

Preliminary Hydrology Study & Drainage Analysis

US Cold Storage

Hesperia, CA 92344
APN(S): 3064-421-01, -02-, & -03

Prepared For:

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May 2020



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A. Introduction

1.1 Purpose & Scope

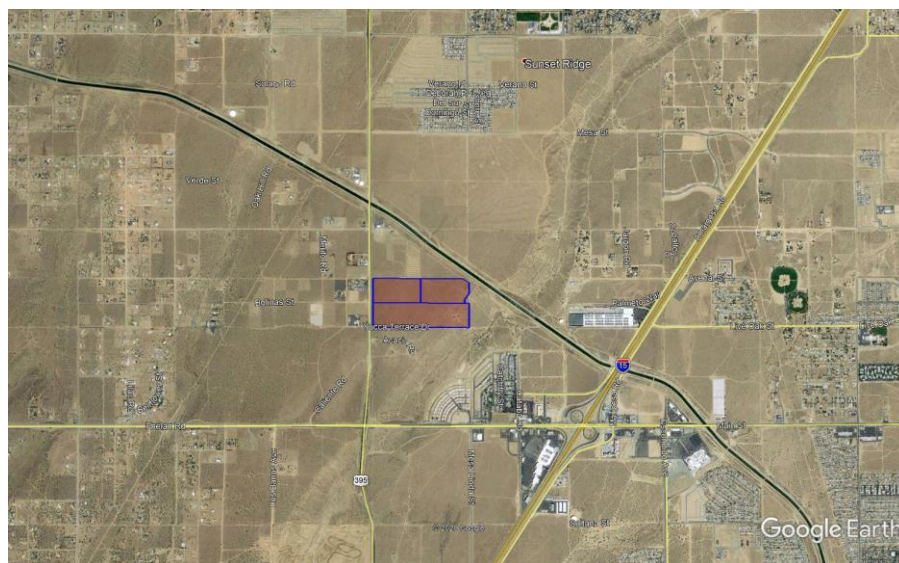
The following Hydrology & Hydraulics Study has been prepared for the development of the US Cold Storage project located along US-395 on approximately 69.33-acres in the City of Hesperia, CA. This report has been prepared to satisfy the City of Hesperia Hydrology requirements per San Bernardino County Department of Public Works Hydrology/Hydraulics requirements for developments of this type.

The scope of this Study is as follows:

- Identification of floodplain(s) impacting the site.
- Identification of existing conditions off-site tributary drainage.
- Identification of existing conditions on-site drainage areas and calculation of peak flow rates and runoff volumes for these areas.
- Identification of proposed on-site drainage areas and calculation of peak flow rates and runoff volumes for these areas.
- Identification of required storm water mitigation due to development.
- Sizing of on-site storm drain improvements.
- Summary of Findings & Conclusion

1.2 Project Overview

The project site is located approximately 1.25 miles west of Interstate 15 and southwest of the California Aqueduct. The proposed project entails the construction and development of a storage facility totaling approximately 69.33-acres in the City of Hesperia, CA on a currently vacant lot. The site will be phase and consist of 2 buildings, a parking lot, sidewalk, and landscape per City requirements.



Site Location

1.3 Existing Conditions Off-Site Areas

The project site and all adjacent properties are located in a “CIBP - Com/Ind Business Park” zone area of Hesperia. The subject property is northeast of the intersection of US Highway 395 and Yucca Terrace Drive. To the north, east and south are vacant lots with the California Aqueduct located to the northeast. Across US Highway 395 to the west of the site are two single family residences, semi-trailer parking and vacant properties.

Drainage in the area generally sheet flows to the northeast toward the California Aqueduct. The flows from the southeast slope drain to the southeast. US Highway 395 intercepts most of the off-site flows and the remainder of off-site flows will be contained in the proposed street improvements to Yucca Terrace Drive which enters the Oro Grande Wash to the east.

1.4 Existing Conditions On-Site Areas

The existing on-site project area is generally flat, sloping to the northeast and is covered with chaparral, narrowleaf. The onsite flows drain from the southwest to northeast to California Aqueduct.

1.5 References

The following documents have been made part of this study by reference:

- 1.) San Bernardino County Department of Public Works Hydrology Manual, August 1986.
- 2.) Site plans by Joseph E. Bonadiman & Associates, Inc., April 2020.
- 3.) County of San Bernardino Hydrology Manual Addendum for Arid Regions, April 6, 2010.
- 4.) The National Oceanic and Atmospheric Administration Atlas 14, Volume 6, Version 2, January 2014.
- 5.) United States Department of Agriculture – Natural Resources Conservation Service – Conservation Engineering Division Technical Release 55 Manual, June 1986

B. Methodology

1.1 General Methodology

The requirements and recommendations found in the San Bernardino County Hydrology Manual (August 1986) provided by the San Bernardino County Department of Public Works was used as the basis for the methodology and calculations found in this Study. On-site calculations were performed using the Rational and Unit Hydrograph methods per County requirements for the Santa Ana River watershed.

For the 2 & 5-Year storm event, Antecedent Moisture Condition (AMC) I was used. For the 10, & 25-Year storm event, Antecedent Moisture Condition (AMC) II was used. For the 100-Year storm event, Antecedent Moisture Condition (AMC) III was used. The San Bernardino County-approved software applications provided by CivilDesign® Corporation were used for all study calculations.

1.2 Sources of Topography

Mapping of existing condition on-site and off-site area and topographic contours for area “A” were provided by Digital Mapping, Inc., dated February 14, 2020.

For offsite tributary area, south of Yucca Terrace Drive, USGS contours were used to determine elevations.

1.3 FEMA Floodplain Identification & Considerations

This site is located in a unshaded Zone X, “AREA OF MINIMAL FLOOD HAZARD”.

Refer to Exhibit “C” for FEMA Map No. 06071C6475H (not printed).

1.4 Watershed Precipitation

Precipitation values used in this report were obtained from The National Oceanic and Atmospheric Administration Atlas 14, Volume 6, Version 2 and are tabulate below. The slope of intensity duration curve value of 0.70 (desert areas) was used per the County Hydrology Manual.

Table 1 – Precipitation Values (Rational Method Calculations)

STORM	PRECIPITATION
10-YEAR, 1-HOUR	0.76
100-YEAR, 1-HOUR	1.27

Table 2 – Precipitation Values (Unit Hydrograph Calculations)

STORM	PRECIPITATION
10-YEAR, 1-HOUR	0.76
100-YEAR, 1-HOUR	1.27
2-YEAR, 6-HOUR	1.04
100-YEAR, 6-HOUR	2.90
2-YEAR, 24-HOUR	1.96
100-YEAR, 24-HOUR	6.12

Refer to Exhibit “D” for the NOAA Point Precipitation Frequency Estimates used in this report.

1.5 Watershed Losses

Soil types and SCS Curve Number (AMC II) used in this report were obtained from the Runoff Curve Numbers Table 2-2, included in the Technical Release 55 manual, and are tabulated below.

Type “A” is shown for the entire area of study per Custom Soil Resource Report Soil Map of United States Department of Agriculture Natural Resources Conservation Service. The existing conditions study site is currently 100% undeveloped, consisting of a dirt lot, poorly covered with desert shrubs. Per the TR-55 Table 2-2, the SCS Curve Number (AMC II) used for existing conditions areas is 63 (“Desert Shrub”). The SCS Curve Numbers (AMC II) used for developed conditions pervious areas is 63 (“Desert Landscape”) per US Department of Agriculture and 98 (“Impervious Areas”) for the parking lots, roofs, driveways, etc., per the San Bernardino County Hydrology Manual Figure C-2 & 3.

Table 3 – Developed Condition Soil Loss Rates

COVER TYPE	SOIL TYPE	QUALITY OF COVER	SCS CURVE NO. (AMC II)
Desert Shrub	A	Poor	63
Desert Landscaping	A	Good	63
Impervious Area	A	~	98

Refer to Exhibit “E” for the NRCS Custom Soil Resource Report and SCS Curve Number per Figure C-2 & 3 and C-6 used in this report.

1.6 Rational Hydrology Method & Unit Hydrograph Hydrology Method Calculations

The San Bernardino County Rational Method (RSBC) & Unit Hydrograph Method (UNSBC) software applications provided by CivilDesign® Corporation was used for the rational & unit hydrograph method calculations included in this report.

C. Existing Conditions Hydrology Calculations & Summary

1.1. Existing Conditions Rational Method Calculations

Input values for the existing conditions rational method calculations prepared for this report are tabulated below:

Table 4 – Existing Conditions Rational Method Input Values

DRAINAGE AREA	SIZE (AC)	TYPE	COVER	SOIL	SCS (AMC II)	PERVIOUS FRACTION	U.S. ELEV. (FT)	D.S. ELEV. (FT)	LENGTH (FT)
A1 NODE 0-1	10	Desert Shrub	POOR	A	63	1.00	3516.2	3504.6	631
A2 NODE 1-2	20.37	Desert Shrub	POOR	A	63	1.00	3504.6	3497.0	464
A3 NODE 2-3	38.96	Desert Shrub	POOR	A	63	1.00	3497.0	3488.4	521
B1 NODE 0-1	6.93	Desert Shrub	POOR	A	63	1.00	3564	3552	1000
B2 NODE 1-2	15.48	Desert Shrub	POOR	A	63	1.00	3552	3536	822
B3 NODE 2-3	33.46	Desert Shrub	POOR	A	63	1.00	3536	3507.8	1054

Output for the existing conditions rational method calculations are tabulated as follows:

Table 5 – Existing Conditions Rational Method Output Calculations

AREA	NODE	Q ₂₅ (CFS)	Q ₁₀₀ (CFS)
A	0-3	47.87	97.62
TC ₁₀₀ (MIN)		30.38	
B	0-3	24.73	61.21
TC ₁₀₀ (MIN)		42.44	

Refer to Attachment No. 1 for printouts of the existing conditions rational method calculations.
Refer to Exhibit “F” for the Existing Conditions Hydrology Study Map.

1.2. Existing Conditions Unit Hydrograph Method Calculations

Based on the output data from the Rational Method above the 100-year TC value was used. Input values for the developed conditions unit hydrograph method calculations prepared for this report are tabulated as follows:

Table 6 – Existing Conditions Unit Hydrograph Method Input Values

DRAINAGE AREA	SIZE (AC)	SCS	PERVIOUS FRACTION	TC ₁₀₀ (HR)
A	69.33	63	1.00	0.506

Output for the existing conditions unit hydrograph method calculations are tabulated as follows:

Table 7 – Existing Conditions Unit Hydrograph Method Output Calculations

DRAINAGE AREA	SIZE (AC)	Q ₂ (CFS)	Q ₅ (CFS)	Q ₁₀ (CFS)	Q ₂₅ (CFS)	Q ₁₀₀ (CFS)	LAG ₁₀₀ (HR)
A	69.33	16.72	30.49	50.81	69.65	114.77	0.405

DRAINAGE AREA	SIZE (AC)	VOL ₂ (AF)	VOL ₅ (AF)	VOL ₁₀ (AF)	VOL ₂₅ (AF)	Q ₁₀₀ (AF)	LAG ₁₀₀ (HR)
A	69.33	0.674	1.259	5.718	9.161	24.414	0.405

Refer to Attachment No. 2 for printouts of the existing conditions unit hydrograph calculations.

Refer to Exhibit ‘F’ for the Existing Conditions Hydrology Study Map.

D. Developed Conditions Hydrology Calculations

1.1 Developed Conditions Rational Method Calculations

Input values for the final conditions rational method calculations were adjusted accordingly and are tabulated below:

Table 8 – Developed Conditions Rational Method Input Values

DRAINAGE AREA	SIZE (AC) (IN)	TYPE	COVER	SOIL	SCS (AMC II)	PERVIOUS FRACTION	U.S. ELEV. (FT)	D.S. ELEV. (FT)	LENGTH (FT)
A1 NODE 0-1	10	Desert Landscaping	GOOD	A	63	0.43	3516.8	3495.5	859
PIPE NODE 1-2	30"	~	~	~	~	n=0.012	3491.5	3488.0	701
A2	20.14	Desert Landscaping	GOOD	A	63	0.08	~	~	~
PIPE NODE 2-3	45"	~	~	~	~	n=0.012	3488.0	3483.0	1007
A3	39.19	Desert Landscaping	GOOD	A	63	0.23	~	~	~
PIPE NODE 3-4	45"	~	~	~	~	n=0.012	3483.0	3475.0	360
B1 NODE 0-1	6.93	Desert Shrub	POOR	A	63	1.00	3564	3552	1000
B2 NODE 1-2	15.48	Desert Shrub	POOR	A	63	1.00	3552	3536	822
B3 NODE 2-3	33.46	Desert Shrub	POOR	A	63	1.00	3536	3507.8	1054

Output for the developed conditions rational method calculations are tabulated as follows:

Table 9 – Developed Conditions Rational Method Output Calculations

AREA	NODE	Q ₂₅ (CFS)	Q ₁₀₀ (CFS)
A	0-4	126.87	175.61
TC ₁₀₀ (MIN)		15.55	
B	0-3	24.73	61.21
TC ₁₀₀ (MIN)		42.44	

Refer to [Attachment No. 3](#) for printouts of the final conditions rational method calculations.
Refer to [Exhibit “G”](#) for the Final Conditions Hydrology Study Map.

1.2 Developed Conditions Unit Hydrograph Method Calculations

Based on the output data from the Rational Method above the 100-year TC value was used. Input values for the existing conditions unit hydrograph method calculations prepared for this report are tabulated as follows:

Table 10 – Developed Conditions Unit Hydrograph Method Input Values

DRAINAGE AREA	SIZE (AC)	SCS	PERVIOUS FRACTION	TC ₁₀₀ (HR)
A	69.33	63	0.22	0.259

Output for the developed conditions unit hydrograph method calculations are tabulated as follows:

Table 11 Developed Conditions Unit Hydrograph Method Output Calculations

DRAINAGE AREA	SIZE (AC)	Q ₂ (CFS)	Q ₁₀ (CFS)	Q ₂₅ (CFS)	Q ₁₀₀ (CFS)	LAG ₁₀₀ (HR)
A	69.33	55.23	112.26	144.11	196.51	0.207

DRAINAGE AREA	SIZE (AC)	VOL ₂ (AF)	VOL ₁₀ (AF)	VOL ₂₅ (AF)	VOL ₁₀₀ (AF)	LAG ₁₀₀ (HR)
A	69.33	8.060	16.875	22.022	32.024	0.207

Refer to Attachment No. 4 for printouts of the existing conditions unit hydrograph calculations. Refer to Exhibit “F” for the Existing Conditions Hydrology Study Map.

E. Detention Basin Calculations

1.1 Detention Basin Analysis

A detention/retention basin is proposed to attenuation storm flows and to meet WQMP requirements. Input values of the depth vs. volume for detention basin routing calculations prepared for this report are tabulated as follows:

Table 12 – Detention Basins A., System Depth vs. Volume

ELEVATION (FT)	DEPTH (FT)	TOTAL VOLUME (CF)	DETENTION VOLUME (AF)*
3470.50 OUTLET	0.00	0	0.000
3471.00	0.50	14,848	0.341
3471.50	1.00	29,695	0.682
3472.00	1.50	44,543	1.023
3472.50	2.00	50,111	1.150
3473.00	2.50	55,679	1.278
3473.50	3.00	61,135	1.403
3474.00	3.50	98,786	2.268
3474.50	4.00	137,520	3.157
3475.00 OUTLET	4.50	177,352	4.071
3475.50	5.00	218,303	5.01
3476.00	5.50	260,392	5.98
3476.50 OUTLET	6.00	303,639	6.971
3477.00	6.50	348,063	7.990
3477.50	7.00	393,683	9.038
3478.00 OUTLET	7.50	440,518	10.113
3478.50	8.00	488,589	11.216
3479.00	8.50	537,914	12.349

* Above listed values include the void spaces of the WQMP material.

For basin routing of the 10-year, 25-year and 100-year hydrographs the starting water depth in the basin was assumed to be the water of the 2-year storm. This conservative approach was used to ensure the other storm events are mitigated properly even if a WQMP storm event was in the process of being mitigated when one of the other storm events affected the project site. Output for the detention basin routing calculations are tabulated as follows:

Table 13 – Detention Basins Output Calculations

BASIN AREA	STORM EVENT	OUTLET (IN)	SPILLWAY WIDTH (FT)	SPILLWAY ELEVATION (FT)	OUTFLOW PEAK Q (CFS)	BASIN WATER DEPTH (FT)
A	2	8" PIPE 18" PIPE 18" PIPE 3' WEIR	10.00	3678.50	3.41	4.40
	10				23.70	6.35
	25				32.02	7.05
	100				47.16	7.89

Table 14 – Detention Basins Spillway Calculations

BASIN AREA	Q ₁₀₀ (CFS)	SCALE FACTOR	Q ₁₀₀₀ (CFS)	SPILLWAY SLOPE (%)	SIDE SLOPE	BASE WIDTH (FT)
A	196.51	1.35	265.29	1.00	2:1	10

All detention basins shall be design based on the “Detention Basin Design Criteria for San Bernardino County”, as follows:

- When feasible no more than 50% of the basins volume shall be above natural grade.
- 3:1 maximum slope on wet side and 2:1 maximum slope on dry side.
- Maximum water depth should not exceed 6’.
- A spillway shall be design to pass the fully developed 1000 year peak flow rate ($Q_{1000} = 1.35 Q_{100}$).
- A minimum of 1-foot of freeboard above the 1000-year HWL or 2-feet of freeboard above the 100 –year HWL, whichever is more stringent.
- Access to the basin shall be gated and locked.

Refer to Attachment No. 5 for a printout of the 2-year, 10-year, 25-year and 100-year hydrograph routing calculations for the proposed basins system.

Summary & Conclusion

1.1 Summary

A summary of the results of the Rational Method calculations are tabulated below:

Table 15–Rational Method Calculations Summary

AREA	STORM EVENT	EXISTING CONDITIONS PEAK Q (CFS)	DEVELOPED CONDITIONS PEAK Q (CFS)	INCREASE (CFS)*
A	25	47.87	126.87	79.00
	100	97.62	175.61	77.99
B	25	24.73	24.73	0.00
	100	61.21	61.21	0.00

* Above listed values are results prior to basin routing & WQMP storage and not reflective of actual site discharge.

A summary of the results of the unit hydrograph calculations are tabulated below:

Table 16–Unit Hydrograph Calculations Summary

AREA	STORM EVENT	EXISTING CONDITIONS PEAK Q (CFS)	DEVELOPED CONDITIONS PEAK Q (CFS)	INCREASE (CFS)*	EXISTING CONDITIONS VOLUME (AF)	FINAL CONDITIONS VOLUME (AF)	INCREASE (AF)*
A	2	16.72	55.23	38.51	0.674	8.060	7.386
	10	50.81	112.26	61.45	5.718	16.875	11.157
	25	69.65	144.11	74.46	9.161	22.022	12.861
	100	114.77	196.51	81.74	24.414	32.024	7.610

* Above listed values are results prior to basin routing and are not reflective of actual site discharge.

As indicated above, an increase in peak flow and runoff volume as a result of the proposed development for area “A” and no increase is expected for area “B”. The increase in flow rates for area “A” shall be mitigated onsite as to reduce the total site discharge to 90% of the pre-development conditions per the San Bernardino County Hydrology Manual.

Per “San Bernardino County Detention Basin Design Criteria” post-development peak flow rates generated by the site shall be less than or equal to 90% of the pre-development peak flow rate based on shifting the rainfall values for the 10-year, 25-year and 100-years storms, providing a least a 50% confidence level that the detention basin outflow will not adversely impact downstream properties. A summary of the maximum allowable peak flow rates are tabulated below:

Table 17 – Area “A” Outlet Requirements

EXISTING AREA	STORM EVENT	EXISTING CONDITIONS PEAK Q (CFS)	ADJUSTED PEAK Q (CFS)	MAXIMUM ALLOWABLE DISCHARGE 90% OF ADJUSTED PEAK Q (CFS)
A	2	16.72	Q ₂ =6.50	5.85
	10	50.81	Q ₅ =30.49	27.44
	25	69.65	Q ₁₀ =50.81	45.73
	100	114.77	Q ₂₅ =69.65	62.69

A summary of the results of the detention basin routing calculations are tabulated below:

Table 18 – Detention Basins Routing Summary

AREA	STORM EVENT	MAXIMUM BASIN DISCHARGE 90% OF ADJUSTED PEAK Q (CFS)	OUTFLOW PEAK Q (CFS)	TOTAL BASIN DEPTH (ft)	INCREASED DISCHARGE VOLUME (AF)*
A	2	5.85	3.41	4.40	7.39
	10	27.44	23.70	6.35	11.16
	25	45.73	32.02	7.05	12.86
	100	62.69	47.16	7.89	7.61

* Above listed values do not reflect WQMP storage volume.

Refer to Attachment No. 5 for a printout of the spillway width calculation calculations for the proposed basins system.

1.2 Conclusion

As indicated in Table 13, development of the site results in an increase in peak flow and runoff volume for area “A” as a result of the proposed development and therefore requires mitigation.

Per the San Bernardino County Hydrology Manual, developed sites shall not increase existing condition flow rate. In order to meet mitigation requirements per “San Bernardino County Detention Basin Design Criteria” post-development peak flow rates generated by the site shall be less than or equal to 90% of the pre-development peak flow rate based on shifting the rainfall values for the 10-year, 25-year and 100-years storms, providing a least a 50% confidence level that the detention basin outflow will not adversely impact downstream properties.

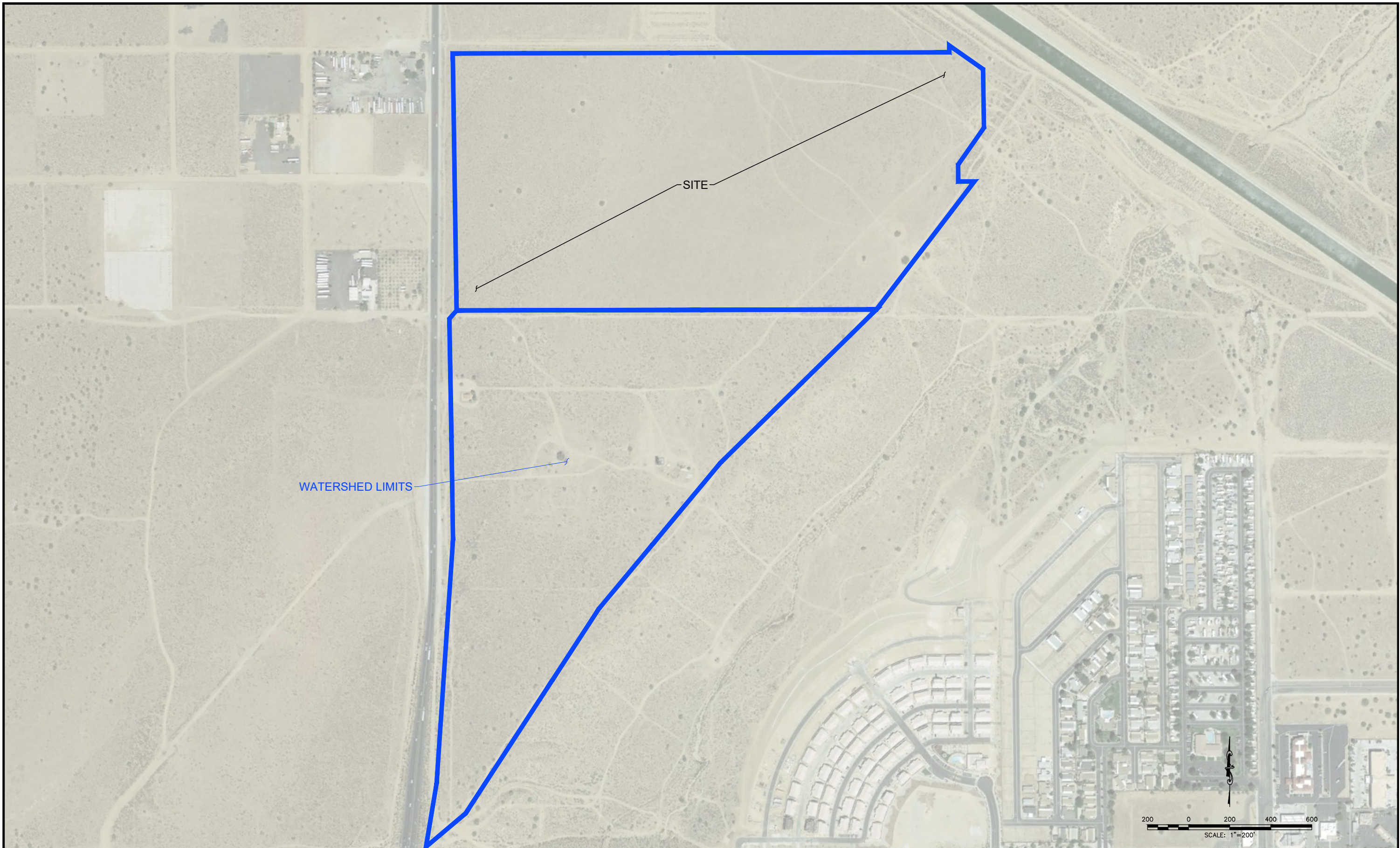
This can be achieved with the use of a storm water detention basin with a minimum capacity of 12.35 AF, 3:1 side slopes and a maximum water depth of 7.89 ft., to bottom of basin. To meet the San Bernardino County WQMP requirements the bottom of the basin will contain a bio-filtration system made up of free draining soil media and underdrain network. See separate WQMP report for more information. The basin shall have four outlets. The first outlet is the 8 inch underdrain, from the WQMP bio-filtration system, which is at the bottom of the basin. The second outlet is an 18 inch HDPE pipe at 4.5 feet from the bottom of basin. The third outlet is an 18 inch HDPE pipe at 6 feet from the bottom of basin. The fourth outlet is a 3 foot wide flat concrete weir box at 7.5 feet from the bottom of the basin. The basin shall also be equipped with a spillway with the crest 7.89 feet from the bottom of the basin and shall have a base width of 10 FT with 2:1 side slopes. The bottom shall slope away from the basin at no less than 1.0%. This will provide a minimum of 2-foot of freeboard above the 100-year HWL from the top of slope elevation and shall prevent the water surface from breaching the rim.

With the above mitigation measure the development of the US Cold Storage project will not have a negative impact on downstream properties or facilities. Refer to project specific WQMP for additional requirements.

(END)

EXHIBIT “A”

Project Watershed
Aerial Photo



SITE

WATERSHED LIMITS

AERIAL PHOTO EXHIBIT
US COLD STORAGE
IN THE CITY OF HESPERIA CA

PREPARED BY:



TEL: 760.945.5000
WWW.BONADIMAN.COM



CIVILDESIGN
LANDSCAPE ARCHITECTURE

PREPARED FOR:

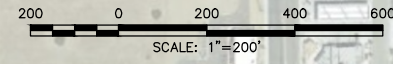


FISHER
CONSTRUCTION GROUP

BY	MARK	REVISION DESCRIPTION	DATE

PREPARED FOR:	FISHER CONSTRUCTION GROUP
JOB NO:	204728
PREPARED BY:	SG
CHECKED BY:	JTS

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AERIAL PHOTO EXHIBIT
US COLD STORAGE
IN THE CITY OF HESPERIA CA

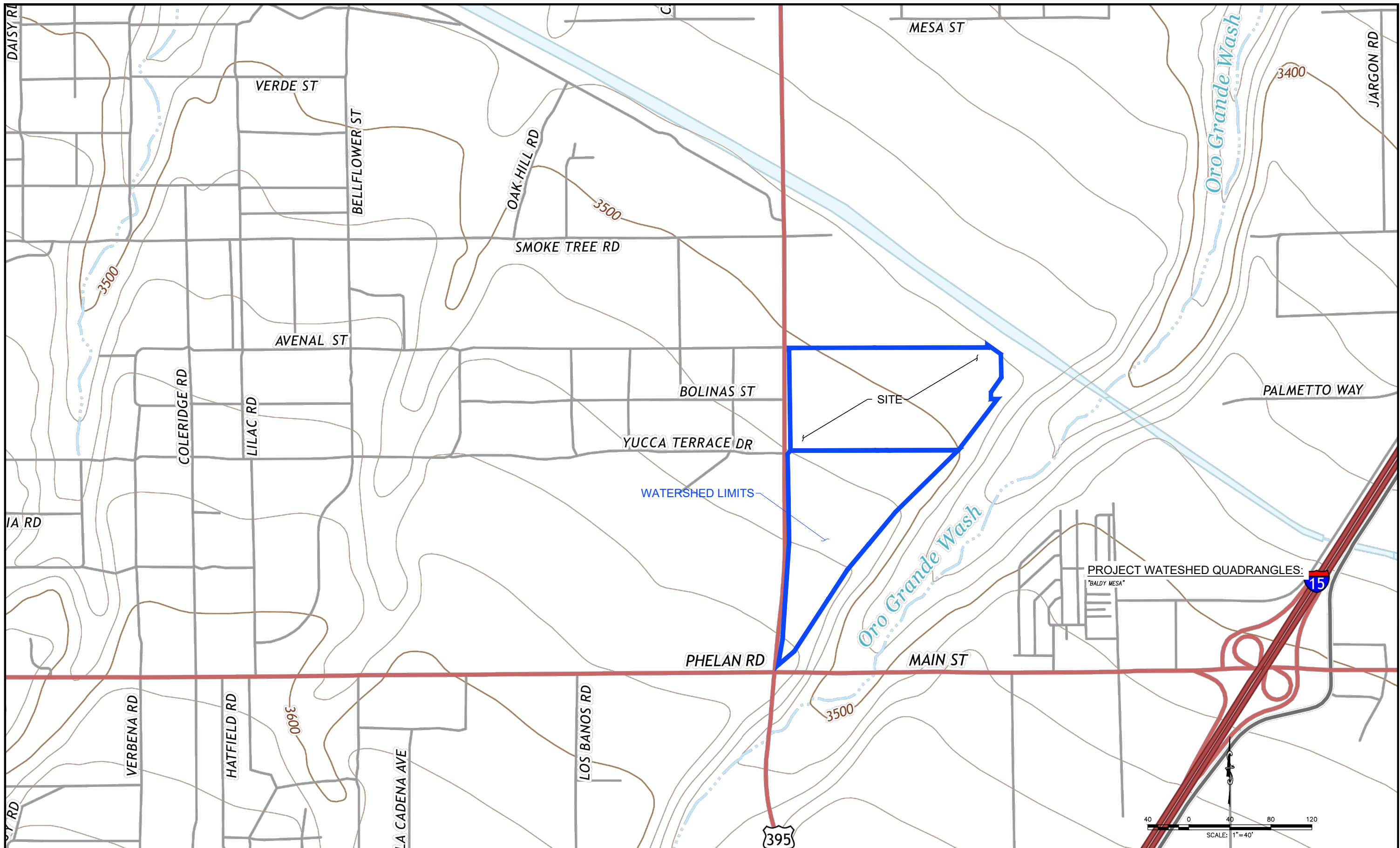
DISREGARD PRINTS BEARING EARLIER REVISION DATES → 05-08-2020

A

SHEET 1 OF 1

EXHIBIT “B”

Project Watershed
USGS Quadrangle



PROJECT WATSHED QUADRANGLES:
"BALDY MESA"

USGS QUADRANGLE EXHIBIT
US COLD STORAGE
IN THE CITY OF HESPERIA CA

PREPARED BY:



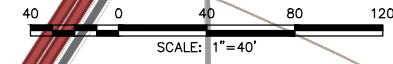
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BY	MARK	REVISION DESCRIPTION	DATE

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USGS QUADRANGLE EXHIBIT
US COLD STORAGE
IN THE CITY OF HESPERIA CA

B
DISREGARD PRINTS BEARING EARLIER REVISION DATES → 05-08-2020
SHEET 1 OF 1

EXHIBIT “C”

FEMA Floodplain Maps

National Flood Hazard Layer FIRMette



34°26'23.60"N



Legend

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

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) <i>Zone A, V, A99</i>
		With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
		Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i>
		Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
		Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>
		Area with Flood Risk due to Levee <i>Zone D</i>

OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>
		Effective LOMRs
		Area of Undetermined Flood Hazard <i>Zone D</i>

GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall

OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance
		17.5 Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
OTHER FEATURES		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature

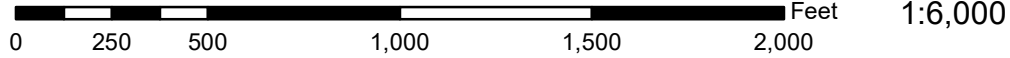
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **4/30/2020 at 2:39:31 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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



USGS The National Map: Orthoimagery. Data refreshed April, 2019.

117°23'25.29"W

EXHIBIT “D”

Precipitation Frequency
Data Server - NOAA Atlas 14, Volume 6,
Version 2



NOAA Atlas 14, Volume 6, Version 2
 Location name: Hesperia, California, USA*
 Latitude: 34.4357°, Longitude: -117.395°
 Elevation: 3501.72 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 & aerals](#)

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	0.083 (0.069-0.101)	0.119 (0.098-0.146)	0.167 (0.137-0.204)	0.206 (0.168-0.254)	0.259 (0.205-0.331)	0.300 (0.232-0.392)	0.343 (0.259-0.458)	0.387 (0.284-0.532)	0.447 (0.315-0.641)	0.495 (0.337-0.734)
10-min	0.119 (0.099-0.145)	0.171 (0.141-0.209)	0.239 (0.197-0.293)	0.295 (0.241-0.364)	0.371 (0.293-0.474)	0.430 (0.333-0.562)	0.491 (0.371-0.657)	0.554 (0.407-0.762)	0.641 (0.452-0.919)	0.709 (0.483-1.05)
15-min	0.144 (0.119-0.176)	0.207 (0.171-0.252)	0.289 (0.238-0.354)	0.356 (0.291-0.440)	0.449 (0.355-0.573)	0.521 (0.403-0.679)	0.594 (0.449-0.794)	0.670 (0.492-0.922)	0.775 (0.546-1.11)	0.857 (0.584-1.27)
30-min	0.219 (0.181-0.268)	0.314 (0.260-0.384)	0.440 (0.362-0.539)	0.542 (0.443-0.670)	0.683 (0.540-0.873)	0.792 (0.613-1.03)	0.904 (0.683-1.21)	1.02 (0.749-1.40)	1.18 (0.831-1.69)	1.31 (0.888-1.94)
60-min	0.307 (0.254-0.375)	0.441 (0.364-0.538)	0.616 (0.508-0.755)	0.760 (0.621-0.939)	0.957 (0.757-1.22)	1.11 (0.859-1.45)	1.27 (0.957-1.69)	1.43 (1.05-1.97)	1.65 (1.16-2.37)	1.83 (1.24-2.71)
2-hr	0.444 (0.368-0.542)	0.604 (0.499-0.738)	0.820 (0.676-1.00)	1.00 (0.819-1.24)	1.26 (0.994-1.61)	1.46 (1.13-1.91)	1.67 (1.26-2.24)	1.90 (1.39-2.61)	2.22 (1.56-3.18)	2.47 (1.68-3.67)
3-hr	0.561 (0.464-0.685)	0.750 (0.620-0.917)	1.01 (0.832-1.24)	1.23 (1.00-1.52)	1.54 (1.22-1.97)	1.80 (1.39-2.34)	2.06 (1.56-2.76)	2.35 (1.72-3.23)	2.76 (1.94-3.95)	3.09 (2.10-4.58)
6-hr	0.788 (0.652-0.962)	1.04 (0.863-1.28)	1.40 (1.15-1.72)	1.71 (1.40-2.11)	2.15 (1.70-2.75)	2.51 (1.94-3.28)	2.90 (2.19-3.88)	3.32 (2.44-4.57)	3.94 (2.77-5.64)	4.44 (3.02-6.60)
12-hr	1.01 (0.839-1.24)	1.39 (1.15-1.69)	1.90 (1.57-2.33)	2.35 (1.92-2.90)	2.99 (2.36-3.82)	3.52 (2.72-4.59)	4.08 (3.08-5.46)	4.70 (3.45-6.46)	5.59 (3.94-8.02)	6.34 (4.31-9.40)
24-hr	1.38 (1.23-1.59)	1.96 (1.73-2.26)	2.76 (2.43-3.19)	3.44 (3.02-4.01)	4.44 (3.76-5.34)	5.25 (4.36-6.45)	6.12 (4.96-7.71)	7.07 (5.57-9.15)	8.43 (6.37-11.4)	9.57 (6.99-13.4)
2-day	1.56 (1.38-1.79)	2.20 (1.95-2.53)	3.09 (2.73-3.58)	3.87 (3.39-4.51)	5.01 (4.25-6.04)	5.96 (4.94-7.32)	6.97 (5.65-8.79)	8.09 (6.37-10.5)	9.72 (7.35-13.1)	11.1 (8.10-15.5)
3-day	1.67 (1.48-1.92)	2.34 (2.08-2.70)	3.29 (2.91-3.81)	4.13 (3.61-4.81)	5.35 (4.53-6.44)	6.36 (5.28-7.82)	7.47 (6.05-9.40)	8.68 (6.84-11.2)	10.5 (7.91-14.1)	12.0 (8.74-16.7)
4-day	1.80 (1.60-2.07)	2.52 (2.23-2.91)	3.54 (3.13-4.09)	4.43 (3.88-5.16)	5.74 (4.87-6.91)	6.83 (5.67-8.40)	8.02 (6.49-10.1)	9.32 (7.34-12.1)	11.2 (8.50-15.2)	12.9 (9.39-18.0)
7-day	2.01 (1.78-2.31)	2.79 (2.47-3.21)	3.88 (3.42-4.48)	4.83 (4.23-5.62)	6.22 (5.27-7.49)	7.37 (6.12-9.06)	8.63 (6.99-10.9)	10.0 (7.88-13.0)	12.0 (9.09-16.2)	13.7 (10.0-19.2)
10-day	2.15 (1.91-2.48)	2.97 (2.63-3.42)	4.11 (3.63-4.75)	5.10 (4.47-5.94)	6.54 (5.55-7.88)	7.74 (6.42-9.52)	9.03 (7.32-11.4)	10.5 (8.24-13.5)	12.5 (9.47-16.9)	14.3 (10.4-19.9)
20-day	2.61 (2.31-3.00)	3.57 (3.16-4.11)	4.90 (4.33-5.67)	6.06 (5.31-7.06)	7.73 (6.55-9.31)	9.10 (7.56-11.2)	10.6 (8.58-13.3)	12.2 (9.63-15.8)	14.6 (11.0-19.7)	16.6 (12.1-23.2)
30-day	3.08 (2.73-3.54)	4.18 (3.71-4.82)	5.71 (5.04-6.60)	7.02 (6.15-8.18)	8.92 (7.56-10.7)	10.5 (8.71-12.9)	12.2 (9.87-15.3)	14.0 (11.1-18.2)	16.8 (12.7-22.6)	19.0 (13.9-26.6)
45-day	3.66 (3.24-4.21)	4.90 (4.34-5.65)	6.62 (5.84-7.64)	8.09 (7.09-9.43)	10.2 (8.66-12.3)	12.0 (9.93-14.7)	13.9 (11.2-17.5)	15.9 (12.6-20.7)	19.0 (14.4-25.6)	21.6 (15.8-30.1)
60-day	4.16 (3.69-4.79)	5.49 (4.86-6.33)	7.32 (6.46-8.46)	8.89 (7.78-10.4)	11.2 (9.45-13.4)	13.0 (10.8-16.0)	15.0 (12.2-18.9)	17.3 (13.6-22.4)	20.6 (15.6-27.8)	23.4 (17.1-32.6)


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.

PF graphical

Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000

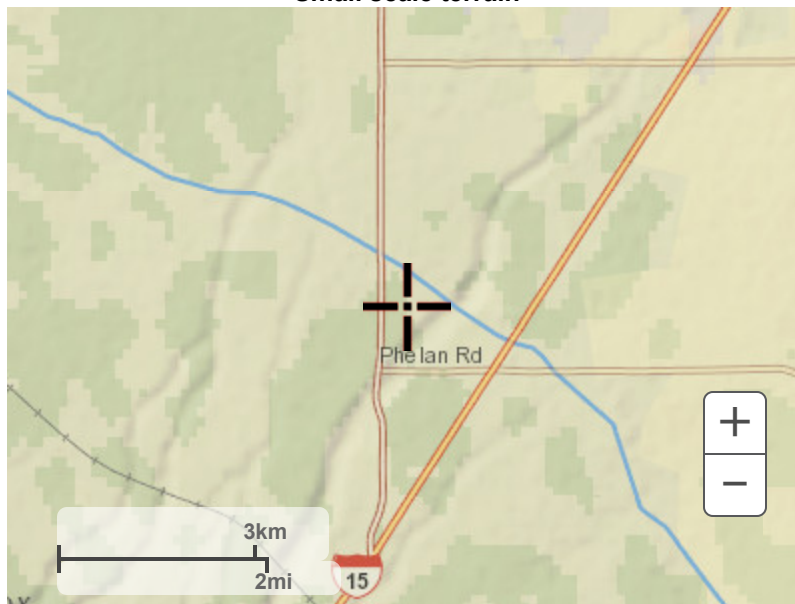
 curve plots

Duration	
5-min	2-day
10-min	3-day
15-min	4-day
30-min	7-day
60-min	10-day
2-hr	20-day
3-hr	30-day
6-hr	45-day
12-hr	60-day
24-hr	

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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



[Back to Top](#)

EXHIBIT “E”
NRCS Soil Data

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description	Average percent impervious area ^{2/}	Curve numbers for hydrologic soil group			
		A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) ^{5/}		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

¹ Average runoff condition, and $I_a = 0.2S$.² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands ^{1/}

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition ^{2/}	A ^{3/}	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair		55	72	81
	Good		49	68	79

¹ Average runoff condition, and I_a , = 0.2S. For range in humid regions, use table 2-2c.

² Poor: <30% ground cover (litter, grass, and brush overstory).

Fair: 30 to 70% ground cover.

Good: > 70% ground cover.

³ Curve numbers for group A have been developed only for desert shrub.



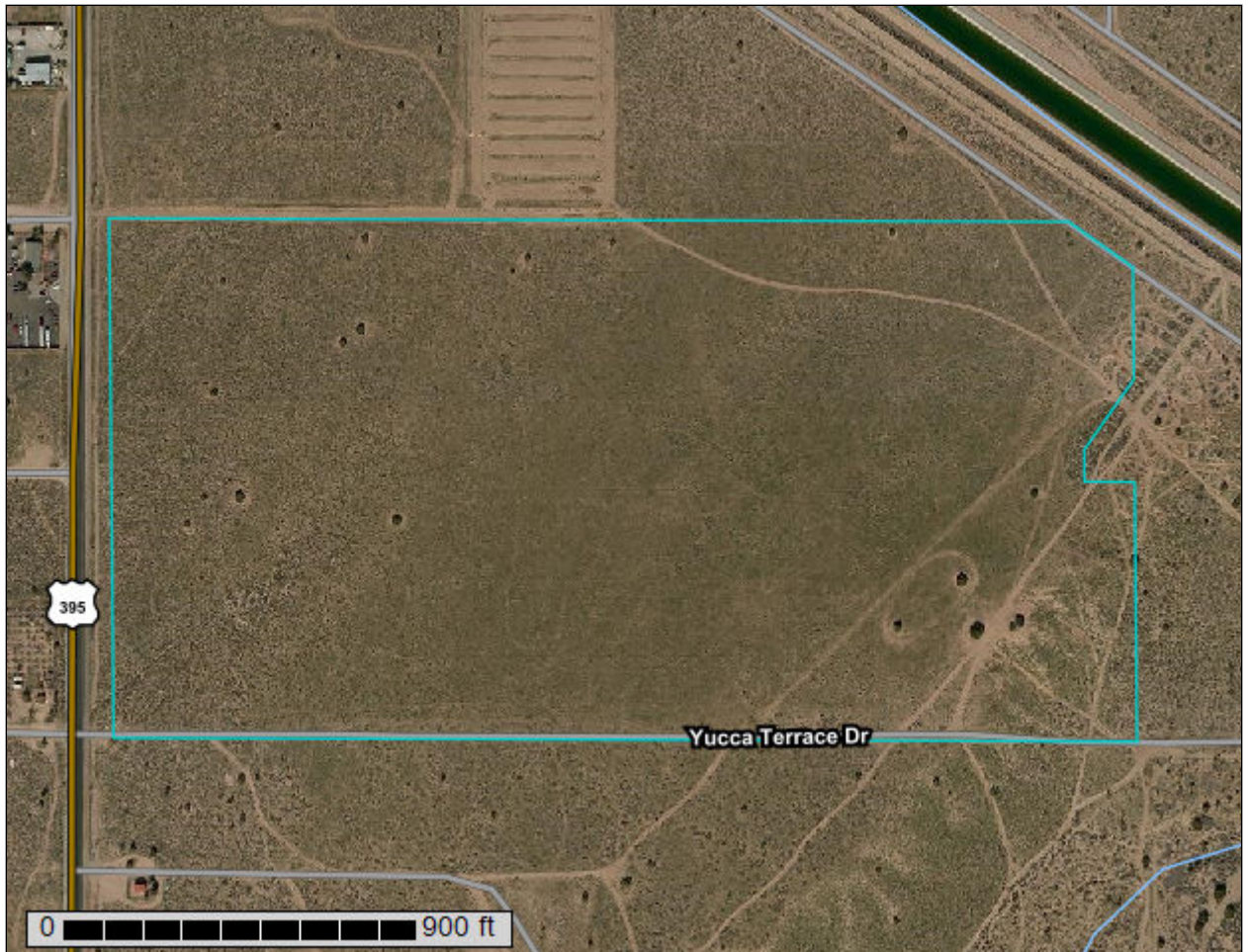
United States
Department of
Agriculture

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, California, Mojave River Area



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

Custom Soil Resource Report

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

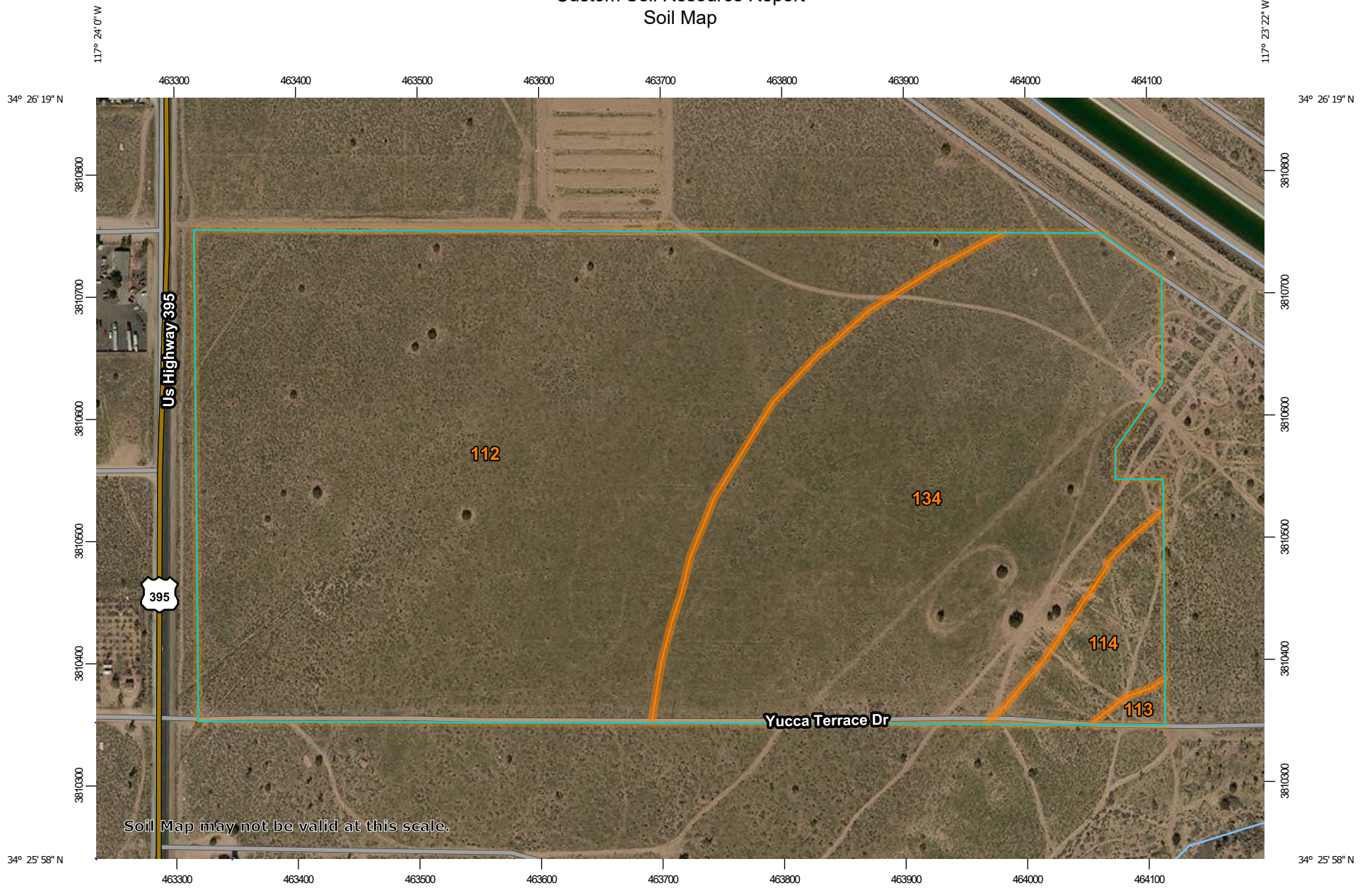
Custom Soil Resource Report

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 LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils







 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: San Bernardino County, California, Mojave River Area
 Survey Area Data: Version 11, Sep 17, 2019

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

Date(s) aerial images were photographed: Feb 1, 2015—Feb 4, 2015

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
112	CAJON SAND, 0 TO 2 PERCENT SLOPES	46.1	58.6%
113	CAJON SAND, 2 TO 9 PERCENT SLOPES	0.3	0.4%
114	CAJON SAND, 9 TO 15 PERCENT SLOPES	3.0	3.8%
134	HESPERIA LOAMY FINE SAND, 2 TO 5 PERCENT SLOPES	29.3	37.2%
Totals for Area of Interest		78.7	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.

Custom Soil Resource Report

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, California, Mojave River Area

112—CAJON SAND, 0 TO 2 PERCENT SLOPES

Map Unit Setting

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

Map Unit Composition

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

Description of Cajon

Setting

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

Typical profile

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

Properties and qualities

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

Interpretive groups

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

Minor Components

Manet

Percent of map unit: 5 percent

Custom Soil Resource Report

Landform: Playas
Hydric soil rating: Yes

Kimberlina

Percent of map unit: 5 percent

Helendale

Percent of map unit: 5 percent

113—CAJON SAND, 2 TO 9 PERCENT SLOPES

Map Unit Setting

National map unit symbol: hkrk
Elevation: 1,800 to 3,500 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 59 to 68 degrees F
Frost-free period: 180 to 290 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Cajon

Setting

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

Typical profile

A - 0 to 6 inches: sand
C1 - 6 to 25 inches: sand
C2 - 25 to 60 inches: gravelly sand, stratified gravelly sand to sand
C2 - 25 to 60 inches:

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Natural 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: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent

Custom Soil Resource Report

Available water storage in profile: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: A

Ecological site: Sandy (R030XF012CA)

Hydric soil rating: No

Minor Components

Cajon, gravelly surface

Percent of map unit: 5 percent

Landform: Alluvial fans

Helendale

Percent of map unit: 5 percent

Landform: Alluvial fans

Hydric soil rating: No

Kimberlina

Percent of map unit: 5 percent

Landform: Alluvial fans

Hydric soil rating: No

114—CAJON SAND, 9 TO 15 PERCENT SLOPES

Map Unit Setting

National map unit symbol: hkrl

Elevation: 1,800 to 4,000 feet

Mean annual precipitation: 3 to 6 inches

Mean annual air temperature: 59 to 66 degrees F

Frost-free period: 180 to 290 days

Farmland classification: Not prime farmland

Map Unit Composition

Cajon, slope, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cajon, Slope

Setting

Landform: Alluvial fans

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 6 inches: sand

Custom Soil Resource Report

H2 - 6 to 42 inches: sand
H3 - 42 to 60 inches: gravelly sand

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: Sandy (R030XF012CA)
Hydric soil rating: No

Minor Components

Arizo

Percent of map unit: 5 percent
Hydric soil rating: No

Cajon, gravelly surface

Percent of map unit: 5 percent
Hydric soil rating: No

Cajon, steep

Percent of map unit: 5 percent
Hydric soil rating: No

134—HESPERIA LOAMY FINE SAND, 2 TO 5 PERCENT SLOPES

Map Unit Setting

National map unit symbol: hks7
Elevation: 200 to 4,000 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 150 to 250 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Hesperia

Setting

Landform: Fan aprons
Landform position (two-dimensional): Foothlope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 6 inches: loamy fine sand
H2 - 6 to 60 inches: sandy loam, coarse sandy loam
H2 - 6 to 60 inches:

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 6e
***Hydrologic Soil Group:* A**
Ecological site: COARSE LOAMY (R030XE006CA)
Hydric soil rating: No

Minor Components

Cajon

Percent of map unit: 5 percent
Hydric soil rating: No

Wrightwood

Percent of map unit: 5 percent
Hydric soil rating: No

Bull trail

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed soils

Percent of map unit: 2 percent
Hydric soil rating: No

Custom Soil Resource Report

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Custom Soil Resource Report

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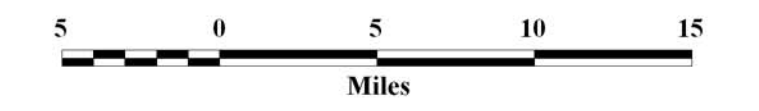
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Figure ADD-1 Antecedent Moisture Condition (AMC)

5-day Rainfall - NOAA Atlas 14
(50% of Total Rainfall Prior to Peak)*

$$*1/2 (11\text{-day} - 1\text{-day}) = 1/2 ((10\text{-day}) + (1/10 ((20\text{-day}) - [10\text{-day}]))) - [1\text{-day}]$$



Growing Season	
AMC I	Dark Blue
AMC II	Light Yellow
AMC III	Dark Brown

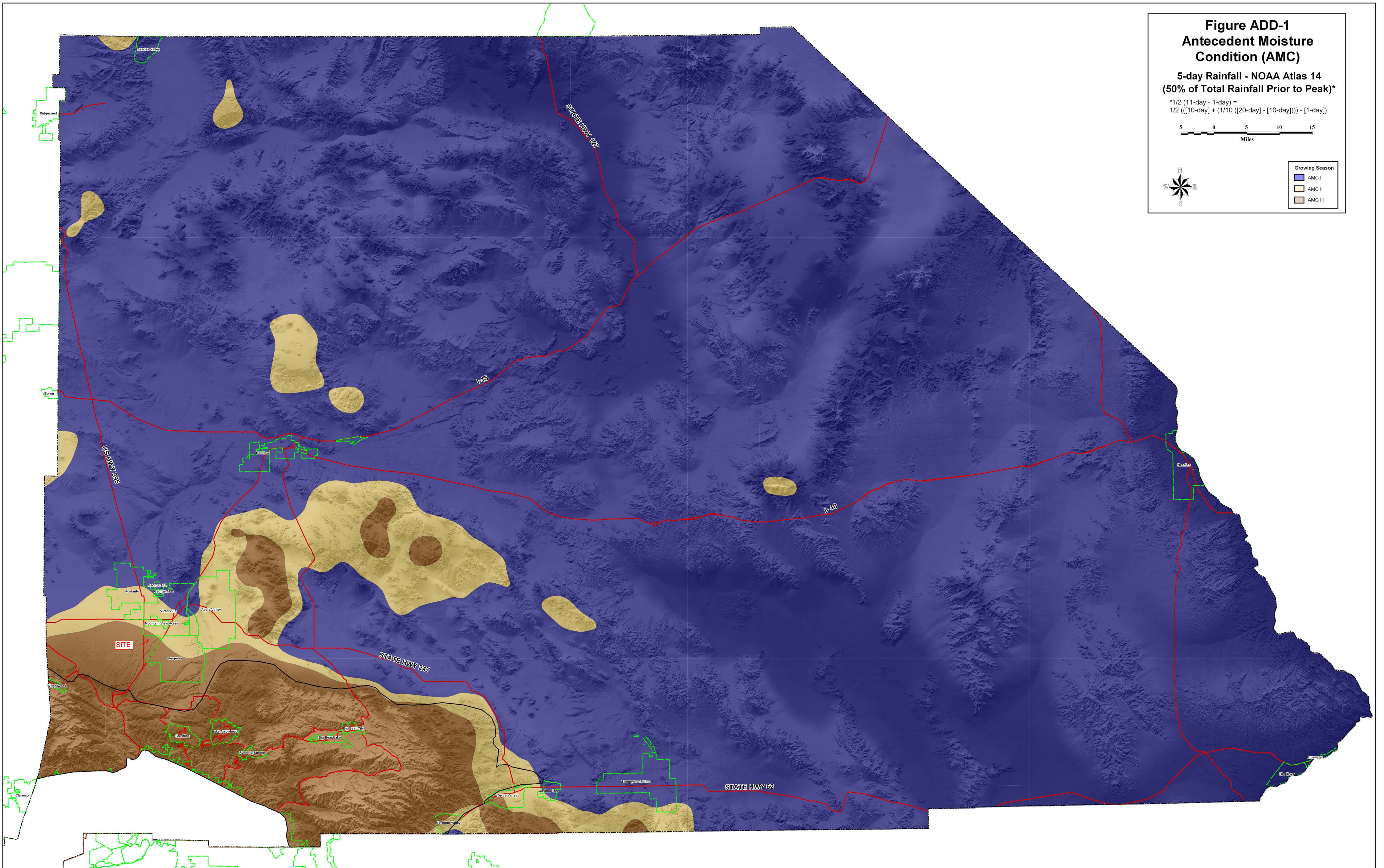
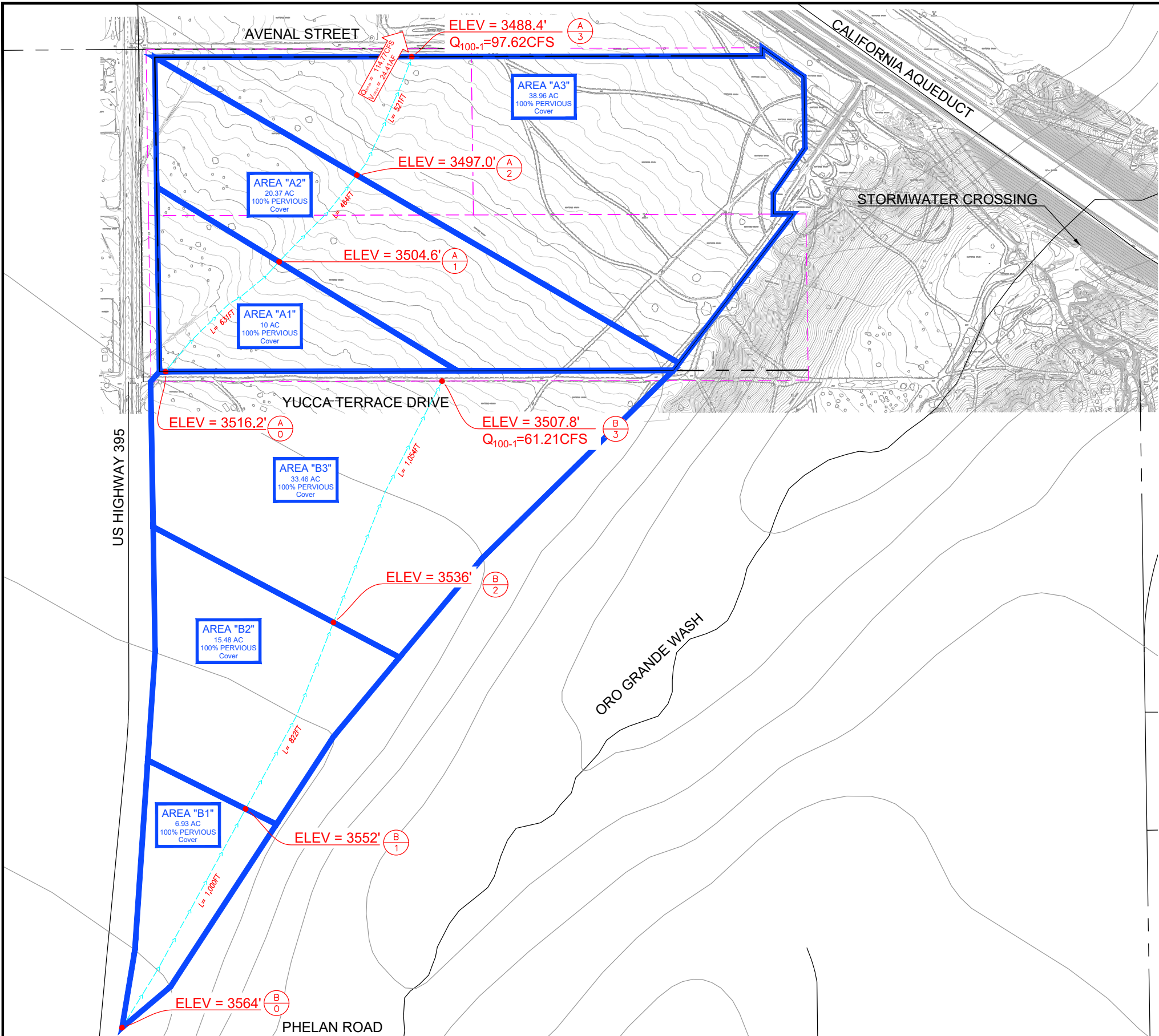
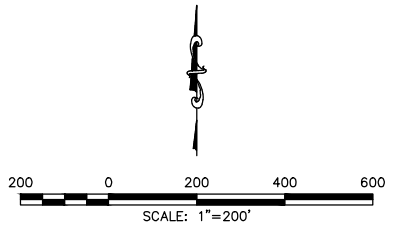
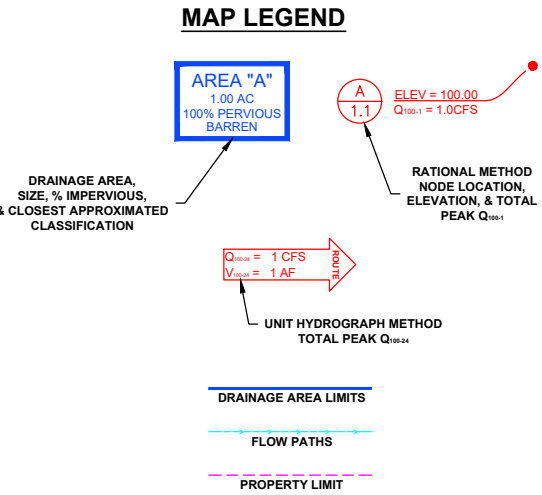
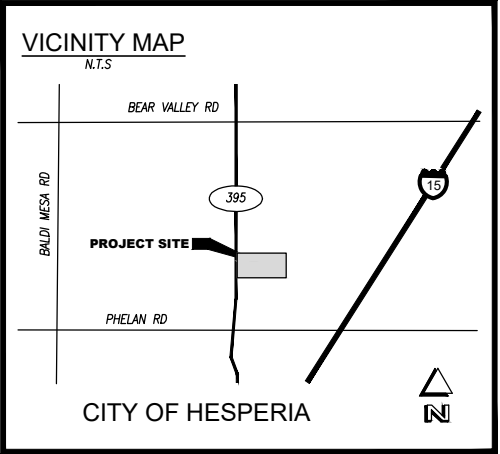


EXHIBIT “F”

Existing Hydrologic Conditions Study Map

EXHIBIT "F" EXISTING CONDITION EXHIBIT US COLD STORAGE IN THE CITY OF HESPERIA CA



EXISTING OFF-SITE TRIBUTARY
US COLD STORAGE
IN THE CITY OF HESPERIA CA

PREPARED BY:
BONADIMAN



PREPARED FOR:
FISHER CONSTRUCTION GROUP

BY	MARK	REVISION DESCRIPTION	DATE

PREPARED FOR: FISHER CONSTRUCTION GROUP
JOB NO: 204728
PREPARED BY: SG
CHECKED BY: JTS
NOTE: JOSEPH E. BONADIMAN & ASSOCIATES, INC. DOES NOT WARRANT THE ACCURACY OF THE G.I.S. DATA PRESENTED IN THIS EXHIBIT. THIS EXHIBIT MAY CONTAIN INFORMATION COPYRIGHTED TO THE COUNTY OF SAN BERNARDINO, CA.

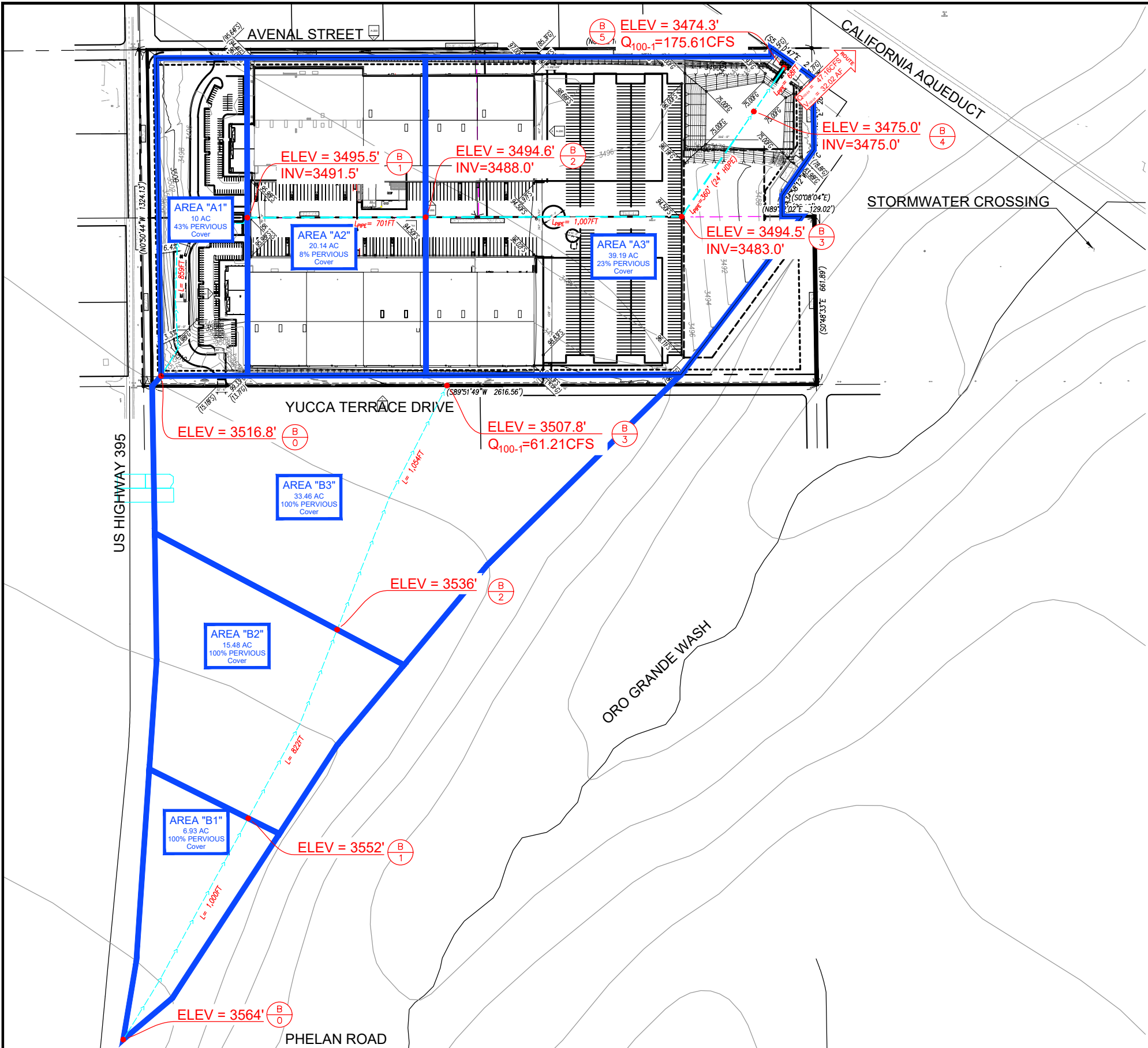
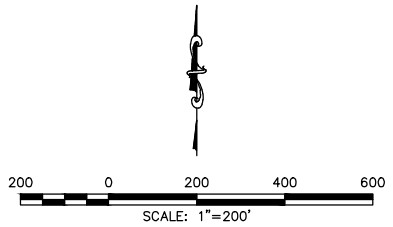
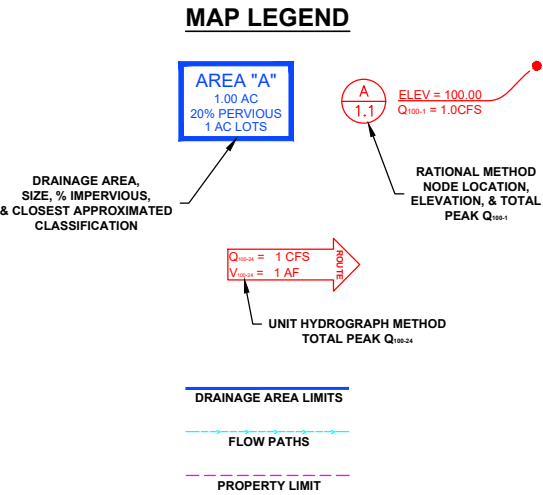
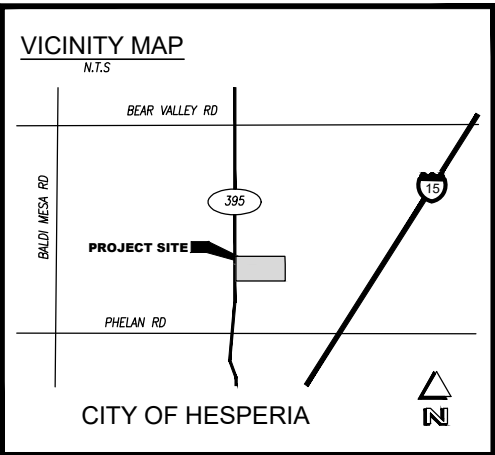
EXISTING OFF-SITE TRIBUTARY
US COLD STORAGE
IN THE CITY OF HESPERIA CA
DISREGARD PRINTS BEARING EARLIER REVISION DATES
05-08-2020

F
SHEET 1 OF 1

EXHIBIT “G”

Developed Hydrologic Conditions
Study Map (On-Site)

EXHIBIT "G" PROPOSED CONDITION EXHIBIT US COLD STORAGE IN THE CITY OF HESPERIA CA



PROPOSED CONDITION EXHIBIT
US COLD STORAGE
IN THE CITY OF HESPERIA CA

PREPARED BY:

PREPARED FOR:

CIVIL DESIGN

PREPARED FOR:	FISHER CONSTRUCTION GROUP
JOB NO:	204728
PREPARED BY:	SG
CHECKED BY:	JTS
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BY	MARK
REVISION DESCRIPTION	DATE

PROPOSED CONDITION EXHIBIT
US COLD STORAGE
IN THE CITY OF HESPERIA CA

DISREGARD PRINTS BEARING
EARLIER REVISION DATES

05-08-2020

G

SHEET 1 OF 1

ATTACHMENT 1

Existing Conditions
Rational Method Calculations

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 05/06/20

204728 - US Cold Storage
EXISTING CONDITIONS - AREA A
25-YEAR, 1- HOUR STORM
BY: SG DATE: 05-06-20

Program License Serial Number 6320

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

Rational hydrology study storm event year is 25.0
10 Year storm 1 hour rainfall = 0.760(In.)
100 Year storm 1 hour rainfall = 1.270(In.)
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.963 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

+++++
Process from Point/Station 0.000 to Point/Station 1.000
**** 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) = 63.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.637(In/Hr)
Initial subarea data:
Initial area flow distance = 631.000(Ft.)
Top (of initial area) elevation = 3516.200(Ft.)
Bottom (of initial area) elevation = 3504.600(Ft.)
Difference in elevation = 11.600(Ft.)
Slope = 0.01838 s(%)= 1.84
TC = k(0.849)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 24.893 min.
Rainfall intensity = 1.632(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.549
Subarea runoff = 8.957(CFS)
Total initial stream area = 10.000(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.637(In/Hr)

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 3504.600(Ft.)
 Downstream point elevation = 3497.000(Ft.)
 Channel length thru subarea = 464.000(Ft.)
 Channel base width = 50.000(Ft.)
 Slope or 'Z' of left channel bank = 10.000
 Slope or 'Z' of right channel bank = 10.000
 Estimated mean flow rate at midpoint of channel = 16.348(CFS)
 Manning's 'N' = 0.025
 Maximum depth of channel = 0.300(Ft.)
 Flow(q) thru subarea = 16.348(CFS)
 Depth of flow = 0.150(Ft.), Average velocity = 2.110(Ft/s)
 Channel flow top width = 53.008(Ft.)
 Flow Velocity = 2.11(Ft/s)
 Travel time = 3.66 min.
 Time of concentration = 28.56 min.
 Critical depth = 0.148(Ft.)
 Adding area flow to channel
 Soil classification AP and SCS values input by user
 USER INPUT of soil data for subarea
 SCS curve number for soil(AMC 2) = 63.00
 Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.637(In/Hr)
 Rainfall intensity = 1.503(In/Hr) for a 25.0 year storm
 Effective runoff coefficient used for area,(total area with modified
 rational method)(Q=KCIA) is C = 0.518
 Subarea runoff = 14.716(CFS) for 20.370(Ac.)
 Total runoff = 23.673(CFS)
 Effective area this stream = 30.37(Ac.)
 Total Study Area (Main Stream No. 1) = 30.37(Ac.)
 Area averaged Fm value = 0.637(In/Hr)
 Depth of flow = 0.188(Ft.), Average velocity = 2.433(Ft/s)
 Critical depth = 0.188(Ft.)

++++++
 Process from Point/Station 2.000 to Point/Station 3.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 3497.000(Ft.)
 Downstream point elevation = 3488.400(Ft.)
 Channel length thru subarea = 521.000(Ft.)
 Channel base width = 70.000(Ft.)
 Slope or 'Z' of left channel bank = 10.000
 Slope or 'Z' of right channel bank = 10.000
 Estimated mean flow rate at midpoint of channel = 35.803(CFS)
 Manning's 'N' = 0.025
 Maximum depth of channel = 0.400(Ft.)
 Flow(q) thru subarea = 35.803(CFS)
 Depth of flow = 0.196(Ft.), Average velocity = 2.534(Ft/s)
 Channel flow top width = 73.927(Ft.)
 Flow Velocity = 2.53(Ft/s)
 Travel time = 3.43 min.
 Time of concentration = 31.98 min.
 Critical depth = 0.199(Ft.)
 Adding area flow to channel
 Soil classification AP and SCS values input by user
 USER INPUT of soil data for subarea
 SCS curve number for soil(AMC 2) = 63.00
 Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.637(In/Hr)

Rainfall intensity = 1.405(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)($Q=KCIA$) is $C = 0.492$
Subarea runoff = 24.202(CFS) for 38.960(Ac.)
Total runoff = 47.875(CFS)
Effective area this stream = 69.33(Ac.)
Total Study Area (Main Stream No. 1) = 69.33(Ac.)
Area averaged F_m value = 0.637(In/Hr)
Depth of flow = 0.233(Ft.), Average velocity = 2.834(Ft/s)
Critical depth = 0.242(Ft.)
End of computations, Total Study Area = 69.33 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 1.000
Area averaged SCS curve number = 63.0

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: 05/06/20

204728 - US Cold Storage
EXISTING CONDITIONS - AREA A
100-YEAR, 1- HOUR STORM
BY: SG DATE: 05-06-20

Program License Serial Number 6320

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.760(In.)
100 Year storm 1 hour rainfall = 1.270(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.270 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

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Process from Point/Station 0.000 to Point/Station 1.000
**** 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) = 63.00
Adjusted SCS curve number for AMC 3 = 81.40
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.346(In/Hr)
Initial subarea data:
Initial area flow distance = 631.000(Ft.)
Top (of initial area) elevation = 3516.200(Ft.)
Bottom (of initial area) elevation = 3504.600(Ft.)
Difference in elevation = 11.600(Ft.)
Slope = 0.01838 s(%)= 1.84
TC = k(0.849)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 24.893 min.
Rainfall intensity = 2.153(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.755
Subarea runoff = 16.265(CFS)
Total initial stream area = 10.000(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.346(In/Hr)

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Process from Point/Station 1.000 to Point/Station 2.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 3504.600(Ft.)
 Downstream point elevation = 3497.000(Ft.)
 Channel length thru subarea = 464.000(Ft.)
 Channel base width = 50.000(Ft.)
 Slope or 'Z' of left channel bank = 10.000
 Slope or 'Z' of right channel bank = 10.000
 Estimated mean flow rate at midpoint of channel = 31.000(CFS)
 Manning's 'N' = 0.025
 Maximum depth of channel = 0.300(Ft.)
 Flow(q) thru subarea = 31.000(CFS)
 Depth of flow = 0.220(Ft.), Average velocity = 2.697(Ft/s)
 Channel flow top width = 54.403(Ft.)
 Flow Velocity = 2.70(Ft/s)
 Travel time = 2.87 min.
 Time of concentration = 27.76 min.
 Critical depth = 0.227(Ft.)
 Adding area flow to channel
 Soil classification AP and SCS values input by user
 USER INPUT of soil data for subarea
 SCS curve number for soil(AMC 2) = 63.00
 Adjusted SCS curve number for AMC 3 = 81.40
 Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.346(In/Hr)
 Rainfall intensity = 2.017(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area,(total area with modified
 rational method)(Q=KCIA) is C = 0.746
 Subarea runoff = 29.406(CFS) for 20.370(Ac.)
 Total runoff = 45.671(CFS)
 Effective area this stream = 30.37(Ac.)
 Total Study Area (Main Stream No. 1) = 30.37(Ac.)
 Area averaged Fm value = 0.346(In/Hr)
 Depth of flow = 0.277(Ft.), Average velocity = 3.124(Ft/s)
 Critical depth = 0.289(Ft.)

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 Process from Point/Station 2.000 to Point/Station 3.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 3497.000(Ft.)
 Downstream point elevation = 3488.400(Ft.)
 Channel length thru subarea = 521.000(Ft.)
 Channel base width = 70.000(Ft.)
 Slope or 'Z' of left channel bank = 10.000
 Slope or 'Z' of right channel bank = 10.000
 Estimated mean flow rate at midpoint of channel = 71.674(CFS)
 Manning's 'N' = 0.025
 Maximum depth of channel = 0.400(Ft.)
 Flow(q) thru subarea = 71.674(CFS)
 Depth of flow = 0.297(Ft.), Average velocity = 3.309(Ft/s)
 Channel flow top width = 75.938(Ft.)
 Flow Velocity = 3.31(Ft/s)
 Travel time = 2.62 min.
 Time of concentration = 30.38 min.
 Critical depth = 0.313(Ft.)
 Adding area flow to channel
 Soil classification AP and SCS values input by user
 USER INPUT of soil data for subarea

SCS curve number for soil(AMC 2) = 63.00
Adjusted SCS curve number for AMC 3 = 81.40
Pervious ratio(A_p) = 1.0000 Max loss rate(F_m)= 0.346(In/Hr)
Rainfall intensity = 1.910(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)($Q=KCIA$) is $C = 0.737$
Subarea runoff = 51.949(CFS) for 38.960(Ac.)
Total runoff = 97.620(CFS)
Effective area this stream = 69.33(Ac.)
Total Study Area (Main Stream No. 1) = 69.33(Ac.)
Area averaged F_m value = 0.346(In/Hr)
Depth of flow = 0.357(Ft.), Average velocity = 3.720(Ft/s)
Critical depth = 0.383(Ft.)
End of computations, Total Study Area = 69.33 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 1.000
Area averaged SCS curve number = 63.0

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: 05/06/20

204728 - US Cold Storage
EXISTING CONDITIONS - AREA B
25-YEAR, 1- HOUR STORM
BY: SG DATE: 05-06-20

Program License Serial Number 6320

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

Rational hydrology study storm event year is 25.0
10 Year storm 1 hour rainfall = 0.760(In.)
100 Year storm 1 hour rainfall = 1.270(In.)
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.963 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

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Process from Point/Station 0.000 to Point/Station 1.000
**** 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) = 63.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.637(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 3564.000(Ft.)
Bottom (of initial area) elevation = 3552.000(Ft.)
Difference in elevation = 12.000(Ft.)
Slope = 0.01200 s(%)= 1.20
TC = k(0.849)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 32.592 min.
Rainfall intensity = 1.389(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.487
Subarea runoff = 4.687(CFS)
Total initial stream area = 6.930(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.637(In/Hr)

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Process from Point/Station 1.000 to Point/Station 2.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 3552.000(Ft.)
 Downstream point elevation = 3536.000(Ft.)
 Channel length thru subarea = 822.000(Ft.)
 Channel base width = 30.000(Ft.)
 Slope or 'Z' of left channel bank = 10.000
 Slope or 'Z' of right channel bank = 10.000
 Estimated mean flow rate at midpoint of channel = 8.485(CFS)
 Manning's 'N' = 0.025
 Maximum depth of channel = 0.300(Ft.)
 Flow(q) thru subarea = 8.485(CFS)
 Depth of flow = 0.131(Ft.), Average velocity = 2.076(Ft/s)
 Channel flow top width = 32.611(Ft.)
 Flow Velocity = 2.08(Ft/s)
 Travel time = 6.60 min.
 Time of concentration = 39.19 min.
 Critical depth = 0.133(Ft.)
 Adding area flow to channel
 Soil classification AP and SCS values input by user
 USER INPUT of soil data for subarea
 SCS curve number for soil(AMC 2) = 63.00
 Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.637(In/Hr)
 Rainfall intensity = 1.243(In/Hr) for a 25.0 year storm
 Effective runoff coefficient used for area,(total area with modified
 rational method)(Q=KCIA) is C = 0.439
 Subarea runoff = 7.537(CFS) for 15.480(Ac.)
 Total runoff = 12.224(CFS)
 Effective area this stream = 22.41(Ac.)
 Total Study Area (Main Stream No. 1) = 22.41(Ac.)
 Area averaged Fm value = 0.637(In/Hr)
 Depth of flow = 0.162(Ft.), Average velocity = 2.384(Ft/s)
 Critical depth = 0.170(Ft.)

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 Process from Point/Station 2.000 to Point/Station 3.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 3536.000(Ft.)
 Downstream point elevation = 3507.800(Ft.)
 Channel length thru subarea = 1054.000(Ft.)
 Channel base width = 50.000(Ft.)
 Slope or 'Z' of left channel bank = 10.000
 Slope or 'Z' of right channel bank = 10.000
 Estimated mean flow rate at midpoint of channel = 18.509(CFS)
 Manning's 'N' = 0.025
 Maximum depth of channel = 0.400(Ft.)
 Flow(q) thru subarea = 18.509(CFS)
 Depth of flow = 0.140(Ft.), Average velocity = 2.574(Ft/s)
 Channel flow top width = 52.798(Ft.)
 Flow Velocity = 2.57(Ft/s)
 Travel time = 6.83 min.
 Time of concentration = 46.02 min.
 Critical depth = 0.160(Ft.)
 Adding area flow to channel
 Soil classification AP and SCS values input by user
 USER INPUT of soil data for subarea
 SCS curve number for soil(AMC 2) = 63.00
 Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.637(In/Hr)

Rainfall intensity = 1.129(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)($Q=KCIA$) is $C = 0.392$
Subarea runoff = 12.509(CFS) for 33.460(Ac.)
Total runoff = 24.733(CFS)
Effective area this stream = 55.87(Ac.)
Total Study Area (Main Stream No. 1) = 55.87(Ac.)
Area averaged F_m value = 0.637(In/Hr)
Depth of flow = 0.166(Ft.), Average velocity = 2.878(Ft/s)
Critical depth = 0.195(Ft.)
End of computations, Total Study Area = 55.87 (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(A_p) = 1.000
Area averaged SCS curve number = 63.0

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: 05/06/20

204728 - US Cold Storage
EXISTING CONDITIONS - AREA B
100-YEAR, 1- HOUR STORM
BY: SG DATE: 05-06-20

Program License Serial Number 6320

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.760(In.)
100 Year storm 1 hour rainfall = 1.270(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.270 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

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Process from Point/Station 0.000 to Point/Station 1.000
**** 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) = 63.00
Adjusted SCS curve number for AMC 3 = 81.40
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.346(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 3564.000(Ft.)
Bottom (of initial area) elevation = 3552.000(Ft.)
Difference in elevation = 12.000(Ft.)
Slope = 0.01200 s(%)= 1.20
TC = k(0.849)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 32.592 min.
Rainfall intensity = 1.832(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.730
Subarea runoff = 9.267(CFS)
Total initial stream area = 6.930(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.346(In/Hr)

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Process from Point/Station 1.000 to Point/Station 2.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 3552.000(Ft.)
 Downstream point elevation = 3536.000(Ft.)
 Channel length thru subarea = 822.000(Ft.)
 Channel base width = 30.000(Ft.)
 Slope or 'Z' of left channel bank = 10.000
 Slope or 'Z' of right channel bank = 10.000
 Estimated mean flow rate at midpoint of channel = 18.139(CFS)
 Manning's 'N' = 0.025
 Maximum depth of channel = 0.300(Ft.)
 Flow(q) thru subarea = 18.139(CFS)
 Depth of flow = 0.205(Ft.), Average velocity = 2.764(Ft/s)
 Channel flow top width = 34.096(Ft.)
 Flow Velocity = 2.76(Ft/s)
 Travel time = 4.96 min.
 Time of concentration = 37.55 min.
 Critical depth = 0.219(Ft.)
 Adding area flow to channel
 Soil classification AP and SCS values input by user
 USER INPUT of soil data for subarea
 SCS curve number for soil(AMC 2) = 63.00
 Adjusted SCS curve number for AMC 3 = 81.40
 Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.346(In/Hr)
 Rainfall intensity = 1.682(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area,(total area with modified
 rational method)(Q=KCIA) is C = 0.715
 Subarea runoff = 17.691(CFS) for 15.480(Ac.)
 Total runoff = 26.958(CFS)
 Effective area this stream = 22.41(Ac.)
 Total Study Area (Main Stream No. 1) = 22.41(Ac.)
 Area averaged Fm value = 0.346(In/Hr)
 Depth of flow = 0.259(Ft.), Average velocity = 3.198(Ft/s)
 Critical depth = 0.285(Ft.)

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 Process from Point/Station 2.000 to Point/Station 3.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 3536.000(Ft.)
 Downstream point elevation = 3507.800(Ft.)
 Channel length thru subarea = 1054.000(Ft.)
 Channel base width = 50.000(Ft.)
 Slope or 'Z' of left channel bank = 10.000
 Slope or 'Z' of right channel bank = 10.000
 Estimated mean flow rate at midpoint of channel = 44.113(CFS)
 Manning's 'N' = 0.025
 Maximum depth of channel = 0.400(Ft.)
 Flow(q) thru subarea = 44.113(CFS)
 Depth of flow = 0.235(Ft.), Average velocity = 3.591(Ft/s)
 Channel flow top width = 54.693(Ft.)
 Flow Velocity = 3.59(Ft/s)
 Travel time = 4.89 min.
 Time of concentration = 42.44 min.
 Critical depth = 0.285(Ft.)
 Adding area flow to channel
 Soil classification AP and SCS values input by user
 USER INPUT of soil data for subarea

SCS curve number for soil(AMC 2) = 63.00
Adjusted SCS curve number for AMC 3 = 81.40
Pervious ratio(A_p) = 1.0000 Max loss rate(F_m)= 0.346(In/Hr)
Rainfall intensity = 1.563(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 = 34.257(CFS) for 33.460(Ac.)
Total runoff = 61.215(CFS)
Effective area this stream = 55.87(Ac.)
Total Study Area (Main Stream No. 1) = 55.87(Ac.)
Area averaged F_m value = 0.346(In/Hr)
Depth of flow = 0.285(Ft.), Average velocity = 4.064(Ft/s)
Critical depth = 0.352(Ft.)
End of computations, Total Study Area = 55.87 (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(A_p) = 1.000
Area averaged SCS curve number = 63.0

ATTACHMENT 2

Existing Conditions
Hydrograph Calculations

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 1)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
63.0	43.0	69.33	1.000	0.887	1.000	0.887

Area-averaged adjusted loss rate Fm (In/Hr) = 0.887

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC1)	S	Pervious Yield Fr
69.33	1.000	63.0	43.0	9.80	0.000

Area-averaged catchment yield fraction, Y = 0.000

Area-averaged low loss fraction, Yb = 1.000

User entry of time of concentration = 0.506 (hours)

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Watershed area = 69.33(Ac.)

Catchment Lag time = 0.405 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 20.5863

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.887(In/Hr)

Average low loss rate fraction (Yb) = 1.000 (decimal)

DESERT S-Graph Selected

Computed peak 5-minute rainfall = 0.191(In)

Computed peak 30-minute rainfall = 0.328(In)

Specified peak 1-hour rainfall = 0.404(In)

Computed peak 3-hour rainfall = 0.721(In)

Specified peak 6-hour rainfall = 1.040(In)

Specified peak 24-hour rainfall = 1.960(In)

Rainfall depth area reduction factors:

Using a total area of 69.33(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.191(In)

30-minute factor = 0.997 Adjusted rainfall = 0.327(In)

1-hour factor = 0.997 Adjusted rainfall = 0.402(In)

3-hour factor = 1.000 Adjusted rainfall = 0.721(In)

6-hour factor = 1.000 Adjusted rainfall = 1.040(In)

24-hour factor = 1.000 Adjusted rainfall = 1.960(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))
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(K = 838.46 (CFS))

1	1.033	8.660
2	4.725	30.955
3	12.013	61.112

4	28.066	134.597
5	45.124	143.023
6	56.476	95.180
7	63.994	63.040
8	69.530	46.418
9	73.935	36.932
10	77.525	30.097
11	80.431	24.371
12	82.868	20.432
13	85.001	17.883
14	86.912	16.023
15	88.543	13.671
16	89.843	10.907
17	91.022	9.880
18	92.092	8.978
19	93.055	8.073
20	93.930	7.331
21	94.649	6.029
22	95.347	5.855
23	95.943	4.997
24	96.478	4.488
25	96.972	4.138
26	97.349	3.164
27	97.713	3.052
28	97.961	2.081
29	98.167	1.726
30	98.388	1.852
31	98.635	2.068
32	98.882	2.071
33	99.129	2.071
34	99.376	2.071
35	99.564	1.578
36	99.693	1.079
37	99.821	1.079
38	100.000	0.539

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.1909	0.1909
2	0.2350	0.0441
3	0.2654	0.0304
4	0.2893	0.0239
5	0.3093	0.0200
6	0.3267	0.0174
7	0.3422	0.0155
8	0.3561	0.0140
9	0.3690	0.0128
10	0.3808	0.0118
11	0.3919	0.0110
12	0.4022	0.0104
13	0.4197	0.0175
14	0.4365	0.0168
15	0.4528	0.0163
16	0.4686	0.0158
17	0.4839	0.0153
18	0.4988	0.0149
19	0.5134	0.0145
20	0.5275	0.0142

21	0.5414	0.0138
22	0.5549	0.0135
23	0.5682	0.0133
24	0.5812	0.0130
25	0.5939	0.0127
26	0.6064	0.0125
27	0.6187	0.0123
28	0.6307	0.0121
29	0.6426	0.0119
30	0.6543	0.0117
31	0.6658	0.0115
32	0.6771	0.0113
33	0.6882	0.0112
34	0.6992	0.0110
35	0.7101	0.0108
36	0.7208	0.0107
37	0.7313	0.0105
38	0.7417	0.0104
39	0.7519	0.0103
40	0.7621	0.0101
41	0.7721	0.0100
42	0.7820	0.0099
43	0.7918	0.0098
44	0.8014	0.0097
45	0.8110	0.0096
46	0.8205	0.0095
47	0.8299	0.0094
48	0.8392	0.0093
49	0.8484	0.0092
50	0.8575	0.0091
51	0.8665	0.0090
52	0.8754	0.0089
53	0.8843	0.0089
54	0.8931	0.0088
55	0.9018	0.0087
56	0.9104	0.0086
57	0.9190	0.0086
58	0.9275	0.0085
59	0.9359	0.0084
60	0.9442	0.0084
61	0.9525	0.0083
62	0.9607	0.0082
63	0.9689	0.0082
64	0.9770	0.0081
65	0.9850	0.0080
66	0.9930	0.0080
67	1.0010	0.0079
68	1.0088	0.0079
69	1.0166	0.0078
70	1.0244	0.0078
71	1.0321	0.0077
72	1.0398	0.0077
73	1.0464	0.0066
74	1.0529	0.0065
75	1.0594	0.0065
76	1.0658	0.0064
77	1.0722	0.0064
78	1.0785	0.0063

79	1.0848	0.0063
80	1.0911	0.0063
81	1.0973	0.0062
82	1.1035	0.0062
83	1.1096	0.0061
84	1.1157	0.0061
85	1.1218	0.0061
86	1.1278	0.0060
87	1.1338	0.0060
88	1.1397	0.0059
89	1.1456	0.0059
90	1.1515	0.0059
91	1.1573	0.0058
92	1.1631	0.0058
93	1.1689	0.0058
94	1.1746	0.0057
95	1.1803	0.0057
96	1.1859	0.0057
97	1.1916	0.0056
98	1.1972	0.0056
99	1.2027	0.0056
100	1.2083	0.0055
101	1.2138	0.0055
102	1.2193	0.0055
103	1.2247	0.0055
104	1.2302	0.0054
105	1.2355	0.0054
106	1.2409	0.0054
107	1.2463	0.0053
108	1.2516	0.0053
109	1.2568	0.0053
110	1.2621	0.0053
111	1.2673	0.0052
112	1.2725	0.0052
113	1.2777	0.0052
114	1.2829	0.0052
115	1.2880	0.0051
116	1.2931	0.0051
117	1.2982	0.0051
118	1.3033	0.0051
119	1.3083	0.0050
120	1.3133	0.0050
121	1.3183	0.0050
122	1.3233	0.0050
123	1.3282	0.0049
124	1.3332	0.0049
125	1.3381	0.0049
126	1.3430	0.0049
127	1.3478	0.0049
128	1.3527	0.0048
129	1.3575	0.0048
130	1.3623	0.0048
131	1.3671	0.0048
132	1.3718	0.0048
133	1.3766	0.0047
134	1.3813	0.0047
135	1.3860	0.0047
136	1.3907	0.0047

137	1.3954	0.0047
138	1.4000	0.0046
139	1.4046	0.0046
140	1.4092	0.0046
141	1.4138	0.0046
142	1.4184	0.0046
143	1.4230	0.0046
144	1.4275	0.0045
145	1.4320	0.0045
146	1.4365	0.0045
147	1.4410	0.0045
148	1.4455	0.0045
149	1.4500	0.0045
150	1.4544	0.0044
151	1.4588	0.0044
152	1.4632	0.0044
153	1.4676	0.0044
154	1.4720	0.0044
155	1.4764	0.0044
156	1.4807	0.0043
157	1.4851	0.0043
158	1.4894	0.0043
159	1.4937	0.0043
160	1.4980	0.0043
161	1.5022	0.0043
162	1.5065	0.0043
163	1.5107	0.0042
164	1.5150	0.0042
165	1.5192	0.0042
166	1.5234	0.0042
167	1.5276	0.0042
168	1.5318	0.0042
169	1.5359	0.0042
170	1.5401	0.0041
171	1.5442	0.0041
172	1.5483	0.0041
173	1.5524	0.0041
174	1.5565	0.0041
175	1.5606	0.0041
176	1.5647	0.0041
177	1.5687	0.0041
178	1.5728	0.0040
179	1.5768	0.0040
180	1.5808	0.0040
181	1.5849	0.0040
182	1.5889	0.0040
183	1.5928	0.0040
184	1.5968	0.0040
185	1.6008	0.0040
186	1.6047	0.0040
187	1.6087	0.0039
188	1.6126	0.0039
189	1.6165	0.0039
190	1.6204	0.0039
191	1.6243	0.0039
192	1.6282	0.0039
193	1.6321	0.0039
194	1.6359	0.0039

195	1.6398	0.0039
196	1.6436	0.0038
197	1.6474	0.0038
198	1.6513	0.0038
199	1.6551	0.0038
200	1.6589	0.0038
201	1.6627	0.0038
202	1.6664	0.0038
203	1.6702	0.0038
204	1.6740	0.0038
205	1.6777	0.0037
206	1.6814	0.0037
207	1.6852	0.0037
208	1.6889	0.0037
209	1.6926	0.0037
210	1.6963	0.0037
211	1.7000	0.0037
212	1.7037	0.0037
213	1.7073	0.0037
214	1.7110	0.0037
215	1.7146	0.0037
216	1.7183	0.0036
217	1.7219	0.0036
218	1.7255	0.0036
219	1.7291	0.0036
220	1.7328	0.0036
221	1.7363	0.0036
222	1.7399	0.0036
223	1.7435	0.0036
224	1.7471	0.0036
225	1.7506	0.0036
226	1.7542	0.0036
227	1.7577	0.0035
228	1.7613	0.0035
229	1.7648	0.0035
230	1.7683	0.0035
231	1.7718	0.0035
232	1.7753	0.0035
233	1.7788	0.0035
234	1.7823	0.0035
235	1.7858	0.0035
236	1.7893	0.0035
237	1.7927	0.0035
238	1.7962	0.0035
239	1.7996	0.0034
240	1.8031	0.0034
241	1.8065	0.0034
242	1.8099	0.0034
243	1.8133	0.0034
244	1.8168	0.0034
245	1.8202	0.0034
246	1.8236	0.0034
247	1.8269	0.0034
248	1.8303	0.0034
249	1.8337	0.0034
250	1.8370	0.0034
251	1.8404	0.0034
252	1.8438	0.0033

253	1.8471	0.0033
254	1.8504	0.0033
255	1.8538	0.0033
256	1.8571	0.0033
257	1.8604	0.0033
258	1.8637	0.0033
259	1.8670	0.0033
260	1.8703	0.0033
261	1.8736	0.0033
262	1.8769	0.0033
263	1.8801	0.0033
264	1.8834	0.0033
265	1.8866	0.0033
266	1.8899	0.0033
267	1.8931	0.0032
268	1.8964	0.0032
269	1.8996	0.0032
270	1.9028	0.0032
271	1.9061	0.0032
272	1.9093	0.0032
273	1.9125	0.0032
274	1.9157	0.0032
275	1.9189	0.0032
276	1.9221	0.0032
277	1.9252	0.0032
278	1.9284	0.0032
279	1.9316	0.0032
280	1.9347	0.0032
281	1.9379	0.0032
282	1.9411	0.0032
283	1.9442	0.0031
284	1.9473	0.0031
285	1.9505	0.0031
286	1.9536	0.0031
287	1.9567	0.0031
288	1.9598	0.0031

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0031	0.0031	0.0000
2	0.0031	0.0031	0.0000
3	0.0031	0.0031	0.0000
4	0.0031	0.0031	0.0000
5	0.0032	0.0032	0.0000
6	0.0032	0.0032	0.0000
7	0.0032	0.0032	0.0000
8	0.0032	0.0032	0.0000
9	0.0032	0.0032	0.0000
10	0.0032	0.0032	0.0000
11	0.0032	0.0032	0.0000
12	0.0032	0.0032	0.0000
13	0.0032	0.0032	0.0000
14	0.0032	0.0032	0.0000
15	0.0032	0.0032	0.0000
16	0.0033	0.0033	0.0000
17	0.0033	0.0033	0.0000

18	0.0033	0.0033	0.0000
19	0.0033	0.0033	0.0000
20	0.0033	0.0033	0.0000
21	0.0033	0.0033	0.0000
22	0.0033	0.0033	0.0000
23	0.0033	0.0033	0.0000
24	0.0033	0.0033	0.0000
25	0.0033	0.0033	0.0000
26	0.0034	0.0034	0.0000
27	0.0034	0.0034	0.0000
28	0.0034	0.0034	0.0000
29	0.0034	0.0034	0.0000
30	0.0034	0.0034	0.0000
31	0.0034	0.0034	0.0000
32	0.0034	0.0034	0.0000
33	0.0034	0.0034	0.0000
34	0.0034	0.0034	0.0000
35	0.0035	0.0035	0.0000
36	0.0035	0.0035	0.0000
37	0.0035	0.0035	0.0000
38	0.0035	0.0035	0.0000
39	0.0035	0.0035	0.0000
40	0.0035	0.0035	0.0000
41	0.0035	0.0035	0.0000
42	0.0035	0.0035	0.0000
43	0.0036	0.0036	0.0000
44	0.0036	0.0036	0.0000
45	0.0036	0.0036	0.0000
46	0.0036	0.0036	0.0000
47	0.0036	0.0036	0.0000
48	0.0036	0.0036	0.0000
49	0.0036	0.0036	0.0000
50	0.0037	0.0037	0.0000
51	0.0037	0.0037	0.0000
52	0.0037	0.0037	0.0000
53	0.0037	0.0037	0.0000
54	0.0037	0.0037	0.0000
55	0.0037	0.0037	0.0000
56	0.0037	0.0037	0.0000
57	0.0038	0.0038	0.0000
58	0.0038	0.0038	0.0000
59	0.0038	0.0038	0.0000
60	0.0038	0.0038	0.0000
61	0.0038	0.0038	0.0000
62	0.0038	0.0038	0.0000
63	0.0039	0.0039	0.0000
64	0.0039	0.0039	0.0000
65	0.0039	0.0039	0.0000
66	0.0039	0.0039	0.0000
67	0.0039	0.0039	0.0000
68	0.0039	0.0039	0.0000
69	0.0040	0.0040	0.0000
70	0.0040	0.0040	0.0000
71	0.0040	0.0040	0.0000
72	0.0040	0.0040	0.0000
73	0.0040	0.0040	0.0000
74	0.0040	0.0040	0.0000
75	0.0041	0.0041	0.0000

76	0.0041	0.0041	0.0000
77	0.0041	0.0041	0.0000
78	0.0041	0.0041	0.0000
79	0.0041	0.0041	0.0000
80	0.0041	0.0041	0.0000
81	0.0042	0.0042	0.0000
82	0.0042	0.0042	0.0000
83	0.0042	0.0042	0.0000
84	0.0042	0.0042	0.0000
85	0.0043	0.0043	0.0000
86	0.0043	0.0043	0.0000
87	0.0043	0.0043	0.0000
88	0.0043	0.0043	0.0000
89	0.0043	0.0043	0.0000
90	0.0044	0.0044	0.0000
91	0.0044	0.0044	0.0000
92	0.0044	0.0044	0.0000
93	0.0044	0.0044	0.0000
94	0.0045	0.0045	0.0000
95	0.0045	0.0045	0.0000
96	0.0045	0.0045	0.0000
97	0.0045	0.0045	0.0000
98	0.0046	0.0046	0.0000
99	0.0046	0.0046	0.0000
100	0.0046	0.0046	0.0000
101	0.0046	0.0046	0.0000
102	0.0047	0.0047	0.0000
103	0.0047	0.0047	0.0000
104	0.0047	0.0047	0.0000
105	0.0048	0.0048	0.0000
106	0.0048	0.0048	0.0000
107	0.0048	0.0048	0.0000
108	0.0048	0.0048	0.0000
109	0.0049	0.0049	0.0000
110	0.0049	0.0049	0.0000
111	0.0049	0.0049	0.0000
112	0.0050	0.0050	0.0000
113	0.0050	0.0050	0.0000
114	0.0050	0.0050	0.0000
115	0.0051	0.0051	0.0000
116	0.0051	0.0051	0.0000
117	0.0052	0.0052	0.0000
118	0.0052	0.0052	0.0000
119	0.0052	0.0052	0.0000
120	0.0053	0.0053	0.0000
121	0.0053	0.0053	0.0000
122	0.0053	0.0053	0.0000
123	0.0054	0.0054	0.0000
124	0.0054	0.0054	0.0000
125	0.0055	0.0055	0.0000
126	0.0055	0.0055	0.0000
127	0.0056	0.0056	0.0000
128	0.0056	0.0056	0.0000
129	0.0057	0.0057	0.0000
130	0.0057	0.0057	0.0000
131	0.0058	0.0058	0.0000
132	0.0058	0.0058	0.0000
133	0.0059	0.0059	0.0000

134	0.0059	0.0059	0.0000
135	0.0060	0.0060	0.0000
136	0.0060	0.0060	0.0000
137	0.0061	0.0061	0.0000
138	0.0061	0.0061	0.0000
139	0.0062	0.0062	0.0000
140	0.0063	0.0063	0.0000
141	0.0063	0.0063	0.0000
142	0.0064	0.0064	0.0000
143	0.0065	0.0065	0.0000
144	0.0065	0.0065	0.0000
145	0.0077	0.0077	0.0000
146	0.0077	0.0077	0.0000
147	0.0078	0.0078	0.0000
148	0.0079	0.0079	0.0000
149	0.0080	0.0080	0.0000
150	0.0080	0.0080	0.0000
151	0.0082	0.0082	0.0000
152	0.0082	0.0082	0.0000
153	0.0084	0.0084	0.0000
154	0.0084	0.0084	0.0000
155	0.0086	0.0086	0.0000
156	0.0086	0.0086	0.0000
157	0.0088	0.0088	0.0000
158	0.0089	0.0089	0.0000
159	0.0090	0.0090	0.0000
160	0.0091	0.0091	0.0000
161	0.0093	0.0093	0.0000
162	0.0094	0.0094	0.0000
163	0.0096	0.0096	0.0000
164	0.0097	0.0097	0.0000
165	0.0099	0.0099	0.0000
166	0.0100	0.0100	0.0000
167	0.0103	0.0103	0.0000
168	0.0104	0.0104	0.0000
169	0.0107	0.0107	0.0000
170	0.0108	0.0108	0.0000
171	0.0112	0.0112	0.0000
172	0.0113	0.0113	0.0000
173	0.0117	0.0117	0.0000
174	0.0119	0.0119	0.0000
175	0.0123	0.0123	0.0000
176	0.0125	0.0125	0.0000
177	0.0130	0.0130	0.0000
178	0.0133	0.0133	0.0000
179	0.0138	0.0138	0.0000
180	0.0142	0.0142	0.0000
181	0.0149	0.0149	0.0000
182	0.0153	0.0153	0.0000
183	0.0163	0.0163	0.0000
184	0.0168	0.0168	0.0000
185	0.0104	0.0104	0.0000
186	0.0110	0.0110	0.0000
187	0.0128	0.0128	0.0000
188	0.0140	0.0140	0.0000
189	0.0174	0.0174	0.0000
190	0.0200	0.0200	0.0000
191	0.0304	0.0304	0.0000

192	0.0441	0.0441	0.0000
193	0.1909	0.0740	0.1169
194	0.0239	0.0239	0.0000
195	0.0155	0.0155	0.0000
196	0.0118	0.0118	0.0000
197	0.0175	0.0175	0.0000
198	0.0158	0.0158	0.0000
199	0.0145	0.0145	0.0000
200	0.0135	0.0135	0.0000
201	0.0127	0.0127	0.0000
202	0.0121	0.0121	0.0000
203	0.0115	0.0115	0.0000
204	0.0110	0.0110	0.0000
205	0.0105	0.0105	0.0000
206	0.0101	0.0101	0.0000
207	0.0098	0.0098	0.0000
208	0.0095	0.0095	0.0000
209	0.0092	0.0092	0.0000
210	0.0089	0.0089	0.0000
211	0.0087	0.0087	0.0000
212	0.0085	0.0085	0.0000
213	0.0083	0.0083	0.0000
214	0.0081	0.0081	0.0000
215	0.0079	0.0079	0.0000
216	0.0078	0.0078	0.0000
217	0.0066	0.0066	0.0000
218	0.0064	0.0064	0.0000
219	0.0063	0.0063	0.0000
220	0.0062	0.0062	0.0000
221	0.0061	0.0061	0.0000
222	0.0059	0.0059	0.0000
223	0.0058	0.0058	0.0000
224	0.0057	0.0057	0.0000
225	0.0056	0.0056	0.0000
226	0.0055	0.0055	0.0000
227	0.0055	0.0055	0.0000
228	0.0054	0.0054	0.0000
229	0.0053	0.0053	0.0000
230	0.0052	0.0052	0.0000
231	0.0051	0.0051	0.0000
232	0.0051	0.0051	0.0000
233	0.0050	0.0050	0.0000
234	0.0049	0.0049	0.0000
235	0.0049	0.0049	0.0000
236	0.0048	0.0048	0.0000
237	0.0047	0.0047	0.0000
238	0.0047	0.0047	0.0000
239	0.0046	0.0046	0.0000
240	0.0046	0.0046	0.0000
241	0.0045	0.0045	0.0000
242	0.0045	0.0045	0.0000
243	0.0044	0.0044	0.0000
244	0.0044	0.0044	0.0000
245	0.0043	0.0043	0.0000
246	0.0043	0.0043	0.0000
247	0.0042	0.0042	0.0000
248	0.0042	0.0042	0.0000
249	0.0042	0.0042	0.0000

250	0.0041	0.0041	0.0000
251	0.0041	0.0041	0.0000
252	0.0040	0.0040	0.0000
253	0.0040	0.0040	0.0000
254	0.0040	0.0040	0.0000
255	0.0039	0.0039	0.0000
256	0.0039	0.0039	0.0000
257	0.0039	0.0039	0.0000
258	0.0038	0.0038	0.0000
259	0.0038	0.0038	0.0000
260	0.0038	0.0038	0.0000
261	0.0037	0.0037	0.0000
262	0.0037	0.0037	0.0000
263	0.0037	0.0037	0.0000
264	0.0037	0.0037	0.0000
265	0.0036	0.0036	0.0000
266	0.0036	0.0036	0.0000
267	0.0036	0.0036	0.0000
268	0.0036	0.0036	0.0000
269	0.0035	0.0035	0.0000
270	0.0035	0.0035	0.0000
271	0.0035	0.0035	0.0000
272	0.0035	0.0035	0.0000
273	0.0034	0.0034	0.0000
274	0.0034	0.0034	0.0000
275	0.0034	0.0034	0.0000
276	0.0034	0.0034	0.0000
277	0.0033	0.0033	0.0000
278	0.0033	0.0033	0.0000
279	0.0033	0.0033	0.0000
280	0.0033	0.0033	0.0000
281	0.0033	0.0033	0.0000
282	0.0032	0.0032	0.0000
283	0.0032	0.0032	0.0000
284	0.0032	0.0032	0.0000
285	0.0032	0.0032	0.0000
286	0.0032	0.0032	0.0000
287	0.0031	0.0031	0.0000
288	0.0031	0.0031	0.0000

Total soil rain loss = 1.84(In)
Total effective rainfall = 0.12(In)
Peak flow rate in flood hydrograph = 16.72(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0000	0.00	Q				
0+10	0.0000	0.00	Q				
0+15	0.0000	0.00	Q				
0+20	0.0000	0.00	Q				

0+25	0.0000	0.00	Q
0+30	0.0000	0.00	Q
0+35	0.0000	0.00	Q
0+40	0.0000	0.00	Q
0+45	0.0000	0.00	Q
0+50	0.0000	0.00	Q
0+55	0.0000	0.00	Q
1+ 0	0.0000	0.00	Q
1+ 5	0.0000	0.00	Q
1+10	0.0000	0.00	Q
1+15	0.0000	0.00	Q
1+20	0.0000	0.00	Q
1+25	0.0000	0.00	Q
1+30	0.0000	0.00	Q
1+35	0.0000	0.00	Q
1+40	0.0000	0.00	Q
1+45	0.0000	0.00	Q
1+50	0.0000	0.00	Q
1+55	0.0000	0.00	Q
2+ 0	0.0000	0.00	Q
2+ 5	0.0000	0.00	Q
2+10	0.0000	0.00	Q
2+15	0.0000	0.00	Q
2+20	0.0000	0.00	Q
2+25	0.0000	0.00	Q
2+30	0.0000	0.00	Q
2+35	0.0000	0.00	Q
2+40	0.0000	0.00	Q
2+45	0.0000	0.00	Q
2+50	0.0000	0.00	Q
2+55	0.0000	0.00	Q
3+ 0	0.0000	0.00	Q
3+ 5	0.0000	0.00	Q
3+10	0.0000	0.00	Q
3+15	0.0000	0.00	Q
3+20	0.0000	0.00	Q
3+25	0.0000	0.00	Q
3+30	0.0000	0.00	Q
3+35	0.0000	0.00	Q
3+40	0.0000	0.00	Q
3+45	0.0000	0.00	Q
3+50	0.0000	0.00	Q
3+55	0.0000	0.00	Q
4+ 0	0.0000	0.00	Q
4+ 5	0.0000	0.00	Q
4+10	0.0000	0.00	Q
4+15	0.0000	0.00	Q
4+20	0.0000	0.00	Q
4+25	0.0000	0.00	Q
4+30	0.0000	0.00	Q
4+35	0.0000	0.00	Q
4+40	0.0000	0.00	Q
4+45	0.0000	0.00	Q
4+50	0.0000	0.00	Q
4+55	0.0000	0.00	Q
5+ 0	0.0000	0.00	Q
5+ 5	0.0000	0.00	Q
5+10	0.0000	0.00	Q

5+15	0.0000	0.00	Q
5+20	0.0000	0.00	Q
5+25	0.0000	0.00	Q
5+30	0.0000	0.00	Q
5+35	0.0000	0.00	Q
5+40	0.0000	0.00	Q
5+45	0.0000	0.00	Q
5+50	0.0000	0.00	Q
5+55	0.0000	0.00	Q
6+ 0	0.0000	0.00	Q
6+ 5	0.0000	0.00	Q
6+10	0.0000	0.00	Q
6+15	0.0000	0.00	Q
6+20	0.0000	0.00	Q
6+25	0.0000	0.00	Q
6+30	0.0000	0.00	Q
6+35	0.0000	0.00	Q
6+40	0.0000	0.00	Q
6+45	0.0000	0.00	Q
6+50	0.0000	0.00	Q
6+55	0.0000	0.00	Q
7+ 0	0.0000	0.00	Q
7+ 5	0.0000	0.00	Q
7+10	0.0000	0.00	Q
7+15	0.0000	0.00	Q
7+20	0.0000	0.00	Q
7+25	0.0000	0.00	Q
7+30	0.0000	0.00	Q
7+35	0.0000	0.00	Q
7+40	0.0000	0.00	Q
7+45	0.0000	0.00	Q
7+50	0.0000	0.00	Q
7+55	0.0000	0.00	Q
8+ 0	0.0000	0.00	Q
8+ 5	0.0000	0.00	Q
8+10	0.0000	0.00	Q
8+15	0.0000	0.00	Q
8+20	0.0000	0.00	Q
8+25	0.0000	0.00	Q
8+30	0.0000	0.00	Q
8+35	0.0000	0.00	Q
8+40	0.0000	0.00	Q
8+45	0.0000	0.00	Q
8+50	0.0000	0.00	Q
8+55	0.0000	0.00	Q
9+ 0	0.0000	0.00	Q
9+ 5	0.0000	0.00	Q
9+10	0.0000	0.00	Q
9+15	0.0000	0.00	Q
9+20	0.0000	0.00	Q
9+25	0.0000	0.00	Q
9+30	0.0000	0.00	Q
9+35	0.0000	0.00	Q
9+40	0.0000	0.00	Q
9+45	0.0000	0.00	Q
9+50	0.0000	0.00	Q
9+55	0.0000	0.00	Q
10+ 0	0.0000	0.00	Q

10+ 5	0.0000	0.00	Q
10+10	0.0000	0.00	Q
10+15	0.0000	0.00	Q
10+20	0.0000	0.00	Q
10+25	0.0000	0.00	Q
10+30	0.0000	0.00	Q
10+35	0.0000	0.00	Q
10+40	0.0000	0.00	Q
10+45	0.0000	0.00	Q
10+50	0.0000	0.00	Q
10+55	0.0000	0.00	Q
11+ 0	0.0000	0.00	Q
11+ 5	0.0000	0.00	Q
11+10	0.0000	0.00	Q
11+15	0.0000	0.00	Q
11+20	0.0000	0.00	Q
11+25	0.0000	0.00	Q
11+30	0.0000	0.00	Q
11+35	0.0000	0.00	Q
11+40	0.0000	0.00	Q
11+45	0.0000	0.00	Q
11+50	0.0000	0.00	Q
11+55	0.0000	0.00	Q
12+ 0	0.0000	0.00	Q
12+ 5	0.0000	0.00	Q
12+10	0.0000	0.00	Q
12+15	0.0000	0.00	Q
12+20	0.0000	0.00	Q
12+25	0.0000	0.00	Q
12+30	0.0000	0.00	Q
12+35	0.0000	0.00	Q
12+40	0.0000	0.00	Q
12+45	0.0000	0.00	Q
12+50	0.0000	0.00	Q
12+55	0.0000	0.00	Q
13+ 0	0.0000	0.00	Q
13+ 5	0.0000	0.00	Q
13+10	0.0000	0.00	Q
13+15	0.0000	0.00	Q
13+20	0.0000	0.00	Q
13+25	0.0000	0.00	Q
13+30	0.0000	0.00	Q
13+35	0.0000	0.00	Q
13+40	0.0000	0.00	Q
13+45	0.0000	0.00	Q
13+50	0.0000	0.00	Q
13+55	0.0000	0.00	Q
14+ 0	0.0000	0.00	Q
14+ 5	0.0000	0.00	Q
14+10	0.0000	0.00	Q
14+15	0.0000	0.00	Q
14+20	0.0000	0.00	Q
14+25	0.0000	0.00	Q
14+30	0.0000	0.00	Q
14+35	0.0000	0.00	Q
14+40	0.0000	0.00	Q
14+45	0.0000	0.00	Q
14+50	0.0000	0.00	Q

14+55	0.0000	0.00	Q				
15+ 0	0.0000	0.00	Q				
15+ 5	0.0000	0.00	Q				
15+10	0.0000	0.00	Q				
15+15	0.0000	0.00	Q				
15+20	0.0000	0.00	Q				
15+25	0.0000	0.00	Q				
15+30	0.0000	0.00	Q				
15+35	0.0000	0.00	Q				
15+40	0.0000	0.00	Q				
15+45	0.0000	0.00	Q				
15+50	0.0000	0.00	Q				
15+55	0.0000	0.00	Q				
16+ 0	0.0000	0.00	Q				
16+ 5	0.0070	1.01	V Q				
16+10	0.0319	3.62	V Q				
16+15	0.0811	7.14	V Q				
16+20	0.1895	15.73	V Q				
16+25	0.3046	16.72	V Q				
16+30	0.3812	11.13	V Q				
16+35	0.4320	7.37	V Q				
16+40	0.4694	5.43	V Q				
16+45	0.4991	4.32	V Q				
16+50	0.5233	3.52	V Q				
16+55	0.5430	2.85	V Q				
17+ 0	0.5594	2.39	V Q				
17+ 5	0.5738	2.09	V Q				
17+10	0.5867	1.87	V Q				
17+15	0.5977	1.60	V Q				
17+20	0.6065	1.28	V Q				
17+25	0.6144	1.15	V Q				
17+30	0.6217	1.05	V Q				
17+35	0.6282	0.94	V Q				
17+40	0.6341	0.86	V Q				
17+45	0.6389	0.70	V Q				
17+50	0.6436	0.68	V Q				
17+55	0.6477	0.58	V Q				
18+ 0	0.6513	0.52	V Q				
18+ 5	0.6546	0.48	V Q				
18+10	0.6572	0.37	V Q				
18+15	0.6596	0.36	V Q				
18+20	0.6613	0.24	V Q				
18+25	0.6627	0.20	V Q				
18+30	0.6642	0.22	V Q				
18+35	0.6658	0.24	V Q				
18+40	0.6675	0.24	V Q				
18+45	0.6692	0.24	V Q				
18+50	0.6708	0.24	V Q				
18+55	0.6721	0.18	V Q				
19+ 0	0.6730	0.13	V Q				
19+ 5	0.6738	0.13	V Q				
19+10	0.6743	0.06	V Q				
19+15	0.6743	0.00	V Q				
19+20	0.6743	0.00	V Q				
19+25	0.6743	0.00	V Q				
19+30	0.6743	0.00	V Q				
19+35	0.6743	0.00	V Q				
19+40	0.6743	0.00	V Q				

19+45	0.6743	0.00	Q				V
19+50	0.6743	0.00	Q				V
19+55	0.6743	0.00	Q				V
20+ 0	0.6743	0.00	Q				V
20+ 5	0.6743	0.00	Q				V
20+10	0.6743	0.00	Q				V
20+15	0.6743	0.00	Q				V
20+20	0.6743	0.00	Q				V
20+25	0.6743	0.00	Q				V
20+30	0.6743	0.00	Q				V
20+35	0.6743	0.00	Q				V
20+40	0.6743	0.00	Q				V
20+45	0.6743	0.00	Q				V
20+50	0.6743	0.00	Q				V
20+55	0.6743	0.00	Q				V
21+ 0	0.6743	0.00	Q				V
21+ 5	0.6743	0.00	Q				V
21+10	0.6743	0.00	Q				V
21+15	0.6743	0.00	Q				V
21+20	0.6743	0.00	Q				V
21+25	0.6743	0.00	Q				V
21+30	0.6743	0.00	Q				V
21+35	0.6743	0.00	Q				V
21+40	0.6743	0.00	Q				V
21+45	0.6743	0.00	Q				V
21+50	0.6743	0.00	Q				V
21+55	0.6743	0.00	Q				V
22+ 0	0.6743	0.00	Q				V
22+ 5	0.6743	0.00	Q				V
22+10	0.6743	0.00	Q				V
22+15	0.6743	0.00	Q				V
22+20	0.6743	0.00	Q				V
22+25	0.6743	0.00	Q				V
22+30	0.6743	0.00	Q				V
22+35	0.6743	0.00	Q				V
22+40	0.6743	0.00	Q				V
22+45	0.6743	0.00	Q				V
22+50	0.6743	0.00	Q				V
22+55	0.6743	0.00	Q				V
23+ 0	0.6743	0.00	Q				V
23+ 5	0.6743	0.00	Q				V
23+10	0.6743	0.00	Q				V
23+15	0.6743	0.00	Q				V
23+20	0.6743	0.00	Q				V
23+25	0.6743	0.00	Q				V
23+30	0.6743	0.00	Q				V
23+35	0.6743	0.00	Q				V
23+40	0.6743	0.00	Q				V
23+45	0.6743	0.00	Q				V
23+50	0.6743	0.00	Q				V
23+55	0.6743	0.00	Q				V
24+ 0	0.6743	0.00	Q				V
24+ 5	0.6743	0.00	Q				V
24+10	0.6743	0.00	Q				V
24+15	0.6743	0.00	Q				V
24+20	0.6743	0.00	Q				V
24+25	0.6743	0.00	Q				V
24+30	0.6743	0.00	Q				V

24+35	0.6743	0.00	Q				V
24+40	0.6743	0.00	Q				V
24+45	0.6743	0.00	Q				V
24+50	0.6743	0.00	Q				V
24+55	0.6743	0.00	Q				V
25+ 0	0.6743	0.00	Q				V
25+ 5	0.6743	0.00	Q				V
25+10	0.6743	0.00	Q				V
25+15	0.6743	0.00	Q				V
25+20	0.6743	0.00	Q				V
25+25	0.6743	0.00	Q				V
25+30	0.6743	0.00	Q				V
25+35	0.6743	0.00	Q				V
25+40	0.6743	0.00	Q				V
25+45	0.6743	0.00	Q				V
25+50	0.6743	0.00	Q				V
25+55	0.6743	0.00	Q				V
26+ 0	0.6743	0.00	Q				V
26+ 5	0.6743	0.00	Q				V
26+10	0.6743	0.00	Q				V
26+15	0.6743	0.00	Q				V
26+20	0.6743	0.00	Q				V
26+25	0.6743	0.00	Q				V
26+30	0.6743	0.00	Q				V
26+35	0.6743	0.00	Q				V
26+40	0.6743	0.00	Q				V
26+45	0.6743	0.00	Q				V
26+50	0.6743	0.00	Q				V
26+55	0.6743	0.00	Q				V
27+ 0	0.6743	0.00	Q				V
27+ 5	0.6743	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 05/06/20

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

Program License Serial Number 6320

204728 - US Cold Storage
EXISTING CONDITIONS - AREA A
5-YEAR, 24- HOUR STORM
BY: SG DATE: 05-06-20

Storm Event Year = 5

Antecedent Moisture Condition = 1

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		
69.33	1	0.76

Rainfall data for year 2		
69.33	6	1.04

Rainfall data for year 2		
69.33	24	1.96

Rainfall data for year 100		
69.33	1	1.27

Rainfall data for year 100		
69.33	6	2.90

Rainfall data for year 100		
69.33	24	6.12

+++++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 1)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
63.0	43.0	69.33	1.000	0.887	1.000	0.887

Area-averaged adjusted loss rate Fm (In/Hr) = 0.887

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC1)	S	Pervious Yield Fr
69.33	1.000	63.0	43.0	13.26	0.002

Area-averaged catchment yield fraction, Y = 0.002

Area-averaged low loss fraction, Yb = 0.998

User entry of time of concentration = 0.506 (hours)

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Watershed area = 69.33(Ac.)
 Catchment Lag time = 0.405 hours
 Unit interval = 5.000 minutes
 Unit interval percentage of lag time = 20.5863
 Hydrograph baseflow = 0.00(CFS)
 Average maximum watershed loss rate(Fm) = 0.887(In/Hr)
 Average low loss rate fraction (Yb) = 0.998 (decimal)
 DESERT S-Graph Selected
 Computed peak 5-minute rainfall = 0.288(In)
 Computed peak 30-minute rainfall = 0.493(In)
 Specified peak 1-hour rainfall = 0.606(In)
 Computed peak 3-hour rainfall = 1.046(In)
 Specified peak 6-hour rainfall = 1.476(In)
 Specified peak 24-hour rainfall = 2.934(In)

Rainfall depth area reduction factors:

Using a total area of 69.33(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997	Adjusted rainfall = 0.287(In)
30-minute factor = 0.997	Adjusted rainfall = 0.491(In)
1-hour factor = 0.997	Adjusted rainfall = 0.605(In)
3-hour factor = 1.000	Adjusted rainfall = 1.046(In)
6-hour factor = 1.000	Adjusted rainfall = 1.475(In)
24-hour factor = 1.000	Adjusted rainfall = 2.934(In)

Unit Hydrograph

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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
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(K = 838.46 (CFS))

1	1.033	8.660
2	4.725	30.955
3	12.013	61.112

4	28.066	134.597
5	45.124	143.023
6	56.476	95.180
7	63.994	63.040
8	69.530	46.418
9	73.935	36.932
10	77.525	30.097
11	80.431	24.371
12	82.868	20.432
13	85.001	17.883
14	86.912	16.023
15	88.543	13.671
16	89.843	10.907
17	91.022	9.880
18	92.092	8.978
19	93.055	8.073
20	93.930	7.331
21	94.649	6.029
22	95.347	5.855
23	95.943	4.997
24	96.478	4.488
25	96.972	4.138
26	97.349	3.164
27	97.713	3.052
28	97.961	2.081
29	98.167	1.726
30	98.388	1.852
31	98.635	2.068
32	98.882	2.071
33	99.129	2.071
34	99.376	2.071
35	99.564	1.578
36	99.693	1.079
37	99.821	1.079
38	100.000	0.539

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.2868	0.2868
2	0.3531	0.0663
3	0.3988	0.0457
4	0.4348	0.0359
5	0.4649	0.0301
6	0.4910	0.0261
7	0.5142	0.0232
8	0.5353	0.0210
9	0.5545	0.0193
10	0.5723	0.0178
11	0.5889	0.0166
12	0.6045	0.0156
13	0.6291	0.0246
14	0.6528	0.0237
15	0.6757	0.0229
16	0.6978	0.0221
17	0.7192	0.0214
18	0.7400	0.0208
19	0.7603	0.0202
20	0.7800	0.0197

21	0.7992	0.0192
22	0.8179	0.0188
23	0.8363	0.0183
24	0.8542	0.0179
25	0.8718	0.0176
26	0.8890	0.0172
27	0.9059	0.0169
28	0.9225	0.0166
29	0.9388	0.0163
30	0.9548	0.0160
31	0.9706	0.0157
32	0.9860	0.0155
33	1.0013	0.0153
34	1.0163	0.0150
35	1.0311	0.0148
36	1.0457	0.0146
37	1.0600	0.0143
38	1.0742	0.0141
39	1.0881	0.0139
40	1.1019	0.0138
41	1.1155	0.0136
42	1.1289	0.0134
43	1.1422	0.0133
44	1.1553	0.0131
45	1.1682	0.0130
46	1.1811	0.0128
47	1.1937	0.0127
48	1.2063	0.0125
49	1.2187	0.0124
50	1.2310	0.0123
51	1.2432	0.0122
52	1.2552	0.0120
53	1.2671	0.0119
54	1.2789	0.0118
55	1.2907	0.0117
56	1.3023	0.0116
57	1.3137	0.0115
58	1.3251	0.0114
59	1.3364	0.0113
60	1.3476	0.0112
61	1.3587	0.0111
62	1.3698	0.0110
63	1.3807	0.0109
64	1.3915	0.0108
65	1.4023	0.0108
66	1.4130	0.0107
67	1.4235	0.0106
68	1.4341	0.0105
69	1.4445	0.0104
70	1.4548	0.0104
71	1.4651	0.0103
72	1.4753	0.0102
73	1.4855	0.0101
74	1.4955	0.0101
75	1.5055	0.0100
76	1.5154	0.0099
77	1.5253	0.0099
78	1.5351	0.0098

79	1.5448	0.0097
80	1.5545	0.0097
81	1.5641	0.0096
82	1.5736	0.0095
83	1.5831	0.0095
84	1.5925	0.0094
85	1.6019	0.0094
86	1.6112	0.0093
87	1.6205	0.0093
88	1.6297	0.0092
89	1.6389	0.0092
90	1.6480	0.0091
91	1.6570	0.0091
92	1.6660	0.0090
93	1.6750	0.0090
94	1.6839	0.0089
95	1.6928	0.0089
96	1.7016	0.0088
97	1.7104	0.0088
98	1.7191	0.0087
99	1.7278	0.0087
100	1.7364	0.0086
101	1.7450	0.0086
102	1.7535	0.0085
103	1.7620	0.0085
104	1.7705	0.0085
105	1.7789	0.0084
106	1.7873	0.0084
107	1.7956	0.0083
108	1.8039	0.0083
109	1.8122	0.0083
110	1.8204	0.0082
111	1.8286	0.0082
112	1.8368	0.0082
113	1.8449	0.0081
114	1.8530	0.0081
115	1.8610	0.0080
116	1.8690	0.0080
117	1.8770	0.0080
118	1.8849	0.0079
119	1.8928	0.0079
120	1.9007	0.0079
121	1.9085	0.0078
122	1.9164	0.0078
123	1.9241	0.0078
124	1.9319	0.0077
125	1.9396	0.0077
126	1.9473	0.0077
127	1.9549	0.0076
128	1.9625	0.0076
129	1.9701	0.0076
130	1.9777	0.0076
131	1.9852	0.0075
132	1.9927	0.0075
133	2.0002	0.0075
134	2.0076	0.0074
135	2.0150	0.0074
136	2.0224	0.0074

137	2.0298	0.0074
138	2.0371	0.0073
139	2.0444	0.0073
140	2.0517	0.0073
141	2.0590	0.0073
142	2.0662	0.0072
143	2.0734	0.0072
144	2.0806	0.0072
145	2.0877	0.0072
146	2.0949	0.0071
147	2.1020	0.0071
148	2.1090	0.0071
149	2.1161	0.0071
150	2.1231	0.0070
151	2.1301	0.0070
152	2.1371	0.0070
153	2.1441	0.0070
154	2.1510	0.0069
155	2.1579	0.0069
156	2.1648	0.0069
157	2.1717	0.0069
158	2.1786	0.0068
159	2.1854	0.0068
160	2.1922	0.0068
161	2.1990	0.0068
162	2.2057	0.0068
163	2.2125	0.0067
164	2.2192	0.0067
165	2.2259	0.0067
166	2.2326	0.0067
167	2.2392	0.0067
168	2.2459	0.0066
169	2.2525	0.0066
170	2.2591	0.0066
171	2.2657	0.0066
172	2.2722	0.0066
173	2.2788	0.0065
174	2.2853	0.0065
175	2.2918	0.0065
176	2.2983	0.0065
177	2.3048	0.0065
178	2.3112	0.0064
179	2.3176	0.0064
180	2.3241	0.0064
181	2.3304	0.0064
182	2.3368	0.0064
183	2.3432	0.0064
184	2.3495	0.0063
185	2.3558	0.0063
186	2.3622	0.0063
187	2.3684	0.0063
188	2.3747	0.0063
189	2.3810	0.0063
190	2.3872	0.0062
191	2.3934	0.0062
192	2.3996	0.0062
193	2.4058	0.0062
194	2.4120	0.0062

195	2.4182	0.0062
196	2.4243	0.0061
197	2.4304	0.0061
198	2.4365	0.0061
199	2.4426	0.0061
200	2.4487	0.0061
201	2.4548	0.0061
202	2.4608	0.0060
203	2.4669	0.0060
204	2.4729	0.0060
205	2.4789	0.0060
206	2.4849	0.0060
207	2.4909	0.0060
208	2.4968	0.0060
209	2.5028	0.0059
210	2.5087	0.0059
211	2.5146	0.0059
212	2.5205	0.0059
213	2.5264	0.0059
214	2.5323	0.0059
215	2.5381	0.0059
216	2.5440	0.0058
217	2.5498	0.0058
218	2.5556	0.0058
219	2.5615	0.0058
220	2.5672	0.0058
221	2.5730	0.0058
222	2.5788	0.0058
223	2.5845	0.0058
224	2.5903	0.0057
225	2.5960	0.0057
226	2.6017	0.0057
227	2.6074	0.0057
228	2.6131	0.0057
229	2.6188	0.0057
230	2.6245	0.0057
231	2.6301	0.0057
232	2.6358	0.0056
233	2.6414	0.0056
234	2.6470	0.0056
235	2.6526	0.0056
236	2.6582	0.0056
237	2.6638	0.0056
238	2.6694	0.0056
239	2.6749	0.0056
240	2.6805	0.0055
241	2.6860	0.0055
242	2.6915	0.0055
243	2.6970	0.0055
244	2.7025	0.0055
245	2.7080	0.0055
246	2.7135	0.0055
247	2.7189	0.0055
248	2.7244	0.0055
249	2.7298	0.0054
250	2.7353	0.0054
251	2.7407	0.0054
252	2.7461	0.0054

253	2.7515	0.0054
254	2.7569	0.0054
255	2.7623	0.0054
256	2.7676	0.0054
257	2.7730	0.0054
258	2.7783	0.0053
259	2.7837	0.0053
260	2.7890	0.0053
261	2.7943	0.0053
262	2.7996	0.0053
263	2.8049	0.0053
264	2.8102	0.0053
265	2.8155	0.0053
266	2.8207	0.0053
267	2.8260	0.0053
268	2.8312	0.0052
269	2.8365	0.0052
270	2.8417	0.0052
271	2.8469	0.0052
272	2.8521	0.0052
273	2.8573	0.0052
274	2.8625	0.0052
275	2.8677	0.0052
276	2.8728	0.0052
277	2.8780	0.0052
278	2.8831	0.0051
279	2.8883	0.0051
280	2.8934	0.0051
281	2.8985	0.0051
282	2.9036	0.0051
283	2.9087	0.0051
284	2.9138	0.0051
285	2.9189	0.0051
286	2.9240	0.0051
287	2.9291	0.0051
288	2.9341	0.0051

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0051	0.0050	0.0000
2	0.0051	0.0051	0.0000
3	0.0051	0.0051	0.0000
4	0.0051	0.0051	0.0000
5	0.0051	0.0051	0.0000
6	0.0051	0.0051	0.0000
7	0.0051	0.0051	0.0000
8	0.0051	0.0051	0.0000
9	0.0052	0.0052	0.0000
10	0.0052	0.0052	0.0000
11	0.0052	0.0052	0.0000
12	0.0052	0.0052	0.0000
13	0.0052	0.0052	0.0000
14	0.0052	0.0052	0.0000
15	0.0053	0.0052	0.0000
16	0.0053	0.0053	0.0000
17	0.0053	0.0053	0.0000

18	0.0053	0.0053	0.0000
19	0.0053	0.0053	0.0000
20	0.0053	0.0053	0.0000
21	0.0053	0.0053	0.0000
22	0.0054	0.0053	0.0000
23	0.0054	0.0054	0.0000
24	0.0054	0.0054	0.0000
25	0.0054	0.0054	0.0000
26	0.0054	0.0054	0.0000
27	0.0054	0.0054	0.0000
28	0.0055	0.0054	0.0000
29	0.0055	0.0055	0.0000
30	0.0055	0.0055	0.0000
31	0.0055	0.0055	0.0000
32	0.0055	0.0055	0.0000
33	0.0055	0.0055	0.0000
34	0.0056	0.0055	0.0000
35	0.0056	0.0056	0.0000
36	0.0056	0.0056	0.0000
37	0.0056	0.0056	0.0000
38	0.0056	0.0056	0.0000
39	0.0057	0.0056	0.0000
40	0.0057	0.0057	0.0000
41	0.0057	0.0057	0.0000
42	0.0057	0.0057	0.0000
43	0.0057	0.0057	0.0000
44	0.0057	0.0057	0.0000
45	0.0058	0.0058	0.0000
46	0.0058	0.0058	0.0000
47	0.0058	0.0058	0.0000
48	0.0058	0.0058	0.0000
49	0.0058	0.0058	0.0000
50	0.0059	0.0058	0.0000
51	0.0059	0.0059	0.0000
52	0.0059	0.0059	0.0000
53	0.0059	0.0059	0.0000
54	0.0059	0.0059	0.0000
55	0.0060	0.0060	0.0000
56	0.0060	0.0060	0.0000
57	0.0060	0.0060	0.0000
58	0.0060	0.0060	0.0000
59	0.0061	0.0061	0.0000
60	0.0061	0.0061	0.0000
61	0.0061	0.0061	0.0000
62	0.0061	0.0061	0.0000
63	0.0062	0.0061	0.0000
64	0.0062	0.0062	0.0000
65	0.0062	0.0062	0.0000
66	0.0062	0.0062	0.0000
67	0.0063	0.0062	0.0000
68	0.0063	0.0063	0.0000
69	0.0063	0.0063	0.0000
70	0.0063	0.0063	0.0000
71	0.0064	0.0063	0.0000
72	0.0064	0.0064	0.0000
73	0.0064	0.0064	0.0000
74	0.0064	0.0064	0.0000
75	0.0065	0.0065	0.0000

76	0.0065	0.0065	0.0000
77	0.0065	0.0065	0.0000
78	0.0065	0.0065	0.0000
79	0.0066	0.0066	0.0000
80	0.0066	0.0066	0.0000
81	0.0066	0.0066	0.0000
82	0.0067	0.0066	0.0000
83	0.0067	0.0067	0.0000
84	0.0067	0.0067	0.0000
85	0.0068	0.0067	0.0000
86	0.0068	0.0068	0.0000
87	0.0068	0.0068	0.0000
88	0.0068	0.0068	0.0000
89	0.0069	0.0069	0.0000
90	0.0069	0.0069	0.0000
91	0.0070	0.0069	0.0000
92	0.0070	0.0070	0.0000
93	0.0070	0.0070	0.0000
94	0.0071	0.0070	0.0000
95	0.0071	0.0071	0.0000
96	0.0071	0.0071	0.0000
97	0.0072	0.0072	0.0000
98	0.0072	0.0072	0.0000
99	0.0073	0.0072	0.0000
100	0.0073	0.0073	0.0000
101	0.0073	0.0073	0.0000
102	0.0074	0.0073	0.0000
103	0.0074	0.0074	0.0000
104	0.0074	0.0074	0.0000
105	0.0075	0.0075	0.0000
106	0.0075	0.0075	0.0000
107	0.0076	0.0076	0.0000
108	0.0076	0.0076	0.0000
109	0.0077	0.0077	0.0000
110	0.0077	0.0077	0.0000
111	0.0078	0.0078	0.0000
112	0.0078	0.0078	0.0000
113	0.0079	0.0079	0.0000
114	0.0079	0.0079	0.0000
115	0.0080	0.0080	0.0000
116	0.0080	0.0080	0.0000
117	0.0081	0.0081	0.0000
118	0.0081	0.0081	0.0000
119	0.0082	0.0082	0.0000
120	0.0082	0.0082	0.0000
121	0.0083	0.0083	0.0000
122	0.0083	0.0083	0.0000
123	0.0084	0.0084	0.0000
124	0.0085	0.0084	0.0000
125	0.0085	0.0085	0.0000
126	0.0086	0.0086	0.0000
127	0.0087	0.0087	0.0000
128	0.0087	0.0087	0.0000
129	0.0088	0.0088	0.0000
130	0.0089	0.0088	0.0000
131	0.0090	0.0089	0.0000
132	0.0090	0.0090	0.0000
133	0.0091	0.0091	0.0000

134	0.0092	0.0091	0.0000
135	0.0093	0.0092	0.0000
136	0.0093	0.0093	0.0000
137	0.0094	0.0094	0.0000
138	0.0095	0.0095	0.0000
139	0.0096	0.0096	0.0000
140	0.0097	0.0096	0.0000
141	0.0098	0.0098	0.0000
142	0.0099	0.0098	0.0000
143	0.0100	0.0100	0.0000
144	0.0101	0.0100	0.0000
145	0.0102	0.0102	0.0000
146	0.0103	0.0103	0.0000
147	0.0104	0.0104	0.0000
148	0.0105	0.0105	0.0000
149	0.0107	0.0106	0.0000
150	0.0108	0.0107	0.0000
151	0.0109	0.0109	0.0000
152	0.0110	0.0110	0.0000
153	0.0112	0.0112	0.0000
154	0.0113	0.0113	0.0000
155	0.0115	0.0115	0.0000
156	0.0116	0.0116	0.0000
157	0.0118	0.0118	0.0000
158	0.0119	0.0119	0.0000
159	0.0122	0.0121	0.0000
160	0.0123	0.0123	0.0000
161	0.0125	0.0125	0.0000
162	0.0127	0.0127	0.0000
163	0.0130	0.0129	0.0000
164	0.0131	0.0131	0.0000
165	0.0134	0.0134	0.0000
166	0.0136	0.0136	0.0000
167	0.0139	0.0139	0.0000
168	0.0141	0.0141	0.0000
169	0.0146	0.0146	0.0000
170	0.0148	0.0148	0.0000
171	0.0153	0.0152	0.0000
172	0.0155	0.0155	0.0000
173	0.0160	0.0160	0.0000
174	0.0163	0.0163	0.0000
175	0.0169	0.0169	0.0000
176	0.0172	0.0172	0.0000
177	0.0179	0.0179	0.0000
178	0.0183	0.0183	0.0000
179	0.0192	0.0192	0.0000
180	0.0197	0.0197	0.0000
181	0.0208	0.0208	0.0000
182	0.0214	0.0214	0.0000
183	0.0229	0.0228	0.0000
184	0.0237	0.0236	0.0000
185	0.0156	0.0155	0.0000
186	0.0166	0.0166	0.0000
187	0.0193	0.0192	0.0000
188	0.0210	0.0210	0.0000
189	0.0261	0.0261	0.0001
190	0.0301	0.0300	0.0001
191	0.0457	0.0456	0.0001

192	0.0663	0.0662	0.0001
193	0.2868	0.0740	0.2129
194	0.0359	0.0359	0.0001
195	0.0232	0.0232	0.0000
196	0.0178	0.0178	0.0000
197	0.0246	0.0246	0.0000
198	0.0221	0.0221	0.0000
199	0.0202	0.0202	0.0000
200	0.0188	0.0187	0.0000
201	0.0176	0.0175	0.0000
202	0.0166	0.0166	0.0000
203	0.0157	0.0157	0.0000
204	0.0150	0.0150	0.0000
205	0.0143	0.0143	0.0000
206	0.0138	0.0137	0.0000
207	0.0133	0.0132	0.0000
208	0.0128	0.0128	0.0000
209	0.0124	0.0124	0.0000
210	0.0120	0.0120	0.0000
211	0.0117	0.0117	0.0000
212	0.0114	0.0114	0.0000
213	0.0111	0.0111	0.0000
214	0.0108	0.0108	0.0000
215	0.0106	0.0106	0.0000
216	0.0104	0.0103	0.0000
217	0.0101	0.0101	0.0000
218	0.0099	0.0099	0.0000
219	0.0097	0.0097	0.0000
220	0.0095	0.0095	0.0000
221	0.0094	0.0094	0.0000
222	0.0092	0.0092	0.0000
223	0.0091	0.0090	0.0000
224	0.0089	0.0089	0.0000
225	0.0088	0.0087	0.0000
226	0.0086	0.0086	0.0000
227	0.0085	0.0085	0.0000
228	0.0084	0.0084	0.0000
229	0.0083	0.0082	0.0000
230	0.0082	0.0081	0.0000
231	0.0080	0.0080	0.0000
232	0.0079	0.0079	0.0000
233	0.0078	0.0078	0.0000
234	0.0077	0.0077	0.0000
235	0.0076	0.0076	0.0000
236	0.0076	0.0075	0.0000
237	0.0075	0.0075	0.0000
238	0.0074	0.0074	0.0000
239	0.0073	0.0073	0.0000
240	0.0072	0.0072	0.0000
241	0.0072	0.0071	0.0000
242	0.0071	0.0071	0.0000
243	0.0070	0.0070	0.0000
244	0.0069	0.0069	0.0000
245	0.0069	0.0069	0.0000
246	0.0068	0.0068	0.0000
247	0.0067	0.0067	0.0000
248	0.0067	0.0067	0.0000
249	0.0066	0.0066	0.0000

250	0.0066	0.0065	0.0000
251	0.0065	0.0065	0.0000
252	0.0064	0.0064	0.0000
253	0.0064	0.0064	0.0000
254	0.0063	0.0063	0.0000
255	0.0063	0.0063	0.0000
256	0.0062	0.0062	0.0000
257	0.0062	0.0062	0.0000
258	0.0061	0.0061	0.0000
259	0.0061	0.0061	0.0000
260	0.0060	0.0060	0.0000
261	0.0060	0.0060	0.0000
262	0.0060	0.0059	0.0000
263	0.0059	0.0059	0.0000
264	0.0059	0.0059	0.0000
265	0.0058	0.0058	0.0000
266	0.0058	0.0058	0.0000
267	0.0058	0.0057	0.0000
268	0.0057	0.0057	0.0000
269	0.0057	0.0057	0.0000
270	0.0056	0.0056	0.0000
271	0.0056	0.0056	0.0000
272	0.0056	0.0056	0.0000
273	0.0055	0.0055	0.0000
274	0.0055	0.0055	0.0000
275	0.0055	0.0055	0.0000
276	0.0054	0.0054	0.0000
277	0.0054	0.0054	0.0000
278	0.0054	0.0054	0.0000
279	0.0053	0.0053	0.0000
280	0.0053	0.0053	0.0000
281	0.0053	0.0053	0.0000
282	0.0052	0.0052	0.0000
283	0.0052	0.0052	0.0000
284	0.0052	0.0052	0.0000
285	0.0052	0.0051	0.0000
286	0.0051	0.0051	0.0000
287	0.0051	0.0051	0.0000
288	0.0051	0.0051	0.0000

Total soil rain loss = 2.72(In)
Total effective rainfall = 0.22(In)
Peak flow rate in flood hydrograph = 30.49(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0000	0.00	Q				
0+10	0.0000	0.00	Q				
0+15	0.0000	0.00	Q				
0+20	0.0000	0.00	Q				

0+25	0.0001	0.00	Q
0+30	0.0001	0.00	Q
0+35	0.0001	0.01	Q
0+40	0.0002	0.01	Q
0+45	0.0002	0.01	Q
0+50	0.0003	0.01	Q
0+55	0.0003	0.01	Q
1+ 0	0.0004	0.01	Q
1+ 5	0.0004	0.01	Q
1+10	0.0005	0.01	Q
1+15	0.0005	0.01	Q
1+20	0.0006	0.01	Q
1+25	0.0006	0.01	Q
1+30	0.0007	0.01	Q
1+35	0.0007	0.01	Q
1+40	0.0008	0.01	Q
1+45	0.0008	0.01	Q
1+50	0.0009	0.01	Q
1+55	0.0010	0.01	Q
2+ 0	0.0010	0.01	Q
2+ 5	0.0011	0.01	Q
2+10	0.0011	0.01	Q
2+15	0.0012	0.01	Q
2+20	0.0013	0.01	Q
2+25	0.0013	0.01	Q
2+30	0.0014	0.01	Q
2+35	0.0015	0.01	Q
2+40	0.0015	0.01	Q
2+45	0.0016	0.01	Q
2+50	0.0016	0.01	Q
2+55	0.0017	0.01	Q
3+ 0	0.0018	0.01	Q
3+ 5	0.0018	0.01	Q
3+10	0.0019	0.01	Q
3+15	0.0020	0.01	Q
3+20	0.0020	0.01	Q
3+25	0.0021	0.01	Q
3+30	0.0022	0.01	Q
3+35	0.0022	0.01	Q
3+40	0.0023	0.01	Q
3+45	0.0024	0.01	Q
3+50	0.0024	0.01	Q
3+55	0.0025	0.01	Q
4+ 0	0.0025	0.01	Q
4+ 5	0.0026	0.01	Q
4+10	0.0027	0.01	Q
4+15	0.0027	0.01	Q
4+20	0.0028	0.01	Q
4+25	0.0029	0.01	Q
4+30	0.0030	0.01	Q
4+35	0.0030	0.01	Q
4+40	0.0031	0.01	Q
4+45	0.0032	0.01	Q
4+50	0.0032	0.01	Q
4+55	0.0033	0.01	Q
5+ 0	0.0034	0.01	Q
5+ 5	0.0034	0.01	Q
5+10	0.0035	0.01	Q

5+15	0.0036	0.01	Q
5+20	0.0036	0.01	Q
5+25	0.0037	0.01	Q
5+30	0.0038	0.01	Q
5+35	0.0039	0.01	Q
5+40	0.0039	0.01	Q
5+45	0.0040	0.01	Q
5+50	0.0041	0.01	Q
5+55	0.0041	0.01	Q
6+ 0	0.0042	0.01	Q
6+ 5	0.0043	0.01	Q
6+10	0.0044	0.01	Q
6+15	0.0044	0.01	Q
6+20	0.0045	0.01	Q
6+25	0.0046	0.01	Q
6+30	0.0047	0.01	Q
6+35	0.0047	0.01	Q
6+40	0.0048	0.01	Q
6+45	0.0049	0.01	Q
6+50	0.0049	0.01	Q
6+55	0.0050	0.01	Q
7+ 0	0.0051	0.01	Q
7+ 5	0.0052	0.01	Q
7+10	0.0053	0.01	Q
7+15	0.0053	0.01	Q
7+20	0.0054	0.01	Q
7+25	0.0055	0.01	Q
7+30	0.0056	0.01	Q
7+35	0.0056	0.01	Q
7+40	0.0057	0.01	Q
7+45	0.0058	0.01	Q
7+50	0.0059	0.01	Q
7+55	0.0060	0.01	Q
8+ 0	0.0060	0.01	Q
8+ 5	0.0061	0.01	Q
8+10	0.0062	0.01	Q
8+15	0.0063	0.01	Q
8+20	0.0064	0.01	Q
8+25	0.0064	0.01	Q
8+30	0.0065	0.01	Q
8+35	0.0066	0.01	Q
8+40	0.0067	0.01	Q
8+45	0.0068	0.01	Q
8+50	0.0069	0.01	Q
8+55	0.0069	0.01	Q
9+ 0	0.0070	0.01	Q
9+ 5	0.0071	0.01	Q
9+10	0.0072	0.01	Q
9+15	0.0073	0.01	Q
9+20	0.0074	0.01	Q
9+25	0.0075	0.01	Q
9+30	0.0076	0.01	Q
9+35	0.0076	0.01	Q
9+40	0.0077	0.01	Q
9+45	0.0078	0.01	Q
9+50	0.0079	0.01	Q
9+55	0.0080	0.01	Q
10+ 0	0.0081	0.01	Q

10+ 5	0.0082	0.01	Q
10+10	0.0083	0.01	Q
10+15	0.0084	0.01	Q
10+20	0.0085	0.01	Q
10+25	0.0086	0.01	Q
10+30	0.0087	0.01	Q
10+35	0.0088	0.01	Q
10+40	0.0089	0.01	Q
10+45	0.0090	0.01	Q
10+50	0.0090	0.01	Q
10+55	0.0091	0.01	Q
11+ 0	0.0092	0.01	Q
11+ 5	0.0093	0.01	Q
11+10	0.0094	0.01	Q
11+15	0.0096	0.01	Q
11+20	0.0097	0.01	Q
11+25	0.0098	0.02	Q
11+30	0.0099	0.02	Q
11+35	0.0100	0.02	Q
11+40	0.0101	0.02	Q
11+45	0.0102	0.02	Q
11+50	0.0103	0.02	Q
11+55	0.0104	0.02	Q
12+ 0	0.0105	0.02	Q
12+ 5	0.0106	0.02	Q
12+10	0.0107	0.02	Q
12+15	0.0108	0.02	Q
12+20	0.0110	0.02	Q
12+25	0.0111	0.02	Q
12+30	0.0112	0.02	Q
12+35	0.0113	0.02	Q
12+40	0.0114	0.02	Q
12+45	0.0115	0.02	Q
12+50	0.0117	0.02	Q
12+55	0.0118	0.02	Q
13+ 0	0.0119	0.02	Q
13+ 5	0.0120	0.02	Q
13+10	0.0122	0.02	Q
13+15	0.0123	0.02	Q
13+20	0.0124	0.02	Q
13+25	0.0126	0.02	Q
13+30	0.0127	0.02	Q
13+35	0.0128	0.02	Q
13+40	0.0130	0.02	Q
13+45	0.0131	0.02	Q
13+50	0.0133	0.02	Q
13+55	0.0134	0.02	Q
14+ 0	0.0135	0.02	Q
14+ 5	0.0137	0.02	Q
14+10	0.0138	0.02	Q
14+15	0.0140	0.02	Q
14+20	0.0142	0.02	Q
14+25	0.0143	0.02	Q
14+30	0.0145	0.02	Q
14+35	0.0147	0.02	Q
14+40	0.0148	0.02	Q
14+45	0.0150	0.03	Q
14+50	0.0152	0.03	Q

14+55	0.0154	0.03	Q				
15+ 0	0.0156	0.03	Q				
15+ 5	0.0158	0.03	Q				
15+10	0.0160	0.03	Q				
15+15	0.0162	0.03	Q				
15+20	0.0164	0.03	Q				
15+25	0.0166	0.03	Q				
15+30	0.0168	0.03	Q				
15+35	0.0171	0.03	Q				
15+40	0.0173	0.03	Q				
15+45	0.0175	0.03	Q				
15+50	0.0177	0.03	Q				
15+55	0.0180	0.03	Q				
16+ 0	0.0182	0.04	Q				
16+ 5	0.0312	1.89	VQ				
16+10	0.0769	6.64	V Q				
16+15	0.1669	13.06	V Q				
16+20	0.3646	28.70	V Q				
16+25	0.5746	30.49	V Q				
16+30	0.7145	20.31	Q V				
16+35	0.8072	13.46	Q				
16+40	0.8755	9.92	Q				
16+45	0.9299	7.90	Q				
16+50	0.9743	6.45	Q				
16+55	1.0103	5.23	Q				
17+ 0	1.0405	4.39	Q				
17+ 5	1.0670	3.84	Q				
17+10	1.0907	3.44	Q				
17+15	1.1110	2.94	Q				
17+20	1.1272	2.35	Q				
17+25	1.1418	2.13	Q				
17+30	1.1552	1.94	Q				
17+35	1.1672	1.75	Q				
17+40	1.1781	1.59	Q				
17+45	1.1871	1.31	Q				
17+50	1.1959	1.27	Q				
17+55	1.2034	1.09	Q				
18+ 0	1.2101	0.98	Q				
18+ 5	1.2163	0.90	Q				
18+10	1.2211	0.69	Q				
18+15	1.2257	0.67	Q				
18+20	1.2289	0.46	Q				
18+25	1.2316	0.39	Q				
18+30	1.2344	0.41	Q				
18+35	1.2376	0.46	Q				
18+40	1.2408	0.46	Q				
18+45	1.2439	0.46	Q				
18+50	1.2471	0.46	Q				
18+55	1.2495	0.35	Q				
19+ 0	1.2512	0.25	Q				
19+ 5	1.2529	0.25	Q				
19+10	1.2538	0.13	Q				
19+15	1.2539	0.02	Q				
19+20	1.2540	0.02	Q				
19+25	1.2541	0.02	Q				
19+30	1.2542	0.01	Q				
19+35	1.2543	0.01	Q				
19+40	1.2544	0.01	Q				

19+45	1.2545	0.01	Q				V
19+50	1.2546	0.01	Q				V
19+55	1.2547	0.01	Q				V
20+ 0	1.2548	0.01	Q				V
20+ 5	1.2549	0.01	Q				V
20+10	1.2550	0.01	Q				V
20+15	1.2551	0.01	Q				V
20+20	1.2551	0.01	Q				V
20+25	1.2552	0.01	Q				V
20+30	1.2553	0.01	Q				V
20+35	1.2554	0.01	Q				V
20+40	1.2555	0.01	Q				V
20+45	1.2556	0.01	Q				V
20+50	1.2557	0.01	Q				V
20+55	1.2557	0.01	Q				V
21+ 0	1.2558	0.01	Q				V
21+ 5	1.2559	0.01	Q				V
21+10	1.2560	0.01	Q				V
21+15	1.2561	0.01	Q				V
21+20	1.2561	0.01	Q				V
21+25	1.2562	0.01	Q				V
21+30	1.2563	0.01	Q				V
21+35	1.2564	0.01	Q				V
21+40	1.2564	0.01	Q				V
21+45	1.2565	0.01	Q				V
21+50	1.2566	0.01	Q				V
21+55	1.2567	0.01	Q				V
22+ 0	1.2567	0.01	Q				V
22+ 5	1.2568	0.01	Q				V
22+10	1.2569	0.01	Q				V
22+15	1.2569	0.01	Q				V
22+20	1.2570	0.01	Q				V
22+25	1.2571	0.01	Q				V
22+30	1.2572	0.01	Q				V
22+35	1.2572	0.01	Q				V
22+40	1.2573	0.01	Q				V
22+45	1.2574	0.01	Q				V
22+50	1.2574	0.01	Q				V
22+55	1.2575	0.01	Q				V
23+ 0	1.2576	0.01	Q				V
23+ 5	1.2576	0.01	Q				V
23+10	1.2577	0.01	Q				V
23+15	1.2578	0.01	Q				V
23+20	1.2578	0.01	Q				V
23+25	1.2579	0.01	Q				V
23+30	1.2579	0.01	Q				V
23+35	1.2580	0.01	Q				V
23+40	1.2581	0.01	Q				V
23+45	1.2581	0.01	Q				V
23+50	1.2582	0.01	Q				V
23+55	1.2583	0.01	Q				V
24+ 0	1.2583	0.01	Q				V
24+ 5	1.2584	0.01	Q				V
24+10	1.2584	0.01	Q				V
24+15	1.2585	0.01	Q				V
24+20	1.2585	0.01	Q				V
24+25	1.2586	0.00	Q				V
24+30	1.2586	0.00	Q				V

24+35	1.2586	0.00	Q				V
24+40	1.2586	0.00	Q				V
24+45	1.2587	0.00	Q				V
24+50	1.2587	0.00	Q				V
24+55	1.2587	0.00	Q				V
25+ 0	1.2587	0.00	Q				V
25+ 5	1.2587	0.00	Q				V
25+10	1.2587	0.00	Q				V
25+15	1.2587	0.00	Q				V
25+20	1.2587	0.00	Q				V
25+25	1.2587	0.00	Q				V
25+30	1.2587	0.00	Q				V
25+35	1.2587	0.00	Q				V
25+40	1.2587	0.00	Q				V
25+45	1.2587	0.00	Q				V
25+50	1.2587	0.00	Q				V
25+55	1.2587	0.00	Q				V
26+ 0	1.2587	0.00	Q				V
26+ 5	1.2588	0.00	Q				V
26+10	1.2588	0.00	Q				V
26+15	1.2588	0.00	Q				V
26+20	1.2588	0.00	Q				V
26+25	1.2588	0.00	Q				V
26+30	1.2588	0.00	Q				V
26+35	1.2588	0.00	Q				V
26+40	1.2588	0.00	Q				V
26+45	1.2588	0.00	Q				V
26+50	1.2588	0.00	Q				V
26+55	1.2588	0.00	Q				V
27+ 0	1.2588	0.00	Q				V
27+ 5	1.2588	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 05/06/20

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

Program License Serial Number 6320

204728 - US Cold Storage
EXISTING CONDITIONS - AREA A
10-YEAR, 24- HOUR STORM
BY: SG DATE: 05-06-20

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		
69.33	1	0.76

Rainfall data for year 2		
69.33	6	1.04

Rainfall data for year 2		
69.33	24	1.96

Rainfall data for year 100		
69.33	1	1.27

Rainfall data for year 100		
69.33	6	2.90

Rainfall data for year 100		
69.33	24	6.12

+++++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
63.0	63.0	69.33	1.000	0.637	1.000	0.637

Area-averaged adjusted loss rate Fm (In/Hr) = 0.637

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
69.33	1.000	63.0	63.0	5.87	0.203

Area-averaged catchment yield fraction, Y = 0.203

Area-averaged low loss fraction, Yb = 0.797

User entry of time of concentration = 0.506 (hours)

+++++

Watershed area = 69.33(Ac.)

Catchment Lag time = 0.405 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 20.5863

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.637(In/Hr)

Average low loss rate fraction (Yb) = 0.797 (decimal)

DESERT S-Graph Selected

Computed peak 5-minute rainfall = 0.361(In)

Computed peak 30-minute rainfall = 0.617(In)

Specified peak 1-hour rainfall = 0.760(In)

Computed peak 3-hour rainfall = 1.292(In)

Specified peak 6-hour rainfall = 1.805(In)

Specified peak 24-hour rainfall = 3.671(In)

Rainfall depth area reduction factors:

Using a total area of 69.33(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.359(In)

30-minute factor = 0.997 Adjusted rainfall = 0.615(In)

1-hour factor = 0.997 Adjusted rainfall = 0.758(In)

3-hour factor = 1.000 Adjusted rainfall = 1.291(In)

6-hour factor = 1.000 Adjusted rainfall = 1.805(In)

24-hour factor = 1.000 Adjusted rainfall = 3.671(In)

Unit Hydrograph

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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
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(K = 838.46 (CFS))

1	1.033	8.660
2	4.725	30.955
3	12.013	61.112

4	28.066	134.597
5	45.124	143.023
6	56.476	95.180
7	63.994	63.040
8	69.530	46.418
9	73.935	36.932
10	77.525	30.097
11	80.431	24.371
12	82.868	20.432
13	85.001	17.883
14	86.912	16.023
15	88.543	13.671
16	89.843	10.907
17	91.022	9.880
18	92.092	8.978
19	93.055	8.073
20	93.930	7.331
21	94.649	6.029
22	95.347	5.855
23	95.943	4.997
24	96.478	4.488
25	96.972	4.138
26	97.349	3.164
27	97.713	3.052
28	97.961	2.081
29	98.167	1.726
30	98.388	1.852
31	98.635	2.068
32	98.882	2.071
33	99.129	2.071
34	99.376	2.071
35	99.564	1.578
36	99.693	1.079
37	99.821	1.079
38	100.000	0.539

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3595	0.3595
2	0.4425	0.0831
3	0.4998	0.0572
4	0.5448	0.0450
5	0.5826	0.0377
6	0.6153	0.0328
7	0.6444	0.0291
8	0.6708	0.0263
9	0.6949	0.0241
10	0.7172	0.0223
11	0.7380	0.0208
12	0.7575	0.0195
13	0.7875	0.0300
14	0.8164	0.0288
15	0.8442	0.0278
16	0.8711	0.0269
17	0.8971	0.0260
18	0.9223	0.0252
19	0.9468	0.0245
20	0.9707	0.0239

21	0.9940	0.0233
22	1.0167	0.0227
23	1.0389	0.0222
24	1.0605	0.0217
25	1.0818	0.0212
26	1.1026	0.0208
27	1.1229	0.0204
28	1.1429	0.0200
29	1.1626	0.0196
30	1.1819	0.0193
31	1.2008	0.0190
32	1.2195	0.0186
33	1.2378	0.0184
34	1.2559	0.0181
35	1.2737	0.0178
36	1.2912	0.0175
37	1.3084	0.0172
38	1.3254	0.0170
39	1.3421	0.0167
40	1.3587	0.0165
41	1.3750	0.0163
42	1.3911	0.0161
43	1.4070	0.0159
44	1.4227	0.0157
45	1.4382	0.0155
46	1.4536	0.0154
47	1.4687	0.0152
48	1.4838	0.0150
49	1.4986	0.0149
50	1.5133	0.0147
51	1.5279	0.0145
52	1.5423	0.0144
53	1.5565	0.0143
54	1.5706	0.0141
55	1.5846	0.0140
56	1.5985	0.0139
57	1.6122	0.0137
58	1.6258	0.0136
59	1.6393	0.0135
60	1.6527	0.0134
61	1.6659	0.0133
62	1.6790	0.0131
63	1.6921	0.0130
64	1.7050	0.0129
65	1.7178	0.0128
66	1.7305	0.0127
67	1.7432	0.0126
68	1.7557	0.0125
69	1.7681	0.0124
70	1.7804	0.0123
71	1.7927	0.0122
72	1.8048	0.0122
73	1.8176	0.0128
74	1.8303	0.0127
75	1.8430	0.0126
76	1.8555	0.0125
77	1.8680	0.0125
78	1.8804	0.0124

79	1.8927	0.0123
80	1.9049	0.0122
81	1.9171	0.0122
82	1.9291	0.0121
83	1.9412	0.0120
84	1.9531	0.0119
85	1.9650	0.0119
86	1.9768	0.0118
87	1.9885	0.0117
88	2.0002	0.0117
89	2.0118	0.0116
90	2.0234	0.0115
91	2.0348	0.0115
92	2.0463	0.0114
93	2.0576	0.0114
94	2.0689	0.0113
95	2.0802	0.0112
96	2.0914	0.0112
97	2.1025	0.0111
98	2.1136	0.0111
99	2.1246	0.0110
100	2.1355	0.0110
101	2.1465	0.0109
102	2.1573	0.0109
103	2.1681	0.0108
104	2.1789	0.0108
105	2.1896	0.0107
106	2.2002	0.0107
107	2.2108	0.0106
108	2.2214	0.0106
109	2.2319	0.0105
110	2.2424	0.0105
111	2.2528	0.0104
112	2.2632	0.0104
113	2.2735	0.0103
114	2.2838	0.0103
115	2.2940	0.0102
116	2.3042	0.0102
117	2.3144	0.0102
118	2.3245	0.0101
119	2.3345	0.0101
120	2.3446	0.0100
121	2.3546	0.0100
122	2.3645	0.0099
123	2.3744	0.0099
124	2.3843	0.0099
125	2.3941	0.0098
126	2.4039	0.0098
127	2.4136	0.0098
128	2.4234	0.0097
129	2.4330	0.0097
130	2.4427	0.0096
131	2.4523	0.0096
132	2.4619	0.0096
133	2.4714	0.0095
134	2.4809	0.0095
135	2.4904	0.0095
136	2.4998	0.0094

137	2.5092	0.0094
138	2.5186	0.0094
139	2.5279	0.0093
140	2.5372	0.0093
141	2.5465	0.0093
142	2.5557	0.0092
143	2.5649	0.0092
144	2.5741	0.0092
145	2.5832	0.0091
146	2.5923	0.0091
147	2.6014	0.0091
148	2.6104	0.0090
149	2.6195	0.0090
150	2.6284	0.0090
151	2.6374	0.0090
152	2.6463	0.0089
153	2.6552	0.0089
154	2.6641	0.0089
155	2.6730	0.0088
156	2.6818	0.0088
157	2.6906	0.0088
158	2.6993	0.0088
159	2.7081	0.0087
160	2.7168	0.0087
161	2.7255	0.0087
162	2.7341	0.0087
163	2.7428	0.0086
164	2.7514	0.0086
165	2.7599	0.0086
166	2.7685	0.0086
167	2.7770	0.0085
168	2.7855	0.0085
169	2.7940	0.0085
170	2.8025	0.0085
171	2.8109	0.0084
172	2.8193	0.0084
173	2.8277	0.0084
174	2.8360	0.0084
175	2.8444	0.0083
176	2.8527	0.0083
177	2.8610	0.0083
178	2.8693	0.0083
179	2.8775	0.0082
180	2.8857	0.0082
181	2.8939	0.0082
182	2.9021	0.0082
183	2.9103	0.0082
184	2.9184	0.0081
185	2.9265	0.0081
186	2.9346	0.0081
187	2.9427	0.0081
188	2.9507	0.0080
189	2.9587	0.0080
190	2.9667	0.0080
191	2.9747	0.0080
192	2.9827	0.0080
193	2.9906	0.0079
194	2.9986	0.0079

195	3.0065	0.0079
196	3.0144	0.0079
197	3.0222	0.0079
198	3.0301	0.0078
199	3.0379	0.0078
200	3.0457	0.0078
201	3.0535	0.0078
202	3.0613	0.0078
203	3.0690	0.0078
204	3.0768	0.0077
205	3.0845	0.0077
206	3.0922	0.0077
207	3.0999	0.0077
208	3.1075	0.0077
209	3.1152	0.0076
210	3.1228	0.0076
211	3.1304	0.0076
212	3.1380	0.0076
213	3.1456	0.0076
214	3.1531	0.0076
215	3.1607	0.0075
216	3.1682	0.0075
217	3.1757	0.0075
218	3.1832	0.0075
219	3.1906	0.0075
220	3.1981	0.0075
221	3.2055	0.0074
222	3.2129	0.0074
223	3.2204	0.0074
224	3.2277	0.0074
225	3.2351	0.0074
226	3.2425	0.0074
227	3.2498	0.0073
228	3.2571	0.0073
229	3.2644	0.0073
230	3.2717	0.0073
231	3.2790	0.0073
232	3.2863	0.0073
233	3.2935	0.0072
234	3.3008	0.0072
235	3.3080	0.0072
236	3.3152	0.0072
237	3.3224	0.0072
238	3.3295	0.0072
239	3.3367	0.0072
240	3.3438	0.0071
241	3.3510	0.0071
242	3.3581	0.0071
243	3.3652	0.0071
244	3.3723	0.0071
245	3.3793	0.0071
246	3.3864	0.0071
247	3.3934	0.0070
248	3.4005	0.0070
249	3.4075	0.0070
250	3.4145	0.0070
251	3.4215	0.0070
252	3.4285	0.0070

253	3.4354	0.0070
254	3.4424	0.0069
255	3.4493	0.0069
256	3.4562	0.0069
257	3.4631	0.0069
258	3.4700	0.0069
259	3.4769	0.0069
260	3.4838	0.0069
261	3.4906	0.0069
262	3.4975	0.0068
263	3.5043	0.0068
264	3.5111	0.0068
265	3.5179	0.0068
266	3.5247	0.0068
267	3.5315	0.0068
268	3.5383	0.0068
269	3.5450	0.0068
270	3.5518	0.0067
271	3.5585	0.0067
272	3.5652	0.0067
273	3.5719	0.0067
274	3.5786	0.0067
275	3.5853	0.0067
276	3.5920	0.0067
277	3.5986	0.0067
278	3.6053	0.0066
279	3.6119	0.0066
280	3.6186	0.0066
281	3.6252	0.0066
282	3.6318	0.0066
283	3.6384	0.0066
284	3.6449	0.0066
285	3.6515	0.0066
286	3.6581	0.0066
287	3.6646	0.0065
288	3.6711	0.0065

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0065	0.0052	0.0013
2	0.0065	0.0052	0.0013
3	0.0066	0.0052	0.0013
4	0.0066	0.0052	0.0013
5	0.0066	0.0053	0.0013
6	0.0066	0.0053	0.0013
7	0.0066	0.0053	0.0013
8	0.0066	0.0053	0.0013
9	0.0067	0.0053	0.0014
10	0.0067	0.0053	0.0014
11	0.0067	0.0053	0.0014
12	0.0067	0.0054	0.0014
13	0.0067	0.0054	0.0014
14	0.0068	0.0054	0.0014
15	0.0068	0.0054	0.0014
16	0.0068	0.0054	0.0014
17	0.0068	0.0054	0.0014

18	0.0068	0.0054	0.0014
19	0.0069	0.0055	0.0014
20	0.0069	0.0055	0.0014
21	0.0069	0.0055	0.0014
22	0.0069	0.0055	0.0014
23	0.0069	0.0055	0.0014
24	0.0069	0.0055	0.0014
25	0.0070	0.0056	0.0014
26	0.0070	0.0056	0.0014
27	0.0070	0.0056	0.0014
28	0.0070	0.0056	0.0014
29	0.0071	0.0056	0.0014
30	0.0071	0.0056	0.0014
31	0.0071	0.0057	0.0014
32	0.0071	0.0057	0.0014
33	0.0071	0.0057	0.0014
34	0.0072	0.0057	0.0015
35	0.0072	0.0057	0.0015
36	0.0072	0.0057	0.0015
37	0.0072	0.0058	0.0015
38	0.0072	0.0058	0.0015
39	0.0073	0.0058	0.0015
40	0.0073	0.0058	0.0015
41	0.0073	0.0058	0.0015
42	0.0073	0.0059	0.0015
43	0.0074	0.0059	0.0015
44	0.0074	0.0059	0.0015
45	0.0074	0.0059	0.0015
46	0.0074	0.0059	0.0015
47	0.0075	0.0060	0.0015
48	0.0075	0.0060	0.0015
49	0.0075	0.0060	0.0015
50	0.0075	0.0060	0.0015
51	0.0076	0.0060	0.0015
52	0.0076	0.0061	0.0015
53	0.0076	0.0061	0.0015
54	0.0076	0.0061	0.0016
55	0.0077	0.0061	0.0016
56	0.0077	0.0061	0.0016
57	0.0077	0.0062	0.0016
58	0.0078	0.0062	0.0016
59	0.0078	0.0062	0.0016
60	0.0078	0.0062	0.0016
61	0.0078	0.0063	0.0016
62	0.0079	0.0063	0.0016
63	0.0079	0.0063	0.0016
64	0.0079	0.0063	0.0016
65	0.0080	0.0064	0.0016
66	0.0080	0.0064	0.0016
67	0.0080	0.0064	0.0016
68	0.0080	0.0064	0.0016
69	0.0081	0.0064	0.0016
70	0.0081	0.0065	0.0016
71	0.0082	0.0065	0.0017
72	0.0082	0.0065	0.0017
73	0.0082	0.0066	0.0017
74	0.0082	0.0066	0.0017
75	0.0083	0.0066	0.0017

76	0.0083	0.0066	0.0017
77	0.0084	0.0067	0.0017
78	0.0084	0.0067	0.0017
79	0.0084	0.0067	0.0017
80	0.0085	0.0067	0.0017
81	0.0085	0.0068	0.0017
82	0.0085	0.0068	0.0017
83	0.0086	0.0068	0.0017
84	0.0086	0.0069	0.0017
85	0.0087	0.0069	0.0018
86	0.0087	0.0069	0.0018
87	0.0087	0.0070	0.0018
88	0.0088	0.0070	0.0018
89	0.0088	0.0070	0.0018
90	0.0088	0.0071	0.0018
91	0.0089	0.0071	0.0018
92	0.0089	0.0071	0.0018
93	0.0090	0.0072	0.0018
94	0.0090	0.0072	0.0018
95	0.0091	0.0072	0.0018
96	0.0091	0.0073	0.0018
97	0.0092	0.0073	0.0019
98	0.0092	0.0073	0.0019
99	0.0093	0.0074	0.0019
100	0.0093	0.0074	0.0019
101	0.0094	0.0075	0.0019
102	0.0094	0.0075	0.0019
103	0.0095	0.0075	0.0019
104	0.0095	0.0076	0.0019
105	0.0096	0.0076	0.0019
106	0.0096	0.0077	0.0019
107	0.0097	0.0077	0.0020
108	0.0097	0.0077	0.0020
109	0.0098	0.0078	0.0020
110	0.0098	0.0078	0.0020
111	0.0099	0.0079	0.0020
112	0.0099	0.0079	0.0020
113	0.0100	0.0080	0.0020
114	0.0101	0.0080	0.0020
115	0.0102	0.0081	0.0021
116	0.0102	0.0081	0.0021
117	0.0103	0.0082	0.0021
118	0.0103	0.0082	0.0021
119	0.0104	0.0083	0.0021
120	0.0105	0.0083	0.0021
121	0.0106	0.0084	0.0021
122	0.0106	0.0085	0.0022
123	0.0107	0.0085	0.0022
124	0.0108	0.0086	0.0022
125	0.0109	0.0087	0.0022
126	0.0109	0.0087	0.0022
127	0.0110	0.0088	0.0022
128	0.0111	0.0088	0.0022
129	0.0112	0.0089	0.0023
130	0.0112	0.0090	0.0023
131	0.0114	0.0091	0.0023
132	0.0114	0.0091	0.0023
133	0.0115	0.0092	0.0023

134	0.0116	0.0093	0.0024
135	0.0117	0.0094	0.0024
136	0.0118	0.0094	0.0024
137	0.0119	0.0095	0.0024
138	0.0120	0.0096	0.0024
139	0.0122	0.0097	0.0025
140	0.0122	0.0098	0.0025
141	0.0124	0.0099	0.0025
142	0.0125	0.0099	0.0025
143	0.0126	0.0101	0.0026
144	0.0127	0.0101	0.0026
145	0.0122	0.0097	0.0025
146	0.0122	0.0098	0.0025
147	0.0124	0.0099	0.0025
148	0.0125	0.0100	0.0025
149	0.0127	0.0101	0.0026
150	0.0128	0.0102	0.0026
151	0.0130	0.0104	0.0026
152	0.0131	0.0105	0.0027
153	0.0134	0.0107	0.0027
154	0.0135	0.0107	0.0027
155	0.0137	0.0109	0.0028
156	0.0139	0.0110	0.0028
157	0.0141	0.0113	0.0029
158	0.0143	0.0114	0.0029
159	0.0145	0.0116	0.0030
160	0.0147	0.0117	0.0030
161	0.0150	0.0120	0.0030
162	0.0152	0.0121	0.0031
163	0.0155	0.0124	0.0032
164	0.0157	0.0125	0.0032
165	0.0161	0.0128	0.0033
166	0.0163	0.0130	0.0033
167	0.0167	0.0133	0.0034
168	0.0170	0.0135	0.0034
169	0.0175	0.0140	0.0036
170	0.0178	0.0142	0.0036
171	0.0184	0.0146	0.0037
172	0.0186	0.0149	0.0038
173	0.0193	0.0154	0.0039
174	0.0196	0.0157	0.0040
175	0.0204	0.0162	0.0041
176	0.0208	0.0166	0.0042
177	0.0217	0.0173	0.0044
178	0.0222	0.0177	0.0045
179	0.0233	0.0185	0.0047
180	0.0239	0.0190	0.0048
181	0.0252	0.0201	0.0051
182	0.0260	0.0207	0.0053
183	0.0278	0.0222	0.0056
184	0.0288	0.0230	0.0059
185	0.0195	0.0156	0.0040
186	0.0208	0.0166	0.0042
187	0.0241	0.0192	0.0049
188	0.0263	0.0210	0.0053
189	0.0328	0.0261	0.0066
190	0.0377	0.0301	0.0077
191	0.0572	0.0456	0.0116

192	0.0831	0.0531	0.0300
193	0.3595	0.0531	0.3064
194	0.0450	0.0359	0.0091
195	0.0291	0.0232	0.0059
196	0.0223	0.0178	0.0045
197	0.0300	0.0239	0.0061
198	0.0269	0.0214	0.0055
199	0.0245	0.0196	0.0050
200	0.0227	0.0181	0.0046
201	0.0212	0.0169	0.0043
202	0.0200	0.0159	0.0041
203	0.0190	0.0151	0.0038
204	0.0181	0.0144	0.0037
205	0.0172	0.0137	0.0035
206	0.0165	0.0132	0.0034
207	0.0159	0.0127	0.0032
208	0.0154	0.0122	0.0031
209	0.0149	0.0118	0.0030
210	0.0144	0.0115	0.0029
211	0.0140	0.0111	0.0028
212	0.0136	0.0108	0.0028
213	0.0133	0.0106	0.0027
214	0.0129	0.0103	0.0026
215	0.0126	0.0101	0.0026
216	0.0123	0.0098	0.0025
217	0.0128	0.0102	0.0026
218	0.0125	0.0100	0.0025
219	0.0123	0.0098	0.0025
220	0.0121	0.0096	0.0025
221	0.0119	0.0095	0.0024
222	0.0117	0.0093	0.0024
223	0.0115	0.0092	0.0023
224	0.0113	0.0090	0.0023
225	0.0111	0.0089	0.0023
226	0.0110	0.0087	0.0022
227	0.0108	0.0086	0.0022
228	0.0107	0.0085	0.0022
229	0.0105	0.0084	0.0021
230	0.0104	0.0083	0.0021
231	0.0102	0.0082	0.0021
232	0.0101	0.0081	0.0021
233	0.0100	0.0080	0.0020
234	0.0099	0.0079	0.0020
235	0.0098	0.0078	0.0020
236	0.0096	0.0077	0.0020
237	0.0095	0.0076	0.0019
238	0.0094	0.0075	0.0019
239	0.0093	0.0074	0.0019
240	0.0092	0.0074	0.0019
241	0.0091	0.0073	0.0019
242	0.0090	0.0072	0.0018
243	0.0090	0.0071	0.0018
244	0.0089	0.0071	0.0018
245	0.0088	0.0070	0.0018
246	0.0087	0.0069	0.0018
247	0.0086	0.0069	0.0018
248	0.0086	0.0068	0.0017
249	0.0085	0.0068	0.0017

250	0.0084	0.0067	0.0017
251	0.0083	0.0066	0.0017
252	0.0083	0.0066	0.0017
253	0.0082	0.0065	0.0017
254	0.0081	0.0065	0.0017
255	0.0081	0.0064	0.0016
256	0.0080	0.0064	0.0016
257	0.0079	0.0063	0.0016
258	0.0079	0.0063	0.0016
259	0.0078	0.0062	0.0016
260	0.0078	0.0062	0.0016
261	0.0077	0.0062	0.0016
262	0.0077	0.0061	0.0016
263	0.0076	0.0061	0.0015
264	0.0076	0.0060	0.0015
265	0.0075	0.0060	0.0015
266	0.0075	0.0059	0.0015
267	0.0074	0.0059	0.0015
268	0.0074	0.0059	0.0015
269	0.0073	0.0058	0.0015
270	0.0073	0.0058	0.0015
271	0.0072	0.0058	0.0015
272	0.0072	0.0057	0.0015
273	0.0071	0.0057	0.0014
274	0.0071	0.0056	0.0014
275	0.0070	0.0056	0.0014
276	0.0070	0.0056	0.0014
277	0.0070	0.0055	0.0014
278	0.0069	0.0055	0.0014
279	0.0069	0.0055	0.0014
280	0.0068	0.0055	0.0014
281	0.0068	0.0054	0.0014
282	0.0068	0.0054	0.0014
283	0.0067	0.0054	0.0014
284	0.0067	0.0053	0.0014
285	0.0067	0.0053	0.0014
286	0.0066	0.0053	0.0013
287	0.0066	0.0053	0.0013
288	0.0066	0.0052	0.0013

 Total soil rain loss = 2.68(In)
 Total effective rainfall = 0.99(In)
 Peak flow rate in flood hydrograph = 50.81(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0001	0.01	Q				
0+10	0.0004	0.05	Q				
0+15	0.0014	0.13	Q				
0+20	0.0035	0.31	Q				

0+25	0.0070	0.50	Q
0+30	0.0113	0.63	Q
0+35	0.0162	0.72	Q
0+40	0.0216	0.78	Q
0+45	0.0273	0.83	Q
0+50	0.0333	0.87	Q
0+55	0.0396	0.91	Q
1+ 0	0.0460	0.94	Q
1+ 5	0.0526	0.96	Q
1+10	0.0594	0.99	Q
1+15	0.0663	1.01	Q
1+20	0.0734	1.02	Q
1+25	0.0806	1.04	Q
1+30	0.0878	1.05	Q
1+35	0.0952	1.07	Q
1+40	0.1026	1.08	Q
1+45	0.1101	1.09	Q
1+50	0.1177	1.10	Q
1+55	0.1254	1.11	Q
2+ 0	0.1331	1.12	Q
2+ 5	0.1409	1.13	Q
2+10	0.1487	1.14	QV
2+15	0.1566	1.14	QV
2+20	0.1645	1.15	QV
2+25	0.1724	1.16	QV
2+30	0.1804	1.16	QV
2+35	0.1885	1.17	QV
2+40	0.1966	1.17	QV
2+45	0.2047	1.18	QV
2+50	0.2128	1.19	QV
2+55	0.2211	1.19	QV
3+ 0	0.2293	1.20	QV
3+ 5	0.2376	1.20	QV
3+10	0.2459	1.21	QV
3+15	0.2542	1.21	QV
3+20	0.2626	1.21	QV
3+25	0.2709	1.22	QV
3+30	0.2793	1.22	QV
3+35	0.2878	1.22	Q V
3+40	0.2962	1.23	Q V
3+45	0.3047	1.23	Q V
3+50	0.3132	1.24	Q V
3+55	0.3218	1.24	Q V
4+ 0	0.3303	1.24	Q V
4+ 5	0.3389	1.25	Q V
4+10	0.3476	1.25	Q V
4+15	0.3562	1.26	Q V
4+20	0.3649	1.26	Q V
4+25	0.3736	1.26	Q V
4+30	0.3823	1.27	Q V
4+35	0.3911	1.27	Q V
4+40	0.3999	1.28	Q V
4+45	0.4087	1.28	Q V
4+50	0.4176	1.29	Q V
4+55	0.4265	1.29	Q V
5+ 0	0.4354	1.29	Q V
5+ 5	0.4443	1.30	Q V
5+10	0.4533	1.30	Q V

5+15	0.4623	1.31	Q	V				
5+20	0.4714	1.31	Q	V				
5+25	0.4805	1.32	Q	V				
5+30	0.4896	1.32	Q	V				
5+35	0.4987	1.33	Q	V				
5+40	0.5079	1.33	Q	V				
5+45	0.5171	1.34	Q	V				
5+50	0.5263	1.34	Q	V				
5+55	0.5356	1.35	Q	V				
6+ 0	0.5449	1.35	Q	V				
6+ 5	0.5543	1.36	Q	V				
6+10	0.5637	1.36	Q	V				
6+15	0.5731	1.37	Q	V				
6+20	0.5826	1.37	Q	V				
6+25	0.5921	1.38	Q	V				
6+30	0.6016	1.39	Q	V				
6+35	0.6112	1.39	Q	V				
6+40	0.6208	1.40	Q	V				
6+45	0.6305	1.40	Q	V				
6+50	0.6402	1.41	Q	V				
6+55	0.6499	1.41	Q	V				
7+ 0	0.6597	1.42	Q	V				
7+ 5	0.6695	1.43	Q	V				
7+10	0.6794	1.43	Q	V				
7+15	0.6893	1.44	Q	V				
7+20	0.6992	1.44	Q	V				
7+25	0.7092	1.45	Q	V				
7+30	0.7193	1.46	Q	V				
7+35	0.7293	1.46	Q	V				
7+40	0.7395	1.47	Q	V				
7+45	0.7496	1.48	Q	V				
7+50	0.7599	1.48	Q	V				
7+55	0.7701	1.49	Q	V				
8+ 0	0.7804	1.50	Q	V				
8+ 5	0.7908	1.50	Q	V				
8+10	0.8012	1.51	Q	V				
8+15	0.8117	1.52	Q	V				
8+20	0.8222	1.53	Q	V				
8+25	0.8328	1.53	Q	V				
8+30	0.8434	1.54	Q	V				
8+35	0.8541	1.55	Q	V				
8+40	0.8648	1.56	Q	V				
8+45	0.8756	1.57	Q	V				
8+50	0.8864	1.57	Q	V				
8+55	0.8973	1.58	Q	V				
9+ 0	0.9083	1.59	Q	V				
9+ 5	0.9193	1.60	Q	V				
9+10	0.9303	1.61	Q	V				
9+15	0.9415	1.62	Q	V				
9+20	0.9527	1.63	Q	V				
9+25	0.9639	1.63	Q	V				
9+30	0.9753	1.64	Q	V				
9+35	0.9866	1.65	Q	V				
9+40	0.9981	1.66	Q	V				
9+45	1.0096	1.67	Q	V				
9+50	1.0212	1.68	Q	V				
9+55	1.0329	1.69	Q	V				
10+ 0	1.0446	1.70	Q	V				

10+ 5	1.0564	1.71	Q	V			
10+10	1.0683	1.73	Q	V			
10+15	1.0803	1.74	Q	V			
10+20	1.0923	1.75	Q	V			
10+25	1.1044	1.76	Q	V			
10+30	1.1166	1.77	Q	V			
10+35	1.1289	1.78	Q	V			
10+40	1.1412	1.79	Q	V			
10+45	1.1537	1.81	Q	V			
10+50	1.1662	1.82	Q	V			
10+55	1.1788	1.83	Q	V			
11+ 0	1.1915	1.85	Q	V			
11+ 5	1.2043	1.86	Q	V			
11+10	1.2172	1.87	Q	V			
11+15	1.2302	1.89	Q	V			
11+20	1.2433	1.90	Q	V			
11+25	1.2565	1.92	Q	V			
11+30	1.2698	1.93	Q	V			
11+35	1.2832	1.95	Q	V			
11+40	1.2968	1.96	Q	V			
11+45	1.3104	1.98	Q	V			
11+50	1.3241	2.00	Q	V			
11+55	1.3380	2.01	Q	V			
12+ 0	1.3520	2.03	Q	V			
12+ 5	1.3661	2.05	Q	V			
12+10	1.3803	2.06	Q	V			
12+15	1.3946	2.07	Q	V			
12+20	1.4088	2.07	Q	V			
12+25	1.4231	2.07	Q	V			
12+30	1.4374	2.08	Q	V			
12+35	1.4518	2.09	Q	V			
12+40	1.4663	2.11	Q	V			
12+45	1.4810	2.12	Q	V			
12+50	1.4957	2.14	Q	V			
12+55	1.5106	2.16	Q	V			
13+ 0	1.5257	2.19	Q	V			
13+ 5	1.5409	2.21	Q	V			
13+10	1.5563	2.24	Q	V			
13+15	1.5719	2.26	Q	V			
13+20	1.5877	2.29	Q	V			
13+25	1.6037	2.32	Q	V			
13+30	1.6199	2.35	Q	V			
13+35	1.6363	2.38	Q	V			
13+40	1.6530	2.42	Q	V			
13+45	1.6699	2.45	Q	V			
13+50	1.6870	2.49	Q	V			
13+55	1.7044	2.53	Q	V			
14+ 0	1.7221	2.57	Q	V			
14+ 5	1.7402	2.62	Q	V			
14+10	1.7585	2.66	Q	V			
14+15	1.7772	2.71	Q	V			
14+20	1.7962	2.77	Q	V			
14+25	1.8157	2.82	Q	V			
14+30	1.8355	2.88	Q	V			
14+35	1.8558	2.95	Q	V			
14+40	1.8766	3.02	Q	V			
14+45	1.8979	3.09	Q	V			
14+50	1.9197	3.16	Q	V			

14+55	1.9420	3.25	Q		V			
15+ 0	1.9650	3.34	Q		V			
15+ 5	1.9887	3.44	Q		V			
15+10	2.0131	3.55	Q		V			
15+15	2.0384	3.67	Q		V			
15+20	2.0646	3.80	Q		V			
15+25	2.0916	3.93	Q		V			
15+30	2.1194	4.03	Q		V			
15+35	2.1474	4.07	Q		V			
15+40	2.1748	3.97	Q		V			
15+45	2.2016	3.89	Q		V			
15+50	2.2290	3.98	Q		V			
15+55	2.2582	4.24	Q		V			
16+ 0	2.2917	4.86	Q		V			
16+ 5	2.3499	8.45	Q		V			
16+10	2.4628	16.40		Q	V			
16+15	2.6509	27.31			Q			
16+20	2.9911	49.39			V			Q
16+25	3.3410	50.81			V			Q
16+30	3.5859	35.56			Q	V		
16+35	3.7595	25.20			Q	V		
16+40	3.8958	19.80			Q	V		
16+45	4.0107	16.68			Q	V		
16+50	4.1093	14.32			Q	V		
16+55	4.1941	12.31			Q	V		
17+ 0	4.2689	10.86			Q	V		
17+ 5	4.3368	9.86			Q	V		
17+10	4.3992	9.06			Q	V		
17+15	4.4551	8.13			Q	V		
17+20	4.5041	7.12			Q	V		
17+25	4.5498	6.64			Q	V		
17+30	4.5926	6.21			Q	V		
17+35	4.6326	5.80			Q	V		
17+40	4.6700	5.44			Q	V		
17+45	4.7040	4.93			Q	V		
17+50	4.7368	4.76			Q	V		
17+55	4.7671	4.40			Q	V		
18+ 0	4.7957	4.15			Q	V		
18+ 5	4.8228	3.94			Q	V		
18+10	4.8473	3.57			Q	V		
18+15	4.8710	3.44			Q	V		
18+20	4.8924	3.10			Q	V		
18+25	4.9127	2.96	Q			V		
18+30	4.9331	2.95	Q			V		
18+35	4.9536	2.98	Q			V		
18+40	4.9738	2.93	Q			V		
18+45	4.9937	2.89	Q			V		
18+50	5.0131	2.83	Q			V		
18+55	5.0312	2.63	Q			V		
19+ 0	5.0480	2.43	Q			V		
19+ 5	5.0644	2.38	Q			V		
19+10	5.0793	2.17	Q			V		
19+15	5.0928	1.97	Q			V		
19+20	5.1062	1.93	Q			V		
19+25	5.1193	1.90	Q			V		
19+30	5.1322	1.87	Q			V		
19+35	5.1449	1.84	Q			V		
19+40	5.1574	1.82	Q			V		

19+45	5.1697	1.79	Q				V
19+50	5.1818	1.77	Q				V
19+55	5.1938	1.74	Q				V
20+ 0	5.2057	1.72	Q				V
20+ 5	5.2174	1.70	Q				V
20+10	5.2289	1.68	Q				V
20+15	5.2403	1.66	Q				V
20+20	5.2516	1.64	Q				V
20+25	5.2628	1.62	Q				V
20+30	5.2738	1.60	Q				V
20+35	5.2847	1.58	Q				V
20+40	5.2955	1.57	Q				V
20+45	5.3062	1.55	Q				V
20+50	5.3167	1.54	Q				V
20+55	5.3272	1.52	Q				V
21+ 0	5.3376	1.51	Q				V
21+ 5	5.3479	1.49	Q				V
21+10	5.3580	1.48	Q				V
21+15	5.3681	1.46	Q				V
21+20	5.3781	1.45	Q				V
21+25	5.3880	1.44	Q				V
21+30	5.3979	1.43	Q				V
21+35	5.4076	1.41	Q				V
21+40	5.4172	1.40	Q				V
21+45	5.4268	1.39	Q				V
21+50	5.4363	1.38	Q				V
21+55	5.4457	1.37	Q				V
22+ 0	5.4551	1.36	Q				V
22+ 5	5.4644	1.35	Q				V
22+10	5.4736	1.34	Q				V
22+15	5.4827	1.33	Q				V
22+20	5.4918	1.32	Q				V
22+25	5.5008	1.31	Q				V
22+30	5.5097	1.30	Q				V
22+35	5.5186	1.29	Q				V
22+40	5.5274	1.28	Q				V
22+45	5.5362	1.27	Q				V
22+50	5.5449	1.26	Q				V
22+55	5.5535	1.25	Q				V
23+ 0	5.5621	1.25	Q				V
23+ 5	5.5707	1.24	Q				V
23+10	5.5791	1.23	Q				V
23+15	5.5876	1.22	Q				V
23+20	5.5959	1.22	Q				V
23+25	5.6043	1.21	Q				V
23+30	5.6125	1.20	Q				V
23+35	5.6207	1.19	Q				V
23+40	5.6289	1.19	Q				V
23+45	5.6370	1.18	Q				V
23+50	5.6451	1.17	Q				V
23+55	5.6532	1.17	Q				V
24+ 0	5.6611	1.16	Q				V
24+ 5	5.6690	1.14	Q				V
24+10	5.6765	1.09	Q				V
24+15	5.6835	1.01	Q				V
24+20	5.6892	0.82	Q				V
24+25	5.6935	0.63	Q				V
24+30	5.6970	0.50	Q				V

24+35	5.6998	0.41	Q				V
24+40	5.7022	0.35	Q				V
24+45	5.7043	0.30	Q				V
24+50	5.7061	0.26	Q				V
24+55	5.7076	0.23	Q				V
25+ 0	5.7090	0.20	Q				V
25+ 5	5.7102	0.17	Q				V
25+10	5.7112	0.15	Q				V
25+15	5.7121	0.13	Q				V
25+20	5.7129	0.12	Q				V
25+25	5.7136	0.10	Q				V
25+30	5.7142	0.09	Q				V
25+35	5.7148	0.08	Q				V
25+40	5.7153	0.07	Q				V
25+45	5.7157	0.06	Q				V
25+50	5.7160	0.05	Q				V
25+55	5.7163	0.05	Q				V
26+ 0	5.7166	0.04	Q				V
26+ 5	5.7168	0.03	Q				V
26+10	5.7170	0.03	Q				V
26+15	5.7172	0.02	Q				V
26+20	5.7174	0.02	Q				V
26+25	5.7175	0.02	Q				V
26+30	5.7176	0.02	Q				V
26+35	5.7177	0.01	Q				V
26+40	5.7178	0.01	Q				V
26+45	5.7178	0.01	Q				V
26+50	5.7179	0.01	Q				V
26+55	5.7179	0.00	Q				V
27+ 0	5.7179	0.00	Q				V
27+ 5	5.7179	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 05/06/20

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

Program License Serial Number 6320

204728 - US Cold Storage
EXISTING CONDITIONS - AREA A
25-YEAR, 24- HOUR STORM
BY: SG DATE: 05-06-20

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 10		
69.33	1	0.76

Rainfall data for year 2		
69.33	6	1.04

Rainfall data for year 2		
69.33	24	1.96

Rainfall data for year 100		
69.33	1	1.27

Rainfall data for year 100		
69.33	6	2.90

Rainfall data for year 100		
69.33	24	6.12

+++++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
63.0	63.0	69.33	1.000	0.637	1.000	0.637

Area-averaged adjusted loss rate Fm (In/Hr) = 0.637

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
69.33	1.000	63.0	63.0	5.87	0.278

Area-averaged catchment yield fraction, Y = 0.278

Area-averaged low loss fraction, Yb = 0.722

User entry of time of concentration = 0.506 (hours)

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Watershed area = 69.33(Ac.)
 Catchment Lag time = 0.405 hours
 Unit interval = 5.000 minutes
 Unit interval percentage of lag time = 20.5863
 Hydrograph baseflow = 0.00(CFS)
 Average maximum watershed loss rate(Fm) = 0.637(In/Hr)
 Average low loss rate fraction (Yb) = 0.722 (decimal)
 DESERT S-Graph Selected
 Computed peak 5-minute rainfall = 0.457(In)
 Computed peak 30-minute rainfall = 0.782(In)
 Specified peak 1-hour rainfall = 0.963(In)
 Computed peak 3-hour rainfall = 1.616(In)
 Specified peak 6-hour rainfall = 2.241(In)
 Specified peak 24-hour rainfall = 4.646(In)

Rainfall depth area reduction factors:

Using a total area of 69.33(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997	Adjusted rainfall = 0.455(In)
30-minute factor = 0.997	Adjusted rainfall = 0.780(In)
1-hour factor = 0.997	Adjusted rainfall = 0.960(In)
3-hour factor = 1.000	Adjusted rainfall = 1.616(In)
6-hour factor = 1.000	Adjusted rainfall = 2.240(In)
24-hour factor = 1.000	Adjusted rainfall = 4.645(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))
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(K = 838.46 (CFS))

1	1.033	8.660
2	4.725	30.955
3	12.013	61.112

4	28.066	134.597
5	45.124	143.023
6	56.476	95.180
7	63.994	63.040
8	69.530	46.418
9	73.935	36.932
10	77.525	30.097
11	80.431	24.371
12	82.868	20.432
13	85.001	17.883
14	86.912	16.023
15	88.543	13.671
16	89.843	10.907
17	91.022	9.880
18	92.092	8.978
19	93.055	8.073
20	93.930	7.331
21	94.649	6.029
22	95.347	5.855
23	95.943	4.997
24	96.478	4.488
25	96.972	4.138
26	97.349	3.164
27	97.713	3.052
28	97.961	2.081
29	98.167	1.726
30	98.388	1.852
31	98.635	2.068
32	98.882	2.071
33	99.129	2.071
34	99.376	2.071
35	99.564	1.578
36	99.693	1.079
37	99.821	1.079
38	100.000	0.539

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.4554	0.4554
2	0.5607	0.1053
3	0.6332	0.0725
4	0.6903	0.0571
5	0.7381	0.0478
6	0.7796	0.0415
7	0.8165	0.0369
8	0.8499	0.0334
9	0.8805	0.0306
10	0.9087	0.0283
11	0.9351	0.0264
12	0.9598	0.0247
13	0.9969	0.0371
14	1.0326	0.0356
15	1.0669	0.0343
16	1.1000	0.0331
17	1.1321	0.0321
18	1.1632	0.0311
19	1.1934	0.0302
20	1.2228	0.0294

21	1.2514	0.0286
22	1.2793	0.0279
23	1.3065	0.0272
24	1.3331	0.0266
25	1.3592	0.0260
26	1.3847	0.0255
27	1.4097	0.0250
28	1.4342	0.0245
29	1.4582	0.0241
30	1.4819	0.0236
31	1.5051	0.0232
32	1.5279	0.0228
33	1.5503	0.0224
34	1.5724	0.0221
35	1.5942	0.0218
36	1.6156	0.0214
37	1.6366	0.0210
38	1.6573	0.0207
39	1.6778	0.0204
40	1.6979	0.0202
41	1.7178	0.0199
42	1.7375	0.0196
43	1.7568	0.0194
44	1.7760	0.0192
45	1.7949	0.0189
46	1.8136	0.0187
47	1.8321	0.0185
48	1.8504	0.0183
49	1.8685	0.0181
50	1.8864	0.0179
51	1.9041	0.0177
52	1.9216	0.0175
53	1.9389	0.0173
54	1.9561	0.0172
55	1.9731	0.0170
56	1.9900	0.0168
57	2.0066	0.0167
58	2.0232	0.0165
59	2.0395	0.0164
60	2.0558	0.0162
61	2.0719	0.0161
62	2.0878	0.0160
63	2.1036	0.0158
64	2.1193	0.0157
65	2.1349	0.0156
66	2.1503	0.0154
67	2.1656	0.0153
68	2.1808	0.0152
69	2.1959	0.0151
70	2.2108	0.0150
71	2.2257	0.0148
72	2.2404	0.0147
73	2.2567	0.0163
74	2.2729	0.0162
75	2.2890	0.0161
76	2.3050	0.0160
77	2.3209	0.0159
78	2.3367	0.0158

79	2.3524	0.0157
80	2.3681	0.0156
81	2.3836	0.0155
82	2.3990	0.0154
83	2.4144	0.0153
84	2.4296	0.0153
85	2.4448	0.0152
86	2.4599	0.0151
87	2.4749	0.0150
88	2.4898	0.0149
89	2.5047	0.0148
90	2.5194	0.0148
91	2.5341	0.0147
92	2.5487	0.0146
93	2.5633	0.0145
94	2.5777	0.0145
95	2.5921	0.0144
96	2.6064	0.0143
97	2.6207	0.0142
98	2.6348	0.0142
99	2.6490	0.0141
100	2.6630	0.0140
101	2.6770	0.0140
102	2.6909	0.0139
103	2.7047	0.0138
104	2.7185	0.0138
105	2.7322	0.0137
106	2.7459	0.0137
107	2.7595	0.0136
108	2.7730	0.0135
109	2.7865	0.0135
110	2.7999	0.0134
111	2.8133	0.0134
112	2.8266	0.0133
113	2.8398	0.0132
114	2.8530	0.0132
115	2.8662	0.0131
116	2.8792	0.0131
117	2.8923	0.0130
118	2.9052	0.0130
119	2.9182	0.0129
120	2.9310	0.0129
121	2.9439	0.0128
122	2.9566	0.0128
123	2.9694	0.0127
124	2.9820	0.0127
125	2.9947	0.0126
126	3.0072	0.0126
127	3.0198	0.0125
128	3.0323	0.0125
129	3.0447	0.0124
130	3.0571	0.0124
131	3.0694	0.0123
132	3.0817	0.0123
133	3.0940	0.0123
134	3.1062	0.0122
135	3.1184	0.0122
136	3.1305	0.0121

137	3.1426	0.0121
138	3.1547	0.0120
139	3.1667	0.0120
140	3.1786	0.0120
141	3.1905	0.0119
142	3.2024	0.0119
143	3.2143	0.0118
144	3.2261	0.0118
145	3.2378	0.0118
146	3.2496	0.0117
147	3.2613	0.0117
148	3.2729	0.0117
149	3.2845	0.0116
150	3.2961	0.0116
151	3.3076	0.0115
152	3.3191	0.0115
153	3.3306	0.0115
154	3.3420	0.0114
155	3.3534	0.0114
156	3.3648	0.0114
157	3.3761	0.0113
158	3.3874	0.0113
159	3.3987	0.0113
160	3.4099	0.0112
161	3.4211	0.0112
162	3.4323	0.0112
163	3.4434	0.0111
164	3.4545	0.0111
165	3.4656	0.0111
166	3.4766	0.0110
167	3.4876	0.0110
168	3.4986	0.0110
169	3.5095	0.0109
170	3.5204	0.0109
171	3.5313	0.0109
172	3.5421	0.0108
173	3.5530	0.0108
174	3.5638	0.0108
175	3.5745	0.0108
176	3.5852	0.0107
177	3.5959	0.0107
178	3.6066	0.0107
179	3.6173	0.0106
180	3.6279	0.0106
181	3.6385	0.0106
182	3.6490	0.0106
183	3.6596	0.0105
184	3.6701	0.0105
185	3.6805	0.0105
186	3.6910	0.0105
187	3.7014	0.0104
188	3.7118	0.0104
189	3.7222	0.0104
190	3.7325	0.0103
191	3.7429	0.0103
192	3.7532	0.0103
193	3.7634	0.0103
194	3.7737	0.0102

195	3.7839	0.0102
196	3.7941	0.0102
197	3.8043	0.0102
198	3.8144	0.0101
199	3.8245	0.0101
200	3.8346	0.0101
201	3.8447	0.0101
202	3.8547	0.0100
203	3.8648	0.0100
204	3.8748	0.0100
205	3.8848	0.0100
206	3.8947	0.0100
207	3.9046	0.0099
208	3.9146	0.0099
209	3.9244	0.0099
210	3.9343	0.0099
211	3.9442	0.0098
212	3.9540	0.0098
213	3.9638	0.0098
214	3.9736	0.0098
215	3.9833	0.0098
216	3.9930	0.0097
217	4.0028	0.0097
218	4.0125	0.0097
219	4.0221	0.0097
220	4.0318	0.0097
221	4.0414	0.0096
222	4.0510	0.0096
223	4.0606	0.0096
224	4.0702	0.0096
225	4.0797	0.0095
226	4.0892	0.0095
227	4.0988	0.0095
228	4.1082	0.0095
229	4.1177	0.0095
230	4.1272	0.0094
231	4.1366	0.0094
232	4.1460	0.0094
233	4.1554	0.0094
234	4.1648	0.0094
235	4.1741	0.0094
236	4.1834	0.0093
237	4.1928	0.0093
238	4.2021	0.0093
239	4.2113	0.0093
240	4.2206	0.0093
241	4.2298	0.0092
242	4.2391	0.0092
243	4.2483	0.0092
244	4.2575	0.0092
245	4.2666	0.0092
246	4.2758	0.0092
247	4.2849	0.0091
248	4.2940	0.0091
249	4.3031	0.0091
250	4.3122	0.0091
251	4.3213	0.0091
252	4.3303	0.0090

253	4.3394	0.0090
254	4.3484	0.0090
255	4.3574	0.0090
256	4.3663	0.0090
257	4.3753	0.0090
258	4.3843	0.0089
259	4.3932	0.0089
260	4.4021	0.0089
261	4.4110	0.0089
262	4.4199	0.0089
263	4.4287	0.0089
264	4.4376	0.0089
265	4.4464	0.0088
266	4.4552	0.0088
267	4.4641	0.0088
268	4.4728	0.0088
269	4.4816	0.0088
270	4.4904	0.0088
271	4.4991	0.0087
272	4.5078	0.0087
273	4.5165	0.0087
274	4.5252	0.0087
275	4.5339	0.0087
276	4.5426	0.0087
277	4.5512	0.0087
278	4.5599	0.0086
279	4.5685	0.0086
280	4.5771	0.0086
281	4.5857	0.0086
282	4.5943	0.0086
283	4.6028	0.0086
284	4.6114	0.0085
285	4.6199	0.0085
286	4.6284	0.0085
287	4.6369	0.0085
288	4.6454	0.0085

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0085	0.0061	0.0024
2	0.0085	0.0061	0.0024
3	0.0085	0.0062	0.0024
4	0.0085	0.0062	0.0024
5	0.0086	0.0062	0.0024
6	0.0086	0.0062	0.0024
7	0.0086	0.0062	0.0024
8	0.0086	0.0062	0.0024
9	0.0087	0.0063	0.0024
10	0.0087	0.0063	0.0024
11	0.0087	0.0063	0.0024
12	0.0087	0.0063	0.0024
13	0.0088	0.0063	0.0024
14	0.0088	0.0063	0.0024
15	0.0088	0.0064	0.0024
16	0.0088	0.0064	0.0024
17	0.0089	0.0064	0.0025

18	0.0089	0.0064	0.0025
19	0.0089	0.0064	0.0025
20	0.0089	0.0064	0.0025
21	0.0089	0.0065	0.0025
22	0.0090	0.0065	0.0025
23	0.0090	0.0065	0.0025
24	0.0090	0.0065	0.0025
25	0.0090	0.0065	0.0025
26	0.0091	0.0065	0.0025
27	0.0091	0.0066	0.0025
28	0.0091	0.0066	0.0025
29	0.0092	0.0066	0.0025
30	0.0092	0.0066	0.0025
31	0.0092	0.0067	0.0026
32	0.0092	0.0067	0.0026
33	0.0093	0.0067	0.0026
34	0.0093	0.0067	0.0026
35	0.0093	0.0067	0.0026
36	0.0093	0.0067	0.0026
37	0.0094	0.0068	0.0026
38	0.0094	0.0068	0.0026
39	0.0094	0.0068	0.0026
40	0.0094	0.0068	0.0026
41	0.0095	0.0069	0.0026
42	0.0095	0.0069	0.0026
43	0.0095	0.0069	0.0027
44	0.0096	0.0069	0.0027
45	0.0096	0.0069	0.0027
46	0.0096	0.0070	0.0027
47	0.0097	0.0070	0.0027
48	0.0097	0.0070	0.0027
49	0.0097	0.0070	0.0027
50	0.0098	0.0070	0.0027
51	0.0098	0.0071	0.0027
52	0.0098	0.0071	0.0027
53	0.0099	0.0071	0.0027
54	0.0099	0.0071	0.0027
55	0.0099	0.0072	0.0028
56	0.0100	0.0072	0.0028
57	0.0100	0.0072	0.0028
58	0.0100	0.0072	0.0028
59	0.0101	0.0073	0.0028
60	0.0101	0.0073	0.0028
61	0.0101	0.0073	0.0028
62	0.0102	0.0073	0.0028
63	0.0102	0.0074	0.0028
64	0.0102	0.0074	0.0028
65	0.0103	0.0074	0.0029
66	0.0103	0.0075	0.0029
67	0.0104	0.0075	0.0029
68	0.0104	0.0075	0.0029
69	0.0105	0.0076	0.0029
70	0.0105	0.0076	0.0029
71	0.0105	0.0076	0.0029
72	0.0106	0.0076	0.0029
73	0.0106	0.0077	0.0029
74	0.0106	0.0077	0.0030
75	0.0107	0.0077	0.0030

76	0.0107	0.0078	0.0030
77	0.0108	0.0078	0.0030
78	0.0108	0.0078	0.0030
79	0.0109	0.0079	0.0030
80	0.0109	0.0079	0.0030
81	0.0110	0.0079	0.0030
82	0.0110	0.0079	0.0031
83	0.0111	0.0080	0.0031
84	0.0111	0.0080	0.0031
85	0.0112	0.0081	0.0031
86	0.0112	0.0081	0.0031
87	0.0113	0.0081	0.0031
88	0.0113	0.0082	0.0031
89	0.0114	0.0082	0.0032
90	0.0114	0.0082	0.0032
91	0.0115	0.0083	0.0032
92	0.0115	0.0083	0.0032
93	0.0116	0.0084	0.0032
94	0.0116	0.0084	0.0032
95	0.0117	0.0084	0.0032
96	0.0117	0.0085	0.0033
97	0.0118	0.0085	0.0033
98	0.0118	0.0086	0.0033
99	0.0119	0.0086	0.0033
100	0.0120	0.0086	0.0033
101	0.0120	0.0087	0.0033
102	0.0121	0.0087	0.0034
103	0.0122	0.0088	0.0034
104	0.0122	0.0088	0.0034
105	0.0123	0.0089	0.0034
106	0.0123	0.0089	0.0034
107	0.0124	0.0090	0.0035
108	0.0125	0.0090	0.0035
109	0.0126	0.0091	0.0035
110	0.0126	0.0091	0.0035
111	0.0127	0.0092	0.0035
112	0.0128	0.0092	0.0035
113	0.0129	0.0093	0.0036
114	0.0129	0.0093	0.0036
115	0.0130	0.0094	0.0036
116	0.0131	0.0095	0.0036
117	0.0132	0.0095	0.0037
118	0.0132	0.0096	0.0037
119	0.0134	0.0097	0.0037
120	0.0134	0.0097	0.0037
121	0.0135	0.0098	0.0038
122	0.0136	0.0098	0.0038
123	0.0137	0.0099	0.0038
124	0.0138	0.0100	0.0038
125	0.0139	0.0100	0.0039
126	0.0140	0.0101	0.0039
127	0.0141	0.0102	0.0039
128	0.0142	0.0102	0.0039
129	0.0143	0.0103	0.0040
130	0.0144	0.0104	0.0040
131	0.0145	0.0105	0.0040
132	0.0146	0.0106	0.0041
133	0.0148	0.0107	0.0041

134	0.0148	0.0107	0.0041
135	0.0150	0.0108	0.0042
136	0.0151	0.0109	0.0042
137	0.0153	0.0110	0.0042
138	0.0153	0.0111	0.0043
139	0.0155	0.0112	0.0043
140	0.0156	0.0113	0.0043
141	0.0158	0.0114	0.0044
142	0.0159	0.0115	0.0044
143	0.0161	0.0116	0.0045
144	0.0162	0.0117	0.0045
145	0.0147	0.0106	0.0041
146	0.0148	0.0107	0.0041
147	0.0151	0.0109	0.0042
148	0.0152	0.0110	0.0042
149	0.0154	0.0111	0.0043
150	0.0156	0.0112	0.0043
151	0.0158	0.0114	0.0044
152	0.0160	0.0115	0.0044
153	0.0162	0.0117	0.0045
154	0.0164	0.0118	0.0045
155	0.0167	0.0121	0.0046
156	0.0168	0.0122	0.0047
157	0.0172	0.0124	0.0048
158	0.0173	0.0125	0.0048
159	0.0177	0.0128	0.0049
160	0.0179	0.0129	0.0050
161	0.0183	0.0132	0.0051
162	0.0185	0.0134	0.0051
163	0.0189	0.0137	0.0053
164	0.0192	0.0138	0.0053
165	0.0196	0.0142	0.0055
166	0.0199	0.0144	0.0055
167	0.0204	0.0148	0.0057
168	0.0207	0.0150	0.0058
169	0.0214	0.0155	0.0059
170	0.0218	0.0157	0.0060
171	0.0224	0.0162	0.0062
172	0.0228	0.0165	0.0063
173	0.0236	0.0171	0.0066
174	0.0241	0.0174	0.0067
175	0.0250	0.0181	0.0069
176	0.0255	0.0184	0.0071
177	0.0266	0.0192	0.0074
178	0.0272	0.0197	0.0076
179	0.0286	0.0207	0.0079
180	0.0294	0.0212	0.0082
181	0.0311	0.0225	0.0086
182	0.0321	0.0232	0.0089
183	0.0343	0.0248	0.0095
184	0.0356	0.0257	0.0099
185	0.0247	0.0179	0.0069
186	0.0264	0.0190	0.0073
187	0.0306	0.0221	0.0085
188	0.0334	0.0241	0.0093
189	0.0415	0.0300	0.0115
190	0.0478	0.0345	0.0133
191	0.0725	0.0524	0.0201

192	0.1053	0.0531	0.0522
193	0.4554	0.0531	0.4023
194	0.0571	0.0412	0.0158
195	0.0369	0.0267	0.0102
196	0.0283	0.0204	0.0078
197	0.0371	0.0268	0.0103
198	0.0331	0.0239	0.0092
199	0.0302	0.0218	0.0084
200	0.0279	0.0202	0.0077
201	0.0260	0.0188	0.0072
202	0.0245	0.0177	0.0068
203	0.0232	0.0168	0.0064
204	0.0221	0.0160	0.0061
205	0.0210	0.0152	0.0058
206	0.0202	0.0146	0.0056
207	0.0194	0.0140	0.0054
208	0.0187	0.0135	0.0052
209	0.0181	0.0131	0.0050
210	0.0175	0.0127	0.0049
211	0.0170	0.0123	0.0047
212	0.0165	0.0119	0.0046
213	0.0161	0.0116	0.0045
214	0.0157	0.0113	0.0044
215	0.0153	0.0111	0.0042
216	0.0150	0.0108	0.0042
217	0.0163	0.0118	0.0045
218	0.0160	0.0116	0.0044
219	0.0157	0.0114	0.0044
220	0.0154	0.0112	0.0043
221	0.0152	0.0110	0.0042
222	0.0149	0.0108	0.0041
223	0.0147	0.0106	0.0041
224	0.0145	0.0104	0.0040
225	0.0142	0.0103	0.0040
226	0.0140	0.0101	0.0039
227	0.0138	0.0100	0.0038
228	0.0137	0.0099	0.0038
229	0.0135	0.0097	0.0037
230	0.0133	0.0096	0.0037
231	0.0131	0.0095	0.0036
232	0.0130	0.0094	0.0036
233	0.0128	0.0093	0.0036
234	0.0127	0.0092	0.0035
235	0.0125	0.0091	0.0035
236	0.0124	0.0090	0.0034
237	0.0123	0.0089	0.0034
238	0.0121	0.0088	0.0034
239	0.0120	0.0087	0.0033
240	0.0119	0.0086	0.0033
241	0.0118	0.0085	0.0033
242	0.0117	0.0084	0.0032
243	0.0115	0.0083	0.0032
244	0.0114	0.0083	0.0032
245	0.0113	0.0082	0.0031
246	0.0112	0.0081	0.0031
247	0.0111	0.0080	0.0031
248	0.0110	0.0080	0.0031
249	0.0109	0.0079	0.0030

250	0.0108	0.0078	0.0030
251	0.0108	0.0078	0.0030
252	0.0107	0.0077	0.0030
253	0.0106	0.0076	0.0029
254	0.0105	0.0076	0.0029
255	0.0104	0.0075	0.0029
256	0.0103	0.0075	0.0029
257	0.0103	0.0074	0.0029
258	0.0102	0.0074	0.0028
259	0.0101	0.0073	0.0028
260	0.0100	0.0073	0.0028
261	0.0100	0.0072	0.0028
262	0.0099	0.0072	0.0028
263	0.0098	0.0071	0.0027
264	0.0098	0.0071	0.0027
265	0.0097	0.0070	0.0027
266	0.0097	0.0070	0.0027
267	0.0096	0.0069	0.0027
268	0.0095	0.0069	0.0026
269	0.0095	0.0068	0.0026
270	0.0094	0.0068	0.0026
271	0.0094	0.0068	0.0026
272	0.0093	0.0067	0.0026
273	0.0092	0.0067	0.0026
274	0.0092	0.0066	0.0026
275	0.0091	0.0066	0.0025
276	0.0091	0.0066	0.0025
277	0.0090	0.0065	0.0025
278	0.0090	0.0065	0.0025
279	0.0089	0.0065	0.0025
280	0.0089	0.0064	0.0025
281	0.0088	0.0064	0.0025
282	0.0088	0.0063	0.0024
283	0.0087	0.0063	0.0024
284	0.0087	0.0063	0.0024
285	0.0087	0.0062	0.0024
286	0.0086	0.0062	0.0024
287	0.0086	0.0062	0.0024
288	0.0085	0.0062	0.0024

 Total soil rain loss = 3.06(In)
 Total effective rainfall = 1.59(In)
 Peak flow rate in flood hydrograph = 69.65(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	17.5	35.0	52.5	70.0
0+ 5	0.0001	0.02	Q				
0+10	0.0008	0.09	Q				
0+15	0.0024	0.24	Q				
0+20	0.0062	0.56	Q				

0+25	0.0124	0.89	Q
0+30	0.0201	1.12	Q
0+35	0.0289	1.27	Q
0+40	0.0384	1.38	Q
0+45	0.0486	1.47	Q
0+50	0.0592	1.55	Q
0+55	0.0703	1.61	Q
1+ 0	0.0818	1.66	Q
1+ 5	0.0935	1.71	Q
1+10	0.1056	1.75	VQ
1+15	0.1179	1.79	VQ
1+20	0.1304	1.82	VQ
1+25	0.1432	1.85	VQ
1+30	0.1561	1.87	VQ
1+35	0.1691	1.90	VQ
1+40	0.1823	1.92	VQ
1+45	0.1957	1.94	VQ
1+50	0.2092	1.96	VQ
1+55	0.2227	1.97	VQ
2+ 0	0.2365	1.99	Q
2+ 5	0.2503	2.01	Q
2+10	0.2642	2.02	Q
2+15	0.2781	2.03	Q
2+20	0.2922	2.04	Q
2+25	0.3063	2.05	Q
2+30	0.3205	2.06	Q
2+35	0.3348	2.07	Q
2+40	0.3491	2.08	Q
2+45	0.3636	2.09	Q
2+50	0.3780	2.10	Q
2+55	0.3926	2.11	Q
3+ 0	0.4072	2.12	Q
3+ 5	0.4219	2.13	Q
3+10	0.4366	2.14	Q
3+15	0.4514	2.15	Q
3+20	0.4662	2.15	QV
3+25	0.4811	2.16	QV
3+30	0.4960	2.16	QV
3+35	0.5109	2.17	QV
3+40	0.5259	2.18	QV
3+45	0.5410	2.18	QV
3+50	0.5561	2.19	QV
3+55	0.5712	2.20	QV
4+ 0	0.5864	2.20	QV
4+ 5	0.6016	2.21	QV
4+10	0.6169	2.22	QV
4+15	0.6322	2.23	QV
4+20	0.6476	2.23	QV
4+25	0.6630	2.24	QV
4+30	0.6785	2.25	QV
4+35	0.6940	2.25	Q V
4+40	0.7096	2.26	Q V
4+45	0.7252	2.27	Q V
4+50	0.7409	2.28	Q V
4+55	0.7567	2.28	Q V
5+ 0	0.7724	2.29	Q V
5+ 5	0.7883	2.30	Q V
5+10	0.8042	2.31	Q V

5+15	0.8201	2.32	Q V				
5+20	0.8361	2.32	Q V				
5+25	0.8522	2.33	Q V				
5+30	0.8683	2.34	Q V				
5+35	0.8845	2.35	Q V				
5+40	0.9007	2.36	Q V				
5+45	0.9170	2.37	Q V				
5+50	0.9334	2.37	Q V				
5+55	0.9498	2.38	Q V				
6+ 0	0.9663	2.39	Q V				
6+ 5	0.9828	2.40	Q V				
6+10	0.9994	2.41	Q V				
6+15	1.0161	2.42	Q V				
6+20	1.0328	2.43	Q V				
6+25	1.0496	2.44	Q V				
6+30	1.0664	2.45	Q V				
6+35	1.0834	2.46	Q V				
6+40	1.1003	2.47	Q V				
6+45	1.1174	2.48	Q V				
6+50	1.1345	2.49	Q V				
6+55	1.1517	2.50	Q V				
7+ 0	1.1690	2.51	Q V				
7+ 5	1.1863	2.52	Q V				
7+10	1.2037	2.53	Q V				
7+15	1.2212	2.54	Q V				
7+20	1.2388	2.55	Q V				
7+25	1.2564	2.56	Q V				
7+30	1.2741	2.57	Q V				
7+35	1.2919	2.58	Q V				
7+40	1.3097	2.59	Q V				
7+45	1.3277	2.61	Q V				
7+50	1.3457	2.62	Q V				
7+55	1.3638	2.63	Q V				
8+ 0	1.3820	2.64	Q V				
8+ 5	1.4003	2.65	Q V				
8+10	1.4186	2.67	Q V				
8+15	1.4371	2.68	Q V				
8+20	1.4556	2.69	Q V				
8+25	1.4742	2.70	Q V				
8+30	1.4929	2.72	Q V				
8+35	1.5117	2.73	Q V				
8+40	1.5306	2.74	Q V				
8+45	1.5496	2.76	Q V				
8+50	1.5687	2.77	Q V				
8+55	1.5879	2.78	Q V				
9+ 0	1.6071	2.80	Q V				
9+ 5	1.6265	2.81	Q V				
9+10	1.6460	2.83	Q V				
9+15	1.6656	2.84	Q V				
9+20	1.6853	2.86	Q V				
9+25	1.7051	2.87	Q V				
9+30	1.7250	2.89	Q V				
9+35	1.7450	2.91	Q V				
9+40	1.7651	2.92	Q V				
9+45	1.7854	2.94	Q V				
9+50	1.8058	2.96	Q V				
9+55	1.8262	2.97	Q V				
10+ 0	1.8469	2.99	Q V				

10+ 5	1.8676	3.01	Q	V			
10+10	1.8885	3.03	Q	V			
10+15	1.9094	3.05	Q	V			
10+20	1.9306	3.07	Q	V			
10+25	1.9518	3.09	Q	V			
10+30	1.9732	3.11	Q	V			
10+35	1.9947	3.13	Q	V			
10+40	2.0164	3.15	Q	V			
10+45	2.0382	3.17	Q	V			
10+50	2.0602	3.19	Q	V			
10+55	2.0823	3.21	Q	V			
11+ 0	2.1046	3.23	Q	V			
11+ 5	2.1270	3.26	Q	V			
11+10	2.1496	3.28	Q	V			
11+15	2.1724	3.30	Q	V			
11+20	2.1953	3.33	Q	V			
11+25	2.2184	3.35	Q	V			
11+30	2.2417	3.38	Q	V			
11+35	2.2652	3.41	Q	V			
11+40	2.2888	3.43	Q	V			
11+45	2.3127	3.46	Q	V			
11+50	2.3367	3.49	Q	V			
11+55	2.3609	3.52	Q	V			
12+ 0	2.3854	3.55	Q	V			
12+ 5	2.4100	3.58	Q	V			
12+10	2.4348	3.59	Q	V			
12+15	2.4596	3.60	Q	V			
12+20	2.4841	3.57	Q	V			
12+25	2.5085	3.54	Q	V			
12+30	2.5328	3.53	Q	V			
12+35	2.5571	3.53	Q	V			
12+40	2.5816	3.55	Q	V			
12+45	2.6062	3.57	Q	V			
12+50	2.6310	3.60	Q	V			
12+55	2.6560	3.63	Q	V			
13+ 0	2.6812	3.66	Q	V			
13+ 5	2.7067	3.70	Q	V			
13+10	2.7324	3.74	Q	V			
13+15	2.7585	3.78	Q	V			
13+20	2.7848	3.83	Q	V			
13+25	2.8115	3.87	Q	V			
13+30	2.8385	3.93	Q	V			
13+35	2.8659	3.98	Q	V			
13+40	2.8937	4.03	Q	V			
13+45	2.9219	4.09	Q	V			
13+50	2.9505	4.16	Q	V			
13+55	2.9796	4.22	Q	V			
14+ 0	3.0092	4.29	Q	V			
14+ 5	3.0392	4.37	Q	V			
14+10	3.0699	4.45	Q	V			
14+15	3.1010	4.53	Q	V			
14+20	3.1329	4.62	Q	V			
14+25	3.1654	4.72	Q	V			
14+30	3.1986	4.82	Q	V			
14+35	3.2325	4.93	Q	V			
14+40	3.2673	5.04	Q	V			
14+45	3.3029	5.17	Q	V			
14+50	3.3394	5.30	Q	V			

14+55	3.3768	5.44	Q		V			
15+ 0	3.4154	5.60	Q		V			
15+ 5	3.4551	5.77	Q		V			
15+10	3.4961	5.95	Q		V			
15+15	3.5385	6.16	Q		V			
15+20	3.5826	6.39	Q		V			
15+25	3.6281	6.61	Q		V			
15+30	3.6748	6.79	Q		V			
15+35	3.7222	6.88	Q		V			
15+40	3.7687	6.74	Q		V			
15+45	3.8144	6.63	Q		V			
15+50	3.8613	6.81	Q		V			
15+55	3.9114	7.28	Q		V			
16+ 0	3.9691	8.37	Q		V			
16+ 5	4.0620	13.49	Q	Q	V			
16+10	4.2301	24.41			V	Q		
16+15	4.5019	39.47			V	Q		
16+20	4.9723	68.29			V			Q
16+25	5.4519	69.65			V			Q
16+30	5.7920	49.37			V			
16+35	6.0366	35.52			Q			
16+40	6.2314	28.28			Q			
16+45	6.3970	24.05		Q				
16+50	6.5404	20.82		Q				
16+55	6.6648	18.06		Q				
17+ 0	6.7753	16.05		Q				
17+ 5	6.8761	14.63		Q				
17+10	6.9689	13.49		Q				
17+15	7.0527	12.17		Q				
17+20	7.1269	10.77		Q				
17+25	7.1962	10.07		Q				
17+30	7.2614	9.45		Q				
17+35	7.3223	8.85		Q				
17+40	7.3796	8.32		Q				
17+45	7.4320	7.61		Q				
17+50	7.4826	7.34		Q				
17+55	7.5295	6.82		Q				
18+ 0	7.5740	6.45		Q				
18+ 5	7.6162	6.13		Q				
18+10	7.6549	5.62		Q				
18+15	7.6924	5.44		Q				
18+20	7.7268	5.00	Q					
18+25	7.7600	4.83	Q					
18+30	7.7933	4.83	Q					
18+35	7.8267	4.85	Q					
18+40	7.8597	4.79	Q					
18+45	7.8922	4.72	Q					
18+50	7.9241	4.62	Q					
18+55	7.9540	4.34	Q					
19+ 0	7.9821	4.08	Q					
19+ 5	8.0095	3.99	Q					
19+10	8.0350	3.69	Q					
19+15	8.0585	3.42	Q					
19+20	8.0817	3.37	Q					
19+25	8.1046	3.32	Q					
19+30	8.1270	3.27	Q					
19+35	8.1492	3.22	Q					
19+40	8.1711	3.17	Q					

19+45	8.1926	3.13	Q			V
19+50	8.2139	3.09	Q			V
19+55	8.2349	3.05	Q			V
20+ 0	8.2556	3.01	Q			V
20+ 5	8.2761	2.98	Q			V
20+10	8.2964	2.94	Q			V
20+15	8.3164	2.91	Q			V
20+20	8.3362	2.88	Q			V
20+25	8.3558	2.84	Q			V
20+30	8.3752	2.81	Q			V
20+35	8.3944	2.79	Q			V
20+40	8.4134	2.76	Q			V
20+45	8.4322	2.73	Q			V
20+50	8.4508	2.70	Q			V
20+55	8.4693	2.68	Q			V
21+ 0	8.4875	2.65	Q			V
21+ 5	8.5057	2.63	Q			V
21+10	8.5236	2.61	Q			V
21+15	8.5414	2.58	Q			V
21+20	8.5590	2.56	Q			V
21+25	8.5765	2.54	Q			V
21+30	8.5938	2.52	Q			V
21+35	8.6110	2.50	Q			V
21+40	8.6281	2.48	Q			V
21+45	8.6450	2.46	Q			V
21+50	8.6618	2.44	Q			V
21+55	8.6785	2.42	Q			V
22+ 0	8.6950	2.40	Q			V
22+ 5	8.7114	2.38	Q			V
22+10	8.7277	2.36	Q			V
22+15	8.7438	2.35	Q			V
22+20	8.7599	2.33	Q			V
22+25	8.7758	2.31	Q			V
22+30	8.7917	2.30	Q			V
22+35	8.8074	2.28	Q			V
22+40	8.8230	2.27	Q			V
22+45	8.8385	2.25	Q			V
22+50	8.8539	2.24	Q			V
22+55	8.8692	2.22	Q			V
23+ 0	8.8845	2.21	Q			V
23+ 5	8.8996	2.20	Q			V
23+10	8.9146	2.18	Q			V
23+15	8.9295	2.17	Q			V
23+20	8.9444	2.16	Q			V
23+25	8.9591	2.14	Q			V
23+30	8.9738	2.13	Q			V
23+35	8.9884	2.12	Q			V
23+40	9.0029	2.11	Q			V
23+45	9.0173	2.09	Q			V
23+50	9.0317	2.08	Q			V
23+55	9.0459	2.07	Q			V
24+ 0	9.0601	2.06	Q			V
24+ 5	9.0741	2.03	Q			V
24+10	9.0875	1.94	Q			V
24+15	9.0998	1.79	Q			V
24+20	9.1099	1.46	Q			V
24+25	9.1176	1.12	Q			V
24+30	9.1237	0.89	Q			V

24+35	9.1288	0.74	Q				V
24+40	9.1331	0.62	Q				V
24+45	9.1368	0.53	Q				V
24+50	9.1399	0.46	Q				V
24+55	9.1427	0.40	Q				V
25+ 0	9.1451	0.35	Q				V
25+ 5	9.1472	0.31	Q				V
25+10	9.1490	0.27	Q				V
25+15	9.1506	0.23	Q				V
25+20	9.1521	0.21	Q				V
25+25	9.1533	0.18	Q				V
25+30	9.1544	0.16	Q				V
25+35	9.1554	0.14	Q				V
25+40	9.1562	0.12	Q				V
25+45	9.1570	0.11	Q				V
25+50	9.1576	0.09	Q				V
25+55	9.1581	0.08	Q				V
26+ 0	9.1586	0.07	Q				V
26+ 5	9.1590	0.06	Q				V
26+10	9.1594	0.05	Q				V
26+15	9.1597	0.04	Q				V
26+20	9.1600	0.04	Q				V
26+25	9.1602	0.03	Q				V
26+30	9.1604	0.03	Q				V
26+35	9.1606	0.03	Q				V
26+40	9.1607	0.02	Q				V
26+45	9.1608	0.02	Q				V
26+50	9.1609	0.01	Q				V
26+55	9.1609	0.01	Q				V
27+ 0	9.1610	0.00	Q				V
27+ 5	9.1610	0.00	Q				V

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
63.0	81.4	69.33	1.000	0.346	1.000	0.346

Area-averaged adjusted loss rate Fm (In/Hr) = 0.346

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
69.33	1.000	63.0	81.4	2.29	0.659

Area-averaged catchment yield fraction, Y = 0.659

Area-averaged low loss fraction, Yb = 0.341

User entry of time of concentration = 0.506 (hours)

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Watershed area = 69.33(Ac.)
 Catchment Lag time = 0.405 hours
 Unit interval = 5.000 minutes
 Unit interval percentage of lag time = 20.5863
 Hydrograph baseflow = 0.00(CFS)
 Average maximum watershed loss rate(Fm) = 0.346(In/Hr)
 Average low loss rate fraction (Yb) = 0.341 (decimal)
 DESERT S-Graph Selected
 Computed peak 5-minute rainfall = 0.603(In)
 Computed peak 30-minute rainfall = 1.032(In)
 Specified peak 1-hour rainfall = 1.270(In)
 Computed peak 3-hour rainfall = 2.107(In)
 Specified peak 6-hour rainfall = 2.900(In)
 Specified peak 24-hour rainfall = 6.120(In)

Rainfall depth area reduction factors:

Using a total area of 69.33(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997	Adjusted rainfall = 0.601(In)
30-minute factor = 0.997	Adjusted rainfall = 1.028(In)
1-hour factor = 0.997	Adjusted rainfall = 1.266(In)
3-hour factor = 1.000	Adjusted rainfall = 2.106(In)
6-hour factor = 1.000	Adjusted rainfall = 2.899(In)
24-hour factor = 1.000	Adjusted rainfall = 6.119(In)

Unit Hydrograph

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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
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(K = 838.46 (CFS))

1	1.033	8.660
2	4.725	30.955
3	12.013	61.112

4	28.066	134.597
5	45.124	143.023
6	56.476	95.180
7	63.994	63.040
8	69.530	46.418
9	73.935	36.932
10	77.525	30.097
11	80.431	24.371
12	82.868	20.432
13	85.001	17.883
14	86.912	16.023
15	88.543	13.671
16	89.843	10.907
17	91.022	9.880
18	92.092	8.978
19	93.055	8.073
20	93.930	7.331
21	94.649	6.029
22	95.347	5.855
23	95.943	4.997
24	96.478	4.488
25	96.972	4.138
26	97.349	3.164
27	97.713	3.052
28	97.961	2.081
29	98.167	1.726
30	98.388	1.852
31	98.635	2.068
32	98.882	2.071
33	99.129	2.071
34	99.376	2.071
35	99.564	1.578
36	99.693	1.079
37	99.821	1.079
38	100.000	0.539

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.6007	0.6007
2	0.7395	0.1388
3	0.8352	0.0957
4	0.9104	0.0753
5	0.9735	0.0630
6	1.0282	0.0547
7	1.0769	0.0487
8	1.1209	0.0440
9	1.1612	0.0403
10	1.1985	0.0373
11	1.2333	0.0348
12	1.2659	0.0326
13	1.3137	0.0478
14	1.3596	0.0459
15	1.4038	0.0442
16	1.4464	0.0426
17	1.4876	0.0412
18	1.5275	0.0399
19	1.5663	0.0388
20	1.6040	0.0377

21	1.6407	0.0367
22	1.6764	0.0358
23	1.7113	0.0349
24	1.7454	0.0341
25	1.7787	0.0333
26	1.8113	0.0326
27	1.8433	0.0320
28	1.8746	0.0313
29	1.9054	0.0307
30	1.9355	0.0302
31	1.9652	0.0296
32	1.9943	0.0291
33	2.0229	0.0286
34	2.0511	0.0282
35	2.0789	0.0277
36	2.1062	0.0273
37	2.1330	0.0268
38	2.1594	0.0264
39	2.1854	0.0260
40	2.2110	0.0257
41	2.2364	0.0253
42	2.2613	0.0250
43	2.2860	0.0247
44	2.3104	0.0244
45	2.3344	0.0241
46	2.3582	0.0238
47	2.3817	0.0235
48	2.4050	0.0232
49	2.4279	0.0230
50	2.4507	0.0227
51	2.4731	0.0225
52	2.4954	0.0222
53	2.5174	0.0220
54	2.5392	0.0218
55	2.5608	0.0216
56	2.5821	0.0214
57	2.6033	0.0212
58	2.6242	0.0210
59	2.6450	0.0208
60	2.6656	0.0206
61	2.6860	0.0204
62	2.7062	0.0202
63	2.7262	0.0200
64	2.7461	0.0199
65	2.7658	0.0197
66	2.7853	0.0195
67	2.8047	0.0194
68	2.8240	0.0192
69	2.8430	0.0191
70	2.8620	0.0189
71	2.8807	0.0188
72	2.8994	0.0186
73	2.9210	0.0216
74	2.9425	0.0215
75	2.9639	0.0214
76	2.9851	0.0212
77	3.0062	0.0211
78	3.0272	0.0210

79	3.0480	0.0209
80	3.0687	0.0207
81	3.0893	0.0206
82	3.1098	0.0205
83	3.1302	0.0204
84	3.1505	0.0203
85	3.1706	0.0202
86	3.1907	0.0200
87	3.2106	0.0199
88	3.2305	0.0198
89	3.2502	0.0197
90	3.2698	0.0196
91	3.2893	0.0195
92	3.3088	0.0194
93	3.3281	0.0193
94	3.3473	0.0192
95	3.3665	0.0191
96	3.3855	0.0190
97	3.4045	0.0190
98	3.4233	0.0189
99	3.4421	0.0188
100	3.4608	0.0187
101	3.4794	0.0186
102	3.4979	0.0185
103	3.5164	0.0184
104	3.5347	0.0184
105	3.5530	0.0183
106	3.5712	0.0182
107	3.5893	0.0181
108	3.6073	0.0180
109	3.6253	0.0180
110	3.6432	0.0179
111	3.6610	0.0178
112	3.6787	0.0177
113	3.6964	0.0177
114	3.7140	0.0176
115	3.7315	0.0175
116	3.7490	0.0174
117	3.7663	0.0174
118	3.7836	0.0173
119	3.8009	0.0172
120	3.8181	0.0172
121	3.8352	0.0171
122	3.8522	0.0170
123	3.8692	0.0170
124	3.8861	0.0169
125	3.9030	0.0169
126	3.9198	0.0168
127	3.9365	0.0167
128	3.9532	0.0167
129	3.9698	0.0166
130	3.9863	0.0166
131	4.0028	0.0165
132	4.0193	0.0164
133	4.0356	0.0164
134	4.0520	0.0163
135	4.0682	0.0163
136	4.0844	0.0162

137	4.1006	0.0162
138	4.1167	0.0161
139	4.1327	0.0160
140	4.1487	0.0160
141	4.1647	0.0159
142	4.1806	0.0159
143	4.1964	0.0158
144	4.2122	0.0158
145	4.2279	0.0157
146	4.2436	0.0157
147	4.2593	0.0156
148	4.2748	0.0156
149	4.2904	0.0155
150	4.3059	0.0155
151	4.3213	0.0154
152	4.3367	0.0154
153	4.3521	0.0154
154	4.3674	0.0153
155	4.3826	0.0153
156	4.3978	0.0152
157	4.4130	0.0152
158	4.4281	0.0151
159	4.4432	0.0151
160	4.4583	0.0150
161	4.4732	0.0150
162	4.4882	0.0149
163	4.5031	0.0149
164	4.5180	0.0149
165	4.5328	0.0148
166	4.5476	0.0148
167	4.5623	0.0147
168	4.5770	0.0147
169	4.5917	0.0147
170	4.6063	0.0146
171	4.6209	0.0146
172	4.6354	0.0145
173	4.6499	0.0145
174	4.6644	0.0145
175	4.6788	0.0144
176	4.6932	0.0144
177	4.7075	0.0143
178	4.7219	0.0143
179	4.7361	0.0143
180	4.7504	0.0142
181	4.7646	0.0142
182	4.7787	0.0142
183	4.7929	0.0141
184	4.8070	0.0141
185	4.8210	0.0141
186	4.8350	0.0140
187	4.8490	0.0140
188	4.8630	0.0140
189	4.8769	0.0139
190	4.8908	0.0139
191	4.9046	0.0139
192	4.9185	0.0138
193	4.9323	0.0138
194	4.9460	0.0138

195	4.9597	0.0137
196	4.9734	0.0137
197	4.9871	0.0137
198	5.0007	0.0136
199	5.0143	0.0136
200	5.0279	0.0136
201	5.0414	0.0135
202	5.0549	0.0135
203	5.0684	0.0135
204	5.0818	0.0134
205	5.0952	0.0134
206	5.1086	0.0134
207	5.1219	0.0133
208	5.1352	0.0133
209	5.1485	0.0133
210	5.1618	0.0133
211	5.1750	0.0132
212	5.1882	0.0132
213	5.2014	0.0132
214	5.2145	0.0131
215	5.2277	0.0131
216	5.2407	0.0131
217	5.2538	0.0131
218	5.2668	0.0130
219	5.2798	0.0130
220	5.2928	0.0130
221	5.3058	0.0129
222	5.3187	0.0129
223	5.3316	0.0129
224	5.3445	0.0129
225	5.3573	0.0128
226	5.3701	0.0128
227	5.3829	0.0128
228	5.3957	0.0128
229	5.4084	0.0127
230	5.4211	0.0127
231	5.4338	0.0127
232	5.4465	0.0127
233	5.4591	0.0126
234	5.4717	0.0126
235	5.4843	0.0126
236	5.4969	0.0126
237	5.5094	0.0125
238	5.5219	0.0125
239	5.5344	0.0125
240	5.5469	0.0125
241	5.5593	0.0124
242	5.5717	0.0124
243	5.5841	0.0124
244	5.5965	0.0124
245	5.6088	0.0123
246	5.6212	0.0123
247	5.6335	0.0123
248	5.6457	0.0123
249	5.6580	0.0123
250	5.6702	0.0122
251	5.6824	0.0122
252	5.6946	0.0122

253	5.7068	0.0122
254	5.7189	0.0121
255	5.7311	0.0121
256	5.7432	0.0121
257	5.7552	0.0121
258	5.7673	0.0121
259	5.7793	0.0120
260	5.7913	0.0120
261	5.8033	0.0120
262	5.8153	0.0120
263	5.8273	0.0119
264	5.8392	0.0119
265	5.8511	0.0119
266	5.8630	0.0119
267	5.8748	0.0119
268	5.8867	0.0118
269	5.8985	0.0118
270	5.9103	0.0118
271	5.9221	0.0118
272	5.9339	0.0118
273	5.9456	0.0117
274	5.9573	0.0117
275	5.9690	0.0117
276	5.9807	0.0117
277	5.9924	0.0117
278	6.0040	0.0116
279	6.0157	0.0116
280	6.0273	0.0116
281	6.0389	0.0116
282	6.0504	0.0116
283	6.0620	0.0116
284	6.0735	0.0115
285	6.0850	0.0115
286	6.0965	0.0115
287	6.1080	0.0115
288	6.1195	0.0115

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0115	0.0039	0.0076
2	0.0115	0.0039	0.0076
3	0.0115	0.0039	0.0076
4	0.0115	0.0039	0.0076
5	0.0116	0.0039	0.0076
6	0.0116	0.0039	0.0076
7	0.0116	0.0040	0.0077
8	0.0116	0.0040	0.0077
9	0.0117	0.0040	0.0077
10	0.0117	0.0040	0.0077
11	0.0117	0.0040	0.0077
12	0.0118	0.0040	0.0078
13	0.0118	0.0040	0.0078
14	0.0118	0.0040	0.0078
15	0.0119	0.0040	0.0078
16	0.0119	0.0040	0.0078
17	0.0119	0.0041	0.0079

18	0.0119	0.0041	0.0079
19	0.0120	0.0041	0.0079
20	0.0120	0.0041	0.0079
21	0.0121	0.0041	0.0079
22	0.0121	0.0041	0.0080
23	0.0121	0.0041	0.0080
24	0.0121	0.0041	0.0080
25	0.0122	0.0042	0.0080
26	0.0122	0.0042	0.0081
27	0.0123	0.0042	0.0081
28	0.0123	0.0042	0.0081
29	0.0123	0.0042	0.0081
30	0.0123	0.0042	0.0081
31	0.0124	0.0042	0.0082
32	0.0124	0.0042	0.0082
33	0.0125	0.0042	0.0082
34	0.0125	0.0043	0.0082
35	0.0125	0.0043	0.0083
36	0.0126	0.0043	0.0083
37	0.0126	0.0043	0.0083
38	0.0126	0.0043	0.0083
39	0.0127	0.0043	0.0084
40	0.0127	0.0043	0.0084
41	0.0128	0.0043	0.0084
42	0.0128	0.0044	0.0084
43	0.0128	0.0044	0.0085
44	0.0129	0.0044	0.0085
45	0.0129	0.0044	0.0085
46	0.0129	0.0044	0.0085
47	0.0130	0.0044	0.0086
48	0.0130	0.0044	0.0086
49	0.0131	0.0045	0.0086
50	0.0131	0.0045	0.0086
51	0.0132	0.0045	0.0087
52	0.0132	0.0045	0.0087
53	0.0133	0.0045	0.0087
54	0.0133	0.0045	0.0088
55	0.0133	0.0045	0.0088
56	0.0134	0.0046	0.0088
57	0.0134	0.0046	0.0089
58	0.0135	0.0046	0.0089
59	0.0135	0.0046	0.0089
60	0.0136	0.0046	0.0089
61	0.0136	0.0046	0.0090
62	0.0137	0.0047	0.0090
63	0.0137	0.0047	0.0090
64	0.0138	0.0047	0.0091
65	0.0138	0.0047	0.0091
66	0.0139	0.0047	0.0091
67	0.0139	0.0047	0.0092
68	0.0140	0.0048	0.0092
69	0.0140	0.0048	0.0092
70	0.0141	0.0048	0.0093
71	0.0141	0.0048	0.0093
72	0.0142	0.0048	0.0093
73	0.0142	0.0049	0.0094
74	0.0143	0.0049	0.0094
75	0.0143	0.0049	0.0095

76	0.0144	0.0049	0.0095
77	0.0145	0.0049	0.0095
78	0.0145	0.0049	0.0096
79	0.0146	0.0050	0.0096
80	0.0146	0.0050	0.0096
81	0.0147	0.0050	0.0097
82	0.0147	0.0050	0.0097
83	0.0148	0.0051	0.0098
84	0.0149	0.0051	0.0098
85	0.0149	0.0051	0.0099
86	0.0150	0.0051	0.0099
87	0.0151	0.0051	0.0099
88	0.0151	0.0052	0.0100
89	0.0152	0.0052	0.0100
90	0.0153	0.0052	0.0101
91	0.0154	0.0052	0.0101
92	0.0154	0.0052	0.0102
93	0.0155	0.0053	0.0102
94	0.0155	0.0053	0.0102
95	0.0156	0.0053	0.0103
96	0.0157	0.0053	0.0103
97	0.0158	0.0054	0.0104
98	0.0158	0.0054	0.0104
99	0.0159	0.0054	0.0105
100	0.0160	0.0054	0.0105
101	0.0161	0.0055	0.0106
102	0.0162	0.0055	0.0107
103	0.0163	0.0055	0.0107
104	0.0163	0.0056	0.0108
105	0.0164	0.0056	0.0108
106	0.0165	0.0056	0.0109
107	0.0166	0.0057	0.0110
108	0.0167	0.0057	0.0110
109	0.0168	0.0057	0.0111
110	0.0169	0.0057	0.0111
111	0.0170	0.0058	0.0112
112	0.0170	0.0058	0.0112
113	0.0172	0.0059	0.0113
114	0.0172	0.0059	0.0114
115	0.0174	0.0059	0.0115
116	0.0174	0.0059	0.0115
117	0.0176	0.0060	0.0116
118	0.0177	0.0060	0.0116
119	0.0178	0.0061	0.0117
120	0.0179	0.0061	0.0118
121	0.0180	0.0061	0.0119
122	0.0181	0.0062	0.0119
123	0.0183	0.0062	0.0120
124	0.0184	0.0063	0.0121
125	0.0185	0.0063	0.0122
126	0.0186	0.0063	0.0123
127	0.0188	0.0064	0.0124
128	0.0189	0.0064	0.0124
129	0.0190	0.0065	0.0126
130	0.0191	0.0065	0.0126
131	0.0193	0.0066	0.0127
132	0.0194	0.0066	0.0128
133	0.0196	0.0067	0.0129

134	0.0197	0.0067	0.0130
135	0.0199	0.0068	0.0131
136	0.0200	0.0068	0.0132
137	0.0203	0.0069	0.0134
138	0.0204	0.0069	0.0134
139	0.0206	0.0070	0.0136
140	0.0207	0.0071	0.0137
141	0.0210	0.0071	0.0138
142	0.0211	0.0072	0.0139
143	0.0214	0.0073	0.0141
144	0.0215	0.0073	0.0142
145	0.0186	0.0064	0.0123
146	0.0188	0.0064	0.0124
147	0.0191	0.0065	0.0126
148	0.0192	0.0066	0.0127
149	0.0195	0.0067	0.0129
150	0.0197	0.0067	0.0130
151	0.0200	0.0068	0.0132
152	0.0202	0.0069	0.0133
153	0.0206	0.0070	0.0136
154	0.0208	0.0071	0.0137
155	0.0212	0.0072	0.0140
156	0.0214	0.0073	0.0141
157	0.0218	0.0074	0.0144
158	0.0220	0.0075	0.0145
159	0.0225	0.0077	0.0148
160	0.0227	0.0077	0.0150
161	0.0232	0.0079	0.0153
162	0.0235	0.0080	0.0155
163	0.0241	0.0082	0.0159
164	0.0244	0.0083	0.0161
165	0.0250	0.0085	0.0165
166	0.0253	0.0086	0.0167
167	0.0260	0.0089	0.0172
168	0.0264	0.0090	0.0174
169	0.0273	0.0093	0.0180
170	0.0277	0.0095	0.0183
171	0.0286	0.0098	0.0189
172	0.0291	0.0099	0.0192
173	0.0302	0.0103	0.0199
174	0.0307	0.0105	0.0203
175	0.0320	0.0109	0.0211
176	0.0326	0.0111	0.0215
177	0.0341	0.0116	0.0225
178	0.0349	0.0119	0.0230
179	0.0367	0.0125	0.0242
180	0.0377	0.0128	0.0248
181	0.0399	0.0136	0.0263
182	0.0412	0.0140	0.0272
183	0.0442	0.0150	0.0291
184	0.0459	0.0156	0.0303
185	0.0326	0.0111	0.0215
186	0.0348	0.0118	0.0229
187	0.0403	0.0137	0.0266
188	0.0440	0.0150	0.0290
189	0.0547	0.0186	0.0361
190	0.0630	0.0215	0.0416
191	0.0957	0.0288	0.0668

192	0.1388	0.0288	0.1100
193	0.6007	0.0288	0.5718
194	0.0753	0.0256	0.0496
195	0.0487	0.0166	0.0321
196	0.0373	0.0127	0.0246
197	0.0478	0.0163	0.0315
198	0.0426	0.0145	0.0281
199	0.0388	0.0132	0.0256
200	0.0358	0.0122	0.0236
201	0.0333	0.0114	0.0220
202	0.0313	0.0107	0.0207
203	0.0296	0.0101	0.0195
204	0.0282	0.0096	0.0186
205	0.0268	0.0091	0.0177
206	0.0257	0.0087	0.0169
207	0.0247	0.0084	0.0163
208	0.0238	0.0081	0.0157
209	0.0230	0.0078	0.0151
210	0.0222	0.0076	0.0147
211	0.0216	0.0074	0.0142
212	0.0210	0.0071	0.0138
213	0.0204	0.0069	0.0134
214	0.0199	0.0068	0.0131
215	0.0194	0.0066	0.0128
216	0.0189	0.0064	0.0125
217	0.0216	0.0074	0.0143
218	0.0212	0.0072	0.0140
219	0.0209	0.0071	0.0137
220	0.0205	0.0070	0.0135
221	0.0202	0.0069	0.0133
222	0.0198	0.0068	0.0131
223	0.0195	0.0067	0.0129
224	0.0192	0.0066	0.0127
225	0.0190	0.0065	0.0125
226	0.0187	0.0064	0.0123
227	0.0184	0.0063	0.0122
228	0.0182	0.0062	0.0120
229	0.0180	0.0061	0.0118
230	0.0177	0.0060	0.0117
231	0.0175	0.0060	0.0116
232	0.0173	0.0059	0.0114
233	0.0171	0.0058	0.0113
234	0.0169	0.0058	0.0112
235	0.0167	0.0057	0.0110
236	0.0166	0.0056	0.0109
237	0.0164	0.0056	0.0108
238	0.0162	0.0055	0.0107
239	0.0160	0.0055	0.0106
240	0.0159	0.0054	0.0105
241	0.0157	0.0054	0.0104
242	0.0156	0.0053	0.0103
243	0.0154	0.0053	0.0102
244	0.0153	0.0052	0.0101
245	0.0152	0.0052	0.0100
246	0.0150	0.0051	0.0099
247	0.0149	0.0051	0.0098
248	0.0148	0.0050	0.0097
249	0.0147	0.0050	0.0097

250	0.0145	0.0050	0.0096
251	0.0144	0.0049	0.0095
252	0.0143	0.0049	0.0094
253	0.0142	0.0048	0.0094
254	0.0141	0.0048	0.0093
255	0.0140	0.0048	0.0092
256	0.0139	0.0047	0.0092
257	0.0138	0.0047	0.0091
258	0.0137	0.0047	0.0090
259	0.0136	0.0046	0.0090
260	0.0135	0.0046	0.0089
261	0.0134	0.0046	0.0088
262	0.0133	0.0045	0.0088
263	0.0132	0.0045	0.0087
264	0.0131	0.0045	0.0087
265	0.0131	0.0044	0.0086
266	0.0130	0.0044	0.0086
267	0.0129	0.0044	0.0085
268	0.0128	0.0044	0.0084
269	0.0127	0.0043	0.0084
270	0.0127	0.0043	0.0083
271	0.0126	0.0043	0.0083
272	0.0125	0.0043	0.0083
273	0.0124	0.0042	0.0082
274	0.0124	0.0042	0.0082
275	0.0123	0.0042	0.0081
276	0.0122	0.0042	0.0081
277	0.0122	0.0041	0.0080
278	0.0121	0.0041	0.0080
279	0.0120	0.0041	0.0079
280	0.0120	0.0041	0.0079
281	0.0119	0.0041	0.0079
282	0.0118	0.0040	0.0078
283	0.0118	0.0040	0.0078
284	0.0117	0.0040	0.0077
285	0.0117	0.0040	0.0077
286	0.0116	0.0040	0.0077
287	0.0116	0.0039	0.0076
288	0.0115	0.0039	0.0076

Total soil rain loss = 1.89(In)
Total effective rainfall = 4.23(In)
Peak flow rate in flood hydrograph = 114.77(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	0.0005	0.07	Q				
0+10	0.0025	0.30	Q				
0+15	0.0078	0.76	Q				
0+20	0.0200	1.78	Q				

0+25	0.0397	2.86	Q
0+30	0.0645	3.59	Q
0+35	0.0925	4.07	Q
0+40	0.1231	4.44	Q
0+45	0.1556	4.72	Q
0+50	0.1898	4.96	Q
0+55	0.2253	5.16	VQ
1+ 0	0.2620	5.33	VQ
1+ 5	0.2997	5.48	VQ
1+10	0.3384	5.61	VQ
1+15	0.3778	5.73	VQ
1+20	0.4179	5.82	VQ
1+25	0.4587	5.91	VQ
1+30	0.5000	6.00	VQ
1+35	0.5418	6.07	VQ
1+40	0.5841	6.14	VQ
1+45	0.6268	6.21	Q
1+50	0.6700	6.27	Q
1+55	0.7135	6.32	Q
2+ 0	0.7574	6.37	Q
2+ 5	0.8016	6.42	Q
2+10	0.8461	6.46	Q
2+15	0.8909	6.50	Q
2+20	0.9359	6.53	Q
2+25	0.9811	6.56	Q
2+30	1.0265	6.60	Q
2+35	1.0721	6.63	Q
2+40	1.1180	6.66	Q
2+45	1.1642	6.70	Q
2+50	1.2105	6.73	Q
2+55	1.2571	6.76	QV
3+ 0	1.3038	6.79	QV
3+ 5	1.3508	6.82	QV
3+10	1.3979	6.84	QV
3+15	1.4452	6.86	QV
3+20	1.4925	6.88	QV
3+25	1.5401	6.90	QV
3+30	1.5877	6.92	QV
3+35	1.6355	6.94	QV
3+40	1.6834	6.96	QV
3+45	1.7315	6.98	QV
3+50	1.7798	7.00	QV
3+55	1.8281	7.02	QV
4+ 0	1.8766	7.04	Q V
4+ 5	1.9253	7.07	Q V
4+10	1.9741	7.09	Q V
4+15	2.0231	7.11	Q V
4+20	2.0722	7.13	Q V
4+25	2.1215	7.15	Q V
4+30	2.1709	7.18	Q V
4+35	2.2205	7.20	Q V
4+40	2.2702	7.22	Q V
4+45	2.3201	7.25	Q V
4+50	2.3702	7.27	Q V
4+55	2.4204	7.29	Q V
5+ 0	2.4708	7.32	Q V
5+ 5	2.5214	7.34	Q V
5+10	2.5721	7.37	Q V

5+15	2.6231	7.39	Q	V				
5+20	2.6741	7.42	Q	V				
5+25	2.7254	7.44	Q	V				
5+30	2.7768	7.47	Q	V				
5+35	2.8284	7.49	Q	V				
5+40	2.8802	7.52	Q	V				
5+45	2.9322	7.55	Q	V				
5+50	2.9843	7.57	Q	V				
5+55	3.0367	7.60	Q	V				
6+ 0	3.0892	7.63	Q	V				
6+ 5	3.1419	7.66	Q	V				
6+10	3.1948	7.68	Q	V				
6+15	3.2479	7.71	Q	V				
6+20	3.3013	7.74	Q	V				
6+25	3.3548	7.77	Q	V				
6+30	3.4085	7.80	Q	V				
6+35	3.4624	7.83	Q	V				
6+40	3.5165	7.86	Q	V				
6+45	3.5708	7.89	Q	V				
6+50	3.6254	7.92	Q	V				
6+55	3.6801	7.95	Q	V				
7+ 0	3.7351	7.98	Q	V				
7+ 5	3.7903	8.01	Q	V				
7+10	3.8458	8.05	Q	V				
7+15	3.9014	8.08	Q	V				
7+20	3.9573	8.11	Q	V				
7+25	4.0134	8.15	Q	V				
7+30	4.0697	8.18	Q	V				
7+35	4.1263	8.22	Q	V				
7+40	4.1832	8.25	Q	V				
7+45	4.2402	8.29	Q	V				
7+50	4.2975	8.32	Q	V				
7+55	4.3551	8.36	Q	V				
8+ 0	4.4130	8.40	Q	V				
8+ 5	4.4710	8.43	Q	V				
8+10	4.5294	8.47	Q	V				
8+15	4.5880	8.51	Q	V				
8+20	4.6469	8.55	Q	V				
8+25	4.7061	8.59	Q	V				
8+30	4.7655	8.63	Q	V				
8+35	4.8252	8.67	Q	V				
8+40	4.8853	8.71	Q	V				
8+45	4.9456	8.76	Q	V				
8+50	5.0062	8.80	Q	V				
8+55	5.0671	8.84	Q	V				
9+ 0	5.1283	8.89	Q	V				
9+ 5	5.1898	8.93	Q	V				
9+10	5.2517	8.98	Q	V				
9+15	5.3138	9.03	Q	V				
9+20	5.3763	9.07	Q	V				
9+25	5.4391	9.12	Q	V				
9+30	5.5023	9.17	Q	V				
9+35	5.5658	9.22	Q	V				
9+40	5.6296	9.27	Q	V				
9+45	5.6938	9.32	Q	V				
9+50	5.7584	9.38	Q	V				
9+55	5.8234	9.43	Q	V				
10+ 0	5.8887	9.48	Q	V				

10+ 5	5.9544	9.54	Q	V			
10+10	6.0205	9.60	Q	V			
10+15	6.0869	9.65	Q	V			
10+20	6.1538	9.71	Q	V			
10+25	6.2211	9.77	Q	V			
10+30	6.2889	9.83	Q	V			
10+35	6.3570	9.90	Q	V			
10+40	6.4256	9.96	Q	V			
10+45	6.4947	10.02	Q	V			
10+50	6.5642	10.09	Q	V			
10+55	6.6341	10.16	Q	V			
11+ 0	6.7046	10.23	Q	V			
11+ 5	6.7755	10.30	Q	V			
11+10	6.8470	10.37	Q	V			
11+15	6.9189	10.45	Q	V			
11+20	6.9914	10.52	Q	V			
11+25	7.0644	10.60	Q	V			
11+30	7.1379	10.68	Q	V			
11+35	7.2120	10.76	Q	V			
11+40	7.2867	10.84	Q	V			
11+45	7.3620	10.93	Q	V			
11+50	7.4378	11.02	Q	V			
11+55	7.5143	11.11	Q	V			
12+ 0	7.5915	11.20	Q	V			
12+ 5	7.6691	11.28	Q	V			
12+10	7.7470	11.31	Q	V			
12+15	7.8247	11.28	Q	V			
12+20	7.9012	11.11	Q	V			
12+25	7.9764	10.92	Q	V			
12+30	8.0511	10.83	Q	V			
12+35	8.1255	10.82	Q	V			
12+40	8.2002	10.84	Q	V			
12+45	8.2751	10.88	Q	V			
12+50	8.3505	10.94	Q	V			
12+55	8.4264	11.02	Q	V			
13+ 0	8.5029	11.11	Q	V			
13+ 5	8.5802	11.21	Q	V			
13+10	8.6582	11.33	Q	V			
13+15	8.7370	11.45	Q	V			
13+20	8.8167	11.58	Q	V			
13+25	8.8975	11.72	Q	V			
13+30	8.9792	11.87	Q	V			
13+35	9.0620	12.03	Q	V			
13+40	9.1460	12.20	Q	V			
13+45	9.2313	12.37	Q	V			
13+50	9.3178	12.56	Q	V			
13+55	9.4057	12.76	Q	V			
14+ 0	9.4951	12.98	Q	V			
14+ 5	9.5860	13.20	Q	V			
14+10	9.6786	13.44	Q	V			
14+15	9.7729	13.70	Q	V			
14+20	9.8692	13.98	Q	V			
14+25	9.9676	14.28	Q	V			
14+30	10.0682	14.60	Q	V			
14+35	10.1710	14.93	Q	V			
14+40	10.2763	15.29	Q	V			
14+45	10.3841	15.66	Q	V			
14+50	10.4948	16.07	Q	V			

14+55	10.6086	16.51	Q		V			
15+ 0	10.7256	17.00	Q		V			
15+ 5	10.8463	17.52	Q		V			
15+10	10.9709	18.10	Q		V			
15+15	11.0999	18.74	Q		V			
15+20	11.2339	19.45	Q		V			
15+25	11.3727	20.15	Q		V			
15+30	11.5153	20.71	Q		V			
15+35	11.6603	21.04	Q		V			
15+40	11.8029	20.71	Q		V			
15+45	11.9439	20.47	Q		V			
15+50	12.0891	21.09	Q		V			
15+55	12.2450	22.63	Q		V			
16+ 0	12.4220	25.69	Q		V			
16+ 5	12.6611	34.73	Q		V			
16+10	13.0212	52.28		Q	V			
16+15	13.5364	74.81			Q	V		
16+20	14.3207	113.89				QV		
16+25	15.1112	114.77				Q	V	
16+30	15.7023	85.83			Q		V	
16+35	16.1527	65.40		Q			V	
16+40	16.5284	54.54			Q		V	
16+45	16.8595	48.08				Q	V	
16+50	17.1549	42.90					Q	V
16+55	17.4191	38.35						Q
17+ 0	17.6593	34.88						Q
17+ 5	17.8815	32.27						Q
17+10	18.0886	30.07						Q
17+15	18.2792	27.69						Q
17+20	18.4532	25.27						Q
17+25	18.6174	23.83						Q
17+30	18.7727	22.56						Q
17+35	18.9197	21.34						Q
17+40	19.0591	20.24						Q
17+45	19.1896	18.94						Q
17+50	19.3152	18.24						Q
17+55	19.4339	17.24						Q
18+ 0	19.5472	16.45						Q
18+ 5	19.6557	15.75						Q
18+10	19.7580	14.85						Q
18+15	19.8575	14.45						Q
18+20	19.9528	13.84						Q
18+25	20.0467	13.63						Q
18+30	20.1403	13.60						Q
18+35	20.2337	13.57						Q
18+40	20.3260	13.39						Q
18+45	20.4168	13.19						Q
18+50	20.5059	12.95						Q
18+55	20.5917	12.45						Q
19+ 0	20.6741	11.97						Q
19+ 5	20.7548	11.72						Q
19+10	20.8321	11.22						Q
19+15	20.9062	10.76						Q
19+20	20.9791	10.58						Q
19+25	21.0510	10.43						Q
19+30	21.1218	10.29						Q
19+35	21.1916	10.14						Q
19+40	21.2606	10.01						Q

19+45	21.3286	9.88	Q				V
19+50	21.3958	9.76	Q				V
19+55	21.4622	9.64	Q				V
20+ 0	21.5278	9.53	Q				V
20+ 5	21.5927	9.42	Q				V
20+10	21.6568	9.31	Q				V
20+15	21.7202	9.21	Q				V
20+20	21.7830	9.11	Q				V
20+25	21.8451	9.02	Q				V
20+30	21.9066	8.93	Q				V
20+35	21.9675	8.84	Q				V
20+40	22.0277	8.75	Q				V
20+45	22.0875	8.67	Q				V
20+50	22.1466	8.59	Q				V
20+55	22.2053	8.51	Q				V
21+ 0	22.2634	8.44	Q				V
21+ 5	22.3210	8.36	Q				V
21+10	22.3781	8.29	Q				V
21+15	22.4347	8.22	Q				V
21+20	22.4908	8.15	Q				V
21+25	22.5465	8.08	Q				V
21+30	22.6016	8.01	Q				V
21+35	22.6564	7.95	Q				V
21+40	22.7107	7.89	Q				V
21+45	22.7646	7.83	Q				V
21+50	22.8181	7.77	Q				V
21+55	22.8712	7.71	Q				V
22+ 0	22.9239	7.65	Q				V
22+ 5	22.9762	7.60	Q				V
22+10	23.0281	7.54	Q				V
22+15	23.0797	7.49	Q				V
22+20	23.1309	7.44	Q				V
22+25	23.1818	7.39	Q				V
22+30	23.2323	7.34	Q				V
22+35	23.2825	7.29	Q				V
22+40	23.3324	7.24	Q				V
22+45	23.3819	7.19	Q				V
22+50	23.4312	7.15	Q				V
22+55	23.4801	7.10	Q				V
23+ 0	23.5287	7.06	Q				V
23+ 5	23.5770	7.02	Q				V
23+10	23.6251	6.97	Q				V
23+15	23.6728	6.93	Q				V
23+20	23.7203	6.89	Q				V
23+25	23.7675	6.85	Q				V
23+30	23.8144	6.81	Q				V
23+35	23.8611	6.78	Q				V
23+40	23.9075	6.74	Q				V
23+45	23.9536	6.70	Q				V
23+50	23.9995	6.66	Q				V
23+55	24.0452	6.63	Q				V
24+ 0	24.0906	6.59	Q				V
24+ 5	24.1353	6.49	Q				V
24+10	24.1782	6.23	Q				V
24+15	24.2177	5.73	Q				V
24+20	24.2500	4.69	Q				V
24+25	24.2747	3.59	Q				V
24+30	24.2943	2.85	Q				V

24+35	24.3105	2.36	Q				V
24+40	24.3243	2.00	Q				V
24+45	24.3360	1.71	Q				V
24+50	24.3462	1.47	Q				V
24+55	24.3550	1.28	Q				V
25+ 0	24.3627	1.12	Q				V
25+ 5	24.3695	0.98	Q				V
25+10	24.3753	0.85	Q				V
25+15	24.3805	0.75	Q				V
25+20	24.3850	0.66	Q				V
25+25	24.3890	0.58	Q				V
25+30	24.3925	0.51	Q				V
25+35	24.3956	0.45	Q				V
25+40	24.3983	0.39	Q				V
25+45	24.4007	0.34	Q				V
25+50	24.4027	0.30	Q				V
25+55	24.4045	0.26	Q				V
26+ 0	24.4060	0.22	Q				V
26+ 5	24.4073	0.19	Q				V
26+10	24.4085	0.16	Q				V
26+15	24.4094	0.14	Q				V
26+20	24.4103	0.12	Q				V
26+25	24.4110	0.11	Q				V
26+30	24.4117	0.10	Q				V
26+35	24.4123	0.08	Q				V
26+40	24.4127	0.06	Q				V
26+45	24.4130	0.05	Q				V
26+50	24.4133	0.03	Q				V
26+55	24.4134	0.02	Q				V
27+ 0	24.4135	0.01	Q				V
27+ 5	24.4135	0.00	Q				V

ATTACHMENT 3

Developed Conditions
Rational Method Calculations

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 05/06/20

204728 - US Cold Storage
PROPOSED CONDITIONS - AREA A
25-YEAR, 1- HOUR STORM
BY: SG DATE: 05-06-20

Program License Serial Number 6320

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

Rational hydrology study storm event year is 25.0
10 Year storm 1 hour rainfall = 0.760(In.)
100 Year storm 1 hour rainfall = 1.270(In.)
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.963 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

+++++
Process from Point/Station 0.000 to Point/Station 1.000
**** 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) = 63.00
Pervious ratio(Ap) = 0.4300 Max loss rate(Fm)= 0.274(In/Hr)
Initial subarea data:
Initial area flow distance = 859.000(Ft.)
Top (of initial area) elevation = 3516.800(Ft.)
Bottom (of initial area) elevation = 3495.500(Ft.)
Difference in elevation = 21.300(Ft.)
Slope = 0.02480 s(%)= 2.48
TC = k(0.381)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.888 min.
Rainfall intensity = 2.543(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.803
Subarea runoff = 20.425(CFS)
Total initial stream area = 10.000(Ac.)
Pervious area fraction = 0.430
Initial area Fm value = 0.274(In/Hr)

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation = 3491.500(Ft.)
Downstream point/station elevation = 3488.000(Ft.)
Pipe length = 701.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 20.425(CFS)
Given pipe size = 30.00(In.)
Calculated individual pipe flow = 20.425(CFS)
Normal flow depth in pipe = 17.63(In.)
Flow top width inside pipe = 29.54(In.)
Critical Depth = 18.40(In.)
Pipe flow velocity = 6.81(Ft/s)
Travel time through pipe = 1.72 min.
Time of concentration (TC) = 13.60 min.

++++
Process from Point/Station 2.000 to Point/Station 2.000
**** SUBAREA FLOW ADDITION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 63.00
Pervious ratio(Ap) = 0.0800 Max loss rate(Fm)= 0.051(In/Hr)
Time of concentration = 13.60 min.
Rainfall intensity = 2.346(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.852
Subarea runoff = 39.818(CFS) for 20.140(Ac.)
Total runoff = 60.243(CFS)
Effective area this stream = 30.14(Ac.)
Total Study Area (Main Stream No. 1) = 30.14(Ac.)
Area averaged Fm value = 0.125(In/Hr)

++++
Process from Point/Station 2.000 to Point/Station 3.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation = 3488.000(Ft.)
Downstream point/station elevation = 3483.000(Ft.)
Pipe length = 1007.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 60.243(CFS)
Given pipe size = 48.00(In.)
Calculated individual pipe flow = 60.243(CFS)
Normal flow depth in pipe = 25.38(In.)
Flow top width inside pipe = 47.92(In.)
Critical Depth = 28.09(In.)
Pipe flow velocity = 8.93(Ft/s)
Travel time through pipe = 1.88 min.
Time of concentration (TC) = 15.48 min.

++++
Process from Point/Station 3.000 to Point/Station 3.000
**** SUBAREA FLOW ADDITION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 63.00

Pervious ratio(A_p) = 0.2300 Max loss rate(F_m)= 0.147(In/Hr)
Time of concentration = 15.48 min.
Rainfall intensity = 2.171(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)($Q=KCIA$) is $C = 0.843$
Subarea runoff = 66.635(CFS) for 39.190(Ac.)
Total runoff = 126.878(CFS)
Effective area this stream = 69.33(Ac.)
Total Study Area (Main Stream No. 1) = 69.33(Ac.)
Area averaged F_m value = 0.137(In/Hr)

+++++
Process from Point/Station 3.000 to Point/Station 4.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation = 3483.000(Ft.)
Downstream point/station elevation = 3475.000(Ft.)
Pipe length = 360.00(Ft.) Manning's $N = 0.012$
No. of pipes = 1 Required pipe flow = 126.878(CFS)
Given pipe size = 48.00(In.)
Calculated individual pipe flow = 126.878(CFS)
Normal flow depth in pipe = 25.31(In.)
Flow top width inside pipe = 47.93(In.)
Critical Depth = 40.54(In.)
Pipe flow velocity = 18.87(Ft/s)
Travel time through pipe = 0.32 min.
Time of concentration (TC) = 15.80 min.
End of computations, Total Study Area = 69.33 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 0.215
Area averaged SCS curve number = 63.0

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: 05/06/20

204728 - US Cold Storage
PROPOSED CONDITIONS - AREA A
100-YEAR, 1- HOUR STORM
BY: SG DATE: 05-06-20

Program License Serial Number 6320

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.760(In.)
100 Year storm 1 hour rainfall = 1.270(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.270 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

+++++
Process from Point/Station 0.000 to Point/Station 1.000
**** 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) = 63.00
Adjusted SCS curve number for AMC 3 = 81.40
Pervious ratio(Ap) = 0.4300 Max loss rate(Fm)= 0.149(In/Hr)
Initial subarea data:
Initial area flow distance = 859.000(Ft.)
Top (of initial area) elevation = 3516.800(Ft.)
Bottom (of initial area) elevation = 3495.500(Ft.)
Difference in elevation = 21.300(Ft.)
Slope = 0.02480 s(%)= 2.48
TC = k(0.381)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.888 min.
Rainfall intensity = 3.354(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.860
Subarea runoff = 28.852(CFS)
Total initial stream area = 10.000(Ac.)
Pervious area fraction = 0.430
Initial area Fm value = 0.149(In/Hr)

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation = 3491.500(Ft.)
Downstream point/station elevation = 3488.000(Ft.)
Pipe length = 701.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 28.852(CFS)
Given pipe size = 30.00(In.)
Calculated individual pipe flow = 28.852(CFS)
Normal flow depth in pipe = 22.64(In.)
Flow top width inside pipe = 25.82(In.)
Critical Depth = 21.96(In.)
Pipe flow velocity = 7.26(Ft/s)
Travel time through pipe = 1.61 min.
Time of concentration (TC) = 13.50 min.

++++
Process from Point/Station 2.000 to Point/Station 2.000
**** SUBAREA FLOW ADDITION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 63.00
Adjusted SCS curve number for AMC 3 = 81.40
Pervious ratio(Ap) = 0.0800 Max loss rate(Fm)= 0.028(In/Hr)
Time of concentration = 13.50 min.
Rainfall intensity = 3.108(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.880
Subarea runoff = 53.624(CFS) for 20.140(Ac.)
Total runoff = 82.476(CFS)
Effective area this stream = 30.14(Ac.)
Total Study Area (Main Stream No. 1) = 30.14(Ac.)
Area averaged Fm value = 0.068(In/Hr)

++++
Process from Point/Station 2.000 to Point/Station 3.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation = 3488.000(Ft.)
Downstream point/station elevation = 3483.000(Ft.)
Pipe length = 1007.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 82.476(CFS)
Given pipe size = 48.00(In.)
Calculated individual pipe flow = 82.476(CFS)
Normal flow depth in pipe = 31.08(In.)
Flow top width inside pipe = 45.87(In.)
Critical Depth = 33.04(In.)
Pipe flow velocity = 9.58(Ft/s)
Travel time through pipe = 1.75 min.
Time of concentration (TC) = 15.25 min.

++++
Process from Point/Station 3.000 to Point/Station 3.000
**** SUBAREA FLOW ADDITION ****

Soil classification AP and SCS values input by user

USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 63.00
Adjusted SCS curve number for AMC 3 = 81.40
Pervious ratio(Ap) = 0.2300 Max loss rate(Fm)= 0.080(In/Hr)
Time of concentration = 15.25 min.
Rainfall intensity = 2.889(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.877
Subarea runoff = 93.137(CFS) for 39.190(Ac.)
Total runoff = 175.613(CFS)
Effective area this stream = 69.33(Ac.)
Total Study Area (Main Stream No. 1) = 69.33(Ac.)
Area averaged Fm value = 0.074(In/Hr)

+++++
Process from Point/Station 3.000 to Point/Station 4.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation = 3483.000(Ft.)
Downstream point/station elevation = 3475.000(Ft.)
Pipe length = 360.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 175.613(CFS)
Given pipe size = 48.00(In.)
Calculated individual pipe flow = 175.613(CFS)
Normal flow depth in pipe = 31.22(In.)
Flow top width inside pipe = 45.78(In.)
Critical Depth = 45.04(In.)
Pipe flow velocity = 20.30(Ft/s)
Travel time through pipe = 0.30 min.
Time of concentration (TC) = 15.55 min.
End of computations, Total Study Area = 69.33 (Ac.)

The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.215
Area averaged SCS curve number = 63.0

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: 05/06/20

204728 - US Cold Storage
PROPOSED CONDITIONS - AREA B
25-YEAR, 1- HOUR STORM
BY: SG DATE: 05-06-20

Program License Serial Number 6320

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

Rational hydrology study storm event year is 25.0
10 Year storm 1 hour rainfall = 0.760(In.)
100 Year storm 1 hour rainfall = 1.270(In.)
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 0.963 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

+++++
Process from Point/Station 0.000 to Point/Station 1.000
**** 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) = 63.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.637(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 3564.000(Ft.)
Bottom (of initial area) elevation = 3552.000(Ft.)
Difference in elevation = 12.000(Ft.)
Slope = 0.01200 s(%)= 1.20
TC = k(0.849)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 32.592 min.
Rainfall intensity = 1.389(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.487
Subarea runoff = 4.687(CFS)
Total initial stream area = 6.930(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.637(In/Hr)

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 3552.000(Ft.)
 Downstream point elevation = 3536.000(Ft.)
 Channel length thru subarea = 822.000(Ft.)
 Channel base width = 30.000(Ft.)
 Slope or 'Z' of left channel bank = 10.000
 Slope or 'Z' of right channel bank = 10.000
 Estimated mean flow rate at midpoint of channel = 8.485(CFS)
 Manning's 'N' = 0.025
 Maximum depth of channel = 0.300(Ft.)
 Flow(q) thru subarea = 8.485(CFS)
 Depth of flow = 0.131(Ft.), Average velocity = 2.076(Ft/s)
 Channel flow top width = 32.611(Ft.)
 Flow Velocity = 2.08(Ft/s)
 Travel time = 6.60 min.
 Time of concentration = 39.19 min.
 Critical depth = 0.133(Ft.)
 Adding area flow to channel
 Soil classification AP and SCS values input by user
 USER INPUT of soil data for subarea
 SCS curve number for soil(AMC 2) = 63.00
 Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.637(In/Hr)
 Rainfall intensity = 1.243(In/Hr) for a 25.0 year storm
 Effective runoff coefficient used for area,(total area with modified
 rational method)(Q=KCIA) is C = 0.439
 Subarea runoff = 7.537(CFS) for 15.480(Ac.)
 Total runoff = 12.224(CFS)
 Effective area this stream = 22.41(Ac.)
 Total Study Area (Main Stream No. 1) = 22.41(Ac.)
 Area averaged Fm value = 0.637(In/Hr)
 Depth of flow = 0.162(Ft.), Average velocity = 2.384(Ft/s)
 Critical depth = 0.170(Ft.)

++++++
 Process from Point/Station 2.000 to Point/Station 3.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 3536.000(Ft.)
 Downstream point elevation = 3507.800(Ft.)
 Channel length thru subarea = 1054.000(Ft.)
 Channel base width = 50.000(Ft.)
 Slope or 'Z' of left channel bank = 10.000
 Slope or 'Z' of right channel bank = 10.000
 Estimated mean flow rate at midpoint of channel = 18.509(CFS)
 Manning's 'N' = 0.025
 Maximum depth of channel = 0.400(Ft.)
 Flow(q) thru subarea = 18.509(CFS)
 Depth of flow = 0.140(Ft.), Average velocity = 2.574(Ft/s)
 Channel flow top width = 52.798(Ft.)
 Flow Velocity = 2.57(Ft/s)
 Travel time = 6.83 min.
 Time of concentration = 46.02 min.
 Critical depth = 0.160(Ft.)
 Adding area flow to channel
 Soil classification AP and SCS values input by user
 USER INPUT of soil data for subarea
 SCS curve number for soil(AMC 2) = 63.00
 Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.637(In/Hr)

Rainfall intensity = 1.129(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)($Q=KCIA$) is $C = 0.392$
Subarea runoff = 12.509(CFS) for 33.460(Ac.)
Total runoff = 24.733(CFS)
Effective area this stream = 55.87(Ac.)
Total Study Area (Main Stream No. 1) = 55.87(Ac.)
Area averaged F_m value = 0.637(In/Hr)
Depth of flow = 0.166(Ft.), Average velocity = 2.878(Ft/s)
Critical depth = 0.195(Ft.)
End of computations, Total Study Area = 55.87 (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(A_p) = 1.000
Area averaged SCS curve number = 63.0

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: 05/06/20

204728 - US Cold Storage
PROPOSED CONDITIONS - AREA B
100-YEAR, 1- HOUR STORM
BY: SG DATE: 05-06-20

Program License Serial Number 6320

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.760(In.)
100 Year storm 1 hour rainfall = 1.270(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.270 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

+++++
Process from Point/Station 0.000 to Point/Station 1.000
**** 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) = 63.00
Adjusted SCS curve number for AMC 3 = 81.40
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.346(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 3564.000(Ft.)
Bottom (of initial area) elevation = 3552.000(Ft.)
Difference in elevation = 12.000(Ft.)
Slope = 0.01200 s(%)= 1.20
TC = k(0.849)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 32.592 min.
Rainfall intensity = 1.832(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.730
Subarea runoff = 9.267(CFS)
Total initial stream area = 6.930(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.346(In/Hr)

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 3552.000(Ft.)
Downstream point elevation = 3536.000(Ft.)
Channel length thru subarea = 822.000(Ft.)
Channel base width = 30.000(Ft.)
Slope or 'Z' of left channel bank = 10.000
Slope or 'Z' of right channel bank = 10.000
Estimated mean flow rate at midpoint of channel = 18.139(CFS)
Manning's 'N' = 0.025
Maximum depth of channel = 0.300(Ft.)
Flow(q) thru subarea = 18.139(CFS)
Depth of flow = 0.205(Ft.), Average velocity = 2.764(Ft/s)
Channel flow top width = 34.096(Ft.)
Flow Velocity = 2.76(Ft/s)
Travel time = 4.96 min.
Time of concentration = 37.55 min.
Critical depth = 0.219(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 63.00
Adjusted SCS curve number for AMC 3 = 81.40
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.346(In/Hr)
Rainfall intensity = 1.682(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.715
Subarea runoff = 17.691(CFS) for 15.480(Ac.)
Total runoff = 26.958(CFS)
Effective area this stream = 22.41(Ac.)
Total Study Area (Main Stream No. 1) = 22.41(Ac.)
Area averaged Fm value = 0.346(In/Hr)
Depth of flow = 0.259(Ft.), Average velocity = 3.198(Ft/s)
Critical depth = 0.285(Ft.)

+++++
Process from Point/Station 2.000 to Point/Station 3.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 3536.000(Ft.)
Downstream point elevation = 3507.800(Ft.)
Channel length thru subarea = 1054.000(Ft.)
Channel base width = 50.000(Ft.)
Slope or 'Z' of left channel bank = 10.000
Slope or 'Z' of right channel bank = 10.000
Estimated mean flow rate at midpoint of channel = 44.113(CFS)
Manning's 'N' = 0.025
Maximum depth of channel = 0.400(Ft.)
Flow(q) thru subarea = 44.113(CFS)
Depth of flow = 0.235(Ft.), Average velocity = 3.591(Ft/s)
Channel flow top width = 54.693(Ft.)
Flow Velocity = 3.59(Ft/s)
Travel time = 4.89 min.
Time of concentration = 42.44 min.
Critical depth = 0.285(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea

SCS curve number for soil(AMC 2) = 63.00
Adjusted SCS curve number for AMC 3 = 81.40
Pervious ratio(A_p) = 1.0000 Max loss rate(F_m)= 0.346(In/Hr)
Rainfall intensity = 1.563(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 = 34.257(CFS) for 33.460(Ac.)
Total runoff = 61.215(CFS)
Effective area this stream = 55.87(Ac.)
Total Study Area (Main Stream No. 1) = 55.87(Ac.)
Area averaged F_m value = 0.346(In/Hr)
Depth of flow = 0.285(Ft.), Average velocity = 4.064(Ft/s)
Critical depth = 0.352(Ft.)
End of computations, Total Study Area = 55.87 (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(A_p) = 1.000
Area averaged SCS curve number = 63.0

ATTACHMENT 4

Developed Conditions
Hydrograph Calculations

Unit Hydrograph Analysis

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Study date 05/06/20

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

Program License Serial Number 6320

204728 - US Cold Storage
PROPOSED CONDITIONS - AREA A
2-YEAR, 1- HOUR STORM
BY: SG DATE: 05-06-20

Storm Event Year = 2

Antecedent Moisture Condition = 1

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		
69.33	1	0.76

Rainfall data for year 2
69.33 6 1.04

Rainfall data for year 2
69.33 24 1.96

Rainfall data for year 100
69.33 1 1.27

Rainfall data for year 100
69.33 6 2.90

Rainfall data for year 100
69.33 24 6.12

+++++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 1)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
63.0	43.0	69.33	1.000	0.887	0.220	0.195

Area-averaged adjusted loss rate Fm (In/Hr) = 0.195

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC1)	S	Pervious Yield Fr
15.25	0.220	63.0	43.0	9.80	0.000
54.08	0.780	98.0	98.0	0.20	0.885

Area-averaged catchment yield fraction, Y = 0.690

Area-averaged low loss fraction, Yb = 0.310

User entry of time of concentration = 0.259 (hours)

+++++

Watershed area = 69.33(Ac.)

Catchment Lag time = 0.207 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 40.2188

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.195(In/Hr)

Average low loss rate fraction (Yb) = 0.310 (decimal)

DESERT S-Graph Selected

Computed peak 5-minute rainfall = 0.191(In)

Computed peak 30-minute rainfall = 0.328(In)

Specified peak 1-hour rainfall = 0.404(In)

Computed peak 3-hour rainfall = 0.721(In)

Specified peak 6-hour rainfall = 1.040(In)

Specified peak 24-hour rainfall = 1.960(In)

Rainfall depth area reduction factors:

Using a total area of 69.33(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.191(In)

30-minute factor = 0.997 Adjusted rainfall = 0.327(In)

1-hour factor = 0.997 Adjusted rainfall = 0.402(In)

3-hour factor = 1.000 Adjusted rainfall = 0.721(In)

6-hour factor = 1.000 Adjusted rainfall = 1.040(In)

24-hour factor = 1.000 Adjusted rainfall = 1.960(In)

Unit Hydrograph

+++++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
-----------------	-----------------------	-------------------------

(K = 838.46 (CFS))

1 2.772 23.244

2 18.946 135.610

3	49.467	255.908
4	65.841	137.286
5	74.974	76.575
6	81.019	50.693
7	85.377	36.535
8	88.714	27.978
9	91.129	20.255
10	93.102	16.543
11	94.658	13.044
12	95.920	10.578
13	96.919	8.381
14	97.656	6.179
15	98.132	3.989
16	98.581	3.762
17	99.063	4.047
18	99.505	3.703
19	99.775	2.266
20	100.000	1.884

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.1909	0.1909
2	0.2350	0.0441
3	0.2654	0.0304
4	0.2893	0.0239
5	0.3093	0.0200
6	0.3267	0.0174
7	0.3422	0.0155
8	0.3561	0.0140
9	0.3690	0.0128
10	0.3808	0.0118
11	0.3919	0.0110
12	0.4022	0.0104
13	0.4197	0.0175
14	0.4365	0.0168
15	0.4528	0.0163
16	0.4686	0.0158
17	0.4839	0.0153
18	0.4988	0.0149
19	0.5134	0.0145
20	0.5275	0.0142
21	0.5414	0.0138
22	0.5549	0.0135
23	0.5682	0.0133
24	0.5812	0.0130
25	0.5939	0.0127
26	0.6064	0.0125
27	0.6187	0.0123
28	0.6307	0.0121
29	0.6426	0.0119
30	0.6543	0.0117
31	0.6658	0.0115
32	0.6771	0.0113
33	0.6882	0.0112
34	0.6992	0.0110
35	0.7101	0.0108
36	0.7208	0.0107
37	0.7313	0.0105

38	0.7417	0.0104
39	0.7519	0.0103
40	0.7621	0.0101
41	0.7721	0.0100
42	0.7820	0.0099
43	0.7918	0.0098
44	0.8014	0.0097
45	0.8110	0.0096
46	0.8205	0.0095
47	0.8299	0.0094
48	0.8392	0.0093
49	0.8484	0.0092
50	0.8575	0.0091
51	0.8665	0.0090
52	0.8754	0.0089
53	0.8843	0.0089
54	0.8931	0.0088
55	0.9018	0.0087
56	0.9104	0.0086
57	0.9190	0.0086
58	0.9275	0.0085
59	0.9359	0.0084
60	0.9442	0.0084
61	0.9525	0.0083
62	0.9607	0.0082
63	0.9689	0.0082
64	0.9770	0.0081
65	0.9850	0.0080
66	0.9930	0.0080
67	1.0010	0.0079
68	1.0088	0.0079
69	1.0166	0.0078
70	1.0244	0.0078
71	1.0321	0.0077
72	1.0398	0.0077
73	1.0464	0.0066
74	1.0529	0.0065
75	1.0594	0.0065
76	1.0658	0.0064
77	1.0722	0.0064
78	1.0785	0.0063
79	1.0848	0.0063
80	1.0911	0.0063
81	1.0973	0.0062
82	1.1035	0.0062
83	1.1096	0.0061
84	1.1157	0.0061
85	1.1218	0.0061
86	1.1278	0.0060
87	1.1338	0.0060
88	1.1397	0.0059
89	1.1456	0.0059
90	1.1515	0.0059
91	1.1573	0.0058
92	1.1631	0.0058
93	1.1689	0.0058
94	1.1746	0.0057
95	1.1803	0.0057

96	1.1859	0.0057
97	1.1916	0.0056
98	1.1972	0.0056
99	1.2027	0.0056
100	1.2083	0.0055
101	1.2138	0.0055
102	1.2193	0.0055
103	1.2247	0.0055
104	1.2302	0.0054
105	1.2355	0.0054
106	1.2409	0.0054
107	1.2463	0.0053
108	1.2516	0.0053
109	1.2568	0.0053
110	1.2621	0.0053
111	1.2673	0.0052
112	1.2725	0.0052
113	1.2777	0.0052
114	1.2829	0.0052
115	1.2880	0.0051
116	1.2931	0.0051
117	1.2982	0.0051
118	1.3033	0.0051
119	1.3083	0.0050
120	1.3133	0.0050
121	1.3183	0.0050
122	1.3233	0.0050
123	1.3282	0.0049
124	1.3332	0.0049
125	1.3381	0.0049
126	1.3430	0.0049
127	1.3478	0.0049
128	1.3527	0.0048
129	1.3575	0.0048
130	1.3623	0.0048
131	1.3671	0.0048
132	1.3718	0.0048
133	1.3766	0.0047
134	1.3813	0.0047
135	1.3860	0.0047
136	1.3907	0.0047
137	1.3954	0.0047
138	1.4000	0.0046
139	1.4046	0.0046
140	1.4092	0.0046
141	1.4138	0.0046
142	1.4184	0.0046
143	1.4230	0.0046
144	1.4275	0.0045
145	1.4320	0.0045
146	1.4365	0.0045
147	1.4410	0.0045
148	1.4455	0.0045
149	1.4500	0.0045
150	1.4544	0.0044
151	1.4588	0.0044
152	1.4632	0.0044
153	1.4676	0.0044

154	1.4720	0.0044
155	1.4764	0.0044
156	1.4807	0.0043
157	1.4851	0.0043
158	1.4894	0.0043
159	1.4937	0.0043
160	1.4980	0.0043
161	1.5022	0.0043
162	1.5065	0.0043
163	1.5107	0.0042
164	1.5150	0.0042
165	1.5192	0.0042
166	1.5234	0.0042
167	1.5276	0.0042
168	1.5318	0.0042
169	1.5359	0.0042
170	1.5401	0.0041
171	1.5442	0.0041
172	1.5483	0.0041
173	1.5524	0.0041
174	1.5565	0.0041
175	1.5606	0.0041
176	1.5647	0.0041
177	1.5687	0.0041
178	1.5728	0.0040
179	1.5768	0.0040
180	1.5808	0.0040
181	1.5849	0.0040
182	1.5889	0.0040
183	1.5928	0.0040
184	1.5968	0.0040
185	1.6008	0.0040
186	1.6047	0.0040
187	1.6087	0.0039
188	1.6126	0.0039
189	1.6165	0.0039
190	1.6204	0.0039
191	1.6243	0.0039
192	1.6282	0.0039
193	1.6321	0.0039
194	1.6359	0.0039
195	1.6398	0.0039
196	1.6436	0.0038
197	1.6474	0.0038
198	1.6513	0.0038
199	1.6551	0.0038
200	1.6589	0.0038
201	1.6627	0.0038
202	1.6664	0.0038
203	1.6702	0.0038
204	1.6740	0.0038
205	1.6777	0.0037
206	1.6814	0.0037
207	1.6852	0.0037
208	1.6889	0.0037
209	1.6926	0.0037
210	1.6963	0.0037
211	1.7000	0.0037

212	1.7037	0.0037
213	1.7073	0.0037
214	1.7110	0.0037
215	1.7146	0.0037
216	1.7183	0.0036
217	1.7219	0.0036
218	1.7255	0.0036
219	1.7291	0.0036
220	1.7328	0.0036
221	1.7363	0.0036
222	1.7399	0.0036
223	1.7435	0.0036
224	1.7471	0.0036
225	1.7506	0.0036
226	1.7542	0.0036
227	1.7577	0.0035
228	1.7613	0.0035
229	1.7648	0.0035
230	1.7683	0.0035
231	1.7718	0.0035
232	1.7753	0.0035
233	1.7788	0.0035
234	1.7823	0.0035
235	1.7858	0.0035
236	1.7893	0.0035
237	1.7927	0.0035
238	1.7962	0.0035
239	1.7996	0.0034
240	1.8031	0.0034
241	1.8065	0.0034
242	1.8099	0.0034
243	1.8133	0.0034
244	1.8168	0.0034
245	1.8202	0.0034
246	1.8236	0.0034
247	1.8269	0.0034
248	1.8303	0.0034
249	1.8337	0.0034
250	1.8370	0.0034
251	1.8404	0.0034
252	1.8438	0.0033
253	1.8471	0.0033
254	1.8504	0.0033
255	1.8538	0.0033
256	1.8571	0.0033
257	1.8604	0.0033
258	1.8637	0.0033
259	1.8670	0.0033
260	1.8703	0.0033
261	1.8736	0.0033
262	1.8769	0.0033
263	1.8801	0.0033
264	1.8834	0.0033
265	1.8866	0.0033
266	1.8899	0.0033
267	1.8931	0.0032
268	1.8964	0.0032
269	1.8996	0.0032

270	1.9028	0.0032
271	1.9061	0.0032
272	1.9093	0.0032
273	1.9125	0.0032
274	1.9157	0.0032
275	1.9189	0.0032
276	1.9221	0.0032
277	1.9252	0.0032
278	1.9284	0.0032
279	1.9316	0.0032
280	1.9347	0.0032
281	1.9379	0.0032
282	1.9411	0.0032
283	1.9442	0.0031
284	1.9473	0.0031
285	1.9505	0.0031
286	1.9536	0.0031
287	1.9567	0.0031
288	1.9598	0.0031

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0031	0.0010	0.0021
2	0.0031	0.0010	0.0022
3	0.0031	0.0010	0.0022
4	0.0031	0.0010	0.0022
5	0.0032	0.0010	0.0022
6	0.0032	0.0010	0.0022
7	0.0032	0.0010	0.0022
8	0.0032	0.0010	0.0022
9	0.0032	0.0010	0.0022
10	0.0032	0.0010	0.0022
11	0.0032	0.0010	0.0022
12	0.0032	0.0010	0.0022
13	0.0032	0.0010	0.0022
14	0.0032	0.0010	0.0022
15	0.0032	0.0010	0.0022
16	0.0033	0.0010	0.0022
17	0.0033	0.0010	0.0023
18	0.0033	0.0010	0.0023
19	0.0033	0.0010	0.0023
20	0.0033	0.0010	0.0023
21	0.0033	0.0010	0.0023
22	0.0033	0.0010	0.0023
23	0.0033	0.0010	0.0023
24	0.0033	0.0010	0.0023
25	0.0033	0.0010	0.0023
26	0.0034	0.0010	0.0023
27	0.0034	0.0010	0.0023
28	0.0034	0.0010	0.0023
29	0.0034	0.0011	0.0023
30	0.0034	0.0011	0.0023
31	0.0034	0.0011	0.0024
32	0.0034	0.0011	0.0024
33	0.0034	0.0011	0.0024
34	0.0034	0.0011	0.0024

35	0.0035	0.0011	0.0024
36	0.0035	0.0011	0.0024
37	0.0035	0.0011	0.0024
38	0.0035	0.0011	0.0024
39	0.0035	0.0011	0.0024
40	0.0035	0.0011	0.0024
41	0.0035	0.0011	0.0024
42	0.0035	0.0011	0.0024
43	0.0036	0.0011	0.0025
44	0.0036	0.0011	0.0025
45	0.0036	0.0011	0.0025
46	0.0036	0.0011	0.0025
47	0.0036	0.0011	0.0025
48	0.0036	0.0011	0.0025
49	0.0036	0.0011	0.0025
50	0.0037	0.0011	0.0025
51	0.0037	0.0011	0.0025
52	0.0037	0.0011	0.0025
53	0.0037	0.0011	0.0026
54	0.0037	0.0011	0.0026
55	0.0037	0.0012	0.0026
56	0.0037	0.0012	0.0026
57	0.0038	0.0012	0.0026
58	0.0038	0.0012	0.0026
59	0.0038	0.0012	0.0026
60	0.0038	0.0012	0.0026
61	0.0038	0.0012	0.0026
62	0.0038	0.0012	0.0026
63	0.0039	0.0012	0.0027
64	0.0039	0.0012	0.0027
65	0.0039	0.0012	0.0027
66	0.0039	0.0012	0.0027
67	0.0039	0.0012	0.0027
68	0.0039	0.0012	0.0027
69	0.0040	0.0012	0.0027
70	0.0040	0.0012	0.0027
71	0.0040	0.0012	0.0028
72	0.0040	0.0012	0.0028
73	0.0040	0.0012	0.0028
74	0.0040	0.0012	0.0028
75	0.0041	0.0013	0.0028
76	0.0041	0.0013	0.0028
77	0.0041	0.0013	0.0028
78	0.0041	0.0013	0.0028
79	0.0041	0.0013	0.0029
80	0.0041	0.0013	0.0029
81	0.0042	0.0013	0.0029
82	0.0042	0.0013	0.0029
83	0.0042	0.0013	0.0029
84	0.0042	0.0013	0.0029
85	0.0043	0.0013	0.0029
86	0.0043	0.0013	0.0030
87	0.0043	0.0013	0.0030
88	0.0043	0.0013	0.0030
89	0.0043	0.0013	0.0030
90	0.0044	0.0014	0.0030
91	0.0044	0.0014	0.0030
92	0.0044	0.0014	0.0030

93	0.0044	0.0014	0.0031
94	0.0045	0.0014	0.0031
95	0.0045	0.0014	0.0031
96	0.0045	0.0014	0.0031
97	0.0045	0.0014	0.0031
98	0.0046	0.0014	0.0031
99	0.0046	0.0014	0.0032
100	0.0046	0.0014	0.0032
101	0.0046	0.0014	0.0032
102	0.0047	0.0014	0.0032
103	0.0047	0.0015	0.0032
104	0.0047	0.0015	0.0033
105	0.0048	0.0015	0.0033
106	0.0048	0.0015	0.0033
107	0.0048	0.0015	0.0033
108	0.0048	0.0015	0.0033
109	0.0049	0.0015	0.0034
110	0.0049	0.0015	0.0034
111	0.0049	0.0015	0.0034
112	0.0050	0.0015	0.0034
113	0.0050	0.0016	0.0035
114	0.0050	0.0016	0.0035
115	0.0051	0.0016	0.0035
116	0.0051	0.0016	0.0035
117	0.0052	0.0016	0.0036
118	0.0052	0.0016	0.0036
119	0.0052	0.0016	0.0036
120	0.0053	0.0016	0.0036
121	0.0053	0.0016	0.0037
122	0.0053	0.0017	0.0037
123	0.0054	0.0017	0.0037
124	0.0054	0.0017	0.0037
125	0.0055	0.0017	0.0038
126	0.0055	0.0017	0.0038
127	0.0056	0.0017	0.0038
128	0.0056	0.0017	0.0039
129	0.0057	0.0018	0.0039
130	0.0057	0.0018	0.0039
131	0.0058	0.0018	0.0040
132	0.0058	0.0018	0.0040
133	0.0059	0.0018	0.0041
134	0.0059	0.0018	0.0041
135	0.0060	0.0019	0.0041
136	0.0060	0.0019	0.0042
137	0.0061	0.0019	0.0042
138	0.0061	0.0019	0.0042
139	0.0062	0.0019	0.0043
140	0.0063	0.0019	0.0043
141	0.0063	0.0020	0.0044
142	0.0064	0.0020	0.0044
143	0.0065	0.0020	0.0045
144	0.0065	0.0020	0.0045
145	0.0077	0.0024	0.0053
146	0.0077	0.0024	0.0053
147	0.0078	0.0024	0.0054
148	0.0079	0.0024	0.0054
149	0.0080	0.0025	0.0055
150	0.0080	0.0025	0.0056

151	0.0082	0.0025	0.0056
152	0.0082	0.0025	0.0057
153	0.0084	0.0026	0.0058
154	0.0084	0.0026	0.0058
155	0.0086	0.0027	0.0059
156	0.0086	0.0027	0.0060
157	0.0088	0.0027	0.0061
158	0.0089	0.0027	0.0061
159	0.0090	0.0028	0.0062
160	0.0091	0.0028	0.0063
161	0.0093	0.0029	0.0064
162	0.0094	0.0029	0.0065
163	0.0096	0.0030	0.0066
164	0.0097	0.0030	0.0067
165	0.0099	0.0031	0.0068
166	0.0100	0.0031	0.0069
167	0.0103	0.0032	0.0071
168	0.0104	0.0032	0.0072
169	0.0107	0.0033	0.0074
170	0.0108	0.0034	0.0075
171	0.0112	0.0035	0.0077
172	0.0113	0.0035	0.0078
173	0.0117	0.0036	0.0081
174	0.0119	0.0037	0.0082
175	0.0123	0.0038	0.0085
176	0.0125	0.0039	0.0086
177	0.0130	0.0040	0.0090
178	0.0133	0.0041	0.0091
179	0.0138	0.0043	0.0096
180	0.0142	0.0044	0.0098
181	0.0149	0.0046	0.0103
182	0.0153	0.0047	0.0106
183	0.0163	0.0050	0.0112
184	0.0168	0.0052	0.0116
185	0.0104	0.0032	0.0072
186	0.0110	0.0034	0.0076
187	0.0128	0.0040	0.0088
188	0.0140	0.0043	0.0097
189	0.0174	0.0054	0.0120
190	0.0200	0.0062	0.0138
191	0.0304	0.0094	0.0210
192	0.0441	0.0137	0.0305
193	0.1909	0.0163	0.1746
194	0.0239	0.0074	0.0165
195	0.0155	0.0048	0.0107
196	0.0118	0.0037	0.0082
197	0.0175	0.0054	0.0121
198	0.0158	0.0049	0.0109
199	0.0145	0.0045	0.0100
200	0.0135	0.0042	0.0093
201	0.0127	0.0039	0.0088
202	0.0121	0.0037	0.0083
203	0.0115	0.0036	0.0079
204	0.0110	0.0034	0.0076
205	0.0105	0.0033	0.0073
206	0.0101	0.0031	0.0070
207	0.0098	0.0030	0.0068
208	0.0095	0.0029	0.0065

209	0.0092	0.0028	0.0063
210	0.0089	0.0028	0.0062
211	0.0087	0.0027	0.0060
212	0.0085	0.0026	0.0059
213	0.0083	0.0026	0.0057
214	0.0081	0.0025	0.0056
215	0.0079	0.0025	0.0055
216	0.0078	0.0024	0.0054
217	0.0066	0.0020	0.0045
218	0.0064	0.0020	0.0044
219	0.0063	0.0020	0.0043
220	0.0062	0.0019	0.0043
221	0.0061	0.0019	0.0042
222	0.0059	0.0018	0.0041
223	0.0058	0.0018	0.0040
224	0.0057	0.0018	0.0040
225	0.0056	0.0017	0.0039
226	0.0055	0.0017	0.0038
227	0.0055	0.0017	0.0038
228	0.0054	0.0017	0.0037
229	0.0053	0.0016	0.0036
230	0.0052	0.0016	0.0036
231	0.0051	0.0016	0.0035
232	0.0051	0.0016	0.0035
233	0.0050	0.0015	0.0034
234	0.0049	0.0015	0.0034
235	0.0049	0.0015	0.0034
236	0.0048	0.0015	0.0033
237	0.0047	0.0015	0.0033
238	0.0047	0.0015	0.0032
239	0.0046	0.0014	0.0032
240	0.0046	0.0014	0.0032
241	0.0045	0.0014	0.0031
242	0.0045	0.0014	0.0031
243	0.0044	0.0014	0.0031
244	0.0044	0.0014	0.0030
245	0.0043	0.0013	0.0030
246	0.0043	0.0013	0.0030
247	0.0042	0.0013	0.0029
248	0.0042	0.0013	0.0029
249	0.0042	0.0013	0.0029
250	0.0041	0.0013	0.0028
251	0.0041	0.0013	0.0028
252	0.0040	0.0013	0.0028
253	0.0040	0.0012	0.0028
254	0.0040	0.0012	0.0027
255	0.0039	0.0012	0.0027
256	0.0039	0.0012	0.0027
257	0.0039	0.0012	0.0027
258	0.0038	0.0012	0.0027
259	0.0038	0.0012	0.0026
260	0.0038	0.0012	0.0026
261	0.0037	0.0012	0.0026
262	0.0037	0.0012	0.0026
263	0.0037	0.0011	0.0025
264	0.0037	0.0011	0.0025
265	0.0036	0.0011	0.0025
266	0.0036	0.0011	0.0025

267	0.0036	0.0011	0.0025
268	0.0036	0.0011	0.0025
269	0.0035	0.0011	0.0024
270	0.0035	0.0011	0.0024
271	0.0035	0.0011	0.0024
272	0.0035	0.0011	0.0024
273	0.0034	0.0011	0.0024
274	0.0034	0.0011	0.0024
275	0.0034	0.0010	0.0023
276	0.0034	0.0010	0.0023
277	0.0033	0.0010	0.0023
278	0.0033	0.0010	0.0023
279	0.0033	0.0010	0.0023
280	0.0033	0.0010	0.0023
281	0.0033	0.0010	0.0022
282	0.0032	0.0010	0.0022
283	0.0032	0.0010	0.0022
284	0.0032	0.0010	0.0022
285	0.0032	0.0010	0.0022
286	0.0032	0.0010	0.0022
287	0.0031	0.0010	0.0022
288	0.0031	0.0010	0.0022

Total soil rain loss = 0.56(In)
Total effective rainfall = 1.40(In)
Peak flow rate in flood hydrograph = 55.23(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	15.0	30.0	45.0	60.0
0+ 5	0.0003	0.05	Q				
0+10	0.0027	0.34	Q				
0+15	0.0088	0.89	Q				
0+20	0.0170	1.19	Q				
0+25	0.0264	1.36	Q				
0+30	0.0365	1.47	Q				
0+35	0.0472	1.55	VQ				
0+40	0.0584	1.62	VQ				
0+45	0.0698	1.67	VQ				
0+50	0.0816	1.71	VQ				
0+55	0.0936	1.74	VQ				
1+ 0	0.1058	1.77	VQ				
1+ 5	0.1181	1.79	VQ				
1+10	0.1306	1.81	VQ				
1+15	0.1431	1.82	VQ				
1+20	0.1558	1.84	VQ				
1+25	0.1685	1.85	VQ				
1+30	0.1814	1.86	VQ				
1+35	0.1943	1.88	VQ				
1+40	0.2073	1.89	Q				
1+45	0.2203	1.89	Q				

1+50	0.2333	1.90	Q
1+55	0.2465	1.90	Q
2+ 0	0.2596	1.91	Q
2+ 5	0.2728	1.92	Q
2+10	0.2860	1.92	Q
2+15	0.2993	1.93	Q
2+20	0.3126	1.93	Q
2+25	0.3260	1.94	Q
2+30	0.3394	1.95	Q
2+35	0.3528	1.95	Q
2+40	0.3663	1.96	Q
2+45	0.3798	1.97	Q
2+50	0.3934	1.97	Q
2+55	0.4070	1.98	QV
3+ 0	0.4207	1.99	QV
3+ 5	0.4344	1.99	QV
3+10	0.4482	2.00	QV
3+15	0.4620	2.01	QV
3+20	0.4759	2.01	QV
3+25	0.4898	2.02	QV
3+30	0.5037	2.03	QV
3+35	0.5177	2.03	QV
3+40	0.5318	2.04	QV
3+45	0.5459	2.05	QV
3+50	0.5601	2.06	QV
3+55	0.5743	2.06	QV
4+ 0	0.5885	2.07	QV
4+ 5	0.6029	2.08	QV
4+10	0.6172	2.09	Q V
4+15	0.6316	2.09	Q V
4+20	0.6461	2.10	Q V
4+25	0.6606	2.11	Q V
4+30	0.6752	2.12	Q V
4+35	0.6899	2.13	Q V
4+40	0.7046	2.13	Q V
4+45	0.7193	2.14	Q V
4+50	0.7341	2.15	Q V
4+55	0.7490	2.16	Q V
5+ 0	0.7639	2.17	Q V
5+ 5	0.7789	2.18	Q V
5+10	0.7940	2.19	Q V
5+15	0.8091	2.19	Q V
5+20	0.8243	2.20	Q V
5+25	0.8395	2.21	Q V
5+30	0.8548	2.22	Q V
5+35	0.8701	2.23	Q V
5+40	0.8856	2.24	Q V
5+45	0.9011	2.25	Q V
5+50	0.9166	2.26	Q V
5+55	0.9323	2.27	Q V
6+ 0	0.9479	2.28	Q V
6+ 5	0.9637	2.29	Q V
6+10	0.9795	2.30	Q V
6+15	0.9954	2.31	Q V
6+20	1.0114	2.32	Q V
6+25	1.0275	2.33	Q V
6+30	1.0436	2.34	Q V
6+35	1.0598	2.35	Q V

6+40	1.0761	2.36	Q	V
6+45	1.0924	2.37	Q	V
6+50	1.1088	2.38	Q	V
6+55	1.1253	2.40	Q	V
7+ 0	1.1419	2.41	Q	V
7+ 5	1.1586	2.42	Q	V
7+10	1.1753	2.43	Q	V
7+15	1.1921	2.44	Q	V
7+20	1.2091	2.46	Q	V
7+25	1.2261	2.47	Q	V
7+30	1.2431	2.48	Q	V
7+35	1.2603	2.49	Q	V
7+40	1.2776	2.51	Q	V
7+45	1.2949	2.52	Q	V
7+50	1.3124	2.53	Q	V
7+55	1.3299	2.55	Q	V
8+ 0	1.3475	2.56	Q	V
8+ 5	1.3653	2.57	Q	V
8+10	1.3831	2.59	Q	V
8+15	1.4010	2.60	Q	V
8+20	1.4190	2.62	Q	V
8+25	1.4372	2.63	Q	V
8+30	1.4554	2.65	Q	V
8+35	1.4737	2.66	Q	V
8+40	1.4922	2.68	Q	V
8+45	1.5107	2.69	Q	V
8+50	1.5294	2.71	Q	V
8+55	1.5482	2.73	Q	V
9+ 0	1.5671	2.74	Q	V
9+ 5	1.5861	2.76	Q	V
9+10	1.6052	2.78	Q	V
9+15	1.6245	2.80	Q	V
9+20	1.6438	2.81	Q	V
9+25	1.6633	2.83	Q	V
9+30	1.6830	2.85	Q	V
9+35	1.7027	2.87	Q	V
9+40	1.7226	2.89	Q	V
9+45	1.7426	2.91	Q	V
9+50	1.7628	2.93	Q	V
9+55	1.7831	2.95	Q	V
10+ 0	1.8036	2.97	Q	V
10+ 5	1.8241	2.99	Q	V
10+10	1.8449	3.01	Q	V
10+15	1.8658	3.04	Q	V
10+20	1.8869	3.06	Q	V
10+25	1.9081	3.08	Q	V
10+30	1.9295	3.10	Q	V
10+35	1.9510	3.13	Q	V
10+40	1.9727	3.15	Q	V
10+45	1.9946	3.18	Q	V
10+50	2.0167	3.20	Q	V
10+55	2.0389	3.23	Q	V
11+ 0	2.0614	3.26	Q	V
11+ 5	2.0840	3.29	Q	V
11+10	2.1068	3.31	Q	V
11+15	2.1299	3.34	Q	V
11+20	2.1531	3.37	Q	V
11+25	2.1766	3.41	Q	V

11+30	2.2002	3.44	Q	V			
11+35	2.2241	3.47	Q	V			
11+40	2.2482	3.50	Q	V			
11+45	2.2726	3.54	Q	V			
11+50	2.2972	3.57	Q	V			
11+55	2.3220	3.61	Q	V			
12+ 0	2.3471	3.64	Q	V			
12+ 5	2.3726	3.70	Q	V			
12+10	2.3990	3.84	Q	V			
12+15	2.4270	4.06	Q	V			
12+20	2.4559	4.20	Q	V			
12+25	2.4855	4.30	Q	V			
12+30	2.5157	4.38	Q	V			
12+35	2.5463	4.45	Q	V			
12+40	2.5775	4.52	Q	V			
12+45	2.6090	4.58	Q	V			
12+50	2.6410	4.65	Q	V			
12+55	2.6735	4.71	Q	V			
13+ 0	2.7063	4.77	Q	V			
13+ 5	2.7396	4.84	Q	V			
13+10	2.7734	4.90	Q	V			
13+15	2.8075	4.96	Q	V			
13+20	2.8422	5.03	Q	V			
13+25	2.8773	5.10	Q	V			
13+30	2.9129	5.17	Q	V			
13+35	2.9491	5.25	Q	V			
13+40	2.9858	5.32	Q	V			
13+45	3.0230	5.41	Q	V			
13+50	3.0608	5.49	Q	V			
13+55	3.0992	5.58	Q	V			
14+ 0	3.1383	5.67	Q	V			
14+ 5	3.1780	5.77	Q	V			
14+10	3.2185	5.88	Q	V			
14+15	3.2597	6.00	Q	V			
14+20	3.3018	6.11	Q	V			
14+25	3.3448	6.24	Q	V			
14+30	3.3887	6.37	Q	V			
14+35	3.4336	6.52	Q	V			
14+40	3.4795	6.67	Q	V			
14+45	3.5266	6.83	Q	V			
14+50	3.5748	7.01	Q	V			
14+55	3.6244	7.20	Q	V			
15+ 0	3.6754	7.41	Q	V			
15+ 5	3.7281	7.64	Q	V			
15+10	3.7824	7.89	Q	V			
15+15	3.8388	8.18	Q	V			
15+20	3.8973	8.50	Q	V			
15+25	3.9575	8.74	Q	V			
15+30	4.0155	8.43	Q	V			
15+35	4.0675	7.54	Q	V			
15+40	4.1180	7.34	Q	V			
15+45	4.1705	7.62	Q	V			
15+50	4.2272	8.23	Q	V			
15+55	4.2916	9.35	Q	V			
16+ 0	4.3700	11.39	Q	V			
16+ 5	4.4962	18.32		Q	V		
16+10	4.7570	37.88			V	Q	
16+15	5.1374	55.23			V		Q

16+20	5.3781	34.95				Q	V		
16+25	5.5391	23.39					V		
16+30	5.6650	18.28					V		
16+35	5.7755	16.04					V		
16+40	5.8738	14.27			Q		V		
16+45	5.9600	12.53			Q		V		
16+50	6.0386	11.41			Q		V		
16+55	6.1100	10.37			Q		V		
17+ 0	6.1757	9.54			Q		V		
17+ 5	6.2363	8.79			Q		V		
17+10	6.2919	8.08			Q		V		
17+15	6.3431	7.43			Q		V		
17+20	6.3922	7.13			Q		V		
17+25	6.4398	6.92			Q		V		
17+30	6.4853	6.61			Q		V		
17+35	6.5277	6.15			Q		V		
17+40	6.5680	5.86			Q		V		
17+45	6.6051	5.38			Q		V		
17+50	6.6411	5.22			Q		V		
17+55	6.6761	5.08			Q		V		
18+ 0	6.7102	4.95			Q		V		
18+ 5	6.7433	4.81			Q		V		
18+10	6.7750	4.60			Q		V		
18+15	6.8047	4.31			Q		V		
18+20	6.8330	4.11			Q		V		
18+25	6.8604	3.97			Q		V		
18+30	6.8869	3.85			Q		V		
18+35	6.9126	3.74			Q		V		
18+40	6.9377	3.65			Q		V		
18+45	6.9622	3.56			Q		V		
18+50	6.9862	3.48			Q		V		
18+55	7.0097	3.41			Q		V		
19+ 0	7.0327	3.34			Q		V		
19+ 5	7.0553	3.28			Q		V		
19+10	7.0775	3.22			Q		V		
19+15	7.0993	3.17			Q		V		
19+20	7.1207	3.11			Q		V		
19+25	7.1418	3.06			Q		V		
19+30	7.1626	3.01			Q		V		
19+35	7.1830	2.97			Q		V		
19+40	7.2032	2.93			Q		V		
19+45	7.2231	2.89			Q		V		
19+50	7.2427	2.85			Q		V		
19+55	7.2620	2.81			Q		V		
20+ 0	7.2811	2.78			Q		V		
20+ 5	7.3000	2.74			Q		V		
20+10	7.3187	2.71			Q		V		
20+15	7.3371	2.68			Q		V		
20+20	7.3553	2.65			Q		V		
20+25	7.3733	2.62			Q		V		
20+30	7.3911	2.59			Q		V		
20+35	7.4088	2.56			Q		V		
20+40	7.4262	2.53			Q		V		
20+45	7.4434	2.50			Q		V		
20+50	7.4605	2.48			Q		V		
20+55	7.4774	2.45			Q		V		
21+ 0	7.4941	2.43			Q		V		
21+ 5	7.5107	2.41			Q		V		

21+10	7.5271	2.38	Q				V
21+15	7.5434	2.36	Q				V
21+20	7.5595	2.34	Q				V
21+25	7.5754	2.32	Q				V
21+30	7.5912	2.30	Q				V
21+35	7.6069	2.28	Q				V
21+40	7.6225	2.26	Q				V
21+45	7.6379	2.24	Q				V
21+50	7.6532	2.22	Q				V
21+55	7.6683	2.20	Q				V
22+ 0	7.6834	2.18	Q				V
22+ 5	7.6983	2.17	Q				V
22+10	7.7131	2.15	Q				V
22+15	7.7277	2.13	Q				V
22+20	7.7423	2.12	Q				V
22+25	7.7568	2.10	Q				V
22+30	7.7711	2.08	Q				V
22+35	7.7854	2.07	Q				V
22+40	7.7995	2.05	Q				V
22+45	7.8136	2.04	Q				V
22+50	7.8275	2.02	Q				V
22+55	7.8414	2.01	Q				V
23+ 0	7.8551	2.00	Q				V
23+ 5	7.8688	1.98	Q				V
23+10	7.8823	1.97	Q				V
23+15	7.8958	1.96	Q				V
23+20	7.9092	1.94	Q				V
23+25	7.9225	1.93	Q				V
23+30	7.9357	1.92	Q				V
23+35	7.9489	1.91	Q				V
23+40	7.9619	1.90	Q				V
23+45	7.9749	1.88	Q				V
23+50	7.9878	1.87	Q				V
23+55	8.0006	1.86	Q				V
24+ 0	8.0133	1.85	Q				V
24+ 5	8.0257	1.79	Q				V
24+10	8.0359	1.49	Q				V
24+15	8.0423	0.93	Q				V
24+20	8.0466	0.63	Q				V
24+25	8.0498	0.46	Q				V
24+30	8.0522	0.35	Q				V
24+35	8.0541	0.27	Q				V
24+40	8.0555	0.21	Q				V
24+45	8.0566	0.16	Q				V
24+50	8.0575	0.13	Q				V
24+55	8.0582	0.10	Q				V
25+ 0	8.0587	0.07	Q				V
25+ 5	8.0591	0.06	Q				V
25+10	8.0594	0.04	Q				V
25+15	8.0596	0.03	Q				V
25+20	8.0598	0.03	Q				V
25+25	8.0599	0.02	Q				V
25+30	8.0600	0.01	Q				V
25+35	8.0600	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 05/06/20

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

Program License Serial Number 6320

204728 - US Cold Storage
PROPOSED CONDITIONS - AREA A
10-YEAR, 1- HOUR STORM
BY: SG DATE: 05-06-20

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		
69.33	1	0.76

Rainfall data for year 2		
69.33	6	1.04

Rainfall data for year 2		
69.33	24	1.96

Rainfall data for year 100		
69.33	1	1.27

Rainfall data for year 100		
69.33	6	2.90

Rainfall data for year 100		
69.33	24	6.12

+++++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
63.0	63.0	69.33	1.000	0.637	0.220	0.140

Area-averaged adjusted loss rate Fm (In/Hr) = 0.140

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
15.25	0.220	63.0	63.0	5.87	0.203
54.08	0.780	98.0	98.0	0.20	0.936

Area-averaged catchment yield fraction, Y = 0.775

Area-averaged low loss fraction, Yb = 0.225

User entry of time of concentration = 0.259 (hours)

+++++

Watershed area = 69.33(Ac.)

Catchment Lag time = 0.207 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 40.2188

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.140(In/Hr)

Average low loss rate fraction (Yb) = 0.225 (decimal)

DESERT S-Graph Selected

Computed peak 5-minute rainfall = 0.361(In)

Computed peak 30-minute rainfall = 0.617(In)

Specified peak 1-hour rainfall = 0.760(In)

Computed peak 3-hour rainfall = 1.292(In)

Specified peak 6-hour rainfall = 1.805(In)

Specified peak 24-hour rainfall = 3.671(In)

Rainfall depth area reduction factors:

Using a total area of 69.33(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.359(In)

30-minute factor = 0.997 Adjusted rainfall = 0.615(In)

1-hour factor = 0.997 Adjusted rainfall = 0.758(In)

3-hour factor = 1.000 Adjusted rainfall = 1.291(In)

6-hour factor = 1.000 Adjusted rainfall = 1.805(In)

24-hour factor = 1.000 Adjusted rainfall = 3.671(In)

Unit Hydrograph

+++++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
-----------------	-----------------------	-------------------------

(K = 838.46 (CFS))

1	2.772	23.244
2	18.946	135.610

3	49.467	255.908
4	65.841	137.286
5	74.974	76.575
6	81.019	50.693
7	85.377	36.535
8	88.714	27.978
9	91.129	20.255
10	93.102	16.543
11	94.658	13.044
12	95.920	10.578
13	96.919	8.381
14	97.656	6.179
15	98.132	3.989
16	98.581	3.762
17	99.063	4.047
18	99.505	3.703
19	99.775	2.266
20	100.000	1.884

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3595	0.3595
2	0.4425	0.0831
3	0.4998	0.0572
4	0.5448	0.0450
5	0.5826	0.0377
6	0.6153	0.0328
7	0.6444	0.0291
8	0.6708	0.0263
9	0.6949	0.0241
10	0.7172	0.0223
11	0.7380	0.0208
12	0.7575	0.0195
13	0.7875	0.0300
14	0.8164	0.0288
15	0.8442	0.0278
16	0.8711	0.0269
17	0.8971	0.0260
18	0.9223	0.0252
19	0.9468	0.0245
20	0.9707	0.0239
21	0.9940	0.0233
22	1.0167	0.0227
23	1.0389	0.0222
24	1.0605	0.0217
25	1.0818	0.0212
26	1.1026	0.0208
27	1.1229	0.0204
28	1.1429	0.0200
29	1.1626	0.0196
30	1.1819	0.0193
31	1.2008	0.0190
32	1.2195	0.0186
33	1.2378	0.0184
34	1.2559	0.0181
35	1.2737	0.0178
36	1.2912	0.0175
37	1.3084	0.0172

38	1.3254	0.0170
39	1.3421	0.0167
40	1.3587	0.0165
41	1.3750	0.0163
42	1.3911	0.0161
43	1.4070	0.0159
44	1.4227	0.0157
45	1.4382	0.0155
46	1.4536	0.0154
47	1.4687	0.0152
48	1.4838	0.0150
49	1.4986	0.0149
50	1.5133	0.0147
51	1.5279	0.0145
52	1.5423	0.0144
53	1.5565	0.0143
54	1.5706	0.0141
55	1.5846	0.0140
56	1.5985	0.0139
57	1.6122	0.0137
58	1.6258	0.0136
59	1.6393	0.0135
60	1.6527	0.0134
61	1.6659	0.0133
62	1.6790	0.0131
63	1.6921	0.0130
64	1.7050	0.0129
65	1.7178	0.0128
66	1.7305	0.0127
67	1.7432	0.0126
68	1.7557	0.0125
69	1.7681	0.0124
70	1.7804	0.0123
71	1.7927	0.0122
72	1.8048	0.0122
73	1.8176	0.0128
74	1.8303	0.0127
75	1.8430	0.0126
76	1.8555	0.0125
77	1.8680	0.0125
78	1.8804	0.0124
79	1.8927	0.0123
80	1.9049	0.0122
81	1.9171	0.0122
82	1.9291	0.0121
83	1.9412	0.0120
84	1.9531	0.0119
85	1.9650	0.0119
86	1.9768	0.0118
87	1.9885	0.0117
88	2.0002	0.0117
89	2.0118	0.0116
90	2.0234	0.0115
91	2.0348	0.0115
92	2.0463	0.0114
93	2.0576	0.0114
94	2.0689	0.0113
95	2.0802	0.0112

96	2.0914	0.0112
97	2.1025	0.0111
98	2.1136	0.0111
99	2.1246	0.0110
100	2.1355	0.0110
101	2.1465	0.0109
102	2.1573	0.0109
103	2.1681	0.0108
104	2.1789	0.0108
105	2.1896	0.0107
106	2.2002	0.0107
107	2.2108	0.0106
108	2.2214	0.0106
109	2.2319	0.0105
110	2.2424	0.0105
111	2.2528	0.0104
112	2.2632	0.0104
113	2.2735	0.0103
114	2.2838	0.0103
115	2.2940	0.0102
116	2.3042	0.0102
117	2.3144	0.0102
118	2.3245	0.0101
119	2.3345	0.0101
120	2.3446	0.0100
121	2.3546	0.0100
122	2.3645	0.0099
123	2.3744	0.0099
124	2.3843	0.0099
125	2.3941	0.0098
126	2.4039	0.0098
127	2.4136	0.0098
128	2.4234	0.0097
129	2.4330	0.0097
130	2.4427	0.0096
131	2.4523	0.0096
132	2.4619	0.0096
133	2.4714	0.0095
134	2.4809	0.0095
135	2.4904	0.0095
136	2.4998	0.0094
137	2.5092	0.0094
138	2.5186	0.0094
139	2.5279	0.0093
140	2.5372	0.0093
141	2.5465	0.0093
142	2.5557	0.0092
143	2.5649	0.0092
144	2.5741	0.0092
145	2.5832	0.0091
146	2.5923	0.0091
147	2.6014	0.0091
148	2.6104	0.0090
149	2.6195	0.0090
150	2.6284	0.0090
151	2.6374	0.0090
152	2.6463	0.0089
153	2.6552	0.0089

154	2.6641	0.0089
155	2.6730	0.0088
156	2.6818	0.0088
157	2.6906	0.0088
158	2.6993	0.0088
159	2.7081	0.0087
160	2.7168	0.0087
161	2.7255	0.0087
162	2.7341	0.0087
163	2.7428	0.0086
164	2.7514	0.0086
165	2.7599	0.0086
166	2.7685	0.0086
167	2.7770	0.0085
168	2.7855	0.0085
169	2.7940	0.0085
170	2.8025	0.0085
171	2.8109	0.0084
172	2.8193	0.0084
173	2.8277	0.0084
174	2.8360	0.0084
175	2.8444	0.0083
176	2.8527	0.0083
177	2.8610	0.0083
178	2.8693	0.0083
179	2.8775	0.0082
180	2.8857	0.0082
181	2.8939	0.0082
182	2.9021	0.0082
183	2.9103	0.0082
184	2.9184	0.0081
185	2.9265	0.0081
186	2.9346	0.0081
187	2.9427	0.0081
188	2.9507	0.0080
189	2.9587	0.0080
190	2.9667	0.0080
191	2.9747	0.0080
192	2.9827	0.0080
193	2.9906	0.0079
194	2.9986	0.0079
195	3.0065	0.0079
196	3.0144	0.0079
197	3.0222	0.0079
198	3.0301	0.0078
199	3.0379	0.0078
200	3.0457	0.0078
201	3.0535	0.0078
202	3.0613	0.0078
203	3.0690	0.0078
204	3.0768	0.0077
205	3.0845	0.0077
206	3.0922	0.0077
207	3.0999	0.0077
208	3.1075	0.0077
209	3.1152	0.0076
210	3.1228	0.0076
211	3.1304	0.0076

212	3.1380	0.0076
213	3.1456	0.0076
214	3.1531	0.0076
215	3.1607	0.0075
216	3.1682	0.0075
217	3.1757	0.0075
218	3.1832	0.0075
219	3.1906	0.0075
220	3.1981	0.0075
221	3.2055	0.0074
222	3.2129	0.0074
223	3.2204	0.0074
224	3.2277	0.0074
225	3.2351	0.0074
226	3.2425	0.0074
227	3.2498	0.0073
228	3.2571	0.0073
229	3.2644	0.0073
230	3.2717	0.0073
231	3.2790	0.0073
232	3.2863	0.0073
233	3.2935	0.0072
234	3.3008	0.0072
235	3.3080	0.0072
236	3.3152	0.0072
237	3.3224	0.0072
238	3.3295	0.0072
239	3.3367	0.0072
240	3.3438	0.0071
241	3.3510	0.0071
242	3.3581	0.0071
243	3.3652	0.0071
244	3.3723	0.0071
245	3.3793	0.0071
246	3.3864	0.0071
247	3.3934	0.0070
248	3.4005	0.0070
249	3.4075	0.0070
250	3.4145	0.0070
251	3.4215	0.0070
252	3.4285	0.0070
253	3.4354	0.0070
254	3.4424	0.0069
255	3.4493	0.0069
256	3.4562	0.0069
257	3.4631	0.0069
258	3.4700	0.0069
259	3.4769	0.0069
260	3.4838	0.0069
261	3.4906	0.0069
262	3.4975	0.0068
263	3.5043	0.0068
264	3.5111	0.0068
265	3.5179	0.0068
266	3.5247	0.0068
267	3.5315	0.0068
268	3.5383	0.0068
269	3.5450	0.0068

270	3.5518	0.0067
271	3.5585	0.0067
272	3.5652	0.0067
273	3.5719	0.0067
274	3.5786	0.0067
275	3.5853	0.0067
276	3.5920	0.0067
277	3.5986	0.0067
278	3.6053	0.0066
279	3.6119	0.0066
280	3.6186	0.0066
281	3.6252	0.0066
282	3.6318	0.0066
283	3.6384	0.0066
284	3.6449	0.0066
285	3.6515	0.0066
286	3.6581	0.0066
287	3.6646	0.0065
288	3.6711	0.0065

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0065	0.0015	0.0051
2	0.0065	0.0015	0.0051
3	0.0066	0.0015	0.0051
4	0.0066	0.0015	0.0051
5	0.0066	0.0015	0.0051
6	0.0066	0.0015	0.0051
7	0.0066	0.0015	0.0051
8	0.0066	0.0015	0.0052
9	0.0067	0.0015	0.0052
10	0.0067	0.0015	0.0052
11	0.0067	0.0015	0.0052
12	0.0067	0.0015	0.0052
13	0.0067	0.0015	0.0052
14	0.0068	0.0015	0.0052
15	0.0068	0.0015	0.0053
16	0.0068	0.0015	0.0053
17	0.0068	0.0015	0.0053
18	0.0068	0.0015	0.0053
19	0.0069	0.0015	0.0053
20	0.0069	0.0015	0.0053
21	0.0069	0.0016	0.0053
22	0.0069	0.0016	0.0054
23	0.0069	0.0016	0.0054
24	0.0069	0.0016	0.0054
25	0.0070	0.0016	0.0054
26	0.0070	0.0016	0.0054
27	0.0070	0.0016	0.0054
28	0.0070	0.0016	0.0054
29	0.0071	0.0016	0.0055
30	0.0071	0.0016	0.0055
31	0.0071	0.0016	0.0055
32	0.0071	0.0016	0.0055
33	0.0071	0.0016	0.0055
34	0.0072	0.0016	0.0055

35	0.0072	0.0016	0.0056
36	0.0072	0.0016	0.0056
37	0.0072	0.0016	0.0056
38	0.0072	0.0016	0.0056
39	0.0073	0.0016	0.0056
40	0.0073	0.0016	0.0057
41	0.0073	0.0016	0.0057
42	0.0073	0.0017	0.0057
43	0.0074	0.0017	0.0057
44	0.0074	0.0017	0.0057
45	0.0074	0.0017	0.0058
46	0.0074	0.0017	0.0058
47	0.0075	0.0017	0.0058
48	0.0075	0.0017	0.0058
49	0.0075	0.0017	0.0058
50	0.0075	0.0017	0.0058
51	0.0076	0.0017	0.0059
52	0.0076	0.0017	0.0059
53	0.0076	0.0017	0.0059
54	0.0076	0.0017	0.0059
55	0.0077	0.0017	0.0060
56	0.0077	0.0017	0.0060
57	0.0077	0.0017	0.0060
58	0.0078	0.0017	0.0060
59	0.0078	0.0018	0.0060
60	0.0078	0.0018	0.0061
61	0.0078	0.0018	0.0061
62	0.0079	0.0018	0.0061
63	0.0079	0.0018	0.0061
64	0.0079	0.0018	0.0061
65	0.0080	0.0018	0.0062
66	0.0080	0.0018	0.0062
67	0.0080	0.0018	0.0062
68	0.0080	0.0018	0.0062
69	0.0081	0.0018	0.0063
70	0.0081	0.0018	0.0063
71	0.0082	0.0018	0.0063
72	0.0082	0.0018	0.0063
73	0.0082	0.0019	0.0064
74	0.0082	0.0019	0.0064
75	0.0083	0.0019	0.0064
76	0.0083	0.0019	0.0064
77	0.0084	0.0019	0.0065
78	0.0084	0.0019	0.0065
79	0.0084	0.0019	0.0065
80	0.0085	0.0019	0.0066
81	0.0085	0.0019	0.0066
82	0.0085	0.0019	0.0066
83	0.0086	0.0019	0.0066
84	0.0086	0.0019	0.0067
85	0.0087	0.0019	0.0067
86	0.0087	0.0020	0.0067
87	0.0087	0.0020	0.0068
88	0.0088	0.0020	0.0068
89	0.0088	0.0020	0.0068
90	0.0088	0.0020	0.0069
91	0.0089	0.0020	0.0069
92	0.0089	0.0020	0.0069

93	0.0090	0.0020	0.0070
94	0.0090	0.0020	0.0070
95	0.0091	0.0020	0.0070
96	0.0091	0.0021	0.0071
97	0.0092	0.0021	0.0071
98	0.0092	0.0021	0.0071
99	0.0093	0.0021	0.0072
100	0.0093	0.0021	0.0072
101	0.0094	0.0021	0.0073
102	0.0094	0.0021	0.0073
103	0.0095	0.0021	0.0073
104	0.0095	0.0021	0.0074
105	0.0096	0.0022	0.0074
106	0.0096	0.0022	0.0074
107	0.0097	0.0022	0.0075
108	0.0097	0.0022	0.0075
109	0.0098	0.0022	0.0076
110	0.0098	0.0022	0.0076
111	0.0099	0.0022	0.0077
112	0.0099	0.0022	0.0077
113	0.0100	0.0023	0.0078
114	0.0101	0.0023	0.0078
115	0.0102	0.0023	0.0079
116	0.0102	0.0023	0.0079
117	0.0103	0.0023	0.0080
118	0.0103	0.0023	0.0080
119	0.0104	0.0023	0.0081
120	0.0105	0.0024	0.0081
121	0.0106	0.0024	0.0082
122	0.0106	0.0024	0.0082
123	0.0107	0.0024	0.0083
124	0.0108	0.0024	0.0083
125	0.0109	0.0024	0.0084
126	0.0109	0.0025	0.0085
127	0.0110	0.0025	0.0085
128	0.0111	0.0025	0.0086
129	0.0112	0.0025	0.0087
130	0.0112	0.0025	0.0087
131	0.0114	0.0026	0.0088
132	0.0114	0.0026	0.0089
133	0.0115	0.0026	0.0089
134	0.0116	0.0026	0.0090
135	0.0117	0.0026	0.0091
136	0.0118	0.0027	0.0091
137	0.0119	0.0027	0.0093
138	0.0120	0.0027	0.0093
139	0.0122	0.0027	0.0094
140	0.0122	0.0028	0.0095
141	0.0124	0.0028	0.0096
142	0.0125	0.0028	0.0097
143	0.0126	0.0028	0.0098
144	0.0127	0.0029	0.0098
145	0.0122	0.0027	0.0094
146	0.0122	0.0028	0.0095
147	0.0124	0.0028	0.0096
148	0.0125	0.0028	0.0097
149	0.0127	0.0029	0.0099
150	0.0128	0.0029	0.0099

151	0.0130	0.0029	0.0101
152	0.0131	0.0030	0.0102
153	0.0134	0.0030	0.0104
154	0.0135	0.0030	0.0104
155	0.0137	0.0031	0.0106
156	0.0139	0.0031	0.0107
157	0.0141	0.0032	0.0109
158	0.0143	0.0032	0.0110
159	0.0145	0.0033	0.0113
160	0.0147	0.0033	0.0114
161	0.0150	0.0034	0.0116
162	0.0152	0.0034	0.0118
163	0.0155	0.0035	0.0120
164	0.0157	0.0035	0.0122
165	0.0161	0.0036	0.0125
166	0.0163	0.0037	0.0126
167	0.0167	0.0038	0.0130
168	0.0170	0.0038	0.0131
169	0.0175	0.0039	0.0136
170	0.0178	0.0040	0.0138
171	0.0184	0.0041	0.0142
172	0.0186	0.0042	0.0145
173	0.0193	0.0043	0.0149
174	0.0196	0.0044	0.0152
175	0.0204	0.0046	0.0158
176	0.0208	0.0047	0.0161
177	0.0217	0.0049	0.0168
178	0.0222	0.0050	0.0172
179	0.0233	0.0052	0.0180
180	0.0239	0.0054	0.0185
181	0.0252	0.0057	0.0196
182	0.0260	0.0059	0.0202
183	0.0278	0.0063	0.0215
184	0.0288	0.0065	0.0224
185	0.0195	0.0044	0.0151
186	0.0208	0.0047	0.0161
187	0.0241	0.0054	0.0187
188	0.0263	0.0059	0.0204
189	0.0328	0.0074	0.0254
190	0.0377	0.0085	0.0292
191	0.0572	0.0117	0.0456
192	0.0831	0.0117	0.0714
193	0.3595	0.0117	0.3478
194	0.0450	0.0101	0.0349
195	0.0291	0.0066	0.0226
196	0.0223	0.0050	0.0173
197	0.0300	0.0068	0.0233
198	0.0269	0.0060	0.0208
199	0.0245	0.0055	0.0190
200	0.0227	0.0051	0.0176
201	0.0212	0.0048	0.0164
202	0.0200	0.0045	0.0155
203	0.0190	0.0043	0.0147
204	0.0181	0.0041	0.0140
205	0.0172	0.0039	0.0133
206	0.0165	0.0037	0.0128
207	0.0159	0.0036	0.0123
208	0.0154	0.0035	0.0119

209	0.0149	0.0033	0.0115
210	0.0144	0.0032	0.0112
211	0.0140	0.0031	0.0108
212	0.0136	0.0031	0.0105
213	0.0133	0.0030	0.0103
214	0.0129	0.0029	0.0100
215	0.0126	0.0028	0.0098
216	0.0123	0.0028	0.0096
217	0.0128	0.0029	0.0099
218	0.0125	0.0028	0.0097
219	0.0123	0.0028	0.0095
220	0.0121	0.0027	0.0094
221	0.0119	0.0027	0.0092
222	0.0117	0.0026	0.0090
223	0.0115	0.0026	0.0089
224	0.0113	0.0025	0.0088
225	0.0111	0.0025	0.0086
226	0.0110	0.0025	0.0085
227	0.0108	0.0024	0.0084
228	0.0107	0.0024	0.0083
229	0.0105	0.0024	0.0081
230	0.0104	0.0023	0.0080
231	0.0102	0.0023	0.0079
232	0.0101	0.0023	0.0078
233	0.0100	0.0022	0.0077
234	0.0099	0.0022	0.0076
235	0.0098	0.0022	0.0076
236	0.0096	0.0022	0.0075
237	0.0095	0.0021	0.0074
238	0.0094	0.0021	0.0073
239	0.0093	0.0021	0.0072
240	0.0092	0.0021	0.0072
241	0.0091	0.0021	0.0071
242	0.0090	0.0020	0.0070
243	0.0090	0.0020	0.0069
244	0.0089	0.0020	0.0069
245	0.0088	0.0020	0.0068
246	0.0087	0.0020	0.0067
247	0.0086	0.0019	0.0067
248	0.0086	0.0019	0.0066
249	0.0085	0.0019	0.0066
250	0.0084	0.0019	0.0065
251	0.0083	0.0019	0.0065
252	0.0083	0.0019	0.0064
253	0.0082	0.0018	0.0064
254	0.0081	0.0018	0.0063
255	0.0081	0.0018	0.0063
256	0.0080	0.0018	0.0062
257	0.0079	0.0018	0.0062
258	0.0079	0.0018	0.0061
259	0.0078	0.0018	0.0061
260	0.0078	0.0017	0.0060
261	0.0077	0.0017	0.0060
262	0.0077	0.0017	0.0059
263	0.0076	0.0017	0.0059
264	0.0076	0.0017	0.0059
265	0.0075	0.0017	0.0058
266	0.0075	0.0017	0.0058

267	0.0074	0.0017	0.0057
268	0.0074	0.0017	0.0057
269	0.0073	0.0016	0.0057
270	0.0073	0.0016	0.0056
271	0.0072	0.0016	0.0056
272	0.0072	0.0016	0.0056
273	0.0071	0.0016	0.0055
274	0.0071	0.0016	0.0055
275	0.0070	0.0016	0.0055
276	0.0070	0.0016	0.0054
277	0.0070	0.0016	0.0054
278	0.0069	0.0016	0.0054
279	0.0069	0.0015	0.0053
280	0.0068	0.0015	0.0053
281	0.0068	0.0015	0.0053
282	0.0068	0.0015	0.0052
283	0.0067	0.0015	0.0052
284	0.0067	0.0015	0.0052
285	0.0067	0.0015	0.0052
286	0.0066	0.0015	0.0051
287	0.0066	0.0015	0.0051
288	0.0066	0.0015	0.0051

Total soil rain loss = 0.75(In)
Total effective rainfall = 2.92(In)
Peak flow rate in flood hydrograph = 112.26(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	0.0008	0.12	Q				
0+10	0.0064	0.80	Q				
0+15	0.0208	2.10	Q				
0+20	0.0401	2.80	Q				
0+25	0.0621	3.20	Q				
0+30	0.0860	3.46	Q				
0+35	0.1112	3.66	Q				
0+40	0.1374	3.81	Q				
0+45	0.1644	3.92	Q				
0+50	0.1920	4.01	Q				
0+55	0.2202	4.09	Q				
1+ 0	0.2488	4.15	Q				
1+ 5	0.2777	4.21	Q				
1+10	0.3070	4.25	Q				
1+15	0.3365	4.28	Q				
1+20	0.3662	4.31	Q				
1+25	0.3961	4.34	Q				
1+30	0.4262	4.37	QV				
1+35	0.4565	4.40	QV				
1+40	0.4870	4.42	QV				
1+45	0.5175	4.43	QV				

1+50	0.5481	4.44	QV
1+55	0.5788	4.46	QV
2+ 0	0.6096	4.47	QV
2+ 5	0.6405	4.48	QV
2+10	0.6714	4.50	QV
2+15	0.7025	4.51	QV
2+20	0.7336	4.52	QV
2+25	0.7648	4.53	QV
2+30	0.7962	4.55	QV
2+35	0.8276	4.56	QV
2+40	0.8591	4.57	Q V
2+45	0.8907	4.59	Q V
2+50	0.9224	4.60	Q V
2+55	0.9542	4.62	Q V
3+ 0	0.9861	4.63	Q V
3+ 5	1.0180	4.64	Q V
3+10	1.0501	4.66	Q V
3+15	1.0823	4.67	Q V
3+20	1.1146	4.69	Q V
3+25	1.1470	4.70	Q V
3+30	1.1795	4.72	Q V
3+35	1.2120	4.73	Q V
3+40	1.2447	4.75	Q V
3+45	1.2775	4.76	Q V
3+50	1.3104	4.78	Q V
3+55	1.3434	4.79	Q V
4+ 0	1.3766	4.81	Q V
4+ 5	1.4098	4.82	Q V
4+10	1.4431	4.84	Q V
4+15	1.4766	4.86	Q V
4+20	1.5101	4.87	Q V
4+25	1.5438	4.89	Q V
4+30	1.5776	4.91	Q V
4+35	1.6115	4.92	Q V
4+40	1.6455	4.94	Q V
4+45	1.6797	4.96	Q V
4+50	1.7140	4.98	Q V
4+55	1.7483	4.99	Q V
5+ 0	1.7829	5.01	Q V
5+ 5	1.8175	5.03	Q V
5+10	1.8522	5.05	Q V
5+15	1.8871	5.07	Q V
5+20	1.9221	5.08	Q V
5+25	1.9573	5.10	Q V
5+30	1.9926	5.12	Q V
5+35	2.0280	5.14	Q V
5+40	2.0635	5.16	Q V
5+45	2.0992	5.18	Q V
5+50	2.1350	5.20	Q V
5+55	2.1710	5.22	Q V
6+ 0	2.2071	5.24	Q V
6+ 5	2.2433	5.26	Q V
6+10	2.2797	5.28	Q V
6+15	2.3162	5.30	Q V
6+20	2.3529	5.33	Q V
6+25	2.3897	5.35	Q V
6+30	2.4267	5.37	Q V
6+35	2.4638	5.39	Q V

6+40	2.5011	5.41	Q	V			
6+45	2.5385	5.44	Q	V			
6+50	2.5761	5.46	Q	V			
6+55	2.6139	5.48	Q	V			
7+ 0	2.6518	5.51	Q	V			
7+ 5	2.6899	5.53	Q	V			
7+10	2.7282	5.56	Q	V			
7+15	2.7666	5.58	Q	V			
7+20	2.8052	5.60	Q	V			
7+25	2.8440	5.63	Q	V			
7+30	2.8829	5.66	Q	V			
7+35	2.9221	5.68	Q	V			
7+40	2.9614	5.71	Q	V			
7+45	3.0009	5.74	Q	V			
7+50	3.0406	5.76	Q	V			
7+55	3.0805	5.79	Q	V			
8+ 0	3.1205	5.82	Q	V			
8+ 5	3.1608	5.85	Q	V			
8+10	3.2013	5.88	Q	V			
8+15	3.2420	5.91	Q	V			
8+20	3.2828	5.94	Q	V			
8+25	3.3239	5.97	Q	V			
8+30	3.3652	6.00	Q	V			
8+35	3.4067	6.03	Q	V			
8+40	3.4485	6.06	Q	V			
8+45	3.4904	6.09	Q	V			
8+50	3.5326	6.12	Q	V			
8+55	3.5750	6.16	Q	V			
9+ 0	3.6176	6.19	Q	V			
9+ 5	3.6605	6.23	Q	V			
9+10	3.7036	6.26	Q	V			
9+15	3.7470	6.30	Q	V			
9+20	3.7906	6.33	Q	V			
9+25	3.8345	6.37	Q	V			
9+30	3.8786	6.41	Q	V			
9+35	3.9230	6.45	Q	V			
9+40	3.9677	6.48	Q	V			
9+45	4.0126	6.53	Q	V			
9+50	4.0578	6.56	Q	V			
9+55	4.1033	6.61	Q	V			
10+ 0	4.1491	6.65	Q	V			
10+ 5	4.1952	6.69	Q	V			
10+10	4.2416	6.73	Q	V			
10+15	4.2883	6.78	Q	V			
10+20	4.3353	6.83	Q	V			
10+25	4.3826	6.87	Q	V			
10+30	4.4303	6.92	Q	V			
10+35	4.4783	6.97	Q	V			
10+40	4.5266	7.02	Q	V			
10+45	4.5753	7.07	Q	V			
10+50	4.6243	7.12	Q	V			
10+55	4.6737	7.17	Q	V			
11+ 0	4.7235	7.23	Q	V			
11+ 5	4.7737	7.28	Q	V			
11+10	4.8242	7.34	Q	V			
11+15	4.8752	7.40	Q	V			
11+20	4.9265	7.46	Q	V			
11+25	4.9783	7.52	Q	V			

11+30	5.0305	7.58	Q		V		
11+35	5.0832	7.65	Q		V		
11+40	5.1363	7.71	Q		V		
11+45	5.1899	7.78	Q		V		
11+50	5.2439	7.85	Q		V		
11+55	5.2985	7.92	Q		V		
12+ 0	5.3535	7.99	Q		V		
12+ 5	5.4090	8.06	Q		V		
12+10	5.4645	8.06	Q		V		
12+15	5.5195	7.99	Q		V		
12+20	5.5746	8.00	Q		V		
12+25	5.6300	8.04	Q		V		
12+30	5.6858	8.10	Q		V		
12+35	5.7421	8.17	Q		V		
12+40	5.7989	8.25	Q		V		
12+45	5.8563	8.34	Q		V		
12+50	5.9143	8.43	Q		V		
12+55	5.9731	8.53	Q		V		
13+ 0	6.0325	8.63	Q		V		
13+ 5	6.0926	8.74	Q		V		
13+10	6.1536	8.85	Q		V		
13+15	6.2154	8.97	Q		V		
13+20	6.2780	9.09	Q		V		
13+25	6.3415	9.23	Q		V		
13+30	6.4060	9.36	Q		V		
13+35	6.4715	9.51	Q		V		
13+40	6.5379	9.65	Q		V		
13+45	6.6055	9.82	Q		V		
13+50	6.6743	9.98	Q		V		
13+55	6.7443	10.16	Q		V		
14+ 0	6.8155	10.34	Q		V		
14+ 5	6.8881	10.54	Q		V		
14+10	6.9622	10.75	Q		V		
14+15	7.0379	11.00	Q		V		
14+20	7.1152	11.23	Q		V		
14+25	7.1944	11.49	Q		V		
14+30	7.2754	11.76	Q		V		
14+35	7.3583	12.05	Q		V		
14+40	7.4434	12.35	Q		V		
14+45	7.5308	12.69	Q		V		
14+50	7.6207	13.05	Q		V		
14+55	7.7133	13.45	Q		V		
15+ 0	7.8088	13.87	Q		V		
15+ 5	7.9077	14.35	Q		V		
15+10	8.0101	14.87	Q		V		
15+15	8.1167	15.47	Q		V		
15+20	8.2277	16.13	Q		V		
15+25	8.3427	16.69	Q		V		
15+30	8.4551	16.31	Q		V		
15+35	8.5584	15.01	Q		V		
15+40	8.6610	14.89	Q		V		
15+45	8.7688	15.65	Q		V		
15+50	8.8861	17.04	Q		V		
15+55	9.0207	19.53	Q		V		
16+ 0	9.1873	24.19	Q		V		
16+ 5	9.4581	39.33	Q	Q	V		
16+10	10.0023	79.02			Q	V	
16+15	10.7755	112.26				Q	V

16+20	11.2677	71.48		Q	V
16+25	11.5990	48.10			V
16+30	11.8569	37.45		Q	V
16+35	12.0800	32.39		Q	V
16+40	12.2762	28.49		Q	V
16+45	12.4469	24.78		Q	V
16+50	12.6010	22.38		Q	V
16+55	12.7401	20.19		Q	V
17+ 0	12.8670	18.43		Q	V
17+ 5	12.9830	16.84		Q	V
17+10	13.0888	15.36		Q	V
17+15	13.1854	14.03		Q	V
17+20	13.2776	13.39		Q	V
17+25	13.3667	12.94		Q	V
17+30	13.4514	12.30		Q	V
17+35	13.5297	11.36		Q	V
17+40	13.6037	10.75		Q	V
17+45	13.6712	9.80		Q	V
17+50	13.7364	9.47		Q	V
17+55	13.7997	9.18		Q	V
18+ 0	13.8611	8.92		Q	V
18+ 5	13.9210	8.69		Q	V
18+10	13.9798	8.54		Q	V
18+15	14.0381	8.47		Q	V
18+20	14.0956	8.36		Q	V
18+25	14.1522	8.22		Q	V
18+30	14.2079	8.08		Q	V
18+35	14.2626	7.94		Q	V
18+40	14.3163	7.81		Q	V
18+45	14.3692	7.68		Q	V
18+50	14.4212	7.56		Q	V
18+55	14.4725	7.44		Q	V
19+ 0	14.5229	7.32		Q	V
19+ 5	14.5726	7.21		Q	V
19+10	14.6216	7.11		Q	V
19+15	14.6698	7.01		Q	V
19+20	14.7174	6.91		Q	V
19+25	14.7644	6.82		Q	V
19+30	14.8108	6.73		Q	V
19+35	14.8565	6.65		Q	V
19+40	14.9017	6.56		Q	V
19+45	14.9464	6.48		Q	V
19+50	14.9905	6.40		Q	V
19+55	15.0341	6.33		Q	V
20+ 0	15.0772	6.26		Q	V
20+ 5	15.1198	6.19		Q	V
20+10	15.1619	6.12		Q	V
20+15	15.2036	6.05		Q	V
20+20	15.2449	5.99		Q	V
20+25	15.2857	5.93		Q	V
20+30	15.3262	5.87		Q	V
20+35	15.3662	5.81		Q	V
20+40	15.4059	5.76		Q	V
20+45	15.4451	5.70		Q	V
20+50	15.4841	5.65		Q	V
20+55	15.5226	5.60		Q	V
21+ 0	15.5609	5.55		Q	V
21+ 5	15.5988	5.50		Q	V

21+10	15.6363	5.45	Q				V
21+15	15.6736	5.41	Q				V
21+20	15.7105	5.36	Q				V
21+25	15.7472	5.32	Q				V
21+30	15.7835	5.28	Q				V
21+35	15.8196	5.24	Q				V
21+40	15.8554	5.20	Q				V
21+45	15.8909	5.16	Q				V
21+50	15.9261	5.12	Q				V
21+55	15.9611	5.08	Q				V
22+ 0	15.9958	5.04	Q				V
22+ 5	16.0303	5.01	Q				V
22+10	16.0645	4.97	Q				V
22+15	16.0985	4.94	Q				V
22+20	16.1323	4.90	Q				V
22+25	16.1658	4.87	Q				V
22+30	16.1991	4.84	Q				V
22+35	16.2322	4.80	Q				V
22+40	16.2651	4.77	Q				V
22+45	16.2978	4.74	Q				V
22+50	16.3302	4.71	Q				V
22+55	16.3625	4.68	Q				V
23+ 0	16.3945	4.65	Q				V
23+ 5	16.4264	4.63	Q				V
23+10	16.4580	4.60	Q				V
23+15	16.4895	4.57	Q				V
23+20	16.5208	4.54	Q				V
23+25	16.5519	4.52	Q				V
23+30	16.5829	4.49	Q				V
23+35	16.6136	4.47	Q				V
23+40	16.6442	4.44	Q				V
23+45	16.6746	4.42	Q				V
23+50	16.7049	4.39	Q				V
23+55	16.7350	4.37	Q				V
24+ 0	16.7649	4.35	Q				V
24+ 5	16.7938	4.20	Q				V
24+10	16.8179	3.50	Q				V
24+15	16.8330	2.19	Q				V
24+20	16.8432	1.48	Q				V
24+25	16.8506	1.08	Q				V
24+30	16.8563	0.82	Q				V
24+35	16.8607	0.63	Q				V
24+40	16.8640	0.49	Q				V
24+45	16.8667	0.38	Q				V
24+50	16.8687	0.30	Q				V
24+55	16.8703	0.23	Q				V
25+ 0	16.8715	0.18	Q				V
25+ 5	16.8724	0.13	Q				V
25+10	16.8731	0.10	Q				V
25+15	16.8737	0.08	Q				V
25+20	16.8741	0.06	Q				V
25+25	16.8744	0.04	Q				V
25+30	16.8745	0.02	Q				V
25+35	16.8746	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 05/06/20

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

Program License Serial Number 6320

204728 - US Cold Storage
PROPOSED CONDITIONS - AREA A
25-YEAR, 1- HOUR STORM
BY: SG DATE: 05-06-20

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 10		
69.33	1	0.76

Rainfall data for year 2		
69.33	6	1.04

Rainfall data for year 2		
69.33	24	1.96

Rainfall data for year 100		
69.33	1	1.27

Rainfall data for year 100		
69.33	6	2.90

Rainfall data for year 100		
69.33	24	6.12

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
63.0	63.0	69.33	1.000	0.637	0.220	0.140

Area-averaged adjusted loss rate Fm (In/Hr) = 0.140

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
15.25	0.220	63.0	63.0	5.87	0.278
54.08	0.780	98.0	98.0	0.20	0.949

Area-averaged catchment yield fraction, Y = 0.801

Area-averaged low loss fraction, Yb = 0.199

User entry of time of concentration = 0.259 (hours)

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Watershed area = 69.33(Ac.)

Catchment Lag time = 0.207 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 40.2188

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.140(In/Hr)

Average low loss rate fraction (Yb) = 0.199 (decimal)

DESERT S-Graph Selected

Computed peak 5-minute rainfall = 0.457(In)

Computed peak 30-minute rainfall = 0.782(In)

Specified peak 1-hour rainfall = 0.963(In)

Computed peak 3-hour rainfall = 1.616(In)

Specified peak 6-hour rainfall = 2.241(In)

Specified peak 24-hour rainfall = 4.646(In)

Rainfall depth area reduction factors:

Using a total area of 69.33(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.455(In)

30-minute factor = 0.997 Adjusted rainfall = 0.780(In)

1-hour factor = 0.997 Adjusted rainfall = 0.960(In)

3-hour factor = 1.000 Adjusted rainfall = 1.616(In)

6-hour factor = 1.000 Adjusted rainfall = 2.240(In)

24-hour factor = 1.000 Adjusted rainfall = 4.645(In)

Unit Hydrograph

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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
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(K = 838.46 (CFS))

1	2.772	23.244
2	18.946	135.610

3	49.467	255.908
4	65.841	137.286
5	74.974	76.575
6	81.019	50.693
7	85.377	36.535
8	88.714	27.978
9	91.129	20.255
10	93.102	16.543
11	94.658	13.044
12	95.920	10.578
13	96.919	8.381
14	97.656	6.179
15	98.132	3.989
16	98.581	3.762
17	99.063	4.047
18	99.505	3.703
19	99.775	2.266
20	100.000	1.884

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.4554	0.4554
2	0.5607	0.1053
3	0.6332	0.0725
4	0.6903	0.0571
5	0.7381	0.0478
6	0.7796	0.0415
7	0.8165	0.0369
8	0.8499	0.0334
9	0.8805	0.0306
10	0.9087	0.0283
11	0.9351	0.0264
12	0.9598	0.0247
13	0.9969	0.0371
14	1.0326	0.0356
15	1.0669	0.0343
16	1.1000	0.0331
17	1.1321	0.0321
18	1.1632	0.0311
19	1.1934	0.0302
20	1.2228	0.0294
21	1.2514	0.0286
22	1.2793	0.0279
23	1.3065	0.0272
24	1.3331	0.0266
25	1.3592	0.0260
26	1.3847	0.0255
27	1.4097	0.0250
28	1.4342	0.0245
29	1.4582	0.0241
30	1.4819	0.0236
31	1.5051	0.0232
32	1.5279	0.0228
33	1.5503	0.0224
34	1.5724	0.0221
35	1.5942	0.0218
36	1.6156	0.0214
37	1.6366	0.0210

38	1.6573	0.0207
39	1.6778	0.0204
40	1.6979	0.0202
41	1.7178	0.0199
42	1.7375	0.0196
43	1.7568	0.0194
44	1.7760	0.0192
45	1.7949	0.0189
46	1.8136	0.0187
47	1.8321	0.0185
48	1.8504	0.0183
49	1.8685	0.0181
50	1.8864	0.0179
51	1.9041	0.0177
52	1.9216	0.0175
53	1.9389	0.0173
54	1.9561	0.0172
55	1.9731	0.0170
56	1.9900	0.0168
57	2.0066	0.0167
58	2.0232	0.0165
59	2.0395	0.0164
60	2.0558	0.0162
61	2.0719	0.0161
62	2.0878	0.0160
63	2.1036	0.0158
64	2.1193	0.0157
65	2.1349	0.0156
66	2.1503	0.0154
67	2.1656	0.0153
68	2.1808	0.0152
69	2.1959	0.0151
70	2.2108	0.0150
71	2.2257	0.0148
72	2.2404	0.0147
73	2.2567	0.0163
74	2.2729	0.0162
75	2.2890	0.0161
76	2.3050	0.0160
77	2.3209	0.0159
78	2.3367	0.0158
79	2.3524	0.0157
80	2.3681	0.0156
81	2.3836	0.0155
82	2.3990	0.0154
83	2.4144	0.0153
84	2.4296	0.0153
85	2.4448	0.0152
86	2.4599	0.0151
87	2.4749	0.0150
88	2.4898	0.0149
89	2.5047	0.0148
90	2.5194	0.0148
91	2.5341	0.0147
92	2.5487	0.0146
93	2.5633	0.0145
94	2.5777	0.0145
95	2.5921	0.0144

96	2.6064	0.0143
97	2.6207	0.0142
98	2.6348	0.0142
99	2.6490	0.0141
100	2.6630	0.0140
101	2.6770	0.0140
102	2.6909	0.0139
103	2.7047	0.0138
104	2.7185	0.0138
105	2.7322	0.0137
106	2.7459	0.0137
107	2.7595	0.0136
108	2.7730	0.0135
109	2.7865	0.0135
110	2.7999	0.0134
111	2.8133	0.0134
112	2.8266	0.0133
113	2.8398	0.0132
114	2.8530	0.0132
115	2.8662	0.0131
116	2.8792	0.0131
117	2.8923	0.0130
118	2.9052	0.0130
119	2.9182	0.0129
120	2.9310	0.0129
121	2.9439	0.0128
122	2.9566	0.0128
123	2.9694	0.0127
124	2.9820	0.0127
125	2.9947	0.0126
126	3.0072	0.0126
127	3.0198	0.0125
128	3.0323	0.0125
129	3.0447	0.0124
130	3.0571	0.0124
131	3.0694	0.0123
132	3.0817	0.0123
133	3.0940	0.0123
134	3.1062	0.0122
135	3.1184	0.0122
136	3.1305	0.0121
137	3.1426	0.0121
138	3.1547	0.0120
139	3.1667	0.0120
140	3.1786	0.0120
141	3.1905	0.0119
142	3.2024	0.0119
143	3.2143	0.0118
144	3.2261	0.0118
145	3.2378	0.0118
146	3.2496	0.0117
147	3.2613	0.0117
148	3.2729	0.0117
149	3.2845	0.0116
150	3.2961	0.0116
151	3.3076	0.0115
152	3.3191	0.0115
153	3.3306	0.0115

154	3.3420	0.0114
155	3.3534	0.0114
156	3.3648	0.0114
157	3.3761	0.0113
158	3.3874	0.0113
159	3.3987	0.0113
160	3.4099	0.0112
161	3.4211	0.0112
162	3.4323	0.0112
163	3.4434	0.0111
164	3.4545	0.0111
165	3.4656	0.0111
166	3.4766	0.0110
167	3.4876	0.0110
168	3.4986	0.0110
169	3.5095	0.0109
170	3.5204	0.0109
171	3.5313	0.0109
172	3.5421	0.0108
173	3.5530	0.0108
174	3.5638	0.0108
175	3.5745	0.0108
176	3.5852	0.0107
177	3.5959	0.0107
178	3.6066	0.0107
179	3.6173	0.0106
180	3.6279	0.0106
181	3.6385	0.0106
182	3.6490	0.0106
183	3.6596	0.0105
184	3.6701	0.0105
185	3.6805	0.0105
186	3.6910	0.0105
187	3.7014	0.0104
188	3.7118	0.0104
189	3.7222	0.0104
190	3.7325	0.0103
191	3.7429	0.0103
192	3.7532	0.0103
193	3.7634	0.0103
194	3.7737	0.0102
195	3.7839	0.0102
196	3.7941	0.0102
197	3.8043	0.0102
198	3.8144	0.0101
199	3.8245	0.0101
200	3.8346	0.0101
201	3.8447	0.0101
202	3.8547	0.0100
203	3.8648	0.0100
204	3.8748	0.0100
205	3.8848	0.0100
206	3.8947	0.0100
207	3.9046	0.0099
208	3.9146	0.0099
209	3.9244	0.0099
210	3.9343	0.0099
211	3.9442	0.0098

212	3.9540	0.0098
213	3.9638	0.0098
214	3.9736	0.0098
215	3.9833	0.0098
216	3.9930	0.0097
217	4.0028	0.0097
218	4.0125	0.0097
219	4.0221	0.0097
220	4.0318	0.0097
221	4.0414	0.0096
222	4.0510	0.0096
223	4.0606	0.0096
224	4.0702	0.0096
225	4.0797	0.0095
226	4.0892	0.0095
227	4.0988	0.0095
228	4.1082	0.0095
229	4.1177	0.0095
230	4.1272	0.0094
231	4.1366	0.0094
232	4.1460	0.0094
233	4.1554	0.0094
234	4.1648	0.0094
235	4.1741	0.0094
236	4.1834	0.0093
237	4.1928	0.0093
238	4.2021	0.0093
239	4.2113	0.0093
240	4.2206	0.0093
241	4.2298	0.0092
242	4.2391	0.0092
243	4.2483	0.0092
244	4.2575	0.0092
245	4.2666	0.0092
246	4.2758	0.0092
247	4.2849	0.0091
248	4.2940	0.0091
249	4.3031	0.0091
250	4.3122	0.0091
251	4.3213	0.0091
252	4.3303	0.0090
253	4.3394	0.0090
254	4.3484	0.0090
255	4.3574	0.0090
256	4.3663	0.0090
257	4.3753	0.0090
258	4.3843	0.0089
259	4.3932	0.0089
260	4.4021	0.0089
261	4.4110	0.0089
262	4.4199	0.0089
263	4.4287	0.0089
264	4.4376	0.0089
265	4.4464	0.0088
266	4.4552	0.0088
267	4.4641	0.0088
268	4.4728	0.0088
269	4.4816	0.0088

270	4.4904	0.0088
271	4.4991	0.0087
272	4.5078	0.0087
273	4.5165	0.0087
274	4.5252	0.0087
275	4.5339	0.0087
276	4.5426	0.0087
277	4.5512	0.0087
278	4.5599	0.0086
279	4.5685	0.0086
280	4.5771	0.0086
281	4.5857	0.0086
282	4.5943	0.0086
283	4.6028	0.0086
284	4.6114	0.0085
285	4.6199	0.0085
286	4.6284	0.0085
287	4.6369	0.0085
288	4.6454	0.0085

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0085	0.0017	0.0068
2	0.0085	0.0017	0.0068
3	0.0085	0.0017	0.0068
4	0.0085	0.0017	0.0069
5	0.0086	0.0017	0.0069
6	0.0086	0.0017	0.0069
7	0.0086	0.0017	0.0069
8	0.0086	0.0017	0.0069
9	0.0087	0.0017	0.0069
10	0.0087	0.0017	0.0070
11	0.0087	0.0017	0.0070
12	0.0087	0.0017	0.0070
13	0.0088	0.0017	0.0070
14	0.0088	0.0017	0.0070
15	0.0088	0.0017	0.0071
16	0.0088	0.0018	0.0071
17	0.0089	0.0018	0.0071
18	0.0089	0.0018	0.0071
19	0.0089	0.0018	0.0071
20	0.0089	0.0018	0.0071
21	0.0089	0.0018	0.0072
22	0.0090	0.0018	0.0072
23	0.0090	0.0018	0.0072
24	0.0090	0.0018	0.0072
25	0.0090	0.0018	0.0073
26	0.0091	0.0018	0.0073
27	0.0091	0.0018	0.0073
28	0.0091	0.0018	0.0073
29	0.0092	0.0018	0.0073
30	0.0092	0.0018	0.0073
31	0.0092	0.0018	0.0074
32	0.0092	0.0018	0.0074
33	0.0093	0.0018	0.0074
34	0.0093	0.0018	0.0074

35	0.0093	0.0019	0.0075
36	0.0093	0.0019	0.0075
37	0.0094	0.0019	0.0075
38	0.0094	0.0019	0.0075
39	0.0094	0.0019	0.0076
40	0.0094	0.0019	0.0076
41	0.0095	0.0019	0.0076
42	0.0095	0.0019	0.0076
43	0.0095	0.0019	0.0077
44	0.0096	0.0019	0.0077
45	0.0096	0.0019	0.0077
46	0.0096	0.0019	0.0077
47	0.0097	0.0019	0.0078
48	0.0097	0.0019	0.0078
49	0.0097	0.0019	0.0078
50	0.0098	0.0019	0.0078
51	0.0098	0.0019	0.0079
52	0.0098	0.0020	0.0079
53	0.0099	0.0020	0.0079
54	0.0099	0.0020	0.0079
55	0.0099	0.0020	0.0080
56	0.0100	0.0020	0.0080
57	0.0100	0.0020	0.0080
58	0.0100	0.0020	0.0080
59	0.0101	0.0020	0.0081
60	0.0101	0.0020	0.0081
61	0.0101	0.0020	0.0081
62	0.0102	0.0020	0.0082
63	0.0102	0.0020	0.0082
64	0.0102	0.0020	0.0082
65	0.0103	0.0020	0.0083
66	0.0103	0.0020	0.0083
67	0.0104	0.0021	0.0083
68	0.0104	0.0021	0.0083
69	0.0105	0.0021	0.0084
70	0.0105	0.0021	0.0084
71	0.0105	0.0021	0.0084
72	0.0106	0.0021	0.0085
73	0.0106	0.0021	0.0085
74	0.0106	0.0021	0.0085
75	0.0107	0.0021	0.0086
76	0.0107	0.0021	0.0086
77	0.0108	0.0021	0.0086
78	0.0108	0.0021	0.0087
79	0.0109	0.0022	0.0087
80	0.0109	0.0022	0.0087
81	0.0110	0.0022	0.0088
82	0.0110	0.0022	0.0088
83	0.0111	0.0022	0.0089
84	0.0111	0.0022	0.0089
85	0.0112	0.0022	0.0089
86	0.0112	0.0022	0.0090
87	0.0113	0.0022	0.0090
88	0.0113	0.0022	0.0091
89	0.0114	0.0023	0.0091
90	0.0114	0.0023	0.0091
91	0.0115	0.0023	0.0092
92	0.0115	0.0023	0.0092

93	0.0116	0.0023	0.0093
94	0.0116	0.0023	0.0093
95	0.0117	0.0023	0.0094
96	0.0117	0.0023	0.0094
97	0.0118	0.0023	0.0095
98	0.0118	0.0024	0.0095
99	0.0119	0.0024	0.0096
100	0.0120	0.0024	0.0096
101	0.0120	0.0024	0.0097
102	0.0121	0.0024	0.0097
103	0.0122	0.0024	0.0098
104	0.0122	0.0024	0.0098
105	0.0123	0.0024	0.0099
106	0.0123	0.0025	0.0099
107	0.0124	0.0025	0.0100
108	0.0125	0.0025	0.0100
109	0.0126	0.0025	0.0101
110	0.0126	0.0025	0.0101
111	0.0127	0.0025	0.0102
112	0.0128	0.0025	0.0102
113	0.0129	0.0026	0.0103
114	0.0129	0.0026	0.0104
115	0.0130	0.0026	0.0104
116	0.0131	0.0026	0.0105
117	0.0132	0.0026	0.0106
118	0.0132	0.0026	0.0106
119	0.0134	0.0027	0.0107
120	0.0134	0.0027	0.0108
121	0.0135	0.0027	0.0108
122	0.0136	0.0027	0.0109
123	0.0137	0.0027	0.0110
124	0.0138	0.0027	0.0110
125	0.0139	0.0028	0.0111
126	0.0140	0.0028	0.0112
127	0.0141	0.0028	0.0113
128	0.0142	0.0028	0.0114
129	0.0143	0.0028	0.0115
130	0.0144	0.0029	0.0115
131	0.0145	0.0029	0.0116
132	0.0146	0.0029	0.0117
133	0.0148	0.0029	0.0118
134	0.0148	0.0029	0.0119
135	0.0150	0.0030	0.0120
136	0.0151	0.0030	0.0121
137	0.0153	0.0030	0.0122
138	0.0153	0.0030	0.0123
139	0.0155	0.0031	0.0124
140	0.0156	0.0031	0.0125
141	0.0158	0.0031	0.0127
142	0.0159	0.0032	0.0127
143	0.0161	0.0032	0.0129
144	0.0162	0.0032	0.0130
145	0.0147	0.0029	0.0118
146	0.0148	0.0029	0.0119
147	0.0151	0.0030	0.0121
148	0.0152	0.0030	0.0122
149	0.0154	0.0031	0.0124
150	0.0156	0.0031	0.0125

151	0.0158	0.0031	0.0127
152	0.0160	0.0032	0.0128
153	0.0162	0.0032	0.0130
154	0.0164	0.0033	0.0131
155	0.0167	0.0033	0.0134
156	0.0168	0.0033	0.0135
157	0.0172	0.0034	0.0138
158	0.0173	0.0034	0.0139
159	0.0177	0.0035	0.0142
160	0.0179	0.0036	0.0143
161	0.0183	0.0036	0.0147
162	0.0185	0.0037	0.0148
163	0.0189	0.0038	0.0152
164	0.0192	0.0038	0.0154
165	0.0196	0.0039	0.0157
166	0.0199	0.0040	0.0159
167	0.0204	0.0041	0.0164
168	0.0207	0.0041	0.0166
169	0.0214	0.0043	0.0172
170	0.0218	0.0043	0.0174
171	0.0224	0.0045	0.0180
172	0.0228	0.0045	0.0183
173	0.0236	0.0047	0.0189
174	0.0241	0.0048	0.0193
175	0.0250	0.0050	0.0200
176	0.0255	0.0051	0.0204
177	0.0266	0.0053	0.0213
178	0.0272	0.0054	0.0218
179	0.0286	0.0057	0.0229
180	0.0294	0.0058	0.0235
181	0.0311	0.0062	0.0249
182	0.0321	0.0064	0.0257
183	0.0343	0.0068	0.0275
184	0.0356	0.0071	0.0286
185	0.0247	0.0049	0.0198
186	0.0264	0.0052	0.0211
187	0.0306	0.0061	0.0245
188	0.0334	0.0066	0.0267
189	0.0415	0.0082	0.0333
190	0.0478	0.0095	0.0383
191	0.0725	0.0117	0.0608
192	0.1053	0.0117	0.0936
193	0.4554	0.0117	0.4438
194	0.0571	0.0113	0.0457
195	0.0369	0.0073	0.0296
196	0.0283	0.0056	0.0227
197	0.0371	0.0074	0.0297
198	0.0331	0.0066	0.0266
199	0.0302	0.0060	0.0242
200	0.0279	0.0055	0.0224
201	0.0260	0.0052	0.0209
202	0.0245	0.0049	0.0196
203	0.0232	0.0046	0.0186
204	0.0221	0.0044	0.0177
205	0.0210	0.0042	0.0168
206	0.0202	0.0040	0.0162
207	0.0194	0.0039	0.0155
208	0.0187	0.0037	0.0150

209	0.0181	0.0036	0.0145
210	0.0175	0.0035	0.0140
211	0.0170	0.0034	0.0136
212	0.0165	0.0033	0.0132
213	0.0161	0.0032	0.0129
214	0.0157	0.0031	0.0126
215	0.0153	0.0030	0.0123
216	0.0150	0.0030	0.0120
217	0.0163	0.0032	0.0131
218	0.0160	0.0032	0.0128
219	0.0157	0.0031	0.0126
220	0.0154	0.0031	0.0124
221	0.0152	0.0030	0.0122
222	0.0149	0.0030	0.0120
223	0.0147	0.0029	0.0118
224	0.0145	0.0029	0.0116
225	0.0142	0.0028	0.0114
226	0.0140	0.0028	0.0113
227	0.0138	0.0027	0.0111
228	0.0137	0.0027	0.0109
229	0.0135	0.0027	0.0108
230	0.0133	0.0026	0.0107
231	0.0131	0.0026	0.0105
232	0.0130	0.0026	0.0104
233	0.0128	0.0025	0.0103
234	0.0127	0.0025	0.0102
235	0.0125	0.0025	0.0100
236	0.0124	0.0025	0.0099
237	0.0123	0.0024	0.0098
238	0.0121	0.0024	0.0097
239	0.0120	0.0024	0.0096
240	0.0119	0.0024	0.0095
241	0.0118	0.0023	0.0094
242	0.0117	0.0023	0.0093
243	0.0115	0.0023	0.0092
244	0.0114	0.0023	0.0092
245	0.0113	0.0022	0.0091
246	0.0112	0.0022	0.0090
247	0.0111	0.0022	0.0089
248	0.0110	0.0022	0.0088
249	0.0109	0.0022	0.0088
250	0.0108	0.0022	0.0087
251	0.0108	0.0021	0.0086
252	0.0107	0.0021	0.0086
253	0.0106	0.0021	0.0085
254	0.0105	0.0021	0.0084
255	0.0104	0.0021	0.0084
256	0.0103	0.0021	0.0083
257	0.0103	0.0020	0.0082
258	0.0102	0.0020	0.0082
259	0.0101	0.0020	0.0081
260	0.0100	0.0020	0.0081
261	0.0100	0.0020	0.0080
262	0.0099	0.0020	0.0079
263	0.0098	0.0020	0.0079
264	0.0098	0.0019	0.0078
265	0.0097	0.0019	0.0078
266	0.0097	0.0019	0.0077

267	0.0096	0.0019	0.0077
268	0.0095	0.0019	0.0076
269	0.0095	0.0019	0.0076
270	0.0094	0.0019	0.0075
271	0.0094	0.0019	0.0075
272	0.0093	0.0018	0.0075
273	0.0092	0.0018	0.0074
274	0.0092	0.0018	0.0074
275	0.0091	0.0018	0.0073
276	0.0091	0.0018	0.0073
277	0.0090	0.0018	0.0072
278	0.0090	0.0018	0.0072
279	0.0089	0.0018	0.0072
280	0.0089	0.0018	0.0071
281	0.0088	0.0018	0.0071
282	0.0088	0.0017	0.0070
283	0.0087	0.0017	0.0070
284	0.0087	0.0017	0.0070
285	0.0087	0.0017	0.0069
286	0.0086	0.0017	0.0069
287	0.0086	0.0017	0.0069
288	0.0085	0.0017	0.0068

Total soil rain loss = 0.83(In)
Total effective rainfall = 3.81(In)
Peak flow rate in flood hydrograph = 144.11(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	0.0085	1.08	Q				
0+15	0.0280	2.82	Q				
0+20	0.0539	3.77	Q				
0+25	0.0835	4.30	Q				
0+30	0.1155	4.65	Q				
0+35	0.1494	4.91	Q				
0+40	0.1846	5.11	VQ				
0+45	0.2209	5.27	VQ				
0+50	0.2580	5.39	VQ				
0+55	0.2958	5.49	VQ				
1+ 0	0.3342	5.58	VQ				
1+ 5	0.3732	5.65	VQ				
1+10	0.4125	5.71	VQ				
1+15	0.4521	5.75	VQ				
1+20	0.4920	5.79	VQ				
1+25	0.5321	5.83	VQ				
1+30	0.5726	5.87	Q				
1+35	0.6133	5.91	Q				
1+40	0.6541	5.93	Q				
1+45	0.6951	5.95	Q				

1+50	0.7362	5.97	Q
1+55	0.7774	5.98	Q
2+ 0	0.8187	6.00	Q
2+ 5	0.8601	6.02	Q
2+10	0.9017	6.03	Q
2+15	0.9433	6.05	Q
2+20	0.9851	6.07	Q
2+25	1.0270	6.08	Q
2+30	1.0690	6.10	Q
2+35	1.1111	6.12	QV
2+40	1.1534	6.14	QV
2+45	1.1958	6.15	QV
2+50	1.2383	6.17	QV
2+55	1.2809	6.19	QV
3+ 0	1.3236	6.21	QV
3+ 5	1.3665	6.23	QV
3+10	1.4095	6.24	QV
3+15	1.4527	6.26	QV
3+20	1.4959	6.28	QV
3+25	1.5393	6.30	QV
3+30	1.5828	6.32	QV
3+35	1.6265	6.34	QV
3+40	1.6703	6.36	Q V
3+45	1.7142	6.38	Q V
3+50	1.7583	6.40	Q V
3+55	1.8025	6.42	Q V
4+ 0	1.8469	6.44	Q V
4+ 5	1.8914	6.46	Q V
4+10	1.9360	6.48	Q V
4+15	1.9808	6.50	Q V
4+20	2.0257	6.52	Q V
4+25	2.0708	6.55	Q V
4+30	2.1161	6.57	Q V
4+35	2.1614	6.59	Q V
4+40	2.2070	6.61	Q V
4+45	2.2527	6.63	Q V
4+50	2.2985	6.66	Q V
4+55	2.3445	6.68	Q V
5+ 0	2.3907	6.70	Q V
5+ 5	2.4370	6.73	Q V
5+10	2.4835	6.75	Q V
5+15	2.5301	6.77	Q V
5+20	2.5770	6.80	Q V
5+25	2.6239	6.82	Q V
5+30	2.6711	6.85	Q V
5+35	2.7184	6.87	Q V
5+40	2.7659	6.90	Q V
5+45	2.8136	6.92	Q V
5+50	2.8615	6.95	Q V
5+55	2.9095	6.98	Q V
6+ 0	2.9577	7.00	Q V
6+ 5	3.0061	7.03	Q V
6+10	3.0547	7.06	Q V
6+15	3.1035	7.08	Q V
6+20	3.1525	7.11	Q V
6+25	3.2017	7.14	Q V
6+30	3.2510	7.17	Q V
6+35	3.3006	7.20	Q V

6+40	3.3504	7.23	Q	V				
6+45	3.4003	7.26	Q	V				
6+50	3.4505	7.29	Q	V				
6+55	3.5009	7.32	Q	V				
7+ 0	3.5515	7.35	Q	V				
7+ 5	3.6023	7.38	Q	V				
7+10	3.6533	7.41	Q	V				
7+15	3.7046	7.44	Q	V				
7+20	3.7561	7.47	Q	V				
7+25	3.8078	7.51	Q	V				
7+30	3.8597	7.54	Q	V				
7+35	3.9119	7.57	Q	V				
7+40	3.9642	7.61	Q	V				
7+45	4.0169	7.64	Q	V				
7+50	4.0698	7.68	Q	V				
7+55	4.1229	7.71	Q	V				
8+ 0	4.1763	7.75	Q	V				
8+ 5	4.2299	7.79	Q	V				
8+10	4.2838	7.82	Q	V				
8+15	4.3380	7.86	Q	V				
8+20	4.3924	7.90	Q	V				
8+25	4.4471	7.94	Q	V				
8+30	4.5020	7.98	Q	V				
8+35	4.5573	8.02	Q	V				
8+40	4.6128	8.06	Q	V				
8+45	4.6686	8.10	Q	V				
8+50	4.7247	8.15	Q	V				
8+55	4.7811	8.19	Q	V				
9+ 0	4.8378	8.23	Q	V				
9+ 5	4.8948	8.28	Q	V				
9+10	4.9521	8.32	Q	V				
9+15	5.0098	8.37	Q	V				
9+20	5.0677	8.42	Q	V				
9+25	5.1260	8.46	Q	V				
9+30	5.1846	8.51	Q	V				
9+35	5.2436	8.56	Q	V				
9+40	5.3029	8.61	Q	V				
9+45	5.3626	8.66	Q	V				
9+50	5.4226	8.71	Q	V				
9+55	5.4830	8.77	Q	V				
10+ 0	5.5437	8.82	Q	V				
10+ 5	5.6049	8.88	Q	V				
10+10	5.6664	8.93	Q	V				
10+15	5.7283	8.99	Q	V				
10+20	5.7907	9.05	Q	V				
10+25	5.8534	9.11	Q	V				
10+30	5.9166	9.17	Q	V				
10+35	5.9802	9.23	Q	V				
10+40	6.0442	9.30	Q	V				
10+45	6.1087	9.36	Q	V				
10+50	6.1737	9.43	Q	V				
10+55	6.2391	9.50	Q	V				
11+ 0	6.3050	9.57	Q	V				
11+ 5	6.3714	9.64	Q	V				
11+10	6.4382	9.71	Q	V				
11+15	6.5056	9.79	Q	V				
11+20	6.5736	9.86	Q	V				
11+25	6.6420	9.94	Q	V				

11+30	6.7111	10.02	Q	V		
11+35	6.7807	10.11	Q	V		
11+40	6.8508	10.19	Q	V		
11+45	6.9216	10.28	Q	V		
11+50	6.9930	10.37	Q	V		
11+55	7.0650	10.46	Q	V		
12+ 0	7.1377	10.55	Q	V		
12+ 5	7.2108	10.62	Q	V		
12+10	7.2834	10.53	Q	V		
12+15	7.3543	10.29	Q	V		
12+20	7.4246	10.21	Q	V		
12+25	7.4949	10.22	Q	V		
12+30	7.5656	10.26	Q	V		
12+35	7.6367	10.33	Q	V		
12+40	7.7084	10.41	Q	V		
12+45	7.7808	10.51	Q	V		
12+50	7.8539	10.61	Q	V		
12+55	7.9278	10.73	Q	V		
13+ 0	8.0026	10.86	Q	V		
13+ 5	8.0783	10.99	Q	V		
13+10	8.1549	11.13	Q	V		
13+15	8.2327	11.29	Q	V		
13+20	8.3115	11.44	Q	V		
13+25	8.3914	11.61	Q	V		
13+30	8.4725	11.78	Q	V		
13+35	8.5550	11.97	Q	V		
13+40	8.6387	12.16	Q	V		
13+45	8.7238	12.36	Q	V		
13+50	8.8104	12.58	Q	V		
13+55	8.8986	12.81	Q	V		
14+ 0	8.9885	13.04	Q	V		
14+ 5	9.0801	13.30	Q	V		
14+10	9.1735	13.57	Q	V		
14+15	9.2692	13.88	Q	V		
14+20	9.3669	14.19	Q	V		
14+25	9.4669	14.53	Q	V		
14+30	9.5693	14.87	Q	V		
14+35	9.6743	15.25	Q	V		
14+40	9.7820	15.64	Q	V		
14+45	9.8928	16.08	Q	V		
14+50	10.0067	16.54	Q	V		
14+55	10.1242	17.06	Q	V		
15+ 0	10.2454	17.61	Q	V		
15+ 5	10.3710	18.24	Q	V		
15+10	10.5012	18.91	Q	V		
15+15	10.6368	19.69	Q	V		
15+20	10.7783	20.54	Q	V		
15+25	10.9249	21.29	Q	V		
15+30	11.0688	20.89	Q	V		
15+35	11.2022	19.36	Q	V		
15+40	11.3351	19.31	Q	V		
15+45	11.4753	20.36	Q	V		
15+50	11.6284	22.22	Q	V		
15+55	11.8042	25.54	Q	V		
16+ 0	12.0231	31.78	Q	V		
16+ 5	12.3778	51.50	Q	V		
16+10	13.0806	102.05		Q	V	
16+15	14.0731	144.11			V	Q

16+20	14.7071	92.05			Q	V	
16+25	15.1349	62.12				V	
16+30	15.4681	48.37			Q	V	
16+35	15.7554	41.71			Q	V	
16+40	16.0075	36.61			Q	V	
16+45	16.2265	31.80			Q	V	
16+50	16.4239	28.66			Q	V	
16+55	16.6017	25.82			Q	V	
17+ 0	16.7637	23.53			Q	V	
17+ 5	16.9116	21.47			Q	V	
17+10	17.0462	19.55			Q	V	
17+15	17.1690	17.82			Q	V	
17+20	17.2860	16.99			Q	V	
17+25	17.3990	16.40			Q	V	
17+30	17.5062	15.57			Q	V	
17+35	17.6051	14.36			Q	V	
17+40	17.6986	13.57			Q	V	
17+45	17.7837	12.35			Q	V	
17+50	17.8658	11.93			Q	V	
17+55	17.9454	11.55			Q	V	
18+ 0	18.0226	11.22			Q	V	
18+ 5	18.0979	10.93			Q	V	
18+10	18.1724	10.82			Q	V	
18+15	18.2475	10.90			Q	V	
18+20	18.3221	10.84			Q	V	
18+25	18.3958	10.71			Q	V	
18+30	18.4686	10.56			Q	V	
18+35	18.5402	10.41			Q	V	
18+40	18.6108	10.25			Q	V	
18+45	18.6804	10.10			Q	V	
18+50	18.7490	9.95			Q	V	
18+55	18.8165	9.81			Q	V	
19+ 0	18.8831	9.67			Q	V	
19+ 5	18.9488	9.54			Q	V	
19+10	19.0136	9.40			Q	V	
19+15	19.0774	9.28			Q	V	
19+20	19.1405	9.15			Q	V	
19+25	19.2027	9.04			Q	V	
19+30	19.2642	8.93			Q	V	
19+35	19.3249	8.82			Q	V	
19+40	19.3849	8.71			Q	V	
19+45	19.4442	8.61			Q	V	
19+50	19.5028	8.51			Q	V	
19+55	19.5607	8.41			Q	V	
20+ 0	19.6180	8.32			Q	V	
20+ 5	19.6747	8.23			Q	V	
20+10	19.7307	8.14			Q	V	
20+15	19.7862	8.06			Q	V	
20+20	19.8411	7.97			Q	V	
20+25	19.8955	7.90			Q	V	
20+30	19.9493	7.82			Q	V	
20+35	20.0027	7.74			Q	V	
20+40	20.0555	7.67			Q	V	
20+45	20.1079	7.60			Q	V	
20+50	20.1598	7.53			Q	V	
20+55	20.2112	7.47			Q	V	
21+ 0	20.2622	7.40			Q	V	
21+ 5	20.3127	7.34			Q	V	

21+10	20.3629	7.28	Q				V
21+15	20.4126	7.22	Q				V
21+20	20.4619	7.16	Q				V
21+25	20.5108	7.10	Q				V
21+30	20.5594	7.05	Q				V
21+35	20.6076	7.00	Q				V
21+40	20.6554	6.94	Q				V
21+45	20.7028	6.89	Q				V
21+50	20.7500	6.84	Q				V
21+55	20.7967	6.79	Q				V
22+ 0	20.8432	6.74	Q				V
22+ 5	20.8893	6.70	Q				V
22+10	20.9351	6.65	Q				V
22+15	20.9806	6.61	Q				V
22+20	21.0258	6.56	Q				V
22+25	21.0707	6.52	Q				V
22+30	21.1153	6.48	Q				V
22+35	21.1596	6.43	Q				V
22+40	21.2036	6.39	Q				V
22+45	21.2474	6.35	Q				V
22+50	21.2909	6.32	Q				V
22+55	21.3341	6.28	Q				V
23+ 0	21.3771	6.24	Q				V
23+ 5	21.4198	6.20	Q				V
23+10	21.4623	6.17	Q				V
23+15	21.5045	6.13	Q				V
23+20	21.5465	6.10	Q				V
23+25	21.5882	6.06	Q				V
23+30	21.6297	6.03	Q				V
23+35	21.6710	5.99	Q				V
23+40	21.7121	5.96	Q				V
23+45	21.7529	5.93	Q				V
23+50	21.7935	5.90	Q				V
23+55	21.8339	5.87	Q				V
24+ 0	21.8741	5.84	Q				V
24+ 5	21.9130	5.65	Q				V
24+10	21.9453	4.70	Q				V
24+15	21.9656	2.94	Q				V
24+20	21.9792	1.99	Q				V
24+25	21.9893	1.46	Q				V
24+30	21.9969	1.11	Q				V
24+35	22.0028	0.85	Q				V
24+40	22.0073	0.66	Q				V
24+45	22.0108	0.52	Q				V
24+50	22.0136	0.40	Q				V
24+55	22.0157	0.31	Q				V
25+ 0	22.0174	0.24	Q				V
25+ 5	22.0186	0.18	Q				V
25+10	22.0195	0.14	Q				V
25+15	22.0203	0.11	Q				V
25+20	22.0208	0.08	Q				V
25+25	22.0212	0.05	Q				V
25+30	22.0214	0.03	Q				V
25+35	22.0215	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 05/06/20

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

Program License Serial Number 6320

204728 - US Cold Storage
PROPOSED CONDITIONS - AREA A
100-YEAR, 1- HOUR STORM
BY: SG DATE: 05-06-20

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
69.33	1	0.76

Rainfall data for year 2		
69.33	6	1.04

Rainfall data for year 2		
69.33	24	1.96

Rainfall data for year 100		
69.33	1	1.27

Rainfall data for year 100		
69.33	6	2.90

Rainfall data for year 100		
69.33	24	6.12

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
63.0	81.4	69.33	1.000	0.346	0.220	0.076

Area-averaged adjusted loss rate Fm (In/Hr) = 0.076

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
15.25	0.220	63.0	81.4	2.29	0.659
54.08	0.780	98.0	98.0	0.20	0.961

Area-averaged catchment yield fraction, Y = 0.895

Area-averaged low loss fraction, Yb = 0.105

User entry of time of concentration = 0.259 (hours)

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Watershed area = 69.33(Ac.)

Catchment Lag time = 0.207 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 40.2188

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.076(In/Hr)

Average low loss rate fraction (Yb) = 0.105 (decimal)

DESERT S-Graph Selected

Computed peak 5-minute rainfall = 0.603(In)

Computed peak 30-minute rainfall = 1.032(In)

Specified peak 1-hour rainfall = 1.270(In)

Computed peak 3-hour rainfall = 2.107(In)

Specified peak 6-hour rainfall = 2.900(In)

Specified peak 24-hour rainfall = 6.120(In)

Rainfall depth area reduction factors:

Using a total area of 69.33(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.601(In)

30-minute factor = 0.997 Adjusted rainfall = 1.028(In)

1-hour factor = 0.997 Adjusted rainfall = 1.266(In)

3-hour factor = 1.000 Adjusted rainfall = 2.106(In)

6-hour factor = 1.000 Adjusted rainfall = 2.899(In)

24-hour factor = 1.000 Adjusted rainfall = 6.119(In)

Unit Hydrograph

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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
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(K = 838.46 (CFS))

1	2.772	23.244
2	18.946	135.610

3	49.467	255.908
4	65.841	137.286
5	74.974	76.575
6	81.019	50.693
7	85.377	36.535
8	88.714	27.978
9	91.129	20.255
10	93.102	16.543
11	94.658	13.044
12	95.920	10.578
13	96.919	8.381
14	97.656	6.179
15	98.132	3.989
16	98.581	3.762
17	99.063	4.047
18	99.505	3.703
19	99.775	2.266
20	100.000	1.884

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.6007	0.6007
2	0.7395	0.1388
3	0.8352	0.0957
4	0.9104	0.0753
5	0.9735	0.0630
6	1.0282	0.0547
7	1.0769	0.0487
8	1.1209	0.0440
9	1.1612	0.0403
10	1.1985	0.0373
11	1.2333	0.0348
12	1.2659	0.0326
13	1.3137	0.0478
14	1.3596	0.0459
15	1.4038	0.0442
16	1.4464	0.0426
17	1.4876	0.0412
18	1.5275	0.0399
19	1.5663	0.0388
20	1.6040	0.0377
21	1.6407	0.0367
22	1.6764	0.0358
23	1.7113	0.0349
24	1.7454	0.0341
25	1.7787	0.0333
26	1.8113	0.0326
27	1.8433	0.0320
28	1.8746	0.0313
29	1.9054	0.0307
30	1.9355	0.0302
31	1.9652	0.0296
32	1.9943	0.0291
33	2.0229	0.0286
34	2.0511	0.0282
35	2.0789	0.0277
36	2.1062	0.0273
37	2.1330	0.0268

38	2.1594	0.0264
39	2.1854	0.0260
40	2.2110	0.0257
41	2.2364	0.0253
42	2.2613	0.0250
43	2.2860	0.0247
44	2.3104	0.0244
45	2.3344	0.0241
46	2.3582	0.0238
47	2.3817	0.0235
48	2.4050	0.0232
49	2.4279	0.0230
50	2.4507	0.0227
51	2.4731	0.0225
52	2.4954	0.0222
53	2.5174	0.0220
54	2.5392	0.0218
55	2.5608	0.0216
56	2.5821	0.0214
57	2.6033	0.0212
58	2.6242	0.0210
59	2.6450	0.0208
60	2.6656	0.0206
61	2.6860	0.0204
62	2.7062	0.0202
63	2.7262	0.0200
64	2.7461	0.0199
65	2.7658	0.0197
66	2.7853	0.0195
67	2.8047	0.0194
68	2.8240	0.0192
69	2.8430	0.0191
70	2.8620	0.0189
71	2.8807	0.0188
72	2.8994	0.0186
73	2.9210	0.0216
74	2.9425	0.0215
75	2.9639	0.0214
76	2.9851	0.0212
77	3.0062	0.0211
78	3.0272	0.0210
79	3.0480	0.0209
80	3.0687	0.0207
81	3.0893	0.0206
82	3.1098	0.0205
83	3.1302	0.0204
84	3.1505	0.0203
85	3.1706	0.0202
86	3.1907	0.0200
87	3.2106	0.0199
88	3.2305	0.0198
89	3.2502	0.0197
90	3.2698	0.0196
91	3.2893	0.0195
92	3.3088	0.0194
93	3.3281	0.0193
94	3.3473	0.0192
95	3.3665	0.0191

96	3.3855	0.0190
97	3.4045	0.0190
98	3.4233	0.0189
99	3.4421	0.0188
100	3.4608	0.0187
101	3.4794	0.0186
102	3.4979	0.0185
103	3.5164	0.0184
104	3.5347	0.0184
105	3.5530	0.0183
106	3.5712	0.0182
107	3.5893	0.0181
108	3.6073	0.0180
109	3.6253	0.0180
110	3.6432	0.0179
111	3.6610	0.0178
112	3.6787	0.0177
113	3.6964	0.0177
114	3.7140	0.0176
115	3.7315	0.0175
116	3.7490	0.0174
117	3.7663	0.0174
118	3.7836	0.0173
119	3.8009	0.0172
120	3.8181	0.0172
121	3.8352	0.0171
122	3.8522	0.0170
123	3.8692	0.0170
124	3.8861	0.0169
125	3.9030	0.0169
126	3.9198	0.0168
127	3.9365	0.0167
128	3.9532	0.0167
129	3.9698	0.0166
130	3.9863	0.0166
131	4.0028	0.0165
132	4.0193	0.0164
133	4.0356	0.0164
134	4.0520	0.0163
135	4.0682	0.0163
136	4.0844	0.0162
137	4.1006	0.0162
138	4.1167	0.0161
139	4.1327	0.0160
140	4.1487	0.0160
141	4.1647	0.0159
142	4.1806	0.0159
143	4.1964	0.0158
144	4.2122	0.0158
145	4.2279	0.0157
146	4.2436	0.0157
147	4.2593	0.0156
148	4.2748	0.0156
149	4.2904	0.0155
150	4.3059	0.0155
151	4.3213	0.0154
152	4.3367	0.0154
153	4.3521	0.0154

154	4.3674	0.0153
155	4.3826	0.0153
156	4.3978	0.0152
157	4.4130	0.0152
158	4.4281	0.0151
159	4.4432	0.0151
160	4.4583	0.0150
161	4.4732	0.0150
162	4.4882	0.0149
163	4.5031	0.0149
164	4.5180	0.0149
165	4.5328	0.0148
166	4.5476	0.0148
167	4.5623	0.0147
168	4.5770	0.0147
169	4.5917	0.0147
170	4.6063	0.0146
171	4.6209	0.0146
172	4.6354	0.0145
173	4.6499	0.0145
174	4.6644	0.0145
175	4.6788	0.0144
176	4.6932	0.0144
177	4.7075	0.0143
178	4.7219	0.0143
179	4.7361	0.0143
180	4.7504	0.0142
181	4.7646	0.0142
182	4.7787	0.0142
183	4.7929	0.0141
184	4.8070	0.0141
185	4.8210	0.0141
186	4.8350	0.0140
187	4.8490	0.0140
188	4.8630	0.0140
189	4.8769	0.0139
190	4.8908	0.0139
191	4.9046	0.0139
192	4.9185	0.0138
193	4.9323	0.0138
194	4.9460	0.0138
195	4.9597	0.0137
196	4.9734	0.0137
197	4.9871	0.0137
198	5.0007	0.0136
199	5.0143	0.0136
200	5.0279	0.0136
201	5.0414	0.0135
202	5.0549	0.0135
203	5.0684	0.0135
204	5.0818	0.0134
205	5.0952	0.0134
206	5.1086	0.0134
207	5.1219	0.0133
208	5.1352	0.0133
209	5.1485	0.0133
210	5.1618	0.0133
211	5.1750	0.0132

212	5.1882	0.0132
213	5.2014	0.0132
214	5.2145	0.0131
215	5.2277	0.0131
216	5.2407	0.0131
217	5.2538	0.0131
218	5.2668	0.0130
219	5.2798	0.0130
220	5.2928	0.0130
221	5.3058	0.0129
222	5.3187	0.0129
223	5.3316	0.0129
224	5.3445	0.0129
225	5.3573	0.0128
226	5.3701	0.0128
227	5.3829	0.0128
228	5.3957	0.0128
229	5.4084	0.0127
230	5.4211	0.0127
231	5.4338	0.0127
232	5.4465	0.0127
233	5.4591	0.0126
234	5.4717	0.0126
235	5.4843	0.0126
236	5.4969	0.0126
237	5.5094	0.0125
238	5.5219	0.0125
239	5.5344	0.0125
240	5.5469	0.0125
241	5.5593	0.0124
242	5.5717	0.0124
243	5.5841	0.0124
244	5.5965	0.0124
245	5.6088	0.0123
246	5.6212	0.0123
247	5.6335	0.0123
248	5.6457	0.0123
249	5.6580	0.0123
250	5.6702	0.0122
251	5.6824	0.0122
252	5.6946	0.0122
253	5.7068	0.0122
254	5.7189	0.0121
255	5.7311	0.0121
256	5.7432	0.0121
257	5.7552	0.0121
258	5.7673	0.0121
259	5.7793	0.0120
260	5.7913	0.0120
261	5.8033	0.0120
262	5.8153	0.0120
263	5.8273	0.0119
264	5.8392	0.0119
265	5.8511	0.0119
266	5.8630	0.0119
267	5.8748	0.0119
268	5.8867	0.0118
269	5.8985	0.0118

270	5.9103	0.0118
271	5.9221	0.0118
272	5.9339	0.0118
273	5.9456	0.0117
274	5.9573	0.0117
275	5.9690	0.0117
276	5.9807	0.0117
277	5.9924	0.0117
278	6.0040	0.0116
279	6.0157	0.0116
280	6.0273	0.0116
281	6.0389	0.0116
282	6.0504	0.0116
283	6.0620	0.0116
284	6.0735	0.0115
285	6.0850	0.0115
286	6.0965	0.0115
287	6.1080	0.0115
288	6.1195	0.0115

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0115	0.0012	0.0103
2	0.0115	0.0012	0.0103
3	0.0115	0.0012	0.0103
4	0.0115	0.0012	0.0103
5	0.0116	0.0012	0.0104
6	0.0116	0.0012	0.0104
7	0.0116	0.0012	0.0104
8	0.0116	0.0012	0.0104
9	0.0117	0.0012	0.0105
10	0.0117	0.0012	0.0105
11	0.0117	0.0012	0.0105
12	0.0118	0.0012	0.0105
13	0.0118	0.0012	0.0106
14	0.0118	0.0012	0.0106
15	0.0119	0.0012	0.0106
16	0.0119	0.0013	0.0106
17	0.0119	0.0013	0.0107
18	0.0119	0.0013	0.0107
19	0.0120	0.0013	0.0107
20	0.0120	0.0013	0.0107
21	0.0121	0.0013	0.0108
22	0.0121	0.0013	0.0108
23	0.0121	0.0013	0.0108
24	0.0121	0.0013	0.0109
25	0.0122	0.0013	0.0109
26	0.0122	0.0013	0.0109
27	0.0123	0.0013	0.0110
28	0.0123	0.0013	0.0110
29	0.0123	0.0013	0.0110
30	0.0123	0.0013	0.0110
31	0.0124	0.0013	0.0111
32	0.0124	0.0013	0.0111
33	0.0125	0.0013	0.0112
34	0.0125	0.0013	0.0112

35	0.0125	0.0013	0.0112
36	0.0126	0.0013	0.0112
37	0.0126	0.0013	0.0113
38	0.0126	0.0013	0.0113
39	0.0127	0.0013	0.0114
40	0.0127	0.0013	0.0114
41	0.0128	0.0013	0.0114
42	0.0128	0.0013	0.0114
43	0.0128	0.0014	0.0115
44	0.0129	0.0014	0.0115
45	0.0129	0.0014	0.0116
46	0.0129	0.0014	0.0116
47	0.0130	0.0014	0.0116
48	0.0130	0.0014	0.0117
49	0.0131	0.0014	0.0117
50	0.0131	0.0014	0.0117
51	0.0132	0.0014	0.0118
52	0.0132	0.0014	0.0118
53	0.0133	0.0014	0.0119
54	0.0133	0.0014	0.0119
55	0.0133	0.0014	0.0119
56	0.0134	0.0014	0.0120
57	0.0134	0.0014	0.0120
58	0.0135	0.0014	0.0120
59	0.0135	0.0014	0.0121
60	0.0136	0.0014	0.0121
61	0.0136	0.0014	0.0122
62	0.0137	0.0014	0.0122
63	0.0137	0.0014	0.0123
64	0.0138	0.0014	0.0123
65	0.0138	0.0015	0.0124
66	0.0139	0.0015	0.0124
67	0.0139	0.0015	0.0125
68	0.0140	0.0015	0.0125
69	0.0140	0.0015	0.0125
70	0.0141	0.0015	0.0126
71	0.0141	0.0015	0.0126
72	0.0142	0.0015	0.0127
73	0.0142	0.0015	0.0127
74	0.0143	0.0015	0.0128
75	0.0143	0.0015	0.0128
76	0.0144	0.0015	0.0129
77	0.0145	0.0015	0.0129
78	0.0145	0.0015	0.0130
79	0.0146	0.0015	0.0130
80	0.0146	0.0015	0.0131
81	0.0147	0.0015	0.0132
82	0.0147	0.0016	0.0132
83	0.0148	0.0016	0.0133
84	0.0149	0.0016	0.0133
85	0.0149	0.0016	0.0134
86	0.0150	0.0016	0.0134
87	0.0151	0.0016	0.0135
88	0.0151	0.0016	0.0135
89	0.0152	0.0016	0.0136
90	0.0153	0.0016	0.0137
91	0.0154	0.0016	0.0137
92	0.0154	0.0016	0.0138

93	0.0155	0.0016	0.0139
94	0.0155	0.0016	0.0139
95	0.0156	0.0016	0.0140
96	0.0157	0.0017	0.0140
97	0.0158	0.0017	0.0141
98	0.0158	0.0017	0.0142
99	0.0159	0.0017	0.0143
100	0.0160	0.0017	0.0143
101	0.0161	0.0017	0.0144
102	0.0162	0.0017	0.0145
103	0.0163	0.0017	0.0146
104	0.0163	0.0017	0.0146
105	0.0164	0.0017	0.0147
106	0.0165	0.0017	0.0148
107	0.0166	0.0017	0.0149
108	0.0167	0.0018	0.0149
109	0.0168	0.0018	0.0150
110	0.0169	0.0018	0.0151
111	0.0170	0.0018	0.0152
112	0.0170	0.0018	0.0153
113	0.0172	0.0018	0.0154
114	0.0172	0.0018	0.0154
115	0.0174	0.0018	0.0155
116	0.0174	0.0018	0.0156
117	0.0176	0.0019	0.0157
118	0.0177	0.0019	0.0158
119	0.0178	0.0019	0.0159
120	0.0179	0.0019	0.0160
121	0.0180	0.0019	0.0161
122	0.0181	0.0019	0.0162
123	0.0183	0.0019	0.0163
124	0.0184	0.0019	0.0164
125	0.0185	0.0020	0.0166
126	0.0186	0.0020	0.0166
127	0.0188	0.0020	0.0168
128	0.0189	0.0020	0.0169
129	0.0190	0.0020	0.0170
130	0.0191	0.0020	0.0171
131	0.0193	0.0020	0.0173
132	0.0194	0.0020	0.0174
133	0.0196	0.0021	0.0176
134	0.0197	0.0021	0.0177
135	0.0199	0.0021	0.0178
136	0.0200	0.0021	0.0179
137	0.0203	0.0021	0.0181
138	0.0204	0.0021	0.0182
139	0.0206	0.0022	0.0184
140	0.0207	0.0022	0.0185
141	0.0210	0.0022	0.0188
142	0.0211	0.0022	0.0189
143	0.0214	0.0022	0.0191
144	0.0215	0.0023	0.0192
145	0.0186	0.0020	0.0167
146	0.0188	0.0020	0.0168
147	0.0191	0.0020	0.0171
148	0.0192	0.0020	0.0172
149	0.0195	0.0021	0.0175
150	0.0197	0.0021	0.0176

151	0.0200	0.0021	0.0179
152	0.0202	0.0021	0.0181
153	0.0206	0.0022	0.0184
154	0.0208	0.0022	0.0186
155	0.0212	0.0022	0.0189
156	0.0214	0.0023	0.0191
157	0.0218	0.0023	0.0195
158	0.0220	0.0023	0.0197
159	0.0225	0.0024	0.0201
160	0.0227	0.0024	0.0203
161	0.0232	0.0024	0.0208
162	0.0235	0.0025	0.0210
163	0.0241	0.0025	0.0215
164	0.0244	0.0026	0.0218
165	0.0250	0.0026	0.0224
166	0.0253	0.0027	0.0227
167	0.0260	0.0027	0.0233
168	0.0264	0.0028	0.0236
169	0.0273	0.0029	0.0244
170	0.0277	0.0029	0.0248
171	0.0286	0.0030	0.0256
172	0.0291	0.0031	0.0261
173	0.0302	0.0032	0.0270
174	0.0307	0.0032	0.0275
175	0.0320	0.0034	0.0286
176	0.0326	0.0034	0.0292
177	0.0341	0.0036	0.0305
178	0.0349	0.0037	0.0312
179	0.0367	0.0039	0.0328
180	0.0377	0.0040	0.0337
181	0.0399	0.0042	0.0357
182	0.0412	0.0043	0.0369
183	0.0442	0.0047	0.0395
184	0.0459	0.0048	0.0411
185	0.0326	0.0034	0.0292
186	0.0348	0.0037	0.0311
187	0.0403	0.0042	0.0361
188	0.0440	0.0046	0.0394
189	0.0547	0.0058	0.0490
190	0.0630	0.0063	0.0567
191	0.0957	0.0063	0.0893
192	0.1388	0.0063	0.1325
193	0.6007	0.0063	0.5943
194	0.0753	0.0063	0.0689
195	0.0487	0.0051	0.0435
196	0.0373	0.0039	0.0334
197	0.0478	0.0050	0.0428
198	0.0426	0.0045	0.0381
199	0.0388	0.0041	0.0347
200	0.0358	0.0038	0.0320
201	0.0333	0.0035	0.0298
202	0.0313	0.0033	0.0280
203	0.0296	0.0031	0.0265
204	0.0282	0.0030	0.0252
205	0.0268	0.0028	0.0240
206	0.0257	0.0027	0.0230
207	0.0247	0.0026	0.0221
208	0.0238	0.0025	0.0213

209	0.0230	0.0024	0.0206
210	0.0222	0.0023	0.0199
211	0.0216	0.0023	0.0193
212	0.0210	0.0022	0.0188
213	0.0204	0.0021	0.0182
214	0.0199	0.0021	0.0178
215	0.0194	0.0020	0.0173
216	0.0189	0.0020	0.0169
217	0.0216	0.0023	0.0194
218	0.0212	0.0022	0.0190
219	0.0209	0.0022	0.0187
220	0.0205	0.0022	0.0183
221	0.0202	0.0021	0.0180
222	0.0198	0.0021	0.0177
223	0.0195	0.0021	0.0175
224	0.0192	0.0020	0.0172
225	0.0190	0.0020	0.0170
226	0.0187	0.0020	0.0167
227	0.0184	0.0019	0.0165
228	0.0182	0.0019	0.0163
229	0.0180	0.0019	0.0161
230	0.0177	0.0019	0.0159
231	0.0175	0.0018	0.0157
232	0.0173	0.0018	0.0155
233	0.0171	0.0018	0.0153
234	0.0169	0.0018	0.0151
235	0.0167	0.0018	0.0150
236	0.0166	0.0017	0.0148
237	0.0164	0.0017	0.0147
238	0.0162	0.0017	0.0145
239	0.0160	0.0017	0.0144
240	0.0159	0.0017	0.0142
241	0.0157	0.0017	0.0141
242	0.0156	0.0016	0.0139
243	0.0154	0.0016	0.0138
244	0.0153	0.0016	0.0137
245	0.0152	0.0016	0.0136
246	0.0150	0.0016	0.0135
247	0.0149	0.0016	0.0133
248	0.0148	0.0016	0.0132
249	0.0147	0.0015	0.0131
250	0.0145	0.0015	0.0130
251	0.0144	0.0015	0.0129
252	0.0143	0.0015	0.0128
253	0.0142	0.0015	0.0127
254	0.0141	0.0015	0.0126
255	0.0140	0.0015	0.0125
256	0.0139	0.0015	0.0124
257	0.0138	0.0015	0.0123
258	0.0137	0.0014	0.0122
259	0.0136	0.0014	0.0122
260	0.0135	0.0014	0.0121
261	0.0134	0.0014	0.0120
262	0.0133	0.0014	0.0119
263	0.0132	0.0014	0.0118
264	0.0131	0.0014	0.0118
265	0.0131	0.0014	0.0117
266	0.0130	0.0014	0.0116

267	0.0129	0.0014	0.0115
268	0.0128	0.0013	0.0115
269	0.0127	0.0013	0.0114
270	0.0127	0.0013	0.0113
271	0.0126	0.0013	0.0113
272	0.0125	0.0013	0.0112
273	0.0124	0.0013	0.0111
274	0.0124	0.0013	0.0111
275	0.0123	0.0013	0.0110
276	0.0122	0.0013	0.0109
277	0.0122	0.0013	0.0109
278	0.0121	0.0013	0.0108
279	0.0120	0.0013	0.0108
280	0.0120	0.0013	0.0107
281	0.0119	0.0013	0.0107
282	0.0118	0.0012	0.0106
283	0.0118	0.0012	0.0105
284	0.0117	0.0012	0.0105
285	0.0117	0.0012	0.0104
286	0.0116	0.0012	0.0104
287	0.0116	0.0012	0.0103
288	0.0115	0.0012	0.0103

Total soil rain loss = 0.57(In)
Total effective rainfall = 5.55(In)
Peak flow rate in flood hydrograph = 196.51(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	50.0	100.0	150.0	200.0
0+ 5	0.0016	0.24	Q				
0+10	0.0129	1.63	Q				
0+15	0.0422	4.26	Q				
0+20	0.0812	5.67	VQ				
0+25	0.1258	6.47	VQ				
0+30	0.1740	7.01	VQ				
0+35	0.2250	7.40	VQ				
0+40	0.2780	7.70	VQ				
0+45	0.3326	7.93	VQ				
0+50	0.3885	8.12	VQ				
0+55	0.4455	8.27	VQ				
1+ 0	0.5034	8.40	VQ				
1+ 5	0.5620	8.51	VQ				
1+10	0.6211	8.59	VQ				
1+15	0.6807	8.66	VQ				
1+20	0.7408	8.72	VQ				
1+25	0.8012	8.78	Q				
1+30	0.8621	8.84	Q				
1+35	0.9233	8.89	Q				
1+40	0.9848	8.93	Q				
1+45	1.0465	8.95	Q				

1+50	1.1083	8.98	Q				
1+55	1.1703	9.00	Q				
2+ 0	1.2324	9.02	Q				
2+ 5	1.2948	9.05	Q				
2+10	1.3572	9.07	Q				
2+15	1.4199	9.10	Q				
2+20	1.4827	9.12	Q				
2+25	1.5457	9.15	Q				
2+30	1.6089	9.17	QV				
2+35	1.6722	9.20	QV				
2+40	1.7358	9.22	QV				
2+45	1.7995	9.25	QV				
2+50	1.8634	9.28	QV				
2+55	1.9274	9.30	QV				
3+ 0	1.9917	9.33	QV				
3+ 5	2.0561	9.36	QV				
3+10	2.1207	9.38	QV				
3+15	2.1856	9.41	QV				
3+20	2.2506	9.44	QV				
3+25	2.3158	9.47	QV				
3+30	2.3811	9.49	QV				
3+35	2.4467	9.52	Q V				
3+40	2.5125	9.55	Q V				
3+45	2.5785	9.58	Q V				
3+50	2.6447	9.61	Q V				
3+55	2.7111	9.64	Q V				
4+ 0	2.7777	9.67	Q V				
4+ 5	2.8445	9.70	Q V				
4+10	2.9115	9.73	Q V				
4+15	2.9787	9.76	Q V				
4+20	3.0462	9.79	Q V				
4+25	3.1138	9.82	Q V				
4+30	3.1817	9.86	Q V				
4+35	3.2498	9.89	Q V				
4+40	3.3181	9.92	Q V				
4+45	3.3867	9.95	Q V				
4+50	3.4554	9.99	Q V				
4+55	3.5244	10.02	Q V				
5+ 0	3.5937	10.05	Q V				
5+ 5	3.6632	10.09	Q V				
5+10	3.7329	10.12	Q V				
5+15	3.8028	10.16	Q V				
5+20	3.8730	10.19	Q V				
5+25	3.9435	10.23	Q V				
5+30	4.0141	10.26	Q V				
5+35	4.0851	10.30	Q V				
5+40	4.1563	10.34	Q V				
5+45	4.2277	10.38	Q V				
5+50	4.2994	10.41	Q V				
5+55	4.3714	10.45	Q V				
6+ 0	4.4437	10.49	Q V				
6+ 5	4.5162	10.53	Q V				
6+10	4.5890	10.57	Q V				
6+15	4.6620	10.61	Q V				
6+20	4.7353	10.65	Q V				
6+25	4.8090	10.69	Q V				
6+30	4.8829	10.73	Q V				
6+35	4.9571	10.77	Q V				

6+40	5.0316	10.82	Q	V				
6+45	5.1064	10.86	Q	V				
6+50	5.1814	10.90	Q	V				
6+55	5.2568	10.95	Q	V				
7+ 0	5.3325	10.99	Q	V				
7+ 5	5.4085	11.04	Q	V				
7+10	5.4849	11.08	Q	V				
7+15	5.5615	11.13	Q	V				
7+20	5.6385	11.18	Q	V				
7+25	5.7158	11.23	Q	V				
7+30	5.7935	11.27	Q	V				
7+35	5.8714	11.32	Q	V				
7+40	5.9498	11.37	Q	V				
7+45	6.0284	11.42	Q	V				
7+50	6.1075	11.47	Q	V				
7+55	6.1868	11.53	Q	V				
8+ 0	6.2666	11.58	Q	V				
8+ 5	6.3467	11.63	Q	V				
8+10	6.4272	11.69	Q	V				
8+15	6.5081	11.74	Q	V				
8+20	6.5893	11.80	Q	V				
8+25	6.6710	11.86	Q	V				
8+30	6.7530	11.91	Q	V				
8+35	6.8355	11.97	Q	V				
8+40	6.9183	12.03	Q	V				
8+45	7.0016	12.09	Q	V				
8+50	7.0853	12.15	Q	V				
8+55	7.1695	12.22	Q	V				
9+ 0	7.2540	12.28	Q	V				
9+ 5	7.3390	12.35	Q	V				
9+10	7.4245	12.41	Q	V				
9+15	7.5104	12.48	Q	V				
9+20	7.5968	12.54	Q	V				
9+25	7.6837	12.61	Q	V				
9+30	7.7711	12.68	Q	V				
9+35	7.8589	12.76	Q	V				
9+40	7.9473	12.83	Q	V				
9+45	8.0361	12.90	Q	V				
9+50	8.1255	12.98	Q	V				
9+55	8.2154	13.06	Q	V				
10+ 0	8.3059	13.13	Q	V				
10+ 5	8.3969	13.22	Q	V				
10+10	8.4885	13.30	Q	V				
10+15	8.5806	13.38	Q	V				
10+20	8.6734	13.46	Q	V				
10+25	8.7667	13.55	Q	V				
10+30	8.8606	13.64	Q	V				
10+35	8.9552	13.73	Q	V				
10+40	9.0504	13.82	Q	V				
10+45	9.1463	13.92	Q	V				
10+50	9.2428	14.01	Q	V				
10+55	9.3400	14.11	Q	V				
11+ 0	9.4379	14.21	Q	V				
11+ 5	9.5365	14.32	Q	V				
11+10	9.6358	14.42	Q	V				
11+15	9.7358	14.53	Q	V				
11+20	9.8367	14.64	Q	V				
11+25	9.9383	14.75	Q	V				

11+30	10.0407	14.87	Q	V			
11+35	10.1439	14.99	Q	V			
11+40	10.2480	15.11	Q	V			
11+45	10.3529	15.24	Q	V			
11+50	10.4588	15.36	Q	V			
11+55	10.5655	15.50	Q	V			
12+ 0	10.6732	15.63	Q	V			
12+ 5	10.7814	15.71	Q	V			
12+10	10.8879	15.47	Q	V			
12+15	10.9906	14.91	Q	V			
12+20	11.0916	14.67	Q	V			
12+25	11.1923	14.62	Q	V			
12+30	11.2931	14.64	Q	V			
12+35	11.3944	14.71	Q	V			
12+40	11.4963	14.80	Q	V			
12+45	11.5991	14.93	Q	V			
12+50	11.7028	15.06	Q	V			
12+55	11.8077	15.22	Q	V			
13+ 0	11.9137	15.39	Q	V			
13+ 5	12.0210	15.58	Q	V			
13+10	12.1296	15.78	Q	V			
13+15	12.2398	16.00	Q	V			
13+20	12.3515	16.22	Q	V			
13+25	12.4648	16.46	Q	V			
13+30	12.5799	16.70	Q	V			
13+35	12.6967	16.97	Q	V			
13+40	12.8155	17.24	Q	V			
13+45	12.9363	17.54	Q	V			
13+50	13.0592	17.85	Q	V			
13+55	13.1844	18.18	Q	V			
14+ 0	13.3120	18.52	Q	V			
14+ 5	13.4422	18.90	Q	V			
14+10	13.5751	19.29	Q	V			
14+15	13.7110	19.75	Q	V			
14+20	13.8501	20.19	Q	V			
14+25	13.9925	20.68	Q	V			
14+30	14.1383	21.17	Q	V			
14+35	14.2880	21.73	Q	V			
14+40	14.4415	22.29	Q	V			
14+45	14.5995	22.94	Q	V			
14+50	14.7620	23.60	Q	V			
14+55	14.9298	24.36	Q	V			
15+ 0	15.1031	25.16	Q	V			
15+ 5	15.2826	26.08	Q	V			
15+10	15.4690	27.06	Q	V			
15+15	15.6632	28.20	Q	V			
15+20	15.8660	29.44	Q	V			
15+25	16.0765	30.57	Q	V			
15+30	16.2838	30.10	Q	V			
15+35	16.4774	28.10	Q	V			
15+40	16.6713	28.16	Q	V			
15+45	16.8764	29.77	Q	V			
15+50	17.1007	32.57	Q	V			
15+55	17.3591	37.51	Q	V			
16+ 0	17.6802	46.62	Q	V			
16+ 5	18.1873	73.64		Q	V		
16+10	19.1574	140.85			V	Q	
16+15	20.5107	196.51			V		Q

16+20	21.3881	127.40				QV	
16+25	21.9862	86.84			Q	V	
16+30	22.4544	67.98				V	
16+35	22.8591	58.77			Q	V	
16+40	23.2149	51.66			Q	V	
16+45	23.5246	44.97			Q	V	
16+50	23.8038	40.54			Q	V	
16+55	24.0555	36.55			Q	V	
17+ 0	24.2850	33.32			Q	V	
17+ 5	24.4945	30.42			Q	V	
17+10	24.6854	27.73			Q	V	
17+15	24.8598	25.32			Q	V	
17+20	25.0258	24.10			Q	V	
17+25	25.1857	23.22			Q	V	
17+30	25.3375	22.03			Q	V	
17+35	25.4776	20.34			Q	V	
17+40	25.6100	19.22			Q	V	
17+45	25.7308	17.54			Q	V	
17+50	25.8473	16.92			Q	V	
17+55	25.9600	16.37			Q	V	
18+ 0	26.0694	15.89			Q	V	
18+ 5	26.1761	15.49			Q	V	
18+10	26.2825	15.45			Q	V	
18+15	26.3912	15.78			Q	V	
18+20	26.5000	15.80			Q	V	
18+25	26.6080	15.68			Q	V	
18+30	26.7148	15.51			Q	V	
18+35	26.8203	15.32			Q	V	
18+40	26.9245	15.12			Q	V	
18+45	27.0272	14.92			Q	V	
18+50	27.1286	14.72			Q	V	
18+55	27.2286	14.52			Q	V	
19+ 0	27.3273	14.33			Q	V	
19+ 5	27.4247	14.14			Q	V	
19+10	27.5209	13.96			Q	V	
19+15	27.6158	13.78			Q	V	
19+20	27.7095	13.60			Q	V	
19+25	27.8020	13.44			Q	V	
19+30	27.8935	13.28			Q	V	
19+35	27.9839	13.12			Q	V	
19+40	28.0732	12.97			Q	V	
19+45	28.1615	12.82			Q	V	
19+50	28.2488	12.68			Q	V	
19+55	28.3352	12.54			Q	V	
20+ 0	28.4206	12.40			Q	V	
20+ 5	28.5051	12.27			Q	V	
20+10	28.5888	12.15			Q	V	
20+15	28.6716	12.02			Q	V	
20+20	28.7535	11.90			Q	V	
20+25	28.8347	11.79			Q	V	
20+30	28.9152	11.68			Q	V	
20+35	28.9949	11.57			Q	V	
20+40	29.0738	11.47			Q	V	
20+45	29.1521	11.36			Q	V	
20+50	29.2296	11.26			Q	V	
20+55	29.3066	11.17			Q	V	
21+ 0	29.3828	11.07			Q	V	
21+ 5	29.4585	10.98			Q	V	

21+10	29.5335	10.89	Q				V
21+15	29.6079	10.81	Q				V
21+20	29.6818	10.72	Q				V
21+25	29.7550	10.64	Q				V
21+30	29.8277	10.56	Q				V
21+35	29.8999	10.48	Q				V
21+40	29.9716	10.40	Q				V
21+45	30.0427	10.33	Q				V
21+50	30.1133	10.26	Q				V
21+55	30.1835	10.18	Q				V
22+ 0	30.2531	10.11	Q				V
22+ 5	30.3223	10.04	Q				V
22+10	30.3910	9.98	Q				V
22+15	30.4593	9.91	Q				V
22+20	30.5271	9.85	Q				V
22+25	30.5945	9.78	Q				V
22+30	30.6614	9.72	Q				V
22+35	30.7280	9.66	Q				V
22+40	30.7941	9.60	Q				V
22+45	30.8598	9.54	Q				V
22+50	30.9252	9.49	Q				V
22+55	30.9901	9.43	Q				V
23+ 0	31.0547	9.38	Q				V
23+ 5	31.1189	9.32	Q				V
23+10	31.1827	9.27	Q				V
23+15	31.2462	9.22	Q				V
23+20	31.3093	9.17	Q				V
23+25	31.3721	9.11	Q				V
23+30	31.4345	9.07	Q				V
23+35	31.4966	9.02	Q				V
23+40	31.5584	8.97	Q				V
23+45	31.6198	8.92	Q				V
23+50	31.6810	8.88	Q				V
23+55	31.7418	8.83	Q				V
24+ 0	31.8023	8.79	Q				V
24+ 5	31.8609	8.50	Q				V
24+10	31.9096	7.07	Q				V
24+15	31.9400	4.42	Q				V
24+20	31.9606	2.99	Q				V
24+25	31.9757	2.19	Q				V
24+30	31.9872	1.66	Q				V
24+35	31.9960	1.28	Q				V
24+40	32.0028	0.99	Q				V
24+45	32.0082	0.78	Q				V
24+50	32.0123	0.60	Q				V
24+55	32.0155	0.47	Q				V
25+ 0	32.0180	0.36	Q				V
25+ 5	32.0199	0.27	Q				V
25+10	32.0213	0.20	Q				V
25+15	32.0224	0.16	Q				V
25+20	32.0232	0.12	Q				V
25+25	32.0238	0.08	Q				V
25+30	32.0241	0.04	Q				V
25+35	32.0242	0.02	Q				V

ATTACHMENT 5

Basin Routing

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014
Study date: 05/08/20

204728 - US Cold Storage
PROPOSED BASIN - AREA A
2-YEAR, 24- HOUR STORM
BY: SG DATE: 05-08-20

Program License Serial Number 6320

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

From study/file name: PROPA2.rte
*****HYDROGRAPH DATA*****
Number of intervals = 307
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 55.231 (CFS)
Total volume = 8.060 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
Process from Point/Station 4.000 to Point/Station 5.000
**** RETARDING BASIN ROUTING ****

Program computation of outflow v. depth

CALCULATED OUTFLOW DATA AT DEPTH = 0.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
Calculated individual pipe flow = 1.112(CFS)
Normal flow depth in pipe = 4.38(In.)
Flow top width inside pipe = 7.96(In.)
Critical Depth = 0.50(Ft.)
Calculated flow rate through pipe(s) = 1.112(CFS)

Total outflow at this depth = 1.11(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 1.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 2.000(Ft.)
Pipe friction loss = 1.178(Ft.)
Minor friction loss = 0.822(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 2.074(CFS)

Total outflow at this depth = 2.07(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 1.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 2.500(Ft.)
Pipe friction loss = 1.472(Ft.)
Minor friction loss = 1.027(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 2.318(CFS)

Total outflow at this depth = 2.32(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 2.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.000(Ft.)
Pipe friction loss = 1.767(Ft.)
Minor friction loss = 1.233(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 2.540(CFS)

Total outflow at this depth = 2.54(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 2.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.500(Ft.)
Pipe friction loss = 2.061(Ft.)
Minor friction loss = 1.438(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 2.743(CFS)

Total outflow at this depth = 2.74(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 2.99(Ft.)

Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.990(Ft.)
Pipe friction loss = 2.350(Ft.)
Minor friction loss = 1.640(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 2.929(CFS)

Total outflow at this depth = 2.93(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 3.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.000(Ft.)
Pipe friction loss = 2.355(Ft.)
Minor friction loss = 1.644(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 2.932(CFS)

Total outflow at this depth = 2.93(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 3.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.500(Ft.)
Pipe friction loss = 2.650(Ft.)
Minor friction loss = 1.849(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.110(CFS)

Total outflow at this depth = 3.11(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 4.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.000(Ft.)
Pipe friction loss = 2.944(Ft.)
Minor friction loss = 2.055(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.279(CFS)

Total outflow at this depth = 3.28(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 4.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.500(Ft.)
Pipe friction loss = 3.239(Ft.)
Minor friction loss = 2.260(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.439(CFS)

Total outflow at this depth = 3.44(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 5.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 6.000(Ft.)
Pipe friction loss = 3.533(Ft.)
Minor friction loss = 2.466(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.591(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 1.768(CFS)
Normal flow depth in pipe = 3.34(In.)
Flow top width inside pipe = 14.00(In.)
Critical Depth = 0.50(Ft.)
Calculated flow rate through pipe(s) = 1.768(CFS)

Total outflow at this depth = 5.36(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 5.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 6.500(Ft.)
Pipe friction loss = 3.828(Ft.)
Minor friction loss = 2.671(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.738(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 6.687(CFS)
Normal flow depth in pipe = 6.57(In.)
Flow top width inside pipe = 17.33(In.)
Critical Depth = 1.00(Ft.)
Calculated flow rate through pipe(s) = 6.687(CFS)

Total outflow at this depth = 10.42(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 6.00(Ft.)

Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 7.000(Ft.)
Pipe friction loss = 4.122(Ft.)
Minor friction loss = 2.877(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.879(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.500(Ft.)
Pipe friction loss = 1.145(Ft.)
Minor friction loss = 2.356(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 17.772(CFS)

Total outflow at this depth = 21.65(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 6.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 7.500(Ft.)
Pipe friction loss = 4.417(Ft.)
Minor friction loss = 3.082(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.015(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.000(Ft.)
Pipe friction loss = 1.309(Ft.)
Minor friction loss = 2.692(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 18.999(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 1.768(CFS)
Normal flow depth in pipe = 3.34(In.)
Flow top width inside pipe = 14.00(In.)
Critical Depth = 0.50(Ft.)
Calculated flow rate through pipe(s) = 1.768(CFS)

Total outflow at this depth = 24.78(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 7.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)

Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 8.000(Ft.)
Pipe friction loss = 4.711(Ft.)
Minor friction loss = 3.288(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.147(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.500(Ft.)
Pipe friction loss = 1.472(Ft.)
Minor friction loss = 3.029(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 20.152(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 6.687(CFS)
Normal flow depth in pipe = 6.57(In.)
Flow top width inside pipe = 17.33(In.)
Critical Depth = 1.00(Ft.)
Calculated flow rate through pipe(s) = 6.687(CFS)

Total outflow at this depth = 30.99(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 7.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 8.500(Ft.)
Pipe friction loss = 5.005(Ft.)
Minor friction loss = 3.493(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.275(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.000(Ft.)
Pipe friction loss = 1.636(Ft.)
Minor friction loss = 3.366(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 21.242(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.500(Ft.)

Pipe friction loss = 1.145(Ft.)
Minor friction loss = 2.356(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 17.772(CFS)

Total outflow at this depth = 43.29(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 8.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 9.000(Ft.)
Pipe friction loss = 5.300(Ft.)
Minor friction loss = 3.698(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.399(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.500(Ft.)
Pipe friction loss = 1.799(Ft.)
Minor friction loss = 3.702(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 22.279(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.000(Ft.)
Pipe friction loss = 1.309(Ft.)
Minor friction loss = 2.692(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 18.999(CFS)

Weir capacity using equation $Q = CLH^{\text{Exp}}$ (Using Feet as units)
Weir Length = 3.00(Ft.) C value = 2.63 Exp = 1.50
Weir flow: Depth = H = 0.50(Ft.) Flow = 2.79 (CFS)

Total outflow at this depth = 48.47(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 8.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 9.500(Ft.)
Pipe friction loss = 5.594(Ft.)
Minor friction loss = 3.904(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.519(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)

Manning's N = 0.013 No. of pipes = 1
 Given pipe size = 18.00(In.)
 NOTE: Assuming free outlet flow.
 NOTE: Normal flow is pressure flow.
 The total friction loss through the pipe is 6.000(Ft.)
 Pipe friction loss = 1.963(Ft.)
 Minor friction loss = 4.039(Ft.) K-factor = 1.50
 Calculated flow rate through pipe(s) = 23.269(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
 Manning's N = 0.013 No. of pipes = 1
 Given pipe size = 18.00(In.)
 NOTE: Assuming free outlet flow.
 NOTE: Normal flow is pressure flow.
 The total friction loss through the pipe is 4.500(Ft.)
 Pipe friction loss = 1.472(Ft.)
 Minor friction loss = 3.029(Ft.) K-factor = 1.50
 Calculated flow rate through pipe(s) = 20.152(CFS)

Weir capacity using equation $Q = CLH^{Exp}$ (Using Feet as units)
 Weir Length = 3.00(Ft.) C value = 2.63 Exp = 1.50
 Weir flow: Depth = H = 1.00(Ft.) Flow = 7.89 (CFS)

Total outflow at this depth = 55.83(CFS)

 Total number of inflow hydrograph intervals = 307
 Hydrograph time unit = 5.000 (Min.)
 Initial depth in storage basin = 0.00(Ft.)

 Initial basin depth = 0.00 (Ft.)
 Initial basin storage = 0.00 (Ac.Ft)
 Initial basin outflow = 0.00 (CFS)

 Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-0*dt/2) (Ac.Ft)	(S+0*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.341	1.112	0.337	0.345
1.000	0.682	2.074	0.675	0.689
1.500	1.023	2.318	1.015	1.031
2.000	1.150	2.540	1.141	1.159
2.500	1.278	2.743	1.269	1.287
2.990	1.403	2.929	1.393	1.413
3.000	1.404	2.932	1.394	1.414
3.500	2.268	3.110	2.257	2.279
4.000	3.157	3.279	3.146	3.168
4.500	4.071	3.439	4.059	4.083
5.000	5.010	5.360	4.992	5.028
5.500	5.980	10.425	5.944	6.016
6.000	6.971	21.652	6.896	7.046
6.500	7.990	24.783	7.905	8.075
7.000	9.038	30.986	8.931	9.145
7.500	10.113	43.289	9.964	10.262

8.000	11.216	48.466	11.049	11.383
8.500	12.349	55.831	12.157	12.541

Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	13.8	27.62	41.42	55.23	Depth (Ft.)
0.083	0.05	0.00	0.000	0					0.00
0.167	0.34	0.00	0.001	0					0.00
0.250	0.89	0.02	0.006	0					0.01
0.333	1.19	0.04	0.013	0					0.02
0.417	1.36	0.07	0.021	0					0.03
0.500	1.47	0.10	0.030	0					0.04
0.583	1.55	0.13	0.040	0					0.06
0.667	1.62	0.16	0.050	0					0.07
0.750	1.67	0.20	0.060	0					0.09
0.833	1.71	0.23	0.070	0					0.10
0.917	1.74	0.26	0.080	OI					0.12
1.000	1.77	0.29	0.090	OI					0.13
1.083	1.79	0.33	0.100	OI					0.15
1.167	1.81	0.36	0.110	OI					0.16
1.250	1.82	0.39	0.120	OI					0.18
1.333	1.84	0.42	0.130	OI					0.19
1.417	1.85	0.46	0.140	OI					0.21
1.500	1.86	0.49	0.149	OI					0.22
1.583	1.88	0.52	0.159	OI					0.23
1.667	1.89	0.55	0.168	OI					0.25
1.750	1.89	0.58	0.177	OI					0.26
1.833	1.90	0.61	0.186	OI					0.27
1.917	1.90	0.64	0.195	OI					0.29
2.000	1.91	0.66	0.204	OI					0.30
2.083	1.92	0.69	0.212	OI					0.31
2.167	1.92	0.72	0.220	OI					0.32
2.250	1.93	0.75	0.229	OI					0.34
2.333	1.93	0.77	0.237	OI					0.35
2.417	1.94	0.80	0.245	OI					0.36
2.500	1.95	0.82	0.252	OI					0.37
2.583	1.95	0.85	0.260	OI					0.38
2.667	1.96	0.87	0.268	OI					0.39
2.750	1.97	0.90	0.275	OI					0.40
2.833	1.97	0.92	0.282	OI					0.41
2.917	1.98	0.94	0.290	OI					0.42
3.000	1.99	0.97	0.297	OI					0.43
3.083	1.99	0.99	0.304	OI					0.45
3.167	2.00	1.01	0.310	OI					0.46
3.250	2.01	1.03	0.317	OI					0.47
3.333	2.01	1.06	0.324	OI					0.47
3.417	2.02	1.08	0.330	OI					0.48
3.500	2.03	1.10	0.337	OI					0.49
3.583	2.03	1.12	0.343	OI					0.50
3.667	2.04	1.14	0.349	OI					0.51
3.750	2.05	1.15	0.356	OI					0.52
3.833	2.06	1.17	0.362	OI					0.53
3.917	2.06	1.19	0.368	OI					0.54
4.000	2.07	1.20	0.374	OI					0.55

4.083	2.08	1.22	0.380	OI				0.56
4.167	2.09	1.24	0.386	OI				0.57
4.250	2.09	1.25	0.391	OI				0.57
4.333	2.10	1.27	0.397	OI				0.58
4.417	2.11	1.29	0.403	OI				0.59
4.500	2.12	1.30	0.408	OI				0.60
4.583	2.13	1.32	0.414	OI				0.61
4.667	2.13	1.33	0.420	OI				0.62
4.750	2.14	1.35	0.425	OI				0.62
4.833	2.15	1.36	0.431	OI				0.63
4.917	2.16	1.38	0.436	OI				0.64
5.000	2.17	1.39	0.441	OI				0.65
5.083	2.18	1.41	0.447	OI				0.65
5.167	2.19	1.42	0.452	OI				0.66
5.250	2.19	1.44	0.457	OI				0.67
5.333	2.20	1.45	0.462	OI				0.68
5.417	2.21	1.47	0.467	OI				0.69
5.500	2.22	1.48	0.472	OI				0.69
5.583	2.23	1.50	0.478	OI				0.70
5.667	2.24	1.51	0.483	OI				0.71
5.750	2.25	1.53	0.488	OI				0.71
5.833	2.26	1.54	0.493	OI				0.72
5.917	2.27	1.55	0.497	OI				0.73
6.000	2.28	1.57	0.502	OI				0.74
6.083	2.29	1.58	0.507	OI				0.74
6.167	2.30	1.59	0.512	OI				0.75
6.250	2.31	1.61	0.517	OI				0.76
6.333	2.32	1.62	0.522	OI				0.77
6.417	2.33	1.64	0.527	OI				0.77
6.500	2.34	1.65	0.531	OI				0.78
6.583	2.35	1.66	0.536	OI				0.79
6.667	2.36	1.68	0.541	OI				0.79
6.750	2.37	1.69	0.546	OI				0.80
6.833	2.38	1.70	0.550	OI				0.81
6.917	2.40	1.72	0.555	OI				0.81
7.000	2.41	1.73	0.560	0				0.82
7.083	2.42	1.74	0.564	0				0.83
7.167	2.43	1.76	0.569	0				0.83
7.250	2.44	1.77	0.574	0				0.84
7.333	2.46	1.78	0.578	0				0.85
7.417	2.47	1.79	0.583	0				0.85
7.500	2.48	1.81	0.588	0				0.86
7.583	2.49	1.82	0.592	0				0.87
7.667	2.51	1.83	0.597	0				0.88
7.750	2.52	1.85	0.601	0				0.88
7.833	2.53	1.86	0.606	0				0.89
7.917	2.55	1.87	0.611	0				0.90
8.000	2.56	1.89	0.615	0				0.90
8.083	2.57	1.90	0.620	0				0.91
8.167	2.59	1.91	0.625	0				0.92
8.250	2.60	1.93	0.629	0				0.92
8.333	2.62	1.94	0.634	0				0.93
8.417	2.63	1.95	0.639	0				0.94
8.500	2.65	1.96	0.643	0				0.94
8.583	2.66	1.98	0.648	0				0.95
8.667	2.68	1.99	0.653	0				0.96
8.750	2.69	2.00	0.658	0				0.96
8.833	2.71	2.02	0.662	0				0.97

8.917	2.73	2.03	0.667	0					0.98
9.000	2.74	2.05	0.672	0					0.99
9.083	2.76	2.06	0.677	0					0.99
9.167	2.78	2.07	0.682	0					1.00
9.250	2.80	2.08	0.686	0					1.01
9.333	2.81	2.08	0.691	0					1.01
9.417	2.83	2.08	0.697	0					1.02
9.500	2.85	2.09	0.702	0					1.03
9.583	2.87	2.09	0.707	0					1.04
9.667	2.89	2.10	0.712	0					1.04
9.750	2.91	2.10	0.718	0					1.05
9.833	2.93	2.10	0.724	0					1.06
9.917	2.95	2.11	0.729	0					1.07
10.000	2.97	2.11	0.735	0					1.08
10.083	2.99	2.12	0.741	0					1.09
10.167	3.01	2.12	0.747	0					1.10
10.250	3.04	2.12	0.753	0					1.10
10.333	3.06	2.13	0.760	0					1.11
10.417	3.08	2.13	0.766	0					1.12
10.500	3.10	2.14	0.773	0					1.13
10.583	3.13	2.14	0.780	0					1.14
10.667	3.15	2.15	0.786	0					1.15
10.750	3.18	2.15	0.793	0					1.16
10.833	3.20	2.16	0.801	0					1.17
10.917	3.23	2.16	0.808	0					1.18
11.000	3.26	2.17	0.815	0					1.20
11.083	3.29	2.17	0.823	0					1.21
11.167	3.31	2.18	0.831	0					1.22
11.250	3.34	2.19	0.838	0					1.23
11.333	3.37	2.19	0.846	0					1.24
11.417	3.41	2.20	0.855	0					1.25
11.500	3.44	2.20	0.863	0					1.27
11.583	3.47	2.21	0.872	OI					1.28
11.667	3.50	2.22	0.880	OI					1.29
11.750	3.54	2.22	0.889	OI					1.30
11.833	3.57	2.23	0.899	OI					1.32
11.917	3.61	2.24	0.908	OI					1.33
12.000	3.64	2.24	0.917	OI					1.35
12.083	3.70	2.25	0.927	OI					1.36
12.167	3.84	2.26	0.938	OI					1.37
12.250	4.06	2.27	0.949	OI					1.39
12.333	4.20	2.27	0.962	OI					1.41
12.417	4.30	2.28	0.976	OI					1.43
12.500	4.38	2.29	0.990	OI					1.45
12.583	4.45	2.30	1.004	OI					1.47
12.667	4.52	2.32	1.019	OI					1.49
12.750	4.58	2.34	1.035	OI					1.55
12.833	4.65	2.37	1.050	OI					1.61
12.917	4.71	2.39	1.066	OI					1.67
13.000	4.77	2.42	1.082	OI					1.73
13.083	4.84	2.45	1.098	OI					1.80
13.167	4.90	2.48	1.115	OI					1.86
13.250	4.96	2.51	1.132	OI					1.93
13.333	5.03	2.54	1.149	OI					2.00
13.417	5.10	2.57	1.166	OI					2.06
13.500	5.17	2.59	1.184	OI					2.13
13.583	5.25	2.62	1.202	0 I					2.20
13.667	5.32	2.65	1.220	0 I					2.27

13.750	5.41	2.68	1.239	0 I					2.35
13.833	5.49	2.71	1.258	0 I					2.42
13.917	5.58	2.74	1.277	0 I					2.50
14.000	5.67	2.77	1.297	0 I					2.57
14.083	5.77	2.80	1.317	0 I					2.65
14.167	5.88	2.83	1.338	0 I					2.73
14.250	6.00	2.86	1.359	0 I					2.82
14.333	6.11	2.90	1.381	0 I					2.90
14.417	6.24	2.93	1.403	0 I					2.99
14.500	6.37	2.94	1.426	0 I					3.01
14.583	6.52	2.94	1.451	0 I					3.03
14.667	6.67	2.95	1.476	0 I					3.04
14.750	6.83	2.95	1.502	0 I					3.06
14.833	7.01	2.96	1.529	0 I					3.07
14.917	7.20	2.96	1.558	0 I					3.09
15.000	7.41	2.97	1.587	0 I					3.11
15.083	7.64	2.98	1.619	0 I					3.12
15.167	7.89	2.98	1.652	0 I					3.14
15.250	8.18	2.99	1.687	0 I					3.16
15.333	8.50	3.00	1.723	0 I					3.18
15.417	8.74	3.01	1.762	0 I					3.21
15.500	8.43	3.01	1.801	0 I					3.23
15.583	7.54	3.02	1.835	0 I					3.25
15.667	7.34	3.03	1.865	0 I					3.27
15.750	7.62	3.03	1.896	0 I					3.28
15.833	8.23	3.04	1.929	0 I					3.30
15.917	9.35	3.05	1.969	0 I					3.33
16.000	11.39	3.06	2.019	0 I					3.36
16.083	18.32	3.08	2.101	0 I		I			3.40
16.167	37.88	3.11	2.273	0 I			I		3.50
16.250	55.23	3.17	2.572	0 I				I	3.67
16.333	34.95	3.22	2.860	0 I			I		3.83
16.417	23.39	3.26	3.039	0 I		I			3.93
16.500	18.28	3.28	3.160	0 I		I			4.00
16.583	16.04	3.30	3.255	0 I		I			4.05
16.667	14.27	3.31	3.337	0 I		I			4.10
16.750	12.53	3.32	3.406	0 I		I			4.14
16.833	11.41	3.33	3.466	0 I		I			4.17
16.917	10.37	3.34	3.518	0 I		I			4.20
17.000	9.54	3.35	3.563	0 I		I			4.22
17.083	8.79	3.36	3.603	0 I		I			4.24
17.167	8.08	3.36	3.638	0 I		I			4.26
17.250	7.43	3.37	3.669	0 I		I			4.28
17.333	7.13	3.37	3.696	0 I		I			4.29
17.417	6.92	3.38	3.721	0 I		I			4.31
17.500	6.61	3.38	3.744	0 I		I			4.32
17.583	6.15	3.38	3.765	0 I		I			4.33
17.667	5.86	3.39	3.783	0 I		I			4.34
17.750	5.38	3.39	3.798	0 I		I			4.35
17.833	5.22	3.39	3.811	0 I		I			4.36
17.917	5.08	3.40	3.823	0 I		I			4.36
18.000	4.95	3.40	3.834	0 I		I			4.37
18.083	4.81	3.40	3.845	0 I		I			4.38
18.167	4.60	3.40	3.854	0 I		I			4.38
18.250	4.31	3.40	3.861	0 I		I			4.39
18.333	4.11	3.40	3.866	0 I		I			4.39
18.417	3.97	3.40	3.871	0 I		I			4.39
18.500	3.85	3.40	3.874	0 I		I			4.39

18.583	3.74	3.40	3.877	OI					4.39
18.667	3.65	3.40	3.879	OI					4.39
18.750	3.56	3.41	3.880	OI					4.40
18.833	3.48	3.41	3.881	OI					4.40
18.917	3.41	3.41	3.881	O					4.40
19.000	3.34	3.41	3.881	O					4.40
19.083	3.28	3.41	3.881	O					4.40
19.167	3.22	3.41	3.880	O					4.40
19.250	3.17	3.40	3.878	O					4.39
19.333	3.11	3.40	3.876	O					4.39
19.417	3.06	3.40	3.874	O					4.39
19.500	3.01	3.40	3.872	O					4.39
19.583	2.97	3.40	3.869	O					4.39
19.667	2.93	3.40	3.866	O					4.39
19.750	2.89	3.40	3.862	O					4.39
19.833	2.85	3.40	3.858	O					4.38
19.917	2.81	3.40	3.855	O					4.38
20.000	2.78	3.40	3.850	O					4.38
20.083	2.74	3.40	3.846	O					4.38
20.167	2.71	3.40	3.841	O					4.37
20.250	2.68	3.40	3.836	O					4.37
20.333	2.65	3.40	3.831	O					4.37
20.417	2.62	3.40	3.826	O					4.37
20.500	2.59	3.39	3.821	O					4.36
20.583	2.56	3.39	3.815	O					4.36
20.667	2.53	3.39	3.809	O					4.36
20.750	2.50	3.39	3.803	O					4.35
20.833	2.48	3.39	3.797	O					4.35
20.917	2.45	3.39	3.791	O					4.35
21.000	2.43	3.39	3.784	O					4.34
21.083	2.41	3.39	3.777	O					4.34
21.167	2.38	3.39	3.770	O					4.34
21.250	2.36	3.38	3.764	O					4.33
21.333	2.34	3.38	3.756	O					4.33
21.417	2.32	3.38	3.749	O					4.32
21.500	2.30	3.38	3.742	O					4.32
21.583	2.28	3.38	3.734	O					4.32
21.667	2.26	3.38	3.727	O					4.31
21.750	2.24	3.38	3.719	O					4.31
21.833	2.22	3.38	3.711	O					4.30
21.917	2.20	3.37	3.703	O					4.30
22.000	2.18	3.37	3.695	O					4.29
22.083	2.17	3.37	3.686	O					4.29
22.167	2.15	3.37	3.678	O					4.29
22.250	2.13	3.37	3.670	O					4.28
22.333	2.12	3.37	3.661	O					4.28
22.417	2.10	3.37	3.652	O					4.27
22.500	2.08	3.36	3.644	O					4.27
22.583	2.07	3.36	3.635	O					4.26
22.667	2.05	3.36	3.626	O					4.26
22.750	2.04	3.36	3.617	O					4.25
22.833	2.02	3.36	3.608	O					4.25
22.917	2.01	3.36	3.598	O					4.24
23.000	2.00	3.35	3.589	O					4.24
23.083	1.98	3.35	3.580	O					4.23
23.167	1.97	3.35	3.570	O					4.23
23.250	1.96	3.35	3.561	O					4.22
23.333	1.94	3.35	3.551	O					4.22

23.417	1.93	3.35	3.541	0				4.21
23.500	1.92	3.34	3.532	0				4.20
23.583	1.91	3.34	3.522	0				4.20
23.667	1.90	3.34	3.512	0				4.19
23.750	1.88	3.34	3.502	0				4.19
23.833	1.87	3.34	3.492	0				4.18
23.917	1.86	3.34	3.482	0				4.18
24.000	1.85	3.33	3.471	0				4.17
24.083	1.79	3.33	3.461	0				4.17
24.167	1.49	3.33	3.449	IO				4.16
24.250	0.93	3.33	3.435	IO				4.15
24.333	0.63	3.32	3.417	IO				4.14
24.417	0.46	3.32	3.398	IO				4.13
24.500	0.35	3.32	3.378	IO				4.12
24.583	0.27	3.31	3.357	IO				4.11
24.667	0.21	3.31	3.336	IO				4.10
24.750	0.16	3.31	3.315	IO				4.09
24.833	0.13	3.30	3.293	IO				4.07
24.917	0.10	3.30	3.271	IO				4.06
25.000	0.07	3.29	3.249	IO				4.05
25.083	0.06	3.29	3.227	IO				4.04
25.167	0.04	3.29	3.204	IO				4.03
25.250	0.03	3.28	3.182	IO				4.01
25.333	0.03	3.28	3.160	IO				4.00
25.417	0.02	3.27	3.137	IO				3.99
25.500	0.01	3.27	3.115	IO				3.98
25.583	0.00	3.27	3.092	IO				3.96
25.667	0.00	3.26	3.070	IO				3.95
25.750	0.00	3.26	3.047	IO				3.94
25.833	0.00	3.25	3.025	IO				3.93
25.917	0.00	3.25	3.003	IO				3.91
26.000	0.00	3.25	2.980	IO				3.90
26.083	0.00	3.24	2.958	IO				3.89
26.167	0.00	3.24	2.936	IO				3.88
26.250	0.00	3.23	2.913	IO				3.86
26.333	0.00	3.23	2.891	IO				3.85
26.417	0.00	3.22	2.869	IO				3.84
26.500	0.00	3.22	2.847	IO				3.83
26.583	0.00	3.22	2.824	IO				3.81
26.667	0.00	3.21	2.802	IO				3.80
26.750	0.00	3.21	2.780	IO				3.79
26.833	0.00	3.20	2.758	IO				3.78
26.917	0.00	3.20	2.736	IO				3.76
27.000	0.00	3.19	2.714	IO				3.75
27.083	0.00	3.19	2.692	IO				3.74
27.167	0.00	3.19	2.670	IO				3.73
27.250	0.00	3.18	2.648	IO				3.71
27.333	0.00	3.18	2.626	IO				3.70
27.417	0.00	3.17	2.604	IO				3.69
27.500	0.00	3.17	2.583	IO				3.68
27.583	0.00	3.17	2.561	IO				3.66
27.667	0.00	3.16	2.539	IO				3.65
27.750	0.00	3.16	2.517	IO				3.64
27.833	0.00	3.15	2.495	IO				3.63
27.917	0.00	3.15	2.474	IO				3.62
28.000	0.00	3.15	2.452	IO				3.60
28.083	0.00	3.14	2.430	IO				3.59
28.167	0.00	3.14	2.409	IO				3.58

28.250	0.00	3.13	2.387	IO	3.57
28.333	0.00	3.13	2.366	IO	3.55
28.417	0.00	3.12	2.344	IO	3.54
28.500	0.00	3.12	2.323	IO	3.53
28.583	0.00	3.12	2.301	IO	3.52
28.667	0.00	3.11	2.280	IO	3.51
28.750	0.00	3.11	2.258	IO	3.49
28.833	0.00	3.10	2.237	IO	3.48
28.917	0.00	3.10	2.216	IO	3.47
29.000	0.00	3.10	2.194	IO	3.46
29.083	0.00	3.09	2.173	IO	3.44
29.167	0.00	3.09	2.152	IO	3.43
29.250	0.00	3.08	2.130	IO	3.42
29.333	0.00	3.08	2.109	IO	3.41
29.417	0.00	3.07	2.088	IO	3.40
29.500	0.00	3.07	2.067	IO	3.38
29.583	0.00	3.06	2.046	IO	3.37
29.667	0.00	3.06	2.025	IO	3.36
29.750	0.00	3.06	2.004	IO	3.35
29.833	0.00	3.05	1.983	IO	3.33
29.917	0.00	3.05	1.962	IO	3.32
30.000	0.00	3.04	1.941	IO	3.31
30.083	0.00	3.04	1.920	IO	3.30
30.167	0.00	3.03	1.899	IO	3.29
30.250	0.00	3.03	1.878	IO	3.27
30.333	0.00	3.03	1.857	IO	3.26
30.417	0.00	3.02	1.836	IO	3.25
30.500	0.00	3.02	1.815	IO	3.24
30.583	0.00	3.01	1.795	IO	3.23
30.667	0.00	3.01	1.774	IO	3.21
30.750	0.00	3.00	1.753	IO	3.20
30.833	0.00	3.00	1.732	IO	3.19
30.917	0.00	3.00	1.712	IO	3.18
31.000	0.00	2.99	1.691	IO	3.17
31.083	0.00	2.99	1.671	IO	3.15
31.167	0.00	2.98	1.650	IO	3.14
31.250	0.00	2.98	1.630	IO	3.13
31.333	0.00	2.97	1.609	IO	3.12
31.417	0.00	2.97	1.589	IO	3.11
31.500	0.00	2.97	1.568	IO	3.09
31.583	0.00	2.96	1.548	IO	3.08
31.667	0.00	2.96	1.527	IO	3.07
31.750	0.00	2.95	1.507	IO	3.06
31.833	0.00	2.95	1.487	IO	3.05
31.917	0.00	2.95	1.466	IO	3.04
32.000	0.00	2.94	1.446	IO	3.02
32.083	0.00	2.94	1.426	IO	3.01
32.167	0.00	2.93	1.406	IO	3.00
32.250	0.00	2.90	1.386	IO	2.92
32.333	0.00	2.87	1.366	IO	2.84
32.417	0.00	2.84	1.346	IO	2.77
32.500	0.00	2.82	1.326	IO	2.69
32.583	0.00	2.79	1.307	IO	2.61
32.667	0.00	2.76	1.288	IO	2.54
32.750	0.00	2.73	1.269	IO	2.47
32.833	0.00	2.70	1.251	IO	2.39
32.917	0.00	2.67	1.232	IO	2.32
33.000	0.00	2.64	1.214	IO	2.25

33.083	0.00	2.61	1.196	IO				2.18
33.167	0.00	2.58	1.178	IO				2.11
33.250	0.00	2.56	1.160	IO				2.04
33.333	0.00	2.53	1.143	IO				1.97
33.417	0.00	2.50	1.125	IO				1.90
33.500	0.00	2.47	1.108	IO				1.84
33.583	0.00	2.44	1.091	IO				1.77
33.667	0.00	2.41	1.075	IO				1.70
33.750	0.00	2.38	1.058	IO				1.64
33.833	0.00	2.35	1.042	IO				1.57
33.917	0.00	2.32	1.026	IO				1.51
34.000	0.00	2.31	1.010	IO				1.48
34.083	0.00	2.30	0.994	IO				1.46
34.167	0.00	2.29	0.978	IO				1.43
34.250	0.00	2.27	0.962	IO				1.41
34.333	0.00	2.26	0.947	IO				1.39
34.417	0.00	2.25	0.931	IO				1.37
34.500	0.00	2.24	0.916	IO				1.34
34.583	0.00	2.23	0.900	IO				1.32
34.667	0.00	2.22	0.885	IO				1.30
34.750	0.00	2.21	0.870	IO				1.28
34.833	0.00	2.20	0.855	IO				1.25
34.917	0.00	2.19	0.840	IO				1.23
35.000	0.00	2.18	0.825	IO				1.21
35.083	0.00	2.17	0.810	IO				1.19
35.167	0.00	2.15	0.795	IO				1.17
35.250	0.00	2.14	0.780	IO				1.14
35.333	0.00	2.13	0.765	IO				1.12
35.417	0.00	2.12	0.751	IO				1.10
35.500	0.00	2.11	0.736	IO				1.08
35.583	0.00	2.10	0.721	IO				1.06
35.667	0.00	2.09	0.707	IO				1.04
35.750	0.00	2.08	0.693	IO				1.02
35.833	0.00	2.06	0.678	IO				0.99
35.917	0.00	2.02	0.664	IO				0.97
36.000	0.00	1.98	0.650	IO				0.95
36.083	0.00	1.95	0.637	IO				0.93
36.167	0.00	1.91	0.624	IO				0.91
36.250	0.00	1.87	0.611	IO				0.90
36.333	0.00	1.84	0.598	IO				0.88
36.417	0.00	1.80	0.585	IO				0.86
36.500	0.00	1.77	0.573	IO				0.84
36.583	0.00	1.73	0.561	IO				0.82
36.667	0.00	1.70	0.549	0				0.81
36.750	0.00	1.67	0.538	0				0.79
36.833	0.00	1.63	0.526	0				0.77
36.917	0.00	1.60	0.515	0				0.76
37.000	0.00	1.57	0.504	0				0.74
37.083	0.00	1.54	0.493	0				0.72
37.167	0.00	1.51	0.483	0				0.71
37.250	0.00	1.48	0.473	0				0.69
37.333	0.00	1.45	0.462	0				0.68
37.417	0.00	1.43	0.453	0				0.66
37.500	0.00	1.40	0.443	0				0.65
37.583	0.00	1.37	0.433	0				0.64
37.667	0.00	1.35	0.424	0				0.62
37.750	0.00	1.32	0.415	0				0.61
37.833	0.00	1.29	0.406	0				0.59

37.917	0.00	1.27	0.397	0				0.58
38.000	0.00	1.25	0.388	0				0.57
38.083	0.00	1.22	0.380	0				0.56
38.167	0.00	1.20	0.371	0				0.54
38.250	0.00	1.18	0.363	0				0.53
38.333	0.00	1.15	0.355	0				0.52
38.417	0.00	1.13	0.347	0				0.51
38.500	0.00	1.11	0.340	0				0.50
38.583	0.00	1.08	0.332	0				0.49
38.667	0.00	1.06	0.325	0				0.48
38.750	0.00	1.04	0.318	0				0.47
38.833	0.00	1.01	0.310	0				0.46
38.917	0.00	0.99	0.304	0				0.45
39.000	0.00	0.97	0.297	0				0.44
39.083	0.00	0.95	0.290	0				0.43
39.167	0.00	0.93	0.284	0				0.42
39.250	0.00	0.91	0.277	0				0.41
39.333	0.00	0.88	0.271	0				0.40
39.417	0.00	0.87	0.265	0				0.39
39.500	0.00	0.85	0.259	0				0.38
39.583	0.00	0.83	0.254	0				0.37
39.667	0.00	0.81	0.248	0				0.36
39.750	0.00	0.79	0.242	0				0.36
39.833	0.00	0.77	0.237	0				0.35
39.917	0.00	0.76	0.232	0				0.34
40.000	0.00	0.74	0.227	0				0.33
40.083	0.00	0.72	0.222	0				0.32
40.167	0.00	0.71	0.217	0				0.32
40.250	0.00	0.69	0.212	0				0.31
40.333	0.00	0.68	0.207	0				0.30
40.417	0.00	0.66	0.203	0				0.30
40.500	0.00	0.65	0.198	0				0.29
40.583	0.00	0.63	0.194	0				0.28
40.667	0.00	0.62	0.189	0				0.28
40.750	0.00	0.60	0.185	0				0.27
40.833	0.00	0.59	0.181	0				0.27
40.917	0.00	0.58	0.177	0				0.26
41.000	0.00	0.56	0.173	0				0.25
41.083	0.00	0.55	0.169	0				0.25
41.167	0.00	0.54	0.166	0				0.24
41.250	0.00	0.53	0.162	0				0.24
41.333	0.00	0.52	0.158	0				0.23
41.417	0.00	0.50	0.155	0				0.23
41.500	0.00	0.49	0.151	0				0.22
41.583	0.00	0.48	0.148	0				0.22
41.667	0.00	0.47	0.145	0				0.21
41.750	0.00	0.46	0.141	0				0.21
41.833	0.00	0.45	0.138	0				0.20
41.917	0.00	0.44	0.135	0				0.20
42.000	0.00	0.43	0.132	0				0.19
42.083	0.00	0.42	0.129	0				0.19
42.167	0.00	0.41	0.126	0				0.19
42.250	0.00	0.40	0.124	0				0.18
42.333	0.00	0.39	0.121	0				0.18
42.417	0.00	0.39	0.118	0				0.17
42.500	0.00	0.38	0.116	0				0.17
42.583	0.00	0.37	0.113	0				0.17
42.667	0.00	0.36	0.110	0				0.16

42.750	0.00	0.35	0.108	0				0.16
42.833	0.00	0.34	0.106	0				0.15
42.917	0.00	0.34	0.103	0				0.15
43.000	0.00	0.33	0.101	0				0.15
43.083	0.00	0.32	0.099	0				0.14
43.167	0.00	0.31	0.097	0				0.14
43.250	0.00	0.31	0.094	0				0.14
43.333	0.00	0.30	0.092	0				0.14
43.417	0.00	0.29	0.090	0				0.13
43.500	0.00	0.29	0.088	0				0.13
43.583	0.00	0.28	0.086	0				0.13
43.667	0.00	0.28	0.084	0				0.12
43.750	0.00	0.27	0.082	0				0.12
43.833	0.00	0.26	0.081	0				0.12
43.917	0.00	0.26	0.079	0				0.12
44.000	0.00	0.25	0.077	0				0.11
44.083	0.00	0.25	0.075	0				0.11
44.167	0.00	0.24	0.074	0				0.11
44.250	0.00	0.24	0.072	0				0.11
44.333	0.00	0.23	0.070	0				0.10
44.417	0.00	0.22	0.069	0				0.10
44.500	0.00	0.22	0.067	0				0.10
44.583	0.00	0.21	0.066	0				0.10
44.667	0.00	0.21	0.064	0				0.09
44.750	0.00	0.21	0.063	0				0.09
44.833	0.00	0.20	0.062	0				0.09
44.917	0.00	0.20	0.060	0				0.09
45.000	0.00	0.19	0.059	0				0.09
45.083	0.00	0.19	0.058	0				0.08
45.167	0.00	0.18	0.056	0				0.08
45.250	0.00	0.18	0.055	0				0.08
45.333	0.00	0.18	0.054	0				0.08
45.417	0.00	0.17	0.053	0				0.08
45.500	0.00	0.17	0.051	0				0.08
45.583	0.00	0.16	0.050	0				0.07
45.667	0.00	0.16	0.049	0				0.07
45.750	0.00	0.16	0.048	0				0.07
45.833	0.00	0.15	0.047	0				0.07
45.917	0.00	0.15	0.046	0				0.07
46.000	0.00	0.15	0.045	0				0.07
46.083	0.00	0.14	0.044	0				0.06
46.167	0.00	0.14	0.043	0				0.06
46.250	0.00	0.14	0.042	0				0.06
46.333	0.00	0.13	0.041	0				0.06
46.417	0.00	0.13	0.040	0				0.06
46.500	0.00	0.13	0.039	0				0.06
46.583	0.00	0.13	0.038	0				0.06
46.667	0.00	0.12	0.038	0				0.06
46.750	0.00	0.12	0.037	0				0.05
46.833	0.00	0.12	0.036	0				0.05
46.917	0.00	0.11	0.035	0				0.05
47.000	0.00	0.11	0.034	0				0.05
47.083	0.00	0.11	0.034	0				0.05
47.167	0.00	0.11	0.033	0				0.05
47.250	0.00	0.10	0.032	0				0.05
47.333	0.00	0.10	0.031	0				0.05
47.417	0.00	0.10	0.031	0				0.05
47.500	0.00	0.10	0.030	0				0.04

47.583	0.00	0.10	0.029	0				0.04
47.667	0.00	0.09	0.029	0				0.04
47.750	0.00	0.09	0.028	0				0.04
47.833	0.00	0.09	0.027	0				0.04
47.917	0.00	0.09	0.027	0				0.04
48.000	0.00	0.09	0.026	0				0.04
48.083	0.00	0.08	0.026	0				0.04
48.167	0.00	0.08	0.025	0				0.04
48.250	0.00	0.08	0.025	0				0.04
48.333	0.00	0.08	0.024	0				0.04
48.417	0.00	0.08	0.023	0				0.03
48.500	0.00	0.07	0.023	0				0.03
48.583	0.00	0.07	0.022	0				0.03
48.667	0.00	0.07	0.022	0				0.03
48.750	0.00	0.07	0.021	0				0.03
48.833	0.00	0.07	0.021	0				0.03
48.917	0.00	0.07	0.020	0				0.03
49.000	0.00	0.07	0.020	0				0.03
49.083	0.00	0.06	0.020	0				0.03
49.167	0.00	0.06	0.019	0				0.03
49.250	0.00	0.06	0.019	0				0.03
49.333	0.00	0.06	0.018	0				0.03
49.417	0.00	0.06	0.018	0				0.03
49.500	0.00	0.06	0.018	0				0.03
49.583	0.00	0.06	0.017	0				0.03
49.667	0.00	0.05	0.017	0				0.02
49.750	0.00	0.05	0.016	0				0.02
49.833	0.00	0.05	0.016	0				0.02
49.917	0.00	0.05	0.016	0				0.02
50.000	0.00	0.05	0.015	0				0.02
50.083	0.00	0.05	0.015	0				0.02
50.167	0.00	0.05	0.015	0				0.02
50.250	0.00	0.05	0.014	0				0.02
50.333	0.00	0.05	0.014	0				0.02
50.417	0.00	0.04	0.014	0				0.02
50.500	0.00	0.04	0.013	0				0.02
50.583	0.00	0.04	0.013	0				0.02
50.667	0.00	0.04	0.013	0				0.02
50.750	0.00	0.04	0.012	0				0.02
50.833	0.00	0.04	0.012	0				0.02
50.917	0.00	0.04	0.012	0				0.02
51.000	0.00	0.04	0.012	0				0.02
51.083	0.00	0.04	0.011	0				0.02
51.167	0.00	0.04	0.011	0				0.02
51.250	0.00	0.04	0.011	0				0.02
51.333	0.00	0.03	0.011	0				0.02
51.417	0.00	0.03	0.010	0				0.02
51.500	0.00	0.03	0.010	0				0.01
51.583	0.00	0.03	0.010	0				0.01
51.667	0.00	0.03	0.010	0				0.01
51.750	0.00	0.03	0.010	0				0.01
51.833	0.00	0.03	0.009	0				0.01
51.917	0.00	0.03	0.009	0				0.01
52.000	0.00	0.03	0.009	0				0.01
52.083	0.00	0.03	0.009	0				0.01
52.167	0.00	0.03	0.009	0				0.01
52.250	0.00	0.03	0.008	0				0.01
52.333	0.00	0.03	0.008	0				0.01

52.417	0.00	0.03	0.008	0				0.01
52.500	0.00	0.03	0.008	0				0.01
52.583	0.00	0.02	0.008	0				0.01
52.667	0.00	0.02	0.007	0				0.01
52.750	0.00	0.02	0.007	0				0.01
52.833	0.00	0.02	0.007	0				0.01
52.917	0.00	0.02	0.007	0				0.01
53.000	0.00	0.02	0.007	0				0.01
53.083	0.00	0.02	0.007	0				0.01
53.167	0.00	0.02	0.007	0				0.01
53.250	0.00	0.02	0.006	0				0.01
53.333	0.00	0.02	0.006	0				0.01
53.417	0.00	0.02	0.006	0				0.01
53.500	0.00	0.02	0.006	0				0.01
53.583	0.00	0.02	0.006	0				0.01
53.667	0.00	0.02	0.006	0				0.01
53.750	0.00	0.02	0.006	0				0.01
53.833	0.00	0.02	0.005	0				0.01
53.917	0.00	0.02	0.005	0				0.01
54.000	0.00	0.02	0.005	0				0.01
54.083	0.00	0.02	0.005	0				0.01
54.167	0.00	0.02	0.005	0				0.01
54.250	0.00	0.02	0.005	0				0.01
54.333	0.00	0.02	0.005	0				0.01
54.417	0.00	0.02	0.005	0				0.01
54.500	0.00	0.01	0.005	0				0.01
54.583	0.00	0.01	0.004	0				0.01
54.667	0.00	0.01	0.004	0				0.01
54.750	0.00	0.01	0.004	0				0.01
54.833	0.00	0.01	0.004	0				0.01
54.917	0.00	0.01	0.004	0				0.01
55.000	0.00	0.01	0.004	0				0.01
55.083	0.00	0.01	0.004	0				0.01
55.167	0.00	0.01	0.004	0				0.01
55.250	0.00	0.01	0.004	0				0.01
55.333	0.00	0.01	0.004	0				0.01
55.417	0.00	0.01	0.004	0				0.01
55.500	0.00	0.01	0.003	0				0.01
55.583	0.00	0.01	0.003	0				0.00
55.667	0.00	0.01	0.003	0				0.00
55.750	0.00	0.01	0.003	0				0.00
55.833	0.00	0.01	0.003	0				0.00
55.917	0.00	0.01	0.003	0				0.00
56.000	0.00	0.01	0.003	0				0.00
56.083	0.00	0.01	0.003	0				0.00
56.167	0.00	0.01	0.003	0				0.00
56.250	0.00	0.01	0.003	0				0.00
56.333	0.00	0.01	0.003	0				0.00
56.417	0.00	0.01	0.003	0				0.00
56.500	0.00	0.01	0.003	0				0.00
56.583	0.00	0.01	0.003	0				0.00
56.667	0.00	0.01	0.003	0				0.00
56.750	0.00	0.01	0.002	0				0.00
56.833	0.00	0.01	0.002	0				0.00
56.917	0.00	0.01	0.002	0				0.00
57.000	0.00	0.01	0.002	0				0.00
57.083	0.00	0.01	0.002	0				0.00
57.167	0.00	0.01	0.002	0				0.00

57.250	0.00	0.01	0.002	0				0.00
57.333	0.00	0.01	0.002	0				0.00
57.417	0.00	0.01	0.002	0				0.00
57.500	0.00	0.01	0.002	0				0.00
57.583	0.00	0.01	0.002	0				0.00
57.667	0.00	0.01	0.002	0				0.00
57.750	0.00	0.01	0.002	0				0.00
57.833	0.00	0.01	0.002	0				0.00
57.917	0.00	0.01	0.002	0				0.00
58.000	0.00	0.01	0.002	0				0.00
58.083	0.00	0.01	0.002	0				0.00
58.167	0.00	0.01	0.002	0				0.00
58.250	0.00	0.01	0.002	0				0.00
58.333	0.00	0.01	0.002	0				0.00
58.417	0.00	0.01	0.002	0				0.00
58.500	0.00	0.01	0.002	0				0.00
58.583	0.00	0.00	0.002	0				0.00
58.667	0.00	0.00	0.001	0				0.00
58.750	0.00	0.00	0.001	0				0.00
58.833	0.00	0.00	0.001	0				0.00
58.917	0.00	0.00	0.001	0				0.00
59.000	0.00	0.00	0.001	0				0.00
59.083	0.00	0.00	0.001	0				0.00
59.167	0.00	0.00	0.001	0				0.00
59.250	0.00	0.00	0.001	0				0.00
59.333	0.00	0.00	0.001	0				0.00
59.417	0.00	0.00	0.001	0				0.00
59.500	0.00	0.00	0.001	0				0.00
59.583	0.00	0.00	0.001	0				0.00
59.667	0.00	0.00	0.001	0				0.00
59.750	0.00	0.00	0.001	0				0.00
59.833	0.00	0.00	0.001	0				0.00
59.917	0.00	0.00	0.001	0				0.00
60.000	0.00	0.00	0.001	0				0.00
60.083	0.00	0.00	0.001	0				0.00
60.167	0.00	0.00	0.001	0				0.00
60.250	0.00	0.00	0.001	0				0.00
60.333	0.00	0.00	0.001	0				0.00
60.417	0.00	0.00	0.001	0				0.00
60.500	0.00	0.00	0.001	0				0.00
60.583	0.00	0.00	0.001	0				0.00
60.667	0.00	0.00	0.001	0				0.00
60.750	0.00	0.00	0.001	0				0.00
60.833	0.00	0.00	0.001	0				0.00
60.917	0.00	0.00	0.001	0				0.00
61.000	0.00	0.00	0.001	0				0.00
61.083	0.00	0.00	0.001	0				0.00
61.167	0.00	0.00	0.001	0				0.00
61.250	0.00	0.00	0.001	0				0.00
61.333	0.00	0.00	0.001	0				0.00
61.417	0.00	0.00	0.001	0				0.00
61.500	0.00	0.00	0.001	0				0.00
61.583	0.00	0.00	0.001	0				0.00

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

Number of intervals = 739
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 3.405 (CFS)

Total volume = 8.059 (Ac.Ft)
Status of hydrographs being held in storage

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

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014
Study date: 05/08/20

204728 - US Cold Storage
PROPOSED BASIN - AREA A
10-YEAR, 24- HOUR STORM
BY: SG DATE: 05-08-20

Program License Serial Number 6320

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

From study/file name: PROPA10.rte

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

Number of intervals = 307

Time interval = 5.0 (Min.)

Maximum/Peak flow rate = 112.265 (CFS)

Total volume = 16.875 (Ac.Ft)

Status of hydrographs being held in storage

Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
Process from Point/Station 4.000 to Point/Station 5.000
**** RETARDING BASIN ROUTING ****

Program computation of outflow v. depth

CALCULATED OUTFLOW DATA AT DEPTH = 0.50(Ft.)
Total outflow at this depth = 0.00(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 1.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
Calculated individual pipe flow = 1.112(CFS)
Normal flow depth in pipe = 4.38(In.)
Flow top width inside pipe = 7.96(In.)
Critical Depth = 0.50(Ft.)

Calculated flow rate through pipe(s) = 1.112(CFS)

Total outflow at this depth = 1.11(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 1.50(Ft.)

Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)

Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)

NOTE: Assuming free outlet flow.

NOTE: Normal flow is pressure flow.

The total friction loss through the pipe is 2.000(Ft.)

Pipe friction loss = 1.178(Ft.)

Minor friction loss = 0.822(Ft.) K-factor = 1.50

Calculated flow rate through pipe(s) = 2.074(CFS)

Total outflow at this depth = 2.07(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 2.00(Ft.)

Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)

Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)

NOTE: Assuming free outlet flow.

NOTE: Normal flow is pressure flow.

The total friction loss through the pipe is 2.500(Ft.)

Pipe friction loss = 1.472(Ft.)

Minor friction loss = 1.027(Ft.) K-factor = 1.50

Calculated flow rate through pipe(s) = 2.318(CFS)

Total outflow at this depth = 2.32(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 2.50(Ft.)

Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)

Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)

NOTE: Assuming free outlet flow.

NOTE: Normal flow is pressure flow.

The total friction loss through the pipe is 3.000(Ft.)

Pipe friction loss = 1.767(Ft.)

Minor friction loss = 1.233(Ft.) K-factor = 1.50

Calculated flow rate through pipe(s) = 2.540(CFS)

Total outflow at this depth = 2.54(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 2.99(Ft.)

Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)

Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)

NOTE: Assuming free outlet flow.

NOTE: Normal flow is pressure flow.

The total friction loss through the pipe is 3.490(Ft.)

Pipe friction loss = 2.055(Ft.)

Minor friction loss = 1.434(Ft.) K-factor = 1.50

Calculated flow rate through pipe(s) = 2.739(CFS)

Total outflow at this depth = 2.74(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 3.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.500(Ft.)
Pipe friction loss = 2.061(Ft.)
Minor friction loss = 1.438(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 2.743(CFS)

Total outflow at this depth = 2.74(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 3.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.000(Ft.)
Pipe friction loss = 2.355(Ft.)
Minor friction loss = 1.644(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 2.932(CFS)

Total outflow at this depth = 2.93(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 4.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.500(Ft.)
Pipe friction loss = 2.650(Ft.)
Minor friction loss = 1.849(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.110(CFS)

Total outflow at this depth = 3.11(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 4.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.000(Ft.)
Pipe friction loss = 2.944(Ft.)
Minor friction loss = 2.055(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.279(CFS)

Total outflow at this depth = 3.28(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 5.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.500(Ft.)
Pipe friction loss = 3.239(Ft.)
Minor friction loss = 2.260(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.439(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 1.768(CFS)
Normal flow depth in pipe = 3.34(In.)
Flow top width inside pipe = 14.00(In.)
Critical Depth = 0.50(Ft.)
Calculated flow rate through pipe(s) = 1.768(CFS)

Total outflow at this depth = 5.21(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 5.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 6.000(Ft.)
Pipe friction loss = 3.533(Ft.)
Minor friction loss = 2.466(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.591(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 6.687(CFS)
Normal flow depth in pipe = 6.57(In.)
Flow top width inside pipe = 17.33(In.)
Critical Depth = 1.00(Ft.)
Calculated flow rate through pipe(s) = 6.687(CFS)

Total outflow at this depth = 10.28(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 6.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 6.500(Ft.)
Pipe friction loss = 3.828(Ft.)
Minor friction loss = 2.671(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.738(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.500(Ft.)
Pipe friction loss = 1.145(Ft.)
Minor friction loss = 2.356(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 17.772(CFS)

Total outflow at this depth = 21.51(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 6.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 7.000(Ft.)
Pipe friction loss = 4.122(Ft.)
Minor friction loss = 2.877(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.879(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.000(Ft.)
Pipe friction loss = 1.309(Ft.)
Minor friction loss = 2.692(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 18.999(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 1.768(CFS)
Normal flow depth in pipe = 3.34(In.)
Flow top width inside pipe = 14.00(In.)
Critical Depth = 0.50(Ft.)
Calculated flow rate through pipe(s) = 1.768(CFS)

Total outflow at this depth = 24.65(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 7.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 7.500(Ft.)
Pipe friction loss = 4.417(Ft.)
Minor friction loss = 3.082(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.015(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)

Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.500(Ft.)
Pipe friction loss = 1.472(Ft.)
Minor friction loss = 3.029(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 20.152(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 6.687(CFS)
Normal flow depth in pipe = 6.57(In.)
Flow top width inside pipe = 17.33(In.)
Critical Depth = 1.00(Ft.)
Calculated flow rate through pipe(s) = 6.687(CFS)

Total outflow at this depth = 30.85(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 7.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 8.000(Ft.)
Pipe friction loss = 4.711(Ft.)
Minor friction loss = 3.288(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.147(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.000(Ft.)
Pipe friction loss = 1.636(Ft.)
Minor friction loss = 3.366(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 21.242(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.500(Ft.)
Pipe friction loss = 1.145(Ft.)
Minor friction loss = 2.356(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 17.772(CFS)

Total outflow at this depth = 43.16(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 8.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 8.500(Ft.)
Pipe friction loss = 5.005(Ft.)
Minor friction loss = 3.493(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.275(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.500(Ft.)
Pipe friction loss = 1.799(Ft.)
Minor friction loss = 3.702(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 22.279(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.000(Ft.)
Pipe friction loss = 1.309(Ft.)
Minor friction loss = 2.692(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 18.999(CFS)

Weir capacity using equation $Q = CLH^{Exp}$ (Using Feet as units)
Weir Length = 3.00(Ft.) C value = 2.63 Exp = 1.50
Weir flow: Depth = H = 0.50(Ft.) Flow = 2.79 (CFS)

Total outflow at this depth = 48.34(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 8.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 9.000(Ft.)
Pipe friction loss = 5.300(Ft.)
Minor friction loss = 3.698(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.399(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 6.000(Ft.)
Pipe friction loss = 1.963(Ft.)
Minor friction loss = 4.039(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 23.269(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)

Manning's N = 0.013 No. of pipes = 1
 Given pipe size = 18.00(In.)
 NOTE: Assuming free outlet flow.
 NOTE: Normal flow is pressure flow.
 The total friction loss through the pipe is 4.500(Ft.)
 Pipe friction loss = 1.472(Ft.)
 Minor friction loss = 3.029(Ft.) K-factor = 1.50
 Calculated flow rate through pipe(s) = 20.152(CFS)

Weir capacity using equation $Q = CLH^{Exp}$ (Using Feet as units)
 Weir Length = 3.00(Ft.) C value = 2.63 Exp = 1.50
 Weir flow: Depth = H = 1.00(Ft.) Flow = 7.89 (CFS)

Total outflow at this depth = 55.71(CFS)

 Total number of inflow hydrograph intervals = 307
 Hydrograph time unit = 5.000 (Min.)
 Initial depth in storage basin = 0.00(Ft.)

 Initial basin depth = 0.00 (Ft.)
 Initial basin storage = 0.00 (Ac.Ft)
 Initial basin outflow = 0.00 (CFS)

 Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.341	0.000	0.341	0.341
1.000	0.682	1.112	0.678	0.686
1.500	1.023	2.074	1.016	1.030
2.000	1.150	2.318	1.142	1.158
2.500	1.278	2.540	1.269	1.287
2.990	1.403	2.739	1.394	1.412
3.000	1.404	2.743	1.395	1.413
3.500	2.268	2.932	2.258	2.278
4.000	3.157	3.110	3.146	3.168
4.500	4.071	3.279	4.060	4.082
5.000	5.010	5.207	4.992	5.028
5.500	5.980	10.278	5.945	6.015
6.000	6.971	21.510	6.897	7.045
6.500	7.990	24.647	7.905	8.075
7.000	9.038	30.854	8.932	9.144
7.500	10.113	43.161	9.964	10.262
8.000	11.216	48.343	11.050	11.382
8.500	12.349	55.710	12.157	12.541

 Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	Depth (Ft.)
.0			0	28.1
28.1			56.13	56.13
56.13			84.20	84.20
84.20			112.26	112.26

0.083	0.12	0.00	0.000	0				0.00
0.167	0.80	0.00	0.004	0				0.01
0.250	2.10	0.00	0.014	0				0.02
0.333	2.80	0.00	0.030	0				0.04
0.417	3.20	0.00	0.051	0				0.07
0.500	3.46	0.00	0.074	0				0.11
0.583	3.66	0.00	0.099	OI				0.14
0.667	3.81	0.00	0.124	OI				0.18
0.750	3.92	0.00	0.151	OI				0.22
0.833	4.01	0.00	0.178	OI				0.26
0.917	4.09	0.00	0.206	OI				0.30
1.000	4.15	0.00	0.234	OI				0.34
1.083	4.21	0.00	0.263	OI				0.39
1.167	4.25	0.00	0.292	OI				0.43
1.250	4.28	0.00	0.322	OI				0.47
1.333	4.31	0.03	0.351	OI				0.52
1.417	4.34	0.13	0.380	OI				0.56
1.500	4.37	0.22	0.409	OI				0.60
1.583	4.40	0.32	0.438	OI				0.64
1.667	4.42	0.41	0.466	OI				0.68
1.750	4.43	0.50	0.493	OI				0.72
1.833	4.44	0.58	0.520	OI				0.76
1.917	4.46	0.67	0.546	OI				0.80
2.000	4.47	0.75	0.572	OI				0.84
2.083	4.48	0.84	0.597	OI				0.88
2.167	4.50	0.92	0.622	OI				0.91
2.250	4.51	1.00	0.647	OI				0.95
2.333	4.52	1.08	0.671	OI				0.98
2.417	4.53	1.15	0.694	OI				1.02
2.500	4.55	1.21	0.717	OI				1.05
2.583	4.56	1.28	0.740	OI				1.09
2.667	4.57	1.34	0.763	OI				1.12
2.750	4.59	1.40	0.785	OI				1.15
2.833	4.60	1.46	0.806	OI				1.18
2.917	4.62	1.52	0.828	OI				1.21
3.000	4.63	1.58	0.849	OI				1.24
3.083	4.64	1.64	0.870	OI				1.28
3.167	4.66	1.70	0.890	OI				1.31
3.250	4.67	1.76	0.911	OI				1.34
3.333	4.69	1.81	0.931	OI				1.36
3.417	4.70	1.87	0.950	OI				1.39
3.500	4.72	1.92	0.970	OI				1.42
3.583	4.73	1.98	0.989	OI				1.45
3.667	4.75	2.03	1.008	OI				1.48
3.750	4.76	2.08	1.026	OI				1.51
3.833	4.78	2.11	1.045	OI				1.58
3.917	4.79	2.15	1.063	OI				1.66
4.000	4.81	2.19	1.081	OI				1.73
4.083	4.82	2.22	1.099	OI				1.80
4.167	4.84	2.25	1.117	OI				1.87
4.250	4.86	2.29	1.135	OI				1.94
4.333	4.87	2.32	1.152	OI				2.01
4.417	4.89	2.35	1.170	OI				2.08
4.500	4.91	2.38	1.187	OI				2.15
4.583	4.92	2.41	1.204	OI				2.21
4.667	4.94	2.44	1.222	OI				2.28
4.750	4.96	2.47	1.239	OI				2.35
4.833	4.98	2.50	1.256	OI				2.41

4.917	4.99	2.53	1.273	OI				2.48
5.000	5.01	2.56	1.290	OI				2.55
5.083	5.03	2.59	1.307	OI				2.61
5.167	5.05	2.61	1.324	OI				2.68
5.250	5.07	2.64	1.340	OI				2.74
5.333	5.08	2.67	1.357	OI				2.81
5.417	5.10	2.69	1.374	OI				2.87
5.500	5.12	2.72	1.390	OI				2.94
5.583	5.14	2.74	1.407	OI				3.00
5.667	5.16	2.75	1.423	OI				3.01
5.750	5.18	2.75	1.440	OI				3.02
5.833	5.20	2.75	1.457	OI				3.03
5.917	5.22	2.76	1.474	OI				3.04
6.000	5.24	2.76	1.491	OI				3.05
6.083	5.26	2.77	1.508	OI				3.06
6.167	5.28	2.77	1.525	OI				3.07
6.250	5.30	2.77	1.542	OI				3.08
6.333	5.33	2.78	1.560	OI				3.09
6.417	5.35	2.78	1.578	OI				3.10
6.500	5.37	2.78	1.595	OI				3.11
6.583	5.39	2.79	1.613	OI				3.12
6.667	5.41	2.79	1.631	OI				3.13
6.750	5.44	2.80	1.649	OI				3.14
6.833	5.46	2.80	1.667	OI				3.15
6.917	5.48	2.80	1.686	OI				3.16
7.000	5.51	2.81	1.704	OI				3.17
7.083	5.53	2.81	1.723	OI				3.18
7.167	5.56	2.82	1.742	OI				3.20
7.250	5.58	2.82	1.761	OI				3.21
7.333	5.60	2.83	1.780	OI				3.22
7.417	5.63	2.83	1.799	OI				3.23
7.500	5.66	2.83	1.818	OI				3.24
7.583	5.68	2.84	1.838	OI				3.25
7.667	5.71	2.84	1.858	OI				3.26
7.750	5.74	2.85	1.877	OI				3.27
7.833	5.76	2.85	1.897	OI				3.29
7.917	5.79	2.86	1.917	OI				3.30
8.000	5.82	2.86	1.938	OI				3.31
8.083	5.85	2.86	1.958	OI				3.32
8.167	5.88	2.87	1.979	OI				3.33
8.250	5.91	2.87	2.000	OI				3.34
8.333	5.94	2.88	2.021	OI				3.36
8.417	5.97	2.88	2.042	OI				3.37
8.500	6.00	2.89	2.063	OI				3.38
8.583	6.03	2.89	2.085	OI				3.39
8.667	6.06	2.90	2.106	OI				3.41
8.750	6.09	2.90	2.128	OI				3.42
8.833	6.12	2.91	2.150	OI				3.43
8.917	6.16	2.91	2.172	OI				3.44
9.000	6.19	2.92	2.195	OI				3.46
9.083	6.23	2.92	2.218	OI				3.47
9.167	6.26	2.93	2.240	OI				3.48
9.250	6.30	2.93	2.264	OI				3.50
9.333	6.33	2.94	2.287	OI				3.51
9.417	6.37	2.94	2.310	OI				3.52
9.500	6.41	2.95	2.334	OI				3.54
9.583	6.45	2.95	2.358	OI				3.55
9.667	6.48	2.96	2.382	OI				3.56

9.750	6.53	2.96	2.407	OI	3.58
9.833	6.56	2.97	2.431	OI	3.59
9.917	6.61	2.97	2.456	OI	3.61
10.000	6.65	2.98	2.481	OI	3.62
10.083	6.69	2.98	2.507	OI	3.63
10.167	6.73	2.99	2.533	OI	3.65
10.250	6.78	2.99	2.558	OI	3.66
10.333	6.83	3.00	2.585	OI	3.68
10.417	6.87	3.00	2.611	OI	3.69
10.500	6.92	3.01	2.638	OI	3.71
10.583	6.97	3.01	2.665	OI	3.72
10.667	7.02	3.02	2.693	O I	3.74
10.750	7.07	3.02	2.720	O I	3.75
10.833	7.12	3.03	2.748	O I	3.77
10.917	7.17	3.03	2.777	O I	3.79
11.000	7.23	3.04	2.805	O I	3.80
11.083	7.28	3.05	2.834	O I	3.82
11.167	7.34	3.05	2.864	O I	3.84
11.250	7.40	3.06	2.893	O I	3.85
11.333	7.46	3.06	2.923	O I	3.87
11.417	7.52	3.07	2.954	O I	3.89
11.500	7.58	3.08	2.985	O I	3.90
11.583	7.65	3.08	3.016	O I	3.92
11.667	7.71	3.09	3.048	O I	3.94
11.750	7.78	3.09	3.080	O I	3.96
11.833	7.85	3.10	3.112	O I	3.97
11.917	7.92	3.11	3.145	O I	3.99
12.000	7.99	3.11	3.178	O I	4.01
12.083	8.06	3.12	3.212	O I	4.03
12.167	8.06	3.13	3.246	O I	4.05
12.250	7.99	3.13	3.280	O I	4.07
12.333	8.00	3.14	3.313	O I	4.09
12.417	8.04	3.15	3.347	O I	4.10
12.500	8.10	3.15	3.381	O I	4.12
12.583	8.17	3.16	3.415	O I	4.14
12.667	8.25	3.16	3.450	O I	4.16
12.750	8.34	3.17	3.485	O I	4.18
12.833	8.43	3.18	3.521	O I	4.20
12.917	8.53	3.18	3.558	O I	4.22
13.000	8.63	3.19	3.595	O I	4.24
13.083	8.74	3.20	3.632	O I	4.26
13.167	8.85	3.20	3.671	O I	4.28
13.250	8.97	3.21	3.710	O I	4.30
13.333	9.09	3.22	3.750	O I	4.32
13.417	9.23	3.23	3.791	O I	4.35
13.500	9.36	3.23	3.833	O I	4.37
13.583	9.51	3.24	3.876	O I	4.39
13.667	9.65	3.25	3.919	O I	4.42
13.750	9.82	3.26	3.964	O I	4.44
13.833	9.98	3.27	4.010	O I	4.47
13.917	10.16	3.28	4.056	O I	4.49
14.000	10.34	3.35	4.104	O I	4.52
14.083	10.54	3.45	4.153	O I	4.54
14.167	10.75	3.55	4.202	O I	4.57
14.250	11.00	3.65	4.252	O I	4.60
14.333	11.23	3.76	4.303	O I	4.62
14.417	11.49	3.86	4.355	O I	4.65
14.500	11.76	3.97	4.408	O I	4.68

14.583	12.05	4.08	4.462	0 I				4.71
14.667	12.35	4.20	4.518	0 I				4.74
14.750	12.69	4.31	4.575	0 I				4.77
14.833	13.05	4.43	4.633	0 I				4.80
14.917	13.45	4.56	4.694	0 I				4.83
15.000	13.87	4.69	4.756	0 I				4.86
15.083	14.35	4.82	4.820	0 I				4.90
15.167	14.87	4.96	4.887	0 I				4.93
15.250	15.47	5.10	4.957	0 I				4.97
15.333	16.13	5.31	5.030	0 I				5.01
15.417	16.69	5.71	5.105	0 I				5.05
15.500	16.31	6.09	5.178	0 I				5.09
15.583	15.01	6.43	5.243	0 I				5.12
15.667	14.89	6.73	5.301	0 I				5.15
15.750	15.65	7.03	5.359	0 I				5.18
15.833	17.04	7.36	5.422	0 I				5.21
15.917	19.53	7.75	5.496	0 I				5.25
16.000	24.19	8.24	5.591	0 I				5.30
16.083	39.33	9.08	5.750	0	I			5.38
16.167	79.02	11.49	6.087	0		I		5.55
16.250	112.26	17.81	6.645	0			I	5.84
16.333	71.48	22.03	7.140	0		I		6.08
16.417	48.10	22.82	7.397	0	I			6.21
16.500	37.45	23.24	7.533	0	I			6.28
16.583	32.39	23.49	7.613	0	I			6.32
16.667	28.49	23.63	7.660	0 I				6.34
16.750	24.78	23.70	7.681	0 I				6.35
16.833	22.38	23.69	7.680	0				6.35
16.917	20.19	23.64	7.664	0				6.34
17.000	18.43	23.55	7.634	0				6.33
17.083	16.84	23.43	7.594	0				6.31
17.167	15.36	23.27	7.544	0				6.28
17.250	14.03	23.09	7.485	0				6.25
17.333	13.39	22.90	7.421	0				6.22
17.417	12.94	22.69	7.355	0				6.19
17.500	12.30	22.48	7.287	0				6.15
17.583	11.36	22.26	7.214	0				6.12
17.667	10.75	22.02	7.138	0				6.08
17.750	9.80	21.78	7.058	0				6.04
17.833	9.47	21.52	6.975	0				6.00
17.917	9.18	20.64	6.894	0				5.96
18.000	8.92	19.77	6.817	0				5.92
18.083	8.69	18.94	6.744	0				5.89
18.167	8.54	18.17	6.676	0				5.85
18.250	8.47	17.44	6.612	0				5.82
18.333	8.36	16.76	6.552	0				5.79
18.417	8.22	16.13	6.496	0				5.76
18.500	8.08	15.53	6.443	0				5.73
18.583	7.94	14.96	6.393	0				5.71
18.667	7.81	14.43	6.346	0				5.68
18.750	7.68	13.93	6.302	0				5.66
18.833	7.56	13.45	6.260	0				5.64
18.917	7.44	13.01	6.221	0				5.62
19.000	7.32	12.58	6.183	0				5.60
19.083	7.21	12.18	6.148	0				5.58
19.167	7.11	11.81	6.115	0				5.57
19.250	7.01	11.45	6.083	0				5.55
19.333	6.91	11.11	6.054	0				5.54

19.417	6.82	10.79	6.025	I 0					5.52
19.500	6.73	10.49	5.999	IO					5.51
19.583	6.65	10.24	5.973	IO					5.50
19.667	6.56	10.12	5.949	IO					5.48
19.750	6.48	9.99	5.925	IO					5.47
19.833	6.40	9.86	5.901	IO					5.46
19.917	6.33	9.74	5.877	IO					5.45
20.000	6.26	9.62	5.854	IO					5.43
20.083	6.19	9.50	5.831	IO					5.42
20.167	6.12	9.38	5.808	IO					5.41
20.250	6.05	9.26	5.786	IO					5.40
20.333	5.99	9.15	5.764	IO					5.39
20.417	5.93	9.04	5.742	IO					5.38
20.500	5.87	8.92	5.721	IO					5.37
20.583	5.81	8.82	5.700	IO					5.36
20.667	5.76	8.71	5.680	IO					5.35
20.750	5.70	8.60	5.660	IO					5.33
20.833	5.65	8.50	5.640	IO					5.32
20.917	5.60	8.40	5.620	IO					5.31
21.000	5.55	8.30	5.601	IO					5.30
21.083	5.50	8.20	5.583	IO					5.30
21.167	5.45	8.10	5.564	IO					5.29
21.250	5.41	8.01	5.546	IO					5.28
21.333	5.36	7.92	5.528	IO					5.27
21.417	5.32	7.83	5.511	IO					5.26
21.500	5.28	7.74	5.494	IO					5.25
21.583	5.24	7.65	5.477	IO					5.24
21.667	5.20	7.56	5.461	IO					5.23
21.750	5.16	7.48	5.444	IO					5.22
21.833	5.12	7.40	5.429	IO					5.22
21.917	5.08	7.31	5.413	IO					5.21
22.000	5.04	7.23	5.398	IO					5.20
22.083	5.01	7.16	5.383	IO					5.19
22.167	4.97	7.08	5.368	IO					5.18
22.250	4.94	7.00	5.354	0					5.18
22.333	4.90	6.93	5.340	0					5.17
22.417	4.87	6.86	5.326	0					5.16
22.500	4.84	6.79	5.312	0					5.16
22.583	4.80	6.72	5.299	0					5.15
22.667	4.77	6.65	5.286	0					5.14
22.750	4.74	6.58	5.273	0					5.14
22.833	4.71	6.52	5.261	0					5.13
22.917	4.68	6.45	5.248	0					5.12
23.000	4.65	6.39	5.236	0					5.12
23.083	4.63	6.33	5.224	0					5.11
23.167	4.60	6.27	5.213	0					5.10
23.250	4.57	6.21	5.201	0					5.10
23.333	4.54	6.15	5.190	0					5.09
23.417	4.52	6.09	5.179	0					5.09
23.500	4.49	6.04	5.169	0					5.08
23.583	4.47	5.98	5.158	0					5.08
23.667	4.44	5.93	5.148	0					5.07
23.750	4.42	5.87	5.138	0					5.07
23.833	4.39	5.82	5.128	0					5.06
23.917	4.37	5.77	5.118	0					5.06
24.000	4.35	5.72	5.108	0					5.05
24.083	4.20	5.67	5.098	0					5.05
24.167	3.50	5.61	5.086	IO					5.04

24.250	2.19	5.51	5.067	IO				5.03
24.333	1.48	5.38	5.043	IO				5.02
24.417	1.08	5.23	5.015	IO				5.00
24.500	0.82	5.16	4.986	IO				4.99
24.583	0.63	5.09	4.955	IO				4.97
24.667	0.49	5.03	4.924	IO				4.95
24.750	0.38	4.97	4.893	IO				4.94
24.833	0.30	4.90	4.861	IO				4.92
24.917	0.23	4.84	4.830	IO				4.90
25.000	0.18	4.77	4.798	IO				4.89
25.083	0.13	4.71	4.766	IO				4.87
25.167	0.10	4.64	4.735	IO				4.85
25.250	0.08	4.58	4.704	IO				4.84
25.333	0.06	4.51	4.673	IO				4.82
25.417	0.04	4.45	4.643	IO				4.80
25.500	0.02	4.39	4.612	IO				4.79
25.583	0.01	4.33	4.582	IO				4.77
25.667	0.00	4.27	4.553	IO				4.76
25.750	0.00	4.21	4.524	IO				4.74
25.833	0.00	4.15	4.495	IO				4.73
25.917	0.00	4.09	4.466	IO				4.71
26.000	0.00	4.03	4.438	IO				4.70
26.083	0.00	3.98	4.411	IO				4.68
26.167	0.00	3.92	4.384	IO				4.67
26.250	0.00	3.87	4.357	IO				4.65
26.333	0.00	3.81	4.330	IO				4.64
26.417	0.00	3.76	4.304	IO				4.62
26.500	0.00	3.71	4.279	IO				4.61
26.583	0.00	3.65	4.253	IO				4.60
26.667	0.00	3.60	4.228	IO				4.58
26.750	0.00	3.55	4.204	IO				4.57
26.833	0.00	3.50	4.179	0				4.56
26.917	0.00	3.45	4.156	0				4.55
27.000	0.00	3.40	4.132	0				4.53
27.083	0.00	3.36	4.109	0				4.52
27.167	0.00	3.31	4.086	0				4.51
27.250	0.00	3.28	4.063	0				4.50
27.333	0.00	3.27	4.040	0				4.48
27.417	0.00	3.27	4.018	0				4.47
27.500	0.00	3.26	3.995	0				4.46
27.583	0.00	3.26	3.973	0				4.45
27.667	0.00	3.26	3.951	0				4.43
27.750	0.00	3.25	3.928	0				4.42
27.833	0.00	3.25	3.906	0				4.41
27.917	0.00	3.24	3.883	0				4.40
28.000	0.00	3.24	3.861	0				4.39
28.083	0.00	3.24	3.839	0				4.37
28.167	0.00	3.23	3.816	0				4.36
28.250	0.00	3.23	3.794	0				4.35
28.333	0.00	3.22	3.772	0				4.34
28.417	0.00	3.22	3.750	0				4.32
28.500	0.00	3.22	3.728	0				4.31
28.583	0.00	3.21	3.706	0				4.30
28.667	0.00	3.21	3.683	0				4.29
28.750	0.00	3.20	3.661	0				4.28
28.833	0.00	3.20	3.639	0				4.26
28.917	0.00	3.20	3.617	0				4.25
29.000	0.00	3.19	3.595	0				4.24

29.083	0.00	3.19	3.573	0				4.23
29.167	0.00	3.18	3.551	0				4.22
29.250	0.00	3.18	3.530	0				4.20
29.333	0.00	3.17	3.508	0				4.19
29.417	0.00	3.17	3.486	0				4.18
29.500	0.00	3.17	3.464	0				4.17
29.583	0.00	3.16	3.442	0				4.16
29.667	0.00	3.16	3.420	0				4.14
29.750	0.00	3.15	3.399	0				4.13
29.833	0.00	3.15	3.377	0				4.12
29.917	0.00	3.15	3.355	0				4.11
30.000	0.00	3.14	3.334	0				4.10
30.083	0.00	3.14	3.312	0				4.08
30.167	0.00	3.13	3.290	0				4.07
30.250	0.00	3.13	3.269	0				4.06
30.333	0.00	3.13	3.247	0				4.05
30.417	0.00	3.12	3.226	0				4.04
30.500	0.00	3.12	3.204	0				4.03
30.583	0.00	3.12	3.183	0				4.01
30.667	0.00	3.11	3.161	0				4.00
30.750	0.00	3.11	3.140	0				3.99
30.833	0.00	3.10	3.119	0				3.98
30.917	0.00	3.10	3.097	0				3.97
31.000	0.00	3.09	3.076	0				3.95
31.083	0.00	3.09	3.055	0				3.94
31.167	0.00	3.09	3.033	0				3.93
31.250	0.00	3.08	3.012	0				3.92
31.333	0.00	3.08	2.991	0				3.91
31.417	0.00	3.07	2.970	0				3.89
31.500	0.00	3.07	2.949	0				3.88
31.583	0.00	3.06	2.927	0				3.87
31.667	0.00	3.06	2.906	0				3.86
31.750	0.00	3.06	2.885	0				3.85
31.833	0.00	3.05	2.864	0				3.84
31.917	0.00	3.05	2.843	0				3.82
32.000	0.00	3.04	2.822	0				3.81
32.083	0.00	3.04	2.801	0				3.80
32.167	0.00	3.03	2.780	0				3.79
32.250	0.00	3.03	2.759	0				3.78
32.333	0.00	3.03	2.739	0				3.76
32.417	0.00	3.02	2.718	0				3.75
32.500	0.00	3.02	2.697	0				3.74
32.583	0.00	3.01	2.676	0				3.73
32.667	0.00	3.01	2.655	0				3.72
32.750	0.00	3.01	2.635	0				3.71
32.833	0.00	3.00	2.614	0				3.69
32.917	0.00	3.00	2.593	0				3.68
33.000	0.00	2.99	2.573	0				3.67
33.083	0.00	2.99	2.552	0				3.66
33.167	0.00	2.99	2.532	0				3.65
33.250	0.00	2.98	2.511	0				3.64
33.333	0.00	2.98	2.491	0				3.63
33.417	0.00	2.97	2.470	0				3.61
33.500	0.00	2.97	2.450	0				3.60
33.583	0.00	2.96	2.429	0				3.59
33.667	0.00	2.96	2.409	0				3.58
33.750	0.00	2.96	2.388	0				3.57
33.833	0.00	2.95	2.368	0				3.56

33.917	0.00	2.95	2.348	0				3.54
34.000	0.00	2.94	2.327	0				3.53
34.083	0.00	2.94	2.307	0				3.52
34.167	0.00	2.94	2.287	0				3.51
34.250	0.00	2.93	2.267	0				3.50
34.333	0.00	2.93	2.247	0				3.49
34.417	0.00	2.92	2.226	0				3.48
34.500	0.00	2.92	2.206	0				3.46
34.583	0.00	2.91	2.186	0				3.45
34.667	0.00	2.91	2.166	0				3.44
34.750	0.00	2.91	2.146	0				3.43
34.833	0.00	2.90	2.126	0				3.42
34.917	0.00	2.90	2.106	0				3.41
35.000	0.00	2.89	2.086	0				3.39
35.083	0.00	2.89	2.066	0				3.38
35.167	0.00	2.88	2.046	0				3.37
35.250	0.00	2.88	2.027	0				3.36
35.333	0.00	2.88	2.007	0				3.35
35.417	0.00	2.87	1.987	0				3.34
35.500	0.00	2.87	1.967	0				3.33
35.583	0.00	2.86	1.947	0				3.31
35.667	0.00	2.86	1.928	0				3.30
35.750	0.00	2.85	1.908	0				3.29
35.833	0.00	2.85	1.888	0				3.28
35.917	0.00	2.84	1.869	0				3.27
36.000	0.00	2.84	1.849	0				3.26
36.083	0.00	2.84	1.830	0				3.25
36.167	0.00	2.83	1.810	0				3.24
36.250	0.00	2.83	1.791	0				3.22
36.333	0.00	2.82	1.771	0				3.21
36.417	0.00	2.82	1.752	0				3.20
36.500	0.00	2.82	1.732	0				3.19
36.583	0.00	2.81	1.713	0				3.18
36.667	0.00	2.81	1.694	0				3.17
36.750	0.00	2.80	1.674	0				3.16
36.833	0.00	2.80	1.655	0				3.15
36.917	0.00	2.79	1.636	0				3.13
37.000	0.00	2.79	1.617	0				3.12
37.083	0.00	2.79	1.597	0				3.11
37.167	0.00	2.78	1.578	0				3.10
37.250	0.00	2.78	1.559	0				3.09
37.333	0.00	2.77	1.540	0				3.08
37.417	0.00	2.77	1.521	0				3.07
37.500	0.00	2.76	1.502	0				3.06
37.583	0.00	2.76	1.483	0				3.05
37.667	0.00	2.76	1.464	0				3.03
37.750	0.00	2.75	1.445	0				3.02
37.833	0.00	2.75	1.426	0				3.01
37.917	0.00	2.74	1.407	0				3.00
38.000	0.00	2.72	1.388	0				2.93
38.083	0.00	2.69	1.370	0				2.86
38.167	0.00	2.66	1.351	0				2.79
38.250	0.00	2.63	1.333	0				2.72
38.333	0.00	2.60	1.315	0				2.65
38.417	0.00	2.57	1.297	0				2.58
38.500	0.00	2.54	1.280	0				2.51
38.583	0.00	2.51	1.262	0				2.44
38.667	0.00	2.48	1.245	0				2.37

38.750	0.00	2.45	1.228	0				2.30
38.833	0.00	2.42	1.211	0				2.24
38.917	0.00	2.40	1.195	0				2.17
39.000	0.00	2.37	1.178	0				2.11
39.083	0.00	2.34	1.162	0				2.05
39.167	0.00	2.31	1.146	0				1.98
39.250	0.00	2.28	1.130	0				1.92
39.333	0.00	2.25	1.115	0				1.86
39.417	0.00	2.22	1.099	0				1.80
39.500	0.00	2.19	1.084	0				1.74
39.583	0.00	2.16	1.069	0				1.68
39.667	0.00	2.13	1.054	0				1.62
39.750	0.00	2.11	1.040	0				1.57
39.833	0.00	2.08	1.025	0				1.51
39.917	0.00	2.04	1.011	0				1.48
40.000	0.00	2.00	0.997	0				1.46
40.083	0.00	1.96	0.984	0				1.44
40.167	0.00	1.92	0.970	0				1.42
40.250	0.00	1.89	0.957	0				1.40
40.333	0.00	1.85	0.944	0				1.38
40.417	0.00	1.82	0.932	0				1.37
40.500	0.00	1.78	0.919	0				1.35
40.583	0.00	1.75	0.907	0				1.33
40.667	0.00	1.71	0.895	0				1.31
40.750	0.00	1.68	0.883	0				1.30
40.833	0.00	1.65	0.872	0				1.28
40.917	0.00	1.62	0.861	0				1.26
41.000	0.00	1.58	0.850	0				1.25
41.083	0.00	1.55	0.839	0				1.23
41.167	0.00	1.52	0.828	0				1.21
41.250	0.00	1.50	0.818	0				1.20
41.333	0.00	1.47	0.808	0				1.18
41.417	0.00	1.44	0.798	0				1.17
41.500	0.00	1.41	0.788	0				1.16
41.583	0.00	1.38	0.778	0				1.14
41.667	0.00	1.36	0.769	0				1.13
41.750	0.00	1.33	0.760	0				1.11
41.833	0.00	1.31	0.750	0				1.10
41.917	0.00	1.28	0.742	0				1.09
42.000	0.00	1.26	0.733	0				1.07
42.083	0.00	1.23	0.724	0				1.06
42.167	0.00	1.21	0.716	0				1.05
42.250	0.00	1.18	0.708	0				1.04
42.333	0.00	1.16	0.700	0				1.03
42.417	0.00	1.14	0.692	0				1.01
42.500	0.00	1.12	0.684	0				1.00
42.583	0.00	1.09	0.676	0				0.99
42.667	0.00	1.07	0.669	0				0.98
42.750	0.00	1.05	0.661	0				0.97
42.833	0.00	1.02	0.654	0				0.96
42.917	0.00	1.00	0.647	0				0.95
43.000	0.00	0.98	0.641	0				0.94
43.083	0.00	0.96	0.634	0				0.93
43.167	0.00	0.93	0.627	0				0.92
43.250	0.00	0.91	0.621	0				0.91
43.333	0.00	0.89	0.615	0				0.90
43.417	0.00	0.87	0.609	0				0.89
43.500	0.00	0.85	0.603	0				0.88

43.583	0.00	0.84	0.597	0				0.88
43.667	0.00	0.82	0.591	0				0.87
43.750	0.00	0.80	0.586	0				0.86
43.833	0.00	0.78	0.580	0				0.85
43.917	0.00	0.76	0.575	0				0.84
44.000	0.00	0.75	0.570	0				0.84
44.083	0.00	0.73	0.565	0				0.83
44.167	0.00	0.71	0.560	0				0.82
44.250	0.00	0.70	0.555	0				0.81
44.333	0.00	0.68	0.550	0				0.81
44.417	0.00	0.67	0.545	0				0.80
44.500	0.00	0.65	0.541	0				0.79
44.583	0.00	0.64	0.537	0				0.79
44.667	0.00	0.62	0.532	0				0.78
44.750	0.00	0.61	0.528	0				0.77
44.833	0.00	0.60	0.524	0				0.77
44.917	0.00	0.58	0.520	0				0.76
45.000	0.00	0.57	0.516	0				0.76
45.083	0.00	0.56	0.512	0				0.75
45.167	0.00	0.54	0.508	0				0.74
45.250	0.00	0.53	0.504	0				0.74
45.333	0.00	0.52	0.501	0				0.73
45.417	0.00	0.51	0.497	0				0.73
45.500	0.00	0.50	0.494	0				0.72
45.583	0.00	0.49	0.490	0				0.72
45.667	0.00	0.48	0.487	0				0.71
45.750	0.00	0.47	0.484	0				0.71
45.833	0.00	0.46	0.481	0				0.70
45.917	0.00	0.45	0.477	0				0.70
46.000	0.00	0.44	0.474	0				0.70
46.083	0.00	0.43	0.471	0				0.69
46.167	0.00	0.42	0.469	0				0.69
46.250	0.00	0.41	0.466	0				0.68
46.333	0.00	0.40	0.463	0				0.68
46.417	0.00	0.39	0.460	0				0.67
46.500	0.00	0.38	0.458	0				0.67
46.583	0.00	0.37	0.455	0				0.67
46.667	0.00	0.36	0.452	0				0.66
46.750	0.00	0.36	0.450	0				0.66
46.833	0.00	0.35	0.448	0				0.66
46.917	0.00	0.34	0.445	0				0.65
47.000	0.00	0.33	0.443	0				0.65
47.083	0.00	0.33	0.441	0				0.65
47.167	0.00	0.32	0.438	0				0.64
47.250	0.00	0.31	0.436	0				0.64
47.333	0.00	0.30	0.434	0				0.64
47.417	0.00	0.30	0.432	0				0.63
47.500	0.00	0.29	0.430	0				0.63
47.583	0.00	0.28	0.428	0				0.63
47.667	0.00	0.28	0.426	0				0.62
47.750	0.00	0.27	0.424	0				0.62
47.833	0.00	0.27	0.422	0				0.62
47.917	0.00	0.26	0.421	0				0.62
48.000	0.00	0.25	0.419	0				0.61
48.083	0.00	0.25	0.417	0				0.61
48.167	0.00	0.24	0.415	0				0.61
48.250	0.00	0.24	0.414	0				0.61
48.333	0.00	0.23	0.412	0				0.60

48.417	0.00	0.23	0.411	0				0.60
48.500	0.00	0.22	0.409	0				0.60
48.583	0.00	0.22	0.408	0				0.60
48.667	0.00	0.21	0.406	0				0.60
48.750	0.00	0.21	0.405	0				0.59
48.833	0.00	0.20	0.403	0				0.59
48.917	0.00	0.20	0.402	0				0.59
49.000	0.00	0.19	0.400	0				0.59
49.083	0.00	0.19	0.399	0				0.59
49.167	0.00	0.19	0.398	0				0.58
49.250	0.00	0.18	0.397	0				0.58
49.333	0.00	0.18	0.395	0				0.58
49.417	0.00	0.17	0.394	0				0.58
49.500	0.00	0.17	0.393	0				0.58
49.583	0.00	0.17	0.392	0				0.57
49.667	0.00	0.16	0.391	0				0.57
49.750	0.00	0.16	0.390	0				0.57
49.833	0.00	0.15	0.388	0				0.57
49.917	0.00	0.15	0.387	0				0.57
50.000	0.00	0.15	0.386	0				0.57
50.083	0.00	0.14	0.385	0				0.57
50.167	0.00	0.14	0.384	0				0.56
50.250	0.00	0.14	0.383	0				0.56
50.333	0.00	0.14	0.382	0				0.56
50.417	0.00	0.13	0.382	0				0.56
50.500	0.00	0.13	0.381	0				0.56
50.583	0.00	0.13	0.380	0				0.56
50.667	0.00	0.12	0.379	0				0.56
50.750	0.00	0.12	0.378	0				0.55
50.833	0.00	0.12	0.377	0				0.55
50.917	0.00	0.12	0.376	0				0.55
51.000	0.00	0.11	0.376	0				0.55
51.083	0.00	0.11	0.375	0				0.55
51.167	0.00	0.11	0.374	0				0.55
51.250	0.00	0.11	0.373	0				0.55
51.333	0.00	0.10	0.373	0				0.55
51.417	0.00	0.10	0.372	0				0.55
51.500	0.00	0.10	0.371	0				0.54
51.583	0.00	0.10	0.371	0				0.54
51.667	0.00	0.09	0.370	0				0.54
51.750	0.00	0.09	0.369	0				0.54
51.833	0.00	0.09	0.369	0				0.54
51.917	0.00	0.09	0.368	0				0.54
52.000	0.00	0.09	0.367	0				0.54
52.083	0.00	0.08	0.367	0				0.54
52.167	0.00	0.08	0.366	0				0.54
52.250	0.00	0.08	0.366	0				0.54
52.333	0.00	0.08	0.365	0				0.54
52.417	0.00	0.08	0.365	0				0.53
52.500	0.00	0.08	0.364	0				0.53
52.583	0.00	0.07	0.364	0				0.53
52.667	0.00	0.07	0.363	0				0.53
52.750	0.00	0.07	0.363	0				0.53
52.833	0.00	0.07	0.362	0				0.53
52.917	0.00	0.07	0.362	0				0.53
53.000	0.00	0.07	0.361	0				0.53
53.083	0.00	0.06	0.361	0				0.53
53.167	0.00	0.06	0.360	0				0.53

53.250	0.00	0.06	0.360	0				0.53
53.333	0.00	0.06	0.359	0				0.53
53.417	0.00	0.06	0.359	0				0.53
53.500	0.00	0.06	0.359	0				0.53
53.583	0.00	0.06	0.358	0				0.53
53.667	0.00	0.06	0.358	0				0.52
53.750	0.00	0.05	0.358	0				0.52
53.833	0.00	0.05	0.357	0				0.52
53.917	0.00	0.05	0.357	0				0.52
54.000	0.00	0.05	0.356	0				0.52
54.083	0.00	0.05	0.356	0				0.52
54.167	0.00	0.05	0.356	0				0.52
54.250	0.00	0.05	0.355	0				0.52
54.333	0.00	0.05	0.355	0				0.52
54.417	0.00	0.05	0.355	0				0.52
54.500	0.00	0.04	0.354	0				0.52
54.583	0.00	0.04	0.354	0				0.52
54.667	0.00	0.04	0.354	0				0.52
54.750	0.00	0.04	0.354	0				0.52
54.833	0.00	0.04	0.353	0				0.52
54.917	0.00	0.04	0.353	0				0.52
55.000	0.00	0.04	0.353	0				0.52
55.083	0.00	0.04	0.353	0				0.52
55.167	0.00	0.04	0.352	0				0.52
55.250	0.00	0.04	0.352	0				0.52
55.333	0.00	0.04	0.352	0				0.52
55.417	0.00	0.03	0.352	0				0.52
55.500	0.00	0.03	0.351	0				0.52
55.583	0.00	0.03	0.351	0				0.51
55.667	0.00	0.03	0.351	0				0.51
55.750	0.00	0.03	0.351	0				0.51
55.833	0.00	0.03	0.350	0				0.51
55.917	0.00	0.03	0.350	0				0.51
56.000	0.00	0.03	0.350	0				0.51
56.083	0.00	0.03	0.350	0				0.51
56.167	0.00	0.03	0.350	0				0.51
56.250	0.00	0.03	0.349	0				0.51
56.333	0.00	0.03	0.349	0				0.51
56.417	0.00	0.03	0.349	0				0.51
56.500	0.00	0.03	0.349	0				0.51
56.583	0.00	0.03	0.349	0				0.51
56.667	0.00	0.02	0.349	0				0.51
56.750	0.00	0.02	0.348	0				0.51
56.833	0.00	0.02	0.348	0				0.51
56.917	0.00	0.02	0.348	0				0.51
57.000	0.00	0.02	0.348	0				0.51
57.083	0.00	0.02	0.348	0				0.51
57.167	0.00	0.02	0.348	0				0.51
57.250	0.00	0.02	0.347	0				0.51
57.333	0.00	0.02	0.347	0				0.51
57.417	0.00	0.02	0.347	0				0.51
57.500	0.00	0.02	0.347	0				0.51
57.583	0.00	0.02	0.347	0				0.51
57.667	0.00	0.02	0.347	0				0.51
57.750	0.00	0.02	0.347	0				0.51
57.833	0.00	0.02	0.346	0				0.51
57.917	0.00	0.02	0.346	0				0.51
58.000	0.00	0.02	0.346	0				0.51

58.083	0.00	0.02	0.346	0				0.51
58.167	0.00	0.02	0.346	0				0.51
58.250	0.00	0.02	0.346	0				0.51
58.333	0.00	0.02	0.346	0				0.51
58.417	0.00	0.02	0.346	0				0.51
58.500	0.00	0.01	0.346	0				0.51
58.583	0.00	0.01	0.345	0				0.51
58.667	0.00	0.01	0.345	0				0.51
58.750	0.00	0.01	0.345	0				0.51
58.833	0.00	0.01	0.345	0				0.51
58.917	0.00	0.01	0.345	0				0.51
59.000	0.00	0.01	0.345	0				0.51
59.083	0.00	0.01	0.345	0				0.51
59.167	0.00	0.01	0.345	0				0.51
59.250	0.00	0.01	0.345	0				0.51
59.333	0.00	0.01	0.345	0				0.51
59.417	0.00	0.01	0.345	0				0.51
59.500	0.00	0.01	0.345	0				0.51
59.583	0.00	0.01	0.344	0				0.51
59.667	0.00	0.01	0.344	0				0.50
59.750	0.00	0.01	0.344	0				0.50
59.833	0.00	0.01	0.344	0				0.50
59.917	0.00	0.01	0.344	0				0.50
60.000	0.00	0.01	0.344	0				0.50
60.083	0.00	0.01	0.344	0				0.50
60.167	0.00	0.01	0.344	0				0.50
60.250	0.00	0.01	0.344	0				0.50
60.333	0.00	0.01	0.344	0				0.50
60.417	0.00	0.01	0.344	0				0.50
60.500	0.00	0.01	0.344	0				0.50
60.583	0.00	0.01	0.344	0				0.50
60.667	0.00	0.01	0.344	0				0.50
60.750	0.00	0.01	0.344	0				0.50
60.833	0.00	0.01	0.343	0				0.50
60.917	0.00	0.01	0.343	0				0.50
61.000	0.00	0.01	0.343	0				0.50
61.083	0.00	0.01	0.343	0				0.50
61.167	0.00	0.01	0.343	0				0.50
61.250	0.00	0.01	0.343	0				0.50
61.333	0.00	0.01	0.343	0				0.50
61.417	0.00	0.01	0.343	0				0.50
61.500	0.00	0.01	0.343	0				0.50
61.583	0.00	0.01	0.343	0				0.50
61.667	0.00	0.01	0.343	0				0.50
61.750	0.00	0.01	0.343	0				0.50
61.833	0.00	0.01	0.343	0				0.50
61.917	0.00	0.01	0.343	0				0.50
62.000	0.00	0.01	0.343	0				0.50
62.083	0.00	0.01	0.343	0				0.50
62.167	0.00	0.01	0.343	0				0.50
62.250	0.00	0.01	0.343	0				0.50
62.333	0.00	0.01	0.343	0				0.50
62.417	0.00	0.01	0.343	0				0.50
62.500	0.00	0.01	0.343	0				0.50
62.583	0.00	0.00	0.343	0				0.50
62.667	0.00	0.00	0.342	0				0.50
62.750	0.00	0.00	0.342	0				0.50
62.833	0.00	0.00	0.342	0				0.50

62.917	0.00	0.00	0.342	0					0.50
63.000	0.00	0.00	0.342	0					0.50
63.083	0.00	0.00	0.342	0					0.50
63.167	0.00	0.00	0.342	0					0.50
63.250	0.00	0.00	0.342	0					0.50
63.333	0.00	0.00	0.342	0					0.50
63.417	0.00	0.00	0.342	0					0.50
63.500	0.00	0.00	0.342	0					0.50
63.583	0.00	0.00	0.342	0					0.50
63.667	0.00	0.00	0.342	0					0.50
63.750	0.00	0.00	0.342	0					0.50
63.833	0.00	0.00	0.342	0					0.50
63.917	0.00	0.00	0.342	0					0.50
64.000	0.00	0.00	0.342	0					0.50
64.083	0.00	0.00	0.342	0					0.50
64.167	0.00	0.00	0.342	0					0.50
64.250	0.00	0.00	0.342	0					0.50
64.333	0.00	0.00	0.342	0					0.50
64.417	0.00	0.00	0.342	0					0.50
64.500	0.00	0.00	0.342	0					0.50
64.583	0.00	0.00	0.342	0					0.50
64.667	0.00	0.00	0.342	0					0.50
64.750	0.00	0.00	0.342	0					0.50
64.833	0.00	0.00	0.342	0					0.50
64.917	0.00	0.00	0.342	0					0.50
65.000	0.00	0.00	0.342	0					0.50
65.083	0.00	0.00	0.342	0					0.50
65.167	0.00	0.00	0.342	0					0.50
65.250	0.00	0.00	0.342	0					0.50
65.333	0.00	0.00	0.342	0					0.50
65.417	0.00	0.00	0.342	0					0.50
65.500	0.00	0.00	0.342	0					0.50
65.583	0.00	0.00	0.342	0					0.50
65.667	0.00	0.00	0.342	0					0.50
65.750	0.00	0.00	0.342	0					0.50
65.833	0.00	0.00	0.342	0					0.50
65.917	0.00	0.00	0.342	0					0.50
66.000	0.00	0.00	0.342	0					0.50
66.083	0.00	0.00	0.342	0					0.50
66.167	0.00	0.00	0.342	0					0.50
66.250	0.00	0.00	0.342	0					0.50
66.333	0.00	0.00	0.342	0					0.50
66.417	0.00	0.00	0.342	0					0.50
66.500	0.00	0.00	0.342	0					0.50
66.583	0.00	0.00	0.342	0					0.50
66.667	0.00	0.00	0.342	0					0.50
66.750	0.00	0.00	0.341	0					0.50
66.833	0.00	0.00	0.341	0					0.50
66.917	0.00	0.00	0.341	0					0.50
67.000	0.00	0.00	0.341	0					0.50
67.083	0.00	0.00	0.341	0					0.50
67.167	0.00	0.00	0.341	0					0.50
67.250	0.00	0.00	0.341	0					0.50
67.333	0.00	0.00	0.341	0					0.50
67.417	0.00	0.00	0.341	0					0.50
67.500	0.00	0.00	0.341	0					0.50
67.583	0.00	0.00	0.341	0					0.50
67.667	0.00	0.00	0.341	0					0.50

67.750	0.00	0.00	0.341	0					0.50
67.833	0.00	0.00	0.341	0					0.50
67.917	0.00	0.00	0.341	0					0.50
68.000	0.00	0.00	0.341	0					0.50
68.083	0.00	0.00	0.341	0					0.50
68.167	0.00	0.00	0.341	0					0.50
68.250	0.00	0.00	0.341	0					0.50
68.333	0.00	0.00	0.341	0					0.50
68.417	0.00	0.00	0.341	0					0.50
68.500	0.00	0.00	0.341	0					0.50
68.583	0.00	0.00	0.341	0					0.50

Remaining water in basin = 0.34 (Ac.Ft)

*****HYDROGRAPH DATA*****
 Number of intervals = 823
 Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 23.696 (CFS)
 Total volume = 16.533 (Ac.Ft)
 Status of hydrographs being held in storage
 Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
 Peak (CFS) 0.000 0.000 0.000 0.000 0.000
 Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014
Study date: 05/08/20

204728 - US Cold Storage
PROPOSED BASIN - AREA A
25-YEAR, 24- HOUR STORM
BY: SG DATE: 05-08-20

Program License Serial Number 6320

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

From study/file name: PROPA25.rte

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

Number of intervals = 307
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 144.109 (CFS)
Total volume = 22.021 (Ac.Ft)

Status of hydrographs being held in storage

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

++++
Process from Point/Station 4.000 to Point/Station 5.000
**** RETARDING BASIN ROUTING ****

Program computation of outflow v. depth

CALCULATED OUTFLOW DATA AT DEPTH = 0.50(Ft.)
Total outflow at this depth = 0.00(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 1.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
Calculated individual pipe flow = 1.112(CFS)
Normal flow depth in pipe = 4.38(In.)
Flow top width inside pipe = 7.96(In.)
Critical Depth = 0.50(Ft.)

Calculated flow rate through pipe(s) = 1.112(CFS)

Total outflow at this depth = 1.11(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 1.50(Ft.)

Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)

Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)

NOTE: Assuming free outlet flow.

NOTE: Normal flow is pressure flow.

The total friction loss through the pipe is 2.000(Ft.)

Pipe friction loss = 1.178(Ft.)

Minor friction loss = 0.822(Ft.) K-factor = 1.50

Calculated flow rate through pipe(s) = 2.074(CFS)

Total outflow at this depth = 2.07(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 2.00(Ft.)

Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)

Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)

NOTE: Assuming free outlet flow.

NOTE: Normal flow is pressure flow.

The total friction loss through the pipe is 2.500(Ft.)

Pipe friction loss = 1.472(Ft.)

Minor friction loss = 1.027(Ft.) K-factor = 1.50

Calculated flow rate through pipe(s) = 2.318(CFS)

Total outflow at this depth = 2.32(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 2.50(Ft.)

Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)

Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)

NOTE: Assuming free outlet flow.

NOTE: Normal flow is pressure flow.

The total friction loss through the pipe is 3.000(Ft.)

Pipe friction loss = 1.767(Ft.)

Minor friction loss = 1.233(Ft.) K-factor = 1.50

Calculated flow rate through pipe(s) = 2.540(CFS)

Total outflow at this depth = 2.54(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 2.99(Ft.)

Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)

Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)

NOTE: Assuming free outlet flow.

NOTE: Normal flow is pressure flow.

The total friction loss through the pipe is 3.490(Ft.)

Pipe friction loss = 2.055(Ft.)

Minor friction loss = 1.434(Ft.) K-factor = 1.50

Calculated flow rate through pipe(s) = 2.739(CFS)

Total outflow at this depth = 2.74(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 3.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.500(Ft.)
Pipe friction loss = 2.061(Ft.)
Minor friction loss = 1.438(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 2.743(CFS)

Total outflow at this depth = 2.74(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 3.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.000(Ft.)
Pipe friction loss = 2.355(Ft.)
Minor friction loss = 1.644(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 2.932(CFS)

Total outflow at this depth = 2.93(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 4.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.500(Ft.)
Pipe friction loss = 2.650(Ft.)
Minor friction loss = 1.849(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.110(CFS)

Total outflow at this depth = 3.11(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 4.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.000(Ft.)
Pipe friction loss = 2.944(Ft.)
Minor friction loss = 2.055(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.279(CFS)

Total outflow at this depth = 3.28(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 5.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.500(Ft.)
Pipe friction loss = 3.239(Ft.)
Minor friction loss = 2.260(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.439(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 1.768(CFS)
Normal flow depth in pipe = 3.34(In.)
Flow top width inside pipe = 14.00(In.)
Critical Depth = 0.50(Ft.)
Calculated flow rate through pipe(s) = 1.768(CFS)

Total outflow at this depth = 5.21(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 5.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 6.000(Ft.)
Pipe friction loss = 3.533(Ft.)
Minor friction loss = 2.466(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.591(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 6.687(CFS)
Normal flow depth in pipe = 6.57(In.)
Flow top width inside pipe = 17.33(In.)
Critical Depth = 1.00(Ft.)
Calculated flow rate through pipe(s) = 6.687(CFS)

Total outflow at this depth = 10.28(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 6.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 6.500(Ft.)
Pipe friction loss = 3.828(Ft.)
Minor friction loss = 2.671(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.738(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.500(Ft.)
Pipe friction loss = 1.145(Ft.)
Minor friction loss = 2.356(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 17.772(CFS)

Total outflow at this depth = 21.51(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 6.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 7.000(Ft.)
Pipe friction loss = 4.122(Ft.)
Minor friction loss = 2.877(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.879(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.000(Ft.)
Pipe friction loss = 1.309(Ft.)
Minor friction loss = 2.692(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 18.999(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 1.768(CFS)
Normal flow depth in pipe = 3.34(In.)
Flow top width inside pipe = 14.00(In.)
Critical Depth = 0.50(Ft.)
Calculated flow rate through pipe(s) = 1.768(CFS)

Total outflow at this depth = 24.65(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 7.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 7.500(Ft.)
Pipe friction loss = 4.417(Ft.)
Minor friction loss = 3.082(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.015(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)

Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.500(Ft.)
Pipe friction loss = 1.472(Ft.)
Minor friction loss = 3.029(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 20.152(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 6.687(CFS)
Normal flow depth in pipe = 6.57(In.)
Flow top width inside pipe = 17.33(In.)
Critical Depth = 1.00(Ft.)
Calculated flow rate through pipe(s) = 6.687(CFS)

Total outflow at this depth = 30.85(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 7.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 8.000(Ft.)
Pipe friction loss = 4.711(Ft.)
Minor friction loss = 3.288(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.147(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.000(Ft.)
Pipe friction loss = 1.636(Ft.)
Minor friction loss = 3.366(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 21.242(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.500(Ft.)
Pipe friction loss = 1.145(Ft.)
Minor friction loss = 2.356(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 17.772(CFS)

Total outflow at this depth = 43.16(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 8.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 8.500(Ft.)
Pipe friction loss = 5.005(Ft.)
Minor friction loss = 3.493(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.275(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.500(Ft.)
Pipe friction loss = 1.799(Ft.)
Minor friction loss = 3.702(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 22.279(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.000(Ft.)
Pipe friction loss = 1.309(Ft.)
Minor friction loss = 2.692(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 18.999(CFS)

Weir capacity using equation $Q = CLH^{Exp}$ (Using Feet as units)
Weir Length = 3.00(Ft.) C value = 2.63 Exp = 1.50
Weir flow: Depth = H = 0.50(Ft.) Flow = 2.79 (CFS)

Total outflow at this depth = 48.34(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 8.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 9.000(Ft.)
Pipe friction loss = 5.300(Ft.)
Minor friction loss = 3.698(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.399(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 6.000(Ft.)
Pipe friction loss = 1.963(Ft.)
Minor friction loss = 4.039(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 23.269(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)

Manning's N = 0.013 No. of pipes = 1
 Given pipe size = 18.00(In.)
 NOTE: Assuming free outlet flow.
 NOTE: Normal flow is pressure flow.
 The total friction loss through the pipe is 4.500(Ft.)
 Pipe friction loss = 1.472(Ft.)
 Minor friction loss = 3.029(Ft.) K-factor = 1.50
 Calculated flow rate through pipe(s) = 20.152(CFS)

Weir capacity using equation $Q = CLH^{Exp}$ (Using Feet as units)
 Weir Length = 3.00(Ft.) C value = 2.63 Exp = 1.50
 Weir flow: Depth = H = 1.00(Ft.) Flow = 7.89 (CFS)

Total outflow at this depth = 55.71(CFS)

 Total number of inflow hydrograph intervals = 307
 Hydrograph time unit = 5.000 (Min.)
 Initial depth in storage basin = 0.00(Ft.)

 Initial basin depth = 0.00 (Ft.)
 Initial basin storage = 0.00 (Ac.Ft)
 Initial basin outflow = 0.00 (CFS)

 Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.341	0.000	0.341	0.341
1.000	0.682	1.112	0.678	0.686
1.500	1.023	2.074	1.016	1.030
2.000	1.150	2.318	1.142	1.158
2.500	1.278	2.540	1.269	1.287
2.990	1.403	2.739	1.394	1.412
3.000	1.404	2.743	1.395	1.413
3.500	2.268	2.932	2.258	2.278
4.000	3.157	3.110	3.146	3.168
4.500	4.071	3.279	4.060	4.082
5.000	5.010	5.207	4.992	5.028
5.500	5.980	10.278	5.945	6.015
6.000	6.971	21.510	6.897	7.045
6.500	7.990	24.647	7.905	8.075
7.000	9.038	30.854	8.932	9.144
7.500	10.113	43.161	9.964	10.262
8.000	11.216	48.343	11.050	11.382
8.500	12.349	55.710	12.157	12.541

 Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	Depth (Ft.)
.0	36.0	72.05	108.08	144.11

0.083	0.16	0.00	0.001	0				0.00
0.167	1.08	0.00	0.005	0				0.01
0.250	2.82	0.00	0.018	0				0.03
0.333	3.77	0.00	0.041	0				0.06
0.417	4.30	0.00	0.069	0				0.10
0.500	4.65	0.00	0.100	OI				0.15
0.583	4.91	0.00	0.132	OI				0.19
0.667	5.11	0.00	0.167	OI				0.24
0.750	5.27	0.00	0.203	OI				0.30
0.833	5.39	0.00	0.239	OI				0.35
0.917	5.49	0.00	0.277	OI				0.41
1.000	5.58	0.00	0.315	OI				0.46
1.083	5.65	0.04	0.354	OI				0.52
1.167	5.71	0.17	0.392	OI				0.57
1.250	5.75	0.29	0.430	OI				0.63
1.333	5.79	0.41	0.467	OI				0.69
1.417	5.83	0.53	0.504	OI				0.74
1.500	5.87	0.65	0.540	OI				0.79
1.583	5.91	0.77	0.576	OI				0.84
1.667	5.93	0.88	0.611	OI				0.90
1.750	5.95	0.99	0.645	OI				0.95
1.833	5.97	1.10	0.679	OI				1.00
1.917	5.98	1.20	0.712	OI				1.04
2.000	6.00	1.29	0.745	OI				1.09
2.083	6.02	1.38	0.777	OI				1.14
2.167	6.03	1.47	0.809	OI				1.19
2.250	6.05	1.56	0.840	OI				1.23
2.333	6.07	1.64	0.871	OI				1.28
2.417	6.08	1.73	0.901	OI				1.32
2.500	6.10	1.81	0.931	OI				1.36
2.583	6.12	1.90	0.960	OI				1.41
2.667	6.14	1.98	0.989	OI				1.45
2.750	6.15	2.06	1.017	OI				1.49
2.833	6.17	2.12	1.045	OI				1.59
2.917	6.19	2.17	1.073	OI				1.70
3.000	6.21	2.22	1.101	OI				1.81
3.083	6.23	2.28	1.128	OI				1.91
3.167	6.24	2.33	1.155	OI				2.02
3.250	6.26	2.37	1.182	OI				2.13
3.333	6.28	2.42	1.209	OI				2.23
3.417	6.30	2.47	1.235	OI				2.33
3.500	6.32	2.51	1.262	OI				2.44
3.583	6.34	2.56	1.288	OI				2.54
3.667	6.36	2.60	1.314	OI				2.64
3.750	6.38	2.64	1.340	OI				2.74
3.833	6.40	2.68	1.365	OI				2.84
3.917	6.42	2.72	1.391	OI				2.94
4.000	6.44	2.75	1.416	OI				3.01
4.083	6.46	2.75	1.442	OI				3.02
4.167	6.48	2.76	1.467	OI				3.04
4.250	6.50	2.76	1.493	OI				3.05
4.333	6.52	2.77	1.519	OI				3.07
4.417	6.55	2.77	1.545	OI				3.08
4.500	6.57	2.78	1.571	OI				3.10
4.583	6.59	2.79	1.597	OI				3.11
4.667	6.61	2.79	1.623	OI				3.13
4.750	6.63	2.80	1.650	OI				3.14
4.833	6.66	2.80	1.676	OI				3.16

4.917	6.68	2.81	1.703	OI	3.17
5.000	6.70	2.81	1.729	OI	3.19
5.083	6.73	2.82	1.756	OI	3.20
5.167	6.75	2.83	1.783	OI	3.22
5.250	6.77	2.83	1.810	OI	3.24
5.333	6.80	2.84	1.838	OI	3.25
5.417	6.82	2.84	1.865	OI	3.27
5.500	6.85	2.85	1.892	OI	3.28
5.583	6.87	2.86	1.920	OI	3.30
5.667	6.90	2.86	1.948	OI	3.31
5.750	6.92	2.87	1.976	OI	3.33
5.833	6.95	2.87	2.004	OI	3.35
5.917	6.98	2.88	2.032	OI	3.36
6.000	7.00	2.89	2.060	OI	3.38
6.083	7.03	2.89	2.088	OI	3.40
6.167	7.06	2.90	2.117	OI	3.41
6.250	7.08	2.91	2.146	OI	3.43
6.333	7.11	2.91	2.174	OI	3.45
6.417	7.14	2.92	2.203	OI	3.46
6.500	7.17	2.92	2.233	OI	3.48
6.583	7.20	2.93	2.262	OI	3.50
6.667	7.23	2.94	2.291	OI	3.51
6.750	7.26	2.94	2.321	OI	3.53
6.833	7.29	2.95	2.351	OI	3.55
6.917	7.32	2.95	2.381	OI	3.56
7.000	7.35	2.96	2.411	OI	3.58
7.083	7.38	2.97	2.441	OI	3.60
7.167	7.41	2.97	2.472	OI	3.61
7.250	7.44	2.98	2.502	OI	3.63
7.333	7.47	2.99	2.533	OI	3.65
7.417	7.51	2.99	2.564	OI	3.67
7.500	7.54	3.00	2.595	OI	3.68
7.583	7.57	3.00	2.627	OI	3.70
7.667	7.61	3.01	2.658	OI	3.72
7.750	7.64	3.02	2.690	OI	3.74
7.833	7.68	3.02	2.722	OI	3.76
7.917	7.71	3.03	2.754	OI	3.77
8.000	7.75	3.04	2.786	OI	3.79
8.083	7.79	3.04	2.819	OI	3.81
8.167	7.82	3.05	2.852	OI	3.83
8.250	7.86	3.06	2.885	OI	3.85
8.333	7.90	3.06	2.918	OI	3.87
8.417	7.94	3.07	2.951	OI	3.88
8.500	7.98	3.08	2.985	OI	3.90
8.583	8.02	3.08	3.019	OI	3.92
8.667	8.06	3.09	3.053	OI	3.94
8.750	8.10	3.10	3.088	OI	3.96
8.833	8.15	3.10	3.122	OI	3.98
8.917	8.19	3.11	3.157	OI	4.00
9.000	8.23	3.12	3.192	OI	4.02
9.083	8.28	3.12	3.227	OI	4.04
9.167	8.32	3.13	3.263	OI	4.06
9.250	8.37	3.14	3.299	OI	4.08
9.333	8.42	3.14	3.335	OI	4.10
9.417	8.46	3.15	3.372	OI	4.12
9.500	8.51	3.16	3.408	OI	4.14
9.583	8.56	3.16	3.445	OI	4.16
9.667	8.61	3.17	3.483	OI	4.18

9.750	8.66	3.18	3.520	OI	4.20
9.833	8.71	3.18	3.558	OI	4.22
9.917	8.77	3.19	3.597	OI	4.24
10.000	8.82	3.20	3.635	OI	4.26
10.083	8.88	3.21	3.674	OI	4.28
10.167	8.93	3.21	3.713	OI	4.30
10.250	8.99	3.22	3.753	OI	4.33
10.333	9.05	3.23	3.793	O I	4.35
10.417	9.11	3.23	3.833	O I	4.37
10.500	9.17	3.24	3.874	O I	4.39
10.583	9.23	3.25	3.915	O I	4.41
10.667	9.30	3.26	3.956	O I	4.44
10.750	9.36	3.27	3.998	O I	4.46
10.833	9.43	3.27	4.040	O I	4.48
10.917	9.50	3.30	4.083	O I	4.51
11.000	9.57	3.39	4.125	O I	4.53
11.083	9.64	3.48	4.168	O I	4.55
11.167	9.71	3.56	4.210	O I	4.57
11.250	9.79	3.65	4.252	O I	4.60
11.333	9.86	3.74	4.295	O I	4.62
11.417	9.94	3.82	4.337	O I	4.64
11.500	10.02	3.91	4.379	O I	4.66
11.583	10.11	4.00	4.421	O I	4.69
11.667	10.19	4.08	4.463	O I	4.71
11.750	10.28	4.17	4.505	O I	4.73
11.833	10.37	4.26	4.547	O I	4.75
11.917	10.46	4.34	4.589	O I	4.78
12.000	10.55	4.43	4.631	O I	4.80
12.083	10.62	4.52	4.674	OI	4.82
12.167	10.53	4.60	4.715	OI	4.84
12.250	10.29	4.68	4.755	OI	4.86
12.333	10.21	4.76	4.793	OI	4.88
12.417	10.22	4.84	4.830	OI	4.90
12.500	10.26	4.91	4.867	OI	4.92
12.583	10.33	4.99	4.904	OI	4.94
12.667	10.41	5.06	4.941	OI	4.96
12.750	10.51	5.14	4.978	OI	4.98
12.833	10.61	5.23	5.015	OI	5.00
12.917	10.73	5.42	5.051	OI	5.02
13.000	10.86	5.61	5.088	OI	5.04
13.083	10.99	5.80	5.124	OI	5.06
13.167	11.13	5.99	5.159	OI	5.08
13.250	11.29	6.17	5.195	OI	5.10
13.333	11.44	6.36	5.230	OI	5.11
13.417	11.61	6.54	5.265	OI	5.13
13.500	11.78	6.72	5.300	OI	5.15
13.583	11.97	6.90	5.334	OI	5.17
13.667	12.16	7.09	5.369	OI	5.19
13.750	12.36	7.27	5.404	OI	5.20
13.833	12.58	7.45	5.439	OI	5.22
13.917	12.81	7.64	5.475	OI	5.24
14.000	13.04	7.82	5.511	OI	5.26
14.083	13.30	8.01	5.547	OI	5.28
14.167	13.57	8.21	5.584	O I	5.30
14.250	13.88	8.40	5.621	O I	5.31
14.333	14.19	8.60	5.659	O I	5.33
14.417	14.53	8.80	5.698	O I	5.35
14.500	14.87	9.01	5.738	OI	5.38

14.583	15.25	9.23	5.779	OI				5.40
14.667	15.64	9.45	5.821	OI				5.42
14.750	16.08	9.67	5.864	OI				5.44
14.833	16.54	9.91	5.909	OI				5.46
14.917	17.06	10.15	5.956	OI				5.49
15.000	17.61	10.55	6.004	OI				5.51
15.083	18.24	11.10	6.053	O I				5.54
15.167	18.91	11.66	6.102	O I				5.56
15.250	19.69	12.24	6.153	O I				5.59
15.333	20.54	12.83	6.205	O I				5.61
15.417	21.29	13.44	6.259	O I				5.64
15.500	20.89	14.01	6.309	OI				5.67
15.583	19.36	14.47	6.350	OI				5.69
15.667	19.31	14.84	6.382	OI				5.70
15.750	20.36	15.21	6.415	OI				5.72
15.833	22.22	15.67	6.456	OI				5.74
15.917	25.54	16.29	6.510	O I				5.77
16.000	31.78	17.21	6.592	O I				5.81
16.083	51.50	19.05	6.754	O	I			5.89
16.167	102.05	22.03	7.141	O		I		6.08
16.250	144.11	24.15	7.830	O			I	6.42
16.333	92.05	27.46	8.465	O		I		6.73
16.417	62.12	29.45	8.800	O	I			6.89
16.500	48.37	30.48	8.974	O	I			6.97
16.583	41.71	31.24	9.072	O	I			7.02
16.667	36.61	31.84	9.125	OI				7.04
16.750	31.80	32.02	9.140	O				7.05
16.833	28.66	31.89	9.128	IO				7.04
16.917	25.82	31.53	9.097	I O				7.03
17.000	23.53	31.01	9.052	IO				7.01
17.083	21.47	30.60	8.995	I O				6.98
17.167	19.55	30.19	8.927	I O				6.95
17.250	17.82	29.73	8.849	I O				6.91
17.333	16.99	29.24	8.766	I O				6.87
17.417	16.40	28.74	8.681	I O				6.83
17.500	15.57	28.23	8.595	I O				6.79
17.583	14.36	27.70	8.506	I O				6.75
17.667	13.57	27.15	8.413	I O				6.70
17.750	12.35	26.58	8.317	I O				6.66
17.833	11.93	26.01	8.220	I O				6.61
17.917	11.55	25.44	8.123	I O				6.56
18.000	11.22	24.87	8.028	I O				6.52
18.083	10.93	24.48	7.935	I O				6.47
18.167	10.82	24.19	7.842	I O				6.43
18.250	10.90	23.91	7.751	I O				6.38
18.333	10.84	23.64	7.662	I O				6.34
18.417	10.71	23.37	7.575	I O				6.30
18.500	10.56	23.10	7.488	I O				6.25
18.583	10.41	22.84	7.402	I O				6.21
18.667	10.25	22.57	7.317	I O				6.17
18.750	10.10	22.31	7.232	I O				6.13
18.833	9.95	22.06	7.148	I O				6.09
18.917	9.81	21.80	7.065	I O				6.05
19.000	9.67	21.55	6.983	I O				6.01
19.083	9.54	20.75	6.904	I O				5.97
19.167	9.40	19.90	6.829	I O				5.93
19.250	9.28	19.11	6.759	I O				5.89
19.333	9.15	18.36	6.693	I O				5.86

19.417	9.04	17.67	6.632	IO				5.83
19.500	8.93	17.02	6.574	I 0				5.80
19.583	8.82	16.40	6.520	I 0				5.77
19.667	8.71	15.83	6.470	I 0				5.75
19.750	8.61	15.29	6.422	I 0				5.72
19.833	8.51	14.78	6.378	I 0				5.70
19.917	8.41	14.31	6.336	I 0				5.68
20.000	8.32	13.86	6.296	I 0				5.66
20.083	8.23	13.44	6.259	IO				5.64
20.167	8.14	13.05	6.224	IO				5.62
20.250	8.06	12.68	6.192	IO				5.61
20.333	7.97	12.33	6.161	IO				5.59
20.417	7.90	12.00	6.132	IO				5.58
20.500	7.82	11.68	6.104	IO				5.56
20.583	7.74	11.39	6.078	IO				5.55
20.667	7.67	11.11	6.054	IO				5.54
20.750	7.60	10.85	6.031	IO				5.53
20.833	7.53	10.61	6.009	IO				5.51
20.917	7.47	10.37	5.988	IO				5.50
21.000	7.40	10.22	5.969	IO				5.49
21.083	7.34	10.12	5.949	IO				5.48
21.167	7.28	10.02	5.930	IO				5.47
21.250	7.22	9.92	5.912	IO				5.46
21.333	7.16	9.82	5.893	IO				5.46
21.417	7.10	9.73	5.875	IO				5.45
21.500	7.05	9.64	5.857	IO				5.44
21.583	7.00	9.54	5.839	IO				5.43
21.667	6.94	9.45	5.822	IO				5.42
21.750	6.89	9.36	5.805	IO				5.41
21.833	6.84	9.27	5.788	IO				5.40
21.917	6.79	9.19	5.771	IO				5.39
22.000	6.74	9.10	5.755	IO				5.38
22.083	6.70	9.02	5.739	IO				5.38
22.167	6.65	8.93	5.723	0				5.37
22.250	6.61	8.85	5.707	0				5.36
22.333	6.56	8.77	5.692	0				5.35
22.417	6.52	8.69	5.677	0				5.34
22.500	6.48	8.62	5.662	0				5.34
22.583	6.43	8.54	5.647	0				5.33
22.667	6.39	8.46	5.633	0				5.32
22.750	6.35	8.39	5.619	0				5.31
22.833	6.32	8.32	5.605	0				5.31
22.917	6.28	8.25	5.591	0				5.30
23.000	6.24	8.18	5.578	0				5.29
23.083	6.20	8.11	5.565	0				5.29
23.167	6.17	8.04	5.552	0				5.28
23.250	6.13	7.97	5.539	0				5.27
23.333	6.10	7.91	5.526	0				5.27
23.417	6.06	7.84	5.514	0				5.26
23.500	6.03	7.78	5.502	0				5.25
23.583	5.99	7.72	5.490	0				5.25
23.667	5.96	7.65	5.478	0				5.24
23.750	5.93	7.59	5.467	0				5.24
23.833	5.90	7.53	5.455	0				5.23
23.917	5.87	7.48	5.444	0				5.22
24.000	5.84	7.42	5.433	0				5.22
24.083	5.65	7.36	5.422	0				5.21
24.167	4.70	7.28	5.407	0				5.20

24.250	2.94	7.16	5.383	IO				5.19
24.333	1.99	6.99	5.352	IO				5.18
24.417	1.46	6.81	5.316	IO				5.16
24.500	1.11	6.61	5.279	IO				5.14
24.583	0.85	6.41	5.240	IO				5.12
24.667	0.66	6.21	5.202	IO				5.10
24.750	0.52	6.01	5.164	IO				5.08
24.833	0.40	5.82	5.127	IO				5.06
24.917	0.31	5.62	5.090	IO				5.04
25.000	0.24	5.43	5.053	IO				5.02
25.083	0.18	5.25	5.018	IO				5.00
25.167	0.14	5.15	4.983	IO				4.99
25.250	0.11	5.08	4.949	IO				4.97
25.333	0.08	5.01	4.915	IO				4.95
25.417	0.05	4.94	4.881	IO				4.93
25.500	0.03	4.87	4.848	IO				4.91
25.583	0.01	4.81	4.814	IO				4.90
25.667	0.00	4.74	4.782	IO				4.88
25.750	0.00	4.67	4.749	IO				4.86
25.833	0.00	4.61	4.717	IO				4.84
25.917	0.00	4.54	4.686	IO				4.83
26.000	0.00	4.48	4.655	0				4.81
26.083	0.00	4.41	4.624	0				4.79
26.167	0.00	4.35	4.594	0				4.78
26.250	0.00	4.29	4.564	0				4.76
26.333	0.00	4.23	4.535	0				4.75
26.417	0.00	4.17	4.506	0				4.73
26.500	0.00	4.11	4.477	0				4.72
26.583	0.00	4.06	4.449	0				4.70
26.667	0.00	4.00	4.421	0				4.69
26.750	0.00	3.94	4.394	0				4.67
26.833	0.00	3.89	4.367	0				4.66
26.917	0.00	3.83	4.341	0				4.64
27.000	0.00	3.78	4.314	0				4.63
27.083	0.00	3.73	4.288	0				4.62
27.167	0.00	3.67	4.263	0				4.60
27.250	0.00	3.62	4.238	0				4.59
27.333	0.00	3.57	4.213	0				4.58
27.417	0.00	3.52	4.189	0				4.56
27.500	0.00	3.47	4.165	0				4.55
27.583	0.00	3.42	4.141	0				4.54
27.667	0.00	3.37	4.117	0				4.52
27.750	0.00	3.33	4.094	0				4.51
27.833	0.00	3.28	4.072	0				4.50
27.917	0.00	3.27	4.049	0				4.49
28.000	0.00	3.27	4.027	0				4.48
28.083	0.00	3.27	4.004	0				4.46
28.167	0.00	3.26	3.982	0				4.45
28.250	0.00	3.26	3.959	0				4.44
28.333	0.00	3.25	3.937	0				4.43
28.417	0.00	3.25	3.914	0				4.41
28.500	0.00	3.25	3.892	0				4.40
28.583	0.00	3.24	3.870	0				4.39
28.667	0.00	3.24	3.847	0				4.38
28.750	0.00	3.23	3.825	0				4.37
28.833	0.00	3.23	3.803	0				4.35
28.917	0.00	3.23	3.781	0				4.34
29.000	0.00	3.22	3.758	0				4.33

29.083	0.00	3.22	3.736	0				4.32
29.167	0.00	3.21	3.714	0				4.30
29.250	0.00	3.21	3.692	0				4.29
29.333	0.00	3.20	3.670	0				4.28
29.417	0.00	3.20	3.648	0				4.27
29.500	0.00	3.20	3.626	0				4.26
29.583	0.00	3.19	3.604	0				4.24
29.667	0.00	3.19	3.582	0				4.23
29.750	0.00	3.18	3.560	0				4.22
29.833	0.00	3.18	3.538	0				4.21
29.917	0.00	3.18	3.516	0				4.20
30.000	0.00	3.17	3.494	0				4.18
30.083	0.00	3.17	3.472	0				4.17
30.167	0.00	3.16	3.450	0				4.16
30.250	0.00	3.16	3.429	0				4.15
30.333	0.00	3.16	3.407	0				4.14
30.417	0.00	3.15	3.385	0				4.12
30.500	0.00	3.15	3.364	0				4.11
30.583	0.00	3.14	3.342	0				4.10
30.667	0.00	3.14	3.320	0				4.09
30.750	0.00	3.14	3.299	0				4.08
30.833	0.00	3.13	3.277	0				4.07
30.917	0.00	3.13	3.255	0				4.05
31.000	0.00	3.12	3.234	0				4.04
31.083	0.00	3.12	3.212	0				4.03
31.167	0.00	3.12	3.191	0				4.02
31.250	0.00	3.11	3.170	0				4.01
31.333	0.00	3.11	3.148	0				3.99
31.417	0.00	3.10	3.127	0				3.98
31.500	0.00	3.10	3.105	0				3.97
31.583	0.00	3.10	3.084	0				3.96
31.667	0.00	3.09	3.063	0				3.95
31.750	0.00	3.09	3.041	0				3.93
31.833	0.00	3.08	3.020	0				3.92
31.917	0.00	3.08	2.999	0				3.91
32.000	0.00	3.07	2.978	0				3.90
32.083	0.00	3.07	2.957	0				3.89
32.167	0.00	3.07	2.935	0				3.88
32.250	0.00	3.06	2.914	0				3.86
32.333	0.00	3.06	2.893	0				3.85
32.417	0.00	3.05	2.872	0				3.84
32.500	0.00	3.05	2.851	0				3.83
32.583	0.00	3.04	2.830	0				3.82
32.667	0.00	3.04	2.809	0				3.80
32.750	0.00	3.04	2.788	0				3.79
32.833	0.00	3.03	2.767	0				3.78
32.917	0.00	3.03	2.747	0				3.77
33.000	0.00	3.02	2.726	0				3.76
33.083	0.00	3.02	2.705	0				3.75
33.167	0.00	3.02	2.684	0				3.73
33.250	0.00	3.01	2.663	0				3.72
33.333	0.00	3.01	2.643	0				3.71
33.417	0.00	3.00	2.622	0				3.70
33.500	0.00	3.00	2.601	0				3.69
33.583	0.00	2.99	2.581	0				3.68
33.667	0.00	2.99	2.560	0				3.66
33.750	0.00	2.99	2.539	0				3.65
33.833	0.00	2.98	2.519	0				3.64

33.917	0.00	2.98	2.498	0				3.63
34.000	0.00	2.97	2.478	0				3.62
34.083	0.00	2.97	2.457	0				3.61
34.167	0.00	2.97	2.437	0				3.60
34.250	0.00	2.96	2.417	0				3.58
34.333	0.00	2.96	2.396	0				3.57
34.417	0.00	2.95	2.376	0				3.56
34.500	0.00	2.95	2.355	0				3.55
34.583	0.00	2.95	2.335	0				3.54
34.667	0.00	2.94	2.315	0				3.53
34.750	0.00	2.94	2.295	0				3.52
34.833	0.00	2.93	2.274	0				3.50
34.917	0.00	2.93	2.254	0				3.49
35.000	0.00	2.92	2.234	0				3.48
35.083	0.00	2.92	2.214	0				3.47
35.167	0.00	2.92	2.194	0				3.46
35.250	0.00	2.91	2.174	0				3.45
35.333	0.00	2.91	2.154	0				3.43
35.417	0.00	2.90	2.134	0				3.42
35.500	0.00	2.90	2.114	0				3.41
35.583	0.00	2.89	2.094	0				3.40
35.667	0.00	2.89	2.074	0				3.39
35.750	0.00	2.89	2.054	0				3.38
35.833	0.00	2.88	2.034	0				3.36
35.917	0.00	2.88	2.014	0				3.35
36.000	0.00	2.87	1.995	0				3.34
36.083	0.00	2.87	1.975	0				3.33
36.167	0.00	2.86	1.955	0				3.32
36.250	0.00	2.86	1.935	0				3.31
36.333	0.00	2.86	1.916	0				3.30
36.417	0.00	2.85	1.896	0				3.28
36.500	0.00	2.85	1.876	0				3.27
36.583	0.00	2.84	1.857	0				3.26
36.667	0.00	2.84	1.837	0				3.25
36.750	0.00	2.83	1.818	0				3.24
36.833	0.00	2.83	1.798	0				3.23
36.917	0.00	2.83	1.779	0				3.22
37.000	0.00	2.82	1.759	0				3.21
37.083	0.00	2.82	1.740	0				3.19
37.167	0.00	2.81	1.720	0				3.18
37.250	0.00	2.81	1.701	0				3.17
37.333	0.00	2.80	1.682	0				3.16
37.417	0.00	2.80	1.663	0				3.15
37.500	0.00	2.80	1.643	0				3.14
37.583	0.00	2.79	1.624	0				3.13
37.667	0.00	2.79	1.605	0				3.12
37.750	0.00	2.78	1.586	0				3.11
37.833	0.00	2.78	1.566	0				3.09
37.917	0.00	2.77	1.547	0				3.08
38.000	0.00	2.77	1.528	0				3.07
38.083	0.00	2.77	1.509	0				3.06
38.167	0.00	2.76	1.490	0				3.05
38.250	0.00	2.76	1.471	0				3.04
38.333	0.00	2.75	1.452	0				3.03
38.417	0.00	2.75	1.433	0				3.02
38.500	0.00	2.75	1.414	0				3.01
38.583	0.00	2.73	1.395	0				2.96
38.667	0.00	2.70	1.377	0				2.89

38.750	0.00	2.67	1.358	0				2.81
38.833	0.00	2.64	1.340	0				2.74
38.917	0.00	2.61	1.322	0				2.67
39.000	0.00	2.58	1.304	0				2.60
39.083	0.00	2.55	1.286	0				2.53
39.167	0.00	2.52	1.269	0				2.46
39.250	0.00	2.49	1.252	0				2.40
39.333	0.00	2.46	1.235	0				2.33
39.417	0.00	2.44	1.218	0				2.26
39.500	0.00	2.41	1.201	0				2.20
39.583	0.00	2.38	1.185	0				2.13
39.667	0.00	2.35	1.168	0				2.07
39.750	0.00	2.32	1.152	0				2.01
39.833	0.00	2.29	1.136	0				1.95
39.917	0.00	2.26	1.121	0				1.88
40.000	0.00	2.23	1.105	0				1.82
40.083	0.00	2.20	1.090	0				1.76
40.167	0.00	2.17	1.075	0				1.70
40.250	0.00	2.14	1.060	0				1.65
40.333	0.00	2.12	1.045	0				1.59
40.417	0.00	2.09	1.031	0				1.53
40.500	0.00	2.06	1.017	0				1.49
40.583	0.00	2.02	1.002	0				1.47
40.667	0.00	1.98	0.989	0				1.45
40.750	0.00	1.94	0.975	0				1.43
40.833	0.00	1.90	0.962	0				1.41
40.917	0.00	1.87	0.949	0				1.39
41.000	0.00	1.83	0.936	0				1.37
41.083	0.00	1.79	0.924	0				1.35
41.167	0.00	1.76	0.912	0				1.34
41.250	0.00	1.73	0.900	0				1.32
41.333	0.00	1.69	0.888	0				1.30
41.417	0.00	1.66	0.876	0				1.28
41.500	0.00	1.63	0.865	0				1.27
41.583	0.00	1.60	0.854	0				1.25
41.667	0.00	1.57	0.843	0				1.24
41.750	0.00	1.54	0.832	0				1.22
41.833	0.00	1.51	0.822	0				1.21
41.917	0.00	1.48	0.812	0				1.19
42.000	0.00	1.45	0.801	0				1.18
42.083	0.00	1.42	0.792	0				1.16
42.167	0.00	1.39	0.782	0				1.15
42.250	0.00	1.37	0.772	0				1.13
42.333	0.00	1.34	0.763	0				1.12
42.417	0.00	1.32	0.754	0				1.11
42.500	0.00	1.29	0.745	0				1.09
42.583	0.00	1.26	0.736	0				1.08
42.667	0.00	1.24	0.728	0				1.07
42.750	0.00	1.22	0.719	0				1.05
42.833	0.00	1.19	0.711	0				1.04
42.917	0.00	1.17	0.703	0				1.03
43.000	0.00	1.15	0.695	0				1.02
43.083	0.00	1.13	0.687	0				1.01
43.167	0.00	1.10	0.679	0				1.00
43.250	0.00	1.08	0.672	0				0.98
43.333	0.00	1.05	0.664	0				0.97
43.417	0.00	1.03	0.657	0				0.96
43.500	0.00	1.01	0.650	0				0.95

43.583	0.00	0.99	0.643	0				0.94
43.667	0.00	0.96	0.636	0				0.93
43.750	0.00	0.94	0.630	0				0.92
43.833	0.00	0.92	0.624	0				0.91
43.917	0.00	0.90	0.617	0				0.91
44.000	0.00	0.88	0.611	0				0.90
44.083	0.00	0.86	0.605	0				0.89
44.167	0.00	0.84	0.599	0				0.88
44.250	0.00	0.82	0.593	0				0.87
44.333	0.00	0.81	0.588	0				0.86
44.417	0.00	0.79	0.582	0				0.85
44.500	0.00	0.77	0.577	0				0.85
44.583	0.00	0.75	0.572	0				0.84
44.667	0.00	0.74	0.567	0				0.83
44.750	0.00	0.72	0.562	0				0.82
44.833	0.00	0.70	0.557	0				0.82
44.917	0.00	0.69	0.552	0				0.81
45.000	0.00	0.67	0.547	0				0.80
45.083	0.00	0.66	0.543	0				0.80
45.167	0.00	0.64	0.538	0				0.79
45.250	0.00	0.63	0.534	0				0.78
45.333	0.00	0.62	0.530	0				0.78
45.417	0.00	0.60	0.525	0				0.77
45.500	0.00	0.59	0.521	0				0.76
45.583	0.00	0.57	0.517	0				0.76
45.667	0.00	0.56	0.513	0				0.75
45.750	0.00	0.55	0.510	0				0.75
45.833	0.00	0.54	0.506	0				0.74
45.917	0.00	0.53	0.502	0				0.74
46.000	0.00	0.51	0.499	0				0.73
46.083	0.00	0.50	0.495	0				0.73
46.167	0.00	0.49	0.492	0				0.72
46.250	0.00	0.48	0.488	0				0.72
46.333	0.00	0.47	0.485	0				0.71
46.417	0.00	0.46	0.482	0				0.71
46.500	0.00	0.45	0.479	0				0.70
46.583	0.00	0.44	0.476	0				0.70
46.667	0.00	0.43	0.473	0				0.69
46.750	0.00	0.42	0.470	0				0.69
46.833	0.00	0.41	0.467	0				0.68
46.917	0.00	0.40	0.464	0				0.68
47.000	0.00	0.39	0.461	0				0.68
47.083	0.00	0.38	0.459	0				0.67
47.167	0.00	0.38	0.456	0				0.67
47.250	0.00	0.37	0.453	0				0.66
47.333	0.00	0.36	0.451	0				0.66
47.417	0.00	0.35	0.449	0				0.66
47.500	0.00	0.34	0.446	0				0.65
47.583	0.00	0.34	0.444	0				0.65
47.667	0.00	0.33	0.442	0				0.65
47.750	0.00	0.32	0.439	0				0.64
47.833	0.00	0.31	0.437	0				0.64
47.917	0.00	0.31	0.435	0				0.64
48.000	0.00	0.30	0.433	0				0.63
48.083	0.00	0.29	0.431	0				0.63
48.167	0.00	0.29	0.429	0				0.63
48.250	0.00	0.28	0.427	0				0.63
48.333	0.00	0.27	0.425	0				0.62

48.417	0.00	0.27	0.423	0				0.62
48.500	0.00	0.26	0.421	0				0.62
48.583	0.00	0.26	0.420	0				0.62
48.667	0.00	0.25	0.418	0				0.61
48.750	0.00	0.24	0.416	0				0.61
48.833	0.00	0.24	0.414	0				0.61
48.917	0.00	0.23	0.413	0				0.61
49.000	0.00	0.23	0.411	0				0.60
49.083	0.00	0.22	0.410	0				0.60
49.167	0.00	0.22	0.408	0				0.60
49.250	0.00	0.21	0.407	0				0.60
49.333	0.00	0.21	0.405	0				0.59
49.417	0.00	0.20	0.404	0				0.59
49.500	0.00	0.20	0.402	0				0.59
49.583	0.00	0.20	0.401	0				0.59
49.667	0.00	0.19	0.400	0				0.59
49.750	0.00	0.19	0.398	0				0.58
49.833	0.00	0.18	0.397	0				0.58
49.917	0.00	0.18	0.396	0				0.58
50.000	0.00	0.17	0.395	0				0.58
50.083	0.00	0.17	0.393	0				0.58
50.167	0.00	0.17	0.392	0				0.58
50.250	0.00	0.16	0.391	0				0.57
50.333	0.00	0.16	0.390	0				0.57
50.417	0.00	0.16	0.389	0				0.57
50.500	0.00	0.15	0.388	0				0.57
50.583	0.00	0.15	0.387	0				0.57
50.667	0.00	0.15	0.386	0				0.57
50.750	0.00	0.14	0.385	0				0.56
50.833	0.00	0.14	0.384	0				0.56
50.917	0.00	0.14	0.383	0				0.56
51.000	0.00	0.13	0.382	0				0.56
51.083	0.00	0.13	0.381	0				0.56
51.167	0.00	0.13	0.380	0				0.56
51.250	0.00	0.12	0.379	0				0.56
51.333	0.00	0.12	0.378	0				0.55
51.417	0.00	0.12	0.378	0				0.55
51.500	0.00	0.12	0.377	0				0.55
51.583	0.00	0.11	0.376	0				0.55
51.667	0.00	0.11	0.375	0				0.55
51.750	0.00	0.11	0.374	0				0.55
51.833	0.00	0.11	0.374	0				0.55
51.917	0.00	0.10	0.373	0				0.55
52.000	0.00	0.10	0.372	0				0.55
52.083	0.00	0.10	0.372	0				0.54
52.167	0.00	0.10	0.371	0				0.54
52.250	0.00	0.10	0.370	0				0.54
52.333	0.00	0.09	0.370	0				0.54
52.417	0.00	0.09	0.369	0				0.54
52.500	0.00	0.09	0.368	0				0.54
52.583	0.00	0.09	0.368	0				0.54
52.667	0.00	0.09	0.367	0				0.54
52.750	0.00	0.08	0.367	0				0.54
52.833	0.00	0.08	0.366	0				0.54
52.917	0.00	0.08	0.365	0				0.54
53.000	0.00	0.08	0.365	0				0.53
53.083	0.00	0.08	0.364	0				0.53
53.167	0.00	0.07	0.364	0				0.53

53.250	0.00	0.07	0.363	0					0.53
53.333	0.00	0.07	0.363	0					0.53
53.417	0.00	0.07	0.362	0					0.53
53.500	0.00	0.07	0.362	0					0.53
53.583	0.00	0.07	0.361	0					0.53
53.667	0.00	0.07	0.361	0					0.53
53.750	0.00	0.06	0.360	0					0.53
53.833	0.00	0.06	0.360	0					0.53
53.917	0.00	0.06	0.360	0					0.53
54.000	0.00	0.06	0.359	0					0.53
54.083	0.00	0.06	0.359	0					0.53
54.167	0.00	0.06	0.358	0					0.53
54.250	0.00	0.06	0.358	0					0.52
54.333	0.00	0.05	0.358	0					0.52
54.417	0.00	0.05	0.357	0					0.52
54.500	0.00	0.05	0.357	0					0.52
54.583	0.00	0.05	0.357	0					0.52
54.667	0.00	0.05	0.356	0					0.52
54.750	0.00	0.05	0.356	0					0.52
54.833	0.00	0.05	0.356	0					0.52
54.917	0.00	0.05	0.355	0					0.52
55.000	0.00	0.05	0.355	0					0.52
55.083	0.00	0.04	0.355	0					0.52
55.167	0.00	0.04	0.354	0					0.52
55.250	0.00	0.04	0.354	0					0.52
55.333	0.00	0.04	0.354	0					0.52
55.417	0.00	0.04	0.353	0					0.52
55.500	0.00	0.04	0.353	0					0.52
55.583	0.00	0.04	0.353	0					0.52
55.667	0.00	0.04	0.353	0					0.52
55.750	0.00	0.04	0.352	0					0.52
55.833	0.00	0.04	0.352	0					0.52
55.917	0.00	0.04	0.352	0					0.52
56.000	0.00	0.03	0.352	0					0.52
56.083	0.00	0.03	0.351	0					0.52
56.167	0.00	0.03	0.351	0					0.51
56.250	0.00	0.03	0.351	0					0.51
56.333	0.00	0.03	0.351	0					0.51
56.417	0.00	0.03	0.350	0					0.51
56.500	0.00	0.03	0.350	0					0.51
56.583	0.00	0.03	0.350	0					0.51
56.667	0.00	0.03	0.350	0					0.51
56.750	0.00	0.03	0.350	0					0.51
56.833	0.00	0.03	0.349	0					0.51
56.917	0.00	0.03	0.349	0					0.51
57.000	0.00	0.03	0.349	0					0.51
57.083	0.00	0.03	0.349	0					0.51
57.167	0.00	0.03	0.349	0					0.51
57.250	0.00	0.02	0.349	0					0.51
57.333	0.00	0.02	0.348	0					0.51
57.417	0.00	0.02	0.348	0					0.51
57.500	0.00	0.02	0.348	0					0.51
57.583	0.00	0.02	0.348	0					0.51
57.667	0.00	0.02	0.348	0					0.51
57.750	0.00	0.02	0.348	0					0.51
57.833	0.00	0.02	0.347	0					0.51
57.917	0.00	0.02	0.347	0					0.51
58.000	0.00	0.02	0.347	0					0.51

58.083	0.00	0.02	0.347	0				0.51
58.167	0.00	0.02	0.347	0				0.51
58.250	0.00	0.02	0.347	0				0.51
58.333	0.00	0.02	0.347	0				0.51
58.417	0.00	0.02	0.347	0				0.51
58.500	0.00	0.02	0.346	0				0.51
58.583	0.00	0.02	0.346	0				0.51
58.667	0.00	0.02	0.346	0				0.51
58.750	0.00	0.02	0.346	0				0.51
58.833	0.00	0.02	0.346	0				0.51
58.917	0.00	0.02	0.346	0				0.51
59.000	0.00	0.02	0.346	0				0.51
59.083	0.00	0.02	0.346	0				0.51
59.167	0.00	0.01	0.346	0				0.51
59.250	0.00	0.01	0.345	0				0.51
59.333	0.00	0.01	0.345	0				0.51
59.417	0.00	0.01	0.345	0				0.51
59.500	0.00	0.01	0.345	0				0.51
59.583	0.00	0.01	0.345	0				0.51
59.667	0.00	0.01	0.345	0				0.51
59.750	0.00	0.01	0.345	0				0.51
59.833	0.00	0.01	0.345	0				0.51
59.917	0.00	0.01	0.345	0				0.51
60.000	0.00	0.01	0.345	0				0.51
60.083	0.00	0.01	0.345	0				0.51
60.167	0.00	0.01	0.344	0				0.51
60.250	0.00	0.01	0.344	0				0.50
60.333	0.00	0.01	0.344	0				0.50
60.417	0.00	0.01	0.344	0				0.50
60.500	0.00	0.01	0.344	0				0.50
60.583	0.00	0.01	0.344	0				0.50
60.667	0.00	0.01	0.344	0				0.50
60.750	0.00	0.01	0.344	0				0.50
60.833	0.00	0.01	0.344	0				0.50
60.917	0.00	0.01	0.344	0				0.50
61.000	0.00	0.01	0.344	0				0.50
61.083	0.00	0.01	0.344	0				0.50
61.167	0.00	0.01	0.344	0				0.50
61.250	0.00	0.01	0.344	0				0.50
61.333	0.00	0.01	0.344	0				0.50
61.417	0.00	0.01	0.343	0				0.50
61.500	0.00	0.01	0.343	0				0.50
61.583	0.00	0.01	0.343	0				0.50
61.667	0.00	0.01	0.343	0				0.50
61.750	0.00	0.01	0.343	0				0.50
61.833	0.00	0.01	0.343	0				0.50
61.917	0.00	0.01	0.343	0				0.50
62.000	0.00	0.01	0.343	0				0.50
62.083	0.00	0.01	0.343	0				0.50
62.167	0.00	0.01	0.343	0				0.50
62.250	0.00	0.01	0.343	0				0.50
62.333	0.00	0.01	0.343	0				0.50
62.417	0.00	0.01	0.343	0				0.50
62.500	0.00	0.01	0.343	0				0.50
62.583	0.00	0.01	0.343	0				0.50
62.667	0.00	0.01	0.343	0				0.50
62.750	0.00	0.01	0.343	0				0.50
62.833	0.00	0.01	0.343	0				0.50

62.917	0.00	0.01	0.343	0				0.50
63.000	0.00	0.01	0.343	0				0.50
63.083	0.00	0.01	0.343	0				0.50
63.167	0.00	0.01	0.343	0				0.50
63.250	0.00	0.00	0.343	0				0.50
63.333	0.00	0.00	0.342	0				0.50
63.417	0.00	0.00	0.342	0				0.50
63.500	0.00	0.00	0.342	0				0.50
63.583	0.00	0.00	0.342	0				0.50
63.667	0.00	0.00	0.342	0				0.50
63.750	0.00	0.00	0.342	0				0.50
63.833	0.00	0.00	0.342	0				0.50
63.917	0.00	0.00	0.342	0				0.50
64.000	0.00	0.00	0.342	0				0.50
64.083	0.00	0.00	0.342	0				0.50
64.167	0.00	0.00	0.342	0				0.50
64.250	0.00	0.00	0.342	0				0.50
64.333	0.00	0.00	0.342	0				0.50
64.417	0.00	0.00	0.342	0				0.50
64.500	0.00	0.00	0.342	0				0.50
64.583	0.00	0.00	0.342	0				0.50
64.667	0.00	0.00	0.342	0				0.50
64.750	0.00	0.00	0.342	0				0.50
64.833	0.00	0.00	0.342	0				0.50
64.917	0.00	0.00	0.342	0				0.50
65.000	0.00	0.00	0.342	0				0.50
65.083	0.00	0.00	0.342	0				0.50
65.167	0.00	0.00	0.342	0				0.50
65.250	0.00	0.00	0.342	0				0.50
65.333	0.00	0.00	0.342	0				0.50
65.417	0.00	0.00	0.342	0				0.50
65.500	0.00	0.00	0.342	0				0.50
65.583	0.00	0.00	0.342	0				0.50
65.667	0.00	0.00	0.342	0				0.50
65.750	0.00	0.00	0.342	0				0.50
65.833	0.00	0.00	0.342	0				0.50
65.917	0.00	0.00	0.342	0				0.50
66.000	0.00	0.00	0.342	0				0.50
66.083	0.00	0.00	0.342	0				0.50
66.167	0.00	0.00	0.342	0				0.50
66.250	0.00	0.00	0.342	0				0.50
66.333	0.00	0.00	0.342	0				0.50
66.417	0.00	0.00	0.342	0				0.50
66.500	0.00	0.00	0.342	0				0.50
66.583	0.00	0.00	0.342	0				0.50
66.667	0.00	0.00	0.342	0				0.50
66.750	0.00	0.00	0.342	0				0.50
66.833	0.00	0.00	0.342	0				0.50
66.917	0.00	0.00	0.342	0				0.50
67.000	0.00	0.00	0.342	0				0.50
67.083	0.00	0.00	0.342	0				0.50
67.167	0.00	0.00	0.342	0				0.50
67.250	0.00	0.00	0.342	0				0.50
67.333	0.00	0.00	0.342	0				0.50
67.417	0.00	0.00	0.341	0				0.50
67.500	0.00	0.00	0.341	0				0.50
67.583	0.00	0.00	0.341	0				0.50
67.667	0.00	0.00	0.341	0				0.50

67.750	0.00	0.00	0.341	0					0.50
67.833	0.00	0.00	0.341	0					0.50
67.917	0.00	0.00	0.341	0					0.50
68.000	0.00	0.00	0.341	0					0.50
68.083	0.00	0.00	0.341	0					0.50
68.167	0.00	0.00	0.341	0					0.50
68.250	0.00	0.00	0.341	0					0.50
68.333	0.00	0.00	0.341	0					0.50
68.417	0.00	0.00	0.341	0					0.50
68.500	0.00	0.00	0.341	0					0.50
68.583	0.00	0.00	0.341	0					0.50
68.667	0.00	0.00	0.341	0					0.50
68.750	0.00	0.00	0.341	0					0.50
68.833	0.00	0.00	0.341	0					0.50
68.917	0.00	0.00	0.341	0					0.50
69.000	0.00	0.00	0.341	0					0.50
69.083	0.00	0.00	0.341	0					0.50
69.167	0.00	0.00	0.341	0					0.50

Remaining water in basin = 0.34 (Ac.Ft)

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

Number of intervals = 830

Time interval = 5.0 (Min.)

Maximum/Peak flow rate = 32.023 (CFS)

Total volume = 21.680 (Ac.Ft)

Status of hydrographs being held in storage

Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014
Study date: 05/08/20

204728 - US Cold Storage
PROPOSED BASIN - AREA A
100-YEAR, 24- HOUR STORM
BY: SG DATE: 05-08-20

Program License Serial Number 6320

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

From study/file name: PROPA100.rte
*****HYDROGRAPH DATA*****
Number of intervals = 307
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 196.510 (CFS)
Total volume = 32.024 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
Process from Point/Station 4.000 to Point/Station 5.000
**** RETARDING BASIN ROUTING ****

Program computation of outflow v. depth

CALCULATED OUTFLOW DATA AT DEPTH = 0.50(Ft.)
Total outflow at this depth = 0.00(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 1.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
Calculated individual pipe flow = 1.112(CFS)
Normal flow depth in pipe = 4.38(In.)
Flow top width inside pipe = 7.96(In.)
Critical Depth = 0.50(Ft.)

Calculated flow rate through pipe(s) = 1.112(CFS)

Total outflow at this depth = 1.11(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 1.50(Ft.)

Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)

Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)

NOTE: Assuming free outlet flow.

NOTE: Normal flow is pressure flow.

The total friction loss through the pipe is 2.000(Ft.)

Pipe friction loss = 1.178(Ft.)

Minor friction loss = 0.822(Ft.) K-factor = 1.50

Calculated flow rate through pipe(s) = 2.074(CFS)

Total outflow at this depth = 2.07(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 2.00(Ft.)

Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)

Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)

NOTE: Assuming free outlet flow.

NOTE: Normal flow is pressure flow.

The total friction loss through the pipe is 2.500(Ft.)

Pipe friction loss = 1.472(Ft.)

Minor friction loss = 1.027(Ft.) K-factor = 1.50

Calculated flow rate through pipe(s) = 2.318(CFS)

Total outflow at this depth = 2.32(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 2.50(Ft.)

Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)

Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)

NOTE: Assuming free outlet flow.

NOTE: Normal flow is pressure flow.

The total friction loss through the pipe is 3.000(Ft.)

Pipe friction loss = 1.767(Ft.)

Minor friction loss = 1.233(Ft.) K-factor = 1.50

Calculated flow rate through pipe(s) = 2.540(CFS)

Total outflow at this depth = 2.54(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 2.99(Ft.)

Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)

Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)

NOTE: Assuming free outlet flow.

NOTE: Normal flow is pressure flow.

The total friction loss through the pipe is 3.490(Ft.)

Pipe friction loss = 2.055(Ft.)

Minor friction loss = 1.434(Ft.) K-factor = 1.50

Calculated flow rate through pipe(s) = 2.739(CFS)

Total outflow at this depth = 2.74(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 3.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.500(Ft.)
Pipe friction loss = 2.061(Ft.)
Minor friction loss = 1.438(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 2.743(CFS)

Total outflow at this depth = 2.74(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 3.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.000(Ft.)
Pipe friction loss = 2.355(Ft.)
Minor friction loss = 1.644(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 2.932(CFS)

Total outflow at this depth = 2.93(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 4.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.500(Ft.)
Pipe friction loss = 2.650(Ft.)
Minor friction loss = 1.849(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.110(CFS)

Total outflow at this depth = 3.11(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 4.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.000(Ft.)
Pipe friction loss = 2.944(Ft.)
Minor friction loss = 2.055(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.279(CFS)

Total outflow at this depth = 3.28(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 5.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.500(Ft.)
Pipe friction loss = 3.239(Ft.)
Minor friction loss = 2.260(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.439(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 1.768(CFS)
Normal flow depth in pipe = 3.34(In.)
Flow top width inside pipe = 14.00(In.)
Critical Depth = 0.50(Ft.)
Calculated flow rate through pipe(s) = 1.768(CFS)

Total outflow at this depth = 5.21(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 5.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 6.000(Ft.)
Pipe friction loss = 3.533(Ft.)
Minor friction loss = 2.466(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.591(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 6.687(CFS)
Normal flow depth in pipe = 6.57(In.)
Flow top width inside pipe = 17.33(In.)
Critical Depth = 1.00(Ft.)
Calculated flow rate through pipe(s) = 6.687(CFS)

Total outflow at this depth = 10.28(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 6.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 6.500(Ft.)
Pipe friction loss = 3.828(Ft.)
Minor friction loss = 2.671(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.738(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.500(Ft.)
Pipe friction loss = 1.145(Ft.)
Minor friction loss = 2.356(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 17.772(CFS)

Total outflow at this depth = 21.51(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 6.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 7.000(Ft.)
Pipe friction loss = 4.122(Ft.)
Minor friction loss = 2.877(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 3.879(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.000(Ft.)
Pipe friction loss = 1.309(Ft.)
Minor friction loss = 2.692(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 18.999(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 1.768(CFS)
Normal flow depth in pipe = 3.34(In.)
Flow top width inside pipe = 14.00(In.)
Critical Depth = 0.50(Ft.)
Calculated flow rate through pipe(s) = 1.768(CFS)

Total outflow at this depth = 24.65(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 7.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 7.500(Ft.)
Pipe friction loss = 4.417(Ft.)
Minor friction loss = 3.082(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.015(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)

Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.500(Ft.)
Pipe friction loss = 1.472(Ft.)
Minor friction loss = 3.029(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 20.152(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 6.687(CFS)
Normal flow depth in pipe = 6.57(In.)
Flow top width inside pipe = 17.33(In.)
Critical Depth = 1.00(Ft.)
Calculated flow rate through pipe(s) = 6.687(CFS)

Total outflow at this depth = 30.85(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 7.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 8.000(Ft.)
Pipe friction loss = 4.711(Ft.)
Minor friction loss = 3.288(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.147(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.000(Ft.)
Pipe friction loss = 1.636(Ft.)
Minor friction loss = 3.366(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 21.242(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 3.500(Ft.)
Pipe friction loss = 1.145(Ft.)
Minor friction loss = 2.356(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 17.772(CFS)

Total outflow at this depth = 43.16(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 8.00(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1

Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 8.500(Ft.)
Pipe friction loss = 5.005(Ft.)
Minor friction loss = 3.493(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.275(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 5.500(Ft.)
Pipe friction loss = 1.799(Ft.)
Minor friction loss = 3.702(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 22.279(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 4.000(Ft.)
Pipe friction loss = 1.309(Ft.)
Minor friction loss = 2.692(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 18.999(CFS)

Weir capacity using equation $Q = CLH^{\text{Exp}}$ (Using Feet as units)
Weir Length = 3.00(Ft.) C value = 2.63 Exp = 1.50
Weir flow: Depth = H = 0.50(Ft.) Flow = 2.79 (CFS)

Total outflow at this depth = 48.34(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 8.50(Ft.)
Pipe length = 40.00(Ft.) Elevation difference = 1.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 8.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 9.000(Ft.)
Pipe friction loss = 5.300(Ft.)
Minor friction loss = 3.698(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 4.399(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Given pipe size = 18.00(In.)
NOTE: Assuming free outlet flow.
NOTE: Normal flow is pressure flow.
The total friction loss through the pipe is 6.000(Ft.)
Pipe friction loss = 1.963(Ft.)
Minor friction loss = 4.039(Ft.) K-factor = 1.50
Calculated flow rate through pipe(s) = 23.269(CFS)

Pipe length = 40.00(Ft.) Elevation difference = 2.00(Ft.)

Manning's N = 0.013 No. of pipes = 1
 Given pipe size = 18.00(In.)
 NOTE: Assuming free outlet flow.
 NOTE: Normal flow is pressure flow.
 The total friction loss through the pipe is 4.500(Ft.)
 Pipe friction loss = 1.472(Ft.)
 Minor friction loss = 3.029(Ft.) K-factor = 1.50
 Calculated flow rate through pipe(s) = 20.152(CFS)

Weir capacity using equation $Q = CLH^{Exp}$ (Using Feet as units)
 Weir Length = 3.00(Ft.) C value = 2.63 Exp = 1.50
 Weir flow: Depth = H = 1.00(Ft.) Flow = 7.89 (CFS)

Total outflow at this depth = 55.71(CFS)

 Total number of inflow hydrograph intervals = 307
 Hydrograph time unit = 5.000 (Min.)
 Initial depth in storage basin = 0.00(Ft.)

 Initial basin depth = 0.00 (Ft.)
 Initial basin storage = 0.00 (Ac.Ft)
 Initial basin outflow = 0.00 (CFS)

 Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-0*dt/2) (Ac.Ft)	(S+0*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.341	0.000	0.341	0.341
1.000	0.682	1.112	0.678	0.686
1.500	1.023	2.074	1.016	1.030
2.000	1.150	2.318	1.142	1.158
2.500	1.278	2.540	1.269	1.287
2.990	1.403	2.739	1.394	1.412
3.000	1.404	2.743	1.395	1.413
3.500	2.268	2.932	2.258	2.278
4.000	3.157	3.110	3.146	3.168
4.500	4.071	3.279	4.060	4.082
5.000	5.010	5.207	4.992	5.028
5.500	5.980	10.278	5.945	6.015
6.000	6.971	21.510	6.897	7.045
6.500	7.990	24.647	7.905	8.075
7.000	9.038	30.854	8.932	9.144
7.500	10.113	43.161	9.964	10.262
8.000	11.216	48.343	11.050	11.382
8.500	12.349	55.710	12.157	12.541

 Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	Depth (Ft.)
.0	49.1	98.25	147.38	196.51

0.083	0.24	0.00	0.001	0				0.00
0.167	1.63	0.00	0.007	0				0.01
0.250	4.26	0.00	0.028	0				0.04
0.333	5.67	0.00	0.062	0				0.09
0.417	6.47	0.00	0.104	OI				0.15
0.500	7.01	0.00	0.150	OI				0.22
0.583	7.40	0.00	0.200	OI				0.29
0.667	7.70	0.00	0.252	OI				0.37
0.750	7.93	0.00	0.305	OI				0.45
0.833	8.12	0.06	0.360	OI				0.53
0.917	8.27	0.24	0.416	OI				0.61
1.000	8.40	0.42	0.471	OI				0.69
1.083	8.51	0.60	0.526	OI				0.77
1.167	8.59	0.78	0.580	OI				0.85
1.250	8.66	0.95	0.633	OI				0.93
1.333	8.72	1.12	0.686	OI				1.01
1.417	8.78	1.27	0.738	OI				1.08
1.500	8.84	1.41	0.789	OI				1.16
1.583	8.89	1.56	0.840	OI				1.23
1.667	8.93	1.70	0.890	OI				1.31
1.750	8.95	1.84	0.940	OI				1.38
1.833	8.98	1.98	0.988	OI				1.45
1.917	9.00	2.10	1.036	OI				1.55
2.000	9.02	2.19	1.083	OI				1.74
2.083	9.05	2.28	1.130	OI				1.92
2.167	9.07	2.36	1.177	OI				2.10
2.250	9.10	2.44	1.223	OI				2.28
2.333	9.12	2.52	1.268	OI				2.46
2.417	9.15	2.60	1.314	OI				2.64
2.500	9.17	2.67	1.358	OI				2.82
2.583	9.20	2.74	1.403	OI				2.99
2.667	9.22	2.75	1.448	OI				3.03
2.750	9.25	2.76	1.492	OI				3.05
2.833	9.28	2.77	1.537	OI				3.08
2.917	9.30	2.78	1.582	OI				3.10
3.000	9.33	2.79	1.627	OI				3.13
3.083	9.36	2.80	1.672	OI				3.16
3.167	9.38	2.81	1.717	OI				3.18
3.250	9.41	2.82	1.762	OI				3.21
3.333	9.44	2.83	1.808	OI				3.23
3.417	9.47	2.84	1.853	OI				3.26
3.500	9.49	2.85	1.899	OI				3.29
3.583	9.52	2.86	1.945	OI				3.31
3.667	9.55	2.87	1.991	OI				3.34
3.750	9.58	2.88	2.037	OI				3.37
3.833	9.61	2.89	2.083	OI				3.39
3.917	9.64	2.90	2.130	OI				3.42
4.000	9.67	2.91	2.176	OI				3.45
4.083	9.70	2.92	2.223	OI				3.47
4.167	9.73	2.93	2.269	OI				3.50
4.250	9.76	2.94	2.316	OI				3.53
4.333	9.79	2.95	2.363	OI				3.55
4.417	9.82	2.96	2.410	OI				3.58
4.500	9.86	2.97	2.458	OI				3.61
4.583	9.89	2.98	2.505	OI				3.63
4.667	9.92	2.99	2.553	OI				3.66
4.750	9.95	3.00	2.601	OI				3.69
4.833	9.99	3.01	2.649	OI				3.71

4.917	10.02	3.02	2.697	OI					3.74
5.000	10.05	3.03	2.745	OI					3.77
5.083	10.09	3.04	2.794	OI					3.80
5.167	10.12	3.05	2.842	OI					3.82
5.250	10.16	3.06	2.891	OI					3.85
5.333	10.19	3.07	2.940	OI					3.88
5.417	10.23	3.08	2.989	OI					3.91
5.500	10.26	3.09	3.039	OI					3.93
5.583	10.30	3.10	3.088	OI					3.96
5.667	10.34	3.11	3.138	OI					3.99
5.750	10.38	3.12	3.188	OI					4.02
5.833	10.41	3.13	3.238	OI					4.04
5.917	10.45	3.13	3.288	OI					4.07
6.000	10.49	3.14	3.339	OI					4.10
6.083	10.53	3.15	3.389	OI					4.13
6.167	10.57	3.16	3.440	OI					4.15
6.250	10.61	3.17	3.491	OI					4.18
6.333	10.65	3.18	3.543	OI					4.21
6.417	10.69	3.19	3.594	OI					4.24
6.500	10.73	3.20	3.646	OI					4.27
6.583	10.77	3.21	3.698	OI					4.30
6.667	10.82	3.22	3.750	OI					4.32
6.750	10.86	3.23	3.803	OI					4.35
6.833	10.90	3.24	3.855	OI					4.38
6.917	10.95	3.25	3.908	OI					4.41
7.000	10.99	3.26	3.961	OI					4.44
7.083	11.04	3.27	4.015	OI					4.47
7.167	11.08	3.28	4.068	OI					4.50
7.250	11.13	3.38	4.122	OI					4.53
7.333	11.18	3.49	4.175	OI					4.56
7.417	11.23	3.60	4.228	OI					4.58
7.500	11.27	3.71	4.280	OI					4.61
7.583	11.32	3.81	4.332	OI					4.64
7.667	11.37	3.92	4.383	OI					4.67
7.750	11.42	4.03	4.435	OI					4.69
7.833	11.47	4.13	4.485	OI					4.72
7.917	11.53	4.23	4.536	OI					4.75
8.000	11.58	4.34	4.586	OI					4.77
8.083	11.63	4.44	4.635	OI					4.80
8.167	11.69	4.54	4.685	OI					4.83
8.250	11.74	4.64	4.734	OI					4.85
8.333	11.80	4.74	4.783	OI					4.88
8.417	11.86	4.84	4.831	OI					4.90
8.500	11.91	4.94	4.879	OI					4.93
8.583	11.97	5.04	4.927	OI					4.96
8.667	12.03	5.13	4.975	OI					4.98
8.750	12.09	5.27	5.022	OI					5.01
8.833	12.15	5.51	5.068	OI					5.03
8.917	12.22	5.75	5.114	OI					5.05
9.000	12.28	5.98	5.158	OI					5.08
9.083	12.35	6.20	5.200	OI					5.10
9.167	12.41	6.42	5.242	OI					5.12
9.250	12.48	6.63	5.283	OI					5.14
9.333	12.54	6.84	5.323	OI					5.16
9.417	12.61	7.04	5.362	OI					5.18
9.500	12.68	7.24	5.399	OI					5.20
9.583	12.76	7.44	5.437	OI					5.22
9.667	12.83	7.63	5.473	OI					5.24

9.750	12.90	7.81	5.508	OI	5.26
9.833	12.98	7.99	5.543	OI	5.27
9.917	13.06	8.17	5.577	OI	5.29
10.000	13.13	8.34	5.610	OI	5.31
10.083	13.22	8.52	5.643	OI	5.33
10.167	13.30	8.68	5.675	OI	5.34
10.250	13.38	8.85	5.706	OI	5.36
10.333	13.46	9.01	5.737	OI	5.37
10.417	13.55	9.17	5.768	OI	5.39
10.500	13.64	9.33	5.798	OI	5.41
10.583	13.73	9.48	5.827	OI	5.42
10.667	13.82	9.63	5.856	OI	5.44
10.750	13.92	9.78	5.885	OI	5.45
10.833	14.01	9.93	5.913	OI	5.47
10.917	14.11	10.08	5.941	OI	5.48
11.000	14.21	10.22	5.969	OI	5.49
11.083	14.32	10.46	5.996	OI	5.51
11.167	14.42	10.75	6.022	OI	5.52
11.250	14.53	11.03	6.047	OI	5.53
11.333	14.64	11.30	6.070	OI	5.55
11.417	14.75	11.55	6.093	OI	5.56
11.500	14.87	11.80	6.114	OI	5.57
11.583	14.99	12.03	6.135	OI	5.58
11.667	15.11	12.26	6.155	OI	5.59
11.750	15.24	12.48	6.174	0	5.60
11.833	15.36	12.69	6.193	0	5.61
11.917	15.50	12.90	6.211	0	5.62
12.000	15.63	13.10	6.229	0	5.63
12.083	15.71	13.29	6.246	0	5.63
12.167	15.47	13.46	6.261	0	5.64
12.250	14.91	13.59	6.273	0	5.65
12.333	14.67	13.68	6.280	0	5.65
12.417	14.62	13.76	6.287	0	5.65
12.500	14.64	13.82	6.293	0	5.66
12.583	14.71	13.89	6.298	0	5.66
12.667	14.80	13.95	6.304	0	5.66
12.750	14.93	14.02	6.310	0	5.67
12.833	15.06	14.09	6.316	0	5.67
12.917	15.22	14.17	6.323	0	5.67
13.000	15.39	14.26	6.331	0	5.68
13.083	15.58	14.35	6.339	0	5.68
13.167	15.78	14.45	6.348	0	5.69
13.250	16.00	14.56	6.357	0	5.69
13.333	16.22	14.67	6.368	0	5.70
13.417	16.46	14.80	6.379	0	5.70
13.500	16.70	14.93	6.391	0	5.71
13.583	16.97	15.08	6.403	0	5.71
13.667	17.24	15.23	6.417	0	5.72
13.750	17.54	15.39	6.431	0	5.73
13.833	17.85	15.56	6.446	0	5.74
13.917	18.18	15.75	6.463	0	5.74
14.000	18.52	15.94	6.480	OI	5.75
14.083	18.90	16.15	6.498	OI	5.76
14.167	19.29	16.37	6.518	OI	5.77
14.250	19.75	16.61	6.539	OI	5.78
14.333	20.19	16.86	6.561	OI	5.79
14.417	20.68	17.13	6.585	OI	5.81
14.500	21.17	17.42	6.610	OI	5.82

14.583	21.73	17.72	6.636	OI				5.83
14.667	22.29	18.04	6.665	OI				5.85
14.750	22.94	18.38	6.695	OI				5.86
14.833	23.60	18.75	6.728	0				5.88
14.917	24.36	19.14	6.762	0				5.89
15.000	25.16	19.57	6.799	OI				5.91
15.083	26.08	20.02	6.840	OI				5.93
15.167	27.06	20.51	6.883	OI				5.96
15.250	28.20	21.05	6.930	OI				5.98
15.333	29.44	21.54	6.982	OI				6.01
15.417	30.57	21.72	7.040	OI				6.03
15.500	30.10	21.90	7.098	OI				6.06
15.583	28.10	22.05	7.147	OI				6.09
15.667	28.16	22.18	7.189	OI				6.11
15.750	29.77	22.32	7.235	OI				6.13
15.833	32.57	22.51	7.295	0 I				6.16
15.917	37.51	22.77	7.381	0 I				6.20
16.000	46.62	23.18	7.512	0 I				6.27
16.083	73.64	23.95	7.764	0	I			6.39
16.167	140.85	26.65	8.328	0		I		6.66
16.250	196.51	33.65	9.283	0			I	7.11
16.333	127.40	43.26	10.133	0		I		7.51
16.417	86.84	45.29	10.566	0	I			7.71
16.500	67.98	46.31	10.784	0	I			7.80
16.583	58.77	46.85	10.899	0	I			7.86
16.667	51.66	47.12	10.956	OI				7.88
16.750	44.97	47.16	10.964	0				7.89
16.833	40.54	47.02	10.934	IO				7.87
16.917	36.55	46.75	10.877	I 0				7.85
17.000	33.32	46.37	10.797	I 0				7.81
17.083	30.42	45.91	10.698	I 0				7.77
17.167	27.73	45.37	10.584	I 0				7.71
17.250	25.32	44.77	10.456	I 0				7.66
17.333	24.10	44.14	10.320	I 0				7.59
17.417	23.22	43.48	10.182	I 0				7.53
17.500	22.03	42.35	10.042	I 0				7.47
17.583	20.34	40.74	9.902	I 0				7.40
17.667	19.22	39.15	9.763	I 0				7.34
17.750	17.54	37.58	9.625	I 0				7.27
17.833	16.92	36.03	9.490	I 0				7.21
17.917	16.37	34.56	9.362	I 0				7.15
18.000	15.89	33.16	9.240	I 0				7.09
18.083	15.49	31.84	9.124	I 0				7.04
18.167	15.45	30.72	9.015	I 0				6.99
18.250	15.78	30.11	8.913	I 0				6.94
18.333	15.80	29.54	8.816	I 0				6.89
18.417	15.68	28.99	8.723	I 0				6.85
18.500	15.51	28.45	8.633	I 0				6.81
18.583	15.32	27.93	8.545	I 0				6.76
18.667	15.12	27.43	8.459	I 0				6.72
18.750	14.92	26.93	8.375	I 0				6.68
18.833	14.72	26.45	8.294	I 0				6.64
18.917	14.52	25.97	8.214	I 0				6.61
19.000	14.33	25.51	8.136	I 0				6.57
19.083	14.14	25.06	8.060	I 0				6.53
19.167	13.96	24.63	7.986	I 0				6.50
19.250	13.78	24.41	7.912	IO				6.46
19.333	13.60	24.18	7.839	IO				6.43

19.417	13.44	23.96	7.766	IO				6.39
19.500	13.28	23.74	7.694	IO				6.35
19.583	13.12	23.52	7.622	IO				6.32
19.667	12.97	23.30	7.551	IO				6.28
19.750	12.82	23.08	7.480	IO				6.25
19.833	12.68	22.86	7.410	IO				6.22
19.917	12.54	22.65	7.340	IO				6.18
20.000	12.40	22.43	7.271	IO				6.15
20.083	12.27	22.22	7.202	I 0				6.11
20.167	12.15	22.01	7.134	I 0				6.08
20.250	12.02	21.80	7.066	I 0				6.05
20.333	11.90	21.60	6.999	I 0				6.01
20.417	11.79	21.09	6.934	I 0				5.98
20.500	11.68	20.38	6.872	I 0				5.95
20.583	11.57	19.73	6.813	I 0				5.92
20.667	11.47	19.11	6.759	I 0				5.89
20.750	11.36	18.53	6.708	I 0				5.87
20.833	11.26	17.99	6.660	IO				5.84
20.917	11.17	17.48	6.615	IO				5.82
21.000	11.07	17.00	6.573	IO				5.80
21.083	10.98	16.55	6.534	IO				5.78
21.167	10.89	16.13	6.496	IO				5.76
21.250	10.81	15.73	6.461	IO				5.74
21.333	10.72	15.36	6.428	IO				5.73
21.417	10.64	15.01	6.397	IO				5.71
21.500	10.56	14.68	6.368	IO				5.70
21.583	10.48	14.37	6.341	IO				5.68
21.667	10.40	14.07	6.315	IO				5.67
21.750	10.33	13.79	6.290	IO				5.66
21.833	10.26	13.53	6.267	IO				5.64
21.917	10.18	13.28	6.245	IO				5.63
22.000	10.11	13.05	6.224	IO				5.62
22.083	10.04	12.82	6.204	IO				5.61
22.167	9.98	12.61	6.186	IO				5.60
22.250	9.91	12.41	6.168	IO				5.59
22.333	9.85	12.22	6.151	0				5.59
22.417	9.78	12.04	6.135	0				5.58
22.500	9.72	11.87	6.120	0				5.57
22.583	9.66	11.70	6.106	0				5.56
22.667	9.60	11.55	6.092	0				5.56
22.750	9.54	11.40	6.079	0				5.55
22.833	9.49	11.26	6.067	0				5.54
22.917	9.43	11.12	6.055	0				5.54
23.000	9.38	10.99	6.043	0				5.53
23.083	9.32	10.87	6.032	0				5.53
23.167	9.27	10.75	6.022	0				5.52
23.250	9.22	10.64	6.012	0				5.52
23.333	9.17	10.53	6.002	0				5.51
23.417	9.11	10.43	5.993	0				5.51
23.500	9.07	10.33	5.984	0				5.50
23.583	9.02	10.25	5.976	0				5.50
23.667	8.97	10.21	5.967	0				5.49
23.750	8.92	10.17	5.958	0				5.49
23.833	8.88	10.12	5.950	0				5.48
23.917	8.83	10.08	5.941	0				5.48
24.000	8.79	10.03	5.933	0				5.48
24.083	8.50	9.98	5.923	0				5.47
24.167	7.07	9.90	5.909	0				5.46

24.250	4.42	9.76	5.880	IO	5.45
24.333	2.99	9.54	5.839	IO	5.43
24.417	2.19	9.30	5.792	IO	5.40
24.500	1.66	9.04	5.743	IO	5.38
24.583	1.28	8.77	5.691	IO	5.35
24.667	0.99	8.50	5.640	IO	5.32
24.750	0.78	8.23	5.588	IO	5.30
24.833	0.60	7.96	5.537	IO	5.27
24.917	0.47	7.70	5.487	IO	5.25
25.000	0.36	7.44	5.438	IO	5.22
25.083	0.27	7.19	5.389	IO	5.20
25.167	0.20	6.94	5.342	IO	5.17
25.250	0.16	6.71	5.297	IO	5.15
25.333	0.12	6.47	5.252	IO	5.12
25.417	0.08	6.25	5.209	IO	5.10
25.500	0.04	6.03	5.167	0	5.08
25.583	0.02	5.82	5.127	0	5.06
25.667	0.00	5.61	5.087	0	5.04
25.750	0.00	5.41	5.049	0	5.02
25.833	0.00	5.22	5.013	0	5.00
25.917	0.00	5.14	4.977	0	4.98
26.000	0.00	5.07	4.942	0	4.96
26.083	0.00	5.00	4.907	0	4.95
26.167	0.00	4.93	4.873	0	4.93
26.250	0.00	4.86	4.840	0	4.91
26.333	0.00	4.79	4.806	0	4.89
26.417	0.00	4.72	4.774	0	4.87
26.500	0.00	4.66	4.741	0	4.86
26.583	0.00	4.59	4.709	0	4.84
26.667	0.00	4.53	4.678	0	4.82
26.750	0.00	4.46	4.647	0	4.81
26.833	0.00	4.40	4.617	0	4.79
26.917	0.00	4.34	4.587	0	4.77
27.000	0.00	4.28	4.557	0	4.76
27.083	0.00	4.22	4.528	0	4.74
27.167	0.00	4.16	4.499	0	4.73
27.250	0.00	4.10	4.470	0	4.71
27.333	0.00	4.04	4.442	0	4.70
27.417	0.00	3.98	4.415	0	4.68
27.500	0.00	3.93	4.387	0	4.67
27.583	0.00	3.87	4.361	0	4.65
27.667	0.00	3.82	4.334	0	4.64
27.750	0.00	3.77	4.308	0	4.63
27.833	0.00	3.71	4.282	0	4.61
27.917	0.00	3.66	4.257	0	4.60
28.000	0.00	3.61	4.232	0	4.59
28.083	0.00	3.56	4.207	0	4.57
28.167	0.00	3.51	4.183	0	4.56
28.250	0.00	3.46	4.159	0	4.55
28.333	0.00	3.41	4.135	0	4.53
28.417	0.00	3.36	4.112	0	4.52
28.500	0.00	3.32	4.089	0	4.51
28.583	0.00	3.28	4.066	0	4.50
28.667	0.00	3.27	4.044	0	4.48
28.750	0.00	3.27	4.021	0	4.47
28.833	0.00	3.27	3.999	0	4.46
28.917	0.00	3.26	3.976	0	4.45
29.000	0.00	3.26	3.954	0	4.44

29.083	0.00	3.25	3.931	0				4.42
29.167	0.00	3.25	3.909	0				4.41
29.250	0.00	3.24	3.886	0				4.40
29.333	0.00	3.24	3.864	0				4.39
29.417	0.00	3.24	3.842	0				4.37
29.500	0.00	3.23	3.820	0				4.36
29.583	0.00	3.23	3.797	0				4.35
29.667	0.00	3.22	3.775	0				4.34
29.750	0.00	3.22	3.753	0				4.33
29.833	0.00	3.22	3.731	0				4.31
29.917	0.00	3.21	3.709	0				4.30
30.000	0.00	3.21	3.686	0				4.29
30.083	0.00	3.20	3.664	0				4.28
30.167	0.00	3.20	3.642	0				4.27
30.250	0.00	3.20	3.620	0				4.25
30.333	0.00	3.19	3.598	0				4.24
30.417	0.00	3.19	3.576	0				4.23
30.500	0.00	3.18	3.554	0				4.22
30.583	0.00	3.18	3.533	0				4.21
30.667	0.00	3.18	3.511	0				4.19
30.750	0.00	3.17	3.489	0				4.18
30.833	0.00	3.17	3.467	0				4.17
30.917	0.00	3.16	3.445	0				4.16
31.000	0.00	3.16	3.423	0				4.15
31.083	0.00	3.16	3.402	0				4.13
31.167	0.00	3.15	3.380	0				4.12
31.250	0.00	3.15	3.358	0				4.11
31.333	0.00	3.14	3.337	0				4.10
31.417	0.00	3.14	3.315	0				4.09
31.500	0.00	3.14	3.293	0				4.07
31.583	0.00	3.13	3.272	0				4.06
31.667	0.00	3.13	3.250	0				4.05
31.750	0.00	3.12	3.229	0				4.04
31.833	0.00	3.12	3.207	0				4.03
31.917	0.00	3.12	3.186	0				4.02
32.000	0.00	3.11	3.164	0				4.00
32.083	0.00	3.11	3.143	0				3.99
32.167	0.00	3.10	3.121	0				3.98
32.250	0.00	3.10	3.100	0				3.97
32.333	0.00	3.09	3.079	0				3.96
32.417	0.00	3.09	3.057	0				3.94
32.500	0.00	3.09	3.036	0				3.93
32.583	0.00	3.08	3.015	0				3.92
32.667	0.00	3.08	2.994	0				3.91
32.750	0.00	3.07	2.973	0				3.90
32.833	0.00	3.07	2.951	0				3.88
32.917	0.00	3.06	2.930	0				3.87
33.000	0.00	3.06	2.909	0				3.86
33.083	0.00	3.06	2.888	0				3.85
33.167	0.00	3.05	2.867	0				3.84
33.250	0.00	3.05	2.846	0				3.83
33.333	0.00	3.04	2.825	0				3.81
33.417	0.00	3.04	2.804	0				3.80
33.500	0.00	3.04	2.783	0				3.79
33.583	0.00	3.03	2.762	0				3.78
33.667	0.00	3.03	2.741	0				3.77
33.750	0.00	3.02	2.721	0				3.75
33.833	0.00	3.02	2.700	0				3.74

33.917	0.00	3.01	2.679	0				3.73
34.000	0.00	3.01	2.658	0				3.72
34.083	0.00	3.01	2.638	0				3.71
34.167	0.00	3.00	2.617	0				3.70
34.250	0.00	3.00	2.596	0				3.68
34.333	0.00	2.99	2.576	0				3.67
34.417	0.00	2.99	2.555	0				3.66
34.500	0.00	2.99	2.534	0				3.65
34.583	0.00	2.98	2.514	0				3.64
34.667	0.00	2.98	2.493	0				3.63
34.750	0.00	2.97	2.473	0				3.62
34.833	0.00	2.97	2.452	0				3.60
34.917	0.00	2.97	2.432	0				3.59
35.000	0.00	2.96	2.412	0				3.58
35.083	0.00	2.96	2.391	0				3.57
35.167	0.00	2.95	2.371	0				3.56
35.250	0.00	2.95	2.351	0				3.55
35.333	0.00	2.94	2.330	0				3.53
35.417	0.00	2.94	2.310	0				3.52
35.500	0.00	2.94	2.290	0				3.51
35.583	0.00	2.93	2.270	0				3.50
35.667	0.00	2.93	2.249	0				3.49
35.750	0.00	2.92	2.229	0				3.48
35.833	0.00	2.92	2.209	0				3.47
35.917	0.00	2.92	2.189	0				3.45
36.000	0.00	2.91	2.169	0				3.44
36.083	0.00	2.91	2.149	0				3.43
36.167	0.00	2.90	2.129	0				3.42
36.250	0.00	2.90	2.109	0				3.41
36.333	0.00	2.89	2.089	0				3.40
36.417	0.00	2.89	2.069	0				3.38
36.500	0.00	2.88	2.049	0				3.37
36.583	0.00	2.88	2.029	0				3.36
36.667	0.00	2.88	2.009	0				3.35
36.750	0.00	2.87	1.990	0				3.34
36.833	0.00	2.87	1.970	0				3.33
36.917	0.00	2.86	1.950	0				3.32
37.000	0.00	2.86	1.931	0				3.30
37.083	0.00	2.85	1.911	0				3.29
37.167	0.00	2.85	1.891	0				3.28
37.250	0.00	2.85	1.872	0				3.27
37.333	0.00	2.84	1.852	0				3.26
37.417	0.00	2.84	1.832	0				3.25
37.500	0.00	2.83	1.813	0				3.24
37.583	0.00	2.83	1.793	0				3.23
37.667	0.00	2.82	1.774	0				3.21
37.750	0.00	2.82	1.755	0				3.20
37.833	0.00	2.82	1.735	0				3.19
37.917	0.00	2.81	1.716	0				3.18
38.000	0.00	2.81	1.696	0				3.17
38.083	0.00	2.80	1.677	0				3.16
38.167	0.00	2.80	1.658	0				3.15
38.250	0.00	2.79	1.639	0				3.14
38.333	0.00	2.79	1.619	0				3.12
38.417	0.00	2.79	1.600	0				3.11
38.500	0.00	2.78	1.581	0				3.10
38.583	0.00	2.78	1.562	0				3.09
38.667	0.00	2.77	1.543	0				3.08

38.750	0.00	2.77	1.524	0				3.07
38.833	0.00	2.77	1.505	0				3.06
38.917	0.00	2.76	1.485	0				3.05
39.000	0.00	2.76	1.466	0				3.04
39.083	0.00	2.75	1.448	0				3.03
39.167	0.00	2.75	1.429	0				3.01
39.250	0.00	2.74	1.410	0				3.00
39.333	0.00	2.72	1.391	0				2.94
39.417	0.00	2.69	1.372	0				2.87
39.500	0.00	2.66	1.354	0				2.80
39.583	0.00	2.63	1.336	0				2.73
39.667	0.00	2.60	1.318	0				2.66
39.750	0.00	2.57	1.300	0				2.59
39.833	0.00	2.55	1.282	0				2.52
39.917	0.00	2.52	1.265	0				2.45
40.000	0.00	2.49	1.247	0				2.38
40.083	0.00	2.46	1.230	0				2.31
40.167	0.00	2.43	1.214	0				2.25
40.250	0.00	2.40	1.197	0				2.18
40.333	0.00	2.37	1.181	0				2.12
40.417	0.00	2.34	1.164	0				2.06
40.500	0.00	2.31	1.148	0				1.99
40.583	0.00	2.28	1.132	0				1.93
40.667	0.00	2.25	1.117	0				1.87
40.750	0.00	2.22	1.101	0				1.81
40.833	0.00	2.20	1.086	0				1.75
40.917	0.00	2.17	1.071	0				1.69
41.000	0.00	2.14	1.056	0				1.63
41.083	0.00	2.11	1.042	0				1.57
41.167	0.00	2.08	1.027	0				1.52
41.250	0.00	2.05	1.013	0				1.49
41.333	0.00	2.01	0.999	0				1.46
41.417	0.00	1.97	0.985	0				1.44
41.500	0.00	1.93	0.972	0				1.43
41.583	0.00	1.89	0.959	0				1.41
41.667	0.00	1.86	0.946	0				1.39
41.750	0.00	1.82	0.933	0				1.37
41.833	0.00	1.79	0.921	0				1.35
41.917	0.00	1.75	0.909	0				1.33
42.000	0.00	1.72	0.897	0				1.31
42.083	0.00	1.68	0.885	0				1.30
42.167	0.00	1.65	0.874	0				1.28
42.250	0.00	1.62	0.862	0				1.26
42.333	0.00	1.59	0.851	0				1.25
42.417	0.00	1.56	0.840	0				1.23
42.500	0.00	1.53	0.830	0				1.22
42.583	0.00	1.50	0.819	0				1.20
42.667	0.00	1.47	0.809	0				1.19
42.750	0.00	1.44	0.799	0				1.17
42.833	0.00	1.41	0.789	0				1.16
42.917	0.00	1.39	0.780	0				1.14
43.000	0.00	1.36	0.770	0				1.13
43.083	0.00	1.33	0.761	0				1.12
43.167	0.00	1.31	0.752	0				1.10
43.250	0.00	1.28	0.743	0				1.09
43.333	0.00	1.26	0.734	0				1.08
43.417	0.00	1.23	0.725	0				1.06
43.500	0.00	1.21	0.717	0				1.05

43.583	0.00	1.19	0.709	0					1.04
43.667	0.00	1.16	0.701	0					1.03
43.750	0.00	1.14	0.693	0					1.02
43.833	0.00	1.12	0.685	0					1.00
43.917	0.00	1.10	0.677	0					0.99
44.000	0.00	1.07	0.670	0					0.98
44.083	0.00	1.05	0.662	0					0.97
44.167	0.00	1.03	0.655	0					0.96
44.250	0.00	1.00	0.648	0					0.95
44.333	0.00	0.98	0.642	0					0.94
44.417	0.00	0.96	0.635	0					0.93
44.500	0.00	0.94	0.628	0					0.92
44.583	0.00	0.92	0.622	0					0.91
44.667	0.00	0.90	0.616	0					0.90
44.750	0.00	0.88	0.610	0					0.89
44.833	0.00	0.86	0.604	0					0.89
44.917	0.00	0.84	0.598	0					0.88
45.000	0.00	0.82	0.592	0					0.87
45.083	0.00	0.80	0.587	0					0.86
45.167	0.00	0.78	0.581	0					0.85
45.250	0.00	0.77	0.576	0					0.84
45.333	0.00	0.75	0.571	0					0.84
45.417	0.00	0.73	0.565	0					0.83
45.500	0.00	0.72	0.560	0					0.82
45.583	0.00	0.70	0.556	0					0.81
45.667	0.00	0.68	0.551	0					0.81
45.750	0.00	0.67	0.546	0					0.80
45.833	0.00	0.65	0.542	0					0.79
45.917	0.00	0.64	0.537	0					0.79
46.000	0.00	0.63	0.533	0					0.78
46.083	0.00	0.61	0.529	0					0.77
46.167	0.00	0.60	0.524	0					0.77
46.250	0.00	0.58	0.520	0					0.76
46.333	0.00	0.57	0.516	0					0.76
46.417	0.00	0.56	0.512	0					0.75
46.500	0.00	0.55	0.509	0					0.75
46.583	0.00	0.53	0.505	0					0.74
46.667	0.00	0.52	0.501	0					0.73
46.750	0.00	0.51	0.498	0					0.73
46.833	0.00	0.50	0.494	0					0.72
46.917	0.00	0.49	0.491	0					0.72
47.000	0.00	0.48	0.487	0					0.71
47.083	0.00	0.47	0.484	0					0.71
47.167	0.00	0.46	0.481	0					0.71
47.250	0.00	0.45	0.478	0					0.70
47.333	0.00	0.44	0.475	0					0.70
47.417	0.00	0.43	0.472	0					0.69
47.500	0.00	0.42	0.469	0					0.69
47.583	0.00	0.41	0.466	0					0.68
47.667	0.00	0.40	0.463	0					0.68
47.750	0.00	0.39	0.461	0					0.68
47.833	0.00	0.38	0.458	0					0.67
47.917	0.00	0.37	0.455	0					0.67
48.000	0.00	0.36	0.453	0					0.66
48.083	0.00	0.36	0.450	0					0.66
48.167	0.00	0.35	0.448	0					0.66
48.250	0.00	0.34	0.446	0					0.65
48.333	0.00	0.33	0.443	0					0.65

48.417	0.00	0.33	0.441	0				0.65
48.500	0.00	0.32	0.439	0				0.64
48.583	0.00	0.31	0.437	0				0.64
48.667	0.00	0.30	0.434	0				0.64
48.750	0.00	0.30	0.432	0				0.63
48.833	0.00	0.29	0.430	0				0.63
48.917	0.00	0.28	0.428	0				0.63
49.000	0.00	0.28	0.426	0				0.63
49.083	0.00	0.27	0.425	0				0.62
49.167	0.00	0.27	0.423	0				0.62
49.250	0.00	0.26	0.421	0				0.62
49.333	0.00	0.25	0.419	0				0.61
49.417	0.00	0.25	0.417	0				0.61
49.500	0.00	0.24	0.416	0				0.61
49.583	0.00	0.24	0.414	0				0.61
49.667	0.00	0.23	0.412	0				0.60
49.750	0.00	0.23	0.411	0				0.60
49.833	0.00	0.22	0.409	0				0.60
49.917	0.00	0.22	0.408	0				0.60
50.000	0.00	0.21	0.406	0				0.60
50.083	0.00	0.21	0.405	0				0.59
50.167	0.00	0.20	0.403	0				0.59
50.250	0.00	0.20	0.402	0				0.59
50.333	0.00	0.19	0.401	0				0.59
50.417	0.00	0.19	0.399	0				0.59
50.500	0.00	0.19	0.398	0				0.58
50.583	0.00	0.18	0.397	0				0.58
50.667	0.00	0.18	0.395	0				0.58
50.750	0.00	0.17	0.394	0				0.58
50.833	0.00	0.17	0.393	0				0.58
50.917	0.00	0.17	0.392	0				0.57
51.000	0.00	0.16	0.391	0				0.57
51.083	0.00	0.16	0.390	0				0.57
51.167	0.00	0.16	0.389	0				0.57
51.250	0.00	0.15	0.388	0				0.57
51.333	0.00	0.15	0.387	0				0.57
51.417	0.00	0.15	0.386	0				0.57
51.500	0.00	0.14	0.385	0				0.56
51.583	0.00	0.14	0.384	0				0.56
51.667	0.00	0.14	0.383	0				0.56
51.750	0.00	0.13	0.382	0				0.56
51.833	0.00	0.13	0.381	0				0.56
51.917	0.00	0.13	0.380	0				0.56
52.000	0.00	0.12	0.379	0				0.56
52.083	0.00	0.12	0.378	0				0.55
52.167	0.00	0.12	0.377	0				0.55
52.250	0.00	0.12	0.377	0				0.55
52.333	0.00	0.11	0.376	0				0.55
52.417	0.00	0.11	0.375	0				0.55
52.500	0.00	0.11	0.374	0				0.55
52.583	0.00	0.11	0.374	0				0.55
52.667	0.00	0.10	0.373	0				0.55
52.750	0.00	0.10	0.372	0				0.55
52.833	0.00	0.10	0.371	0				0.54
52.917	0.00	0.10	0.371	0				0.54
53.000	0.00	0.09	0.370	0				0.54
53.083	0.00	0.09	0.369	0				0.54
53.167	0.00	0.09	0.369	0				0.54

53.250	0.00	0.09	0.368	0				0.54
53.333	0.00	0.09	0.368	0				0.54
53.417	0.00	0.08	0.367	0				0.54
53.500	0.00	0.08	0.366	0				0.54
53.583	0.00	0.08	0.366	0				0.54
53.667	0.00	0.08	0.365	0				0.54
53.750	0.00	0.08	0.365	0				0.53
53.833	0.00	0.08	0.364	0				0.53
53.917	0.00	0.07	0.364	0				0.53
54.000	0.00	0.07	0.363	0				0.53
54.083	0.00	0.07	0.363	0				0.53
54.167	0.00	0.07	0.362	0				0.53
54.250	0.00	0.07	0.362	0				0.53
54.333	0.00	0.07	0.361	0				0.53
54.417	0.00	0.06	0.361	0				0.53
54.500	0.00	0.06	0.360	0				0.53
54.583	0.00	0.06	0.360	0				0.53
54.667	0.00	0.06	0.360	0				0.53
54.750	0.00	0.06	0.359	0				0.53
54.833	0.00	0.06	0.359	0				0.53
54.917	0.00	0.06	0.358	0				0.53
55.000	0.00	0.06	0.358	0				0.52
55.083	0.00	0.05	0.358	0				0.52
55.167	0.00	0.05	0.357	0				0.52
55.250	0.00	0.05	0.357	0				0.52
55.333	0.00	0.05	0.356	0				0.52
55.417	0.00	0.05	0.356	0				0.52
55.500	0.00	0.05	0.356	0				0.52
55.583	0.00	0.05	0.355	0				0.52
55.667	0.00	0.05	0.355	0				0.52
55.750	0.00	0.05	0.355	0				0.52
55.833	0.00	0.04	0.355	0				0.52
55.917	0.00	0.04	0.354	0				0.52
56.000	0.00	0.04	0.354	0				0.52
56.083	0.00	0.04	0.354	0				0.52
56.167	0.00	0.04	0.353	0				0.52
56.250	0.00	0.04	0.353	0				0.52
56.333	0.00	0.04	0.353	0				0.52
56.417	0.00	0.04	0.353	0				0.52
56.500	0.00	0.04	0.352	0				0.52
56.583	0.00	0.04	0.352	0				0.52
56.667	0.00	0.04	0.352	0				0.52
56.750	0.00	0.03	0.352	0				0.52
56.833	0.00	0.03	0.351	0				0.52
56.917	0.00	0.03	0.351	0				0.51
57.000	0.00	0.03	0.351	0				0.51
57.083	0.00	0.03	0.351	0				0.51
57.167	0.00	0.03	0.350	0				0.51
57.250	0.00	0.03	0.350	0				0.51
57.333	0.00	0.03	0.350	0				0.51
57.417	0.00	0.03	0.350	0				0.51
57.500	0.00	0.03	0.350	0				0.51
57.583	0.00	0.03	0.349	0				0.51
57.667	0.00	0.03	0.349	0				0.51
57.750	0.00	0.03	0.349	0				0.51
57.833	0.00	0.03	0.349	0				0.51
57.917	0.00	0.03	0.349	0				0.51
58.000	0.00	0.02	0.349	0				0.51

58.083	0.00	0.02	0.348	0					0.51
58.167	0.00	0.02	0.348	0					0.51
58.250	0.00	0.02	0.348	0					0.51
58.333	0.00	0.02	0.348	0					0.51
58.417	0.00	0.02	0.348	0					0.51
58.500	0.00	0.02	0.348	0					0.51
58.583	0.00	0.02	0.347	0					0.51
58.667	0.00	0.02	0.347	0					0.51
58.750	0.00	0.02	0.347	0					0.51
58.833	0.00	0.02	0.347	0					0.51
58.917	0.00	0.02	0.347	0					0.51
59.000	0.00	0.02	0.347	0					0.51
59.083	0.00	0.02	0.347	0					0.51
59.167	0.00	0.02	0.347	0					0.51
59.250	0.00	0.02	0.346	0					0.51
59.333	0.00	0.02	0.346	0					0.51
59.417	0.00	0.02	0.346	0					0.51
59.500	0.00	0.02	0.346	0					0.51
59.583	0.00	0.02	0.346	0					0.51
59.667	0.00	0.02	0.346	0					0.51
59.750	0.00	0.02	0.346	0					0.51
59.833	0.00	0.02	0.346	0					0.51
59.917	0.00	0.01	0.346	0					0.51
60.000	0.00	0.01	0.345	0					0.51
60.083	0.00	0.01	0.345	0					0.51
60.167	0.00	0.01	0.345	0					0.51
60.250	0.00	0.01	0.345	0					0.51
60.333	0.00	0.01	0.345	0					0.51
60.417	0.00	0.01	0.345	0					0.51
60.500	0.00	0.01	0.345	0					0.51
60.583	0.00	0.01	0.345	0					0.51
60.667	0.00	0.01	0.345	0					0.51
60.750	0.00	0.01	0.345	0					0.51
60.833	0.00	0.01	0.345	0					0.51
60.917	0.00	0.01	0.344	0					0.51
61.000	0.00	0.01	0.344	0					0.50
61.083	0.00	0.01	0.344	0					0.50
61.167	0.00	0.01	0.344	0					0.50
61.250	0.00	0.01	0.344	0					0.50
61.333	0.00	0.01	0.344	0					0.50
61.417	0.00	0.01	0.344	0					0.50
61.500	0.00	0.01	0.344	0					0.50
61.583	0.00	0.01	0.344	0					0.50
61.667	0.00	0.01	0.344	0					0.50
61.750	0.00	0.01	0.344	0					0.50
61.833	0.00	0.01	0.344	0					0.50
61.917	0.00	0.01	0.344	0					0.50
62.000	0.00	0.01	0.344	0					0.50
62.083	0.00	0.01	0.344	0					0.50
62.167	0.00	0.01	0.343	0					0.50
62.250	0.00	0.01	0.343	0					0.50
62.333	0.00	0.01	0.343	0					0.50
62.417	0.00	0.01	0.343	0					0.50
62.500	0.00	0.01	0.343	0					0.50
62.583	0.00	0.01	0.343	0					0.50
62.667	0.00	0.01	0.343	0					0.50
62.750	0.00	0.01	0.343	0					0.50
62.833	0.00	0.01	0.343	0					0.50

62.917	0.00	0.01	0.343	0					0.50
63.000	0.00	0.01	0.343	0					0.50
63.083	0.00	0.01	0.343	0					0.50
63.167	0.00	0.01	0.343	0					0.50
63.250	0.00	0.01	0.343	0					0.50
63.333	0.00	0.01	0.343	0					0.50
63.417	0.00	0.01	0.343	0					0.50
63.500	0.00	0.01	0.343	0					0.50
63.583	0.00	0.01	0.343	0					0.50
63.667	0.00	0.01	0.343	0					0.50
63.750	0.00	0.01	0.343	0					0.50
63.833	0.00	0.01	0.343	0					0.50
63.917	0.00	0.00	0.343	0					0.50
64.000	0.00	0.00	0.342	0					0.50
64.083	0.00	0.00	0.342	0					0.50
64.167	0.00	0.00	0.342	0					0.50
64.250	0.00	0.00	0.342	0					0.50
64.333	0.00	0.00	0.342	0					0.50
64.417	0.00	0.00	0.342	0					0.50
64.500	0.00	0.00	0.342	0					0.50
64.583	0.00	0.00	0.342	0					0.50
64.667	0.00	0.00	0.342	0					0.50
64.750	0.00	0.00	0.342	0					0.50
64.833	0.00	0.00	0.342	0					0.50
64.917	0.00	0.00	0.342	0					0.50
65.000	0.00	0.00	0.342	0					0.50
65.083	0.00	0.00	0.342	0					0.50
65.167	0.00	0.00	0.342	0					0.50
65.250	0.00	0.00	0.342	0					0.50
65.333	0.00	0.00	0.342	0					0.50
65.417	0.00	0.00	0.342	0					0.50
65.500	0.00	0.00	0.342	0					0.50
65.583	0.00	0.00	0.342	0					0.50
65.667	0.00	0.00	0.342	0					0.50
65.750	0.00	0.00	0.342	0					0.50
65.833	0.00	0.00	0.342	0					0.50
65.917	0.00	0.00	0.342	0					0.50
66.000	0.00	0.00	0.342	0					0.50
66.083	0.00	0.00	0.342	0					0.50
66.167	0.00	0.00	0.342	0					0.50
66.250	0.00	0.00	0.342	0					0.50
66.333	0.00	0.00	0.342	0					0.50
66.417	0.00	0.00	0.342	0					0.50
66.500	0.00	0.00	0.342	0					0.50
66.583	0.00	0.00	0.342	0					0.50
66.667	0.00	0.00	0.342	0					0.50
66.750	0.00	0.00	0.342	0					0.50
66.833	0.00	0.00	0.342	0					0.50
66.917	0.00	0.00	0.342	0					0.50
67.000	0.00	0.00	0.342	0					0.50
67.083	0.00	0.00	0.342	0					0.50
67.167	0.00	0.00	0.342	0					0.50
67.250	0.00	0.00	0.342	0					0.50
67.333	0.00	0.00	0.342	0					0.50
67.417	0.00	0.00	0.342	0					0.50
67.500	0.00	0.00	0.342	0					0.50
67.583	0.00	0.00	0.342	0					0.50
67.667	0.00	0.00	0.342	0					0.50

67.750	0.00	0.00	0.342	0					0.50
67.833	0.00	0.00	0.342	0					0.50
67.917	0.00	0.00	0.342	0					0.50
68.000	0.00	0.00	0.342	0					0.50
68.083	0.00	0.00	0.341	0					0.50
68.167	0.00	0.00	0.341	0					0.50
68.250	0.00	0.00	0.341	0					0.50
68.333	0.00	0.00	0.341	0					0.50
68.417	0.00	0.00	0.341	0					0.50
68.500	0.00	0.00	0.341	0					0.50
68.583	0.00	0.00	0.341	0					0.50
68.667	0.00	0.00	0.341	0					0.50
68.750	0.00	0.00	0.341	0					0.50
68.833	0.00	0.00	0.341	0					0.50
68.917	0.00	0.00	0.341	0					0.50
69.000	0.00	0.00	0.341	0					0.50
69.083	0.00	0.00	0.341	0					0.50
69.167	0.00	0.00	0.341	0					0.50
69.250	0.00	0.00	0.341	0					0.50
69.333	0.00	0.00	0.341	0					0.50
69.417	0.00	0.00	0.341	0					0.50
69.500	0.00	0.00	0.341	0					0.50
69.583	0.00	0.00	0.341	0					0.50
69.667	0.00	0.00	0.341	0					0.50
69.750	0.00	0.00	0.341	0					0.50
69.833	0.00	0.00	0.341	0					0.50
69.917	0.00	0.00	0.341	0					0.50

Remaining water in basin = 0.34 (Ac.Ft)

*****HYDROGRAPH DATA*****
Number of intervals = 839
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 47.159 (CFS)
Total volume = 31.683 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

ATTACHMENT 6

Hydraulics

Spillway

.
 . Joseph E. Bonadiman & Assoc., Inc. .
 . Consulting Engineers .
 . 234 N. Arrowhead Ave. .
 . San Bernardino, California 92408 .
 . (909) 885-3806 .


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*****
***                                     *****
***                                     ***
***                                     ***
***                                     ***
*** |<----- ( 16.24') ----->| ***
***^^^^^^^^ Water Depth ( 1.56') ^^^^^^***
***                                     ***
***                                     ***
***                                     ***
*** |<----- ( 10.00') ----->| ***
*****
*****
  
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Trapezoidal Channel

Flowrate	265.290	CFS
Velocity	12.952	fps
Depth of Flow	1.561	feet
Critical Depth	2.374	feet
Freeboard	0.000	feet
Total Depth	1.561	feet
Width at Water Surface	16.244	feet
Top Width	16.244	feet
Slope of Channel	1.000	%
Left Side Slope	2.000	: 1
Right Side Slope	2.000	: 1
Base Width	10.000	feet
X-Sectional Area	20.482	sq. ft.
Wetted Perimeter	16.980	feet
AR^(2/3)	23.208	
Mannings 'n'	0.013	