

PRELIMINARY DRAINAGE REPORT

For

Keystone – Rialto Townhouses

PPD 2020-0007

TRACT MAP NO. 20356

APN: 128-071-02, 03 & 09

PROJECT LOCATION

1075 W. Foothill Blvd.
City of Rialto

PREPARED FOR

Keystone DCS
9140 Trask Avenue, Suite 202
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714-791-3772

PREPARED BY

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C52921, Exp 12/31/2020

PREPARATION DATE

January 10, 2022

HZ PROJECT NUMBER

R312213.01

Table of Contents

<u>Title</u>	<u>Page</u>
Introduction	1
Purpose	1
Existing Condition	1
Proposed Condition	1
Hydrologic Analysis	1
Discussion	1

List of Appendices

- | | |
|------------|---|
| Appendix A | Preliminary Drainage Maps <ul style="list-style-type: none">- 100 Year Storm Event – Existing Condition- 100 Year Storm Event – Proposed Condition |
| Appendix B | 100-year Rational Method Hydrologic Analysis <ul style="list-style-type: none">- Existing Condition- Proposed Condition |
| Appendix C | Infiltration/ Detention System Basin Routing Studies |
| Appendix D | Soil Group Map and Isohyetal Map |

Introduction

The project is a new development of a residential townhouse that located at the 1075 W. Foothill Blvd. in the City of Rialto, California. The site is currently vacant and covers with grass. The proposed project will be included approximately 70 townhomes, common drive aisle and recreation areas within a gated tract on approximately 4.5 acres of land.

Purpose

The purpose of this report is to present the drainage concept for the project and to determine the design flow rates and estimate storm drain sizes that will be needed for the proposed development. The drainage maps (Appendix A) and calculations reflect the tributary areas and 100-year storm event runoff flows (Q_{100}).

Existing Condition

The project site is currently vacant with scattered weeds and native grass. The site slopes from northwest to southeast with about nine (9) feet of fall. Existing runoff flows into an existing concrete v-gutter along the south side of the project site, and the runoff continues easterly onto Spruce Ave and ultimately discharges to Rialto Channel. There are no existing storm drain facilities in the vicinity. See Appendix A for existing site drainage map.

Proposed Condition

For the proposed condition, all runoff will be collected by catch basins and directed to a proposed on-site underground infiltration/ detention system that beneath the proposed swimming pool area. The overflow from the underground system will discharge through a trench drain to an existing v-gutter along the south side of the project site. See Appendix A for proposed on-site hydrology map.

Hydrologic Analysis

A hydrologic analysis was prepared using the methodology outlined in the San Bernardino County Flood Control District (SBCFCD) Hydrology Manual. A rational method analysis was completed for the existing and proposed 100-year return event using Civild software, version 7.1. Unit Hydrograph and Basin Routing analyses were also completed using Civild software.

The 100-year, 1-hour rainfall rate was taken from the isohyetal maps in the County of San Bernardino Hydrology Manual. The hydrologic soils type for the site is "A" and was taken from the soil map in the Hydrology Manual. A "apartment" land use was used with an AMC of 3. See Appendix D for Soil Group and Isohyetal Maps.

Peak Storm Mitigation

The proposed infiltration/detention basin has been designed to mitigate the peak flow increase to the downstream facilities from the proposed project. The proposed site runoff will be hold in the basin until it reaches to trench drain's grate elev. at 1277.00 and overflow into the existing v-gutter on the south side of the project site. The basin routing calculations (in Appendix C) demonstrate that during a 100-year storm event the basin will discharge 9.5 cfs, which is less than the existing 100-year 12.7 cfs.

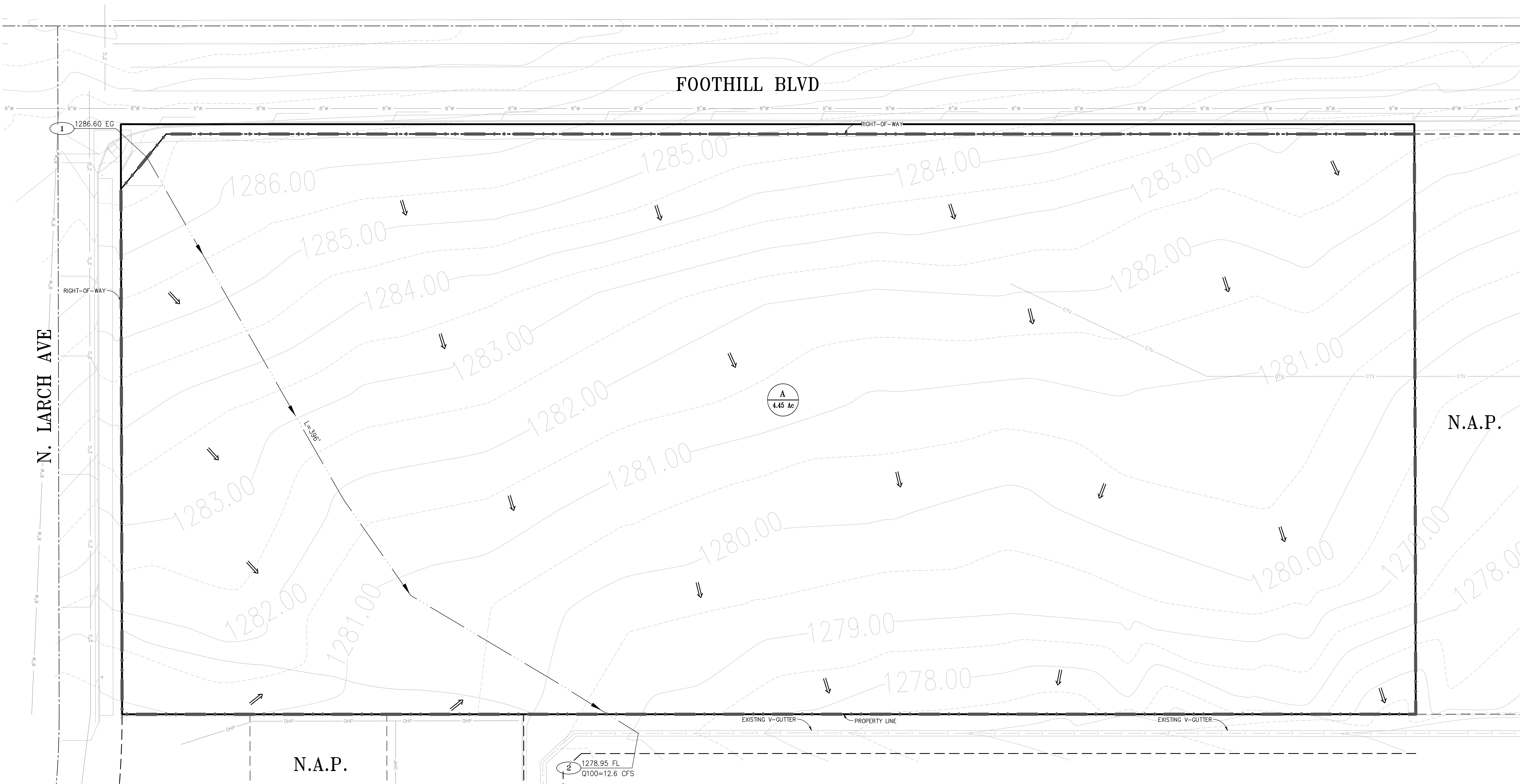
Discussion

According to the hydrologic analysis and basin routing studies for existing and proposed conditions, the results indicate the proposed Q_{100} will be detained on-site in the underground system and the resulting discharge will be less than the existing Q_{100} . All proposed drainage and storm drain facilities will be sized adequately for Q_{100} and additional calculations will be provided in final drainage report including storm drain hydraulics and catch basins sizing.

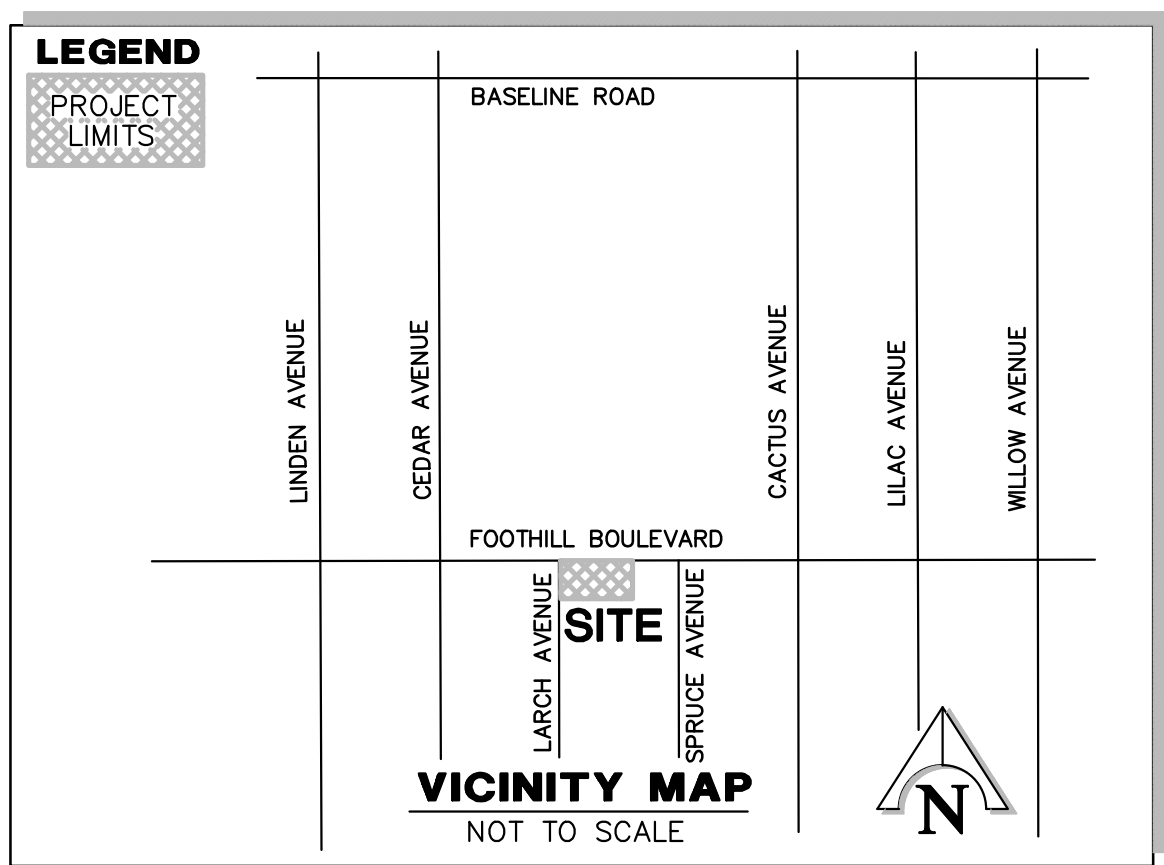
Appendix A

Preliminary Drainage Maps

- 100 Year Storm Event – Existing Condition
- 100 Year Storm Event – Proposed Condition



- LEGEND**
- NO. HYDROLOGY MODEL NODE NUMBER
 - A-11 7.40 Ac TRIBUTARY AREA IN ACRES
 - 673' LENGTH OF FLOW
 - DRAINAGE BOUNDARY
 - FLOW LINE
 - ← FLOW DIRECTION



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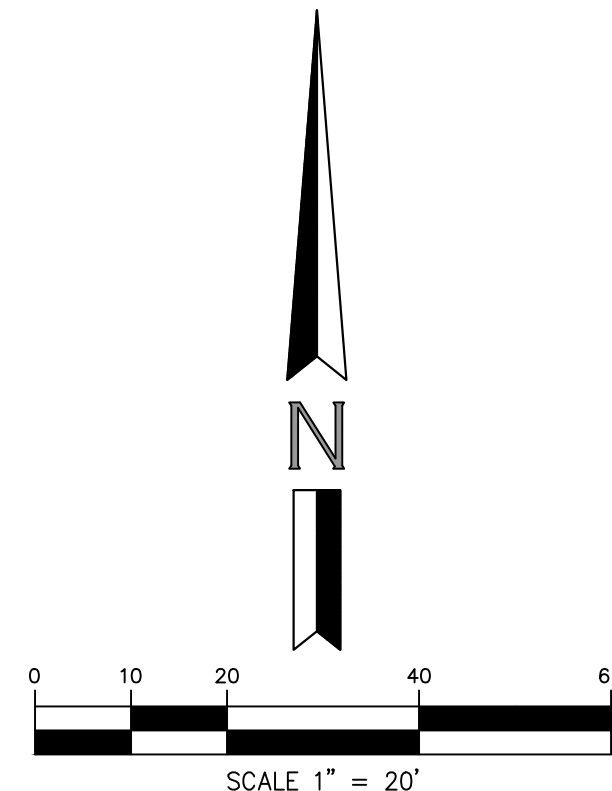
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PRELIMINARY DRAINAGE MAP - EXISTING CONDITION
FOR
KEYSTONE - RIALTO TOWNHOUSES
1075 W. FOOTHILL BLVD
CITY OF RIALTO

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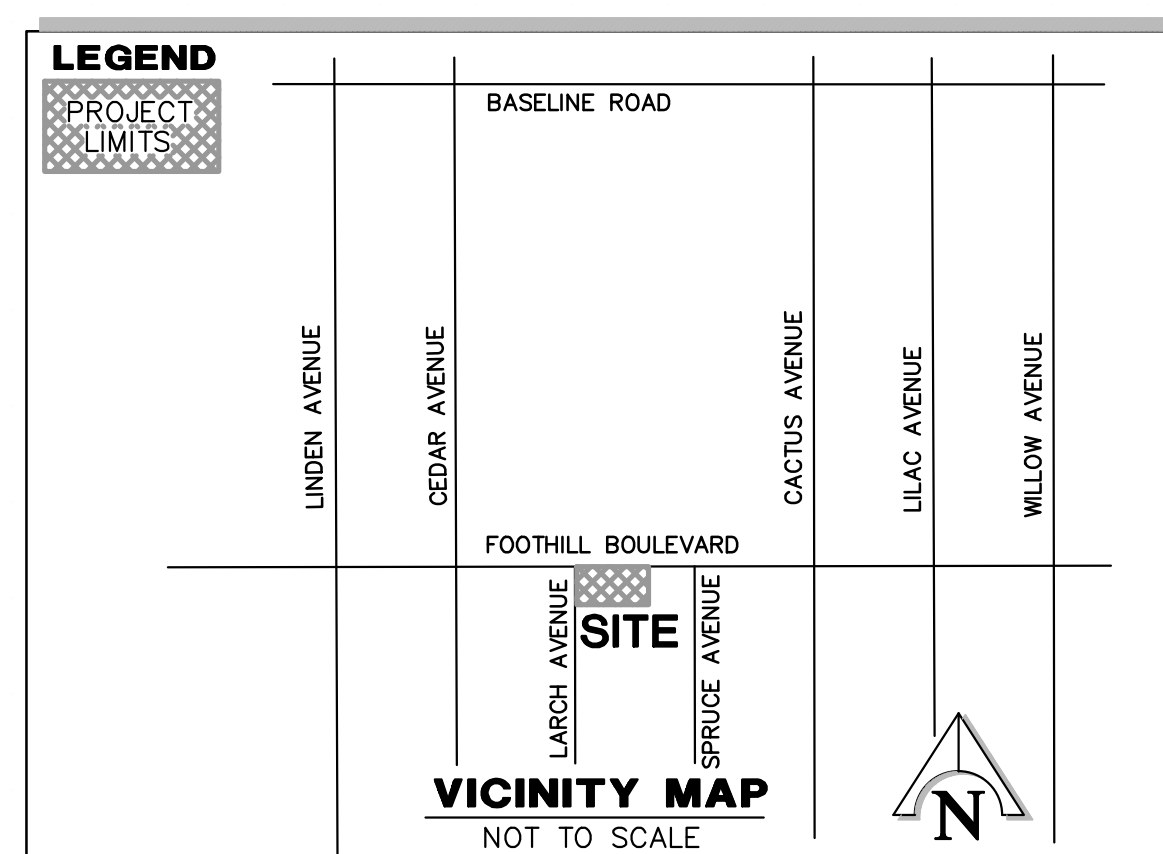
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CHECKED BY D.W.	SHEETS
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N. LARCH AVE

FOOTHILL BLVD



LEGEND

- NO. HYDROLOGY MODEL NODE NUMBER
- A-11 TRIBUTARY AREA IN ACRES
- 673' LENGTH OF FLOW
- DRAINAGE BOUNDARY
- FLOW LINE
- ← FLOW DIRECTION
- DRAINAGE INLET/CATCH BASIN (CB)
- SD PROPOSED STORM DRAIN



PRELIMINARY DRAINAGE MAP - PROPOSED CONDITION

FOR

KEYSTONE - RIALTO TOWNHOUSES

1075 W. FOOTHILL BLVD

CITY OF RIALTO

OWNER/DEVELOPER:

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9140 TRASK AVENUE, SUITE 202

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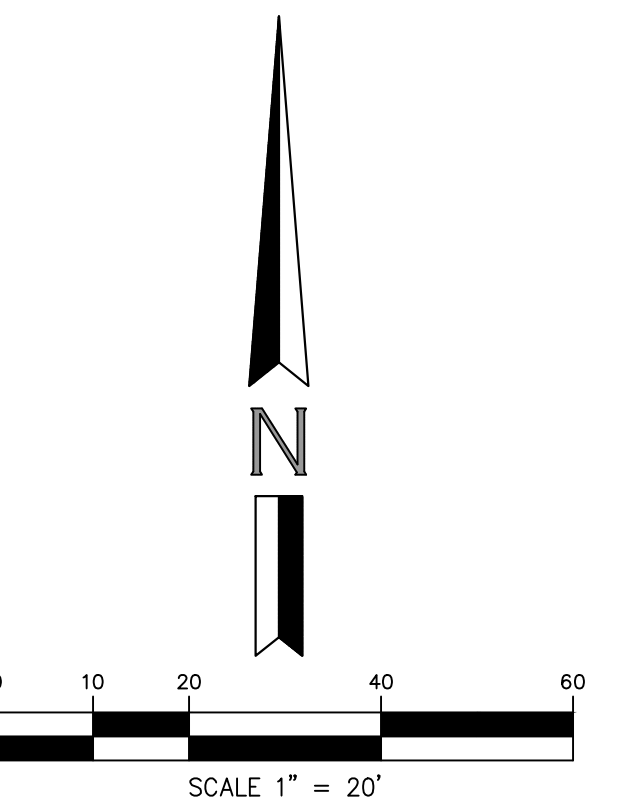
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D.W.

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Appendix B

100-year Rational Method Hydrologic Analysis

- Existing Condition
- Proposed Condition

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 06/10/20

KEYSTONE - RIALTO TOWNHOUSES
100 YEAR STORM EVENT - EXISTING CONDITION
2213E100

Program License Serial Number 6145

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.350 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

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

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Adjusted SCS curve number for AMC 3 = 84.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.290 (In/Hr)
Initial subarea data:
Initial area flow distance = 396.000 (Ft.)
Top (of initial area) elevation = 1286.600 (Ft.)
Bottom (of initial area) elevation = 1278.950 (Ft.)
Difference in elevation = 7.650 (Ft.)
Slope = 0.01932 s(%)= 1.93
 $TC = k(0.525) * [(length^3) / (elevation\ change)]^{0.2}$
Initial area time of concentration = 12.649 min.
Rainfall intensity = 3.436 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.824
Subarea runoff = 12.598 (CFS)
Total initial stream area = 4.450 (Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.290 (In/Hr)
End of computations, Total Study Area = 4.45 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 67.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 06/10/20

KEYSTONE - RIALTO TOWNHOUSES
100 YEAR STORM EVENT - PROPOSED CONDITION
2213P100

Program License Serial Number 6145

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.350 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

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

APARTMENT subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.2000 Max loss rate(Fm)= 0.157(In/Hr)
Initial subarea data:
Initial area flow distance = 407.000(Ft.)
Top (of initial area) elevation = 1283.490(Ft.)
Bottom (of initial area) elevation = 1281.360(Ft.)
Difference in elevation = 2.130(Ft.)
Slope = 0.00523 s(%)= 0.52
 $TC = k(0.324)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 10.248 min.
Rainfall intensity = 3.898(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.864
Subarea runoff = 4.175(CFS)
Total initial stream area = 1.240(Ac.)
Pervious area fraction = 0.200
Initial area Fm value = 0.157(In/Hr)

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

Upstream point/station elevation = 1277.860(Ft.)
Downstream point/station elevation = 1275.000(Ft.)
Pipe length = 15.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 4.175(CFS)

Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 4.175(CFS)
Normal flow depth in pipe = 4.68(In.)
Flow top width inside pipe = 8.99(In.)
Critical depth could not be calculated.
Pipe flow velocity = 18.00(Ft/s)
Travel time through pipe = 0.01 min.
Time of concentration (TC) = 10.26 min.

+++++
Process from Point/Station 3.000 to Point/Station 3.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 1
Stream flow area = 1.240(Ac.)
Runoff from this stream = 4.175(CFS)
Time of concentration = 10.26 min.
Rainfall intensity = 3.895(In/Hr)
Area averaged loss rate (Fm) = 0.1570(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2000
Program is now starting with Main Stream No. 2

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

APARTMENT subarea type

Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.2000 Max loss rate(Fm)= 0.157(In/Hr)
Initial subarea data:
Initial area flow distance = 130.000(Ft.)
Top (of initial area) elevation = 1282.640(Ft.)
Bottom (of initial area) elevation = 1281.780(Ft.)
Difference in elevation = 0.860(Ft.)
Slope = 0.00662 s(%)= 0.66
TC = $k(0.324)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 6.195 min.
Rainfall intensity = 5.273(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.873
Subarea runoff = 1.013(CFS)
Total initial stream area = 0.220(Ac.)
Pervious area fraction = 0.200
Initial area Fm value = 0.157(In/Hr)

+++++
Process from Point/Station 12.000 to Point/Station 13.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1278.280(Ft.)
Downstream point/station elevation = 1277.920(Ft.)
Pipe length = 73.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 1.013(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 1.013(CFS)

Normal flow depth in pipe = 6.12(In.)
Flow top width inside pipe = 8.40(In.)
Critical Depth = 5.54(In.)
Pipe flow velocity = 3.17(Ft/s)
Travel time through pipe = 0.38 min.
Time of concentration (TC) = 6.58 min.

+++++
Process from Point/Station 13.000 to Point/Station 13.000
**** SUBAREA FLOW ADDITION ****

APARTMENT subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.2000 Max loss rate(Fm)= 0.157(In/Hr)
Time of concentration = 6.58 min.
Rainfall intensity = 5.086(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.872
Subarea runoff = 1.116(CFS) for 0.260(Ac.)
Total runoff = 2.129(CFS)
Effective area this stream = 0.48(Ac.)
Total Study Area (Main Stream No. 2) = 1.72(Ac.)
Area averaged Fm value = 0.157(In/Hr)

+++++
Process from Point/Station 13.000 to Point/Station 14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1277.920(Ft.)
Downstream point/station elevation = 1277.380(Ft.)
Pipe length = 109.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 2.129(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 2.129(CFS)
Normal flow depth in pipe = 8.00(In.)
Flow top width inside pipe = 11.31(In.)
Critical Depth = 7.48(In.)
Pipe flow velocity = 3.83(Ft/s)
Travel time through pipe = 0.47 min.
Time of concentration (TC) = 7.05 min.

+++++
Process from Point/Station 14.000 to Point/Station 14.000
**** SUBAREA FLOW ADDITION ****

APARTMENT subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.2000 Max loss rate(Fm)= 0.157(In/Hr)
Time of concentration = 7.05 min.
Rainfall intensity = 4.878(In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area, (total area with modified rational method) ($Q=KCIA$) is $C = 0.871$
 Subarea runoff = 0.377 (CFS) for 0.110 (Ac.)
 Total runoff = 2.507 (CFS)
 Effective area this stream = 0.59 (Ac.)
 Total Study Area (Main Stream No. 2) = 1.83 (Ac.)
 Area averaged Fm value = 0.157 (In/Hr)

 Process from Point/Station 14.000 to Point/Station 3.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1277.380 (Ft.)
 Downstream point/station elevation = 1275.000 (Ft.)
 Pipe length = 83.00 (Ft.) Manning's N = 0.012
 No. of pipes = 1 Required pipe flow = 2.507 (CFS)
 Nearest computed pipe diameter = 9.00 (In.)
 Calculated individual pipe flow = 2.507 (CFS)
 Normal flow depth in pipe = 6.23 (In.)
 Flow top width inside pipe = 8.30 (In.)
 Critical Depth = 8.32 (In.)
 Pipe flow velocity = 7.67 (Ft/s)
 Travel time through pipe = 0.18 min.
 Time of concentration (TC) = 7.23 min.

 Process from Point/Station 3.000 to Point/Station 3.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 0.590 (Ac.)
 Runoff from this stream = 2.507 (CFS)
 Time of concentration = 7.23 min.
 Rainfall intensity = 4.804 (In/Hr)
 Area averaged loss rate (Fm) = 0.1570 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.2000
 Summary of stream data:

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

1	4.17	1.240	10.26	0.157	3.895
2	2.51	0.590	7.23	0.157	4.804

Qmax(1) =
 1.000 * 1.000 * 4.175) +
 0.804 * 1.000 * 2.507) + = 6.191
 Qmax(2) =
 1.243 * 0.705 * 4.175) +
 1.000 * 1.000 * 2.507) + = 6.165

Total of 2 main streams to confluence:

Flow rates before confluence point:
 5.175 3.507

Maximum flow rates at confluence using above data:
 6.191 6.165

Area of streams before confluence:
 1.240 0.590

Effective area values after confluence:
 1.830 1.464

Results of confluence:

Total flow rate = 6.191(CFS)
Time of concentration = 10.262 min.
Effective stream area after confluence = 1.830(Ac.)
Study area average Pervious fraction(Ap) = 0.200
Study area average soil loss rate(Fm) = 0.157(In/Hr)
Study area total = 1.83(Ac.)

+++++
Process from Point/Station 3.100 to Point/Station 3.000
**** SUBAREA FLOW ADDITION ****

APARTMENT subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.2000 Max loss rate(Fm)= 0.157(In/Hr)
Time of concentration = 10.26 min.
Rainfall intensity = 3.895(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.864
Subarea runoff = 3.161(CFS) for 0.950(Ac.)
Total runoff = 9.352(CFS)
Effective area this stream = 2.78(Ac.)
Total Study Area (Main Stream No. 1) = 2.78(Ac.)
Area averaged Fm value = 0.157(In/Hr)

+++++
Process from Point/Station 3.200 to Point/Station 3.000
**** SUBAREA FLOW ADDITION ****

APARTMENT subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.2000 Max loss rate(Fm)= 0.157(In/Hr)
Time of concentration = 10.26 min.
Rainfall intensity = 3.895(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.864
Subarea runoff = 0.572(CFS) for 0.170(Ac.)
Total runoff = 9.924(CFS)
Effective area this stream = 2.95(Ac.)
Total Study Area (Main Stream No. 1) = 2.95(Ac.)
Area averaged Fm value = 0.157(In/Hr)

+++++
Process from Point/Station 3.300 to Point/Station 3.000
**** SUBAREA FLOW ADDITION ****

APARTMENT subarea type
Decimal fraction soil group A = 1.000

Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.2000 Max loss rate(Fm)= 0.157(In/Hr)
Time of concentration = 10.26 min.
Rainfall intensity = 3.895(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.864
Subarea runoff = 1.413(CFS) for 0.420 (Ac.)
Total runoff = 11.337(CFS)
Effective area this stream = 3.37(Ac.)
Total Study Area (Main Stream No. 1) = 3.37(Ac.)
Area averaged Fm value = 0.157(In/Hr)

+++++
Process from Point/Station 3.400 to Point/Station 3.000
**** SUBAREA FLOW ADDITION ****

APARTMENT subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.2000 Max loss rate(Fm)= 0.157(In/Hr)
Time of concentration = 10.26 min.
Rainfall intensity = 3.895(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.864
Subarea runoff = 3.297(CFS) for 0.980 (Ac.)
Total runoff = 14.634(CFS)
Effective area this stream = 4.35(Ac.)
Total Study Area (Main Stream No. 1) = 4.35(Ac.)
Area averaged Fm value = 0.157(In/Hr)

+++++
Process from Point/Station 3.500 to Point/Station 3.000
**** SUBAREA FLOW ADDITION ****

APARTMENT subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.2000 Max loss rate(Fm)= 0.157(In/Hr)
Time of concentration = 10.26 min.
Rainfall intensity = 3.895(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified
rational method) (Q=KCIA) is C = 0.864
Subarea runoff = 0.336(CFS) for 0.100 (Ac.)
Total runoff = 14.970(CFS)
Effective area this stream = 4.45(Ac.)
Total Study Area (Main Stream No. 1) = 4.45(Ac.)
Area averaged Fm value = 0.157(In/Hr)
End of computations, Total Study Area = 4.45 (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) = 0.200

Area averaged SCS curve number = 32.0

Appendix C
Infiltration/ Detention System Basin Routing Studies

Stage Storage Table

#	Depth	Elevation	Area (sf)	Incremental volume (cf)	Total Volume (cf)	Total Volume (acre-ft)	Outflow Q	Notes
1	0.0	1,268.00	10,400	0	0	0	0	Bottom of Infiltration System
2	0.5	1,268.50	10,400	1,714	1,714	0.039	0.39	96" CMP Invert
3	1.0	1,269.00	10,400	2,308	4,022	0.092	0.39	
4	2.0	1,270.00	10,400	5,795	9,817	0.225	0.39	
5	3.0	1,271.00	10,400	6,557	16,374	0.376	0.39	
6	4.0	1,272.00	10,400	6,932	23,306	0.535	0.39	*Meets WQMP DCV
7	5.0	1,273.00	10,400	7,048	30,354	0.697	0.39	
8	6.0	1,274.00	10,400	6,932	37,286	0.856	0.39	
9	7.0	1,275.00	10,400	6,557	43,843	1.006	0.39	
10	8.0	1,276.00	10,400	5,795	49,638	1.140	0.39	
11	8.5	1,276.50	10,400	2,308	51,945	1.192	0.39	96" CMP Soffit
12	9.0	1,277.00	10,400	1,714	53,660	1.232	0.39	Top of Infiltration System & Outlet Elev.
13	9.3	1,277.30	10,400	0	53,660	1.232	11.80	
14	9.5	1,277.50	10,400	0	53,660	1.232	12.42	
96" CMP system with 6" rock top & bottom								

Infiltration rate per geotechnical report = 6"/hr, Factor of Safety =3.

Unit convert = (6"/hr)/3 x (1'/12") X (1hr/60min) X (1 min/60 sec) = 0.000046 ft/sec

Underground Basin open area is 8,572 sf

Therefore, Q out for basin = 8,572 * 0.000046 = 0.39 cfs

*WQMP Design Capture Volume is 18,090 CF

Basin Routing Summary Table

100 YEAR STORM	24 Hour
Max. Q Out (CFS)	9.5
WSE	1277.24

	Trench Drain Q Outflow	18 Pipe Outflow	Total O Outflow (+ Basin Infiltration Q)
1277.50	47.09	12.03	12.42
1277.40	33.70	11.72	12.11
1277.30	21.89	11.41	11.80
1277.20	11.91	11.09	11.48
1277.10	4.21	10.76	11.15
1277.00	0.00	0.00	0.39

Peak discharge of 9.5 CFS occurs during the 100 year 24 hour event, which is less than allowable discharge 12.7 CFS (per Unit Hydrograph)

Total Volume	Stone Directly Above and Below Pipe			Stone Between Pipe			Pipe			
	Elevation (ft)	Volume of Stone (cf)	Storage in stone (cf)	Elevation (ft)	Volume of Stone (cf)	Storage in stone (cf)	Elevation (ft)	Area (sf)	Volume (cf)	Top Width (ft)
0	1268.00	0.0	0.0	1268.00	0.00	0.00				
	1268.08	504.0	201.6	1268.08	210.33	84.13				
	1268.17	1008.0	403.2	1268.17	420.67	168.27				
	1268.25	1512.0	604.8	1268.25	631.00	252.40				
	1268.33	2016.0	806.4	1268.33	841.33	336.53				
	1268.42	2520.0	1008.0	1268.42	1051.67	420.67				
1714.4	1268.50	3024.0	1209.6	1268.50	1262.00	504.80	1268.50	0.00	0.00	0.00
	1268.58	3459.6	1383.9	1268.58	1472.33	588.93	1268.58	0.09	68.37	1.62
	1268.67	3839.2	1535.7	1268.67	1682.67	673.07	1268.67	0.25	192.77	2.29
	1268.75	4183.0	1673.2	1268.75	1893.00	757.20	1268.75	0.47	353.02	2.78
	1268.83	4498.2	1799.3	1268.83	2103.33	841.33	1268.83	0.72	541.78	3.20
	1268.92	4789.3	1915.7	1268.92	2313.67	925.47	1268.92	1.00	754.72	3.56
4022.1	1269.00	5059.1	2023.6	1269.00	2524.00	1009.60	1269.00	1.31	988.88	3.87
	1269.08	5309.9	2124.0	1269.08	2734.33	1093.73	1269.08	1.64	1242.07	4.16
	1269.17	5543.5	2217.4	1269.17	2944.67	1177.87	1269.17	2.00	1512.52	4.42
	1269.25	5761.2	2304.5	1269.25	3155.00	1262.00	1269.25	2.38	1798.83	4.66
	1269.33	5964.2	2385.7	1269.33	3365.33	1346.13	1269.33	2.78	2099.78	4.89
	1269.42	6153.7	2461.5	1269.42	3575.67	1430.27	1269.42	3.19	2414.35	5.10
	1269.50	6330.4	2532.1	1269.50	3786.00	1514.40	1269.50	3.63	2741.63	5.29
	1269.58	6495.2	2598.1	1269.58	3996.33	1598.53	1269.58	4.08	3080.82	5.47
	1269.67	6648.8	2659.5	1269.67	4206.67	1682.67	1269.67	4.54	3431.21	5.65
	1269.75	6791.9	2716.7	1269.75	4417.00	1766.80	1269.75	5.02	3792.14	5.81
	1269.83	6925.0	2770.0	1269.83	4627.33	1850.93	1269.83	5.51	4163.02	5.96
	1269.92	7048.7	2819.5	1269.92	4837.67	1935.07	1269.92	6.01	4543.28	6.11
9817.0	1270.00	7163.6	2865.4	1270.00	5048.00	2019.20	1270.00	6.52	4932.44	6.24
	1270.08	7270.0	2908.0	1270.08	5258.33	2103.33	1270.08	7.05	5330.00	6.37
	1270.17	7368.5	2947.4	1270.17	5468.67	2187.47	1270.17	7.59	5735.53	6.50
	1270.25	7459.4	2983.8	1270.25	5679.00	2271.60	1270.25	8.13	6148.60	6.61
	1270.33	7543.2	3017.3	1270.33	5889.33	2355.73	1270.33	8.69	6568.81	6.72
	1270.42	7620.2	3048.1	1270.42	6099.67	2439.87	1270.42	9.25	6995.79	6.83
	1270.50	7690.8	3076.3	1270.50	6310.00	2524.00	1270.50	9.83	7429.18	6.93
	1270.58	7755.4	3102.1	1270.58	6520.33	2608.13	1270.58	10.41	7868.63	7.02
	1270.67	7814.2	3125.7	1270.67	6730.67	2692.27	1270.67	11.00	8313.82	7.11
	1270.75	7867.6	3147.0	1270.75	6941.00	2776.40	1270.75	11.59	8764.42	7.19
	1270.83	7915.9	3166.3	1270.83	7151.33	2860.53	1270.83	12.20	9220.13	7.27
	1270.92	7959.3	3183.7	1270.92	7361.67	2944.67	1270.92	12.81	9680.65	7.35
16373.8	1271.00	7998.3	3199.3	1271.00	7572.00	3028.80	1271.00	13.42	10145.70	7.42
	1271.08	8033.0	3213.2	1271.08	7782.33	3112.93	1271.08	14.04	10615.00	7.48
	1271.17	8063.7	3225.5	1271.17	7992.67	3197.07	1271.17	14.67	11088.28	7.54
	1271.25	8090.7	3236.3	1271.25	8203.00	3281.20	1271.25	15.30	11565.27	7.60
	1271.33	8114.3	3245.7	1271.33	8413.33	3365.33	1271.33	15.93	12045.71	7.65
	1271.42	8134.6	3253.9	1271.42	8623.67	3449.47	1271.42	16.57	12529.36	7.70
	1271.50	8152.0	3260.8	1271.50	8834.00	3533.60	1271.50	17.22	13015.96	7.75
	1271.58	8166.7	3266.7	1271.58	9044.33	3617.73	1271.58	17.86	13505.27	7.79
	1271.67	8178.9	3271.6	1271.67	9254.67	3701.87	1271.67	18.51	13997.05	7.82
	1271.75	8188.9	3275.6	1271.75	9465.00	3786.00	1271.75	19.17	14491.07	7.86
	1271.83	8196.9	3278.8	1271.83	9675.33	3870.13	1271.83	19.82	14987.10	7.89
	1271.92	8203.1	3281.2	1271.92	9885.67	3954.27	1271.92	20.48	15484.90	7.91
23305.8	1272.00	8207.8	3283.1	1272.00	10096.00	4038.40	1272.00	21.14	15984.25	7.94
	1272.08	8211.1	3284.4	1272.08	10306.33	4122.53	1272.08	21.81	16484.92	7.96
	1272.17	8213.3	3285.3	1272.17	10516.67	4206.67	1272.17	22.47	16986.69	7.97
	1272.25	8214.7	3285.9	1272.25	10727.00	4290.80	1272.25	23.13	17489.34	7.98
	1272.33	8215.4	3286.1	1272.33	10937.33	4374.93	1272.33	23.80	17992.64	7.99
	1272.42	8215.6	3286.2	1272.42	11147.67	4459.07	1272.42	24.47	18496.39	8.00
	1272.50	8215.6	3286.3	1272.50	11358.00	4543.20	1272.50	25.13	19000.35	8.00
	1272.58	8215.7	3286.3	1272.58	11568.33	4627.33	1272.58	25.80	19504.32	8.00
	1272.67	8215.9	3286.4	1272.67	11778.67	4711.47	1272.67	26.47	20008.06	7.99
	1272.75	8216.6	3286.7	1272.75	11989.00	4795.60	1272.75	27.13	20511.37	7.98
	1272.83	8218.0	3287.2	1272.83	12199.33	4879.73	1272.83	27.80	21014.02	7.97
	1272.92	8220.2	3288.1	1272.92	12409.67	4963.87	1272.92	28.46	21515.79	7.96
30353.9	1273.00	8223.5	3289.4	1273.00	12620.00	5048.00	1273.00	29.12	22016.46	7.94
	1273.08	8228.2	3291.3	1273.08	12830.33	5132.13	1273.08	29.78	22515.81	7.91
	1273.17	8234.4	3293.8	1273.17	13040.67	5216.27	1273.17	30.44	23013.61	7.89
	1273.25	8242.4	3296.9	1273.25	13251.00	5300.40	1273.25	31.10	23509.63	7.86
	1273.33	8252.3	3300.9	1273.33	13461.33	5384.53	1273.33	31.75	24003.65	7.82
	1273.42	8264.6	3305.8	1273.42	13671.67	5468.67	1273.42	32.40	24495.44	7.79
	1273.50	8279.3	3311.7	1273.50	13882.00	5552.80	1273.50	33.05	24984.75	7.75
	1273.58	8296.7	3318.7	1273.58	14092.33	5636.93	1273.58	33.69	25471.35	7.70
	1273.67	8317.0	3326.8	1273.67	14302.67	5721.07	1273.67	34.33	25954.99	7.65
	1273.75	8340.6	3336.2	1273.75	14513.00	5805.20	1273.75	34.97	26435.44	7.60
	1273.83	8367.6	3347.0	1273.83	14723.33	5889.33	1273.83	35.60	26912.43	7.54
	1273.92	8398.3	3359.3	1273.92	14933.67	5973.47	1273.92	36.22	27385.70	7.48
37285.8	1274.00	8433.0	3373.2	1274.00	15144.00	6057.60	1274.00	36.85	27855.00	7.42
	1274.08	8471.9	3388.8	1274.08	15354.33	6141.73	1274.08	37.46	28320.05	7.35
	1274.17	8515.4	3406.2	1274.17	15564.67	6225.87	1274.17	38.07	28780.58	7.27
	1274.25	8563.7	3425.5	1274.25	15775.00	6310.00	1274.25	38.67	29236.29	7.19
	1274.33	8617.1	3446.8	1274.33	15985.33	6394.13	1274.33	39.27	29686.89	7.11
	1274.42	8675.9	3470.4	1274.42	16195.67	6478.27	1274.42	39.86	30132.07	7.02
	1274.50	8740.5	3496.2	1274.50	16406.00	6562.40	1274.50	40.44	30571.52	6.93
	1274.58	8811.1	3524.4	1274.58	16616.33	6646.53	1274.58	41.01	31004.91	6.83
	1274.67	8888.1	3555.2	1274.67	16826.67	6730.67	1274.67	41.58	31431.90	6.72
	1274.75	8971.9	3588.8	1274.75	17037.00	6814.80	1274.75	42.13	31852.11	6.61
	1274.83	9062.8	3625.1	1274.83	17247.33	6898.93	1274.83	42.68	32265.18	6.50
	1274.92	9161.3	3664.5	1274.92	17457.67	6983.07	1274.92	43.22	32670.70	6.37

43842.6	1275.00	9267.7	3707.1	1275.00	17668.00	7067.20	1275.00	43.74	33068.27	6.24
	1275.08	9382.6	3753.0	1275.08	17878.33	7151.33	1275.08	44.26	33457.42	6.11
	1275.17	9506.3	3802.5	1275.17	18088.67	7235.47	1275.17	44.76	33837.69	5.96
	1275.25	9639.4	3855.8	1275.25	18299.00	7319.60	1275.25	45.25	34208.56	5.81
	1275.33	9782.5	3913.0	1275.33	18509.33	7403.73	1275.33	45.73	34569.49	5.65
	1275.42	9936.1	3974.4	1275.42	18719.67	7487.87	1275.42	46.19	34919.88	5.47
	1275.50	10100.9	4040.4	1275.50	18930.00	7572.00	1275.50	46.64	35259.08	5.29
	1275.58	10277.6	4111.1	1275.58	19140.33	7656.13	1275.58	47.07	35586.36	5.10
	1275.67	10467.1	4186.8	1275.67	19350.67	7740.27	1275.67	47.49	35900.93	4.89
	1275.75	10670.1	4268.0	1275.75	19561.00	7824.40	1275.75	47.89	36201.88	4.66
	1275.83	10887.8	4355.1	1275.83	19771.33	7908.53	1275.83	48.26	36488.18	4.42
	1275.92	11121.4	4448.5	1275.92	19981.67	7992.67	1275.92	48.62	36758.64	4.16
	1276.00	11372.2	4548.9	1276.00	20192.00	8076.80	1276.00	48.96	37011.82	3.87
49637.5	1276.08	11642.0	4656.8	1276.08	20402.33	8160.93	1276.08	49.27	37245.99	3.56
	1276.17	11933.1	4773.2	1276.17	20612.67	8245.07	1276.17	49.55	37458.93	3.20
	1276.25	12248.3	4899.3	1276.25	20823.00	8329.20	1276.25	49.80	37647.68	2.78
	1276.33	12592.1	5036.8	1276.33	21033.33	8413.33	1276.33	50.01	37807.93	2.29
	1276.42	12971.7	5188.7	1276.42	21243.67	8497.47	1276.42	50.18	37932.33	1.62
	1276.50	13407.3	5362.9	1276.50	21454.00	8581.60	1276.50	50.27	38000.70	0.00
51945.2	1276.58	13911.3	5564.5	1276.58	21664.33	8665.73				
	1276.67	14415.3	5766.1	1276.67	21874.67	8749.87				
	1276.75	14919.3	5967.7	1276.75	22085.00	8834.00				
	1276.83	15423.3	6169.3	1276.83	22295.33	8918.13				
	1276.92	15927.3	6370.9	1276.92	22505.67	9002.27				
53659.6	1277.00	16431.3	6572.5	1277.00	22716.00	9086.40				

Unit Hydrograph Analysis

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Study date 06/10/20

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

Program License Serial Number 6145

KEYSTONE - RIALTO TOWNHOUSES
100 YEAR STORM EVENT - EXISTING CONDITION
UNIT HYDROGRAPH STUDY
2213EUH

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 100		
4.45	1	1.35

Rainfall data for year 100
4.45 6 3.60

Rainfall data for year 100
4.45 24 8.00

+++++

***** 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)
67.0	84.6	4.45	1.000	0.290	1.000	0.290

Area-averaged adjusted loss rate Fm (In/Hr) = 0.290

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
---------------	---------------	------------------	------------------	---	----------------------

4.45 1.000 67.0 84.6 1.82 0.771

Area-averaged catchment yield fraction, Y = 0.771
Area-averaged low loss fraction, Yb = 0.229
User entry of time of concentration = 0.225 (hours)
++++
Watershed area = 4.45 (Ac.)
Catchment Lag time = 0.180 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 46.2963
Hydrograph baseflow = 0.00 (CFS)
Average maximum watershed loss rate (Fm) = 0.290 (In/Hr)
Average low loss rate fraction (Yb) = 0.229 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.500 (In)
Computed peak 30-minute rainfall = 1.023 (In)
Specified peak 1-hour rainfall = 1.350 (In)
Computed peak 3-hour rainfall = 2.463 (In)
Specified peak 6-hour rainfall = 3.600 (In)
Specified peak 24-hour rainfall = 8.000 (In)

Rainfall depth area reduction factors:
Using a total area of 4.45 (Ac.) (Ref: fig. E-4)

5-minute factor = 1.000	Adjusted rainfall = 0.500 (In)
30-minute factor = 1.000	Adjusted rainfall = 1.023 (In)
1-hour factor = 1.000	Adjusted rainfall = 1.350 (In)
3-hour factor = 1.000	Adjusted rainfall = 2.463 (In)
6-hour factor = 1.000	Adjusted rainfall = 3.600 (In)
24-hour factor = 1.000	Adjusted rainfall = 8.000 (In)

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

(K = 53.82 (CFS))

1	3.956	2.129
2	25.784	11.748
3	62.516	19.768
4	86.343	12.823
5	95.507	4.932
6	98.357	1.534
7	99.217	0.463
8	100.000	0.422

Total soil rain loss = 1.73 (In)
Total effective rainfall = 6.27 (In)
Peak flow rate in flood hydrograph = 12.69 (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	0.0002	0.03	Q				
0+10	0.0014	0.17	Q				
0+15	0.0042	0.42	Q				
0+20	0.0082	0.57	VQ				
0+25	0.0126	0.64	VQ				
0+30	0.0171	0.66	VQ				
0+35	0.0217	0.66	VQ				
0+40	0.0263	0.67	VQ				
0+45	0.0309	0.67	VQ				
0+50	0.0356	0.67	VQ				
0+55	0.0402	0.68	VQ				
1+ 0	0.0449	0.68	VQ				
1+ 5	0.0496	0.68	VQ				
1+10	0.0542	0.68	VQ				
1+15	0.0589	0.68	Q				
1+20	0.0636	0.68	Q				
1+25	0.0684	0.69	Q				
1+30	0.0731	0.69	Q				
1+35	0.0778	0.69	Q				
1+40	0.0826	0.69	Q				
1+45	0.0873	0.69	Q				
1+50	0.0921	0.69	Q				
1+55	0.0969	0.70	Q				
2+ 0	0.1017	0.70	Q				
2+ 5	0.1065	0.70	Q				
2+10	0.1113	0.70	Q				
2+15	0.1162	0.70	Q				
2+20	0.1210	0.70	QV				
2+25	0.1259	0.71	QV				
2+30	0.1308	0.71	QV				
2+35	0.1356	0.71	QV				
2+40	0.1405	0.71	QV				
2+45	0.1455	0.71	QV				
2+50	0.1504	0.71	QV				
2+55	0.1553	0.72	QV				
3+ 0	0.1603	0.72	QV				
3+ 5	0.1652	0.72	QV				
3+10	0.1702	0.72	QV				
3+15	0.1752	0.72	Q V				
3+20	0.1802	0.73	Q V				
3+25	0.1852	0.73	Q V				
3+30	0.1902	0.73	Q V				
3+35	0.1953	0.73	Q V				
3+40	0.2004	0.73	Q V				
3+45	0.2054	0.74	Q V				
3+50	0.2105	0.74	Q V				
3+55	0.2156	0.74	Q V				
4+ 0	0.2207	0.74	Q V				
4+ 5	0.2259	0.75	Q V				
4+10	0.2310	0.75	Q V				
4+15	0.2362	0.75	Q V				
4+20	0.2414	0.75	Q V				
4+25	0.2465	0.75	Q V				
4+30	0.2518	0.76	Q V				
4+35	0.2570	0.76	Q V				
4+40	0.2622	0.76	Q V				
4+45	0.2675	0.76	Q V				
4+50	0.2727	0.77	Q V				
4+55	0.2780	0.77	Q V				
5+ 0	0.2833	0.77	Q V				
5+ 5	0.2887	0.77	Q V				
5+10	0.2940	0.78	Q V				

5+15	0.2994	0.78	Q	V				
5+20	0.3047	0.78	Q	V				
5+25	0.3101	0.78	Q	V				
5+30	0.3155	0.79	Q	V				
5+35	0.3210	0.79	Q	V				
5+40	0.3264	0.79	Q	V				
5+45	0.3319	0.79	Q	V				
5+50	0.3373	0.80	Q	V				
5+55	0.3428	0.80	Q	V				
6+ 0	0.3484	0.80	Q	V				
6+ 5	0.3539	0.80	Q	V				
6+10	0.3595	0.81	Q	V				
6+15	0.3650	0.81	Q	V				
6+20	0.3706	0.81	Q	V				
6+25	0.3762	0.82	Q	V				
6+30	0.3819	0.82	Q	V				
6+35	0.3875	0.82	Q	V				
6+40	0.3932	0.82	Q	V				
6+45	0.3989	0.83	Q	V				
6+50	0.4046	0.83	Q	V				
6+55	0.4104	0.83	Q	V				
7+ 0	0.4161	0.84	Q	V				
7+ 5	0.4219	0.84	Q	V				
7+10	0.4277	0.84	Q	V				
7+15	0.4336	0.85	Q	V				
7+20	0.4394	0.85	Q	V				
7+25	0.4453	0.85	Q	V				
7+30	0.4512	0.86	Q	V				
7+35	0.4571	0.86	Q	V				
7+40	0.4631	0.86	Q	V				
7+45	0.4691	0.87	Q	V				
7+50	0.4751	0.87	Q	V				
7+55	0.4811	0.87	Q	V				
8+ 0	0.4871	0.88	Q	V				
8+ 5	0.4932	0.88	Q	V				
8+10	0.4993	0.89	Q	V				
8+15	0.5054	0.89	Q	V				
8+20	0.5116	0.89	Q	V				
8+25	0.5178	0.90	Q	V				
8+30	0.5240	0.90	Q	V				
8+35	0.5302	0.91	Q	V				
8+40	0.5365	0.91	Q	V				
8+45	0.5428	0.91	Q	V				
8+50	0.5491	0.92	Q	V				
8+55	0.5555	0.92	Q	V				
9+ 0	0.5619	0.93	Q	V				
9+ 5	0.5683	0.93	Q	V				
9+10	0.5748	0.94	Q	V				
9+15	0.5812	0.94	Q	V				
9+20	0.5878	0.95	Q	V				
9+25	0.5943	0.95	Q	V				
9+30	0.6009	0.96	Q	V				
9+35	0.6075	0.96	Q	V				
9+40	0.6142	0.97	Q	V				
9+45	0.6209	0.97	Q	V				
9+50	0.6276	0.98	Q	V				
9+55	0.6344	0.98	Q	V				
10+ 0	0.6412	0.99	Q	V				
10+ 5	0.6480	0.99	Q	V				
10+10	0.6549	1.00	Q	V				
10+15	0.6618	1.01	Q	V				
10+20	0.6688	1.01	Q	V				
10+25	0.6758	1.02	Q	V				

10+30	0.6828	1.02	Q	V		
10+35	0.6899	1.03	Q	V		
10+40	0.6971	1.04	Q	V		
10+45	0.7043	1.04	Q	V		
10+50	0.7115	1.05	Q	V		
10+55	0.7188	1.06	Q	V		
11+ 0	0.7261	1.06	Q	V		
11+ 5	0.7335	1.07	Q	V		
11+10	0.7409	1.08	Q	V		
11+15	0.7484	1.09	Q	V		
11+20	0.7559	1.09	Q	V		
11+25	0.7635	1.10	Q	V		
11+30	0.7711	1.11	Q	V		
11+35	0.7788	1.12	Q	V		
11+40	0.7866	1.13	Q	V		
11+45	0.7944	1.14	Q	V		
11+50	0.8023	1.14	Q	V		
11+55	0.8103	1.15	Q	V		
12+ 0	0.8183	1.16	Q	V		
12+ 5	0.8263	1.17	Q	V		
12+10	0.8344	1.17	Q	V		
12+15	0.8423	1.16	Q	V		
12+20	0.8503	1.15	Q	V		
12+25	0.8583	1.16	Q	V		
12+30	0.8663	1.17	Q	V		
12+35	0.8744	1.18	Q	V		
12+40	0.8827	1.19	Q	V		
12+45	0.8909	1.20	Q	V		
12+50	0.8993	1.22	Q	V		
12+55	0.9078	1.23	Q	V		
13+ 0	0.9164	1.25	Q	V		
13+ 5	0.9251	1.26	Q	V		
13+10	0.9339	1.28	Q	V		
13+15	0.9428	1.29	Q	V		
13+20	0.9518	1.31	Q	V		
13+25	0.9609	1.33	Q	V		
13+30	0.9702	1.34	Q	V		
13+35	0.9795	1.36	Q	V		
13+40	0.9891	1.38	Q	V		
13+45	0.9987	1.40	Q	V		
13+50	1.0085	1.42	Q	V		
13+55	1.0185	1.45	Q	V		
14+ 0	1.0286	1.47	Q	V		
14+ 5	1.0389	1.50	Q	V		
14+10	1.0494	1.52	Q	V		
14+15	1.0601	1.55	Q	V		
14+20	1.0710	1.58	Q	V		
14+25	1.0821	1.61	Q	V		
14+30	1.0935	1.65	Q	V		
14+35	1.1051	1.69	Q	V		
14+40	1.1170	1.72	Q	V		
14+45	1.1292	1.77	Q	V		
14+50	1.1416	1.81	Q	V		
14+55	1.1545	1.86	Q	V		
15+ 0	1.1677	1.92	Q	V		
15+ 5	1.1813	1.98	Q	V		
15+10	1.1955	2.05	Q	V		
15+15	1.2101	2.12	Q	V		
15+20	1.2253	2.21	Q	V		
15+25	1.2410	2.28	Q	V		
15+30	1.2565	2.24	Q	V		
15+35	1.2711	2.13	Q	V		
15+40	1.2857	2.12	Q	V		

15+45	1.3013	2.27	Q			V	
15+50	1.3187	2.52	Q			V	
15+55	1.3388	2.92	Q			V	
16+ 0	1.3639	3.64		Q		V	
16+ 5	1.4025	5.60			Q	V	
16+10	1.4715	10.03				V	
16+15	1.5589	12.69				QV	
16+20	1.6214	9.07			Q	V	
16+25	1.6566	5.11		Q		V	
16+30	1.6791	3.26		Q		V	
16+35	1.6973	2.65		Q		V	
16+40	1.7144	2.48	Q			V	
16+45	1.7293	2.16	Q			V	
16+50	1.7431	2.01	Q			V	
16+55	1.7562	1.89	Q			V	
17+ 0	1.7685	1.79	Q			V	
17+ 5	1.7803	1.71	Q			V	
17+10	1.7915	1.63	Q			V	
17+15	1.8023	1.57	Q				V
17+20	1.8127	1.51	Q				V
17+25	1.8228	1.46	Q				V
17+30	1.8325	1.41	Q				V
17+35	1.8419	1.37	Q				V
17+40	1.8511	1.33	Q				V
17+45	1.8601	1.30	Q				V
17+50	1.8688	1.27	Q				V
17+55	1.8773	1.24	Q				V
18+ 0	1.8856	1.21	Q				V
18+ 5	1.8938	1.19	Q				V
18+10	1.9019	1.18	Q				V
18+15	1.9100	1.18	Q				V
18+20	1.9181	1.17	Q				V
18+25	1.9260	1.16	Q				V
18+30	1.9339	1.14	Q				V
18+35	1.9416	1.12	Q				V
18+40	1.9492	1.11	Q				V
18+45	1.9567	1.09	Q				V
18+50	1.9641	1.07	Q				V
18+55	1.9714	1.06	Q				V
19+ 0	1.9786	1.05	Q				V
19+ 5	1.9857	1.03	Q				V
19+10	1.9927	1.02	Q				V
19+15	1.9997	1.01	Q				V
19+20	2.0065	1.00	Q				V
19+25	2.0133	0.98	Q				V
19+30	2.0200	0.97	Q				V
19+35	2.0267	0.96	Q				V
19+40	2.0332	0.95	Q				V
19+45	2.0397	0.94	Q				V
19+50	2.0462	0.93	Q				V
19+55	2.0525	0.93	Q				V
20+ 0	2.0588	0.92	Q				V
20+ 5	2.0651	0.91	Q				V
20+10	2.0713	0.90	Q				V
20+15	2.0774	0.89	Q				V
20+20	2.0835	0.88	Q				V
20+25	2.0896	0.88	Q				V
20+30	2.0955	0.87	Q				V
20+35	2.1015	0.86	Q				V
20+40	2.1074	0.85	Q				V
20+45	2.1132	0.85	Q				V
20+50	2.1190	0.84	Q				V
20+55	2.1247	0.83	Q				V

21+ 0	2.1304	0.83	Q				V
21+ 5	2.1361	0.82	Q				V
21+10	2.1417	0.82	Q				V
21+15	2.1473	0.81	Q				V
21+20	2.1529	0.81	Q				V
21+25	2.1584	0.80	Q				V
21+30	2.1638	0.79	Q				V
21+35	2.1693	0.79	Q				V
21+40	2.1747	0.78	Q				V
21+45	2.1800	0.78	Q				V
21+50	2.1854	0.77	Q				V
21+55	2.1907	0.77	Q				V
22+ 0	2.1959	0.76	Q				V
22+ 5	2.2012	0.76	Q				V
22+10	2.2064	0.75	Q				V
22+15	2.2115	0.75	Q				V
22+20	2.2167	0.75	Q				V
22+25	2.2218	0.74	Q				V
22+30	2.2268	0.74	Q				V
22+35	2.2319	0.73	Q				V
22+40	2.2369	0.73	Q				V
22+45	2.2419	0.73	Q				V
22+50	2.2469	0.72	Q				V
22+55	2.2518	0.72	Q				V
23+ 0	2.2567	0.71	Q				V
23+ 5	2.2616	0.71	Q				V
23+10	2.2665	0.71	Q				V
23+15	2.2713	0.70	Q				V
23+20	2.2761	0.70	Q				V
23+25	2.2809	0.70	Q				V
23+30	2.2857	0.69	Q				V
23+35	2.2905	0.69	Q				V
23+40	2.2952	0.69	Q				V
23+45	2.2999	0.68	Q				V
23+50	2.3046	0.68	Q				V
23+55	2.3092	0.68	Q				V
24+ 0	2.3138	0.67	Q				V
24+ 5	2.3183	0.64	Q				V
24+10	2.3217	0.50	Q				V
24+15	2.3234	0.25	Q				V
24+20	2.3240	0.09	Q				V
24+25	2.3243	0.03	Q				V
24+30	2.3243	0.01	Q				V
24+35	2.3244	0.01	Q				V

Unit Hydrograph Analysis

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Study date 06/10/20

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

Program License Serial Number 6145

KEYSTONE - RIALTO TOWNHOUSES
100 YEAR STORM EVENT - PROPOSED CONDITION
UNIT HYDROGRAPH STUDY
2213PUH

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 100		
4.45	1	1.35

Rainfall data for year 100
4.45 6 3.60

Rainfall data for year 100
4.45 24 8.00

+++++

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

SCS curve No. (AMCII)	SCS curve NO. (AMC 3)	Area (Ac.)	Area Fraction	Fp (Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	52.0	4.45	1.000	0.785	0.200	0.157

Area-averaged adjusted loss rate Fm (In/Hr) = 0.157

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
---------------	---------------	------------------	------------------	---	----------------------

0.89	0.200	32.0	52.0	9.23	0.308
3.56	0.800	98.0	98.0	0.20	0.970

Area-averaged catchment yield fraction, Y = 0.838
Area-averaged low loss fraction, Yb = 0.162
User entry of time of concentration = 0.151 (hours)
++++
Watershed area = 4.45(Ac.)
Catchment Lag time = 0.121 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 68.9845
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.157(In/Hr)
Average low loss rate fraction (Yb) = 0.162 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.500(In)
Computed peak 30-minute rainfall = 1.023(In)
Specified peak 1-hour rainfall = 1.350(In)
Computed peak 3-hour rainfall = 2.463(In)
Specified peak 6-hour rainfall = 3.600(In)
Specified peak 24-hour rainfall = 8.000(In)

Rainfall depth area reduction factors:
Using a total area of 4.45(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000	Adjusted rainfall = 0.500(In)
30-minute factor = 1.000	Adjusted rainfall = 1.023(In)
1-hour factor = 1.000	Adjusted rainfall = 1.350(In)
3-hour factor = 1.000	Adjusted rainfall = 2.463(In)
6-hour factor = 1.000	Adjusted rainfall = 3.600(In)
24-hour factor = 1.000	Adjusted rainfall = 8.000(In)

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

(K = 53.82 (CFS))

1	8.534	4.593
2	52.350	23.580
3	88.678	19.551
4	97.767	4.891
5	99.385	0.871
6	100.000	0.331

Total soil rain loss = 1.21(In)
Total effective rainfall = 6.79(In)
Peak flow rate in flood hydrograph = 15.29(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	0.0004	0.06	Q
0+10	0.0030	0.38	Q
0+15	0.0074	0.64	VQ
0+20	0.0123	0.71	VQ
0+25	0.0173	0.72	VQ
0+30	0.0223	0.73	VQ
0+35	0.0273	0.73	VQ
0+40	0.0323	0.73	VQ
0+45	0.0374	0.73	VQ
0+50	0.0424	0.73	VQ
0+55	0.0475	0.74	VQ
1+ 0	0.0526	0.74	VQ
1+ 5	0.0577	0.74	VQ
1+10	0.0628	0.74	VQ
1+15	0.0679	0.74	Q
1+20	0.0730	0.74	Q
1+25	0.0781	0.75	Q
1+30	0.0833	0.75	Q
1+35	0.0884	0.75	Q
1+40	0.0936	0.75	Q
1+45	0.0988	0.75	Q
1+50	0.1040	0.75	Q
1+55	0.1092	0.76	Q
2+ 0	0.1144	0.76	Q
2+ 5	0.1197	0.76	Q
2+10	0.1249	0.76	Q
2+15	0.1302	0.76	QV
2+20	0.1355	0.77	QV
2+25	0.1408	0.77	QV
2+30	0.1461	0.77	QV
2+35	0.1514	0.77	QV
2+40	0.1567	0.77	QV
2+45	0.1621	0.78	QV
2+50	0.1674	0.78	QV
2+55	0.1728	0.78	QV
3+ 0	0.1782	0.78	QV
3+ 5	0.1836	0.78	QV
3+10	0.1890	0.79	Q V
3+15	0.1945	0.79	Q V
3+20	0.1999	0.79	Q V
3+25	0.2054	0.79	Q V
3+30	0.2108	0.80	Q V
3+35	0.2163	0.80	Q V
3+40	0.2218	0.80	Q V
3+45	0.2274	0.80	Q V
3+50	0.2329	0.80	Q V
3+55	0.2385	0.81	Q V
4+ 0	0.2440	0.81	Q V
4+ 5	0.2496	0.81	Q V
4+10	0.2552	0.81	Q V
4+15	0.2609	0.82	Q V
4+20	0.2665	0.82	Q V
4+25	0.2722	0.82	Q V
4+30	0.2778	0.82	Q V
4+35	0.2835	0.83	Q V
4+40	0.2892	0.83	Q V
4+45	0.2949	0.83	Q V
4+50	0.3007	0.83	Q V
4+55	0.3065	0.84	Q V
5+ 0	0.3122	0.84	Q V
5+ 5	0.3180	0.84	Q V
5+10	0.3238	0.84	Q V
5+15	0.3297	0.85	Q V

5+20	0.3355	0.85	Q	V				
5+25	0.3414	0.85	Q	V				
5+30	0.3473	0.86	Q	V				
5+35	0.3532	0.86	Q	V				
5+40	0.3591	0.86	Q	V				
5+45	0.3651	0.86	Q	V				
5+50	0.3711	0.87	Q	V				
5+55	0.3771	0.87	Q	V				
6+ 0	0.3831	0.87	Q	V				
6+ 5	0.3891	0.88	Q	V				
6+10	0.3952	0.88	Q	V				
6+15	0.4012	0.88	Q	V				
6+20	0.4073	0.89	Q	V				
6+25	0.4134	0.89	Q	V				
6+30	0.4196	0.89	Q	V				
6+35	0.4258	0.90	Q	V				
6+40	0.4319	0.90	Q	V				
6+45	0.4381	0.90	Q	V				
6+50	0.4444	0.91	Q	V				
6+55	0.4506	0.91	Q	V				
7+ 0	0.4569	0.91	Q	V				
7+ 5	0.4632	0.92	Q	V				
7+10	0.4696	0.92	Q	V				
7+15	0.4759	0.92	Q	V				
7+20	0.4823	0.93	Q	V				
7+25	0.4887	0.93	Q	V				
7+30	0.4951	0.93	Q	V				
7+35	0.5016	0.94	Q	V				
7+40	0.5081	0.94	Q	V				
7+45	0.5146	0.95	Q	V				
7+50	0.5211	0.95	Q	V				
7+55	0.5277	0.95	Q	V				
8+ 0	0.5343	0.96	Q	V				
8+ 5	0.5409	0.96	Q	V				
8+10	0.5476	0.97	Q	V				
8+15	0.5542	0.97	Q	V				
8+20	0.5610	0.97	Q	V				
8+25	0.5677	0.98	Q	V				
8+30	0.5745	0.98	Q	V				
8+35	0.5813	0.99	Q	V				
8+40	0.5881	0.99	Q	V				
8+45	0.5950	1.00	Q	V				
8+50	0.6019	1.00	Q	V				
8+55	0.6088	1.01	Q	V				
9+ 0	0.6158	1.01	Q	V				
9+ 5	0.6228	1.02	Q	V				
9+10	0.6298	1.02	Q	V				
9+15	0.6369	1.03	Q	V				
9+20	0.6440	1.03	Q	V				
9+25	0.6512	1.04	Q	V				
9+30	0.6584	1.04	Q	V				
9+35	0.6656	1.05	Q	V				
9+40	0.6729	1.05	Q	V				
9+45	0.6802	1.06	Q	V				
9+50	0.6875	1.07	Q	V				
9+55	0.6949	1.07	Q	V				
10+ 0	0.7023	1.08	Q	V				
10+ 5	0.7098	1.08	Q	V				
10+10	0.7173	1.09	Q	V				
10+15	0.7248	1.10	Q	V				
10+20	0.7324	1.10	Q	V				
10+25	0.7401	1.11	Q	V				
10+30	0.7478	1.12	Q	V				

10+35	0.7555	1.12	Q	V		
10+40	0.7633	1.13	Q	V		
10+45	0.7712	1.14	Q	V		
10+50	0.7791	1.15	Q	V		
10+55	0.7870	1.15	Q	V		
11+ 0	0.7950	1.16	Q	V		
11+ 5	0.8031	1.17	Q	V		
11+10	0.8112	1.18	Q	V		
11+15	0.8194	1.19	Q	V		
11+20	0.8276	1.20	Q	V		
11+25	0.8359	1.20	Q	V		
11+30	0.8442	1.21	Q	V		
11+35	0.8526	1.22	Q	V		
11+40	0.8611	1.23	Q	V		
11+45	0.8697	1.24	Q	V		
11+50	0.8783	1.25	Q	V		
11+55	0.8870	1.26	Q	V		
12+ 0	0.8957	1.27	Q	V		
12+ 5	0.9045	1.28	Q	V		
12+10	0.9132	1.26	Q	V		
12+15	0.9218	1.25	Q	V		
12+20	0.9305	1.25	Q	V		
12+25	0.9392	1.27	Q	V		
12+30	0.9480	1.28	Q	V		
12+35	0.9569	1.29	Q	V		
12+40	0.9659	1.31	Q	V		
12+45	0.9750	1.32	Q	V		
12+50	0.9842	1.33	Q	V		
12+55	0.9935	1.35	Q	V		
13+ 0	1.0029	1.37	Q	V		
13+ 5	1.0124	1.38	Q	V		
13+10	1.0220	1.40	Q	V		
13+15	1.0318	1.42	Q	V		
13+20	1.0417	1.44	Q	V		
13+25	1.0517	1.45	Q	V		
13+30	1.0618	1.48	Q	V		
13+35	1.0721	1.50	Q	V		
13+40	1.0826	1.52	Q	V		
13+45	1.0932	1.54	Q	V		
13+50	1.1040	1.57	Q	V		
13+55	1.1150	1.59	Q	V		
14+ 0	1.1261	1.62	Q	V		
14+ 5	1.1375	1.65	Q	V		
14+10	1.1490	1.68	Q	V		
14+15	1.1608	1.71	Q	V		
14+20	1.1728	1.74	Q	V		
14+25	1.1851	1.78	Q	V		
14+30	1.1976	1.82	Q	V		
14+35	1.2104	1.86	Q	V		
14+40	1.2236	1.91	Q	V		
14+45	1.2370	1.96	Q	V		
14+50	1.2509	2.01	Q	V		
14+55	1.2651	2.07	Q	V		
15+ 0	1.2798	2.13	Q	V		
15+ 5	1.2950	2.20	Q	V		
15+10	1.3107	2.28	Q	V		
15+15	1.3271	2.37	Q	V		
15+20	1.3441	2.48	Q	V		
15+25	1.3615	2.53	Q	V		
15+30	1.3777	2.34	Q	V		
15+35	1.3930	2.23	Q	V		
15+40	1.4093	2.37	Q	V		
15+45	1.4273	2.61	Q	V		

15+50	1.4479	2.99	Q		V	
15+55	1.4724	3.56	Q		V	
16+ 0	1.5053	4.79	Q		V	
16+ 5	1.5611	8.10		Q	V	
16+10	1.6665	15.29			V	Q
16+15	1.7526	12.51			Q	V
16+20	1.7913	5.62		Q	V	
16+25	1.8133	3.19	Q		V	
16+30	1.8322	2.75	Q		V	
16+35	1.8498	2.56	Q		V	
16+40	1.8663	2.38	Q		V	
16+45	1.8815	2.22	Q		V	
16+50	1.8959	2.08	Q		V	
16+55	1.9094	1.97	Q		V	
17+ 0	1.9223	1.87	Q		V	
17+ 5	1.9346	1.79	Q		V	
17+10	1.9464	1.72	Q		V	
17+15	1.9578	1.65	Q			V
17+20	1.9688	1.60	Q			V
17+25	1.9795	1.55	Q			V
17+30	1.9898	1.50	Q			V
17+35	1.9998	1.46	Q			V
17+40	2.0096	1.42	Q			V
17+45	2.0191	1.38	Q			V
17+50	2.0284	1.35	Q			V
17+55	2.0375	1.32	Q			V
18+ 0	2.0465	1.29	Q			V
18+ 5	2.0552	1.27	Q			V
18+10	2.0640	1.28	Q			V
18+15	2.0728	1.28	Q			V
18+20	2.0815	1.26	Q			V
18+25	2.0901	1.24	Q			V
18+30	2.0985	1.22	Q			V
18+35	2.1068	1.20	Q			V
18+40	2.1150	1.19	Q			V
18+45	2.1230	1.17	Q			V
18+50	2.1310	1.15	Q			V
18+55	2.1388	1.14	Q			V
19+ 0	2.1466	1.13	Q			V
19+ 5	2.1542	1.11	Q			V
19+10	2.1618	1.10	Q			V
19+15	2.1693	1.09	Q			V
19+20	2.1767	1.07	Q			V
19+25	2.1840	1.06	Q			V
19+30	2.1912	1.05	Q			V
19+35	2.1983	1.04	Q			V
19+40	2.2054	1.03	Q			V
19+45	2.2124	1.02	Q			V
19+50	2.2194	1.01	Q			V
19+55	2.2262	1.00	Q			V
20+ 0	2.2331	0.99	Q			V
20+ 5	2.2398	0.98	Q			V
20+10	2.2465	0.97	Q			V
20+15	2.2531	0.96	Q			V
20+20	2.2597	0.95	Q			V
20+25	2.2662	0.95	Q			V
20+30	2.2727	0.94	Q			V
20+35	2.2791	0.93	Q			V
20+40	2.2854	0.92	Q			V
20+45	2.2917	0.92	Q			V
20+50	2.2980	0.91	Q			V
20+55	2.3042	0.90	Q			V
21+ 0	2.3104	0.90	Q			V

21+ 5	2.3165	0.89	Q				V
21+10	2.3226	0.88	Q				V
21+15	2.3286	0.88	Q				V
21+20	2.3346	0.87	Q				V
21+25	2.3406	0.86	Q				V
21+30	2.3465	0.86	Q				V
21+35	2.3523	0.85	Q				V
21+40	2.3582	0.85	Q				V
21+45	2.3640	0.84	Q				V
21+50	2.3697	0.84	Q				V
21+55	2.3755	0.83	Q				V
22+ 0	2.3812	0.83	Q				V
22+ 5	2.3868	0.82	Q				V
22+10	2.3924	0.82	Q				V
22+15	2.3980	0.81	Q				V
22+20	2.4036	0.81	Q				V
22+25	2.4091	0.80	Q				V
22+30	2.4146	0.80	Q				V
22+35	2.4201	0.79	Q				V
22+40	2.4255	0.79	Q				V
22+45	2.4309	0.78	Q				V
22+50	2.4363	0.78	Q				V
22+55	2.4416	0.78	Q				V
23+ 0	2.4470	0.77	Q				V
23+ 5	2.4523	0.77	Q				V
23+10	2.4575	0.76	Q				V
23+15	2.4628	0.76	Q				V
23+20	2.4680	0.76	Q				V
23+25	2.4732	0.75	Q				V
23+30	2.4783	0.75	Q				V
23+35	2.4835	0.75	Q				V
23+40	2.4886	0.74	Q				V
23+45	2.4937	0.74	Q				V
23+50	2.4987	0.74	Q				V
23+55	2.5038	0.73	Q				V
24+ 0	2.5088	0.73	Q				V
24+ 5	2.5134	0.66	Q				V
24+10	2.5158	0.35	Q				V
24+15	2.5163	0.08	Q				V
24+20	2.5164	0.02	Q				V
24+25	2.5165	0.00	Q				V

FLOOD HYDROGRAPH ROUTING PROGRAM
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Study date: 06/17/20

KEYSTONE - RIALTO TOWNHOUSES
PROPOSED SITE ROUTING STUDY
2213ROUTING

Program License Serial Number 6145

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

From study/file name: 2213PUH.rte
*****HYDROGRAPH DATA*****
Number of intervals = 293
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 15.292 (CFS)
Total volume = 2.516 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 293
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00 (Ft.)

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

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.039	0.390	0.038	0.040
1.000	0.092	0.390	0.091	0.093
2.000	0.225	0.390	0.224	0.226
3.000	0.376	0.390	0.375	0.377
4.000	0.535	0.390	0.534	0.536
5.000	0.697	0.390	0.696	0.698
6.000	0.856	0.390	0.855	0.857

7.000	1.006	0.390	1.005	1.007
8.000	1.140	0.390	1.139	1.141
8.500	1.192	0.390	1.191	1.193
9.000	1.232	0.390	1.231	1.233
9.300	1.233	11.800	1.192	1.274
9.500	1.234	12.420	1.191	1.277

Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	3.8	7.65	11.47	15.29	Depth (Ft.)
0.083	0.06	0.00	0.000	O					0.00
0.167	0.38	0.02	0.002	O					0.02
0.250	0.64	0.05	0.005	OI					0.06
0.333	0.71	0.09	0.009	OI					0.12
0.417	0.72	0.13	0.013	OI					0.17
0.500	0.73	0.17	0.017	OI					0.22
0.583	0.73	0.21	0.021	OI					0.27
0.667	0.73	0.24	0.024	OI					0.31
0.750	0.73	0.28	0.028	OI					0.35
0.833	0.73	0.31	0.031	OI					0.39
0.917	0.74	0.33	0.033	OI					0.43
1.000	0.74	0.36	0.036	OI					0.46
1.083	0.74	0.39	0.039	OI					0.50
1.167	0.74	0.39	0.041	OI					0.52
1.250	0.74	0.39	0.044	OI					0.54
1.333	0.74	0.39	0.046	OI					0.57
1.417	0.75	0.39	0.048	OI					0.59
1.500	0.75	0.39	0.051	OI					0.61
1.583	0.75	0.39	0.053	OI					0.64
1.667	0.75	0.39	0.056	OI					0.66
1.750	0.75	0.39	0.058	OI					0.68
1.833	0.75	0.39	0.061	OI					0.71
1.917	0.76	0.39	0.063	OI					0.73
2.000	0.76	0.39	0.066	OI					0.75
2.083	0.76	0.39	0.068	OI					0.78
2.167	0.76	0.39	0.071	OI					0.80
2.250	0.76	0.39	0.074	OI					0.83
2.333	0.77	0.39	0.076	OI					0.85
2.417	0.77	0.39	0.079	OI					0.87
2.500	0.77	0.39	0.081	OI					0.90
2.583	0.77	0.39	0.084	OI					0.92
2.667	0.77	0.39	0.087	OI					0.95
2.750	0.78	0.39	0.089	OI					0.97
2.833	0.78	0.39	0.092	OI					1.00
2.917	0.78	0.39	0.095	OI					1.02
3.000	0.78	0.39	0.097	OI					1.04
3.083	0.78	0.39	0.100	OI					1.06
3.167	0.79	0.39	0.103	OI					1.08
3.250	0.79	0.39	0.105	OI					1.10
3.333	0.79	0.39	0.108	OI					1.12
3.417	0.79	0.39	0.111	OI					1.14
3.500	0.80	0.39	0.114	OI					1.16
3.583	0.80	0.39	0.117	OI					1.18
3.667	0.80	0.39	0.119	OI					1.21
3.750	0.80	0.39	0.122	OI					1.23
3.833	0.80	0.39	0.125	OI					1.25
3.917	0.81	0.39	0.128	OI					1.27
4.000	0.81	0.39	0.131	OI					1.29
4.083	0.81	0.39	0.134	OI					1.31

4.167	0.81	0.39	0.137	OI					1.34
4.250	0.82	0.39	0.140	OI					1.36
4.333	0.82	0.39	0.142	OI					1.38
4.417	0.82	0.39	0.145	OI					1.40
4.500	0.82	0.39	0.148	OI					1.42
4.583	0.83	0.39	0.151	OI					1.45
4.667	0.83	0.39	0.154	OI					1.47
4.750	0.83	0.39	0.157	OI					1.49
4.833	0.83	0.39	0.161	OI					1.52
4.917	0.84	0.39	0.164	OI					1.54
5.000	0.84	0.39	0.167	OI					1.56
5.083	0.84	0.39	0.170	OI					1.58
5.167	0.84	0.39	0.173	OI					1.61
5.250	0.85	0.39	0.176	OI					1.63
5.333	0.85	0.39	0.179	OI					1.66
5.417	0.85	0.39	0.182	OI					1.68
5.500	0.86	0.39	0.186	OI					1.70
5.583	0.86	0.39	0.189	OI					1.73
5.667	0.86	0.39	0.192	OI					1.75
5.750	0.86	0.39	0.195	OI					1.78
5.833	0.87	0.39	0.199	OI					1.80
5.917	0.87	0.39	0.202	OI					1.83
6.000	0.87	0.39	0.205	OI					1.85
6.083	0.88	0.39	0.208	OI					1.88
6.167	0.88	0.39	0.212	OI					1.90
6.250	0.88	0.39	0.215	OI					1.93
6.333	0.89	0.39	0.219	OI					1.95
6.417	0.89	0.39	0.222	OI					1.98
6.500	0.89	0.39	0.225	OI					2.00
6.583	0.90	0.39	0.229	OI					2.03
6.667	0.90	0.39	0.232	OI					2.05
6.750	0.90	0.39	0.236	OI					2.07
6.833	0.91	0.39	0.239	OI					2.10
6.917	0.91	0.39	0.243	OI					2.12
7.000	0.91	0.39	0.247	OI					2.14
7.083	0.92	0.39	0.250	OI					2.17
7.167	0.92	0.39	0.254	OI					2.19
7.250	0.92	0.39	0.258	OI					2.22
7.333	0.93	0.39	0.261	OI					2.24
7.417	0.93	0.39	0.265	OI					2.26
7.500	0.93	0.39	0.269	OI					2.29
7.583	0.94	0.39	0.272	OI					2.31
7.667	0.94	0.39	0.276	OI					2.34
7.750	0.95	0.39	0.280	OI					2.36
7.833	0.95	0.39	0.284	OI					2.39
7.917	0.95	0.39	0.288	OI					2.42
8.000	0.96	0.39	0.292	O I					2.44
8.083	0.96	0.39	0.296	O I					2.47
8.167	0.97	0.39	0.299	O I					2.49
8.250	0.97	0.39	0.303	O I					2.52
8.333	0.97	0.39	0.307	O I					2.55
8.417	0.98	0.39	0.312	O I					2.57
8.500	0.98	0.39	0.316	O I					2.60
8.583	0.99	0.39	0.320	O I					2.63
8.667	0.99	0.39	0.324	O I					2.65
8.750	1.00	0.39	0.328	O I					2.68
8.833	1.00	0.39	0.332	O I					2.71
8.917	1.01	0.39	0.336	O I					2.74
9.000	1.01	0.39	0.341	O I					2.77
9.083	1.02	0.39	0.345	O I					2.79
9.167	1.02	0.39	0.349	O I					2.82
9.250	1.03	0.39	0.354	O I					2.85
9.333	1.03	0.39	0.358	O I					2.88

9.417	1.04	0.39	0.363	O I					2.91
9.500	1.04	0.39	0.367	O I					2.94
9.583	1.05	0.39	0.372	O I					2.97
9.667	1.05	0.39	0.376	O I					3.00
9.750	1.06	0.39	0.381	O I					3.03
9.833	1.07	0.39	0.385	O I					3.06
9.917	1.07	0.39	0.390	O I					3.09
10.000	1.08	0.39	0.395	O I					3.12
10.083	1.08	0.39	0.400	O I					3.15
10.167	1.09	0.39	0.404	O I					3.18
10.250	1.10	0.39	0.409	O I					3.21
10.333	1.10	0.39	0.414	O I					3.24
10.417	1.11	0.39	0.419	O I					3.27
10.500	1.12	0.39	0.424	O I					3.30
10.583	1.12	0.39	0.429	O I					3.33
10.667	1.13	0.39	0.434	O I					3.37
10.750	1.14	0.39	0.439	O I					3.40
10.833	1.15	0.39	0.444	O I					3.43
10.917	1.15	0.39	0.450	O I					3.46
11.000	1.16	0.39	0.455	O I					3.50
11.083	1.17	0.39	0.460	O I					3.53
11.167	1.18	0.39	0.466	O I					3.56
11.250	1.19	0.39	0.471	O I					3.60
11.333	1.20	0.39	0.477	O I					3.63
11.417	1.20	0.39	0.482	O I					3.67
11.500	1.21	0.39	0.488	O I					3.70
11.583	1.22	0.39	0.494	O I					3.74
11.667	1.23	0.39	0.499	O I					3.78
11.750	1.24	0.39	0.505	O I					3.81
11.833	1.25	0.39	0.511	O I					3.85
11.917	1.26	0.39	0.517	O I					3.89
12.000	1.27	0.39	0.523	O I					3.92
12.083	1.28	0.39	0.529	O I					3.96
12.167	1.26	0.39	0.535	O I					4.00
12.250	1.25	0.39	0.541	O I					4.04
12.333	1.25	0.39	0.547	O I					4.07
12.417	1.27	0.39	0.553	O I					4.11
12.500	1.28	0.39	0.559	O I					4.15
12.583	1.29	0.39	0.565	O I					4.19
12.667	1.31	0.39	0.572	O I					4.23
12.750	1.32	0.39	0.578	O I					4.27
12.833	1.33	0.39	0.584	O I					4.31
12.917	1.35	0.39	0.591	O I					4.35
13.000	1.37	0.39	0.598	O I					4.39
13.083	1.38	0.39	0.604	O I					4.43
13.167	1.40	0.39	0.611	O I					4.47
13.250	1.42	0.39	0.618	O I					4.51
13.333	1.44	0.39	0.625	O I					4.56
13.417	1.45	0.39	0.633	O I					4.60
13.500	1.48	0.39	0.640	O I					4.65
13.583	1.50	0.39	0.648	O I					4.70
13.667	1.52	0.39	0.655	O I					4.74
13.750	1.54	0.39	0.663	O I					4.79
13.833	1.57	0.39	0.671	O I					4.84
13.917	1.59	0.39	0.679	O I					4.89
14.000	1.62	0.39	0.688	O I					4.94
14.083	1.65	0.39	0.696	O I					5.00
14.167	1.68	0.39	0.705	O I					5.05
14.250	1.71	0.39	0.714	O I					5.11
14.333	1.74	0.39	0.723	O I					5.17
14.417	1.78	0.39	0.733	O I					5.22
14.500	1.82	0.39	0.742	O I					5.29
14.583	1.86	0.39	0.752	O I					5.35

14.667	1.91	0.39	0.763	O	I					5.41
14.750	1.96	0.39	0.773	O	I					5.48
14.833	2.01	0.39	0.784	O	I					5.55
14.917	2.07	0.39	0.796	O	I					5.62
15.000	2.13	0.39	0.807	O	I					5.69
15.083	2.20	0.39	0.820	O	I					5.77
15.167	2.28	0.39	0.833	O	I					5.85
15.250	2.37	0.39	0.846	O	I					5.94
15.333	2.48	0.39	0.860	O	I					6.03
15.417	2.53	0.39	0.874	O	I					6.12
15.500	2.34	0.39	0.888	O	I					6.22
15.583	2.23	0.39	0.902	O	I					6.30
15.667	2.37	0.39	0.915	O	I					6.39
15.750	2.61	0.39	0.929	O	I					6.49
15.833	2.99	0.39	0.946	O	I					6.60
15.917	3.56	0.39	0.966	O	I					6.73
16.000	4.79	0.39	0.992	O		I				6.90
16.083	8.10	0.39	1.033	O			I			7.20
16.167	15.29	0.39	1.111	O				I		7.79
16.250	12.51	0.39	1.204	O				I		8.65
16.333	5.62	9.45	1.233			I	O			9.24
16.417	3.19	0.39	1.229	O	I					8.97
16.500	2.75	4.64	1.232		I	O				9.11
16.583	2.56	0.76	1.232	O	I					9.01
16.667	2.38	4.09	1.232		I	O				9.10
16.750	2.22	0.60	1.232	O	I					9.01
16.833	2.08	3.62	1.232		I	O				9.09
16.917	1.97	0.51	1.232	O	I					9.00
17.000	1.87	3.26	1.232		I	O				9.08
17.083	1.79	0.47	1.232	O	I					9.00
17.167	1.72	2.97	1.232		I	O				9.07
17.250	1.65	0.46	1.232	O	I					9.00
17.333	1.60	2.73	1.232		I	O				9.06
17.417	1.55	0.47	1.232	O	I					9.00
17.500	1.50	2.52	1.232		I	O				9.06
17.583	1.46	0.48	1.232	O	I					9.00
17.667	1.42	2.35	1.232		I	O				9.05
17.750	1.38	0.51	1.232	O	I					9.00
17.833	1.35	2.19	1.232		I	O				9.05
17.917	1.32	0.53	1.232	O	I					9.00
18.000	1.29	2.05	1.232		I	O				9.04
18.083	1.27	0.56	1.232	O	I					9.00
18.167	1.28	1.96	1.232		I	O				9.04
18.250	1.28	0.63	1.232	O	I					9.01
18.333	1.26	1.88	1.232		I	O				9.04
18.417	1.24	0.66	1.232	O	I					9.01
18.500	1.22	1.78	1.232		I	O				9.04
18.583	1.20	0.68	1.232	O	I					9.01
18.667	1.19	1.69	1.232		I	O				9.03
18.750	1.17	0.69	1.232	O	I					9.01
18.833	1.15	1.61	1.232		I	O				9.03
18.917	1.14	0.71	1.232	O	I					9.01
19.000	1.13	1.54	1.232		I	O				9.03
19.083	1.11	0.72	1.232	O	I					9.01
19.167	1.10	1.47	1.232		I	O				9.03
19.250	1.09	0.73	1.232	O	I					9.01
19.333	1.07	1.41	1.232		O					9.03
19.417	1.06	0.74	1.232	O	I					9.01
19.500	1.05	1.35	1.232		O					9.03
19.583	1.04	0.75	1.232	O	I					9.01
19.667	1.03	1.30	1.232		O					9.02
19.750	1.02	0.76	1.232	O	I					9.01
19.833	1.01	1.25	1.232		O					9.02

19.917	1.00	0.76	1.232	OI					9.01
20.000	0.99	1.21	1.232	O					9.02
20.083	0.98	0.77	1.232	OI					9.01
20.167	0.97	1.17	1.232	O					9.02
20.250	0.96	0.77	1.232	OI					9.01
20.333	0.95	1.14	1.232	IO					9.02
20.417	0.95	0.77	1.232	O					9.01
20.500	0.94	1.10	1.232	IO					9.02
20.583	0.93	0.77	1.232	O					9.01
20.667	0.92	1.07	1.232	IO					9.02
20.750	0.92	0.78	1.232	O					9.01
20.833	0.91	1.04	1.232	IO					9.02
20.917	0.90	0.78	1.232	O					9.01
21.000	0.90	1.02	1.232	IO					9.02
21.083	0.89	0.77	1.232	O					9.01
21.167	0.88	0.99	1.232	IO					9.02
21.250	0.88	0.77	1.232	O					9.01
21.333	0.87	0.97	1.232	IO					9.02
21.417	0.86	0.77	1.232	O					9.01
21.500	0.86	0.95	1.232	O					9.01
21.583	0.85	0.77	1.232	O					9.01
21.667	0.85	0.93	1.232	O					9.01
21.750	0.84	0.77	1.232	O					9.01
21.833	0.84	0.91	1.232	O					9.01
21.917	0.83	0.76	1.232	O					9.01
22.000	0.83	0.89	1.232	O					9.01
22.083	0.82	0.76	1.232	O					9.01
22.167	0.82	0.88	1.232	O					9.01
22.250	0.81	0.76	1.232	O					9.01
22.333	0.81	0.86	1.232	O					9.01
22.417	0.80	0.75	1.232	O					9.01
22.500	0.80	0.85	1.232	O					9.01
22.583	0.79	0.75	1.232	O					9.01
22.667	0.79	0.83	1.232	O					9.01
22.750	0.78	0.74	1.232	O					9.01
22.833	0.78	0.82	1.232	O					9.01
22.917	0.78	0.74	1.232	O					9.01
23.000	0.77	0.81	1.232	O					9.01
23.083	0.77	0.73	1.232	O					9.01
23.167	0.76	0.80	1.232	O					9.01
23.250	0.76	0.73	1.232	O					9.01
23.333	0.76	0.79	1.232	O					9.01
23.417	0.75	0.73	1.232	O					9.01
23.500	0.75	0.78	1.232	O					9.01
23.583	0.75	0.72	1.232	O					9.01
23.667	0.74	0.77	1.232	O					9.01
23.750	0.74	0.72	1.232	O					9.01
23.833	0.74	0.76	1.232	O					9.01
23.917	0.73	0.71	1.232	O					9.01
24.000	0.73	0.75	1.232	O					9.01
24.083	0.66	0.65	1.232	O					9.01
24.167	0.35	0.39	1.232	O					9.00
24.250	0.08	0.39	1.231	O					8.98
24.333	0.02	0.39	1.228	O					8.95
24.417	0.00	0.39	1.226	O					8.92
24.500	0.00	0.39	1.223	O					8.89
24.583	0.00	0.39	1.220	O					8.85
24.667	0.00	0.39	1.218	O					8.82
24.750	0.00	0.39	1.215	O					8.79
24.833	0.00	0.39	1.212	O					8.75
24.917	0.00	0.39	1.210	O					8.72
25.000	0.00	0.39	1.207	O					8.69
25.083	0.00	0.39	1.204	O					8.65

25.167	0.00	0.39	1.202	O					8.62
25.250	0.00	0.39	1.199	O					8.59
25.333	0.00	0.39	1.196	O					8.55
25.417	0.00	0.39	1.194	O					8.52
25.500	0.00	0.39	1.191	O					8.49
25.583	0.00	0.39	1.188	O					8.46
25.667	0.00	0.39	1.185	O					8.44
25.750	0.00	0.39	1.183	O					8.41
25.833	0.00	0.39	1.180	O					8.39
25.917	0.00	0.39	1.177	O					8.36
26.000	0.00	0.39	1.175	O					8.33
26.083	0.00	0.39	1.172	O					8.31
26.167	0.00	0.39	1.169	O					8.28
26.250	0.00	0.39	1.167	O					8.26
26.333	0.00	0.39	1.164	O					8.23
26.417	0.00	0.39	1.161	O					8.20
26.500	0.00	0.39	1.159	O					8.18
26.583	0.00	0.39	1.156	O					8.15
26.667	0.00	0.39	1.153	O					8.13
26.750	0.00	0.39	1.151	O					8.10
26.833	0.00	0.39	1.148	O					8.08
26.917	0.00	0.39	1.145	O					8.05
27.000	0.00	0.39	1.143	O					8.02
27.083	0.00	0.39	1.140	O					8.00
27.167	0.00	0.39	1.137	O					7.98
27.250	0.00	0.39	1.134	O					7.96
27.333	0.00	0.39	1.132	O					7.94
27.417	0.00	0.39	1.129	O					7.92
27.500	0.00	0.39	1.126	O					7.90
27.583	0.00	0.39	1.124	O					7.88
27.667	0.00	0.39	1.121	O					7.86
27.750	0.00	0.39	1.118	O					7.84
27.833	0.00	0.39	1.116	O					7.82
27.917	0.00	0.39	1.113	O					7.80
28.000	0.00	0.39	1.110	O					7.78
28.083	0.00	0.39	1.108	O					7.76
28.167	0.00	0.39	1.105	O					7.74
28.250	0.00	0.39	1.102	O					7.72
28.333	0.00	0.39	1.100	O					7.70
28.417	0.00	0.39	1.097	O					7.68
28.500	0.00	0.39	1.094	O					7.66
28.583	0.00	0.39	1.091	O					7.64
28.667	0.00	0.39	1.089	O					7.62
28.750	0.00	0.39	1.086	O					7.60
28.833	0.00	0.39	1.083	O					7.58
28.917	0.00	0.39	1.081	O					7.56
29.000	0.00	0.39	1.078	O					7.54
29.083	0.00	0.39	1.075	O					7.52
29.167	0.00	0.39	1.073	O					7.50
29.250	0.00	0.39	1.070	O					7.48
29.333	0.00	0.39	1.067	O					7.46
29.417	0.00	0.39	1.065	O					7.44
29.500	0.00	0.39	1.062	O					7.42
29.583	0.00	0.39	1.059	O					7.40
29.667	0.00	0.39	1.057	O					7.38
29.750	0.00	0.39	1.054	O					7.36
29.833	0.00	0.39	1.051	O					7.34
29.917	0.00	0.39	1.048	O					7.32
30.000	0.00	0.39	1.046	O					7.30
30.083	0.00	0.39	1.043	O					7.28
30.167	0.00	0.39	1.040	O					7.26
30.250	0.00	0.39	1.038	O					7.24
30.333	0.00	0.39	1.035	O					7.22

30.417	0.00	0.39	1.032	O					7.20
30.500	0.00	0.39	1.030	O					7.18
30.583	0.00	0.39	1.027	O					7.16
30.667	0.00	0.39	1.024	O					7.14
30.750	0.00	0.39	1.022	O					7.12
30.833	0.00	0.39	1.019	O					7.10
30.917	0.00	0.39	1.016	O					7.08
31.000	0.00	0.39	1.014	O					7.06
31.083	0.00	0.39	1.011	O					7.04
31.167	0.00	0.39	1.008	O					7.02
31.250	0.00	0.39	1.006	O					7.00
31.333	0.00	0.39	1.003	O					6.98
31.417	0.00	0.39	1.000	O					6.96
31.500	0.00	0.39	0.997	O					6.94
31.583	0.00	0.39	0.995	O					6.93
31.667	0.00	0.39	0.992	O					6.91
31.750	0.00	0.39	0.989	O					6.89
31.833	0.00	0.39	0.987	O					6.87
31.917	0.00	0.39	0.984	O					6.85
32.000	0.00	0.39	0.981	O					6.84
32.083	0.00	0.39	0.979	O					6.82
32.167	0.00	0.39	0.976	O					6.80
32.250	0.00	0.39	0.973	O					6.78
32.333	0.00	0.39	0.971	O					6.76
32.417	0.00	0.39	0.968	O					6.75
32.500	0.00	0.39	0.965	O					6.73
32.583	0.00	0.39	0.963	O					6.71
32.667	0.00	0.39	0.960	O					6.69
32.750	0.00	0.39	0.957	O					6.67
32.833	0.00	0.39	0.954	O					6.66
32.917	0.00	0.39	0.952	O					6.64
33.000	0.00	0.39	0.949	O					6.62
33.083	0.00	0.39	0.946	O					6.60
33.167	0.00	0.39	0.944	O					6.58
33.250	0.00	0.39	0.941	O					6.57
33.333	0.00	0.39	0.938	O					6.55
33.417	0.00	0.39	0.936	O					6.53
33.500	0.00	0.39	0.933	O					6.51
33.583	0.00	0.39	0.930	O					6.50
33.667	0.00	0.39	0.928	O					6.48
33.750	0.00	0.39	0.925	O					6.46
33.833	0.00	0.39	0.922	O					6.44
33.917	0.00	0.39	0.920	O					6.42
34.000	0.00	0.39	0.917	O					6.41
34.083	0.00	0.39	0.914	O					6.39
34.167	0.00	0.39	0.912	O					6.37
34.250	0.00	0.39	0.909	O					6.35
34.333	0.00	0.39	0.906	O					6.33
34.417	0.00	0.39	0.903	O					6.32
34.500	0.00	0.39	0.901	O					6.30
34.583	0.00	0.39	0.898	O					6.28
34.667	0.00	0.39	0.895	O					6.26
34.750	0.00	0.39	0.893	O					6.24
34.833	0.00	0.39	0.890	O					6.23
34.917	0.00	0.39	0.887	O					6.21
35.000	0.00	0.39	0.885	O					6.19
35.083	0.00	0.39	0.882	O					6.17
35.167	0.00	0.39	0.879	O					6.16
35.250	0.00	0.39	0.877	O					6.14
35.333	0.00	0.39	0.874	O					6.12
35.417	0.00	0.39	0.871	O					6.10
35.500	0.00	0.39	0.869	O					6.08
35.583	0.00	0.39	0.866	O					6.07

35.667	0.00	0.39	0.863	O					6.05
35.750	0.00	0.39	0.860	O					6.03
35.833	0.00	0.39	0.858	O					6.01
35.917	0.00	0.39	0.855	O					5.99
36.000	0.00	0.39	0.852	O					5.98
36.083	0.00	0.39	0.850	O					5.96
36.167	0.00	0.39	0.847	O					5.94
36.250	0.00	0.39	0.844	O					5.93
36.333	0.00	0.39	0.842	O					5.91
36.417	0.00	0.39	0.839	O					5.89
36.500	0.00	0.39	0.836	O					5.88
36.583	0.00	0.39	0.834	O					5.86
36.667	0.00	0.39	0.831	O					5.84
36.750	0.00	0.39	0.828	O					5.83
36.833	0.00	0.39	0.826	O					5.81
36.917	0.00	0.39	0.823	O					5.79
37.000	0.00	0.39	0.820	O					5.77
37.083	0.00	0.39	0.818	O					5.76
37.167	0.00	0.39	0.815	O					5.74
37.250	0.00	0.39	0.812	O					5.72
37.333	0.00	0.39	0.809	O					5.71
37.417	0.00	0.39	0.807	O					5.69
37.500	0.00	0.39	0.804	O					5.67
37.583	0.00	0.39	0.801	O					5.66
37.667	0.00	0.39	0.799	O					5.64
37.750	0.00	0.39	0.796	O					5.62
37.833	0.00	0.39	0.793	O					5.61
37.917	0.00	0.39	0.791	O					5.59
38.000	0.00	0.39	0.788	O					5.57
38.083	0.00	0.39	0.785	O					5.56
38.167	0.00	0.39	0.783	O					5.54
38.250	0.00	0.39	0.780	O					5.52
38.333	0.00	0.39	0.777	O					5.50
38.417	0.00	0.39	0.775	O					5.49
38.500	0.00	0.39	0.772	O					5.47
38.583	0.00	0.39	0.769	O					5.45
38.667	0.00	0.39	0.766	O					5.44
38.750	0.00	0.39	0.764	O					5.42
38.833	0.00	0.39	0.761	O					5.40
38.917	0.00	0.39	0.758	O					5.39
39.000	0.00	0.39	0.756	O					5.37
39.083	0.00	0.39	0.753	O					5.35
39.167	0.00	0.39	0.750	O					5.34
39.250	0.00	0.39	0.748	O					5.32
39.333	0.00	0.39	0.745	O					5.30
39.417	0.00	0.39	0.742	O					5.28
39.500	0.00	0.39	0.740	O					5.27
39.583	0.00	0.39	0.737	O					5.25
39.667	0.00	0.39	0.734	O					5.23
39.750	0.00	0.39	0.732	O					5.22
39.833	0.00	0.39	0.729	O					5.20
39.917	0.00	0.39	0.726	O					5.18
40.000	0.00	0.39	0.723	O					5.17
40.083	0.00	0.39	0.721	O					5.15
40.167	0.00	0.39	0.718	O					5.13
40.250	0.00	0.39	0.715	O					5.12
40.333	0.00	0.39	0.713	O					5.10
40.417	0.00	0.39	0.710	O					5.08
40.500	0.00	0.39	0.707	O					5.07
40.583	0.00	0.39	0.705	O					5.05
40.667	0.00	0.39	0.702	O					5.03
40.750	0.00	0.39	0.699	O					5.01
40.833	0.00	0.39	0.697	O					5.00

40.917	0.00	0.39	0.694	O					4.98
41.000	0.00	0.39	0.691	O					4.96
41.083	0.00	0.39	0.689	O					4.95
41.167	0.00	0.39	0.686	O					4.93
41.250	0.00	0.39	0.683	O					4.91
41.333	0.00	0.39	0.681	O					4.90
41.417	0.00	0.39	0.678	O					4.88
41.500	0.00	0.39	0.675	O					4.87
41.583	0.00	0.39	0.672	O					4.85
41.667	0.00	0.39	0.670	O					4.83
41.750	0.00	0.39	0.667	O					4.82
41.833	0.00	0.39	0.664	O					4.80
41.917	0.00	0.39	0.662	O					4.78
42.000	0.00	0.39	0.659	O					4.77
42.083	0.00	0.39	0.656	O					4.75
42.167	0.00	0.39	0.654	O					4.73
42.250	0.00	0.39	0.651	O					4.72
42.333	0.00	0.39	0.648	O					4.70
42.417	0.00	0.39	0.646	O					4.68
42.500	0.00	0.39	0.643	O					4.67
42.583	0.00	0.39	0.640	O					4.65
42.667	0.00	0.39	0.638	O					4.63
42.750	0.00	0.39	0.635	O					4.62
42.833	0.00	0.39	0.632	O					4.60
42.917	0.00	0.39	0.629	O					4.58
43.000	0.00	0.39	0.627	O					4.57
43.083	0.00	0.39	0.624	O					4.55
43.167	0.00	0.39	0.621	O					4.53
43.250	0.00	0.39	0.619	O					4.52
43.333	0.00	0.39	0.616	O					4.50
43.417	0.00	0.39	0.613	O					4.48
43.500	0.00	0.39	0.611	O					4.47
43.583	0.00	0.39	0.608	O					4.45
43.667	0.00	0.39	0.605	O					4.43
43.750	0.00	0.39	0.603	O					4.42
43.833	0.00	0.39	0.600	O					4.40
43.917	0.00	0.39	0.597	O					4.38
44.000	0.00	0.39	0.595	O					4.37
44.083	0.00	0.39	0.592	O					4.35
44.167	0.00	0.39	0.589	O					4.33
44.250	0.00	0.39	0.587	O					4.32
44.333	0.00	0.39	0.584	O					4.30
44.417	0.00	0.39	0.581	O					4.28
44.500	0.00	0.39	0.578	O					4.27
44.583	0.00	0.39	0.576	O					4.25
44.667	0.00	0.39	0.573	O					4.24
44.750	0.00	0.39	0.570	O					4.22
44.833	0.00	0.39	0.568	O					4.20
44.917	0.00	0.39	0.565	O					4.19
45.000	0.00	0.39	0.562	O					4.17
45.083	0.00	0.39	0.560	O					4.15
45.167	0.00	0.39	0.557	O					4.14
45.250	0.00	0.39	0.554	O					4.12
45.333	0.00	0.39	0.552	O					4.10
45.417	0.00	0.39	0.549	O					4.09
45.500	0.00	0.39	0.546	O					4.07
45.583	0.00	0.39	0.544	O					4.05
45.667	0.00	0.39	0.541	O					4.04
45.750	0.00	0.39	0.538	O					4.02
45.833	0.00	0.39	0.535	O					4.00
45.917	0.00	0.39	0.533	O					3.99
46.000	0.00	0.39	0.530	O					3.97
46.083	0.00	0.39	0.527	O					3.95

46.167	0.00	0.39	0.525	O					3.94
46.250	0.00	0.39	0.522	O					3.92
46.333	0.00	0.39	0.519	O					3.90
46.417	0.00	0.39	0.517	O					3.88
46.500	0.00	0.39	0.514	O					3.87
46.583	0.00	0.39	0.511	O					3.85
46.667	0.00	0.39	0.509	O					3.83
46.750	0.00	0.39	0.506	O					3.82
46.833	0.00	0.39	0.503	O					3.80
46.917	0.00	0.39	0.501	O					3.78
47.000	0.00	0.39	0.498	O					3.77
47.083	0.00	0.39	0.495	O					3.75
47.167	0.00	0.39	0.493	O					3.73
47.250	0.00	0.39	0.490	O					3.72
47.333	0.00	0.39	0.487	O					3.70
47.417	0.00	0.39	0.484	O					3.68
47.500	0.00	0.39	0.482	O					3.67
47.583	0.00	0.39	0.479	O					3.65
47.667	0.00	0.39	0.476	O					3.63
47.750	0.00	0.39	0.474	O					3.61
47.833	0.00	0.39	0.471	O					3.60
47.917	0.00	0.39	0.468	O					3.58
48.000	0.00	0.39	0.466	O					3.56
48.083	0.00	0.39	0.463	O					3.55
48.167	0.00	0.39	0.460	O					3.53
48.250	0.00	0.39	0.458	O					3.51
48.333	0.00	0.39	0.455	O					3.50
48.417	0.00	0.39	0.452	O					3.48
48.500	0.00	0.39	0.450	O					3.46
48.583	0.00	0.39	0.447	O					3.45
48.667	0.00	0.39	0.444	O					3.43
48.750	0.00	0.39	0.441	O					3.41
48.833	0.00	0.39	0.439	O					3.39
48.917	0.00	0.39	0.436	O					3.38
49.000	0.00	0.39	0.433	O					3.36
49.083	0.00	0.39	0.431	O					3.34
49.167	0.00	0.39	0.428	O					3.33
49.250	0.00	0.39	0.425	O					3.31
49.333	0.00	0.39	0.423	O					3.29
49.417	0.00	0.39	0.420	O					3.28
49.500	0.00	0.39	0.417	O					3.26
49.583	0.00	0.39	0.415	O					3.24
49.667	0.00	0.39	0.412	O					3.23
49.750	0.00	0.39	0.409	O					3.21
49.833	0.00	0.39	0.407	O					3.19
49.917	0.00	0.39	0.404	O					3.18
50.000	0.00	0.39	0.401	O					3.16
50.083	0.00	0.39	0.398	O					3.14
50.167	0.00	0.39	0.396	O					3.12
50.250	0.00	0.39	0.393	O					3.11
50.333	0.00	0.39	0.390	O					3.09
50.417	0.00	0.39	0.388	O					3.07
50.500	0.00	0.39	0.385	O					3.06
50.583	0.00	0.39	0.382	O					3.04
50.667	0.00	0.39	0.380	O					3.02
50.750	0.00	0.39	0.377	O					3.01
50.833	0.00	0.39	0.374	O					2.99
50.917	0.00	0.39	0.372	O					2.97
51.000	0.00	0.39	0.369	O					2.95
51.083	0.00	0.39	0.366	O					2.94
51.167	0.00	0.39	0.364	O					2.92
51.250	0.00	0.39	0.361	O					2.90
51.333	0.00	0.39	0.358	O					2.88

51.417	0.00	0.39	0.356	O					2.86
51.500	0.00	0.39	0.353	O					2.85
51.583	0.00	0.39	0.350	O					2.83
51.667	0.00	0.39	0.347	O					2.81
51.750	0.00	0.39	0.345	O					2.79
51.833	0.00	0.39	0.342	O					2.78
51.917	0.00	0.39	0.339	O					2.76
52.000	0.00	0.39	0.337	O					2.74
52.083	0.00	0.39	0.334	O					2.72
52.167	0.00	0.39	0.331	O					2.70
52.250	0.00	0.39	0.329	O					2.69
52.333	0.00	0.39	0.326	O					2.67
52.417	0.00	0.39	0.323	O					2.65
52.500	0.00	0.39	0.321	O					2.63
52.583	0.00	0.39	0.318	O					2.62
52.667	0.00	0.39	0.315	O					2.60
52.750	0.00	0.39	0.313	O					2.58
52.833	0.00	0.39	0.310	O					2.56
52.917	0.00	0.39	0.307	O					2.54
53.000	0.00	0.39	0.304	O					2.53
53.083	0.00	0.39	0.302	O					2.51
53.167	0.00	0.39	0.299	O					2.49
53.250	0.00	0.39	0.296	O					2.47
53.333	0.00	0.39	0.294	O					2.46
53.417	0.00	0.39	0.291	O					2.44
53.500	0.00	0.39	0.288	O					2.42
53.583	0.00	0.39	0.286	O					2.40
53.667	0.00	0.39	0.283	O					2.38
53.750	0.00	0.39	0.280	O					2.37
53.833	0.00	0.39	0.278	O					2.35
53.917	0.00	0.39	0.275	O					2.33
54.000	0.00	0.39	0.272	O					2.31
54.083	0.00	0.39	0.270	O					2.30
54.167	0.00	0.39	0.267	O					2.28
54.250	0.00	0.39	0.264	O					2.26
54.333	0.00	0.39	0.262	O					2.24
54.417	0.00	0.39	0.259	O					2.22
54.500	0.00	0.39	0.256	O					2.21
54.583	0.00	0.39	0.253	O					2.19
54.667	0.00	0.39	0.251	O					2.17
54.750	0.00	0.39	0.248	O					2.15
54.833	0.00	0.39	0.245	O					2.14
54.917	0.00	0.39	0.243	O					2.12
55.000	0.00	0.39	0.240	O					2.10
55.083	0.00	0.39	0.237	O					2.08
55.167	0.00	0.39	0.235	O					2.06
55.250	0.00	0.39	0.232	O					2.05
55.333	0.00	0.39	0.229	O					2.03
55.417	0.00	0.39	0.227	O					2.01
55.500	0.00	0.39	0.224	O					1.99
55.583	0.00	0.39	0.221	O					1.97
55.667	0.00	0.39	0.219	O					1.95
55.750	0.00	0.39	0.216	O					1.93
55.833	0.00	0.39	0.213	O					1.91
55.917	0.00	0.39	0.210	O					1.89
56.000	0.00	0.39	0.208	O					1.87
56.083	0.00	0.39	0.205	O					1.85
56.167	0.00	0.39	0.202	O					1.83
56.250	0.00	0.39	0.200	O					1.81
56.333	0.00	0.39	0.197	O					1.79
56.417	0.00	0.39	0.194	O					1.77
56.500	0.00	0.39	0.192	O					1.75
56.583	0.00	0.39	0.189	O					1.73

56.667	0.00	0.39	0.186	O					1.71
56.750	0.00	0.39	0.184	O					1.69
56.833	0.00	0.39	0.181	O					1.67
56.917	0.00	0.39	0.178	O					1.65
57.000	0.00	0.39	0.176	O					1.63
57.083	0.00	0.39	0.173	O					1.61
57.167	0.00	0.39	0.170	O					1.59
57.250	0.00	0.39	0.168	O					1.57
57.333	0.00	0.39	0.165	O					1.55
57.417	0.00	0.39	0.162	O					1.53
57.500	0.00	0.39	0.159	O					1.51
57.583	0.00	0.39	0.157	O					1.49
57.667	0.00	0.39	0.154	O					1.47
57.750	0.00	0.39	0.151	O					1.45
57.833	0.00	0.39	0.149	O					1.43
57.917	0.00	0.39	0.146	O					1.41
58.000	0.00	0.39	0.143	O					1.39
58.083	0.00	0.39	0.141	O					1.37
58.167	0.00	0.39	0.138	O					1.35
58.250	0.00	0.39	0.135	O					1.33
58.333	0.00	0.39	0.133	O					1.31
58.417	0.00	0.39	0.130	O					1.28
58.500	0.00	0.39	0.127	O					1.26
58.583	0.00	0.39	0.125	O					1.24
58.667	0.00	0.39	0.122	O					1.22
58.750	0.00	0.39	0.119	O					1.20
58.833	0.00	0.39	0.116	O					1.18
58.917	0.00	0.39	0.114	O					1.16
59.000	0.00	0.39	0.111	O					1.14
59.083	0.00	0.39	0.108	O					1.12
59.167	0.00	0.39	0.106	O					1.10
59.250	0.00	0.39	0.103	O					1.08
59.333	0.00	0.39	0.100	O					1.06
59.417	0.00	0.39	0.098	O					1.04
59.500	0.00	0.39	0.095	O					1.02
59.583	0.00	0.39	0.092	O					1.00
59.667	0.00	0.39	0.090	O					0.98
59.750	0.00	0.39	0.087	O					0.95
59.833	0.00	0.39	0.084	O					0.93
59.917	0.00	0.39	0.082	O					0.90
60.000	0.00	0.39	0.079	O					0.88
60.083	0.00	0.39	0.076	O					0.85
60.167	0.00	0.39	0.073	O					0.83
60.250	0.00	0.39	0.071	O					0.80
60.333	0.00	0.39	0.068	O					0.77
60.417	0.00	0.39	0.065	O					0.75
60.500	0.00	0.39	0.063	O					0.72
60.583	0.00	0.39	0.060	O					0.70
60.667	0.00	0.39	0.057	O					0.67
60.750	0.00	0.39	0.055	O					0.65
60.833	0.00	0.39	0.052	O					0.62
60.917	0.00	0.39	0.049	O					0.60
61.000	0.00	0.39	0.047	O					0.57
61.083	0.00	0.39	0.044	O					0.55
61.167	0.00	0.39	0.041	O					0.52
61.250	0.00	0.39	0.039	O					0.49
61.333	0.00	0.36	0.036	O					0.46
61.417	0.00	0.34	0.034	O					0.43
61.500	0.00	0.31	0.031	O					0.40
61.583	0.00	0.29	0.029	O					0.38
61.667	0.00	0.27	0.027	O					0.35
61.750	0.00	0.26	0.026	O					0.33
61.833	0.00	0.24	0.024	O					0.31

61.917	0.00	0.22	0.022	O					0.29
62.000	0.00	0.21	0.021	O					0.27
62.083	0.00	0.19	0.019	O					0.25
62.167	0.00	0.18	0.018	O					0.23
62.250	0.00	0.17	0.017	O					0.22
62.333	0.00	0.16	0.016	O					0.20
62.417	0.00	0.15	0.015	O					0.19
62.500	0.00	0.14	0.014	O					0.18
62.583	0.00	0.13	0.013	O					0.16
62.667	0.00	0.12	0.012	O					0.15
62.750	0.00	0.11	0.011	O					0.14
62.833	0.00	0.10	0.010	O					0.13
62.917	0.00	0.10	0.010	O					0.12
63.000	0.00	0.09	0.009	O					0.12
63.083	0.00	0.08	0.008	O					0.11
63.167	0.00	0.08	0.008	O					0.10
63.250	0.00	0.07	0.007	O					0.09
63.333	0.00	0.07	0.007	O					0.09
63.417	0.00	0.06	0.006	O					0.08
63.500	0.00	0.06	0.006	O					0.08
63.583	0.00	0.06	0.006	O					0.07
63.667	0.00	0.05	0.005	O					0.07
63.750	0.00	0.05	0.005	O					0.06
63.833	0.00	0.05	0.005	O					0.06
63.917	0.00	0.04	0.004	O					0.05
64.000	0.00	0.04	0.004	O					0.05
64.083	0.00	0.04	0.004	O					0.05
64.167	0.00	0.03	0.003	O					0.04
64.250	0.00	0.03	0.003	O					0.04
64.333	0.00	0.03	0.003	O					0.04
64.417	0.00	0.03	0.003	O					0.04
64.500	0.00	0.03	0.003	O					0.03
64.583	0.00	0.02	0.002	O					0.03
64.667	0.00	0.02	0.002	O					0.03
64.750	0.00	0.02	0.002	O					0.03
64.833	0.00	0.02	0.002	O					0.03
64.917	0.00	0.02	0.002	O					0.02
65.000	0.00	0.02	0.002	O					0.02
65.083	0.00	0.02	0.002	O					0.02
65.167	0.00	0.02	0.002	O					0.02
65.250	0.00	0.01	0.001	O					0.02
65.333	0.00	0.01	0.001	O					0.02
65.417	0.00	0.01	0.001	O					0.02
65.500	0.00	0.01	0.001	O					0.01
65.583	0.00	0.01	0.001	O					0.01
65.667	0.00	0.01	0.001	O					0.01
65.750	0.00	0.01	0.001	O					0.01
65.833	0.00	0.01	0.001	O					0.01
65.917	0.00	0.01	0.001	O					0.01
66.000	0.00	0.01	0.001	O					0.01
66.083	0.00	0.01	0.001	O					0.01
66.167	0.00	0.01	0.001	O					0.01
66.250	0.00	0.01	0.001	O					0.01
66.333	0.00	0.01	0.001	O					0.01
66.417	0.00	0.01	0.001	O					0.01
66.500	0.00	0.01	0.001	O					0.01
66.583	0.00	0.00	0.000	O					0.01
66.667	0.00	0.00	0.000	O					0.01
66.750	0.00	0.00	0.000	O					0.01
66.833	0.00	0.00	0.000	O					0.00
66.917	0.00	0.00	0.000	O					0.00
67.000	0.00	0.00	0.000	O					0.00
67.083	0.00	0.00	0.000	O					0.00

67.167	0.00	0.00	0.000	O					0.00
67.250	0.00	0.00	0.000	O					0.00
67.333	0.00	0.00	0.000	O					0.00
67.417	0.00	0.00	0.000	O					0.00
67.500	0.00	0.00	0.000	O					0.00
67.583	0.00	0.00	0.000	O					0.00
67.667	0.00	0.00	0.000	O					0.00
67.750	0.00	0.00	0.000	O					0.00
67.833	0.00	0.00	0.000	O					0.00
67.917	0.00	0.00	0.000	O					0.00
68.000	0.00	0.00	0.000	O					0.00
68.083	0.00	0.00	0.000	O					0.00
68.167	0.00	0.00	0.000	O					0.00
68.250	0.00	0.00	0.000	O					0.00
68.333	0.00	0.00	0.000	O					0.00
68.417	0.00	0.00	0.000	O					0.00
68.500	0.00	0.00	0.000	O					0.00

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

Number of intervals = 822

Time interval = 5.0 (Min.)

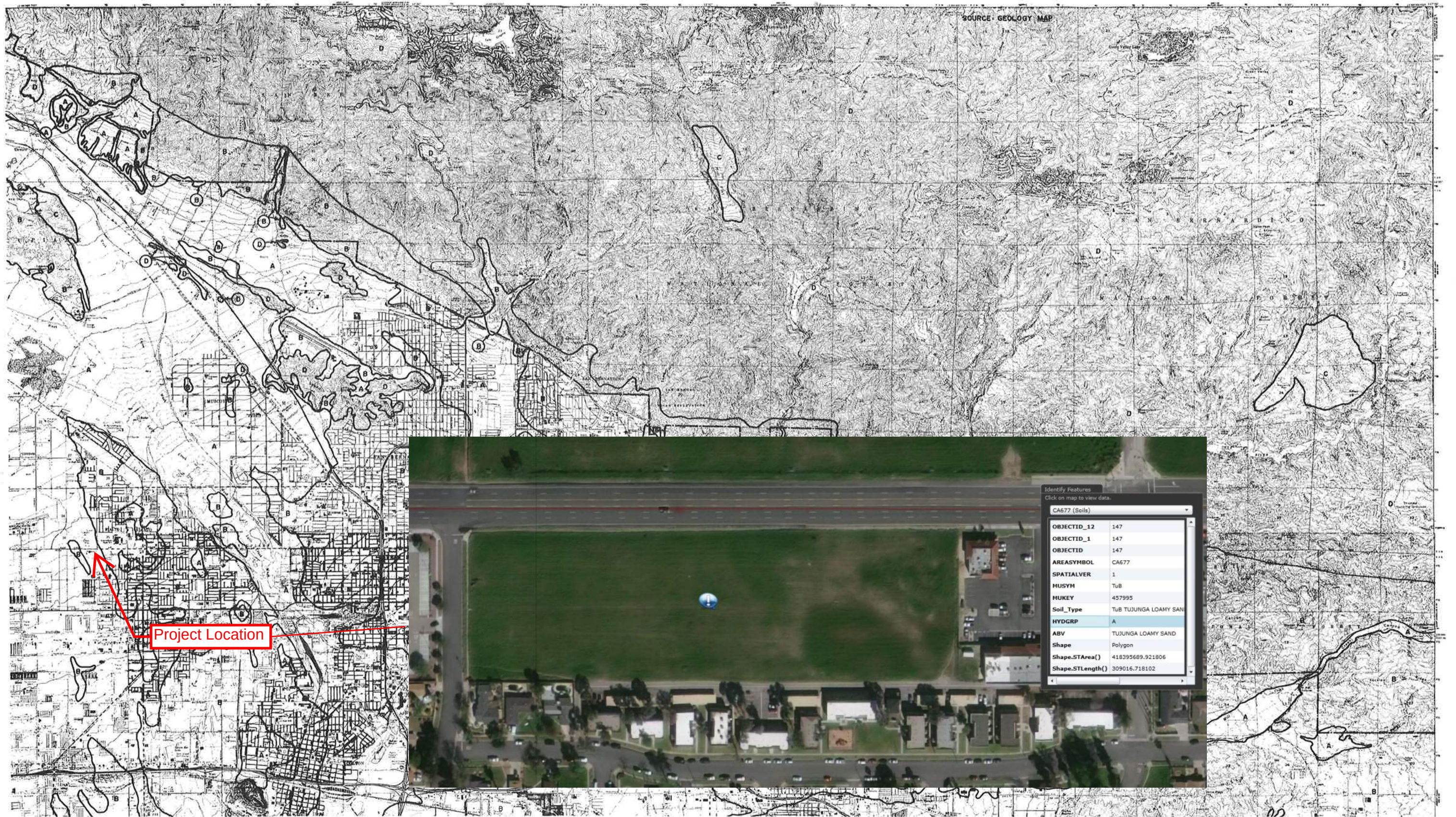
Maximum/Peak flow rate = 9.452 (CFS)

Total volume = 2.516 (Ac.Ft)

Status of hydrographs being held in storage

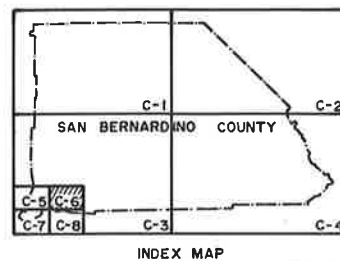
	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

Appendix D
Soil Group Map and Isohyetal Map



Identify Features
Click on map to view data.

CA677 (Soils)	
OBJECTID_12	147
OBJECTID_1	147
OBJECTID	147
AREASymbol	CA677
SPATIALVER	1
MUSYM	TuB
MUKEY	457995
Soil_Type	TuB TUJUNGA LOAMY SAND
HYDGRP	A
ABV	TUJUNGA LOAMY SAND
Shape	Polygon
Shape.STArea()	418395689.921806
Shape.STLength()	309016.718102



LEGEND

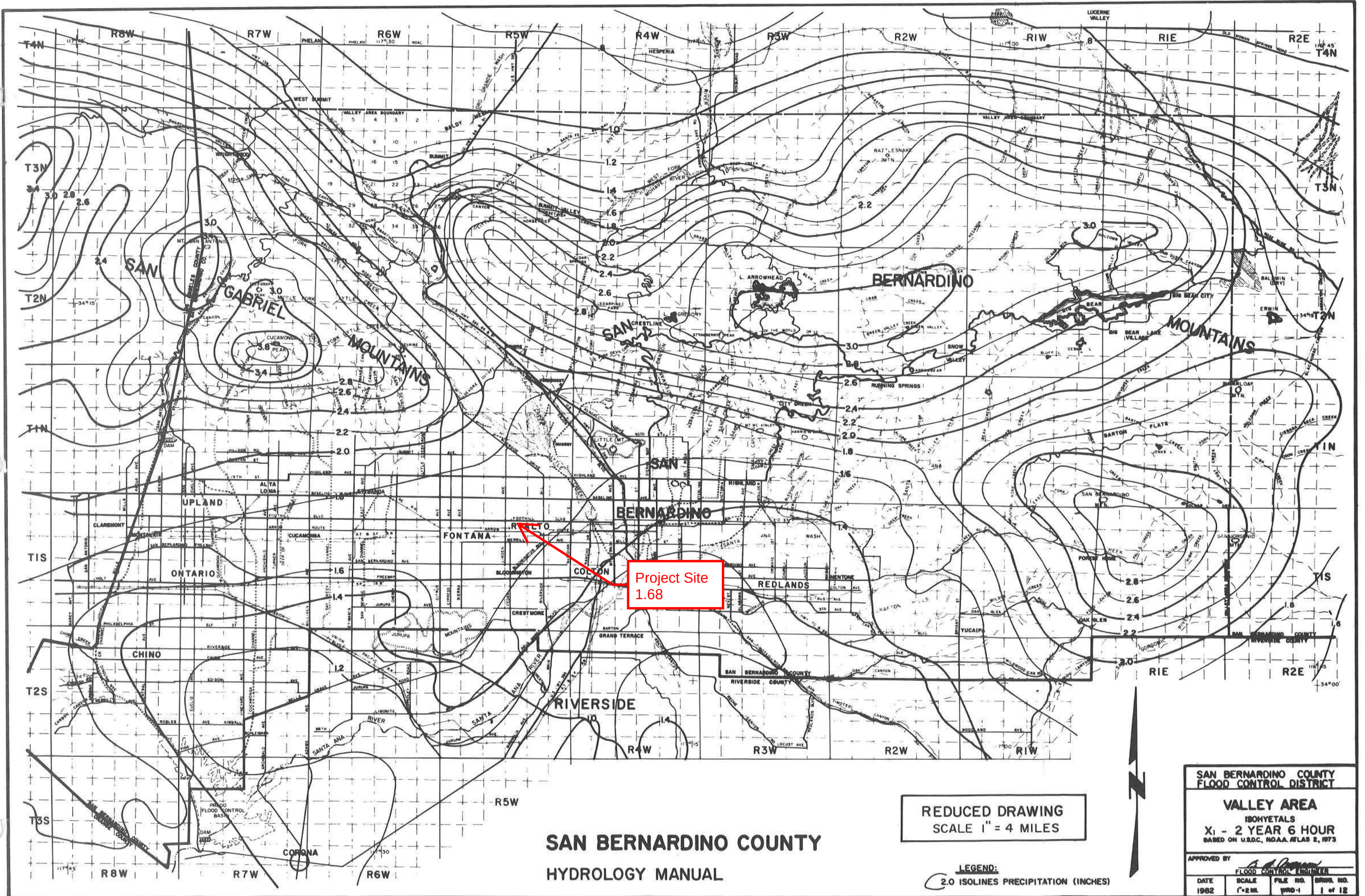
— SOIL GROUP BOUNDARY

A SOIL GROUP DESIGNATION

— BOUNDARY OF INDICATED SOURCE

SCALE REDUCED BY 1/2

SCALE 1:48,000

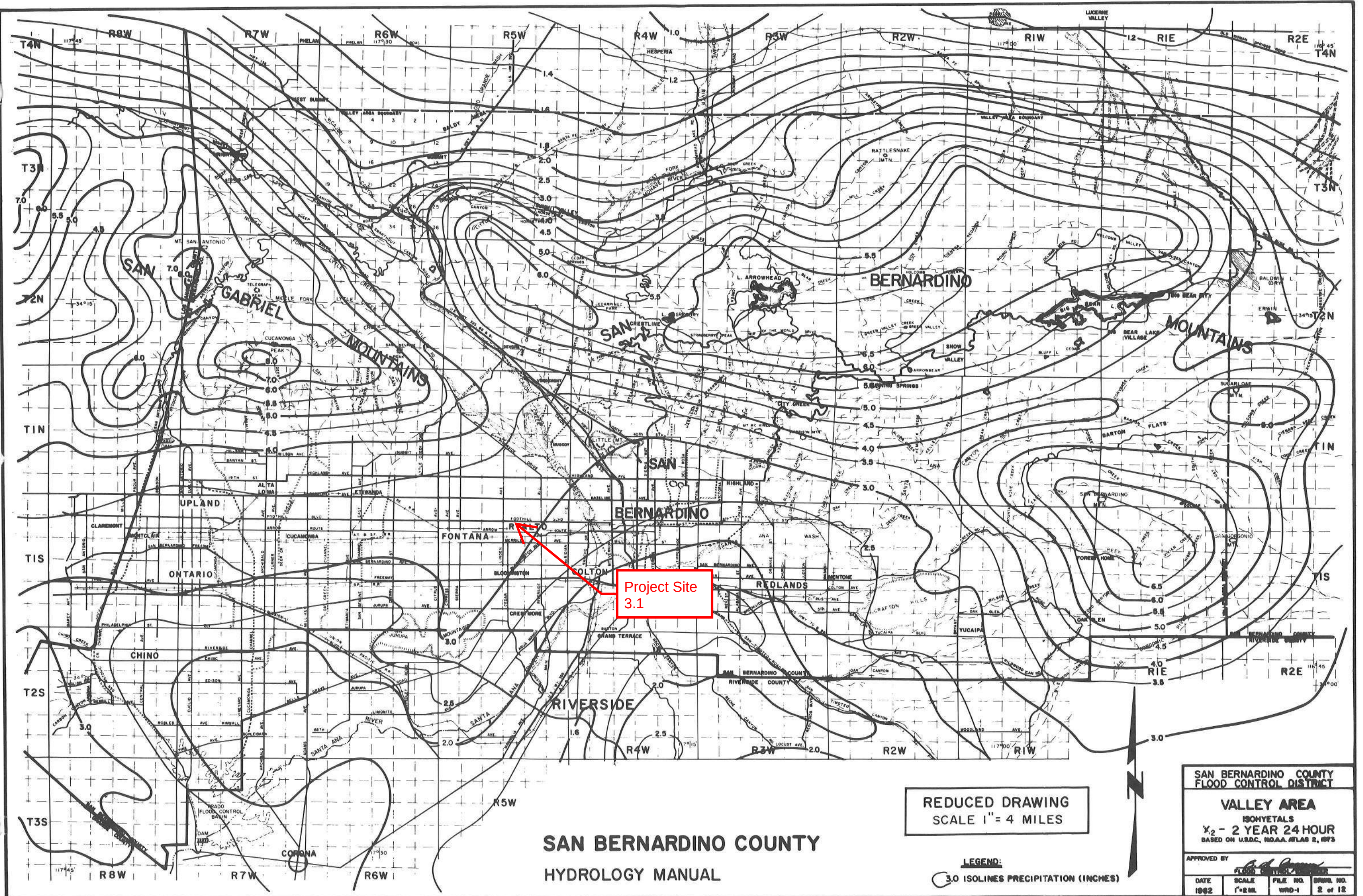


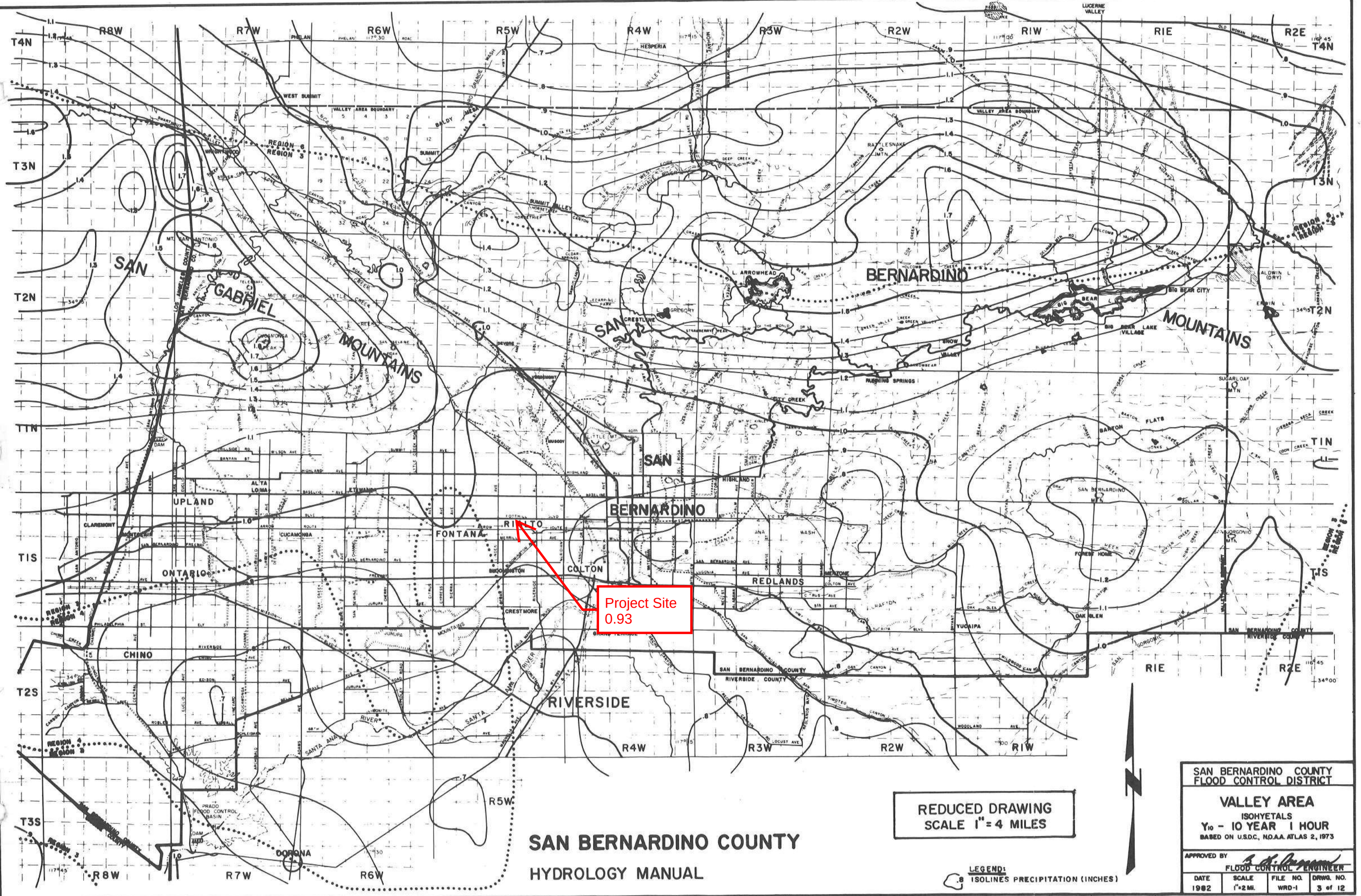
SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

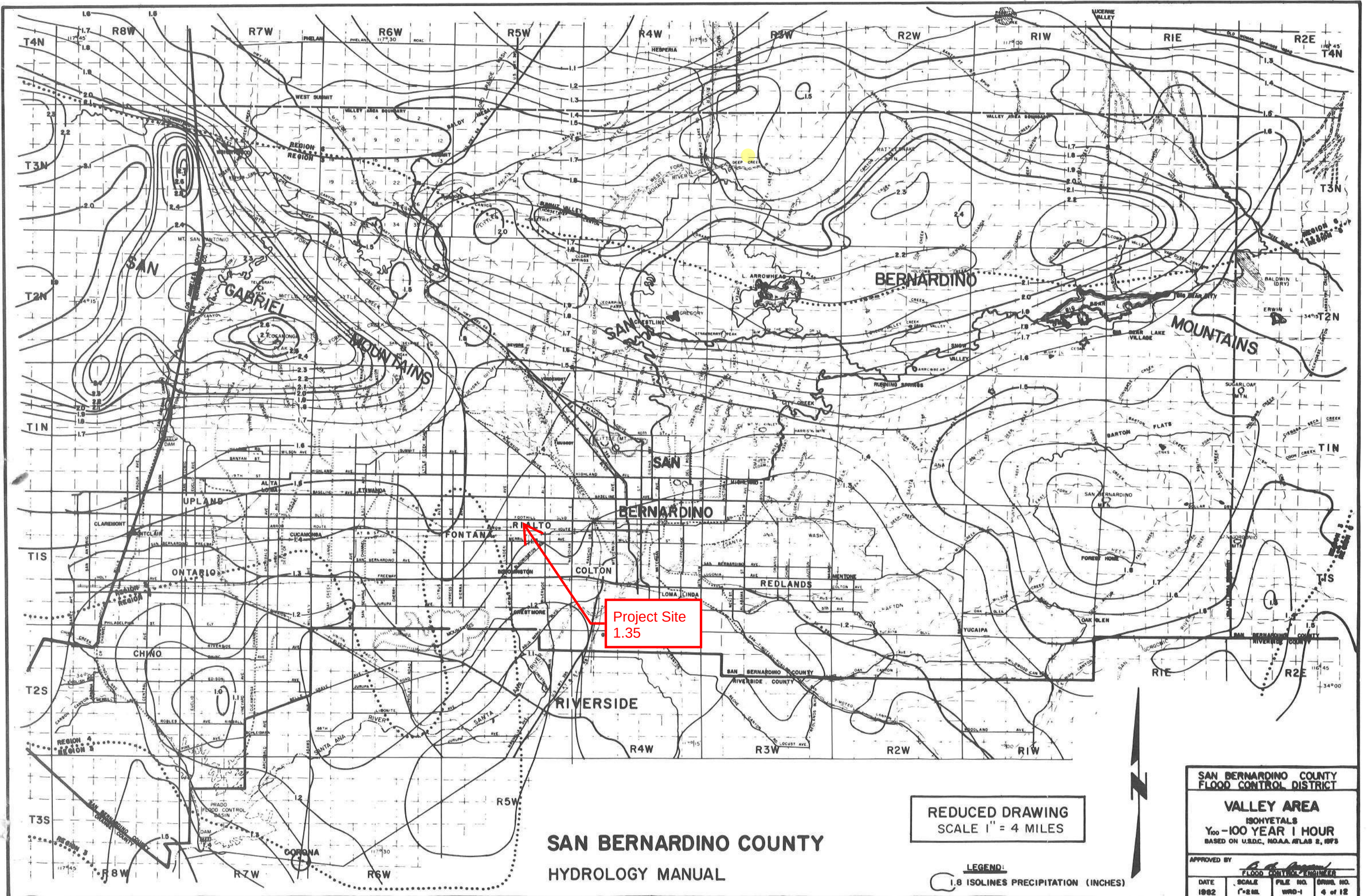
REDUCED DRAWING
SCALE 1" = 4 MILES

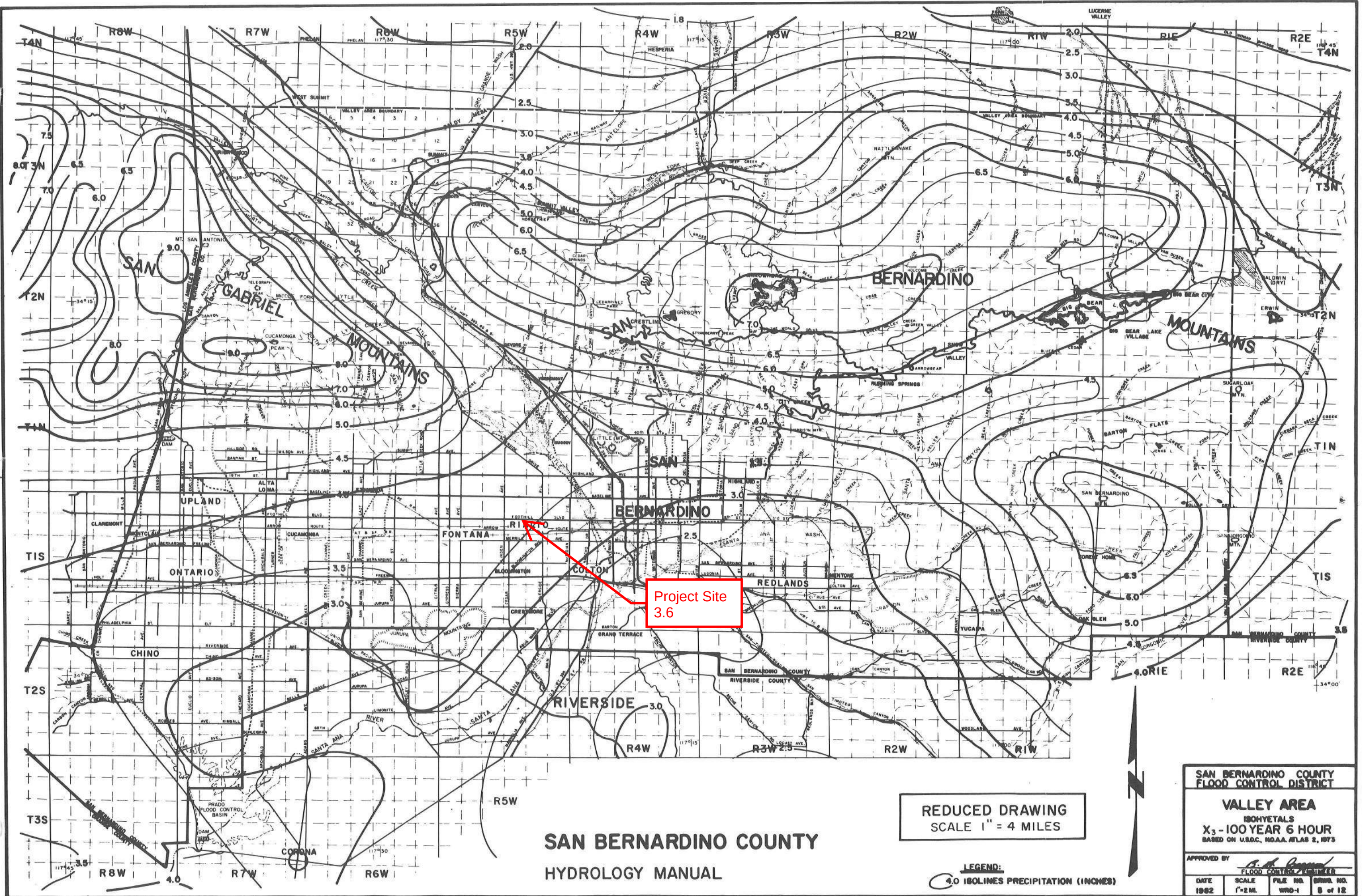
LEGEND:
2.0 ISOINES PRECIPITATION (INCHES)

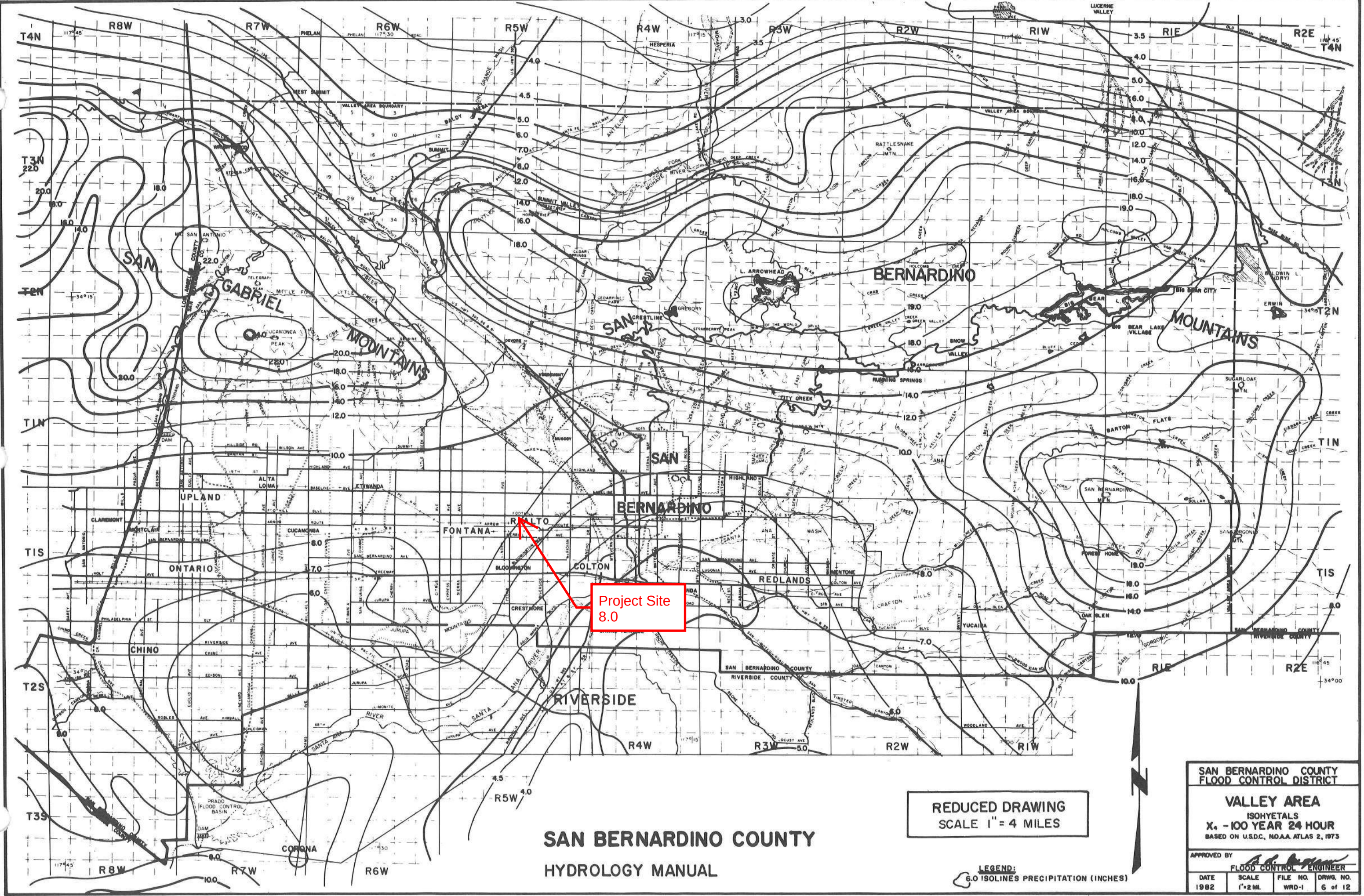
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT			
VALLEY AREA ISOHYETALS X1 - 2 YEAR 6 HOUR BASED ON U.S.D.C. NOAA ATLAS 2, 1973			
APPROVED BY <i>[Signature]</i>			
DATE	SCALE	FILE NO.	SPRNG. NO.
1982	1"=2 MI.	WFD-1	1 of 12











**SAN BERNARDINO COUNTY
HYDROLOGY MANUAL**

REDUCED DRAWING
SCALE 1" = 4 MILES

LEGEND:
6.0 ISOLINES PRECIPITATION (INCHES)

**SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT**

VALLEY AREA
ISOHYETALS
X4 - 100 YEAR 24 HOUR
BASED ON U.S.D.C. NO. AA ATLAS 2, 1973

APPROVED BY *[Signature]*
FLOOD CONTROL ENGINEER

DATE 1982	SCALE 1" = 2 MI.	FILE NO. WRD-1	DRWG. NO. 6 of 12
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