.0097
157	3.4275	0.0097
158	3.4371	0.0096
159	3.4467	0.0096
160	3.4563	0.0095
161	3.4658	0.0095
162	3.4753	0.0095
163	3.4847	0.0095
164	3.4941	0.0094
165	3.5035	0.0094
166	3.5129	0.0094

167	3.5222	0.0093
168	3.5315	0.0093
169	3.5408	0.0093
170	3.5500	0.0092
171	3.5592	0.0092
172	3.5684	0.0092
173	3.5775	0.0091
174	3.5866	0.0091
175	3.5957	0.0091
176	3.6047	0.0091
177	3.6138	0.0090
178	3.6228	0.0090
179	3.6317	0.0090
180	3.6407	0.0089
181	3.6496	0.0089
182	3.6585	0.0089
183	3.6673	0.0089
184	3.6762	0.0088
185	3.6850	0.0088
186	3.6937	0.0088
187	3.7025	0.0088
188	3.7112	0.0087
189	3.7199	0.0087
190	3.7286	0.0087
191	3.7372	0.0086
192	3.7459	0.0086
193	3.7545	0.0086
194	3.7630	0.0086
195	3.7716	0.0085
196	3.7801	0.0085
197	3.7886	0.0085
198	3.7971	0.0085
199	3.8055	0.0085
200	3.8139	0.0084
201	3.8224	0.0084
202	3.8307	0.0084
203	3.8391	0.0084
204	3.8474	0.0083
205	3.8557	0.0083
206	3.8640	0.0083
207	3.8723	0.0083
208	3.8805	0.0082
209	3.8888	0.0082
210	3.8970	0.0082
211	3.9051	0.0082
212	3.9133	0.0082
213	3.9214	0.0081
214	3.9295	0.0081
215	3.9376	0.0081
216	3.9457	0.0081
217	3.9538	0.0081
218	3.9618	0.0080
219	3.9698	0.0080
220	3.9778	0.0080
221	3.9858	0.0080
222	3.9937	0.0079
223	4.0016	0.0079

224	4.0095	0.0079
225	4.0174	0.0079
226	4.0253	0.0079
227	4.0332	0.0079
228	4.0410	0.0078
229	4.0488	0.0078
230	4.0566	0.0078
231	4.0644	0.0078
232	4.0721	0.0078
233	4.0799	0.0077
234	4.0876	0.0077
235	4.0953	0.0077
236	4.1030	0.0077
237	4.1106	0.0077
238	4.1183	0.0076
239	4.1259	0.0076
240	4.1335	0.0076
241	4.1411	0.0076
242	4.1487	0.0076
243	4.1562	0.0076
244	4.1638	0.0075
245	4.1713	0.0075
246	4.1788	0.0075
247	4.1863	0.0075
248	4.1938	0.0075
249	4.2012	0.0075
250	4.2086	0.0074
251	4.2161	0.0074
252	4.2235	0.0074
253	4.2309	0.0074
254	4.2382	0.0074
255	4.2456	0.0074
256	4.2529	0.0073
257	4.2602	0.0073
258	4.2676	0.0073
259	4.2748	0.0073
260	4.2821	0.0073
261	4.2894	0.0073
262	4.2966	0.0072
263	4.3039	0.0072
264	4.3111	0.0072
265	4.3183	0.0072
266	4.3255	0.0072
267	4.3326	0.0072
268	4.3398	0.0072
269	4.3469	0.0071
270	4.3540	0.0071
271	4.3612	0.0071
272	4.3682	0.0071
273	4.3753	0.0071
274	4.3824	0.0071
275	4.3894	0.0071
276	4.3965	0.0070
277	4.4035	0.0070
278	4.4105	0.0070
279	4.4175	0.0070
280	4.4245	0.0070

281	4.4315	0.0070
282	4.4384	0.0070
283	4.4453	0.0069
284	4.4523	0.0069
285	4.4592	0.0069
286	4.4661	0.0069
287	4.4730	0.0069
288	4.4798	0.0069

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0069	0.0054	0.0014
2	0.0069	0.0054	0.0015
3	0.0069	0.0055	0.0015
4	0.0069	0.0055	0.0015
5	0.0070	0.0055	0.0015
6	0.0070	0.0055	0.0015
7	0.0070	0.0055	0.0015
8	0.0070	0.0055	0.0015
9	0.0070	0.0056	0.0015
10	0.0071	0.0056	0.0015
11	0.0071	0.0056	0.0015
12	0.0071	0.0056	0.0015
13	0.0071	0.0056	0.0015
14	0.0071	0.0056	0.0015
15	0.0072	0.0057	0.0015
16	0.0072	0.0057	0.0015
17	0.0072	0.0057	0.0015
18	0.0072	0.0057	0.0015
19	0.0073	0.0057	0.0015
20	0.0073	0.0057	0.0015
21	0.0073	0.0058	0.0015
22	0.0073	0.0058	0.0015
23	0.0074	0.0058	0.0016
24	0.0074	0.0058	0.0016
25	0.0074	0.0058	0.0016
26	0.0074	0.0059	0.0016
27	0.0075	0.0059	0.0016
28	0.0075	0.0059	0.0016
29	0.0075	0.0059	0.0016
30	0.0075	0.0059	0.0016
31	0.0076	0.0060	0.0016
32	0.0076	0.0060	0.0016
33	0.0076	0.0060	0.0016
34	0.0076	0.0060	0.0016
35	0.0077	0.0060	0.0016
36	0.0077	0.0061	0.0016
37	0.0077	0.0061	0.0016
38	0.0077	0.0061	0.0016
39	0.0078	0.0061	0.0016
40	0.0078	0.0062	0.0016
41	0.0078	0.0062	0.0017
42	0.0079	0.0062	0.0017
43	0.0079	0.0062	0.0017
44	0.0079	0.0062	0.0017

45	0.0079	0.0063	0.0017
46	0.0080	0.0063	0.0017
47	0.0080	0.0063	0.0017
48	0.0080	0.0063	0.0017
49	0.0081	0.0064	0.0017
50	0.0081	0.0064	0.0017
51	0.0081	0.0064	0.0017
52	0.0082	0.0064	0.0017
53	0.0082	0.0065	0.0017
54	0.0082	0.0065	0.0017
55	0.0083	0.0065	0.0017
56	0.0083	0.0065	0.0017
57	0.0083	0.0066	0.0018
58	0.0084	0.0066	0.0018
59	0.0084	0.0066	0.0018
60	0.0084	0.0067	0.0018
61	0.0085	0.0067	0.0018
62	0.0085	0.0067	0.0018
63	0.0085	0.0067	0.0018
64	0.0086	0.0068	0.0018
65	0.0086	0.0068	0.0018
66	0.0086	0.0068	0.0018
67	0.0087	0.0069	0.0018
68	0.0087	0.0069	0.0018
69	0.0088	0.0069	0.0018
70	0.0088	0.0069	0.0019
71	0.0089	0.0070	0.0019
72	0.0089	0.0070	0.0019
73	0.0089	0.0071	0.0019
74	0.0090	0.0071	0.0019
75	0.0090	0.0071	0.0019
76	0.0091	0.0071	0.0019
77	0.0091	0.0072	0.0019
78	0.0091	0.0072	0.0019
79	0.0092	0.0073	0.0019
80	0.0092	0.0073	0.0019
81	0.0093	0.0073	0.0020
82	0.0093	0.0074	0.0020
83	0.0094	0.0074	0.0020
84	0.0094	0.0074	0.0020
85	0.0095	0.0075	0.0020
86	0.0095	0.0075	0.0020
87	0.0096	0.0076	0.0020
88	0.0096	0.0076	0.0020
89	0.0097	0.0076	0.0020
90	0.0097	0.0077	0.0020
91	0.0098	0.0077	0.0021
92	0.0098	0.0078	0.0021
93	0.0099	0.0078	0.0021
94	0.0099	0.0078	0.0021
95	0.0100	0.0079	0.0021
96	0.0101	0.0079	0.0021
97	0.0101	0.0080	0.0021
98	0.0102	0.0080	0.0021
99	0.0103	0.0081	0.0022
100	0.0103	0.0081	0.0022
101	0.0104	0.0082	0.0022

102	0.0104	0.0082	0.0022
103	0.0105	0.0083	0.0022
104	0.0105	0.0083	0.0022
105	0.0106	0.0084	0.0022
106	0.0107	0.0084	0.0023
107	0.0108	0.0085	0.0023
108	0.0108	0.0085	0.0023
109	0.0109	0.0086	0.0023
110	0.0110	0.0087	0.0023
111	0.0111	0.0087	0.0023
112	0.0111	0.0088	0.0023
113	0.0112	0.0089	0.0024
114	0.0113	0.0089	0.0024
115	0.0114	0.0090	0.0024
116	0.0114	0.0090	0.0024
117	0.0115	0.0091	0.0024
118	0.0116	0.0092	0.0024
119	0.0117	0.0093	0.0025
120	0.0118	0.0093	0.0025
121	0.0119	0.0094	0.0025
122	0.0120	0.0094	0.0025
123	0.0121	0.0095	0.0025
124	0.0122	0.0096	0.0026
125	0.0123	0.0097	0.0026
126	0.0124	0.0098	0.0026
127	0.0125	0.0099	0.0026
128	0.0126	0.0099	0.0026
129	0.0127	0.0100	0.0027
130	0.0128	0.0101	0.0027
131	0.0129	0.0102	0.0027
132	0.0130	0.0103	0.0027
133	0.0132	0.0104	0.0028
134	0.0133	0.0105	0.0028
135	0.0134	0.0106	0.0028
136	0.0135	0.0107	0.0029
137	0.0137	0.0108	0.0029
138	0.0138	0.0109	0.0029
139	0.0140	0.0110	0.0029
140	0.0141	0.0111	0.0030
141	0.0143	0.0113	0.0030
142	0.0144	0.0114	0.0030
143	0.0146	0.0115	0.0031
144	0.0147	0.0116	0.0031
145	0.0168	0.0133	0.0035
146	0.0169	0.0134	0.0036
147	0.0172	0.0136	0.0036
148	0.0173	0.0137	0.0036
149	0.0176	0.0139	0.0037
150	0.0177	0.0140	0.0037
151	0.0180	0.0142	0.0038
152	0.0181	0.0143	0.0038
153	0.0185	0.0146	0.0039
154	0.0186	0.0147	0.0039
155	0.0189	0.0149	0.0040
156	0.0191	0.0151	0.0040
157	0.0195	0.0154	0.0041
158	0.0197	0.0155	0.0041

159	0.0200	0.0158	0.0042
160	0.0202	0.0160	0.0043
161	0.0207	0.0163	0.0044
162	0.0209	0.0165	0.0044
163	0.0214	0.0169	0.0045
164	0.0216	0.0171	0.0046
165	0.0221	0.0175	0.0047
166	0.0224	0.0177	0.0047
167	0.0230	0.0181	0.0048
168	0.0233	0.0184	0.0049
169	0.0240	0.0189	0.0051
170	0.0243	0.0192	0.0051
171	0.0251	0.0198	0.0053
172	0.0255	0.0201	0.0054
173	0.0263	0.0208	0.0055
174	0.0268	0.0211	0.0056
175	0.0278	0.0219	0.0059
176	0.0283	0.0223	0.0060
177	0.0295	0.0233	0.0062
178	0.0301	0.0238	0.0064
179	0.0316	0.0249	0.0067
180	0.0324	0.0256	0.0068
181	0.0342	0.0270	0.0072
182	0.0352	0.0278	0.0074
183	0.0376	0.0297	0.0079
184	0.0390	0.0308	0.0082
185	0.0341	0.0269	0.0072
186	0.0360	0.0284	0.0076
187	0.0409	0.0323	0.0086
188	0.0441	0.0348	0.0093
189	0.0531	0.0419	0.0112
190	0.0600	0.0473	0.0126
191	0.0857	0.0634	0.0223
192	0.1179	0.0634	0.0545
193	0.3689	0.0634	0.3055
194	0.0698	0.0551	0.0147
195	0.0480	0.0379	0.0101
196	0.0382	0.0302	0.0081
197	0.0405	0.0320	0.0085
198	0.0364	0.0287	0.0077
199	0.0333	0.0263	0.0070
200	0.0308	0.0243	0.0065
201	0.0289	0.0228	0.0061
202	0.0273	0.0215	0.0057
203	0.0259	0.0204	0.0055
204	0.0247	0.0195	0.0052
205	0.0236	0.0186	0.0050
206	0.0227	0.0179	0.0048
207	0.0219	0.0173	0.0046
208	0.0211	0.0167	0.0045
209	0.0205	0.0161	0.0043
210	0.0198	0.0157	0.0042
211	0.0193	0.0152	0.0041
212	0.0188	0.0148	0.0040
213	0.0183	0.0144	0.0039
214	0.0179	0.0141	0.0038
215	0.0174	0.0138	0.0037

216	0.0171	0.0135	0.0036
217	0.0148	0.0117	0.0031
218	0.0145	0.0114	0.0031
219	0.0142	0.0112	0.0030
220	0.0139	0.0110	0.0029
221	0.0136	0.0107	0.0029
222	0.0134	0.0105	0.0028
223	0.0131	0.0103	0.0028
224	0.0129	0.0102	0.0027
225	0.0126	0.0100	0.0027
226	0.0124	0.0098	0.0026
227	0.0122	0.0096	0.0026
228	0.0120	0.0095	0.0025
229	0.0118	0.0093	0.0025
230	0.0117	0.0092	0.0025
231	0.0115	0.0091	0.0024
232	0.0113	0.0089	0.0024
233	0.0112	0.0088	0.0024
234	0.0110	0.0087	0.0023
235	0.0109	0.0086	0.0023
236	0.0107	0.0085	0.0023
237	0.0106	0.0084	0.0022
238	0.0105	0.0083	0.0022
239	0.0103	0.0082	0.0022
240	0.0102	0.0081	0.0022
241	0.0101	0.0080	0.0021
242	0.0100	0.0079	0.0021
243	0.0099	0.0078	0.0021
244	0.0098	0.0077	0.0021
245	0.0097	0.0076	0.0020
246	0.0095	0.0075	0.0020
247	0.0095	0.0075	0.0020
248	0.0094	0.0074	0.0020
249	0.0093	0.0073	0.0020
250	0.0092	0.0072	0.0019
251	0.0091	0.0072	0.0019
252	0.0090	0.0071	0.0019
253	0.0089	0.0070	0.0019
254	0.0088	0.0070	0.0019
255	0.0088	0.0069	0.0018
256	0.0087	0.0068	0.0018
257	0.0086	0.0068	0.0018
258	0.0085	0.0067	0.0018
259	0.0085	0.0067	0.0018
260	0.0084	0.0066	0.0018
261	0.0083	0.0066	0.0018
262	0.0082	0.0065	0.0017
263	0.0082	0.0065	0.0017
264	0.0081	0.0064	0.0017
265	0.0081	0.0064	0.0017
266	0.0080	0.0063	0.0017
267	0.0079	0.0063	0.0017
268	0.0079	0.0062	0.0017
269	0.0078	0.0062	0.0016
270	0.0078	0.0061	0.0016
271	0.0077	0.0061	0.0016
272	0.0076	0.0060	0.0016

273	0.0076	0.0060	0.0016
274	0.0075	0.0060	0.0016
275	0.0075	0.0059	0.0016
276	0.0074	0.0059	0.0016
277	0.0074	0.0058	0.0016
278	0.0073	0.0058	0.0015
279	0.0073	0.0058	0.0015
280	0.0072	0.0057	0.0015
281	0.0072	0.0057	0.0015
282	0.0072	0.0056	0.0015
283	0.0071	0.0056	0.0015
284	0.0071	0.0056	0.0015
285	0.0070	0.0055	0.0015
286	0.0070	0.0055	0.0015
287	0.0069	0.0055	0.0015
288	0.0069	0.0054	0.0015

Total soil rain loss = 3.27(In)
Total effective rainfall = 1.21(In)
Peak flow rate in flood hydrograph = 40.63(CFS)

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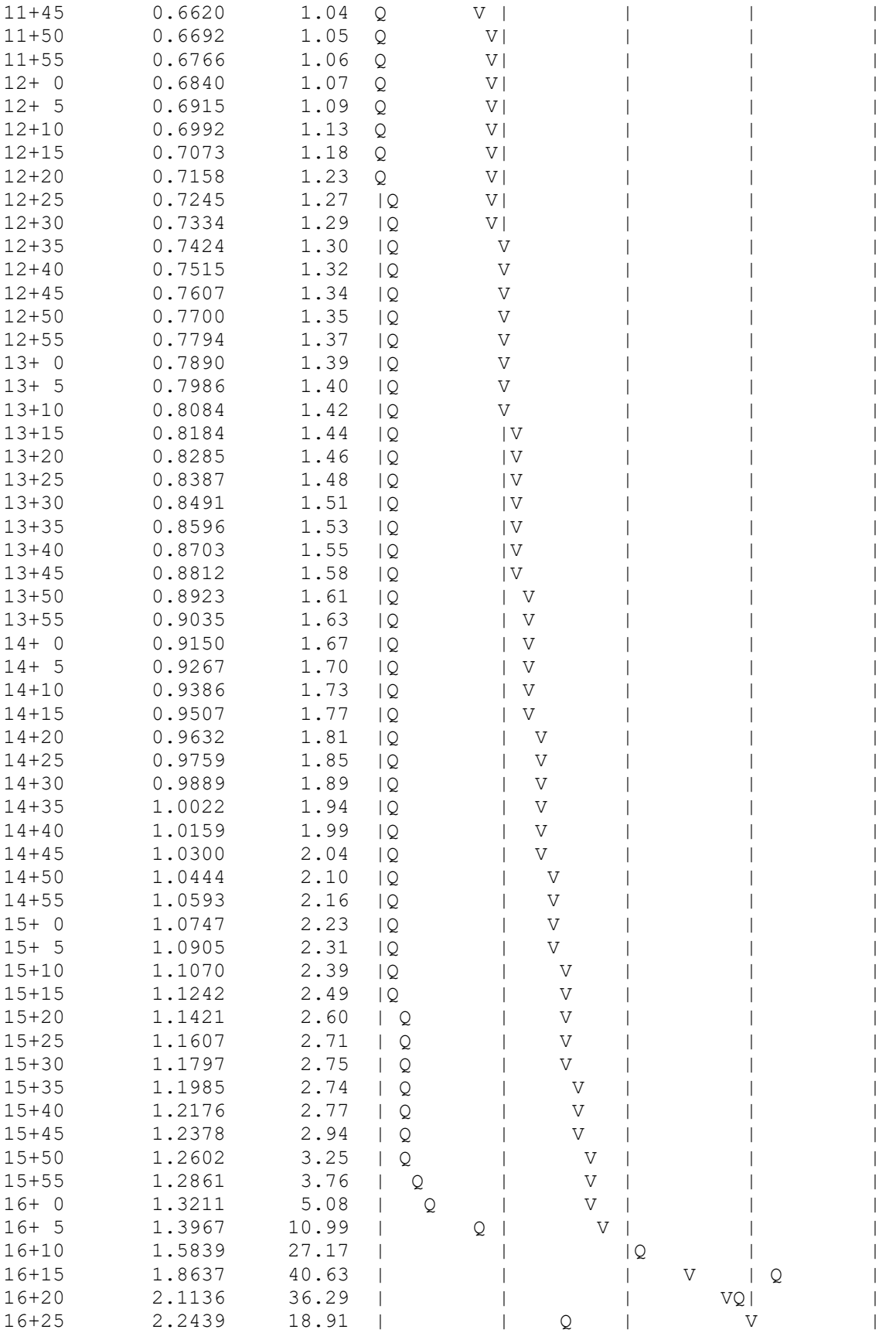
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0001	0.02	Q				
0+10	0.0008	0.10	Q				
0+15	0.0026	0.26	Q				
0+20	0.0054	0.40	Q				
0+25	0.0086	0.47	Q				
0+30	0.0121	0.50	Q				
0+35	0.0156	0.51	Q				
0+40	0.0192	0.52	Q				
0+45	0.0228	0.52	Q				
0+50	0.0264	0.52	Q				
0+55	0.0300	0.53	Q				
1+ 0	0.0337	0.53	Q				
1+ 5	0.0373	0.53	Q				
1+10	0.0410	0.53	Q				
1+15	0.0446	0.53	Q				
1+20	0.0483	0.53	Q				
1+25	0.0520	0.54	Q				
1+30	0.0557	0.54	Q				
1+35	0.0594	0.54	Q				
1+40	0.0631	0.54	Q				
1+45	0.0669	0.54	Q				
1+50	0.0706	0.54	Q				
1+55	0.0744	0.55	QV				
2+ 0	0.0781	0.55	QV				
2+ 5	0.0819	0.55	QV				
2+10	0.0857	0.55	QV				

2+15	0.0895	0.55	QV	|	|	|	|
2+20	0.0934	0.56	QV	|	|	|	|
2+25	0.0972	0.56	QV	|	|	|	|
2+30	0.1010	0.56	QV	|	|	|	|
2+35	0.1049	0.56	QV	|	|	|	|
2+40	0.1088	0.56	QV	|	|	|	|
2+45	0.1127	0.56	QV	|	|	|	|
2+50	0.1166	0.57	QV	|	|	|	|
2+55	0.1205	0.57	QV	|	|	|	|
3+ 0	0.1244	0.57	QV	|	|	|	|
3+ 5	0.1283	0.57	QV	|	|	|	|
3+10	0.1323	0.57	QV	|	|	|	|
3+15	0.1363	0.58	QV	|	|	|	|
3+20	0.1403	0.58	QV	|	|	|	|
3+25	0.1443	0.58	QV	|	|	|	|
3+30	0.1483	0.58	Q V	|	|	|	|
3+35	0.1523	0.58	Q V	|	|	|	|
3+40	0.1563	0.59	Q V	|	|	|	|
3+45	0.1604	0.59	Q V	|	|	|	|
3+50	0.1645	0.59	Q V	|	|	|	|
3+55	0.1686	0.59	Q V	|	|	|	|
4+ 0	0.1727	0.60	Q V	|	|	|	|
4+ 5	0.1768	0.60	Q V	|	|	|	|
4+10	0.1809	0.60	Q V	|	|	|	|
4+15	0.1851	0.60	Q V	|	|	|	|
4+20	0.1892	0.61	Q V	|	|	|	|
4+25	0.1934	0.61	Q V	|	|	|	|
4+30	0.1976	0.61	Q V	|	|	|	|
4+35	0.2018	0.61	Q V	|	|	|	|
4+40	0.2061	0.61	Q V	|	|	|	|
4+45	0.2103	0.62	Q V	|	|	|	|
4+50	0.2146	0.62	Q V	|	|	|	|
4+55	0.2189	0.62	Q V	|	|	|	|
5+ 0	0.2232	0.62	Q V	|	|	|	|
5+ 5	0.2275	0.63	Q V	|	|	|	|
5+10	0.2318	0.63	Q V	|	|	|	|
5+15	0.2362	0.63	Q V	|	|	|	|
5+20	0.2406	0.64	Q V	|	|	|	|
5+25	0.2450	0.64	Q V	|	|	|	|
5+30	0.2494	0.64	Q V	|	|	|	|
5+35	0.2538	0.64	Q V	|	|	|	|
5+40	0.2583	0.65	Q V	|	|	|	|
5+45	0.2627	0.65	Q V	|	|	|	|
5+50	0.2672	0.65	Q V	|	|	|	|
5+55	0.2717	0.66	Q V	|	|	|	|
6+ 0	0.2763	0.66	Q V	|	|	|	|
6+ 5	0.2808	0.66	Q V	|	|	|	|
6+10	0.2854	0.66	Q V	|	|	|	|
6+15	0.2900	0.67	Q V	|	|	|	|
6+20	0.2946	0.67	Q V	|	|	|	|
6+25	0.2993	0.67	Q V	|	|	|	|
6+30	0.3039	0.68	Q V	|	|	|	|
6+35	0.3086	0.68	Q V	|	|	|	|
6+40	0.3133	0.68	Q V	|	|	|	|
6+45	0.3180	0.69	Q V	|	|	|	|
6+50	0.3228	0.69	Q V	|	|	|	|
6+55	0.3276	0.69	Q V	|	|	|	|

7+ 0	0.3324	0.70	Q	V				
7+ 5	0.3372	0.70	Q	V				
7+10	0.3420	0.70	Q	V				
7+15	0.3469	0.71	Q	V				
7+20	0.3518	0.71	Q	V				
7+25	0.3567	0.71	Q	V				
7+30	0.3617	0.72	Q	V				
7+35	0.3666	0.72	Q	V				
7+40	0.3716	0.73	Q	V				
7+45	0.3767	0.73	Q	V				
7+50	0.3817	0.73	Q	V				
7+55	0.3868	0.74	Q	V				
8+ 0	0.3919	0.74	Q	V				
8+ 5	0.3971	0.75	Q	V				
8+10	0.4023	0.75	Q	V				
8+15	0.4075	0.76	Q	V				
8+20	0.4127	0.76	Q	V				
8+25	0.4180	0.76	Q	V				
8+30	0.4232	0.77	Q	V				
8+35	0.4286	0.77	Q	V				
8+40	0.4339	0.78	Q	V				
8+45	0.4393	0.78	Q	V				
8+50	0.4448	0.79	Q	V				
8+55	0.4502	0.79	Q	V				
9+ 0	0.4557	0.80	Q	V				
9+ 5	0.4612	0.80	Q	V				
9+10	0.4668	0.81	Q	V				
9+15	0.4724	0.81	Q	V				
9+20	0.4780	0.82	Q	V				
9+25	0.4837	0.82	Q	V				
9+30	0.4894	0.83	Q	V				
9+35	0.4952	0.84	Q	V				
9+40	0.5010	0.84	Q	V				
9+45	0.5068	0.85	Q	V				
9+50	0.5127	0.85	Q	V				
9+55	0.5186	0.86	Q	V				
10+ 0	0.5246	0.87	Q	V				
10+ 5	0.5306	0.87	Q	V				
10+10	0.5367	0.88	Q	V				
10+15	0.5428	0.89	Q	V				
10+20	0.5489	0.89	Q	V				
10+25	0.5551	0.90	Q	V				
10+30	0.5614	0.91	Q	V				
10+35	0.5677	0.91	Q	V				
10+40	0.5740	0.92	Q	V				
10+45	0.5805	0.93	Q	V				
10+50	0.5869	0.94	Q	V				
10+55	0.5934	0.95	Q	V				
11+ 0	0.6000	0.95	Q	V				
11+ 5	0.6066	0.96	Q	V				
11+10	0.6133	0.97	Q	V				
11+15	0.6201	0.98	Q	V				
11+20	0.6269	0.99	Q	V				
11+25	0.6338	1.00	Q	V				
11+30	0.6407	1.01	Q	V				
11+35	0.6478	1.02	Q	V				
11+40	0.6548	1.03	Q	V				



16+30	2.3100	9.60	| Q |	|	|	|V |
16+35	2.3453	5.13	| Q |	|	|	|V |
16+40	2.3708	3.70	| Q |	|	|	| V |
16+45	2.3916	3.03	| Q |	|	|	| V |
16+50	2.4085	2.45	|Q |	|	|	| V |
16+55	2.4242	2.28	|Q |	|	|	| V |
17+ 0	2.4390	2.14	|Q |	|	|	| V |
17+ 5	2.4529	2.02	|Q |	|	|	| V |
17+10	2.4660	1.92	|Q |	|	|	| V |
17+15	2.4786	1.83	|Q |	|	|	| V |
17+20	2.4907	1.75	|Q |	|	|	| V |
17+25	2.5023	1.68	|Q |	|	|	| V |
17+30	2.5134	1.62	|Q |	|	|	| V |
17+35	2.5242	1.57	|Q |	|	|	| V |
17+40	2.5347	1.52	|Q |	|	|	| V |
17+45	2.5448	1.47	|Q |	|	|	| V |
17+50	2.5547	1.43	|Q |	|	|	| V |
17+55	2.5643	1.39	|Q |	|	|	| V |
18+ 0	2.5737	1.36	|Q |	|	|	| V |
18+ 5	2.5828	1.32	|Q |	|	|	| V |
18+10	2.5915	1.27	|Q |	|	|	| V |
18+15	2.5998	1.20	Q |	|	|	| V |
18+20	2.6076	1.13	Q |	|	|	| V |
18+25	2.6151	1.09	Q |	|	|	| V |
18+30	2.6224	1.06	Q |	|	|	| V |
18+35	2.6295	1.04	Q |	|	|	| V |
18+40	2.6365	1.01	Q |	|	|	| V |
18+45	2.6434	0.99	Q |	|	|	| V |
18+50	2.6501	0.98	Q |	|	|	| V |
18+55	2.6567	0.96	Q |	|	|	| V |
19+ 0	2.6632	0.94	Q |	|	|	| V |
19+ 5	2.6695	0.93	Q |	|	|	| V |
19+10	2.6758	0.91	Q |	|	|	| V |
19+15	2.6820	0.90	Q |	|	|	| V |
19+20	2.6881	0.88	Q |	|	|	| V |
19+25	2.6940	0.87	Q |	|	|	| V |
19+30	2.6999	0.86	Q |	|	|	| V |
19+35	2.7058	0.84	Q |	|	|	| V |
19+40	2.7115	0.83	Q |	|	|	| V |
19+45	2.7172	0.82	Q |	|	|	| V |
19+50	2.7227	0.81	Q |	|	|	| V |
19+55	2.7282	0.80	Q |	|	|	| V |
20+ 0	2.7337	0.79	Q |	|	|	| V |
20+ 5	2.7391	0.78	Q |	|	|	| V |
20+10	2.7444	0.77	Q |	|	|	| V |
20+15	2.7496	0.76	Q |	|	|	| V |
20+20	2.7548	0.75	Q |	|	|	| V |
20+25	2.7599	0.74	Q |	|	|	| V |
20+30	2.7650	0.74	Q |	|	|	| V |
20+35	2.7700	0.73	Q |	|	|	| V |
20+40	2.7750	0.72	Q |	|	|	| V |
20+45	2.7799	0.71	Q |	|	|	| V |
20+50	2.7847	0.71	Q |	|	|	| V |
20+55	2.7895	0.70	Q |	|	|	| V |
21+ 0	2.7943	0.69	Q |	|	|	| V |
21+ 5	2.7990	0.68	Q |	|	|	| V |
21+10	2.8037	0.68	Q |	|	|	| V |

21+15	2.8083	0.67	Q	|	|	|	V |
21+20	2.8129	0.67	Q	|	|	|	V |
21+25	2.8174	0.66	Q	|	|	|	V |
21+30	2.8219	0.65	Q	|	|	|	V |
21+35	2.8264	0.65	Q	|	|	|	V |
21+40	2.8308	0.64	Q	|	|	|	V |
21+45	2.8352	0.64	Q	|	|	|	V |
21+50	2.8395	0.63	Q	|	|	|	V |
21+55	2.8439	0.63	Q	|	|	|	V |
22+ 0	2.8481	0.62	Q	|	|	|	V |
22+ 5	2.8524	0.62	Q	|	|	|	V |
22+10	2.8566	0.61	Q	|	|	|	V |
22+15	2.8607	0.61	Q	|	|	|	V |
22+20	2.8649	0.60	Q	|	|	|	V |
22+25	2.8690	0.60	Q	|	|	|	V |
22+30	2.8731	0.59	Q	|	|	|	V |
22+35	2.8771	0.59	Q	|	|	|	V |
22+40	2.8811	0.58	Q	|	|	|	V|
22+45	2.8851	0.58	Q	|	|	|	V|
22+50	2.8891	0.58	Q	|	|	|	V|
22+55	2.8930	0.57	Q	|	|	|	V|
23+ 0	2.8969	0.57	Q	|	|	|	V|
23+ 5	2.9008	0.56	Q	|	|	|	V|
23+10	2.9047	0.56	Q	|	|	|	V|
23+15	2.9085	0.56	Q	|	|	|	V|
23+20	2.9123	0.55	Q	|	|	|	V|
23+25	2.9161	0.55	Q	|	|	|	V|
23+30	2.9198	0.54	Q	|	|	|	V|
23+35	2.9236	0.54	Q	|	|	|	V|
23+40	2.9273	0.54	Q	|	|	|	V|
23+45	2.9309	0.53	Q	|	|	|	V|
23+50	2.9346	0.53	Q	|	|	|	V|
23+55	2.9382	0.53	Q	|	|	|	V|
24+ 0	2.9419	0.52	Q	|	|	|	V|
24+ 5	2.9453	0.51	Q	|	|	|	V|
24+10	2.9482	0.42	Q	|	|	|	V|
24+15	2.9500	0.26	Q	|	|	|	V|
24+20	2.9508	0.11	Q	|	|	|	V|
24+25	2.9511	0.04	Q	|	|	|	V|
24+30	2.9512	0.01	Q	|	|	|	V|
24+35	2.9512	0.01	Q	|	|	|	V|
24+40	2.9512	0.00	Q	|	|	|	V

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
OFFSITE EXISTING CONDITION - WATERSHED B
25-YEAR STORM EVENT ANALYSIS WITH ADJUSTED 10 YEAR RAINFALL DATA

Storm Event Year = 25

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 25		
29.52	1	0.81
Rainfall data for year 25		
29.52	6	2.02
Rainfall data for year 25		
29.52	24	3.71

++

******** 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)
32.0	32.0	29.52	1.000	0.978	0.778	0.761

Area-averaged adjusted loss rate Fm (In/Hr) = 0.761

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
22.97	0.778	32.0	32.0	18.55	0.000
6.55	0.222	98.0	98.0	0.20	0.937

Area-averaged catchment yield fraction, Y = 0.208
Area-averaged low loss fraction, Yb = 0.792
User entry of time of concentration = 0.267 (hours)
++
Watershed area = 29.52(Ac.)
Catchment Lag time = 0.214 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 39.0137
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.761(In/Hr)
Average low loss rate fraction (Yb) = 0.792 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.301(In)
Computed peak 30-minute rainfall = 0.616(In)
Specified peak 1-hour rainfall = 0.813(In)
Computed peak 3-hour rainfall = 1.421(In)
Specified peak 6-hour rainfall = 2.020(In)
Specified peak 24-hour rainfall = 3.710(In)

Rainfall depth area reduction factors:
Using a total area of 29.52(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.300(In)
30-minute factor = 0.999 Adjusted rainfall = 0.615(In)
1-hour factor = 0.999 Adjusted rainfall = 0.812(In)
3-hour factor = 1.000 Adjusted rainfall = 1.420(In)
6-hour factor = 1.000 Adjusted rainfall = 2.020(In)
24-hour factor = 1.000 Adjusted rainfall = 3.710(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 = 357.01 (CFS))	
1	2.915	10.406
2	18.659	56.207
3	47.461	102.827
4	76.210	102.636
5	90.309	50.332
6	96.233	21.149
7	98.351	7.564

8	99.067	2.555
9	100.000	1.277

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3005	0.3005
2	0.3965	0.0960
3	0.4663	0.0698
4	0.5232	0.0569
5	0.5720	0.0488
6	0.6153	0.0433
7	0.6544	0.0391
8	0.6903	0.0359
9	0.7236	0.0333
10	0.7548	0.0311
11	0.7841	0.0293
12	0.8119	0.0278
13	0.8456	0.0338
14	0.8781	0.0325
15	0.9095	0.0314
16	0.9399	0.0304
17	0.9694	0.0295
18	0.9980	0.0286
19	1.0258	0.0278
20	1.0530	0.0271
21	1.0795	0.0265
22	1.1053	0.0259
23	1.1306	0.0253
24	1.1554	0.0248
25	1.1796	0.0243
26	1.2034	0.0238
27	1.2268	0.0233
28	1.2497	0.0229
29	1.2722	0.0225
30	1.2944	0.0221
31	1.3162	0.0218
32	1.3376	0.0214
33	1.3587	0.0211
34	1.3795	0.0208
35	1.4000	0.0205
36	1.4203	0.0202
37	1.4402	0.0199
38	1.4598	0.0196
39	1.4792	0.0194
40	1.4984	0.0192
41	1.5173	0.0189
42	1.5360	0.0187
43	1.5544	0.0185
44	1.5727	0.0183
45	1.5908	0.0181
46	1.6086	0.0179
47	1.6263	0.0177
48	1.6438	0.0175
49	1.6611	0.0173
50	1.6782	0.0171
51	1.6952	0.0170
52	1.7120	0.0168

53	1.7287	0.0166
54	1.7452	0.0165
55	1.7615	0.0163
56	1.7777	0.0162
57	1.7938	0.0161
58	1.8097	0.0159
59	1.8255	0.0158
60	1.8411	0.0157
61	1.8566	0.0155
62	1.8720	0.0154
63	1.8873	0.0153
64	1.9025	0.0152
65	1.9175	0.0150
66	1.9325	0.0149
67	1.9473	0.0148
68	1.9620	0.0147
69	1.9766	0.0146
70	1.9911	0.0145
71	2.0055	0.0144
72	2.0198	0.0143
73	2.0321	0.0123
74	2.0442	0.0122
75	2.0563	0.0121
76	2.0683	0.0120
77	2.0802	0.0119
78	2.0920	0.0118
79	2.1037	0.0117
80	2.1153	0.0116
81	2.1269	0.0116
82	2.1384	0.0115
83	2.1498	0.0114
84	2.1611	0.0113
85	2.1723	0.0112
86	2.1835	0.0112
87	2.1946	0.0111
88	2.2056	0.0110
89	2.2166	0.0110
90	2.2275	0.0109
91	2.2383	0.0108
92	2.2491	0.0108
93	2.2597	0.0107
94	2.2704	0.0106
95	2.2809	0.0106
96	2.2914	0.0105
97	2.3019	0.0104
98	2.3122	0.0104
99	2.3226	0.0103
100	2.3328	0.0103
101	2.3430	0.0102
102	2.3532	0.0101
103	2.3633	0.0101
104	2.3733	0.0100
105	2.3833	0.0100
106	2.3932	0.0099
107	2.4031	0.0099
108	2.4129	0.0098
109	2.4227	0.0098

110	2.4324	0.0097
111	2.4421	0.0097
112	2.4517	0.0096
113	2.4613	0.0096
114	2.4708	0.0095
115	2.4803	0.0095
116	2.4897	0.0094
117	2.4991	0.0094
118	2.5085	0.0093
119	2.5178	0.0093
120	2.5270	0.0093
121	2.5362	0.0092
122	2.5454	0.0092
123	2.5545	0.0091
124	2.5636	0.0091
125	2.5727	0.0090
126	2.5817	0.0090
127	2.5906	0.0090
128	2.5996	0.0089
129	2.6085	0.0089
130	2.6173	0.0088
131	2.6261	0.0088
132	2.6349	0.0088
133	2.6436	0.0087
134	2.6523	0.0087
135	2.6610	0.0087
136	2.6696	0.0086
137	2.6782	0.0086
138	2.6868	0.0086
139	2.6953	0.0085
140	2.7038	0.0085
141	2.7122	0.0085
142	2.7206	0.0084
143	2.7290	0.0084
144	2.7374	0.0084
145	2.7457	0.0083
146	2.7540	0.0083
147	2.7622	0.0083
148	2.7705	0.0082
149	2.7787	0.0082
150	2.7868	0.0082
151	2.7950	0.0081
152	2.8031	0.0081
153	2.8111	0.0081
154	2.8192	0.0080
155	2.8272	0.0080
156	2.8352	0.0080
157	2.8431	0.0080
158	2.8511	0.0079
159	2.8590	0.0079
160	2.8668	0.0079
161	2.8747	0.0078
162	2.8825	0.0078
163	2.8903	0.0078
164	2.8980	0.0078
165	2.9058	0.0077
166	2.9135	0.0077

167	2.9212	0.0077
168	2.9288	0.0077
169	2.9365	0.0076
170	2.9441	0.0076
171	2.9517	0.0076
172	2.9592	0.0076
173	2.9668	0.0075
174	2.9743	0.0075
175	2.9817	0.0075
176	2.9892	0.0075
177	2.9966	0.0074
178	3.0041	0.0074
179	3.0114	0.0074
180	3.0188	0.0074
181	3.0262	0.0073
182	3.0335	0.0073
183	3.0408	0.0073
184	3.0481	0.0073
185	3.0553	0.0073
186	3.0625	0.0072
187	3.0698	0.0072
188	3.0769	0.0072
189	3.0841	0.0072
190	3.0913	0.0071
191	3.0984	0.0071
192	3.1055	0.0071
193	3.1126	0.0071
194	3.1196	0.0071
195	3.1267	0.0070
196	3.1337	0.0070
197	3.1407	0.0070
198	3.1477	0.0070
199	3.1546	0.0070
200	3.1616	0.0069
201	3.1685	0.0069
202	3.1754	0.0069
203	3.1823	0.0069
204	3.1892	0.0069
205	3.1960	0.0068
206	3.2028	0.0068
207	3.2096	0.0068
208	3.2164	0.0068
209	3.2232	0.0068
210	3.2300	0.0068
211	3.2367	0.0067
212	3.2434	0.0067
213	3.2501	0.0067
214	3.2568	0.0067
215	3.2635	0.0067
216	3.2701	0.0066
217	3.2767	0.0066
218	3.2834	0.0066
219	3.2900	0.0066
220	3.2965	0.0066
221	3.3031	0.0066
222	3.3096	0.0065
223	3.3162	0.0065

224	3.3227	0.0065
225	3.3292	0.0065
226	3.3357	0.0065
227	3.3421	0.0065
228	3.3486	0.0064
229	3.3550	0.0064
230	3.3614	0.0064
231	3.3678	0.0064
232	3.3742	0.0064
233	3.3806	0.0064
234	3.3870	0.0064
235	3.3933	0.0063
236	3.3996	0.0063
237	3.4059	0.0063
238	3.4122	0.0063
239	3.4185	0.0063
240	3.4248	0.0063
241	3.4310	0.0063
242	3.4373	0.0062
243	3.4435	0.0062
244	3.4497	0.0062
245	3.4559	0.0062
246	3.4621	0.0062
247	3.4682	0.0062
248	3.4744	0.0062
249	3.4805	0.0061
250	3.4866	0.0061
251	3.4927	0.0061
252	3.4988	0.0061
253	3.5049	0.0061
254	3.5110	0.0061
255	3.5170	0.0061
256	3.5231	0.0060
257	3.5291	0.0060
258	3.5351	0.0060
259	3.5411	0.0060
260	3.5471	0.0060
261	3.5531	0.0060
262	3.5591	0.0060
263	3.5650	0.0060
264	3.5710	0.0059
265	3.5769	0.0059
266	3.5828	0.0059
267	3.5887	0.0059
268	3.5946	0.0059
269	3.6005	0.0059
270	3.6063	0.0059
271	3.6122	0.0059
272	3.6180	0.0058
273	3.6238	0.0058
274	3.6297	0.0058
275	3.6355	0.0058
276	3.6413	0.0058
277	3.6470	0.0058
278	3.6528	0.0058
279	3.6586	0.0058
280	3.6643	0.0057

281	3.6700	0.0057
282	3.6758	0.0057
283	3.6815	0.0057
284	3.6872	0.0057
285	3.6929	0.0057
286	3.6985	0.0057
287	3.7042	0.0057
288	3.7099	0.0057

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0057	0.0045	0.0012
2	0.0057	0.0045	0.0012
3	0.0057	0.0045	0.0012
4	0.0057	0.0045	0.0012
5	0.0057	0.0045	0.0012
6	0.0057	0.0045	0.0012
7	0.0058	0.0046	0.0012
8	0.0058	0.0046	0.0012
9	0.0058	0.0046	0.0012
10	0.0058	0.0046	0.0012
11	0.0058	0.0046	0.0012
12	0.0058	0.0046	0.0012
13	0.0059	0.0046	0.0012
14	0.0059	0.0047	0.0012
15	0.0059	0.0047	0.0012
16	0.0059	0.0047	0.0012
17	0.0059	0.0047	0.0012
18	0.0060	0.0047	0.0012
19	0.0060	0.0047	0.0012
20	0.0060	0.0047	0.0012
21	0.0060	0.0048	0.0013
22	0.0060	0.0048	0.0013
23	0.0061	0.0048	0.0013
24	0.0061	0.0048	0.0013
25	0.0061	0.0048	0.0013
26	0.0061	0.0048	0.0013
27	0.0061	0.0049	0.0013
28	0.0062	0.0049	0.0013
29	0.0062	0.0049	0.0013
30	0.0062	0.0049	0.0013
31	0.0062	0.0049	0.0013
32	0.0062	0.0049	0.0013
33	0.0063	0.0050	0.0013
34	0.0063	0.0050	0.0013
35	0.0063	0.0050	0.0013
36	0.0063	0.0050	0.0013
37	0.0064	0.0050	0.0013
38	0.0064	0.0050	0.0013
39	0.0064	0.0051	0.0013
40	0.0064	0.0051	0.0013
41	0.0064	0.0051	0.0013
42	0.0065	0.0051	0.0013
43	0.0065	0.0051	0.0014
44	0.0065	0.0052	0.0014

45	0.0065	0.0052	0.0014
46	0.0066	0.0052	0.0014
47	0.0066	0.0052	0.0014
48	0.0066	0.0052	0.0014
49	0.0066	0.0053	0.0014
50	0.0067	0.0053	0.0014
51	0.0067	0.0053	0.0014
52	0.0067	0.0053	0.0014
53	0.0068	0.0053	0.0014
54	0.0068	0.0054	0.0014
55	0.0068	0.0054	0.0014
56	0.0068	0.0054	0.0014
57	0.0069	0.0054	0.0014
58	0.0069	0.0055	0.0014
59	0.0069	0.0055	0.0014
60	0.0069	0.0055	0.0014
61	0.0070	0.0055	0.0015
62	0.0070	0.0055	0.0015
63	0.0070	0.0056	0.0015
64	0.0071	0.0056	0.0015
65	0.0071	0.0056	0.0015
66	0.0071	0.0056	0.0015
67	0.0072	0.0057	0.0015
68	0.0072	0.0057	0.0015
69	0.0072	0.0057	0.0015
70	0.0073	0.0057	0.0015
71	0.0073	0.0058	0.0015
72	0.0073	0.0058	0.0015
73	0.0074	0.0058	0.0015
74	0.0074	0.0059	0.0015
75	0.0074	0.0059	0.0015
76	0.0075	0.0059	0.0016
77	0.0075	0.0059	0.0016
78	0.0075	0.0060	0.0016
79	0.0076	0.0060	0.0016
80	0.0076	0.0060	0.0016
81	0.0077	0.0061	0.0016
82	0.0077	0.0061	0.0016
83	0.0077	0.0061	0.0016
84	0.0078	0.0061	0.0016
85	0.0078	0.0062	0.0016
86	0.0078	0.0062	0.0016
87	0.0079	0.0063	0.0016
88	0.0079	0.0063	0.0016
89	0.0080	0.0063	0.0017
90	0.0080	0.0063	0.0017
91	0.0081	0.0064	0.0017
92	0.0081	0.0064	0.0017
93	0.0082	0.0065	0.0017
94	0.0082	0.0065	0.0017
95	0.0083	0.0065	0.0017
96	0.0083	0.0066	0.0017
97	0.0084	0.0066	0.0017
98	0.0084	0.0066	0.0017
99	0.0085	0.0067	0.0018
100	0.0085	0.0067	0.0018
101	0.0086	0.0068	0.0018

102	0.0086	0.0068	0.0018
103	0.0087	0.0069	0.0018
104	0.0087	0.0069	0.0018
105	0.0088	0.0069	0.0018
106	0.0088	0.0070	0.0018
107	0.0089	0.0070	0.0018
108	0.0089	0.0071	0.0019
109	0.0090	0.0071	0.0019
110	0.0090	0.0072	0.0019
111	0.0091	0.0072	0.0019
112	0.0092	0.0073	0.0019
113	0.0093	0.0073	0.0019
114	0.0093	0.0074	0.0019
115	0.0094	0.0074	0.0020
116	0.0094	0.0075	0.0020
117	0.0095	0.0075	0.0020
118	0.0096	0.0076	0.0020
119	0.0097	0.0077	0.0020
120	0.0097	0.0077	0.0020
121	0.0098	0.0078	0.0020
122	0.0099	0.0078	0.0021
123	0.0100	0.0079	0.0021
124	0.0100	0.0079	0.0021
125	0.0101	0.0080	0.0021
126	0.0102	0.0081	0.0021
127	0.0103	0.0082	0.0021
128	0.0104	0.0082	0.0022
129	0.0105	0.0083	0.0022
130	0.0106	0.0084	0.0022
131	0.0107	0.0085	0.0022
132	0.0108	0.0085	0.0022
133	0.0109	0.0086	0.0023
134	0.0110	0.0087	0.0023
135	0.0111	0.0088	0.0023
136	0.0112	0.0088	0.0023
137	0.0113	0.0090	0.0024
138	0.0114	0.0090	0.0024
139	0.0116	0.0092	0.0024
140	0.0116	0.0092	0.0024
141	0.0118	0.0093	0.0025
142	0.0119	0.0094	0.0025
143	0.0121	0.0096	0.0025
144	0.0122	0.0096	0.0025
145	0.0143	0.0113	0.0030
146	0.0144	0.0114	0.0030
147	0.0146	0.0116	0.0030
148	0.0147	0.0117	0.0031
149	0.0149	0.0118	0.0031
150	0.0150	0.0119	0.0031
151	0.0153	0.0121	0.0032
152	0.0154	0.0122	0.0032
153	0.0157	0.0124	0.0033
154	0.0158	0.0125	0.0033
155	0.0161	0.0127	0.0033
156	0.0162	0.0128	0.0034
157	0.0165	0.0131	0.0034
158	0.0166	0.0132	0.0035

159	0.0170	0.0134	0.0035
160	0.0171	0.0136	0.0036
161	0.0175	0.0139	0.0036
162	0.0177	0.0140	0.0037
163	0.0181	0.0143	0.0038
164	0.0183	0.0145	0.0038
165	0.0187	0.0148	0.0039
166	0.0189	0.0150	0.0039
167	0.0194	0.0154	0.0040
168	0.0196	0.0156	0.0041
169	0.0202	0.0160	0.0042
170	0.0205	0.0162	0.0043
171	0.0211	0.0167	0.0044
172	0.0214	0.0170	0.0045
173	0.0221	0.0175	0.0046
174	0.0225	0.0178	0.0047
175	0.0233	0.0185	0.0049
176	0.0238	0.0188	0.0049
177	0.0248	0.0196	0.0052
178	0.0253	0.0200	0.0053
179	0.0265	0.0210	0.0055
180	0.0271	0.0215	0.0056
181	0.0286	0.0227	0.0060
182	0.0295	0.0233	0.0061
183	0.0314	0.0249	0.0065
184	0.0325	0.0257	0.0068
185	0.0278	0.0220	0.0058
186	0.0293	0.0232	0.0061
187	0.0333	0.0264	0.0069
188	0.0359	0.0284	0.0075
189	0.0433	0.0343	0.0090
190	0.0488	0.0387	0.0102
191	0.0698	0.0553	0.0145
192	0.0960	0.0634	0.0326
193	0.3005	0.0634	0.2371
194	0.0569	0.0450	0.0118
195	0.0391	0.0310	0.0081
196	0.0311	0.0247	0.0065
197	0.0338	0.0267	0.0070
198	0.0304	0.0241	0.0063
199	0.0278	0.0221	0.0058
200	0.0259	0.0205	0.0054
201	0.0243	0.0192	0.0050
202	0.0229	0.0182	0.0048
203	0.0218	0.0173	0.0045
204	0.0208	0.0165	0.0043
205	0.0199	0.0158	0.0041
206	0.0192	0.0152	0.0040
207	0.0185	0.0146	0.0038
208	0.0179	0.0141	0.0037
209	0.0173	0.0137	0.0036
210	0.0168	0.0133	0.0035
211	0.0163	0.0129	0.0034
212	0.0159	0.0126	0.0033
213	0.0155	0.0123	0.0032
214	0.0152	0.0120	0.0032
215	0.0148	0.0117	0.0031

216	0.0145	0.0115	0.0030
217	0.0123	0.0097	0.0025
218	0.0120	0.0095	0.0025
219	0.0117	0.0093	0.0024
220	0.0115	0.0091	0.0024
221	0.0112	0.0089	0.0023
222	0.0110	0.0087	0.0023
223	0.0108	0.0086	0.0023
224	0.0106	0.0084	0.0022
225	0.0104	0.0083	0.0022
226	0.0103	0.0081	0.0021
227	0.0101	0.0080	0.0021
228	0.0099	0.0079	0.0021
229	0.0098	0.0077	0.0020
230	0.0096	0.0076	0.0020
231	0.0095	0.0075	0.0020
232	0.0093	0.0074	0.0019
233	0.0092	0.0073	0.0019
234	0.0091	0.0072	0.0019
235	0.0090	0.0071	0.0019
236	0.0088	0.0070	0.0018
237	0.0087	0.0069	0.0018
238	0.0086	0.0068	0.0018
239	0.0085	0.0067	0.0018
240	0.0084	0.0067	0.0018
241	0.0083	0.0066	0.0017
242	0.0082	0.0065	0.0017
243	0.0081	0.0064	0.0017
244	0.0080	0.0064	0.0017
245	0.0080	0.0063	0.0017
246	0.0079	0.0062	0.0016
247	0.0078	0.0062	0.0016
248	0.0077	0.0061	0.0016
249	0.0076	0.0060	0.0016
250	0.0076	0.0060	0.0016
251	0.0075	0.0059	0.0016
252	0.0074	0.0059	0.0015
253	0.0073	0.0058	0.0015
254	0.0073	0.0058	0.0015
255	0.0072	0.0057	0.0015
256	0.0071	0.0057	0.0015
257	0.0071	0.0056	0.0015
258	0.0070	0.0056	0.0015
259	0.0070	0.0055	0.0014
260	0.0069	0.0055	0.0014
261	0.0068	0.0054	0.0014
262	0.0068	0.0054	0.0014
263	0.0067	0.0053	0.0014
264	0.0067	0.0053	0.0014
265	0.0066	0.0053	0.0014
266	0.0066	0.0052	0.0014
267	0.0065	0.0052	0.0014
268	0.0065	0.0051	0.0013
269	0.0064	0.0051	0.0013
270	0.0064	0.0051	0.0013
271	0.0063	0.0050	0.0013
272	0.0063	0.0050	0.0013

273	0.0063	0.0050	0.0013
274	0.0062	0.0049	0.0013
275	0.0062	0.0049	0.0013
276	0.0061	0.0048	0.0013
277	0.0061	0.0048	0.0013
278	0.0060	0.0048	0.0013
279	0.0060	0.0048	0.0012
280	0.0060	0.0047	0.0012
281	0.0059	0.0047	0.0012
282	0.0059	0.0047	0.0012
283	0.0059	0.0046	0.0012
284	0.0058	0.0046	0.0012
285	0.0058	0.0046	0.0012
286	0.0057	0.0046	0.0012
287	0.0057	0.0045	0.0012
288	0.0057	0.0045	0.0012

Total soil rain loss = 2.75(In)
Total effective rainfall = 0.96(In)
Peak flow rate in flood hydrograph = 29.52(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0001	0.01	Q				
0+10	0.0006	0.08	Q				
0+15	0.0020	0.20	Q				
0+20	0.0042	0.32	Q				
0+25	0.0068	0.38	Q				
0+30	0.0096	0.41	Q				
0+35	0.0125	0.42	Q				
0+40	0.0154	0.42	Q				
0+45	0.0183	0.42	Q				
0+50	0.0213	0.43	Q				
0+55	0.0242	0.43	Q				
1+ 0	0.0271	0.43	Q				
1+ 5	0.0301	0.43	Q				
1+10	0.0331	0.43	Q				
1+15	0.0360	0.43	Q				
1+20	0.0390	0.43	Q				
1+25	0.0420	0.43	Q				
1+30	0.0450	0.44	Q				
1+35	0.0480	0.44	Q				
1+40	0.0510	0.44	Q				
1+45	0.0541	0.44	Q				
1+50	0.0571	0.44	Q				
1+55	0.0602	0.44	QV				
2+ 0	0.0632	0.44	QV				
2+ 5	0.0663	0.45	QV				
2+10	0.0694	0.45	QV				

2+15	0.0725	0.45	QV	|	|	|	|
2+20	0.0756	0.45	QV	|	|	|	|
2+25	0.0787	0.45	QV	|	|	|	|
2+30	0.0818	0.45	QV	|	|	|	|
2+35	0.0849	0.45	QV	|	|	|	|
2+40	0.0881	0.46	QV	|	|	|	|
2+45	0.0912	0.46	QV	|	|	|	|
2+50	0.0944	0.46	QV	|	|	|	|
2+55	0.0976	0.46	QV	|	|	|	|
3+ 0	0.1008	0.46	QV	|	|	|	|
3+ 5	0.1040	0.46	QV	|	|	|	|
3+10	0.1072	0.47	QV	|	|	|	|
3+15	0.1104	0.47	QV	|	|	|	|
3+20	0.1136	0.47	QV	|	|	|	|
3+25	0.1169	0.47	QV	|	|	|	|
3+30	0.1201	0.47	Q V	|	|	|	|
3+35	0.1234	0.47	Q V	|	|	|	|
3+40	0.1267	0.48	Q V	|	|	|	|
3+45	0.1300	0.48	Q V	|	|	|	|
3+50	0.1333	0.48	Q V	|	|	|	|
3+55	0.1366	0.48	Q V	|	|	|	|
4+ 0	0.1399	0.48	Q V	|	|	|	|
4+ 5	0.1433	0.49	Q V	|	|	|	|
4+10	0.1466	0.49	Q V	|	|	|	|
4+15	0.1500	0.49	Q V	|	|	|	|
4+20	0.1534	0.49	Q V	|	|	|	|
4+25	0.1568	0.49	Q V	|	|	|	|
4+30	0.1602	0.50	Q V	|	|	|	|
4+35	0.1636	0.50	Q V	|	|	|	|
4+40	0.1670	0.50	Q V	|	|	|	|
4+45	0.1705	0.50	Q V	|	|	|	|
4+50	0.1740	0.50	Q V	|	|	|	|
4+55	0.1774	0.51	Q V	|	|	|	|
5+ 0	0.1809	0.51	Q V	|	|	|	|
5+ 5	0.1844	0.51	Q V	|	|	|	|
5+10	0.1880	0.51	Q V	|	|	|	|
5+15	0.1915	0.51	Q V	|	|	|	|
5+20	0.1950	0.52	Q V	|	|	|	|
5+25	0.1986	0.52	Q V	|	|	|	|
5+30	0.2022	0.52	Q V	|	|	|	|
5+35	0.2058	0.52	Q V	|	|	|	|
5+40	0.2094	0.52	Q V	|	|	|	|
5+45	0.2130	0.53	Q V	|	|	|	|
5+50	0.2167	0.53	Q V	|	|	|	|
5+55	0.2204	0.53	Q V	|	|	|	|
6+ 0	0.2240	0.53	Q V	|	|	|	|
6+ 5	0.2277	0.54	Q V	|	|	|	|
6+10	0.2314	0.54	Q V	|	|	|	|
6+15	0.2352	0.54	Q V	|	|	|	|
6+20	0.2389	0.54	Q V	|	|	|	|
6+25	0.2427	0.55	Q V	|	|	|	|
6+30	0.2465	0.55	Q V	|	|	|	|
6+35	0.2503	0.55	Q V	|	|	|	|
6+40	0.2541	0.55	Q V	|	|	|	|
6+45	0.2579	0.56	Q V	|	|	|	|
6+50	0.2618	0.56	Q V	|	|	|	|
6+55	0.2657	0.56	Q V	|	|	|	|

7+ 0	0.2696	0.57	Q	V	|	|	|
7+ 5	0.2735	0.57	Q	V	|	|	|
7+10	0.2774	0.57	Q	V	|	|	|
7+15	0.2814	0.57	Q	V	|	|	|
7+20	0.2854	0.58	Q	V	|	|	|
7+25	0.2894	0.58	Q	V	|	|	|
7+30	0.2934	0.58	Q	V	|	|	|
7+35	0.2974	0.59	Q	V	|	|	|
7+40	0.3015	0.59	Q	V	|	|	|
7+45	0.3056	0.59	Q	V	|	|	|
7+50	0.3097	0.60	Q	V	|	|	|
7+55	0.3138	0.60	Q	V	|	|	|
8+ 0	0.3180	0.60	Q	V	|	|	|
8+ 5	0.3221	0.61	Q	V	|	|	|
8+10	0.3263	0.61	Q	V	|	|	|
8+15	0.3306	0.61	Q	V	|	|	|
8+20	0.3348	0.62	Q	V	|	|	|
8+25	0.3391	0.62	Q	V	|	|	|
8+30	0.3434	0.62	Q	V	|	|	|
8+35	0.3477	0.63	Q	V	|	|	|
8+40	0.3521	0.63	Q	V	|	|	|
8+45	0.3565	0.64	Q	V	|	|	|
8+50	0.3609	0.64	Q	V	|	|	|
8+55	0.3653	0.64	Q	V	|	|	|
9+ 0	0.3698	0.65	Q	V	|	|	|
9+ 5	0.3743	0.65	Q	V	|	|	|
9+10	0.3788	0.66	Q	V	|	|	|
9+15	0.3834	0.66	Q	V	|	|	|
9+20	0.3879	0.67	Q	V	|	|	|
9+25	0.3926	0.67	Q	V	|	|	|
9+30	0.3972	0.67	Q	V	|	|	|
9+35	0.4019	0.68	Q	V	|	|	|
9+40	0.4066	0.68	Q	V	|	|	|
9+45	0.4113	0.69	Q	V	|	|	|
9+50	0.4161	0.69	Q	V	|	|	|
9+55	0.4209	0.70	Q	V	|	|	|
10+ 0	0.4258	0.70	Q	V	|	|	|
10+ 5	0.4307	0.71	Q	V	|	|	|
10+10	0.4356	0.72	Q	V	|	|	|
10+15	0.4406	0.72	Q	V	|	|	|
10+20	0.4456	0.73	Q	V	|	|	|
10+25	0.4506	0.73	Q	V	|	|	|
10+30	0.4557	0.74	Q	V	|	|	|
10+35	0.4608	0.74	Q	V	|	|	|
10+40	0.4660	0.75	|Q	V	|	|	|
10+45	0.4712	0.76	|Q	V	|	|	|
10+50	0.4764	0.76	|Q	V	|	|	|
10+55	0.4817	0.77	|Q	V	|	|	|
11+ 0	0.4871	0.78	|Q	V	|	|	|
11+ 5	0.4925	0.78	|Q	V	|	|	|
11+10	0.4979	0.79	|Q	V	|	|	|
11+15	0.5034	0.80	|Q	V	|	|	|
11+20	0.5090	0.81	|Q	V	|	|	|
11+25	0.5146	0.81	|Q	V	|	|	|
11+30	0.5202	0.82	|Q	V	|	|	|
11+35	0.5259	0.83	|Q	V	|	|	|
11+40	0.5317	0.84	|Q	V	|	|	|

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11+45       0.5375      0.85  |Q       V|          |          |          |
11+50       0.5434      0.85  |Q       V|          |          |          |
11+55       0.5494      0.86  |Q       V|          |          |          |
12+ 0       0.5554      0.87  |Q       V|          |          |          |
12+ 5       0.5615      0.89  |Q       V|          |          |          |
12+10       0.5678      0.92  |Q       V|          |          |          |
12+15       0.5745      0.97  |Q       V|          |          |          |
12+20       0.5816      1.02  |Q       V|          |          |          |
12+25       0.5888      1.06  |Q        V          |          |          |
12+30       0.5962      1.08  |Q        V          |          |          |
12+35       0.6038      1.09  |Q        V          |          |          |
12+40       0.6114      1.10  |Q        V          |          |          |
12+45       0.6191      1.12  |Q        V          |          |          |
12+50       0.6269      1.13  |Q        V          |          |          |
12+55       0.6347      1.14  |Q        V          |          |          |
13+ 0       0.6427      1.16  |Q        V          |          |          |
13+ 5       0.6508      1.17  |Q        |V         |          |          |
13+10       0.6590      1.19  |Q        |V         |          |          |
13+15       0.6673      1.20  |Q        |V         |          |          |
13+20       0.6757      1.22  |Q        |V         |          |          |
13+25       0.6842      1.24  |Q        |V         |          |          |
13+30       0.6929      1.26  |Q        |V         |          |          |
13+35       0.7016      1.28  |Q        |V         |          |          |
13+40       0.7106      1.30  |Q        | V        |          |          |
13+45       0.7196      1.32  |Q        | V        |          |          |
13+50       0.7288      1.34  |Q        | V        |          |          |
13+55       0.7382      1.36  |Q        | V        |          |          |
14+ 0       0.7478      1.39  |Q        | V        |          |          |
14+ 5       0.7575      1.41  |Q        | V        |          |          |
14+10       0.7674      1.44  |Q        |  V       |          |          |
14+15       0.7775      1.47  |Q        |  V       |          |          |
14+20       0.7878      1.50  |Q        |  V       |          |          |
14+25       0.7983      1.53  | Q       |  V       |          |          |
14+30       0.8091      1.57  | Q       |  V       |          |          |
14+35       0.8202      1.60  | Q       |  V       |          |          |
14+40       0.8315      1.64  | Q       |   V      |          |          |
14+45       0.8431      1.69  | Q       |   V      |          |          |
14+50       0.8551      1.73  | Q       |   V      |          |          |
14+55       0.8674      1.79  | Q       |   V      |          |          |
15+ 0       0.8801      1.84  | Q       |    V     |          |          |
15+ 5       0.8932      1.90  | Q       |    V     |          |          |
15+10       0.9068      1.97  | Q       |    V     |          |          |
15+15       0.9209      2.05  | Q       |    V     |          |          |
15+20       0.9356      2.14  | Q       |    V     |          |          |
15+25       0.9509      2.22  | Q       |     V    |          |          |
15+30       0.9664      2.25  |  Q      |     V    |          |          |
15+35       0.9818      2.23  | Q       |     V    |          |          |
15+40       0.9972      2.23  | Q       |      V   |          |          |
15+45       1.0134      2.36  |  Q      |      V   |          |          |
15+50       1.0313      2.60  |  Q      |      V   |          |          |
15+55       1.0517      2.96  |  Q      |      V   |          |          |
16+ 0       1.0772      3.72  |   Q     |       V  |          |          |
16+ 5       1.1291      7.52  |         Q        V|          |          |
16+10       1.2604     19.08  |         |          |V   Q     |          |
16+15       1.4637     29.52  |         |          |   V      |        Q |
16+20       1.6575     28.13  |         |          |       V  |      Q   |
16+25       1.7626     15.26  |         |          Q         V          |
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16+30	1.8167	7.87	| Q | | |V |
16+35	1.8468	4.36	| Q | | |V |
16+40	1.8673	2.99	| Q | | |V |
16+45	1.8844	2.48	| Q | | | V |
16+50	1.8984	2.03	| Q | | | V |
16+55	1.9115	1.89	| Q | | | V |
17+ 0	1.9237	1.78	| Q | | | V |
17+ 5	1.9352	1.68	| Q | | | V |
17+10	1.9462	1.59	| Q | | | V |
17+15	1.9567	1.52	| Q | | | V |
17+20	1.9668	1.46	|Q | | | V |
17+25	1.9764	1.40	|Q | | | V |
17+30	1.9857	1.35	|Q | | | V |
17+35	1.9948	1.31	|Q | | | V |
17+40	2.0035	1.27	|Q | | | V |
17+45	2.0120	1.23	|Q | | | V |
17+50	2.0202	1.20	|Q | | | V |
17+55	2.0283	1.17	|Q | | | V |
18+ 0	2.0361	1.14	|Q | | | V |
18+ 5	2.0438	1.11	|Q | | | V |
18+10	2.0511	1.06	|Q | | | V |
18+15	2.0579	1.00	|Q | | | V |
18+20	2.0644	0.93	|Q | | | V |
18+25	2.0705	0.89	|Q | | | V |
18+30	2.0765	0.87	|Q | | | V |
18+35	2.0823	0.84	|Q | | | V |
18+40	2.0880	0.83	|Q | | | V |
18+45	2.0935	0.81	|Q | | | V |
18+50	2.0990	0.79	|Q | | | V |
18+55	2.1044	0.78	|Q | | | V |
19+ 0	2.1097	0.77	|Q | | | V |
19+ 5	2.1149	0.75	|Q | | | V |
19+10	2.1200	0.74	Q | | | V |
19+15	2.1250	0.73	Q | | | V |
19+20	2.1299	0.72	Q | | | V |
19+25	2.1348	0.71	Q | | | V |
19+30	2.1396	0.70	Q | | | V |
19+35	2.1444	0.69	Q | | | V |
19+40	2.1490	0.68	Q | | | V |
19+45	2.1536	0.67	Q | | | V |
19+50	2.1582	0.66	Q | | | V |
19+55	2.1626	0.65	Q | | | V |
20+ 0	2.1671	0.64	Q | | | V |
20+ 5	2.1714	0.63	Q | | | V |
20+10	2.1758	0.63	Q | | | V |
20+15	2.1800	0.62	Q | | | V |
20+20	2.1842	0.61	Q | | | V |
20+25	2.1884	0.61	Q | | | V |
20+30	2.1925	0.60	Q | | | V |
20+35	2.1966	0.59	Q | | | V |
20+40	2.2006	0.59	Q | | | V |
20+45	2.2046	0.58	Q | | | V |
20+50	2.2086	0.57	Q | | | V |
20+55	2.2125	0.57	Q | | | V |
21+ 0	2.2164	0.56	Q | | | V |
21+ 5	2.2202	0.56	Q | | | V |
21+10	2.2240	0.55	Q | | | V |

21+15	2.2277	0.55	Q	|	|	|	V |
21+20	2.2315	0.54	Q	|	|	|	V |
21+25	2.2352	0.54	Q	|	|	|	V |
21+30	2.2388	0.53	Q	|	|	|	V |
21+35	2.2424	0.53	Q	|	|	|	V |
21+40	2.2460	0.52	Q	|	|	|	V |
21+45	2.2496	0.52	Q	|	|	|	V |
21+50	2.2531	0.51	Q	|	|	|	V |
21+55	2.2566	0.51	Q	|	|	|	V |
22+ 0	2.2601	0.50	Q	|	|	|	V |
22+ 5	2.2635	0.50	Q	|	|	|	V |
22+10	2.2670	0.50	Q	|	|	|	V |
22+15	2.2703	0.49	Q	|	|	|	V |
22+20	2.2737	0.49	Q	|	|	|	V |
22+25	2.2770	0.48	Q	|	|	|	V |
22+30	2.2804	0.48	Q	|	|	|	V |
22+35	2.2836	0.48	Q	|	|	|	V |
22+40	2.2869	0.47	Q	|	|	|	V|
22+45	2.2901	0.47	Q	|	|	|	V|
22+50	2.2934	0.47	Q	|	|	|	V|
22+55	2.2966	0.46	Q	|	|	|	V|
23+ 0	2.2997	0.46	Q	|	|	|	V|
23+ 5	2.3029	0.46	Q	|	|	|	V|
23+10	2.3060	0.45	Q	|	|	|	V|
23+15	2.3091	0.45	Q	|	|	|	V|
23+20	2.3122	0.45	Q	|	|	|	V|
23+25	2.3153	0.45	Q	|	|	|	V|
23+30	2.3183	0.44	Q	|	|	|	V|
23+35	2.3213	0.44	Q	|	|	|	V|
23+40	2.3243	0.44	Q	|	|	|	V|
23+45	2.3273	0.43	Q	|	|	|	V|
23+50	2.3303	0.43	Q	|	|	|	V|
23+55	2.3333	0.43	Q	|	|	|	V|
24+ 0	2.3362	0.43	Q	|	|	|	V|
24+ 5	2.3390	0.41	Q	|	|	|	V|
24+10	2.3414	0.34	Q	|	|	|	V|
24+15	2.3429	0.22	Q	|	|	|	V|
24+20	2.3436	0.10	Q	|	|	|	V|
24+25	2.3438	0.04	Q	|	|	|	V|
24+30	2.3439	0.01	Q	|	|	|	V|
24+35	2.3440	0.00	Q	|	|	|	V|
24+40	2.3440	0.00	Q	|	|	|	V

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
OFFSITE EXISTING CONDITION - WATERSHED B
10-YEAR STORM EVENT ANALYSIS

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		
29.52	1	0.81
Rainfall data for year 10		
29.52	6	2.02
Rainfall data for year 10		
29.52	24	3.71

++

******** 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)
32.0	32.0	29.52	1.000	0.978	0.778	0.761

Area-averaged adjusted loss rate Fm (In/Hr) = 0.761

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
22.97	0.778	32.0	32.0	18.55	0.000
6.55	0.222	98.0	98.0	0.20	0.937

Area-averaged catchment yield fraction, Y = 0.208
Area-averaged low loss fraction, Yb = 0.792
User entry of time of concentration = 0.267 (hours)
++
Watershed area = 29.52(Ac.)
Catchment Lag time = 0.214 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 39.0137
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.761(In/Hr)
Average low loss rate fraction (Yb) = 0.792 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.301(In)
Computed peak 30-minute rainfall = 0.616(In)
Specified peak 1-hour rainfall = 0.813(In)
Computed peak 3-hour rainfall = 1.421(In)
Specified peak 6-hour rainfall = 2.020(In)
Specified peak 24-hour rainfall = 3.710(In)

Rainfall depth area reduction factors:
Using a total area of 29.52(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.300(In)
30-minute factor = 0.999 Adjusted rainfall = 0.615(In)
1-hour factor = 0.999 Adjusted rainfall = 0.812(In)
3-hour factor = 1.000 Adjusted rainfall = 1.420(In)
6-hour factor = 1.000 Adjusted rainfall = 2.020(In)
24-hour factor = 1.000 Adjusted rainfall = 3.710(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 = 357.01 (CFS))	
1	2.915	10.406
2	18.659	56.207
3	47.461	102.827
4	76.210	102.636
5	90.309	50.332
6	96.233	21.149
7	98.351	7.564

8	99.067	2.555
9	100.000	1.277

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3005	0.3005
2	0.3965	0.0960
3	0.4663	0.0698
4	0.5232	0.0569
5	0.5720	0.0488
6	0.6153	0.0433
7	0.6544	0.0391
8	0.6903	0.0359
9	0.7236	0.0333
10	0.7548	0.0311
11	0.7841	0.0293
12	0.8119	0.0278
13	0.8456	0.0338
14	0.8781	0.0325
15	0.9095	0.0314
16	0.9399	0.0304
17	0.9694	0.0295
18	0.9980	0.0286
19	1.0258	0.0278
20	1.0530	0.0271
21	1.0795	0.0265
22	1.1053	0.0259
23	1.1306	0.0253
24	1.1554	0.0248
25	1.1796	0.0243
26	1.2034	0.0238
27	1.2268	0.0233
28	1.2497	0.0229
29	1.2722	0.0225
30	1.2944	0.0221
31	1.3162	0.0218
32	1.3376	0.0214
33	1.3587	0.0211
34	1.3795	0.0208
35	1.4000	0.0205
36	1.4203	0.0202
37	1.4402	0.0199
38	1.4598	0.0196
39	1.4792	0.0194
40	1.4984	0.0192
41	1.5173	0.0189
42	1.5360	0.0187
43	1.5544	0.0185
44	1.5727	0.0183
45	1.5908	0.0181
46	1.6086	0.0179
47	1.6263	0.0177
48	1.6438	0.0175
49	1.6611	0.0173
50	1.6782	0.0171
51	1.6952	0.0170
52	1.7120	0.0168

53	1.7287	0.0166
54	1.7452	0.0165
55	1.7615	0.0163
56	1.7777	0.0162
57	1.7938	0.0161
58	1.8097	0.0159
59	1.8255	0.0158
60	1.8411	0.0157
61	1.8566	0.0155
62	1.8720	0.0154
63	1.8873	0.0153
64	1.9025	0.0152
65	1.9175	0.0150
66	1.9325	0.0149
67	1.9473	0.0148
68	1.9620	0.0147
69	1.9766	0.0146
70	1.9911	0.0145
71	2.0055	0.0144
72	2.0198	0.0143
73	2.0321	0.0123
74	2.0442	0.0122
75	2.0563	0.0121
76	2.0683	0.0120
77	2.0802	0.0119
78	2.0920	0.0118
79	2.1037	0.0117
80	2.1153	0.0116
81	2.1269	0.0116
82	2.1384	0.0115
83	2.1498	0.0114
84	2.1611	0.0113
85	2.1723	0.0112
86	2.1835	0.0112
87	2.1946	0.0111
88	2.2056	0.0110
89	2.2166	0.0110
90	2.2275	0.0109
91	2.2383	0.0108
92	2.2491	0.0108
93	2.2597	0.0107
94	2.2704	0.0106
95	2.2809	0.0106
96	2.2914	0.0105
97	2.3019	0.0104
98	2.3122	0.0104
99	2.3226	0.0103
100	2.3328	0.0103
101	2.3430	0.0102
102	2.3532	0.0101
103	2.3633	0.0101
104	2.3733	0.0100
105	2.3833	0.0100
106	2.3932	0.0099
107	2.4031	0.0099
108	2.4129	0.0098
109	2.4227	0.0098

110	2.4324	0.0097
111	2.4421	0.0097
112	2.4517	0.0096
113	2.4613	0.0096
114	2.4708	0.0095
115	2.4803	0.0095
116	2.4897	0.0094
117	2.4991	0.0094
118	2.5085	0.0093
119	2.5178	0.0093
120	2.5270	0.0093
121	2.5362	0.0092
122	2.5454	0.0092
123	2.5545	0.0091
124	2.5636	0.0091
125	2.5727	0.0090
126	2.5817	0.0090
127	2.5906	0.0090
128	2.5996	0.0089
129	2.6085	0.0089
130	2.6173	0.0088
131	2.6261	0.0088
132	2.6349	0.0088
133	2.6436	0.0087
134	2.6523	0.0087
135	2.6610	0.0087
136	2.6696	0.0086
137	2.6782	0.0086
138	2.6868	0.0086
139	2.6953	0.0085
140	2.7038	0.0085
141	2.7122	0.0085
142	2.7206	0.0084
143	2.7290	0.0084
144	2.7374	0.0084
145	2.7457	0.0083
146	2.7540	0.0083
147	2.7622	0.0083
148	2.7705	0.0082
149	2.7787	0.0082
150	2.7868	0.0082
151	2.7950	0.0081
152	2.8031	0.0081
153	2.8111	0.0081
154	2.8192	0.0080
155	2.8272	0.0080
156	2.8352	0.0080
157	2.8431	0.0080
158	2.8511	0.0079
159	2.8590	0.0079
160	2.8668	0.0079
161	2.8747	0.0078
162	2.8825	0.0078
163	2.8903	0.0078
164	2.8980	0.0078
165	2.9058	0.0077
166	2.9135	0.0077

167	2.9212	0.0077
168	2.9288	0.0077
169	2.9365	0.0076
170	2.9441	0.0076
171	2.9517	0.0076
172	2.9592	0.0076
173	2.9668	0.0075
174	2.9743	0.0075
175	2.9817	0.0075
176	2.9892	0.0075
177	2.9966	0.0074
178	3.0041	0.0074
179	3.0114	0.0074
180	3.0188	0.0074
181	3.0262	0.0073
182	3.0335	0.0073
183	3.0408	0.0073
184	3.0481	0.0073
185	3.0553	0.0073
186	3.0625	0.0072
187	3.0698	0.0072
188	3.0769	0.0072
189	3.0841	0.0072
190	3.0913	0.0071
191	3.0984	0.0071
192	3.1055	0.0071
193	3.1126	0.0071
194	3.1196	0.0071
195	3.1267	0.0070
196	3.1337	0.0070
197	3.1407	0.0070
198	3.1477	0.0070
199	3.1546	0.0070
200	3.1616	0.0069
201	3.1685	0.0069
202	3.1754	0.0069
203	3.1823	0.0069
204	3.1892	0.0069
205	3.1960	0.0068
206	3.2028	0.0068
207	3.2096	0.0068
208	3.2164	0.0068
209	3.2232	0.0068
210	3.2300	0.0068
211	3.2367	0.0067
212	3.2434	0.0067
213	3.2501	0.0067
214	3.2568	0.0067
215	3.2635	0.0067
216	3.2701	0.0066
217	3.2767	0.0066
218	3.2834	0.0066
219	3.2900	0.0066
220	3.2965	0.0066
221	3.3031	0.0066
222	3.3096	0.0065
223	3.3162	0.0065

224	3.3227	0.0065
225	3.3292	0.0065
226	3.3357	0.0065
227	3.3421	0.0065
228	3.3486	0.0064
229	3.3550	0.0064
230	3.3614	0.0064
231	3.3678	0.0064
232	3.3742	0.0064
233	3.3806	0.0064
234	3.3870	0.0064
235	3.3933	0.0063
236	3.3996	0.0063
237	3.4059	0.0063
238	3.4122	0.0063
239	3.4185	0.0063
240	3.4248	0.0063
241	3.4310	0.0063
242	3.4373	0.0062
243	3.4435	0.0062
244	3.4497	0.0062
245	3.4559	0.0062
246	3.4621	0.0062
247	3.4682	0.0062
248	3.4744	0.0062
249	3.4805	0.0061
250	3.4866	0.0061
251	3.4927	0.0061
252	3.4988	0.0061
253	3.5049	0.0061
254	3.5110	0.0061
255	3.5170	0.0061
256	3.5231	0.0060
257	3.5291	0.0060
258	3.5351	0.0060
259	3.5411	0.0060
260	3.5471	0.0060
261	3.5531	0.0060
262	3.5591	0.0060
263	3.5650	0.0060
264	3.5710	0.0059
265	3.5769	0.0059
266	3.5828	0.0059
267	3.5887	0.0059
268	3.5946	0.0059
269	3.6005	0.0059
270	3.6063	0.0059
271	3.6122	0.0059
272	3.6180	0.0058
273	3.6238	0.0058
274	3.6297	0.0058
275	3.6355	0.0058
276	3.6413	0.0058
277	3.6470	0.0058
278	3.6528	0.0058
279	3.6586	0.0058
280	3.6643	0.0057

281	3.6700	0.0057
282	3.6758	0.0057
283	3.6815	0.0057
284	3.6872	0.0057
285	3.6929	0.0057
286	3.6985	0.0057
287	3.7042	0.0057
288	3.7099	0.0057

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0057	0.0045	0.0012
2	0.0057	0.0045	0.0012
3	0.0057	0.0045	0.0012
4	0.0057	0.0045	0.0012
5	0.0057	0.0045	0.0012
6	0.0057	0.0045	0.0012
7	0.0058	0.0046	0.0012
8	0.0058	0.0046	0.0012
9	0.0058	0.0046	0.0012
10	0.0058	0.0046	0.0012
11	0.0058	0.0046	0.0012
12	0.0058	0.0046	0.0012
13	0.0059	0.0046	0.0012
14	0.0059	0.0047	0.0012
15	0.0059	0.0047	0.0012
16	0.0059	0.0047	0.0012
17	0.0059	0.0047	0.0012
18	0.0060	0.0047	0.0012
19	0.0060	0.0047	0.0012
20	0.0060	0.0047	0.0012
21	0.0060	0.0048	0.0013
22	0.0060	0.0048	0.0013
23	0.0061	0.0048	0.0013
24	0.0061	0.0048	0.0013
25	0.0061	0.0048	0.0013
26	0.0061	0.0048	0.0013
27	0.0061	0.0049	0.0013
28	0.0062	0.0049	0.0013
29	0.0062	0.0049	0.0013
30	0.0062	0.0049	0.0013
31	0.0062	0.0049	0.0013
32	0.0062	0.0049	0.0013
33	0.0063	0.0050	0.0013
34	0.0063	0.0050	0.0013
35	0.0063	0.0050	0.0013
36	0.0063	0.0050	0.0013
37	0.0064	0.0050	0.0013
38	0.0064	0.0050	0.0013
39	0.0064	0.0051	0.0013
40	0.0064	0.0051	0.0013
41	0.0064	0.0051	0.0013
42	0.0065	0.0051	0.0013
43	0.0065	0.0051	0.0014
44	0.0065	0.0052	0.0014

45	0.0065	0.0052	0.0014
46	0.0066	0.0052	0.0014
47	0.0066	0.0052	0.0014
48	0.0066	0.0052	0.0014
49	0.0066	0.0053	0.0014
50	0.0067	0.0053	0.0014
51	0.0067	0.0053	0.0014
52	0.0067	0.0053	0.0014
53	0.0068	0.0053	0.0014
54	0.0068	0.0054	0.0014
55	0.0068	0.0054	0.0014
56	0.0068	0.0054	0.0014
57	0.0069	0.0054	0.0014
58	0.0069	0.0055	0.0014
59	0.0069	0.0055	0.0014
60	0.0069	0.0055	0.0014
61	0.0070	0.0055	0.0015
62	0.0070	0.0055	0.0015
63	0.0070	0.0056	0.0015
64	0.0071	0.0056	0.0015
65	0.0071	0.0056	0.0015
66	0.0071	0.0056	0.0015
67	0.0072	0.0057	0.0015
68	0.0072	0.0057	0.0015
69	0.0072	0.0057	0.0015
70	0.0073	0.0057	0.0015
71	0.0073	0.0058	0.0015
72	0.0073	0.0058	0.0015
73	0.0074	0.0058	0.0015
74	0.0074	0.0059	0.0015
75	0.0074	0.0059	0.0015
76	0.0075	0.0059	0.0016
77	0.0075	0.0059	0.0016
78	0.0075	0.0060	0.0016
79	0.0076	0.0060	0.0016
80	0.0076	0.0060	0.0016
81	0.0077	0.0061	0.0016
82	0.0077	0.0061	0.0016
83	0.0077	0.0061	0.0016
84	0.0078	0.0061	0.0016
85	0.0078	0.0062	0.0016
86	0.0078	0.0062	0.0016
87	0.0079	0.0063	0.0016
88	0.0079	0.0063	0.0016
89	0.0080	0.0063	0.0017
90	0.0080	0.0063	0.0017
91	0.0081	0.0064	0.0017
92	0.0081	0.0064	0.0017
93	0.0082	0.0065	0.0017
94	0.0082	0.0065	0.0017
95	0.0083	0.0065	0.0017
96	0.0083	0.0066	0.0017
97	0.0084	0.0066	0.0017
98	0.0084	0.0066	0.0017
99	0.0085	0.0067	0.0018
100	0.0085	0.0067	0.0018
101	0.0086	0.0068	0.0018

102	0.0086	0.0068	0.0018
103	0.0087	0.0069	0.0018
104	0.0087	0.0069	0.0018
105	0.0088	0.0069	0.0018
106	0.0088	0.0070	0.0018
107	0.0089	0.0070	0.0018
108	0.0089	0.0071	0.0019
109	0.0090	0.0071	0.0019
110	0.0090	0.0072	0.0019
111	0.0091	0.0072	0.0019
112	0.0092	0.0073	0.0019
113	0.0093	0.0073	0.0019
114	0.0093	0.0074	0.0019
115	0.0094	0.0074	0.0020
116	0.0094	0.0075	0.0020
117	0.0095	0.0075	0.0020
118	0.0096	0.0076	0.0020
119	0.0097	0.0077	0.0020
120	0.0097	0.0077	0.0020
121	0.0098	0.0078	0.0020
122	0.0099	0.0078	0.0021
123	0.0100	0.0079	0.0021
124	0.0100	0.0079	0.0021
125	0.0101	0.0080	0.0021
126	0.0102	0.0081	0.0021
127	0.0103	0.0082	0.0021
128	0.0104	0.0082	0.0022
129	0.0105	0.0083	0.0022
130	0.0106	0.0084	0.0022
131	0.0107	0.0085	0.0022
132	0.0108	0.0085	0.0022
133	0.0109	0.0086	0.0023
134	0.0110	0.0087	0.0023
135	0.0111	0.0088	0.0023
136	0.0112	0.0088	0.0023
137	0.0113	0.0090	0.0024
138	0.0114	0.0090	0.0024
139	0.0116	0.0092	0.0024
140	0.0116	0.0092	0.0024
141	0.0118	0.0093	0.0025
142	0.0119	0.0094	0.0025
143	0.0121	0.0096	0.0025
144	0.0122	0.0096	0.0025
145	0.0143	0.0113	0.0030
146	0.0144	0.0114	0.0030
147	0.0146	0.0116	0.0030
148	0.0147	0.0117	0.0031
149	0.0149	0.0118	0.0031
150	0.0150	0.0119	0.0031
151	0.0153	0.0121	0.0032
152	0.0154	0.0122	0.0032
153	0.0157	0.0124	0.0033
154	0.0158	0.0125	0.0033
155	0.0161	0.0127	0.0033
156	0.0162	0.0128	0.0034
157	0.0165	0.0131	0.0034
158	0.0166	0.0132	0.0035

159	0.0170	0.0134	0.0035
160	0.0171	0.0136	0.0036
161	0.0175	0.0139	0.0036
162	0.0177	0.0140	0.0037
163	0.0181	0.0143	0.0038
164	0.0183	0.0145	0.0038
165	0.0187	0.0148	0.0039
166	0.0189	0.0150	0.0039
167	0.0194	0.0154	0.0040
168	0.0196	0.0156	0.0041
169	0.0202	0.0160	0.0042
170	0.0205	0.0162	0.0043
171	0.0211	0.0167	0.0044
172	0.0214	0.0170	0.0045
173	0.0221	0.0175	0.0046
174	0.0225	0.0178	0.0047
175	0.0233	0.0185	0.0049
176	0.0238	0.0188	0.0049
177	0.0248	0.0196	0.0052
178	0.0253	0.0200	0.0053
179	0.0265	0.0210	0.0055
180	0.0271	0.0215	0.0056
181	0.0286	0.0227	0.0060
182	0.0295	0.0233	0.0061
183	0.0314	0.0249	0.0065
184	0.0325	0.0257	0.0068
185	0.0278	0.0220	0.0058
186	0.0293	0.0232	0.0061
187	0.0333	0.0264	0.0069
188	0.0359	0.0284	0.0075
189	0.0433	0.0343	0.0090
190	0.0488	0.0387	0.0102
191	0.0698	0.0553	0.0145
192	0.0960	0.0634	0.0326
193	0.3005	0.0634	0.2371
194	0.0569	0.0450	0.0118
195	0.0391	0.0310	0.0081
196	0.0311	0.0247	0.0065
197	0.0338	0.0267	0.0070
198	0.0304	0.0241	0.0063
199	0.0278	0.0221	0.0058
200	0.0259	0.0205	0.0054
201	0.0243	0.0192	0.0050
202	0.0229	0.0182	0.0048
203	0.0218	0.0173	0.0045
204	0.0208	0.0165	0.0043
205	0.0199	0.0158	0.0041
206	0.0192	0.0152	0.0040
207	0.0185	0.0146	0.0038
208	0.0179	0.0141	0.0037
209	0.0173	0.0137	0.0036
210	0.0168	0.0133	0.0035
211	0.0163	0.0129	0.0034
212	0.0159	0.0126	0.0033
213	0.0155	0.0123	0.0032
214	0.0152	0.0120	0.0032
215	0.0148	0.0117	0.0031

216	0.0145	0.0115	0.0030
217	0.0123	0.0097	0.0025
218	0.0120	0.0095	0.0025
219	0.0117	0.0093	0.0024
220	0.0115	0.0091	0.0024
221	0.0112	0.0089	0.0023
222	0.0110	0.0087	0.0023
223	0.0108	0.0086	0.0023
224	0.0106	0.0084	0.0022
225	0.0104	0.0083	0.0022
226	0.0103	0.0081	0.0021
227	0.0101	0.0080	0.0021
228	0.0099	0.0079	0.0021
229	0.0098	0.0077	0.0020
230	0.0096	0.0076	0.0020
231	0.0095	0.0075	0.0020
232	0.0093	0.0074	0.0019
233	0.0092	0.0073	0.0019
234	0.0091	0.0072	0.0019
235	0.0090	0.0071	0.0019
236	0.0088	0.0070	0.0018
237	0.0087	0.0069	0.0018
238	0.0086	0.0068	0.0018
239	0.0085	0.0067	0.0018
240	0.0084	0.0067	0.0018
241	0.0083	0.0066	0.0017
242	0.0082	0.0065	0.0017
243	0.0081	0.0064	0.0017
244	0.0080	0.0064	0.0017
245	0.0080	0.0063	0.0017
246	0.0079	0.0062	0.0016
247	0.0078	0.0062	0.0016
248	0.0077	0.0061	0.0016
249	0.0076	0.0060	0.0016
250	0.0076	0.0060	0.0016
251	0.0075	0.0059	0.0016
252	0.0074	0.0059	0.0015
253	0.0073	0.0058	0.0015
254	0.0073	0.0058	0.0015
255	0.0072	0.0057	0.0015
256	0.0071	0.0057	0.0015
257	0.0071	0.0056	0.0015
258	0.0070	0.0056	0.0015
259	0.0070	0.0055	0.0014
260	0.0069	0.0055	0.0014
261	0.0068	0.0054	0.0014
262	0.0068	0.0054	0.0014
263	0.0067	0.0053	0.0014
264	0.0067	0.0053	0.0014
265	0.0066	0.0053	0.0014
266	0.0066	0.0052	0.0014
267	0.0065	0.0052	0.0014
268	0.0065	0.0051	0.0013
269	0.0064	0.0051	0.0013
270	0.0064	0.0051	0.0013
271	0.0063	0.0050	0.0013
272	0.0063	0.0050	0.0013

273	0.0063	0.0050	0.0013
274	0.0062	0.0049	0.0013
275	0.0062	0.0049	0.0013
276	0.0061	0.0048	0.0013
277	0.0061	0.0048	0.0013
278	0.0060	0.0048	0.0013
279	0.0060	0.0048	0.0012
280	0.0060	0.0047	0.0012
281	0.0059	0.0047	0.0012
282	0.0059	0.0047	0.0012
283	0.0059	0.0046	0.0012
284	0.0058	0.0046	0.0012
285	0.0058	0.0046	0.0012
286	0.0057	0.0046	0.0012
287	0.0057	0.0045	0.0012
288	0.0057	0.0045	0.0012

Total soil rain loss = 2.75(In)
Total effective rainfall = 0.96(In)
Peak flow rate in flood hydrograph = 29.52(CFS)

++

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0001	0.01	Q				
0+10	0.0006	0.08	Q				
0+15	0.0020	0.20	Q				
0+20	0.0042	0.32	Q				
0+25	0.0068	0.38	Q				
0+30	0.0096	0.41	Q				
0+35	0.0125	0.42	Q				
0+40	0.0154	0.42	Q				
0+45	0.0183	0.42	Q				
0+50	0.0213	0.43	Q				
0+55	0.0242	0.43	Q				
1+ 0	0.0271	0.43	Q				
1+ 5	0.0301	0.43	Q				
1+10	0.0331	0.43	Q				
1+15	0.0360	0.43	Q				
1+20	0.0390	0.43	Q				
1+25	0.0420	0.43	Q				
1+30	0.0450	0.44	Q				
1+35	0.0480	0.44	Q				
1+40	0.0510	0.44	Q				
1+45	0.0541	0.44	Q				
1+50	0.0571	0.44	Q				
1+55	0.0602	0.44	QV				
2+ 0	0.0632	0.44	QV				
2+ 5	0.0663	0.45	QV				
2+10	0.0694	0.45	QV				

2+15	0.0725	0.45	QV	|	|	|	|
2+20	0.0756	0.45	QV	|	|	|	|
2+25	0.0787	0.45	QV	|	|	|	|
2+30	0.0818	0.45	QV	|	|	|	|
2+35	0.0849	0.45	QV	|	|	|	|
2+40	0.0881	0.46	QV	|	|	|	|
2+45	0.0912	0.46	QV	|	|	|	|
2+50	0.0944	0.46	QV	|	|	|	|
2+55	0.0976	0.46	QV	|	|	|	|
3+ 0	0.1008	0.46	QV	|	|	|	|
3+ 5	0.1040	0.46	QV	|	|	|	|
3+10	0.1072	0.47	QV	|	|	|	|
3+15	0.1104	0.47	QV	|	|	|	|
3+20	0.1136	0.47	QV	|	|	|	|
3+25	0.1169	0.47	QV	|	|	|	|
3+30	0.1201	0.47	Q V	|	|	|	|
3+35	0.1234	0.47	Q V	|	|	|	|
3+40	0.1267	0.48	Q V	|	|	|	|
3+45	0.1300	0.48	Q V	|	|	|	|
3+50	0.1333	0.48	Q V	|	|	|	|
3+55	0.1366	0.48	Q V	|	|	|	|
4+ 0	0.1399	0.48	Q V	|	|	|	|
4+ 5	0.1433	0.49	Q V	|	|	|	|
4+10	0.1466	0.49	Q V	|	|	|	|
4+15	0.1500	0.49	Q V	|	|	|	|
4+20	0.1534	0.49	Q V	|	|	|	|
4+25	0.1568	0.49	Q V	|	|	|	|
4+30	0.1602	0.50	Q V	|	|	|	|
4+35	0.1636	0.50	Q V	|	|	|	|
4+40	0.1670	0.50	Q V	|	|	|	|
4+45	0.1705	0.50	Q V	|	|	|	|
4+50	0.1740	0.50	Q V	|	|	|	|
4+55	0.1774	0.51	Q V	|	|	|	|
5+ 0	0.1809	0.51	Q V	|	|	|	|
5+ 5	0.1844	0.51	Q V	|	|	|	|
5+10	0.1880	0.51	Q V	|	|	|	|
5+15	0.1915	0.51	Q V	|	|	|	|
5+20	0.1950	0.52	Q V	|	|	|	|
5+25	0.1986	0.52	Q V	|	|	|	|
5+30	0.2022	0.52	Q V	|	|	|	|
5+35	0.2058	0.52	Q V	|	|	|	|
5+40	0.2094	0.52	Q V	|	|	|	|
5+45	0.2130	0.53	Q V	|	|	|	|
5+50	0.2167	0.53	Q V	|	|	|	|
5+55	0.2204	0.53	Q V	|	|	|	|
6+ 0	0.2240	0.53	Q V	|	|	|	|
6+ 5	0.2277	0.54	Q V	|	|	|	|
6+10	0.2314	0.54	Q V	|	|	|	|
6+15	0.2352	0.54	Q V	|	|	|	|
6+20	0.2389	0.54	Q V	|	|	|	|
6+25	0.2427	0.55	Q V	|	|	|	|
6+30	0.2465	0.55	Q V	|	|	|	|
6+35	0.2503	0.55	Q V	|	|	|	|
6+40	0.2541	0.55	Q V	|	|	|	|
6+45	0.2579	0.56	Q V	|	|	|	|
6+50	0.2618	0.56	Q V	|	|	|	|
6+55	0.2657	0.56	Q V	|	|	|	|

7+ 0	0.2696	0.57	Q	V	|	|	|
7+ 5	0.2735	0.57	Q	V	|	|	|
7+10	0.2774	0.57	Q	V	|	|	|
7+15	0.2814	0.57	Q	V	|	|	|
7+20	0.2854	0.58	Q	V	|	|	|
7+25	0.2894	0.58	Q	V	|	|	|
7+30	0.2934	0.58	Q	V	|	|	|
7+35	0.2974	0.59	Q	V	|	|	|
7+40	0.3015	0.59	Q	V	|	|	|
7+45	0.3056	0.59	Q	V	|	|	|
7+50	0.3097	0.60	Q	V	|	|	|
7+55	0.3138	0.60	Q	V	|	|	|
8+ 0	0.3180	0.60	Q	V	|	|	|
8+ 5	0.3221	0.61	Q	V	|	|	|
8+10	0.3263	0.61	Q	V	|	|	|
8+15	0.3306	0.61	Q	V	|	|	|
8+20	0.3348	0.62	Q	V	|	|	|
8+25	0.3391	0.62	Q	V	|	|	|
8+30	0.3434	0.62	Q	V	|	|	|
8+35	0.3477	0.63	Q	V	|	|	|
8+40	0.3521	0.63	Q	V	|	|	|
8+45	0.3565	0.64	Q	V	|	|	|
8+50	0.3609	0.64	Q	V	|	|	|
8+55	0.3653	0.64	Q	V	|	|	|
9+ 0	0.3698	0.65	Q	V	|	|	|
9+ 5	0.3743	0.65	Q	V	|	|	|
9+10	0.3788	0.66	Q	V	|	|	|
9+15	0.3834	0.66	Q	V	|	|	|
9+20	0.3879	0.67	Q	V	|	|	|
9+25	0.3926	0.67	Q	V	|	|	|
9+30	0.3972	0.67	Q	V	|	|	|
9+35	0.4019	0.68	Q	V	|	|	|
9+40	0.4066	0.68	Q	V	|	|	|
9+45	0.4113	0.69	Q	V	|	|	|
9+50	0.4161	0.69	Q	V	|	|	|
9+55	0.4209	0.70	Q	V	|	|	|
10+ 0	0.4258	0.70	Q	V	|	|	|
10+ 5	0.4307	0.71	Q	V	|	|	|
10+10	0.4356	0.72	Q	V	|	|	|
10+15	0.4406	0.72	Q	V	|	|	|
10+20	0.4456	0.73	Q	V	|	|	|
10+25	0.4506	0.73	Q	V	|	|	|
10+30	0.4557	0.74	Q	V	|	|	|
10+35	0.4608	0.74	Q	V	|	|	|
10+40	0.4660	0.75	|Q	V	|	|	|
10+45	0.4712	0.76	|Q	V	|	|	|
10+50	0.4764	0.76	|Q	V	|	|	|
10+55	0.4817	0.77	|Q	V	|	|	|
11+ 0	0.4871	0.78	|Q	V	|	|	|
11+ 5	0.4925	0.78	|Q	V	|	|	|
11+10	0.4979	0.79	|Q	V	|	|	|
11+15	0.5034	0.80	|Q	V	|	|	|
11+20	0.5090	0.81	|Q	V	|	|	|
11+25	0.5146	0.81	|Q	V	|	|	|
11+30	0.5202	0.82	|Q	V	|	|	|
11+35	0.5259	0.83	|Q	V	|	|	|
11+40	0.5317	0.84	|Q	V	|	|	|

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11+45       0.5375      0.85  |Q       V|          |          |          |
11+50       0.5434      0.85  |Q       V|          |          |          |
11+55       0.5494      0.86  |Q       V|          |          |          |
12+ 0       0.5554      0.87  |Q       V|          |          |          |
12+ 5       0.5615      0.89  |Q       V|          |          |          |
12+10       0.5678      0.92  |Q       V|          |          |          |
12+15       0.5745      0.97  |Q       V|          |          |          |
12+20       0.5816      1.02  |Q       V|          |          |          |
12+25       0.5888      1.06  |Q        V          |          |          |
12+30       0.5962      1.08  |Q        V          |          |          |
12+35       0.6038      1.09  |Q        V          |          |          |
12+40       0.6114      1.10  |Q        V          |          |          |
12+45       0.6191      1.12  |Q        V          |          |          |
12+50       0.6269      1.13  |Q        V          |          |          |
12+55       0.6347      1.14  |Q        V          |          |          |
13+ 0       0.6427      1.16  |Q        V          |          |          |
13+ 5       0.6508      1.17  |Q        |V         |          |          |
13+10       0.6590      1.19  |Q        |V         |          |          |
13+15       0.6673      1.20  |Q        |V         |          |          |
13+20       0.6757      1.22  |Q        |V         |          |          |
13+25       0.6842      1.24  |Q        |V         |          |          |
13+30       0.6929      1.26  |Q        |V         |          |          |
13+35       0.7016      1.28  |Q        |V         |          |          |
13+40       0.7106      1.30  |Q        | V        |          |          |
13+45       0.7196      1.32  |Q        | V        |          |          |
13+50       0.7288      1.34  |Q        | V        |          |          |
13+55       0.7382      1.36  |Q        | V        |          |          |
14+ 0       0.7478      1.39  |Q        | V        |          |          |
14+ 5       0.7575      1.41  |Q        | V        |          |          |
14+10       0.7674      1.44  |Q        |  V       |          |          |
14+15       0.7775      1.47  |Q        |  V       |          |          |
14+20       0.7878      1.50  |Q        |  V       |          |          |
14+25       0.7983      1.53  | Q       |  V       |          |          |
14+30       0.8091      1.57  | Q       |  V       |          |          |
14+35       0.8202      1.60  | Q       |  V       |          |          |
14+40       0.8315      1.64  | Q       |   V      |          |          |
14+45       0.8431      1.69  | Q       |   V      |          |          |
14+50       0.8551      1.73  | Q       |   V      |          |          |
14+55       0.8674      1.79  | Q       |   V      |          |          |
15+ 0       0.8801      1.84  | Q       |    V     |          |          |
15+ 5       0.8932      1.90  | Q       |    V     |          |          |
15+10       0.9068      1.97  | Q       |    V     |          |          |
15+15       0.9209      2.05  | Q       |    V     |          |          |
15+20       0.9356      2.14  | Q       |    V     |          |          |
15+25       0.9509      2.22  | Q       |     V    |          |          |
15+30       0.9664      2.25  |  Q      |     V    |          |          |
15+35       0.9818      2.23  | Q       |     V    |          |          |
15+40       0.9972      2.23  | Q       |      V   |          |          |
15+45       1.0134      2.36  |  Q      |      V   |          |          |
15+50       1.0313      2.60  |  Q      |      V   |          |          |
15+55       1.0517      2.96  |  Q      |      V   |          |          |
16+ 0       1.0772      3.72  |   Q     |       V  |          |          |
16+ 5       1.1291      7.52  |         Q        V|          |          |
16+10       1.2604     19.08  |         |          |V   Q     |          |
16+15       1.4637     29.52  |         |          |   V      |        Q |
16+20       1.6575     28.13  |         |          |       V  |      Q   |
16+25       1.7626     15.26  |         |          Q         V          |
```

16+30	1.8167	7.87	| Q | | |V |
16+35	1.8468	4.36	| Q | | |V |
16+40	1.8673	2.99	| Q | | |V |
16+45	1.8844	2.48	| Q | | | V |
16+50	1.8984	2.03	| Q | | | V |
16+55	1.9115	1.89	| Q | | | V |
17+ 0	1.9237	1.78	| Q | | | V |
17+ 5	1.9352	1.68	| Q | | | V |
17+10	1.9462	1.59	| Q | | | V |
17+15	1.9567	1.52	| Q | | | V |
17+20	1.9668	1.46	|Q | | | V |
17+25	1.9764	1.40	|Q | | | V |
17+30	1.9857	1.35	|Q | | | V |
17+35	1.9948	1.31	|Q | | | V |
17+40	2.0035	1.27	|Q | | | V |
17+45	2.0120	1.23	|Q | | | V |
17+50	2.0202	1.20	|Q | | | V |
17+55	2.0283	1.17	|Q | | | V |
18+ 0	2.0361	1.14	|Q | | | V |
18+ 5	2.0438	1.11	|Q | | | V |
18+10	2.0511	1.06	|Q | | | V |
18+15	2.0579	1.00	|Q | | | V |
18+20	2.0644	0.93	|Q | | | V |
18+25	2.0705	0.89	|Q | | | V |
18+30	2.0765	0.87	|Q | | | V |
18+35	2.0823	0.84	|Q | | | V |
18+40	2.0880	0.83	|Q | | | V |
18+45	2.0935	0.81	|Q | | | V |
18+50	2.0990	0.79	|Q | | | V |
18+55	2.1044	0.78	|Q | | | V |
19+ 0	2.1097	0.77	|Q | | | V |
19+ 5	2.1149	0.75	|Q | | | V |
19+10	2.1200	0.74	Q | | | V |
19+15	2.1250	0.73	Q | | | V |
19+20	2.1299	0.72	Q | | | V |
19+25	2.1348	0.71	Q | | | V |
19+30	2.1396	0.70	Q | | | V |
19+35	2.1444	0.69	Q | | | V |
19+40	2.1490	0.68	Q | | | V |
19+45	2.1536	0.67	Q | | | V |
19+50	2.1582	0.66	Q | | | V |
19+55	2.1626	0.65	Q | | | V |
20+ 0	2.1671	0.64	Q | | | V |
20+ 5	2.1714	0.63	Q | | | V |
20+10	2.1758	0.63	Q | | | V |
20+15	2.1800	0.62	Q | | | V |
20+20	2.1842	0.61	Q | | | V |
20+25	2.1884	0.61	Q | | | V |
20+30	2.1925	0.60	Q | | | V |
20+35	2.1966	0.59	Q | | | V |
20+40	2.2006	0.59	Q | | | V |
20+45	2.2046	0.58	Q | | | V |
20+50	2.2086	0.57	Q | | | V |
20+55	2.2125	0.57	Q | | | V |
21+ 0	2.2164	0.56	Q | | | V |
21+ 5	2.2202	0.56	Q | | | V |
21+10	2.2240	0.55	Q | | | V |

21+15	2.2277	0.55	Q	|	|	|	V |
21+20	2.2315	0.54	Q	|	|	|	V |
21+25	2.2352	0.54	Q	|	|	|	V |
21+30	2.2388	0.53	Q	|	|	|	V |
21+35	2.2424	0.53	Q	|	|	|	V |
21+40	2.2460	0.52	Q	|	|	|	V |
21+45	2.2496	0.52	Q	|	|	|	V |
21+50	2.2531	0.51	Q	|	|	|	V |
21+55	2.2566	0.51	Q	|	|	|	V |
22+ 0	2.2601	0.50	Q	|	|	|	V |
22+ 5	2.2635	0.50	Q	|	|	|	V |
22+10	2.2670	0.50	Q	|	|	|	V |
22+15	2.2703	0.49	Q	|	|	|	V |
22+20	2.2737	0.49	Q	|	|	|	V |
22+25	2.2770	0.48	Q	|	|	|	V |
22+30	2.2804	0.48	Q	|	|	|	V |
22+35	2.2836	0.48	Q	|	|	|	V |
22+40	2.2869	0.47	Q	|	|	|	V|
22+45	2.2901	0.47	Q	|	|	|	V|
22+50	2.2934	0.47	Q	|	|	|	V|
22+55	2.2966	0.46	Q	|	|	|	V|
23+ 0	2.2997	0.46	Q	|	|	|	V|
23+ 5	2.3029	0.46	Q	|	|	|	V|
23+10	2.3060	0.45	Q	|	|	|	V|
23+15	2.3091	0.45	Q	|	|	|	V|
23+20	2.3122	0.45	Q	|	|	|	V|
23+25	2.3153	0.45	Q	|	|	|	V|
23+30	2.3183	0.44	Q	|	|	|	V|
23+35	2.3213	0.44	Q	|	|	|	V|
23+40	2.3243	0.44	Q	|	|	|	V|
23+45	2.3273	0.43	Q	|	|	|	V|
23+50	2.3303	0.43	Q	|	|	|	V|
23+55	2.3333	0.43	Q	|	|	|	V|
24+ 0	2.3362	0.43	Q	|	|	|	V|
24+ 5	2.3390	0.41	Q	|	|	|	V|
24+10	2.3414	0.34	Q	|	|	|	V|
24+15	2.3429	0.22	Q	|	|	|	V|
24+20	2.3436	0.10	Q	|	|	|	V|
24+25	2.3438	0.04	Q	|	|	|	V|
24+30	2.3439	0.01	Q	|	|	|	V|
24+35	2.3440	0.00	Q	|	|	|	V|
24+40	2.3440	0.00	Q	|	|	|	V

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
OFFSITE EXISTING CONDITION - WATERSHED B
10-YEAR STORM EVENT ANALYSIS WITH ADJUSTED 5 YEAR RAINFALL DATA

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		
29.52	1	0.68
Rainfall data for year 10		
29.52	6	1.71
Rainfall data for year 10		
29.52	24	3.13

++

******** 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)
32.0	32.0	29.52	1.000	0.978	0.778	0.761

Area-averaged adjusted loss rate Fm (In/Hr) = 0.761

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
22.97	0.778	32.0	32.0	15.65	0.000
6.55	0.222	98.0	98.0	0.20	0.926

Area-averaged catchment yield fraction, Y = 0.206
Area-averaged low loss fraction, Yb = 0.794
User entry of time of concentration = 0.273 (hours)
++
Watershed area = 29.52(Ac.)
Catchment Lag time = 0.218 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 38.1563
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.761(In/Hr)
Average low loss rate fraction (Yb) = 0.794 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.252(In)
Computed peak 30-minute rainfall = 0.515(In)
Specified peak 1-hour rainfall = 0.680(In)
Computed peak 3-hour rainfall = 1.197(In)
Specified peak 6-hour rainfall = 1.710(In)
Specified peak 24-hour rainfall = 3.130(In)

Rainfall depth area reduction factors:
Using a total area of 29.52(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.251(In)
30-minute factor = 0.999 Adjusted rainfall = 0.515(In)
1-hour factor = 0.999 Adjusted rainfall = 0.679(In)
3-hour factor = 1.000 Adjusted rainfall = 1.197(In)
6-hour factor = 1.000 Adjusted rainfall = 1.710(In)
24-hour factor = 1.000 Adjusted rainfall = 3.130(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 = 357.01 (CFS))		
1	2.812	10.038
2	17.873	53.770
3	45.581	98.920
4	74.650	103.780
5	89.400	52.657
6	95.762	22.712
7	98.206	8.726

8	98.951	2.661
9	99.635	2.443
10	100.000	1.301

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.2513	0.2513
2	0.3316	0.0803
3	0.3900	0.0584
4	0.4376	0.0476
5	0.4784	0.0409
6	0.5146	0.0362
7	0.5474	0.0327
8	0.5774	0.0300
9	0.6052	0.0279
10	0.6313	0.0261
11	0.6558	0.0245
12	0.6791	0.0232
13	0.7077	0.0286
14	0.7353	0.0276
15	0.7619	0.0266
16	0.7877	0.0258
17	0.8127	0.0250
18	0.8370	0.0243
19	0.8607	0.0237
20	0.8838	0.0231
21	0.9063	0.0225
22	0.9283	0.0220
23	0.9498	0.0215
24	0.9709	0.0211
25	0.9915	0.0207
26	1.0118	0.0203
27	1.0317	0.0199
28	1.0512	0.0195
29	1.0704	0.0192
30	1.0893	0.0189
31	1.1079	0.0186
32	1.1262	0.0183
33	1.1442	0.0180
34	1.1619	0.0178
35	1.1795	0.0175
36	1.1967	0.0173
37	1.2137	0.0170
38	1.2305	0.0168
39	1.2471	0.0166
40	1.2634	0.0164
41	1.2796	0.0162
42	1.2955	0.0160
43	1.3113	0.0158
44	1.3269	0.0156
45	1.3424	0.0154
46	1.3577	0.0153
47	1.3728	0.0151
48	1.3877	0.0150
49	1.4025	0.0148
50	1.4172	0.0147
51	1.4317	0.0145

52	1.4461	0.0144
53	1.4604	0.0142
54	1.4745	0.0141
55	1.4885	0.0140
56	1.5023	0.0139
57	1.5161	0.0138
58	1.5297	0.0136
59	1.5433	0.0135
60	1.5567	0.0134
61	1.5700	0.0133
62	1.5832	0.0132
63	1.5963	0.0131
64	1.6092	0.0130
65	1.6221	0.0129
66	1.6349	0.0128
67	1.6477	0.0127
68	1.6603	0.0126
69	1.6728	0.0125
70	1.6852	0.0124
71	1.6976	0.0124
72	1.7098	0.0123
73	1.7202	0.0103
74	1.7304	0.0102
75	1.7406	0.0102
76	1.7506	0.0101
77	1.7606	0.0100
78	1.7706	0.0099
79	1.7804	0.0099
80	1.7902	0.0098
81	1.8000	0.0097
82	1.8096	0.0097
83	1.8192	0.0096
84	1.8287	0.0095
85	1.8382	0.0095
86	1.8476	0.0094
87	1.8569	0.0093
88	1.8662	0.0093
89	1.8754	0.0092
90	1.8846	0.0092
91	1.8937	0.0091
92	1.9028	0.0090
93	1.9118	0.0090
94	1.9207	0.0089
95	1.9296	0.0089
96	1.9384	0.0088
97	1.9472	0.0088
98	1.9559	0.0087
99	1.9646	0.0087
100	1.9732	0.0086
101	1.9818	0.0086
102	1.9903	0.0085
103	1.9988	0.0085
104	2.0073	0.0084
105	2.0157	0.0084
106	2.0240	0.0083
107	2.0323	0.0083
108	2.0406	0.0083

109	2.0488	0.0082
110	2.0570	0.0082
111	2.0651	0.0081
112	2.0732	0.0081
113	2.0813	0.0081
114	2.0893	0.0080
115	2.0972	0.0080
116	2.1052	0.0079
117	2.1131	0.0079
118	2.1209	0.0079
119	2.1287	0.0078
120	2.1365	0.0078
121	2.1443	0.0077
122	2.1520	0.0077
123	2.1597	0.0077
124	2.1673	0.0076
125	2.1749	0.0076
126	2.1825	0.0076
127	2.1900	0.0075
128	2.1975	0.0075
129	2.2050	0.0075
130	2.2124	0.0074
131	2.2198	0.0074
132	2.2272	0.0074
133	2.2346	0.0073
134	2.2419	0.0073
135	2.2491	0.0073
136	2.2564	0.0073
137	2.2636	0.0072
138	2.2708	0.0072
139	2.2780	0.0072
140	2.2851	0.0071
141	2.2922	0.0071
142	2.2993	0.0071
143	2.3063	0.0070
144	2.3134	0.0070
145	2.3203	0.0070
146	2.3273	0.0070
147	2.3343	0.0069
148	2.3412	0.0069
149	2.3480	0.0069
150	2.3549	0.0069
151	2.3617	0.0068
152	2.3686	0.0068
153	2.3753	0.0068
154	2.3821	0.0068
155	2.3888	0.0067
156	2.3955	0.0067
157	2.4022	0.0067
158	2.4089	0.0067
159	2.4155	0.0066
160	2.4221	0.0066
161	2.4287	0.0066
162	2.4353	0.0066
163	2.4418	0.0065
164	2.4484	0.0065
165	2.4549	0.0065

166	2.4613	0.0065
167	2.4678	0.0065
168	2.4742	0.0064
169	2.4806	0.0064
170	2.4870	0.0064
171	2.4934	0.0064
172	2.4997	0.0063
173	2.5061	0.0063
174	2.5124	0.0063
175	2.5187	0.0063
176	2.5249	0.0063
177	2.5312	0.0062
178	2.5374	0.0062
179	2.5436	0.0062
180	2.5498	0.0062
181	2.5560	0.0062
182	2.5621	0.0061
183	2.5683	0.0061
184	2.5744	0.0061
185	2.5805	0.0061
186	2.5865	0.0061
187	2.5926	0.0061
188	2.5986	0.0060
189	2.6046	0.0060
190	2.6106	0.0060
191	2.6166	0.0060
192	2.6226	0.0060
193	2.6285	0.0059
194	2.6345	0.0059
195	2.6404	0.0059
196	2.6463	0.0059
197	2.6522	0.0059
198	2.6580	0.0059
199	2.6639	0.0058
200	2.6697	0.0058
201	2.6755	0.0058
202	2.6813	0.0058
203	2.6871	0.0058
204	2.6929	0.0058
205	2.6986	0.0057
206	2.7043	0.0057
207	2.7101	0.0057
208	2.7158	0.0057
209	2.7214	0.0057
210	2.7271	0.0057
211	2.7328	0.0057
212	2.7384	0.0056
213	2.7440	0.0056
214	2.7497	0.0056
215	2.7552	0.0056
216	2.7608	0.0056
217	2.7664	0.0056
218	2.7719	0.0056
219	2.7775	0.0055
220	2.7830	0.0055
221	2.7885	0.0055
222	2.7940	0.0055

223	2.7995	0.0055
224	2.8050	0.0055
225	2.8104	0.0055
226	2.8159	0.0054
227	2.8213	0.0054
228	2.8267	0.0054
229	2.8321	0.0054
230	2.8375	0.0054
231	2.8429	0.0054
232	2.8482	0.0054
233	2.8536	0.0053
234	2.8589	0.0053
235	2.8642	0.0053
236	2.8695	0.0053
237	2.8748	0.0053
238	2.8801	0.0053
239	2.8854	0.0053
240	2.8907	0.0053
241	2.8959	0.0052
242	2.9011	0.0052
243	2.9064	0.0052
244	2.9116	0.0052
245	2.9168	0.0052
246	2.9219	0.0052
247	2.9271	0.0052
248	2.9323	0.0052
249	2.9374	0.0052
250	2.9426	0.0051
251	2.9477	0.0051
252	2.9528	0.0051
253	2.9579	0.0051
254	2.9630	0.0051
255	2.9681	0.0051
256	2.9732	0.0051
257	2.9782	0.0051
258	2.9833	0.0050
259	2.9883	0.0050
260	2.9933	0.0050
261	2.9984	0.0050
262	3.0034	0.0050
263	3.0084	0.0050
264	3.0133	0.0050
265	3.0183	0.0050
266	3.0233	0.0050
267	3.0282	0.0050
268	3.0332	0.0049
269	3.0381	0.0049
270	3.0430	0.0049
271	3.0479	0.0049
272	3.0528	0.0049
273	3.0577	0.0049
274	3.0626	0.0049
275	3.0675	0.0049
276	3.0723	0.0049
277	3.0772	0.0048
278	3.0820	0.0048
279	3.0868	0.0048

280	3.0917	0.0048
281	3.0965	0.0048
282	3.1013	0.0048
283	3.1061	0.0048
284	3.1109	0.0048
285	3.1156	0.0048
286	3.1204	0.0048
287	3.1251	0.0048
288	3.1299	0.0047

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0047	0.0038	0.0010
2	0.0048	0.0038	0.0010
3	0.0048	0.0038	0.0010
4	0.0048	0.0038	0.0010
5	0.0048	0.0038	0.0010
6	0.0048	0.0038	0.0010
7	0.0048	0.0038	0.0010
8	0.0048	0.0038	0.0010
9	0.0049	0.0039	0.0010
10	0.0049	0.0039	0.0010
11	0.0049	0.0039	0.0010
12	0.0049	0.0039	0.0010
13	0.0049	0.0039	0.0010
14	0.0049	0.0039	0.0010
15	0.0050	0.0039	0.0010
16	0.0050	0.0039	0.0010
17	0.0050	0.0040	0.0010
18	0.0050	0.0040	0.0010
19	0.0050	0.0040	0.0010
20	0.0050	0.0040	0.0010
21	0.0050	0.0040	0.0010
22	0.0051	0.0040	0.0010
23	0.0051	0.0040	0.0010
24	0.0051	0.0040	0.0010
25	0.0051	0.0041	0.0011
26	0.0051	0.0041	0.0011
27	0.0052	0.0041	0.0011
28	0.0052	0.0041	0.0011
29	0.0052	0.0041	0.0011
30	0.0052	0.0041	0.0011
31	0.0052	0.0041	0.0011
32	0.0052	0.0042	0.0011
33	0.0053	0.0042	0.0011
34	0.0053	0.0042	0.0011
35	0.0053	0.0042	0.0011
36	0.0053	0.0042	0.0011
37	0.0053	0.0042	0.0011
38	0.0053	0.0042	0.0011
39	0.0054	0.0043	0.0011
40	0.0054	0.0043	0.0011
41	0.0054	0.0043	0.0011
42	0.0054	0.0043	0.0011
43	0.0055	0.0043	0.0011

44	0.0055	0.0043	0.0011
45	0.0055	0.0044	0.0011
46	0.0055	0.0044	0.0011
47	0.0055	0.0044	0.0011
48	0.0056	0.0044	0.0011
49	0.0056	0.0044	0.0011
50	0.0056	0.0044	0.0012
51	0.0056	0.0045	0.0012
52	0.0056	0.0045	0.0012
53	0.0057	0.0045	0.0012
54	0.0057	0.0045	0.0012
55	0.0057	0.0045	0.0012
56	0.0057	0.0046	0.0012
57	0.0058	0.0046	0.0012
58	0.0058	0.0046	0.0012
59	0.0058	0.0046	0.0012
60	0.0058	0.0046	0.0012
61	0.0059	0.0047	0.0012
62	0.0059	0.0047	0.0012
63	0.0059	0.0047	0.0012
64	0.0059	0.0047	0.0012
65	0.0060	0.0047	0.0012
66	0.0060	0.0048	0.0012
67	0.0060	0.0048	0.0012
68	0.0060	0.0048	0.0012
69	0.0061	0.0048	0.0012
70	0.0061	0.0048	0.0013
71	0.0061	0.0049	0.0013
72	0.0061	0.0049	0.0013
73	0.0062	0.0049	0.0013
74	0.0062	0.0049	0.0013
75	0.0062	0.0050	0.0013
76	0.0063	0.0050	0.0013
77	0.0063	0.0050	0.0013
78	0.0063	0.0050	0.0013
79	0.0064	0.0051	0.0013
80	0.0064	0.0051	0.0013
81	0.0064	0.0051	0.0013
82	0.0065	0.0051	0.0013
83	0.0065	0.0052	0.0013
84	0.0065	0.0052	0.0013
85	0.0066	0.0052	0.0013
86	0.0066	0.0052	0.0014
87	0.0066	0.0053	0.0014
88	0.0067	0.0053	0.0014
89	0.0067	0.0053	0.0014
90	0.0067	0.0053	0.0014
91	0.0068	0.0054	0.0014
92	0.0068	0.0054	0.0014
93	0.0069	0.0054	0.0014
94	0.0069	0.0055	0.0014
95	0.0069	0.0055	0.0014
96	0.0070	0.0055	0.0014
97	0.0070	0.0056	0.0014
98	0.0070	0.0056	0.0014
99	0.0071	0.0056	0.0015
100	0.0071	0.0057	0.0015

101	0.0072	0.0057	0.0015
102	0.0072	0.0057	0.0015
103	0.0073	0.0058	0.0015
104	0.0073	0.0058	0.0015
105	0.0074	0.0059	0.0015
106	0.0074	0.0059	0.0015
107	0.0075	0.0059	0.0015
108	0.0075	0.0060	0.0015
109	0.0076	0.0060	0.0016
110	0.0076	0.0060	0.0016
111	0.0077	0.0061	0.0016
112	0.0077	0.0061	0.0016
113	0.0078	0.0062	0.0016
114	0.0078	0.0062	0.0016
115	0.0079	0.0063	0.0016
116	0.0079	0.0063	0.0016
117	0.0080	0.0064	0.0016
118	0.0081	0.0064	0.0017
119	0.0081	0.0065	0.0017
120	0.0082	0.0065	0.0017
121	0.0083	0.0066	0.0017
122	0.0083	0.0066	0.0017
123	0.0084	0.0067	0.0017
124	0.0084	0.0067	0.0017
125	0.0085	0.0068	0.0018
126	0.0086	0.0068	0.0018
127	0.0087	0.0069	0.0018
128	0.0087	0.0069	0.0018
129	0.0088	0.0070	0.0018
130	0.0089	0.0071	0.0018
131	0.0090	0.0071	0.0018
132	0.0090	0.0072	0.0019
133	0.0092	0.0073	0.0019
134	0.0092	0.0073	0.0019
135	0.0093	0.0074	0.0019
136	0.0094	0.0075	0.0019
137	0.0095	0.0076	0.0020
138	0.0096	0.0076	0.0020
139	0.0097	0.0077	0.0020
140	0.0098	0.0078	0.0020
141	0.0099	0.0079	0.0020
142	0.0100	0.0080	0.0021
143	0.0102	0.0081	0.0021
144	0.0102	0.0081	0.0021
145	0.0123	0.0097	0.0025
146	0.0124	0.0098	0.0025
147	0.0125	0.0100	0.0026
148	0.0126	0.0100	0.0026
149	0.0128	0.0102	0.0026
150	0.0129	0.0102	0.0027
151	0.0131	0.0104	0.0027
152	0.0132	0.0105	0.0027
153	0.0134	0.0107	0.0028
154	0.0135	0.0107	0.0028
155	0.0138	0.0109	0.0028
156	0.0139	0.0110	0.0029
157	0.0141	0.0112	0.0029

158	0.0142	0.0113	0.0029
159	0.0145	0.0115	0.0030
160	0.0147	0.0116	0.0030
161	0.0150	0.0119	0.0031
162	0.0151	0.0120	0.0031
163	0.0154	0.0123	0.0032
164	0.0156	0.0124	0.0032
165	0.0160	0.0127	0.0033
166	0.0162	0.0128	0.0033
167	0.0166	0.0132	0.0034
168	0.0168	0.0133	0.0034
169	0.0173	0.0137	0.0035
170	0.0175	0.0139	0.0036
171	0.0180	0.0143	0.0037
172	0.0183	0.0145	0.0038
173	0.0189	0.0150	0.0039
174	0.0192	0.0153	0.0039
175	0.0199	0.0158	0.0041
176	0.0203	0.0161	0.0042
177	0.0211	0.0167	0.0043
178	0.0215	0.0171	0.0044
179	0.0225	0.0179	0.0046
180	0.0231	0.0183	0.0047
181	0.0243	0.0193	0.0050
182	0.0250	0.0199	0.0051
183	0.0266	0.0212	0.0055
184	0.0276	0.0219	0.0057
185	0.0232	0.0185	0.0048
186	0.0245	0.0195	0.0050
187	0.0279	0.0221	0.0057
188	0.0300	0.0239	0.0062
189	0.0362	0.0288	0.0074
190	0.0409	0.0325	0.0084
191	0.0584	0.0464	0.0120
192	0.0803	0.0634	0.0169
193	0.2513	0.0634	0.1879
194	0.0476	0.0378	0.0098
195	0.0327	0.0260	0.0067
196	0.0261	0.0207	0.0054
197	0.0286	0.0227	0.0059
198	0.0258	0.0205	0.0053
199	0.0237	0.0188	0.0049
200	0.0220	0.0175	0.0045
201	0.0207	0.0164	0.0042
202	0.0195	0.0155	0.0040
203	0.0186	0.0148	0.0038
204	0.0178	0.0141	0.0036
205	0.0170	0.0135	0.0035
206	0.0164	0.0130	0.0034
207	0.0158	0.0125	0.0032
208	0.0153	0.0121	0.0031
209	0.0148	0.0118	0.0030
210	0.0144	0.0114	0.0030
211	0.0140	0.0111	0.0029
212	0.0136	0.0108	0.0028
213	0.0133	0.0106	0.0027
214	0.0130	0.0103	0.0027

215	0.0127	0.0101	0.0026
216	0.0124	0.0099	0.0026
217	0.0103	0.0082	0.0021
218	0.0101	0.0080	0.0021
219	0.0099	0.0078	0.0020
220	0.0097	0.0077	0.0020
221	0.0095	0.0075	0.0019
222	0.0093	0.0074	0.0019
223	0.0091	0.0072	0.0019
224	0.0089	0.0071	0.0018
225	0.0088	0.0070	0.0018
226	0.0086	0.0069	0.0018
227	0.0085	0.0067	0.0017
228	0.0083	0.0066	0.0017
229	0.0082	0.0065	0.0017
230	0.0081	0.0064	0.0017
231	0.0080	0.0063	0.0016
232	0.0079	0.0062	0.0016
233	0.0077	0.0062	0.0016
234	0.0076	0.0061	0.0016
235	0.0075	0.0060	0.0015
236	0.0074	0.0059	0.0015
237	0.0073	0.0058	0.0015
238	0.0073	0.0058	0.0015
239	0.0072	0.0057	0.0015
240	0.0071	0.0056	0.0015
241	0.0070	0.0056	0.0014
242	0.0069	0.0055	0.0014
243	0.0068	0.0054	0.0014
244	0.0068	0.0054	0.0014
245	0.0067	0.0053	0.0014
246	0.0066	0.0053	0.0014
247	0.0065	0.0052	0.0013
248	0.0065	0.0051	0.0013
249	0.0064	0.0051	0.0013
250	0.0063	0.0050	0.0013
251	0.0063	0.0050	0.0013
252	0.0062	0.0049	0.0013
253	0.0062	0.0049	0.0013
254	0.0061	0.0049	0.0013
255	0.0061	0.0048	0.0012
256	0.0060	0.0048	0.0012
257	0.0059	0.0047	0.0012
258	0.0059	0.0047	0.0012
259	0.0058	0.0046	0.0012
260	0.0058	0.0046	0.0012
261	0.0057	0.0046	0.0012
262	0.0057	0.0045	0.0012
263	0.0057	0.0045	0.0012
264	0.0056	0.0045	0.0012
265	0.0056	0.0044	0.0011
266	0.0055	0.0044	0.0011
267	0.0055	0.0044	0.0011
268	0.0054	0.0043	0.0011
269	0.0054	0.0043	0.0011
270	0.0054	0.0043	0.0011
271	0.0053	0.0042	0.0011

272	0.0053	0.0042	0.0011
273	0.0052	0.0042	0.0011
274	0.0052	0.0041	0.0011
275	0.0052	0.0041	0.0011
276	0.0051	0.0041	0.0011
277	0.0051	0.0041	0.0010
278	0.0051	0.0040	0.0010
279	0.0050	0.0040	0.0010
280	0.0050	0.0040	0.0010
281	0.0050	0.0040	0.0010
282	0.0049	0.0039	0.0010
283	0.0049	0.0039	0.0010
284	0.0049	0.0039	0.0010
285	0.0048	0.0039	0.0010
286	0.0048	0.0038	0.0010
287	0.0048	0.0038	0.0010
288	0.0048	0.0038	0.0010

Total soil rain loss = 2.35(In)
Total effective rainfall = 0.78(In)
Peak flow rate in flood hydrograph = 22.16(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0001	0.01	Q				
0+10	0.0005	0.06	Q				
0+15	0.0016	0.16	Q				
0+20	0.0034	0.26	Q				
0+25	0.0055	0.31	Q				
0+30	0.0078	0.34	Q				
0+35	0.0102	0.35	Q				
0+40	0.0126	0.35	Q				
0+45	0.0151	0.35	Q				
0+50	0.0175	0.35	Q				
0+55	0.0199	0.36	Q				
1+ 0	0.0224	0.36	Q				
1+ 5	0.0249	0.36	Q				
1+10	0.0273	0.36	Q				
1+15	0.0298	0.36	Q				
1+20	0.0323	0.36	Q				
1+25	0.0348	0.36	Q				
1+30	0.0373	0.36	Q				
1+35	0.0398	0.36	Q				
1+40	0.0423	0.37	Q				
1+45	0.0449	0.37	Q				
1+50	0.0474	0.37	Q				
1+55	0.0499	0.37	QV				
2+ 0	0.0525	0.37	QV				
2+ 5	0.0550	0.37	QV				

2+10	0.0576	0.37	QV				
2+15	0.0602	0.37	QV				
2+20	0.0628	0.38	QV				
2+25	0.0654	0.38	QV				
2+30	0.0680	0.38	QV				
2+35	0.0706	0.38	QV				
2+40	0.0732	0.38	QV				
2+45	0.0758	0.38	QV				
2+50	0.0785	0.38	QV				
2+55	0.0811	0.38	QV				
3+ 0	0.0838	0.39	QV				
3+ 5	0.0865	0.39	QV				
3+10	0.0891	0.39	QV				
3+15	0.0918	0.39	QV				
3+20	0.0945	0.39	QV				
3+25	0.0972	0.39	Q V				
3+30	0.0999	0.39	Q V				
3+35	0.1027	0.40	Q V				
3+40	0.1054	0.40	Q V				
3+45	0.1081	0.40	Q V				
3+50	0.1109	0.40	Q V				
3+55	0.1137	0.40	Q V				
4+ 0	0.1164	0.40	Q V				
4+ 5	0.1192	0.40	Q V				
4+10	0.1220	0.41	Q V				
4+15	0.1248	0.41	Q V				
4+20	0.1277	0.41	Q V				
4+25	0.1305	0.41	Q V				
4+30	0.1333	0.41	Q V				
4+35	0.1362	0.41	Q V				
4+40	0.1391	0.42	Q V				
4+45	0.1419	0.42	Q V				
4+50	0.1448	0.42	Q V				
4+55	0.1477	0.42	Q V				
5+ 0	0.1507	0.42	Q V				
5+ 5	0.1536	0.42	Q V				
5+10	0.1565	0.43	Q V				
5+15	0.1595	0.43	Q V				
5+20	0.1624	0.43	Q V				
5+25	0.1654	0.43	Q V				
5+30	0.1684	0.43	Q V				
5+35	0.1714	0.44	Q V				
5+40	0.1744	0.44	Q V				
5+45	0.1774	0.44	Q V				
5+50	0.1805	0.44	Q V				
5+55	0.1835	0.44	Q V				
6+ 0	0.1866	0.45	Q V				
6+ 5	0.1897	0.45	Q V				
6+10	0.1928	0.45	Q V				
6+15	0.1959	0.45	Q V				
6+20	0.1990	0.45	Q V				
6+25	0.2022	0.46	Q V				
6+30	0.2053	0.46	Q V				
6+35	0.2085	0.46	Q V				
6+40	0.2117	0.46	Q V				
6+45	0.2149	0.47	Q V				
6+50	0.2181	0.47	Q V				

6+55	0.2214	0.47	Q	V	|	|	|	|
7+ 0	0.2246	0.47	Q	V	|	|	|	|
7+ 5	0.2279	0.47	Q	V	|	|	|	|
7+10	0.2312	0.48	Q	V	|	|	|	|
7+15	0.2345	0.48	Q	V	|	|	|	|
7+20	0.2378	0.48	Q	V	|	|	|	|
7+25	0.2411	0.48	Q	V	|	|	|	|
7+30	0.2445	0.49	Q	V	|	|	|	|
7+35	0.2479	0.49	Q	V	|	|	|	|
7+40	0.2513	0.49	Q	V	|	|	|	|
7+45	0.2547	0.50	Q	V	|	|	|	|
7+50	0.2581	0.50	Q	V	|	|	|	|
7+55	0.2615	0.50	Q	V	|	|	|	|
8+ 0	0.2650	0.50	Q	V	|	|	|	|
8+ 5	0.2685	0.51	Q	V	|	|	|	|
8+10	0.2720	0.51	Q	V	|	|	|	|
8+15	0.2755	0.51	Q	V	|	|	|	|
8+20	0.2791	0.52	Q	V	|	|	|	|
8+25	0.2827	0.52	Q	V	|	|	|	|
8+30	0.2862	0.52	Q	V	|	|	|	|
8+35	0.2899	0.52	Q	V	|	|	|	|
8+40	0.2935	0.53	Q	V	|	|	|	|
8+45	0.2972	0.53	Q	V	|	|	|	|
8+50	0.3008	0.53	Q	V	|	|	|	|
8+55	0.3045	0.54	Q	V	|	|	|	|
9+ 0	0.3083	0.54	Q	V	|	|	|	|
9+ 5	0.3120	0.54	Q	V	|	|	|	|
9+10	0.3158	0.55	Q	V	|	|	|	|
9+15	0.3196	0.55	Q	V	|	|	|	|
9+20	0.3234	0.56	Q	V	|	|	|	|
9+25	0.3273	0.56	Q	V	|	|	|	|
9+30	0.3312	0.56	Q	V	|	|	|	|
9+35	0.3351	0.57	Q	V	|	|	|	|
9+40	0.3390	0.57	Q	V	|	|	|	|
9+45	0.3430	0.58	Q	V	|	|	|	|
9+50	0.3470	0.58	Q	V	|	|	|	|
9+55	0.3510	0.58	Q	V	|	|	|	|
10+ 0	0.3550	0.59	Q	V	|	|	|	|
10+ 5	0.3591	0.59	Q	V	|	|	|	|
10+10	0.3632	0.60	Q	V	|	|	|	|
10+15	0.3674	0.60	Q	V	|	|	|	|
10+20	0.3716	0.61	Q	V	|	|	|	|
10+25	0.3758	0.61	Q	V	|	|	|	|
10+30	0.3800	0.62	Q	V	|	|	|	|
10+35	0.3843	0.62	Q	V	|	|	|	|
10+40	0.3886	0.63	Q	V	|	|	|	|
10+45	0.3930	0.63	Q	V	|	|	|	|
10+50	0.3973	0.64	Q	V	|	|	|	|
10+55	0.4018	0.64	Q	V	|	|	|	|
11+ 0	0.4062	0.65	Q	V	|	|	|	|
11+ 5	0.4107	0.65	Q	V	|	|	|	|
11+10	0.4153	0.66	Q	V	|	|	|	|
11+15	0.4199	0.67	Q	V	|	|	|	|
11+20	0.4245	0.67	Q	V	|	|	|	|
11+25	0.4292	0.68	Q	V	|	|	|	|
11+30	0.4339	0.69	Q	V	|	|	|	|
11+35	0.4387	0.69	Q	V	|	|	|	|

11+40	0.4435	0.70	Q	V|	|	|	|
11+45	0.4484	0.71	Q	V|	|	|	|
11+50	0.4533	0.71	Q	V|	|	|	|
11+55	0.4583	0.72	Q	V|	|	|	|
12+ 0	0.4633	0.73	Q	V|	|	|	|
12+ 5	0.4684	0.74	Q	V|	|	|	|
12+10	0.4737	0.77	|Q	V|	|	|	|
12+15	0.4793	0.82	|Q	V|	|	|	|
12+20	0.4853	0.87	|Q	V	|	|	|
12+25	0.4915	0.90	|Q	V	|	|	|
12+30	0.4978	0.91	|Q	V	|	|	|
12+35	0.5042	0.93	|Q	V	|	|	|
12+40	0.5106	0.94	|Q	V	|	|	|
12+45	0.5172	0.95	|Q	V	|	|	|
12+50	0.5238	0.96	|Q	V	|	|	|
12+55	0.5305	0.97	|Q	|V	|	|	|
13+ 0	0.5373	0.99	|Q	|V	|	|	|
13+ 5	0.5442	1.00	|Q	|V	|	|	|
13+10	0.5511	1.01	|Q	|V	|	|	|
13+15	0.5582	1.02	|Q	|V	|	|	|
13+20	0.5653	1.04	|Q	|V	|	|	|
13+25	0.5725	1.05	|Q	|V	|	|	|
13+30	0.5799	1.07	|Q	| V	|	|	|
13+35	0.5874	1.08	|Q	| V	|	|	|
13+40	0.5949	1.10	|Q	| V	|	|	|
13+45	0.6026	1.12	|Q	| V	|	|	|
13+50	0.6104	1.14	|Q	| V	|	|	|
13+55	0.6184	1.15	|Q	| V	|	|	|
14+ 0	0.6265	1.17	|Q	| V	|	|	|
14+ 5	0.6347	1.20	|Q	| V	|	|	|
14+10	0.6431	1.22	|Q	| V	|	|	|
14+15	0.6517	1.24	|Q	| V	|	|	|
14+20	0.6604	1.27	|Q	| V	|	|	|
14+25	0.6693	1.30	|Q	| V	|	|	|
14+30	0.6785	1.33	|Q	| V	|	|	|
14+35	0.6878	1.36	|Q	| V	|	|	|
14+40	0.6974	1.39	|Q	| V	|	|	|
14+45	0.7072	1.43	|Q	| V	|	|	|
14+50	0.7173	1.47	|Q	| V	|	|	|
14+55	0.7277	1.51	| Q	| V	|	|	|
15+ 0	0.7384	1.55	| Q	| V	|	|	|
15+ 5	0.7494	1.61	| Q	| V	|	|	|
15+10	0.7609	1.66	| Q	| V	|	|	|
15+15	0.7728	1.73	| Q	| V	|	|	|
15+20	0.7852	1.80	| Q	| V	|	|	|
15+25	0.7980	1.87	| Q	| V	|	|	|
15+30	0.8111	1.89	| Q	| V	|	|	|
15+35	0.8239	1.87	| Q	| V	|	|	|
15+40	0.8367	1.86	| Q	| V	|	|	|
15+45	0.8502	1.96	| Q	| V	|	|	|
15+50	0.8650	2.15	| Q	| V	|	|	|
15+55	0.8818	2.44	| Q	| V	|	|	|
16+ 0	0.9021	2.95	| Q	| V	|	|	|
16+ 5	0.9398	5.47	| Q	| V|	|	|	|
16+10	1.0350	13.82	|	| Q |V	|	|	|
16+15	1.1855	21.86	|	|	| V Q|	|	|
16+20	1.3382	22.16	|	|	| V Q|	|	|

16+25	1.4240	12.46	|	| Q	|	V|	|
16+30	1.4694	6.59	|	Q |	|	V	|
16+35	1.4955	3.77	|	Q	|	|	V|
16+40	1.5127	2.52	|	Q	|	|	V|
16+45	1.5286	2.31	|	Q	|	|	V|
16+50	1.5422	1.97	|	Q	|	|	| V|
16+55	1.5533	1.61	|	Q	|	|	| V|
17+ 0	1.5637	1.51	|	Q	|	|	| V|
17+ 5	1.5736	1.43	|	Q	|	|	| V|
17+10	1.5829	1.36	|	Q	|	|	| V|
17+15	1.5919	1.30	|	Q	|	|	| V|
17+20	1.6004	1.24	|	Q	|	|	| V|
17+25	1.6087	1.20	|	Q	|	|	| V|
17+30	1.6166	1.15	|	Q	|	|	| V|
17+35	1.6243	1.12	|	Q	|	|	| V|
17+40	1.6318	1.08	|	Q	|	|	| V|
17+45	1.6390	1.05	|	Q	|	|	| V|
17+50	1.6461	1.02	|	Q	|	|	| V|
17+55	1.6529	1.00	|	Q	|	|	| V|
18+ 0	1.6596	0.97	|	Q	|	|	| V|
18+ 5	1.6661	0.95	|	Q	|	|	| V|
18+10	1.6724	0.90	|	Q	|	|	| V|
18+15	1.6782	0.85	|	Q	|	|	| V|
18+20	1.6836	0.79	|	Q	|	|	| V|
18+25	1.6888	0.75	|	Q	|	|	| V|
18+30	1.6938	0.73	Q	|	|	|	| V|
18+35	1.6987	0.71	Q	|	|	|	| V|
18+40	1.7035	0.69	Q	|	|	|	| V|
18+45	1.7082	0.68	Q	|	|	|	| V|
18+50	1.7127	0.67	Q	|	|	|	| V|
18+55	1.7172	0.65	Q	|	|	|	| V|
19+ 0	1.7217	0.64	Q	|	|	|	| V|
19+ 5	1.7260	0.63	Q	|	|	|	| V|
19+10	1.7303	0.62	Q	|	|	|	| V|
19+15	1.7345	0.61	Q	|	|	|	| V|
19+20	1.7386	0.60	Q	|	|	|	| V|
19+25	1.7427	0.59	Q	|	|	|	| V|
19+30	1.7467	0.58	Q	|	|	|	| V|
19+35	1.7507	0.58	Q	|	|	|	| V|
19+40	1.7546	0.57	Q	|	|	|	| V|
19+45	1.7585	0.56	Q	|	|	|	| V|
19+50	1.7623	0.55	Q	|	|	|	| V|
19+55	1.7660	0.54	Q	|	|	|	| V|
20+ 0	1.7697	0.54	Q	|	|	|	| V|
20+ 5	1.7734	0.53	Q	|	|	|	| V|
20+10	1.7770	0.52	Q	|	|	|	| V|
20+15	1.7805	0.52	Q	|	|	|	| V|
20+20	1.7841	0.51	Q	|	|	|	| V|
20+25	1.7876	0.51	Q	|	|	|	| V|
20+30	1.7910	0.50	Q	|	|	|	| V|
20+35	1.7944	0.49	Q	|	|	|	| V|
20+40	1.7978	0.49	Q	|	|	|	| V|
20+45	1.8011	0.48	Q	|	|	|	| V|
20+50	1.8044	0.48	Q	|	|	|	| V|
20+55	1.8077	0.47	Q	|	|	|	| V|
21+ 0	1.8109	0.47	Q	|	|	|	| V|
21+ 5	1.8141	0.46	Q	|	|	|	| V|

21+10	1.8173	0.46	Q	|	|	|	V |
21+15	1.8204	0.46	Q	|	|	|	V |
21+20	1.8235	0.45	Q	|	|	|	V |
21+25	1.8266	0.45	Q	|	|	|	V |
21+30	1.8297	0.44	Q	|	|	|	V |
21+35	1.8327	0.44	Q	|	|	|	V |
21+40	1.8357	0.44	Q	|	|	|	V |
21+45	1.8387	0.43	Q	|	|	|	V |
21+50	1.8416	0.43	Q	|	|	|	V |
21+55	1.8446	0.42	Q	|	|	|	V |
22+ 0	1.8475	0.42	Q	|	|	|	V |
22+ 5	1.8503	0.42	Q	|	|	|	V |
22+10	1.8532	0.41	Q	|	|	|	V |
22+15	1.8560	0.41	Q	|	|	|	V |
22+20	1.8588	0.41	Q	|	|	|	V |
22+25	1.8616	0.40	Q	|	|	|	V |
22+30	1.8644	0.40	Q	|	|	|	V |
22+35	1.8671	0.40	Q	|	|	|	V |
22+40	1.8698	0.40	Q	|	|	|	V|
22+45	1.8725	0.39	Q	|	|	|	V|
22+50	1.8752	0.39	Q	|	|	|	V|
22+55	1.8779	0.39	Q	|	|	|	V|
23+ 0	1.8805	0.38	Q	|	|	|	V|
23+ 5	1.8832	0.38	Q	|	|	|	V|
23+10	1.8858	0.38	Q	|	|	|	V|
23+15	1.8884	0.38	Q	|	|	|	V|
23+20	1.8910	0.37	Q	|	|	|	V|
23+25	1.8935	0.37	Q	|	|	|	V|
23+30	1.8961	0.37	Q	|	|	|	V|
23+35	1.8986	0.37	Q	|	|	|	V|
23+40	1.9011	0.36	Q	|	|	|	V|
23+45	1.9036	0.36	Q	|	|	|	V|
23+50	1.9061	0.36	Q	|	|	|	V|
23+55	1.9085	0.36	Q	|	|	|	V|
24+ 0	1.9110	0.36	Q	|	|	|	V|
24+ 5	1.9133	0.34	Q	|	|	|	V|
24+10	1.9153	0.29	Q	|	|	|	V|
24+15	1.9166	0.19	Q	|	|	|	V|
24+20	1.9173	0.09	Q	|	|	|	V|
24+25	1.9175	0.04	Q	|	|	|	V|
24+30	1.9176	0.01	Q	|	|	|	V|
24+35	1.9177	0.01	Q	|	|	|	V|
24+40	1.9177	0.00	Q	|	|	|	V|
24+45	1.9177	0.00	Q	|	|	|	V|

APPENDIX E

POST PROJECT CONDITION UNIT HYDROGRAPH HYDROLOGY

E.1: UNIT HYDROGRAPH ANALYSIS, 100 YEAR, 24 HOUR STORM DURATION, WATERSHED A

E.2: UNIT HYDROGRAPH ANALYSIS, 25 YEAR, 24 HOUR STORM DURATION, WATERSHED A

E.3: UNIT HYDROGRAPH ANALYSIS, 10 YEAR, 24 HOUR STORM DURATION, WATERSHED A

E.4: UNIT HYDROGRAPH ANALYSIS, 100 YEAR, 24 HOUR STORM DURATION, NORTHERLY CHAMBERS

E.5: UNIT HYDROGRAPH ANALYSIS, 25 YEAR, 24 HOUR STORM DURATION, NORTHERLY CHAMBERS

E.6: UNIT HYDROGRAPH ANALYSIS, 10 YEAR, 24 HOUR STORM DURATION, NORTHERLY CHAMBERS

E.7: UNIT HYDROGRAPH ANALYSIS, 100 YEAR, 24 HOUR STORM DURATION, SOUTHERLY CHAMBERS

E.8: UNIT HYDROGRAPH ANALYSIS, 25 YEAR, 24 HOUR STORM DURATION, SOUTHERLY CHAMBERS

E.9: UNIT HYDROGRAPH ANALYSIS, 10 YEAR, 24 HOUR STORM DURATION, SOUTHERLY CHAMBERS

E.10 UNIT HYDROGRAPH ANALYSIS, 100 YEAR, 24 HOUR STORM DURATION, WATERSHED B

E.11 UNIT HYDROGRAPH ANALYSIS, 25 YEAR, 24 HOUR STORM DURATION, WATERSHED B

E.12 UNIT HYDROGRAPH ANALYSIS, 10 YEAR, 24 HOUR STORM DURATION, WATERSHED B

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

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Study date 04/06/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE PROPOSED CONDITION
100-YEAR STORM EVENT ANALYSIS

Storm Event Year = 100

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 100		
39.51	1	1.30
Rainfall data for year 100		
39.51	6	3.07
Rainfall data for year 100		
39.51	24	5.64

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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)
32.0	32.0	39.51	1.000	0.978	0.243	0.238

Area-averaged adjusted loss rate Fm (In/Hr) = 0.238

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
9.60	0.243	32.0	32.0	21.25	0.015
29.91	0.757	98.0	98.0	0.20	0.958

Area-averaged catchment yield fraction, Y = 0.729
Area-averaged low loss fraction, Yb = 0.271
User entry of time of concentration = 0.191 (hours)
++
Watershed area = 39.51(Ac.)
Catchment Lag time = 0.153 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 54.6233
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.238(In/Hr)
Average low loss rate fraction (Yb) = 0.271 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.481(In)
Computed peak 30-minute rainfall = 0.985(In)
Specified peak 1-hour rainfall = 1.300(In)
Computed peak 3-hour rainfall = 2.202(In)
Specified peak 6-hour rainfall = 3.070(In)
Specified peak 24-hour rainfall = 5.640(In)

Rainfall depth area reduction factors:
Using a total area of 39.51(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.480(In)
30-minute factor = 0.998 Adjusted rainfall = 0.983(In)
1-hour factor = 0.998 Adjusted rainfall = 1.298(In)
3-hour factor = 1.000 Adjusted rainfall = 2.201(In)
6-hour factor = 1.000 Adjusted rainfall = 3.070(In)
24-hour factor = 1.000 Adjusted rainfall = 5.640(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 = 477.82 (CFS))		
1	5.430	25.946
2	35.100	141.769
3	75.656	193.788
4	93.023	82.981
5	98.046	24.003
6	99.208	5.551
7	100.000	3.786

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.4802	0.4802
2	0.6337	0.1534
3	0.7453	0.1116
4	0.8362	0.0909
5	0.9142	0.0781
6	0.9834	0.0692
7	1.0459	0.0625
8	1.1033	0.0574
9	1.1565	0.0532
10	1.2063	0.0498
11	1.2532	0.0469
12	1.2976	0.0444
13	1.3485	0.0509
14	1.3975	0.0489
15	1.4446	0.0472
16	1.4902	0.0456
17	1.5343	0.0441
18	1.5771	0.0428
19	1.6186	0.0416
20	1.6591	0.0404
21	1.6985	0.0394
22	1.7369	0.0384
23	1.7744	0.0375
24	1.8111	0.0367
25	1.8471	0.0359
26	1.8822	0.0352
27	1.9167	0.0345
28	1.9506	0.0338
29	1.9838	0.0332
30	2.0164	0.0326
31	2.0484	0.0321
32	2.0800	0.0315
33	2.1110	0.0310
34	2.1415	0.0305
35	2.1716	0.0301
36	2.2012	0.0296
37	2.2304	0.0291
38	2.2591	0.0287
39	2.2874	0.0283
40	2.3154	0.0280
41	2.3429	0.0276
42	2.3702	0.0272
43	2.3971	0.0269
44	2.4237	0.0266
45	2.4500	0.0263
46	2.4759	0.0260
47	2.5016	0.0257
48	2.5270	0.0254
49	2.5521	0.0251
50	2.5770	0.0249
51	2.6016	0.0246
52	2.6259	0.0243
53	2.6500	0.0241
54	2.6739	0.0239

55	2.6975	0.0236
56	2.7210	0.0234
57	2.7442	0.0232
58	2.7672	0.0230
59	2.7899	0.0228
60	2.8125	0.0226
61	2.8349	0.0224
62	2.8571	0.0222
63	2.8791	0.0220
64	2.9010	0.0218
65	2.9226	0.0217
66	2.9441	0.0215
67	2.9654	0.0213
68	2.9866	0.0212
69	3.0076	0.0210
70	3.0284	0.0208
71	3.0491	0.0207
72	3.0696	0.0205
73	3.0883	0.0186
74	3.1067	0.0185
75	3.1251	0.0184
76	3.1433	0.0182
77	3.1614	0.0181
78	3.1793	0.0179
79	3.1972	0.0178
80	3.2149	0.0177
81	3.2324	0.0176
82	3.2499	0.0175
83	3.2672	0.0173
84	3.2844	0.0172
85	3.3015	0.0171
86	3.3185	0.0170
87	3.3354	0.0169
88	3.3522	0.0168
89	3.3688	0.0167
90	3.3854	0.0166
91	3.4018	0.0165
92	3.4182	0.0164
93	3.4344	0.0163
94	3.4506	0.0162
95	3.4667	0.0161
96	3.4826	0.0160
97	3.4985	0.0159
98	3.5143	0.0158
99	3.5300	0.0157
100	3.5456	0.0156
101	3.5611	0.0155
102	3.5765	0.0154
103	3.5918	0.0153
104	3.6071	0.0153
105	3.6223	0.0152
106	3.6374	0.0151
107	3.6524	0.0150
108	3.6673	0.0149
109	3.6822	0.0149
110	3.6970	0.0148
111	3.7117	0.0147

112	3.7263	0.0146
113	3.7409	0.0146
114	3.7554	0.0145
115	3.7698	0.0144
116	3.7841	0.0143
117	3.7984	0.0143
118	3.8126	0.0142
119	3.8268	0.0141
120	3.8409	0.0141
121	3.8549	0.0140
122	3.8688	0.0139
123	3.8827	0.0139
124	3.8965	0.0138
125	3.9103	0.0138
126	3.9240	0.0137
127	3.9376	0.0136
128	3.9512	0.0136
129	3.9647	0.0135
130	3.9781	0.0135
131	3.9915	0.0134
132	4.0049	0.0133
133	4.0182	0.0133
134	4.0314	0.0132
135	4.0446	0.0132
136	4.0577	0.0131
137	4.0708	0.0131
138	4.0838	0.0130
139	4.0967	0.0130
140	4.1096	0.0129
141	4.1225	0.0129
142	4.1353	0.0128
143	4.1480	0.0128
144	4.1607	0.0127
145	4.1734	0.0127
146	4.1860	0.0126
147	4.1986	0.0126
148	4.2111	0.0125
149	4.2235	0.0125
150	4.2359	0.0124
151	4.2483	0.0124
152	4.2606	0.0123
153	4.2729	0.0123
154	4.2851	0.0122
155	4.2973	0.0122
156	4.3095	0.0121
157	4.3216	0.0121
158	4.3336	0.0121
159	4.3456	0.0120
160	4.3576	0.0120
161	4.3695	0.0119
162	4.3814	0.0119
163	4.3933	0.0118
164	4.4051	0.0118
165	4.4168	0.0118
166	4.4286	0.0117
167	4.4403	0.0117
168	4.4519	0.0116

169	4.4635	0.0116
170	4.4751	0.0116
171	4.4866	0.0115
172	4.4981	0.0115
173	4.5096	0.0115
174	4.5210	0.0114
175	4.5324	0.0114
176	4.5437	0.0113
177	4.5550	0.0113
178	4.5663	0.0113
179	4.5775	0.0112
180	4.5887	0.0112
181	4.5999	0.0112
182	4.6110	0.0111
183	4.6221	0.0111
184	4.6332	0.0111
185	4.6442	0.0110
186	4.6552	0.0110
187	4.6662	0.0110
188	4.6771	0.0109
189	4.6880	0.0109
190	4.6989	0.0109
191	4.7097	0.0108
192	4.7205	0.0108
193	4.7313	0.0108
194	4.7421	0.0107
195	4.7528	0.0107
196	4.7634	0.0107
197	4.7741	0.0106
198	4.7847	0.0106
199	4.7953	0.0106
200	4.8059	0.0106
201	4.8164	0.0105
202	4.8269	0.0105
203	4.8374	0.0105
204	4.8478	0.0104
205	4.8582	0.0104
206	4.8686	0.0104
207	4.8790	0.0104
208	4.8893	0.0103
209	4.8996	0.0103
210	4.9099	0.0103
211	4.9201	0.0102
212	4.9303	0.0102
213	4.9405	0.0102
214	4.9507	0.0102
215	4.9608	0.0101
216	4.9709	0.0101
217	4.9810	0.0101
218	4.9911	0.0101
219	5.0011	0.0100
220	5.0111	0.0100
221	5.0211	0.0100
222	5.0310	0.0100
223	5.0410	0.0099
224	5.0509	0.0099
225	5.0608	0.0099

226	5.0706	0.0099
227	5.0805	0.0098
228	5.0903	0.0098
229	5.1000	0.0098
230	5.1098	0.0098
231	5.1195	0.0097
232	5.1293	0.0097
233	5.1389	0.0097
234	5.1486	0.0097
235	5.1583	0.0096
236	5.1679	0.0096
237	5.1775	0.0096
238	5.1870	0.0096
239	5.1966	0.0096
240	5.2061	0.0095
241	5.2156	0.0095
242	5.2251	0.0095
243	5.2346	0.0095
244	5.2440	0.0094
245	5.2534	0.0094
246	5.2628	0.0094
247	5.2722	0.0094
248	5.2816	0.0094
249	5.2909	0.0093
250	5.3002	0.0093
251	5.3095	0.0093
252	5.3188	0.0093
253	5.3280	0.0093
254	5.3373	0.0092
255	5.3465	0.0092
256	5.3557	0.0092
257	5.3648	0.0092
258	5.3740	0.0091
259	5.3831	0.0091
260	5.3922	0.0091
261	5.4013	0.0091
262	5.4104	0.0091
263	5.4194	0.0091
264	5.4285	0.0090
265	5.4375	0.0090
266	5.4465	0.0090
267	5.4554	0.0090
268	5.4644	0.0090
269	5.4733	0.0089
270	5.4823	0.0089
271	5.4912	0.0089
272	5.5000	0.0089
273	5.5089	0.0089
274	5.5177	0.0088
275	5.5266	0.0088
276	5.5354	0.0088
277	5.5442	0.0088
278	5.5529	0.0088
279	5.5617	0.0088
280	5.5704	0.0087
281	5.5792	0.0087
282	5.5879	0.0087

283	5.5965	0.0087
284	5.6052	0.0087
285	5.6139	0.0087
286	5.6225	0.0086
287	5.6311	0.0086
288	5.6397	0.0086

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0086	0.0023	0.0063
2	0.0086	0.0023	0.0063
3	0.0087	0.0023	0.0063
4	0.0087	0.0024	0.0063
5	0.0087	0.0024	0.0063
6	0.0087	0.0024	0.0064
7	0.0088	0.0024	0.0064
8	0.0088	0.0024	0.0064
9	0.0088	0.0024	0.0064
10	0.0088	0.0024	0.0064
11	0.0089	0.0024	0.0065
12	0.0089	0.0024	0.0065
13	0.0089	0.0024	0.0065
14	0.0089	0.0024	0.0065
15	0.0090	0.0024	0.0065
16	0.0090	0.0024	0.0066
17	0.0090	0.0024	0.0066
18	0.0091	0.0025	0.0066
19	0.0091	0.0025	0.0066
20	0.0091	0.0025	0.0066
21	0.0091	0.0025	0.0067
22	0.0092	0.0025	0.0067
23	0.0092	0.0025	0.0067
24	0.0092	0.0025	0.0067
25	0.0093	0.0025	0.0068
26	0.0093	0.0025	0.0068
27	0.0093	0.0025	0.0068
28	0.0094	0.0025	0.0068
29	0.0094	0.0025	0.0068
30	0.0094	0.0026	0.0069
31	0.0095	0.0026	0.0069
32	0.0095	0.0026	0.0069
33	0.0095	0.0026	0.0069
34	0.0096	0.0026	0.0070
35	0.0096	0.0026	0.0070
36	0.0096	0.0026	0.0070
37	0.0097	0.0026	0.0070
38	0.0097	0.0026	0.0071
39	0.0097	0.0026	0.0071
40	0.0098	0.0026	0.0071
41	0.0098	0.0027	0.0071
42	0.0098	0.0027	0.0072
43	0.0099	0.0027	0.0072
44	0.0099	0.0027	0.0072
45	0.0100	0.0027	0.0073
46	0.0100	0.0027	0.0073

47	0.0100	0.0027	0.0073
48	0.0101	0.0027	0.0073
49	0.0101	0.0027	0.0074
50	0.0101	0.0027	0.0074
51	0.0102	0.0028	0.0074
52	0.0102	0.0028	0.0074
53	0.0103	0.0028	0.0075
54	0.0103	0.0028	0.0075
55	0.0104	0.0028	0.0075
56	0.0104	0.0028	0.0076
57	0.0104	0.0028	0.0076
58	0.0105	0.0028	0.0076
59	0.0105	0.0029	0.0077
60	0.0106	0.0029	0.0077
61	0.0106	0.0029	0.0077
62	0.0106	0.0029	0.0078
63	0.0107	0.0029	0.0078
64	0.0107	0.0029	0.0078
65	0.0108	0.0029	0.0079
66	0.0108	0.0029	0.0079
67	0.0109	0.0030	0.0079
68	0.0109	0.0030	0.0080
69	0.0110	0.0030	0.0080
70	0.0110	0.0030	0.0080
71	0.0111	0.0030	0.0081
72	0.0111	0.0030	0.0081
73	0.0112	0.0030	0.0082
74	0.0112	0.0030	0.0082
75	0.0113	0.0031	0.0082
76	0.0113	0.0031	0.0083
77	0.0114	0.0031	0.0083
78	0.0115	0.0031	0.0083
79	0.0115	0.0031	0.0084
80	0.0116	0.0031	0.0084
81	0.0116	0.0032	0.0085
82	0.0117	0.0032	0.0085
83	0.0118	0.0032	0.0086
84	0.0118	0.0032	0.0086
85	0.0119	0.0032	0.0087
86	0.0119	0.0032	0.0087
87	0.0120	0.0033	0.0088
88	0.0121	0.0033	0.0088
89	0.0121	0.0033	0.0088
90	0.0122	0.0033	0.0089
91	0.0123	0.0033	0.0089
92	0.0123	0.0033	0.0090
93	0.0124	0.0034	0.0090
94	0.0125	0.0034	0.0091
95	0.0126	0.0034	0.0092
96	0.0126	0.0034	0.0092
97	0.0127	0.0034	0.0093
98	0.0128	0.0035	0.0093
99	0.0129	0.0035	0.0094
100	0.0129	0.0035	0.0094
101	0.0130	0.0035	0.0095
102	0.0131	0.0035	0.0095
103	0.0132	0.0036	0.0096

104	0.0132	0.0036	0.0096
105	0.0133	0.0036	0.0097
106	0.0134	0.0036	0.0098
107	0.0135	0.0037	0.0098
108	0.0136	0.0037	0.0099
109	0.0137	0.0037	0.0100
110	0.0138	0.0037	0.0100
111	0.0139	0.0038	0.0101
112	0.0139	0.0038	0.0102
113	0.0141	0.0038	0.0103
114	0.0141	0.0038	0.0103
115	0.0143	0.0039	0.0104
116	0.0143	0.0039	0.0105
117	0.0145	0.0039	0.0106
118	0.0146	0.0039	0.0106
119	0.0147	0.0040	0.0107
120	0.0148	0.0040	0.0108
121	0.0149	0.0041	0.0109
122	0.0150	0.0041	0.0109
123	0.0152	0.0041	0.0111
124	0.0153	0.0041	0.0111
125	0.0154	0.0042	0.0112
126	0.0155	0.0042	0.0113
127	0.0157	0.0043	0.0114
128	0.0158	0.0043	0.0115
129	0.0160	0.0043	0.0116
130	0.0161	0.0044	0.0117
131	0.0163	0.0044	0.0118
132	0.0164	0.0044	0.0119
133	0.0166	0.0045	0.0121
134	0.0167	0.0045	0.0121
135	0.0169	0.0046	0.0123
136	0.0170	0.0046	0.0124
137	0.0172	0.0047	0.0125
138	0.0173	0.0047	0.0126
139	0.0176	0.0048	0.0128
140	0.0177	0.0048	0.0129
141	0.0179	0.0049	0.0131
142	0.0181	0.0049	0.0132
143	0.0184	0.0050	0.0134
144	0.0185	0.0050	0.0135
145	0.0205	0.0056	0.0150
146	0.0207	0.0056	0.0151
147	0.0210	0.0057	0.0153
148	0.0212	0.0057	0.0154
149	0.0215	0.0058	0.0157
150	0.0217	0.0059	0.0158
151	0.0220	0.0060	0.0160
152	0.0222	0.0060	0.0162
153	0.0226	0.0061	0.0165
154	0.0228	0.0062	0.0166
155	0.0232	0.0063	0.0169
156	0.0234	0.0064	0.0171
157	0.0239	0.0065	0.0174
158	0.0241	0.0065	0.0176
159	0.0246	0.0067	0.0179
160	0.0249	0.0067	0.0181

161	0.0254	0.0069	0.0185
162	0.0257	0.0070	0.0187
163	0.0263	0.0071	0.0191
164	0.0266	0.0072	0.0194
165	0.0272	0.0074	0.0199
166	0.0276	0.0075	0.0201
167	0.0283	0.0077	0.0206
168	0.0287	0.0078	0.0209
169	0.0296	0.0080	0.0216
170	0.0301	0.0082	0.0219
171	0.0310	0.0084	0.0226
172	0.0315	0.0086	0.0230
173	0.0326	0.0088	0.0238
174	0.0332	0.0090	0.0242
175	0.0345	0.0094	0.0251
176	0.0352	0.0095	0.0256
177	0.0367	0.0100	0.0267
178	0.0375	0.0102	0.0274
179	0.0394	0.0107	0.0287
180	0.0404	0.0110	0.0295
181	0.0428	0.0116	0.0312
182	0.0441	0.0120	0.0321
183	0.0472	0.0128	0.0344
184	0.0489	0.0133	0.0357
185	0.0444	0.0120	0.0323
186	0.0469	0.0127	0.0342
187	0.0532	0.0144	0.0388
188	0.0574	0.0156	0.0418
189	0.0692	0.0188	0.0504
190	0.0781	0.0198	0.0583
191	0.1116	0.0198	0.0918
192	0.1534	0.0198	0.1336
193	0.4802	0.0198	0.4604
194	0.0909	0.0198	0.0711
195	0.0625	0.0170	0.0456
196	0.0498	0.0135	0.0363
197	0.0509	0.0138	0.0371
198	0.0456	0.0124	0.0332
199	0.0416	0.0113	0.0303
200	0.0384	0.0104	0.0280
201	0.0359	0.0097	0.0262
202	0.0338	0.0092	0.0247
203	0.0321	0.0087	0.0234
204	0.0305	0.0083	0.0223
205	0.0291	0.0079	0.0212
206	0.0280	0.0076	0.0204
207	0.0269	0.0073	0.0196
208	0.0260	0.0070	0.0189
209	0.0251	0.0068	0.0183
210	0.0243	0.0066	0.0177
211	0.0236	0.0064	0.0172
212	0.0230	0.0062	0.0168
213	0.0224	0.0061	0.0163
214	0.0218	0.0059	0.0159
215	0.0213	0.0058	0.0155
216	0.0208	0.0057	0.0152
217	0.0186	0.0051	0.0136

218	0.0182	0.0049	0.0133
219	0.0178	0.0048	0.0130
220	0.0175	0.0047	0.0127
221	0.0171	0.0046	0.0125
222	0.0168	0.0045	0.0122
223	0.0165	0.0045	0.0120
224	0.0162	0.0044	0.0118
225	0.0159	0.0043	0.0116
226	0.0156	0.0042	0.0114
227	0.0153	0.0042	0.0112
228	0.0151	0.0041	0.0110
229	0.0149	0.0040	0.0108
230	0.0146	0.0040	0.0107
231	0.0144	0.0039	0.0105
232	0.0142	0.0039	0.0104
233	0.0140	0.0038	0.0102
234	0.0138	0.0037	0.0101
235	0.0136	0.0037	0.0099
236	0.0135	0.0036	0.0098
237	0.0133	0.0036	0.0097
238	0.0131	0.0036	0.0096
239	0.0130	0.0035	0.0094
240	0.0128	0.0035	0.0093
241	0.0127	0.0034	0.0092
242	0.0125	0.0034	0.0091
243	0.0124	0.0034	0.0090
244	0.0122	0.0033	0.0089
245	0.0121	0.0033	0.0088
246	0.0120	0.0032	0.0087
247	0.0118	0.0032	0.0086
248	0.0117	0.0032	0.0085
249	0.0116	0.0031	0.0085
250	0.0115	0.0031	0.0084
251	0.0114	0.0031	0.0083
252	0.0113	0.0031	0.0082
253	0.0112	0.0030	0.0081
254	0.0111	0.0030	0.0081
255	0.0110	0.0030	0.0080
256	0.0109	0.0029	0.0079
257	0.0108	0.0029	0.0079
258	0.0107	0.0029	0.0078
259	0.0106	0.0029	0.0077
260	0.0105	0.0028	0.0077
261	0.0104	0.0028	0.0076
262	0.0103	0.0028	0.0075
263	0.0102	0.0028	0.0075
264	0.0102	0.0028	0.0074
265	0.0101	0.0027	0.0073
266	0.0100	0.0027	0.0073
267	0.0099	0.0027	0.0072
268	0.0099	0.0027	0.0072
269	0.0098	0.0027	0.0071
270	0.0097	0.0026	0.0071
271	0.0096	0.0026	0.0070
272	0.0096	0.0026	0.0070
273	0.0095	0.0026	0.0069

274	0.0094	0.0026	0.0069
275	0.0094	0.0025	0.0068
276	0.0093	0.0025	0.0068
277	0.0093	0.0025	0.0067
278	0.0092	0.0025	0.0067
279	0.0091	0.0025	0.0067
280	0.0091	0.0025	0.0066
281	0.0090	0.0024	0.0066
282	0.0090	0.0024	0.0065
283	0.0089	0.0024	0.0065
284	0.0088	0.0024	0.0064
285	0.0088	0.0024	0.0064
286	0.0087	0.0024	0.0064
287	0.0087	0.0024	0.0063
288	0.0086	0.0023	0.0063

Total soil rain loss = 1.38(In)
Total effective rainfall = 4.26(In)
Peak flow rate in flood hydrograph = 114.30(CFS)

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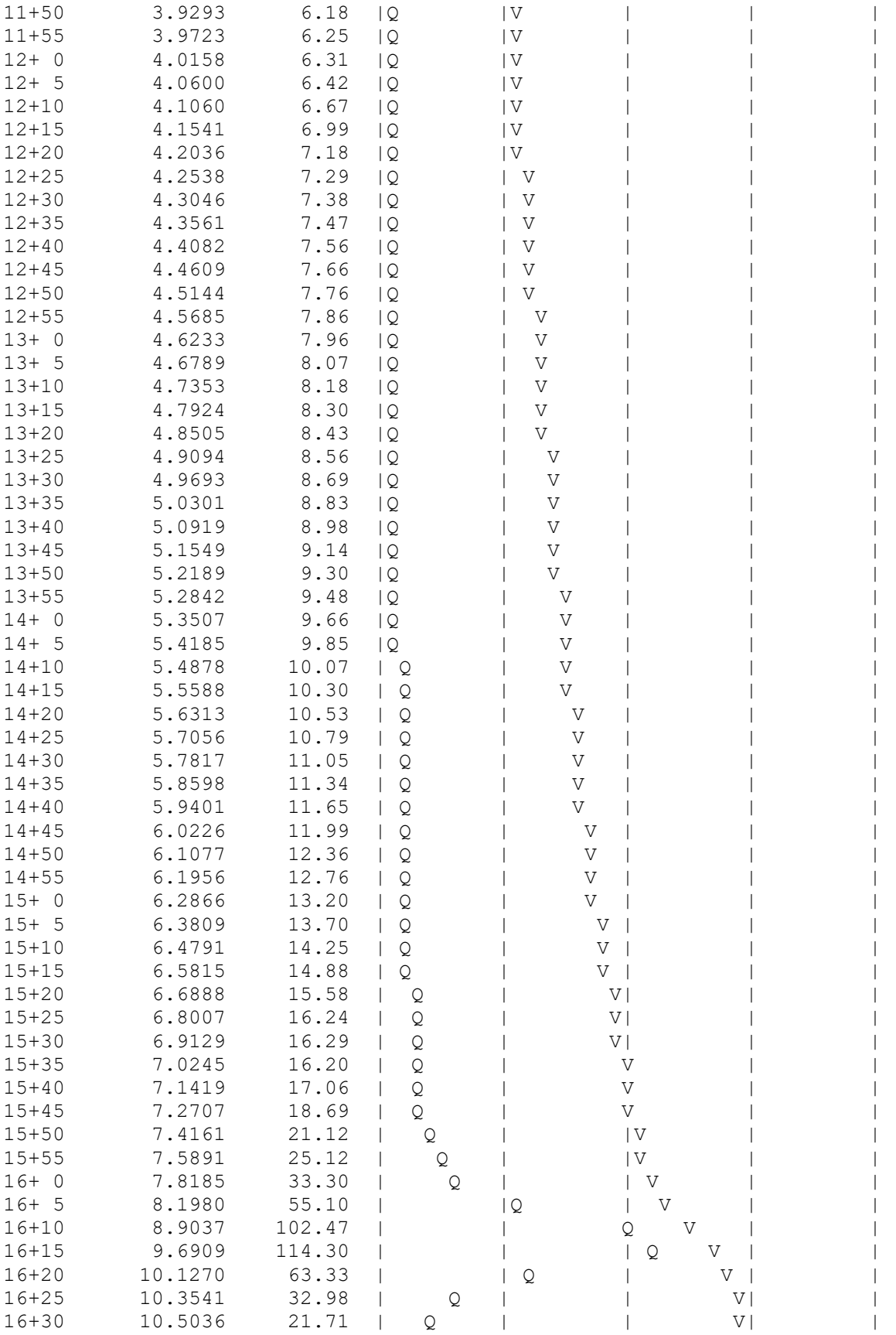
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0011	0.16	Q				
0+10	0.0084	1.05	Q				
0+15	0.0240	2.27	Q				
0+20	0.0432	2.79	Q				
0+25	0.0636	2.95	Q				
0+30	0.0842	3.00	Q				
0+35	0.1051	3.03	Q				
0+40	0.1260	3.04	Q				
0+45	0.1470	3.05	Q				
0+50	0.1681	3.06	Q				
0+55	0.1892	3.07	Q				
1+ 0	0.2104	3.08	Q				
1+ 5	0.2316	3.09	Q				
1+10	0.2529	3.10	Q				
1+15	0.2743	3.10	Q				
1+20	0.2958	3.11	Q				
1+25	0.3173	3.12	Q				
1+30	0.3389	3.13	Q				
1+35	0.3605	3.14	QV				
1+40	0.3822	3.15	QV				
1+45	0.4040	3.16	QV				
1+50	0.4259	3.17	QV				
1+55	0.4478	3.19	QV				
2+ 0	0.4698	3.20	QV				
2+ 5	0.4919	3.21	QV				
2+10	0.5141	3.22	QV				
2+15	0.5363	3.23	QV				

2+20	0.5586	3.24	QV	|	|	|	|
2+25	0.5810	3.25	QV	|	|	|	|
2+30	0.6034	3.26	QV	|	|	|	|
2+35	0.6260	3.27	QV	|	|	|	|
2+40	0.6486	3.28	QV	|	|	|	|
2+45	0.6713	3.29	QV	|	|	|	|
2+50	0.6940	3.31	QV	|	|	|	|
2+55	0.7169	3.32	Q V	|	|	|	|
3+ 0	0.7398	3.33	Q V	|	|	|	|
3+ 5	0.7628	3.34	Q V	|	|	|	|
3+10	0.7859	3.35	Q V	|	|	|	|
3+15	0.8091	3.36	Q V	|	|	|	|
3+20	0.8323	3.38	Q V	|	|	|	|
3+25	0.8557	3.39	Q V	|	|	|	|
3+30	0.8791	3.40	Q V	|	|	|	|
3+35	0.9026	3.41	Q V	|	|	|	|
3+40	0.9262	3.43	Q V	|	|	|	|
3+45	0.9499	3.44	Q V	|	|	|	|
3+50	0.9737	3.45	Q V	|	|	|	|
3+55	0.9976	3.47	Q V	|	|	|	|
4+ 0	1.0215	3.48	Q V	|	|	|	|
4+ 5	1.0456	3.49	Q V	|	|	|	|
4+10	1.0697	3.51	Q V	|	|	|	|
4+15	1.0940	3.52	Q V	|	|	|	|
4+20	1.1183	3.53	Q V	|	|	|	|
4+25	1.1427	3.55	Q V	|	|	|	|
4+30	1.1672	3.56	Q V	|	|	|	|
4+35	1.1919	3.58	Q V	|	|	|	|
4+40	1.2166	3.59	Q V	|	|	|	|
4+45	1.2414	3.60	Q V	|	|	|	|
4+50	1.2664	3.62	Q V	|	|	|	|
4+55	1.2914	3.63	Q V	|	|	|	|
5+ 0	1.3165	3.65	Q V	|	|	|	|
5+ 5	1.3418	3.67	Q V	|	|	|	|
5+10	1.3671	3.68	Q V	|	|	|	|
5+15	1.3926	3.70	Q V	|	|	|	|
5+20	1.4181	3.71	Q V	|	|	|	|
5+25	1.4438	3.73	Q V	|	|	|	|
5+30	1.4696	3.74	Q V	|	|	|	|
5+35	1.4955	3.76	Q V	|	|	|	|
5+40	1.5215	3.78	Q V	|	|	|	|
5+45	1.5476	3.79	Q V	|	|	|	|
5+50	1.5739	3.81	Q V	|	|	|	|
5+55	1.6002	3.83	Q V	|	|	|	|
6+ 0	1.6267	3.85	Q V	|	|	|	|
6+ 5	1.6533	3.86	Q V	|	|	|	|
6+10	1.6801	3.88	Q V	|	|	|	|
6+15	1.7069	3.90	Q V	|	|	|	|
6+20	1.7339	3.92	Q V	|	|	|	|
6+25	1.7610	3.94	Q V	|	|	|	|
6+30	1.7883	3.96	Q V	|	|	|	|
6+35	1.8156	3.97	Q V	|	|	|	|
6+40	1.8431	3.99	Q V	|	|	|	|
6+45	1.8708	4.01	Q V	|	|	|	|
6+50	1.8986	4.03	Q V	|	|	|	|
6+55	1.9265	4.05	Q V	|	|	|	|
7+ 0	1.9545	4.07	Q V	|	|	|	|

7+ 5	1.9827	4.10	Q	V	|	|	|	|
7+10	2.0111	4.12	Q	V	|	|	|	|
7+15	2.0396	4.14	Q	V	|	|	|	|
7+20	2.0682	4.16	Q	V	|	|	|	|
7+25	2.0970	4.18	Q	V	|	|	|	|
7+30	2.1260	4.20	Q	V	|	|	|	|
7+35	2.1551	4.23	Q	V	|	|	|	|
7+40	2.1844	4.25	Q	V	|	|	|	|
7+45	2.2138	4.27	Q	V	|	|	|	|
7+50	2.2434	4.30	Q	V	|	|	|	|
7+55	2.2731	4.32	Q	V	|	|	|	|
8+ 0	2.3031	4.35	Q	V	|	|	|	|
8+ 5	2.3332	4.37	Q	V	|	|	|	|
8+10	2.3634	4.40	Q	V	|	|	|	|
8+15	2.3939	4.42	Q	V	|	|	|	|
8+20	2.4245	4.45	Q	V	|	|	|	|
8+25	2.4553	4.47	Q	V	|	|	|	|
8+30	2.4863	4.50	Q	V	|	|	|	|
8+35	2.5175	4.53	Q	V	|	|	|	|
8+40	2.5489	4.56	Q	V	|	|	|	|
8+45	2.5804	4.58	Q	V	|	|	|	|
8+50	2.6122	4.61	Q	V	|	|	|	|
8+55	2.6442	4.64	Q	V	|	|	|	|
9+ 0	2.6764	4.67	Q	V	|	|	|	|
9+ 5	2.7088	4.70	Q	V	|	|	|	|
9+10	2.7414	4.73	Q	V	|	|	|	|
9+15	2.7742	4.77	Q	V	|	|	|	|
9+20	2.8073	4.80	Q	V	|	|	|	|
9+25	2.8405	4.83	Q	V	|	|	|	|
9+30	2.8740	4.86	Q	V	|	|	|	|
9+35	2.9078	4.90	Q	V	|	|	|	|
9+40	2.9417	4.93	Q	V	|	|	|	|
9+45	2.9760	4.97	Q	V	|	|	|	|
9+50	3.0104	5.01	|Q	V	|	|	|	|
9+55	3.0452	5.04	|Q	V	|	|	|	|
10+ 0	3.0802	5.08	|Q	V	|	|	|	|
10+ 5	3.1154	5.12	|Q	V	|	|	|	|
10+10	3.1509	5.16	|Q	V	|	|	|	|
10+15	3.1867	5.20	|Q	V	|	|	|	|
10+20	3.2228	5.24	|Q	V	|	|	|	|
10+25	3.2592	5.28	|Q	V	|	|	|	|
10+30	3.2959	5.32	|Q	V	|	|	|	|
10+35	3.3328	5.37	|Q	V	|	|	|	|
10+40	3.3701	5.41	|Q	V	|	|	|	|
10+45	3.4077	5.46	|Q	V	|	|	|	|
10+50	3.4456	5.51	|Q	V	|	|	|	|
10+55	3.4839	5.56	|Q	V	|	|	|	|
11+ 0	3.5225	5.60	|Q	V	|	|	|	|
11+ 5	3.5614	5.66	|Q	V	|	|	|	|
11+10	3.6007	5.71	|Q	V	|	|	|	|
11+15	3.6404	5.76	|Q	V	|	|	|	|
11+20	3.6805	5.82	|Q	V	|	|	|	|
11+25	3.7209	5.87	|Q	V	|	|	|	|
11+30	3.7618	5.93	|Q	V	|	|	|	|
11+35	3.8030	5.99	|Q	V	|	|	|	|
11+40	3.8447	6.05	|Q	V	|	|	|	|
11+45	3.8868	6.11	|Q	|V	|	|	|	|


11+50 3.9293 6.18
11+55 3.9723 6.25
12+ 0 4.0158 6.31
12+ 5 4.0600 6.42
12+10 4.1060 6.67
12+15 4.1541 6.99
12+20 4.2036 7.18
12+25 4.2538 7.29
12+30 4.3046 7.38
12+35 4.3561 7.47
12+40 4.4082 7.56
12+45 4.4609 7.66
12+50 4.5144 7.76
12+55 4.5685 7.86
13+ 0 4.6233 7.96
13+ 5 4.6789 8.07
13+10 4.7353 8.18
13+15 4.7924 8.30
13+20 4.8505 8.43
13+25 4.9094 8.56
13+30 4.9693 8.69
13+35 5.0301 8.83
13+40 5.0919 8.98
13+45 5.1549 9.14
13+50 5.2189 9.30
13+55 5.2842 9.48
14+ 0 5.3507 9.66
14+ 5 5.4185 9.85
14+10 5.4878 10.07
14+15 5.5588 10.30
14+20 5.6313 10.53
14+25 5.7056 10.79
14+30 5.7817 11.05
14+35 5.8598 11.34
14+40 5.9401 11.65
14+45 6.0226 11.99
14+50 6.1077 12.36
14+55 6.1956 12.76
15+ 0 6.2866 13.20
15+ 5 6.3809 13.70
15+10 6.4791 14.25
15+15 6.5815 14.88
15+20 6.6888 15.58
15+25 6.8007 16.24
15+30 6.9129 16.29
15+35 7.0245 16.20
15+40 7.1419 17.06
15+45 7.2707 18.69
15+50 7.4161 21.12
15+55 7.5891 25.12
16+ 0 7.8185 33.30
16+ 5 8.1980 55.10
16+10 8.9037 102.47
16+15 9.6909 114.30
16+20 10.1270 63.33
16+25 10.3541 32.98
16+30 10.5036 21.71

16+35	10.6340	18.93	Q		V	
16+40	10.7437	15.93	Q		V	
16+45	10.8438	14.54	Q		V	
16+50	10.9363	13.43	Q		V	
16+55	11.0228	12.55	Q		V	
17+ 0	11.1041	11.81	Q		V	
17+ 5	11.1811	11.18	Q		V	
17+10	11.2543	10.63	Q		V	
17+15	11.3242	10.15	Q		V	
17+20	11.3913	9.74	Q		V	
17+25	11.4558	9.37	Q		V	
17+30	11.5181	9.04	Q		V	
17+35	11.5783	8.75	Q		V	
17+40	11.6367	8.48	Q		V	
17+45	11.6933	8.23	Q		V	
17+50	11.7485	8.00	Q		V	
17+55	11.8021	7.79	Q		V	
18+ 0	11.8545	7.60	Q		V	
18+ 5	11.9053	7.39	Q		V	
18+10	11.9538	7.04	Q		V	
18+15	11.9995	6.63	Q		V	
18+20	12.0434	6.38	Q		V	
18+25	12.0862	6.21	Q		V	
18+30	12.1281	6.08	Q		V	
18+35	12.1691	5.95	Q		V	
18+40	12.2092	5.84	Q		V	
18+45	12.2487	5.73	Q		V	
18+50	12.2874	5.62	Q		V	
18+55	12.3254	5.52	Q		V	
19+ 0	12.3628	5.43	Q		V	
19+ 5	12.3996	5.34	Q		V	
19+10	12.4358	5.25	Q		V	
19+15	12.4714	5.17	Q		V	
19+20	12.5065	5.09	Q		V	
19+25	12.5410	5.02	Q		V	
19+30	12.5751	4.95	Q		V	
19+35	12.6087	4.88	Q		V	
19+40	12.6418	4.81	Q		V	
19+45	12.6745	4.75	Q		V	
19+50	12.7067	4.68	Q		V	
19+55	12.7386	4.62	Q		V	
20+ 0	12.7700	4.57	Q		V	
20+ 5	12.8011	4.51	Q		V	
20+10	12.8318	4.46	Q		V	
20+15	12.8621	4.40	Q		V	
20+20	12.8921	4.35	Q		V	
20+25	12.9217	4.30	Q		V	
20+30	12.9511	4.26	Q		V	
20+35	12.9801	4.21	Q		V	
20+40	13.0088	4.17	Q		V	
20+45	13.0371	4.12	Q		V	
20+50	13.0653	4.08	Q		V	
20+55	13.0931	4.04	Q		V	
21+ 0	13.1206	4.00	Q		V	
21+ 5	13.1479	3.96	Q		V	
21+10	13.1749	3.92	Q		V	
21+15	13.2017	3.89	Q		V	

21+20	13.2282	3.85	Q				V
21+25	13.2545	3.82	Q				V
21+30	13.2806	3.78	Q				V
21+35	13.3064	3.75	Q				V
21+40	13.3320	3.72	Q				V
21+45	13.3574	3.69	Q				V
21+50	13.3826	3.65	Q				V
21+55	13.4075	3.62	Q				V
22+ 0	13.4323	3.59	Q				V
22+ 5	13.4568	3.57	Q				V
22+10	13.4812	3.54	Q				V
22+15	13.5054	3.51	Q				V
22+20	13.5294	3.48	Q				V
22+25	13.5532	3.46	Q				V
22+30	13.5768	3.43	Q				V
22+35	13.6003	3.41	Q				V
22+40	13.6235	3.38	Q				V
22+45	13.6467	3.36	Q				V
22+50	13.6696	3.33	Q				V
22+55	13.6924	3.31	Q				V
23+ 0	13.7150	3.29	Q				V
23+ 5	13.7375	3.26	Q				V
23+10	13.7598	3.24	Q				V
23+15	13.7820	3.22	Q				V
23+20	13.8040	3.20	Q				V
23+25	13.8259	3.18	Q				V
23+30	13.8477	3.16	Q				V
23+35	13.8693	3.14	Q				V
23+40	13.8908	3.12	Q				V
23+45	13.9121	3.10	Q				V
23+50	13.9333	3.08	Q				V
23+55	13.9544	3.06	Q				V
24+ 0	13.9753	3.04	Q				V
24+ 5	13.9950	2.86	Q				V
24+10	14.0085	1.96	Q				V
24+15	14.0136	0.73	Q				V
24+20	14.0150	0.21	Q				V
24+25	14.0154	0.06	Q				V
24+30	14.0156	0.02	Q				V

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

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Study date 04/06/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE PROPOSED CONDITION
25-YEAR STORM EVENT ANALYSIS

Storm Event Year = 25

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 25		
39.51	1	1.00
Rainfall data for year 25		
39.51	6	2.43
Rainfall data for year 25		
39.51	24	4.48

++

******** 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)
32.0	32.0	39.51	1.000	0.978	0.243	0.238

Area-averaged adjusted loss rate Fm (In/Hr) = 0.238

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
9.60	0.243	32.0	32.0	21.25	0.001
29.91	0.757	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.717
Area-averaged low loss fraction, Yb = 0.283
User entry of time of concentration = 0.231 (hours)
++
Watershed area = 39.51(Ac.)
Catchment Lag time = 0.184 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 45.1916
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.238(In/Hr)
Average low loss rate fraction (Yb) = 0.283 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.369(In)
Computed peak 30-minute rainfall = 0.756(In)
Specified peak 1-hour rainfall = 0.998(In)
Computed peak 3-hour rainfall = 1.722(In)
Specified peak 6-hour rainfall = 2.430(In)
Specified peak 24-hour rainfall = 4.480(In)

Rainfall depth area reduction factors:
Using a total area of 39.51(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.369(In)
30-minute factor = 0.998 Adjusted rainfall = 0.755(In)
1-hour factor = 0.998 Adjusted rainfall = 0.996(In)
3-hour factor = 1.000 Adjusted rainfall = 1.722(In)
6-hour factor = 1.000 Adjusted rainfall = 2.430(In)
24-hour factor = 1.000 Adjusted rainfall = 4.480(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 = 477.82 (CFS))		
1	3.781	18.064
2	24.645	99.694
3	60.458	171.123
4	85.095	117.721
5	94.917	46.932
6	98.190	15.643
7	99.087	4.286

8	100.000	2.143

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3687	0.3687
2	0.4865	0.1178
3	0.5721	0.0857
4	0.6419	0.0698
5	0.7018	0.0599
6	0.7549	0.0531
7	0.8030	0.0480
8	0.8470	0.0441
9	0.8879	0.0409
10	0.9261	0.0382
11	0.9621	0.0360
12	0.9962	0.0341
13	1.0367	0.0405
14	1.0757	0.0390
15	1.1133	0.0376
16	1.1496	0.0364
17	1.1849	0.0352
18	1.2191	0.0342
19	1.2524	0.0333
20	1.2848	0.0324
21	1.3164	0.0316
22	1.3473	0.0309
23	1.3774	0.0302
24	1.4069	0.0295
25	1.4359	0.0289
26	1.4642	0.0283
27	1.4920	0.0278
28	1.5192	0.0273
29	1.5460	0.0268
30	1.5724	0.0263
31	1.5983	0.0259
32	1.6237	0.0255
33	1.6488	0.0251
34	1.6735	0.0247
35	1.6979	0.0243
36	1.7218	0.0240
37	1.7454	0.0236
38	1.7687	0.0233
39	1.7917	0.0230
40	1.8144	0.0227
41	1.8368	0.0224
42	1.8589	0.0221
43	1.8808	0.0219
44	1.9024	0.0216
45	1.9237	0.0214
46	1.9448	0.0211
47	1.9657	0.0209
48	1.9864	0.0207
49	2.0069	0.0205
50	2.0271	0.0202
51	2.0471	0.0200
52	2.0670	0.0198
53	2.0866	0.0197

54	2.1061	0.0195
55	2.1254	0.0193
56	2.1445	0.0191
57	2.1634	0.0189
58	2.1822	0.0188
59	2.2008	0.0186
60	2.2193	0.0185
61	2.2376	0.0183
62	2.2557	0.0181
63	2.2737	0.0180
64	2.2916	0.0179
65	2.3093	0.0177
66	2.3269	0.0176
67	2.3444	0.0174
68	2.3617	0.0173
69	2.3789	0.0172
70	2.3959	0.0171
71	2.4129	0.0169
72	2.4297	0.0168
73	2.4445	0.0148
74	2.4593	0.0147
75	2.4739	0.0146
76	2.4884	0.0145
77	2.5028	0.0144
78	2.5171	0.0143
79	2.5313	0.0142
80	2.5453	0.0141
81	2.5593	0.0140
82	2.5732	0.0139
83	2.5870	0.0138
84	2.6007	0.0137
85	2.6144	0.0136
86	2.6279	0.0135
87	2.6413	0.0134
88	2.6547	0.0134
89	2.6680	0.0133
90	2.6812	0.0132
91	2.6943	0.0131
92	2.7073	0.0130
93	2.7202	0.0129
94	2.7331	0.0129
95	2.7459	0.0128
96	2.7586	0.0127
97	2.7713	0.0126
98	2.7838	0.0126
99	2.7963	0.0125
100	2.8088	0.0124
101	2.8211	0.0124
102	2.8334	0.0123
103	2.8456	0.0122
104	2.8578	0.0122
105	2.8699	0.0121
106	2.8819	0.0120
107	2.8939	0.0120
108	2.9058	0.0119
109	2.9176	0.0118
110	2.9294	0.0118

111	2.9412	0.0117
112	2.9528	0.0117
113	2.9644	0.0116
114	2.9760	0.0115
115	2.9875	0.0115
116	2.9989	0.0114
117	3.0103	0.0114
118	3.0216	0.0113
119	3.0329	0.0113
120	3.0441	0.0112
121	3.0553	0.0112
122	3.0664	0.0111
123	3.0775	0.0111
124	3.0885	0.0110
125	3.0994	0.0110
126	3.1104	0.0109
127	3.1212	0.0109
128	3.1321	0.0108
129	3.1428	0.0108
130	3.1536	0.0107
131	3.1642	0.0107
132	3.1749	0.0106
133	3.1855	0.0106
134	3.1960	0.0105
135	3.2065	0.0105
136	3.2170	0.0105
137	3.2274	0.0104
138	3.2378	0.0104
139	3.2481	0.0103
140	3.2584	0.0103
141	3.2687	0.0103
142	3.2789	0.0102
143	3.2890	0.0102
144	3.2992	0.0101
145	3.3093	0.0101
146	3.3193	0.0101
147	3.3293	0.0100
148	3.3393	0.0100
149	3.3492	0.0099
150	3.3591	0.0099
151	3.3690	0.0099
152	3.3788	0.0098
153	3.3886	0.0098
154	3.3984	0.0098
155	3.4081	0.0097
156	3.4178	0.0097
157	3.4274	0.0097
158	3.4371	0.0096
159	3.4466	0.0096
160	3.4562	0.0095
161	3.4657	0.0095
162	3.4752	0.0095
163	3.4846	0.0095
164	3.4941	0.0094
165	3.5035	0.0094
166	3.5128	0.0094
167	3.5221	0.0093

168	3.5314	0.0093
169	3.5407	0.0093
170	3.5499	0.0092
171	3.5591	0.0092
172	3.5683	0.0092
173	3.5774	0.0091
174	3.5865	0.0091
175	3.5956	0.0091
176	3.6047	0.0091
177	3.6137	0.0090
178	3.6227	0.0090
179	3.6317	0.0090
180	3.6406	0.0089
181	3.6495	0.0089
182	3.6584	0.0089
183	3.6673	0.0089
184	3.6761	0.0088
185	3.6849	0.0088
186	3.6937	0.0088
187	3.7024	0.0088
188	3.7111	0.0087
189	3.7198	0.0087
190	3.7285	0.0087
191	3.7372	0.0086
192	3.7458	0.0086
193	3.7544	0.0086
194	3.7630	0.0086
195	3.7715	0.0085
196	3.7800	0.0085
197	3.7885	0.0085
198	3.7970	0.0085
199	3.8055	0.0085
200	3.8139	0.0084
201	3.8223	0.0084
202	3.8307	0.0084
203	3.8390	0.0084
204	3.8474	0.0083
205	3.8557	0.0083
206	3.8640	0.0083
207	3.8722	0.0083
208	3.8805	0.0082
209	3.8887	0.0082
210	3.8969	0.0082
211	3.9051	0.0082
212	3.9132	0.0082
213	3.9214	0.0081
214	3.9295	0.0081
215	3.9376	0.0081
216	3.9456	0.0081
217	3.9537	0.0081
218	3.9617	0.0080
219	3.9697	0.0080
220	3.9777	0.0080
221	3.9857	0.0080
222	3.9936	0.0079
223	4.0016	0.0079
224	4.0095	0.0079

225	4.0174	0.0079
226	4.0252	0.0079
227	4.0331	0.0079
228	4.0409	0.0078
229	4.0487	0.0078
230	4.0565	0.0078
231	4.0643	0.0078
232	4.0721	0.0078
233	4.0798	0.0077
234	4.0875	0.0077
235	4.0952	0.0077
236	4.1029	0.0077
237	4.1106	0.0077
238	4.1182	0.0076
239	4.1258	0.0076
240	4.1334	0.0076
241	4.1410	0.0076
242	4.1486	0.0076
243	4.1562	0.0076
244	4.1637	0.0075
245	4.1712	0.0075
246	4.1787	0.0075
247	4.1862	0.0075
248	4.1937	0.0075
249	4.2011	0.0075
250	4.2086	0.0074
251	4.2160	0.0074
252	4.2234	0.0074
253	4.2308	0.0074
254	4.2382	0.0074
255	4.2455	0.0074
256	4.2529	0.0073
257	4.2602	0.0073
258	4.2675	0.0073
259	4.2748	0.0073
260	4.2821	0.0073
261	4.2893	0.0073
262	4.2966	0.0072
263	4.3038	0.0072
264	4.3110	0.0072
265	4.3182	0.0072
266	4.3254	0.0072
267	4.3326	0.0072
268	4.3397	0.0072
269	4.3469	0.0071
270	4.3540	0.0071
271	4.3611	0.0071
272	4.3682	0.0071
273	4.3753	0.0071
274	4.3823	0.0071
275	4.3894	0.0071
276	4.3964	0.0070
277	4.4034	0.0070
278	4.4105	0.0070
279	4.4174	0.0070
280	4.4244	0.0070
281	4.4314	0.0070

282	4.4383	0.0070
283	4.4453	0.0069
284	4.4522	0.0069
285	4.4591	0.0069
286	4.4660	0.0069
287	4.4729	0.0069
288	4.4798	0.0069

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0069	0.0019	0.0049
2	0.0069	0.0019	0.0049
3	0.0069	0.0020	0.0050
4	0.0069	0.0020	0.0050
5	0.0070	0.0020	0.0050
6	0.0070	0.0020	0.0050
7	0.0070	0.0020	0.0050
8	0.0070	0.0020	0.0050
9	0.0070	0.0020	0.0050
10	0.0071	0.0020	0.0051
11	0.0071	0.0020	0.0051
12	0.0071	0.0020	0.0051
13	0.0071	0.0020	0.0051
14	0.0071	0.0020	0.0051
15	0.0072	0.0020	0.0051
16	0.0072	0.0020	0.0052
17	0.0072	0.0020	0.0052
18	0.0072	0.0020	0.0052
19	0.0073	0.0021	0.0052
20	0.0073	0.0021	0.0052
21	0.0073	0.0021	0.0052
22	0.0073	0.0021	0.0053
23	0.0074	0.0021	0.0053
24	0.0074	0.0021	0.0053
25	0.0074	0.0021	0.0053
26	0.0074	0.0021	0.0053
27	0.0075	0.0021	0.0053
28	0.0075	0.0021	0.0054
29	0.0075	0.0021	0.0054
30	0.0075	0.0021	0.0054
31	0.0076	0.0021	0.0054
32	0.0076	0.0021	0.0054
33	0.0076	0.0022	0.0055
34	0.0076	0.0022	0.0055
35	0.0077	0.0022	0.0055
36	0.0077	0.0022	0.0055
37	0.0077	0.0022	0.0055
38	0.0077	0.0022	0.0055
39	0.0078	0.0022	0.0056
40	0.0078	0.0022	0.0056
41	0.0078	0.0022	0.0056
42	0.0079	0.0022	0.0056
43	0.0079	0.0022	0.0057
44	0.0079	0.0022	0.0057
45	0.0079	0.0022	0.0057

46	0.0080	0.0023	0.0057
47	0.0080	0.0023	0.0057
48	0.0080	0.0023	0.0058
49	0.0081	0.0023	0.0058
50	0.0081	0.0023	0.0058
51	0.0081	0.0023	0.0058
52	0.0082	0.0023	0.0059
53	0.0082	0.0023	0.0059
54	0.0082	0.0023	0.0059
55	0.0083	0.0023	0.0059
56	0.0083	0.0023	0.0059
57	0.0083	0.0024	0.0060
58	0.0084	0.0024	0.0060
59	0.0084	0.0024	0.0060
60	0.0084	0.0024	0.0060
61	0.0085	0.0024	0.0061
62	0.0085	0.0024	0.0061
63	0.0085	0.0024	0.0061
64	0.0086	0.0024	0.0061
65	0.0086	0.0024	0.0062
66	0.0086	0.0024	0.0062
67	0.0087	0.0025	0.0062
68	0.0087	0.0025	0.0063
69	0.0088	0.0025	0.0063
70	0.0088	0.0025	0.0063
71	0.0089	0.0025	0.0064
72	0.0089	0.0025	0.0064
73	0.0089	0.0025	0.0064
74	0.0090	0.0025	0.0064
75	0.0090	0.0026	0.0065
76	0.0091	0.0026	0.0065
77	0.0091	0.0026	0.0065
78	0.0091	0.0026	0.0066
79	0.0092	0.0026	0.0066
80	0.0092	0.0026	0.0066
81	0.0093	0.0026	0.0067
82	0.0093	0.0026	0.0067
83	0.0094	0.0027	0.0067
84	0.0094	0.0027	0.0068
85	0.0095	0.0027	0.0068
86	0.0095	0.0027	0.0068
87	0.0096	0.0027	0.0069
88	0.0096	0.0027	0.0069
89	0.0097	0.0027	0.0069
90	0.0097	0.0027	0.0070
91	0.0098	0.0028	0.0070
92	0.0098	0.0028	0.0070
93	0.0099	0.0028	0.0071
94	0.0099	0.0028	0.0071
95	0.0100	0.0028	0.0072
96	0.0101	0.0028	0.0072
97	0.0101	0.0029	0.0073
98	0.0102	0.0029	0.0073
99	0.0103	0.0029	0.0074
100	0.0103	0.0029	0.0074
101	0.0104	0.0029	0.0074
102	0.0104	0.0029	0.0075

103	0.0105	0.0030	0.0075
104	0.0105	0.0030	0.0076
105	0.0106	0.0030	0.0076
106	0.0107	0.0030	0.0077
107	0.0108	0.0030	0.0077
108	0.0108	0.0031	0.0078
109	0.0109	0.0031	0.0078
110	0.0110	0.0031	0.0079
111	0.0111	0.0031	0.0079
112	0.0111	0.0031	0.0080
113	0.0112	0.0032	0.0080
114	0.0113	0.0032	0.0081
115	0.0114	0.0032	0.0082
116	0.0114	0.0032	0.0082
117	0.0115	0.0033	0.0083
118	0.0116	0.0033	0.0083
119	0.0117	0.0033	0.0084
120	0.0118	0.0033	0.0085
121	0.0119	0.0034	0.0085
122	0.0120	0.0034	0.0086
123	0.0121	0.0034	0.0087
124	0.0122	0.0034	0.0087
125	0.0123	0.0035	0.0088
126	0.0124	0.0035	0.0089
127	0.0125	0.0035	0.0090
128	0.0126	0.0036	0.0090
129	0.0127	0.0036	0.0091
130	0.0128	0.0036	0.0092
131	0.0129	0.0037	0.0093
132	0.0130	0.0037	0.0093
133	0.0132	0.0037	0.0095
134	0.0133	0.0038	0.0095
135	0.0134	0.0038	0.0096
136	0.0135	0.0038	0.0097
137	0.0137	0.0039	0.0098
138	0.0138	0.0039	0.0099
139	0.0140	0.0040	0.0100
140	0.0141	0.0040	0.0101
141	0.0143	0.0040	0.0103
142	0.0144	0.0041	0.0103
143	0.0146	0.0041	0.0105
144	0.0147	0.0042	0.0106
145	0.0168	0.0048	0.0121
146	0.0169	0.0048	0.0122
147	0.0172	0.0049	0.0123
148	0.0173	0.0049	0.0124
149	0.0176	0.0050	0.0126
150	0.0177	0.0050	0.0127
151	0.0180	0.0051	0.0129
152	0.0181	0.0051	0.0130
153	0.0185	0.0052	0.0132
154	0.0186	0.0053	0.0133
155	0.0189	0.0054	0.0136
156	0.0191	0.0054	0.0137
157	0.0195	0.0055	0.0140
158	0.0197	0.0056	0.0141
159	0.0200	0.0057	0.0144

160	0.0202	0.0057	0.0145
161	0.0207	0.0058	0.0148
162	0.0209	0.0059	0.0150
163	0.0214	0.0060	0.0153
164	0.0216	0.0061	0.0155
165	0.0221	0.0063	0.0159
166	0.0224	0.0063	0.0161
167	0.0230	0.0065	0.0165
168	0.0233	0.0066	0.0167
169	0.0240	0.0068	0.0172
170	0.0243	0.0069	0.0175
171	0.0251	0.0071	0.0180
172	0.0255	0.0072	0.0183
173	0.0263	0.0074	0.0189
174	0.0268	0.0076	0.0192
175	0.0278	0.0079	0.0199
176	0.0283	0.0080	0.0203
177	0.0295	0.0083	0.0212
178	0.0302	0.0085	0.0216
179	0.0316	0.0089	0.0227
180	0.0324	0.0092	0.0232
181	0.0342	0.0097	0.0245
182	0.0352	0.0100	0.0253
183	0.0376	0.0106	0.0270
184	0.0390	0.0110	0.0280
185	0.0341	0.0096	0.0244
186	0.0360	0.0102	0.0258
187	0.0409	0.0116	0.0293
188	0.0441	0.0125	0.0316
189	0.0531	0.0150	0.0381
190	0.0599	0.0169	0.0430
191	0.0857	0.0198	0.0659
192	0.1178	0.0198	0.0980
193	0.3687	0.0198	0.3489
194	0.0698	0.0197	0.0500
195	0.0480	0.0136	0.0344
196	0.0382	0.0108	0.0274
197	0.0405	0.0115	0.0291
198	0.0364	0.0103	0.0261
199	0.0333	0.0094	0.0239
200	0.0309	0.0087	0.0221
201	0.0289	0.0082	0.0207
202	0.0273	0.0077	0.0196
203	0.0259	0.0073	0.0186
204	0.0247	0.0070	0.0177
205	0.0236	0.0067	0.0169
206	0.0227	0.0064	0.0163
207	0.0219	0.0062	0.0157
208	0.0211	0.0060	0.0151
209	0.0205	0.0058	0.0147
210	0.0198	0.0056	0.0142
211	0.0193	0.0055	0.0138
212	0.0188	0.0053	0.0135
213	0.0183	0.0052	0.0131
214	0.0179	0.0050	0.0128
215	0.0174	0.0049	0.0125
216	0.0171	0.0048	0.0122

217	0.0148	0.0042	0.0106
218	0.0145	0.0041	0.0104
219	0.0142	0.0040	0.0102
220	0.0139	0.0039	0.0100
221	0.0136	0.0039	0.0098
222	0.0134	0.0038	0.0096
223	0.0131	0.0037	0.0094
224	0.0129	0.0036	0.0092
225	0.0126	0.0036	0.0091
226	0.0124	0.0035	0.0089
227	0.0122	0.0035	0.0088
228	0.0120	0.0034	0.0086
229	0.0118	0.0033	0.0085
230	0.0117	0.0033	0.0084
231	0.0115	0.0032	0.0082
232	0.0113	0.0032	0.0081
233	0.0112	0.0032	0.0080
234	0.0110	0.0031	0.0079
235	0.0109	0.0031	0.0078
236	0.0107	0.0030	0.0077
237	0.0106	0.0030	0.0076
238	0.0105	0.0030	0.0075
239	0.0103	0.0029	0.0074
240	0.0102	0.0029	0.0073
241	0.0101	0.0029	0.0072
242	0.0100	0.0028	0.0072
243	0.0099	0.0028	0.0071
244	0.0098	0.0028	0.0070
245	0.0097	0.0027	0.0069
246	0.0095	0.0027	0.0068
247	0.0095	0.0027	0.0068
248	0.0094	0.0026	0.0067
249	0.0093	0.0026	0.0066
250	0.0092	0.0026	0.0066
251	0.0091	0.0026	0.0065
252	0.0090	0.0025	0.0065
253	0.0089	0.0025	0.0064
254	0.0088	0.0025	0.0063
255	0.0088	0.0025	0.0063
256	0.0087	0.0025	0.0062
257	0.0086	0.0024	0.0062
258	0.0085	0.0024	0.0061
259	0.0085	0.0024	0.0061
260	0.0084	0.0024	0.0060
261	0.0083	0.0024	0.0060
262	0.0082	0.0023	0.0059
263	0.0082	0.0023	0.0059
264	0.0081	0.0023	0.0058
265	0.0081	0.0023	0.0058
266	0.0080	0.0023	0.0057
267	0.0079	0.0022	0.0057
268	0.0079	0.0022	0.0056
269	0.0078	0.0022	0.0056
270	0.0078	0.0022	0.0056
271	0.0077	0.0022	0.0055
272	0.0076	0.0022	0.0055
273	0.0076	0.0021	0.0054

274	0.0075	0.0021	0.0054
275	0.0075	0.0021	0.0054
276	0.0074	0.0021	0.0053
277	0.0074	0.0021	0.0053
278	0.0073	0.0021	0.0053
279	0.0073	0.0021	0.0052
280	0.0072	0.0020	0.0052
281	0.0072	0.0020	0.0052
282	0.0072	0.0020	0.0051
283	0.0071	0.0020	0.0051
284	0.0071	0.0020	0.0051
285	0.0070	0.0020	0.0050
286	0.0070	0.0020	0.0050
287	0.0069	0.0020	0.0050
288	0.0069	0.0020	0.0049

Total soil rain loss = 1.16(In)
Total effective rainfall = 3.32(In)
Peak flow rate in flood hydrograph = 80.84(CFS)

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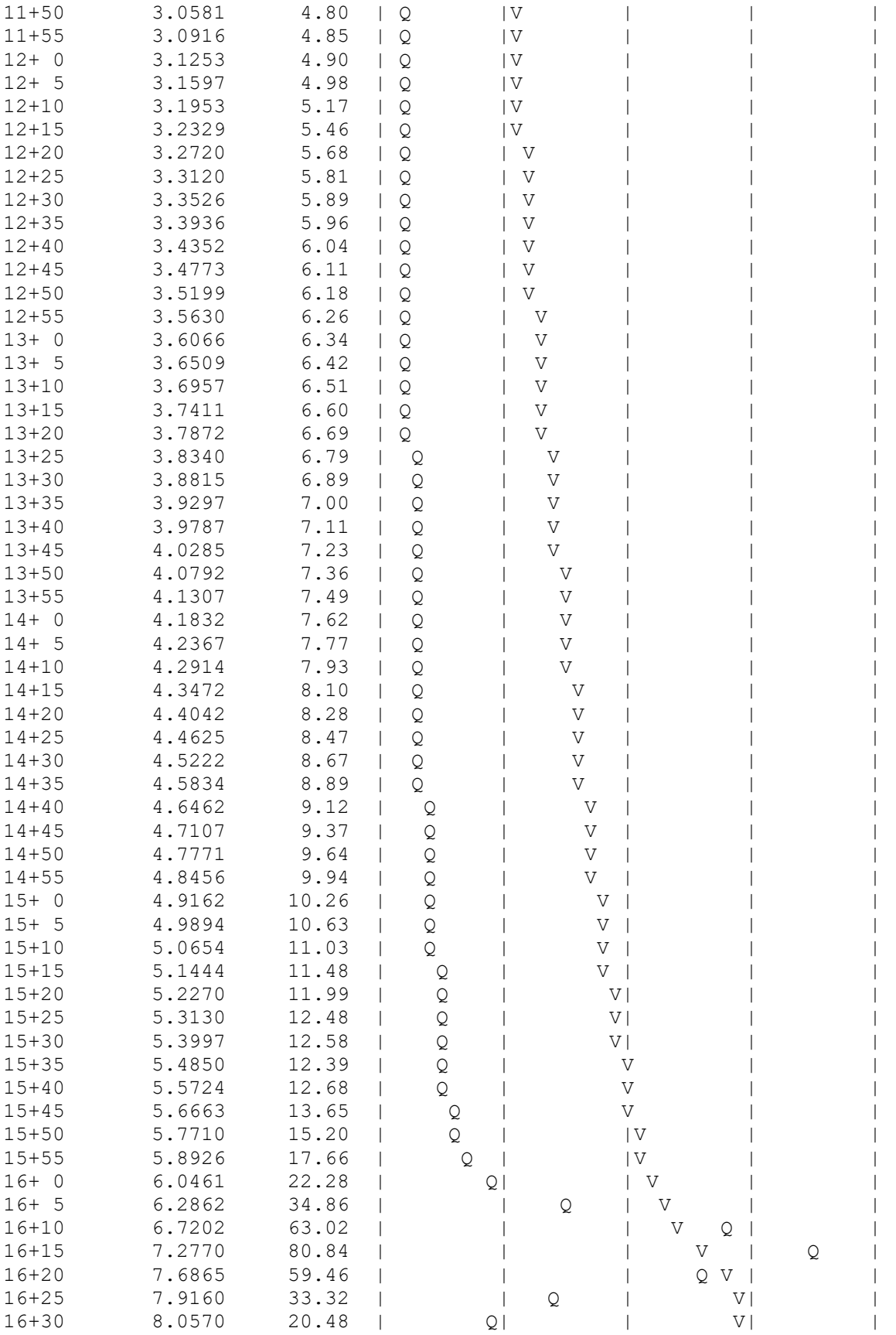
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	22.5	45.0	67.5	90.0
0+ 5	0.0006	0.09	Q				
0+10	0.0046	0.58	Q				
0+15	0.0144	1.43	Q				
0+20	0.0283	2.01	Q				
0+25	0.0437	2.25	Q				
0+30	0.0598	2.33	VQ				
0+35	0.0760	2.36	VQ				
0+40	0.0924	2.38	VQ				
0+45	0.1088	2.38	VQ				
0+50	0.1253	2.39	VQ				
0+55	0.1418	2.40	VQ				
1+ 0	0.1583	2.40	VQ				
1+ 5	0.1749	2.41	VQ				
1+10	0.1916	2.42	VQ				
1+15	0.2083	2.43	VQ				
1+20	0.2251	2.43	VQ				
1+25	0.2419	2.44	VQ				
1+30	0.2588	2.45	VQ				
1+35	0.2757	2.46	|Q				
1+40	0.2927	2.47	|Q				
1+45	0.3097	2.47	|Q				
1+50	0.3268	2.48	|Q				
1+55	0.3439	2.49	|Q				
2+ 0	0.3611	2.50	|Q				
2+ 5	0.3784	2.51	|Q				
2+10	0.3957	2.51	|Q				
2+15	0.4131	2.52	|Q				

2+20	0.4305	2.53	|Q	|	|	|	|
2+25	0.4480	2.54	|Q	|	|	|	|
2+30	0.4655	2.55	|Q	|	|	|	|
2+35	0.4831	2.56	|Q	|	|	|	|
2+40	0.5008	2.56	|Q	|	|	|	|
2+45	0.5185	2.57	|Q	|	|	|	|
2+50	0.5363	2.58	|Q	|	|	|	|
2+55	0.5541	2.59	|QV	|	|	|	|
3+ 0	0.5721	2.60	|QV	|	|	|	|
3+ 5	0.5900	2.61	|QV	|	|	|	|
3+10	0.6081	2.62	|QV	|	|	|	|
3+15	0.6262	2.63	|QV	|	|	|	|
3+20	0.6443	2.64	|QV	|	|	|	|
3+25	0.6626	2.65	|QV	|	|	|	|
3+30	0.6809	2.66	|QV	|	|	|	|
3+35	0.6992	2.67	|QV	|	|	|	|
3+40	0.7177	2.68	|QV	|	|	|	|
3+45	0.7362	2.69	|QV	|	|	|	|
3+50	0.7547	2.70	|QV	|	|	|	|
3+55	0.7734	2.71	|QV	|	|	|	|
4+ 0	0.7921	2.72	|QV	|	|	|	|
4+ 5	0.8109	2.73	|QV	|	|	|	|
4+10	0.8297	2.74	|Q V	|	|	|	|
4+15	0.8487	2.75	|Q V	|	|	|	|
4+20	0.8677	2.76	|Q V	|	|	|	|
4+25	0.8868	2.77	|Q V	|	|	|	|
4+30	0.9059	2.78	|Q V	|	|	|	|
4+35	0.9251	2.79	|Q V	|	|	|	|
4+40	0.9444	2.80	|Q V	|	|	|	|
4+45	0.9638	2.81	|Q V	|	|	|	|
4+50	0.9833	2.83	|Q V	|	|	|	|
4+55	1.0028	2.84	|Q V	|	|	|	|
5+ 0	1.0225	2.85	|Q V	|	|	|	|
5+ 5	1.0422	2.86	|Q V	|	|	|	|
5+10	1.0620	2.87	|Q V	|	|	|	|
5+15	1.0818	2.89	|Q V	|	|	|	|
5+20	1.1018	2.90	|Q V	|	|	|	|
5+25	1.1218	2.91	|Q V	|	|	|	|
5+30	1.1420	2.92	|Q V	|	|	|	|
5+35	1.1622	2.94	|Q V	|	|	|	|
5+40	1.1825	2.95	|Q V	|	|	|	|
5+45	1.2029	2.96	|Q V	|	|	|	|
5+50	1.2234	2.97	|Q V	|	|	|	|
5+55	1.2439	2.99	|Q V	|	|	|	|
6+ 0	1.2646	3.00	|Q V	|	|	|	|
6+ 5	1.2854	3.02	|Q V	|	|	|	|
6+10	1.3062	3.03	|Q V	|	|	|	|
6+15	1.3272	3.04	|Q V	|	|	|	|
6+20	1.3482	3.06	|Q V	|	|	|	|
6+25	1.3694	3.07	|Q V	|	|	|	|
6+30	1.3907	3.09	|Q V	|	|	|	|
6+35	1.4120	3.10	|Q V	|	|	|	|
6+40	1.4335	3.12	|Q V	|	|	|	|
6+45	1.4550	3.13	|Q V	|	|	|	|
6+50	1.4767	3.15	|Q V	|	|	|	|
6+55	1.4985	3.16	|Q V	|	|	|	|
7+ 0	1.5204	3.18	|Q V	|	|	|	|

7+ 5	1.5424	3.19	|Q V |	|	|	|
7+10	1.5645	3.21	|Q V |	|	|	|
7+15	1.5867	3.23	|Q V |	|	|	|
7+20	1.6091	3.24	|Q V |	|	|	|
7+25	1.6315	3.26	|Q V |	|	|	|
7+30	1.6541	3.28	|Q V |	|	|	|
7+35	1.6768	3.30	|Q V |	|	|	|
7+40	1.6996	3.31	|Q V |	|	|	|
7+45	1.7226	3.33	|Q V |	|	|	|
7+50	1.7456	3.35	|Q V |	|	|	|
7+55	1.7688	3.37	|Q V |	|	|	|
8+ 0	1.7922	3.39	|Q V |	|	|	|
8+ 5	1.8156	3.41	|Q V |	|	|	|
8+10	1.8392	3.43	|Q V |	|	|	|
8+15	1.8630	3.45	|Q V |	|	|	|
8+20	1.8869	3.47	|Q V |	|	|	|
8+25	1.9109	3.49	|Q V |	|	|	|
8+30	1.9350	3.51	|Q V |	|	|	|
8+35	1.9593	3.53	|Q V |	|	|	|
8+40	1.9838	3.55	|Q V |	|	|	|
8+45	2.0084	3.57	|Q V |	|	|	|
8+50	2.0332	3.60	|Q V |	|	|	|
8+55	2.0581	3.62	|Q V |	|	|	|
9+ 0	2.0832	3.64	|Q V |	|	|	|
9+ 5	2.1084	3.66	|Q V |	|	|	|
9+10	2.1338	3.69	|Q V |	|	|	|
9+15	2.1594	3.71	|Q V |	|	|	|
9+20	2.1851	3.74	|Q V |	|	|	|
9+25	2.2110	3.76	|Q V |	|	|	|
9+30	2.2371	3.79	|Q V |	|	|	|
9+35	2.2634	3.82	|Q V |	|	|	|
9+40	2.2899	3.84	|Q V |	|	|	|
9+45	2.3165	3.87	|Q V |	|	|	|
9+50	2.3434	3.90	|Q V |	|	|	|
9+55	2.3704	3.93	|Q V |	|	|	|
10+ 0	2.3976	3.96	|Q V |	|	|	|
10+ 5	2.4251	3.99	|Q V |	|	|	|
10+10	2.4527	4.02	|Q V|	|	|	|
10+15	2.4806	4.05	|Q V|	|	|	|
10+20	2.5087	4.08	|Q V|	|	|	|
10+25	2.5370	4.11	|Q V|	|	|	|
10+30	2.5655	4.14	|Q V|	|	|	|
10+35	2.5943	4.18	|Q V|	|	|	|
10+40	2.6233	4.21	|Q V|	|	|	|
10+45	2.6526	4.25	|Q V|	|	|	|
10+50	2.6821	4.28	|Q V|	|	|	|
10+55	2.7119	4.32	|Q V|	|	|	|
11+ 0	2.7419	4.36	|Q V	|	|	|
11+ 5	2.7722	4.40	|Q V	|	|	|
11+10	2.8027	4.44	|Q V	|	|	|
11+15	2.8336	4.48	|Q V	|	|	|
11+20	2.8647	4.52	| Q V	|	|	|
11+25	2.8962	4.57	| Q V	|	|	|
11+30	2.9279	4.61	| Q V	|	|	|
11+35	2.9600	4.66	| Q V	|	|	|
11+40	2.9924	4.70	| Q |V	|	|	|
11+45	3.0251	4.75	| Q |V	|	|	|


11+50 3.0581 4.80
11+55 3.0916 4.85
12+ 0 3.1253 4.90
12+ 5 3.1597 4.98
12+10 3.1953 5.17
12+15 3.2329 5.46
12+20 3.2720 5.68
12+25 3.3120 5.81
12+30 3.3526 5.89
12+35 3.3936 5.96
12+40 3.4352 6.04
12+45 3.4773 6.11
12+50 3.5199 6.18
12+55 3.5630 6.26
13+ 0 3.6066 6.34
13+ 5 3.6509 6.42
13+10 3.6957 6.51
13+15 3.7411 6.60
13+20 3.7872 6.69
13+25 3.8340 6.79
13+30 3.8815 6.89
13+35 3.9297 7.00
13+40 3.9787 7.11
13+45 4.0285 7.23
13+50 4.0792 7.36
13+55 4.1307 7.49
14+ 0 4.1832 7.62
14+ 5 4.2367 7.77
14+10 4.2914 7.93
14+15 4.3472 8.10
14+20 4.4042 8.28
14+25 4.4625 8.47
14+30 4.5222 8.67
14+35 4.5834 8.89
14+40 4.6462 9.12
14+45 4.7107 9.37
14+50 4.7771 9.64
14+55 4.8456 9.94
15+ 0 4.9162 10.26
15+ 5 4.9894 10.63
15+10 5.0654 11.03
15+15 5.1444 11.48
15+20 5.2270 11.99
15+25 5.3130 12.48
15+30 5.3997 12.58
15+35 5.4850 12.39
15+40 5.5724 12.68
15+45 5.6663 13.65
15+50 5.7710 15.20
15+55 5.8926 17.66
16+ 0 6.0461 22.28
16+ 5 6.2862 34.86
16+10 6.7202 63.02
16+15 7.2770 80.84
16+20 7.6865 59.46
16+25 7.9160 33.32
16+30 8.0570 20.48

16+35	8.1627	15.34	| Q |	|	| V |
16+40	8.2553	13.45	| Q |	|	| V |
16+45	8.3365	11.79	| Q |	|	| V |
16+50	8.4115	10.89	| Q |	|	| V |
16+55	8.4814	10.15	| Q |	|	|V |
17+ 0	8.5471	9.55	| Q |	|	|V |
17+ 5	8.6093	9.03	| Q |	|	|V |
17+10	8.6685	8.59	| Q |	|	|V |
17+15	8.7250	8.20	| Q |	|	| V |
17+20	8.7791	7.86	| Q |	|	| V |
17+25	8.8312	7.57	| Q |	|	| V |
17+30	8.8815	7.30	| Q |	|	| V |
17+35	8.9302	7.06	| Q |	|	| V |
17+40	8.9773	6.85	| Q |	|	| V |
17+45	9.0231	6.65	| Q |	|	| V |
17+50	9.0677	6.47	| Q |	|	| V |
17+55	9.1111	6.30	| Q |	|	| V |
18+ 0	9.1534	6.15	| Q |	|	| V |
18+ 5	9.1946	5.98	| Q |	|	| V |
18+10	9.2339	5.71	| Q |	|	| V |
18+15	9.2708	5.36	| Q |	|	| V |
18+20	9.3058	5.08	| Q |	|	| V |
18+25	9.3396	4.91	| Q |	|	| V |
18+30	9.3726	4.78	| Q |	|	| V |
18+35	9.4048	4.68	| Q |	|	| V |
18+40	9.4364	4.59	| Q |	|	| V |
18+45	9.4674	4.50	| Q |	|	| V |
18+50	9.4978	4.42	|Q |	|	| V |
18+55	9.5277	4.34	|Q |	|	| V |
19+ 0	9.5571	4.27	|Q |	|	| V |
19+ 5	9.5860	4.19	|Q |	|	| V |
19+10	9.6144	4.13	|Q |	|	| V |
19+15	9.6424	4.06	|Q |	|	| V |
19+20	9.6699	4.00	|Q |	|	| V |
19+25	9.6971	3.94	|Q |	|	| V |
19+30	9.7238	3.88	|Q |	|	| V |
19+35	9.7502	3.83	|Q |	|	| V |
19+40	9.7762	3.78	|Q |	|	| V |
19+45	9.8019	3.73	|Q |	|	| V |
19+50	9.8272	3.68	|Q |	|	| V |
19+55	9.8522	3.63	|Q |	|	| V |
20+ 0	9.8769	3.58	|Q |	|	| V |
20+ 5	9.9012	3.54	|Q |	|	| V |
20+10	9.9253	3.50	|Q |	|	| V |
20+15	9.9491	3.46	|Q |	|	| V |
20+20	9.9727	3.42	|Q |	|	| V |
20+25	9.9959	3.38	|Q |	|	| V |
20+30	10.0189	3.34	|Q |	|	| V |
20+35	10.0417	3.30	|Q |	|	| V |
20+40	10.0642	3.27	|Q |	|	| V |
20+45	10.0865	3.24	|Q |	|	| V |
20+50	10.1085	3.20	|Q |	|	| V |
20+55	10.1304	3.17	|Q |	|	| V |
21+ 0	10.1520	3.14	|Q |	|	| V |
21+ 5	10.1734	3.11	|Q |	|	| V |
21+10	10.1946	3.08	|Q |	|	| V |
21+15	10.2156	3.05	|Q |	|	| V |

21+20	10.2364	3.02	|Q	|	|	|	V |
21+25	10.2570	2.99	|Q	|	|	|	V |
21+30	10.2775	2.97	|Q	|	|	|	V |
21+35	10.2977	2.94	|Q	|	|	|	V |
21+40	10.3178	2.92	|Q	|	|	|	V |
21+45	10.3377	2.89	|Q	|	|	|	V |
21+50	10.3575	2.87	|Q	|	|	|	V |
21+55	10.3770	2.84	|Q	|	|	|	V |
22+ 0	10.3965	2.82	|Q	|	|	|	V |
22+ 5	10.4157	2.80	|Q	|	|	|	V |
22+10	10.4349	2.78	|Q	|	|	|	V |
22+15	10.4538	2.75	|Q	|	|	|	V |
22+20	10.4726	2.73	|Q	|	|	|	V |
22+25	10.4913	2.71	|Q	|	|	|	V |
22+30	10.5098	2.69	|Q	|	|	|	V |
22+35	10.5282	2.67	|Q	|	|	|	V |
22+40	10.5465	2.65	|Q	|	|	|	V |
22+45	10.5646	2.63	|Q	|	|	|	V |
22+50	10.5826	2.61	|Q	|	|	|	V |
22+55	10.6005	2.60	|Q	|	|	|	V|
23+ 0	10.6183	2.58	|Q	|	|	|	V|
23+ 5	10.6359	2.56	|Q	|	|	|	V|
23+10	10.6534	2.54	|Q	|	|	|	V|
23+15	10.6708	2.53	|Q	|	|	|	V|
23+20	10.6881	2.51	|Q	|	|	|	V|
23+25	10.7053	2.49	|Q	|	|	|	V|
23+30	10.7223	2.48	|Q	|	|	|	V|
23+35	10.7393	2.46	|Q	|	|	|	V|
23+40	10.7561	2.45	|Q	|	|	|	V|
23+45	10.7729	2.43	|Q	|	|	|	V|
23+50	10.7895	2.42	|Q	|	|	|	V|
23+55	10.8060	2.40	|Q	|	|	|	V|
24+ 0	10.8225	2.39	|Q	|	|	|	V|
24+ 5	10.8382	2.28	|Q	|	|	|	V|
24+10	10.8504	1.78	Q	|	|	|	V|
24+15	10.8568	0.93	Q	|	|	|	V|
24+20	10.8592	0.34	Q	|	|	|	V|
24+25	10.8599	0.11	Q	|	|	|	V|
24+30	10.8601	0.03	Q	|	|	|	V|
24+35	10.8602	0.01	Q	|	|	|	V|

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

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Study date 04/22/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE PROPOSED CONDITION
10-YEAR STORM EVENT ANALYSIS

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		
39.51	1	0.81
Rainfall data for year 10		
39.51	6	2.02
Rainfall data for year 10		
39.51	24	3.71

++

******** 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)
32.0	32.0	39.51	1.000	0.978	0.243	0.238

Area-averaged adjusted loss rate Fm (In/Hr) = 0.238

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
9.60	0.243	32.0	32.0	18.55	0.000
29.91	0.757	98.0	98.0	0.20	0.937

Area-averaged catchment yield fraction, Y = 0.709
Area-averaged low loss fraction, Yb = 0.291
User entry of time of concentration = 0.188 (hours)
++
Watershed area = 39.51(Ac.)
Catchment Lag time = 0.150 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 55.3783
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.238(In/Hr)
Average low loss rate fraction (Yb) = 0.291 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.301(In)
Computed peak 30-minute rainfall = 0.616(In)
Specified peak 1-hour rainfall = 0.813(In)
Computed peak 3-hour rainfall = 1.421(In)
Specified peak 6-hour rainfall = 2.020(In)
Specified peak 24-hour rainfall = 3.710(In)

Rainfall depth area reduction factors:
Using a total area of 39.51(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.300(In)
30-minute factor = 0.998 Adjusted rainfall = 0.615(In)
1-hour factor = 0.998 Adjusted rainfall = 0.811(In)
3-hour factor = 1.000 Adjusted rainfall = 1.420(In)
6-hour factor = 1.000 Adjusted rainfall = 2.020(In)
24-hour factor = 1.000 Adjusted rainfall = 3.710(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 = 477.82 (CFS))	
1	5.577	26.650
2	35.992	145.331
3	76.647	194.256
4	93.421	80.153
5	98.160	22.642
6	99.282	5.364
7	100.000	3.429

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3003	0.3003
2	0.3963	0.0960
3	0.4661	0.0698
4	0.5229	0.0568
5	0.5717	0.0488
6	0.6150	0.0433
7	0.6541	0.0391
8	0.6900	0.0359
9	0.7233	0.0333
10	0.7544	0.0311
11	0.7837	0.0293
12	0.8115	0.0278
13	0.8453	0.0338
14	0.8778	0.0325
15	0.9092	0.0314
16	0.9396	0.0304
17	0.9690	0.0295
18	0.9977	0.0286
19	1.0255	0.0279
20	1.0527	0.0272
21	1.0792	0.0265
22	1.1051	0.0259
23	1.1304	0.0253
24	1.1551	0.0248
25	1.1794	0.0243
26	1.2032	0.0238
27	1.2266	0.0234
28	1.2495	0.0229
29	1.2721	0.0225
30	1.2942	0.0222
31	1.3160	0.0218
32	1.3375	0.0215
33	1.3586	0.0211
34	1.3794	0.0208
35	1.3999	0.0205
36	1.4202	0.0202
37	1.4401	0.0199
38	1.4597	0.0196
39	1.4791	0.0194
40	1.4983	0.0192
41	1.5172	0.0189
42	1.5359	0.0187
43	1.5544	0.0185
44	1.5726	0.0183
45	1.5907	0.0181
46	1.6085	0.0179
47	1.6262	0.0177
48	1.6437	0.0175
49	1.6610	0.0173
50	1.6782	0.0171
51	1.6951	0.0170
52	1.7119	0.0168
53	1.7286	0.0166
54	1.7451	0.0165

55	1.7614	0.0163
56	1.7776	0.0162
57	1.7937	0.0161
58	1.8096	0.0159
59	1.8254	0.0158
60	1.8410	0.0157
61	1.8566	0.0155
62	1.8720	0.0154
63	1.8873	0.0153
64	1.9024	0.0152
65	1.9175	0.0150
66	1.9324	0.0149
67	1.9472	0.0148
68	1.9619	0.0147
69	1.9765	0.0146
70	1.9910	0.0145
71	2.0054	0.0144
72	2.0198	0.0143
73	2.0320	0.0123
74	2.0442	0.0122
75	2.0562	0.0121
76	2.0682	0.0120
77	2.0801	0.0119
78	2.0919	0.0118
79	2.1036	0.0117
80	2.1153	0.0116
81	2.1268	0.0116
82	2.1383	0.0115
83	2.1497	0.0114
84	2.1610	0.0113
85	2.1723	0.0112
86	2.1834	0.0112
87	2.1945	0.0111
88	2.2056	0.0110
89	2.2165	0.0110
90	2.2274	0.0109
91	2.2382	0.0108
92	2.2490	0.0108
93	2.2597	0.0107
94	2.2703	0.0106
95	2.2809	0.0106
96	2.2914	0.0105
97	2.3018	0.0104
98	2.3122	0.0104
99	2.3225	0.0103
100	2.3328	0.0103
101	2.3430	0.0102
102	2.3531	0.0101
103	2.3632	0.0101
104	2.3732	0.0100
105	2.3832	0.0100
106	2.3931	0.0099
107	2.4030	0.0099
108	2.4128	0.0098
109	2.4226	0.0098
110	2.4323	0.0097
111	2.4420	0.0097

112	2.4516	0.0096
113	2.4612	0.0096
114	2.4707	0.0095
115	2.4802	0.0095
116	2.4897	0.0094
117	2.4991	0.0094
118	2.5084	0.0093
119	2.5177	0.0093
120	2.5270	0.0093
121	2.5362	0.0092
122	2.5453	0.0092
123	2.5545	0.0091
124	2.5636	0.0091
125	2.5726	0.0090
126	2.5816	0.0090
127	2.5906	0.0090
128	2.5995	0.0089
129	2.6084	0.0089
130	2.6172	0.0088
131	2.6261	0.0088
132	2.6348	0.0088
133	2.6436	0.0087
134	2.6523	0.0087
135	2.6609	0.0087
136	2.6695	0.0086
137	2.6781	0.0086
138	2.6867	0.0086
139	2.6952	0.0085
140	2.7037	0.0085
141	2.7122	0.0085
142	2.7206	0.0084
143	2.7290	0.0084
144	2.7373	0.0084
145	2.7456	0.0083
146	2.7539	0.0083
147	2.7622	0.0083
148	2.7704	0.0082
149	2.7786	0.0082
150	2.7868	0.0082
151	2.7949	0.0081
152	2.8030	0.0081
153	2.8111	0.0081
154	2.8191	0.0080
155	2.8271	0.0080
156	2.8351	0.0080
157	2.8431	0.0080
158	2.8510	0.0079
159	2.8589	0.0079
160	2.8668	0.0079
161	2.8746	0.0078
162	2.8824	0.0078
163	2.8902	0.0078
164	2.8980	0.0078
165	2.9057	0.0077
166	2.9134	0.0077
167	2.9211	0.0077
168	2.9288	0.0077

169	2.9364	0.0076
170	2.9440	0.0076
171	2.9516	0.0076
172	2.9592	0.0076
173	2.9667	0.0075
174	2.9742	0.0075
175	2.9817	0.0075
176	2.9892	0.0075
177	2.9966	0.0074
178	3.0040	0.0074
179	3.0114	0.0074
180	3.0188	0.0074
181	3.0261	0.0073
182	3.0334	0.0073
183	3.0407	0.0073
184	3.0480	0.0073
185	3.0553	0.0073
186	3.0625	0.0072
187	3.0697	0.0072
188	3.0769	0.0072
189	3.0841	0.0072
190	3.0912	0.0071
191	3.0983	0.0071
192	3.1054	0.0071
193	3.1125	0.0071
194	3.1196	0.0071
195	3.1266	0.0070
196	3.1336	0.0070
197	3.1406	0.0070
198	3.1476	0.0070
199	3.1546	0.0070
200	3.1615	0.0069
201	3.1685	0.0069
202	3.1754	0.0069
203	3.1822	0.0069
204	3.1891	0.0069
205	3.1960	0.0068
206	3.2028	0.0068
207	3.2096	0.0068
208	3.2164	0.0068
209	3.2232	0.0068
210	3.2299	0.0068
211	3.2366	0.0067
212	3.2434	0.0067
213	3.2501	0.0067
214	3.2567	0.0067
215	3.2634	0.0067
216	3.2701	0.0066
217	3.2767	0.0066
218	3.2833	0.0066
219	3.2899	0.0066
220	3.2965	0.0066
221	3.3030	0.0066
222	3.3096	0.0065
223	3.3161	0.0065
224	3.3226	0.0065
225	3.3291	0.0065

226	3.3356	0.0065
227	3.3421	0.0065
228	3.3485	0.0064
229	3.3550	0.0064
230	3.3614	0.0064
231	3.3678	0.0064
232	3.3742	0.0064
233	3.3805	0.0064
234	3.3869	0.0064
235	3.3932	0.0063
236	3.3996	0.0063
237	3.4059	0.0063
238	3.4122	0.0063
239	3.4185	0.0063
240	3.4247	0.0063
241	3.4310	0.0063
242	3.4372	0.0062
243	3.4434	0.0062
244	3.4496	0.0062
245	3.4558	0.0062
246	3.4620	0.0062
247	3.4682	0.0062
248	3.4743	0.0062
249	3.4805	0.0061
250	3.4866	0.0061
251	3.4927	0.0061
252	3.4988	0.0061
253	3.5049	0.0061
254	3.5109	0.0061
255	3.5170	0.0061
256	3.5230	0.0060
257	3.5291	0.0060
258	3.5351	0.0060
259	3.5411	0.0060
260	3.5471	0.0060
261	3.5531	0.0060
262	3.5590	0.0060
263	3.5650	0.0060
264	3.5709	0.0059
265	3.5768	0.0059
266	3.5828	0.0059
267	3.5887	0.0059
268	3.5945	0.0059
269	3.6004	0.0059
270	3.6063	0.0059
271	3.6121	0.0059
272	3.6180	0.0058
273	3.6238	0.0058
274	3.6296	0.0058
275	3.6354	0.0058
276	3.6412	0.0058
277	3.6470	0.0058
278	3.6528	0.0058
279	3.6585	0.0058
280	3.6643	0.0057
281	3.6700	0.0057
282	3.6757	0.0057

283	3.6814	0.0057
284	3.6871	0.0057
285	3.6928	0.0057
286	3.6985	0.0057
287	3.7042	0.0057
288	3.7098	0.0057

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0057	0.0016	0.0040
2	0.0057	0.0016	0.0040
3	0.0057	0.0017	0.0040
4	0.0057	0.0017	0.0040
5	0.0057	0.0017	0.0041
6	0.0057	0.0017	0.0041
7	0.0058	0.0017	0.0041
8	0.0058	0.0017	0.0041
9	0.0058	0.0017	0.0041
10	0.0058	0.0017	0.0041
11	0.0058	0.0017	0.0041
12	0.0058	0.0017	0.0041
13	0.0059	0.0017	0.0042
14	0.0059	0.0017	0.0042
15	0.0059	0.0017	0.0042
16	0.0059	0.0017	0.0042
17	0.0059	0.0017	0.0042
18	0.0060	0.0017	0.0042
19	0.0060	0.0017	0.0042
20	0.0060	0.0017	0.0042
21	0.0060	0.0017	0.0043
22	0.0060	0.0018	0.0043
23	0.0061	0.0018	0.0043
24	0.0061	0.0018	0.0043
25	0.0061	0.0018	0.0043
26	0.0061	0.0018	0.0043
27	0.0061	0.0018	0.0044
28	0.0062	0.0018	0.0044
29	0.0062	0.0018	0.0044
30	0.0062	0.0018	0.0044
31	0.0062	0.0018	0.0044
32	0.0062	0.0018	0.0044
33	0.0063	0.0018	0.0044
34	0.0063	0.0018	0.0045
35	0.0063	0.0018	0.0045
36	0.0063	0.0018	0.0045
37	0.0064	0.0018	0.0045
38	0.0064	0.0019	0.0045
39	0.0064	0.0019	0.0045
40	0.0064	0.0019	0.0046
41	0.0064	0.0019	0.0046
42	0.0065	0.0019	0.0046
43	0.0065	0.0019	0.0046
44	0.0065	0.0019	0.0046
45	0.0065	0.0019	0.0046
46	0.0066	0.0019	0.0047

47	0.0066	0.0019	0.0047
48	0.0066	0.0019	0.0047
49	0.0066	0.0019	0.0047
50	0.0067	0.0019	0.0047
51	0.0067	0.0019	0.0048
52	0.0067	0.0020	0.0048
53	0.0068	0.0020	0.0048
54	0.0068	0.0020	0.0048
55	0.0068	0.0020	0.0048
56	0.0068	0.0020	0.0048
57	0.0069	0.0020	0.0049
58	0.0069	0.0020	0.0049
59	0.0069	0.0020	0.0049
60	0.0069	0.0020	0.0049
61	0.0070	0.0020	0.0050
62	0.0070	0.0020	0.0050
63	0.0070	0.0020	0.0050
64	0.0071	0.0021	0.0050
65	0.0071	0.0021	0.0050
66	0.0071	0.0021	0.0051
67	0.0072	0.0021	0.0051
68	0.0072	0.0021	0.0051
69	0.0072	0.0021	0.0051
70	0.0073	0.0021	0.0051
71	0.0073	0.0021	0.0052
72	0.0073	0.0021	0.0052
73	0.0074	0.0021	0.0052
74	0.0074	0.0021	0.0052
75	0.0074	0.0022	0.0053
76	0.0075	0.0022	0.0053
77	0.0075	0.0022	0.0053
78	0.0075	0.0022	0.0053
79	0.0076	0.0022	0.0054
80	0.0076	0.0022	0.0054
81	0.0077	0.0022	0.0054
82	0.0077	0.0022	0.0055
83	0.0077	0.0022	0.0055
84	0.0078	0.0023	0.0055
85	0.0078	0.0023	0.0055
86	0.0078	0.0023	0.0056
87	0.0079	0.0023	0.0056
88	0.0079	0.0023	0.0056
89	0.0080	0.0023	0.0057
90	0.0080	0.0023	0.0057
91	0.0081	0.0023	0.0057
92	0.0081	0.0024	0.0057
93	0.0082	0.0024	0.0058
94	0.0082	0.0024	0.0058
95	0.0083	0.0024	0.0059
96	0.0083	0.0024	0.0059
97	0.0084	0.0024	0.0059
98	0.0084	0.0024	0.0059
99	0.0085	0.0025	0.0060
100	0.0085	0.0025	0.0060
101	0.0086	0.0025	0.0061
102	0.0086	0.0025	0.0061
103	0.0087	0.0025	0.0061

104	0.0087	0.0025	0.0062
105	0.0088	0.0026	0.0062
106	0.0088	0.0026	0.0062
107	0.0089	0.0026	0.0063
108	0.0089	0.0026	0.0063
109	0.0090	0.0026	0.0064
110	0.0090	0.0026	0.0064
111	0.0091	0.0027	0.0065
112	0.0092	0.0027	0.0065
113	0.0093	0.0027	0.0066
114	0.0093	0.0027	0.0066
115	0.0094	0.0027	0.0067
116	0.0094	0.0027	0.0067
117	0.0095	0.0028	0.0068
118	0.0096	0.0028	0.0068
119	0.0097	0.0028	0.0069
120	0.0097	0.0028	0.0069
121	0.0098	0.0029	0.0070
122	0.0099	0.0029	0.0070
123	0.0100	0.0029	0.0071
124	0.0100	0.0029	0.0071
125	0.0101	0.0030	0.0072
126	0.0102	0.0030	0.0072
127	0.0103	0.0030	0.0073
128	0.0104	0.0030	0.0074
129	0.0105	0.0031	0.0074
130	0.0106	0.0031	0.0075
131	0.0107	0.0031	0.0076
132	0.0108	0.0031	0.0076
133	0.0109	0.0032	0.0077
134	0.0110	0.0032	0.0078
135	0.0111	0.0032	0.0079
136	0.0112	0.0032	0.0079
137	0.0113	0.0033	0.0080
138	0.0114	0.0033	0.0081
139	0.0116	0.0034	0.0082
140	0.0116	0.0034	0.0083
141	0.0118	0.0034	0.0084
142	0.0119	0.0035	0.0084
143	0.0121	0.0035	0.0086
144	0.0122	0.0035	0.0086
145	0.0143	0.0042	0.0101
146	0.0144	0.0042	0.0102
147	0.0146	0.0042	0.0104
148	0.0147	0.0043	0.0104
149	0.0149	0.0043	0.0106
150	0.0150	0.0044	0.0107
151	0.0153	0.0044	0.0108
152	0.0154	0.0045	0.0109
153	0.0157	0.0046	0.0111
154	0.0158	0.0046	0.0112
155	0.0161	0.0047	0.0114
156	0.0162	0.0047	0.0115
157	0.0165	0.0048	0.0117
158	0.0166	0.0048	0.0118
159	0.0170	0.0049	0.0120
160	0.0171	0.0050	0.0122

161	0.0175	0.0051	0.0124
162	0.0177	0.0051	0.0125
163	0.0181	0.0053	0.0128
164	0.0183	0.0053	0.0130
165	0.0187	0.0054	0.0133
166	0.0189	0.0055	0.0134
167	0.0194	0.0056	0.0138
168	0.0196	0.0057	0.0139
169	0.0202	0.0059	0.0144
170	0.0205	0.0060	0.0146
171	0.0211	0.0061	0.0150
172	0.0215	0.0062	0.0152
173	0.0222	0.0064	0.0157
174	0.0225	0.0066	0.0160
175	0.0234	0.0068	0.0166
176	0.0238	0.0069	0.0169
177	0.0248	0.0072	0.0176
178	0.0253	0.0074	0.0179
179	0.0265	0.0077	0.0188
180	0.0272	0.0079	0.0193
181	0.0286	0.0083	0.0203
182	0.0295	0.0086	0.0209
183	0.0314	0.0091	0.0223
184	0.0325	0.0095	0.0231
185	0.0278	0.0081	0.0197
186	0.0293	0.0085	0.0208
187	0.0333	0.0097	0.0236
188	0.0359	0.0104	0.0255
189	0.0433	0.0126	0.0307
190	0.0488	0.0142	0.0346
191	0.0698	0.0198	0.0500
192	0.0960	0.0198	0.0762
193	0.3003	0.0198	0.2805
194	0.0568	0.0165	0.0403
195	0.0391	0.0114	0.0277
196	0.0311	0.0091	0.0221
197	0.0338	0.0098	0.0240
198	0.0304	0.0088	0.0216
199	0.0279	0.0081	0.0198
200	0.0259	0.0075	0.0184
201	0.0243	0.0071	0.0172
202	0.0229	0.0067	0.0163
203	0.0218	0.0063	0.0155
204	0.0208	0.0061	0.0148
205	0.0199	0.0058	0.0141
206	0.0192	0.0056	0.0136
207	0.0185	0.0054	0.0131
208	0.0179	0.0052	0.0127
209	0.0173	0.0050	0.0123
210	0.0168	0.0049	0.0119
211	0.0163	0.0048	0.0116
212	0.0159	0.0046	0.0113
213	0.0155	0.0045	0.0110
214	0.0152	0.0044	0.0108
215	0.0148	0.0043	0.0105
216	0.0145	0.0042	0.0103
217	0.0123	0.0036	0.0087

218	0.0120	0.0035	0.0085
219	0.0117	0.0034	0.0083
220	0.0115	0.0033	0.0081
221	0.0112	0.0033	0.0080
222	0.0110	0.0032	0.0078
223	0.0108	0.0031	0.0077
224	0.0106	0.0031	0.0075
225	0.0104	0.0030	0.0074
226	0.0103	0.0030	0.0073
227	0.0101	0.0029	0.0072
228	0.0099	0.0029	0.0070
229	0.0098	0.0028	0.0069
230	0.0096	0.0028	0.0068
231	0.0095	0.0028	0.0067
232	0.0093	0.0027	0.0066
233	0.0092	0.0027	0.0065
234	0.0091	0.0026	0.0064
235	0.0090	0.0026	0.0064
236	0.0088	0.0026	0.0063
237	0.0087	0.0025	0.0062
238	0.0086	0.0025	0.0061
239	0.0085	0.0025	0.0060
240	0.0084	0.0024	0.0060
241	0.0083	0.0024	0.0059
242	0.0082	0.0024	0.0058
243	0.0081	0.0024	0.0058
244	0.0080	0.0023	0.0057
245	0.0080	0.0023	0.0056
246	0.0079	0.0023	0.0056
247	0.0078	0.0023	0.0055
248	0.0077	0.0022	0.0055
249	0.0076	0.0022	0.0054
250	0.0076	0.0022	0.0054
251	0.0075	0.0022	0.0053
252	0.0074	0.0022	0.0053
253	0.0073	0.0021	0.0052
254	0.0073	0.0021	0.0052
255	0.0072	0.0021	0.0051
256	0.0071	0.0021	0.0051
257	0.0071	0.0021	0.0050
258	0.0070	0.0020	0.0050
259	0.0070	0.0020	0.0049
260	0.0069	0.0020	0.0049
261	0.0068	0.0020	0.0049
262	0.0068	0.0020	0.0048
263	0.0067	0.0020	0.0048
264	0.0067	0.0019	0.0047
265	0.0066	0.0019	0.0047
266	0.0066	0.0019	0.0047
267	0.0065	0.0019	0.0046
268	0.0065	0.0019	0.0046
269	0.0064	0.0019	0.0046
270	0.0064	0.0019	0.0045
271	0.0063	0.0018	0.0045
272	0.0063	0.0018	0.0045
273	0.0063	0.0018	0.0044
274	0.0062	0.0018	0.0044

275	0.0062	0.0018	0.0044
276	0.0061	0.0018	0.0043
277	0.0061	0.0018	0.0043
278	0.0060	0.0018	0.0043
279	0.0060	0.0017	0.0043
280	0.0060	0.0017	0.0042
281	0.0059	0.0017	0.0042
282	0.0059	0.0017	0.0042
283	0.0059	0.0017	0.0042
284	0.0058	0.0017	0.0041
285	0.0058	0.0017	0.0041
286	0.0057	0.0017	0.0041
287	0.0057	0.0017	0.0041
288	0.0057	0.0017	0.0040

Total soil rain loss = 1.00(In)
Total effective rainfall = 2.71(In)
Peak flow rate in flood hydrograph = 68.62(CFS)

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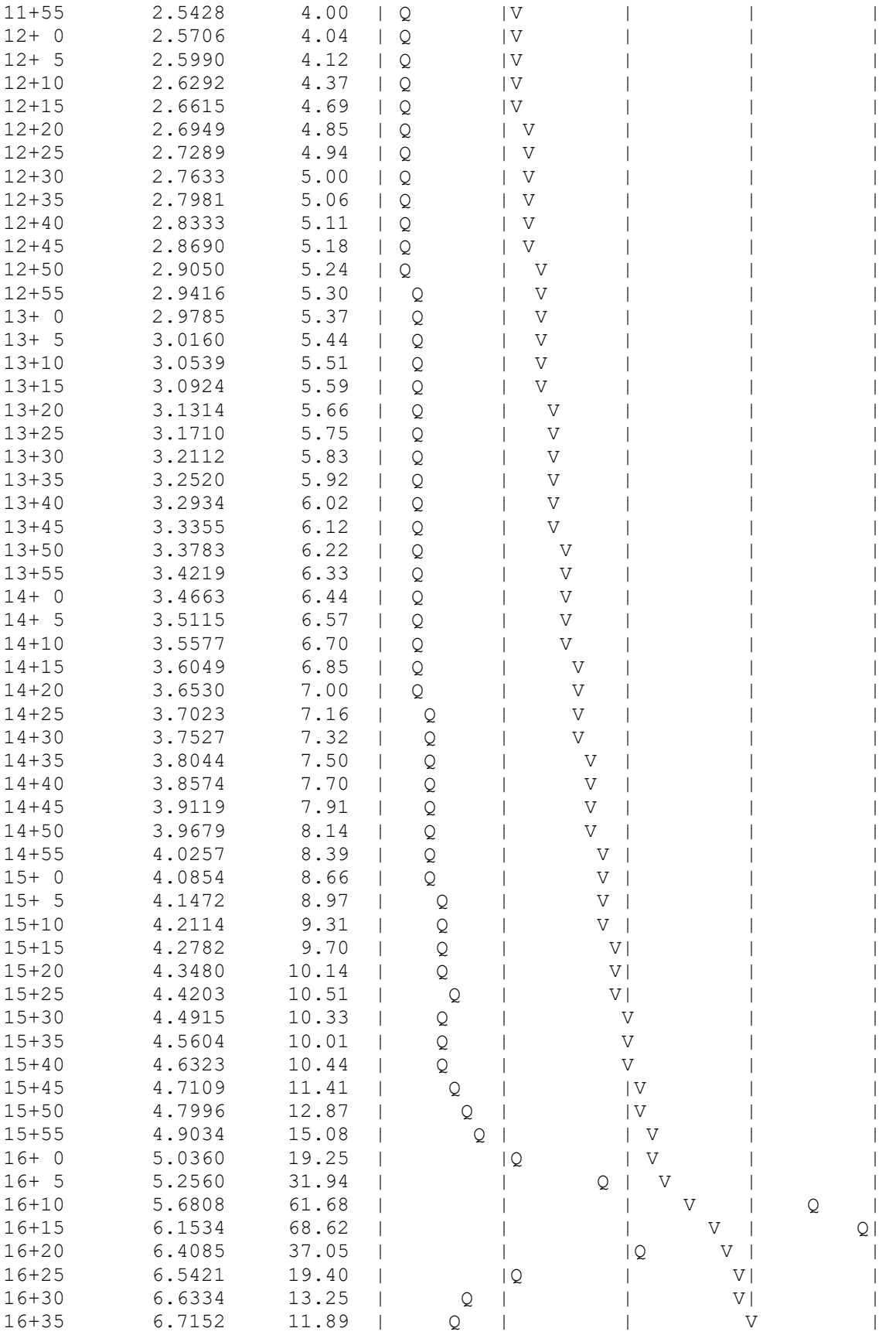
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	17.5	35.0	52.5	70.0
0+ 5	0.0007	0.11	Q				
0+10	0.0055	0.69	Q				
0+15	0.0156	1.47	Q				
0+20	0.0280	1.80	VQ				
0+25	0.0410	1.89	VQ				
0+30	0.0542	1.92	VQ				
0+35	0.0676	1.94	VQ				
0+40	0.0810	1.94	VQ				
0+45	0.0944	1.95	VQ				
0+50	0.1079	1.96	VQ				
0+55	0.1214	1.96	VQ				
1+ 0	0.1350	1.97	VQ				
1+ 5	0.1486	1.97	VQ				
1+10	0.1622	1.98	VQ				
1+15	0.1759	1.99	VQ				
1+20	0.1896	1.99	VQ				
1+25	0.2034	2.00	VQ				
1+30	0.2172	2.01	VQ				
1+35	0.2311	2.01	|Q				
1+40	0.2450	2.02	|Q				
1+45	0.2589	2.03	|Q				
1+50	0.2729	2.03	|Q				
1+55	0.2869	2.04	|Q				
2+ 0	0.3010	2.04	|Q				
2+ 5	0.3151	2.05	|Q				
2+10	0.3293	2.06	|Q				
2+15	0.3435	2.07	|Q				
2+20	0.3578	2.07	|Q				

2+25	0.3721	2.08	|Q	|	|	|	|
2+30	0.3865	2.09	|Q	|	|	|	|
2+35	0.4009	2.09	|Q	|	|	|	|
2+40	0.4154	2.10	|Q	|	|	|	|
2+45	0.4299	2.11	|Q	|	|	|	|
2+50	0.4445	2.12	|Q	|	|	|	|
2+55	0.4591	2.12	|QV	|	|	|	|
3+ 0	0.4738	2.13	|QV	|	|	|	|
3+ 5	0.4885	2.14	|QV	|	|	|	|
3+10	0.5033	2.15	|QV	|	|	|	|
3+15	0.5181	2.15	|QV	|	|	|	|
3+20	0.5330	2.16	|QV	|	|	|	|
3+25	0.5479	2.17	|QV	|	|	|	|
3+30	0.5629	2.18	|QV	|	|	|	|
3+35	0.5780	2.19	|QV	|	|	|	|
3+40	0.5931	2.19	|QV	|	|	|	|
3+45	0.6082	2.20	|QV	|	|	|	|
3+50	0.6234	2.21	|QV	|	|	|	|
3+55	0.6387	2.22	|QV	|	|	|	|
4+ 0	0.6541	2.23	|QV	|	|	|	|
4+ 5	0.6695	2.24	|Q V	|	|	|	|
4+10	0.6849	2.24	|Q V	|	|	|	|
4+15	0.7004	2.25	|Q V	|	|	|	|
4+20	0.7160	2.26	|Q V	|	|	|	|
4+25	0.7316	2.27	|Q V	|	|	|	|
4+30	0.7473	2.28	|Q V	|	|	|	|
4+35	0.7631	2.29	|Q V	|	|	|	|
4+40	0.7789	2.30	|Q V	|	|	|	|
4+45	0.7948	2.31	|Q V	|	|	|	|
4+50	0.8107	2.32	|Q V	|	|	|	|
4+55	0.8268	2.33	|Q V	|	|	|	|
5+ 0	0.8429	2.34	|Q V	|	|	|	|
5+ 5	0.8590	2.35	|Q V	|	|	|	|
5+10	0.8752	2.36	|Q V	|	|	|	|
5+15	0.8915	2.37	|Q V	|	|	|	|
5+20	0.9079	2.38	|Q V	|	|	|	|
5+25	0.9243	2.39	|Q V	|	|	|	|
5+30	0.9408	2.40	|Q V	|	|	|	|
5+35	0.9574	2.41	|Q V	|	|	|	|
5+40	0.9740	2.42	|Q V	|	|	|	|
5+45	0.9908	2.43	|Q V	|	|	|	|
5+50	1.0076	2.44	|Q V	|	|	|	|
5+55	1.0244	2.45	|Q V	|	|	|	|
6+ 0	1.0414	2.46	|Q V	|	|	|	|
6+ 5	1.0584	2.47	|Q V	|	|	|	|
6+10	1.0755	2.48	|Q V	|	|	|	|
6+15	1.0927	2.50	|Q V	|	|	|	|
6+20	1.1100	2.51	|Q V	|	|	|	|
6+25	1.1273	2.52	|Q V	|	|	|	|
6+30	1.1448	2.53	|Q V	|	|	|	|
6+35	1.1623	2.54	|Q V	|	|	|	|
6+40	1.1799	2.56	|Q V	|	|	|	|
6+45	1.1976	2.57	|Q V	|	|	|	|
6+50	1.2154	2.58	|Q V	|	|	|	|
6+55	1.2332	2.59	|Q V	|	|	|	|
7+ 0	1.2512	2.61	|Q V	|	|	|	|
7+ 5	1.2692	2.62	|Q V	|	|	|	|

7+10	1.2874	2.63	|Q V |	|	|	|
7+15	1.3056	2.65	|Q V |	|	|	|
7+20	1.3240	2.66	|Q V |	|	|	|
7+25	1.3424	2.68	|Q V |	|	|	|
7+30	1.3609	2.69	|Q V |	|	|	|
7+35	1.3796	2.71	|Q V |	|	|	|
7+40	1.3983	2.72	|Q V |	|	|	|
7+45	1.4171	2.73	|Q V |	|	|	|
7+50	1.4361	2.75	|Q V |	|	|	|
7+55	1.4551	2.77	|Q V |	|	|	|
8+ 0	1.4743	2.78	|Q V |	|	|	|
8+ 5	1.4935	2.80	|Q V |	|	|	|
8+10	1.5129	2.81	|Q V |	|	|	|
8+15	1.5324	2.83	|Q V |	|	|	|
8+20	1.5520	2.85	|Q V |	|	|	|
8+25	1.5717	2.86	|Q V |	|	|	|
8+30	1.5915	2.88	|Q V |	|	|	|
8+35	1.6115	2.90	|Q V |	|	|	|
8+40	1.6316	2.92	|Q V |	|	|	|
8+45	1.6518	2.93	|Q V |	|	|	|
8+50	1.6721	2.95	|Q V |	|	|	|
8+55	1.6926	2.97	|Q V |	|	|	|
9+ 0	1.7132	2.99	|Q V |	|	|	|
9+ 5	1.7339	3.01	|Q V |	|	|	|
9+10	1.7548	3.03	|Q V |	|	|	|
9+15	1.7758	3.05	|Q V |	|	|	|
9+20	1.7970	3.07	|Q V |	|	|	|
9+25	1.8183	3.09	|Q V |	|	|	|
9+30	1.8397	3.11	|Q V |	|	|	|
9+35	1.8613	3.14	|Q V |	|	|	|
9+40	1.8831	3.16	|Q V |	|	|	|
9+45	1.9050	3.18	|Q V |	|	|	|
9+50	1.9270	3.20	|Q V |	|	|	|
9+55	1.9493	3.23	|Q V |	|	|	|
10+ 0	1.9717	3.25	|Q V |	|	|	|
10+ 5	1.9942	3.28	|Q V |	|	|	|
10+10	2.0170	3.30	|Q V|	|	|	|
10+15	2.0399	3.33	|Q V|	|	|	|
10+20	2.0630	3.35	|Q V|	|	|	|
10+25	2.0863	3.38	|Q V|	|	|	|
10+30	2.1097	3.41	|Q V|	|	|	|
10+35	2.1334	3.44	|Q V|	|	|	|
10+40	2.1573	3.47	|Q V|	|	|	|
10+45	2.1813	3.50	|Q V|	|	|	|
10+50	2.2056	3.52	| Q V|	|	|	|
10+55	2.2301	3.56	| Q V	|	|	|
11+ 0	2.2548	3.59	| Q V	|	|	|
11+ 5	2.2798	3.62	| Q V	|	|	|
11+10	2.3049	3.65	| Q V	|	|	|
11+15	2.3303	3.69	| Q V	|	|	|
11+20	2.3560	3.72	| Q V	|	|	|
11+25	2.3818	3.76	| Q V	|	|	|
11+30	2.4080	3.80	| Q V	|	|	|
11+35	2.4344	3.83	| Q V	|	|	|
11+40	2.4611	3.87	| Q |V	|	|	|
11+45	2.4880	3.91	| Q |V	|	|	|
11+50	2.5153	3.96	| Q |V	|	|	|



16+40	6.7859	10.25	Q		V	
16+45	6.8509	9.45	Q		V	
16+50	6.9114	8.78	Q		V	
16+55	6.9681	8.24	Q		V	
17+ 0	7.0217	7.78	Q		V	
17+ 5	7.0725	7.39	Q		V	
17+10	7.1210	7.05	Q		V	
17+15	7.1675	6.75	Q		V	
17+20	7.2122	6.48	Q		V	
17+25	7.2552	6.25	Q		V	
17+30	7.2969	6.05	Q		V	
17+35	7.3372	5.86	Q		V	
17+40	7.3764	5.69	Q		V	
17+45	7.4145	5.53	Q		V	
17+50	7.4516	5.39	Q		V	
17+55	7.4878	5.26	Q		V	
18+ 0	7.5232	5.13	Q		V	
18+ 5	7.5575	4.98	Q		V	
18+10	7.5897	4.67	Q		V	
18+15	7.6193	4.30	Q		V	
18+20	7.6475	4.10	Q		V	
18+25	7.6749	3.98	Q		V	
18+30	7.7017	3.89	Q		V	
18+35	7.7279	3.81	Q		V	
18+40	7.7536	3.73	Q		V	
18+45	7.7789	3.66	Q		V	
18+50	7.8036	3.60	Q		V	
18+55	7.8280	3.53	Q		V	
19+ 0	7.8519	3.47	Q		V	
19+ 5	7.8754	3.42	Q		V	
19+10	7.8985	3.36	Q		V	
19+15	7.9213	3.31	Q		V	
19+20	7.9438	3.26	Q		V	
19+25	7.9659	3.21	Q		V	
19+30	7.9877	3.16	Q		V	
19+35	8.0092	3.12	Q		V	
19+40	8.0303	3.08	Q		V	
19+45	8.0513	3.04	Q		V	
19+50	8.0719	3.00	Q		V	
19+55	8.0923	2.96	Q		V	
20+ 0	8.1124	2.92	Q		V	
20+ 5	8.1322	2.89	Q		V	
20+10	8.1519	2.85	Q		V	
20+15	8.1713	2.82	Q		V	
20+20	8.1905	2.79	Q		V	
20+25	8.2094	2.75	Q		V	
20+30	8.2282	2.72	Q		V	
20+35	8.2467	2.69	Q		V	
20+40	8.2651	2.67	Q		V	
20+45	8.2833	2.64	Q		V	
20+50	8.3013	2.61	Q		V	
20+55	8.3191	2.58	Q		V	
21+ 0	8.3367	2.56	Q		V	
21+ 5	8.3541	2.53	Q		V	
21+10	8.3714	2.51	Q		V	
21+15	8.3886	2.49	Q		V	
21+20	8.4055	2.46	Q		V	

21+25	8.4223	2.44	|Q	|	|	|	V |
21+30	8.4390	2.42	|Q	|	|	|	V |
21+35	8.4555	2.40	|Q	|	|	|	V |
21+40	8.4719	2.38	|Q	|	|	|	V |
21+45	8.4881	2.36	|Q	|	|	|	V |
21+50	8.5042	2.34	|Q	|	|	|	V |
21+55	8.5202	2.32	|Q	|	|	|	V |
22+ 0	8.5361	2.30	|Q	|	|	|	V |
22+ 5	8.5518	2.28	|Q	|	|	|	V |
22+10	8.5674	2.26	|Q	|	|	|	V |
22+15	8.5828	2.25	|Q	|	|	|	V |
22+20	8.5982	2.23	|Q	|	|	|	V |
22+25	8.6134	2.21	|Q	|	|	|	V |
22+30	8.6285	2.20	|Q	|	|	|	V |
22+35	8.6435	2.18	|Q	|	|	|	V |
22+40	8.6584	2.16	|Q	|	|	|	V |
22+45	8.6732	2.15	|Q	|	|	|	V |
22+50	8.6879	2.13	|Q	|	|	|	V|
22+55	8.7025	2.12	|Q	|	|	|	V|
23+ 0	8.7170	2.10	|Q	|	|	|	V|
23+ 5	8.7313	2.09	|Q	|	|	|	V|
23+10	8.7456	2.07	|Q	|	|	|	V|
23+15	8.7598	2.06	|Q	|	|	|	V|
23+20	8.7739	2.05	|Q	|	|	|	V|
23+25	8.7879	2.03	|Q	|	|	|	V|
23+30	8.8018	2.02	|Q	|	|	|	V|
23+35	8.8157	2.01	|Q	|	|	|	V|
23+40	8.8294	1.99	|Q	|	|	|	V|
23+45	8.8430	1.98	|Q	|	|	|	V|
23+50	8.8566	1.97	|Q	|	|	|	V|
23+55	8.8701	1.96	|Q	|	|	|	V|
24+ 0	8.8835	1.95	|Q	|	|	|	V|
24+ 5	8.8961	1.83	|Q	|	|	|	V|
24+10	8.9046	1.24	Q	|	|	|	V|
24+15	8.9077	0.45	Q	|	|	|	V|
24+20	8.9086	0.13	Q	|	|	|	V|
24+25	8.9088	0.04	Q	|	|	|	V|
24+30	8.9089	0.01	Q	|	|	|	V

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

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Study date 04/22/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE PROPOSED CONDITION NORTHERLY CHAMBER SYSTEM
100-YEAR STORM EVENT ANALYSIS

Storm Event Year = 100

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 100		
15.31	1	1.30
Rainfall data for year 100		
15.31	6	3.07
Rainfall data for year 100		
15.31	24	5.64

++

******** 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)
32.0	32.0	15.31	1.000	0.978	0.133	0.130

Area-averaged adjusted loss rate Fm (In/Hr) = 0.130

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
2.04	0.133	32.0	32.0	21.25	0.015
13.27	0.867	98.0	98.0	0.20	0.958

Area-averaged catchment yield fraction, Y = 0.832
Area-averaged low loss fraction, Yb = 0.168
User entry of time of concentration = 0.151 (hours)
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Watershed area = 15.31(Ac.)
Catchment Lag time = 0.121 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 69.0074
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.130(In/Hr)
Average low loss rate fraction (Yb) = 0.168 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.481(In)
Computed peak 30-minute rainfall = 0.985(In)
Specified peak 1-hour rainfall = 1.300(In)
Computed peak 3-hour rainfall = 2.202(In)
Specified peak 6-hour rainfall = 3.070(In)
Specified peak 24-hour rainfall = 5.640(In)

Rainfall depth area reduction factors:
Using a total area of 15.31(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.481(In)
30-minute factor = 0.999 Adjusted rainfall = 0.985(In)
1-hour factor = 0.999 Adjusted rainfall = 1.299(In)
3-hour factor = 1.000 Adjusted rainfall = 2.202(In)
6-hour factor = 1.000 Adjusted rainfall = 3.070(In)
24-hour factor = 1.000 Adjusted rainfall = 5.640(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 = 185.16 (CFS))		
1	8.540	15.812
2	52.375	81.163
3	88.693	67.244
4	97.770	16.807
5	99.387	2.994
6	100.000	1.135

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.4808	0.4808
2	0.6344	0.1536
3	0.7461	0.1117
4	0.8371	0.0910
5	0.9153	0.0782
6	0.9845	0.0692
7	1.0471	0.0626
8	1.1046	0.0575
9	1.1579	0.0533
10	1.2077	0.0498
11	1.2546	0.0469
12	1.2991	0.0444
13	1.3500	0.0509
14	1.3989	0.0489
15	1.4460	0.0471
16	1.4915	0.0455
17	1.5356	0.0441
18	1.5783	0.0427
19	1.6198	0.0415
20	1.6602	0.0404
21	1.6995	0.0394
22	1.7379	0.0384
23	1.7754	0.0375
24	1.8121	0.0367
25	1.8479	0.0359
26	1.8831	0.0351
27	1.9175	0.0344
28	1.9513	0.0338
29	1.9844	0.0332
30	2.0170	0.0326
31	2.0490	0.0320
32	2.0805	0.0315
33	2.1115	0.0310
34	2.1419	0.0305
35	2.1720	0.0300
36	2.2015	0.0296
37	2.2307	0.0291
38	2.2594	0.0287
39	2.2877	0.0283
40	2.3157	0.0280
41	2.3433	0.0276
42	2.3705	0.0272
43	2.3974	0.0269
44	2.4240	0.0266
45	2.4503	0.0263
46	2.4762	0.0260
47	2.5019	0.0257
48	2.5273	0.0254
49	2.5524	0.0251
50	2.5773	0.0249
51	2.6019	0.0246
52	2.6262	0.0243
53	2.6503	0.0241
54	2.6742	0.0239
55	2.6978	0.0236

56	2.7212	0.0234
57	2.7444	0.0232
58	2.7674	0.0230
59	2.7902	0.0228
60	2.8128	0.0226
61	2.8352	0.0224
62	2.8574	0.0222
63	2.8794	0.0220
64	2.9012	0.0218
65	2.9229	0.0217
66	2.9444	0.0215
67	2.9657	0.0213
68	2.9868	0.0211
69	3.0078	0.0210
70	3.0287	0.0208
71	3.0493	0.0207
72	3.0699	0.0205
73	3.0885	0.0186
74	3.1070	0.0185
75	3.1253	0.0184
76	3.1435	0.0182
77	3.1616	0.0181
78	3.1796	0.0179
79	3.1974	0.0178
80	3.2151	0.0177
81	3.2327	0.0176
82	3.2501	0.0174
83	3.2674	0.0173
84	3.2847	0.0172
85	3.3018	0.0171
86	3.3187	0.0170
87	3.3356	0.0169
88	3.3524	0.0168
89	3.3691	0.0167
90	3.3856	0.0166
91	3.4021	0.0165
92	3.4184	0.0164
93	3.4347	0.0163
94	3.4508	0.0162
95	3.4669	0.0161
96	3.4828	0.0160
97	3.4987	0.0159
98	3.5145	0.0158
99	3.5302	0.0157
100	3.5458	0.0156
101	3.5613	0.0155
102	3.5767	0.0154
103	3.5921	0.0153
104	3.6073	0.0153
105	3.6225	0.0152
106	3.6376	0.0151
107	3.6526	0.0150
108	3.6676	0.0149
109	3.6824	0.0149
110	3.6972	0.0148
111	3.7119	0.0147
112	3.7266	0.0146

113	3.7411	0.0146
114	3.7556	0.0145
115	3.7700	0.0144
116	3.7844	0.0143
117	3.7987	0.0143
118	3.8129	0.0142
119	3.8270	0.0141
120	3.8411	0.0141
121	3.8551	0.0140
122	3.8690	0.0139
123	3.8829	0.0139
124	3.8967	0.0138
125	3.9105	0.0138
126	3.9242	0.0137
127	3.9378	0.0136
128	3.9514	0.0136
129	3.9649	0.0135
130	3.9784	0.0135
131	3.9918	0.0134
132	4.0051	0.0133
133	4.0184	0.0133
134	4.0316	0.0132
135	4.0448	0.0132
136	4.0579	0.0131
137	4.0710	0.0131
138	4.0840	0.0130
139	4.0969	0.0130
140	4.1099	0.0129
141	4.1227	0.0129
142	4.1355	0.0128
143	4.1483	0.0128
144	4.1610	0.0127
145	4.1736	0.0127
146	4.1862	0.0126
147	4.1988	0.0126
148	4.2113	0.0125
149	4.2237	0.0125
150	4.2362	0.0124
151	4.2485	0.0124
152	4.2609	0.0123
153	4.2731	0.0123
154	4.2854	0.0122
155	4.2975	0.0122
156	4.3097	0.0121
157	4.3218	0.0121
158	4.3338	0.0121
159	4.3459	0.0120
160	4.3578	0.0120
161	4.3698	0.0119
162	4.3816	0.0119
163	4.3935	0.0118
164	4.4053	0.0118
165	4.4171	0.0118
166	4.4288	0.0117
167	4.4405	0.0117
168	4.4521	0.0116
169	4.4637	0.0116

170	4.4753	0.0116
171	4.4868	0.0115
172	4.4983	0.0115
173	4.5098	0.0115
174	4.5212	0.0114
175	4.5326	0.0114
176	4.5439	0.0113
177	4.5552	0.0113
178	4.5665	0.0113
179	4.5777	0.0112
180	4.5890	0.0112
181	4.6001	0.0112
182	4.6113	0.0111
183	4.6224	0.0111
184	4.6334	0.0111
185	4.6444	0.0110
186	4.6554	0.0110
187	4.6664	0.0110
188	4.6773	0.0109
189	4.6882	0.0109
190	4.6991	0.0109
191	4.7099	0.0108
192	4.7207	0.0108
193	4.7315	0.0108
194	4.7423	0.0107
195	4.7530	0.0107
196	4.7637	0.0107
197	4.7743	0.0106
198	4.7849	0.0106
199	4.7955	0.0106
200	4.8061	0.0106
201	4.8166	0.0105
202	4.8271	0.0105
203	4.8376	0.0105
204	4.8480	0.0104
205	4.8584	0.0104
206	4.8688	0.0104
207	4.8792	0.0104
208	4.8895	0.0103
209	4.8998	0.0103
210	4.9101	0.0103
211	4.9203	0.0102
212	4.9305	0.0102
213	4.9407	0.0102
214	4.9509	0.0102
215	4.9610	0.0101
216	4.9711	0.0101
217	4.9812	0.0101
218	4.9913	0.0101
219	5.0013	0.0100
220	5.0113	0.0100
221	5.0213	0.0100
222	5.0312	0.0100
223	5.0412	0.0099
224	5.0511	0.0099
225	5.0610	0.0099
226	5.0708	0.0099

227	5.0806	0.0098
228	5.0905	0.0098
229	5.1002	0.0098
230	5.1100	0.0098
231	5.1197	0.0097
232	5.1294	0.0097
233	5.1391	0.0097
234	5.1488	0.0097
235	5.1584	0.0096
236	5.1681	0.0096
237	5.1777	0.0096
238	5.1872	0.0096
239	5.1968	0.0096
240	5.2063	0.0095
241	5.2158	0.0095
242	5.2253	0.0095
243	5.2348	0.0095
244	5.2442	0.0094
245	5.2536	0.0094
246	5.2630	0.0094
247	5.2724	0.0094
248	5.2818	0.0094
249	5.2911	0.0093
250	5.3004	0.0093
251	5.3097	0.0093
252	5.3190	0.0093
253	5.3282	0.0093
254	5.3374	0.0092
255	5.3467	0.0092
256	5.3558	0.0092
257	5.3650	0.0092
258	5.3742	0.0091
259	5.3833	0.0091
260	5.3924	0.0091
261	5.4015	0.0091
262	5.4106	0.0091
263	5.4196	0.0091
264	5.4286	0.0090
265	5.4377	0.0090
266	5.4466	0.0090
267	5.4556	0.0090
268	5.4646	0.0090
269	5.4735	0.0089
270	5.4824	0.0089
271	5.4913	0.0089
272	5.5002	0.0089
273	5.5091	0.0089
274	5.5179	0.0088
275	5.5267	0.0088
276	5.5356	0.0088
277	5.5443	0.0088
278	5.5531	0.0088
279	5.5619	0.0088
280	5.5706	0.0087
281	5.5793	0.0087
282	5.5880	0.0087
283	5.5967	0.0087

284	5.6054	0.0087
285	5.6140	0.0087
286	5.6227	0.0086
287	5.6313	0.0086
288	5.6399	0.0086

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0086	0.0014	0.0072
2	0.0086	0.0014	0.0072
3	0.0087	0.0014	0.0072
4	0.0087	0.0015	0.0072
5	0.0087	0.0015	0.0072
6	0.0087	0.0015	0.0073
7	0.0088	0.0015	0.0073
8	0.0088	0.0015	0.0073
9	0.0088	0.0015	0.0073
10	0.0088	0.0015	0.0073
11	0.0089	0.0015	0.0074
12	0.0089	0.0015	0.0074
13	0.0089	0.0015	0.0074
14	0.0089	0.0015	0.0074
15	0.0090	0.0015	0.0075
16	0.0090	0.0015	0.0075
17	0.0090	0.0015	0.0075
18	0.0091	0.0015	0.0075
19	0.0091	0.0015	0.0076
20	0.0091	0.0015	0.0076
21	0.0091	0.0015	0.0076
22	0.0092	0.0015	0.0076
23	0.0092	0.0015	0.0077
24	0.0092	0.0015	0.0077
25	0.0093	0.0016	0.0077
26	0.0093	0.0016	0.0077
27	0.0093	0.0016	0.0078
28	0.0094	0.0016	0.0078
29	0.0094	0.0016	0.0078
30	0.0094	0.0016	0.0078
31	0.0095	0.0016	0.0079
32	0.0095	0.0016	0.0079
33	0.0095	0.0016	0.0079
34	0.0096	0.0016	0.0080
35	0.0096	0.0016	0.0080
36	0.0096	0.0016	0.0080
37	0.0097	0.0016	0.0080
38	0.0097	0.0016	0.0081
39	0.0097	0.0016	0.0081
40	0.0098	0.0016	0.0081
41	0.0098	0.0016	0.0082
42	0.0098	0.0016	0.0082
43	0.0099	0.0017	0.0082
44	0.0099	0.0017	0.0082
45	0.0100	0.0017	0.0083
46	0.0100	0.0017	0.0083
47	0.0100	0.0017	0.0084

48	0.0101	0.0017	0.0084
49	0.0101	0.0017	0.0084
50	0.0101	0.0017	0.0084
51	0.0102	0.0017	0.0085
52	0.0102	0.0017	0.0085
53	0.0103	0.0017	0.0086
54	0.0103	0.0017	0.0086
55	0.0104	0.0017	0.0086
56	0.0104	0.0017	0.0086
57	0.0104	0.0017	0.0087
58	0.0105	0.0018	0.0087
59	0.0105	0.0018	0.0088
60	0.0106	0.0018	0.0088
61	0.0106	0.0018	0.0088
62	0.0106	0.0018	0.0089
63	0.0107	0.0018	0.0089
64	0.0107	0.0018	0.0089
65	0.0108	0.0018	0.0090
66	0.0108	0.0018	0.0090
67	0.0109	0.0018	0.0091
68	0.0109	0.0018	0.0091
69	0.0110	0.0018	0.0092
70	0.0110	0.0018	0.0092
71	0.0111	0.0019	0.0092
72	0.0111	0.0019	0.0093
73	0.0112	0.0019	0.0093
74	0.0112	0.0019	0.0094
75	0.0113	0.0019	0.0094
76	0.0113	0.0019	0.0094
77	0.0114	0.0019	0.0095
78	0.0115	0.0019	0.0095
79	0.0115	0.0019	0.0096
80	0.0116	0.0019	0.0096
81	0.0116	0.0020	0.0097
82	0.0117	0.0020	0.0097
83	0.0118	0.0020	0.0098
84	0.0118	0.0020	0.0098
85	0.0119	0.0020	0.0099
86	0.0119	0.0020	0.0099
87	0.0120	0.0020	0.0100
88	0.0121	0.0020	0.0100
89	0.0121	0.0020	0.0101
90	0.0122	0.0020	0.0101
91	0.0123	0.0021	0.0102
92	0.0123	0.0021	0.0103
93	0.0124	0.0021	0.0103
94	0.0125	0.0021	0.0104
95	0.0126	0.0021	0.0105
96	0.0126	0.0021	0.0105
97	0.0127	0.0021	0.0106
98	0.0128	0.0021	0.0106
99	0.0129	0.0022	0.0107
100	0.0129	0.0022	0.0107
101	0.0130	0.0022	0.0108
102	0.0131	0.0022	0.0109
103	0.0132	0.0022	0.0110
104	0.0132	0.0022	0.0110

105	0.0133	0.0022	0.0111
106	0.0134	0.0022	0.0112
107	0.0135	0.0023	0.0113
108	0.0136	0.0023	0.0113
109	0.0137	0.0023	0.0114
110	0.0138	0.0023	0.0115
111	0.0139	0.0023	0.0116
112	0.0139	0.0023	0.0116
113	0.0141	0.0024	0.0117
114	0.0141	0.0024	0.0118
115	0.0143	0.0024	0.0119
116	0.0143	0.0024	0.0119
117	0.0145	0.0024	0.0121
118	0.0146	0.0024	0.0121
119	0.0147	0.0025	0.0122
120	0.0148	0.0025	0.0123
121	0.0149	0.0025	0.0124
122	0.0150	0.0025	0.0125
123	0.0152	0.0025	0.0126
124	0.0153	0.0026	0.0127
125	0.0154	0.0026	0.0128
126	0.0155	0.0026	0.0129
127	0.0157	0.0026	0.0131
128	0.0158	0.0026	0.0131
129	0.0160	0.0027	0.0133
130	0.0161	0.0027	0.0134
131	0.0163	0.0027	0.0135
132	0.0164	0.0027	0.0136
133	0.0166	0.0028	0.0138
134	0.0167	0.0028	0.0139
135	0.0169	0.0028	0.0140
136	0.0170	0.0028	0.0141
137	0.0172	0.0029	0.0143
138	0.0173	0.0029	0.0144
139	0.0176	0.0029	0.0146
140	0.0177	0.0030	0.0147
141	0.0179	0.0030	0.0149
142	0.0181	0.0030	0.0151
143	0.0184	0.0031	0.0153
144	0.0185	0.0031	0.0154
145	0.0205	0.0034	0.0171
146	0.0207	0.0035	0.0172
147	0.0210	0.0035	0.0175
148	0.0211	0.0035	0.0176
149	0.0215	0.0036	0.0179
150	0.0217	0.0036	0.0180
151	0.0220	0.0037	0.0183
152	0.0222	0.0037	0.0185
153	0.0226	0.0038	0.0188
154	0.0228	0.0038	0.0190
155	0.0232	0.0039	0.0193
156	0.0234	0.0039	0.0195
157	0.0239	0.0040	0.0199
158	0.0241	0.0040	0.0201
159	0.0246	0.0041	0.0205
160	0.0249	0.0042	0.0207
161	0.0254	0.0043	0.0211

162	0.0257	0.0043	0.0214
163	0.0263	0.0044	0.0219
164	0.0266	0.0045	0.0221
165	0.0272	0.0046	0.0227
166	0.0276	0.0046	0.0230
167	0.0283	0.0047	0.0236
168	0.0287	0.0048	0.0239
169	0.0296	0.0050	0.0246
170	0.0300	0.0050	0.0250
171	0.0310	0.0052	0.0258
172	0.0315	0.0053	0.0262
173	0.0326	0.0055	0.0271
174	0.0332	0.0056	0.0276
175	0.0344	0.0058	0.0287
176	0.0351	0.0059	0.0292
177	0.0367	0.0061	0.0305
178	0.0375	0.0063	0.0312
179	0.0394	0.0066	0.0328
180	0.0404	0.0068	0.0336
181	0.0427	0.0072	0.0356
182	0.0441	0.0074	0.0367
183	0.0471	0.0079	0.0392
184	0.0489	0.0082	0.0407
185	0.0444	0.0074	0.0370
186	0.0469	0.0079	0.0391
187	0.0533	0.0089	0.0444
188	0.0575	0.0096	0.0478
189	0.0692	0.0108	0.0584
190	0.0782	0.0108	0.0673
191	0.1117	0.0108	0.1009
192	0.1536	0.0108	0.1428
193	0.4808	0.0108	0.4700
194	0.0910	0.0108	0.0802
195	0.0626	0.0105	0.0521
196	0.0498	0.0083	0.0415
197	0.0509	0.0085	0.0424
198	0.0455	0.0076	0.0379
199	0.0415	0.0070	0.0346
200	0.0384	0.0064	0.0320
201	0.0359	0.0060	0.0299
202	0.0338	0.0057	0.0281
203	0.0320	0.0054	0.0266
204	0.0305	0.0051	0.0254
205	0.0291	0.0049	0.0242
206	0.0280	0.0047	0.0233
207	0.0269	0.0045	0.0224
208	0.0260	0.0044	0.0216
209	0.0251	0.0042	0.0209
210	0.0243	0.0041	0.0203
211	0.0236	0.0040	0.0197
212	0.0230	0.0039	0.0191
213	0.0224	0.0038	0.0186
214	0.0218	0.0037	0.0182
215	0.0213	0.0036	0.0177
216	0.0208	0.0035	0.0173
217	0.0186	0.0031	0.0155
218	0.0182	0.0031	0.0152

219	0.0178	0.0030	0.0148
220	0.0174	0.0029	0.0145
221	0.0171	0.0029	0.0142
222	0.0168	0.0028	0.0140
223	0.0165	0.0028	0.0137
224	0.0162	0.0027	0.0134
225	0.0159	0.0027	0.0132
226	0.0156	0.0026	0.0130
227	0.0153	0.0026	0.0128
228	0.0151	0.0025	0.0126
229	0.0149	0.0025	0.0124
230	0.0146	0.0025	0.0122
231	0.0144	0.0024	0.0120
232	0.0142	0.0024	0.0118
233	0.0140	0.0023	0.0117
234	0.0138	0.0023	0.0115
235	0.0136	0.0023	0.0114
236	0.0135	0.0023	0.0112
237	0.0133	0.0022	0.0111
238	0.0131	0.0022	0.0109
239	0.0130	0.0022	0.0108
240	0.0128	0.0021	0.0107
241	0.0127	0.0021	0.0105
242	0.0125	0.0021	0.0104
243	0.0124	0.0021	0.0103
244	0.0122	0.0020	0.0102
245	0.0121	0.0020	0.0101
246	0.0120	0.0020	0.0100
247	0.0118	0.0020	0.0099
248	0.0117	0.0020	0.0098
249	0.0116	0.0019	0.0097
250	0.0115	0.0019	0.0096
251	0.0114	0.0019	0.0095
252	0.0113	0.0019	0.0094
253	0.0112	0.0019	0.0093
254	0.0111	0.0019	0.0092
255	0.0110	0.0018	0.0091
256	0.0109	0.0018	0.0090
257	0.0108	0.0018	0.0090
258	0.0107	0.0018	0.0089
259	0.0106	0.0018	0.0088
260	0.0105	0.0018	0.0087
261	0.0104	0.0017	0.0087
262	0.0103	0.0017	0.0086
263	0.0102	0.0017	0.0085
264	0.0102	0.0017	0.0085
265	0.0101	0.0017	0.0084
266	0.0100	0.0017	0.0083
267	0.0099	0.0017	0.0083
268	0.0099	0.0017	0.0082
269	0.0098	0.0016	0.0081
270	0.0097	0.0016	0.0081
271	0.0096	0.0016	0.0080
272	0.0096	0.0016	0.0080
273	0.0095	0.0016	0.0079
274	0.0094	0.0016	0.0079
275	0.0094	0.0016	0.0078

276	0.0093	0.0016	0.0078
277	0.0093	0.0015	0.0077
278	0.0092	0.0015	0.0076
279	0.0091	0.0015	0.0076
280	0.0091	0.0015	0.0076
281	0.0090	0.0015	0.0075
282	0.0090	0.0015	0.0075
283	0.0089	0.0015	0.0074
284	0.0088	0.0015	0.0074
285	0.0088	0.0015	0.0073
286	0.0087	0.0015	0.0073
287	0.0087	0.0015	0.0072
288	0.0086	0.0014	0.0072

Total soil rain loss = 0.84(In)
Total effective rainfall = 4.79(In)
Peak flow rate in flood hydrograph = 50.97(CFS)

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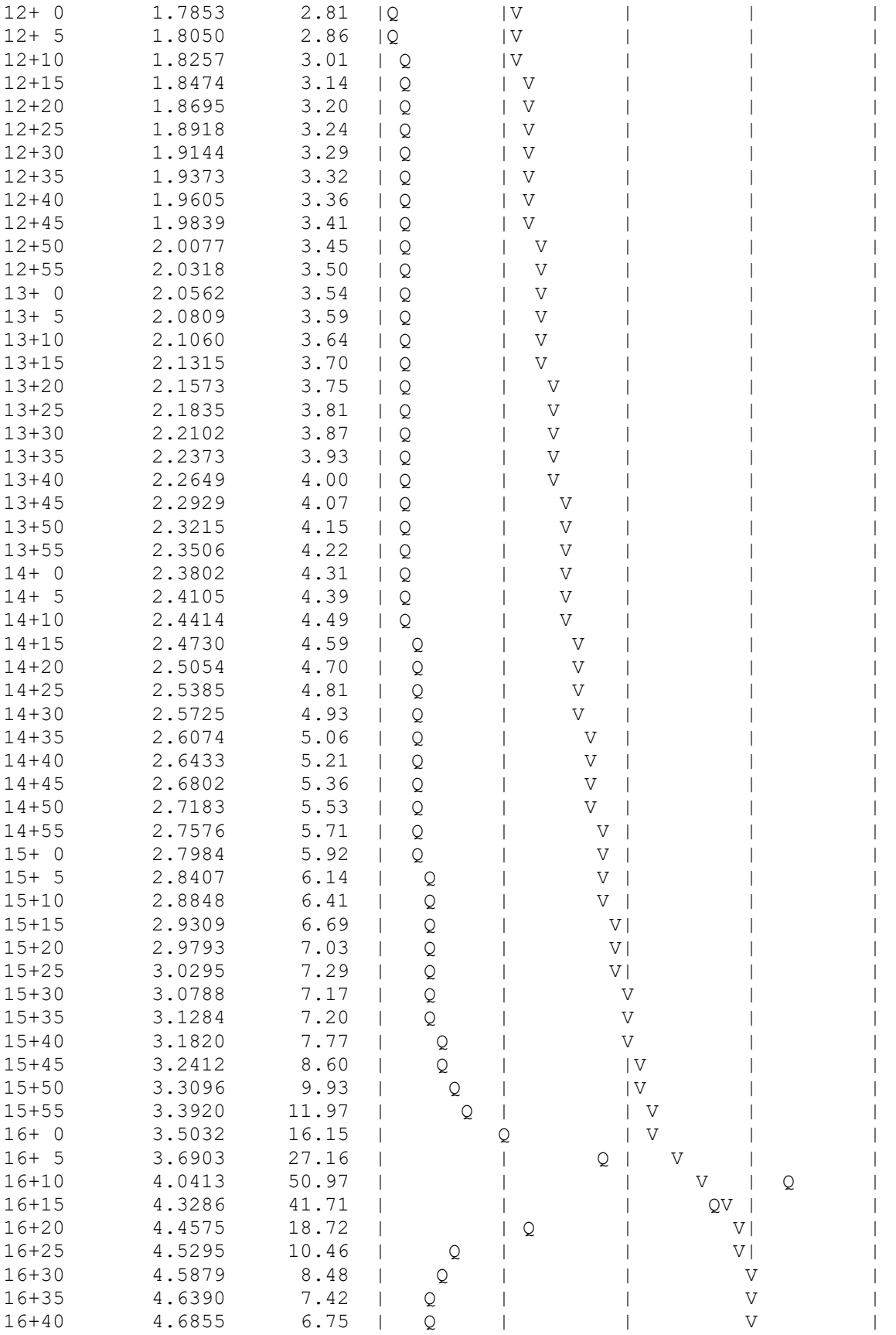
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0008	0.11	Q				
0+10	0.0056	0.69	Q				
0+15	0.0137	1.18	Q				
0+20	0.0226	1.30	Q				
0+25	0.0318	1.33	Q				
0+30	0.0410	1.34	Q				
0+35	0.0502	1.34	Q				
0+40	0.0595	1.35	Q				
0+45	0.0688	1.35	Q				
0+50	0.0781	1.35	Q				
0+55	0.0875	1.36	Q				
1+ 0	0.0969	1.36	Q				
1+ 5	0.1063	1.37	Q				
1+10	0.1158	1.37	Q				
1+15	0.1252	1.38	Q				
1+20	0.1347	1.38	Q				
1+25	0.1443	1.38	Q				
1+30	0.1538	1.39	QV				
1+35	0.1634	1.39	QV				
1+40	0.1731	1.40	QV				
1+45	0.1827	1.40	QV				
1+50	0.1924	1.41	QV				
1+55	0.2021	1.41	QV				
2+ 0	0.2119	1.42	QV				
2+ 5	0.2217	1.42	QV				
2+10	0.2315	1.43	QV				
2+15	0.2413	1.43	QV				
2+20	0.2512	1.44	QV				
2+25	0.2611	1.44	QV				

2+30	0.2711	1.45	QV	|	|	|	|
2+35	0.2811	1.45	QV	|	|	|	|
2+40	0.2911	1.46	QV	|	|	|	|
2+45	0.3012	1.46	QV	|	|	|	|
2+50	0.3113	1.47	Q V	|	|	|	|
2+55	0.3214	1.47	Q V	|	|	|	|
3+ 0	0.3315	1.48	Q V	|	|	|	|
3+ 5	0.3417	1.48	Q V	|	|	|	|
3+10	0.3520	1.49	Q V	|	|	|	|
3+15	0.3622	1.49	Q V	|	|	|	|
3+20	0.3726	1.50	Q V	|	|	|	|
3+25	0.3829	1.50	|QV	|	|	|	|
3+30	0.3933	1.51	|QV	|	|	|	|
3+35	0.4037	1.51	|QV	|	|	|	|
3+40	0.4142	1.52	|QV	|	|	|	|
3+45	0.4247	1.52	|QV	|	|	|	|
3+50	0.4352	1.53	|QV	|	|	|	|
3+55	0.4458	1.54	|QV	|	|	|	|
4+ 0	0.4564	1.54	|QV	|	|	|	|
4+ 5	0.4671	1.55	|Q V	|	|	|	|
4+10	0.4778	1.55	|Q V	|	|	|	|
4+15	0.4885	1.56	|Q V	|	|	|	|
4+20	0.4993	1.57	|Q V	|	|	|	|
4+25	0.5102	1.57	|Q V	|	|	|	|
4+30	0.5210	1.58	|Q V	|	|	|	|
4+35	0.5319	1.59	|Q V	|	|	|	|
4+40	0.5429	1.59	|Q V	|	|	|	|
4+45	0.5539	1.60	|Q V	|	|	|	|
4+50	0.5650	1.60	|Q V	|	|	|	|
4+55	0.5761	1.61	|Q V	|	|	|	|
5+ 0	0.5872	1.62	|Q V	|	|	|	|
5+ 5	0.5984	1.62	|Q V	|	|	|	|
5+10	0.6096	1.63	|Q V	|	|	|	|
5+15	0.6209	1.64	|Q V	|	|	|	|
5+20	0.6323	1.65	|Q V	|	|	|	|
5+25	0.6436	1.65	|Q V	|	|	|	|
5+30	0.6551	1.66	|Q V	|	|	|	|
5+35	0.6666	1.67	|Q V	|	|	|	|
5+40	0.6781	1.67	|Q V	|	|	|	|
5+45	0.6897	1.68	|Q V	|	|	|	|
5+50	0.7013	1.69	|Q V	|	|	|	|
5+55	0.7130	1.70	|Q V	|	|	|	|
6+ 0	0.7248	1.71	|Q V	|	|	|	|
6+ 5	0.7365	1.71	|Q V	|	|	|	|
6+10	0.7484	1.72	|Q V	|	|	|	|
6+15	0.7603	1.73	|Q V	|	|	|	|
6+20	0.7723	1.74	|Q V	|	|	|	|
6+25	0.7843	1.75	|Q V	|	|	|	|
6+30	0.7964	1.75	|Q V	|	|	|	|
6+35	0.8085	1.76	|Q V	|	|	|	|
6+40	0.8207	1.77	|Q V	|	|	|	|
6+45	0.8330	1.78	|Q V	|	|	|	|
6+50	0.8453	1.79	|Q V	|	|	|	|
6+55	0.8577	1.80	|Q V	|	|	|	|
7+ 0	0.8701	1.81	|Q V	|	|	|	|
7+ 5	0.8826	1.82	|Q V	|	|	|	|
7+10	0.8952	1.83	|Q V	|	|	|	|

7+15	0.9079	1.84	|Q V	|	|	|	|
7+20	0.9206	1.85	|Q V	|	|	|	|
7+25	0.9333	1.85	|Q V	|	|	|	|
7+30	0.9462	1.86	|Q V	|	|	|	|
7+35	0.9591	1.87	|Q V	|	|	|	|
7+40	0.9721	1.89	|Q V	|	|	|	|
7+45	0.9851	1.90	|Q V	|	|	|	|
7+50	0.9982	1.91	|Q V	|	|	|	|
7+55	1.0114	1.92	|Q V	|	|	|	|
8+ 0	1.0247	1.93	|Q V	|	|	|	|
8+ 5	1.0381	1.94	|Q V	|	|	|	|
8+10	1.0515	1.95	|Q V	|	|	|	|
8+15	1.0650	1.96	|Q V	|	|	|	|
8+20	1.0786	1.97	|Q V	|	|	|	|
8+25	1.0923	1.98	|Q V	|	|	|	|
8+30	1.1060	2.00	|Q V	|	|	|	|
8+35	1.1199	2.01	|Q V	|	|	|	|
8+40	1.1338	2.02	|Q V	|	|	|	|
8+45	1.1478	2.03	|Q V	|	|	|	|
8+50	1.1619	2.05	|Q V	|	|	|	|
8+55	1.1761	2.06	|Q V	|	|	|	|
9+ 0	1.1904	2.07	|Q V	|	|	|	|
9+ 5	1.2047	2.09	|Q V	|	|	|	|
9+10	1.2192	2.10	|Q V	|	|	|	|
9+15	1.2338	2.12	|Q V	|	|	|	|
9+20	1.2485	2.13	|Q V	|	|	|	|
9+25	1.2632	2.14	|Q V	|	|	|	|
9+30	1.2781	2.16	|Q V	|	|	|	|
9+35	1.2931	2.17	|Q V	|	|	|	|
9+40	1.3082	2.19	|Q V	|	|	|	|
9+45	1.3233	2.21	|Q V	|	|	|	|
9+50	1.3386	2.22	|Q V	|	|	|	|
9+55	1.3541	2.24	|Q V	|	|	|	|
10+ 0	1.3696	2.26	|Q V	|	|	|	|
10+ 5	1.3852	2.27	|Q V|	|	|	|	|
10+10	1.4010	2.29	|Q V|	|	|	|	|
10+15	1.4169	2.31	|Q V|	|	|	|	|
10+20	1.4329	2.33	|Q V|	|	|	|	|
10+25	1.4491	2.35	|Q V|	|	|	|	|
10+30	1.4654	2.36	|Q V|	|	|	|	|
10+35	1.4818	2.38	|Q V|	|	|	|	|
10+40	1.4984	2.40	|Q V|	|	|	|	|
10+45	1.5151	2.42	|Q V|	|	|	|	|
10+50	1.5319	2.45	|Q V	|	|	|	|
10+55	1.5489	2.47	|Q V	|	|	|	|
11+ 0	1.5660	2.49	|Q V	|	|	|	|
11+ 5	1.5833	2.51	|Q V	|	|	|	|
11+10	1.6008	2.54	|Q V	|	|	|	|
11+15	1.6184	2.56	|Q V	|	|	|	|
11+20	1.6362	2.58	|Q V	|	|	|	|
11+25	1.6542	2.61	|Q V	|	|	|	|
11+30	1.6723	2.64	|Q V	|	|	|	|
11+35	1.6907	2.66	|Q |V	|	|	|	|
11+40	1.7092	2.69	|Q |V	|	|	|	|
11+45	1.7279	2.72	|Q |V	|	|	|	|
11+50	1.7468	2.75	|Q |V	|	|	|	|
11+55	1.7659	2.78	|Q |V	|	|	|	|


12+ 0 1.7853 2.81
12+ 5 1.8050 2.86
12+10 1.8257 3.01
12+15 1.8474 3.14
12+20 1.8695 3.20
12+25 1.8918 3.24
12+30 1.9144 3.29
12+35 1.9373 3.32
12+40 1.9605 3.36
12+45 1.9839 3.41
12+50 2.0077 3.45
12+55 2.0318 3.50
13+ 0 2.0562 3.54
13+ 5 2.0809 3.59
13+10 2.1060 3.64
13+15 2.1315 3.70
13+20 2.1573 3.75
13+25 2.1835 3.81
13+30 2.2102 3.87
13+35 2.2373 3.93
13+40 2.2649 4.00
13+45 2.2929 4.07
13+50 2.3215 4.15
13+55 2.3506 4.22
14+ 0 2.3802 4.31
14+ 5 2.4105 4.39
14+10 2.4414 4.49
14+15 2.4730 4.59
14+20 2.5054 4.70
14+25 2.5385 4.81
14+30 2.5725 4.93
14+35 2.6074 5.06
14+40 2.6433 5.21
14+45 2.6802 5.36
14+50 2.7183 5.53
14+55 2.7576 5.71
15+ 0 2.7984 5.92
15+ 5 2.8407 6.14
15+10 2.8848 6.41
15+15 2.9309 6.69
15+20 2.9793 7.03
15+25 3.0295 7.29
15+30 3.0788 7.17
15+35 3.1284 7.20
15+40 3.1820 7.77
15+45 3.2412 8.60
15+50 3.3096 9.93
15+55 3.3920 11.97
16+ 0 3.5032 16.15
16+ 5 3.6903 27.16
16+10 4.0413 50.97
16+15 4.3286 41.71
16+20 4.4575 18.72
16+25 4.5295 10.46
16+30 4.5879 8.48
16+35 4.6390 7.42
16+40 4.6855 6.75

16+45	4.7282	6.20	| Q	|	|	V |
16+50	4.7678	5.76	| Q	|	|	|V |
16+55	4.8050	5.40	| Q	|	|	|V |
17+ 0	4.8401	5.09	| Q	|	|	|V |
17+ 5	4.8734	4.83	| Q	|	|	|V |
17+10	4.9051	4.61	| Q	|	|	| V |
17+15	4.9355	4.41	| Q	|	|	| V |
17+20	4.9647	4.24	| Q	|	|	| V |
17+25	4.9928	4.08	| Q	|	|	| V |
17+30	5.0199	3.94	| Q	|	|	| V |
17+35	5.0463	3.82	| Q	|	|	| V |
17+40	5.0718	3.70	| Q	|	|	| V |
17+45	5.0966	3.60	| Q	|	|	| V |
17+50	5.1207	3.50	| Q	|	|	| V |
17+55	5.1442	3.41	| Q	|	|	| V |
18+ 0	5.1671	3.33	| Q	|	|	| V |
18+ 5	5.1893	3.23	| Q	|	|	| V |
18+10	5.2103	3.04	| Q	|	|	| V |
18+15	5.2301	2.87	|Q	|	|	| V |
18+20	5.2492	2.79	|Q	|	|	| V |
18+25	5.2680	2.72	|Q	|	|	| V |
18+30	5.2864	2.67	|Q	|	|	| V |
18+35	5.3043	2.61	|Q	|	|	| V |
18+40	5.3220	2.56	|Q	|	|	| V |
18+45	5.3393	2.52	|Q	|	|	| V |
18+50	5.3563	2.47	|Q	|	|	| V |
18+55	5.3731	2.43	|Q	|	|	| V |
19+ 0	5.3895	2.39	|Q	|	|	| V |
19+ 5	5.4057	2.35	|Q	|	|	| V |
19+10	5.4216	2.31	|Q	|	|	| V |
19+15	5.4372	2.27	|Q	|	|	| V |
19+20	5.4527	2.24	|Q	|	|	| V |
19+25	5.4679	2.21	|Q	|	|	| V |
19+30	5.4829	2.18	|Q	|	|	| V |
19+35	5.4976	2.15	|Q	|	|	| V |
19+40	5.5122	2.12	|Q	|	|	| V |
19+45	5.5266	2.09	|Q	|	|	| V |
19+50	5.5408	2.06	|Q	|	|	| V |
19+55	5.5548	2.04	|Q	|	|	| V |
20+ 0	5.5687	2.01	|Q	|	|	| V |
20+ 5	5.5824	1.99	|Q	|	|	| V |
20+10	5.5959	1.96	|Q	|	|	| V |
20+15	5.6092	1.94	|Q	|	|	| V |
20+20	5.6224	1.92	|Q	|	|	| V |
20+25	5.6355	1.90	|Q	|	|	| V |
20+30	5.6484	1.88	|Q	|	|	| V |
20+35	5.6612	1.86	|Q	|	|	| V |
20+40	5.6739	1.84	|Q	|	|	| V |
20+45	5.6864	1.82	|Q	|	|	| V |
20+50	5.6988	1.80	|Q	|	|	| V |
20+55	5.7110	1.78	|Q	|	|	| V |
21+ 0	5.7232	1.76	|Q	|	|	| V |
21+ 5	5.7352	1.75	|Q	|	|	| V |
21+10	5.7471	1.73	|Q	|	|	| V |
21+15	5.7589	1.71	|Q	|	|	| V |
21+20	5.7706	1.70	|Q	|	|	| V |
21+25	5.7822	1.68	|Q	|	|	| V |

21+30	5.7937	1.67	|Q	|	|	|	V |
21+35	5.8051	1.65	|Q	|	|	|	V |
21+40	5.8164	1.64	|Q	|	|	|	V |
21+45	5.8276	1.63	|Q	|	|	|	V |
21+50	5.8387	1.61	|Q	|	|	|	V |
21+55	5.8497	1.60	|Q	|	|	|	V |
22+ 0	5.8606	1.59	|Q	|	|	|	V |
22+ 5	5.8715	1.57	|Q	|	|	|	V |
22+10	5.8822	1.56	|Q	|	|	|	V |
22+15	5.8929	1.55	|Q	|	|	|	V |
22+20	5.9035	1.54	|Q	|	|	|	V |
22+25	5.9140	1.53	|Q	|	|	|	V |
22+30	5.9244	1.51	|Q	|	|	|	V |
22+35	5.9347	1.50	|Q	|	|	|	V |
22+40	5.9450	1.49	Q	|	|	|	V |
22+45	5.9552	1.48	Q	|	|	|	V |
22+50	5.9653	1.47	Q	|	|	|	V|
22+55	5.9754	1.46	Q	|	|	|	V|
23+ 0	5.9854	1.45	Q	|	|	|	V|
23+ 5	5.9953	1.44	Q	|	|	|	V|
23+10	6.0052	1.43	Q	|	|	|	V|
23+15	6.0150	1.42	Q	|	|	|	V|
23+20	6.0247	1.41	Q	|	|	|	V|
23+25	6.0343	1.40	Q	|	|	|	V|
23+30	6.0439	1.39	Q	|	|	|	V|
23+35	6.0535	1.39	Q	|	|	|	V|
23+40	6.0630	1.38	Q	|	|	|	V|
23+45	6.0724	1.37	Q	|	|	|	V|
23+50	6.0818	1.36	Q	|	|	|	V|
23+55	6.0911	1.35	Q	|	|	|	V|
24+ 0	6.1003	1.34	Q	|	|	|	V|
24+ 5	6.1087	1.22	Q	|	|	|	V|
24+10	6.1131	0.63	Q	|	|	|	V|
24+15	6.1141	0.15	Q	|	|	|	V|
24+20	6.1143	0.03	Q	|	|	|	V|
24+25	6.1144	0.01	Q	|	|	|	V

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE PROPOSED CONDITION NORTHERLY CHAMBER SYSTEM
25-YEAR STORM EVENT ANALYSIS

Storm Event Year = 25

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 25		
15.31	1	1.00
Rainfall data for year 25		
15.31	6	2.43
Rainfall data for year 25		
15.31	24	4.48

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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)
32.0	32.0	15.31	1.000	0.978	0.133	0.130

Area-averaged adjusted loss rate Fm (In/Hr) = 0.130

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
2.04	0.133	32.0	32.0	21.25	0.001
13.27	0.867	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.821
Area-averaged low loss fraction, Yb = 0.179
User entry of time of concentration = 0.156 (hours)
++
Watershed area = 15.31(Ac.)
Catchment Lag time = 0.125 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 66.7735
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.130(In/Hr)
Average low loss rate fraction (Yb) = 0.179 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.369(In)
Computed peak 30-minute rainfall = 0.756(In)
Specified peak 1-hour rainfall = 0.998(In)
Computed peak 3-hour rainfall = 1.722(In)
Specified peak 6-hour rainfall = 2.430(In)
Specified peak 24-hour rainfall = 4.480(In)

Rainfall depth area reduction factors:
Using a total area of 15.31(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.369(In)
30-minute factor = 0.999 Adjusted rainfall = 0.756(In)
1-hour factor = 0.999 Adjusted rainfall = 0.997(In)
3-hour factor = 1.000 Adjusted rainfall = 1.722(In)
6-hour factor = 1.000 Adjusted rainfall = 2.430(In)
24-hour factor = 1.000 Adjusted rainfall = 4.480(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 = 185.16 (CFS))		
1	8.016	14.842
2	49.840	77.440
3	87.198	69.169
4	97.393	18.877
5	99.209	3.362
6	100.000	1.465

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3691	0.3691
2	0.4870	0.1179
3	0.5728	0.0858
4	0.6426	0.0699
5	0.7026	0.0600
6	0.7558	0.0532
7	0.8039	0.0481
8	0.8480	0.0441
9	0.8889	0.0409
10	0.9271	0.0383
11	0.9632	0.0360
12	0.9973	0.0341
13	1.0378	0.0405
14	1.0767	0.0390
15	1.1143	0.0376
16	1.1506	0.0363
17	1.1859	0.0352
18	1.2200	0.0342
19	1.2533	0.0332
20	1.2857	0.0324
21	1.3172	0.0316
22	1.3481	0.0308
23	1.3782	0.0301
24	1.4077	0.0295
25	1.4365	0.0289
26	1.4648	0.0283
27	1.4926	0.0277
28	1.5198	0.0272
29	1.5466	0.0268
30	1.5728	0.0263
31	1.5987	0.0259
32	1.6241	0.0254
33	1.6492	0.0250
34	1.6738	0.0247
35	1.6981	0.0243
36	1.7221	0.0240
37	1.7457	0.0236
38	1.7690	0.0233
39	1.7919	0.0230
40	1.8146	0.0227
41	1.8370	0.0224
42	1.8591	0.0221
43	1.8810	0.0219
44	1.9026	0.0216
45	1.9240	0.0214
46	1.9451	0.0211
47	1.9660	0.0209
48	1.9866	0.0207
49	2.0071	0.0205
50	2.0273	0.0202
51	2.0474	0.0200
52	2.0672	0.0198
53	2.0869	0.0197
54	2.1063	0.0195
55	2.1256	0.0193

56	2.1447	0.0191
57	2.1637	0.0189
58	2.1824	0.0188
59	2.2010	0.0186
60	2.2195	0.0185
61	2.2378	0.0183
62	2.2559	0.0181
63	2.2739	0.0180
64	2.2918	0.0179
65	2.3095	0.0177
66	2.3271	0.0176
67	2.3445	0.0174
68	2.3619	0.0173
69	2.3791	0.0172
70	2.3961	0.0171
71	2.4131	0.0169
72	2.4299	0.0168
73	2.4447	0.0148
74	2.4594	0.0147
75	2.4741	0.0146
76	2.4886	0.0145
77	2.5030	0.0144
78	2.5172	0.0143
79	2.5314	0.0142
80	2.5455	0.0141
81	2.5595	0.0140
82	2.5734	0.0139
83	2.5872	0.0138
84	2.6009	0.0137
85	2.6145	0.0136
86	2.6281	0.0135
87	2.6415	0.0134
88	2.6549	0.0134
89	2.6681	0.0133
90	2.6813	0.0132
91	2.6944	0.0131
92	2.7075	0.0130
93	2.7204	0.0129
94	2.7333	0.0129
95	2.7461	0.0128
96	2.7588	0.0127
97	2.7714	0.0126
98	2.7840	0.0126
99	2.7965	0.0125
100	2.8089	0.0124
101	2.8213	0.0124
102	2.8336	0.0123
103	2.8458	0.0122
104	2.8580	0.0122
105	2.8701	0.0121
106	2.8821	0.0120
107	2.8941	0.0120
108	2.9060	0.0119
109	2.9178	0.0118
110	2.9296	0.0118
111	2.9413	0.0117
112	2.9530	0.0117

113	2.9646	0.0116
114	2.9762	0.0115
115	2.9876	0.0115
116	2.9991	0.0114
117	3.0105	0.0114
118	3.0218	0.0113
119	3.0331	0.0113
120	3.0443	0.0112
121	3.0555	0.0112
122	3.0666	0.0111
123	3.0776	0.0111
124	3.0887	0.0110
125	3.0996	0.0110
126	3.1105	0.0109
127	3.1214	0.0109
128	3.1322	0.0108
129	3.1430	0.0108
130	3.1537	0.0107
131	3.1644	0.0107
132	3.1751	0.0106
133	3.1857	0.0106
134	3.1962	0.0105
135	3.2067	0.0105
136	3.2172	0.0105
137	3.2276	0.0104
138	3.2380	0.0104
139	3.2483	0.0103
140	3.2586	0.0103
141	3.2688	0.0103
142	3.2790	0.0102
143	3.2892	0.0102
144	3.2993	0.0101
145	3.3094	0.0101
146	3.3195	0.0101
147	3.3295	0.0100
148	3.3395	0.0100
149	3.3494	0.0099
150	3.3593	0.0099
151	3.3692	0.0099
152	3.3790	0.0098
153	3.3888	0.0098
154	3.3986	0.0098
155	3.4083	0.0097
156	3.4180	0.0097
157	3.4276	0.0097
158	3.4372	0.0096
159	3.4468	0.0096
160	3.4564	0.0095
161	3.4659	0.0095
162	3.4754	0.0095
163	3.4848	0.0095
164	3.4942	0.0094
165	3.5036	0.0094
166	3.5130	0.0094
167	3.5223	0.0093
168	3.5316	0.0093
169	3.5409	0.0093

170	3.5501	0.0092
171	3.5593	0.0092
172	3.5685	0.0092
173	3.5776	0.0091
174	3.5867	0.0091
175	3.5958	0.0091
176	3.6048	0.0091
177	3.6139	0.0090
178	3.6229	0.0090
179	3.6318	0.0090
180	3.6408	0.0089
181	3.6497	0.0089
182	3.6586	0.0089
183	3.6674	0.0089
184	3.6763	0.0088
185	3.6851	0.0088
186	3.6938	0.0088
187	3.7026	0.0088
188	3.7113	0.0087
189	3.7200	0.0087
190	3.7287	0.0087
191	3.7373	0.0086
192	3.7460	0.0086
193	3.7545	0.0086
194	3.7631	0.0086
195	3.7717	0.0085
196	3.7802	0.0085
197	3.7887	0.0085
198	3.7972	0.0085
199	3.8056	0.0085
200	3.8140	0.0084
201	3.8224	0.0084
202	3.8308	0.0084
203	3.8392	0.0084
204	3.8475	0.0083
205	3.8558	0.0083
206	3.8641	0.0083
207	3.8724	0.0083
208	3.8806	0.0082
209	3.8889	0.0082
210	3.8971	0.0082
211	3.9052	0.0082
212	3.9134	0.0082
213	3.9215	0.0081
214	3.9296	0.0081
215	3.9377	0.0081
216	3.9458	0.0081
217	3.9539	0.0081
218	3.9619	0.0080
219	3.9699	0.0080
220	3.9779	0.0080
221	3.9859	0.0080
222	3.9938	0.0079
223	4.0017	0.0079
224	4.0096	0.0079
225	4.0175	0.0079
226	4.0254	0.0079

227	4.0332	0.0079
228	4.0411	0.0078
229	4.0489	0.0078
230	4.0567	0.0078
231	4.0645	0.0078
232	4.0722	0.0078
233	4.0799	0.0077
234	4.0877	0.0077
235	4.0954	0.0077
236	4.1030	0.0077
237	4.1107	0.0077
238	4.1184	0.0076
239	4.1260	0.0076
240	4.1336	0.0076
241	4.1412	0.0076
242	4.1488	0.0076
243	4.1563	0.0076
244	4.1639	0.0075
245	4.1714	0.0075
246	4.1789	0.0075
247	4.1864	0.0075
248	4.1938	0.0075
249	4.2013	0.0075
250	4.2087	0.0074
251	4.2162	0.0074
252	4.2236	0.0074
253	4.2309	0.0074
254	4.2383	0.0074
255	4.2457	0.0074
256	4.2530	0.0073
257	4.2603	0.0073
258	4.2676	0.0073
259	4.2749	0.0073
260	4.2822	0.0073
261	4.2895	0.0073
262	4.2967	0.0072
263	4.3039	0.0072
264	4.3112	0.0072
265	4.3184	0.0072
266	4.3255	0.0072
267	4.3327	0.0072
268	4.3399	0.0072
269	4.3470	0.0071
270	4.3541	0.0071
271	4.3612	0.0071
272	4.3683	0.0071
273	4.3754	0.0071
274	4.3825	0.0071
275	4.3895	0.0071
276	4.3966	0.0070
277	4.4036	0.0070
278	4.4106	0.0070
279	4.4176	0.0070
280	4.4246	0.0070
281	4.4315	0.0070
282	4.4385	0.0070
283	4.4454	0.0069

284	4.4523	0.0069
285	4.4593	0.0069
286	4.4662	0.0069
287	4.4730	0.0069
288	4.4799	0.0069

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0069	0.0012	0.0056
2	0.0069	0.0012	0.0057
3	0.0069	0.0012	0.0057
4	0.0069	0.0012	0.0057
5	0.0070	0.0012	0.0057
6	0.0070	0.0012	0.0057
7	0.0070	0.0012	0.0057
8	0.0070	0.0013	0.0058
9	0.0070	0.0013	0.0058
10	0.0071	0.0013	0.0058
11	0.0071	0.0013	0.0058
12	0.0071	0.0013	0.0058
13	0.0071	0.0013	0.0059
14	0.0071	0.0013	0.0059
15	0.0072	0.0013	0.0059
16	0.0072	0.0013	0.0059
17	0.0072	0.0013	0.0059
18	0.0072	0.0013	0.0059
19	0.0073	0.0013	0.0060
20	0.0073	0.0013	0.0060
21	0.0073	0.0013	0.0060
22	0.0073	0.0013	0.0060
23	0.0074	0.0013	0.0060
24	0.0074	0.0013	0.0061
25	0.0074	0.0013	0.0061
26	0.0074	0.0013	0.0061
27	0.0075	0.0013	0.0061
28	0.0075	0.0013	0.0061
29	0.0075	0.0013	0.0062
30	0.0075	0.0013	0.0062
31	0.0076	0.0013	0.0062
32	0.0076	0.0014	0.0062
33	0.0076	0.0014	0.0063
34	0.0076	0.0014	0.0063
35	0.0077	0.0014	0.0063
36	0.0077	0.0014	0.0063
37	0.0077	0.0014	0.0063
38	0.0077	0.0014	0.0064
39	0.0078	0.0014	0.0064
40	0.0078	0.0014	0.0064
41	0.0078	0.0014	0.0064
42	0.0079	0.0014	0.0064
43	0.0079	0.0014	0.0065
44	0.0079	0.0014	0.0065
45	0.0079	0.0014	0.0065
46	0.0080	0.0014	0.0065
47	0.0080	0.0014	0.0066

48	0.0080	0.0014	0.0066
49	0.0081	0.0014	0.0066
50	0.0081	0.0014	0.0066
51	0.0081	0.0015	0.0067
52	0.0082	0.0015	0.0067
53	0.0082	0.0015	0.0067
54	0.0082	0.0015	0.0068
55	0.0083	0.0015	0.0068
56	0.0083	0.0015	0.0068
57	0.0083	0.0015	0.0068
58	0.0084	0.0015	0.0069
59	0.0084	0.0015	0.0069
60	0.0084	0.0015	0.0069
61	0.0085	0.0015	0.0070
62	0.0085	0.0015	0.0070
63	0.0085	0.0015	0.0070
64	0.0086	0.0015	0.0070
65	0.0086	0.0015	0.0071
66	0.0086	0.0015	0.0071
67	0.0087	0.0016	0.0071
68	0.0087	0.0016	0.0072
69	0.0088	0.0016	0.0072
70	0.0088	0.0016	0.0072
71	0.0089	0.0016	0.0073
72	0.0089	0.0016	0.0073
73	0.0089	0.0016	0.0073
74	0.0090	0.0016	0.0074
75	0.0090	0.0016	0.0074
76	0.0091	0.0016	0.0074
77	0.0091	0.0016	0.0075
78	0.0091	0.0016	0.0075
79	0.0092	0.0016	0.0076
80	0.0092	0.0016	0.0076
81	0.0093	0.0017	0.0076
82	0.0093	0.0017	0.0077
83	0.0094	0.0017	0.0077
84	0.0094	0.0017	0.0077
85	0.0095	0.0017	0.0078
86	0.0095	0.0017	0.0078
87	0.0096	0.0017	0.0079
88	0.0096	0.0017	0.0079
89	0.0097	0.0017	0.0080
90	0.0097	0.0017	0.0080
91	0.0098	0.0017	0.0080
92	0.0098	0.0018	0.0081
93	0.0099	0.0018	0.0081
94	0.0099	0.0018	0.0082
95	0.0100	0.0018	0.0082
96	0.0101	0.0018	0.0083
97	0.0101	0.0018	0.0083
98	0.0102	0.0018	0.0084
99	0.0103	0.0018	0.0084
100	0.0103	0.0018	0.0085
101	0.0104	0.0019	0.0085
102	0.0104	0.0019	0.0086
103	0.0105	0.0019	0.0086
104	0.0105	0.0019	0.0087

105	0.0106	0.0019	0.0087
106	0.0107	0.0019	0.0088
107	0.0108	0.0019	0.0089
108	0.0108	0.0019	0.0089
109	0.0109	0.0019	0.0090
110	0.0110	0.0020	0.0090
111	0.0111	0.0020	0.0091
112	0.0111	0.0020	0.0091
113	0.0112	0.0020	0.0092
114	0.0113	0.0020	0.0093
115	0.0114	0.0020	0.0093
116	0.0114	0.0020	0.0094
117	0.0115	0.0021	0.0095
118	0.0116	0.0021	0.0095
119	0.0117	0.0021	0.0096
120	0.0118	0.0021	0.0097
121	0.0119	0.0021	0.0098
122	0.0120	0.0021	0.0098
123	0.0121	0.0022	0.0099
124	0.0122	0.0022	0.0100
125	0.0123	0.0022	0.0101
126	0.0124	0.0022	0.0102
127	0.0125	0.0022	0.0103
128	0.0126	0.0022	0.0103
129	0.0127	0.0023	0.0104
130	0.0128	0.0023	0.0105
131	0.0129	0.0023	0.0106
132	0.0130	0.0023	0.0107
133	0.0132	0.0024	0.0108
134	0.0133	0.0024	0.0109
135	0.0134	0.0024	0.0110
136	0.0135	0.0024	0.0111
137	0.0137	0.0024	0.0113
138	0.0138	0.0025	0.0113
139	0.0140	0.0025	0.0115
140	0.0141	0.0025	0.0116
141	0.0143	0.0026	0.0117
142	0.0144	0.0026	0.0118
143	0.0146	0.0026	0.0120
144	0.0147	0.0026	0.0121
145	0.0168	0.0030	0.0138
146	0.0169	0.0030	0.0139
147	0.0172	0.0031	0.0141
148	0.0173	0.0031	0.0142
149	0.0176	0.0031	0.0144
150	0.0177	0.0032	0.0146
151	0.0180	0.0032	0.0148
152	0.0181	0.0032	0.0149
153	0.0185	0.0033	0.0152
154	0.0186	0.0033	0.0153
155	0.0189	0.0034	0.0156
156	0.0191	0.0034	0.0157
157	0.0195	0.0035	0.0160
158	0.0197	0.0035	0.0161
159	0.0200	0.0036	0.0165
160	0.0202	0.0036	0.0166
161	0.0207	0.0037	0.0170

162	0.0209	0.0037	0.0172
163	0.0214	0.0038	0.0175
164	0.0216	0.0039	0.0177
165	0.0221	0.0040	0.0182
166	0.0224	0.0040	0.0184
167	0.0230	0.0041	0.0189
168	0.0233	0.0042	0.0191
169	0.0240	0.0043	0.0197
170	0.0243	0.0043	0.0200
171	0.0250	0.0045	0.0206
172	0.0254	0.0045	0.0209
173	0.0263	0.0047	0.0216
174	0.0268	0.0048	0.0220
175	0.0277	0.0050	0.0228
176	0.0283	0.0051	0.0232
177	0.0295	0.0053	0.0242
178	0.0301	0.0054	0.0247
179	0.0316	0.0056	0.0259
180	0.0324	0.0058	0.0266
181	0.0342	0.0061	0.0281
182	0.0352	0.0063	0.0289
183	0.0376	0.0067	0.0309
184	0.0390	0.0070	0.0320
185	0.0341	0.0061	0.0280
186	0.0360	0.0064	0.0296
187	0.0409	0.0073	0.0336
188	0.0441	0.0079	0.0362
189	0.0532	0.0095	0.0437
190	0.0600	0.0107	0.0493
191	0.0858	0.0108	0.0749
192	0.1179	0.0108	0.1071
193	0.3691	0.0108	0.3583
194	0.0699	0.0108	0.0590
195	0.0481	0.0086	0.0395
196	0.0383	0.0068	0.0314
197	0.0405	0.0072	0.0333
198	0.0363	0.0065	0.0298
199	0.0332	0.0059	0.0273
200	0.0308	0.0055	0.0253
201	0.0289	0.0052	0.0237
202	0.0272	0.0049	0.0224
203	0.0259	0.0046	0.0212
204	0.0247	0.0044	0.0203
205	0.0236	0.0042	0.0194
206	0.0227	0.0040	0.0186
207	0.0219	0.0039	0.0180
208	0.0211	0.0038	0.0173
209	0.0205	0.0037	0.0168
210	0.0198	0.0035	0.0163
211	0.0193	0.0034	0.0158
212	0.0188	0.0034	0.0154
213	0.0183	0.0033	0.0150
214	0.0179	0.0032	0.0147
215	0.0174	0.0031	0.0143
216	0.0171	0.0030	0.0140
217	0.0148	0.0026	0.0122
218	0.0145	0.0026	0.0119

219	0.0142	0.0025	0.0117
220	0.0139	0.0025	0.0114
221	0.0136	0.0024	0.0112
222	0.0134	0.0024	0.0110
223	0.0131	0.0023	0.0108
224	0.0129	0.0023	0.0106
225	0.0126	0.0023	0.0104
226	0.0124	0.0022	0.0102
227	0.0122	0.0022	0.0100
228	0.0120	0.0021	0.0099
229	0.0118	0.0021	0.0097
230	0.0117	0.0021	0.0096
231	0.0115	0.0021	0.0094
232	0.0113	0.0020	0.0093
233	0.0112	0.0020	0.0092
234	0.0110	0.0020	0.0090
235	0.0109	0.0019	0.0089
236	0.0107	0.0019	0.0088
237	0.0106	0.0019	0.0087
238	0.0105	0.0019	0.0086
239	0.0103	0.0018	0.0085
240	0.0102	0.0018	0.0084
241	0.0101	0.0018	0.0083
242	0.0100	0.0018	0.0082
243	0.0099	0.0018	0.0081
244	0.0098	0.0017	0.0080
245	0.0097	0.0017	0.0079
246	0.0095	0.0017	0.0078
247	0.0095	0.0017	0.0078
248	0.0094	0.0017	0.0077
249	0.0093	0.0017	0.0076
250	0.0092	0.0016	0.0075
251	0.0091	0.0016	0.0075
252	0.0090	0.0016	0.0074
253	0.0089	0.0016	0.0073
254	0.0088	0.0016	0.0073
255	0.0088	0.0016	0.0072
256	0.0087	0.0015	0.0071
257	0.0086	0.0015	0.0071
258	0.0085	0.0015	0.0070
259	0.0085	0.0015	0.0069
260	0.0084	0.0015	0.0069
261	0.0083	0.0015	0.0068
262	0.0082	0.0015	0.0068
263	0.0082	0.0015	0.0067
264	0.0081	0.0014	0.0067
265	0.0081	0.0014	0.0066
266	0.0080	0.0014	0.0066
267	0.0079	0.0014	0.0065
268	0.0079	0.0014	0.0065
269	0.0078	0.0014	0.0064
270	0.0078	0.0014	0.0064
271	0.0077	0.0014	0.0063
272	0.0076	0.0014	0.0063
273	0.0076	0.0014	0.0062
274	0.0075	0.0013	0.0062
275	0.0075	0.0013	0.0062

276	0.0074	0.0013	0.0061
277	0.0074	0.0013	0.0061
278	0.0073	0.0013	0.0060
279	0.0073	0.0013	0.0060
280	0.0072	0.0013	0.0060
281	0.0072	0.0013	0.0059
282	0.0072	0.0013	0.0059
283	0.0071	0.0013	0.0058
284	0.0071	0.0013	0.0058
285	0.0070	0.0013	0.0058
286	0.0070	0.0012	0.0057
287	0.0069	0.0012	0.0057
288	0.0069	0.0012	0.0057

Total soil rain loss = 0.73(In)
Total effective rainfall = 3.75(In)
Peak flow rate in flood hydrograph = 37.67(CFS)

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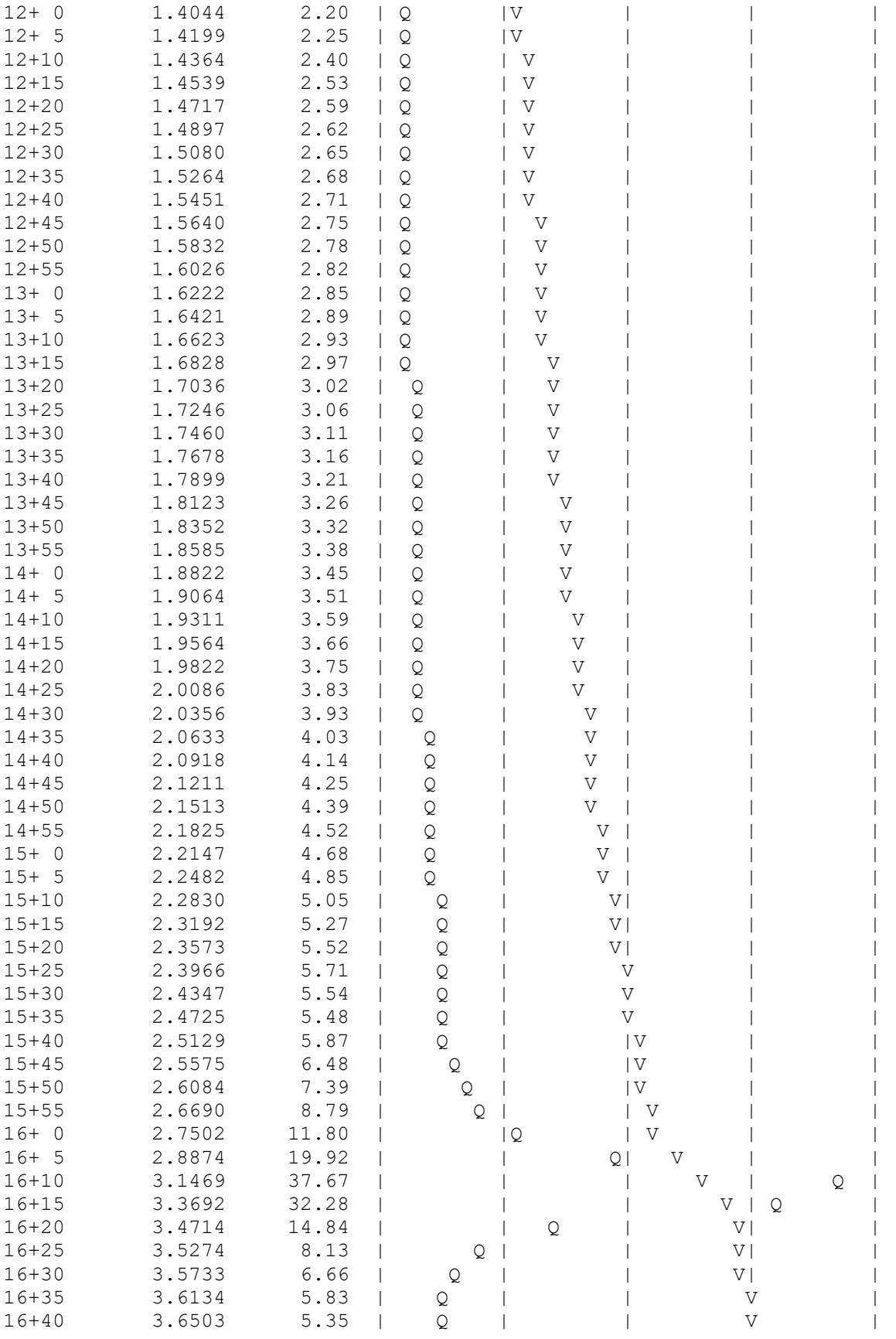
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0006	0.08	Q				
0+10	0.0042	0.52	Q				
0+15	0.0105	0.91	Q				
0+20	0.0175	1.02	VQ				
0+25	0.0247	1.04	VQ				
0+30	0.0319	1.06	VQ				
0+35	0.0392	1.06	VQ				
0+40	0.0465	1.06	VQ				
0+45	0.0539	1.06	VQ				
0+50	0.0612	1.07	VQ				
0+55	0.0686	1.07	VQ				
1+ 0	0.0760	1.07	VQ				
1+ 5	0.0834	1.08	VQ				
1+10	0.0909	1.08	VQ				
1+15	0.0983	1.08	VQ				
1+20	0.1058	1.09	VQ				
1+25	0.1133	1.09	VQ				
1+30	0.1209	1.09	|Q				
1+35	0.1284	1.10	|Q				
1+40	0.1360	1.10	|Q				
1+45	0.1436	1.11	|Q				
1+50	0.1513	1.11	|Q				
1+55	0.1589	1.11	|Q				
2+ 0	0.1666	1.12	|Q				
2+ 5	0.1743	1.12	|Q				
2+10	0.1821	1.12	|Q				
2+15	0.1898	1.13	|Q				
2+20	0.1976	1.13	|Q				
2+25	0.2054	1.13	|Q				

2+30	0.2133	1.14	|Q	|	|	|	|
2+35	0.2211	1.14	|Q	|	|	|	|
2+40	0.2290	1.15	|Q	|	|	|	|
2+45	0.2370	1.15	|Q	|	|	|	|
2+50	0.2449	1.15	|QV	|	|	|	|
2+55	0.2529	1.16	|QV	|	|	|	|
3+ 0	0.2609	1.16	|QV	|	|	|	|
3+ 5	0.2689	1.17	|QV	|	|	|	|
3+10	0.2770	1.17	|QV	|	|	|	|
3+15	0.2851	1.17	|QV	|	|	|	|
3+20	0.2932	1.18	|QV	|	|	|	|
3+25	0.3013	1.18	|QV	|	|	|	|
3+30	0.3095	1.19	|QV	|	|	|	|
3+35	0.3177	1.19	|QV	|	|	|	|
3+40	0.3260	1.20	|QV	|	|	|	|
3+45	0.3343	1.20	|QV	|	|	|	|
3+50	0.3426	1.21	|QV	|	|	|	|
3+55	0.3509	1.21	|QV	|	|	|	|
4+ 0	0.3593	1.21	|Q V	|	|	|	|
4+ 5	0.3677	1.22	|Q V	|	|	|	|
4+10	0.3761	1.22	|Q V	|	|	|	|
4+15	0.3845	1.23	|Q V	|	|	|	|
4+20	0.3930	1.23	|Q V	|	|	|	|
4+25	0.4016	1.24	|Q V	|	|	|	|
4+30	0.4101	1.24	|Q V	|	|	|	|
4+35	0.4187	1.25	|Q V	|	|	|	|
4+40	0.4274	1.25	|Q V	|	|	|	|
4+45	0.4360	1.26	|Q V	|	|	|	|
4+50	0.4447	1.26	|Q V	|	|	|	|
4+55	0.4535	1.27	|Q V	|	|	|	|
5+ 0	0.4623	1.27	|Q V	|	|	|	|
5+ 5	0.4711	1.28	|Q V	|	|	|	|
5+10	0.4799	1.28	|Q V	|	|	|	|
5+15	0.4888	1.29	|Q V	|	|	|	|
5+20	0.4977	1.30	|Q V	|	|	|	|
5+25	0.5067	1.30	|Q V	|	|	|	|
5+30	0.5157	1.31	|Q V	|	|	|	|
5+35	0.5247	1.31	|Q V	|	|	|	|
5+40	0.5338	1.32	|Q V	|	|	|	|
5+45	0.5429	1.32	|Q V	|	|	|	|
5+50	0.5521	1.33	|Q V	|	|	|	|
5+55	0.5613	1.34	|Q V	|	|	|	|
6+ 0	0.5705	1.34	|Q V	|	|	|	|
6+ 5	0.5798	1.35	|Q V	|	|	|	|
6+10	0.5892	1.35	|Q V	|	|	|	|
6+15	0.5985	1.36	|Q V	|	|	|	|
6+20	0.6080	1.37	|Q V	|	|	|	|
6+25	0.6174	1.37	|Q V	|	|	|	|
6+30	0.6269	1.38	|Q V	|	|	|	|
6+35	0.6365	1.39	|Q V	|	|	|	|
6+40	0.6461	1.39	|Q V	|	|	|	|
6+45	0.6557	1.40	|Q V	|	|	|	|
6+50	0.6654	1.41	|Q V	|	|	|	|
6+55	0.6752	1.41	|Q V	|	|	|	|
7+ 0	0.6850	1.42	|Q V	|	|	|	|
7+ 5	0.6948	1.43	|Q V	|	|	|	|
7+10	0.7047	1.44	|Q V	|	|	|	|

7+15	0.7147	1.44	|Q V |	|	|	|
7+20	0.7247	1.45	|Q V |	|	|	|
7+25	0.7347	1.46	|Q V |	|	|	|
7+30	0.7448	1.47	|Q V |	|	|	|
7+35	0.7550	1.48	|Q V |	|	|	|
7+40	0.7652	1.48	|Q V |	|	|	|
7+45	0.7755	1.49	|Q V |	|	|	|
7+50	0.7858	1.50	|Q V |	|	|	|
7+55	0.7962	1.51	|Q V |	|	|	|
8+ 0	0.8066	1.52	|Q V |	|	|	|
8+ 5	0.8171	1.53	|Q V |	|	|	|
8+10	0.8277	1.53	|Q V |	|	|	|
8+15	0.8383	1.54	|Q V |	|	|	|
8+20	0.8490	1.55	|Q V |	|	|	|
8+25	0.8598	1.56	|Q V |	|	|	|
8+30	0.8706	1.57	|Q V |	|	|	|
8+35	0.8815	1.58	|Q V |	|	|	|
8+40	0.8924	1.59	|Q V |	|	|	|
8+45	0.9034	1.60	|Q V |	|	|	|
8+50	0.9145	1.61	|Q V |	|	|	|
8+55	0.9257	1.62	|Q V |	|	|	|
9+ 0	0.9369	1.63	|Q V |	|	|	|
9+ 5	0.9482	1.64	|Q V |	|	|	|
9+10	0.9596	1.65	|Q V |	|	|	|
9+15	0.9711	1.66	|Q V |	|	|	|
9+20	0.9826	1.67	|Q V |	|	|	|
9+25	0.9942	1.69	|Q V |	|	|	|
9+30	1.0059	1.70	|Q V |	|	|	|
9+35	1.0177	1.71	|Q V |	|	|	|
9+40	1.0295	1.72	|Q V |	|	|	|
9+45	1.0415	1.73	|Q V |	|	|	|
9+50	1.0535	1.75	|Q V |	|	|	|
9+55	1.0656	1.76	|Q V |	|	|	|
10+ 0	1.0778	1.77	|Q V|	|	|	|
10+ 5	1.0901	1.79	|Q V|	|	|	|
10+10	1.1025	1.80	|Q V|	|	|	|
10+15	1.1150	1.81	|Q V|	|	|	|
10+20	1.1276	1.83	|Q V|	|	|	|
10+25	1.1403	1.84	|Q V|	|	|	|
10+30	1.1531	1.86	|Q V|	|	|	|
10+35	1.1660	1.87	|Q V|	|	|	|
10+40	1.1790	1.89	|Q V|	|	|	|
10+45	1.1922	1.91	|Q V|	|	|	|
10+50	1.2054	1.92	|Q V	|	|	|
10+55	1.2188	1.94	|Q V	|	|	|
11+ 0	1.2322	1.96	|Q V	|	|	|
11+ 5	1.2458	1.97	|Q V	|	|	|
11+10	1.2595	1.99	|Q V	|	|	|
11+15	1.2734	2.01	| Q V	|	|	|
11+20	1.2874	2.03	| Q V	|	|	|
11+25	1.3015	2.05	| Q V	|	|	|
11+30	1.3157	2.07	| Q |V	|	|	|
11+35	1.3301	2.09	| Q |V	|	|	|
11+40	1.3447	2.11	| Q |V	|	|	|
11+45	1.3594	2.13	| Q |V	|	|	|
11+50	1.3742	2.16	| Q |V	|	|	|
11+55	1.3892	2.18	| Q |V	|	|	|



16+45	3.6842	4.92	Q		V	
16+50	3.7157	4.58	Q		V	
16+55	3.7453	4.30	Q		V	
17+ 0	3.7733	4.07	Q		V	
17+ 5	3.8000	3.86	Q		V	
17+10	3.8254	3.69	Q		V	
17+15	3.8497	3.54	Q		V	
17+20	3.8732	3.40	Q		V	
17+25	3.8958	3.28	Q		V	
17+30	3.9176	3.17	Q		V	
17+35	3.9388	3.07	Q		V	
17+40	3.9593	2.98	Q		V	
17+45	3.9793	2.90	Q		V	
17+50	3.9988	2.83	Q		V	
17+55	4.0178	2.76	Q		V	
18+ 0	4.0363	2.69	Q		V	
18+ 5	4.0543	2.61	Q		V	
18+10	4.0710	2.43	Q		V	
18+15	4.0867	2.27	Q		V	
18+20	4.1018	2.19	Q		V	
18+25	4.1165	2.14	Q		V	
18+30	4.1310	2.10	Q		V	
18+35	4.1451	2.06	Q		V	
18+40	4.1590	2.02	Q		V	
18+45	4.1726	1.98	Q		V	
18+50	4.1860	1.94	Q		V	
18+55	4.1992	1.91	Q		V	
19+ 0	4.2121	1.88	Q		V	
19+ 5	4.2248	1.85	Q		V	
19+10	4.2374	1.82	Q		V	
19+15	4.2497	1.79	Q		V	
19+20	4.2618	1.76	Q		V	
19+25	4.2738	1.74	Q		V	
19+30	4.2856	1.71	Q		V	
19+35	4.2972	1.69	Q		V	
19+40	4.3087	1.67	Q		V	
19+45	4.3200	1.64	Q		V	
19+50	4.3312	1.62	Q		V	
19+55	4.3423	1.60	Q		V	
20+ 0	4.3532	1.58	Q		V	
20+ 5	4.3639	1.56	Q		V	
20+10	4.3746	1.55	Q		V	
20+15	4.3851	1.53	Q		V	
20+20	4.3955	1.51	Q		V	
20+25	4.4058	1.49	Q		V	
20+30	4.4160	1.48	Q		V	
20+35	4.4260	1.46	Q		V	
20+40	4.4360	1.45	Q		V	
20+45	4.4458	1.43	Q		V	
20+50	4.4556	1.42	Q		V	
20+55	4.4653	1.40	Q		V	
21+ 0	4.4748	1.39	Q		V	
21+ 5	4.4843	1.38	Q		V	
21+10	4.4937	1.36	Q		V	
21+15	4.5030	1.35	Q		V	
21+20	4.5122	1.34	Q		V	
21+25	4.5213	1.33	Q		V	

21+30	4.5304	1.31	|Q	|	|	|	V |
21+35	4.5394	1.30	|Q	|	|	|	V |
21+40	4.5483	1.29	|Q	|	|	|	V |
21+45	4.5571	1.28	|Q	|	|	|	V |
21+50	4.5658	1.27	|Q	|	|	|	V |
21+55	4.5745	1.26	|Q	|	|	|	V |
22+ 0	4.5831	1.25	|Q	|	|	|	V |
22+ 5	4.5917	1.24	|Q	|	|	|	V |
22+10	4.6001	1.23	|Q	|	|	|	V |
22+15	4.6085	1.22	|Q	|	|	|	V |
22+20	4.6169	1.21	|Q	|	|	|	V |
22+25	4.6252	1.20	|Q	|	|	|	V |
22+30	4.6334	1.19	|Q	|	|	|	V |
22+35	4.6415	1.18	|Q	|	|	|	V |
22+40	4.6496	1.18	|Q	|	|	|	V |
22+45	4.6577	1.17	|Q	|	|	|	V |
22+50	4.6657	1.16	|Q	|	|	|	V|
22+55	4.6736	1.15	|Q	|	|	|	V|
23+ 0	4.6815	1.14	|Q	|	|	|	V|
23+ 5	4.6893	1.14	|Q	|	|	|	V|
23+10	4.6971	1.13	|Q	|	|	|	V|
23+15	4.7048	1.12	|Q	|	|	|	V|
23+20	4.7124	1.11	|Q	|	|	|	V|
23+25	4.7201	1.11	|Q	|	|	|	V|
23+30	4.7276	1.10	|Q	|	|	|	V|
23+35	4.7351	1.09	|Q	|	|	|	V|
23+40	4.7426	1.09	|Q	|	|	|	V|
23+45	4.7501	1.08	|Q	|	|	|	V|
23+50	4.7574	1.07	|Q	|	|	|	V|
23+55	4.7648	1.07	|Q	|	|	|	V|
24+ 0	4.7721	1.06	|Q	|	|	|	V|
24+ 5	4.7787	0.97	Q	|	|	|	V|
24+10	4.7824	0.53	Q	|	|	|	V|
24+15	4.7833	0.13	Q	|	|	|	V|
24+20	4.7835	0.03	Q	|	|	|	V|
24+25	4.7835	0.01	Q	|	|	|	V|

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE PROPOSED CONDITION NORTHERLY CHAMBER SYSTEM
10-YEAR STORM ANALYSIS

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		
15.31	1	0.81
Rainfall data for year 10		
15.31	6	2.02
Rainfall data for year 10		
15.31	24	3.71

++

******** 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)
32.0	32.0	15.31	1.000	0.978	0.133	0.130

Area-averaged adjusted loss rate Fm (In/Hr) = 0.130

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
2.04	0.133	32.0	32.0	18.55	0.000
13.27	0.867	98.0	98.0	0.20	0.937

Area-averaged catchment yield fraction, Y = 0.812
Area-averaged low loss fraction, Yb = 0.188
User entry of time of concentration = 0.159 (hours)
++
Watershed area = 15.31(Ac.)
Catchment Lag time = 0.127 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 65.6375
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.130(In/Hr)
Average low loss rate fraction (Yb) = 0.188 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.301(In)
Computed peak 30-minute rainfall = 0.616(In)
Specified peak 1-hour rainfall = 0.813(In)
Computed peak 3-hour rainfall = 1.421(In)
Specified peak 6-hour rainfall = 2.020(In)
Specified peak 24-hour rainfall = 3.710(In)

Rainfall depth area reduction factors:
Using a total area of 15.31(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.301(In)
30-minute factor = 0.999 Adjusted rainfall = 0.616(In)
1-hour factor = 0.999 Adjusted rainfall = 0.812(In)
3-hour factor = 1.000 Adjusted rainfall = 1.420(In)
6-hour factor = 1.000 Adjusted rainfall = 2.020(In)
24-hour factor = 1.000 Adjusted rainfall = 3.710(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 = 185.16 (CFS))	
1	7.755	14.359
2	48.512	75.464
3	86.387	70.128
4	97.165	19.955
5	99.117	3.614
6	100.000	1.636

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3007	0.3007
2	0.3968	0.0961
3	0.4666	0.0699
4	0.5235	0.0569
5	0.5724	0.0489
6	0.6157	0.0433
7	0.6549	0.0392
8	0.6908	0.0359
9	0.7241	0.0333
10	0.7553	0.0312
11	0.7846	0.0294
12	0.8124	0.0278
13	0.8462	0.0338
14	0.8787	0.0325
15	0.9100	0.0314
16	0.9404	0.0304
17	0.9698	0.0294
18	0.9984	0.0286
19	1.0263	0.0278
20	1.0534	0.0271
21	1.0799	0.0265
22	1.1057	0.0259
23	1.1310	0.0253
24	1.1557	0.0247
25	1.1800	0.0242
26	1.2037	0.0238
27	1.2271	0.0233
28	1.2500	0.0229
29	1.2725	0.0225
30	1.2946	0.0221
31	1.3164	0.0218
32	1.3378	0.0214
33	1.3589	0.0211
34	1.3797	0.0208
35	1.4002	0.0205
36	1.4204	0.0202
37	1.4403	0.0199
38	1.4599	0.0196
39	1.4793	0.0194
40	1.4985	0.0191
41	1.5174	0.0189
42	1.5361	0.0187
43	1.5546	0.0185
44	1.5728	0.0183
45	1.5909	0.0181
46	1.6087	0.0179
47	1.6264	0.0177
48	1.6439	0.0175
49	1.6612	0.0173
50	1.6783	0.0171
51	1.6953	0.0170
52	1.7121	0.0168
53	1.7288	0.0166
54	1.7453	0.0165
55	1.7616	0.0163

56	1.7778	0.0162
57	1.7939	0.0161
58	1.8098	0.0159
59	1.8256	0.0158
60	1.8412	0.0157
61	1.8567	0.0155
62	1.8721	0.0154
63	1.8874	0.0153
64	1.9026	0.0152
65	1.9176	0.0150
66	1.9326	0.0149
67	1.9474	0.0148
68	1.9621	0.0147
69	1.9767	0.0146
70	1.9912	0.0145
71	2.0056	0.0144
72	2.0199	0.0143
73	2.0322	0.0123
74	2.0443	0.0122
75	2.0564	0.0121
76	2.0684	0.0120
77	2.0803	0.0119
78	2.0921	0.0118
79	2.1038	0.0117
80	2.1154	0.0116
81	2.1270	0.0116
82	2.1385	0.0115
83	2.1499	0.0114
84	2.1612	0.0113
85	2.1724	0.0112
86	2.1836	0.0112
87	2.1947	0.0111
88	2.2057	0.0110
89	2.2167	0.0110
90	2.2276	0.0109
91	2.2384	0.0108
92	2.2491	0.0108
93	2.2598	0.0107
94	2.2705	0.0106
95	2.2810	0.0106
96	2.2915	0.0105
97	2.3020	0.0104
98	2.3123	0.0104
99	2.3226	0.0103
100	2.3329	0.0103
101	2.3431	0.0102
102	2.3533	0.0101
103	2.3633	0.0101
104	2.3734	0.0100
105	2.3834	0.0100
106	2.3933	0.0099
107	2.4032	0.0099
108	2.4130	0.0098
109	2.4228	0.0098
110	2.4325	0.0097
111	2.4422	0.0097
112	2.4518	0.0096

113	2.4614	0.0096
114	2.4709	0.0095
115	2.4804	0.0095
116	2.4898	0.0094
117	2.4992	0.0094
118	2.5085	0.0093
119	2.5178	0.0093
120	2.5271	0.0093
121	2.5363	0.0092
122	2.5455	0.0092
123	2.5546	0.0091
124	2.5637	0.0091
125	2.5728	0.0090
126	2.5818	0.0090
127	2.5907	0.0090
128	2.5997	0.0089
129	2.6085	0.0089
130	2.6174	0.0088
131	2.6262	0.0088
132	2.6350	0.0088
133	2.6437	0.0087
134	2.6524	0.0087
135	2.6611	0.0087
136	2.6697	0.0086
137	2.6783	0.0086
138	2.6868	0.0086
139	2.6954	0.0085
140	2.7039	0.0085
141	2.7123	0.0085
142	2.7207	0.0084
143	2.7291	0.0084
144	2.7375	0.0084
145	2.7458	0.0083
146	2.7541	0.0083
147	2.7623	0.0083
148	2.7706	0.0082
149	2.7787	0.0082
150	2.7869	0.0082
151	2.7950	0.0081
152	2.8031	0.0081
153	2.8112	0.0081
154	2.8193	0.0080
155	2.8273	0.0080
156	2.8353	0.0080
157	2.8432	0.0080
158	2.8511	0.0079
159	2.8590	0.0079
160	2.8669	0.0079
161	2.8748	0.0078
162	2.8826	0.0078
163	2.8904	0.0078
164	2.8981	0.0078
165	2.9059	0.0077
166	2.9136	0.0077
167	2.9213	0.0077
168	2.9289	0.0077
169	2.9366	0.0076

170	2.9442	0.0076
171	2.9517	0.0076
172	2.9593	0.0076
173	2.9668	0.0075
174	2.9743	0.0075
175	2.9818	0.0075
176	2.9893	0.0075
177	2.9967	0.0074
178	3.0041	0.0074
179	3.0115	0.0074
180	3.0189	0.0074
181	3.0262	0.0073
182	3.0336	0.0073
183	3.0409	0.0073
184	3.0481	0.0073
185	3.0554	0.0073
186	3.0626	0.0072
187	3.0698	0.0072
188	3.0770	0.0072
189	3.0842	0.0072
190	3.0913	0.0071
191	3.0985	0.0071
192	3.1056	0.0071
193	3.1126	0.0071
194	3.1197	0.0071
195	3.1268	0.0070
196	3.1338	0.0070
197	3.1408	0.0070
198	3.1478	0.0070
199	3.1547	0.0070
200	3.1617	0.0069
201	3.1686	0.0069
202	3.1755	0.0069
203	3.1824	0.0069
204	3.1892	0.0069
205	3.1961	0.0068
206	3.2029	0.0068
207	3.2097	0.0068
208	3.2165	0.0068
209	3.2233	0.0068
210	3.2300	0.0068
211	3.2368	0.0067
212	3.2435	0.0067
213	3.2502	0.0067
214	3.2569	0.0067
215	3.2635	0.0067
216	3.2702	0.0066
217	3.2768	0.0066
218	3.2834	0.0066
219	3.2900	0.0066
220	3.2966	0.0066
221	3.3032	0.0066
222	3.3097	0.0065
223	3.3163	0.0065
224	3.3228	0.0065
225	3.3293	0.0065
226	3.3357	0.0065

227	3.3422	0.0065
228	3.3487	0.0064
229	3.3551	0.0064
230	3.3615	0.0064
231	3.3679	0.0064
232	3.3743	0.0064
233	3.3807	0.0064
234	3.3870	0.0064
235	3.3934	0.0063
236	3.3997	0.0063
237	3.4060	0.0063
238	3.4123	0.0063
239	3.4186	0.0063
240	3.4248	0.0063
241	3.4311	0.0063
242	3.4373	0.0062
243	3.4436	0.0062
244	3.4498	0.0062
245	3.4560	0.0062
246	3.4621	0.0062
247	3.4683	0.0062
248	3.4744	0.0062
249	3.4806	0.0061
250	3.4867	0.0061
251	3.4928	0.0061
252	3.4989	0.0061
253	3.5050	0.0061
254	3.5111	0.0061
255	3.5171	0.0061
256	3.5232	0.0060
257	3.5292	0.0060
258	3.5352	0.0060
259	3.5412	0.0060
260	3.5472	0.0060
261	3.5532	0.0060
262	3.5591	0.0060
263	3.5651	0.0060
264	3.5710	0.0059
265	3.5770	0.0059
266	3.5829	0.0059
267	3.5888	0.0059
268	3.5947	0.0059
269	3.6005	0.0059
270	3.6064	0.0059
271	3.6122	0.0059
272	3.6181	0.0058
273	3.6239	0.0058
274	3.6297	0.0058
275	3.6355	0.0058
276	3.6413	0.0058
277	3.6471	0.0058
278	3.6529	0.0058
279	3.6586	0.0058
280	3.6644	0.0057
281	3.6701	0.0057
282	3.6758	0.0057
283	3.6815	0.0057

284	3.6872	0.0057
285	3.6929	0.0057
286	3.6986	0.0057
287	3.7043	0.0057
288	3.7099	0.0057

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0057	0.0011	0.0046
2	0.0057	0.0011	0.0046
3	0.0057	0.0011	0.0046
4	0.0057	0.0011	0.0046
5	0.0057	0.0011	0.0046
6	0.0057	0.0011	0.0047
7	0.0058	0.0011	0.0047
8	0.0058	0.0011	0.0047
9	0.0058	0.0011	0.0047
10	0.0058	0.0011	0.0047
11	0.0058	0.0011	0.0047
12	0.0058	0.0011	0.0047
13	0.0059	0.0011	0.0048
14	0.0059	0.0011	0.0048
15	0.0059	0.0011	0.0048
16	0.0059	0.0011	0.0048
17	0.0059	0.0011	0.0048
18	0.0060	0.0011	0.0048
19	0.0060	0.0011	0.0049
20	0.0060	0.0011	0.0049
21	0.0060	0.0011	0.0049
22	0.0060	0.0011	0.0049
23	0.0061	0.0011	0.0049
24	0.0061	0.0011	0.0049
25	0.0061	0.0011	0.0049
26	0.0061	0.0011	0.0050
27	0.0061	0.0012	0.0050
28	0.0062	0.0012	0.0050
29	0.0062	0.0012	0.0050
30	0.0062	0.0012	0.0050
31	0.0062	0.0012	0.0051
32	0.0062	0.0012	0.0051
33	0.0063	0.0012	0.0051
34	0.0063	0.0012	0.0051
35	0.0063	0.0012	0.0051
36	0.0063	0.0012	0.0051
37	0.0064	0.0012	0.0052
38	0.0064	0.0012	0.0052
39	0.0064	0.0012	0.0052
40	0.0064	0.0012	0.0052
41	0.0064	0.0012	0.0052
42	0.0065	0.0012	0.0052
43	0.0065	0.0012	0.0053
44	0.0065	0.0012	0.0053
45	0.0065	0.0012	0.0053
46	0.0066	0.0012	0.0053
47	0.0066	0.0012	0.0054

48	0.0066	0.0012	0.0054
49	0.0066	0.0012	0.0054
50	0.0067	0.0013	0.0054
51	0.0067	0.0013	0.0054
52	0.0067	0.0013	0.0055
53	0.0068	0.0013	0.0055
54	0.0068	0.0013	0.0055
55	0.0068	0.0013	0.0055
56	0.0068	0.0013	0.0055
57	0.0069	0.0013	0.0056
58	0.0069	0.0013	0.0056
59	0.0069	0.0013	0.0056
60	0.0069	0.0013	0.0056
61	0.0070	0.0013	0.0057
62	0.0070	0.0013	0.0057
63	0.0070	0.0013	0.0057
64	0.0071	0.0013	0.0057
65	0.0071	0.0013	0.0058
66	0.0071	0.0013	0.0058
67	0.0072	0.0013	0.0058
68	0.0072	0.0014	0.0058
69	0.0072	0.0014	0.0059
70	0.0073	0.0014	0.0059
71	0.0073	0.0014	0.0059
72	0.0073	0.0014	0.0059
73	0.0074	0.0014	0.0060
74	0.0074	0.0014	0.0060
75	0.0074	0.0014	0.0060
76	0.0075	0.0014	0.0061
77	0.0075	0.0014	0.0061
78	0.0075	0.0014	0.0061
79	0.0076	0.0014	0.0062
80	0.0076	0.0014	0.0062
81	0.0077	0.0014	0.0062
82	0.0077	0.0014	0.0062
83	0.0077	0.0015	0.0063
84	0.0078	0.0015	0.0063
85	0.0078	0.0015	0.0063
86	0.0078	0.0015	0.0064
87	0.0079	0.0015	0.0064
88	0.0079	0.0015	0.0064
89	0.0080	0.0015	0.0065
90	0.0080	0.0015	0.0065
91	0.0081	0.0015	0.0066
92	0.0081	0.0015	0.0066
93	0.0082	0.0015	0.0066
94	0.0082	0.0015	0.0067
95	0.0083	0.0016	0.0067
96	0.0083	0.0016	0.0067
97	0.0084	0.0016	0.0068
98	0.0084	0.0016	0.0068
99	0.0085	0.0016	0.0069
100	0.0085	0.0016	0.0069
101	0.0086	0.0016	0.0069
102	0.0086	0.0016	0.0070
103	0.0087	0.0016	0.0070
104	0.0087	0.0016	0.0071

105	0.0088	0.0016	0.0071
106	0.0088	0.0017	0.0072
107	0.0089	0.0017	0.0072
108	0.0089	0.0017	0.0072
109	0.0090	0.0017	0.0073
110	0.0090	0.0017	0.0073
111	0.0091	0.0017	0.0074
112	0.0092	0.0017	0.0074
113	0.0093	0.0017	0.0075
114	0.0093	0.0017	0.0076
115	0.0094	0.0018	0.0076
116	0.0094	0.0018	0.0077
117	0.0095	0.0018	0.0077
118	0.0096	0.0018	0.0078
119	0.0097	0.0018	0.0079
120	0.0097	0.0018	0.0079
121	0.0098	0.0018	0.0080
122	0.0099	0.0019	0.0080
123	0.0100	0.0019	0.0081
124	0.0100	0.0019	0.0081
125	0.0101	0.0019	0.0082
126	0.0102	0.0019	0.0083
127	0.0103	0.0019	0.0084
128	0.0104	0.0020	0.0084
129	0.0105	0.0020	0.0085
130	0.0106	0.0020	0.0086
131	0.0107	0.0020	0.0087
132	0.0108	0.0020	0.0087
133	0.0109	0.0020	0.0088
134	0.0110	0.0021	0.0089
135	0.0111	0.0021	0.0090
136	0.0112	0.0021	0.0091
137	0.0113	0.0021	0.0092
138	0.0114	0.0021	0.0093
139	0.0116	0.0022	0.0094
140	0.0116	0.0022	0.0094
141	0.0118	0.0022	0.0096
142	0.0119	0.0022	0.0097
143	0.0121	0.0023	0.0098
144	0.0122	0.0023	0.0099
145	0.0143	0.0027	0.0116
146	0.0144	0.0027	0.0117
147	0.0146	0.0027	0.0119
148	0.0147	0.0028	0.0119
149	0.0149	0.0028	0.0121
150	0.0150	0.0028	0.0122
151	0.0153	0.0029	0.0124
152	0.0154	0.0029	0.0125
153	0.0157	0.0029	0.0127
154	0.0158	0.0030	0.0128
155	0.0161	0.0030	0.0130
156	0.0162	0.0030	0.0132
157	0.0165	0.0031	0.0134
158	0.0166	0.0031	0.0135
159	0.0170	0.0032	0.0138
160	0.0171	0.0032	0.0139
161	0.0175	0.0033	0.0142

162	0.0177	0.0033	0.0144
163	0.0181	0.0034	0.0147
164	0.0183	0.0034	0.0148
165	0.0187	0.0035	0.0152
166	0.0189	0.0036	0.0154
167	0.0194	0.0036	0.0157
168	0.0196	0.0037	0.0160
169	0.0202	0.0038	0.0164
170	0.0205	0.0039	0.0166
171	0.0211	0.0040	0.0171
172	0.0214	0.0040	0.0174
173	0.0221	0.0042	0.0180
174	0.0225	0.0042	0.0183
175	0.0233	0.0044	0.0189
176	0.0238	0.0045	0.0193
177	0.0247	0.0047	0.0201
178	0.0253	0.0048	0.0205
179	0.0265	0.0050	0.0215
180	0.0271	0.0051	0.0220
181	0.0286	0.0054	0.0232
182	0.0294	0.0055	0.0239
183	0.0314	0.0059	0.0255
184	0.0325	0.0061	0.0264
185	0.0278	0.0052	0.0226
186	0.0294	0.0055	0.0238
187	0.0333	0.0063	0.0271
188	0.0359	0.0068	0.0292
189	0.0433	0.0081	0.0352
190	0.0489	0.0092	0.0397
191	0.0699	0.0109	0.0590
192	0.0961	0.0109	0.0852
193	0.3007	0.0109	0.2898
194	0.0569	0.0107	0.0462
195	0.0392	0.0074	0.0318
196	0.0312	0.0059	0.0253
197	0.0338	0.0063	0.0274
198	0.0304	0.0057	0.0247
199	0.0278	0.0052	0.0226
200	0.0259	0.0049	0.0210
201	0.0242	0.0046	0.0197
202	0.0229	0.0043	0.0186
203	0.0218	0.0041	0.0177
204	0.0208	0.0039	0.0169
205	0.0199	0.0037	0.0162
206	0.0191	0.0036	0.0155
207	0.0185	0.0035	0.0150
208	0.0179	0.0034	0.0145
209	0.0173	0.0033	0.0141
210	0.0168	0.0032	0.0136
211	0.0163	0.0031	0.0133
212	0.0159	0.0030	0.0129
213	0.0155	0.0029	0.0126
214	0.0152	0.0029	0.0123
215	0.0148	0.0028	0.0120
216	0.0145	0.0027	0.0118
217	0.0123	0.0023	0.0100
218	0.0120	0.0023	0.0097

219	0.0117	0.0022	0.0095
220	0.0115	0.0022	0.0093
221	0.0112	0.0021	0.0091
222	0.0110	0.0021	0.0090
223	0.0108	0.0020	0.0088
224	0.0106	0.0020	0.0086
225	0.0104	0.0020	0.0085
226	0.0103	0.0019	0.0083
227	0.0101	0.0019	0.0082
228	0.0099	0.0019	0.0081
229	0.0098	0.0018	0.0079
230	0.0096	0.0018	0.0078
231	0.0095	0.0018	0.0077
232	0.0093	0.0018	0.0076
233	0.0092	0.0017	0.0075
234	0.0091	0.0017	0.0074
235	0.0090	0.0017	0.0073
236	0.0088	0.0017	0.0072
237	0.0087	0.0016	0.0071
238	0.0086	0.0016	0.0070
239	0.0085	0.0016	0.0069
240	0.0084	0.0016	0.0068
241	0.0083	0.0016	0.0068
242	0.0082	0.0015	0.0067
243	0.0081	0.0015	0.0066
244	0.0080	0.0015	0.0065
245	0.0080	0.0015	0.0065
246	0.0079	0.0015	0.0064
247	0.0078	0.0015	0.0063
248	0.0077	0.0014	0.0063
249	0.0076	0.0014	0.0062
250	0.0076	0.0014	0.0061
251	0.0075	0.0014	0.0061
252	0.0074	0.0014	0.0060
253	0.0073	0.0014	0.0060
254	0.0073	0.0014	0.0059
255	0.0072	0.0014	0.0059
256	0.0071	0.0013	0.0058
257	0.0071	0.0013	0.0058
258	0.0070	0.0013	0.0057
259	0.0070	0.0013	0.0057
260	0.0069	0.0013	0.0056
261	0.0068	0.0013	0.0056
262	0.0068	0.0013	0.0055
263	0.0067	0.0013	0.0055
264	0.0067	0.0013	0.0054
265	0.0066	0.0012	0.0054
266	0.0066	0.0012	0.0053
267	0.0065	0.0012	0.0053
268	0.0065	0.0012	0.0053
269	0.0064	0.0012	0.0052
270	0.0064	0.0012	0.0052
271	0.0063	0.0012	0.0051
272	0.0063	0.0012	0.0051
273	0.0063	0.0012	0.0051
274	0.0062	0.0012	0.0050
275	0.0062	0.0012	0.0050

276	0.0061	0.0012	0.0050
277	0.0061	0.0011	0.0049
278	0.0060	0.0011	0.0049
279	0.0060	0.0011	0.0049
280	0.0060	0.0011	0.0048
281	0.0059	0.0011	0.0048
282	0.0059	0.0011	0.0048
283	0.0059	0.0011	0.0048
284	0.0058	0.0011	0.0047
285	0.0058	0.0011	0.0047
286	0.0057	0.0011	0.0047
287	0.0057	0.0011	0.0046
288	0.0057	0.0011	0.0046

Total soil rain loss = 0.64(In)
Total effective rainfall = 3.07(In)
Peak flow rate in flood hydrograph = 29.89(CFS)

++

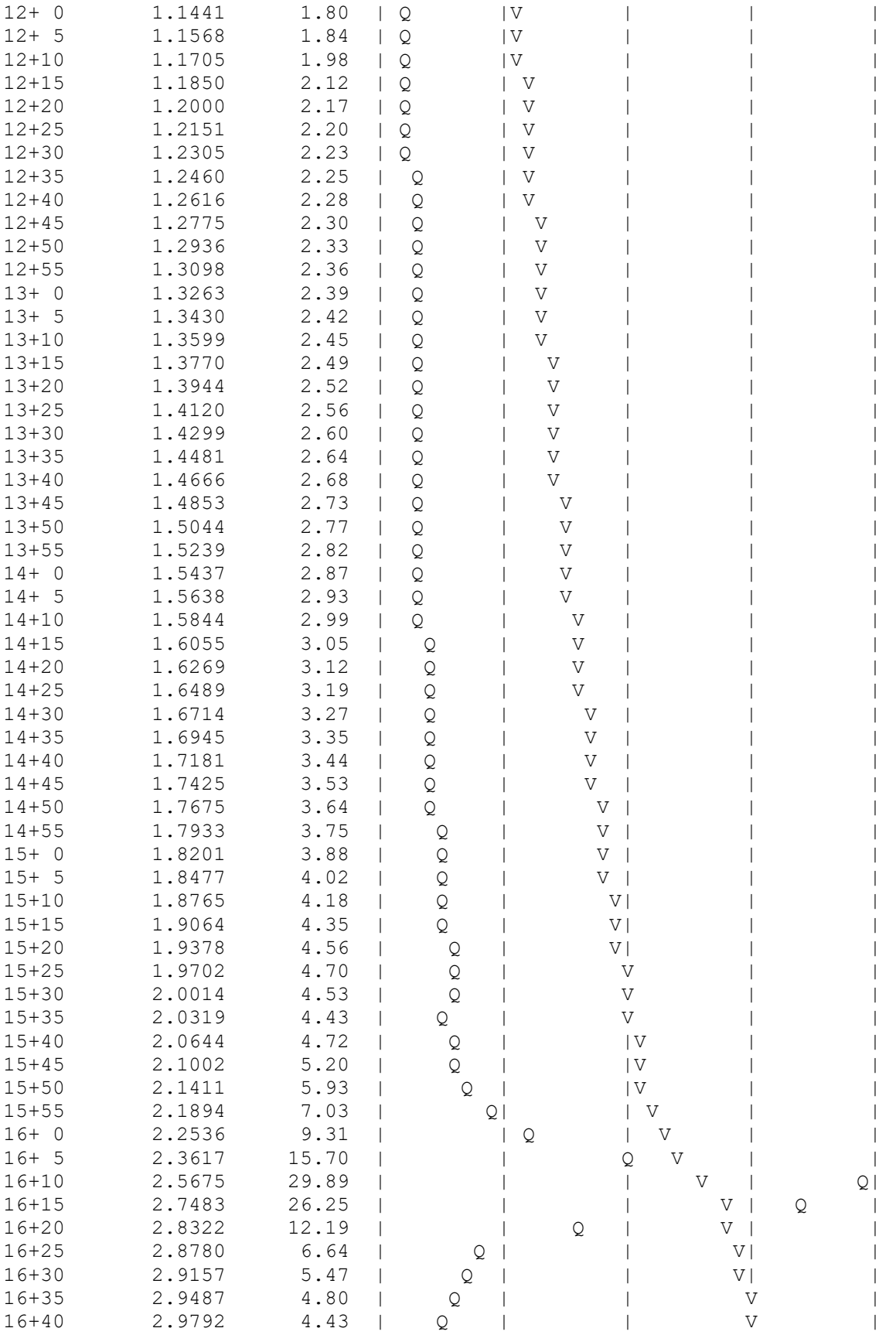
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

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	0.0005	0.07	Q				
0+10	0.0033	0.41	Q				
0+15	0.0084	0.74	Q				
0+20	0.0141	0.83	VQ				
0+25	0.0199	0.85	VQ				
0+30	0.0258	0.86	VQ				
0+35	0.0318	0.86	VQ				
0+40	0.0377	0.86	VQ				
0+45	0.0437	0.87	VQ				
0+50	0.0496	0.87	VQ				
0+55	0.0557	0.87	VQ				
1+ 0	0.0617	0.87	VQ				
1+ 5	0.0677	0.88	VQ				
1+10	0.0738	0.88	VQ				
1+15	0.0798	0.88	VQ				
1+20	0.0859	0.89	VQ				
1+25	0.0921	0.89	VQ				
1+30	0.0982	0.89	|Q				
1+35	0.1043	0.89	|Q				
1+40	0.1105	0.90	|Q				
1+45	0.1167	0.90	|Q				
1+50	0.1229	0.90	|Q				
1+55	0.1292	0.91	|Q				
2+ 0	0.1354	0.91	|Q				
2+ 5	0.1417	0.91	|Q				
2+10	0.1480	0.91	|Q				
2+15	0.1543	0.92	|Q				
2+20	0.1606	0.92	|Q				
2+25	0.1670	0.92	|Q				

2+30	0.1734	0.93	|Q	|	|	|	|
2+35	0.1798	0.93	|Q	|	|	|	|
2+40	0.1862	0.93	|Q	|	|	|	|
2+45	0.1926	0.94	|Q	|	|	|	|
2+50	0.1991	0.94	|QV	|	|	|	|
2+55	0.2056	0.94	|QV	|	|	|	|
3+ 0	0.2121	0.95	|QV	|	|	|	|
3+ 5	0.2187	0.95	|QV	|	|	|	|
3+10	0.2252	0.95	|QV	|	|	|	|
3+15	0.2318	0.96	|QV	|	|	|	|
3+20	0.2384	0.96	|QV	|	|	|	|
3+25	0.2451	0.96	|QV	|	|	|	|
3+30	0.2517	0.97	|QV	|	|	|	|
3+35	0.2584	0.97	|QV	|	|	|	|
3+40	0.2651	0.97	|QV	|	|	|	|
3+45	0.2718	0.98	|QV	|	|	|	|
3+50	0.2786	0.98	|QV	|	|	|	|
3+55	0.2854	0.99	|QV	|	|	|	|
4+ 0	0.2922	0.99	|QV	|	|	|	|
4+ 5	0.2990	0.99	|Q V	|	|	|	|
4+10	0.3059	1.00	|Q V	|	|	|	|
4+15	0.3128	1.00	|Q V	|	|	|	|
4+20	0.3197	1.00	|Q V	|	|	|	|
4+25	0.3266	1.01	|Q V	|	|	|	|
4+30	0.3336	1.01	|Q V	|	|	|	|
4+35	0.3406	1.02	|Q V	|	|	|	|
4+40	0.3476	1.02	|Q V	|	|	|	|
4+45	0.3547	1.02	|Q V	|	|	|	|
4+50	0.3618	1.03	|Q V	|	|	|	|
4+55	0.3689	1.03	|Q V	|	|	|	|
5+ 0	0.3761	1.04	|Q V	|	|	|	|
5+ 5	0.3832	1.04	|Q V	|	|	|	|
5+10	0.3904	1.05	|Q V	|	|	|	|
5+15	0.3977	1.05	|Q V	|	|	|	|
5+20	0.4049	1.06	|Q V	|	|	|	|
5+25	0.4122	1.06	|Q V	|	|	|	|
5+30	0.4196	1.06	|Q V	|	|	|	|
5+35	0.4269	1.07	|Q V	|	|	|	|
5+40	0.4343	1.07	|Q V	|	|	|	|
5+45	0.4418	1.08	|Q V	|	|	|	|
5+50	0.4492	1.08	|Q V	|	|	|	|
5+55	0.4567	1.09	|Q V	|	|	|	|
6+ 0	0.4642	1.09	|Q V	|	|	|	|
6+ 5	0.4718	1.10	|Q V	|	|	|	|
6+10	0.4794	1.10	|Q V	|	|	|	|
6+15	0.4870	1.11	|Q V	|	|	|	|
6+20	0.4947	1.11	|Q V	|	|	|	|
6+25	0.5024	1.12	|Q V	|	|	|	|
6+30	0.5102	1.12	|Q V	|	|	|	|
6+35	0.5180	1.13	|Q V	|	|	|	|
6+40	0.5258	1.14	|Q V	|	|	|	|
6+45	0.5336	1.14	|Q V	|	|	|	|
6+50	0.5415	1.15	|Q V	|	|	|	|
6+55	0.5495	1.15	|Q V	|	|	|	|
7+ 0	0.5575	1.16	|Q V	|	|	|	|
7+ 5	0.5655	1.16	|Q V	|	|	|	|
7+10	0.5735	1.17	|Q V	|	|	|	|

7+15	0.5816	1.18	|Q V |	|	|	|
7+20	0.5898	1.18	|Q V |	|	|	|
7+25	0.5980	1.19	|Q V |	|	|	|
7+30	0.6062	1.20	|Q V |	|	|	|
7+35	0.6145	1.20	|Q V |	|	|	|
7+40	0.6228	1.21	|Q V |	|	|	|
7+45	0.6312	1.22	|Q V |	|	|	|
7+50	0.6396	1.22	|Q V |	|	|	|
7+55	0.6481	1.23	|Q V |	|	|	|
8+ 0	0.6566	1.24	|Q V |	|	|	|
8+ 5	0.6651	1.24	|Q V |	|	|	|
8+10	0.6737	1.25	|Q V |	|	|	|
8+15	0.6824	1.26	|Q V |	|	|	|
8+20	0.6911	1.27	|Q V |	|	|	|
8+25	0.6999	1.27	|Q V |	|	|	|
8+30	0.7087	1.28	|Q V |	|	|	|
8+35	0.7176	1.29	|Q V |	|	|	|
8+40	0.7265	1.30	|Q V |	|	|	|
8+45	0.7355	1.30	|Q V |	|	|	|
8+50	0.7445	1.31	|Q V |	|	|	|
8+55	0.7536	1.32	|Q V |	|	|	|
9+ 0	0.7628	1.33	|Q V |	|	|	|
9+ 5	0.7720	1.34	|Q V |	|	|	|
9+10	0.7813	1.35	|Q V |	|	|	|
9+15	0.7906	1.36	|Q V |	|	|	|
9+20	0.8000	1.37	|Q V |	|	|	|
9+25	0.8095	1.37	|Q V |	|	|	|
9+30	0.8190	1.38	|Q V |	|	|	|
9+35	0.8286	1.39	|Q V |	|	|	|
9+40	0.8383	1.40	|Q V |	|	|	|
9+45	0.8480	1.41	|Q V |	|	|	|
9+50	0.8578	1.42	|Q V |	|	|	|
9+55	0.8677	1.44	|Q V |	|	|	|
10+ 0	0.8777	1.45	|Q V |	|	|	|
10+ 5	0.8877	1.46	|Q V|	|	|	|
10+10	0.8978	1.47	|Q V|	|	|	|
10+15	0.9080	1.48	|Q V|	|	|	|
10+20	0.9183	1.49	|Q V|	|	|	|
10+25	0.9286	1.50	| Q V|	|	|	|
10+30	0.9391	1.52	| Q V|	|	|	|
10+35	0.9496	1.53	| Q V|	|	|	|
10+40	0.9602	1.54	| Q V|	|	|	|
10+45	0.9709	1.55	| Q V|	|	|	|
10+50	0.9817	1.57	| Q V	|	|	|
10+55	0.9926	1.58	| Q V	|	|	|
11+ 0	1.0036	1.60	| Q V	|	|	|
11+ 5	1.0147	1.61	| Q V	|	|	|
11+10	1.0259	1.63	| Q V	|	|	|
11+15	1.0372	1.64	| Q V	|	|	|
11+20	1.0486	1.66	| Q V	|	|	|
11+25	1.0601	1.67	| Q V	|	|	|
11+30	1.0717	1.69	| Q V	|	|	|
11+35	1.0835	1.71	| Q |V	|	|	|
11+40	1.0954	1.72	| Q |V	|	|	|
11+45	1.1074	1.74	| Q |V	|	|	|
11+50	1.1195	1.76	| Q |V	|	|	|
11+55	1.1317	1.78	| Q |V	|	|	|



16+45	3.0073	4.08	Q		V	
16+50	3.0336	3.81	Q		V	
16+55	3.0582	3.58	Q		V	
17+ 0	3.0816	3.39	Q		V	
17+ 5	3.1037	3.22	Q		V	
17+10	3.1249	3.08	Q		V	
17+15	3.1453	2.95	Q		V	
17+20	3.1649	2.84	Q		V	
17+25	3.1838	2.74	Q		V	
17+30	3.2021	2.66	Q		V	
17+35	3.2198	2.58	Q		V	
17+40	3.2370	2.50	Q		V	
17+45	3.2538	2.43	Q		V	
17+50	3.2701	2.37	Q		V	
17+55	3.2861	2.31	Q		V	
18+ 0	3.3016	2.26	Q		V	
18+ 5	3.3167	2.19	Q		V	
18+10	3.3306	2.02	Q		V	
18+15	3.3435	1.87	Q		V	
18+20	3.3558	1.80	Q		V	
18+25	3.3679	1.75	Q		V	
18+30	3.3797	1.71	Q		V	
18+35	3.3913	1.68	Q		V	
18+40	3.4026	1.65	Q		V	
18+45	3.4137	1.62	Q		V	
18+50	3.4247	1.59	Q		V	
18+55	3.4354	1.56	Q		V	
19+ 0	3.4459	1.53	Q		V	
19+ 5	3.4563	1.51	Q		V	
19+10	3.4666	1.48	Q		V	
19+15	3.4766	1.46	Q		V	
19+20	3.4865	1.44	Q		V	
19+25	3.4963	1.42	Q		V	
19+30	3.5059	1.40	Q		V	
19+35	3.5154	1.38	Q		V	
19+40	3.5248	1.36	Q		V	
19+45	3.5340	1.34	Q		V	
19+50	3.5431	1.32	Q		V	
19+55	3.5521	1.31	Q		V	
20+ 0	3.5610	1.29	Q		V	
20+ 5	3.5698	1.28	Q		V	
20+10	3.5785	1.26	Q		V	
20+15	3.5871	1.25	Q		V	
20+20	3.5955	1.23	Q		V	
20+25	3.6039	1.22	Q		V	
20+30	3.6122	1.20	Q		V	
20+35	3.6204	1.19	Q		V	
20+40	3.6285	1.18	Q		V	
20+45	3.6366	1.17	Q		V	
20+50	3.6445	1.15	Q		V	
20+55	3.6524	1.14	Q		V	
21+ 0	3.6602	1.13	Q		V	
21+ 5	3.6679	1.12	Q		V	
21+10	3.6756	1.11	Q		V	
21+15	3.6831	1.10	Q		V	
21+20	3.6907	1.09	Q		V	
21+25	3.6981	1.08	Q		V	

21+30	3.7055	1.07	|Q	|	|	|	V |
21+35	3.7128	1.06	|Q	|	|	|	V |
21+40	3.7200	1.05	|Q	|	|	|	V |
21+45	3.7272	1.04	|Q	|	|	|	V |
21+50	3.7343	1.03	|Q	|	|	|	V |
21+55	3.7414	1.03	|Q	|	|	|	V |
22+ 0	3.7484	1.02	|Q	|	|	|	V |
22+ 5	3.7554	1.01	|Q	|	|	|	V |
22+10	3.7623	1.00	|Q	|	|	|	V |
22+15	3.7691	0.99	|Q	|	|	|	V |
22+20	3.7759	0.99	|Q	|	|	|	V |
22+25	3.7827	0.98	|Q	|	|	|	V |
22+30	3.7893	0.97	|Q	|	|	|	V |
22+35	3.7960	0.96	|Q	|	|	|	V |
22+40	3.8026	0.96	|Q	|	|	|	V |
22+45	3.8091	0.95	|Q	|	|	|	V |
22+50	3.8156	0.94	|Q	|	|	|	V|
22+55	3.8221	0.94	|Q	|	|	|	V|
23+ 0	3.8285	0.93	|Q	|	|	|	V|
23+ 5	3.8349	0.92	|Q	|	|	|	V|
23+10	3.8412	0.92	|Q	|	|	|	V|
23+15	3.8475	0.91	|Q	|	|	|	V|
23+20	3.8537	0.91	|Q	|	|	|	V|
23+25	3.8599	0.90	|Q	|	|	|	V|
23+30	3.8661	0.89	|Q	|	|	|	V|
23+35	3.8722	0.89	|Q	|	|	|	V|
23+40	3.8783	0.88	|Q	|	|	|	V|
23+45	3.8843	0.88	|Q	|	|	|	V|
23+50	3.8903	0.87	|Q	|	|	|	V|
23+55	3.8963	0.87	|Q	|	|	|	V|
24+ 0	3.9022	0.86	|Q	|	|	|	V|
24+ 5	3.9077	0.79	|Q	|	|	|	V|
24+10	3.9107	0.44	Q	|	|	|	V|
24+15	3.9115	0.12	Q	|	|	|	V|
24+20	3.9117	0.02	Q	|	|	|	V|
24+25	3.9117	0.01	Q	|	|	|	V|

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

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Study date 04/23/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE PROPOSED CONDITION SOUTHERLY CHAMBER SYSTEM
100-YEAR STORM ANALYSIS

Storm Event Year = 100

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 100		
16.36	1	1.30
Rainfall data for year 100		
16.36	6	3.07
Rainfall data for year 100		
16.36	24	5.64

++

******** 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)
32.0	32.0	0.00	0.000	0.978	0.294	0.287
20.0	20.0	0.00	0.000	1.000	0.010	0.010
20.0	20.0	0.00	0.000	1.000	0.010	0.010
20.0	20.0	0.00	0.000	1.000	0.010	0.010
20.0	20.0	0.00	0.000	1.000	0.010	0.010
20.0	20.0	0.00	0.000	1.000	0.010	0.010
20.0	20.0	0.00	0.000	1.000	0.010	0.010
32.0	32.0	16.36	1.000	0.978	0.294	0.287

Area-averaged adjusted loss rate Fm (In/Hr) = 0.287

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
0.00	0.000	32.0	32.0	21.25	0.015
0.00	0.000	20.0	20.0	28.20	0.000
0.00	0.000	20.0	20.0	28.20	0.000
0.00	0.000	20.0	20.0	28.20	0.000
0.00	0.000	20.0	20.0	28.20	0.000
0.00	0.000	20.0	20.0	28.20	0.000
0.00	0.000	20.0	20.0	28.20	0.000
4.81	0.294	32.0	32.0	21.25	0.015
11.55	0.706	98.0	98.0	0.20	0.958

Area-averaged catchment yield fraction, Y = 0.681
Area-averaged low loss fraction, Yb = 0.319
User entry of time of concentration = 0.184 (hours)
++
Watershed area = 16.36(Ac.)
Catchment Lag time = 0.148 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 56.4742
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.287(In/Hr)
Average low loss rate fraction (Yb) = 0.319 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.481(In)
Computed peak 30-minute rainfall = 0.985(In)
Specified peak 1-hour rainfall = 1.300(In)
Computed peak 3-hour rainfall = 2.202(In)
Specified peak 6-hour rainfall = 3.070(In)
Specified peak 24-hour rainfall = 5.640(In)

Rainfall depth area reduction factors:
Using a total area of 16.36(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.481(In)

30-minute factor = 0.999 Adjusted rainfall = 0.984(In)
1-hour factor = 0.999 Adjusted rainfall = 1.299(In)
3-hour factor = 1.000 Adjusted rainfall = 2.202(In)
6-hour factor = 1.000 Adjusted rainfall = 3.070(In)
24-hour factor = 1.000 Adjusted rainfall = 5.640(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 = 197.85 (CFS))		
1	5.794	11.464
2	37.306	62.347
3	77.994	80.502
4	93.974	31.618
5	98.307	8.573
6	99.391	2.145
7	100.000	1.205

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.4808	0.4808
2	0.6344	0.1536
3	0.7461	0.1117
4	0.8371	0.0910
5	0.9152	0.0782
6	0.9845	0.0692
7	1.0471	0.0626
8	1.1045	0.0574
9	1.1578	0.0533
10	1.2076	0.0498
11	1.2546	0.0469
12	1.2990	0.0444
13	1.3499	0.0509
14	1.3988	0.0489
15	1.4459	0.0471
16	1.4914	0.0455
17	1.5355	0.0441
18	1.5782	0.0427
19	1.6197	0.0415
20	1.6601	0.0404
21	1.6995	0.0394
22	1.7379	0.0384
23	1.7754	0.0375
24	1.8120	0.0367
25	1.8479	0.0359
26	1.8830	0.0351
27	1.9175	0.0344
28	1.9513	0.0338
29	1.9844	0.0332
30	2.0170	0.0326
31	2.0490	0.0320
32	2.0805	0.0315
33	2.1114	0.0310

34	2.1419	0.0305
35	2.1719	0.0300
36	2.2015	0.0296
37	2.2307	0.0291
38	2.2594	0.0287
39	2.2877	0.0283
40	2.3156	0.0280
41	2.3432	0.0276
42	2.3705	0.0272
43	2.3974	0.0269
44	2.4240	0.0266
45	2.4502	0.0263
46	2.4762	0.0260
47	2.5019	0.0257
48	2.5273	0.0254
49	2.5524	0.0251
50	2.5772	0.0249
51	2.6018	0.0246
52	2.6262	0.0243
53	2.6503	0.0241
54	2.6742	0.0239
55	2.6978	0.0236
56	2.7212	0.0234
57	2.7444	0.0232
58	2.7674	0.0230
59	2.7902	0.0228
60	2.8128	0.0226
61	2.8352	0.0224
62	2.8574	0.0222
63	2.8794	0.0220
64	2.9012	0.0218
65	2.9229	0.0217
66	2.9444	0.0215
67	2.9657	0.0213
68	2.9868	0.0211
69	3.0078	0.0210
70	3.0286	0.0208
71	3.0493	0.0207
72	3.0698	0.0205
73	3.0885	0.0186
74	3.1070	0.0185
75	3.1253	0.0184
76	3.1435	0.0182
77	3.1616	0.0181
78	3.1796	0.0179
79	3.1974	0.0178
80	3.2151	0.0177
81	3.2327	0.0176
82	3.2501	0.0174
83	3.2674	0.0173
84	3.2847	0.0172
85	3.3017	0.0171
86	3.3187	0.0170
87	3.3356	0.0169
88	3.3524	0.0168
89	3.3690	0.0167
90	3.3856	0.0166

91	3.4021	0.0165
92	3.4184	0.0164
93	3.4347	0.0163
94	3.4508	0.0162
95	3.4669	0.0161
96	3.4828	0.0160
97	3.4987	0.0159
98	3.5145	0.0158
99	3.5302	0.0157
100	3.5458	0.0156
101	3.5613	0.0155
102	3.5767	0.0154
103	3.5921	0.0153
104	3.6073	0.0153
105	3.6225	0.0152
106	3.6376	0.0151
107	3.6526	0.0150
108	3.6676	0.0149
109	3.6824	0.0149
110	3.6972	0.0148
111	3.7119	0.0147
112	3.7265	0.0146
113	3.7411	0.0146
114	3.7556	0.0145
115	3.7700	0.0144
116	3.7844	0.0143
117	3.7986	0.0143
118	3.8129	0.0142
119	3.8270	0.0141
120	3.8411	0.0141
121	3.8551	0.0140
122	3.8690	0.0139
123	3.8829	0.0139
124	3.8967	0.0138
125	3.9105	0.0138
126	3.9242	0.0137
127	3.9378	0.0136
128	3.9514	0.0136
129	3.9649	0.0135
130	3.9784	0.0135
131	3.9918	0.0134
132	4.0051	0.0133
133	4.0184	0.0133
134	4.0316	0.0132
135	4.0448	0.0132
136	4.0579	0.0131
137	4.0710	0.0131
138	4.0840	0.0130
139	4.0969	0.0130
140	4.1098	0.0129
141	4.1227	0.0129
142	4.1355	0.0128
143	4.1483	0.0128
144	4.1610	0.0127
145	4.1736	0.0127
146	4.1862	0.0126
147	4.1988	0.0126

148	4.2113	0.0125
149	4.2237	0.0125
150	4.2362	0.0124
151	4.2485	0.0124
152	4.2608	0.0123
153	4.2731	0.0123
154	4.2854	0.0122
155	4.2975	0.0122
156	4.3097	0.0121
157	4.3218	0.0121
158	4.3338	0.0121
159	4.3458	0.0120
160	4.3578	0.0120
161	4.3697	0.0119
162	4.3816	0.0119
163	4.3935	0.0118
164	4.4053	0.0118
165	4.4171	0.0118
166	4.4288	0.0117
167	4.4405	0.0117
168	4.4521	0.0116
169	4.4637	0.0116
170	4.4753	0.0116
171	4.4868	0.0115
172	4.4983	0.0115
173	4.5098	0.0115
174	4.5212	0.0114
175	4.5326	0.0114
176	4.5439	0.0113
177	4.5552	0.0113
178	4.5665	0.0113
179	4.5777	0.0112
180	4.5889	0.0112
181	4.6001	0.0112
182	4.6112	0.0111
183	4.6223	0.0111
184	4.6334	0.0111
185	4.6444	0.0110
186	4.6554	0.0110
187	4.6664	0.0110
188	4.6773	0.0109
189	4.6882	0.0109
190	4.6991	0.0109
191	4.7099	0.0108
192	4.7207	0.0108
193	4.7315	0.0108
194	4.7423	0.0107
195	4.7530	0.0107
196	4.7636	0.0107
197	4.7743	0.0106
198	4.7849	0.0106
199	4.7955	0.0106
200	4.8061	0.0106
201	4.8166	0.0105
202	4.8271	0.0105
203	4.8376	0.0105
204	4.8480	0.0104

205	4.8584	0.0104
206	4.8688	0.0104
207	4.8791	0.0104
208	4.8895	0.0103
209	4.8998	0.0103
210	4.9100	0.0103
211	4.9203	0.0102
212	4.9305	0.0102
213	4.9407	0.0102
214	4.9509	0.0102
215	4.9610	0.0101
216	4.9711	0.0101
217	4.9812	0.0101
218	4.9913	0.0101
219	5.0013	0.0100
220	5.0113	0.0100
221	5.0213	0.0100
222	5.0312	0.0100
223	5.0412	0.0099
224	5.0511	0.0099
225	5.0609	0.0099
226	5.0708	0.0099
227	5.0806	0.0098
228	5.0904	0.0098
229	5.1002	0.0098
230	5.1100	0.0098
231	5.1197	0.0097
232	5.1294	0.0097
233	5.1391	0.0097
234	5.1488	0.0097
235	5.1584	0.0096
236	5.1681	0.0096
237	5.1776	0.0096
238	5.1872	0.0096
239	5.1968	0.0096
240	5.2063	0.0095
241	5.2158	0.0095
242	5.2253	0.0095
243	5.2348	0.0095
244	5.2442	0.0094
245	5.2536	0.0094
246	5.2630	0.0094
247	5.2724	0.0094
248	5.2817	0.0094
249	5.2911	0.0093
250	5.3004	0.0093
251	5.3097	0.0093
252	5.3190	0.0093
253	5.3282	0.0093
254	5.3374	0.0092
255	5.3466	0.0092
256	5.3558	0.0092
257	5.3650	0.0092
258	5.3742	0.0091
259	5.3833	0.0091
260	5.3924	0.0091
261	5.4015	0.0091

262	5.4106	0.0091
263	5.4196	0.0091
264	5.4286	0.0090
265	5.4376	0.0090
266	5.4466	0.0090
267	5.4556	0.0090
268	5.4646	0.0090
269	5.4735	0.0089
270	5.4824	0.0089
271	5.4913	0.0089
272	5.5002	0.0089
273	5.5091	0.0089
274	5.5179	0.0088
275	5.5267	0.0088
276	5.5355	0.0088
277	5.5443	0.0088
278	5.5531	0.0088
279	5.5619	0.0088
280	5.5706	0.0087
281	5.5793	0.0087
282	5.5880	0.0087
283	5.5967	0.0087
284	5.6054	0.0087
285	5.6140	0.0087
286	5.6227	0.0086
287	5.6313	0.0086
288	5.6399	0.0086

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0086	0.0027	0.0059
2	0.0086	0.0028	0.0059
3	0.0087	0.0028	0.0059
4	0.0087	0.0028	0.0059
5	0.0087	0.0028	0.0059
6	0.0087	0.0028	0.0059
7	0.0088	0.0028	0.0060
8	0.0088	0.0028	0.0060
9	0.0088	0.0028	0.0060
10	0.0088	0.0028	0.0060
11	0.0089	0.0028	0.0060
12	0.0089	0.0028	0.0060
13	0.0089	0.0028	0.0061
14	0.0089	0.0029	0.0061
15	0.0090	0.0029	0.0061
16	0.0090	0.0029	0.0061
17	0.0090	0.0029	0.0061
18	0.0091	0.0029	0.0062
19	0.0091	0.0029	0.0062
20	0.0091	0.0029	0.0062
21	0.0091	0.0029	0.0062
22	0.0092	0.0029	0.0062
23	0.0092	0.0029	0.0063
24	0.0092	0.0029	0.0063
25	0.0093	0.0030	0.0063

26	0.0093	0.0030	0.0063
27	0.0093	0.0030	0.0064
28	0.0094	0.0030	0.0064
29	0.0094	0.0030	0.0064
30	0.0094	0.0030	0.0064
31	0.0095	0.0030	0.0064
32	0.0095	0.0030	0.0065
33	0.0095	0.0030	0.0065
34	0.0096	0.0030	0.0065
35	0.0096	0.0031	0.0065
36	0.0096	0.0031	0.0065
37	0.0097	0.0031	0.0066
38	0.0097	0.0031	0.0066
39	0.0097	0.0031	0.0066
40	0.0098	0.0031	0.0066
41	0.0098	0.0031	0.0067
42	0.0098	0.0031	0.0067
43	0.0099	0.0032	0.0067
44	0.0099	0.0032	0.0067
45	0.0100	0.0032	0.0068
46	0.0100	0.0032	0.0068
47	0.0100	0.0032	0.0068
48	0.0101	0.0032	0.0068
49	0.0101	0.0032	0.0069
50	0.0101	0.0032	0.0069
51	0.0102	0.0033	0.0069
52	0.0102	0.0033	0.0070
53	0.0103	0.0033	0.0070
54	0.0103	0.0033	0.0070
55	0.0104	0.0033	0.0070
56	0.0104	0.0033	0.0071
57	0.0104	0.0033	0.0071
58	0.0105	0.0033	0.0071
59	0.0105	0.0034	0.0072
60	0.0106	0.0034	0.0072
61	0.0106	0.0034	0.0072
62	0.0106	0.0034	0.0072
63	0.0107	0.0034	0.0073
64	0.0107	0.0034	0.0073
65	0.0108	0.0034	0.0074
66	0.0108	0.0035	0.0074
67	0.0109	0.0035	0.0074
68	0.0109	0.0035	0.0074
69	0.0110	0.0035	0.0075
70	0.0110	0.0035	0.0075
71	0.0111	0.0035	0.0076
72	0.0111	0.0036	0.0076
73	0.0112	0.0036	0.0076
74	0.0112	0.0036	0.0076
75	0.0113	0.0036	0.0077
76	0.0113	0.0036	0.0077
77	0.0114	0.0036	0.0078
78	0.0115	0.0037	0.0078
79	0.0115	0.0037	0.0078
80	0.0116	0.0037	0.0079
81	0.0116	0.0037	0.0079
82	0.0117	0.0037	0.0080

83	0.0118	0.0038	0.0080
84	0.0118	0.0038	0.0080
85	0.0119	0.0038	0.0081
86	0.0119	0.0038	0.0081
87	0.0120	0.0038	0.0082
88	0.0121	0.0038	0.0082
89	0.0121	0.0039	0.0083
90	0.0122	0.0039	0.0083
91	0.0123	0.0039	0.0084
92	0.0123	0.0039	0.0084
93	0.0124	0.0040	0.0085
94	0.0125	0.0040	0.0085
95	0.0126	0.0040	0.0085
96	0.0126	0.0040	0.0086
97	0.0127	0.0041	0.0086
98	0.0128	0.0041	0.0087
99	0.0129	0.0041	0.0087
100	0.0129	0.0041	0.0088
101	0.0130	0.0042	0.0089
102	0.0131	0.0042	0.0089
103	0.0132	0.0042	0.0090
104	0.0132	0.0042	0.0090
105	0.0133	0.0043	0.0091
106	0.0134	0.0043	0.0091
107	0.0135	0.0043	0.0092
108	0.0136	0.0043	0.0092
109	0.0137	0.0044	0.0093
110	0.0138	0.0044	0.0094
111	0.0139	0.0044	0.0094
112	0.0139	0.0045	0.0095
113	0.0141	0.0045	0.0096
114	0.0141	0.0045	0.0096
115	0.0143	0.0046	0.0097
116	0.0143	0.0046	0.0098
117	0.0145	0.0046	0.0099
118	0.0146	0.0046	0.0099
119	0.0147	0.0047	0.0100
120	0.0148	0.0047	0.0101
121	0.0149	0.0048	0.0102
122	0.0150	0.0048	0.0102
123	0.0152	0.0048	0.0103
124	0.0153	0.0049	0.0104
125	0.0154	0.0049	0.0105
126	0.0155	0.0050	0.0106
127	0.0157	0.0050	0.0107
128	0.0158	0.0050	0.0107
129	0.0160	0.0051	0.0109
130	0.0161	0.0051	0.0109
131	0.0163	0.0052	0.0111
132	0.0164	0.0052	0.0111
133	0.0166	0.0053	0.0113
134	0.0167	0.0053	0.0113
135	0.0169	0.0054	0.0115
136	0.0170	0.0054	0.0116
137	0.0172	0.0055	0.0117
138	0.0173	0.0055	0.0118
139	0.0176	0.0056	0.0120

140	0.0177	0.0057	0.0120
141	0.0179	0.0057	0.0122
142	0.0181	0.0058	0.0123
143	0.0184	0.0059	0.0125
144	0.0185	0.0059	0.0126
145	0.0205	0.0066	0.0140
146	0.0207	0.0066	0.0141
147	0.0210	0.0067	0.0143
148	0.0211	0.0068	0.0144
149	0.0215	0.0069	0.0146
150	0.0217	0.0069	0.0147
151	0.0220	0.0070	0.0150
152	0.0222	0.0071	0.0151
153	0.0226	0.0072	0.0154
154	0.0228	0.0073	0.0155
155	0.0232	0.0074	0.0158
156	0.0234	0.0075	0.0159
157	0.0239	0.0076	0.0162
158	0.0241	0.0077	0.0164
159	0.0246	0.0079	0.0167
160	0.0249	0.0079	0.0169
161	0.0254	0.0081	0.0173
162	0.0257	0.0082	0.0175
163	0.0263	0.0084	0.0179
164	0.0266	0.0085	0.0181
165	0.0272	0.0087	0.0185
166	0.0276	0.0088	0.0188
167	0.0283	0.0090	0.0193
168	0.0287	0.0092	0.0195
169	0.0296	0.0094	0.0201
170	0.0300	0.0096	0.0204
171	0.0310	0.0099	0.0211
172	0.0315	0.0101	0.0214
173	0.0326	0.0104	0.0222
174	0.0332	0.0106	0.0226
175	0.0344	0.0110	0.0234
176	0.0351	0.0112	0.0239
177	0.0367	0.0117	0.0250
178	0.0375	0.0120	0.0255
179	0.0394	0.0126	0.0268
180	0.0404	0.0129	0.0275
181	0.0427	0.0136	0.0291
182	0.0441	0.0141	0.0300
183	0.0471	0.0150	0.0321
184	0.0489	0.0156	0.0333
185	0.0444	0.0142	0.0302
186	0.0469	0.0150	0.0319
187	0.0533	0.0170	0.0363
188	0.0574	0.0183	0.0391
189	0.0692	0.0221	0.0471
190	0.0782	0.0240	0.0542
191	0.1117	0.0240	0.0877
192	0.1536	0.0240	0.1297
193	0.4808	0.0240	0.4568
194	0.0910	0.0240	0.0670
195	0.0626	0.0200	0.0426
196	0.0498	0.0159	0.0339

197	0.0509	0.0163	0.0346
198	0.0455	0.0145	0.0310
199	0.0415	0.0133	0.0283
200	0.0384	0.0123	0.0261
201	0.0359	0.0115	0.0244
202	0.0338	0.0108	0.0230
203	0.0320	0.0102	0.0218
204	0.0305	0.0097	0.0208
205	0.0291	0.0093	0.0198
206	0.0280	0.0089	0.0190
207	0.0269	0.0086	0.0183
208	0.0260	0.0083	0.0177
209	0.0251	0.0080	0.0171
210	0.0243	0.0078	0.0166
211	0.0236	0.0075	0.0161
212	0.0230	0.0073	0.0156
213	0.0224	0.0071	0.0152
214	0.0218	0.0070	0.0149
215	0.0213	0.0068	0.0145
216	0.0208	0.0067	0.0142
217	0.0186	0.0060	0.0127
218	0.0182	0.0058	0.0124
219	0.0178	0.0057	0.0121
220	0.0174	0.0056	0.0119
221	0.0171	0.0055	0.0116
222	0.0168	0.0054	0.0114
223	0.0165	0.0053	0.0112
224	0.0162	0.0052	0.0110
225	0.0159	0.0051	0.0108
226	0.0156	0.0050	0.0106
227	0.0153	0.0049	0.0104
228	0.0151	0.0048	0.0103
229	0.0149	0.0047	0.0101
230	0.0146	0.0047	0.0100
231	0.0144	0.0046	0.0098
232	0.0142	0.0045	0.0097
233	0.0140	0.0045	0.0095
234	0.0138	0.0044	0.0094
235	0.0136	0.0044	0.0093
236	0.0135	0.0043	0.0092
237	0.0133	0.0042	0.0090
238	0.0131	0.0042	0.0089
239	0.0130	0.0041	0.0088
240	0.0128	0.0041	0.0087
241	0.0127	0.0040	0.0086
242	0.0125	0.0040	0.0085
243	0.0124	0.0039	0.0084
244	0.0122	0.0039	0.0083
245	0.0121	0.0039	0.0082
246	0.0120	0.0038	0.0081
247	0.0118	0.0038	0.0081
248	0.0117	0.0037	0.0080
249	0.0116	0.0037	0.0079
250	0.0115	0.0037	0.0078
251	0.0114	0.0036	0.0077
252	0.0113	0.0036	0.0077
253	0.0112	0.0036	0.0076

254	0.0111	0.0035	0.0075
255	0.0110	0.0035	0.0075
256	0.0109	0.0035	0.0074
257	0.0108	0.0034	0.0073
258	0.0107	0.0034	0.0073
259	0.0106	0.0034	0.0072
260	0.0105	0.0034	0.0071
261	0.0104	0.0033	0.0071
262	0.0103	0.0033	0.0070
263	0.0102	0.0033	0.0070
264	0.0102	0.0032	0.0069
265	0.0101	0.0032	0.0069
266	0.0100	0.0032	0.0068
267	0.0099	0.0032	0.0068
268	0.0099	0.0031	0.0067
269	0.0098	0.0031	0.0067
270	0.0097	0.0031	0.0066
271	0.0096	0.0031	0.0066
272	0.0096	0.0031	0.0065
273	0.0095	0.0030	0.0065
274	0.0094	0.0030	0.0064
275	0.0094	0.0030	0.0064
276	0.0093	0.0030	0.0063
277	0.0093	0.0030	0.0063
278	0.0092	0.0029	0.0063
279	0.0091	0.0029	0.0062
280	0.0091	0.0029	0.0062
281	0.0090	0.0029	0.0061
282	0.0090	0.0029	0.0061
283	0.0089	0.0028	0.0061
284	0.0088	0.0028	0.0060
285	0.0088	0.0028	0.0060
286	0.0087	0.0028	0.0059
287	0.0087	0.0028	0.0059
288	0.0086	0.0028	0.0059

Total soil rain loss = 1.63(In)
Total effective rainfall = 4.01(In)
Peak flow rate in flood hydrograph = 46.47(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

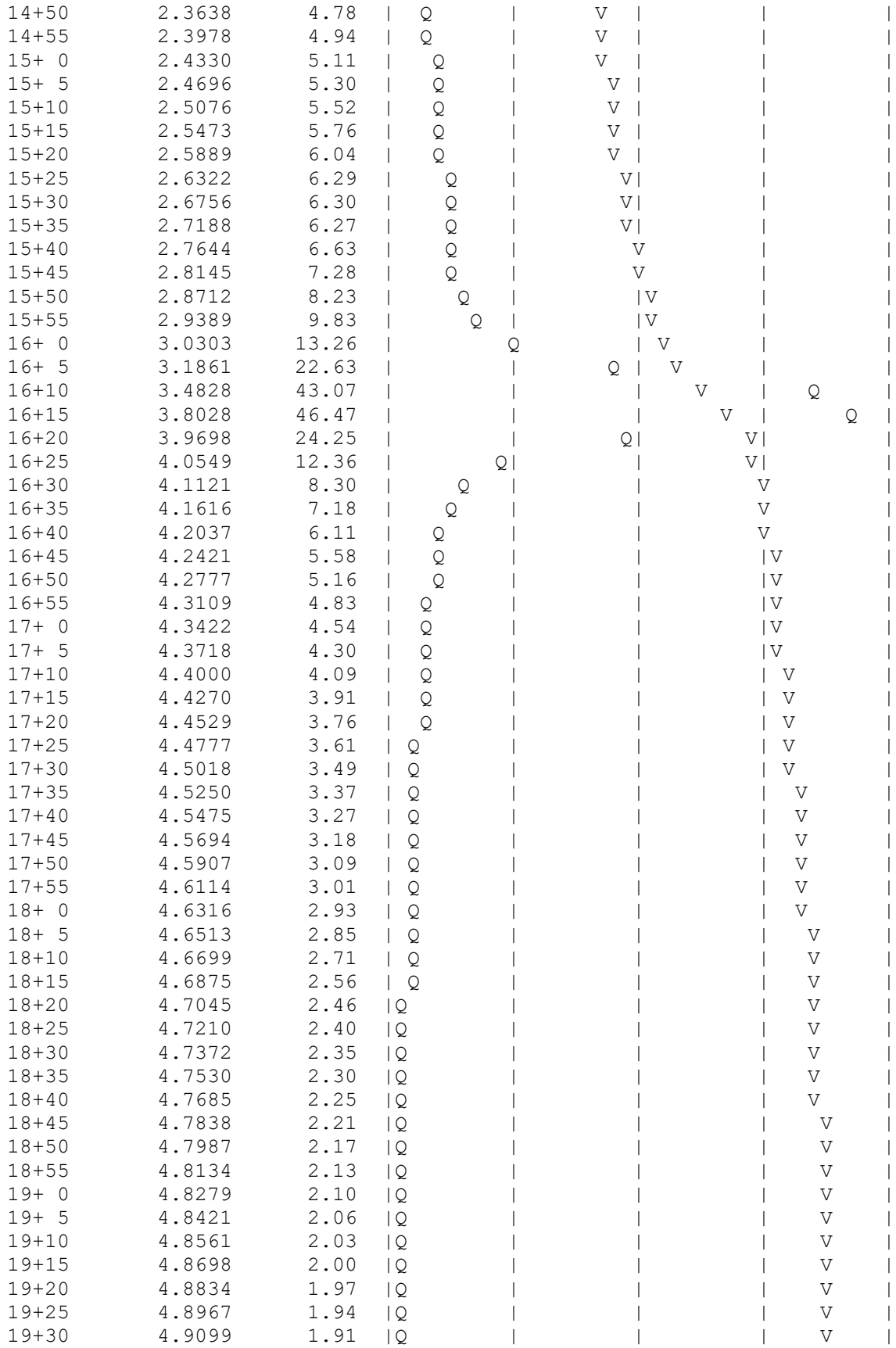
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0005	0.07	Q	|	|	|	|
0+10	0.0034	0.43	Q	|	|	|	|
0+15	0.0097	0.90	Q	|	|	|	|
0+20	0.0172	1.09	Q	|	|	|	|
0+25	0.0251	1.15	Q	|	|	|	|
0+30	0.0331	1.16	Q	|	|	|	|
0+35	0.0411	1.17	Q	|	|	|	|

0+40	0.0492	1.18	Q	|	|	|	|
0+45	0.0574	1.18	Q	|	|	|	|
0+50	0.0655	1.18	Q	|	|	|	|
0+55	0.0737	1.19	Q	|	|	|	|
1+ 0	0.0819	1.19	Q	|	|	|	|
1+ 5	0.0901	1.19	Q	|	|	|	|
1+10	0.0983	1.20	Q	|	|	|	|
1+15	0.1066	1.20	Q	|	|	|	|
1+20	0.1149	1.20	Q	|	|	|	|
1+25	0.1232	1.21	Q	|	|	|	|
1+30	0.1316	1.21	Q	|	|	|	|
1+35	0.1400	1.22	QV	|	|	|	|
1+40	0.1484	1.22	QV	|	|	|	|
1+45	0.1568	1.22	QV	|	|	|	|
1+50	0.1652	1.23	QV	|	|	|	|
1+55	0.1737	1.23	QV	|	|	|	|
2+ 0	0.1822	1.24	QV	|	|	|	|
2+ 5	0.1908	1.24	QV	|	|	|	|
2+10	0.1994	1.24	QV	|	|	|	|
2+15	0.2080	1.25	QV	|	|	|	|
2+20	0.2166	1.25	|Q	|	|	|	|
2+25	0.2252	1.26	|Q	|	|	|	|
2+30	0.2339	1.26	|Q	|	|	|	|
2+35	0.2426	1.27	|Q	|	|	|	|
2+40	0.2514	1.27	|Q	|	|	|	|
2+45	0.2602	1.27	|Q	|	|	|	|
2+50	0.2690	1.28	|Q	|	|	|	|
2+55	0.2778	1.28	|QV	|	|	|	|
3+ 0	0.2867	1.29	|QV	|	|	|	|
3+ 5	0.2956	1.29	|QV	|	|	|	|
3+10	0.3045	1.30	|QV	|	|	|	|
3+15	0.3135	1.30	|QV	|	|	|	|
3+20	0.3225	1.31	|QV	|	|	|	|
3+25	0.3315	1.31	|QV	|	|	|	|
3+30	0.3406	1.32	|QV	|	|	|	|
3+35	0.3497	1.32	|QV	|	|	|	|
3+40	0.3588	1.33	|QV	|	|	|	|
3+45	0.3679	1.33	|QV	|	|	|	|
3+50	0.3771	1.34	|QV	|	|	|	|
3+55	0.3864	1.34	|QV	|	|	|	|
4+ 0	0.3956	1.35	|QV	|	|	|	|
4+ 5	0.4049	1.35	|QV	|	|	|	|
4+10	0.4143	1.36	|Q V	|	|	|	|
4+15	0.4237	1.36	|Q V	|	|	|	|
4+20	0.4331	1.37	|Q V	|	|	|	|
4+25	0.4425	1.37	|Q V	|	|	|	|
4+30	0.4520	1.38	|Q V	|	|	|	|
4+35	0.4615	1.38	|Q V	|	|	|	|
4+40	0.4711	1.39	|Q V	|	|	|	|
4+45	0.4807	1.39	|Q V	|	|	|	|
4+50	0.4904	1.40	|Q V	|	|	|	|
4+55	0.5000	1.41	|Q V	|	|	|	|
5+ 0	0.5098	1.41	|Q V	|	|	|	|
5+ 5	0.5195	1.42	|Q V	|	|	|	|
5+10	0.5293	1.42	|Q V	|	|	|	|
5+15	0.5392	1.43	|Q V	|	|	|	|
5+20	0.5491	1.44	|Q V	|	|	|	|

5+25	0.5590	1.44	Q V			
5+30	0.5690	1.45	Q V			
5+35	0.5790	1.45	Q V			
5+40	0.5891	1.46	Q V			
5+45	0.5992	1.47	Q V			
5+50	0.6093	1.47	Q V			
5+55	0.6195	1.48	Q V			
6+ 0	0.6298	1.49	Q V			
6+ 5	0.6401	1.49	Q V			
6+10	0.6504	1.50	Q V			
6+15	0.6608	1.51	Q V			
6+20	0.6712	1.52	Q V			
6+25	0.6817	1.52	Q V			
6+30	0.6923	1.53	Q V			
6+35	0.7028	1.54	Q V			
6+40	0.7135	1.55	Q V			
6+45	0.7242	1.55	Q V			
6+50	0.7349	1.56	Q V			
6+55	0.7457	1.57	Q V			
7+ 0	0.7566	1.58	Q V			
7+ 5	0.7675	1.58	Q V			
7+10	0.7785	1.59	Q V			
7+15	0.7895	1.60	Q V			
7+20	0.8006	1.61	Q V			
7+25	0.8117	1.62	Q V			
7+30	0.8229	1.63	Q V			
7+35	0.8342	1.64	Q V			
7+40	0.8455	1.64	Q V			
7+45	0.8569	1.65	Q V			
7+50	0.8683	1.66	Q V			
7+55	0.8798	1.67	Q V			
8+ 0	0.8914	1.68	Q V			
8+ 5	0.9031	1.69	Q V			
8+10	0.9148	1.70	Q V			
8+15	0.9266	1.71	Q V			
8+20	0.9384	1.72	Q V			
8+25	0.9503	1.73	Q V			
8+30	0.9623	1.74	Q V			
8+35	0.9744	1.75	Q V			
8+40	0.9865	1.76	Q V			
8+45	0.9987	1.77	Q V			
8+50	1.0110	1.78	Q V			
8+55	1.0234	1.80	Q V			
9+ 0	1.0359	1.81	Q V			
9+ 5	1.0484	1.82	Q V			
9+10	1.0610	1.83	Q V			
9+15	1.0737	1.84	Q V			
9+20	1.0865	1.86	Q V			
9+25	1.0994	1.87	Q V			
9+30	1.1123	1.88	Q V			
9+35	1.1254	1.90	Q V			
9+40	1.1385	1.91	Q V			
9+45	1.1518	1.92	Q V			
9+50	1.1651	1.94	Q V			
9+55	1.1785	1.95	Q V			
10+ 0	1.1921	1.97	Q V			

10+ 5	1.2057	1.98	|Q V |	|	|	|
10+10	1.2195	2.00	|Q V |	|	|	|
10+15	1.2333	2.01	|Q V|	|	|	|
10+20	1.2473	2.03	|Q V|	|	|	|
10+25	1.2614	2.04	|Q V|	|	|	|
10+30	1.2755	2.06	|Q V|	|	|	|
10+35	1.2899	2.08	|Q V|	|	|	|
10+40	1.3043	2.09	|Q V|	|	|	|
10+45	1.3188	2.11	|Q V|	|	|	|
10+50	1.3335	2.13	|Q V|	|	|	|
10+55	1.3483	2.15	|Q V|	|	|	|
11+ 0	1.3632	2.17	|Q V|	|	|	|
11+ 5	1.3783	2.19	|Q V	|	|	|
11+10	1.3935	2.21	|Q V	|	|	|
11+15	1.4089	2.23	|Q V	|	|	|
11+20	1.4244	2.25	|Q V	|	|	|
11+25	1.4400	2.27	|Q V	|	|	|
11+30	1.4558	2.29	|Q V	|	|	|
11+35	1.4718	2.32	|Q V	|	|	|
11+40	1.4879	2.34	|Q V	|	|	|
11+45	1.5042	2.37	|Q |V	|	|	|
11+50	1.5207	2.39	|Q |V	|	|	|
11+55	1.5373	2.42	|Q |V	|	|	|
12+ 0	1.5542	2.44	|Q |V	|	|	|
12+ 5	1.5713	2.48	|Q |V	|	|	|
12+10	1.5891	2.59	| Q |V	|	|	|
12+15	1.6078	2.71	| Q |V	|	|	|
12+20	1.6269	2.78	| Q |V	|	|	|
12+25	1.6463	2.82	| Q | V	|	|	|
12+30	1.6660	2.86	| Q | V	|	|	|
12+35	1.6859	2.89	| Q | V	|	|	|
12+40	1.7061	2.93	| Q | V	|	|	|
12+45	1.7265	2.96	| Q | V	|	|	|
12+50	1.7472	3.00	| Q | V	|	|	|
12+55	1.7681	3.04	| Q | V	|	|	|
13+ 0	1.7894	3.08	| Q | V	|	|	|
13+ 5	1.8109	3.12	| Q | V	|	|	|
13+10	1.8327	3.17	| Q | V	|	|	|
13+15	1.8548	3.21	| Q | V	|	|	|
13+20	1.8773	3.26	| Q | V	|	|	|
13+25	1.9001	3.31	| Q | V	|	|	|
13+30	1.9233	3.36	| Q | V	|	|	|
13+35	1.9468	3.42	| Q | V	|	|	|
13+40	1.9708	3.48	| Q | V	|	|	|
13+45	1.9951	3.54	| Q | V	|	|	|
13+50	2.0199	3.60	| Q | V	|	|	|
13+55	2.0452	3.67	| Q | V	|	|	|
14+ 0	2.0709	3.74	| Q | V	|	|	|
14+ 5	2.0972	3.81	| Q | V	|	|	|
14+10	2.1240	3.90	| Q | V	|	|	|
14+15	2.1515	3.98	| Q | V	|	|	|
14+20	2.1795	4.07	| Q | V	|	|	|
14+25	2.2083	4.17	| Q | V	|	|	|
14+30	2.2377	4.27	| Q | V	|	|	|
14+35	2.2679	4.39	| Q | V	|	|	|
14+40	2.2989	4.51	| Q | V	|	|	|
14+45	2.3309	4.64	| Q | V	|	|	|



19+35	4.9229	1.88	|Q	|	|	|	V |
19+40	4.9357	1.86	|Q	|	|	|	V |
19+45	4.9483	1.83	|Q	|	|	|	V |
19+50	4.9608	1.81	|Q	|	|	|	V |
19+55	4.9731	1.79	|Q	|	|	|	V |
20+ 0	4.9852	1.76	|Q	|	|	|	V |
20+ 5	4.9972	1.74	|Q	|	|	|	V |
20+10	5.0091	1.72	|Q	|	|	|	V |
20+15	5.0208	1.70	|Q	|	|	|	V |
20+20	5.0324	1.68	|Q	|	|	|	V |
20+25	5.0438	1.66	|Q	|	|	|	V |
20+30	5.0552	1.65	|Q	|	|	|	V |
20+35	5.0664	1.63	|Q	|	|	|	V |
20+40	5.0775	1.61	|Q	|	|	|	V |
20+45	5.0884	1.59	|Q	|	|	|	V |
20+50	5.0993	1.58	|Q	|	|	|	V |
20+55	5.1101	1.56	|Q	|	|	|	V |
21+ 0	5.1207	1.55	|Q	|	|	|	V |
21+ 5	5.1313	1.53	|Q	|	|	|	V |
21+10	5.1417	1.52	|Q	|	|	|	V |
21+15	5.1520	1.50	|Q	|	|	|	V |
21+20	5.1623	1.49	|Q	|	|	|	V |
21+25	5.1725	1.48	|Q	|	|	|	V |
21+30	5.1825	1.46	|Q	|	|	|	V |
21+35	5.1925	1.45	|Q	|	|	|	V |
21+40	5.2024	1.44	|Q	|	|	|	V |
21+45	5.2122	1.42	|Q	|	|	|	V |
21+50	5.2219	1.41	|Q	|	|	|	V |
21+55	5.2316	1.40	|Q	|	|	|	V |
22+ 0	5.2412	1.39	|Q	|	|	|	V |
22+ 5	5.2507	1.38	|Q	|	|	|	V |
22+10	5.2601	1.37	|Q	|	|	|	V |
22+15	5.2694	1.36	|Q	|	|	|	V |
22+20	5.2787	1.35	|Q	|	|	|	V |
22+25	5.2879	1.34	|Q	|	|	|	V |
22+30	5.2970	1.33	|Q	|	|	|	V |
22+35	5.3061	1.32	|Q	|	|	|	V |
22+40	5.3151	1.31	|Q	|	|	|	V |
22+45	5.3240	1.30	|Q	|	|	|	V |
22+50	5.3329	1.29	|Q	|	|	|	V|
22+55	5.3417	1.28	|Q	|	|	|	V|
23+ 0	5.3505	1.27	|Q	|	|	|	V|
23+ 5	5.3592	1.26	|Q	|	|	|	V|
23+10	5.3678	1.25	|Q	|	|	|	V|
23+15	5.3764	1.24	Q	|	|	|	V|
23+20	5.3849	1.24	Q	|	|	|	V|
23+25	5.3933	1.23	Q	|	|	|	V|
23+30	5.4017	1.22	Q	|	|	|	V|
23+35	5.4101	1.21	Q	|	|	|	V|
23+40	5.4184	1.21	Q	|	|	|	V|
23+45	5.4267	1.20	Q	|	|	|	V|
23+50	5.4348	1.19	Q	|	|	|	V|
23+55	5.4430	1.18	Q	|	|	|	V|
24+ 0	5.4511	1.18	Q	|	|	|	V|
24+ 5	5.4587	1.10	Q	|	|	|	V|
24+10	5.4637	0.73	Q	|	|	|	V|
24+15	5.4655	0.26	Q	|	|	|	V|

24+20	5.4660	0.07	Q	|	|	|	V|
24+25	5.4661	0.02	Q	|	|	|	V|
24+30	5.4662	0.01	Q	|	|	|	V|

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE PROPOSED CONDITION SOUTHERLY CHAMBER SYSTEM
25-YEAR STORM ANALYSIS

Storm Event Year = 25

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 25		
16.36	1	1.00
Rainfall data for year 25		
16.36	6	2.43
Rainfall data for year 25		
16.36	24	4.48

++

******** 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)
32.0	32.0	16.36	1.000	0.978	0.294	0.287

Area-averaged adjusted loss rate Fm (In/Hr) = 0.287

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
4.81	0.294	32.0	32.0	21.25	0.001
11.55	0.706	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.669
Area-averaged low loss fraction, Yb = 0.331
User entry of time of concentration = 0.185 (hours)
++
Watershed area = 16.36(Ac.)
Catchment Lag time = 0.148 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 56.3581
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.287(In/Hr)
Average low loss rate fraction (Yb) = 0.331 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.369(In)
Computed peak 30-minute rainfall = 0.756(In)
Specified peak 1-hour rainfall = 0.998(In)
Computed peak 3-hour rainfall = 1.722(In)
Specified peak 6-hour rainfall = 2.430(In)
Specified peak 24-hour rainfall = 4.480(In)

Rainfall depth area reduction factors:
Using a total area of 16.36(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.369(In)
30-minute factor = 0.999 Adjusted rainfall = 0.756(In)
1-hour factor = 0.999 Adjusted rainfall = 0.997(In)
3-hour factor = 1.000 Adjusted rainfall = 1.722(In)
6-hour factor = 1.000 Adjusted rainfall = 2.430(In)
24-hour factor = 1.000 Adjusted rainfall = 4.480(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 = 197.85 (CFS))		
1	5.771	11.419
2	37.166	62.116
3	77.856	80.506
4	93.917	31.777
5	98.292	8.657
6	99.379	2.151
7	100.000	1.228

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3691	0.3691
2	0.4870	0.1179
3	0.5728	0.0858
4	0.6426	0.0699
5	0.7026	0.0600
6	0.7558	0.0532
7	0.8038	0.0481
8	0.8479	0.0441
9	0.8888	0.0409
10	0.9271	0.0383
11	0.9631	0.0360
12	0.9972	0.0341
13	1.0377	0.0405
14	1.0767	0.0390
15	1.1143	0.0376
16	1.1506	0.0363
17	1.1858	0.0352
18	1.2200	0.0342
19	1.2533	0.0332
20	1.2856	0.0324
21	1.3172	0.0316
22	1.3480	0.0308
23	1.3782	0.0301
24	1.4076	0.0295
25	1.4365	0.0289
26	1.4648	0.0283
27	1.4925	0.0277
28	1.5198	0.0272
29	1.5465	0.0268
30	1.5728	0.0263
31	1.5987	0.0259
32	1.6241	0.0254
33	1.6492	0.0250
34	1.6738	0.0247
35	1.6981	0.0243
36	1.7221	0.0240
37	1.7457	0.0236
38	1.7690	0.0233
39	1.7919	0.0230
40	1.8146	0.0227
41	1.8370	0.0224
42	1.8591	0.0221
43	1.8810	0.0219
44	1.9026	0.0216
45	1.9239	0.0214
46	1.9451	0.0211
47	1.9660	0.0209
48	1.9866	0.0207
49	2.0071	0.0205
50	2.0273	0.0202
51	2.0474	0.0200
52	2.0672	0.0198
53	2.0869	0.0197
54	2.1063	0.0195

55	2.1256	0.0193
56	2.1447	0.0191
57	2.1637	0.0189
58	2.1824	0.0188
59	2.2010	0.0186
60	2.2195	0.0185
61	2.2378	0.0183
62	2.2559	0.0181
63	2.2739	0.0180
64	2.2918	0.0179
65	2.3095	0.0177
66	2.3271	0.0176
67	2.3445	0.0174
68	2.3619	0.0173
69	2.3790	0.0172
70	2.3961	0.0171
71	2.4131	0.0169
72	2.4299	0.0168
73	2.4447	0.0148
74	2.4594	0.0147
75	2.4740	0.0146
76	2.4885	0.0145
77	2.5029	0.0144
78	2.5172	0.0143
79	2.5314	0.0142
80	2.5455	0.0141
81	2.5595	0.0140
82	2.5734	0.0139
83	2.5872	0.0138
84	2.6009	0.0137
85	2.6145	0.0136
86	2.6281	0.0135
87	2.6415	0.0134
88	2.6549	0.0134
89	2.6681	0.0133
90	2.6813	0.0132
91	2.6944	0.0131
92	2.7075	0.0130
93	2.7204	0.0129
94	2.7333	0.0129
95	2.7461	0.0128
96	2.7588	0.0127
97	2.7714	0.0126
98	2.7840	0.0126
99	2.7965	0.0125
100	2.8089	0.0124
101	2.8213	0.0124
102	2.8336	0.0123
103	2.8458	0.0122
104	2.8580	0.0122
105	2.8701	0.0121
106	2.8821	0.0120
107	2.8941	0.0120
108	2.9060	0.0119
109	2.9178	0.0118
110	2.9296	0.0118
111	2.9413	0.0117

112	2.9530	0.0117
113	2.9646	0.0116
114	2.9761	0.0115
115	2.9876	0.0115
116	2.9991	0.0114
117	3.0105	0.0114
118	3.0218	0.0113
119	3.0331	0.0113
120	3.0443	0.0112
121	3.0554	0.0112
122	3.0666	0.0111
123	3.0776	0.0111
124	3.0886	0.0110
125	3.0996	0.0110
126	3.1105	0.0109
127	3.1214	0.0109
128	3.1322	0.0108
129	3.1430	0.0108
130	3.1537	0.0107
131	3.1644	0.0107
132	3.1751	0.0106
133	3.1856	0.0106
134	3.1962	0.0105
135	3.2067	0.0105
136	3.2172	0.0105
137	3.2276	0.0104
138	3.2379	0.0104
139	3.2483	0.0103
140	3.2586	0.0103
141	3.2688	0.0103
142	3.2790	0.0102
143	3.2892	0.0102
144	3.2993	0.0101
145	3.3094	0.0101
146	3.3195	0.0101
147	3.3295	0.0100
148	3.3395	0.0100
149	3.3494	0.0099
150	3.3593	0.0099
151	3.3692	0.0099
152	3.3790	0.0098
153	3.3888	0.0098
154	3.3986	0.0098
155	3.4083	0.0097
156	3.4180	0.0097
157	3.4276	0.0097
158	3.4372	0.0096
159	3.4468	0.0096
160	3.4564	0.0095
161	3.4659	0.0095
162	3.4754	0.0095
163	3.4848	0.0095
164	3.4942	0.0094
165	3.5036	0.0094
166	3.5130	0.0094
167	3.5223	0.0093
168	3.5316	0.0093

169	3.5408	0.0093
170	3.5501	0.0092
171	3.5593	0.0092
172	3.5684	0.0092
173	3.5776	0.0091
174	3.5867	0.0091
175	3.5958	0.0091
176	3.6048	0.0091
177	3.6139	0.0090
178	3.6229	0.0090
179	3.6318	0.0090
180	3.6408	0.0089
181	3.6497	0.0089
182	3.6586	0.0089
183	3.6674	0.0089
184	3.6762	0.0088
185	3.6851	0.0088
186	3.6938	0.0088
187	3.7026	0.0088
188	3.7113	0.0087
189	3.7200	0.0087
190	3.7287	0.0087
191	3.7373	0.0086
192	3.7459	0.0086
193	3.7545	0.0086
194	3.7631	0.0086
195	3.7717	0.0085
196	3.7802	0.0085
197	3.7887	0.0085
198	3.7972	0.0085
199	3.8056	0.0085
200	3.8140	0.0084
201	3.8224	0.0084
202	3.8308	0.0084
203	3.8392	0.0084
204	3.8475	0.0083
205	3.8558	0.0083
206	3.8641	0.0083
207	3.8724	0.0083
208	3.8806	0.0082
209	3.8888	0.0082
210	3.8970	0.0082
211	3.9052	0.0082
212	3.9134	0.0082
213	3.9215	0.0081
214	3.9296	0.0081
215	3.9377	0.0081
216	3.9458	0.0081
217	3.9538	0.0081
218	3.9619	0.0080
219	3.9699	0.0080
220	3.9779	0.0080
221	3.9858	0.0080
222	3.9938	0.0079
223	4.0017	0.0079
224	4.0096	0.0079
225	4.0175	0.0079

226	4.0254	0.0079
227	4.0332	0.0079
228	4.0411	0.0078
229	4.0489	0.0078
230	4.0567	0.0078
231	4.0645	0.0078
232	4.0722	0.0078
233	4.0799	0.0077
234	4.0877	0.0077
235	4.0954	0.0077
236	4.1030	0.0077
237	4.1107	0.0077
238	4.1183	0.0076
239	4.1260	0.0076
240	4.1336	0.0076
241	4.1412	0.0076
242	4.1488	0.0076
243	4.1563	0.0076
244	4.1638	0.0075
245	4.1714	0.0075
246	4.1789	0.0075
247	4.1864	0.0075
248	4.1938	0.0075
249	4.2013	0.0075
250	4.2087	0.0074
251	4.2161	0.0074
252	4.2236	0.0074
253	4.2309	0.0074
254	4.2383	0.0074
255	4.2457	0.0074
256	4.2530	0.0073
257	4.2603	0.0073
258	4.2676	0.0073
259	4.2749	0.0073
260	4.2822	0.0073
261	4.2895	0.0073
262	4.2967	0.0072
263	4.3039	0.0072
264	4.3112	0.0072
265	4.3184	0.0072
266	4.3255	0.0072
267	4.3327	0.0072
268	4.3399	0.0072
269	4.3470	0.0071
270	4.3541	0.0071
271	4.3612	0.0071
272	4.3683	0.0071
273	4.3754	0.0071
274	4.3825	0.0071
275	4.3895	0.0071
276	4.3966	0.0070
277	4.4036	0.0070
278	4.4106	0.0070
279	4.4176	0.0070
280	4.4246	0.0070
281	4.4315	0.0070
282	4.4385	0.0070

283	4.4454	0.0069
284	4.4523	0.0069
285	4.4593	0.0069
286	4.4662	0.0069
287	4.4730	0.0069
288	4.4799	0.0069

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0069	0.0023	0.0046
2	0.0069	0.0023	0.0046
3	0.0069	0.0023	0.0046
4	0.0069	0.0023	0.0046
5	0.0070	0.0023	0.0047
6	0.0070	0.0023	0.0047
7	0.0070	0.0023	0.0047
8	0.0070	0.0023	0.0047
9	0.0070	0.0023	0.0047
10	0.0071	0.0023	0.0047
11	0.0071	0.0023	0.0047
12	0.0071	0.0023	0.0047
13	0.0071	0.0024	0.0048
14	0.0071	0.0024	0.0048
15	0.0072	0.0024	0.0048
16	0.0072	0.0024	0.0048
17	0.0072	0.0024	0.0048
18	0.0072	0.0024	0.0048
19	0.0073	0.0024	0.0049
20	0.0073	0.0024	0.0049
21	0.0073	0.0024	0.0049
22	0.0073	0.0024	0.0049
23	0.0074	0.0024	0.0049
24	0.0074	0.0024	0.0049
25	0.0074	0.0025	0.0050
26	0.0074	0.0025	0.0050
27	0.0075	0.0025	0.0050
28	0.0075	0.0025	0.0050
29	0.0075	0.0025	0.0050
30	0.0075	0.0025	0.0050
31	0.0076	0.0025	0.0051
32	0.0076	0.0025	0.0051
33	0.0076	0.0025	0.0051
34	0.0076	0.0025	0.0051
35	0.0077	0.0025	0.0051
36	0.0077	0.0025	0.0051
37	0.0077	0.0026	0.0052
38	0.0077	0.0026	0.0052
39	0.0078	0.0026	0.0052
40	0.0078	0.0026	0.0052
41	0.0078	0.0026	0.0052
42	0.0079	0.0026	0.0053
43	0.0079	0.0026	0.0053
44	0.0079	0.0026	0.0053
45	0.0079	0.0026	0.0053
46	0.0080	0.0026	0.0053

47	0.0080	0.0027	0.0054
48	0.0080	0.0027	0.0054
49	0.0081	0.0027	0.0054
50	0.0081	0.0027	0.0054
51	0.0081	0.0027	0.0054
52	0.0082	0.0027	0.0055
53	0.0082	0.0027	0.0055
54	0.0082	0.0027	0.0055
55	0.0083	0.0027	0.0055
56	0.0083	0.0027	0.0055
57	0.0083	0.0028	0.0056
58	0.0084	0.0028	0.0056
59	0.0084	0.0028	0.0056
60	0.0084	0.0028	0.0056
61	0.0085	0.0028	0.0057
62	0.0085	0.0028	0.0057
63	0.0085	0.0028	0.0057
64	0.0086	0.0028	0.0057
65	0.0086	0.0029	0.0058
66	0.0086	0.0029	0.0058
67	0.0087	0.0029	0.0058
68	0.0087	0.0029	0.0058
69	0.0088	0.0029	0.0059
70	0.0088	0.0029	0.0059
71	0.0089	0.0029	0.0059
72	0.0089	0.0029	0.0059
73	0.0089	0.0030	0.0060
74	0.0090	0.0030	0.0060
75	0.0090	0.0030	0.0060
76	0.0091	0.0030	0.0061
77	0.0091	0.0030	0.0061
78	0.0091	0.0030	0.0061
79	0.0092	0.0030	0.0062
80	0.0092	0.0031	0.0062
81	0.0093	0.0031	0.0062
82	0.0093	0.0031	0.0062
83	0.0094	0.0031	0.0063
84	0.0094	0.0031	0.0063
85	0.0095	0.0031	0.0063
86	0.0095	0.0032	0.0064
87	0.0096	0.0032	0.0064
88	0.0096	0.0032	0.0064
89	0.0097	0.0032	0.0065
90	0.0097	0.0032	0.0065
91	0.0098	0.0032	0.0066
92	0.0098	0.0033	0.0066
93	0.0099	0.0033	0.0066
94	0.0099	0.0033	0.0066
95	0.0100	0.0033	0.0067
96	0.0101	0.0033	0.0067
97	0.0101	0.0034	0.0068
98	0.0102	0.0034	0.0068
99	0.0103	0.0034	0.0069
100	0.0103	0.0034	0.0069
101	0.0104	0.0034	0.0069
102	0.0104	0.0034	0.0070
103	0.0105	0.0035	0.0070

104	0.0105	0.0035	0.0071
105	0.0106	0.0035	0.0071
106	0.0107	0.0035	0.0071
107	0.0108	0.0036	0.0072
108	0.0108	0.0036	0.0072
109	0.0109	0.0036	0.0073
110	0.0110	0.0036	0.0073
111	0.0111	0.0037	0.0074
112	0.0111	0.0037	0.0074
113	0.0112	0.0037	0.0075
114	0.0113	0.0037	0.0075
115	0.0114	0.0038	0.0076
116	0.0114	0.0038	0.0077
117	0.0115	0.0038	0.0077
118	0.0116	0.0038	0.0078
119	0.0117	0.0039	0.0078
120	0.0118	0.0039	0.0079
121	0.0119	0.0039	0.0080
122	0.0120	0.0040	0.0080
123	0.0121	0.0040	0.0081
124	0.0122	0.0040	0.0081
125	0.0123	0.0041	0.0082
126	0.0124	0.0041	0.0083
127	0.0125	0.0041	0.0084
128	0.0126	0.0042	0.0084
129	0.0127	0.0042	0.0085
130	0.0128	0.0042	0.0086
131	0.0129	0.0043	0.0087
132	0.0130	0.0043	0.0087
133	0.0132	0.0044	0.0088
134	0.0133	0.0044	0.0089
135	0.0134	0.0044	0.0090
136	0.0135	0.0045	0.0091
137	0.0137	0.0045	0.0092
138	0.0138	0.0046	0.0092
139	0.0140	0.0046	0.0094
140	0.0141	0.0047	0.0094
141	0.0143	0.0047	0.0096
142	0.0144	0.0048	0.0096
143	0.0146	0.0048	0.0098
144	0.0147	0.0049	0.0098
145	0.0168	0.0056	0.0113
146	0.0169	0.0056	0.0113
147	0.0172	0.0057	0.0115
148	0.0173	0.0057	0.0116
149	0.0176	0.0058	0.0118
150	0.0177	0.0059	0.0119
151	0.0180	0.0060	0.0120
152	0.0181	0.0060	0.0121
153	0.0185	0.0061	0.0123
154	0.0186	0.0062	0.0125
155	0.0189	0.0063	0.0127
156	0.0191	0.0063	0.0128
157	0.0195	0.0064	0.0130
158	0.0197	0.0065	0.0131
159	0.0200	0.0066	0.0134
160	0.0202	0.0067	0.0135

161	0.0207	0.0068	0.0138
162	0.0209	0.0069	0.0140
163	0.0214	0.0071	0.0143
164	0.0216	0.0072	0.0145
165	0.0221	0.0073	0.0148
166	0.0224	0.0074	0.0150
167	0.0230	0.0076	0.0154
168	0.0233	0.0077	0.0156
169	0.0240	0.0079	0.0160
170	0.0243	0.0080	0.0163
171	0.0250	0.0083	0.0168
172	0.0254	0.0084	0.0170
173	0.0263	0.0087	0.0176
174	0.0268	0.0089	0.0179
175	0.0277	0.0092	0.0186
176	0.0283	0.0094	0.0189
177	0.0295	0.0098	0.0197
178	0.0301	0.0100	0.0202
179	0.0316	0.0105	0.0211
180	0.0324	0.0107	0.0217
181	0.0342	0.0113	0.0229
182	0.0352	0.0117	0.0236
183	0.0376	0.0124	0.0251
184	0.0390	0.0129	0.0261
185	0.0341	0.0113	0.0228
186	0.0360	0.0119	0.0241
187	0.0409	0.0135	0.0274
188	0.0441	0.0146	0.0295
189	0.0532	0.0176	0.0356
190	0.0600	0.0199	0.0401
191	0.0858	0.0240	0.0618
192	0.1179	0.0240	0.0940
193	0.3691	0.0240	0.3451
194	0.0699	0.0231	0.0467
195	0.0481	0.0159	0.0322
196	0.0383	0.0127	0.0256
197	0.0405	0.0134	0.0271
198	0.0363	0.0120	0.0243
199	0.0332	0.0110	0.0222
200	0.0308	0.0102	0.0206
201	0.0289	0.0096	0.0193
202	0.0272	0.0090	0.0182
203	0.0259	0.0086	0.0173
204	0.0247	0.0082	0.0165
205	0.0236	0.0078	0.0158
206	0.0227	0.0075	0.0152
207	0.0219	0.0072	0.0146
208	0.0211	0.0070	0.0141
209	0.0205	0.0068	0.0137
210	0.0198	0.0066	0.0133
211	0.0193	0.0064	0.0129
212	0.0188	0.0062	0.0126
213	0.0183	0.0061	0.0122
214	0.0179	0.0059	0.0119
215	0.0174	0.0058	0.0117
216	0.0171	0.0056	0.0114
217	0.0148	0.0049	0.0099

218	0.0145	0.0048	0.0097
219	0.0142	0.0047	0.0095
220	0.0139	0.0046	0.0093
221	0.0136	0.0045	0.0091
222	0.0134	0.0044	0.0089
223	0.0131	0.0043	0.0088
224	0.0129	0.0043	0.0086
225	0.0126	0.0042	0.0085
226	0.0124	0.0041	0.0083
227	0.0122	0.0040	0.0082
228	0.0120	0.0040	0.0080
229	0.0118	0.0039	0.0079
230	0.0117	0.0039	0.0078
231	0.0115	0.0038	0.0077
232	0.0113	0.0037	0.0076
233	0.0112	0.0037	0.0075
234	0.0110	0.0036	0.0074
235	0.0109	0.0036	0.0073
236	0.0107	0.0036	0.0072
237	0.0106	0.0035	0.0071
238	0.0105	0.0035	0.0070
239	0.0103	0.0034	0.0069
240	0.0102	0.0034	0.0068
241	0.0101	0.0033	0.0068
242	0.0100	0.0033	0.0067
243	0.0099	0.0033	0.0066
244	0.0098	0.0032	0.0065
245	0.0097	0.0032	0.0065
246	0.0095	0.0032	0.0064
247	0.0095	0.0031	0.0063
248	0.0094	0.0031	0.0063
249	0.0093	0.0031	0.0062
250	0.0092	0.0030	0.0061
251	0.0091	0.0030	0.0061
252	0.0090	0.0030	0.0060
253	0.0089	0.0030	0.0060
254	0.0088	0.0029	0.0059
255	0.0088	0.0029	0.0059
256	0.0087	0.0029	0.0058
257	0.0086	0.0028	0.0058
258	0.0085	0.0028	0.0057
259	0.0085	0.0028	0.0057
260	0.0084	0.0028	0.0056
261	0.0083	0.0028	0.0056
262	0.0082	0.0027	0.0055
263	0.0082	0.0027	0.0055
264	0.0081	0.0027	0.0054
265	0.0081	0.0027	0.0054
266	0.0080	0.0026	0.0053
267	0.0079	0.0026	0.0053
268	0.0079	0.0026	0.0053
269	0.0078	0.0026	0.0052
270	0.0078	0.0026	0.0052
271	0.0077	0.0025	0.0052
272	0.0076	0.0025	0.0051
273	0.0076	0.0025	0.0051
274	0.0075	0.0025	0.0050

275	0.0075	0.0025	0.0050
276	0.0074	0.0025	0.0050
277	0.0074	0.0024	0.0049
278	0.0073	0.0024	0.0049
279	0.0073	0.0024	0.0049
280	0.0072	0.0024	0.0048
281	0.0072	0.0024	0.0048
282	0.0072	0.0024	0.0048
283	0.0071	0.0024	0.0048
284	0.0071	0.0023	0.0047
285	0.0070	0.0023	0.0047
286	0.0070	0.0023	0.0047
287	0.0069	0.0023	0.0046
288	0.0069	0.0023	0.0046

Total soil rain loss = 1.37(In)
Total effective rainfall = 3.11(In)
Peak flow rate in flood hydrograph = 34.71(CFS)

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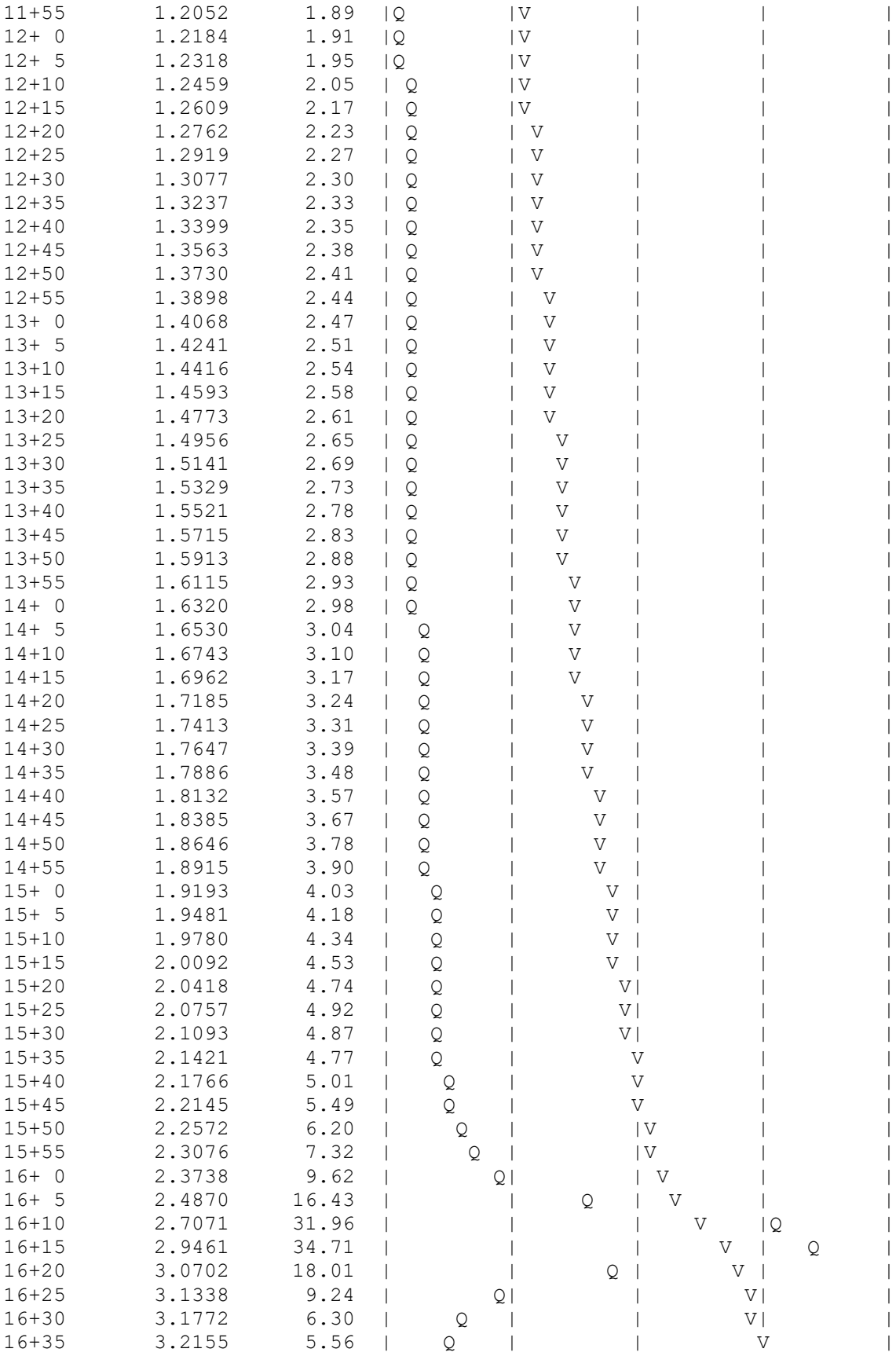
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0004	0.05	Q				
0+10	0.0027	0.34	Q				
0+15	0.0076	0.71	Q				
0+20	0.0135	0.86	Q				
0+25	0.0197	0.90	Q				
0+30	0.0259	0.91	Q				
0+35	0.0323	0.92	Q				
0+40	0.0386	0.92	Q				
0+45	0.0450	0.93	Q				
0+50	0.0514	0.93	Q				
0+55	0.0578	0.93	Q				
1+ 0	0.0643	0.93	Q				
1+ 5	0.0707	0.94	Q				
1+10	0.0772	0.94	Q				
1+15	0.0837	0.94	Q				
1+20	0.0902	0.95	Q				
1+25	0.0967	0.95	Q				
1+30	0.1033	0.95	Q				
1+35	0.1099	0.95	QV				
1+40	0.1164	0.96	QV				
1+45	0.1231	0.96	QV				
1+50	0.1297	0.96	QV				
1+55	0.1364	0.97	QV				
2+ 0	0.1430	0.97	QV				
2+ 5	0.1498	0.97	QV				
2+10	0.1565	0.98	QV				
2+15	0.1632	0.98	QV				
2+20	0.1700	0.98	QV				

2+25	0.1768	0.99	QV	|	|	|	|
2+30	0.1836	0.99	QV	|	|	|	|
2+35	0.1905	0.99	QV	|	|	|	|
2+40	0.1973	1.00	QV	|	|	|	|
2+45	0.2042	1.00	|Q	|	|	|	|
2+50	0.2111	1.00	|Q	|	|	|	|
2+55	0.2180	1.01	|QV	|	|	|	|
3+ 0	0.2250	1.01	|QV	|	|	|	|
3+ 5	0.2320	1.01	|QV	|	|	|	|
3+10	0.2390	1.02	|QV	|	|	|	|
3+15	0.2460	1.02	|QV	|	|	|	|
3+20	0.2531	1.03	|QV	|	|	|	|
3+25	0.2602	1.03	|QV	|	|	|	|
3+30	0.2673	1.03	|QV	|	|	|	|
3+35	0.2744	1.04	|QV	|	|	|	|
3+40	0.2816	1.04	|QV	|	|	|	|
3+45	0.2888	1.04	|QV	|	|	|	|
3+50	0.2960	1.05	|QV	|	|	|	|
3+55	0.3033	1.05	|QV	|	|	|	|
4+ 0	0.3105	1.06	|QV	|	|	|	|
4+ 5	0.3178	1.06	|QV	|	|	|	|
4+10	0.3252	1.06	|Q V	|	|	|	|
4+15	0.3325	1.07	|Q V	|	|	|	|
4+20	0.3399	1.07	|Q V	|	|	|	|
4+25	0.3473	1.08	|Q V	|	|	|	|
4+30	0.3548	1.08	|Q V	|	|	|	|
4+35	0.3622	1.09	|Q V	|	|	|	|
4+40	0.3697	1.09	|Q V	|	|	|	|
4+45	0.3773	1.09	|Q V	|	|	|	|
4+50	0.3848	1.10	|Q V	|	|	|	|
4+55	0.3924	1.10	|Q V	|	|	|	|
5+ 0	0.4001	1.11	|Q V	|	|	|	|
5+ 5	0.4077	1.11	|Q V	|	|	|	|
5+10	0.4154	1.12	|Q V	|	|	|	|
5+15	0.4231	1.12	|Q V	|	|	|	|
5+20	0.4309	1.13	|Q V	|	|	|	|
5+25	0.4387	1.13	|Q V	|	|	|	|
5+30	0.4465	1.14	|Q V	|	|	|	|
5+35	0.4544	1.14	|Q V	|	|	|	|
5+40	0.4623	1.15	|Q V	|	|	|	|
5+45	0.4702	1.15	|Q V	|	|	|	|
5+50	0.4781	1.16	|Q V	|	|	|	|
5+55	0.4861	1.16	|Q V	|	|	|	|
6+ 0	0.4942	1.17	|Q V	|	|	|	|
6+ 5	0.5023	1.17	|Q V	|	|	|	|
6+10	0.5104	1.18	|Q V	|	|	|	|
6+15	0.5185	1.18	|Q V	|	|	|	|
6+20	0.5267	1.19	|Q V	|	|	|	|
6+25	0.5349	1.19	|Q V	|	|	|	|
6+30	0.5432	1.20	|Q V	|	|	|	|
6+35	0.5515	1.21	|Q V	|	|	|	|
6+40	0.5598	1.21	|Q V	|	|	|	|
6+45	0.5682	1.22	|Q V	|	|	|	|
6+50	0.5766	1.22	|Q V	|	|	|	|
6+55	0.5851	1.23	|Q V	|	|	|	|
7+ 0	0.5936	1.24	|Q V	|	|	|	|
7+ 5	0.6022	1.24	|Q V	|	|	|	|

7+10	0.6108	1.25	|Q	V	|	|	|
7+15	0.6194	1.26	|Q	V	|	|	|
7+20	0.6281	1.26	|Q	V	|	|	|
7+25	0.6368	1.27	|Q	V	|	|	|
7+30	0.6456	1.27	|Q	V	|	|	|
7+35	0.6545	1.28	|Q	V	|	|	|
7+40	0.6633	1.29	|Q	V	|	|	|
7+45	0.6723	1.30	|Q	V	|	|	|
7+50	0.6812	1.30	|Q	V	|	|	|
7+55	0.6903	1.31	|Q	V	|	|	|
8+ 0	0.6993	1.32	|Q	V	|	|	|
8+ 5	0.7085	1.33	|Q	V	|	|	|
8+10	0.7176	1.33	|Q	V	|	|	|
8+15	0.7269	1.34	|Q	V	|	|	|
8+20	0.7362	1.35	|Q	V	|	|	|
8+25	0.7455	1.36	|Q	V	|	|	|
8+30	0.7549	1.36	|Q	V	|	|	|
8+35	0.7644	1.37	|Q	V	|	|	|
8+40	0.7739	1.38	|Q	V	|	|	|
8+45	0.7834	1.39	|Q	V	|	|	|
8+50	0.7931	1.40	|Q	V	|	|	|
8+55	0.8028	1.41	|Q	V	|	|	|
9+ 0	0.8125	1.42	|Q	V	|	|	|
9+ 5	0.8223	1.43	|Q	V	|	|	|
9+10	0.8322	1.44	|Q	V	|	|	|
9+15	0.8422	1.44	|Q	V	|	|	|
9+20	0.8522	1.45	|Q	V	|	|	|
9+25	0.8623	1.46	|Q	V	|	|	|
9+30	0.8724	1.47	|Q	V	|	|	|
9+35	0.8827	1.48	|Q	V	|	|	|
9+40	0.8930	1.50	|Q	V	|	|	|
9+45	0.9033	1.51	|Q	V	|	|	|
9+50	0.9138	1.52	|Q	V	|	|	|
9+55	0.9243	1.53	|Q	V	|	|	|
10+ 0	0.9349	1.54	|Q	V	|	|	|
10+ 5	0.9456	1.55	|Q	V	|	|	|
10+10	0.9564	1.56	|Q	V	|	|	|
10+15	0.9672	1.58	|Q	V	|	|	|
10+20	0.9782	1.59	|Q	V	|	|	|
10+25	0.9892	1.60	|Q	V	|	|	|
10+30	1.0003	1.61	|Q	V	|	|	|
10+35	1.0115	1.63	|Q	V	|	|	|
10+40	1.0228	1.64	|Q	V	|	|	|
10+45	1.0342	1.65	|Q	V	|	|	|
10+50	1.0457	1.67	|Q	V	|	|	|
10+55	1.0573	1.68	|Q	V	|	|	|
11+ 0	1.0690	1.70	|Q	V	|	|	|
11+ 5	1.0808	1.71	|Q	V	|	|	|
11+10	1.0927	1.73	|Q	V	|	|	|
11+15	1.1047	1.75	|Q	V	|	|	|
11+20	1.1168	1.76	|Q	V	|	|	|
11+25	1.1291	1.78	|Q	V	|	|	|
11+30	1.1414	1.80	|Q	V	|	|	|
11+35	1.1539	1.81	|Q	V	|	|	|
11+40	1.1665	1.83	|Q	V	|	|	|
11+45	1.1793	1.85	|Q	V	|	|	|
11+50	1.1922	1.87	|Q	V	|	|	|



16+40	3.2485	4.78	Q		V	
16+45	3.2787	4.39	Q		V	
16+50	3.3068	4.07	Q		V	
16+55	3.3331	3.82	Q		V	
17+ 0	3.3579	3.60	Q		V	
17+ 5	3.3814	3.42	Q		V	
17+10	3.4038	3.26	Q		V	
17+15	3.4253	3.12	Q		V	
17+20	3.4459	3.00	Q		V	
17+25	3.4658	2.89	Q		V	
17+30	3.4850	2.79	Q		V	
17+35	3.5036	2.70	Q		V	
17+40	3.5216	2.62	Q		V	
17+45	3.5392	2.55	Q		V	
17+50	3.5563	2.48	Q		V	
17+55	3.5729	2.42	Q		V	
18+ 0	3.5891	2.36	Q		V	
18+ 5	3.6049	2.29	Q		V	
18+10	3.6198	2.16	Q		V	
18+15	3.6337	2.01	Q		V	
18+20	3.6470	1.93	Q		V	
18+25	3.6599	1.88	Q		V	
18+30	3.6726	1.84	Q		V	
18+35	3.6850	1.80	Q		V	
18+40	3.6971	1.76	Q		V	
18+45	3.7091	1.73	Q		V	
18+50	3.7208	1.70	Q		V	
18+55	3.7323	1.67	Q		V	
19+ 0	3.7436	1.64	Q		V	
19+ 5	3.7547	1.62	Q		V	
19+10	3.7657	1.59	Q		V	
19+15	3.7764	1.57	Q		V	
19+20	3.7871	1.54	Q		V	
19+25	3.7975	1.52	Q		V	
19+30	3.8078	1.50	Q		V	
19+35	3.8180	1.48	Q		V	
19+40	3.8280	1.46	Q		V	
19+45	3.8379	1.44	Q		V	
19+50	3.8477	1.42	Q		V	
19+55	3.8573	1.40	Q		V	
20+ 0	3.8669	1.38	Q		V	
20+ 5	3.8763	1.37	Q		V	
20+10	3.8856	1.35	Q		V	
20+15	3.8947	1.33	Q		V	
20+20	3.9038	1.32	Q		V	
20+25	3.9128	1.30	Q		V	
20+30	3.9217	1.29	Q		V	
20+35	3.9305	1.28	Q		V	
20+40	3.9392	1.26	Q		V	
20+45	3.9478	1.25	Q		V	
20+50	3.9563	1.24	Q		V	
20+55	3.9647	1.22	Q		V	
21+ 0	3.9731	1.21	Q		V	
21+ 5	3.9814	1.20	Q		V	
21+10	3.9895	1.19	Q		V	
21+15	3.9977	1.18	Q		V	
21+20	4.0057	1.17	Q		V	

21+25	4.0137	1.16	|Q	|	|	|	V |
21+30	4.0216	1.15	|Q	|	|	|	V |
21+35	4.0294	1.14	|Q	|	|	|	V |
21+40	4.0372	1.13	|Q	|	|	|	V |
21+45	4.0449	1.12	|Q	|	|	|	V |
21+50	4.0525	1.11	|Q	|	|	|	V |
21+55	4.0601	1.10	|Q	|	|	|	V |
22+ 0	4.0676	1.09	|Q	|	|	|	V |
22+ 5	4.0750	1.08	|Q	|	|	|	V |
22+10	4.0824	1.07	|Q	|	|	|	V |
22+15	4.0897	1.06	|Q	|	|	|	V |
22+20	4.0970	1.06	|Q	|	|	|	V |
22+25	4.1042	1.05	|Q	|	|	|	V |
22+30	4.1114	1.04	|Q	|	|	|	V |
22+35	4.1185	1.03	|Q	|	|	|	V |
22+40	4.1256	1.03	|Q	|	|	|	V |
22+45	4.1326	1.02	|Q	|	|	|	V |
22+50	4.1396	1.01	|Q	|	|	|	V|
22+55	4.1465	1.00	|Q	|	|	|	V|
23+ 0	4.1533	1.00	Q	|	|	|	V|
23+ 5	4.1602	0.99	Q	|	|	|	V|
23+10	4.1669	0.98	Q	|	|	|	V|
23+15	4.1737	0.98	Q	|	|	|	V|
23+20	4.1804	0.97	Q	|	|	|	V|
23+25	4.1870	0.96	Q	|	|	|	V|
23+30	4.1936	0.96	Q	|	|	|	V|
23+35	4.2002	0.95	Q	|	|	|	V|
23+40	4.2067	0.95	Q	|	|	|	V|
23+45	4.2131	0.94	Q	|	|	|	V|
23+50	4.2196	0.93	Q	|	|	|	V|
23+55	4.2260	0.93	Q	|	|	|	V|
24+ 0	4.2323	0.92	Q	|	|	|	V|
24+ 5	4.2383	0.87	Q	|	|	|	V|
24+10	4.2423	0.58	Q	|	|	|	V|
24+15	4.2437	0.20	Q	|	|	|	V|
24+20	4.2440	0.06	Q	|	|	|	V|
24+25	4.2441	0.02	Q	|	|	|	V|
24+30	4.2442	0.01	Q	|	|	|	V

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
ONSITE PROPOSED CONDITION SOUTHERLY CHAMBER SYSTEM
10-YEAR STORM ANALYSIS

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		
16.36	1	0.81
Rainfall data for year 10		
16.36	6	2.02
Rainfall data for year 10		
16.36	24	3.71

++

******** 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)
32.0	32.0	16.36	1.000	0.978	0.294	0.287

Area-averaged adjusted loss rate Fm (In/Hr) = 0.287

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
4.81	0.294	32.0	32.0	18.55	0.000
11.55	0.706	98.0	98.0	0.20	0.937

Area-averaged catchment yield fraction, Y = 0.661
Area-averaged low loss fraction, Yb = 0.339
User entry of time of concentration = 0.185 (hours)
++
Watershed area = 16.36(Ac.)
Catchment Lag time = 0.148 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 56.3011
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.287(In/Hr)
Average low loss rate fraction (Yb) = 0.339 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.301(In)
Computed peak 30-minute rainfall = 0.616(In)
Specified peak 1-hour rainfall = 0.813(In)
Computed peak 3-hour rainfall = 1.421(In)
Specified peak 6-hour rainfall = 2.020(In)
Specified peak 24-hour rainfall = 3.710(In)

Rainfall depth area reduction factors:
Using a total area of 16.36(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.301(In)
30-minute factor = 0.999 Adjusted rainfall = 0.616(In)
1-hour factor = 0.999 Adjusted rainfall = 0.812(In)
3-hour factor = 1.000 Adjusted rainfall = 1.420(In)
6-hour factor = 1.000 Adjusted rainfall = 2.020(In)
24-hour factor = 1.000 Adjusted rainfall = 3.710(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 = 197.85 (CFS))	
1	5.760	11.396
2	37.097	62.002
3	77.788	80.508
4	93.889	31.856
5	98.285	8.698
6	99.374	2.154
7	100.000	1.239

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3007	0.3007
2	0.3967	0.0961
3	0.4666	0.0699
4	0.5235	0.0569
5	0.5724	0.0489
6	0.6157	0.0433
7	0.6548	0.0392
8	0.6907	0.0359
9	0.7241	0.0333
10	0.7552	0.0312
11	0.7846	0.0293
12	0.8124	0.0278
13	0.8461	0.0338
14	0.8786	0.0325
15	0.9100	0.0314
16	0.9404	0.0304
17	0.9698	0.0294
18	0.9984	0.0286
19	1.0262	0.0278
20	1.0534	0.0271
21	1.0798	0.0265
22	1.1057	0.0259
23	1.1310	0.0253
24	1.1557	0.0247
25	1.1800	0.0242
26	1.2037	0.0238
27	1.2271	0.0233
28	1.2500	0.0229
29	1.2725	0.0225
30	1.2946	0.0221
31	1.3164	0.0218
32	1.3378	0.0214
33	1.3589	0.0211
34	1.3797	0.0208
35	1.4002	0.0205
36	1.4204	0.0202
37	1.4403	0.0199
38	1.4599	0.0196
39	1.4793	0.0194
40	1.4985	0.0191
41	1.5174	0.0189
42	1.5361	0.0187
43	1.5545	0.0185
44	1.5728	0.0183
45	1.5909	0.0181
46	1.6087	0.0179
47	1.6264	0.0177
48	1.6439	0.0175
49	1.6612	0.0173
50	1.6783	0.0171
51	1.6953	0.0170
52	1.7121	0.0168
53	1.7288	0.0166
54	1.7453	0.0165

55	1.7616	0.0163
56	1.7778	0.0162
57	1.7939	0.0161
58	1.8098	0.0159
59	1.8256	0.0158
60	1.8412	0.0157
61	1.8567	0.0155
62	1.8721	0.0154
63	1.8874	0.0153
64	1.9026	0.0152
65	1.9176	0.0150
66	1.9326	0.0149
67	1.9474	0.0148
68	1.9621	0.0147
69	1.9767	0.0146
70	1.9912	0.0145
71	2.0056	0.0144
72	2.0199	0.0143
73	2.0322	0.0123
74	2.0443	0.0122
75	2.0564	0.0121
76	2.0684	0.0120
77	2.0803	0.0119
78	2.0921	0.0118
79	2.1038	0.0117
80	2.1154	0.0116
81	2.1270	0.0116
82	2.1385	0.0115
83	2.1498	0.0114
84	2.1612	0.0113
85	2.1724	0.0112
86	2.1836	0.0112
87	2.1947	0.0111
88	2.2057	0.0110
89	2.2167	0.0110
90	2.2276	0.0109
91	2.2384	0.0108
92	2.2491	0.0108
93	2.2598	0.0107
94	2.2704	0.0106
95	2.2810	0.0106
96	2.2915	0.0105
97	2.3019	0.0104
98	2.3123	0.0104
99	2.3226	0.0103
100	2.3329	0.0103
101	2.3431	0.0102
102	2.3533	0.0101
103	2.3633	0.0101
104	2.3734	0.0100
105	2.3834	0.0100
106	2.3933	0.0099
107	2.4032	0.0099
108	2.4130	0.0098
109	2.4228	0.0098
110	2.4325	0.0097
111	2.4422	0.0097

112	2.4518	0.0096
113	2.4614	0.0096
114	2.4709	0.0095
115	2.4804	0.0095
116	2.4898	0.0094
117	2.4992	0.0094
118	2.5085	0.0093
119	2.5178	0.0093
120	2.5271	0.0093
121	2.5363	0.0092
122	2.5455	0.0092
123	2.5546	0.0091
124	2.5637	0.0091
125	2.5727	0.0090
126	2.5818	0.0090
127	2.5907	0.0090
128	2.5996	0.0089
129	2.6085	0.0089
130	2.6174	0.0088
131	2.6262	0.0088
132	2.6350	0.0088
133	2.6437	0.0087
134	2.6524	0.0087
135	2.6611	0.0087
136	2.6697	0.0086
137	2.6783	0.0086
138	2.6868	0.0086
139	2.6954	0.0085
140	2.7038	0.0085
141	2.7123	0.0085
142	2.7207	0.0084
143	2.7291	0.0084
144	2.7375	0.0084
145	2.7458	0.0083
146	2.7541	0.0083
147	2.7623	0.0083
148	2.7705	0.0082
149	2.7787	0.0082
150	2.7869	0.0082
151	2.7950	0.0081
152	2.8031	0.0081
153	2.8112	0.0081
154	2.8193	0.0080
155	2.8273	0.0080
156	2.8353	0.0080
157	2.8432	0.0080
158	2.8511	0.0079
159	2.8590	0.0079
160	2.8669	0.0079
161	2.8748	0.0078
162	2.8826	0.0078
163	2.8904	0.0078
164	2.8981	0.0078
165	2.9059	0.0077
166	2.9136	0.0077
167	2.9213	0.0077
168	2.9289	0.0077

169	2.9365	0.0076
170	2.9442	0.0076
171	2.9517	0.0076
172	2.9593	0.0076
173	2.9668	0.0075
174	2.9743	0.0075
175	2.9818	0.0075
176	2.9893	0.0075
177	2.9967	0.0074
178	3.0041	0.0074
179	3.0115	0.0074
180	3.0189	0.0074
181	3.0262	0.0073
182	3.0336	0.0073
183	3.0409	0.0073
184	3.0481	0.0073
185	3.0554	0.0073
186	3.0626	0.0072
187	3.0698	0.0072
188	3.0770	0.0072
189	3.0842	0.0072
190	3.0913	0.0071
191	3.0985	0.0071
192	3.1056	0.0071
193	3.1126	0.0071
194	3.1197	0.0071
195	3.1267	0.0070
196	3.1338	0.0070
197	3.1408	0.0070
198	3.1478	0.0070
199	3.1547	0.0070
200	3.1617	0.0069
201	3.1686	0.0069
202	3.1755	0.0069
203	3.1824	0.0069
204	3.1892	0.0069
205	3.1961	0.0068
206	3.2029	0.0068
207	3.2097	0.0068
208	3.2165	0.0068
209	3.2233	0.0068
210	3.2300	0.0068
211	3.2368	0.0067
212	3.2435	0.0067
213	3.2502	0.0067
214	3.2569	0.0067
215	3.2635	0.0067
216	3.2702	0.0066
217	3.2768	0.0066
218	3.2834	0.0066
219	3.2900	0.0066
220	3.2966	0.0066
221	3.3032	0.0066
222	3.3097	0.0065
223	3.3162	0.0065
224	3.3228	0.0065
225	3.3293	0.0065

226	3.3357	0.0065
227	3.3422	0.0065
228	3.3487	0.0064
229	3.3551	0.0064
230	3.3615	0.0064
231	3.3679	0.0064
232	3.3743	0.0064
233	3.3807	0.0064
234	3.3870	0.0064
235	3.3934	0.0063
236	3.3997	0.0063
237	3.4060	0.0063
238	3.4123	0.0063
239	3.4186	0.0063
240	3.4248	0.0063
241	3.4311	0.0063
242	3.4373	0.0062
243	3.4435	0.0062
244	3.4498	0.0062
245	3.4559	0.0062
246	3.4621	0.0062
247	3.4683	0.0062
248	3.4744	0.0062
249	3.4806	0.0061
250	3.4867	0.0061
251	3.4928	0.0061
252	3.4989	0.0061
253	3.5050	0.0061
254	3.5111	0.0061
255	3.5171	0.0061
256	3.5232	0.0060
257	3.5292	0.0060
258	3.5352	0.0060
259	3.5412	0.0060
260	3.5472	0.0060
261	3.5532	0.0060
262	3.5591	0.0060
263	3.5651	0.0060
264	3.5710	0.0059
265	3.5769	0.0059
266	3.5829	0.0059
267	3.5888	0.0059
268	3.5947	0.0059
269	3.6005	0.0059
270	3.6064	0.0059
271	3.6122	0.0059
272	3.6181	0.0058
273	3.6239	0.0058
274	3.6297	0.0058
275	3.6355	0.0058
276	3.6413	0.0058
277	3.6471	0.0058
278	3.6529	0.0058
279	3.6586	0.0058
280	3.6644	0.0057
281	3.6701	0.0057
282	3.6758	0.0057

283	3.6815	0.0057
284	3.6872	0.0057
285	3.6929	0.0057
286	3.6986	0.0057
287	3.7043	0.0057
288	3.7099	0.0057

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0057	0.0019	0.0037
2	0.0057	0.0019	0.0037
3	0.0057	0.0019	0.0038
4	0.0057	0.0019	0.0038
5	0.0057	0.0019	0.0038
6	0.0057	0.0019	0.0038
7	0.0058	0.0019	0.0038
8	0.0058	0.0020	0.0038
9	0.0058	0.0020	0.0038
10	0.0058	0.0020	0.0038
11	0.0058	0.0020	0.0039
12	0.0058	0.0020	0.0039
13	0.0059	0.0020	0.0039
14	0.0059	0.0020	0.0039
15	0.0059	0.0020	0.0039
16	0.0059	0.0020	0.0039
17	0.0059	0.0020	0.0039
18	0.0060	0.0020	0.0039
19	0.0060	0.0020	0.0040
20	0.0060	0.0020	0.0040
21	0.0060	0.0020	0.0040
22	0.0060	0.0020	0.0040
23	0.0061	0.0021	0.0040
24	0.0061	0.0021	0.0040
25	0.0061	0.0021	0.0040
26	0.0061	0.0021	0.0040
27	0.0061	0.0021	0.0041
28	0.0062	0.0021	0.0041
29	0.0062	0.0021	0.0041
30	0.0062	0.0021	0.0041
31	0.0062	0.0021	0.0041
32	0.0062	0.0021	0.0041
33	0.0063	0.0021	0.0041
34	0.0063	0.0021	0.0042
35	0.0063	0.0021	0.0042
36	0.0063	0.0021	0.0042
37	0.0064	0.0022	0.0042
38	0.0064	0.0022	0.0042
39	0.0064	0.0022	0.0042
40	0.0064	0.0022	0.0042
41	0.0064	0.0022	0.0043
42	0.0065	0.0022	0.0043
43	0.0065	0.0022	0.0043
44	0.0065	0.0022	0.0043
45	0.0065	0.0022	0.0043
46	0.0066	0.0022	0.0043

47	0.0066	0.0022	0.0044
48	0.0066	0.0022	0.0044
49	0.0066	0.0023	0.0044
50	0.0067	0.0023	0.0044
51	0.0067	0.0023	0.0044
52	0.0067	0.0023	0.0044
53	0.0068	0.0023	0.0045
54	0.0068	0.0023	0.0045
55	0.0068	0.0023	0.0045
56	0.0068	0.0023	0.0045
57	0.0069	0.0023	0.0045
58	0.0069	0.0023	0.0046
59	0.0069	0.0023	0.0046
60	0.0069	0.0024	0.0046
61	0.0070	0.0024	0.0046
62	0.0070	0.0024	0.0046
63	0.0070	0.0024	0.0047
64	0.0071	0.0024	0.0047
65	0.0071	0.0024	0.0047
66	0.0071	0.0024	0.0047
67	0.0072	0.0024	0.0047
68	0.0072	0.0024	0.0048
69	0.0072	0.0024	0.0048
70	0.0073	0.0025	0.0048
71	0.0073	0.0025	0.0048
72	0.0073	0.0025	0.0048
73	0.0074	0.0025	0.0049
74	0.0074	0.0025	0.0049
75	0.0074	0.0025	0.0049
76	0.0075	0.0025	0.0049
77	0.0075	0.0025	0.0050
78	0.0075	0.0026	0.0050
79	0.0076	0.0026	0.0050
80	0.0076	0.0026	0.0050
81	0.0077	0.0026	0.0051
82	0.0077	0.0026	0.0051
83	0.0077	0.0026	0.0051
84	0.0078	0.0026	0.0051
85	0.0078	0.0026	0.0052
86	0.0078	0.0027	0.0052
87	0.0079	0.0027	0.0052
88	0.0079	0.0027	0.0052
89	0.0080	0.0027	0.0053
90	0.0080	0.0027	0.0053
91	0.0081	0.0027	0.0053
92	0.0081	0.0027	0.0054
93	0.0082	0.0028	0.0054
94	0.0082	0.0028	0.0054
95	0.0083	0.0028	0.0055
96	0.0083	0.0028	0.0055
97	0.0084	0.0028	0.0055
98	0.0084	0.0028	0.0055
99	0.0085	0.0029	0.0056
100	0.0085	0.0029	0.0056
101	0.0086	0.0029	0.0057
102	0.0086	0.0029	0.0057
103	0.0087	0.0029	0.0057

104	0.0087	0.0029	0.0058
105	0.0088	0.0030	0.0058
106	0.0088	0.0030	0.0058
107	0.0089	0.0030	0.0059
108	0.0089	0.0030	0.0059
109	0.0090	0.0030	0.0060
110	0.0090	0.0031	0.0060
111	0.0091	0.0031	0.0060
112	0.0092	0.0031	0.0061
113	0.0093	0.0031	0.0061
114	0.0093	0.0031	0.0062
115	0.0094	0.0032	0.0062
116	0.0094	0.0032	0.0062
117	0.0095	0.0032	0.0063
118	0.0096	0.0032	0.0063
119	0.0097	0.0033	0.0064
120	0.0097	0.0033	0.0064
121	0.0098	0.0033	0.0065
122	0.0099	0.0033	0.0065
123	0.0100	0.0034	0.0066
124	0.0100	0.0034	0.0066
125	0.0101	0.0034	0.0067
126	0.0102	0.0035	0.0067
127	0.0103	0.0035	0.0068
128	0.0104	0.0035	0.0069
129	0.0105	0.0036	0.0069
130	0.0106	0.0036	0.0070
131	0.0107	0.0036	0.0071
132	0.0108	0.0036	0.0071
133	0.0109	0.0037	0.0072
134	0.0110	0.0037	0.0072
135	0.0111	0.0038	0.0073
136	0.0112	0.0038	0.0074
137	0.0113	0.0038	0.0075
138	0.0114	0.0039	0.0075
139	0.0116	0.0039	0.0076
140	0.0116	0.0039	0.0077
141	0.0118	0.0040	0.0078
142	0.0119	0.0040	0.0079
143	0.0121	0.0041	0.0080
144	0.0122	0.0041	0.0080
145	0.0143	0.0048	0.0095
146	0.0144	0.0049	0.0095
147	0.0146	0.0049	0.0097
148	0.0147	0.0050	0.0097
149	0.0149	0.0051	0.0099
150	0.0150	0.0051	0.0100
151	0.0153	0.0052	0.0101
152	0.0154	0.0052	0.0102
153	0.0157	0.0053	0.0104
154	0.0158	0.0053	0.0104
155	0.0161	0.0054	0.0106
156	0.0162	0.0055	0.0107
157	0.0165	0.0056	0.0109
158	0.0166	0.0056	0.0110
159	0.0170	0.0057	0.0112
160	0.0171	0.0058	0.0113

161	0.0175	0.0059	0.0116
162	0.0177	0.0060	0.0117
163	0.0181	0.0061	0.0119
164	0.0183	0.0062	0.0121
165	0.0187	0.0063	0.0124
166	0.0189	0.0064	0.0125
167	0.0194	0.0066	0.0128
168	0.0196	0.0067	0.0130
169	0.0202	0.0068	0.0134
170	0.0205	0.0069	0.0136
171	0.0211	0.0071	0.0140
172	0.0214	0.0073	0.0142
173	0.0221	0.0075	0.0146
174	0.0225	0.0076	0.0149
175	0.0233	0.0079	0.0154
176	0.0238	0.0080	0.0157
177	0.0247	0.0084	0.0164
178	0.0253	0.0086	0.0167
179	0.0265	0.0090	0.0175
180	0.0271	0.0092	0.0179
181	0.0286	0.0097	0.0189
182	0.0294	0.0100	0.0195
183	0.0314	0.0106	0.0208
184	0.0325	0.0110	0.0215
185	0.0278	0.0094	0.0184
186	0.0293	0.0099	0.0194
187	0.0333	0.0113	0.0220
188	0.0359	0.0122	0.0238
189	0.0433	0.0147	0.0286
190	0.0489	0.0165	0.0323
191	0.0699	0.0237	0.0462
192	0.0961	0.0240	0.0721
193	0.3007	0.0240	0.2767
194	0.0569	0.0193	0.0376
195	0.0392	0.0133	0.0259
196	0.0312	0.0106	0.0206
197	0.0338	0.0114	0.0223
198	0.0304	0.0103	0.0201
199	0.0278	0.0094	0.0184
200	0.0259	0.0088	0.0171
201	0.0242	0.0082	0.0160
202	0.0229	0.0078	0.0152
203	0.0218	0.0074	0.0144
204	0.0208	0.0070	0.0138
205	0.0199	0.0067	0.0132
206	0.0191	0.0065	0.0127
207	0.0185	0.0063	0.0122
208	0.0179	0.0060	0.0118
209	0.0173	0.0059	0.0114
210	0.0168	0.0057	0.0111
211	0.0163	0.0055	0.0108
212	0.0159	0.0054	0.0105
213	0.0155	0.0053	0.0103
214	0.0152	0.0051	0.0100
215	0.0148	0.0050	0.0098
216	0.0145	0.0049	0.0096
217	0.0123	0.0041	0.0081

218	0.0120	0.0041	0.0079
219	0.0117	0.0040	0.0078
220	0.0115	0.0039	0.0076
221	0.0112	0.0038	0.0074
222	0.0110	0.0037	0.0073
223	0.0108	0.0037	0.0072
224	0.0106	0.0036	0.0070
225	0.0104	0.0035	0.0069
226	0.0103	0.0035	0.0068
227	0.0101	0.0034	0.0067
228	0.0099	0.0034	0.0066
229	0.0098	0.0033	0.0065
230	0.0096	0.0033	0.0064
231	0.0095	0.0032	0.0063
232	0.0093	0.0032	0.0062
233	0.0092	0.0031	0.0061
234	0.0091	0.0031	0.0060
235	0.0090	0.0030	0.0059
236	0.0088	0.0030	0.0059
237	0.0087	0.0030	0.0058
238	0.0086	0.0029	0.0057
239	0.0085	0.0029	0.0056
240	0.0084	0.0029	0.0056
241	0.0083	0.0028	0.0055
242	0.0082	0.0028	0.0054
243	0.0081	0.0028	0.0054
244	0.0080	0.0027	0.0053
245	0.0080	0.0027	0.0053
246	0.0079	0.0027	0.0052
247	0.0078	0.0026	0.0052
248	0.0077	0.0026	0.0051
249	0.0076	0.0026	0.0050
250	0.0076	0.0026	0.0050
251	0.0075	0.0025	0.0050
252	0.0074	0.0025	0.0049
253	0.0073	0.0025	0.0049
254	0.0073	0.0025	0.0048
255	0.0072	0.0024	0.0048
256	0.0071	0.0024	0.0047
257	0.0071	0.0024	0.0047
258	0.0070	0.0024	0.0046
259	0.0070	0.0024	0.0046
260	0.0069	0.0023	0.0046
261	0.0068	0.0023	0.0045
262	0.0068	0.0023	0.0045
263	0.0067	0.0023	0.0045
264	0.0067	0.0023	0.0044
265	0.0066	0.0022	0.0044
266	0.0066	0.0022	0.0044
267	0.0065	0.0022	0.0043
268	0.0065	0.0022	0.0043
269	0.0064	0.0022	0.0043
270	0.0064	0.0022	0.0042
271	0.0063	0.0021	0.0042
272	0.0063	0.0021	0.0042
273	0.0063	0.0021	0.0041
274	0.0062	0.0021	0.0041

275	0.0062	0.0021	0.0041
276	0.0061	0.0021	0.0041
277	0.0061	0.0021	0.0040
278	0.0060	0.0020	0.0040
279	0.0060	0.0020	0.0040
280	0.0060	0.0020	0.0039
281	0.0059	0.0020	0.0039
282	0.0059	0.0020	0.0039
283	0.0059	0.0020	0.0039
284	0.0058	0.0020	0.0038
285	0.0058	0.0020	0.0038
286	0.0057	0.0019	0.0038
287	0.0057	0.0019	0.0038
288	0.0057	0.0019	0.0038

Total soil rain loss = 1.17(In)
Total effective rainfall = 2.54(In)
Peak flow rate in flood hydrograph = 27.71(CFS)

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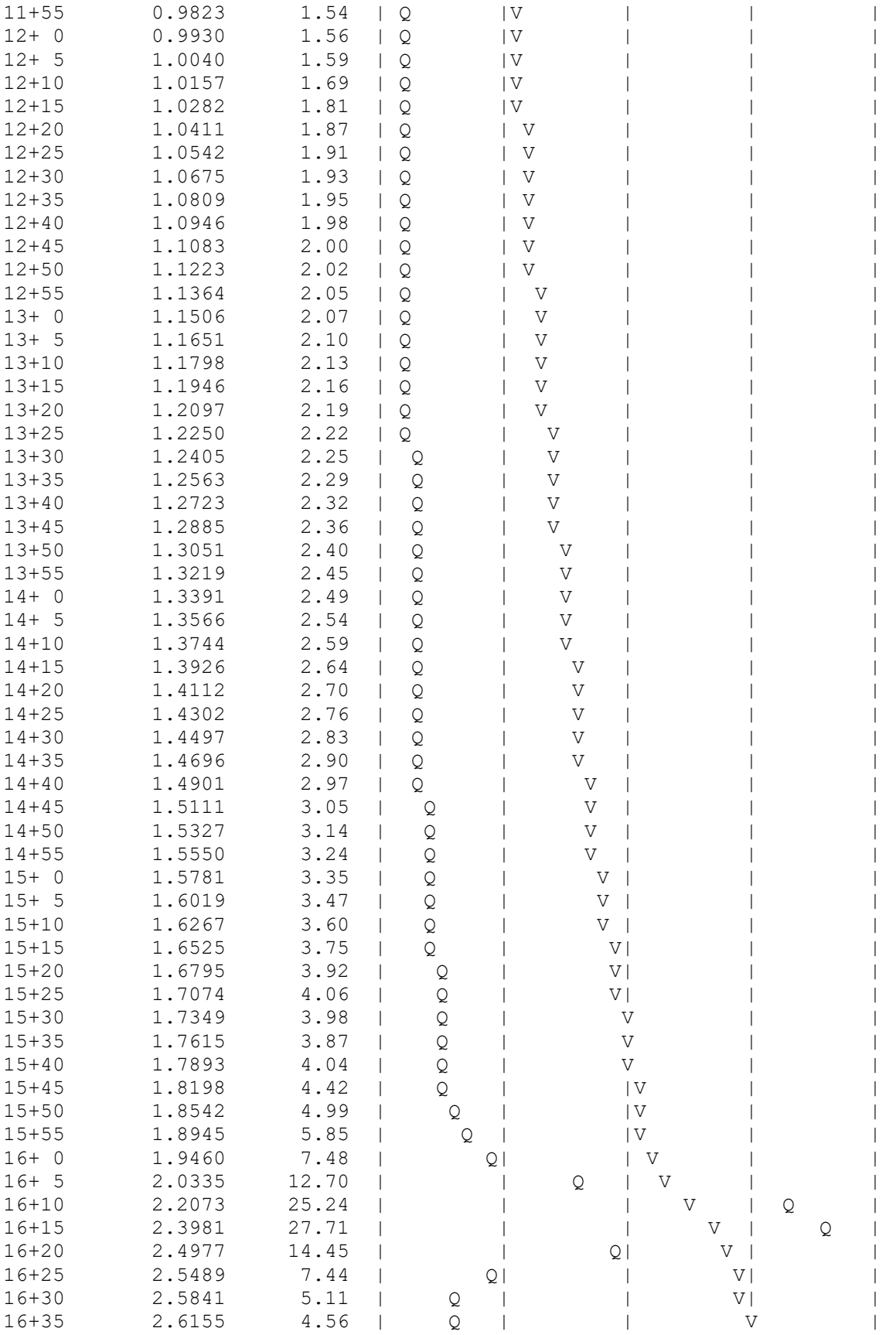
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

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	0.0003	0.04	Q				
0+10	0.0022	0.27	Q				
0+15	0.0062	0.58	Q				
0+20	0.0110	0.70	Q				
0+25	0.0160	0.73	Q				
0+30	0.0211	0.74	Q				
0+35	0.0263	0.75	Q				
0+40	0.0314	0.75	VQ				
0+45	0.0366	0.75	VQ				
0+50	0.0418	0.76	VQ				
0+55	0.0470	0.76	VQ				
1+ 0	0.0523	0.76	VQ				
1+ 5	0.0575	0.76	VQ				
1+10	0.0628	0.76	VQ				
1+15	0.0681	0.77	VQ				
1+20	0.0734	0.77	VQ				
1+25	0.0787	0.77	VQ				
1+30	0.0840	0.77	VQ				
1+35	0.0894	0.78	|Q				
1+40	0.0948	0.78	|Q				
1+45	0.1001	0.78	|Q				
1+50	0.1055	0.78	|Q				
1+55	0.1110	0.79	|Q				
2+ 0	0.1164	0.79	|Q				
2+ 5	0.1219	0.79	|Q				
2+10	0.1273	0.79	|Q				
2+15	0.1328	0.80	|Q				
2+20	0.1383	0.80	|Q				

2+25	0.1439	0.80	|Q	|	|	|	|
2+30	0.1494	0.81	|Q	|	|	|	|
2+35	0.1550	0.81	|Q	|	|	|	|
2+40	0.1606	0.81	|Q	|	|	|	|
2+45	0.1662	0.81	|Q	|	|	|	|
2+50	0.1718	0.82	|Q	|	|	|	|
2+55	0.1775	0.82	|QV	|	|	|	|
3+ 0	0.1831	0.82	|QV	|	|	|	|
3+ 5	0.1888	0.83	|QV	|	|	|	|
3+10	0.1945	0.83	|QV	|	|	|	|
3+15	0.2002	0.83	|QV	|	|	|	|
3+20	0.2060	0.83	|QV	|	|	|	|
3+25	0.2118	0.84	|QV	|	|	|	|
3+30	0.2176	0.84	|QV	|	|	|	|
3+35	0.2234	0.84	|QV	|	|	|	|
3+40	0.2292	0.85	|QV	|	|	|	|
3+45	0.2351	0.85	|QV	|	|	|	|
3+50	0.2409	0.85	|QV	|	|	|	|
3+55	0.2468	0.86	|QV	|	|	|	|
4+ 0	0.2528	0.86	|QV	|	|	|	|
4+ 5	0.2587	0.86	|QV	|	|	|	|
4+10	0.2647	0.87	|Q V	|	|	|	|
4+15	0.2707	0.87	|Q V	|	|	|	|
4+20	0.2767	0.87	|Q V	|	|	|	|
4+25	0.2827	0.88	|Q V	|	|	|	|
4+30	0.2888	0.88	|Q V	|	|	|	|
4+35	0.2949	0.88	|Q V	|	|	|	|
4+40	0.3010	0.89	|Q V	|	|	|	|
4+45	0.3071	0.89	|Q V	|	|	|	|
4+50	0.3133	0.89	|Q V	|	|	|	|
4+55	0.3195	0.90	|Q V	|	|	|	|
5+ 0	0.3257	0.90	|Q V	|	|	|	|
5+ 5	0.3319	0.91	|Q V	|	|	|	|
5+10	0.3382	0.91	|Q V	|	|	|	|
5+15	0.3445	0.91	|Q V	|	|	|	|
5+20	0.3508	0.92	|Q V	|	|	|	|
5+25	0.3571	0.92	|Q V	|	|	|	|
5+30	0.3635	0.93	|Q V	|	|	|	|
5+35	0.3699	0.93	|Q V	|	|	|	|
5+40	0.3763	0.93	|Q V	|	|	|	|
5+45	0.3828	0.94	|Q V	|	|	|	|
5+50	0.3893	0.94	|Q V	|	|	|	|
5+55	0.3958	0.95	|Q V	|	|	|	|
6+ 0	0.4023	0.95	|Q V	|	|	|	|
6+ 5	0.4089	0.96	|Q V	|	|	|	|
6+10	0.4155	0.96	|Q V	|	|	|	|
6+15	0.4222	0.96	|Q V	|	|	|	|
6+20	0.4288	0.97	|Q V	|	|	|	|
6+25	0.4355	0.97	|Q V	|	|	|	|
6+30	0.4423	0.98	|Q V	|	|	|	|
6+35	0.4490	0.98	|Q V	|	|	|	|
6+40	0.4558	0.99	|Q V	|	|	|	|
6+45	0.4627	0.99	|Q V	|	|	|	|
6+50	0.4695	1.00	|Q V	|	|	|	|
6+55	0.4764	1.00	|Q V	|	|	|	|
7+ 0	0.4834	1.01	|Q V	|	|	|	|
7+ 5	0.4904	1.01	|Q V	|	|	|	|

7+10	0.4974	1.02	|Q V |	|	|	|
7+15	0.5044	1.02	|Q V |	|	|	|
7+20	0.5115	1.03	|Q V |	|	|	|
7+25	0.5186	1.03	|Q V |	|	|	|
7+30	0.5258	1.04	|Q V |	|	|	|
7+35	0.5330	1.04	|Q V |	|	|	|
7+40	0.5402	1.05	|Q V |	|	|	|
7+45	0.5475	1.06	|Q V |	|	|	|
7+50	0.5548	1.06	|Q V |	|	|	|
7+55	0.5621	1.07	|Q V |	|	|	|
8+ 0	0.5695	1.07	|Q V |	|	|	|
8+ 5	0.5770	1.08	|Q V |	|	|	|
8+10	0.5845	1.09	|Q V |	|	|	|
8+15	0.5920	1.09	|Q V |	|	|	|
8+20	0.5996	1.10	|Q V |	|	|	|
8+25	0.6072	1.11	|Q V |	|	|	|
8+30	0.6148	1.11	|Q V |	|	|	|
8+35	0.6225	1.12	|Q V |	|	|	|
8+40	0.6303	1.13	|Q V |	|	|	|
8+45	0.6381	1.13	|Q V |	|	|	|
8+50	0.6460	1.14	|Q V |	|	|	|
8+55	0.6539	1.15	|Q V |	|	|	|
9+ 0	0.6618	1.16	|Q V |	|	|	|
9+ 5	0.6698	1.16	|Q V |	|	|	|
9+10	0.6779	1.17	|Q V |	|	|	|
9+15	0.6860	1.18	|Q V |	|	|	|
9+20	0.6942	1.19	|Q V |	|	|	|
9+25	0.7024	1.19	|Q V |	|	|	|
9+30	0.7107	1.20	|Q V |	|	|	|
9+35	0.7190	1.21	|Q V |	|	|	|
9+40	0.7274	1.22	|Q V |	|	|	|
9+45	0.7359	1.23	|Q V |	|	|	|
9+50	0.7444	1.24	|Q V |	|	|	|
9+55	0.7530	1.25	|Q V |	|	|	|
10+ 0	0.7617	1.26	|Q V |	|	|	|
10+ 5	0.7704	1.27	|Q V |	|	|	|
10+10	0.7792	1.28	|Q V|	|	|	|
10+15	0.7880	1.29	|Q V|	|	|	|
10+20	0.7969	1.30	|Q V|	|	|	|
10+25	0.8059	1.31	|Q V|	|	|	|
10+30	0.8150	1.32	|Q V|	|	|	|
10+35	0.8241	1.33	|Q V|	|	|	|
10+40	0.8334	1.34	|Q V|	|	|	|
10+45	0.8427	1.35	|Q V|	|	|	|
10+50	0.8520	1.36	|Q V|	|	|	|
10+55	0.8615	1.37	|Q V|	|	|	|
11+ 0	0.8710	1.39	|Q V |	|	|	|
11+ 5	0.8807	1.40	|Q V |	|	|	|
11+10	0.8904	1.41	|Q V |	|	|	|
11+15	0.9002	1.42	|Q V |	|	|	|
11+20	0.9101	1.44	|Q V |	|	|	|
11+25	0.9201	1.45	|Q V |	|	|	|
11+30	0.9302	1.47	|Q V |	|	|	|
11+35	0.9404	1.48	|Q V |	|	|	|
11+40	0.9507	1.50	|Q V |	|	|	|
11+45	0.9611	1.51	| Q |V |	|	|	|
11+50	0.9716	1.53	| Q |V |	|	|	|



16+40	2.6427	3.95	Q		V	
16+45	2.6677	3.64	Q		V	
16+50	2.6910	3.38	Q		V	
16+55	2.7128	3.17	Q		V	
17+ 0	2.7334	2.99	Q		V	
17+ 5	2.7530	2.84	Q		V	
17+10	2.7717	2.71	Q		V	
17+15	2.7896	2.60	Q		V	
17+20	2.8068	2.50	Q		V	
17+25	2.8234	2.41	Q		V	
17+30	2.8395	2.33	Q		V	
17+35	2.8551	2.26	Q		V	
17+40	2.8702	2.19	Q		V	
17+45	2.8849	2.13	Q		V	
17+50	2.8992	2.08	Q		V	
17+55	2.9132	2.03	Q		V	
18+ 0	2.9268	1.98	Q		V	
18+ 5	2.9400	1.92	Q		V	
18+10	2.9524	1.80	Q		V	
18+15	2.9638	1.66	Q		V	
18+20	2.9747	1.58	Q		V	
18+25	2.9853	1.54	Q		V	
18+30	2.9956	1.50	Q		V	
18+35	3.0058	1.47	Q		V	
18+40	3.0157	1.44	Q		V	
18+45	3.0254	1.41	Q		V	
18+50	3.0350	1.39	Q		V	
18+55	3.0444	1.36	Q		V	
19+ 0	3.0536	1.34	Q		V	
19+ 5	3.0627	1.32	Q		V	
19+10	3.0716	1.30	Q		V	
19+15	3.0804	1.28	Q		V	
19+20	3.0891	1.26	Q		V	
19+25	3.0976	1.24	Q		V	
19+30	3.1060	1.22	Q		V	
19+35	3.1143	1.20	Q		V	
19+40	3.1225	1.19	Q		V	
19+45	3.1306	1.17	Q		V	
19+50	3.1385	1.16	Q		V	
19+55	3.1464	1.14	Q		V	
20+ 0	3.1541	1.13	Q		V	
20+ 5	3.1618	1.11	Q		V	
20+10	3.1694	1.10	Q		V	
20+15	3.1769	1.09	Q		V	
20+20	3.1843	1.08	Q		V	
20+25	3.1916	1.06	Q		V	
20+30	3.1989	1.05	Q		V	
20+35	3.2060	1.04	Q		V	
20+40	3.2131	1.03	Q		V	
20+45	3.2201	1.02	Q		V	
20+50	3.2271	1.01	Q		V	
20+55	3.2339	1.00	Q		V	
21+ 0	3.2407	0.99	Q		V	
21+ 5	3.2475	0.98	Q		V	
21+10	3.2542	0.97	Q		V	
21+15	3.2608	0.96	Q		V	
21+20	3.2673	0.95	Q		V	

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   21+25       3.2738      0.94  |Q        |         |         |      V  |
   21+30       3.2802      0.93  |Q        |         |         |      V  |
   21+35       3.2866      0.93  |Q        |         |         |      V  |
   21+40       3.2929      0.92  |Q        |         |         |       V |
   21+45       3.2992      0.91  |Q        |         |         |       V |
   21+50       3.3054      0.90  |Q        |         |         |       V |
   21+55       3.3116      0.90  |Q        |         |         |       V |
   22+ 0       3.3177      0.89  |Q        |         |         |       V |
   22+ 5       3.3238      0.88  |Q        |         |         |       V |
   22+10       3.3298      0.87  |Q        |         |         |       V |
   22+15       3.3358      0.87  |Q        |         |         |       V |
   22+20       3.3417      0.86  |Q        |         |         |       V |
   22+25       3.3476      0.85  |Q        |         |         |       V |
   22+30       3.3534      0.85  |Q        |         |         |       V |
   22+35       3.3592      0.84  |Q        |         |         |       V |
   22+40       3.3650      0.84  |Q        |         |         |       V |
   22+45       3.3707      0.83  |Q        |         |         |       V |
   22+50       3.3763      0.82  |Q        |         |         |        V|
   22+55       3.3820      0.82  |Q        |         |         |        V|
   23+ 0       3.3876      0.81  |Q        |         |         |        V|
   23+ 5       3.3931      0.81  |Q        |         |         |        V|
   23+10       3.3986      0.80  |Q        |         |         |        V|
   23+15       3.4041      0.80  |Q        |         |         |        V|
   23+20       3.4095      0.79  |Q        |         |         |        V|
   23+25       3.4149      0.78  |Q        |         |         |        V|
   23+30       3.4203      0.78  |Q        |         |         |        V|
   23+35       3.4257      0.77  |Q        |         |         |        V|
   23+40       3.4310      0.77  |Q        |         |         |        V|
   23+45       3.4362      0.77  |Q        |         |         |        V|
   23+50       3.4415      0.76  |Q        |         |         |        V|
   23+55       3.4467      0.76  |Q        |         |         |        V|
   24+ 0       3.4518      0.75  |Q        |         |         |        V|
   24+ 5       3.4567      0.70  Q         |         |         |        V|
   24+10       3.4599      0.47  Q         |         |         |        V|
   24+15       3.4611      0.17  Q         |         |         |        V|
   24+20       3.4614      0.05  Q         |         |         |        V|
   24+25       3.4615      0.01  Q         |         |         |        V|
   24+30       3.4615      0.00  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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
OFFSITE PROPOSED CONDITION WATERSHED B
100-YEAR STORM ANALYSIS

Storm Event Year = 100

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 100		
30.54	1	1.30
Rainfall data for year 100		
30.54	6	3.07
Rainfall data for year 100		
30.54	24	5.64

++

******** 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)
32.0	32.0	30.54	1.000	0.978	0.765	0.748

Area-averaged adjusted loss rate Fm (In/Hr) = 0.748

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
23.36	0.765	32.0	32.0	21.25	0.015
7.18	0.235	98.0	98.0	0.20	0.958

Area-averaged catchment yield fraction, Y = 0.237
Area-averaged low loss fraction, Yb = 0.763
User entry of time of concentration = 0.250 (hours)
++
Watershed area = 30.54(Ac.)
Catchment Lag time = 0.200 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 41.6500
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.748(In/Hr)
Average low loss rate fraction (Yb) = 0.763 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.481(In)
Computed peak 30-minute rainfall = 0.985(In)
Specified peak 1-hour rainfall = 1.300(In)
Computed peak 3-hour rainfall = 2.202(In)
Specified peak 6-hour rainfall = 3.070(In)
Specified peak 24-hour rainfall = 5.640(In)

Rainfall depth area reduction factors:
Using a total area of 30.54(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.480(In)
30-minute factor = 0.999 Adjusted rainfall = 0.984(In)
1-hour factor = 0.999 Adjusted rainfall = 1.298(In)
3-hour factor = 1.000 Adjusted rainfall = 2.201(In)
6-hour factor = 1.000 Adjusted rainfall = 3.070(In)
24-hour factor = 1.000 Adjusted rainfall = 5.640(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 = 369.34 (CFS))		
1	3.258	12.033
2	21.137	66.036
3	53.204	118.434
4	80.572	101.083
5	92.527	44.154
6	97.352	17.821
7	98.673	4.880

8	99.423	2.769
9	100.000	2.132

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.4805	0.4805
2	0.6340	0.1535
3	0.7456	0.1116
4	0.8365	0.0909
5	0.9146	0.0781
6	0.9838	0.0692
7	1.0464	0.0626
8	1.1038	0.0574
9	1.1570	0.0532
10	1.2068	0.0498
11	1.2537	0.0469
12	1.2981	0.0444
13	1.3491	0.0509
14	1.3980	0.0489
15	1.4451	0.0471
16	1.4907	0.0455
17	1.5348	0.0441
18	1.5775	0.0428
19	1.6191	0.0415
20	1.6595	0.0404
21	1.6989	0.0394
22	1.7373	0.0384
23	1.7748	0.0375
24	1.8115	0.0367
25	1.8474	0.0359
26	1.8826	0.0352
27	1.9170	0.0345
28	1.9508	0.0338
29	1.9840	0.0332
30	2.0166	0.0326
31	2.0487	0.0320
32	2.0802	0.0315
33	2.1112	0.0310
34	2.1417	0.0305
35	2.1717	0.0301
36	2.2013	0.0296
37	2.2305	0.0291
38	2.2592	0.0287
39	2.2875	0.0283
40	2.3155	0.0280
41	2.3431	0.0276
42	2.3703	0.0272
43	2.3972	0.0269
44	2.4238	0.0266
45	2.4501	0.0263
46	2.4760	0.0260
47	2.5017	0.0257
48	2.5271	0.0254
49	2.5522	0.0251
50	2.5771	0.0249
51	2.6017	0.0246
52	2.6260	0.0243

53	2.6501	0.0241
54	2.6740	0.0239
55	2.6976	0.0236
56	2.7211	0.0234
57	2.7443	0.0232
58	2.7673	0.0230
59	2.7900	0.0228
60	2.8126	0.0226
61	2.8350	0.0224
62	2.8572	0.0222
63	2.8792	0.0220
64	2.9011	0.0218
65	2.9227	0.0217
66	2.9442	0.0215
67	2.9655	0.0213
68	2.9867	0.0212
69	3.0077	0.0210
70	3.0285	0.0208
71	3.0492	0.0207
72	3.0697	0.0205
73	3.0883	0.0186
74	3.1068	0.0185
75	3.1252	0.0184
76	3.1434	0.0182
77	3.1615	0.0181
78	3.1794	0.0179
79	3.1973	0.0178
80	3.2149	0.0177
81	3.2325	0.0176
82	3.2500	0.0174
83	3.2673	0.0173
84	3.2845	0.0172
85	3.3016	0.0171
86	3.3186	0.0170
87	3.3355	0.0169
88	3.3522	0.0168
89	3.3689	0.0167
90	3.3855	0.0166
91	3.4019	0.0165
92	3.4183	0.0164
93	3.4345	0.0163
94	3.4507	0.0162
95	3.4667	0.0161
96	3.4827	0.0160
97	3.4986	0.0159
98	3.5144	0.0158
99	3.5300	0.0157
100	3.5456	0.0156
101	3.5612	0.0155
102	3.5766	0.0154
103	3.5919	0.0153
104	3.6072	0.0153
105	3.6224	0.0152
106	3.6375	0.0151
107	3.6525	0.0150
108	3.6674	0.0149
109	3.6823	0.0149

110	3.6971	0.0148
111	3.7118	0.0147
112	3.7264	0.0146
113	3.7410	0.0146
114	3.7555	0.0145
115	3.7699	0.0144
116	3.7842	0.0143
117	3.7985	0.0143
118	3.8127	0.0142
119	3.8269	0.0141
120	3.8409	0.0141
121	3.8550	0.0140
122	3.8689	0.0139
123	3.8828	0.0139
124	3.8966	0.0138
125	3.9104	0.0138
126	3.9241	0.0137
127	3.9377	0.0136
128	3.9513	0.0136
129	3.9648	0.0135
130	3.9782	0.0135
131	3.9916	0.0134
132	4.0050	0.0133
133	4.0183	0.0133
134	4.0315	0.0132
135	4.0447	0.0132
136	4.0578	0.0131
137	4.0708	0.0131
138	4.0838	0.0130
139	4.0968	0.0130
140	4.1097	0.0129
141	4.1226	0.0129
142	4.1354	0.0128
143	4.1481	0.0128
144	4.1608	0.0127
145	4.1735	0.0127
146	4.1861	0.0126
147	4.1986	0.0126
148	4.2112	0.0125
149	4.2236	0.0125
150	4.2360	0.0124
151	4.2484	0.0124
152	4.2607	0.0123
153	4.2730	0.0123
154	4.2852	0.0122
155	4.2974	0.0122
156	4.3096	0.0121
157	4.3217	0.0121
158	4.3337	0.0121
159	4.3457	0.0120
160	4.3577	0.0120
161	4.3696	0.0119
162	4.3815	0.0119
163	4.3934	0.0118
164	4.4052	0.0118
165	4.4169	0.0118
166	4.4287	0.0117

167	4.4403	0.0117
168	4.4520	0.0116
169	4.4636	0.0116
170	4.4752	0.0116
171	4.4867	0.0115
172	4.4982	0.0115
173	4.5096	0.0115
174	4.5211	0.0114
175	4.5324	0.0114
176	4.5438	0.0113
177	4.5551	0.0113
178	4.5664	0.0113
179	4.5776	0.0112
180	4.5888	0.0112
181	4.6000	0.0112
182	4.6111	0.0111
183	4.6222	0.0111
184	4.6333	0.0111
185	4.6443	0.0110
186	4.6553	0.0110
187	4.6663	0.0110
188	4.6772	0.0109
189	4.6881	0.0109
190	4.6990	0.0109
191	4.7098	0.0108
192	4.7206	0.0108
193	4.7314	0.0108
194	4.7421	0.0107
195	4.7528	0.0107
196	4.7635	0.0107
197	4.7742	0.0106
198	4.7848	0.0106
199	4.7954	0.0106
200	4.8059	0.0106
201	4.8165	0.0105
202	4.8270	0.0105
203	4.8374	0.0105
204	4.8479	0.0104
205	4.8583	0.0104
206	4.8687	0.0104
207	4.8790	0.0104
208	4.8894	0.0103
209	4.8997	0.0103
210	4.9099	0.0103
211	4.9202	0.0102
212	4.9304	0.0102
213	4.9406	0.0102
214	4.9507	0.0102
215	4.9609	0.0101
216	4.9710	0.0101
217	4.9811	0.0101
218	4.9911	0.0101
219	5.0012	0.0100
220	5.0112	0.0100
221	5.0212	0.0100
222	5.0311	0.0100
223	5.0410	0.0099

224	5.0510	0.0099
225	5.0608	0.0099
226	5.0707	0.0099
227	5.0805	0.0098
228	5.0903	0.0098
229	5.1001	0.0098
230	5.1099	0.0098
231	5.1196	0.0097
232	5.1293	0.0097
233	5.1390	0.0097
234	5.1487	0.0097
235	5.1583	0.0096
236	5.1679	0.0096
237	5.1775	0.0096
238	5.1871	0.0096
239	5.1967	0.0096
240	5.2062	0.0095
241	5.2157	0.0095
242	5.2252	0.0095
243	5.2346	0.0095
244	5.2441	0.0094
245	5.2535	0.0094
246	5.2629	0.0094
247	5.2723	0.0094
248	5.2816	0.0094
249	5.2910	0.0093
250	5.3003	0.0093
251	5.3096	0.0093
252	5.3188	0.0093
253	5.3281	0.0093
254	5.3373	0.0092
255	5.3465	0.0092
256	5.3557	0.0092
257	5.3649	0.0092
258	5.3740	0.0091
259	5.3832	0.0091
260	5.3923	0.0091
261	5.4014	0.0091
262	5.4104	0.0091
263	5.4195	0.0091
264	5.4285	0.0090
265	5.4375	0.0090
266	5.4465	0.0090
267	5.4555	0.0090
268	5.4645	0.0090
269	5.4734	0.0089
270	5.4823	0.0089
271	5.4912	0.0089
272	5.5001	0.0089
273	5.5090	0.0089
274	5.5178	0.0088
275	5.5266	0.0088
276	5.5354	0.0088
277	5.5442	0.0088
278	5.5530	0.0088
279	5.5618	0.0088
280	5.5705	0.0087

281	5.5792	0.0087
282	5.5879	0.0087
283	5.5966	0.0087
284	5.6053	0.0087
285	5.6139	0.0087
286	5.6226	0.0086
287	5.6312	0.0086
288	5.6398	0.0086

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0086	0.0066	0.0020
2	0.0086	0.0066	0.0020
3	0.0087	0.0066	0.0020
4	0.0087	0.0066	0.0021
5	0.0087	0.0066	0.0021
6	0.0087	0.0067	0.0021
7	0.0088	0.0067	0.0021
8	0.0088	0.0067	0.0021
9	0.0088	0.0067	0.0021
10	0.0088	0.0067	0.0021
11	0.0089	0.0068	0.0021
12	0.0089	0.0068	0.0021
13	0.0089	0.0068	0.0021
14	0.0089	0.0068	0.0021
15	0.0090	0.0069	0.0021
16	0.0090	0.0069	0.0021
17	0.0090	0.0069	0.0021
18	0.0091	0.0069	0.0021
19	0.0091	0.0069	0.0022
20	0.0091	0.0070	0.0022
21	0.0091	0.0070	0.0022
22	0.0092	0.0070	0.0022
23	0.0092	0.0070	0.0022
24	0.0092	0.0070	0.0022
25	0.0093	0.0071	0.0022
26	0.0093	0.0071	0.0022
27	0.0093	0.0071	0.0022
28	0.0094	0.0071	0.0022
29	0.0094	0.0072	0.0022
30	0.0094	0.0072	0.0022
31	0.0095	0.0072	0.0022
32	0.0095	0.0072	0.0022
33	0.0095	0.0073	0.0023
34	0.0096	0.0073	0.0023
35	0.0096	0.0073	0.0023
36	0.0096	0.0073	0.0023
37	0.0097	0.0074	0.0023
38	0.0097	0.0074	0.0023
39	0.0097	0.0074	0.0023
40	0.0098	0.0075	0.0023
41	0.0098	0.0075	0.0023
42	0.0098	0.0075	0.0023
43	0.0099	0.0075	0.0023
44	0.0099	0.0076	0.0023

45	0.0100	0.0076	0.0024
46	0.0100	0.0076	0.0024
47	0.0100	0.0077	0.0024
48	0.0101	0.0077	0.0024
49	0.0101	0.0077	0.0024
50	0.0101	0.0077	0.0024
51	0.0102	0.0078	0.0024
52	0.0102	0.0078	0.0024
53	0.0103	0.0078	0.0024
54	0.0103	0.0079	0.0024
55	0.0104	0.0079	0.0025
56	0.0104	0.0079	0.0025
57	0.0104	0.0080	0.0025
58	0.0105	0.0080	0.0025
59	0.0105	0.0080	0.0025
60	0.0106	0.0081	0.0025
61	0.0106	0.0081	0.0025
62	0.0106	0.0081	0.0025
63	0.0107	0.0082	0.0025
64	0.0107	0.0082	0.0025
65	0.0108	0.0082	0.0026
66	0.0108	0.0083	0.0026
67	0.0109	0.0083	0.0026
68	0.0109	0.0083	0.0026
69	0.0110	0.0084	0.0026
70	0.0110	0.0084	0.0026
71	0.0111	0.0085	0.0026
72	0.0111	0.0085	0.0026
73	0.0112	0.0086	0.0027
74	0.0112	0.0086	0.0027
75	0.0113	0.0086	0.0027
76	0.0113	0.0087	0.0027
77	0.0114	0.0087	0.0027
78	0.0115	0.0087	0.0027
79	0.0115	0.0088	0.0027
80	0.0116	0.0088	0.0027
81	0.0116	0.0089	0.0028
82	0.0117	0.0089	0.0028
83	0.0118	0.0090	0.0028
84	0.0118	0.0090	0.0028
85	0.0119	0.0091	0.0028
86	0.0119	0.0091	0.0028
87	0.0120	0.0092	0.0028
88	0.0121	0.0092	0.0029
89	0.0121	0.0093	0.0029
90	0.0122	0.0093	0.0029
91	0.0123	0.0094	0.0029
92	0.0123	0.0094	0.0029
93	0.0124	0.0095	0.0029
94	0.0125	0.0095	0.0029
95	0.0126	0.0096	0.0030
96	0.0126	0.0096	0.0030
97	0.0127	0.0097	0.0030
98	0.0128	0.0097	0.0030
99	0.0129	0.0098	0.0030
100	0.0129	0.0099	0.0031
101	0.0130	0.0099	0.0031

102	0.0131	0.0100	0.0031
103	0.0132	0.0101	0.0031
104	0.0132	0.0101	0.0031
105	0.0133	0.0102	0.0032
106	0.0134	0.0102	0.0032
107	0.0135	0.0103	0.0032
108	0.0136	0.0104	0.0032
109	0.0137	0.0105	0.0032
110	0.0138	0.0105	0.0033
111	0.0139	0.0106	0.0033
112	0.0139	0.0106	0.0033
113	0.0141	0.0107	0.0033
114	0.0141	0.0108	0.0033
115	0.0143	0.0109	0.0034
116	0.0143	0.0110	0.0034
117	0.0145	0.0111	0.0034
118	0.0146	0.0111	0.0034
119	0.0147	0.0112	0.0035
120	0.0148	0.0113	0.0035
121	0.0149	0.0114	0.0035
122	0.0150	0.0115	0.0036
123	0.0152	0.0116	0.0036
124	0.0153	0.0116	0.0036
125	0.0154	0.0118	0.0037
126	0.0155	0.0118	0.0037
127	0.0157	0.0120	0.0037
128	0.0158	0.0120	0.0037
129	0.0160	0.0122	0.0038
130	0.0161	0.0123	0.0038
131	0.0163	0.0124	0.0038
132	0.0164	0.0125	0.0039
133	0.0166	0.0126	0.0039
134	0.0167	0.0127	0.0039
135	0.0169	0.0129	0.0040
136	0.0170	0.0130	0.0040
137	0.0172	0.0131	0.0041
138	0.0173	0.0132	0.0041
139	0.0176	0.0134	0.0042
140	0.0177	0.0135	0.0042
141	0.0179	0.0137	0.0042
142	0.0181	0.0138	0.0043
143	0.0184	0.0140	0.0043
144	0.0185	0.0141	0.0044
145	0.0205	0.0157	0.0049
146	0.0207	0.0158	0.0049
147	0.0210	0.0160	0.0050
148	0.0212	0.0161	0.0050
149	0.0215	0.0164	0.0051
150	0.0217	0.0165	0.0051
151	0.0220	0.0168	0.0052
152	0.0222	0.0169	0.0053
153	0.0226	0.0172	0.0053
154	0.0228	0.0174	0.0054
155	0.0232	0.0177	0.0055
156	0.0234	0.0179	0.0055
157	0.0239	0.0182	0.0056
158	0.0241	0.0184	0.0057

159	0.0246	0.0188	0.0058
160	0.0249	0.0190	0.0059
161	0.0254	0.0194	0.0060
162	0.0257	0.0196	0.0061
163	0.0263	0.0201	0.0062
164	0.0266	0.0203	0.0063
165	0.0272	0.0208	0.0064
166	0.0276	0.0211	0.0065
167	0.0283	0.0216	0.0067
168	0.0287	0.0219	0.0068
169	0.0296	0.0226	0.0070
170	0.0301	0.0229	0.0071
171	0.0310	0.0237	0.0073
172	0.0315	0.0241	0.0075
173	0.0326	0.0249	0.0077
174	0.0332	0.0253	0.0079
175	0.0345	0.0263	0.0082
176	0.0352	0.0268	0.0083
177	0.0367	0.0280	0.0087
178	0.0375	0.0286	0.0089
179	0.0394	0.0301	0.0093
180	0.0404	0.0309	0.0096
181	0.0428	0.0326	0.0101
182	0.0441	0.0337	0.0104
183	0.0471	0.0360	0.0112
184	0.0489	0.0373	0.0116
185	0.0444	0.0339	0.0105
186	0.0469	0.0358	0.0111
187	0.0532	0.0406	0.0126
188	0.0574	0.0438	0.0136
189	0.0692	0.0528	0.0164
190	0.0781	0.0596	0.0185
191	0.1116	0.0623	0.0493
192	0.1535	0.0623	0.0912
193	0.4805	0.0623	0.4181
194	0.0909	0.0623	0.0286
195	0.0626	0.0478	0.0148
196	0.0498	0.0380	0.0118
197	0.0509	0.0389	0.0121
198	0.0455	0.0348	0.0108
199	0.0415	0.0317	0.0098
200	0.0384	0.0293	0.0091
201	0.0359	0.0274	0.0085
202	0.0338	0.0258	0.0080
203	0.0320	0.0245	0.0076
204	0.0305	0.0233	0.0072
205	0.0291	0.0222	0.0069
206	0.0280	0.0213	0.0066
207	0.0269	0.0205	0.0064
208	0.0260	0.0198	0.0061
209	0.0251	0.0192	0.0059
210	0.0243	0.0186	0.0058
211	0.0236	0.0180	0.0056
212	0.0230	0.0176	0.0054
213	0.0224	0.0171	0.0053
214	0.0218	0.0167	0.0052
215	0.0213	0.0163	0.0050

216	0.0208	0.0159	0.0049
217	0.0186	0.0142	0.0044
218	0.0182	0.0139	0.0043
219	0.0178	0.0136	0.0042
220	0.0174	0.0133	0.0041
221	0.0171	0.0131	0.0040
222	0.0168	0.0128	0.0040
223	0.0165	0.0126	0.0039
224	0.0162	0.0123	0.0038
225	0.0159	0.0121	0.0038
226	0.0156	0.0119	0.0037
227	0.0153	0.0117	0.0036
228	0.0151	0.0115	0.0036
229	0.0149	0.0113	0.0035
230	0.0146	0.0112	0.0035
231	0.0144	0.0110	0.0034
232	0.0142	0.0108	0.0034
233	0.0140	0.0107	0.0033
234	0.0138	0.0105	0.0033
235	0.0136	0.0104	0.0032
236	0.0135	0.0103	0.0032
237	0.0133	0.0101	0.0031
238	0.0131	0.0100	0.0031
239	0.0130	0.0099	0.0031
240	0.0128	0.0098	0.0030
241	0.0127	0.0097	0.0030
242	0.0125	0.0095	0.0030
243	0.0124	0.0094	0.0029
244	0.0122	0.0093	0.0029
245	0.0121	0.0092	0.0029
246	0.0120	0.0091	0.0028
247	0.0118	0.0090	0.0028
248	0.0117	0.0090	0.0028
249	0.0116	0.0089	0.0027
250	0.0115	0.0088	0.0027
251	0.0114	0.0087	0.0027
252	0.0113	0.0086	0.0027
253	0.0112	0.0085	0.0026
254	0.0111	0.0084	0.0026
255	0.0110	0.0084	0.0026
256	0.0109	0.0083	0.0026
257	0.0108	0.0082	0.0025
258	0.0107	0.0082	0.0025
259	0.0106	0.0081	0.0025
260	0.0105	0.0080	0.0025
261	0.0104	0.0079	0.0025
262	0.0103	0.0079	0.0024
263	0.0102	0.0078	0.0024
264	0.0102	0.0078	0.0024
265	0.0101	0.0077	0.0024
266	0.0100	0.0076	0.0024
267	0.0099	0.0076	0.0024
268	0.0099	0.0075	0.0023
269	0.0098	0.0075	0.0023
270	0.0097	0.0074	0.0023
271	0.0096	0.0074	0.0023
272	0.0096	0.0073	0.0023

273	0.0095	0.0073	0.0022
274	0.0094	0.0072	0.0022
275	0.0094	0.0072	0.0022
276	0.0093	0.0071	0.0022
277	0.0093	0.0071	0.0022
278	0.0092	0.0070	0.0022
279	0.0091	0.0070	0.0022
280	0.0091	0.0069	0.0021
281	0.0090	0.0069	0.0021
282	0.0090	0.0068	0.0021
283	0.0089	0.0068	0.0021
284	0.0088	0.0068	0.0021
285	0.0088	0.0067	0.0021
286	0.0087	0.0067	0.0021
287	0.0087	0.0066	0.0021
288	0.0086	0.0066	0.0020

Total soil rain loss = 3.92(In)
Total effective rainfall = 1.72(In)
Peak flow rate in flood hydrograph = 63.45(CFS)

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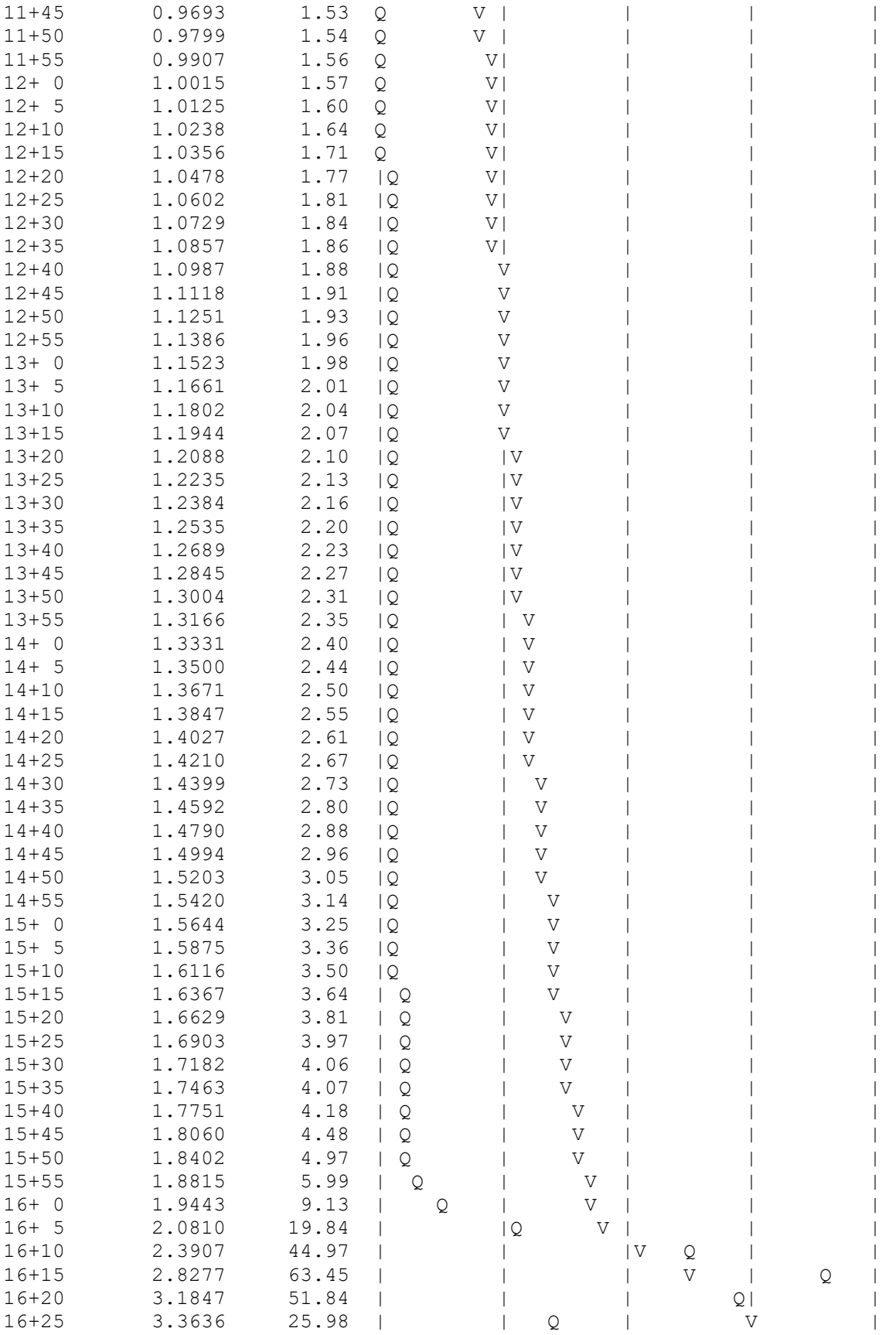
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	17.5	35.0	52.5	70.0
0+ 5	0.0002	0.02	Q				
0+10	0.0013	0.16	Q				
0+15	0.0040	0.40	Q				
0+20	0.0082	0.61	Q				
0+25	0.0130	0.70	Q				
0+30	0.0181	0.74	Q				
0+35	0.0233	0.75	Q				
0+40	0.0285	0.76	Q				
0+45	0.0337	0.76	Q				
0+50	0.0390	0.77	Q				
0+55	0.0443	0.77	Q				
1+ 0	0.0496	0.77	Q				
1+ 5	0.0549	0.77	Q				
1+10	0.0603	0.78	Q				
1+15	0.0656	0.78	Q				
1+20	0.0710	0.78	Q				
1+25	0.0764	0.78	Q				
1+30	0.0818	0.79	Q				
1+35	0.0872	0.79	Q				
1+40	0.0927	0.79	Q				
1+45	0.0981	0.79	Q				
1+50	0.1036	0.80	Q				
1+55	0.1091	0.80	Q				
2+ 0	0.1146	0.80	QV				
2+ 5	0.1201	0.80	QV				
2+10	0.1257	0.81	QV				

2+15	0.1313	0.81	QV	|	|	|	|
2+20	0.1368	0.81	QV	|	|	|	|
2+25	0.1425	0.81	QV	|	|	|	|
2+30	0.1481	0.82	QV	|	|	|	|
2+35	0.1537	0.82	QV	|	|	|	|
2+40	0.1594	0.82	QV	|	|	|	|
2+45	0.1651	0.83	QV	|	|	|	|
2+50	0.1708	0.83	QV	|	|	|	|
2+55	0.1765	0.83	QV	|	|	|	|
3+ 0	0.1822	0.83	QV	|	|	|	|
3+ 5	0.1880	0.84	QV	|	|	|	|
3+10	0.1938	0.84	QV	|	|	|	|
3+15	0.1996	0.84	QV	|	|	|	|
3+20	0.2054	0.85	QV	|	|	|	|
3+25	0.2113	0.85	QV	|	|	|	|
3+30	0.2171	0.85	QV	|	|	|	|
3+35	0.2230	0.86	Q V	|	|	|	|
3+40	0.2289	0.86	Q V	|	|	|	|
3+45	0.2349	0.86	Q V	|	|	|	|
3+50	0.2408	0.86	Q V	|	|	|	|
3+55	0.2468	0.87	Q V	|	|	|	|
4+ 0	0.2528	0.87	Q V	|	|	|	|
4+ 5	0.2588	0.87	Q V	|	|	|	|
4+10	0.2649	0.88	Q V	|	|	|	|
4+15	0.2709	0.88	Q V	|	|	|	|
4+20	0.2770	0.88	Q V	|	|	|	|
4+25	0.2832	0.89	Q V	|	|	|	|
4+30	0.2893	0.89	Q V	|	|	|	|
4+35	0.2955	0.90	Q V	|	|	|	|
4+40	0.3017	0.90	Q V	|	|	|	|
4+45	0.3079	0.90	Q V	|	|	|	|
4+50	0.3141	0.91	Q V	|	|	|	|
4+55	0.3204	0.91	Q V	|	|	|	|
5+ 0	0.3267	0.91	Q V	|	|	|	|
5+ 5	0.3330	0.92	Q V	|	|	|	|
5+10	0.3393	0.92	Q V	|	|	|	|
5+15	0.3457	0.93	Q V	|	|	|	|
5+20	0.3521	0.93	Q V	|	|	|	|
5+25	0.3585	0.93	Q V	|	|	|	|
5+30	0.3650	0.94	Q V	|	|	|	|
5+35	0.3715	0.94	Q V	|	|	|	|
5+40	0.3780	0.95	Q V	|	|	|	|
5+45	0.3845	0.95	Q V	|	|	|	|
5+50	0.3911	0.95	Q V	|	|	|	|
5+55	0.3977	0.96	Q V	|	|	|	|
6+ 0	0.4043	0.96	Q V	|	|	|	|
6+ 5	0.4110	0.97	Q V	|	|	|	|
6+10	0.4177	0.97	Q V	|	|	|	|
6+15	0.4244	0.98	Q V	|	|	|	|
6+20	0.4312	0.98	Q V	|	|	|	|
6+25	0.4380	0.99	Q V	|	|	|	|
6+30	0.4448	0.99	Q V	|	|	|	|
6+35	0.4516	0.99	Q V	|	|	|	|
6+40	0.4585	1.00	Q V	|	|	|	|
6+45	0.4654	1.00	Q V	|	|	|	|
6+50	0.4724	1.01	Q V	|	|	|	|
6+55	0.4794	1.01	Q V	|	|	|	|

7+ 0	0.4864	1.02	Q	V				
7+ 5	0.4934	1.02	Q	V				
7+10	0.5005	1.03	Q	V				
7+15	0.5077	1.04	Q	V				
7+20	0.5148	1.04	Q	V				
7+25	0.5220	1.05	Q	V				
7+30	0.5293	1.05	Q	V				
7+35	0.5366	1.06	Q	V				
7+40	0.5439	1.06	Q	V				
7+45	0.5513	1.07	Q	V				
7+50	0.5587	1.07	Q	V				
7+55	0.5661	1.08	Q	V				
8+ 0	0.5736	1.09	Q	V				
8+ 5	0.5811	1.09	Q	V				
8+10	0.5887	1.10	Q	V				
8+15	0.5963	1.11	Q	V				
8+20	0.6040	1.11	Q	V				
8+25	0.6117	1.12	Q	V				
8+30	0.6194	1.13	Q	V				
8+35	0.6272	1.13	Q	V				
8+40	0.6351	1.14	Q	V				
8+45	0.6430	1.15	Q	V				
8+50	0.6509	1.15	Q	V				
8+55	0.6589	1.16	Q	V				
9+ 0	0.6670	1.17	Q	V				
9+ 5	0.6751	1.18	Q	V				
9+10	0.6832	1.18	Q	V				
9+15	0.6914	1.19	Q	V				
9+20	0.6997	1.20	Q	V				
9+25	0.7080	1.21	Q	V				
9+30	0.7164	1.22	Q	V				
9+35	0.7248	1.22	Q	V				
9+40	0.7333	1.23	Q	V				
9+45	0.7419	1.24	Q	V				
9+50	0.7505	1.25	Q	V				
9+55	0.7592	1.26	Q	V				
10+ 0	0.7679	1.27	Q	V				
10+ 5	0.7767	1.28	Q	V				
10+10	0.7856	1.29	Q	V				
10+15	0.7945	1.30	Q	V				
10+20	0.8035	1.31	Q	V				
10+25	0.8126	1.32	Q	V				
10+30	0.8218	1.33	Q	V				
10+35	0.8310	1.34	Q	V				
10+40	0.8403	1.35	Q	V				
10+45	0.8497	1.36	Q	V				
10+50	0.8592	1.38	Q	V				
10+55	0.8688	1.39	Q	V				
11+ 0	0.8784	1.40	Q	V				
11+ 5	0.8881	1.41	Q	V				
11+10	0.8979	1.42	Q	V				
11+15	0.9078	1.44	Q	V				
11+20	0.9178	1.45	Q	V				
11+25	0.9279	1.47	Q	V				
11+30	0.9381	1.48	Q	V				
11+35	0.9484	1.49	Q	V				
11+40	0.9588	1.51	Q	V				



16+30	3.4542	13.15	| Q |	|	|	|V |
16+35	3.5025	7.01	| Q |	|	|	|V |
16+40	3.5405	5.53	| Q |	|	|	| V |
16+45	3.5732	4.74	| Q |	|	|	| V |
16+50	3.5978	3.58	| Q |	|	|	| V |
16+55	3.6205	3.29	|Q |	|	|	| V |
17+ 0	3.6418	3.08	|Q |	|	|	| V |
17+ 5	3.6618	2.91	|Q |	|	|	| V |
17+10	3.6808	2.76	|Q |	|	|	| V |
17+15	3.6988	2.62	|Q |	|	|	| V |
17+20	3.7161	2.51	|Q |	|	|	| V |
17+25	3.7327	2.41	|Q |	|	|	| V |
17+30	3.7487	2.32	|Q |	|	|	| V |
17+35	3.7642	2.24	|Q |	|	|	| V |
17+40	3.7791	2.17	|Q |	|	|	| V |
17+45	3.7936	2.10	|Q |	|	|	| V |
17+50	3.8077	2.04	|Q |	|	|	| V |
17+55	3.8214	1.99	|Q |	|	|	| V |
18+ 0	3.8347	1.94	|Q |	|	|	| V |
18+ 5	3.8477	1.89	|Q |	|	|	| V |
18+10	3.8602	1.81	|Q |	|	|	| V |
18+15	3.8721	1.72	Q |	|	|	| V |
18+20	3.8834	1.64	Q |	|	|	| V |
18+25	3.8943	1.59	Q |	|	|	| V |
18+30	3.9050	1.55	Q |	|	|	| V |
18+35	3.9154	1.51	Q |	|	|	| V |
18+40	3.9257	1.48	Q |	|	|	| V |
18+45	3.9357	1.45	Q |	|	|	| V |
18+50	3.9455	1.43	Q |	|	|	| V |
18+55	3.9552	1.40	Q |	|	|	| V |
19+ 0	3.9646	1.38	Q |	|	|	| V |
19+ 5	3.9740	1.35	Q |	|	|	| V |
19+10	3.9831	1.33	Q |	|	|	| V |
19+15	3.9922	1.31	Q |	|	|	| V |
19+20	4.0011	1.29	Q |	|	|	| V |
19+25	4.0098	1.27	Q |	|	|	| V |
19+30	4.0184	1.25	Q |	|	|	| V |
19+35	4.0269	1.23	Q |	|	|	| V |
19+40	4.0353	1.22	Q |	|	|	| V |
19+45	4.0436	1.20	Q |	|	|	| V |
19+50	4.0518	1.19	Q |	|	|	| V |
19+55	4.0598	1.17	Q |	|	|	| V |
20+ 0	4.0678	1.15	Q |	|	|	| V |
20+ 5	4.0756	1.14	Q |	|	|	| V |
20+10	4.0834	1.13	Q |	|	|	| V |
20+15	4.0911	1.11	Q |	|	|	| V |
20+20	4.0986	1.10	Q |	|	|	| V |
20+25	4.1061	1.09	Q |	|	|	| V |
20+30	4.1135	1.08	Q |	|	|	| V |
20+35	4.1209	1.06	Q |	|	|	| V |
20+40	4.1281	1.05	Q |	|	|	| V |
20+45	4.1353	1.04	Q |	|	|	| V |
20+50	4.1424	1.03	Q |	|	|	| V |
20+55	4.1494	1.02	Q |	|	|	| V |
21+ 0	4.1564	1.01	Q |	|	|	| V |
21+ 5	4.1633	1.00	Q |	|	|	| V |
21+10	4.1701	0.99	Q |	|	|	| V |

21+15	4.1769	0.98	Q	|	|	|	V |
21+20	4.1836	0.97	Q	|	|	|	V |
21+25	4.1902	0.96	Q	|	|	|	V |
21+30	4.1968	0.95	Q	|	|	|	V |
21+35	4.2033	0.95	Q	|	|	|	V |
21+40	4.2097	0.94	Q	|	|	|	V |
21+45	4.2161	0.93	Q	|	|	|	V |
21+50	4.2225	0.92	Q	|	|	|	V |
21+55	4.2288	0.91	Q	|	|	|	V |
22+ 0	4.2350	0.91	Q	|	|	|	V |
22+ 5	4.2412	0.90	Q	|	|	|	V |
22+10	4.2474	0.89	Q	|	|	|	V |
22+15	4.2535	0.89	Q	|	|	|	V |
22+20	4.2595	0.88	Q	|	|	|	V |
22+25	4.2655	0.87	Q	|	|	|	V |
22+30	4.2715	0.87	Q	|	|	|	V |
22+35	4.2774	0.86	Q	|	|	|	V|
22+40	4.2833	0.85	Q	|	|	|	V|
22+45	4.2891	0.85	Q	|	|	|	V|
22+50	4.2949	0.84	Q	|	|	|	V|
22+55	4.3006	0.83	Q	|	|	|	V|
23+ 0	4.3063	0.83	Q	|	|	|	V|
23+ 5	4.3120	0.82	Q	|	|	|	V|
23+10	4.3176	0.82	Q	|	|	|	V|
23+15	4.3232	0.81	Q	|	|	|	V|
23+20	4.3288	0.81	Q	|	|	|	V|
23+25	4.3343	0.80	Q	|	|	|	V|
23+30	4.3398	0.80	Q	|	|	|	V|
23+35	4.3452	0.79	Q	|	|	|	V|
23+40	4.3506	0.79	Q	|	|	|	V|
23+45	4.3560	0.78	Q	|	|	|	V|
23+50	4.3613	0.78	Q	|	|	|	V|
23+55	4.3667	0.77	Q	|	|	|	V|
24+ 0	4.3719	0.77	Q	|	|	|	V|
24+ 5	4.3770	0.74	Q	|	|	|	V|
24+10	4.3811	0.60	Q	|	|	|	V|
24+15	4.3836	0.35	Q	|	|	|	V|
24+20	4.3846	0.15	Q	|	|	|	V|
24+25	4.3850	0.06	Q	|	|	|	V|
24+30	4.3851	0.02	Q	|	|	|	V|
24+35	4.3852	0.01	Q	|	|	|	V|
24+40	4.3852	0.00	Q	|	|	|	V

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
OFFSITE PROPOSED CONDITION WATERSHED B
25-YEAR STORM ANALYSIS

Storm Event Year = 25

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 25		
30.54	1	1.00
Rainfall data for year 25		
30.54	6	2.43
Rainfall data for year 25		
30.54	24	4.48

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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)
32.0	32.0	30.54	1.000	0.978	0.765	0.748

Area-averaged adjusted loss rate Fm (In/Hr) = 0.748

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
23.36	0.765	32.0	32.0	21.25	0.001
7.18	0.235	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.223
Area-averaged low loss fraction, Yb = 0.777
User entry of time of concentration = 0.257 (hours)
++
Watershed area = 30.54(Ac.)
Catchment Lag time = 0.206 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 40.5476
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.748(In/Hr)
Average low loss rate fraction (Yb) = 0.777 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.369(In)
Computed peak 30-minute rainfall = 0.756(In)
Specified peak 1-hour rainfall = 0.998(In)
Computed peak 3-hour rainfall = 1.722(In)
Specified peak 6-hour rainfall = 2.430(In)
Specified peak 24-hour rainfall = 4.480(In)

Rainfall depth area reduction factors:
Using a total area of 30.54(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.369(In)
30-minute factor = 0.999 Adjusted rainfall = 0.755(In)
1-hour factor = 0.999 Adjusted rainfall = 0.997(In)
3-hour factor = 1.000 Adjusted rainfall = 1.722(In)
6-hour factor = 1.000 Adjusted rainfall = 2.430(In)
24-hour factor = 1.000 Adjusted rainfall = 4.480(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 = 369.34 (CFS))	
1	3.109	11.484
2	20.091	62.720
3	50.818	113.489
4	78.855	103.552
5	91.663	47.307
6	96.951	19.530
7	98.544	5.884

8	99.274	2.696
9	100.000	2.682

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3688	0.3688
2	0.4867	0.1178
3	0.5724	0.0857
4	0.6422	0.0698
5	0.7021	0.0600
6	0.7553	0.0531
7	0.8033	0.0480
8	0.8474	0.0441
9	0.8882	0.0409
10	0.9265	0.0382
11	0.9625	0.0360
12	0.9966	0.0341
13	1.0371	0.0405
14	1.0761	0.0390
15	1.1137	0.0376
16	1.1500	0.0364
17	1.1852	0.0352
18	1.2195	0.0342
19	1.2527	0.0333
20	1.2851	0.0324
21	1.3167	0.0316
22	1.3476	0.0308
23	1.3777	0.0302
24	1.4072	0.0295
25	1.4361	0.0289
26	1.4644	0.0283
27	1.4922	0.0278
28	1.5195	0.0273
29	1.5462	0.0268
30	1.5725	0.0263
31	1.5984	0.0259
32	1.6239	0.0255
33	1.6489	0.0251
34	1.6736	0.0247
35	1.6980	0.0243
36	1.7219	0.0240
37	1.7455	0.0236
38	1.7688	0.0233
39	1.7918	0.0230
40	1.8145	0.0227
41	1.8369	0.0224
42	1.8590	0.0221
43	1.8808	0.0219
44	1.9024	0.0216
45	1.9238	0.0214
46	1.9449	0.0211
47	1.9658	0.0209
48	1.9865	0.0207
49	2.0069	0.0205
50	2.0272	0.0202
51	2.0472	0.0200
52	2.0671	0.0198

53	2.0867	0.0197
54	2.1062	0.0195
55	2.1255	0.0193
56	2.1446	0.0191
57	2.1635	0.0189
58	2.1823	0.0188
59	2.2009	0.0186
60	2.2194	0.0185
61	2.2377	0.0183
62	2.2558	0.0181
63	2.2738	0.0180
64	2.2917	0.0179
65	2.3094	0.0177
66	2.3270	0.0176
67	2.3444	0.0174
68	2.3617	0.0173
69	2.3789	0.0172
70	2.3960	0.0171
71	2.4129	0.0169
72	2.4298	0.0168
73	2.4446	0.0148
74	2.4593	0.0147
75	2.4739	0.0146
76	2.4884	0.0145
77	2.5028	0.0144
78	2.5171	0.0143
79	2.5313	0.0142
80	2.5454	0.0141
81	2.5594	0.0140
82	2.5733	0.0139
83	2.5871	0.0138
84	2.6008	0.0137
85	2.6144	0.0136
86	2.6280	0.0135
87	2.6414	0.0134
88	2.6548	0.0134
89	2.6680	0.0133
90	2.6812	0.0132
91	2.6943	0.0131
92	2.7074	0.0130
93	2.7203	0.0129
94	2.7332	0.0129
95	2.7460	0.0128
96	2.7587	0.0127
97	2.7713	0.0126
98	2.7839	0.0126
99	2.7964	0.0125
100	2.8088	0.0124
101	2.8212	0.0124
102	2.8335	0.0123
103	2.8457	0.0122
104	2.8579	0.0122
105	2.8700	0.0121
106	2.8820	0.0120
107	2.8940	0.0120
108	2.9059	0.0119
109	2.9177	0.0118

110	2.9295	0.0118
111	2.9412	0.0117
112	2.9529	0.0117
113	2.9645	0.0116
114	2.9760	0.0115
115	2.9875	0.0115
116	2.9990	0.0114
117	3.0104	0.0114
118	3.0217	0.0113
119	3.0330	0.0113
120	3.0442	0.0112
121	3.0553	0.0112
122	3.0665	0.0111
123	3.0775	0.0111
124	3.0885	0.0110
125	3.0995	0.0110
126	3.1104	0.0109
127	3.1213	0.0109
128	3.1321	0.0108
129	3.1429	0.0108
130	3.1536	0.0107
131	3.1643	0.0107
132	3.1749	0.0106
133	3.1855	0.0106
134	3.1961	0.0105
135	3.2066	0.0105
136	3.2171	0.0105
137	3.2275	0.0104
138	3.2378	0.0104
139	3.2482	0.0103
140	3.2585	0.0103
141	3.2687	0.0103
142	3.2789	0.0102
143	3.2891	0.0102
144	3.2992	0.0101
145	3.3093	0.0101
146	3.3194	0.0101
147	3.3294	0.0100
148	3.3394	0.0100
149	3.3493	0.0099
150	3.3592	0.0099
151	3.3691	0.0099
152	3.3789	0.0098
153	3.3887	0.0098
154	3.3985	0.0098
155	3.4082	0.0097
156	3.4179	0.0097
157	3.4275	0.0097
158	3.4371	0.0096
159	3.4467	0.0096
160	3.4563	0.0095
161	3.4658	0.0095
162	3.4753	0.0095
163	3.4847	0.0095
164	3.4941	0.0094
165	3.5035	0.0094
166	3.5129	0.0094

167	3.5222	0.0093
168	3.5315	0.0093
169	3.5407	0.0093
170	3.5500	0.0092
171	3.5592	0.0092
172	3.5683	0.0092
173	3.5775	0.0091
174	3.5866	0.0091
175	3.5957	0.0091
176	3.6047	0.0091
177	3.6138	0.0090
178	3.6228	0.0090
179	3.6317	0.0090
180	3.6407	0.0089
181	3.6496	0.0089
182	3.6585	0.0089
183	3.6673	0.0089
184	3.6761	0.0088
185	3.6850	0.0088
186	3.6937	0.0088
187	3.7025	0.0088
188	3.7112	0.0087
189	3.7199	0.0087
190	3.7286	0.0087
191	3.7372	0.0086
192	3.7458	0.0086
193	3.7544	0.0086
194	3.7630	0.0086
195	3.7716	0.0085
196	3.7801	0.0085
197	3.7886	0.0085
198	3.7971	0.0085
199	3.8055	0.0085
200	3.8139	0.0084
201	3.8223	0.0084
202	3.8307	0.0084
203	3.8391	0.0084
204	3.8474	0.0083
205	3.8557	0.0083
206	3.8640	0.0083
207	3.8723	0.0083
208	3.8805	0.0082
209	3.8888	0.0082
210	3.8970	0.0082
211	3.9051	0.0082
212	3.9133	0.0082
213	3.9214	0.0081
214	3.9295	0.0081
215	3.9376	0.0081
216	3.9457	0.0081
217	3.9538	0.0081
218	3.9618	0.0080
219	3.9698	0.0080
220	3.9778	0.0080
221	3.9858	0.0080
222	3.9937	0.0079
223	4.0016	0.0079

224	4.0095	0.0079
225	4.0174	0.0079
226	4.0253	0.0079
227	4.0332	0.0079
228	4.0410	0.0078
229	4.0488	0.0078
230	4.0566	0.0078
231	4.0644	0.0078
232	4.0721	0.0078
233	4.0799	0.0077
234	4.0876	0.0077
235	4.0953	0.0077
236	4.1030	0.0077
237	4.1106	0.0077
238	4.1183	0.0076
239	4.1259	0.0076
240	4.1335	0.0076
241	4.1411	0.0076
242	4.1487	0.0076
243	4.1562	0.0076
244	4.1638	0.0075
245	4.1713	0.0075
246	4.1788	0.0075
247	4.1863	0.0075
248	4.1937	0.0075
249	4.2012	0.0075
250	4.2086	0.0074
251	4.2161	0.0074
252	4.2235	0.0074
253	4.2309	0.0074
254	4.2382	0.0074
255	4.2456	0.0074
256	4.2529	0.0073
257	4.2602	0.0073
258	4.2676	0.0073
259	4.2748	0.0073
260	4.2821	0.0073
261	4.2894	0.0073
262	4.2966	0.0072
263	4.3039	0.0072
264	4.3111	0.0072
265	4.3183	0.0072
266	4.3255	0.0072
267	4.3326	0.0072
268	4.3398	0.0072
269	4.3469	0.0071
270	4.3540	0.0071
271	4.3611	0.0071
272	4.3682	0.0071
273	4.3753	0.0071
274	4.3824	0.0071
275	4.3894	0.0071
276	4.3965	0.0070
277	4.4035	0.0070
278	4.4105	0.0070
279	4.4175	0.0070
280	4.4245	0.0070

281	4.4314	0.0070
282	4.4384	0.0070
283	4.4453	0.0069
284	4.4523	0.0069
285	4.4592	0.0069
286	4.4661	0.0069
287	4.4730	0.0069
288	4.4798	0.0069

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0069	0.0053	0.0015
2	0.0069	0.0053	0.0015
3	0.0069	0.0054	0.0015
4	0.0069	0.0054	0.0015
5	0.0070	0.0054	0.0016
6	0.0070	0.0054	0.0016
7	0.0070	0.0054	0.0016
8	0.0070	0.0054	0.0016
9	0.0070	0.0055	0.0016
10	0.0071	0.0055	0.0016
11	0.0071	0.0055	0.0016
12	0.0071	0.0055	0.0016
13	0.0071	0.0055	0.0016
14	0.0071	0.0055	0.0016
15	0.0072	0.0056	0.0016
16	0.0072	0.0056	0.0016
17	0.0072	0.0056	0.0016
18	0.0072	0.0056	0.0016
19	0.0073	0.0056	0.0016
20	0.0073	0.0057	0.0016
21	0.0073	0.0057	0.0016
22	0.0073	0.0057	0.0016
23	0.0074	0.0057	0.0016
24	0.0074	0.0057	0.0016
25	0.0074	0.0058	0.0017
26	0.0074	0.0058	0.0017
27	0.0075	0.0058	0.0017
28	0.0075	0.0058	0.0017
29	0.0075	0.0058	0.0017
30	0.0075	0.0058	0.0017
31	0.0076	0.0059	0.0017
32	0.0076	0.0059	0.0017
33	0.0076	0.0059	0.0017
34	0.0076	0.0059	0.0017
35	0.0077	0.0060	0.0017
36	0.0077	0.0060	0.0017
37	0.0077	0.0060	0.0017
38	0.0077	0.0060	0.0017
39	0.0078	0.0060	0.0017
40	0.0078	0.0061	0.0017
41	0.0078	0.0061	0.0017
42	0.0079	0.0061	0.0018
43	0.0079	0.0061	0.0018
44	0.0079	0.0061	0.0018

45	0.0079	0.0062	0.0018
46	0.0080	0.0062	0.0018
47	0.0080	0.0062	0.0018
48	0.0080	0.0062	0.0018
49	0.0081	0.0063	0.0018
50	0.0081	0.0063	0.0018
51	0.0081	0.0063	0.0018
52	0.0082	0.0063	0.0018
53	0.0082	0.0064	0.0018
54	0.0082	0.0064	0.0018
55	0.0083	0.0064	0.0018
56	0.0083	0.0064	0.0018
57	0.0083	0.0065	0.0019
58	0.0084	0.0065	0.0019
59	0.0084	0.0065	0.0019
60	0.0084	0.0065	0.0019
61	0.0085	0.0066	0.0019
62	0.0085	0.0066	0.0019
63	0.0085	0.0066	0.0019
64	0.0086	0.0067	0.0019
65	0.0086	0.0067	0.0019
66	0.0086	0.0067	0.0019
67	0.0087	0.0068	0.0019
68	0.0087	0.0068	0.0019
69	0.0088	0.0068	0.0020
70	0.0088	0.0068	0.0020
71	0.0089	0.0069	0.0020
72	0.0089	0.0069	0.0020
73	0.0089	0.0069	0.0020
74	0.0090	0.0070	0.0020
75	0.0090	0.0070	0.0020
76	0.0091	0.0070	0.0020
77	0.0091	0.0071	0.0020
78	0.0091	0.0071	0.0020
79	0.0092	0.0071	0.0021
80	0.0092	0.0072	0.0021
81	0.0093	0.0072	0.0021
82	0.0093	0.0072	0.0021
83	0.0094	0.0073	0.0021
84	0.0094	0.0073	0.0021
85	0.0095	0.0074	0.0021
86	0.0095	0.0074	0.0021
87	0.0096	0.0074	0.0021
88	0.0096	0.0075	0.0021
89	0.0097	0.0075	0.0022
90	0.0097	0.0076	0.0022
91	0.0098	0.0076	0.0022
92	0.0098	0.0076	0.0022
93	0.0099	0.0077	0.0022
94	0.0099	0.0077	0.0022
95	0.0100	0.0078	0.0022
96	0.0101	0.0078	0.0022
97	0.0101	0.0079	0.0023
98	0.0102	0.0079	0.0023
99	0.0103	0.0080	0.0023
100	0.0103	0.0080	0.0023
101	0.0104	0.0081	0.0023

102	0.0104	0.0081	0.0023
103	0.0105	0.0082	0.0023
104	0.0105	0.0082	0.0024
105	0.0106	0.0083	0.0024
106	0.0107	0.0083	0.0024
107	0.0108	0.0084	0.0024
108	0.0108	0.0084	0.0024
109	0.0109	0.0085	0.0024
110	0.0110	0.0085	0.0024
111	0.0111	0.0086	0.0025
112	0.0111	0.0086	0.0025
113	0.0112	0.0087	0.0025
114	0.0113	0.0088	0.0025
115	0.0114	0.0088	0.0025
116	0.0114	0.0089	0.0026
117	0.0115	0.0090	0.0026
118	0.0116	0.0090	0.0026
119	0.0117	0.0091	0.0026
120	0.0118	0.0092	0.0026
121	0.0119	0.0092	0.0027
122	0.0120	0.0093	0.0027
123	0.0121	0.0094	0.0027
124	0.0122	0.0094	0.0027
125	0.0123	0.0096	0.0027
126	0.0124	0.0096	0.0028
127	0.0125	0.0097	0.0028
128	0.0126	0.0098	0.0028
129	0.0127	0.0099	0.0028
130	0.0128	0.0099	0.0029
131	0.0129	0.0101	0.0029
132	0.0130	0.0101	0.0029
133	0.0132	0.0102	0.0029
134	0.0133	0.0103	0.0030
135	0.0134	0.0104	0.0030
136	0.0135	0.0105	0.0030
137	0.0137	0.0107	0.0031
138	0.0138	0.0107	0.0031
139	0.0140	0.0109	0.0031
140	0.0141	0.0109	0.0031
141	0.0143	0.0111	0.0032
142	0.0144	0.0112	0.0032
143	0.0146	0.0114	0.0033
144	0.0147	0.0114	0.0033
145	0.0168	0.0131	0.0038
146	0.0169	0.0132	0.0038
147	0.0172	0.0134	0.0038
148	0.0173	0.0135	0.0039
149	0.0176	0.0137	0.0039
150	0.0177	0.0138	0.0040
151	0.0180	0.0140	0.0040
152	0.0181	0.0141	0.0040
153	0.0185	0.0143	0.0041
154	0.0186	0.0145	0.0042
155	0.0189	0.0147	0.0042
156	0.0191	0.0148	0.0043
157	0.0195	0.0151	0.0043
158	0.0197	0.0153	0.0044

159	0.0200	0.0156	0.0045
160	0.0202	0.0157	0.0045
161	0.0207	0.0161	0.0046
162	0.0209	0.0162	0.0047
163	0.0214	0.0166	0.0048
164	0.0216	0.0168	0.0048
165	0.0221	0.0172	0.0049
166	0.0224	0.0174	0.0050
167	0.0230	0.0178	0.0051
168	0.0233	0.0181	0.0052
169	0.0240	0.0186	0.0053
170	0.0243	0.0189	0.0054
171	0.0251	0.0195	0.0056
172	0.0255	0.0198	0.0057
173	0.0263	0.0204	0.0059
174	0.0268	0.0208	0.0060
175	0.0278	0.0216	0.0062
176	0.0283	0.0220	0.0063
177	0.0295	0.0229	0.0066
178	0.0302	0.0234	0.0067
179	0.0316	0.0245	0.0070
180	0.0324	0.0252	0.0072
181	0.0342	0.0266	0.0076
182	0.0352	0.0274	0.0079
183	0.0376	0.0292	0.0084
184	0.0390	0.0303	0.0087
185	0.0341	0.0265	0.0076
186	0.0360	0.0280	0.0080
187	0.0409	0.0318	0.0091
188	0.0441	0.0342	0.0098
189	0.0531	0.0413	0.0118
190	0.0600	0.0466	0.0134
191	0.0857	0.0623	0.0234
192	0.1178	0.0623	0.0555
193	0.3688	0.0623	0.3065
194	0.0698	0.0542	0.0156
195	0.0480	0.0373	0.0107
196	0.0382	0.0297	0.0085
197	0.0405	0.0315	0.0090
198	0.0364	0.0282	0.0081
199	0.0333	0.0258	0.0074
200	0.0308	0.0240	0.0069
201	0.0289	0.0224	0.0064
202	0.0273	0.0212	0.0061
203	0.0259	0.0201	0.0058
204	0.0247	0.0192	0.0055
205	0.0236	0.0183	0.0053
206	0.0227	0.0176	0.0051
207	0.0219	0.0170	0.0049
208	0.0211	0.0164	0.0047
209	0.0205	0.0159	0.0046
210	0.0198	0.0154	0.0044
211	0.0193	0.0150	0.0043
212	0.0188	0.0146	0.0042
213	0.0183	0.0142	0.0041
214	0.0179	0.0139	0.0040
215	0.0174	0.0136	0.0039

216	0.0171	0.0133	0.0038
217	0.0148	0.0115	0.0033
218	0.0145	0.0113	0.0032
219	0.0142	0.0110	0.0032
220	0.0139	0.0108	0.0031
221	0.0136	0.0106	0.0030
222	0.0134	0.0104	0.0030
223	0.0131	0.0102	0.0029
224	0.0129	0.0100	0.0029
225	0.0126	0.0098	0.0028
226	0.0124	0.0097	0.0028
227	0.0122	0.0095	0.0027
228	0.0120	0.0093	0.0027
229	0.0118	0.0092	0.0026
230	0.0117	0.0091	0.0026
231	0.0115	0.0089	0.0026
232	0.0113	0.0088	0.0025
233	0.0112	0.0087	0.0025
234	0.0110	0.0086	0.0025
235	0.0109	0.0084	0.0024
236	0.0107	0.0083	0.0024
237	0.0106	0.0082	0.0024
238	0.0105	0.0081	0.0023
239	0.0103	0.0080	0.0023
240	0.0102	0.0079	0.0023
241	0.0101	0.0078	0.0023
242	0.0100	0.0078	0.0022
243	0.0099	0.0077	0.0022
244	0.0098	0.0076	0.0022
245	0.0097	0.0075	0.0022
246	0.0095	0.0074	0.0021
247	0.0095	0.0073	0.0021
248	0.0094	0.0073	0.0021
249	0.0093	0.0072	0.0021
250	0.0092	0.0071	0.0020
251	0.0091	0.0071	0.0020
252	0.0090	0.0070	0.0020
253	0.0089	0.0069	0.0020
254	0.0088	0.0069	0.0020
255	0.0088	0.0068	0.0020
256	0.0087	0.0067	0.0019
257	0.0086	0.0067	0.0019
258	0.0085	0.0066	0.0019
259	0.0085	0.0066	0.0019
260	0.0084	0.0065	0.0019
261	0.0083	0.0065	0.0019
262	0.0082	0.0064	0.0018
263	0.0082	0.0064	0.0018
264	0.0081	0.0063	0.0018
265	0.0081	0.0063	0.0018
266	0.0080	0.0062	0.0018
267	0.0079	0.0062	0.0018
268	0.0079	0.0061	0.0018
269	0.0078	0.0061	0.0017
270	0.0078	0.0060	0.0017
271	0.0077	0.0060	0.0017
272	0.0076	0.0059	0.0017

273	0.0076	0.0059	0.0017
274	0.0075	0.0059	0.0017
275	0.0075	0.0058	0.0017
276	0.0074	0.0058	0.0017
277	0.0074	0.0057	0.0016
278	0.0073	0.0057	0.0016
279	0.0073	0.0057	0.0016
280	0.0072	0.0056	0.0016
281	0.0072	0.0056	0.0016
282	0.0072	0.0056	0.0016
283	0.0071	0.0055	0.0016
284	0.0071	0.0055	0.0016
285	0.0070	0.0055	0.0016
286	0.0070	0.0054	0.0016
287	0.0069	0.0054	0.0015
288	0.0069	0.0054	0.0015

Total soil rain loss = 3.22(In)
Total effective rainfall = 1.26(In)
Peak flow rate in flood hydrograph = 43.12(CFS)

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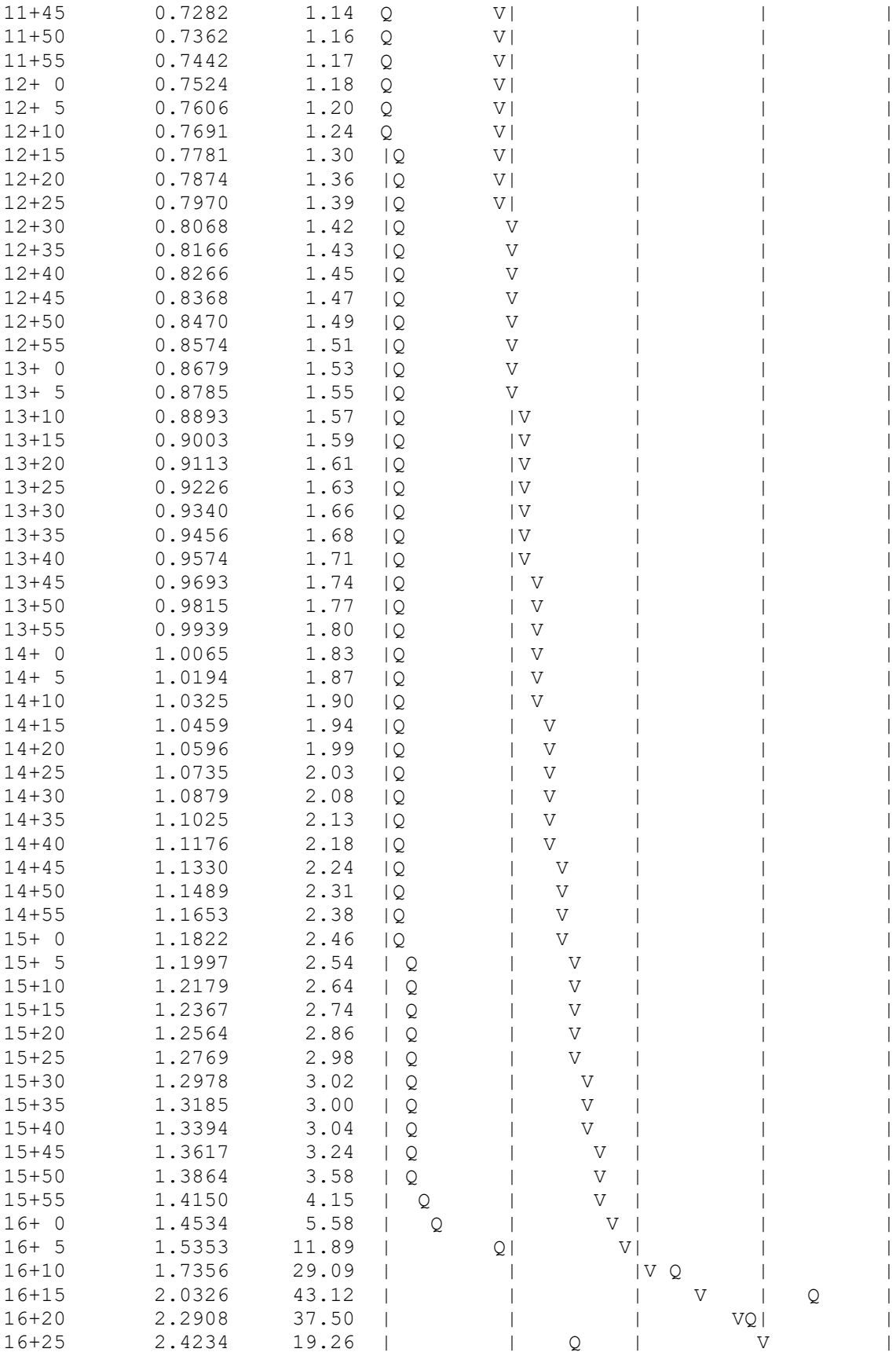
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0001	0.02	Q				
0+10	0.0009	0.11	Q				
0+15	0.0029	0.29	Q				
0+20	0.0060	0.45	Q				
0+25	0.0096	0.52	Q				
0+30	0.0134	0.55	Q				
0+35	0.0172	0.56	Q				
0+40	0.0212	0.57	Q				
0+45	0.0251	0.57	Q				
0+50	0.0291	0.58	Q				
0+55	0.0331	0.58	Q				
1+ 0	0.0371	0.58	Q				
1+ 5	0.0411	0.58	Q				
1+10	0.0451	0.58	Q				
1+15	0.0491	0.59	Q				
1+20	0.0532	0.59	Q				
1+25	0.0572	0.59	Q				
1+30	0.0613	0.59	Q				
1+35	0.0654	0.59	Q				
1+40	0.0695	0.59	Q				
1+45	0.0736	0.60	Q				
1+50	0.0777	0.60	Q				
1+55	0.0819	0.60	QV				
2+ 0	0.0860	0.60	QV				
2+ 5	0.0902	0.60	QV				
2+10	0.0943	0.61	QV				

2+15	0.0985	0.61	QV	|	|	|	|
2+20	0.1027	0.61	QV	|	|	|	|
2+25	0.1070	0.61	QV	|	|	|	|
2+30	0.1112	0.61	QV	|	|	|	|
2+35	0.1154	0.62	QV	|	|	|	|
2+40	0.1197	0.62	QV	|	|	|	|
2+45	0.1240	0.62	QV	|	|	|	|
2+50	0.1283	0.62	QV	|	|	|	|
2+55	0.1326	0.63	QV	|	|	|	|
3+ 0	0.1369	0.63	QV	|	|	|	|
3+ 5	0.1412	0.63	QV	|	|	|	|
3+10	0.1456	0.63	QV	|	|	|	|
3+15	0.1499	0.63	QV	|	|	|	|
3+20	0.1543	0.64	QV	|	|	|	|
3+25	0.1587	0.64	QV	|	|	|	|
3+30	0.1631	0.64	Q V	|	|	|	|
3+35	0.1676	0.64	Q V	|	|	|	|
3+40	0.1720	0.65	Q V	|	|	|	|
3+45	0.1765	0.65	Q V	|	|	|	|
3+50	0.1810	0.65	Q V	|	|	|	|
3+55	0.1855	0.65	Q V	|	|	|	|
4+ 0	0.1900	0.66	Q V	|	|	|	|
4+ 5	0.1945	0.66	Q V	|	|	|	|
4+10	0.1990	0.66	Q V	|	|	|	|
4+15	0.2036	0.66	Q V	|	|	|	|
4+20	0.2082	0.67	Q V	|	|	|	|
4+25	0.2128	0.67	Q V	|	|	|	|
4+30	0.2174	0.67	Q V	|	|	|	|
4+35	0.2221	0.67	Q V	|	|	|	|
4+40	0.2267	0.68	Q V	|	|	|	|
4+45	0.2314	0.68	Q V	|	|	|	|
4+50	0.2361	0.68	Q V	|	|	|	|
4+55	0.2408	0.68	Q V	|	|	|	|
5+ 0	0.2455	0.69	Q V	|	|	|	|
5+ 5	0.2503	0.69	Q V	|	|	|	|
5+10	0.2551	0.69	Q V	|	|	|	|
5+15	0.2599	0.70	Q V	|	|	|	|
5+20	0.2647	0.70	Q V	|	|	|	|
5+25	0.2695	0.70	Q V	|	|	|	|
5+30	0.2744	0.70	Q V	|	|	|	|
5+35	0.2792	0.71	Q V	|	|	|	|
5+40	0.2841	0.71	Q V	|	|	|	|
5+45	0.2890	0.71	Q V	|	|	|	|
5+50	0.2940	0.72	Q V	|	|	|	|
5+55	0.2989	0.72	Q V	|	|	|	|
6+ 0	0.3039	0.72	Q V	|	|	|	|
6+ 5	0.3089	0.73	Q V	|	|	|	|
6+10	0.3140	0.73	Q V	|	|	|	|
6+15	0.3190	0.73	Q V	|	|	|	|
6+20	0.3241	0.74	Q V	|	|	|	|
6+25	0.3292	0.74	Q V	|	|	|	|
6+30	0.3343	0.74	Q V	|	|	|	|
6+35	0.3395	0.75	Q V	|	|	|	|
6+40	0.3447	0.75	Q V	|	|	|	|
6+45	0.3499	0.76	Q V	|	|	|	|
6+50	0.3551	0.76	Q V	|	|	|	|
6+55	0.3603	0.76	Q V	|	|	|	|

7+ 0	0.3656	0.77	Q	V	|	|	|	|
7+ 5	0.3709	0.77	Q	V	|	|	|	|
7+10	0.3763	0.77	Q	V	|	|	|	|
7+15	0.3816	0.78	Q	V	|	|	|	|
7+20	0.3870	0.78	Q	V	|	|	|	|
7+25	0.3924	0.79	Q	V	|	|	|	|
7+30	0.3979	0.79	Q	V	|	|	|	|
7+35	0.4033	0.79	Q	V	|	|	|	|
7+40	0.4088	0.80	Q	V	|	|	|	|
7+45	0.4144	0.80	Q	V	|	|	|	|
7+50	0.4199	0.81	Q	V	|	|	|	|
7+55	0.4255	0.81	Q	V	|	|	|	|
8+ 0	0.4311	0.82	Q	V	|	|	|	|
8+ 5	0.4368	0.82	Q	V	|	|	|	|
8+10	0.4425	0.83	Q	V	|	|	|	|
8+15	0.4482	0.83	Q	V	|	|	|	|
8+20	0.4540	0.84	Q	V	|	|	|	|
8+25	0.4598	0.84	Q	V	|	|	|	|
8+30	0.4656	0.85	Q	V	|	|	|	|
8+35	0.4714	0.85	Q	V	|	|	|	|
8+40	0.4773	0.86	Q	V	|	|	|	|
8+45	0.4833	0.86	Q	V	|	|	|	|
8+50	0.4892	0.87	Q	V	|	|	|	|
8+55	0.4952	0.87	Q	V	|	|	|	|
9+ 0	0.5013	0.88	Q	V	|	|	|	|
9+ 5	0.5074	0.88	Q	V	|	|	|	|
9+10	0.5135	0.89	Q	V	|	|	|	|
9+15	0.5197	0.89	Q	V	|	|	|	|
9+20	0.5259	0.90	Q	V	|	|	|	|
9+25	0.5321	0.91	Q	V	|	|	|	|
9+30	0.5384	0.91	Q	V	|	|	|	|
9+35	0.5447	0.92	Q	V	|	|	|	|
9+40	0.5511	0.93	Q	V	|	|	|	|
9+45	0.5575	0.93	Q	V	|	|	|	|
9+50	0.5640	0.94	Q	V	|	|	|	|
9+55	0.5705	0.95	Q	V	|	|	|	|
10+ 0	0.5771	0.95	Q	V	|	|	|	|
10+ 5	0.5837	0.96	Q	V	|	|	|	|
10+10	0.5904	0.97	Q	V	|	|	|	|
10+15	0.5971	0.97	Q	V	|	|	|	|
10+20	0.6038	0.98	Q	V	|	|	|	|
10+25	0.6107	0.99	Q	V	|	|	|	|
10+30	0.6175	1.00	Q	V	|	|	|	|
10+35	0.6245	1.01	Q	V	|	|	|	|
10+40	0.6315	1.01	Q	V	|	|	|	|
10+45	0.6385	1.02	Q	V	|	|	|	|
10+50	0.6456	1.03	Q	V	|	|	|	|
10+55	0.6528	1.04	Q	V	|	|	|	|
11+ 0	0.6600	1.05	Q	V	|	|	|	|
11+ 5	0.6673	1.06	Q	V	|	|	|	|
11+10	0.6747	1.07	Q	V	|	|	|	|
11+15	0.6821	1.08	Q	V	|	|	|	|
11+20	0.6896	1.09	Q	V	|	|	|	|
11+25	0.6972	1.10	Q	V	|	|	|	|
11+30	0.7048	1.11	Q	V	|	|	|	|
11+35	0.7125	1.12	Q	V	|	|	|	|
11+40	0.7203	1.13	Q	V	|	|	|	|



16+30	2.4915	9.89	| Q |	|	|	|V |
16+35	2.5282	5.33	| Q |	|	|	|V |
16+40	2.5563	4.08	| Q |	|	|	|V |
16+45	2.5818	3.71	| Q |	|	|	| V |
16+50	2.6005	2.70	| Q |	|	|	| V |
16+55	2.6177	2.51	| Q |	|	|	| V |
17+ 0	2.6339	2.35	|Q |	|	|	| V |
17+ 5	2.6492	2.22	|Q |	|	|	| V |
17+10	2.6637	2.11	|Q |	|	|	| V |
17+15	2.6775	2.01	|Q |	|	|	| V |
17+20	2.6908	1.92	|Q |	|	|	| V |
17+25	2.7035	1.85	|Q |	|	|	| V |
17+30	2.7158	1.78	|Q |	|	|	| V |
17+35	2.7276	1.72	|Q |	|	|	| V |
17+40	2.7391	1.67	|Q |	|	|	| V |
17+45	2.7503	1.62	|Q |	|	|	| V |
17+50	2.7612	1.58	|Q |	|	|	| V |
17+55	2.7717	1.53	|Q |	|	|	| V |
18+ 0	2.7820	1.50	|Q |	|	|	| V |
18+ 5	2.7920	1.46	|Q |	|	|	| V |
18+10	2.8017	1.40	|Q |	|	|	| V |
18+15	2.8107	1.32	|Q |	|	|	| V |
18+20	2.8193	1.25	Q |	|	|	| V |
18+25	2.8276	1.20	Q |	|	|	| V |
18+30	2.8356	1.17	Q |	|	|	| V |
18+35	2.8434	1.14	Q |	|	|	| V |
18+40	2.8511	1.12	Q |	|	|	| V |
18+45	2.8586	1.09	Q |	|	|	| V |
18+50	2.8660	1.07	Q |	|	|	| V |
18+55	2.8733	1.05	Q |	|	|	| V |
19+ 0	2.8804	1.04	Q |	|	|	| V |
19+ 5	2.8874	1.02	Q |	|	|	| V |
19+10	2.8943	1.00	Q |	|	|	| V |
19+15	2.9011	0.99	Q |	|	|	| V |
19+20	2.9078	0.97	Q |	|	|	| V |
19+25	2.9144	0.96	Q |	|	|	| V |
19+30	2.9209	0.94	Q |	|	|	| V |
19+35	2.9273	0.93	Q |	|	|	| V |
19+40	2.9336	0.92	Q |	|	|	| V |
19+45	2.9398	0.90	Q |	|	|	| V |
19+50	2.9459	0.89	Q |	|	|	| V |
19+55	2.9520	0.88	Q |	|	|	| V |
20+ 0	2.9580	0.87	Q |	|	|	| V |
20+ 5	2.9639	0.86	Q |	|	|	| V |
20+10	2.9697	0.85	Q |	|	|	| V |
20+15	2.9755	0.84	Q |	|	|	| V |
20+20	2.9812	0.83	Q |	|	|	| V |
20+25	2.9868	0.82	Q |	|	|	| V |
20+30	2.9924	0.81	Q |	|	|	| V |
20+35	2.9979	0.80	Q |	|	|	| V |
20+40	3.0034	0.79	Q |	|	|	| V |
20+45	3.0088	0.78	Q |	|	|	| V |
20+50	3.0141	0.78	Q |	|	|	| V |
20+55	3.0194	0.77	Q |	|	|	| V |
21+ 0	3.0246	0.76	Q |	|	|	| V |
21+ 5	3.0298	0.75	Q |	|	|	| V |
21+10	3.0350	0.75	Q |	|	|	| V |

21+15	3.0400	0.74	Q	|	|	|	V |
21+20	3.0451	0.73	Q	|	|	|	V |
21+25	3.0501	0.73	Q	|	|	|	V |
21+30	3.0550	0.72	Q	|	|	|	V |
21+35	3.0599	0.71	Q	|	|	|	V |
21+40	3.0648	0.71	Q	|	|	|	V |
21+45	3.0696	0.70	Q	|	|	|	V |
21+50	3.0744	0.69	Q	|	|	|	V |
21+55	3.0791	0.69	Q	|	|	|	V |
22+ 0	3.0838	0.68	Q	|	|	|	V |
22+ 5	3.0885	0.68	Q	|	|	|	V |
22+10	3.0931	0.67	Q	|	|	|	V |
22+15	3.0977	0.67	Q	|	|	|	V |
22+20	3.1023	0.66	Q	|	|	|	V |
22+25	3.1068	0.66	Q	|	|	|	V |
22+30	3.1113	0.65	Q	|	|	|	V |
22+35	3.1157	0.65	Q	|	|	|	V |
22+40	3.1201	0.64	Q	|	|	|	V|
22+45	3.1245	0.64	Q	|	|	|	V|
22+50	3.1289	0.63	Q	|	|	|	V|
22+55	3.1332	0.63	Q	|	|	|	V|
23+ 0	3.1375	0.62	Q	|	|	|	V|
23+ 5	3.1418	0.62	Q	|	|	|	V|
23+10	3.1460	0.62	Q	|	|	|	V|
23+15	3.1502	0.61	Q	|	|	|	V|
23+20	3.1544	0.61	Q	|	|	|	V|
23+25	3.1586	0.60	Q	|	|	|	V|
23+30	3.1627	0.60	Q	|	|	|	V|
23+35	3.1668	0.60	Q	|	|	|	V|
23+40	3.1709	0.59	Q	|	|	|	V|
23+45	3.1749	0.59	Q	|	|	|	V|
23+50	3.1789	0.58	Q	|	|	|	V|
23+55	3.1829	0.58	Q	|	|	|	V|
24+ 0	3.1869	0.58	Q	|	|	|	V|
24+ 5	3.1907	0.56	Q	|	|	|	V|
24+10	3.1939	0.46	Q	|	|	|	V|
24+15	3.1958	0.28	Q	|	|	|	V|
24+20	3.1967	0.12	Q	|	|	|	V|
24+25	3.1970	0.05	Q	|	|	|	V|
24+30	3.1971	0.02	Q	|	|	|	V|
24+35	3.1972	0.01	Q	|	|	|	V|
24+40	3.1972	0.00	Q	|	|	|	V|

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

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Study date 04/26/21

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

Program License Serial Number 6405

BLOOMINGTON COMMERCE CENTER SITE 3
OFFSITE PROPOSED CONDITION WATERSHED B
10-YEAR STORM ANALYSIS

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		
30.54	1	0.81
Rainfall data for year 10		
30.54	6	2.02
Rainfall data for year 10		
30.54	24	3.71

++

******** 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)
32.0	32.0	30.54	1.000	0.978	0.765	0.748

Area-averaged adjusted loss rate Fm (In/Hr) = 0.748

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
23.36	0.765	32.0	32.0	18.55	0.000
7.18	0.235	98.0	98.0	0.20	0.937

Area-averaged catchment yield fraction, Y = 0.220
Area-averaged low loss fraction, Yb = 0.780
User entry of time of concentration = 0.263 (hours)
++
Watershed area = 30.54(Ac.)
Catchment Lag time = 0.210 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 39.6523
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.748(In/Hr)
Average low loss rate fraction (Yb) = 0.780 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.301(In)
Computed peak 30-minute rainfall = 0.616(In)
Specified peak 1-hour rainfall = 0.813(In)
Computed peak 3-hour rainfall = 1.421(In)
Specified peak 6-hour rainfall = 2.020(In)
Specified peak 24-hour rainfall = 3.710(In)

Rainfall depth area reduction factors:
Using a total area of 30.54(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.300(In)
30-minute factor = 0.999 Adjusted rainfall = 0.615(In)
1-hour factor = 0.999 Adjusted rainfall = 0.812(In)
3-hour factor = 1.000 Adjusted rainfall = 1.420(In)
6-hour factor = 1.000 Adjusted rainfall = 2.020(In)
24-hour factor = 1.000 Adjusted rainfall = 3.710(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 = 369.34 (CFS))		
1	2.994	11.057
2	19.251	60.046
3	48.864	109.374
4	77.330	105.134
5	90.914	50.173
6	96.551	20.819
7	98.439	6.973

8	99.153	2.638
9	100.000	1.319

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3005	0.3005
2	0.3965	0.0960
3	0.4663	0.0698
4	0.5231	0.0569
5	0.5720	0.0488
6	0.6153	0.0433
7	0.6544	0.0391
8	0.6903	0.0359
9	0.7236	0.0333
10	0.7547	0.0311
11	0.7841	0.0293
12	0.8118	0.0278
13	0.8456	0.0338
14	0.8781	0.0325
15	0.9095	0.0314
16	0.9399	0.0304
17	0.9693	0.0295
18	0.9980	0.0286
19	1.0258	0.0279
20	1.0530	0.0271
21	1.0794	0.0265
22	1.1053	0.0259
23	1.1306	0.0253
24	1.1554	0.0248
25	1.1796	0.0243
26	1.2034	0.0238
27	1.2268	0.0233
28	1.2497	0.0229
29	1.2722	0.0225
30	1.2944	0.0221
31	1.3161	0.0218
32	1.3376	0.0214
33	1.3587	0.0211
34	1.3795	0.0208
35	1.4000	0.0205
36	1.4203	0.0202
37	1.4402	0.0199
38	1.4598	0.0196
39	1.4792	0.0194
40	1.4983	0.0192
41	1.5173	0.0189
42	1.5360	0.0187
43	1.5544	0.0185
44	1.5727	0.0183
45	1.5908	0.0181
46	1.6086	0.0179
47	1.6263	0.0177
48	1.6438	0.0175
49	1.6611	0.0173
50	1.6782	0.0171
51	1.6952	0.0170
52	1.7120	0.0168

53	1.7287	0.0166
54	1.7451	0.0165
55	1.7615	0.0163
56	1.7777	0.0162
57	1.7938	0.0161
58	1.8097	0.0159
59	1.8255	0.0158
60	1.8411	0.0157
61	1.8566	0.0155
62	1.8720	0.0154
63	1.8873	0.0153
64	1.9025	0.0152
65	1.9175	0.0150
66	1.9325	0.0149
67	1.9473	0.0148
68	1.9620	0.0147
69	1.9766	0.0146
70	1.9911	0.0145
71	2.0055	0.0144
72	2.0198	0.0143
73	2.0321	0.0123
74	2.0442	0.0122
75	2.0563	0.0121
76	2.0683	0.0120
77	2.0802	0.0119
78	2.0920	0.0118
79	2.1037	0.0117
80	2.1153	0.0116
81	2.1269	0.0116
82	2.1384	0.0115
83	2.1498	0.0114
84	2.1611	0.0113
85	2.1723	0.0112
86	2.1835	0.0112
87	2.1946	0.0111
88	2.2056	0.0110
89	2.2166	0.0110
90	2.2275	0.0109
91	2.2383	0.0108
92	2.2490	0.0108
93	2.2597	0.0107
94	2.2704	0.0106
95	2.2809	0.0106
96	2.2914	0.0105
97	2.3019	0.0104
98	2.3122	0.0104
99	2.3226	0.0103
100	2.3328	0.0103
101	2.3430	0.0102
102	2.3532	0.0101
103	2.3633	0.0101
104	2.3733	0.0100
105	2.3833	0.0100
106	2.3932	0.0099
107	2.4031	0.0099
108	2.4129	0.0098
109	2.4227	0.0098

110	2.4324	0.0097
111	2.4421	0.0097
112	2.4517	0.0096
113	2.4613	0.0096
114	2.4708	0.0095
115	2.4803	0.0095
116	2.4897	0.0094
117	2.4991	0.0094
118	2.5085	0.0093
119	2.5178	0.0093
120	2.5270	0.0093
121	2.5362	0.0092
122	2.5454	0.0092
123	2.5545	0.0091
124	2.5636	0.0091
125	2.5727	0.0090
126	2.5817	0.0090
127	2.5906	0.0090
128	2.5996	0.0089
129	2.6084	0.0089
130	2.6173	0.0088
131	2.6261	0.0088
132	2.6349	0.0088
133	2.6436	0.0087
134	2.6523	0.0087
135	2.6610	0.0087
136	2.6696	0.0086
137	2.6782	0.0086
138	2.6868	0.0086
139	2.6953	0.0085
140	2.7038	0.0085
141	2.7122	0.0085
142	2.7206	0.0084
143	2.7290	0.0084
144	2.7374	0.0084
145	2.7457	0.0083
146	2.7540	0.0083
147	2.7622	0.0083
148	2.7705	0.0082
149	2.7787	0.0082
150	2.7868	0.0082
151	2.7950	0.0081
152	2.8031	0.0081
153	2.8111	0.0081
154	2.8192	0.0080
155	2.8272	0.0080
156	2.8352	0.0080
157	2.8431	0.0080
158	2.8511	0.0079
159	2.8590	0.0079
160	2.8668	0.0079
161	2.8747	0.0078
162	2.8825	0.0078
163	2.8903	0.0078
164	2.8980	0.0078
165	2.9058	0.0077
166	2.9135	0.0077

167	2.9212	0.0077
168	2.9288	0.0077
169	2.9365	0.0076
170	2.9441	0.0076
171	2.9517	0.0076
172	2.9592	0.0076
173	2.9667	0.0075
174	2.9743	0.0075
175	2.9817	0.0075
176	2.9892	0.0075
177	2.9966	0.0074
178	3.0041	0.0074
179	3.0114	0.0074
180	3.0188	0.0074
181	3.0262	0.0073
182	3.0335	0.0073
183	3.0408	0.0073
184	3.0480	0.0073
185	3.0553	0.0073
186	3.0625	0.0072
187	3.0697	0.0072
188	3.0769	0.0072
189	3.0841	0.0072
190	3.0912	0.0071
191	3.0984	0.0071
192	3.1055	0.0071
193	3.1126	0.0071
194	3.1196	0.0071
195	3.1267	0.0070
196	3.1337	0.0070
197	3.1407	0.0070
198	3.1477	0.0070
199	3.1546	0.0070
200	3.1616	0.0069
201	3.1685	0.0069
202	3.1754	0.0069
203	3.1823	0.0069
204	3.1892	0.0069
205	3.1960	0.0068
206	3.2028	0.0068
207	3.2096	0.0068
208	3.2164	0.0068
209	3.2232	0.0068
210	3.2300	0.0068
211	3.2367	0.0067
212	3.2434	0.0067
213	3.2501	0.0067
214	3.2568	0.0067
215	3.2635	0.0067
216	3.2701	0.0066
217	3.2767	0.0066
218	3.2834	0.0066
219	3.2900	0.0066
220	3.2965	0.0066
221	3.3031	0.0066
222	3.3096	0.0065
223	3.3162	0.0065

224	3.3227	0.0065
225	3.3292	0.0065
226	3.3357	0.0065
227	3.3421	0.0065
228	3.3486	0.0064
229	3.3550	0.0064
230	3.3614	0.0064
231	3.3678	0.0064
232	3.3742	0.0064
233	3.3806	0.0064
234	3.3869	0.0064
235	3.3933	0.0063
236	3.3996	0.0063
237	3.4059	0.0063
238	3.4122	0.0063
239	3.4185	0.0063
240	3.4248	0.0063
241	3.4310	0.0063
242	3.4373	0.0062
243	3.4435	0.0062
244	3.4497	0.0062
245	3.4559	0.0062
246	3.4621	0.0062
247	3.4682	0.0062
248	3.4744	0.0062
249	3.4805	0.0061
250	3.4866	0.0061
251	3.4927	0.0061
252	3.4988	0.0061
253	3.5049	0.0061
254	3.5110	0.0061
255	3.5170	0.0061
256	3.5231	0.0060
257	3.5291	0.0060
258	3.5351	0.0060
259	3.5411	0.0060
260	3.5471	0.0060
261	3.5531	0.0060
262	3.5591	0.0060
263	3.5650	0.0060
264	3.5710	0.0059
265	3.5769	0.0059
266	3.5828	0.0059
267	3.5887	0.0059
268	3.5946	0.0059
269	3.6005	0.0059
270	3.6063	0.0059
271	3.6122	0.0059
272	3.6180	0.0058
273	3.6238	0.0058
274	3.6297	0.0058
275	3.6355	0.0058
276	3.6413	0.0058
277	3.6470	0.0058
278	3.6528	0.0058
279	3.6586	0.0058
280	3.6643	0.0057

281	3.6700	0.0057
282	3.6758	0.0057
283	3.6815	0.0057
284	3.6872	0.0057
285	3.6929	0.0057
286	3.6985	0.0057
287	3.7042	0.0057
288	3.7099	0.0057

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0057	0.0044	0.0012
2	0.0057	0.0044	0.0012
3	0.0057	0.0044	0.0013
4	0.0057	0.0044	0.0013
5	0.0057	0.0045	0.0013
6	0.0057	0.0045	0.0013
7	0.0058	0.0045	0.0013
8	0.0058	0.0045	0.0013
9	0.0058	0.0045	0.0013
10	0.0058	0.0045	0.0013
11	0.0058	0.0045	0.0013
12	0.0058	0.0046	0.0013
13	0.0059	0.0046	0.0013
14	0.0059	0.0046	0.0013
15	0.0059	0.0046	0.0013
16	0.0059	0.0046	0.0013
17	0.0059	0.0046	0.0013
18	0.0060	0.0046	0.0013
19	0.0060	0.0047	0.0013
20	0.0060	0.0047	0.0013
21	0.0060	0.0047	0.0013
22	0.0060	0.0047	0.0013
23	0.0061	0.0047	0.0013
24	0.0061	0.0047	0.0013
25	0.0061	0.0048	0.0013
26	0.0061	0.0048	0.0013
27	0.0061	0.0048	0.0014
28	0.0062	0.0048	0.0014
29	0.0062	0.0048	0.0014
30	0.0062	0.0048	0.0014
31	0.0062	0.0049	0.0014
32	0.0062	0.0049	0.0014
33	0.0063	0.0049	0.0014
34	0.0063	0.0049	0.0014
35	0.0063	0.0049	0.0014
36	0.0063	0.0049	0.0014
37	0.0064	0.0050	0.0014
38	0.0064	0.0050	0.0014
39	0.0064	0.0050	0.0014
40	0.0064	0.0050	0.0014
41	0.0064	0.0050	0.0014
42	0.0065	0.0050	0.0014
43	0.0065	0.0051	0.0014
44	0.0065	0.0051	0.0014

45	0.0065	0.0051	0.0014
46	0.0066	0.0051	0.0014
47	0.0066	0.0051	0.0015
48	0.0066	0.0052	0.0015
49	0.0066	0.0052	0.0015
50	0.0067	0.0052	0.0015
51	0.0067	0.0052	0.0015
52	0.0067	0.0052	0.0015
53	0.0068	0.0053	0.0015
54	0.0068	0.0053	0.0015
55	0.0068	0.0053	0.0015
56	0.0068	0.0053	0.0015
57	0.0069	0.0054	0.0015
58	0.0069	0.0054	0.0015
59	0.0069	0.0054	0.0015
60	0.0069	0.0054	0.0015
61	0.0070	0.0054	0.0015
62	0.0070	0.0055	0.0015
63	0.0070	0.0055	0.0016
64	0.0071	0.0055	0.0016
65	0.0071	0.0055	0.0016
66	0.0071	0.0056	0.0016
67	0.0072	0.0056	0.0016
68	0.0072	0.0056	0.0016
69	0.0072	0.0056	0.0016
70	0.0073	0.0057	0.0016
71	0.0073	0.0057	0.0016
72	0.0073	0.0057	0.0016
73	0.0074	0.0057	0.0016
74	0.0074	0.0058	0.0016
75	0.0074	0.0058	0.0016
76	0.0075	0.0058	0.0016
77	0.0075	0.0059	0.0017
78	0.0075	0.0059	0.0017
79	0.0076	0.0059	0.0017
80	0.0076	0.0059	0.0017
81	0.0077	0.0060	0.0017
82	0.0077	0.0060	0.0017
83	0.0077	0.0060	0.0017
84	0.0078	0.0061	0.0017
85	0.0078	0.0061	0.0017
86	0.0078	0.0061	0.0017
87	0.0079	0.0062	0.0017
88	0.0079	0.0062	0.0017
89	0.0080	0.0062	0.0018
90	0.0080	0.0062	0.0018
91	0.0081	0.0063	0.0018
92	0.0081	0.0063	0.0018
93	0.0082	0.0064	0.0018
94	0.0082	0.0064	0.0018
95	0.0083	0.0064	0.0018
96	0.0083	0.0065	0.0018
97	0.0084	0.0065	0.0018
98	0.0084	0.0065	0.0018
99	0.0085	0.0066	0.0019
100	0.0085	0.0066	0.0019
101	0.0086	0.0067	0.0019

102	0.0086	0.0067	0.0019
103	0.0087	0.0068	0.0019
104	0.0087	0.0068	0.0019
105	0.0088	0.0068	0.0019
106	0.0088	0.0069	0.0019
107	0.0089	0.0069	0.0020
108	0.0089	0.0070	0.0020
109	0.0090	0.0070	0.0020
110	0.0090	0.0071	0.0020
111	0.0091	0.0071	0.0020
112	0.0092	0.0072	0.0020
113	0.0093	0.0072	0.0020
114	0.0093	0.0073	0.0020
115	0.0094	0.0073	0.0021
116	0.0094	0.0074	0.0021
117	0.0095	0.0074	0.0021
118	0.0096	0.0075	0.0021
119	0.0097	0.0075	0.0021
120	0.0097	0.0076	0.0021
121	0.0098	0.0077	0.0022
122	0.0099	0.0077	0.0022
123	0.0100	0.0078	0.0022
124	0.0100	0.0078	0.0022
125	0.0101	0.0079	0.0022
126	0.0102	0.0080	0.0022
127	0.0103	0.0080	0.0023
128	0.0104	0.0081	0.0023
129	0.0105	0.0082	0.0023
130	0.0106	0.0082	0.0023
131	0.0107	0.0083	0.0024
132	0.0108	0.0084	0.0024
133	0.0109	0.0085	0.0024
134	0.0110	0.0085	0.0024
135	0.0111	0.0087	0.0024
136	0.0112	0.0087	0.0025
137	0.0113	0.0088	0.0025
138	0.0114	0.0089	0.0025
139	0.0116	0.0090	0.0025
140	0.0116	0.0091	0.0026
141	0.0118	0.0092	0.0026
142	0.0119	0.0093	0.0026
143	0.0121	0.0094	0.0027
144	0.0122	0.0095	0.0027
145	0.0143	0.0112	0.0031
146	0.0144	0.0112	0.0032
147	0.0146	0.0114	0.0032
148	0.0147	0.0115	0.0032
149	0.0149	0.0116	0.0033
150	0.0150	0.0117	0.0033
151	0.0153	0.0119	0.0034
152	0.0154	0.0120	0.0034
153	0.0157	0.0122	0.0034
154	0.0158	0.0123	0.0035
155	0.0161	0.0125	0.0035
156	0.0162	0.0126	0.0036
157	0.0165	0.0129	0.0036
158	0.0166	0.0130	0.0037

159	0.0170	0.0132	0.0037
160	0.0171	0.0134	0.0038
161	0.0175	0.0136	0.0039
162	0.0177	0.0138	0.0039
163	0.0181	0.0141	0.0040
164	0.0183	0.0142	0.0040
165	0.0187	0.0146	0.0041
166	0.0189	0.0148	0.0042
167	0.0194	0.0151	0.0043
168	0.0196	0.0153	0.0043
169	0.0202	0.0158	0.0045
170	0.0205	0.0160	0.0045
171	0.0211	0.0165	0.0046
172	0.0214	0.0167	0.0047
173	0.0221	0.0173	0.0049
174	0.0225	0.0176	0.0050
175	0.0233	0.0182	0.0051
176	0.0238	0.0186	0.0052
177	0.0248	0.0193	0.0055
178	0.0253	0.0197	0.0056
179	0.0265	0.0207	0.0058
180	0.0271	0.0212	0.0060
181	0.0286	0.0223	0.0063
182	0.0295	0.0230	0.0065
183	0.0314	0.0245	0.0069
184	0.0325	0.0254	0.0072
185	0.0278	0.0217	0.0061
186	0.0293	0.0229	0.0065
187	0.0333	0.0260	0.0073
188	0.0359	0.0280	0.0079
189	0.0433	0.0337	0.0095
190	0.0488	0.0381	0.0108
191	0.0698	0.0544	0.0154
192	0.0960	0.0623	0.0337
193	0.3005	0.0623	0.2381
194	0.0569	0.0443	0.0125
195	0.0391	0.0305	0.0086
196	0.0311	0.0243	0.0069
197	0.0338	0.0263	0.0074
198	0.0304	0.0237	0.0067
199	0.0279	0.0217	0.0061
200	0.0259	0.0202	0.0057
201	0.0243	0.0189	0.0053
202	0.0229	0.0179	0.0050
203	0.0218	0.0170	0.0048
204	0.0208	0.0162	0.0046
205	0.0199	0.0155	0.0044
206	0.0192	0.0149	0.0042
207	0.0185	0.0144	0.0041
208	0.0179	0.0139	0.0039
209	0.0173	0.0135	0.0038
210	0.0168	0.0131	0.0037
211	0.0163	0.0127	0.0036
212	0.0159	0.0124	0.0035
213	0.0155	0.0121	0.0034
214	0.0152	0.0118	0.0033
215	0.0148	0.0116	0.0033

216	0.0145	0.0113	0.0032
217	0.0123	0.0096	0.0027
218	0.0120	0.0093	0.0026
219	0.0117	0.0091	0.0026
220	0.0115	0.0089	0.0025
221	0.0112	0.0088	0.0025
222	0.0110	0.0086	0.0024
223	0.0108	0.0084	0.0024
224	0.0106	0.0083	0.0023
225	0.0104	0.0081	0.0023
226	0.0103	0.0080	0.0023
227	0.0101	0.0079	0.0022
228	0.0099	0.0077	0.0022
229	0.0098	0.0076	0.0022
230	0.0096	0.0075	0.0021
231	0.0095	0.0074	0.0021
232	0.0093	0.0073	0.0021
233	0.0092	0.0072	0.0020
234	0.0091	0.0071	0.0020
235	0.0090	0.0070	0.0020
236	0.0088	0.0069	0.0019
237	0.0087	0.0068	0.0019
238	0.0086	0.0067	0.0019
239	0.0085	0.0066	0.0019
240	0.0084	0.0066	0.0019
241	0.0083	0.0065	0.0018
242	0.0082	0.0064	0.0018
243	0.0081	0.0063	0.0018
244	0.0080	0.0063	0.0018
245	0.0080	0.0062	0.0018
246	0.0079	0.0061	0.0017
247	0.0078	0.0061	0.0017
248	0.0077	0.0060	0.0017
249	0.0076	0.0060	0.0017
250	0.0076	0.0059	0.0017
251	0.0075	0.0058	0.0016
252	0.0074	0.0058	0.0016
253	0.0073	0.0057	0.0016
254	0.0073	0.0057	0.0016
255	0.0072	0.0056	0.0016
256	0.0071	0.0056	0.0016
257	0.0071	0.0055	0.0016
258	0.0070	0.0055	0.0015
259	0.0070	0.0054	0.0015
260	0.0069	0.0054	0.0015
261	0.0068	0.0053	0.0015
262	0.0068	0.0053	0.0015
263	0.0067	0.0053	0.0015
264	0.0067	0.0052	0.0015
265	0.0066	0.0052	0.0015
266	0.0066	0.0051	0.0014
267	0.0065	0.0051	0.0014
268	0.0065	0.0051	0.0014
269	0.0064	0.0050	0.0014
270	0.0064	0.0050	0.0014
271	0.0063	0.0049	0.0014
272	0.0063	0.0049	0.0014

273	0.0063	0.0049	0.0014
274	0.0062	0.0048	0.0014
275	0.0062	0.0048	0.0014
276	0.0061	0.0048	0.0013
277	0.0061	0.0047	0.0013
278	0.0060	0.0047	0.0013
279	0.0060	0.0047	0.0013
280	0.0060	0.0047	0.0013
281	0.0059	0.0046	0.0013
282	0.0059	0.0046	0.0013
283	0.0059	0.0046	0.0013
284	0.0058	0.0045	0.0013
285	0.0058	0.0045	0.0013
286	0.0057	0.0045	0.0013
287	0.0057	0.0045	0.0013
288	0.0057	0.0044	0.0012

Total soil rain loss = 2.71(In)
Total effective rainfall = 1.00(In)
Peak flow rate in flood hydrograph = 31.52(CFS)

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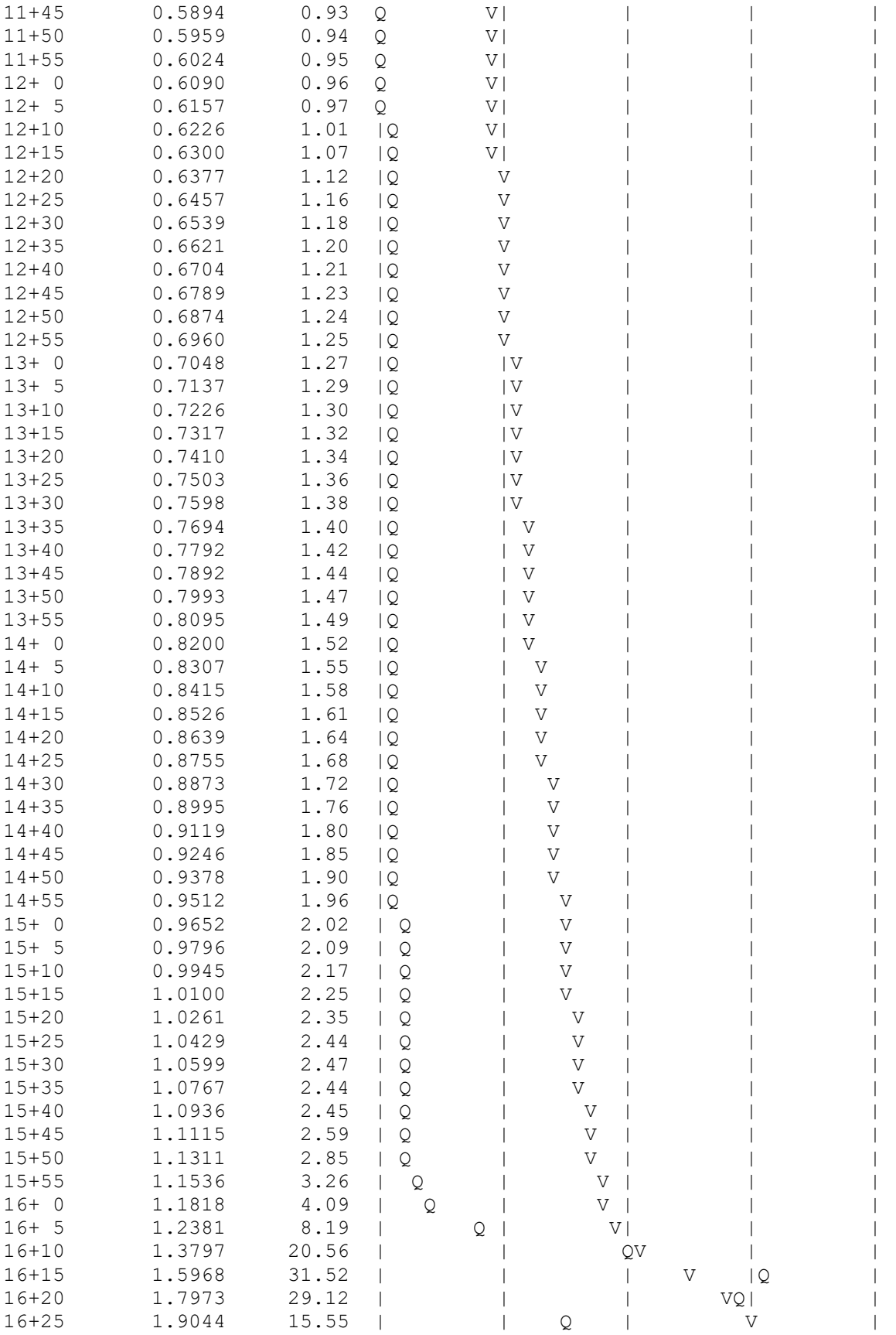
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0001	0.01	Q				
0+10	0.0007	0.09	Q				
0+15	0.0023	0.22	Q				
0+20	0.0047	0.36	Q				
0+25	0.0076	0.42	Q				
0+30	0.0107	0.45	Q				
0+35	0.0138	0.46	Q				
0+40	0.0170	0.46	Q				
0+45	0.0202	0.46	Q				
0+50	0.0234	0.47	Q				
0+55	0.0266	0.47	Q				
1+ 0	0.0299	0.47	Q				
1+ 5	0.0331	0.47	Q				
1+10	0.0364	0.47	Q				
1+15	0.0396	0.47	Q				
1+20	0.0429	0.47	Q				
1+25	0.0462	0.48	Q				
1+30	0.0495	0.48	Q				
1+35	0.0528	0.48	Q				
1+40	0.0561	0.48	Q				
1+45	0.0594	0.48	Q				
1+50	0.0627	0.48	Q				
1+55	0.0661	0.49	QV				
2+ 0	0.0694	0.49	QV				
2+ 5	0.0728	0.49	QV				
2+10	0.0762	0.49	QV				

2+15	0.0796	0.49	QV	|	|	|	|
2+20	0.0830	0.49	QV	|	|	|	|
2+25	0.0864	0.50	QV	|	|	|	|
2+30	0.0898	0.50	QV	|	|	|	|
2+35	0.0932	0.50	QV	|	|	|	|
2+40	0.0967	0.50	QV	|	|	|	|
2+45	0.1001	0.50	QV	|	|	|	|
2+50	0.1036	0.50	QV	|	|	|	|
2+55	0.1071	0.51	QV	|	|	|	|
3+ 0	0.1106	0.51	QV	|	|	|	|
3+ 5	0.1141	0.51	QV	|	|	|	|
3+10	0.1176	0.51	QV	|	|	|	|
3+15	0.1211	0.51	QV	|	|	|	|
3+20	0.1247	0.51	QV	|	|	|	|
3+25	0.1282	0.52	Q V	|	|	|	|
3+30	0.1318	0.52	Q V	|	|	|	|
3+35	0.1354	0.52	Q V	|	|	|	|
3+40	0.1390	0.52	Q V	|	|	|	|
3+45	0.1426	0.52	Q V	|	|	|	|
3+50	0.1462	0.53	Q V	|	|	|	|
3+55	0.1499	0.53	Q V	|	|	|	|
4+ 0	0.1535	0.53	Q V	|	|	|	|
4+ 5	0.1572	0.53	Q V	|	|	|	|
4+10	0.1609	0.53	Q V	|	|	|	|
4+15	0.1645	0.54	Q V	|	|	|	|
4+20	0.1683	0.54	Q V	|	|	|	|
4+25	0.1720	0.54	Q V	|	|	|	|
4+30	0.1757	0.54	Q V	|	|	|	|
4+35	0.1795	0.54	Q V	|	|	|	|
4+40	0.1832	0.55	Q V	|	|	|	|
4+45	0.1870	0.55	Q V	|	|	|	|
4+50	0.1908	0.55	Q V	|	|	|	|
4+55	0.1946	0.55	Q V	|	|	|	|
5+ 0	0.1985	0.56	Q V	|	|	|	|
5+ 5	0.2023	0.56	Q V	|	|	|	|
5+10	0.2062	0.56	Q V	|	|	|	|
5+15	0.2100	0.56	Q V	|	|	|	|
5+20	0.2139	0.57	Q V	|	|	|	|
5+25	0.2178	0.57	Q V	|	|	|	|
5+30	0.2218	0.57	Q V	|	|	|	|
5+35	0.2257	0.57	Q V	|	|	|	|
5+40	0.2297	0.58	Q V	|	|	|	|
5+45	0.2337	0.58	Q V	|	|	|	|
5+50	0.2377	0.58	Q V	|	|	|	|
5+55	0.2417	0.58	Q V	|	|	|	|
6+ 0	0.2457	0.59	Q V	|	|	|	|
6+ 5	0.2498	0.59	Q V	|	|	|	|
6+10	0.2538	0.59	Q V	|	|	|	|
6+15	0.2579	0.59	Q V	|	|	|	|
6+20	0.2620	0.60	Q V	|	|	|	|
6+25	0.2662	0.60	Q V	|	|	|	|
6+30	0.2703	0.60	Q V	|	|	|	|
6+35	0.2745	0.61	Q V	|	|	|	|
6+40	0.2787	0.61	Q V	|	|	|	|
6+45	0.2829	0.61	Q V	|	|	|	|
6+50	0.2871	0.61	Q V	|	|	|	|
6+55	0.2914	0.62	Q V	|	|	|	|

7+ 0	0.2956	0.62	Q	V	|	|	|	|
7+ 5	0.2999	0.62	Q	V	|	|	|	|
7+10	0.3042	0.63	Q	V	|	|	|	|
7+15	0.3086	0.63	Q	V	|	|	|	|
7+20	0.3129	0.63	Q	V	|	|	|	|
7+25	0.3173	0.64	Q	V	|	|	|	|
7+30	0.3217	0.64	Q	V	|	|	|	|
7+35	0.3262	0.64	Q	V	|	|	|	|
7+40	0.3306	0.65	Q	V	|	|	|	|
7+45	0.3351	0.65	Q	V	|	|	|	|
7+50	0.3396	0.65	Q	V	|	|	|	|
7+55	0.3441	0.66	Q	V	|	|	|	|
8+ 0	0.3487	0.66	Q	V	|	|	|	|
8+ 5	0.3533	0.67	Q	V	|	|	|	|
8+10	0.3579	0.67	Q	V	|	|	|	|
8+15	0.3625	0.67	Q	V	|	|	|	|
8+20	0.3672	0.68	Q	V	|	|	|	|
8+25	0.3719	0.68	Q	V	|	|	|	|
8+30	0.3766	0.68	Q	V	|	|	|	|
8+35	0.3813	0.69	Q	V	|	|	|	|
8+40	0.3861	0.69	Q	V	|	|	|	|
8+45	0.3909	0.70	Q	V	|	|	|	|
8+50	0.3957	0.70	Q	V	|	|	|	|
8+55	0.4006	0.71	Q	V	|	|	|	|
9+ 0	0.4055	0.71	Q	V	|	|	|	|
9+ 5	0.4104	0.72	Q	V	|	|	|	|
9+10	0.4154	0.72	Q	V	|	|	|	|
9+15	0.4204	0.72	Q	V	|	|	|	|
9+20	0.4254	0.73	Q	V	|	|	|	|
9+25	0.4305	0.73	Q	V	|	|	|	|
9+30	0.4356	0.74	Q	V	|	|	|	|
9+35	0.4407	0.74	Q	V	|	|	|	|
9+40	0.4459	0.75	Q	V	|	|	|	|
9+45	0.4511	0.76	Q	V	|	|	|	|
9+50	0.4563	0.76	Q	V	|	|	|	|
9+55	0.4616	0.77	Q	V	|	|	|	|
10+ 0	0.4669	0.77	Q	V	|	|	|	|
10+ 5	0.4723	0.78	Q	V	|	|	|	|
10+10	0.4777	0.78	Q	V	|	|	|	|
10+15	0.4831	0.79	Q	V	|	|	|	|
10+20	0.4886	0.80	Q	V	|	|	|	|
10+25	0.4941	0.80	Q	V	|	|	|	|
10+30	0.4997	0.81	Q	V	|	|	|	|
10+35	0.5053	0.82	Q	V	|	|	|	|
10+40	0.5110	0.82	Q	V	|	|	|	|
10+45	0.5167	0.83	Q	V	|	|	|	|
10+50	0.5224	0.84	Q	V	|	|	|	|
10+55	0.5283	0.84	Q	V	|	|	|	|
11+ 0	0.5341	0.85	Q	V	|	|	|	|
11+ 5	0.5400	0.86	Q	V	|	|	|	|
11+10	0.5460	0.87	Q	V	|	|	|	|
11+15	0.5520	0.87	Q	V	|	|	|	|
11+20	0.5581	0.88	Q	V	|	|	|	|
11+25	0.5642	0.89	Q	V	|	|	|	|
11+30	0.5704	0.90	Q	V	|	|	|	|
11+35	0.5767	0.91	Q	V	|	|	|	|
11+40	0.5830	0.92	Q	V	|	|	|	|



16+30	1.9599	8.05	| Q |	|	V |	
16+35	1.9906	4.47	| Q |	|	|V |	
16+40	2.0129	3.23	| Q |	|	|V |	
16+45	2.0315	2.70	| Q |	|	| V |	
16+50	2.0468	2.22	| Q |	|	| V |	
16+55	2.0610	2.07	| Q |	|	| V |	
17+ 0	2.0744	1.94	|Q |	|	| V |	
17+ 5	2.0870	1.84	|Q |	|	| V |	
17+10	2.0990	1.74	|Q |	|	| V |	
17+15	2.1105	1.67	|Q |	|	| V |	
17+20	2.1215	1.60	|Q |	|	| V |	
17+25	2.1321	1.54	|Q |	|	| V |	
17+30	2.1423	1.48	|Q |	|	| V |	
17+35	2.1521	1.43	|Q |	|	| V |	
17+40	2.1617	1.39	|Q |	|	| V |	
17+45	2.1710	1.35	|Q |	|	| V |	
17+50	2.1800	1.31	|Q |	|	| V |	
17+55	2.1888	1.28	|Q |	|	| V |	
18+ 0	2.1974	1.25	|Q |	|	| V |	
18+ 5	2.2058	1.21	|Q |	|	| V |	
18+10	2.2138	1.16	|Q |	|	| V |	
18+15	2.2213	1.09	|Q |	|	| V |	
18+20	2.2283	1.02	|Q |	|	| V |	
18+25	2.2350	0.98	Q |	|	| V |	
18+30	2.2416	0.95	Q |	|	| V |	
18+35	2.2479	0.92	Q |	|	| V |	
18+40	2.2542	0.91	Q |	|	| V |	
18+45	2.2603	0.89	Q |	|	| V |	
18+50	2.2663	0.87	Q |	|	| V |	
18+55	2.2721	0.85	Q |	|	| V |	
19+ 0	2.2779	0.84	Q |	|	| V |	
19+ 5	2.2836	0.83	Q |	|	| V |	
19+10	2.2892	0.81	Q |	|	| V |	
19+15	2.2947	0.80	Q |	|	| V |	
19+20	2.3001	0.79	Q |	|	| V |	
19+25	2.3055	0.78	Q |	|	| V |	
19+30	2.3107	0.76	Q |	|	| V |	
19+35	2.3159	0.75	Q |	|	| V |	
19+40	2.3210	0.74	Q |	|	| V |	
19+45	2.3261	0.73	Q |	|	| V |	
19+50	2.3310	0.72	Q |	|	| V |	
19+55	2.3360	0.71	Q |	|	| V |	
20+ 0	2.3408	0.70	Q |	|	| V |	
20+ 5	2.3456	0.70	Q |	|	| V |	
20+10	2.3503	0.69	Q |	|	| V |	
20+15	2.3550	0.68	Q |	|	| V |	
20+20	2.3596	0.67	Q |	|	| V |	
20+25	2.3642	0.66	Q |	|	| V |	
20+30	2.3687	0.66	Q |	|	| V |	
20+35	2.3732	0.65	Q |	|	| V |	
20+40	2.3776	0.64	Q |	|	| V |	
20+45	2.3820	0.63	Q |	|	| V |	
20+50	2.3863	0.63	Q |	|	| V |	
20+55	2.3906	0.62	Q |	|	| V |	
21+ 0	2.3948	0.62	Q |	|	| V |	
21+ 5	2.3990	0.61	Q |	|	| V |	
21+10	2.4032	0.60	Q |	|	| V |	

21+15	2.4073	0.60	Q	|	|	|	V |
21+20	2.4114	0.59	Q	|	|	|	V |
21+25	2.4154	0.59	Q	|	|	|	V |
21+30	2.4194	0.58	Q	|	|	|	V |
21+35	2.4234	0.58	Q	|	|	|	V |
21+40	2.4273	0.57	Q	|	|	|	V |
21+45	2.4312	0.57	Q	|	|	|	V |
21+50	2.4351	0.56	Q	|	|	|	V |
21+55	2.4389	0.56	Q	|	|	|	V |
22+ 0	2.4427	0.55	Q	|	|	|	V |
22+ 5	2.4465	0.55	Q	|	|	|	V |
22+10	2.4502	0.54	Q	|	|	|	V |
22+15	2.4540	0.54	Q	|	|	|	V |
22+20	2.4576	0.54	Q	|	|	|	V |
22+25	2.4613	0.53	Q	|	|	|	V |
22+30	2.4649	0.53	Q	|	|	|	V |
22+35	2.4685	0.52	Q	|	|	|	V |
22+40	2.4721	0.52	Q	|	|	|	V|
22+45	2.4757	0.52	Q	|	|	|	V|
22+50	2.4792	0.51	Q	|	|	|	V|
22+55	2.4827	0.51	Q	|	|	|	V|
23+ 0	2.4862	0.50	Q	|	|	|	V|
23+ 5	2.4896	0.50	Q	|	|	|	V|
23+10	2.4930	0.50	Q	|	|	|	V|
23+15	2.4964	0.49	Q	|	|	|	V|
23+20	2.4998	0.49	Q	|	|	|	V|
23+25	2.5032	0.49	Q	|	|	|	V|
23+30	2.5065	0.48	Q	|	|	|	V|
23+35	2.5098	0.48	Q	|	|	|	V|
23+40	2.5131	0.48	Q	|	|	|	V|
23+45	2.5164	0.48	Q	|	|	|	V|
23+50	2.5197	0.47	Q	|	|	|	V|
23+55	2.5229	0.47	Q	|	|	|	V|
24+ 0	2.5261	0.47	Q	|	|	|	V|
24+ 5	2.5292	0.45	Q	|	|	|	V|
24+10	2.5318	0.37	Q	|	|	|	V|
24+15	2.5334	0.23	Q	|	|	|	V|
24+20	2.5341	0.10	Q	|	|	|	V|
24+25	2.5344	0.04	Q	|	|	|	V|
24+30	2.5345	0.01	Q	|	|	|	V|
24+35	2.5345	0.00	Q	|	|	|	V|
24+40	2.5345	0.00	Q	|	|	|	V|

APPENDIX F

HYDRAULIC CALCULATIONS

F.1: STREET CAPACITY CALCULATIONS

F.2: INLET CLACLUATIONS

F.3: PIPE HYDRAULIC CALCULATIONS

F.4: OUTLET CONTROL STRUCTURE CALCULATIONS

Hydraulic Analysis Report

Project Data

Project Title: Locust – Existing Street – 100 Year Storm Analysis

Designer: DJV

Project Date: Friday, March 26, 2021

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Channel Analysis

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
-30.00	0.75	0.0200
-17.70	0.50	0.0200
-16.50	0.10	0.0200
-16.50	0.00	0.0200
0.00	0.33	0.0200
16.50	0.00	0.0200
16.50	0.10	0.0200
17.70	0.50	0.0200
30.00	0.75	-----

Longitudinal Slope: 0.0090 ft/ft

Flow: 315.7000 cfs

Result Parameters

Depth: 1.1992 ft

Area of Flow: 50.4597 ft^2

Wetted Perimeter: 61.2477 ft

Hydraulic Radius: 0.8239 ft

Average Velocity: 6.2565 ft/s

Top Width: 60.0000 ft

Froude Number: 1.2023

Critical Depth: 1.3086 ft

Critical Velocity: 5.5359 ft/s

Critical Slope: 0.0060 ft/ft

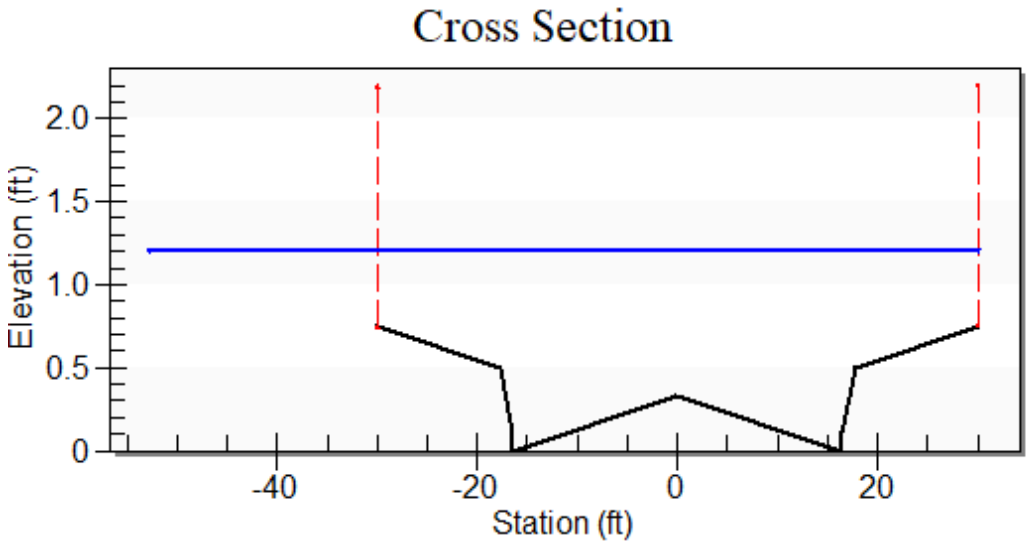
Critical Top Width: 60.00 ft

Calculated Max Shear Stress: 0.6735 lb/ft^2

Calculated Avg Shear Stress: 0.4627 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0198



Hydraulic Analysis Report

Project Data

Project Title: Laurel – Proposed Street No Catch Basins – 100 Year Analysis

Designer: DJV

Project Date: Friday, March 26, 2021

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Channel Analysis

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
-44.00	0.91	0.0150
-32.00	0.67	0.0150
-31.83	0.00	0.0150
-30.50	0.13	0.0150
0.00	0.73	0.0200
16.50	0.41	0.0200
16.50	0.51	0.0200
17.70	0.91	0.0200
30.00	1.15	-----

Longitudinal Slope: 0.0090 ft/ft

Flow: 367.0000 cfs

Result Parameters

Depth: 1.3234 ft

Area of Flow: 52.3048 ft^2

Wetted Perimeter: 75.2922 ft

Hydraulic Radius: 0.6947 ft

Average Velocity: 7.0166 ft/s

Top Width: 74.0000 ft

Froude Number: 1.4708

Critical Depth: 1.5306 ft

Critical Velocity: 5.4263 ft/s

Critical Slope: 0.0039 ft/ft

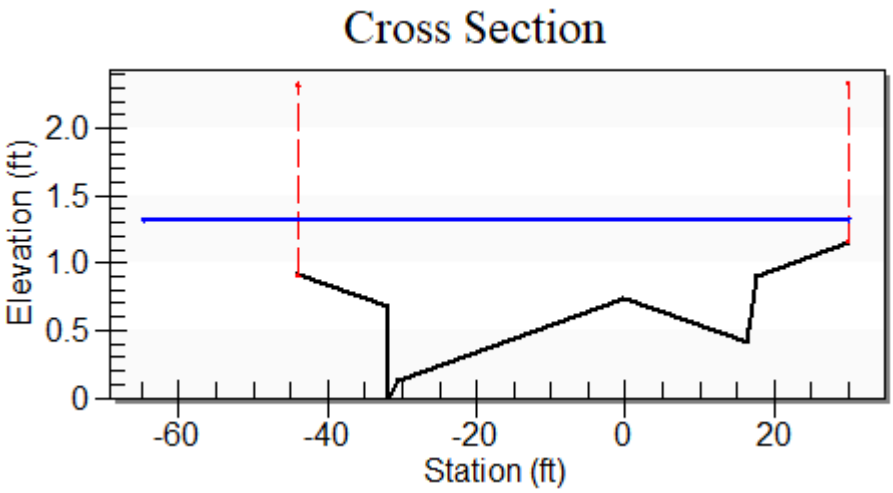
Critical Top Width: 74.00 ft

Calculated Max Shear Stress: 0.7432 lb/ft^2

Calculated Avg Shear Stress: 0.3901 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0158



Hydraulic Analysis Report

Project Data

Project Title: Locust – Proposed Street W/ Catch Basins – 100 Year Storm Analysis

Designer: DJV

Project Date: Friday, March 26, 2021

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Channel Analysis

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
-44.00	0.91	0.0150
-32.00	0.67	0.0150
-31.83	0.00	0.0150
-30.50	0.13	0.0150
0.00	0.73	0.0200
16.50	0.41	0.0200
16.50	0.51	0.0200
17.70	0.91	0.0200
30.00	1.15	-----

Longitudinal Slope: 0.0090 ft/ft

Flow: 135.2600 cfs

Result Parameters

Depth: 0.9736 ft

Area of Flow: 27.2059 ft^2

Wetted Perimeter: 65.9006 ft

Hydraulic Radius: 0.4128 ft

Average Velocity: 4.9717 ft/s

Top Width: 65.1325 ft

Froude Number: 1.3556

Critical Depth: 1.0764 ft

Critical Velocity: 3.9594 ft/s

Critical Slope: 0.0046 ft/ft

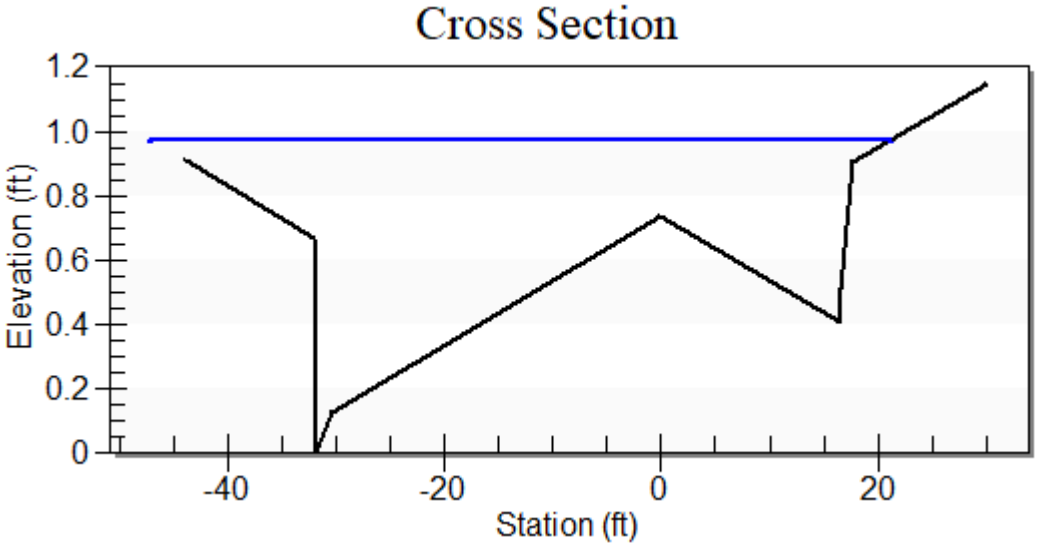
Critical Top Width: 70.27 ft

Calculated Max Shear Stress: 0.5468 lb/ft^2

Calculated Avg Shear Stress: 0.2318 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0157



Hydraulic Analysis Report

Project Data

Project Title: Locust – Existing Street – 10 Year Analysis

Designer: DJV

Project Date: Friday, March 26, 2021

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Channel Analysis

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
-30.00	0.75	0.0200
-17.70	0.50	0.0200
-16.50	0.10	0.0200
-16.50	0.00	0.0200
0.00	0.33	0.0200
16.50	0.00	0.0200
16.50	0.10	0.0200
17.70	0.50	0.0200
30.00	0.75	-----

Longitudinal Slope: 0.0090 ft/ft

Flow: 152.2900 cfs

Result Parameters

Depth: 0.9012 ft

Area of Flow: 32.5824 ft^2

Wetted Perimeter: 60.6518 ft

Hydraulic Radius: 0.5372 ft

Average Velocity: 4.6740 ft/s

Top Width: 60.0000 ft

Froude Number: 1.1178

Critical Depth: 0.9431 ft

Critical Velocity: 4.3397 ft/s

Critical Slope: 0.0070 ft/ft

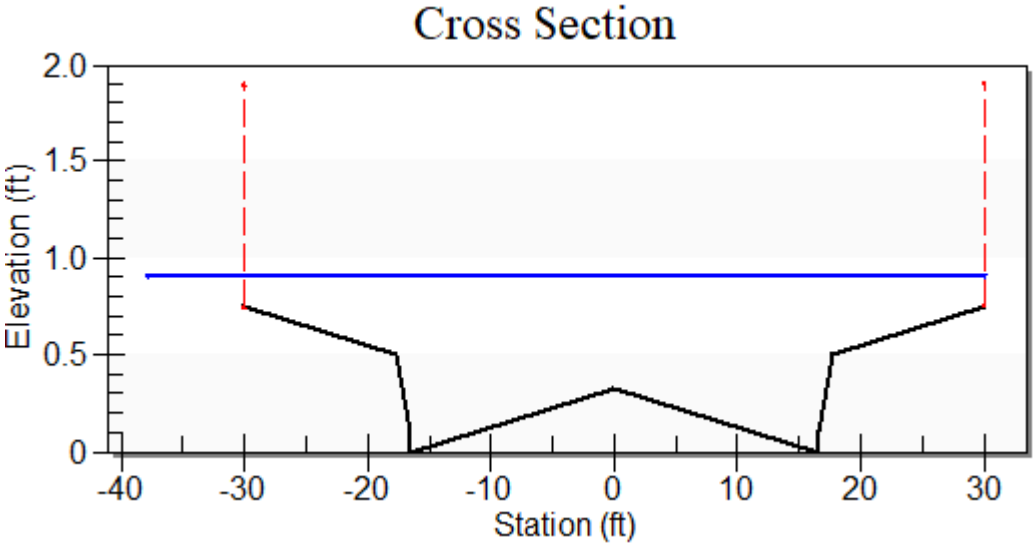
Critical Top Width: 60.00 ft

Calculated Max Shear Stress: 0.5061 lb/ft^2

Calculated Avg Shear Stress: 0.3017 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0199



Hydraulic Analysis Report

Project Data

Project Title: Locust – Proposed Street No Catch Basins – 10 Year Storm Analysis

Designer: DJV

Project Date: Friday, March 26, 2021

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Channel Analysis

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
-44.00	0.91	0.0150
-32.00	0.67	0.0150
-31.83	0.00	0.0150
-30.50	0.13	0.0150
0.00	0.73	0.0200
16.50	0.41	0.0200
16.50	0.51	0.0200
17.70	0.91	0.0200
30.00	1.15	-----

Longitudinal Slope: 0.0090 ft/ft

Flow: 186.1800 cfs

Result Parameters

Depth: 1.0698 ft

Area of Flow: 33.6987 ft^2

Wetted Perimeter: 70.8046 ft

Hydraulic Radius: 0.4759 ft

Average Velocity: 5.5248 ft/s

Top Width: 69.9394 ft

Froude Number: 1.4026

Critical Depth: 1.1979 ft

Critical Velocity: 4.3280 ft/s

Critical Slope: 0.0043 ft/ft

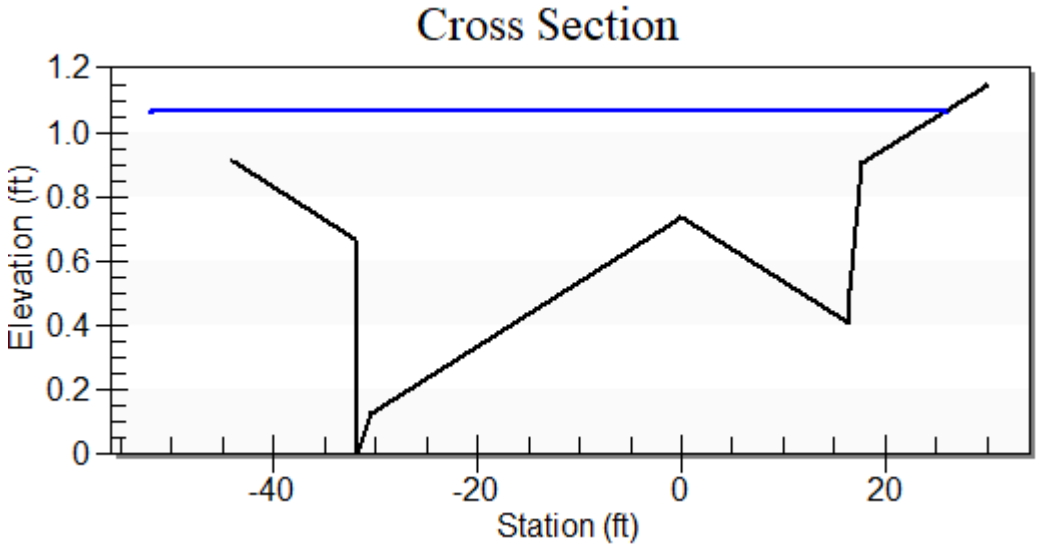
Critical Top Width: 74.00 ft

Calculated Max Shear Stress: 0.6008 lb/ft^2

Calculated Avg Shear Stress: 0.2673 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0156



Hydraulic Analysis Report

Project Data

Project Title: Locust – Proposed Street W/ Catch Basins – 10 Year Storm Analysis

Designer: DJV

Project Date: Friday, March 26, 2021

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Channel Analysis

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
-44.00	0.91	0.0150
-32.00	0.67	0.0150
-31.83	0.00	0.0150
-30.50	0.13	0.0150
0.00	0.73	0.0200
16.50	0.41	0.0200
16.50	0.51	0.0200
17.70	0.91	0.0200
30.00	1.15	-----

Longitudinal Slope: 0.0090 ft/ft

Flow: 32.8000 cfs

Result Parameters

Depth: 0.6477 ft

Area of Flow: 9.1644 ft^2

Wetted Perimeter: 40.8313 ft

Hydraulic Radius: 0.2244 ft

Average Velocity: 3.5791 ft/s

Top Width: 40.1908 ft

Froude Number: 1.3208

Critical Depth: 0.7057 ft

Critical Velocity: 2.8030 ft/s

Critical Slope: 0.0053 ft/ft

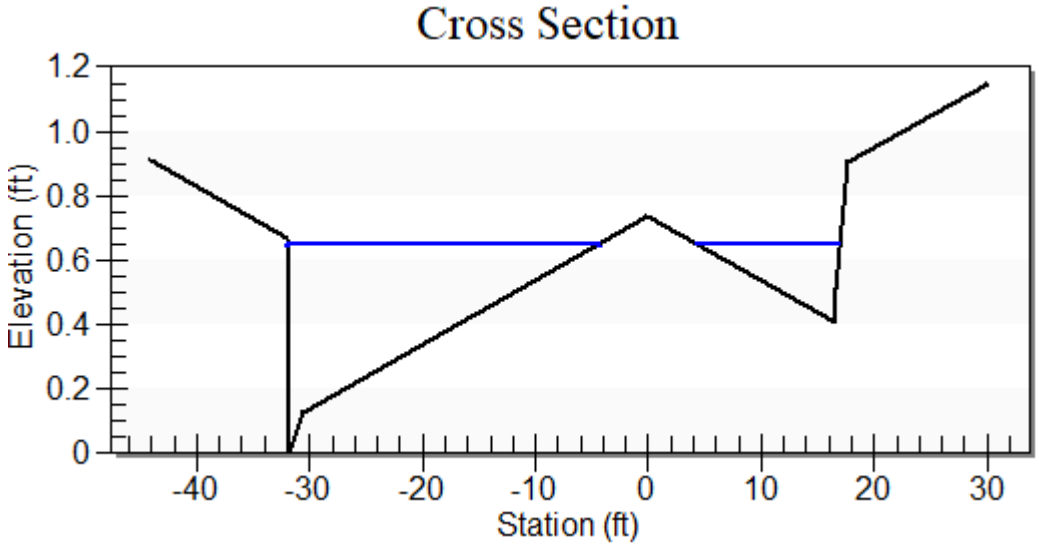
Critical Top Width: 47.96 ft

Calculated Max Shear Stress: 0.3637 lb/ft^2

Calculated Avg Shear Stress: 0.1260 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0145



Hydraulic Analysis Report

Project Data

Project Title: Laurel Ave – Existing Street – 100 Year Storm Analysis

Designer: DJV

Project Date: Thursday, March 25, 2021

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Channel Analysis

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
-30.00	0.71	0.0300
-14.70	0.40	0.0200
-13.50	0.10	0.0200
-13.50	0.00	0.0200
0.00	0.27	0.0200
13.50	0.00	0.0200
13.50	0.10	0.0200
14.70	0.40	0.0300
30.00	0.71	-----

Longitudinal Slope: 0.0050 ft/ft

Flow: 200.1100 cfs

Result Parameters

Depth: 1.1495 ft

Area of Flow: 47.8051 ft^2

Wetted Perimeter: 61.1724 ft

Hydraulic Radius: 0.7815 ft

Average Velocity: 4.1860 ft/s

Top Width: 60.0000 ft

Froude Number: 0.8264

Critical Depth: 1.0544 ft

Critical Velocity: 4.7533 ft/s

Critical Slope: 0.0073 ft/ft

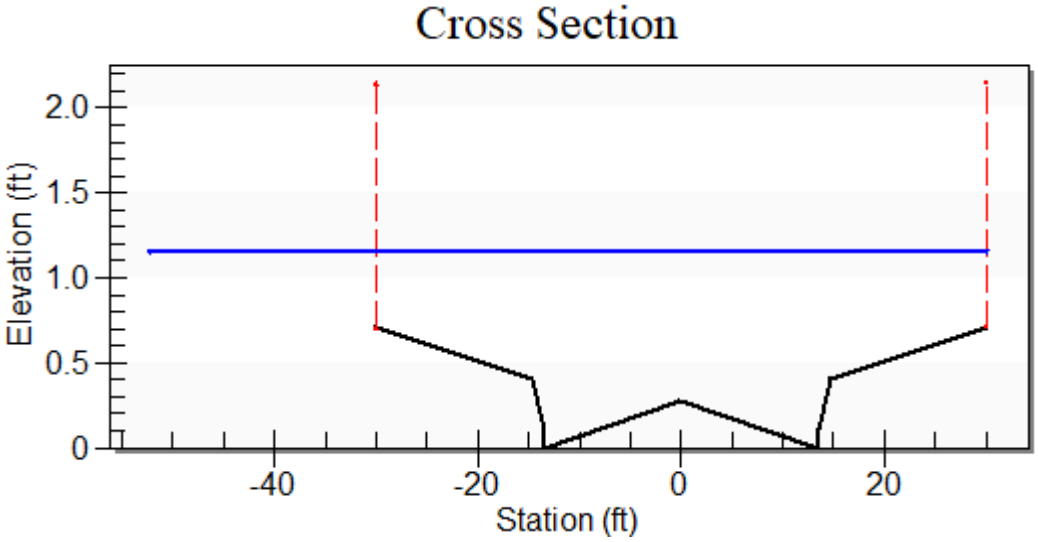
Critical Top Width: 60.00 ft

Calculated Max Shear Stress: 0.3587 lb/ft^2

Calculated Avg Shear Stress: 0.2438 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0213



Hydraulic Analysis Report

Project Data

Project Title: Laurel – Proposed Street No Catch Basins – 100 Year Storm

Designer: DJV

Project Date: Thursday, March 25, 2021

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Channel Analysis

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
-30.00	1.08	0.0300
-14.70	0.77	0.0200
-13.50	0.37	0.0200
-13.50	0.27	0.0200
0.00	0.54	0.0200
20.50	0.13	0.0200
21.83	0.00	0.0150
22.00	0.67	0.0150
33.00	0.89	-----

Longitudinal Slope: 0.0050 ft/ft

Flow: 200.7000 cfs

Result Parameters

Depth: 1.2784 ft

Area of Flow: 44.7299 ft^2

Wetted Perimeter: 64.2950 ft

Hydraulic Radius: 0.6957 ft

Average Velocity: 4.4869 ft/s

Top Width: 63.0000 ft

Froude Number: 0.9384

Critical Depth: 1.2489 ft

Critical Velocity: 4.6812 ft/s

Critical Slope: 0.0057 ft/ft

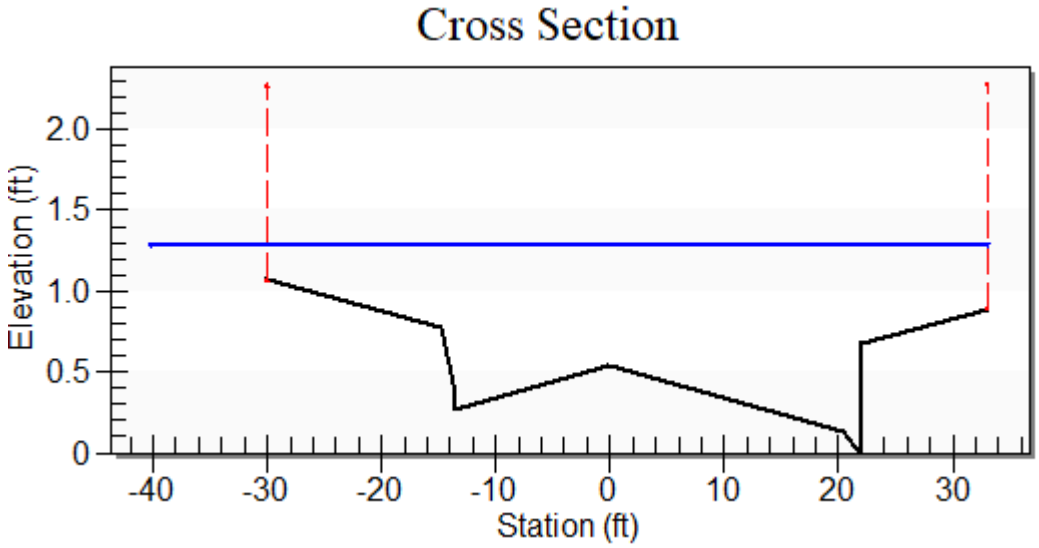
Critical Top Width: 63.00 ft

Calculated Max Shear Stress: 0.3989 lb/ft^2

Calculated Avg Shear Stress: 0.2171 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0184



Hydraulic Analysis Report

Project Data

Project Title: Laurel – Proposed Street W/ Catch Basins – 100 Year Storm Analysis

Designer: DJV

Project Date: Thursday, March 25, 2021

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Channel Analysis

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
-30.00	1.08	0.0300
-14.70	0.77	0.0200
-13.50	0.37	0.0200
-13.50	0.27	0.0200
0.00	0.54	0.0200
20.50	0.13	0.0200
21.83	0.00	0.0150
22.00	0.67	0.0150
33.00	0.89	-----

Longitudinal Slope: 0.0050 ft/ft

Flow: 86.5400 cfs

Result Parameters

Depth: 0.9563 ft

Area of Flow: 24.7958 ft^2

Wetted Perimeter: 57.7846 ft

Hydraulic Radius: 0.4291 ft

Average Velocity: 3.4901 ft/s

Top Width: 57.0153 ft

Froude Number: 0.9327

Critical Depth: 0.9335 ft

Critical Velocity: 3.6809 ft/s

Critical Slope: 0.0058 ft/ft

Critical Top Width: 55.88 ft

Calculated Max Shear Stress: 0.2984 lb/ft^2

Calculated Avg Shear Stress: 0.1339 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0171

Hydraulic Analysis Report

Project Data

Project Title: Laurel – Existing Street – 10 Year Analysis

Designer:

Project Date: Thursday, March 25, 2021

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Channel Analysis

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
-30.00	0.71	0.0300
-14.70	0.40	0.0200
-13.50	0.10	0.0200
-13.50	0.00	0.0200
0.00	0.27	0.0200
13.50	0.00	0.0200
13.50	0.10	0.0200
14.70	0.40	0.0300
30.00	0.71	-----

Longitudinal Slope: 0.0050 ft/ft

Flow: 100.3000 cfs

Result Parameters

Depth: 0.8510 ft

Area of Flow: 29.8951 ft^2

Wetted Perimeter: 60.5754 ft

Hydraulic Radius: 0.4935 ft

Average Velocity: 3.3551 ft/s

Top Width: 60.0000 ft

Froude Number: 0.8376

Critical Depth: 0.7955 ft

Critical Velocity: 3.7757 ft/s

Critical Slope: 0.0069 ft/ft

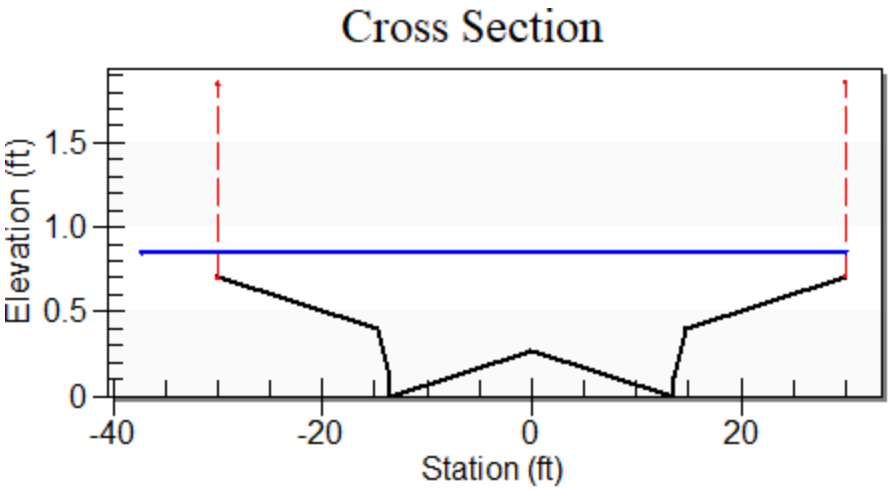
Critical Top Width: 60.00 ft

Calculated Max Shear Stress: 0.2655 lb/ft^2

Calculated Avg Shear Stress: 0.1540 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0196



Hydraulic Analysis Report

Project Data

Project Title: Laurel – Proposed Street No Catch Basins – 10 Year Storm Analysis

Designer: DJV

Project Date: Thursday, March 25, 2021

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Channel Analysis

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
-30.00	1.08	0.0300
-14.70	0.77	0.0200
-13.50	0.37	0.0200
-13.50	0.27	0.0200
0.00	0.54	0.0200
20.50	0.13	0.0200
21.83	0.00	0.0150
22.00	0.67	0.0150
33.00	0.89	-----

Longitudinal Slope: 0.0050 ft/ft

Flow: 101.3000 cfs

Result Parameters

Depth: 1.0075 ft

Area of Flow: 27.7777 ft^2

Wetted Perimeter: 60.3940 ft

Hydraulic Radius: 0.4599 ft

Average Velocity: 3.6468 ft/s

Top Width: 59.5730 ft

Froude Number: 0.9412

Critical Depth: 0.9861 ft

Critical Velocity: 3.8203 ft/s

Critical Slope: 0.0057 ft/ft

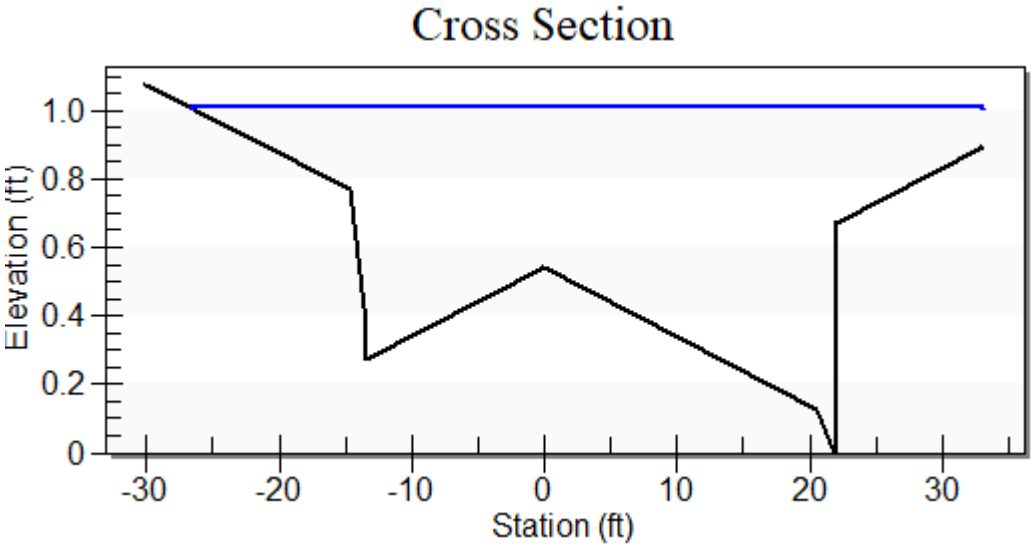
Critical Top Width: 58.50 ft

Calculated Max Shear Stress: 0.3143 lb/ft^2

Calculated Avg Shear Stress: 0.1435 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0172



Hydraulic Analysis Report

Project Data

Project Title: Laurel – Proposed Street W/ Catch Basins – 10 Year Storm Analysis

Designer: DJV

Project Date: Thursday, March 25, 2021

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Channel Analysis

Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
-30.00	1.08	0.0300
-14.70	0.77	0.0200
-13.50	0.37	0.0200
-13.50	0.27	0.0200
0.00	0.54	0.0200
20.50	0.13	0.0200
21.83	0.00	0.0150
22.00	0.67	0.0150
33.00	0.89	-----

Longitudinal Slope: 0.0050 ft/ft

Flow: 24.3400 cfs

Result Parameters

Depth: 0.6451 ft

Area of Flow: 10.5918 ft^2

Wetted Perimeter: 36.9784 ft

Hydraulic Radius: 0.2864 ft

Average Velocity: 2.2980 ft/s

Top Width: 36.3191 ft

Froude Number: 0.7499

Critical Depth: 0.5937 ft

Critical Velocity: 2.7884 ft/s

Critical Slope: 0.0095 ft/ft

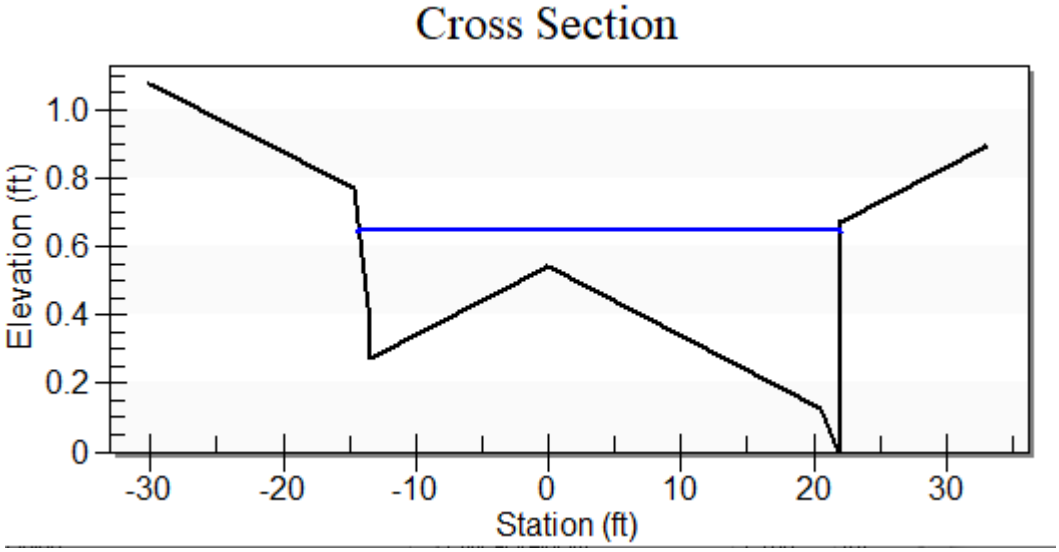
Critical Top Width: 36.15 ft

Calculated Max Shear Stress: 0.2013 lb/ft^2

Calculated Avg Shear Stress: 0.0894 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0199



Hydraulic Analysis Report

Project Data

Project Title: Locust – Catch Basin #1 Analysis – W'LY Curb and Gutter

Designer:

Project Date: Friday, April 9, 2021

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: CB#1-100

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0050 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 1.5000 ft

Width of Spread: 64.6588 ft

Gutter Result Parameters

Design Flow: 263.0000 cfs

Gutter Depression: 1.1340 in

Area of Flow: 41.8784 ft^2

Eo (Gutter Flow to Total Flow): 0.0643

Gutter Depth at Curb: 16.6521 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 28.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 106.4923 cfs

Bypass Flow: 156.5077 cfs

Efficiency: 0.4049

Curb and Gutter Analysis: CB#1-10

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0050 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 1.5000 ft

Width of Spread: 50.1716 ft

Gutter Result Parameters

Design Flow: 134.0500 cfs

Gutter Depression: 1.1340 in

Area of Flow: 25.2428 ft^2

Eo (Gutter Flow to Total Flow): 0.0837

Gutter Depth at Curb: 13.1752 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 28.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 74.0872 cfs

Bypass Flow: 59.9628 cfs

Efficiency: 0.5527

Hydraulic Analysis Report

Project Data

Project Title: Locust – Catch Basin #2 Analysis – E'LY Curb and Gutter Analysis

Designer: DJV

Project Date: Friday, April 9, 2021

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: CB#2-100

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0050 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 1.5000 ft

Width of Spread: 45.5934 ft

Gutter Result Parameters

Design Flow: 104.0000 cfs

Gutter Depression: 1.1340 in

Area of Flow: 20.8585 ft^2

Eo (Gutter Flow to Total Flow): 0.0925

Gutter Depth at Curb: 12.0764 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 14.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 35.5358 cfs

Bypass Flow: 68.4642 cfs

Efficiency: 0.3417

Curb and Gutter Analysis: CB#2-10

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0050 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 1.5000 ft

Width of Spread: 35.1207 ft

Gutter Result Parameters

Design Flow: 52.1300 cfs

Gutter Depression: 1.1340 in

Area of Flow: 12.4055 ft^2

Eo (Gutter Flow to Total Flow): 0.1215

Gutter Depth at Curb: 9.5630 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 14.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 25.0998 cfs

Bypass Flow: 27.0302 cfs

Efficiency: 0.4815

Hydraulic Analysis Report

Project Data

Project Title: Locust – Catch Basin #3 Analysis – W'LY Curb and Gutter

Designer: DJV

Project Date: Friday, April 9, 2021

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: CB#3-10

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0050 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 1.5000 ft

Width of Spread: 37.0310 ft

Gutter Result Parameters

Design Flow: 59.9600 cfs

Gutter Depression: 1.1340 in

Area of Flow: 13.7839 ft^2

Eo (Gutter Flow to Total Flow): 0.1149

Gutter Depth at Curb: 10.0215 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 28.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 46.5368 cfs

Bypass Flow: 13.4232 cfs

Efficiency: 0.7761

Curb and Gutter Analysis: CB#3-100

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0050 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 1.5000 ft

Width of Spread: 53.8788 ft

Gutter Result Parameters

Design Flow: 161.9800 cfs

Gutter Depression: 1.1340 in

Area of Flow: 29.1002 ft^2

Eo (Gutter Flow to Total Flow): 0.0777

Gutter Depth at Curb: 14.0649 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 28.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 82.1534 cfs

Bypass Flow: 79.8266 cfs

Efficiency: 0.5072

Hydraulic Analysis Report

Project Data

Project Title: Locust – Catch Basin #4 Analysis – E'LY Curb and Gutter

Designer: DJV

Project Date: Friday, April 9, 2021

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: CB#4-10

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0050 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 1.5000 ft

Width of Spread: 26.3029 ft

Gutter Result Parameters

Design Flow: 24.3600 cfs

Gutter Depression: 1.1340 in

Area of Flow: 6.9893 ft^2

Eo (Gutter Flow to Total Flow): 0.1647

Gutter Depth at Curb: 7.4467 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 3.5000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 4.9618 cfs

Bypass Flow: 19.3982 cfs

Efficiency: 0.2037

Curb and Gutter Analysis: CB#4-100

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0050 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 1.5000 ft

Width of Spread: 37.7303 ft

Gutter Result Parameters

Design Flow: 63.0000 cfs

Gutter Depression: 1.1340 in

Area of Flow: 14.3066 ft^2

Eo (Gutter Flow to Total Flow): 0.1127

Gutter Depth at Curb: 10.1893 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 3.5000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 7.5672 cfs

Bypass Flow: 55.4328 cfs

Efficiency: 0.1201

Hydraulic Analysis Report

Project Data

Project Title: Laurel – Catch Basin #5 Analysis – E'LY Curb and Gutter

Designer: DJV

Project Date: Friday, April 9, 2021

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: CB#5-100

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0050 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 1.5000 ft

Width of Spread: 48.7832 ft

Gutter Result Parameters

Design Flow: 124.4300 cfs

Gutter Depression: 1.1340 in

Area of Flow: 23.8689 ft^2

Eo (Gutter Flow to Total Flow): 0.0862

Gutter Depth at Curb: 12.8420 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 28.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 71.1038 cfs

Bypass Flow: 53.3262 cfs

Efficiency: 0.5714

Curb and Gutter Analysis: CB#5-10

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0050 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 1.5000 ft

Width of Spread: 37.7190 ft

Gutter Result Parameters

Design Flow: 62.9500 cfs

Gutter Depression: 1.1340 in

Area of Flow: 14.2981 ft^2

Eo (Gutter Flow to Total Flow): 0.1127

Gutter Depth at Curb: 10.1866 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 28.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 47.9492 cfs

Bypass Flow: 15.0008 cfs

Efficiency: 0.7617

Hydraulic Analysis Report

Project Data

Project Title: Laurel – Catch Basin #6 Analysis – W'LY Curb and Gutter

Designer: DJV

Project Date: Friday, April 9, 2021

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: CB#2-100

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0050 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 1.5000 ft

Width of Spread: 40.5571 ft

Gutter Result Parameters

Design Flow: 76.2700 cfs

Gutter Depression: 1.1340 in

Area of Flow: 16.5196 ft^2

Eo (Gutter Flow to Total Flow): 0.1045

Gutter Depth at Curb: 10.8677 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 21.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 43.0337 cfs

Bypass Flow: 33.2363 cfs

Efficiency: 0.5642

Curb and Gutter Analysis: CB#2-10

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0050 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 1.5000 ft

Width of Spread: 31.3328 ft

Gutter Result Parameters

Design Flow: 38.5800 cfs

Gutter Depression: 1.1340 in

Area of Flow: 9.8883 ft^2

Eo (Gutter Flow to Total Flow): 0.1370

Gutter Depth at Curb: 8.6539 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 21.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 29.2386 cfs

Bypass Flow: 9.3414 cfs

Efficiency: 0.7579

Hydraulic Analysis Report

Project Data

Project Title: Outlet Pipe Watershed A Normal Depth Analysis

Designer: DJV

Project Date: Friday, April 9, 2021

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Watershed A Outlet Pipe

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 3.5000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0130

Flow: 51.6000 cfs

Result Parameters

Depth: 2.2101 ft

Area of Flow: 6.4020 ft^2

Wetted Perimeter: 6.4288 ft

Hydraulic Radius: 0.9958 ft

Average Velocity: 8.0600 ft/s

Top Width: 3.3769 ft

Froude Number: 1.0316

Critical Depth: 2.2456 ft

Critical Velocity: 7.9120 ft/s

Critical Slope: 0.0048 ft/ft

Critical Top Width: 3.36 ft

Calculated Max Shear Stress: 0.6895 lb/ft^2

Calculated Avg Shear Stress: 0.3107 lb/ft^2

Hydraulic Analysis Report

Project Data

Project Title: Outlet Pipe Watershed B Normal Depth Analysis

Designer: DJV

Project Date: Friday, April 9, 2021

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Watershed B Outlet Pipe

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 3.0000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0130

Flow: 33.6000 cfs

Result Parameters

Depth: 1.8714 ft

Area of Flow: 4.6371 ft^2

Wetted Perimeter: 5.4631 ft

Hydraulic Radius: 0.8488 ft

Average Velocity: 7.2459 ft/s

Top Width: 2.9066 ft

Froude Number: 1.0109

Critical Depth: 1.8823 ft

Critical Velocity: 7.1968 ft/s

Critical Slope: 0.0049 ft/ft

Critical Top Width: 2.90 ft

Calculated Max Shear Stress: 0.5839 lb/ft^2

Calculated Avg Shear Stress: 0.2648 lb/ft^2

Hydraulic Analysis Report

Project Data

Project Title: Northerly Chambers – Weir Analysis

Designer: DJV

Project Date: Thursday, April 29, 2021

Project Units: U.S. Customary Units

Notes:

Weir Analysis: Outlet Control Structure Q Mitigate

Notes: Mitigation Flow Analysis

Input Parameters

Weir Type: Rectangular

Coefficient: 3.1000

Length: 10.0000 ft

Flow: 10.4600 cfs

Result Parameters

Head: 0.4847 ft

Weir Analysis: Outlet Control Structure Q100 Bypass

Notes: 100-Year Bypass Flow Weir Analysis

Input Parameters

Weir Type: Rectangular

Coefficient: 3.1000

Length: 10.0000 ft

Flow: 51.6400 cfs

Result Parameters

Head: 1.4052 ft

Hydraulic Analysis Report

Project Data

Project Title: Southerly Chambers – Weir Analysis

Designer: DJV

Project Date: Thursday, April 29, 2021

Project Units: U.S. Customary Units

Notes:

Weir Analysis: Southerly Outlet Control Structure Q Mitigate

Notes: Mitigation Flow Analysis

Input Parameters

Weir Type: Rectangular

Coefficient: 3.1000

Length: 6.5000 ft

Flow: 8.5000 cfs

Result Parameters

Head: 0.5625 ft

Weir Analysis: Southerly Outlet Control Structure Q Bypass

Notes: 100-Year Bypass Flow Weir Analysis

Input Parameters

Weir Type: Rectangular

Coefficient: 3.1000

Length: 6.5000 ft

Flow: 33.3100 cfs

Result Parameters

Head: 1.3981 ft

APPENDIX G

REFERENCE DATA

G.1: HYDROLOGIC SOILS DATA BY NRCS WEBSOIL SURVEY

G.2: PLATE D-4.1

G.3: INFILTRATION REPORT (EXCERPT)

G.4: OC TGD WORKSHEET H – FACTOR OF SAFETY AND DESIGN INFILTRATION RATE

G.5: CONTECH CMP DETENTION DESIGN VOLUMES

G.6: BMP DCV CALCULATIONS

G.7: SAN BERNARDINO COUNTY MEMORANDUM DETENTION BASIN DESIGN CRITERIA

G.8: COMPREHENSIVE STORM DRAIN PLAN NO.3, PROJECT 3-4 (CSDP 3-4), EXCERPT

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

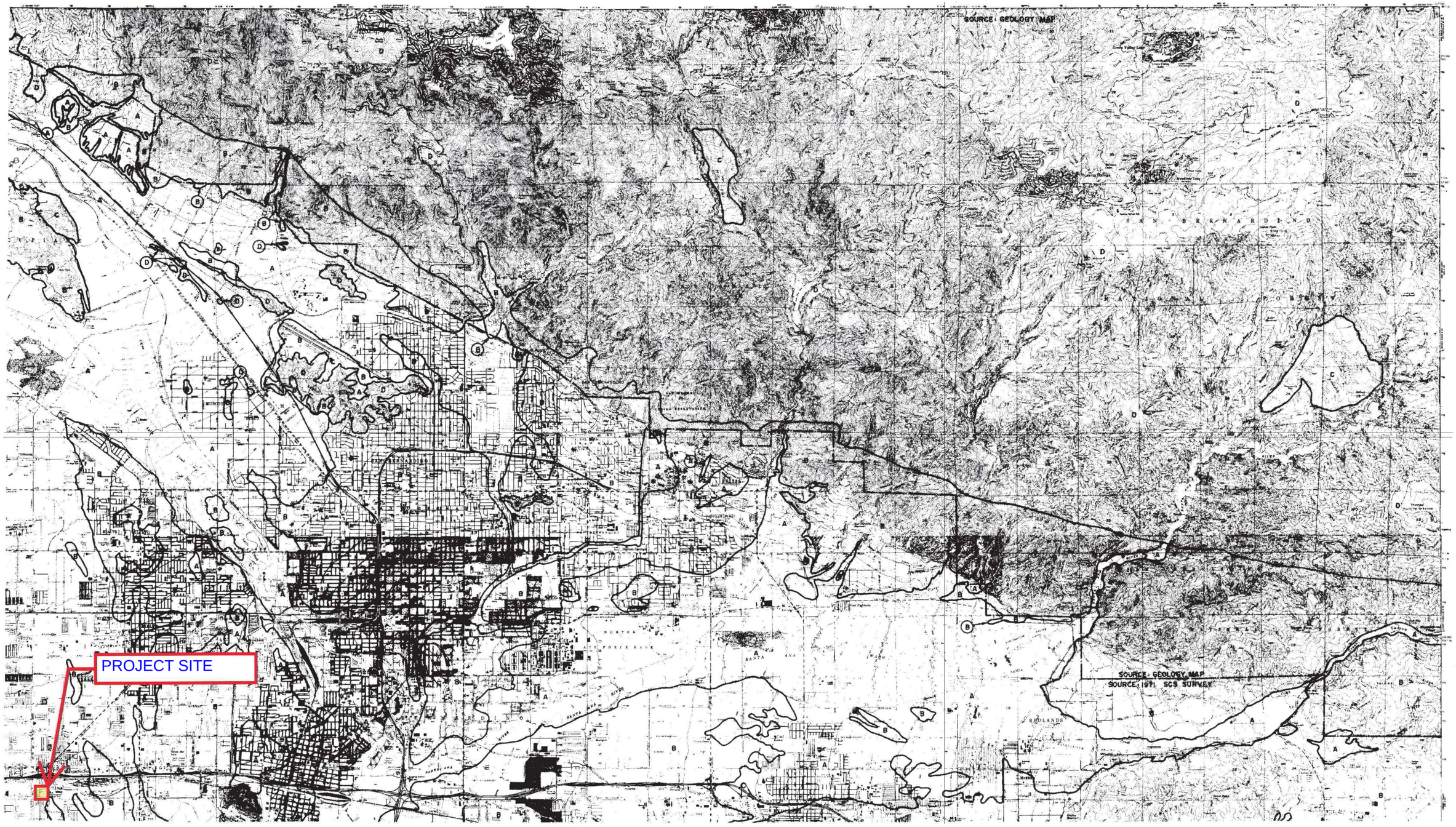
Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparral, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparral, Narrowleaf (Chamise and redshank)	Poor	71	82	88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

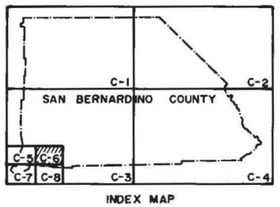
SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

CURVE NUMBERS FOR PERVIOUS AREAS

Figure C-3 (1 of 2)





INDEX MAP

LEGEND

SOIL GROUP BOUNDARY

A SOIL GROUP DESIGNATION

BOUNDARY OF INDICATED SOURCE

SCALE 1:48,000

SCALE REDUCED BY 1/2

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

HYDROLOGIC SOILS GROUP MAP FOR SOUTHWEST-B AREA

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Bernardino County Southwestern Part, California

Bloomington Commerce Center SP3 Scheme 1



January 21, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

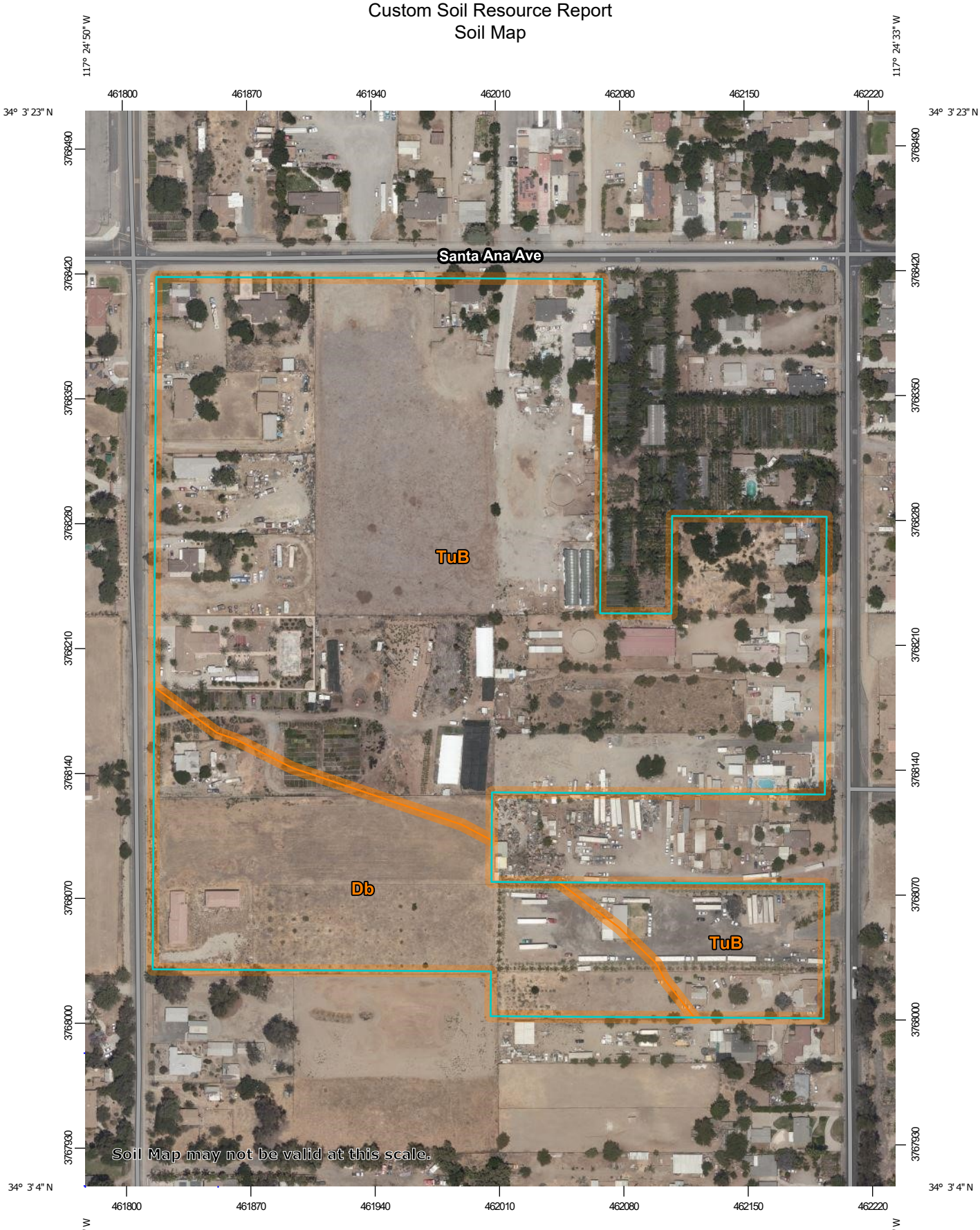
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:2,940 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

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 Southwestern Part, California
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: Apr 1, 2018—Jun 30, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

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
Db	Delhi fine sand	6.8	22.1%
TuB	Tujunga loamy sand, 0 to 5 percent slopes	23.8	77.9%
Totals for Area of Interest		**30.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Bernardino County Southwestern Part, California

Db—Delhi fine sand

Map Unit Setting

National map unit symbol: hcjq
Elevation: 30 to 1,400 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 225 to 310 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Delhi

Setting

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

Typical profile

H1 - 0 to 18 inches: fine sand
H2 - 18 to 60 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
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
Available water capacity: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Unnamed

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

Unnamed
Percent of map unit: 5 percent
Hydric soil rating: No

Tujunga, loamy sand
Percent of map unit: 5 percent
Hydric soil rating: No

TuB—Tujunga loamy sand, 0 to 5 percent slopes

Map Unit Setting
National map unit symbol: 2sx6y
Elevation: 650 to 3,110 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 62 to 65 degrees F
Frost-free period: 325 to 365 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Tujunga, loamy sand, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tujunga, Loamy Sand

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

Typical profile
A - 0 to 6 inches: loamy sand
C1 - 6 to 18 inches: loamy sand
C2 - 18 to 60 inches: loamy sand

Properties and qualities
Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
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: Rare
Frequency of ponding: None
Available water capacity: Low (about 4.2 inches)

Interpretive groups
Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Tujunga, gravelly loamy sand
Percent of map unit: 10 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hanford, sandy loam
Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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

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

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

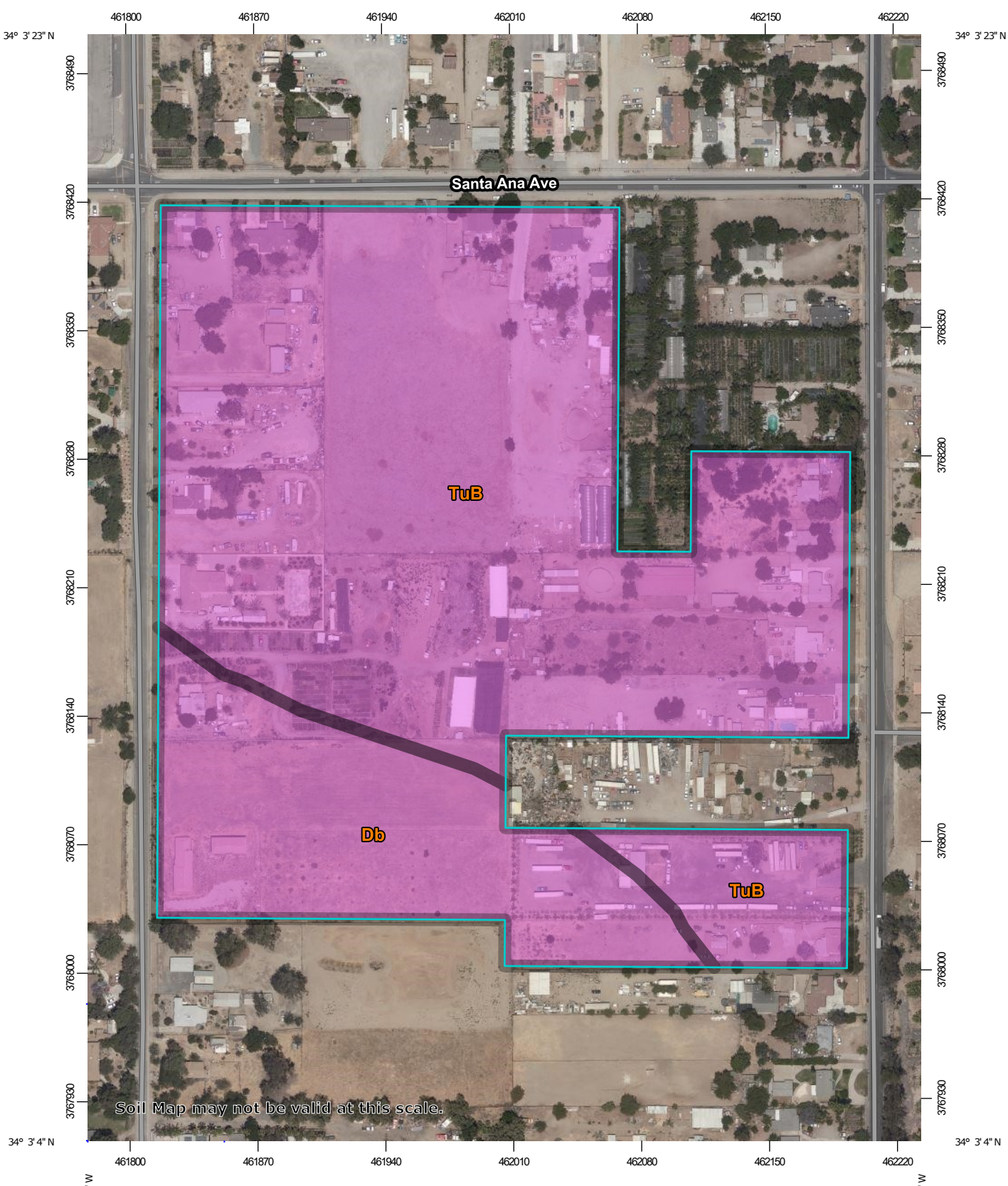
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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

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

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

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:2,940 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

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 Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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Soil Survey Area: San Bernardino County Southwestern Part, California
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: Apr 1, 2018—Jun 30, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Db	Delhi fine sand	A	6.8	22.1%
TuB	Tujunga loamy sand, 0 to 5 percent slopes	A	23.8	77.9%
Totals for Area of Interest			**30.5**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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NOAA Atlas 14, Volume 6, Version 2
Location name: Bloomington, California, USA*
Latitude: 34.0535°, Longitude: -117.4117°
Elevation: 1036.19 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.107 (0.089-0.129)	0.138 (0.115-0.167)	0.180 (0.149-0.219)	0.215 (0.177-0.264)	0.264 (0.210-0.336)	0.303 (0.236-0.393)	0.343 (0.260-0.457)	0.386 (0.285-0.529)	0.447 (0.315-0.639)	0.496 (0.338-0.735)
10-min	0.153 (0.127-0.185)	0.198 (0.165-0.240)	0.258 (0.214-0.314)	0.308 (0.254-0.378)	0.379 (0.301-0.481)	0.434 (0.338-0.564)	0.492 (0.373-0.655)	0.554 (0.408-0.759)	0.640 (0.452-0.916)	0.711 (0.484-1.05)
15-min	0.185 (0.154-0.224)	0.239 (0.199-0.290)	0.312 (0.259-0.380)	0.373 (0.307-0.458)	0.458 (0.364-0.582)	0.525 (0.408-0.682)	0.595 (0.451-0.792)	0.670 (0.493-0.918)	0.774 (0.547-1.11)	0.859 (0.585-1.27)
30-min	0.275 (0.230-0.334)	0.357 (0.297-0.433)	0.465 (0.386-0.566)	0.556 (0.458-0.683)	0.683 (0.543-0.867)	0.783 (0.609-1.02)	0.888 (0.673-1.18)	0.999 (0.736-1.37)	1.16 (0.815-1.65)	1.28 (0.873-1.90)
60-min	0.403 (0.336-0.488)	0.521 (0.434-0.633)	0.680 (0.565-0.828)	0.813 (0.669-0.998)	0.998 (0.793-1.27)	1.15 (0.890-1.49)	1.30 (0.984-1.73)	1.46 (1.08-2.00)	1.69 (1.19-2.42)	1.87 (1.28-2.78)
2-hr	0.591 (0.492-0.716)	0.758 (0.631-0.920)	0.980 (0.813-1.19)	1.16 (0.956-1.43)	1.41 (1.12-1.79)	1.61 (1.25-2.08)	1.81 (1.37-2.40)	2.01 (1.48-2.76)	2.30 (1.63-3.30)	2.53 (1.73-3.76)
3-hr	0.737 (0.614-0.893)	0.944 (0.786-1.15)	1.22 (1.01-1.48)	1.44 (1.18-1.76)	1.74 (1.38-2.21)	1.97 (1.53-2.56)	2.21 (1.68-2.94)	2.46 (1.81-3.37)	2.80 (1.97-4.00)	3.07 (2.09-4.54)
6-hr	1.04 (0.866-1.26)	1.33 (1.11-1.62)	1.71 (1.42-2.08)	2.02 (1.66-2.48)	2.43 (1.94-3.09)	2.75 (2.14-3.57)	3.07 (2.33-4.09)	3.40 (2.51-4.66)	3.85 (2.72-5.50)	4.20 (2.86-6.22)
12-hr	1.38 (1.15-1.67)	1.78 (1.48-2.16)	2.30 (1.91-2.79)	2.71 (2.23-3.33)	3.26 (2.59-4.14)	3.68 (2.86-4.78)	4.10 (3.11-5.46)	4.53 (3.34-6.20)	5.10 (3.60-7.30)	5.55 (3.78-8.22)
24-hr	1.84 (1.63-2.13)	2.41 (2.13-2.78)	3.13 (2.76-3.62)	3.71 (3.24-4.32)	4.48 (3.79-5.40)	5.06 (4.20-6.22)	5.64 (4.57-7.10)	6.23 (4.91-8.07)	7.02 (5.31-9.47)	7.63 (5.58-10.6)
2-day	2.24 (1.98-2.58)	2.98 (2.63-3.44)	3.93 (3.47-4.55)	4.70 (4.11-5.49)	5.74 (4.86-6.92)	6.53 (5.42-8.03)	7.33 (5.94-9.23)	8.14 (6.42-10.5)	9.24 (7.00-12.5)	10.1 (7.39-14.1)
3-day	2.40 (2.13-2.77)	3.25 (2.87-3.75)	4.34 (3.83-5.03)	5.24 (4.59-6.11)	6.46 (5.47-7.79)	7.40 (6.14-9.10)	8.35 (6.77-10.5)	9.34 (7.36-12.1)	10.7 (8.08-14.4)	11.7 (8.58-16.4)
4-day	2.58 (2.29-2.98)	3.53 (3.12-4.07)	4.76 (4.20-5.51)	5.77 (5.05-6.73)	7.15 (6.06-8.62)	8.23 (6.83-10.1)	9.32 (7.55-11.7)	10.5 (8.24-13.5)	12.0 (9.09-16.2)	13.2 (9.68-18.5)
7-day	2.96 (2.62-3.41)	4.08 (3.61-4.71)	5.56 (4.91-6.44)	6.78 (5.93-7.91)	8.46 (7.16-10.2)	9.77 (8.10-12.0)	11.1 (9.00-14.0)	12.5 (9.86-16.2)	14.4 (10.9-19.5)	16.0 (11.7-22.3)
10-day	3.21 (2.84-3.70)	4.46 (3.94-5.15)	6.11 (5.39-7.07)	7.48 (6.54-8.72)	9.36 (7.93-11.3)	10.8 (8.99-13.3)	12.4 (10.0-15.6)	14.0 (11.0-18.1)	16.2 (12.2-21.8)	17.9 (13.1-25.0)
20-day	3.88 (3.43-4.47)	5.43 (4.80-6.27)	7.51 (6.62-8.69)	9.25 (8.09-10.8)	11.7 (9.88-14.1)	13.6 (11.3-16.7)	15.6 (12.6-19.6)	17.7 (13.9-22.9)	20.6 (15.6-27.8)	23.0 (16.8-32.1)
30-day	4.59 (4.06-5.29)	6.43 (5.69-7.42)	8.91 (7.86-10.3)	11.0 (9.62-12.8)	13.9 (11.8-16.8)	16.3 (13.5-20.0)	18.7 (15.2-23.6)	21.3 (16.8-27.6)	25.0 (18.9-33.7)	28.0 (20.5-39.1)
45-day	5.48 (4.85-6.32)	7.62 (6.73-8.79)	10.5 (9.28-12.2)	13.0 (11.4-15.1)	16.4 (13.9-19.8)	19.2 (16.0-23.7)	22.2 (18.0-28.0)	25.4 (20.0-32.9)	30.0 (22.7-40.4)	33.7 (24.6-47.0)
60-day	6.41 (5.67-7.39)	8.81 (7.79-10.2)	12.1 (10.7-14.0)	14.9 (13.0-17.4)	18.9 (16.0-22.7)	22.1 (18.3-27.2)	25.5 (20.7-32.1)	29.2 (23.0-37.8)	34.6 (26.2-46.6)	39.0 (28.5-54.4)

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

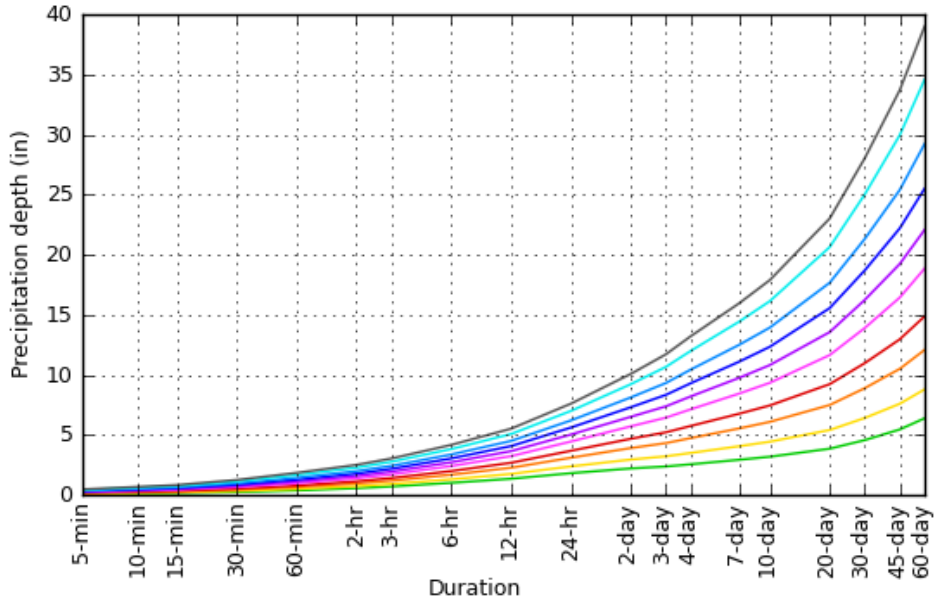
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper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

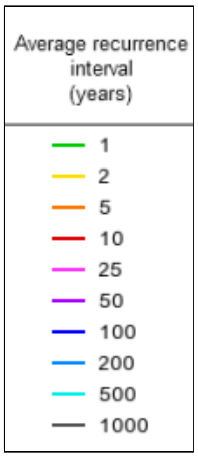
Please refer to NOAA Atlas 14 document for more information.

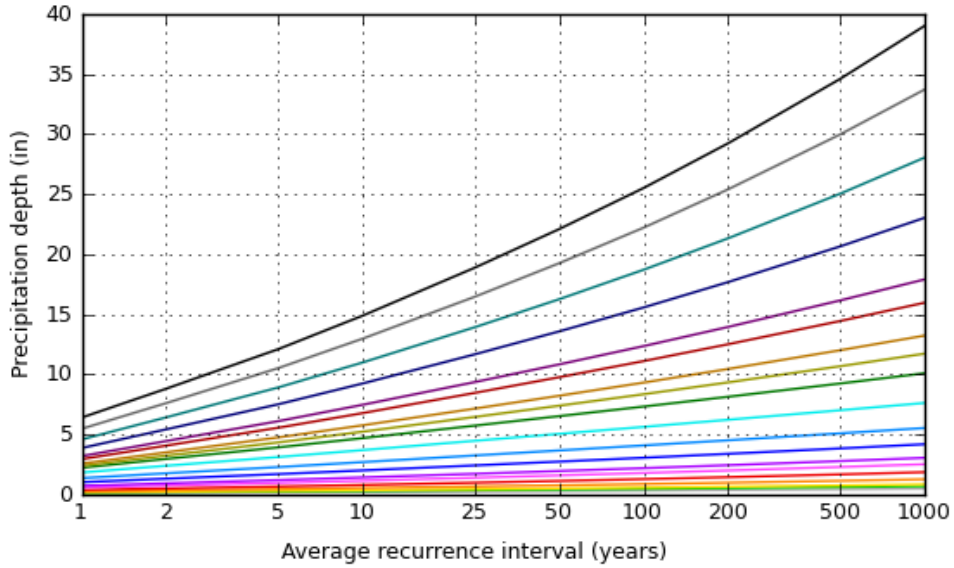
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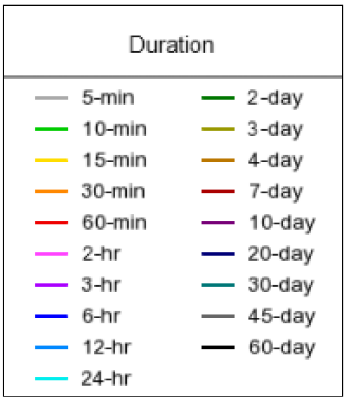
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 34.0535°, Longitude: -117.4117°









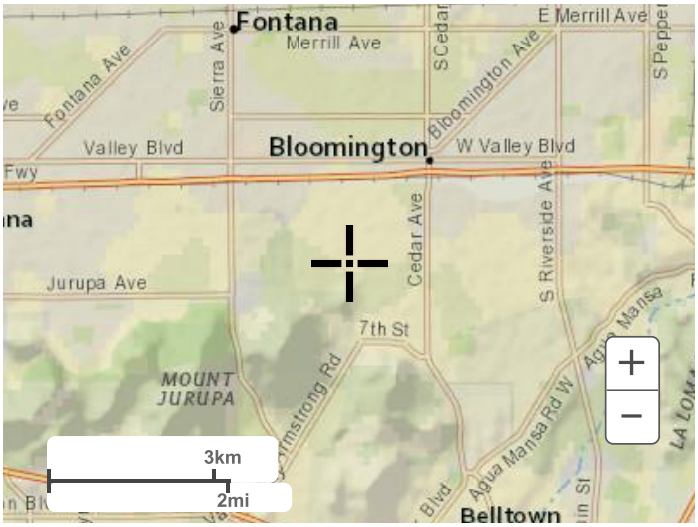
NOAA Atlas 14, Volume 6, Version 2

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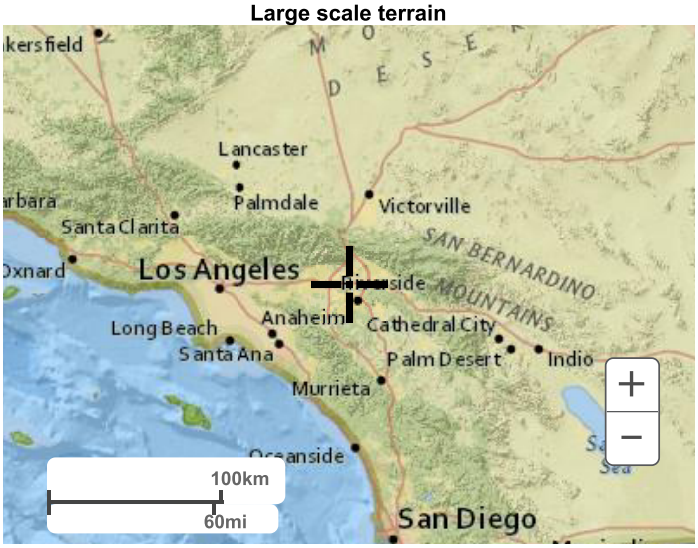
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Maps & aerials

Small scale terrain



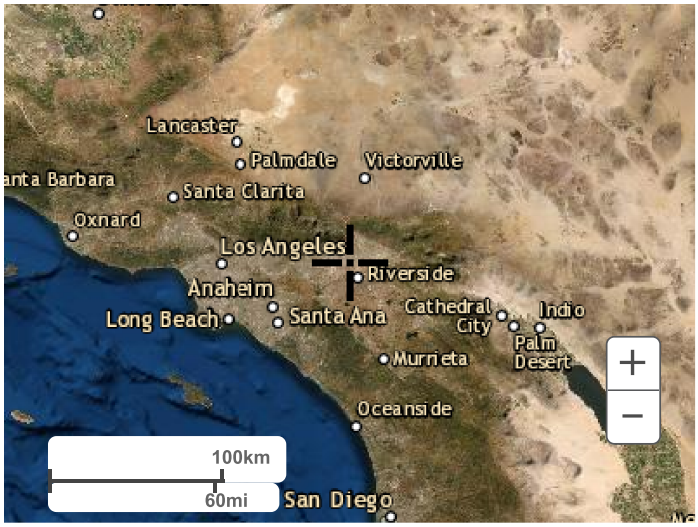
Large scale terrain



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

October 20, 2020

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Howard Industrial Partners
1944 North Tustin Street, Suite 122
Orange, California 92865

Attention: Mr. Mike Tunney
Vice President

Project No.: **20G172-2**

Subject: **Results of Infiltration Testing**
Proposed Commercial/Industrial Development
Laurel Avenue, South of Santa Ana Avenue
Bloomington (Unincorporated San Bernardino County), California

Reference: Geotechnical Investigation, Proposed Commercial/Industrial Development, Bloomington, California, prepared by Southern California Geotechnical, Inc. (SCG), prepared for Howard Industrial Partners, SCG project No. 20G172-4.

Mr. Tunney:

In accordance with your request, we have conducted infiltration testing at the subject site. We are pleased to present this report summarizing the results of the infiltration testing and our design recommendations.

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 19P389R4, dated August 20, 2020. The scope of services included site reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the on-site soils. The infiltration testing was performed in general accordance with the Technical Guidance Document for Water Quality Management Plans prepared for the County of San Bernardino Areawide Stormwater Program dated June 7, 2013. The San Bernardino County standards defer to guidelines published by Riverside County Department of Environmental Health (RCDEH).

Site and Project Description

The overall subject site consists of four (4) contiguous areas (identified as Site 1 through Site 4), approximately 213 acres in size, in an unincorporated portion of San Bernardino County, California. This investigation only includes Site 3 and Site 4. The general location of the site is illustrated on the Site Location Map, enclosed as Plate 1 of this report.

Site 3

Site 3 is located on the west side of Locust Avenue, south of Santa Ana Avenue in Bloomington area of unincorporated San Bernardino County, California. The site is bounded to the north by

Santa Ana Avenue and single-family residences, to the west by Laurel Avenue, to the south by single-family residences, and to the east by Locust Avenue.

The site consists of multiple contiguous rectangular-shaped parcels which total 28.09± acres in size. The site is developed with several single-family residences, commercial/industrial buildings, and trailer storage yards.

Detailed topographic information was not available at the time of this report. Based on visual observations made at the time of the subsurface investigation and from elevations obtained from Google Earth, the overall site topography of Site 3 appears to slope gently to the southwest with an estimated gradient of 1.5± percent. The topographic low point of Site 3 is 1,027± feet mean sea level (msl) in the central-southern region of the site. The topographic high point of Site 3 appears to be 1,047± feet msl, located in the northeastern region of the site.

Site 4

Site 4 is located on the west side of Laurel Avenue, south of Santa Ana Avenue in Bloomington area of unincorporated San Bernardino County, California. The site is bounded to the north, west, and south by single-family residences, and to the east by Laurel Avenue.

The site consists of multiple contiguous rectangular-shaped parcels which total 9.55± acres in size. The site is developed with a single-family residence.

Detailed topographic information was not available at the time of this report. Based on visual observations made at the time of the subsurface investigation and from elevations obtained from Google Earth, the overall site topography of Site 4 appears to slope gently to the southeast with an estimated gradient of 0.7± percent. The topographic high point of Site 4 is 1,049 feet msl, located in the northwestern corner of the site. The topographic low point of Site 4 is 1,038 feet msl, located in the central-east portion of the site. A north-south trending 5 to 7± foot berm exists within Site 4, located 200± feet west of Laurel Avenue and contains a concentration of trees.

Proposed Development

A conceptual master plan identified as the Bloomington Industrial Master Plan, prepared by AO, has been provided to our office by the client. As previously stated, this investigation only includes Site 3 and Site 4 of the overall development.

Site 3

Site 3 will be developed with a commercial/industrial building, 440,000± ft² in size. The building will be constructed with dock-high doors located along the north side of the building. It is also assumed that the building will be a tilt-up concrete structure, supported on conventional shallow foundations with a concrete slab-on-grade floor. The building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete in the loading dock areas, and landscape planters throughout.

Site 4

Site 4 will be developed as an asphaltic concrete parking lot. The parking lot will consist of 310 trailer parking stalls with associated drive lanes.

Based on conversations with representatives of the project civil engineer, Site 3 and Site 4 will include on-site storm water infiltration. A below-grade chamber system will be constructed in the east-central area of Site 3 and a detention basin will be constructed in the southeastern area of Site 3. A below-grade chamber system will be constructed in the southeastern area of Site 4. The bottom of the infiltration systems will extend to depths up to 10 feet below the existing site grades.

Concurrent Study

Southern California Geotechnical, Inc. (SCG) concurrently conducted a geotechnical investigation at the subject site, referenced above. As a part of this study, twelve (12) borings were advanced to depths of 10 to 30± feet below existing site grades.

Artificial fill soils and possible fill soils were encountered at the ground surface of all twelve (12) boring locations, extending to depths of 1½ to 5½± feet below the existing site grades. The artificial fill soils consist of very loose to medium dense silty fine sands and medium dense fine sandy silts. Trace to little quantities of medium to coarse sand were encountered within the artificial fill soils and occasional trace quantities of fine to coarse gravel were present in the strata. Possible fill soils were also encountered at the ground surface of B-10 and beneath the artificial fill soils at B-6. The possible fill soils are comprised of loose silty fine sands with the same characteristics as the fill soils, except lacking indications of being disturbed. Native alluvium was encountered beneath the fill soils at all twelve (12) boring locations, extending to the maximum explored depth of 30± feet below existing site grades. The shallow native alluvial soils at depths less than 10± feet consist of loose to very dense fine to coarse sands, medium dense to very dense silty fine sands, loose to very dense fine to medium sands, dense silty fine to coarse sands, dense to very dense fine sands, and dense to very dense fine sandy silts. Variable constituent quantities of fine to coarse sand, silt, fine to coarse gravel, and occasional cobbles were encountered throughout these strata. At depths greater than 10± feet, the alluvium consists of medium dense to very dense fine to coarse sands, medium dense to very dense silty fine to coarse sands, medium dense to very dense fine to medium sands, dense fine sands, medium dense to very dense silty fine sands, and medium dense to very dense fine sandy silts. Trace to some quantity of silts, fine to coarse sands, fine to coarse gravels, and occasional cobbles were also encountered within the deeper alluvial strata. At Boring No. B-5, trace quantities of clays were encountered at depths of 22 to 27± feet below existing site grades.

Groundwater

Groundwater was not encountered at any of the borings. Based on the lack of any water within the borings, and the moisture contents of the recovered soil samples, the static groundwater table is considered to have existed at a depth in excess of 30± feet below existing site grades, at the time of the subsurface investigation.

As part of our research, we reviewed available groundwater data in order to determine the historic and more recent high groundwater levels for the site. The primary reference used to determine the groundwater depths in this area is the California Department of Water Resources website, http://www.water.ca.gov/waterdatalibrary/. The nearest monitoring well is located approximately 2,600 feet southeast from the site. Water level readings within this monitoring well indicate a historic high groundwater levels of 176± feet in October 2011, and more recent groundwater levels of 187± feet below the ground surface in October 2019.

Subsurface Exploration

Scope of Exploration

The subsurface exploration conducted for the infiltration testing consisted of nine (9) infiltration test borings, advanced to depths of 10± feet below the existing site grades. The infiltration borings were advanced using a truck-mounted drilling rig, equipped with 8-inch-diameter hollow-stem augers and were logged during drilling by a member of our staff. The approximate locations of the infiltration test borings (identified as Infiltration Test Nos. I-1 through I-9) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

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

Geotechnical Conditions

Artificial Fill

Artificial fill and possible fill soils were encountered at the ground surface of all nine (9) infiltration test locations, extending to depths of 5½ to 7± feet below existing site grades. The artificial fill soils consist of loose to medium dense fine sandy silts and loose to medium dense silty fine sands. Variable quantities of medium to coarse sand and trace quantities of fine to coarse gravel were encountered within the artificial fill soils. Occasional Cobbles were encountered at Infiltration Test No. I-7.

Alluvium

Native alluvium was encountered beneath the artificial fill soils at all nine (9) infiltration test locations, extending to the maximum explored depth of 10± feet below existing site grades. The native alluvial soils generally consist of medium dense silty fine sands and fine to coarse sands, dense fine to coarse sands and silty fine to coarse sands, and very dense fine to coarse sands. Trace to little medium to coarse sand, fine to coarse gravel, and variable silt content was encountered within the alluvial strata. The Boring Logs, which illustrate the conditions encountered at each boring location is included within this report.

Infiltration Testing

As previously mentioned, the infiltration testing was performed in general accordance with Technical Guidance Document for Water Quality Management Plans, prepared for the County of San Bernardino Areawide Stormwater Program.

Pre-soaking

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

Infiltration Testing

Following the pre-soaking process of the infiltration test borings, SCG performed the infiltration testing. Each test hole was filled with water to a depth of at least 5 times the hole's radius above the gravel at the bottom of the test hole. In accordance with the San Bernardino County guidelines, since "sandy soils" were encountered at the bottom of all of the infiltration test borings (where 6 inches of water infiltrated into the surrounding soils for two consecutive 25-minute readings), readings were taken at 10-minute intervals for a total of 1 hour at all three (3) test locations. After each reading, water was added to the borings so that the depth of the water was at least 5 times the radius of the hole. The water level readings are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on the spreadsheets.

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

Infiltration Test No.	Depth (feet)	Soil Description	Infiltration Rate (inches/hour)
I-1	10	Brown Gray fine to coarse Sand, some fine to coarse Gravel, trace Silt	21.4
I-2	10	Light Gray Brown fine to coarse Sand, some fine to coarse Gravel, little Silt	20.4
I-3	10	Light Gray Brown fine to coarse Sand, some fine to coarse Gravel, trace Silt	22.9
I-4	10	Light Brown Gray fine to coarse Sand, some fine to coarse Gravel	20.4
I-5	10	Gray fine to coarse Sand, some fine to coarse Gravel, trace Silt	14.2
I-6	10	Light Gray Brown fine to coarse Sand, little fine to coarse Gravel, trace Silt	19.5

I-7	10	Light Brown Gray fine to coarse Sand, little to some Silt, trace fine Gravel	12.1
I-8	10	Light Brown Gray fine to coarse Sand, little Silt, little fine Gravel	13.1
I-9	10	Brown Silty fine to coarse Sand, trace fine Gravel	2.6

Laboratory Testing

Moisture Content

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

Grain Size Analysis

The grain size distribution of selected soils collected from the base of each infiltration test boring have been determined using a range of wire mesh screens. These tests were performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these tests are presented on Plates C-1 through C-9 of this report.

Design Recommendations

Nine (9) infiltration tests were performed at the subject site. As noted above, the infiltration rates at these locations vary from 2.6 to 22.9 inches per hour. The primary factor affecting the infiltration rates is the varying silt content in the soil. **Based on the infiltration test results from Infiltration Test Nos. I-1 through I-9, the following design infiltration rates are recommended:**

Infiltration Test Nos.	Infiltration System	Design Infiltration Rate (inches per hour)
I-1, I-2, I-3	A	20.4
I-4, I-5, I-6	B	14.2
I-7, I-8, I-9	C	2.6

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

The design of the storm water infiltration system should be performed by the project civil engineer, in accordance with the City of Bloomington and/or County of San Bernardino guidelines. It is recommended that the system be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the system. The presence of such

materials would decrease the effective infiltration rates. **It is recommended that the project civil engineer apply an appropriate factor of safety. The infiltration rate recommended above is based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rate.** It should be noted that the recommended infiltration rates are based on infiltration testing at nine (9) discrete locations and that the overall infiltration rates of the proposed infiltration system could vary considerably.

Construction Considerations

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

Infiltration versus Permeability

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

Location of Infiltration System

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

General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the proposed storm water infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rate contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the proposed storm water infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.

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

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

Closure

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

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

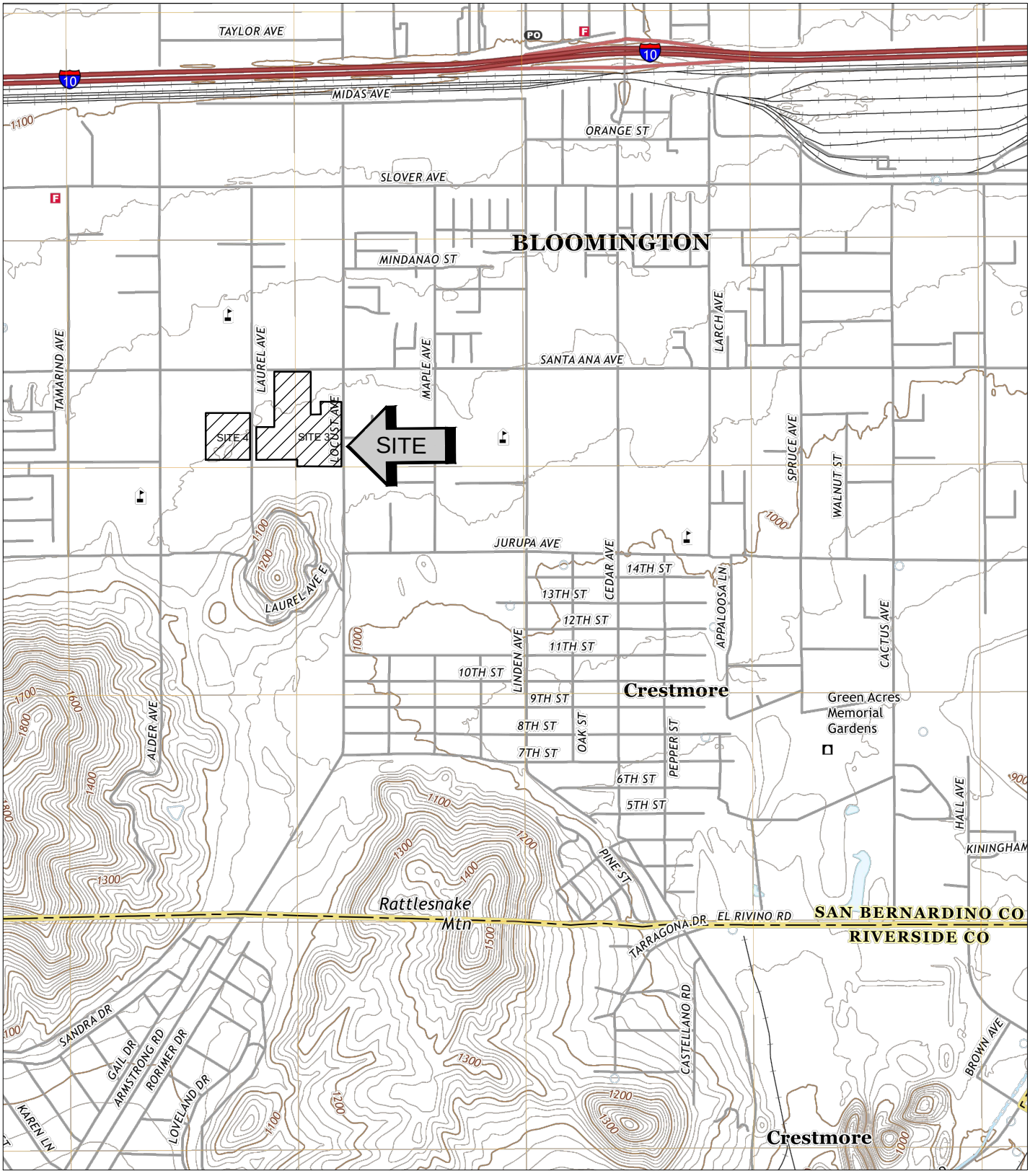
Ryan Bremer
Staff Geologist



Robert G. Trazo, GE 2655
Principal Engineer

Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Boring Log Legend and Logs
Infiltration Test Results Spreadsheets (22 pages)
Grain Size Distribution Graphs (9 pages)



LEGEND

PROJECT SITES 3 AND 4

SOURCE: USGS TOPOGRAPHIC MAP OF THE FONTANA QUADRANGLE, SAN BERNARDINO COUNTY, CALIFORNIA, 2018.

SITE LOCATION MAP

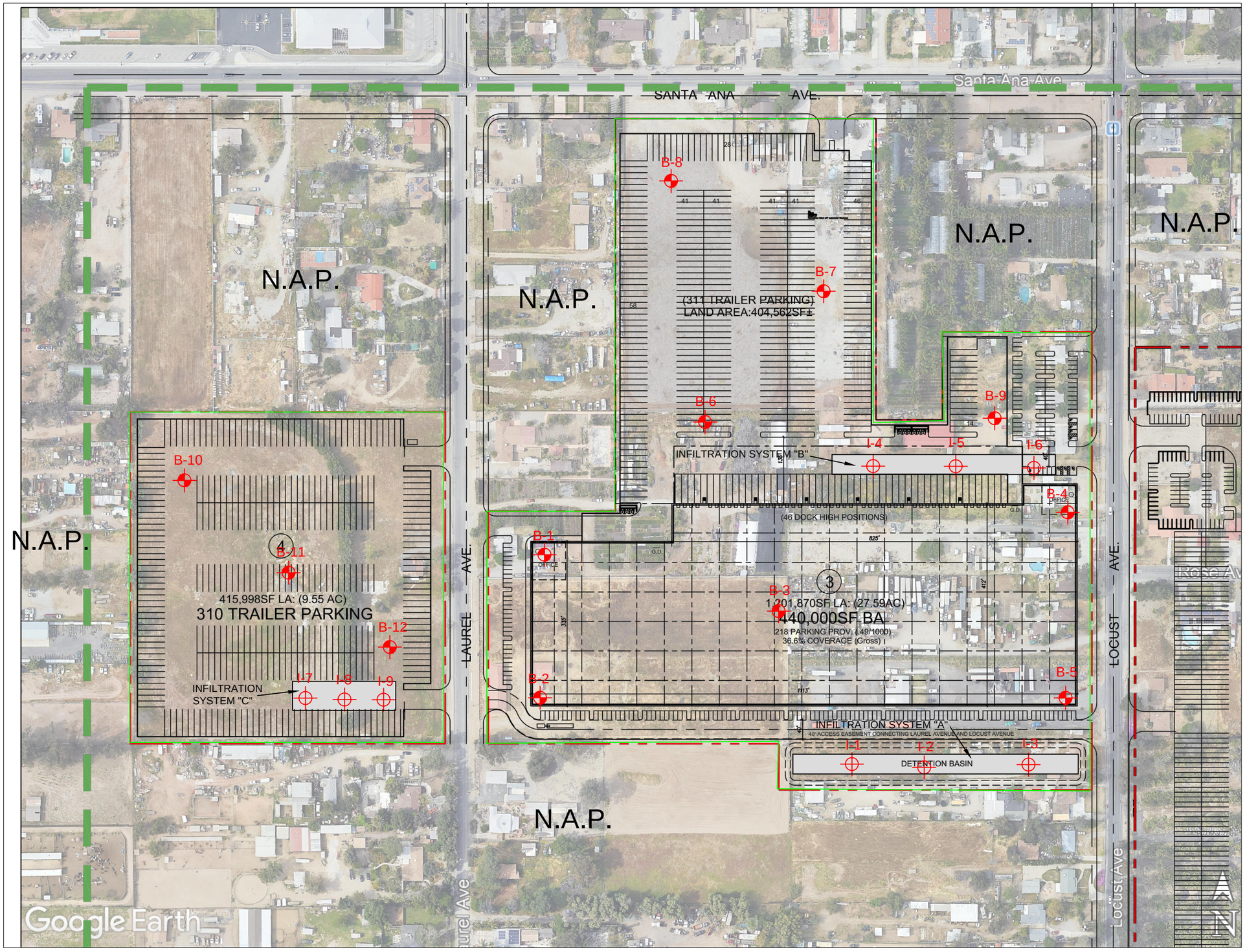
PROPOSED COMMERCIAL/INDUSTRIAL DEVELOPMENT

UNINCORPORATED SAN BERNARDINO COUNTY, CALIFORNIA

SCALE: 1" = 2000'	
DRAWN: OS CHKD: RGT	
SCG PROJECT 20G172-2	
PLATE 1	

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



NORTH
SoCalGeo

GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION TEST LOCATION
- APPROXIMATE BORING LOCATION (SCG PROJECT NO. 20G172-4)
- APPROXIMATE INFILTRATION SYSTEM LOCATION

INFILTRATION TEST LOCATION PLAN

PROPOSED COMMERCIAL/INDUSTRIAL DEVELOPMENT

BLOOMINGTON, CALIFORNIA

SCALE: 1" = 200'	SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: RB CHKD: RGT	
SCG PROJECT 20G172-2	
PLATE 2	

Infiltration Test No.	Infiltration Rate (in/hr)	
I-12	20.4	
I-11	11.4	
Infiltration Rate (lowest) =	11.4	Used
Geotechnical Report recommendation =	11.40	

Worksheet H: Factor of Safety and Design Infiltration Rate and Worksheet

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	3	0.75
		Predominant soil texture	0.25	1	0.25
		Site soil variability	0.25	1	0.25
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \sum p$			1.5
B	Design	Tributary area size	0.25	2	0.5
		Level of pretreatment/ expected sediment loads	0.25	2	0.5
		Redundancy	0.25	2	0.5
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \sum p$			2
Combined Safety Factor, $S_{total} = S_A x S_B$					3.00
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)					11.40
Design Infiltration Rate, in/hr, Kdesign = $K_{0bserved} / S_{total}$					**3.80**

Infiltration rates from Preliminary Southern California Geotechincal Report 20G172-6 dated February 15, 2021.

Note: The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.

Infiltration Test No.	Infiltration Rate (in/hr)	
I-10 (20G172-6)	20	
I-1 (20G172-2)	20.4	
Infiltration Rate (lowest) =	20	Used
Geotechnical Report recommendation =	20.0	

Worksheet H: Factor of Safety and Design Infiltration Rate and Worksheet

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	3	0.75
		Predominant soil texture	0.25	1	0.25
		Site soil variability	0.25	1	0.25
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \sum p$			1.5
B	Design	Tributary area size	0.25	2	0.5
		Level of pretreatment/ expected sediment loads	0.25	2	0.5
		Redundancy	0.25	2	0.5
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \sum p$			2
Combined Safety Factor, $S_{total} = S_A x S_B$					3.00
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)					20.00
Design Infiltration Rate, in/hr, Kdesign = $K_{0bserved} / S_{total}$					**6.67**

Infiltration rates from Preliminary Southern California Geotechincal Report 20G172-6 dated February 15, 2021, and Report 20G172-2 dated October 20, 2020.

Note: The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

ADVANCED DRAINAGE SYSTEMS, INC.

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BLOOMINGTON, CA

MC-4500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-4500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-4500 CHAMBER SYSTEM

1. STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

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

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

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PROPOSED LAYOUT

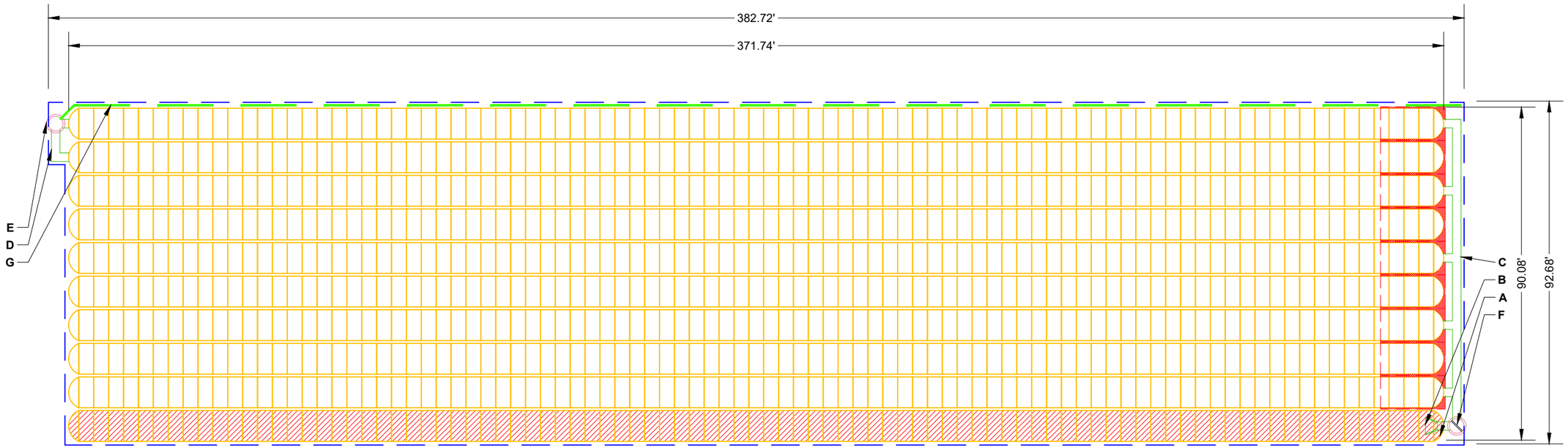
910	STORMTECH MC-4500 CHAMBERS
20	STORMTECH MC-4500 END CAPS
12	STONE ABOVE (in)
9	STONE BELOW (in)
40	STONE VOID
153481	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
35131	SYSTEM AREA (SF)
950.8	SYSTEM PERIMETER (ft)

CONCEPTUAL ELEVATIONS

MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	12.75
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	8.25
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	7.75
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	7.75
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	7.75
TOP OF STONE:	6.75
TOP OF MC-4500 CHAMBER:	5.75
24" x 24" BOTTOM MANIFOLD INVERT:	0.94
24" x 24" BOTTOM MANIFOLD INVERT:	0.94
24" ISOLATOR ROW PLUS INVERT:	0.94
24" BOTTOM CONNECTION INVERT:	0.94
BOTTOM OF MC-4500 CHAMBER:	0.75
UNDERDRAIN INVERT:	0.00
BOTTOM OF STONE:	0.00

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	24" BOTTOM PARTIAL CUT END CAP, PART#: MC4500IEPP24B / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	2.26"	
FLAMP	B	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MC450024RAMP		
MANIFOLD	C	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"	
MANIFOLD	D	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"	
CONCRETE STRUCTURE	E	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		14.0 CFS OUT
CONCRETE STRUCTURE W/WEIR	F	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		41.5 CFS IN
UNDERDRAIN	G	6" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		



ISOLATOR ROW PLUS
(SEE DETAIL)

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

BED LIMITS

NOTES

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

DA 1 EAST, BLOOMINGTON SITE 3
SCHEME 1
BLOOMINGTON, CA

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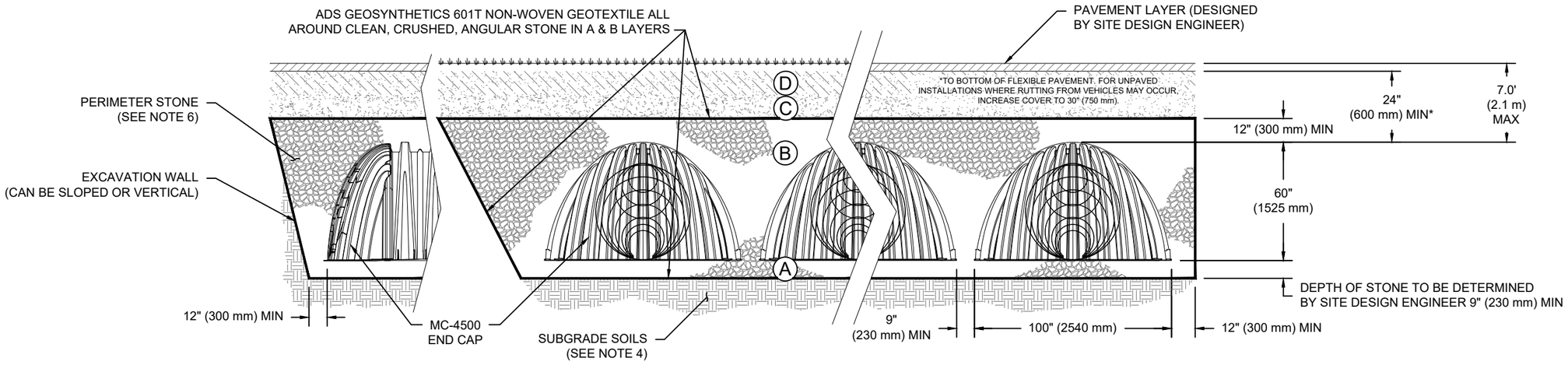
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ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

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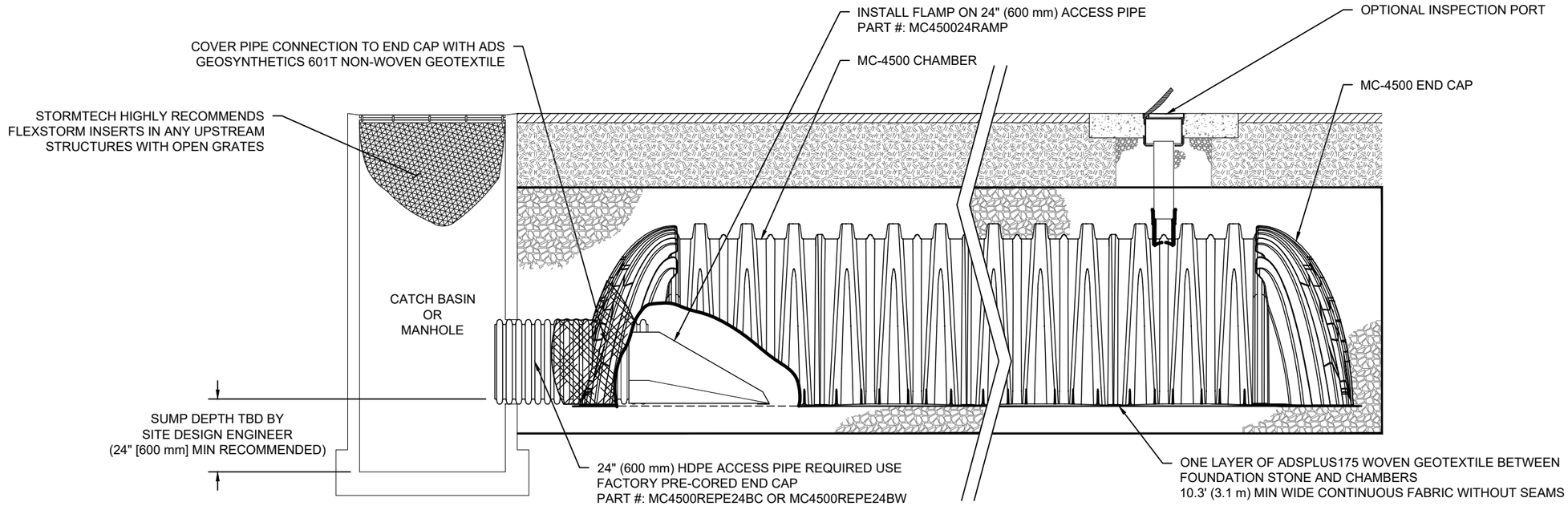
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REV | DRW | CHK | DESCRIPTION

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MC-4500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

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

NOTES

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

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

DA 1 EAST, BLOOMINGTON SITE 3
SCHEME 1
BLOOMINGTON, CA

DATE: 12/7/2020 | DRAWN: HP | CHECKED: N/A
PROJECT #:

REV	DRW	CHK	DESCRIPTION

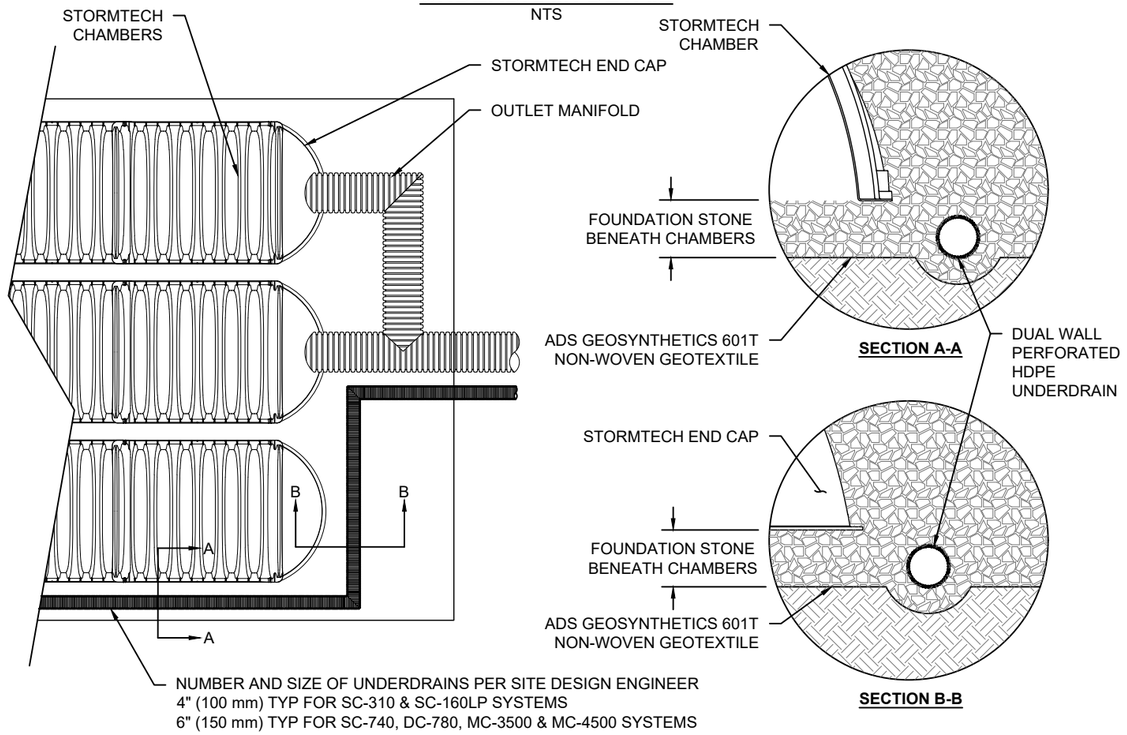
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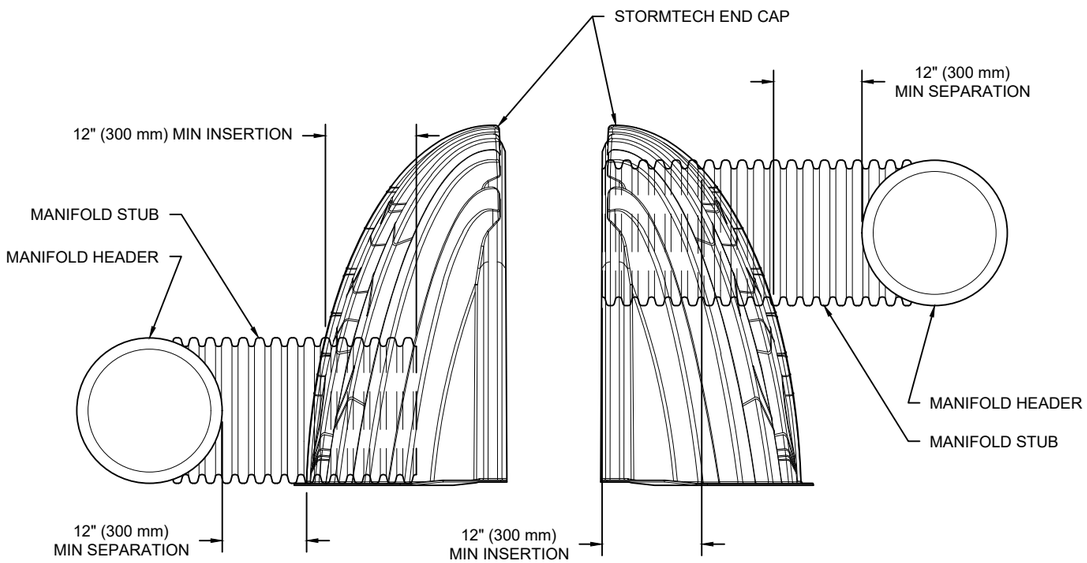
UNDERDRAIN DETAIL

NTS



MC-SERIES END CAP INSERTION DETAIL

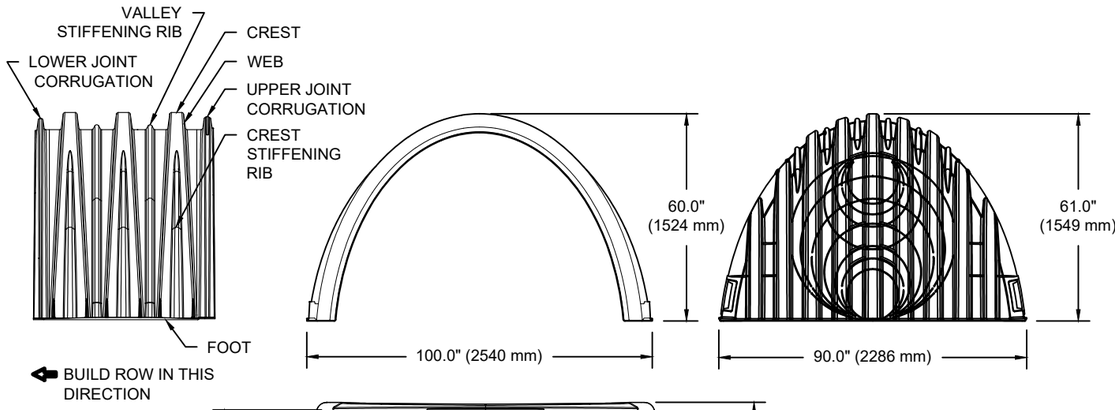
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NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

MC-4500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 48.3"	(2540 mm X 1524 mm X 1227 mm)
CHAMBER STORAGE	106.5 CUBIC FEET	(3.01 m³)
MINIMUM INSTALLED STORAGE*	162.6 CUBIC FEET	(4.60 m³)
WEIGHT (NOMINAL)	125.0 lbs.	(56.7 kg)

NOMINAL END CAP SPECIFICATIONS

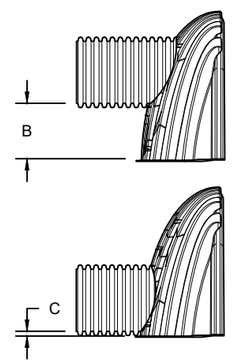
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

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

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

PART #	STUB	B	C
MC4500IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC4500IEPP06B		---	0.86" (22 mm)
MC4500IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC4500IEPP08B		---	1.01" (26 mm)
MC4500IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC4500IEPP10B		---	1.33" (34 mm)
MC4500IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC4500IEPP12B		---	1.55" (39 mm)
MC4500IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC4500IEPP15B		---	1.70" (43 mm)
MC4500IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC4500IEPP18TW			
MC4500IEPP18B		---	1.97" (50 mm)
MC4500IEPP18BW			
MC4500IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC4500IEPP24TW			
MC4500IEPP24B		---	2.26" (57 mm)
MC4500IEPP24BW			
MC4500IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC4500IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC4500IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PARTIAL CUT INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-4500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

DA 1 EAST, BLOOMINGTON SITE 3
SCHEME 1
BLOOMINGTON, CA

DATE: 12/7/2020 | DRAWN: HP | CHECKED: N/A | PROJECT #:

REV	DRW	CHK	DESCRIPTION

StormTech
Detention • Retention • Water Quality
520 CROMWELL AVENUE | ROCKY HILL | CT | 06067
860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

ADS
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APN 0256-101-11

APN 0256-111-78

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

ADVANCED DRAINAGE SYSTEMS, INC.

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DA 1 WEST, BLOOMINGTON SITE 3 SCHEME 1

BLOOMINGTON, CA

MC-4500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-4500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-4500 CHAMBER SYSTEM

1. STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

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

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

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PROPOSED LAYOUT

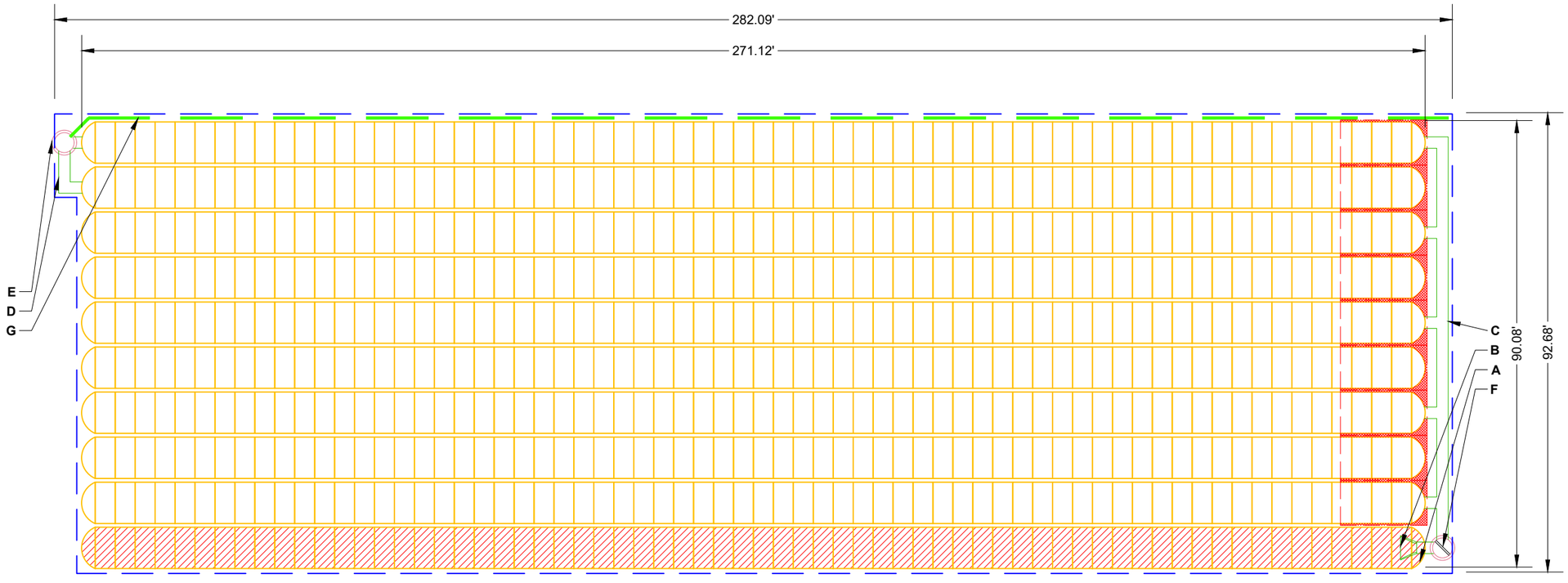
660	STORMTECH MC-4500 CHAMBERS
20	STORMTECH MC-4500 END CAPS
12	STONE ABOVE (in)
9	STONE BELOW (in)
40	STONE VOID
112324	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
25805	SYSTEM AREA (SF)
749.6	SYSTEM PERIMETER (ft)

CONCEPTUAL ELEVATIONS

MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	12.75
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	8.25
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	7.75
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	7.75
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	7.75
TOP OF STONE:	6.75
TOP OF MC-4500 CHAMBER:	5.75
24" x 24" BOTTOM MANIFOLD INVERT:	0.94
24" x 24" BOTTOM MANIFOLD INVERT:	0.94
24" ISOLATOR ROW PLUS INVERT:	0.94
24" BOTTOM CONNECTION INVERT:	0.94
BOTTOM OF MC-4500 CHAMBER:	0.75
UNDERDRAIN INVERT:	0.00
BOTTOM OF STONE:	0.00

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	24" BOTTOM PARTIAL CUT END CAP, PART#: MC4500IEPP24B / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	2.26"	
FLAMP	B	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MC450024RAMP		
MANIFOLD	C	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"	
MANIFOLD	D	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"	
CONCRETE STRUCTURE	E	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		14.0 CFS OUT
CONCRETE STRUCTURE W/WEIR	F	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		41.5 CFS IN
UNDERDRAIN	G	6" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		



ISOLATOR ROW PLUS
(SEE DETAIL)

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

BED LIMITS

NOTES

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

DA 1 WEST, BLOOMINGTON SITE 3
SCHEME 1
BLOOMINGTON, CA

DRAWN: HP
CHECKED: N/A
DATE: 12/7/2020
PROJECT #:

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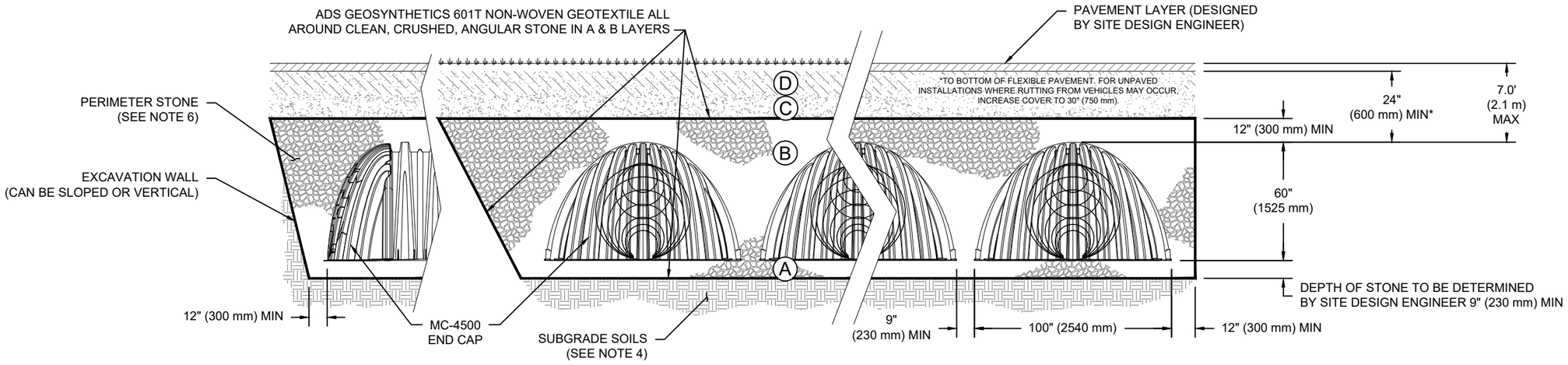
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ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

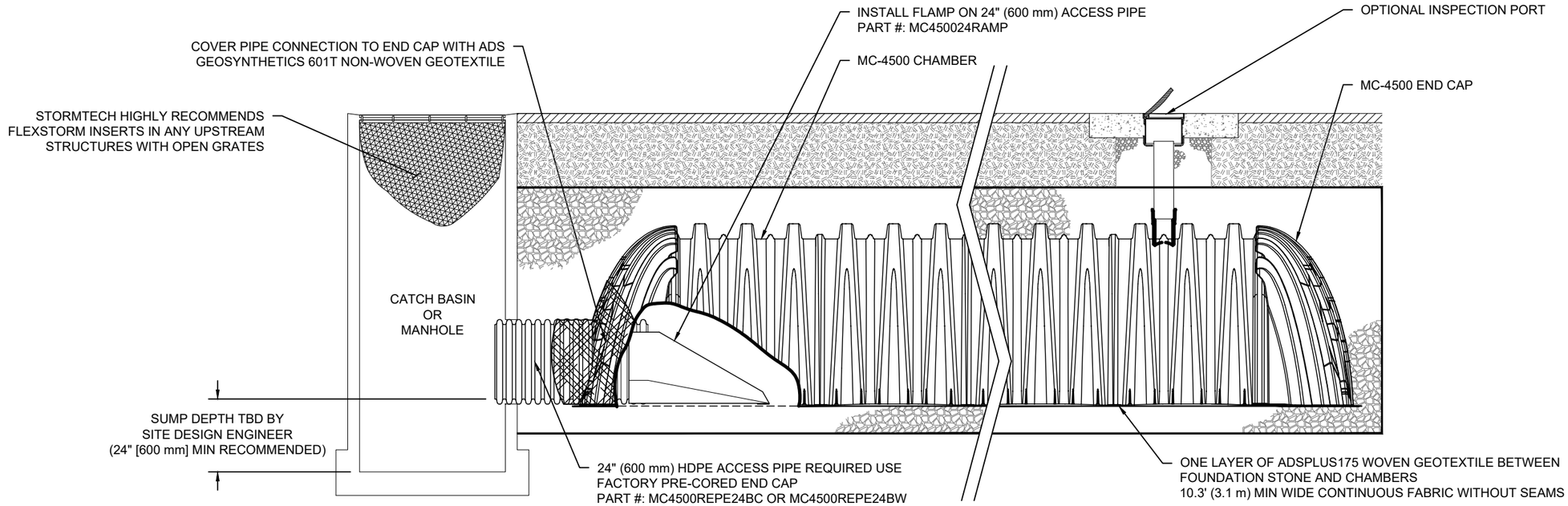
DA 1 WEST, BLOOMINGTON SITE 3
SCHEME 1
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DATE: 12/7/2020 | DRAWN: HP | CHECKED: N/A
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REV | DRW | CHK | DESCRIPTION

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MC-4500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

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

NOTES

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

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

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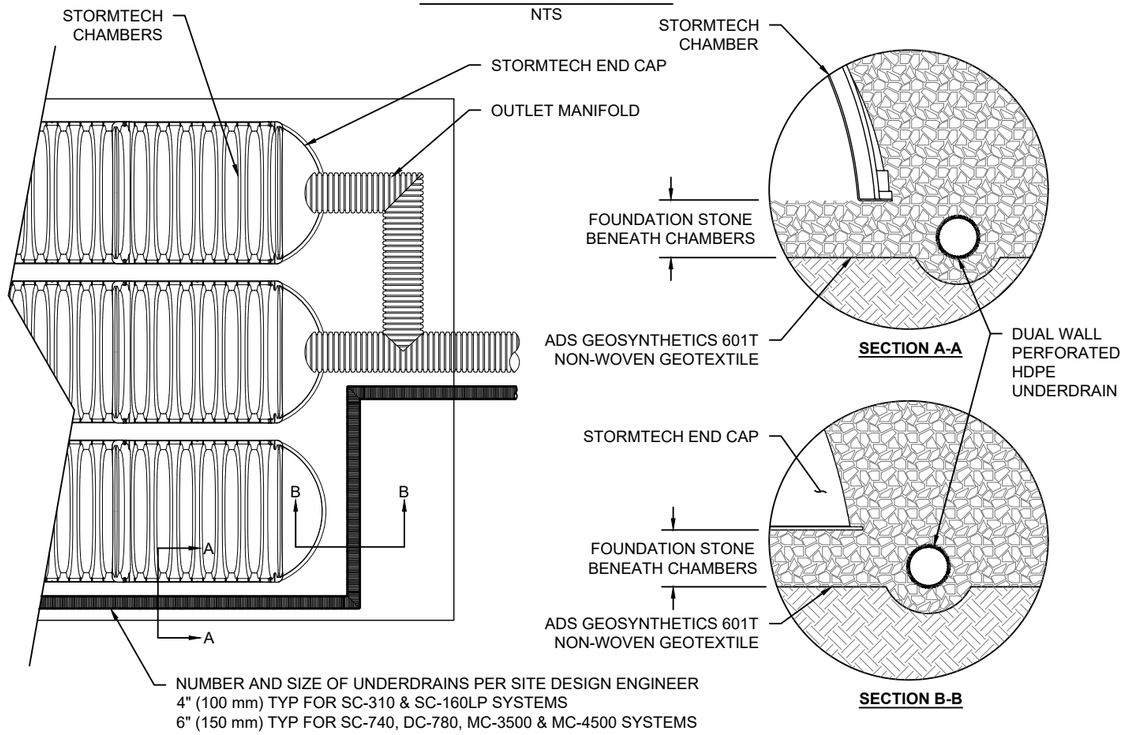
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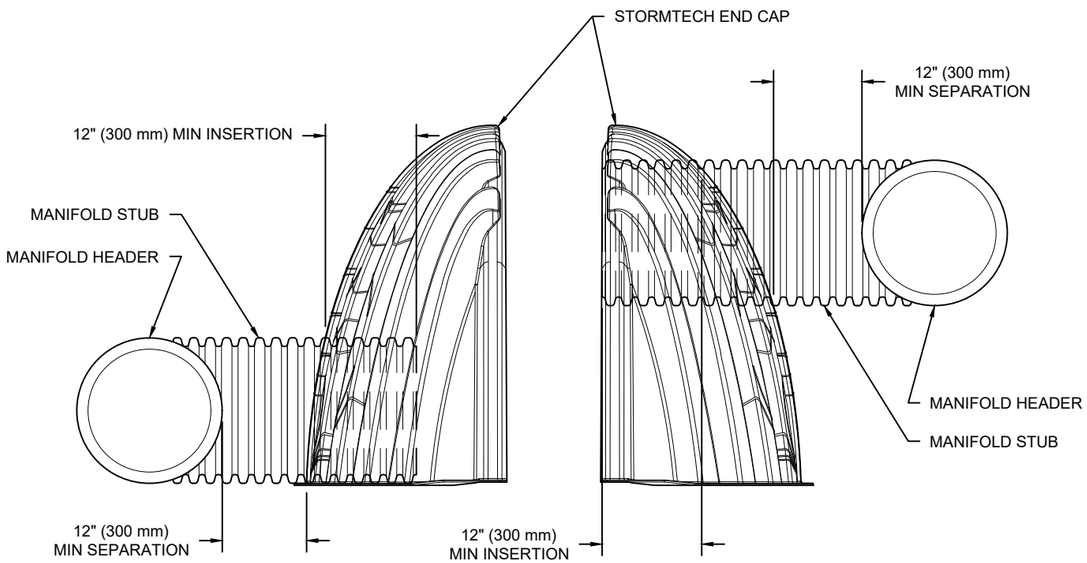
UNDERDRAIN DETAIL

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MC-SERIES END CAP INSERTION DETAIL

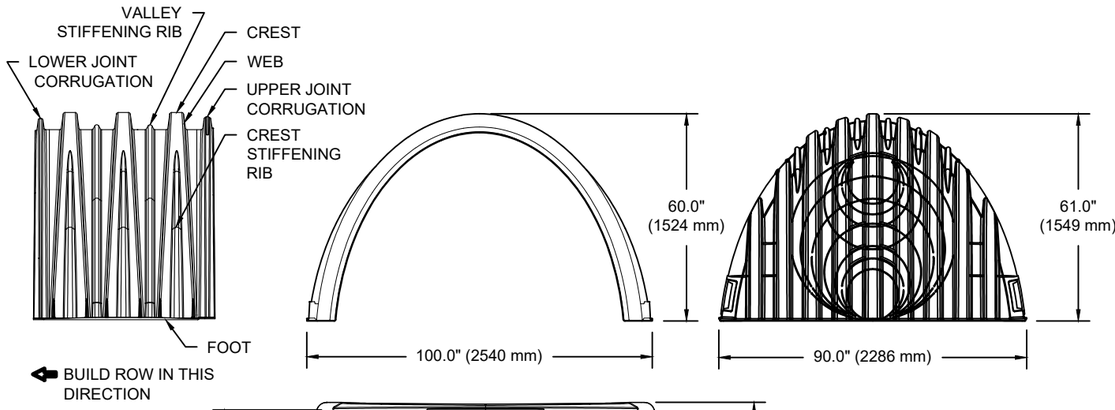
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NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

MC-4500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 48.3"	(2540 mm X 1524 mm X 1227 mm)
CHAMBER STORAGE	106.5 CUBIC FEET	(3.01 m³)
MINIMUM INSTALLED STORAGE*	162.6 CUBIC FEET	(4.60 m³)
WEIGHT (NOMINAL)	125.0 lbs.	(56.7 kg)

NOMINAL END CAP SPECIFICATIONS

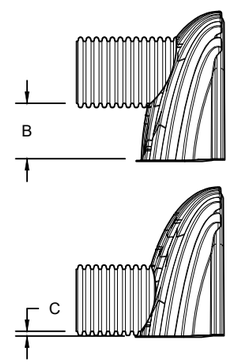
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

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

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

PART #	STUB	B	C
MC4500IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC4500IEPP06B		---	0.86" (22 mm)
MC4500IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC4500IEPP08B		---	1.01" (26 mm)
MC4500IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC4500IEPP10B		---	1.33" (34 mm)
MC4500IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC4500IEPP12B		---	1.55" (39 mm)
MC4500IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC4500IEPP15B		---	1.70" (43 mm)
MC4500IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC4500IEPP18TW			
MC4500IEPP18B		---	1.97" (50 mm)
MC4500IEPP18BW			
MC4500IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC4500IEPP24TW			
MC4500IEPP24B		---	2.26" (57 mm)
MC4500IEPP24BW			
MC4500IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC4500IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC4500IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PARTIAL CUT INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-4500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

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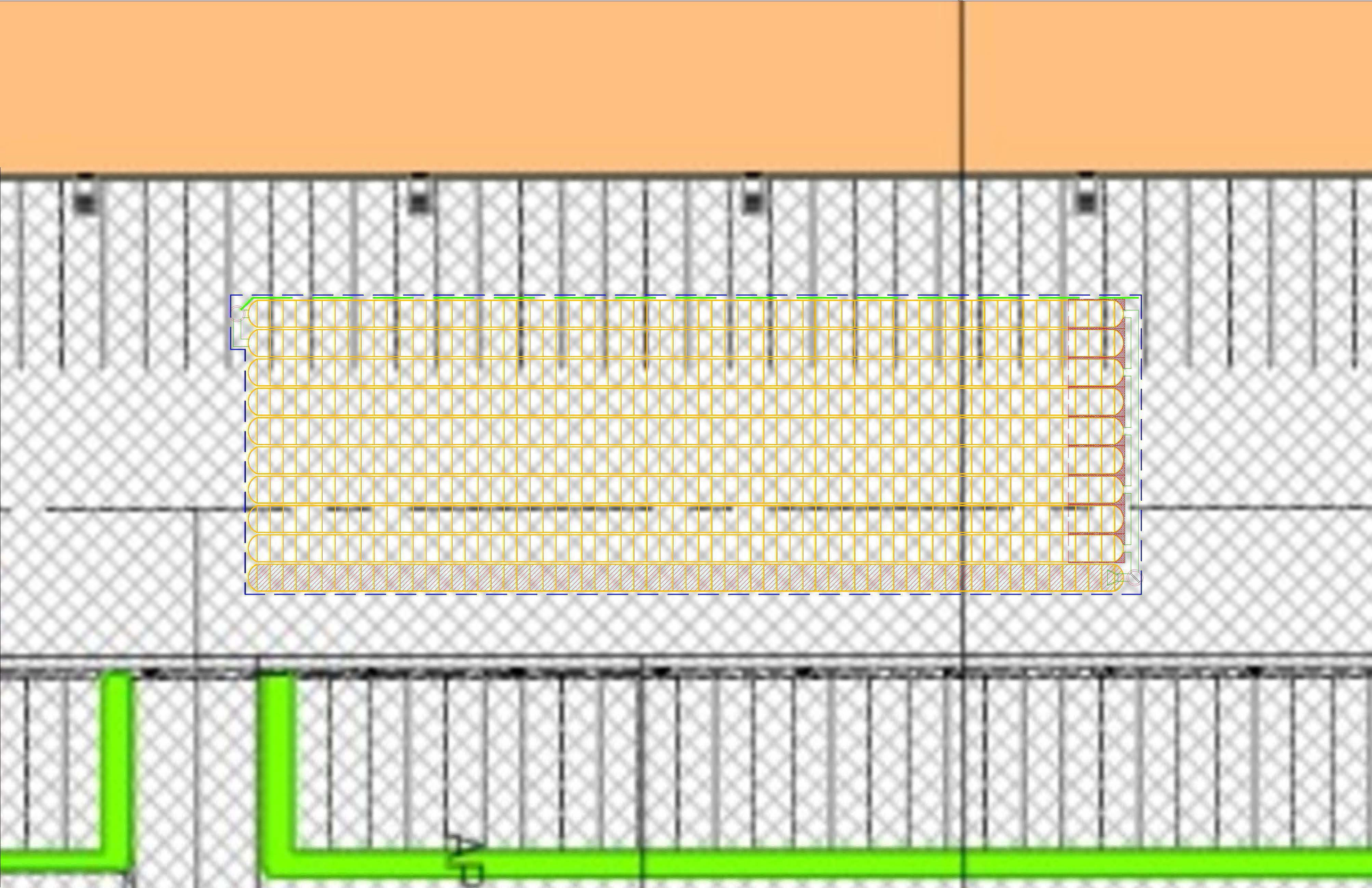
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PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

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MC-4500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-4500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-4500 CHAMBER SYSTEM

1. STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

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

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

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PROPOSED LAYOUT

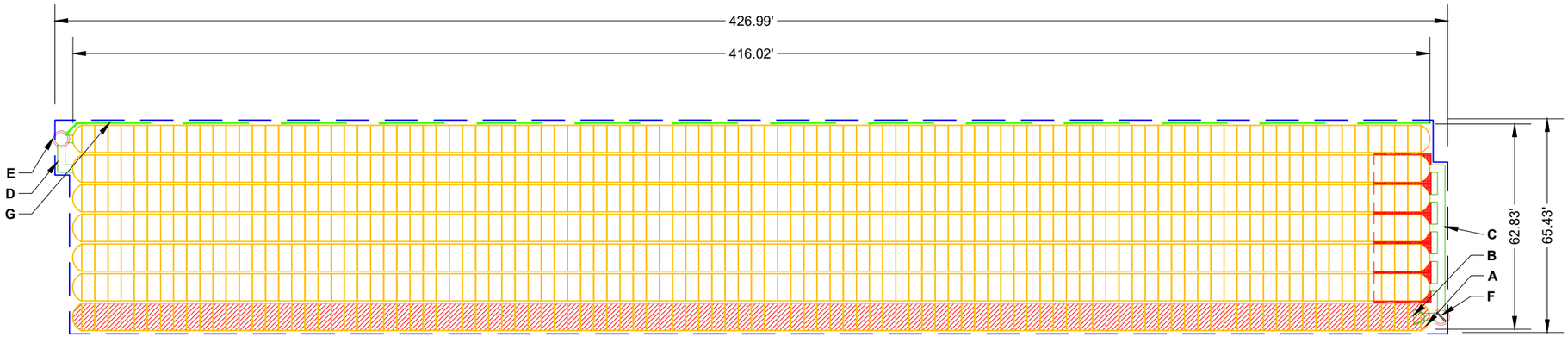
714	STORMTECH MC-4500 CHAMBERS
14	STORMTECH MC-4500 END CAPS
12	STONE ABOVE (in)
9	STONE BELOW (in)
40	STONE VOID
120651	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
27664	SYSTEM AREA (SF)
984.9	SYSTEM PERIMETER (ft)

CONCEPTUAL ELEVATIONS

MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	12.75
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	8.25
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	7.75
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	7.75
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	7.75
TOP OF STONE:	6.75
TOP OF MC-4500 CHAMBER:	5.75
24" x 24" BOTTOM MANIFOLD INVERT:	0.94
24" x 24" BOTTOM MANIFOLD INVERT:	0.94
24" ISOLATOR ROW PLUS INVERT:	0.94
24" BOTTOM CONNECTION INVERT:	0.94
BOTTOM OF MC-4500 CHAMBER:	0.75
UNDERDRAIN INVERT:	0.00
BOTTOM OF STONE:	0.00

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	24" BOTTOM PARTIAL CUT END CAP, PART#: MC4500IEPP24B / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	2.26"	
FLAMP	B	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MC450024RAMP		
MANIFOLD	C	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"	
MANIFOLD	D	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"	
CONCRETE STRUCTURE	E	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		14.0 CFS OUT
CONCRETE STRUCTURE W/WEIR	F	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		41.5 CFS IN
UNDERDRAIN	G	6" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		



ISOLATOR ROW PLUS
(SEE DETAIL)

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

BED LIMITS

NOTES

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

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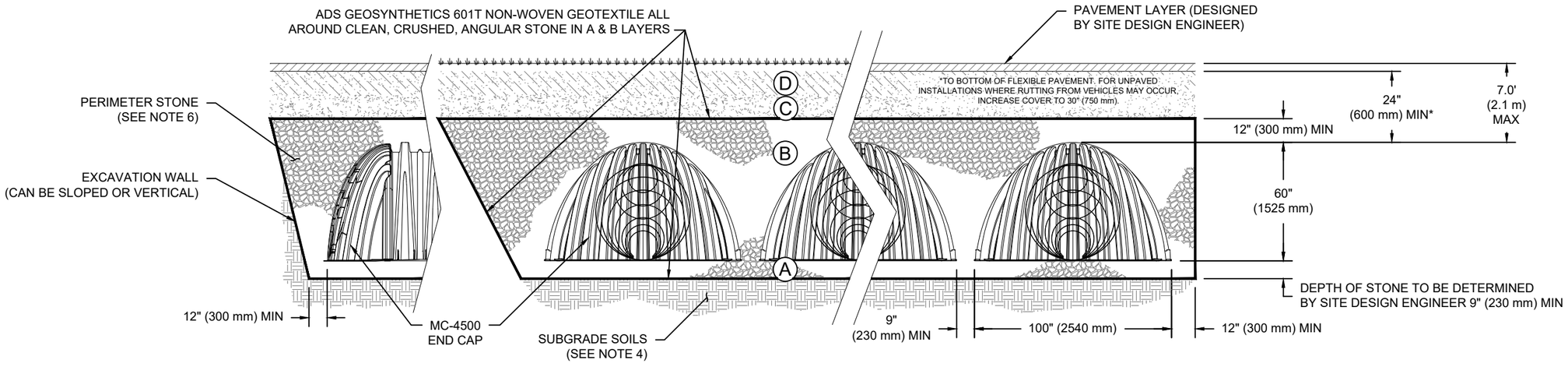
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ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

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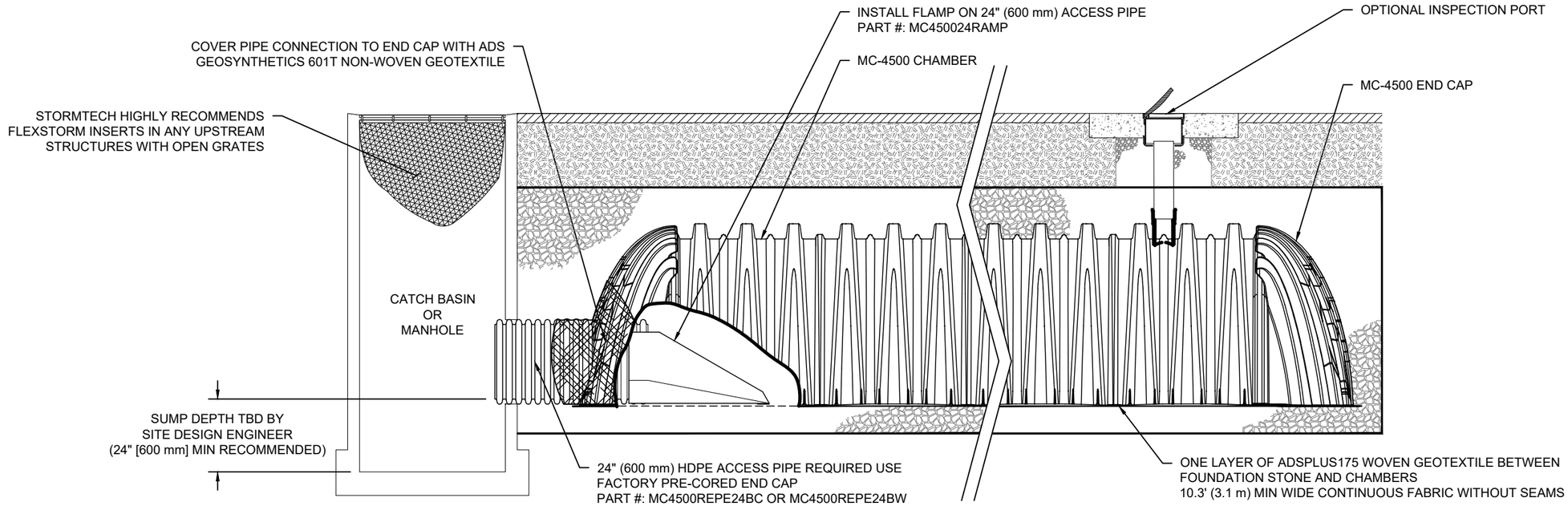
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ADVANCED DRAINAGE SYSTEMS, INC.
4640 TRUEMAN BLVD
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1-800-733-7473

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MC-4500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

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

NOTES

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

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

DA 2 NORTH, BLOOMINGTON SITE 3
SCHEME 1
BLOOMINGTON, CA

DATE: 12/7/2020 | DRAWN: HP | CHECKED: N/A
PROJECT #:

REV	DRW	CHK	DESCRIPTION

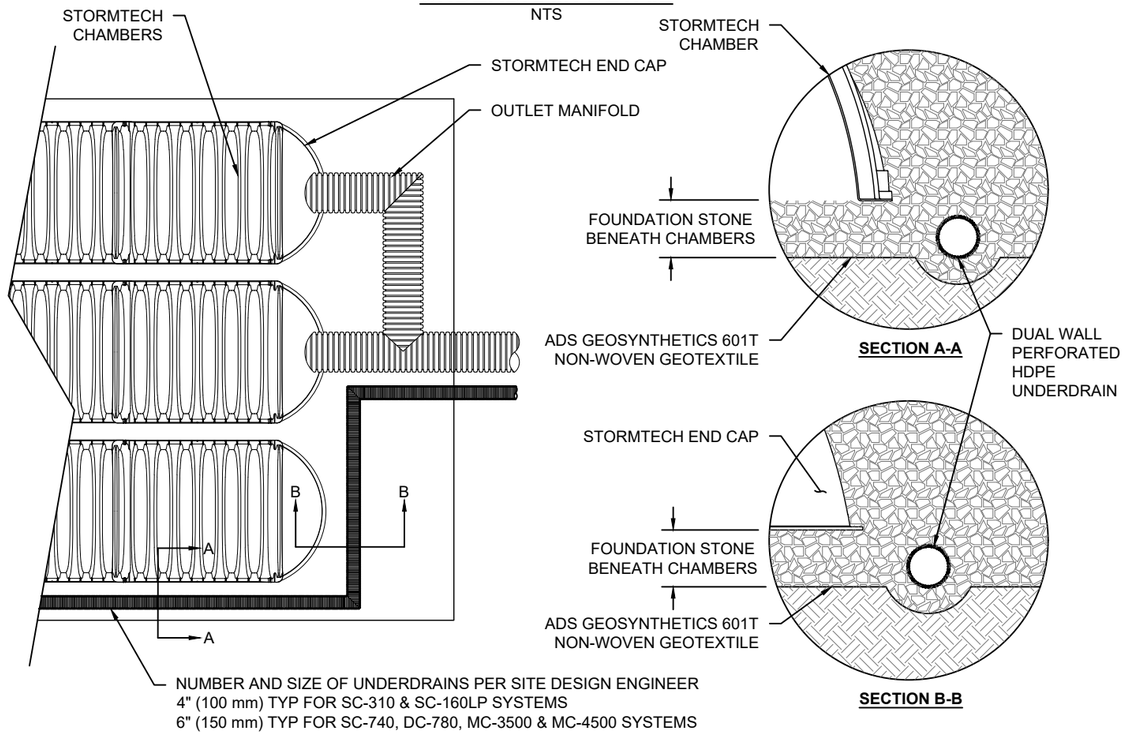
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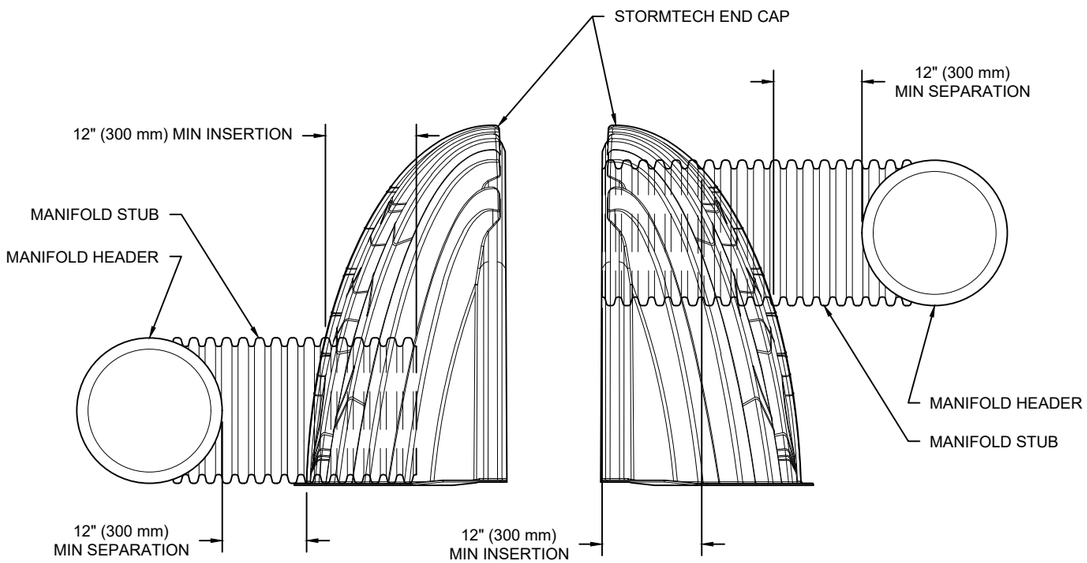
UNDERDRAIN DETAIL

NTS



MC-SERIES END CAP INSERTION DETAIL

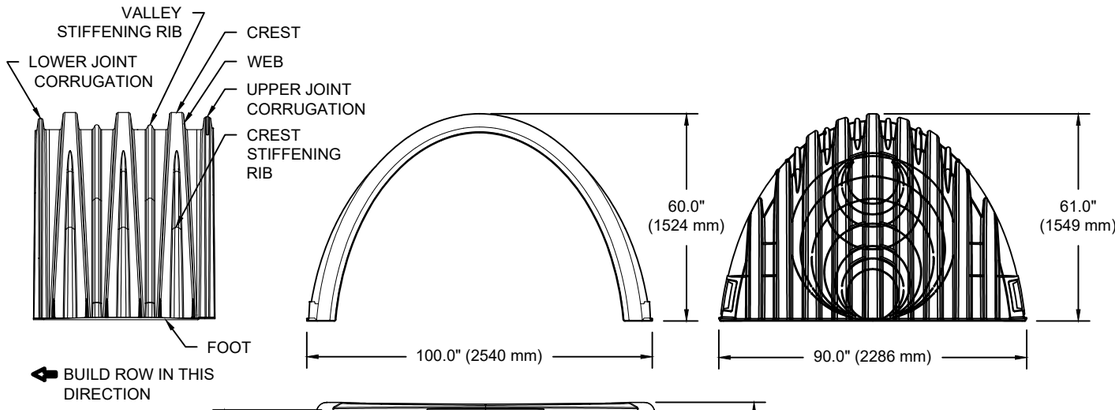
NTS



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

MC-4500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 48.3"	(2540 mm X 1524 mm X 1227 mm)
CHAMBER STORAGE	106.5 CUBIC FEET	(3.01 m³)
MINIMUM INSTALLED STORAGE*	162.6 CUBIC FEET	(4.60 m³)
WEIGHT (NOMINAL)	125.0 lbs.	(56.7 kg)

NOMINAL END CAP SPECIFICATIONS

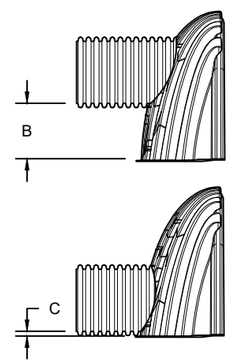
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

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

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

PART #	STUB	B	C
MC4500IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC4500IEPP06B		---	0.86" (22 mm)
MC4500IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC4500IEPP08B		---	1.01" (26 mm)
MC4500IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC4500IEPP10B		---	1.33" (34 mm)
MC4500IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC4500IEPP12B		---	1.55" (39 mm)
MC4500IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC4500IEPP15B		---	1.70" (43 mm)
MC4500IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC4500IEPP18TW			
MC4500IEPP18B		---	1.97" (50 mm)
MC4500IEPP18BW			
MC4500IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC4500IEPP24TW			
MC4500IEPP24B		---	2.26" (57 mm)
MC4500IEPP24BW			
MC4500IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC4500IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC4500IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PARTIAL CUT INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-4500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

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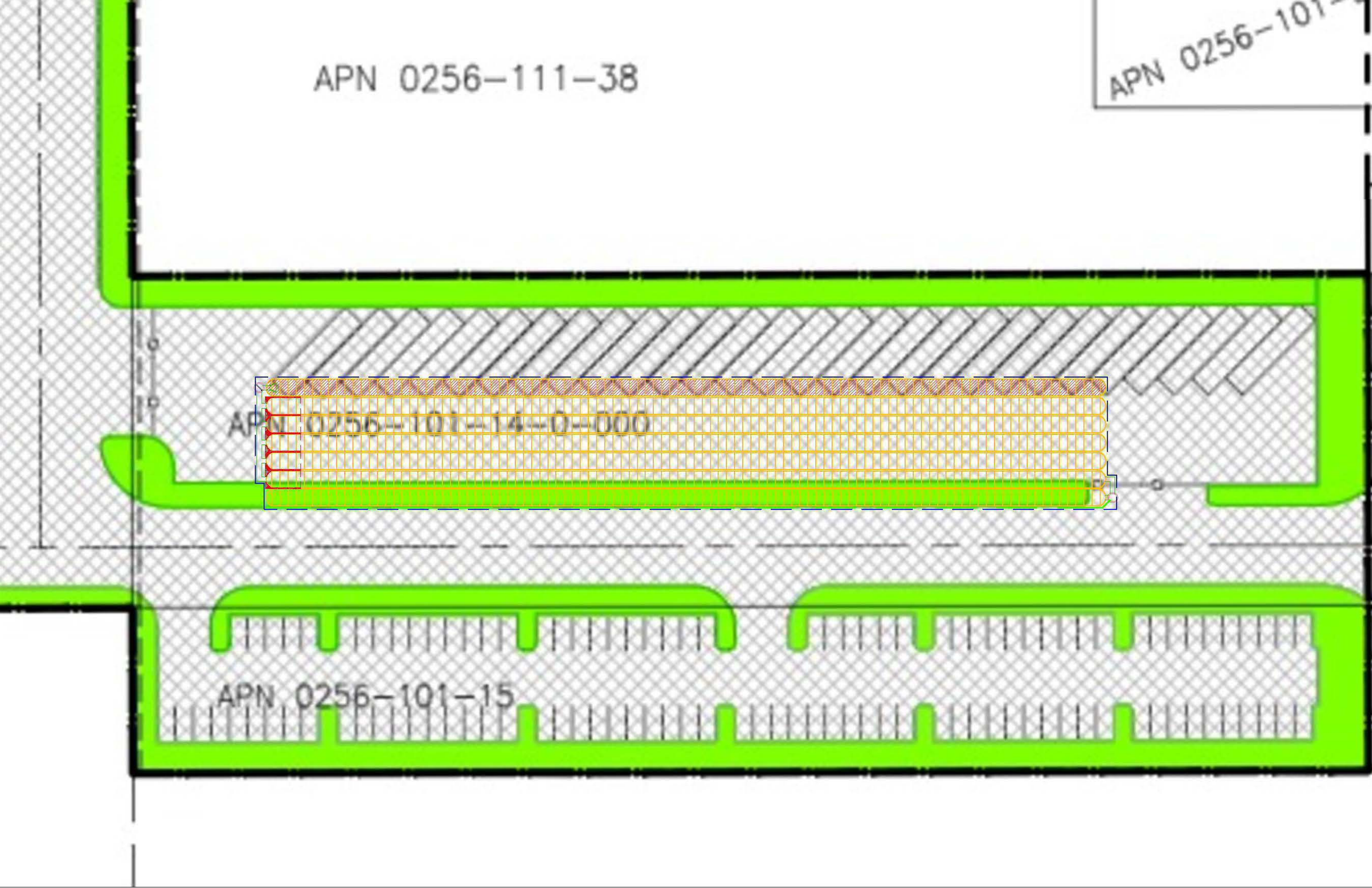
DATE: 12/7/2020 | DRAWN: HP | CHECKED: N/A | PROJECT #:

REV	DRW	CHK	DESCRIPTION

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APN 0256-111-38
APN 0256-101-14-0-000
APN 0256-101-15

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

ADVANCED DRAINAGE SYSTEMS, INC.

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DA 2 SOUTH, BLOOMINGTON SITE 3 SCHEME 1

BLOOMINGTON, CA

MC-4500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-4500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-4500 CHAMBER SYSTEM

1. STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

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

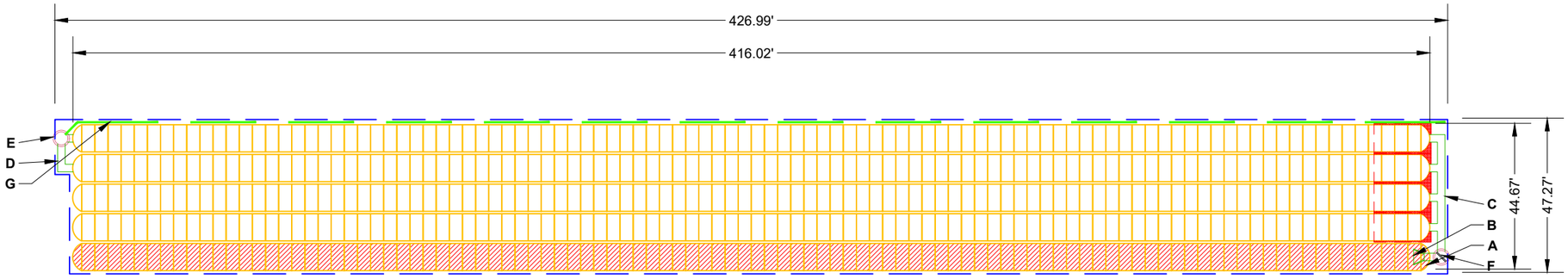
CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

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PROPOSED LAYOUT		CONCEPTUAL ELEVATIONS	
510	STORMTECH MC-4500 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	12.75
10	STORMTECH MC-4500 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	8.25
12	STONE ABOVE (in)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	7.75
9	STONE BELOW (in)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	7.75
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	7.75
86952	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	6.75
		TOP OF MC-4500 CHAMBER:	5.75
		24" x 24" BOTTOM MANIFOLD INVERT:	0.94
		24" x 24" BOTTOM MANIFOLD INVERT:	0.94
20046	SYSTEM AREA (SF)	24" ISOLATOR ROW PLUS INVERT:	0.94
948.5	SYSTEM PERIMETER (ft)	24" BOTTOM CONNECTION INVERT:	0.94
		BOTTOM OF MC-4500 CHAMBER:	0.75
		UNDERDRAIN INVERT:	0.00
		BOTTOM OF STONE:	0.00

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	24" BOTTOM PARTIAL CUT END CAP, PART#: MC4500IEPP24B / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	2.26"	
FLAMP	B	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MC450024RAMP		
MANIFOLD	C	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"	
MANIFOLD	D	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"	
CONCRETE STRUCTURE	E	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		14.0 CFS OUT
CONCRETE STRUCTURE W/WEIR	F	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		38.0 CFS IN
UNDERDRAIN	G	6" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		



ISOLATOR ROW PLUS
(SEE DETAIL)

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

BED LIMITS

NOTES

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

DA 2 SOUTH, BLOOMINGTON SITE 3
SCHEME 1
BLOOMINGTON, CA

DRAWN: HP
CHECKED: N/A
DATE: 12/7/2020
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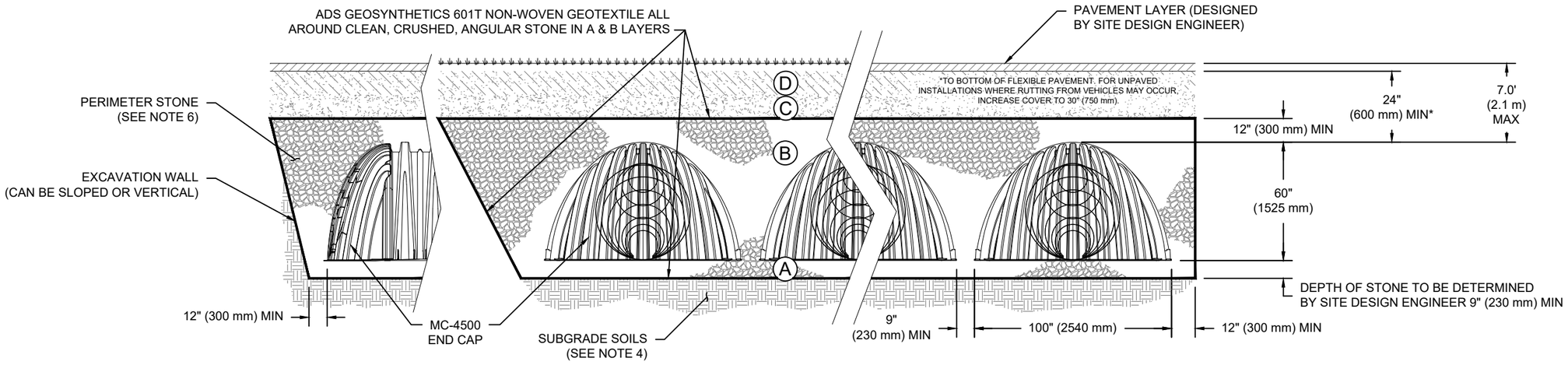
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ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

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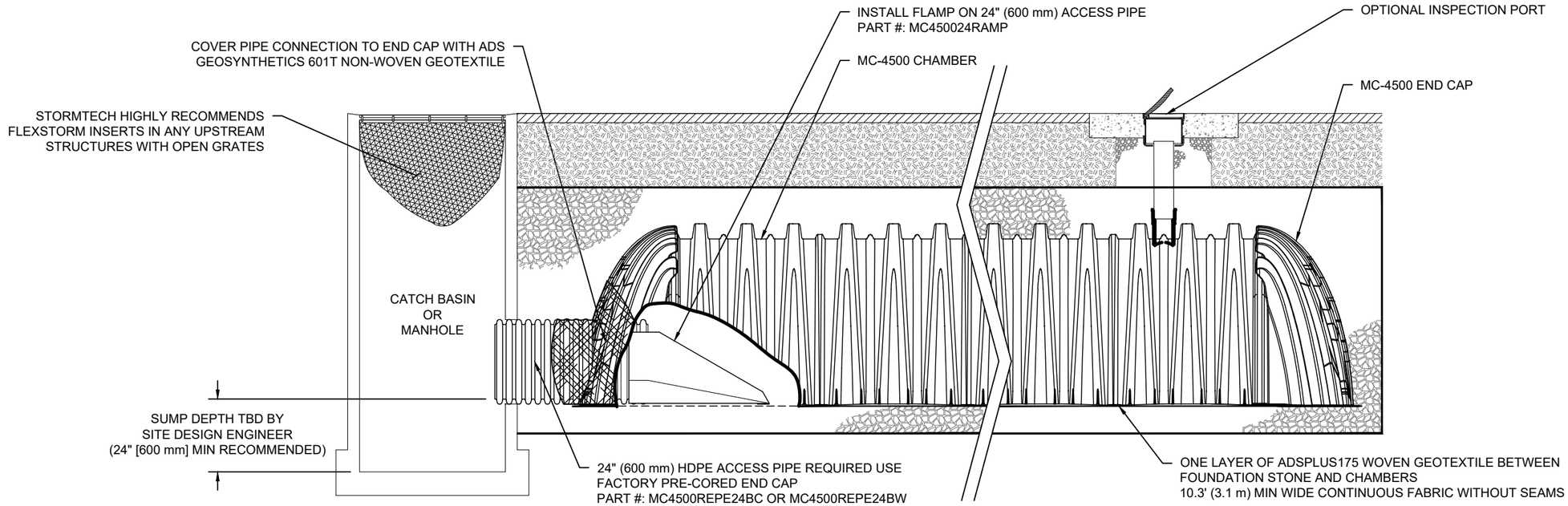
DATE: 12/7/2020 | DRAWN: HP | CHECKED: N/A | PROJECT #:

REV | DRW | CHK | DESCRIPTION

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MC-4500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

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

NOTES

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

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

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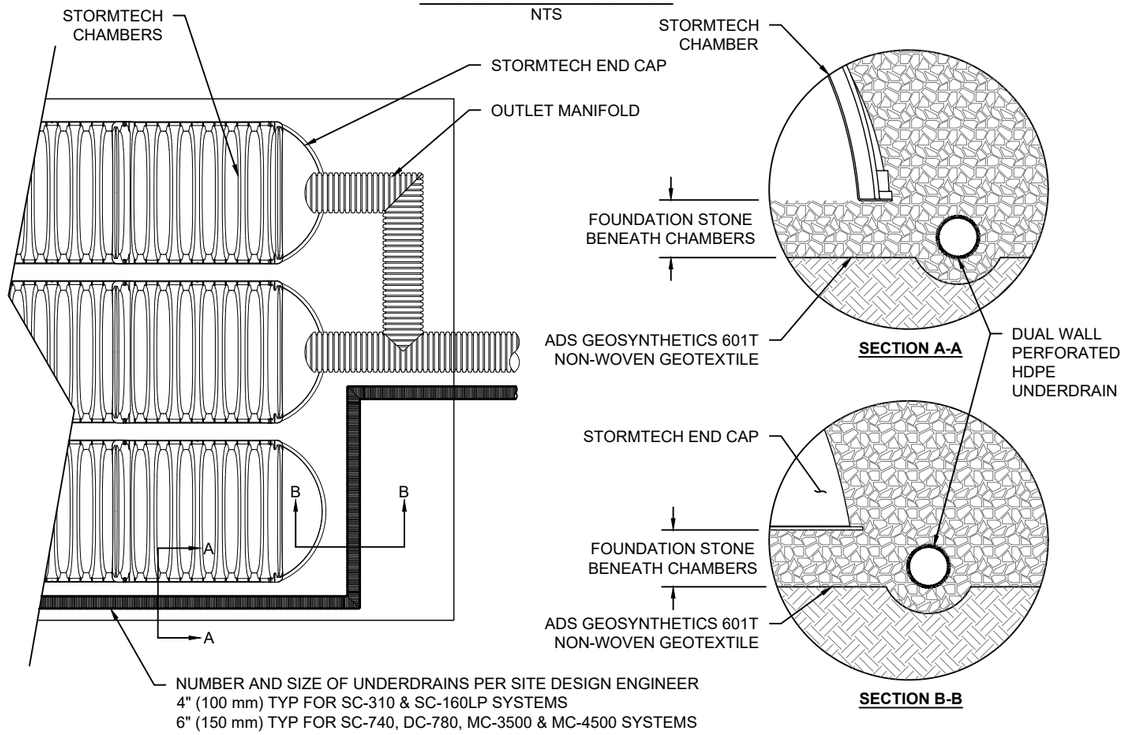
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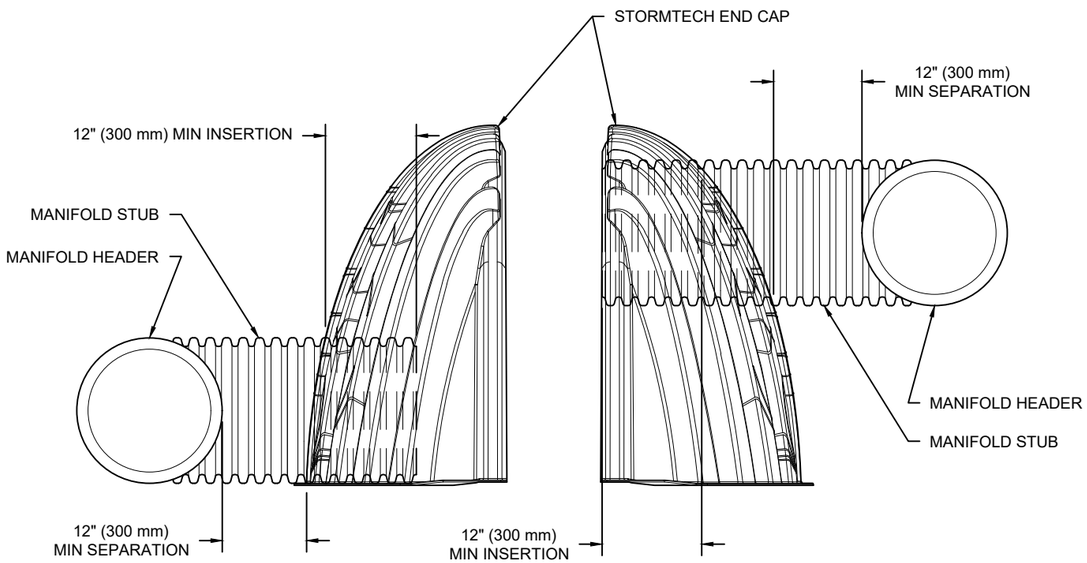
UNDERDRAIN DETAIL

NTS



MC-SERIES END CAP INSERTION DETAIL

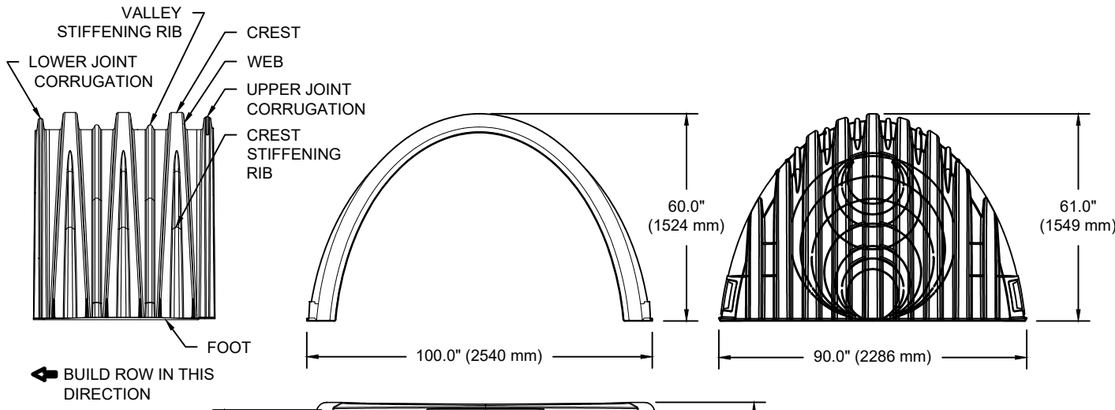
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NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

MC-4500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 48.3"	(2540 mm X 1524 mm X 1227 mm)
CHAMBER STORAGE	106.5 CUBIC FEET	(3.01 m³)
MINIMUM INSTALLED STORAGE*	162.6 CUBIC FEET	(4.60 m³)
WEIGHT (NOMINAL)	125.0 lbs.	(56.7 kg)

NOMINAL END CAP SPECIFICATIONS

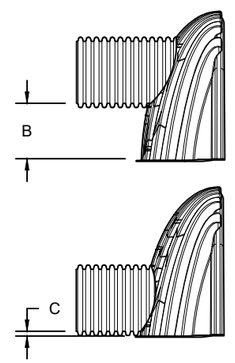
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

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

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

PART #	STUB	B	C
MC4500IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC4500IEPP06B		---	0.86" (22 mm)
MC4500IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC4500IEPP08B		---	1.01" (26 mm)
MC4500IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC4500IEPP10B		---	1.33" (34 mm)
MC4500IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC4500IEPP12B		---	1.55" (39 mm)
MC4500IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC4500IEPP15B		---	1.70" (43 mm)
MC4500IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC4500IEPP18TW			
MC4500IEPP18B		---	1.97" (50 mm)
MC4500IEPP18BW			
MC4500IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC4500IEPP24TW			
MC4500IEPP24B		---	2.26" (57 mm)
MC4500IEPP24BW			
MC4500IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC4500IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC4500IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PARTIAL CUT INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-4500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

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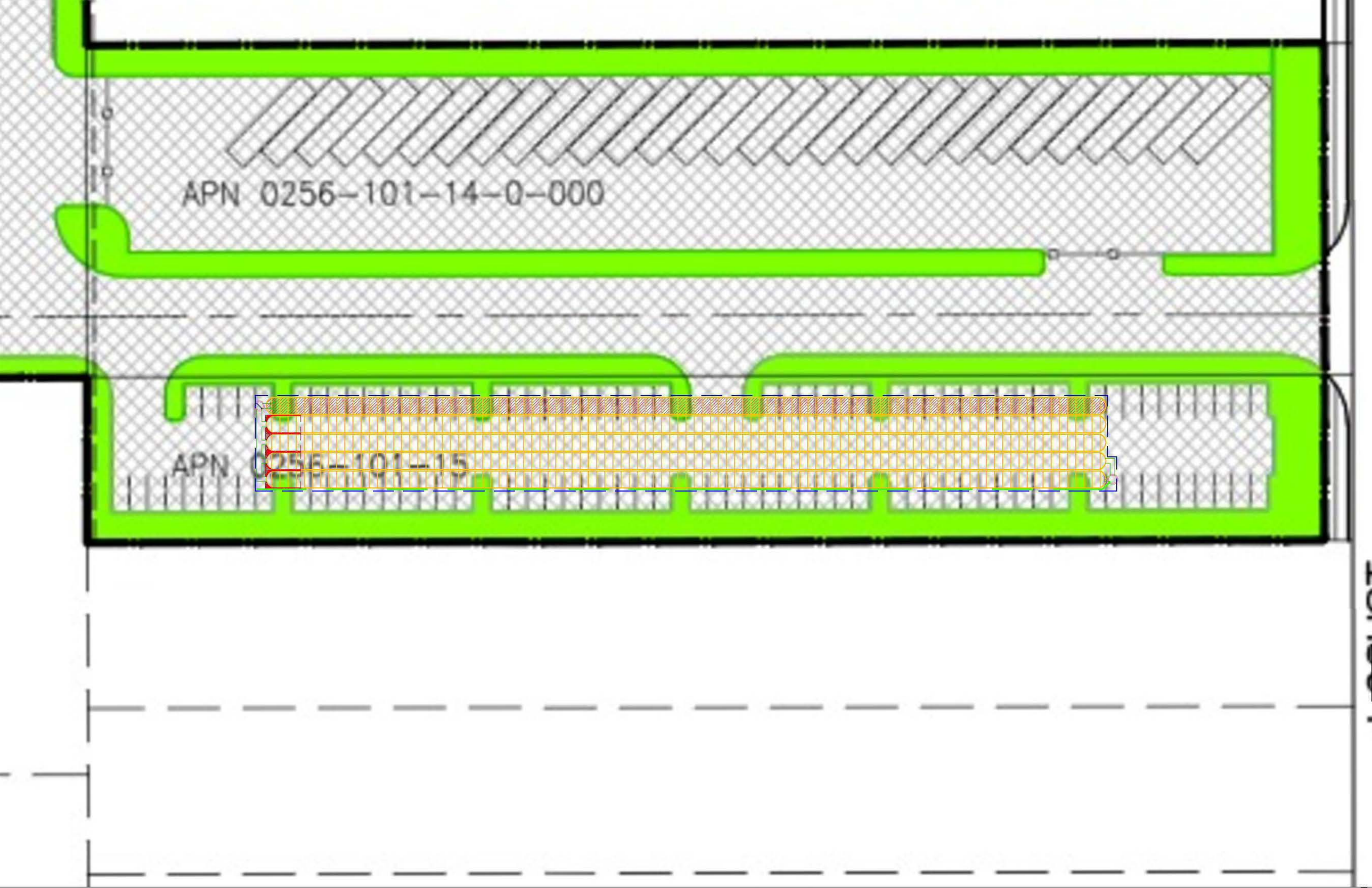
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APN 0256-101-14-0-000
APN 0256-101-15

Santa Ana Watershed

BMP Design Volume, V_{BMP}

Company Name	FMCIVIL Engineers Inc.
Designed by	Francisco Martinez, PE
Project	Bloomington Commerce Center SP3, Drainage Area 1
Date	4/8/2021

Surface Type	**Area (SF)**
Roof	161,925.03
Concrete or Asphalt	433,252.85
Future Impervious Area	-
Restore to Natural	-
Ornamental Landscaping	64,629.37
Total Area (SF)	659,807.25
Total Area (Acres)	15.1

Impervious Ratio =	**(i)**	90.2%
C_{BMP} = Runoff Coefficient	**$0.858i^3-0.78i^2+0.774i+0.04$**	0.7333
$P_{2yr,1hr}$	**NOAA - 2-yr 1-hr rainfall depth**	0.521
a_1 = San Bernardino Climate Region	**Valley = 1.4807 Mountain = 1.909 Desert = 1.2371**	1.4807
P_6 - Mean Storm Rainfall Depth	**$P_6 = a_1 * P_{2yr,1hr}$**	0.7714
a_2 = Drawdown rate of Basin	**1.582 for 24-hr 1.963 for 48-hr**	1.9630
Project Area (SF)	**(DA)**	659,807.25
Design Capture Volume (cu.ft.)	**DCV = DA * C_{BMP} * a_2 * P_6/12**	61,055.37
Volume Provided, cu. Ft.	**Chamber Capacity**	265,805.00

Santa Ana Watershed

BMP Design Volume, V_{BMP}

Company Name	FMCIVIL Engineers Inc.
Designed by	Francisco Martinez, PE
Project	Bloomington Commerce Center SP3, Drainage Area 2
Date	4/8/2021

Surface Type	**Area (SF)**
Roof	318,805.56
Concrete or Asphalt	225,094.01
Future Impervious Area	-
Restore to Natural	-
Ornamental Landscaping	79,638.18
Total Area (SF)	623,537.75
Total Area (Acres)	14.3

Impervious Ratio =	**(i)**	87.2%
C_{BMP} = Runoff Coefficient	**$0.858i^3-0.78i^2+0.774i+0.04$**	0.6911
$P_{2yr,1hr}$	**NOAA - 2-yr 1-hr rainfall depth**	0.521
a_1 = San Bernardino Climate Region	**Valley = 1.4807 Mountain = 1.909 Desert = 1.2371**	1.4807
P_6 - Mean Storm Rainfall Depth	**$P_6 = a_1 * P_{2yr,1hr}$**	0.7714
a_2 = Drawdown rate of Basin	**1.582 for 24-hr 1.963 for 48-hr**	1.9630
Project Area (SF)	**(DA)**	623,537.75
Design Capture Volume (cu.ft.)	**DCV = DA * C_{BMP}* a_2 * P_6/12**	54,382.11
Volume Provided, cu. Ft.	**Chamber Capacity**	207,603.00
	DA2 will share Chamber Capacity with DA3 when future phase is built	

Santa Ana Watershed

BMP Design Volume, V_{BMP}

Company Name	FMCIVIL Engineers Inc.
Designed by	Francisco Martinez, PE
Project	Bloomington Commerce Center SP3, Drainage Area 3 (Future Phase)
Date	4/8/2021

Surface Type	**Area (SF)**
Roof	-
Concrete or Asphalt	-
Future Impervious Area	101,573.65
Restore to Natural	-
Ornamental Landscaping	-
Total Area (SF)	101,573.65
Total Area (Acres)	2.3

Impervious Ratio =	**(i)**	100.0%
C_{BMP} = Runoff Coefficient	**$0.858i^3-0.78i^2+0.774i+0.04$**	0.8920
$P_{2yr,1hr}$	**NOAA - 2-yr 1-hr rainfall depth**	0.521
a_1 = San Bernardino Climate Region	**Valley = 1.4807 Mountain = 1.909 Desert = 1.2371**	1.4807
P_6 - Mean Storm Rainfall Depth	**$P_6 = a_1 * P_{2yr,1hr}$**	0.7714
a_2 = Drawdown rate of Basin	**1.582 for 24-hr 1.963 for 48-hr**	1.9630
Project Area (SF)	**(DA)**	101,573.65
Design Capture Volume (cu.ft.)	**DCV = DA * C_{BMP} * a_2 * P_6/12**	11,433.78
Volume Provided, cu. Ft.	**Chamber Capacity**	207,603.00
	DA3 will share Chamber Capacity with DA2 when future phase is built	

Santa Ana Watershed

BMP Design Volume, V_{BMP}

Company Name	FMCIVIL Engineers Inc.
Designed by	Francisco Martinez, PE
Project	Bloomington Commerce Center SP3, Drainage Area 4 (Flowing Offsite)
Date	4/8/2021

Surface Type	**Area (SF)**
Roof	-
Concrete or Asphalt	1,591.87
Future Impervious Area	-
Restore to Natural	-
Ornamental Landscaping	24,312.25
Total Area (SF)	25,904.11
Total Area (Acres)	0.6

Impervious Ratio =	**(i)**	6.1%
C_{BMP} = Runoff Coefficient	**$0.858i^3-0.78i^2+0.774i+0.04$**	0.0848
$P_{2yr,1hr}$	**NOAA - 2-yr 1-hr rainfall depth**	0.521
a_1 = San Bernardino Climate Region	**Valley = 1.4807** **Mountain = 1.909** **Desert = 1.2371**	1.4807
P_6 - Mean Storm Rainfall Depth	**$P_6 = a_1 * P_{2yr,1hr}$**	0.7714
a_2 = Drawdown rate of Basin	**1.582 for 24-hr** **1.963 for 48-hr**	1.9630
Project Area (SF)	**(DA)**	25,904.11
Design Capture Volume (cu.ft.)	**DCV = DA * C_{BMP} * a_2 * P_6/12**	277.27
Volume Provided, cu. Ft.	**Chamber Capacity**	--

Santa Ana Watershed

BMP Design Volume, V_{BMP}

Company Name	FMCIVIL Engineers Inc.
Designed by	Francisco Martinez, PE
Project	Bloomington Commerce Center SP3, Drainage Area 5 (Flowing Offsite)
Date	4/8/2021

Surface Type	**Area (SF)**
Roof	-
Concrete or Asphalt	-
Future Impervious Area	-
Restore to Natural	-
Ornamental Landscaping	12,745.07
Total Area (SF)	12,745.07
Total Area (Acres)	0.3

Impervious Ratio =	**(i)**	0.0%
C_{BMP} = Runoff Coefficient	**$0.858i^3-0.78i^2+0.774i+0.04$**	0.0400
$P_{2yr,1hr}$	**NOAA - 2-yr 1-hr rainfall depth**	0.521
a_1 = San Bernardino Climate Region	**Valley = 1.4807** **Mountain = 1.909** **Desert = 1.2371**	1.4807
P_6 - Mean Storm Rainfall Depth	**$P_6 = a_1 * P_{2yr,1hr}$**	0.7714
a_2 = Drawdown rate of Basin	**1.582 for 24-hr** **1.963 for 48-hr**	1.9630
Project Area (SF)	**(DA)**	12,745.07
Design Capture Volume (cu.ft.)	**DCV = DA * C_{BMP} * a_2 * P_6/12**	64.33
Volume Provided, cu. Ft.	**Chamber Capacity**	--

Santa Ana Watershed

BMP Design Volume, V_{BMP}

Company Name	FMCIVIL Engineers Inc.
Designed by	Francisco Martinez, PE
Project	Bloomington Commerce Center SP3, Drainage Area 6 (Flowing Offsite)
Date	4/8/2021

Surface Type	**Area (SF)**
Roof	-
Concrete or Asphalt	1,044.62
Future Impervious Area	-
Restore to Natural	-
Ornamental Landscaping	5,157.82
Total Area (SF)	6,202.44
Total Area (Acres)	0.1

Impervious Ratio =	**(i)**	16.8%
C_{BMP} = Runoff Coefficient	**$0.858i^3-0.78i^2+0.774i+0.04$**	0.1523
$P_{2yr,1hr}$	**NOAA - 2-yr 1-hr rainfall depth**	0.521
a_1 = San Bernardino Climate Region	**Valley = 1.4807** **Mountain = 1.909** **Desert = 1.2371**	1.4807
P_6 - Mean Storm Rainfall Depth	**$P_6 = a_1 * P_{2yr,1hr}$**	0.7714
a_2 = Drawdown rate of Basin	**1.582 for 24-hr** **1.963 for 48-hr**	1.9630
Project Area (SF)	**(DA)**	6,202.44
Design Capture Volume (cu.ft.)	**DCV = DA * C_{BMP} * a_2 * P_6/12**	119.23
Volume Provided, cu. Ft.	**Chamber Capacity**	--

DETENTION BASIN DESIGN CRITERIA FOR SAN BERNARDINO COUNTY

The following design parameters and procedures are listed as guidelines to insure proper detention basin operation. When necessary, these guidelines may be modified if approved in writing by both the Flood Control District and Land Management Department.

I. Definitions

A. Regional Detention Basin

1. A basin which can be incorporated into the Flood Control District's existing or proposed drainage system,

2. Basin owned and operated by the Flood Control District, although it may be joint use, and

3. A basin which will reduce the downstream peak flow rate and the necessary downstream storm drain size.

B. Local Detention Basin

1. A basin which will not be incorporated into the Flood Control District's existing or proposed drainage system,

2. A basin owned by an individual or organization other than the Flood Control District, and

3. A basin which will reduce the downstream peak flow rate, but will not be considered in downsizing future downstream storm drains.

C. Joint Use Detention Basin: A regional or local detention basin which has an additional use such as football field, parking lot, golf course, lake or etc.

D. Temporary Detention Basin

1. A local detention basin used to reduce downstream peak flow rates until ultimate storm drain facilities can be constructed as part of a phased development, and

2. Generally the life of the basin shall not exceed 10 years.

SEE CHANGE PER ATTACHED MEMO

II. Basin Capacity and Outlet Drain

A. When a basin (regional, local, temporary or joint use) is to be used to mitigate downstream impacts due to increased flows generated by a development, the basin capacity and outlet size shall be such that the post-development peak flow rate generated by the site shall be less than or equal to 90% of the pre-development peak flow rate from the site for all frequency storms up to and including 100-year (i.e. the peak 2 year post-development flow rate is equal to or less than 90% of the peak 2 year pre-development flow rate from the site and etc. for all frequency storm events through 100-year).

1. Only 2, 10, 25 and 100-year storms need to be analyzed.

2. Additional studies shall be submitted where there exists more than one basin in the drainage area under review. The studies shall address the timing of the peak flow rates from the basins to ensure downstream flow rates are not increased.

B. When a basin (generally regional or regional joint use) is to be used to reduce the size of a master planned downstream drainage facility, the basin capacity and outlet size shall be such that the 100 year basin peak outflow rate is no greater than the downstream facility's design capacity.

1. Open channel design capacities shall be per the San Bernardino County Flood Control District Standard Plat 100 ("San Bernradino County Standards and Specifications"). A bulking factor is not necessary when the basin is designed to handle debris and the downstream channel is lined.

2. Pressure flow closed conduits shall be designed such that the hydraulic grade line is below the ground or street surface. In those reaches where no surface flow will be intercepted (now or in the future), a hydraulic grade line which encroaches on or is slightly higher than the ground or street surface will be acceptable.

3. Non-pressure flow closed conduit capacities shall be based on a flow depth no greater than 0.8 times the conduits diameter or height.

C. Where downstream erosion is a concern the duration of erosive flow velocities for all frequency storms shall not be substantially increased unless other forms of mitigation are provided. This can be accomplished by reducing the peak flowrate further than that required above. Refer to "Handbook of Hydraulics" by Horace Williams King and Earnest F. Brater, and "Open-Channel Hydraulics" by Ven Te Chow, Ph.d. for erosive flow velocities.

D. When there exists a potential for debris entering the basin, the basin capacity shall be increased or a desilting basin provided to accomodate the debris production generated from a 100-year storm four years after a burn (over the entire watershed), plus 20% due to maintenance uncertainties.

1. For all basins where a significant amount of debris accumulation is anticipated, a debris disposal area or areas shall be provided within a reasonable hauling distance.

2. "A New Method of Estimating Debris-Storage Requirements for Debris Basins" by Fred E. Tatum of the U.S. Army Corps of Engineers shall be used for determining the 100-year debris volume.

3. Local basins shall not be located in desert areas where there exists the potential for debris entering the basin (i.e., locations where flows are directed to the basin by natural drainage courses or earth graded channels which handle flows from undeveloped watersheds). It is recommended that the flows from the development be conducted to the basin in a hardlined facility (i.e. street or concrete channel), then outletted into the natural drainage course or earth channel.

4. Local detention basins shall not be fed by natural drainage courses or earth channels with undeveloped watersheds greater than 0.5 square mile.

5. The basin capacity for local detention basins fed by natural drainage courses or earth channels with undeveloped watershed less than 0.5 square mile, shall be enlarged to handle an additional 5 years of accumulated annual debris based on the attached figure 1.

6. Generally regional detention basins with undeveloped watersheds shall be flow-by basins or have a separate debris basin upstream of the detention basin.

7. The basin capacity for detention basins located in watersheds known to have a high risk of burning, shall be increased as determined by the Flood Control District.

E. Outlet Drain

1. The outlet pipe for all basins except temporary basins shall be a minimum 24" RCP (1350 D minimum) for local basins and a minimum 36" RCP (1350 D minimum) for regional basins. The outlet pipe or conduit shall be encased with cut-off collars per the "Los Angeles County Flood Control Design Manual - Debris Dams and Basins" or designed per "Section 242. Cut-and-Cover Conduit Detail" of the Bureau of Reclamation's publication "Design of Small Dams".

   a) Reinforced concrete collars generally from 2 to 3 feet high, 12 to 18 inches wide, and spaced from 7 to 10 times their height shall be provided.

   b) All joints for pipes not encased shall be rubber gasketed.

   c) The pipe shall be capable of withstanding H20 live loads plus the applicable dead loads.

   d) Erosion control measures shall be provided at the outlet of the basin outlet pipe.

   e) Temporary basin outlet pipes may be a minimum 24" C.M.P., 12 gauge with seep rings. Design considerations shall be as stated above.

2. A metered outlet structure may be necessary to provide the necessary flow attenuation for all frequency storms. "V"-shaped weirs and notched weirs are preferred over other alternates because they do not plug with debris and trash as easily as other designs.

3. All detention basin outlets should be sized so the basin will drain within 24 hours after the basin reaches its 100 year peak depth/volume. If the basin does not drain in 24 hours, further studies using longer duration storms will be necessary. The basin storage volume (capacity) may need to be increased to accomodate subsequent storms.

4. Trash racks shall be provided at the inlet to the basin outlet structure(s).

5. Anti-vortex devises shall be provided where warranted.

6. A depth gauge shall be provided on the basin outlet structure in order to monitor debris deposition and basin operation.

F. Analysis Methodology

1. Pre and post development peak flow rates shall be developed using the procedures outlined in the San Bernardino County's Hydrology Manual.

2. Basin inflow hydrographs shall be developed using the procedures outlined in the San Bernardino County's Hydrology Manual.

3. Basin outflow hydrographs shall be developed by the Modified Puls Method.

4. Channel hydrograph routing shall be calculated by the convex channel routing method or by moving the hydrograph utilizing travel time.

III. Water Surface Elevation and Depth

A. Local Basins

1. When feasible the 100 year design water surface elevation should be at or below existing natural ground. Generally no more than 50% of the basins 100 year storage depth should be above existing ground (i.e., 50% or more of the 100-year minimum storage depth must be below the lowest ground outside basin).

2. The necessary storage depth for debris plus the two year flow attenuation shall be below existing ground.

3. The basin's maximum water depth for 100-year design should be 6 feet or less.

4. When site conditions warrant and safety can be assured, the above depth requirements may be modified if the following conditions are met.

a) The detention basin is designed in accordance with the Los Angeles County Flood Control Distrit's "Design Manual - Debris Dams and Basins".

b) The basin embankment is constructed of material, or has a solid core, which does not allow seepage or piping to occur due to rodent holes.

B. Regional Basins

1. Depths shall be as approved by the Flood Control District.

2. Basins with heights greater than or equal to 25 feet and capacity greater than or equal to 15 Ac.ft., or a capacity greater than or equal to 50 ac. ft. and a height greater than or equal to 6 feet, shall be reviewed and approved by the State's Division of Safety of Dams. (See figure 2)

C. Joint Use Basins

1. Depths should be shallow and compatible with the secondary use.

2. Depths for parking lot, tennis court or other similar joint use basins should be no greater than 6 inches to 12 inches.

3. The allowable depth in most cases will be site specific and shall be approved by all agencies involved.

IV. Emergency Spillway

A. All detention basin spillways shall be designed to pass the fully developed 1000 year peak flow rate ($Q_{1000}=1.35\ Q_{100}$) or that peak flow rate required by the State's Division of Safety of Dams, whichever is greater.

B. Spillway outflows shall be adequately conveyed to a storm drain, drainage channel, street or an established watercourse.

C. Generally, all spillway structures shall be constructed of reinforced concrete. For temporary detention basins with an expected life less than 10 years the spillway may be constructed with grouted rock or other forms of approved protection designed to resist maximum design velocities.

D. When the spillway crest is more than 3 feet above the flowline of the facility the spillway outlets into, the spillway shall be constructed of reinforced concrete.

E. Generally the spillway crest shall be at, or above the basin's design 100 year high water line.

V. Freeboard to the Top of Embankment

A. Local and temporary basins shall have a minimum 1-foot of freeboard above the 1000-year HWL on the emergency spillway or 2-feet of freeboard above the 100-year HWL in the basin, whichever is more stringent.

B. Regional basins shall have a minimum 2-feet of freeboard above the 1000 year HWL on the emergency spillway. For basins with larger surface areas the freeboard shall be increased due to possible wave action. Also, a Seismic Seiche analysis shall be provided to determine necessary freeboard. Reference "Design of Small Dams" by the United States Department of Interior.

C. Joint use basins shall conform to the applicable local or regional freeboard requirements. For smaller basins such as parking lot and tennis court basins, the freeboard conditions may be reduced.

VI. Basin Embankment

A. Basin side slopes should be of 3H:1V or flatter on the wet side and 2H:1V or flatter on the dry side. Steeper slopes may be acceptable on a case by case basis if rock lined and recommended in the soils and geotechnical report. (See items C and D below for expanded requirements for report.)

B. Top Width of Levee

1. Regional and local basins - 15 feet minimum
2. Joint use - site specific
3. Refer to Section IX.C.

C. For design of the embankment abutments and adjacent slopes, a soils and geotechnical report shall be prepared by a soils and geotechnical engineer with a demonstrated expertise in earth fill dam design. The report shall be reviewed and approved by the Land Management Department and the San Bernardino County Flood Control District. The report shall include:

a) Site geology including bedding, foliation, fracture, joint, fault and land slide plane attitudes.

b) Seismic conditions including fault locations and potential seismic surface movements respective loadings and parameters of seismic shaking.

c) Potential impact of reservoir loading on geologic structure should be evaluated.

d) Detailed descriptions, locations, and logs of all field explorations.

e) Field and laboratory tests and analysis descriptions and results.

f) Ground water table elevation and analysis of near surface groundwater movement.

g) Recommended design parameters including, but not limited to the following for the dam and its natural abutments and slopes adjacent reservoir areas:

1. Lateral earth loadings
2. Shear strengths
3. Bearing capacities
4. Permeability
5. Slope stability analysis when saturated and during rapid drawdown conditions
6. Seive analysis
7. Sand equivalents
8. Liquefaction analysis and if appropriate; mitigation
9. Seismic Seiche analysis ___ 10. UBC Chapter 70

h) Special design and construction recommendations including, but not limited to the following:

1. Foundation preparation requirements

2. Suitability of materials for embankments (gradation, sand equivalent, etc.) and abutments

3. Compaction methods and minimum requirements

4. Seepage and piping control provisions

5. Potential for settlement

6. Seismic considerations

7. Minimum design factors of safety are:

	Without Seismic	With Seismic
Embankment, Abutment and Adjacent Slope Stability	1.5	1.1
Seepage - Piping	1.5	---

8. Necessity of impervious core or shear key

9. Erosion control of abutments.

D. Regional basins and local basins not meeting the depth and side slope requirements setforth previously shall be designed in accordance with the Los Angeles County Flood Control District's "Design Manual - Debris Dams and Basins".

VII. Basin Floor

A. A low flow channel shall be provided from the basin inlet(s) to the basin outlet.

1. Where basin slopes exceed 2% or produce erosive flow velocities the low flow channel should be protected from erosion with reinforced concrete, rock lining or other form of approved erosion protection.

2. Joint use basins

a) A low flow channel or conduit should be provided to conduct minor flows around the dual use facilities wherever possible. Low flow channels may not be necessary for parking lot basins or other similar joint uses.

b) Low flow channel may be grass lined if there exists a maintenance program which includes mowing and maintenance of turf in good condition and velocities of flow through the various stages of discharge are low enough to be nonerosive.

B. Earth basin floors shall slope at a minimum 0.5% grade to the low flow channel.

C. Earth basin floors shall have a minimum grade of 0.5% from the inlet to the outlet.

VIII. Inlet Structures

A. Where storm drains enter the basin, energy dissipators and/or erosion protection shall be provided. Plans must be approved by the San Bernardino County Flood Control District Permit Section before plan approval if the basin is to be operated and maintained by the Flood Control District.

B. Where natural drainage courses or channels enter the basin some form of invert stabilization such as a reinforced concrete spillway shall be provided.

C. Energy dissipators may be required when the inletting flow velocities exceed 5 fps.

D. Inletting storm drains shall be a minimum 24" RCP (1350 D).

IX. Access

A. Access to any type of detention basin area shall be provided by a roadway capable of handling two way traffic (from a public street or public access to the parcel upon which the basin is constructed).

B. Access shall be maintained under all weather conditions.

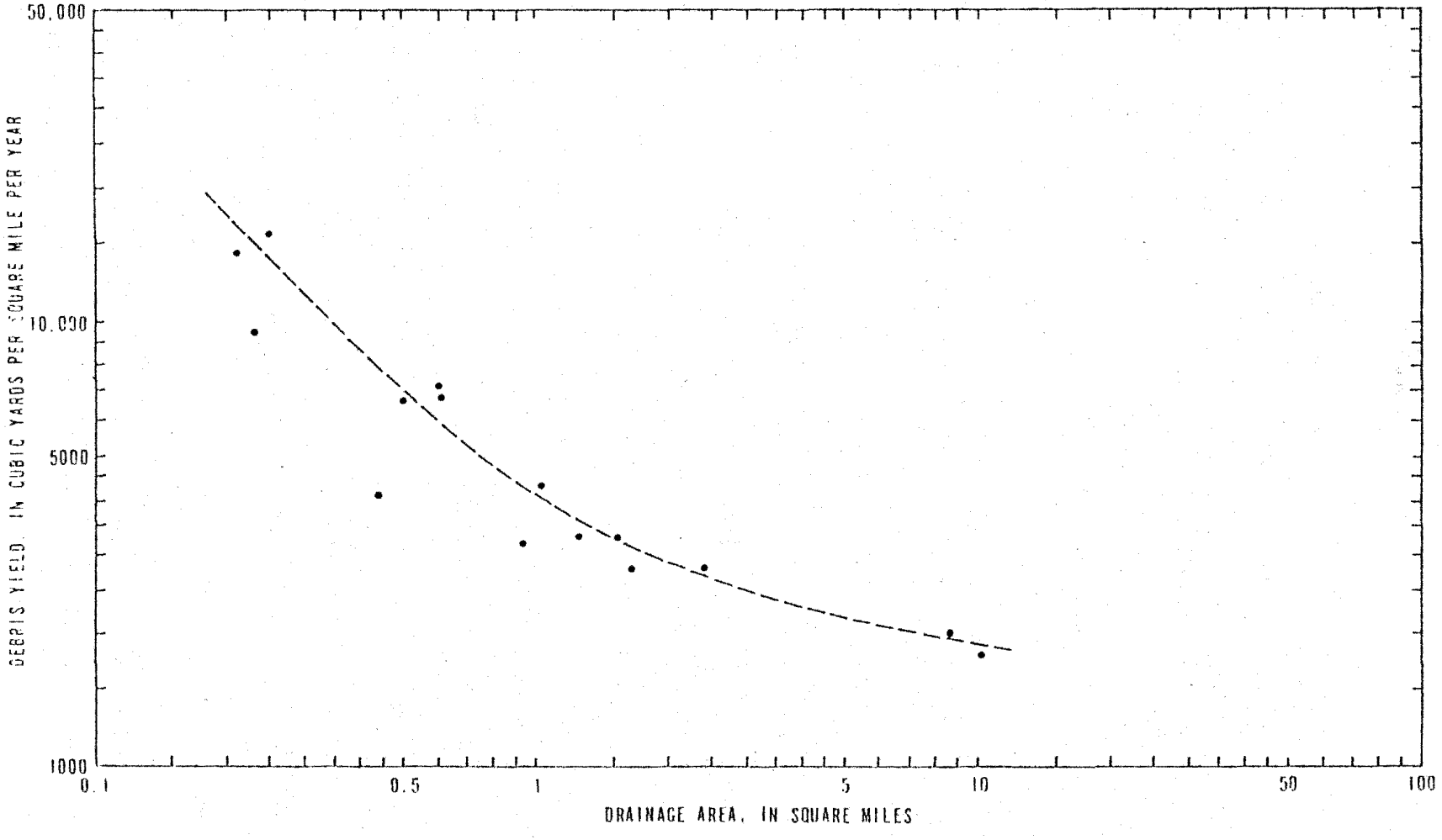


FIGURE 1 .--Long-term sediment yields at selected sites in Los Angeles County, California.

C. A 15-foot wide roadway shall be provided along the top of embankment, across the spillway and around the basin. The intent of this criteria is to have continuous access around, and to, the basin for maintenance purposes. Under certain circumstances where it can be shown the recommended top width is not necessary for structural safety and maintenance, the criteria may be modified. Approval will be required by both the Land Management Department and the Flood Control District.

1. If access across the spillway is not provided minimum 40' X 60' turn arounds shall be provided on both sides of the spillway.

2. If there exists adequate access for maintenance, this requirement may be amended for local, temporary or joint use basins.

D. Access ramps shall be provided to the basin floor.

1. Minimum of one - 15 foot wide ramp for local basins.
2. Minimum of two - 15 foot wide ramps for regional basins.

E. The maximum roadway or access ramp slope shall be 10%.

F. The minimum access and roadway inside turning radius shall be 35 feet.

X. Fencing

A. All basins shall be fenced with 6-foot chain link fencing per Cal Trans standards or other approved barrier unless otherwise approved by the Land Management Department and the Flood Control District. Joint use basin fencing will be site specific and must meet the needs of all agencies utilizing the basin.

B. All regional basin chain link fencing shall have a 1 foot wide painted horizontal orange stripe at the mid height of the fence.

C. Access to the basins shall be gated and locked.

XI. Rights-of-Way

A. Sufficient rights-of-way shall be provided for the construction and economical maintenance of the basin(s), (including all fill and cut slopes) and shall include sufficient area to provide for an access road from a dedicated public street to the basin.

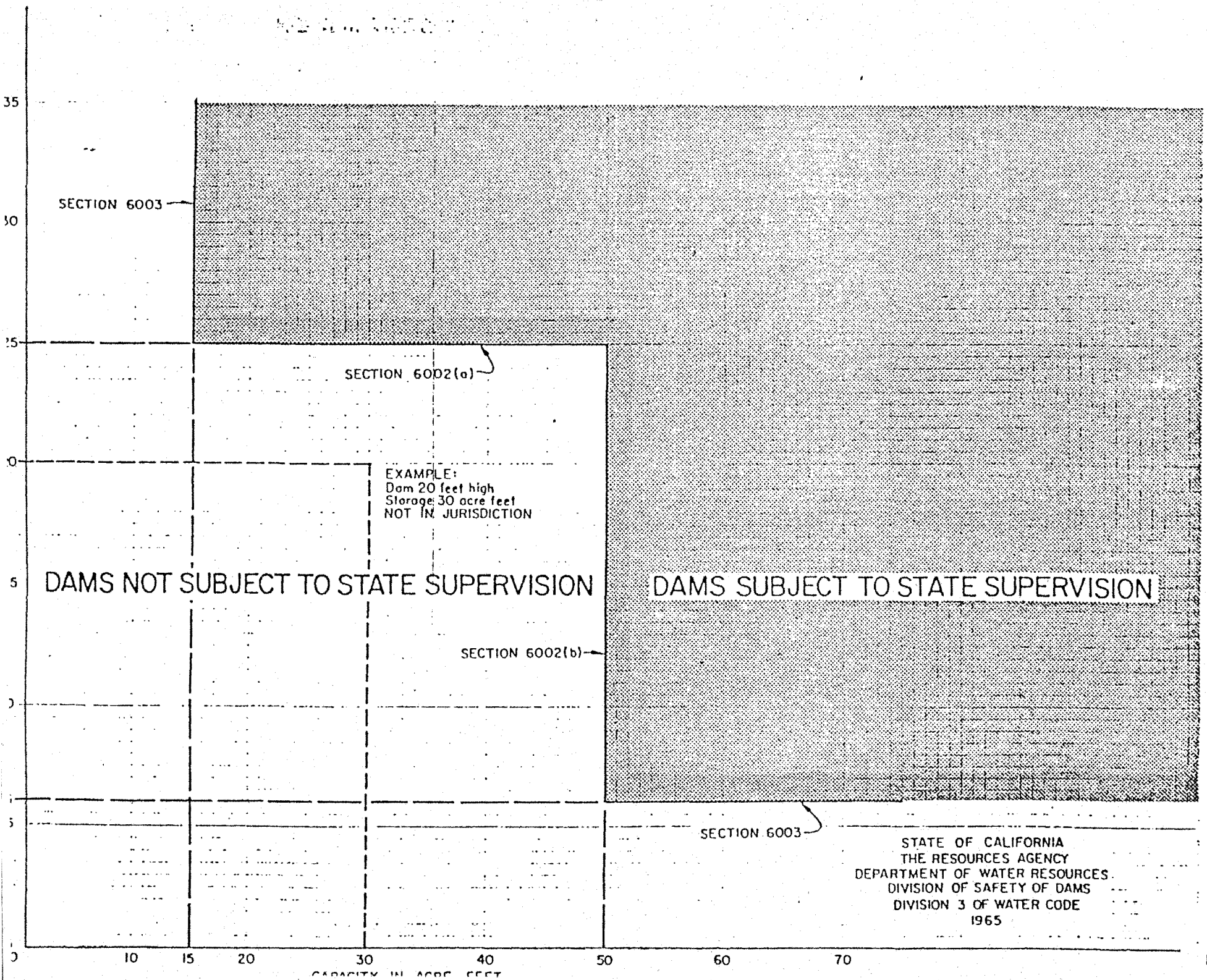

SECTION 6003
SECTION 6002(a)
EXAMPLE:
Dam 20 feet high
Storage 30 acre feet
NOT IN JURISDICTION
DAMS NOT SUBJECT TO STATE SUPERVISION
DAMS SUBJECT TO STATE SUPERVISION
SECTION 6002(b)
SECTION 6003
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF SAFETY OF DAMS
DIVISION 3 OF WATER CODE
1965
10
15
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30
40
50
60
70

FIG. 2

B. Regional basins shall be dedicated to the District in fee title.

C. Local basins shall be covered by an adequate San Bernardino County Drainage Easement.

XII. References to be Used in Design.

"A New Method of Estimating Debris - Storage Requirements for Debris Basins," Tatum, U.S. Army Engineer District, Los Angeles, CA, 1963

"Design of Small Dams", U.S. Bureau of Reclamation, 1977

"Handbook of Hydraulics", King and Brater, McGraw Hill Book Company, 1954

"Los Angeles County Flood Control Manual - Debris Dams and Basin", Los Angeles County Flood Control District

"Open-Channel Hydraulics", Ven Te Chow, Ph.d., 1959

"San Bernardino County Hydrology Manual", San Bernardino County, May 1983

"San Bernardino County Standards and Specification", San Bernardino County Department of Transmportation/Flood Control/Airports

INTEROFFICE MEMO

1853

County of San Bernardino

DATE September 4, 1987 PHONE 2515

FROM ROBERT W. CORCHERO, Chief
Water Resources Division

TO CHARLES L. LAIRD, Acting Director
Transportation/Flood Control File: 1(FC)-53

SUBJECT SAN BERNARDINO COUNTY DETENTION BASIN DESIGN CRITERIA

As requested the subject criteria was reviewed with respect to the determination of pre-development peak flow rates. According to the existing criteria the County can be 85% confident that the calculated peak flow rate will equal or exceed the peak flow rate at a given concentration point if adequate streamflow data was available. Therefore, the County can only be about 15% confident a detention basin outflow will not adversely affect downstream properties (not considering erosion).

The County should be at least 50% confident a detention basin outflow will not adversely impact properties downstream of the basin. Based on the calibration study of the county's hydrology method the input parameters (procedures) described in the Manual should be modified as follows:

a) 10 year peak flow rates should be calculated using 5-year rainfall,

b) 25-year peak flow rates should be calculated using 10-year rainfall, and

c) 100-year peak flow rates should be calculated using 25-year rainfall and AMC II.

If these design parameters are used for determining the pre-development peak flow rates, the basin outflow metered to 90% of these calculated pre-development peak flow rates and the post-development peak flow rates to the basin calculated in accordance with County Hydrology Manual, the County will be over 50% confident the resulting basin design will not adversely affect adjacent or downstream properties (not considering erosion).

The desired confidence level for detention basin outflow is a policy decision. Once the desired confidence level is determined the required input rainfall amounts can be developed to calculate the peak flow rate at the corresponding confidence level. I have discussed this policy issue with John Pederson of the U.S. Army Corps of Engineers, Ron Moore of the Soil Conservation Service and Al Nessinger of Orange County. Al Nessinger pointed out by using basin inflow hydrographs based on a 85% confidence level

and by creating adequate storage to reduce the peak flow rate from the basin to 90% of pre-development condition based on a 50% confidence level, the resulting confidence level that downstream conditions have not changed will be greater than 50%. Also, the rainfall pattern used in the hydrograph method was chosen to be the most severe test on basin design. When these facts are combined with criteria of using multi-day storms, the resulting basin design should be adequate to ensure downstream properties will not be subject to increased peak flow rates. Ron Moore felt the revised criteria better fit the actual pre-development conditions in the field. John Pederson and Al Nessigner both felt the criteria should be tested against actual occurrences in gaged watershed. Attached is page 2 of the design criteria with the proposed changes shown in bold type.

Should you have any questions, please call.

RWC:mjs
Attachment

cc: Ken Miller

II. Basin Capacity and Outlet Drain

A. When a basin (regional, local, temporary or joint use) is to be used to mitigate downstream impacts due to increased flows generated by a development, the basin capacity and outlet size shall be such that the post-development peak flow rate generated by the site shall be less than or equal to 90% of the pre-development peak flow rate from the site for all frequency storms up to and including 100-year (i.e.) the peak 2 year post-development flow rate is equal to or less than 90% of the peak 2 year pre-development flow rate from the site and etc. for all frequency storm events through 100 year).

1. Only 2, 10, 25 and 100-year storms need to be analyzed.

2. Post-development peak flow rates shall be calculated in accordance with the "San Bernardino County Hydrology Manual".

3. Pre-development peak flow rates shall be calculated in accordance with the "San Bernardino County Hydrology Manual" with the following exceptions.

   a) 10-year peak flow rates shall be calculated using 5-year rainfall.

   b) 25-year peak flow rates shall be calculated using 10-year rainfall.

   c) 100-year peak flow rates shall be calculated using 25-year rainfall and AMC-II.

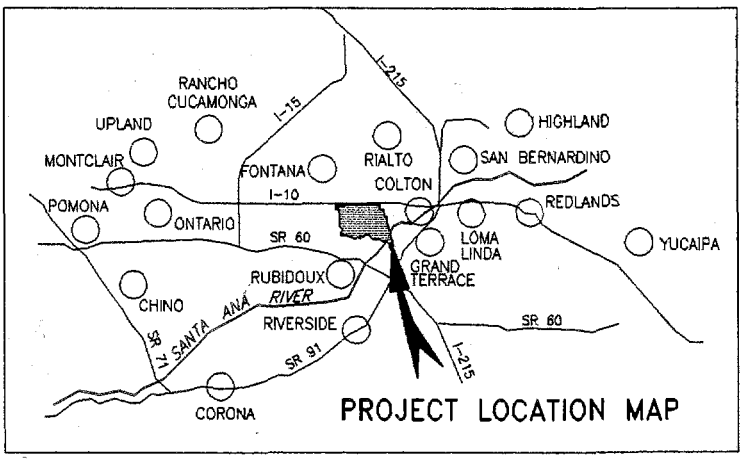
4. Additional studies shall be submitted where there exists more than one basin in the drainage area under review. The studies shall address the timing of the peak flow rates from the basins to ensure downstream flow rates are not increased.

LOCAL AREA DRAINAGE PLAN

PROJECT 3-4

ENGINEERS REPORT
VOLUME #1

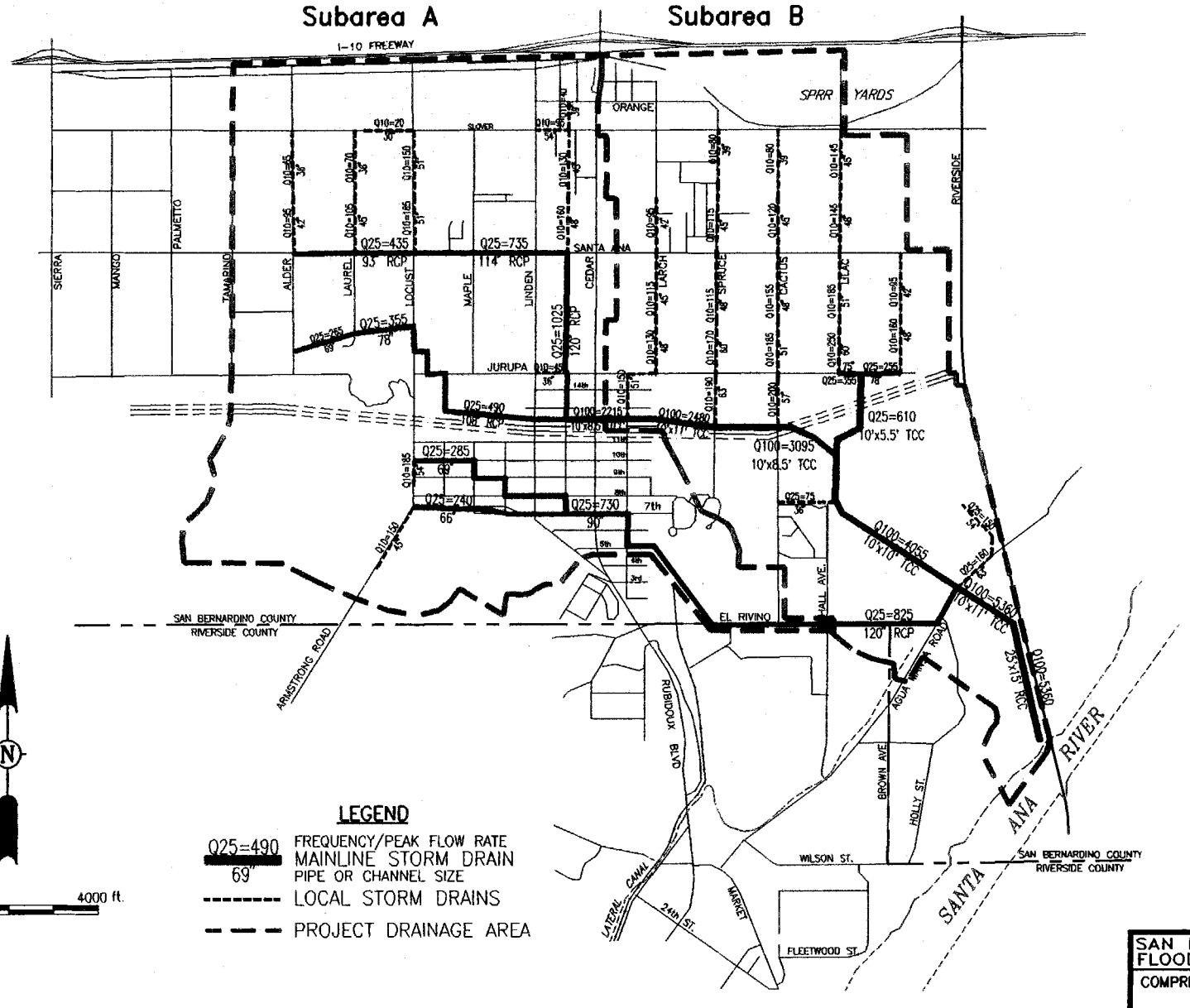
OCTOBER 1992



PROJECT LOCATION MAP

PREPARED BY
SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT
PLANNING DIVISION

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT



REV. JAN 93

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT		
COMPREHENSIVE STORM DRAIN PLAN		
PROJECT 3-4		
MODEL-1		
LOCAL AREA DRAINAGE PLAN		
BY JLD	ACAD FILE	PLANNING FILE NO.
DATE JUL 88	PX1-21D	PM-D1-115

PLATE NO.1