

PRELIMINARY HYDROLOGY REPORT

For

Chartwell – Rider at Redlands Industrial

APN: 300-250-007, -008

PROJECT LOCATION

Southwest corner of Rider Street and Redlands Avenue
City of Perris, CA

DEVELOPER

Chartwell Real Estate Development
151 Innovation Drive
Irvine, CA 92617
949-701-5128

PREPARED BY

Huitt-Zollars, Inc.
3990 Concours, Suite 330
Ontario, CA 91764
Ph: 909.941.7799
Fax: 909.941.7789

Manuel Gonzales, P.E.
C65195, Exp 09/30/2023

PREPARATION DATE

October 10, 2021

HZ PROJECT NUMBER

R312997.01

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Introduction

This preliminary hydrology report has been prepared for Chartwell Real Estate Development. The project is located at the southwest corner of Rider Street and Redlands Avenue in the City of Perris, California. This project is a new development of an approximate 132,818 square foot industrial warehouse building proposed on approximately 6.3 gross acres of undeveloped land.

Purpose

The purpose of this report is to present the drainage concept for the project and to determine the design flow rates for the project site. The hydrology map and calculations reflect the tributary areas and the 100-year (Q_{100}) flows.

Existing Condition

The existing site grades range from a maximum elevation of ± 1447 mean sea level (msl) in the southerly region of the site to a minimum elevation of ± 1445 msl in the northerly region of the site with less than one percent (1%) gradient. The runoff from the existing site flows from south to the north in a sheet flow condition and overflows onto Rider Street where it is collected in a catch basin curb inlet. The channel flow is then conveyed easterly to the Perris Valley Channel via the master drainage pipe (MDP) Line AB. See the Existing Condition Hydrology Map in Appendix A for drainage area.

Proposed Condition

In the proposed condition, the site has been designed to generally drain in the same direction as the existing undeveloped condition. In compliance with the city, county and state guidelines the site has been designed to incorporate two BioClean Modular Wetlands System to treat the storm water. Additionally, there will be an underground CMP Detention System to help mitigate the storm water generated by the developed condition. The site will generally be graded to drain toward the north of the project site, it will then be conveyed through the onsite storm drain system to be treated by the BioClean Modular Wetlands Systems. From there the high water flow will bypass the treatment and go to the underground CMP system for detention. The underground detention system has been sized to capture the storm water while providing peak storm mitigation by slowing down and reducing the storm water discharge rate during the 100-year storm event for the 1-hour, 3-hour, 6-hour, and 24-hour durations to help mimic the existing undeveloped conditions. The treated low flows and the detained higher flows will combine at a proposed manhole. A proposed 18-inch line will convey the outflow to the existing RCB Line AB in Rider Street. Other storm events will be modeled with the Final Hydrology Study. See Appendix A for the Preliminary Proposed Condition Hydrology Map.

Hydrologic Analysis

The hydrologic analysis has been prepared in accordance with the Riverside County Flood Control & Water Conservation District (RCFC&WCD) Hydrology Manual Rational method using CIVILD software version 7.1. CIVILD hydrology calculations are included in Appendix B and indicate flow data at each node. Unit hydrograph and detention routing calculations are included in Appendices C and D.

The 100-year and the 2-year rainfall rates were taken from the isohyetal maps in the Hydrology Manual. The hydrologic soil type for the site is “C” and was taken from the soils map in the Hydrology Manual. See Appendix C for reference maps. A “commercial” land use was used for the project site with AMC III for the proposed condition.

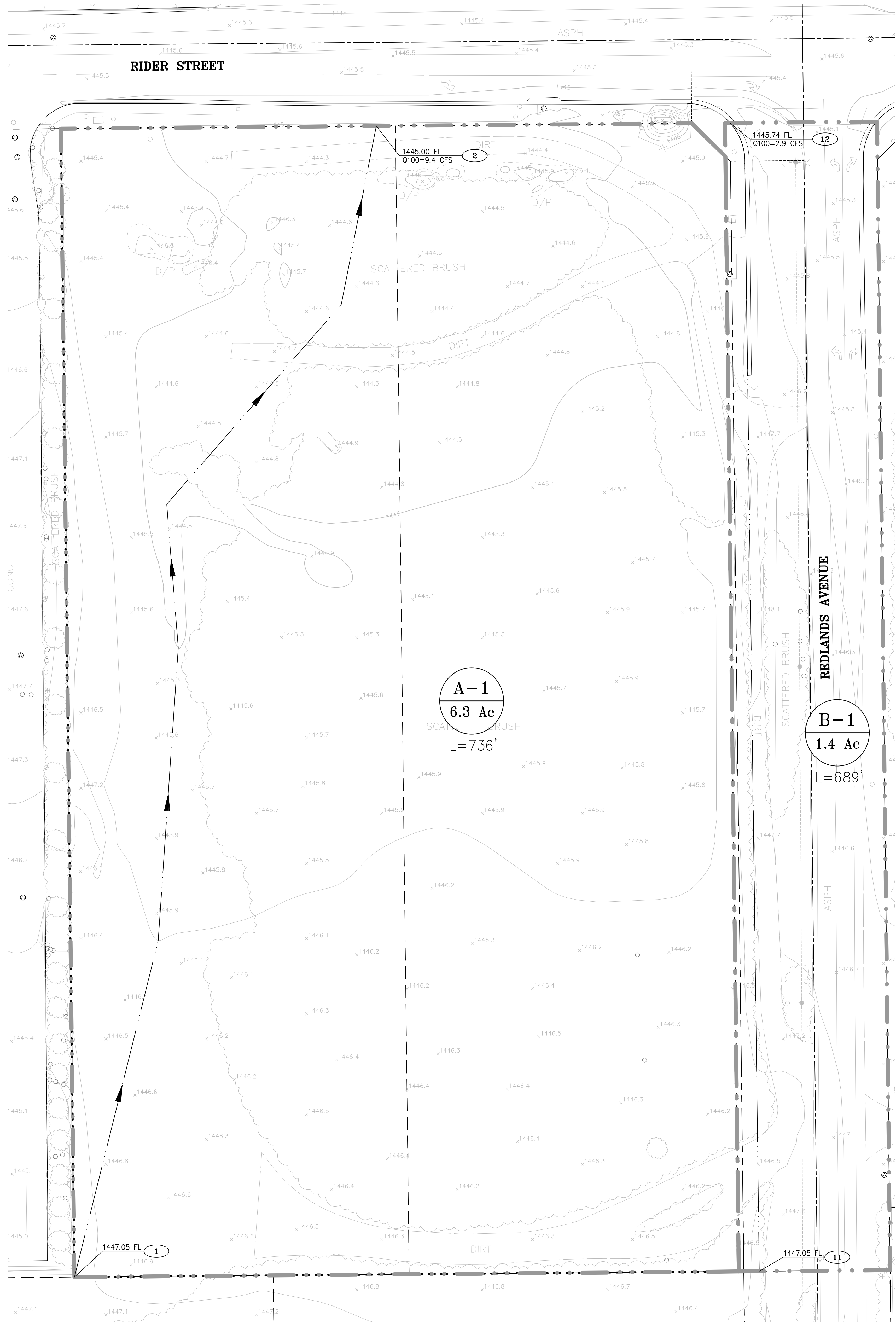
Results

The required treatment flow rate is 1.0 cubic feet per second of storm water per the current water quality management plan guidance document. The two Modular Wetlands Systems together treat 1.1 cubic feet per second of storm water. Unit hydrograph calculations were prepared to establish existing and proposed condition flow (Q's) for the 100-year storm at 1 hour, 3 hour, 6 hour, and 24 hour durations. Results from the detention routing calculations indicate the proposed peak Q's are mitigated utilizing a 10-inch orifice outlet control. The highest water surface elevation in the basin occurs during the 1-hour storm and is 1442.3, which is lower than the top of the underground system and drains within 24 hours in all cases.

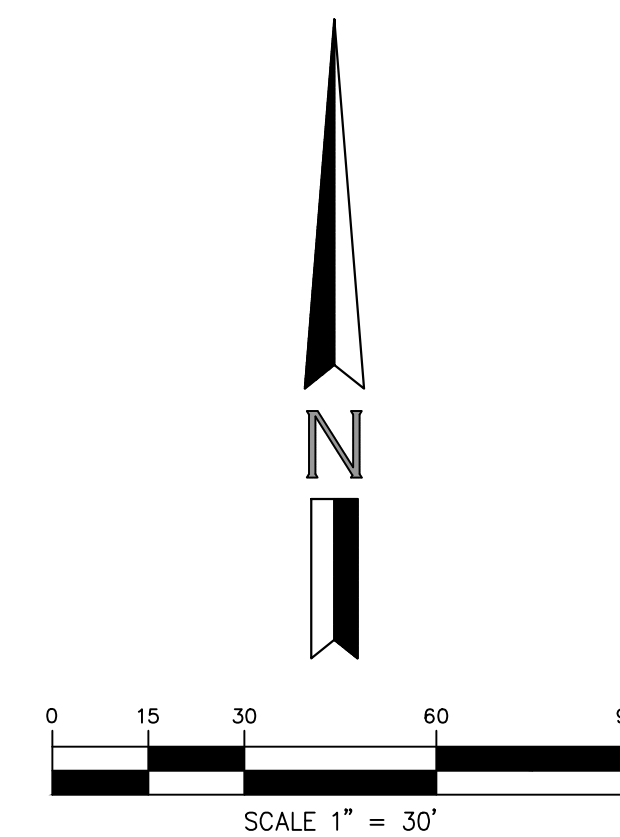
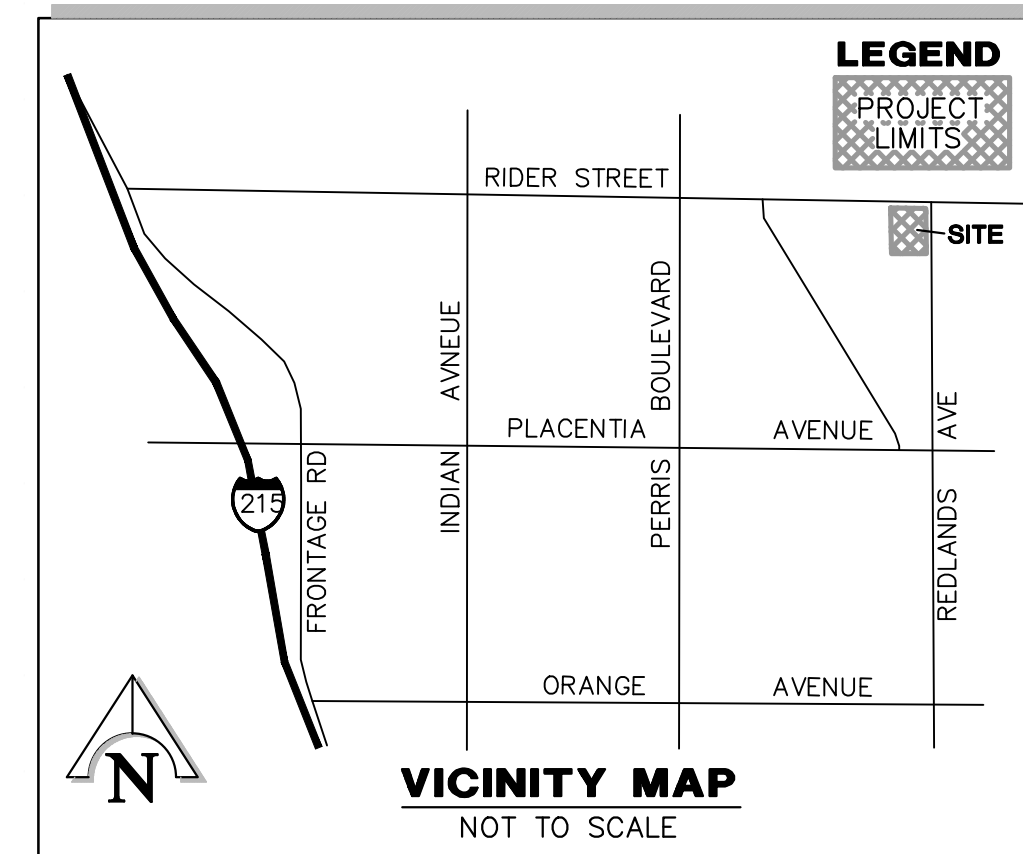
100 YEAR STORM	1 Hour	3 Hour	6 Hour	24 Hour
Existing Condition Q Out (CFS) From Unit Hydrograph Study for Existing Condition	9.3	7.4	6.3	3.0
Proposed Condition Max. Q Out (CFS) after Routing From Routing Study	6.9	6.5	6.1	3.0
WSE	1442.3	1441.6	1441.0	1438.2

All proposed project site drainage and storm drain facilities will be sized adequately for 100-year storm event. Additional calculations, including on-site storm drain hydraulics and catch basin sizing in addition to any other storm event models will be provided in the final drainage report.

Appendix A
Existing Condition Hydrology Map
Preliminary Proposed Condition Hydrology Map



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



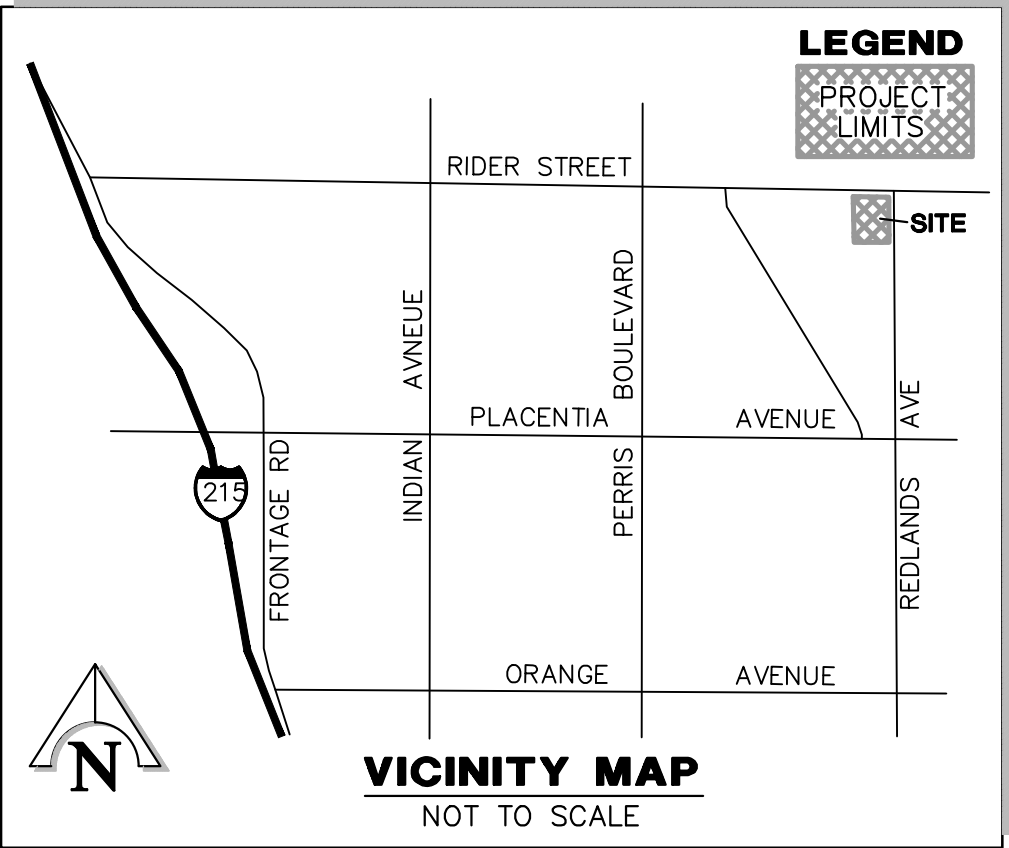
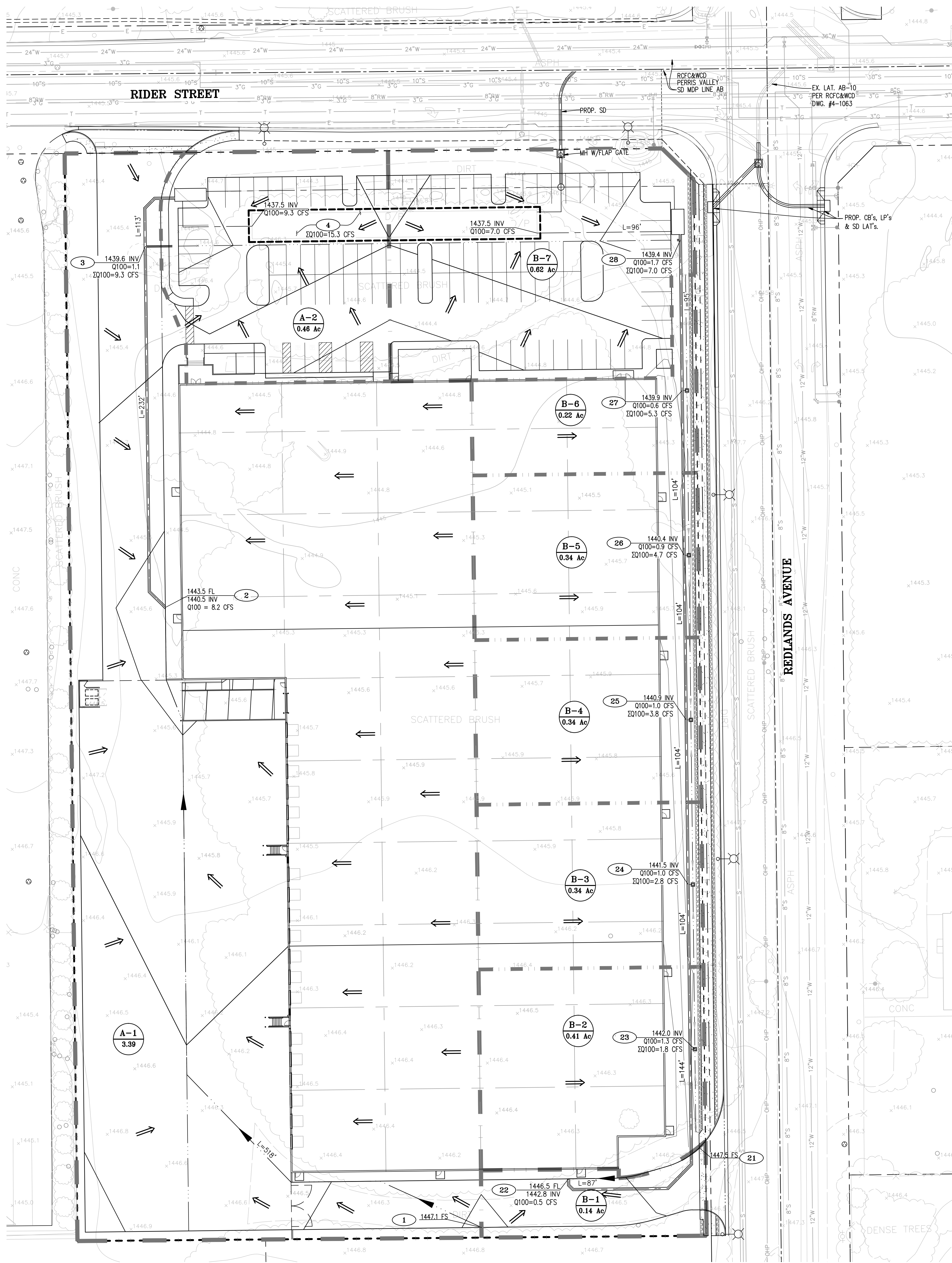
ENGINEER
HUITT-ZOLLARS
3990 CONCOURS, SUITE 330
ONTARIO, CA 91764
PHONE: (909) 941-7799
CONTACT: JOHNNY MURAD
EMAIL: jmurad@huitt-zollars.com

OWNER/DEVELOPER
CHARTWELL REAL ESTATE DEVELOPMENT
151 INNOVATION DRIVE
IRVINE, CA 92617
PHONE: (949) 701-5128
CONTACT: MR. HENRY PYLE
EMAIL: HENRY@CHARTWELLRED.COM

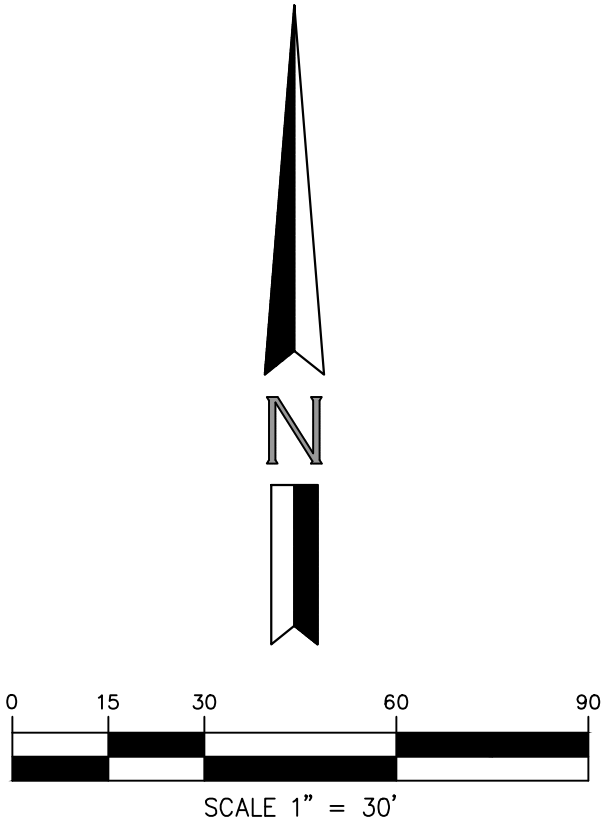
HUITT-ZOLLARS
Huitt-Zollars, Inc. Ontario
3990 CONCOURS, SUITE 330 • ONTARIO, CALIFORNIA 91764 • (909) 941-7799

CITY OF PERRIS
EXISTING CONDITION HYDROLOGY MAP
CHARTWELL - RIDER AT REDLANDS INDUSTRIAL
DPR 21-00003

SHEET
1 OF 1



- 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
 - DRAINAGE INLET/CATCH BASIN (CB)
 - PROPOSED STORM DRAIN



ENGINEER
HUITT-ZOLLARS
3990 CONCOURS, SUITE 330
ONTARIO, CA 91764
PHONE: (909) 941-7799
CONTACT: JOHNNY MURAD
EMAIL: jmurad@huitt-zollars.com

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CONTACT: MR. HENRY PYLE
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CITY OF PERRIS
PRELIMINARY HYDROLOGY MAP
CHARTWELL - RIDER AT REDLANDS INDUSTRIAL
DPR 21-00003

SHEET
1 OF 1

Appendix B

100-year Rational Method Hydrologic Analysis

- Existing Condition
- Proposed Condition

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/29/20 File:2997q100ea.out

Chartwell - Rider at Redlands Ind
100 YEAR STORM EVENT - EXISTING CONDITION
2997Q100EA
CB

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

English (in-lb) Units used in input data file

Program License Serial Number 6145

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

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

Initial area flow distance = 736.000(Ft.)
Top (of initial area) elevation = 1447.050(Ft.)
Bottom (of initial area) elevation = 1445.000(Ft.)
Difference in elevation = 2.050(Ft.)
Slope = 0.00279 s(percent)= 0.28
TC = $k(0.530)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$
Initial area time of concentration = 24.102 min.
Rainfall intensity = 1.751(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 94.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 9.439(CFS)
Total initial stream area = 6.260(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 6.26 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 86.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/29/20 File:2997q100eb.out

Chartwell - Rider at Redlands Ind
100 YEAR STORM EVENT - EXISTING CONDITION
2997Q100EB
CB

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

English (in-lb) Units used in input data file

Program License Serial Number 6145

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

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

Initial area flow distance = 689.000(Ft.)
Top (of initial area) elevation = 1447.050(Ft.)
Bottom (of initial area) elevation = 1445.740(Ft.)
Difference in elevation = 1.310(Ft.)
Slope = 0.00190 s(percent)= 0.19
TC = $k(0.300)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$
Initial area time of concentration = 14.342 min.
Rainfall intensity = 2.258(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.891
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 2.878(CFS)
Total initial stream area = 1.430(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 1.43 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 69.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/12/21 File:2997q100p.out

Chartwell - Rider at Redlands Ind

100 YEAR STORM EVENT - PROPOSED CONDITION

2997Q100P

CB

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

English (in-lb) Units used in input data file

Program License Serial Number 6145

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)

For the [Perris Valley] area used.

10 year storm 10 minute intensity = 1.880(In/Hr)

10 year storm 60 minute intensity = 0.780(In/Hr)

100 year storm 10 minute intensity = 2.690(In/Hr)

100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0

Calculated rainfall intensity data:

1 hour intensity = 1.120(In/Hr)

Slope of intensity duration curve = 0.4900

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

Initial area flow distance = 518.000(Ft.)

Top (of initial area) elevation = 1447.100(Ft.)

Bottom (of initial area) elevation = 1443.500(Ft.)

Difference in elevation = 3.600(Ft.)

Slope = 0.00695 s(percent)= 0.69

$TC = k(0.300) * [(length^3) / (elevation\ change)]^{0.2}$

Initial area time of concentration = 9.873 min.

Rainfall intensity = 2.712(In/Hr) for a 100.0 year storm

COMMERCIAL subarea type

Runoff Coefficient = 0.893

Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.000

Decimal fraction soil group C = 1.000

Decimal fraction soil group D = 0.000

RI index for soil(AMC 3) = 84.40

Pervious area fraction = 0.100; Impervious fraction = 0.900

Initial subarea runoff = 8.204(CFS)
Total initial stream area = 3.390(Ac.)
Pervious area fraction = 0.100

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

Upstream point/station elevation = 1440.500(Ft.)
Downstream point/station elevation = 1439.600(Ft.)
Pipe length = 232.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.204(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 8.204(CFS)
Normal flow depth in pipe = 14.63(In.)
Flow top width inside pipe = 19.31(In.)
Critical Depth = 12.75(In.)
Pipe flow velocity = 4.59(Ft/s)
Travel time through pipe = 0.84 min.
Time of concentration (TC) = 10.72 min.

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

COMMERCIAL subarea type
Runoff Coefficient = 0.892
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 10.72 min.
Rainfall intensity = 2.605(In/Hr) for a 100.0 year storm
Subarea runoff = 1.069(CFS) for 0.460(Ac.)
Total runoff = 9.273(CFS) Total area = 3.850(Ac.)

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

Upstream point/station elevation = 1439.600(Ft.)
Downstream point/station elevation = 1437.500(Ft.)
Pipe length = 113.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 9.273(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 9.273(CFS)
Normal flow depth in pipe = 10.55(In.)
Flow top width inside pipe = 17.73(In.)
Critical Depth = 14.13(In.)
Pipe flow velocity = 8.62(Ft/s)
Travel time through pipe = 0.22 min.
Time of concentration (TC) = 10.93 min.

+++++
Process from Point/Station 4.000 to Point/Station 4.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 1
Stream flow area = 3.850 (Ac.)
Runoff from this stream = 9.273 (CFS)
Time of concentration = 10.93 min.
Rainfall intensity = 2.579 (In/Hr)
Program is now starting with Main Stream No. 2

+++++
Process from Point/Station 21.000 to Point/Station 22.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 87.000 (Ft.)
Top (of initial area) elevation = 1447.500 (Ft.)
Bottom (of initial area) elevation = 1446.500 (Ft.)
Difference in elevation = 1.000 (Ft.)
Slope = 0.01149 s(percent) = 1.15
 $TC = k(0.300) * [(length^3) / (elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 3.785 (In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.894
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil (AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.474 (CFS)
Total initial stream area = 0.140 (Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 22.000 to Point/Station 23.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1442.780 (Ft.)
Downstream point/station elevation = 1442.000 (Ft.)
Pipe length = 144.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 0.474 (CFS)
Nearest computed pipe diameter = 9.00 (In.)
Calculated individual pipe flow = 0.474 (CFS)
Normal flow depth in pipe = 3.90 (In.)
Flow top width inside pipe = 8.92 (In.)
Critical Depth = 3.73 (In.)
Pipe flow velocity = 2.59 (Ft/s)
Travel time through pipe = 0.93 min.
Time of concentration (TC) = 5.93 min.

+++++
Process from Point/Station 23.000 to Point/Station 23.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.894
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000

Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 5.93 min.
Rainfall intensity = 3.482(In/Hr) for a 100.0 year storm
Subarea runoff = 1.276(CFS) for 0.410(Ac.)
Total runoff = 1.750(CFS) Total area = 0.550(Ac.)

+++++
Process from Point/Station 23.000 to Point/Station 24.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1442.000(Ft.)
Downstream point/station elevation = 1441.500(Ft.)
Pipe length = 104.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.750(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 1.750(CFS)
Normal flow depth in pipe = 7.45(In.)
Flow top width inside pipe = 11.64(In.)
Critical Depth = 6.76(In.)
Pipe flow velocity = 3.41(Ft/s)
Travel time through pipe = 0.51 min.
Time of concentration (TC) = 6.44 min.

+++++
Process from Point/Station 24.000 to Point/Station 24.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.894
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 6.44 min.
Rainfall intensity = 3.344(In/Hr) for a 100.0 year storm
Subarea runoff = 1.016(CFS) for 0.340(Ac.)
Total runoff = 2.766(CFS) Total area = 0.890(Ac.)

+++++
Process from Point/Station 24.000 to Point/Station 25.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1441.500(Ft.)
Downstream point/station elevation = 1440.900(Ft.)
Pipe length = 104.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.766(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 2.766(CFS)
Normal flow depth in pipe = 8.06(In.)
Flow top width inside pipe = 14.96(In.)
Critical Depth = 8.00(In.)
Pipe flow velocity = 4.12(Ft/s)
Travel time through pipe = 0.42 min.
Time of concentration (TC) = 6.86 min.

+++++
Process from Point/Station 25.000 to Point/Station 25.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.894
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 6.86 min.
Rainfall intensity = 3.242(In/Hr) for a 100.0 year storm
Subarea runoff = 0.985(CFS) for 0.340(Ac.)
Total runoff = 3.751(CFS) Total area = 1.230(Ac.)

+++++
Process from Point/Station 25.000 to Point/Station 26.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1440.900(Ft.)
Downstream point/station elevation = 1440.400(Ft.)
Pipe length = 104.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.751(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 3.751(CFS)
Normal flow depth in pipe = 10.50(In.)
Flow top width inside pipe = 13.75(In.)
Critical Depth = 9.39(In.)
Pipe flow velocity = 4.09(Ft/s)
Travel time through pipe = 0.42 min.
Time of concentration (TC) = 7.28 min.

+++++
Process from Point/Station 26.000 to Point/Station 26.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.893
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 7.28 min.
Rainfall intensity = 3.148(In/Hr) for a 100.0 year storm
Subarea runoff = 0.956(CFS) for 0.340(Ac.)
Total runoff = 4.708(CFS) Total area = 1.570(Ac.)

+++++
Process from Point/Station 26.000 to Point/Station 27.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1440.400(Ft.)
Downstream point/station elevation = 1439.900(Ft.)
Pipe length = 104.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.708(CFS)
Nearest computed pipe diameter = 18.00(In.)

Calculated individual pipe flow = 4.708(CFS)
Normal flow depth in pipe = 10.54(In.)
Flow top width inside pipe = 17.74(In.)
Critical Depth = 10.00(In.)
Pipe flow velocity = 4.38(Ft/s)
Travel time through pipe = 0.40 min.
Time of concentration (TC) = 7.68 min.

+++++
Process from Point/Station 27.000 to Point/Station 27.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.893
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 7.68 min.
Rainfall intensity = 3.067(In/Hr) for a 100.0 year storm
Subarea runoff = 0.603(CFS) for 0.220(Ac.)
Total runoff = 5.310(CFS) Total area = 1.790(Ac.)

+++++
Process from Point/Station 27.000 to Point/Station 28.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1439.900(Ft.)
Downstream point/station elevation = 1439.400(Ft.)
Pipe length = 95.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.310(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 5.310(CFS)
Normal flow depth in pipe = 11.06(In.)
Flow top width inside pipe = 17.52(In.)
Critical Depth = 10.65(In.)
Pipe flow velocity = 4.66(Ft/s)
Travel time through pipe = 0.34 min.
Time of concentration (TC) = 8.02 min.

+++++
Process from Point/Station 28.000 to Point/Station 28.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.893
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 8.02 min.
Rainfall intensity = 3.003(In/Hr) for a 100.0 year storm
Subarea runoff = 1.663(CFS) for 0.620(Ac.)
Total runoff = 6.973(CFS) Total area = 2.410(Ac.)

```

+++++
Process from Point/Station      28.000 to Point/Station      4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

```

```

Upstream point/station elevation = 1439.400(Ft.)
Downstream point/station elevation = 1437.500(Ft.)
Pipe length = 96.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.973(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 6.973(CFS)
Normal flow depth in pipe = 9.84(In.)
Flow top width inside pipe = 14.25(In.)
Critical Depth = 12.69(In.)
Pipe flow velocity = 8.16(Ft/s)
Travel time through pipe = 0.20 min.
Time of concentration (TC) = 8.21 min.

```

```

+++++
Process from Point/Station      4.000 to Point/Station      4.000
**** CONFLUENCE OF MAIN STREAMS ****

```

The following data inside Main Stream is listed:

```

In Main Stream number: 2
Stream flow area = 2.410(Ac.)
Runoff from this stream = 6.973(CFS)
Time of concentration = 8.21 min.
Rainfall intensity = 2.968(In/Hr)
Summary of stream data:

```

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

1	9.273	10.93	2.579
2	6.973	8.21	2.968

Largest stream flow has longer time of concentration

```

Qp = 9.273 + sum of
      Qb      Ia/Ib
      6.973 * 0.869 = 6.061
Qp = 15.334

```

Total of 2 main streams to confluence:

Flow rates before confluence point:

9.273	6.973
-------	-------

Area of streams before confluence:

3.850	2.410
-------	-------

Results of confluence:

Total flow rate = 15.334(CFS)

Time of concentration = 10.934 min.

Effective stream area after confluence = 6.260(Ac.)

Appendix C

Unit Hydrograph Calculations

- Existing Condition: 1, 3, 6, 24 HR
- Proposed Condition: 1, 3, 6, 24 HR

Unit Hydrograph Analysis

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Study date 01/26/21 File: 2997UNIHDE1100.out

+++++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6145

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Chartwell - Rider at Redlands Ind
100 YEAR STORM EVENT - EXISTING CONDITION
UNIT HYDROGRAPH STUDY - 1 HR
2997UNIHDE

Drainage Area = 6.30(Ac.) = 0.010 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.30(Ac.) = 0.010 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.321 Hr.
Lag time = 19.28 Min.
25% of lag time = 4.82 Min.
40% of lag time = 7.71 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.30	0.45	2.84

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.30	1.20	7.56

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.450(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.300	85.00	0.000
Total Area Entered = 6.30(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
85.0	94.0	0.078	0.000	0.078	1.000	0.078
Sum (F) =						0.078

Area averaged mean soil loss (F) (In/Hr) = 0.078
 Minimum soil loss rate ((In/Hr)) = 0.039
 (for 24 hour storm duration)
 Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm = 0.5000

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	2.403	0.153
2	0.167	8.160	0.518
3	0.250	14.542	0.923
4	0.333	18.191	1.155
5	0.417	14.974	0.951
6	0.500	9.097	0.578
7	0.583	5.757	0.366
8	0.667	4.030	0.256
9	0.750	3.269	0.208
10	0.833	2.692	0.171
11	0.917	2.313	0.147
12	1.000	1.914	0.122
13	1.083	1.606	0.102
14	1.167	1.503	0.095
15	1.250	1.192	0.076
16	1.333	1.090	0.069
17	1.417	0.858	0.054
18	1.500	0.819	0.052
19	1.583	0.781	0.050
20	1.667	0.724	0.046
21	1.750	0.579	0.037
22	1.833	0.538	0.034
23	1.917	0.469	0.030
24	2.000	0.428	0.027
25	2.083	0.364	0.023
26	2.167	0.318	0.020
27	2.250	0.260	0.016
28	2.333	0.259	0.016
29	2.417	0.259	0.016
30	2.500	0.259	0.016
31	2.583	0.350	0.022
Sum = 100.000		Sum=	6.349

Unit	Time	Pattern	Storm Rain	Loss rate(In./Hr)		Effective
	(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1	0.08	4.20	0.605	0.078	---	0.53
2	0.17	4.30	0.619	0.078	---	0.54
3	0.25	5.00	0.720	0.078	---	0.64
4	0.33	5.00	0.720	0.078	---	0.64
5	0.42	5.80	0.835	0.078	---	0.76
6	0.50	6.50	0.936	0.078	---	0.86
7	0.58	7.40	1.066	0.078	---	0.99
8	0.67	8.60	1.238	0.078	---	1.16
9	0.75	12.30	1.771	0.078	---	1.69
10	0.83	29.10	4.190	0.078	---	4.11
11	0.92	6.80	0.979	0.078	---	0.90
12	1.00	5.00	0.720	0.078	---	0.64
Sum =		100.0			Sum =	13.5

Flood volume = Effective rainfall 1.12(In)
 times area 6.3(Ac.)/[(In)/(Ft.)] = 0.6(Ac.Ft)
 Total soil loss = 0.08(In)
 Total soil loss = 0.041(Ac.Ft)
 Total rainfall = 1.20(In)

Flood volume = 25657.5 Cubic Feet
 Total soil loss = 1783.8 Cubic Feet

Peak flow rate of this hydrograph = 9.260(CFS)

+++++

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0006	0.08	Q					
0+10	0.0030	0.36	VQ					
0+15	0.0090	0.87	V Q					
0+20	0.0196	1.54	V Q					
0+25	0.0345	2.17	V Q					
0+30	0.0529	2.68	V Q					
0+35	0.0746	3.15	V Q					
0+40	0.0999	3.67	V Q					
0+45	0.1298	4.34	V Q					
0+50	0.1682	5.57	V Q					
0+55	0.2188	7.35	V Q					
1+ 0	0.2801	8.89	V Q					
1+ 5	0.3438	9.26	V Q					
1+10	0.3975	7.79	V Q					
1+15	0.4360	5.59	V Q					
1+20	0.4628	3.90	V Q					
1+25	0.4821	2.81	V Q					
1+30	0.4974	2.21	V Q					
1+35	0.5099	1.82	V Q					
1+40	0.5205	1.55	V Q					
1+45	0.5296	1.31	V Q					
1+50	0.5373	1.13	V Q					
1+55	0.5442	0.99	V Q					
2+ 0	0.5500	0.85	V Q					
2+ 5	0.5552	0.75	V Q					
2+10	0.5596	0.64	V Q					
2+15	0.5637	0.59	V Q					
2+20	0.5673	0.53	V Q					
2+25	0.5706	0.48	V Q					
2+30	0.5735	0.42	V Q					
2+35	0.5761	0.38	V Q					
2+40	0.5784	0.33	V Q					
2+45	0.5804	0.29	V Q					
2+50	0.5821	0.25	V Q					
2+55	0.5836	0.22	V Q					
3+ 0	0.5849	0.18	V Q					
3+ 5	0.5860	0.16	V Q					
3+10	0.5870	0.15	V Q					
3+15	0.5879	0.13	V Q					
3+20	0.5887	0.12	V Q					
3+25	0.5889	0.03	V Q					
3+30	0.5890	0.01	V Q					

Unit Hydrograph Analysis

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6145

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Chartwell - Rider at Redlands Ind
100 YEAR STORM EVENT - EXISTING CONDITION
UNIT HYDROGRAPH STUDY - 3 HR
2997UNIHDE

Drainage Area = 6.30(Ac.) = 0.010 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.30(Ac.) = 0.010 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.321 Hr.
Lag time = 19.28 Min.
25% of lag time = 4.82 Min.
40% of lag time = 7.71 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.30	0.78	4.91

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.30	1.90	11.97

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.780(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.300	85.00	0.000
Total Area Entered = 6.30(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.)	(In/Hr)	(Dec.)	(In/Hr)
85.0	94.0	0.078	0.000	0.078	1.000	0.078
Sum (F) =						0.078

Area averaged mean soil loss (F) (In/Hr) = 0.078
 Minimum soil loss rate ((In/Hr)) = 0.039
 (for 24 hour storm duration)
 Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
 VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	25.931	2.403
2	0.167	51.863	8.160
3	0.250	77.794	14.542
4	0.333	103.726	18.191
5	0.417	129.657	14.974
6	0.500	155.589	9.097
7	0.583	181.520	5.757
8	0.667	207.452	4.030
9	0.750	233.383	3.269
10	0.833	259.315	2.692
11	0.917	285.246	2.313
12	1.000	311.177	1.914
13	1.083	337.109	1.606
14	1.167	363.040	1.503
15	1.250	388.972	1.192
16	1.333	414.903	1.090
17	1.417	440.835	0.858
18	1.500	466.766	0.819
19	1.583	492.698	0.781
20	1.667	518.629	0.724
21	1.750	544.561	0.579
22	1.833	570.492	0.538
23	1.917	596.424	0.469
24	2.000	622.355	0.428
25	2.083	648.286	0.364
26	2.167	674.218	0.318
27	2.250	700.149	0.260
28	2.333	726.081	0.259
29	2.417	752.012	0.259
30	2.500	777.944	0.259
31	2.583	803.875	0.350
		Sum = 100.000	Sum= 6.349

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max Low	Effective (In/Hr)
1	0.08	1.30	0.296	0.078 ---	0.22
2	0.17	1.30	0.296	0.078 ---	0.22
3	0.25	1.10	0.251	0.078 ---	0.17
4	0.33	1.50	0.342	0.078 ---	0.26
5	0.42	1.50	0.342	0.078 ---	0.26
6	0.50	1.80	0.410	0.078 ---	0.33
7	0.58	1.50	0.342	0.078 ---	0.26
8	0.67	1.80	0.410	0.078 ---	0.33
9	0.75	1.80	0.410	0.078 ---	0.33
10	0.83	1.50	0.342	0.078 ---	0.26
11	0.92	1.60	0.365	0.078 ---	0.29
12	1.00	1.80	0.410	0.078 ---	0.33
13	1.08	2.20	0.502	0.078 ---	0.42
14	1.17	2.20	0.502	0.078 ---	0.42
15	1.25	2.20	0.502	0.078 ---	0.42
16	1.33	2.00	0.456	0.078 ---	0.38
17	1.42	2.60	0.593	0.078 ---	0.51
18	1.50	2.70	0.616	0.078 ---	0.54
19	1.58	2.40	0.547	0.078 ---	0.47
20	1.67	2.70	0.616	0.078 ---	0.54

21	1.75	3.30	0.752	0.078	---	0.67
22	1.83	3.10	0.707	0.078	---	0.63
23	1.92	2.90	0.661	0.078	---	0.58
24	2.00	3.00	0.684	0.078	---	0.61
25	2.08	3.10	0.707	0.078	---	0.63
26	2.17	4.20	0.958	0.078	---	0.88
27	2.25	5.00	1.140	0.078	---	1.06
28	2.33	3.50	0.798	0.078	---	0.72
29	2.42	6.80	1.550	0.078	---	1.47
30	2.50	7.30	1.664	0.078	---	1.59
31	2.58	8.20	1.870	0.078	---	1.79
32	2.67	5.90	1.345	0.078	---	1.27
33	2.75	2.00	0.456	0.078	---	0.38
34	2.83	1.80	0.410	0.078	---	0.33
35	2.92	1.80	0.410	0.078	---	0.33
36	3.00	0.60	0.137	0.078	---	0.06

Sum = 100.0

Sum = 20.0

Flood volume = Effective rainfall 1.67(In)
times area 6.3(Ac.)/[(In)/(Ft.)) = 0.9(Ac.Ft)
Total soil loss = 0.23(In)
Total soil loss = 0.123(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 38098.6 Cubic Feet
Total soil loss = 5351.3 Cubic Feet

Peak flow rate of this hydrograph = 7.390(CFS)

+++++

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0002	0.03	Q				
0+10	0.0012	0.15	Q				
0+15	0.0036	0.34	VQ				
0+20	0.0076	0.58	V Q				
0+25	0.0131	0.80	V Q				
0+30	0.0197	0.97	V Q				
0+35	0.0275	1.13	V Q				
0+40	0.0364	1.29	V Q				
0+45	0.0462	1.42	V Q				
0+50	0.0566	1.52	V Q				
0+55	0.0675	1.58	V Q				
1+ 0	0.0787	1.63	V Q				
1+ 5	0.0903	1.67	V Q				
1+10	0.1025	1.77	V Q				
1+15	0.1157	1.93	V Q				
1+20	0.1302	2.09	V Q				
1+25	0.1454	2.22	V Q				
1+30	0.1615	2.34	V Q				
1+35	0.1786	2.47	VQ				
1+40	0.1967	2.63	V Q				
1+45	0.2159	2.79	V Q				
1+50	0.2362	2.95	VQ				
1+55	0.2579	3.14	VQ				
2+ 0	0.2808	3.32	VQ				
2+ 5	0.3044	3.44	Q				
2+10	0.3288	3.54	QV				
2+15	0.3547	3.76	QV				
2+20	0.3830	4.11	QV				
2+25	0.4144	4.56	Q				
2+30	0.4499	5.15	Q				
2+35	0.4905	5.90	VQ				
2+40	0.5374	6.80	V Q				
2+45	0.5883	7.39	V Q				
2+50	0.6380	7.21	QV				
2+55	0.6814	6.31	Q				

3+ 0	0.7164	5.07			Q		V	
3+ 5	0.7438	3.99			Q		V	
3+10	0.7657	3.17			Q		V	
3+15	0.7829	2.50			Q		V	
3+20	0.7964	1.97			Q		V	
3+25	0.8075	1.60			Q		V	
3+30	0.8167	1.34			Q		V	
3+35	0.8246	1.15			Q		V	
3+40	0.8315	0.99			Q		V	
3+45	0.8374	0.86			Q		V	
3+50	0.8425	0.74			Q		V	
3+55	0.8470	0.65			Q		V	
4+ 0	0.8510	0.58			Q		V	
4+ 5	0.8546	0.51			Q		V	
4+10	0.8577	0.46			Q		V	
4+15	0.8604	0.40			Q		V	
4+20	0.8628	0.35			Q		V	
4+25	0.8649	0.30			Q		V	
4+30	0.8667	0.26			Q		V	
4+35	0.8683	0.23			Q		V	
4+40	0.8697	0.20			Q		V	
4+45	0.8708	0.17			Q		V	
4+50	0.8718	0.14			Q		V	
4+55	0.8727	0.13			Q		V	
5+ 0	0.8735	0.11			Q		V	
5+ 5	0.8740	0.08			Q		V	
5+10	0.8743	0.05			Q		V	
5+15	0.8745	0.02			Q		V	
5+20	0.8746	0.01			Q		V	
5+25	0.8746	0.01			Q		V	
5+30	0.8746	0.00			Q		V	

Unit Hydrograph Analysis

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Study date 01/26/21 File: 2997UNIHDE6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6145

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Chartwell - Rider at Redlands Ind
100 YEAR STORM EVENT - EXISTING CONDITION
UNIT HYDROGRAPH STUDY - 6 HR
2997UNIHDE

Drainage Area = 6.30(Ac.) = 0.010 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.30(Ac.) = 0.010 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.321 Hr.
Lag time = 19.28 Min.
25% of lag time = 4.82 Min.
40% of lag time = 7.71 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.30	1.00	6.30

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.30	2.45	15.44

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.000(In)
Area Averaged 100-Year Rainfall = 2.450(In)

Point rain (area averaged) = 2.450(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.450(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.300	85.00	0.000
Total Area Entered = 6.30(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.)	(In/Hr)	(Dec.)	(In/Hr)
85.0	94.0	0.078	0.000	0.078	1.000	0.078
Sum (F) =						0.078

Area averaged mean soil loss (F) (In/Hr) = 0.078
 Minimum soil loss rate ((In/Hr)) = 0.039
 (for 24 hour storm duration)
 Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
 VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	25.931	2.403
2	0.167	51.863	8.160
3	0.250	77.794	14.542
4	0.333	103.726	18.191
5	0.417	129.657	14.974
6	0.500	155.589	9.097
7	0.583	181.520	5.757
8	0.667	207.452	4.030
9	0.750	233.383	3.269
10	0.833	259.315	2.692
11	0.917	285.246	2.313
12	1.000	311.177	1.914
13	1.083	337.109	1.606
14	1.167	363.040	1.503
15	1.250	388.972	1.192
16	1.333	414.903	1.090
17	1.417	440.835	0.858
18	1.500	466.766	0.819
19	1.583	492.698	0.781
20	1.667	518.629	0.724
21	1.750	544.561	0.579
22	1.833	570.492	0.538
23	1.917	596.424	0.469
24	2.000	622.355	0.428
25	2.083	648.286	0.364
26	2.167	674.218	0.318
27	2.250	700.149	0.260
28	2.333	726.081	0.259
29	2.417	752.012	0.259
30	2.500	777.944	0.259
31	2.583	803.875	0.350
		Sum = 100.000	Sum= 6.349

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)	Effective
(Hr.)	Percent	(In/Hr)	Max Low	(In/Hr)
1	0.08	0.50	0.147	0.07
2	0.17	0.60	0.176	0.10
3	0.25	0.60	0.176	0.10
4	0.33	0.60	0.176	0.10
5	0.42	0.60	0.176	0.10
6	0.50	0.70	0.206	0.13
7	0.58	0.70	0.206	0.13
8	0.67	0.70	0.206	0.13
9	0.75	0.70	0.206	0.13
10	0.83	0.70	0.206	0.13
11	0.92	0.70	0.206	0.13
12	1.00	0.80	0.235	0.16
13	1.08	0.80	0.235	0.16
14	1.17	0.80	0.235	0.16
15	1.25	0.80	0.235	0.16
16	1.33	0.80	0.235	0.16
17	1.42	0.80	0.235	0.16
18	1.50	0.80	0.235	0.16
19	1.58	0.80	0.235	0.16
20	1.67	0.80	0.235	0.16

21	1.75	0.80	0.235	0.078	---	0.16
22	1.83	0.80	0.235	0.078	---	0.16
23	1.92	0.80	0.235	0.078	---	0.16
24	2.00	0.90	0.265	0.078	---	0.19
25	2.08	0.80	0.235	0.078	---	0.16
26	2.17	0.90	0.265	0.078	---	0.19
27	2.25	0.90	0.265	0.078	---	0.19
28	2.33	0.90	0.265	0.078	---	0.19
29	2.42	0.90	0.265	0.078	---	0.19
30	2.50	0.90	0.265	0.078	---	0.19
31	2.58	0.90	0.265	0.078	---	0.19
32	2.67	0.90	0.265	0.078	---	0.19
33	2.75	1.00	0.294	0.078	---	0.22
34	2.83	1.00	0.294	0.078	---	0.22
35	2.92	1.00	0.294	0.078	---	0.22
36	3.00	1.00	0.294	0.078	---	0.22
37	3.08	1.00	0.294	0.078	---	0.22
38	3.17	1.10	0.323	0.078	---	0.25
39	3.25	1.10	0.323	0.078	---	0.25
40	3.33	1.10	0.323	0.078	---	0.25
41	3.42	1.20	0.353	0.078	---	0.27
42	3.50	1.30	0.382	0.078	---	0.30
43	3.58	1.40	0.412	0.078	---	0.33
44	3.67	1.40	0.412	0.078	---	0.33
45	3.75	1.50	0.441	0.078	---	0.36
46	3.83	1.50	0.441	0.078	---	0.36
47	3.92	1.60	0.470	0.078	---	0.39
48	4.00	1.60	0.470	0.078	---	0.39
49	4.08	1.70	0.500	0.078	---	0.42
50	4.17	1.80	0.529	0.078	---	0.45
51	4.25	1.90	0.559	0.078	---	0.48
52	4.33	2.00	0.588	0.078	---	0.51
53	4.42	2.10	0.617	0.078	---	0.54
54	4.50	2.10	0.617	0.078	---	0.54
55	4.58	2.20	0.647	0.078	---	0.57
56	4.67	2.30	0.676	0.078	---	0.60
57	4.75	2.40	0.706	0.078	---	0.63
58	4.83	2.40	0.706	0.078	---	0.63
59	4.92	2.50	0.735	0.078	---	0.66
60	5.00	2.60	0.764	0.078	---	0.69
61	5.08	3.10	0.911	0.078	---	0.83
62	5.17	3.60	1.058	0.078	---	0.98
63	5.25	3.90	1.147	0.078	---	1.07
64	5.33	4.20	1.235	0.078	---	1.16
65	5.42	4.70	1.382	0.078	---	1.30
66	5.50	5.60	1.646	0.078	---	1.57
67	5.58	1.90	0.559	0.078	---	0.48
68	5.67	0.90	0.265	0.078	---	0.19
69	5.75	0.60	0.176	0.078	---	0.10
70	5.83	0.50	0.147	0.078	---	0.07
71	5.92	0.30	0.088	0.078	---	0.01
72	6.00	0.20	0.059	0.078	0.053	0.01

Sum = 100.0 Sum = 23.8

Flood volume = Effective rainfall 1.98(In)
times area 6.3(Ac.)/[(In)/(Ft.)] = 1.0(Ac.Ft)
Total soil loss = 0.47(In)
Total soil loss = 0.245(Ac.Ft)
Total rainfall = 2.45(In)
Flood volume = 45372.9 Cubic Feet
Total soil loss = 10654.9 Cubic Feet

Peak flow rate of this hydrograph = 6.320(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m) Volume Ac.Ft Q(CFS) 0 2.5 5.0 7.5 10.0

0+ 5	0.0001	0.01	Q				
0+10	0.0004	0.05	Q				
0+15	0.0013	0.13	Q				
0+20	0.0029	0.24	Q				
0+25	0.0053	0.34	VQ				
0+30	0.0081	0.41	VQ				
0+35	0.0113	0.47	VQ				
0+40	0.0149	0.52	V Q				
0+45	0.0189	0.58	V Q				
0+50	0.0231	0.62	V Q				
0+55	0.0277	0.66	VQ				
1+ 0	0.0324	0.68	VQ				
1+ 5	0.0373	0.72	VQ				
1+10	0.0425	0.76	V Q				
1+15	0.0481	0.81	V Q				
1+20	0.0539	0.85	VQ				
1+25	0.0599	0.87	VQ				
1+30	0.0661	0.89	VQ				
1+35	0.0723	0.91	VQ				
1+40	0.0786	0.92	Q				
1+45	0.0850	0.93	Q				
1+50	0.0915	0.94	Q				
1+55	0.0981	0.95	Q				
2+ 0	0.1047	0.96	QV				
2+ 5	0.1114	0.98	QV				
2+10	0.1183	1.00	QV				
2+15	0.1253	1.03	Q				
2+20	0.1326	1.05	QV				
2+25	0.1400	1.08	QV				
2+30	0.1476	1.10	QV				
2+35	0.1553	1.12	QV				
2+40	0.1631	1.13	Q V				
2+45	0.1710	1.15	Q V				
2+50	0.1790	1.17	Q V				
2+55	0.1873	1.20	Q V				
3+ 0	0.1958	1.24	Q V				
3+ 5	0.2046	1.27	Q V				
3+10	0.2135	1.30	Q V				
3+15	0.2226	1.32	Q V				
3+20	0.2320	1.36	Q V				
3+25	0.2417	1.41	Q V				
3+30	0.2518	1.46	Q V				
3+35	0.2623	1.53	Q V				
3+40	0.2735	1.62	Q V				
3+45	0.2854	1.73	Q V				
3+50	0.2981	1.83	Q V				
3+55	0.3113	1.93	Q V				
4+ 0	0.3253	2.02	Q V				
4+ 5	0.3398	2.11	Q V				
4+10	0.3550	2.21	Q V				
4+15	0.3709	2.31	Q V				
4+20	0.3877	2.43	Q V				
4+25	0.4054	2.57	Q V				
4+30	0.4241	2.72	Q V				
4+35	0.4439	2.86	Q V				
4+40	0.4645	3.00	Q V				
4+45	0.4861	3.13	Q V				
4+50	0.5085	3.27	Q V				
4+55	0.5320	3.40	Q V				
5+ 0	0.5564	3.54	Q V				
5+ 5	0.5818	3.69	Q V				
5+10	0.6087	3.91	Q V				
5+15	0.6380	4.25	Q V				
5+20	0.6703	4.70	Q V				
5+25	0.7063	5.22	Q V				
5+30	0.7461	5.79	Q V				
5+35	0.7892	6.26	Q V				
5+40	0.8327	6.32	Q V				
5+45	0.8725	5.77	Q				
5+50	0.9046	4.67	Q				

5+55	0.9288	3.50						V
6+ 0	0.9471	2.66						V
6+ 5	0.9615	2.09						V
6+10	0.9732	1.70						V
6+15	0.9828	1.40						V
6+20	0.9910	1.18						V
6+25	0.9979	1.01						V
6+30	1.0039	0.87						V
6+35	1.0092	0.76						V
6+40	1.0137	0.66						V
6+45	1.0177	0.58						V
6+50	1.0211	0.50						V
6+55	1.0242	0.45						V
7+ 0	1.0270	0.40						V
7+ 5	1.0294	0.35						V
7+10	1.0315	0.30						V
7+15	1.0333	0.26						V
7+20	1.0349	0.23						V
7+25	1.0362	0.20						V
7+30	1.0374	0.17						V
7+35	1.0384	0.15						V
7+40	1.0393	0.13						V
7+45	1.0400	0.11						V
7+50	1.0406	0.09						V
7+55	1.0411	0.07						V
8+ 0	1.0414	0.05						V
8+ 5	1.0415	0.02						V
8+10	1.0416	0.01						V
8+15	1.0416	0.00						V
8+20	1.0416	0.00						V
8+25	1.0416	0.00						V
8+30	1.0416	0.00						V

Unit Hydrograph Analysis

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Study date 01/26/21 File: 2997UNIHDE24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6145

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Chartwell - Rider at Redlands Ind
100 YEAR STORM EVENT - EXISTING CONDITION
UNIT HYDROGRAPH STUDY - 24 HR
2997UNIHDE

Drainage Area = 6.30 (Ac.) = 0.010 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.30 (Ac.) = 0.010
Sq. Mi.

USER Entry of lag time in hours
Lag time = 0.321 Hr.
Lag time = 19.28 Min.
25% of lag time = 4.82 Min.
40% of lag time = 7.71 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00 (CFS)

2 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
6.30	1.65	10.40

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
6.30	4.25	26.77

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.650 (In)
Area Averaged 100-Year Rainfall = 4.250 (In)

Point rain (area averaged) = 4.250 (In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.250 (In)

Sub-Area Data:

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
85.0	94.0	0.078	0.000	0.078	1.000	0.078
					Sum (F) =	0.078
Area averaged mean soil loss (F) (In/Hr) = 0.078						
Minimum soil loss rate ((In/Hr)) = 0.039						
(for 24 hour storm duration)						
Soil low loss rate (decimal) = 0.900						

Unit Hydrograph Data

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate (In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.08	0.07	0.034	0.138	0.031	0.00
2	0.17	0.07	0.034	0.138	0.031	0.00
3	0.25	0.07	0.034	0.137	0.031	0.00

4	0.33	0.10	0.051	0.137	0.046	0.01
5	0.42	0.10	0.051	0.136	0.046	0.01
6	0.50	0.10	0.051	0.136	0.046	0.01
7	0.58	0.10	0.051	0.135	0.046	0.01
8	0.67	0.10	0.051	0.135	0.046	0.01
9	0.75	0.10	0.051	0.134	0.046	0.01
10	0.83	0.13	0.068	0.133	0.061	0.01
11	0.92	0.13	0.068	0.133	0.061	0.01
12	1.00	0.13	0.068	0.132	0.061	0.01
13	1.08	0.10	0.051	0.132	0.046	0.01
14	1.17	0.10	0.051	0.131	0.046	0.01
15	1.25	0.10	0.051	0.131	0.046	0.01
16	1.33	0.10	0.051	0.130	0.046	0.01
17	1.42	0.10	0.051	0.130	0.046	0.01
18	1.50	0.10	0.051	0.129	0.046	0.01
19	1.58	0.10	0.051	0.129	0.046	0.01
20	1.67	0.10	0.051	0.128	0.046	0.01
21	1.75	0.10	0.051	0.128	0.046	0.01
22	1.83	0.13	0.068	0.127	0.061	0.01
23	1.92	0.13	0.068	0.127	0.061	0.01
24	2.00	0.13	0.068	0.126	0.061	0.01
25	2.08	0.13	0.068	0.126	0.061	0.01
26	2.17	0.13	0.068	0.125	0.061	0.01
27	2.25	0.13	0.068	0.125	0.061	0.01
28	2.33	0.13	0.068	0.124	0.061	0.01
29	2.42	0.13	0.068	0.124	0.061	0.01
30	2.50	0.13	0.068	0.123	0.061	0.01
31	2.58	0.17	0.085	0.123	0.076	0.01
32	2.67	0.17	0.085	0.122	0.076	0.01
33	2.75	0.17	0.085	0.122	0.076	0.01
34	2.83	0.17	0.085	0.121	0.076	0.01
35	2.92	0.17	0.085	0.121	0.076	0.01
36	3.00	0.17	0.085	0.120	0.076	0.01
37	3.08	0.17	0.085	0.120	0.076	0.01
38	3.17	0.17	0.085	0.119	0.076	0.01
39	3.25	0.17	0.085	0.119	0.076	0.01
40	3.33	0.17	0.085	0.118	0.076	0.01
41	3.42	0.17	0.085	0.118	0.076	0.01
42	3.50	0.17	0.085	0.117	0.076	0.01
43	3.58	0.17	0.085	0.117	0.076	0.01
44	3.67	0.17	0.085	0.116	0.076	0.01
45	3.75	0.17	0.085	0.116	0.076	0.01
46	3.83	0.20	0.102	0.115	0.092	0.01
47	3.92	0.20	0.102	0.115	0.092	0.01
48	4.00	0.20	0.102	0.114	0.092	0.01
49	4.08	0.20	0.102	0.114	0.092	0.01
50	4.17	0.20	0.102	0.113	0.092	0.01
51	4.25	0.20	0.102	0.113	0.092	0.01
52	4.33	0.23	0.119	0.112	---	0.01
53	4.42	0.23	0.119	0.112	---	0.01
54	4.50	0.23	0.119	0.111	---	0.01
55	4.58	0.23	0.119	0.111	---	0.01
56	4.67	0.23	0.119	0.110	---	0.01
57	4.75	0.23	0.119	0.110	---	0.01
58	4.83	0.27	0.136	0.109	---	0.03
59	4.92	0.27	0.136	0.109	---	0.03
60	5.00	0.27	0.136	0.109	---	0.03
61	5.08	0.20	0.102	0.108	0.092	0.01
62	5.17	0.20	0.102	0.108	0.092	0.01
63	5.25	0.20	0.102	0.107	0.092	0.01
64	5.33	0.23	0.119	0.107	---	0.01
65	5.42	0.23	0.119	0.106	---	0.01
66	5.50	0.23	0.119	0.106	---	0.01

67	5.58	0.27	0.136	0.105	---	0.03
68	5.67	0.27	0.136	0.105	---	0.03
69	5.75	0.27	0.136	0.104	---	0.03
70	5.83	0.27	0.136	0.104	---	0.03
71	5.92	0.27	0.136	0.103	---	0.03
72	6.00	0.27	0.136	0.103	---	0.03
73	6.08	0.30	0.153	0.103	---	0.05
74	6.17	0.30	0.153	0.102	---	0.05
75	6.25	0.30	0.153	0.102	---	0.05
76	6.33	0.30	0.153	0.101	---	0.05
77	6.42	0.30	0.153	0.101	---	0.05
78	6.50	0.30	0.153	0.100	---	0.05
79	6.58	0.33	0.170	0.100	---	0.07
80	6.67	0.33	0.170	0.099	---	0.07
81	6.75	0.33	0.170	0.099	---	0.07
82	6.83	0.33	0.170	0.098	---	0.07
83	6.92	0.33	0.170	0.098	---	0.07
84	7.00	0.33	0.170	0.098	---	0.07
85	7.08	0.33	0.170	0.097	---	0.07
86	7.17	0.33	0.170	0.097	---	0.07
87	7.25	0.33	0.170	0.096	---	0.07
88	7.33	0.37	0.187	0.096	---	0.09
89	7.42	0.37	0.187	0.095	---	0.09
90	7.50	0.37	0.187	0.095	---	0.09
91	7.58	0.40	0.204	0.094	---	0.11
92	7.67	0.40	0.204	0.094	---	0.11
93	7.75	0.40	0.204	0.094	---	0.11
94	7.83	0.43	0.221	0.093	---	0.13
95	7.92	0.43	0.221	0.093	---	0.13
96	8.00	0.43	0.221	0.092	---	0.13
97	8.08	0.50	0.255	0.092	---	0.16
98	8.17	0.50	0.255	0.091	---	0.16
99	8.25	0.50	0.255	0.091	---	0.16
100	8.33	0.50	0.255	0.091	---	0.16
101	8.42	0.50	0.255	0.090	---	0.16
102	8.50	0.50	0.255	0.090	---	0.17
103	8.58	0.53	0.272	0.089	---	0.18
104	8.67	0.53	0.272	0.089	---	0.18
105	8.75	0.53	0.272	0.088	---	0.18
106	8.83	0.57	0.289	0.088	---	0.20
107	8.92	0.57	0.289	0.088	---	0.20
108	9.00	0.57	0.289	0.087	---	0.20
109	9.08	0.63	0.323	0.087	---	0.24
110	9.17	0.63	0.323	0.086	---	0.24
111	9.25	0.63	0.323	0.086	---	0.24
112	9.33	0.67	0.340	0.086	---	0.25
113	9.42	0.67	0.340	0.085	---	0.25
114	9.50	0.67	0.340	0.085	---	0.26
115	9.58	0.70	0.357	0.084	---	0.27
116	9.67	0.70	0.357	0.084	---	0.27
117	9.75	0.70	0.357	0.084	---	0.27
118	9.83	0.73	0.374	0.083	---	0.29
119	9.92	0.73	0.374	0.083	---	0.29
120	10.00	0.73	0.374	0.082	---	0.29
121	10.08	0.50	0.255	0.082	---	0.17
122	10.17	0.50	0.255	0.082	---	0.17
123	10.25	0.50	0.255	0.081	---	0.17
124	10.33	0.50	0.255	0.081	---	0.17
125	10.42	0.50	0.255	0.080	---	0.17
126	10.50	0.50	0.255	0.080	---	0.17
127	10.58	0.67	0.340	0.080	---	0.26
128	10.67	0.67	0.340	0.079	---	0.26
129	10.75	0.67	0.340	0.079	---	0.26

130	10.83	0.67	0.340	0.078	---	0.26
131	10.92	0.67	0.340	0.078	---	0.26
132	11.00	0.67	0.340	0.078	---	0.26
133	11.08	0.63	0.323	0.077	---	0.25
134	11.17	0.63	0.323	0.077	---	0.25
135	11.25	0.63	0.323	0.077	---	0.25
136	11.33	0.63	0.323	0.076	---	0.25
137	11.42	0.63	0.323	0.076	---	0.25
138	11.50	0.63	0.323	0.075	---	0.25
139	11.58	0.57	0.289	0.075	---	0.21
140	11.67	0.57	0.289	0.075	---	0.21
141	11.75	0.57	0.289	0.074	---	0.21
142	11.83	0.60	0.306	0.074	---	0.23
143	11.92	0.60	0.306	0.074	---	0.23
144	12.00	0.60	0.306	0.073	---	0.23
145	12.08	0.83	0.425	0.073	---	0.35
146	12.17	0.83	0.425	0.072	---	0.35
147	12.25	0.83	0.425	0.072	---	0.35
148	12.33	0.87	0.442	0.072	---	0.37
149	12.42	0.87	0.442	0.071	---	0.37
150	12.50	0.87	0.442	0.071	---	0.37
151	12.58	0.93	0.476	0.071	---	0.41
152	12.67	0.93	0.476	0.070	---	0.41
153	12.75	0.93	0.476	0.070	---	0.41
154	12.83	0.97	0.493	0.070	---	0.42
155	12.92	0.97	0.493	0.069	---	0.42
156	13.00	0.97	0.493	0.069	---	0.42
157	13.08	1.13	0.578	0.069	---	0.51
158	13.17	1.13	0.578	0.068	---	0.51
159	13.25	1.13	0.578	0.068	---	0.51
160	13.33	1.13	0.578	0.067	---	0.51
161	13.42	1.13	0.578	0.067	---	0.51
162	13.50	1.13	0.578	0.067	---	0.51
163	13.58	0.77	0.391	0.066	---	0.32
164	13.67	0.77	0.391	0.066	---	0.32
165	13.75	0.77	0.391	0.066	---	0.33
166	13.83	0.77	0.391	0.065	---	0.33
167	13.92	0.77	0.391	0.065	---	0.33
168	14.00	0.77	0.391	0.065	---	0.33
169	14.08	0.90	0.459	0.064	---	0.39
170	14.17	0.90	0.459	0.064	---	0.39
171	14.25	0.90	0.459	0.064	---	0.40
172	14.33	0.87	0.442	0.063	---	0.38
173	14.42	0.87	0.442	0.063	---	0.38
174	14.50	0.87	0.442	0.063	---	0.38
175	14.58	0.87	0.442	0.063	---	0.38
176	14.67	0.87	0.442	0.062	---	0.38
177	14.75	0.87	0.442	0.062	---	0.38
178	14.83	0.83	0.425	0.062	---	0.36
179	14.92	0.83	0.425	0.061	---	0.36
180	15.00	0.83	0.425	0.061	---	0.36
181	15.08	0.80	0.408	0.061	---	0.35
182	15.17	0.80	0.408	0.060	---	0.35
183	15.25	0.80	0.408	0.060	---	0.35
184	15.33	0.77	0.391	0.060	---	0.33
185	15.42	0.77	0.391	0.059	---	0.33
186	15.50	0.77	0.391	0.059	---	0.33
187	15.58	0.63	0.323	0.059	---	0.26
188	15.67	0.63	0.323	0.058	---	0.26
189	15.75	0.63	0.323	0.058	---	0.26
190	15.83	0.63	0.323	0.058	---	0.27
191	15.92	0.63	0.323	0.058	---	0.27
192	16.00	0.63	0.323	0.057	---	0.27

193	16.08	0.13	0.068	0.057	---	0.01
194	16.17	0.13	0.068	0.057	---	0.01
195	16.25	0.13	0.068	0.056	---	0.01
196	16.33	0.13	0.068	0.056	---	0.01
197	16.42	0.13	0.068	0.056	---	0.01
198	16.50	0.13	0.068	0.056	---	0.01
199	16.58	0.10	0.051	0.055	0.046	0.01
200	16.67	0.10	0.051	0.055	0.046	0.01
201	16.75	0.10	0.051	0.055	0.046	0.01
202	16.83	0.10	0.051	0.054	0.046	0.01
203	16.92	0.10	0.051	0.054	0.046	0.01
204	17.00	0.10	0.051	0.054	0.046	0.01
205	17.08	0.17	0.085	0.054	---	0.03
206	17.17	0.17	0.085	0.053	---	0.03
207	17.25	0.17	0.085	0.053	---	0.03
208	17.33	0.17	0.085	0.053	---	0.03
209	17.42	0.17	0.085	0.053	---	0.03
210	17.50	0.17	0.085	0.052	---	0.03
211	17.58	0.17	0.085	0.052	---	0.03
212	17.67	0.17	0.085	0.052	---	0.03
213	17.75	0.17	0.085	0.051	---	0.03
214	17.83	0.13	0.068	0.051	---	0.02
215	17.92	0.13	0.068	0.051	---	0.02
216	18.00	0.13	0.068	0.051	---	0.02
217	18.08	0.13	0.068	0.050	---	0.02
218	18.17	0.13	0.068	0.050	---	0.02
219	18.25	0.13	0.068	0.050	---	0.02
220	18.33	0.13	0.068	0.050	---	0.02
221	18.42	0.13	0.068	0.050	---	0.02
222	18.50	0.13	0.068	0.049	---	0.02
223	18.58	0.10	0.051	0.049	---	0.00
224	18.67	0.10	0.051	0.049	---	0.00
225	18.75	0.10	0.051	0.049	---	0.00
226	18.83	0.07	0.034	0.048	0.031	0.00
227	18.92	0.07	0.034	0.048	0.031	0.00
228	19.00	0.07	0.034	0.048	0.031	0.00
229	19.08	0.10	0.051	0.048	---	0.00
230	19.17	0.10	0.051	0.047	---	0.00
231	19.25	0.10	0.051	0.047	---	0.00
232	19.33	0.13	0.068	0.047	---	0.02
233	19.42	0.13	0.068	0.047	---	0.02
234	19.50	0.13	0.068	0.047	---	0.02
235	19.58	0.10	0.051	0.046	---	0.00
236	19.67	0.10	0.051	0.046	---	0.00
237	19.75	0.10	0.051	0.046	---	0.01
238	19.83	0.07	0.034	0.046	0.031	0.00
239	19.92	0.07	0.034	0.045	0.031	0.00
240	20.00	0.07	0.034	0.045	0.031	0.00
241	20.08	0.10	0.051	0.045	---	0.01
242	20.17	0.10	0.051	0.045	---	0.01
243	20.25	0.10	0.051	0.045	---	0.01
244	20.33	0.10	0.051	0.045	---	0.01
245	20.42	0.10	0.051	0.044	---	0.01
246	20.50	0.10	0.051	0.044	---	0.01
247	20.58	0.10	0.051	0.044	---	0.01
248	20.67	0.10	0.051	0.044	---	0.01
249	20.75	0.10	0.051	0.044	---	0.01
250	20.83	0.07	0.034	0.043	0.031	0.00
251	20.92	0.07	0.034	0.043	0.031	0.00
252	21.00	0.07	0.034	0.043	0.031	0.00
253	21.08	0.10	0.051	0.043	---	0.01
254	21.17	0.10	0.051	0.043	---	0.01
255	21.25	0.10	0.051	0.043	---	0.01

256	21.33	0.07	0.034	0.042	0.031	0.00
257	21.42	0.07	0.034	0.042	0.031	0.00
258	21.50	0.07	0.034	0.042	0.031	0.00
259	21.58	0.10	0.051	0.042	---	0.01
260	21.67	0.10	0.051	0.042	---	0.01
261	21.75	0.10	0.051	0.042	---	0.01
262	21.83	0.07	0.034	0.041	0.031	0.00
263	21.92	0.07	0.034	0.041	0.031	0.00
264	22.00	0.07	0.034	0.041	0.031	0.00
265	22.08	0.10	0.051	0.041	---	0.01
266	22.17	0.10	0.051	0.041	---	0.01
267	22.25	0.10	0.051	0.041	---	0.01
268	22.33	0.07	0.034	0.041	0.031	0.00
269	22.42	0.07	0.034	0.041	0.031	0.00
270	22.50	0.07	0.034	0.040	0.031	0.00
271	22.58	0.07	0.034	0.040	0.031	0.00
272	22.67	0.07	0.034	0.040	0.031	0.00
273	22.75	0.07	0.034	0.040	0.031	0.00
274	22.83	0.07	0.034	0.040	0.031	0.00
275	22.92	0.07	0.034	0.040	0.031	0.00
276	23.00	0.07	0.034	0.040	0.031	0.00
277	23.08	0.07	0.034	0.040	0.031	0.00
278	23.17	0.07	0.034	0.040	0.031	0.00
279	23.25	0.07	0.034	0.040	0.031	0.00
280	23.33	0.07	0.034	0.039	0.031	0.00
281	23.42	0.07	0.034	0.039	0.031	0.00
282	23.50	0.07	0.034	0.039	0.031	0.00
283	23.58	0.07	0.034	0.039	0.031	0.00
284	23.67	0.07	0.034	0.039	0.031	0.00
285	23.75	0.07	0.034	0.039	0.031	0.00
286	23.83	0.07	0.034	0.039	0.031	0.00
287	23.92	0.07	0.034	0.039	0.031	0.00
288	24.00	0.07	0.034	0.039	0.031	0.00
Sum =		100.0			Sum =	32.2

Flood volume = Effective rainfall 2.68 (In)
 times area 6.3 (Ac.) / [(In) / (Ft.)] = 1.4 (Ac.Ft)
 Total soil loss = 1.57 (In)
 Total soil loss = 0.823 (Ac.Ft)
 Total rainfall = 4.25 (In)
 Flood volume = 61358.0 Cubic Feet
 Total soil loss = 35834.0 Cubic Feet

 Peak flow rate of this hydrograph = 2.977 (CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q				
0+10	0.0000	0.00	Q				
0+15	0.0001	0.01	Q				
0+20	0.0001	0.01	Q				
0+25	0.0002	0.01	Q				
0+30	0.0003	0.02	Q				
0+35	0.0005	0.02	Q				
0+40	0.0006	0.02	Q				
0+45	0.0008	0.02	Q				
0+50	0.0010	0.03	Q				

0+55	0.0012	0.03	Q
1+ 0	0.0014	0.03	Q
1+ 5	0.0016	0.03	Q
1+10	0.0018	0.03	Q
1+15	0.0021	0.03	Q
1+20	0.0023	0.03	Q
1+25	0.0025	0.03	Q
1+30	0.0027	0.03	Q
1+35	0.0030	0.03	Q
1+40	0.0032	0.03	Q
1+45	0.0034	0.03	Q
1+50	0.0036	0.03	Q
1+55	0.0038	0.03	Q
2+ 0	0.0041	0.03	Q
2+ 5	0.0043	0.04	Q
2+10	0.0046	0.04	Q
2+15	0.0049	0.04	Q
2+20	0.0052	0.04	Q
2+25	0.0054	0.04	Q
2+30	0.0057	0.04	Q
2+35	0.0060	0.04	Q
2+40	0.0063	0.04	Q
2+45	0.0066	0.04	Q
2+50	0.0069	0.05	Q
2+55	0.0073	0.05	Q
3+ 0	0.0076	0.05	Q
3+ 5	0.0080	0.05	Q
3+10	0.0083	0.05	Q
3+15	0.0087	0.05	Q
3+20	0.0090	0.05	Q
3+25	0.0094	0.05	Q
3+30	0.0097	0.05	Q
3+35	0.0101	0.05	Q
3+40	0.0105	0.05	Q
3+45	0.0108	0.05	Q
3+50	0.0112	0.05	Q
3+55	0.0116	0.05	Q
4+ 0	0.0119	0.06	Q
4+ 5	0.0123	0.06	Q
4+10	0.0128	0.06	Q
4+15	0.0132	0.06	Q
4+20	0.0136	0.06	Q
4+25	0.0140	0.06	Q
4+30	0.0144	0.06	Q
4+35	0.0148	0.05	Q
4+40	0.0151	0.05	Q
4+45	0.0155	0.05	Q
4+50	0.0159	0.06	Q
4+55	0.0163	0.07	Q
5+ 0	0.0169	0.08	Q
5+ 5	0.0176	0.10	Q
5+10	0.0184	0.11	Q
5+15	0.0191	0.11	Q
5+20	0.0198	0.09	Q
5+25	0.0204	0.08	Q
5+30	0.0209	0.08	Q
5+35	0.0215	0.08	Q
5+40	0.0221	0.09	Q
5+45	0.0229	0.11	Q
5+50	0.0238	0.13	Q
5+55	0.0249	0.15	Q
6+ 0	0.0260	0.16	Q
6+ 5	0.0272	0.17	Q

6+10	0.0285	0.19	Q				
6+15	0.0299	0.21	Q				
6+20	0.0316	0.24	Q				
6+25	0.0333	0.26	VQ				
6+30	0.0352	0.27	VQ				
6+35	0.0372	0.28	Q				
6+40	0.0392	0.30	Q				
6+45	0.0415	0.33	Q				
6+50	0.0439	0.35	Q				
6+55	0.0465	0.37	Q				
7+ 0	0.0492	0.39	Q				
7+ 5	0.0519	0.40	Q				
7+10	0.0548	0.41	Q				
7+15	0.0576	0.42	Q				
7+20	0.0606	0.43	Q				
7+25	0.0637	0.44	Q				
7+30	0.0669	0.47	Q				
7+35	0.0703	0.49	Q				
7+40	0.0739	0.52	Q				
7+45	0.0777	0.55	Q				
7+50	0.0818	0.59	Q				
7+55	0.0860	0.62	Q				
8+ 0	0.0906	0.66	Q				
8+ 5	0.0953	0.69	Q				
8+10	0.1004	0.74	Q				
8+15	0.1059	0.79	Q				
8+20	0.1117	0.84	Q				
8+25	0.1178	0.89	Q				
8+30	0.1241	0.92	Q				
8+35	0.1306	0.94	Q				
8+40	0.1372	0.97	Q				
8+45	0.1441	1.00	QV				
8+50	0.1512	1.03	Q				
8+55	0.1585	1.07	Q				
9+ 0	0.1661	1.10	Q				
9+ 5	0.1740	1.14	Q				
9+10	0.1822	1.19	QV				
9+15	0.1908	1.24	QV				
9+20	0.1997	1.30	Q				
9+25	0.2090	1.35	Q				
9+30	0.2187	1.40	QV				
9+35	0.2286	1.45	QV				
9+40	0.2389	1.49	QV				
9+45	0.2494	1.53	QV				
9+50	0.2602	1.57	QV				
9+55	0.2714	1.61	QV				
10+ 0	0.2827	1.65	Q V				
10+ 5	0.2942	1.67	Q V				
10+10	0.3056	1.64	Q V				
10+15	0.3163	1.55	Q V				
10+20	0.3261	1.44	Q V				
10+25	0.3354	1.34	Q V				
10+30	0.3442	1.28	Q V				
10+35	0.3529	1.26	Q V				
10+40	0.3617	1.29	Q V				
10+45	0.3710	1.35	Q V				
10+50	0.3809	1.43	Q V				
10+55	0.3913	1.51	Q V				
11+ 0	0.4019	1.55	Q V				
11+ 5	0.4127	1.57	Q V				
11+10	0.4236	1.58	Q V				
11+15	0.4344	1.57	Q V				
11+20	0.4452	1.57	Q V				

11+25	0.4560	1.56	Q	V		
11+30	0.4667	1.56	Q	V		
11+35	0.4774	1.56	Q	V		
11+40	0.4880	1.54	Q	V		
11+45	0.4984	1.51	Q	V		
11+50	0.5086	1.48	Q	V		
11+55	0.5186	1.45	Q	V		
12+ 0	0.5286	1.45	Q	V		
12+ 5	0.5388	1.48	Q	V		
12+10	0.5495	1.55	Q	V		
12+15	0.5610	1.67	Q	V		
12+20	0.5734	1.81	Q	V		
12+25	0.5868	1.93	Q	V		
12+30	0.6007	2.02	Q	V		
12+35	0.6151	2.09	Q	V		
12+40	0.6299	2.15	Q	V		
12+45	0.6452	2.22	Q	V		
12+50	0.6610	2.29	Q	V		
12+55	0.6773	2.36	Q	V		
13+ 0	0.6939	2.42	Q	V		
13+ 5	0.7110	2.48	Q	V		
13+10	0.7286	2.56	Q	V		
13+15	0.7470	2.67	Q	V		
13+20	0.7663	2.79	Q	V		
13+25	0.7862	2.89	Q	V		
13+30	0.8066	2.96	Q	V		
13+35	0.8271	2.98	Q	V		
13+40	0.8472	2.92	Q	V		
13+45	0.8663	2.77	Q	V		
13+50	0.8841	2.58	Q	V		
13+55	0.9008	2.43	Q	V		
14+ 0	0.9169	2.34	Q	V		
14+ 5	0.9327	2.30	Q	V		
14+10	0.9485	2.30	Q	V		
14+15	0.9646	2.34	Q	V		
14+20	0.9811	2.39	Q	V		
14+25	0.9979	2.43	Q	V		
14+30	1.0147	2.44	Q	V		
14+35	1.0315	2.44	Q	V		
14+40	1.0483	2.43	Q	V		
14+45	1.0650	2.43	Q	V		
14+50	1.0817	2.42	Q	V		
14+55	1.0983	2.42	Q	V		
15+ 0	1.1149	2.40	Q	V		
15+ 5	1.1313	2.38	Q	V		
15+10	1.1475	2.35	Q	V		
15+15	1.1635	2.33	Q	V		
15+20	1.1793	2.30	Q	V		
15+25	1.1950	2.27	Q	V		
15+30	1.2104	2.24	Q	V		
15+35	1.2256	2.20	Q	V		
15+40	1.2404	2.15	Q	V		
15+45	1.2546	2.07	Q	V		
15+50	1.2683	1.98	Q	V		
15+55	1.2814	1.91	Q	V		
16+ 0	1.2942	1.86	Q	V		
16+ 5	1.3065	1.79	Q	V		
16+10	1.3178	1.64	Q	V		
16+15	1.3274	1.39	Q	V		
16+20	1.3348	1.08	Q	V		
16+25	1.3405	0.83	Q	V		
16+30	1.3451	0.67	Q	V		
16+35	1.3490	0.57	Q	V		

16+40	1.3524	0.49	Q				V
16+45	1.3554	0.43	Q				V
16+50	1.3579	0.37	Q				V
16+55	1.3601	0.32	Q				V
17+ 0	1.3620	0.28	Q				V
17+ 5	1.3638	0.25	Q				V
17+10	1.3654	0.24	Q				V
17+15	1.3670	0.24	Q				V
17+20	1.3687	0.24	Q				V
17+25	1.3704	0.25	Q				V
17+30	1.3722	0.25	Q				V
17+35	1.3739	0.25	Q				V
17+40	1.3756	0.24	Q				V
17+45	1.3772	0.24	Q				V
17+50	1.3788	0.23	Q				V
17+55	1.3803	0.22	Q				V
18+ 0	1.3817	0.20	Q				V
18+ 5	1.3829	0.18	Q				V
18+10	1.3840	0.16	Q				V
18+15	1.3850	0.15	Q				V
18+20	1.3859	0.14	Q				V
18+25	1.3868	0.13	Q				V
18+30	1.3877	0.13	Q				V
18+35	1.3886	0.12	Q				V
18+40	1.3893	0.11	Q				V
18+45	1.3900	0.10	Q				V
18+50	1.3905	0.08	Q				V
18+55	1.3909	0.06	Q				V
19+ 0	1.3913	0.05	Q				V
19+ 5	1.3916	0.05	Q				V
19+10	1.3920	0.04	Q				V
19+15	1.3922	0.04	Q				V
19+20	1.3925	0.04	Q				V
19+25	1.3929	0.05	Q				V
19+30	1.3933	0.06	Q				V
19+35	1.3939	0.08	Q				V
19+40	1.3945	0.09	Q				V
19+45	1.3950	0.08	Q				V
19+50	1.3955	0.07	Q				V
19+55	1.3959	0.05	Q				V
20+ 0	1.3962	0.05	Q				V
20+ 5	1.3965	0.04	Q				V
20+10	1.3968	0.04	Q				V
20+15	1.3970	0.04	Q				V
20+20	1.3973	0.04	Q				V
20+25	1.3976	0.04	Q				V
20+30	1.3979	0.04	Q				V
20+35	1.3981	0.04	Q				V
20+40	1.3984	0.04	Q				V
20+45	1.3987	0.04	Q				V
20+50	1.3990	0.04	Q				V
20+55	1.3993	0.04	Q				V
21+ 0	1.3996	0.04	Q				V
21+ 5	1.3998	0.04	Q				V
21+10	1.4001	0.03	Q				V
21+15	1.4003	0.04	Q				V
21+20	1.4006	0.04	Q				V
21+25	1.4009	0.04	Q				V
21+30	1.4012	0.04	Q				V
21+35	1.4014	0.04	Q				V
21+40	1.4016	0.03	Q				V
21+45	1.4019	0.04	Q				V
21+50	1.4022	0.04	Q				V

21+55	1.4025	0.04	Q				V
22+ 0	1.4028	0.04	Q				V
22+ 5	1.4030	0.04	Q				V
22+10	1.4033	0.04	Q				V
22+15	1.4036	0.04	Q				V
22+20	1.4039	0.04	Q				V
22+25	1.4042	0.05	Q				V
22+30	1.4045	0.04	Q				V
22+35	1.4047	0.04	Q				V
22+40	1.4050	0.03	Q				V
22+45	1.4052	0.03	Q				V
22+50	1.4054	0.03	Q				V
22+55	1.4056	0.03	Q				V
23+ 0	1.4057	0.03	Q				V
23+ 5	1.4059	0.03	Q				V
23+10	1.4061	0.03	Q				V
23+15	1.4063	0.02	Q				V
23+20	1.4064	0.02	Q				V
23+25	1.4066	0.02	Q				V
23+30	1.4068	0.02	Q				V
23+35	1.4069	0.02	Q				V
23+40	1.4071	0.02	Q				V
23+45	1.4072	0.02	Q				V
23+50	1.4074	0.02	Q				V
23+55	1.4075	0.02	Q				V
24+ 0	1.4077	0.02	Q				V
24+ 5	1.4078	0.02	Q				V
24+10	1.4080	0.02	Q				V
24+15	1.4081	0.02	Q				V
24+20	1.4082	0.01	Q				V
24+25	1.4083	0.01	Q				V
24+30	1.4083	0.01	Q				V
24+35	1.4083	0.01	Q				V
24+40	1.4084	0.01	Q				V
24+45	1.4084	0.00	Q				V
24+50	1.4084	0.00	Q				V
24+55	1.4085	0.00	Q				V
25+ 0	1.4085	0.00	Q				V
25+ 5	1.4085	0.00	Q				V
25+10	1.4085	0.00	Q				V
25+15	1.4085	0.00	Q				V
25+20	1.4085	0.00	Q				V
25+25	1.4085	0.00	Q				V
25+30	1.4085	0.00	Q				V
25+35	1.4086	0.00	Q				V
25+40	1.4086	0.00	Q				V
25+45	1.4086	0.00	Q				V
25+50	1.4086	0.00	Q				V
25+55	1.4086	0.00	Q				V
26+ 0	1.4086	0.00	Q				V
26+ 5	1.4086	0.00	Q				V
26+10	1.4086	0.00	Q				V
26+15	1.4086	0.00	Q				V
26+20	1.4086	0.00	Q				V
26+25	1.4086	0.00	Q				V
26+30	1.4086	0.00	Q				V

Unit Hydrograph Analysis

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6145

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Chartwell - Rider at Redlands Ind
100 YEAR STORM EVENT - PROPOSED CONDITION
UNIT HYDROGRAPH STUDY - 1 HR
2997UNIHYP

Drainage Area = 6.30 (Ac.) = 0.010 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.30 (Ac.) = 0.010
Sq. Mi.

USER Entry of lag time in hours
Lag time = 0.147 Hr.
Lag time = 8.85 Min.
25% of lag time = 2.21 Min.
40% of lag time = 3.54 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00 (CFS)

2 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
6.30	0.45	2.84

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
6.30	1.20	7.56

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.450 (In)
Area Averaged 100-Year Rainfall = 1.200 (In)

Point rain (area averaged) = 1.200 (In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.200 (In)

Sub-Area Data:

Flood volume = Effective rainfall 1.16(In)
times area 6.3(Ac.) / [(In) / (Ft.)] = 0.6(Ac.Ft)
Total soil loss = 0.04(In)
Total soil loss = 0.020(Ac.Ft)

Total rainfall = 1.20(In)
 Flood volume = 26569.3 Cubic Feet
 Total soil loss = 872.0 Cubic Feet

 Peak flow rate of this hydrograph = 13.687(CFS)

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1 - 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	0.0018	0.27	Q					
0+10	0.0115	1.41	V Q					
0+15	0.0286	2.48	V Q					
0+20	0.0499	3.10	V Q					
0+25	0.0745	3.57	V Q					
0+30	0.1026	4.08	V Q					
0+35	0.1349	4.70	VQ					
0+40	0.1722	5.41	QV					
0+45	0.2165	6.43	Q V					
0+50	0.2796	9.17				Q		
0+55	0.3739	13.69				V Q		
1+ 0	0.4562	11.96				Q	V	
1+ 5	0.5080	7.52			Q			V
1+10	0.5402	4.67		Q				V
1+15	0.5598	2.85	Q					V
1+20	0.5735	1.99	Q					V
1+25	0.5834	1.44	Q					V
1+30	0.5909	1.09	Q					V
1+35	0.5967	0.84	Q					V
1+40	0.6011	0.63	Q					V
1+45	0.6043	0.47	Q					V
1+50	0.6066	0.34	Q					V
1+55	0.6084	0.26	Q					V
2+ 0	0.6095	0.16	Q					V
2+ 5	0.6098	0.05	Q					V
2+10	0.6099	0.02	Q					V

Unit Hydrograph Analysis

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6145

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Chartwell - Rider at Redlands Ind
100 YEAR STORM EVENT - PROPOSED CONDITION
UNIT HYDROGRAPH STUDY - 3 HR
2997UNIHYDP

Drainage Area = 6.30(Ac.) = 0.010 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.30(Ac.) = 0.010 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.147 Hr.
Lag time = 8.85 Min.
25% of lag time = 2.21 Min.
40% of lag time = 3.54 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.30	0.78	4.91

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.30	1.90	11.97

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.780(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.300	68.00	0.900
Total Area Entered = 6.30(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.)	(In/Hr)	(Dec.)	(In/Hr)
68.0	83.8	0.201	0.900	0.038	1.000	0.038
Sum (F) =						0.038

Area averaged mean soil loss (F) (In/Hr) = 0.038
 Minimum soil loss rate ((In/Hr)) = 0.019
 (for 24 hour storm duration)
 Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h
 VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.510	7.442
2	0.167	113.020	31.401
3	0.250	169.530	27.640
4	0.333	226.040	11.015
5	0.417	282.550	6.311
6	0.500	339.060	4.307
7	0.583	395.570	3.129
8	0.667	452.080	2.215
9	0.750	508.590	1.745
10	0.833	565.099	1.398
11	0.917	621.609	1.061
12	1.000	678.119	0.806
13	1.083	734.629	0.594
14	1.167	791.139	0.565
15	1.250	847.649	0.371
Sum = 100.000			Sum= 6.349

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)		Effective
(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1	0.08	1.30	0.296	0.038	0.26
2	0.17	1.30	0.296	0.038	0.26
3	0.25	1.10	0.251	0.038	0.21
4	0.33	1.50	0.342	0.038	0.30
5	0.42	1.50	0.342	0.038	0.30
6	0.50	1.80	0.410	0.038	0.37
7	0.58	1.50	0.342	0.038	0.30
8	0.67	1.80	0.410	0.038	0.37
9	0.75	1.80	0.410	0.038	0.37
10	0.83	1.50	0.342	0.038	0.30
11	0.92	1.60	0.365	0.038	0.33
12	1.00	1.80	0.410	0.038	0.37
13	1.08	2.20	0.502	0.038	0.46
14	1.17	2.20	0.502	0.038	0.46
15	1.25	2.20	0.502	0.038	0.46
16	1.33	2.00	0.456	0.038	0.42
17	1.42	2.60	0.593	0.038	0.55
18	1.50	2.70	0.616	0.038	0.58
19	1.58	2.40	0.547	0.038	0.51
20	1.67	2.70	0.616	0.038	0.58
21	1.75	3.30	0.752	0.038	0.71
22	1.83	3.10	0.707	0.038	0.67
23	1.92	2.90	0.661	0.038	0.62
24	2.00	3.00	0.684	0.038	0.65
25	2.08	3.10	0.707	0.038	0.67
26	2.17	4.20	0.958	0.038	0.92
27	2.25	5.00	1.140	0.038	1.10
28	2.33	3.50	0.798	0.038	0.76
29	2.42	6.80	1.550	0.038	1.51
30	2.50	7.30	1.664	0.038	1.63
31	2.58	8.20	1.870	0.038	1.83
32	2.67	5.90	1.345	0.038	1.31
33	2.75	2.00	0.456	0.038	0.42
34	2.83	1.80	0.410	0.038	0.37
35	2.92	1.80	0.410	0.038	0.37
36	3.00	0.60	0.137	0.038	0.10

Sum = 100.0 Sum = 21.4
 Flood volume = Effective rainfall 1.79(In)
 times area 6.3(Ac.)/[((In)/(Ft.))] = 0.9(Ac.Ft)
 Total soil loss = 0.11(In)
 Total soil loss = 0.060(Ac.Ft)
 Total rainfall = 1.90(In)
 Flood volume = 40834.0 Cubic Feet
 Total soil loss = 2615.9 Cubic Feet

 Peak flow rate of this hydrograph = 9.330(CFS)

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

 Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0008	0.12	Q				
0+10	0.0052	0.64	V Q				
0+15	0.0126	1.07	V	Q			
0+20	0.0209	1.20	V	Q			
0+25	0.0306	1.41	V	Q			
0+30	0.0419	1.64	V	Q			
0+35	0.0545	1.84	V	Q			
0+40	0.0677	1.92	V	Q			
0+45	0.0817	2.02	V	Q			
0+50	0.0963	2.13	V	Q			
0+55	0.1105	2.07	V	Q			
1+ 0	0.1247	2.05	V	Q			
1+ 5	0.1399	2.21	V	Q			
1+10	0.1570	2.48	V	Q			
1+15	0.1755	2.68	V	Q			
1+20	0.1944	2.75	V	Q			
1+25	0.2135	2.77	V	Q			
1+30	0.2342	3.01	V	Q			
1+35	0.2566	3.26	V	Q			
1+40	0.2793	3.29	V	Q			
1+45	0.3029	3.44	V	Q			
1+50	0.3292	3.81	V	Q			
1+55	0.3567	3.99	V	Q			
2+ 0	0.3840	3.96	V	Q			
2+ 5	0.4114	3.99	V	Q			
2+10	0.4403	4.20	V	Q			
2+15	0.4737	4.85	V	Q			
2+20	0.5117	5.52	V	Q			
2+25	0.5511	5.71	V	Q			
2+30	0.5987	6.91	V	Q			
2+35	0.6570	8.47	V	Q			
2+40	0.7213	9.33	V	Q			
2+45	0.7804	8.59	V	Q			
2+50	0.8235	6.26	V	Q			
2+55	0.8545	4.50	V	Q			
3+ 0	0.8796	3.64	V	Q			
3+ 5	0.8978	2.65	V	Q			
3+10	0.9096	1.71	V	Q			
3+15	0.9176	1.17	V	Q			
3+20	0.9235	0.86	V	Q			
3+25	0.9279	0.63	V	Q			
3+30	0.9311	0.47	V	Q			
3+35	0.9335	0.35	V	Q			
3+40	0.9352	0.24	V	Q			
3+45	0.9363	0.16	V	Q			
3+50	0.9368	0.09	V	Q			
3+55	0.9371	0.04	V	Q			
4+ 0	0.9373	0.03	V	Q			
4+ 5	0.9374	0.01	V	Q			
4+10	0.9374	0.00	V	Q			

Unit Hydrograph Analysis

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6145

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Chartwell - Rider at Redlands Ind
100 YEAR STORM EVENT - PROPOSED CONDITION
UNIT HYDROGRAPH STUDY - 6 HR
2997UNIHYDP

Drainage Area = 6.30(Ac.) = 0.010 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.30(Ac.) = 0.010 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.147 Hr.
Lag time = 8.85 Min.
25% of lag time = 2.21 Min.
40% of lag time = 3.54 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.30	1.00	6.30

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
6.30	2.45	15.44

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.000(In)
Area Averaged 100-Year Rainfall = 2.450(In)

Point rain (area averaged) = 2.450(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.450(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.300	68.00	0.900
Total Area Entered = 6.30(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.)	(In/Hr)	(Dec.)	(In/Hr)
68.0	83.8	0.201	0.900	0.038	1.000	0.038
Sum (F) =						0.038

Area averaged mean soil loss (F) (In/Hr) = 0.038
 Minimum soil loss rate ((In/Hr)) = 0.019
 (for 24 hour storm duration)
 Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h
 VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.510	7.442
2	0.167	113.020	31.401
3	0.250	169.530	27.640
4	0.333	226.040	11.015
5	0.417	282.550	6.311
6	0.500	339.060	4.307
7	0.583	395.570	3.129
8	0.667	452.080	2.215
9	0.750	508.590	1.745
10	0.833	565.099	1.398
11	0.917	621.609	1.061
12	1.000	678.119	0.806
13	1.083	734.629	0.594
14	1.167	791.139	0.565
15	1.250	847.649	0.371
Sum = 100.000			Sum= 6.349

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)		Effective
(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1	0.08	0.50	0.147	0.038	0.11
2	0.17	0.60	0.176	0.038	0.14
3	0.25	0.60	0.176	0.038	0.14
4	0.33	0.60	0.176	0.038	0.14
5	0.42	0.60	0.176	0.038	0.14
6	0.50	0.70	0.206	0.038	0.17
7	0.58	0.70	0.206	0.038	0.17
8	0.67	0.70	0.206	0.038	0.17
9	0.75	0.70	0.206	0.038	0.17
10	0.83	0.70	0.206	0.038	0.17
11	0.92	0.70	0.206	0.038	0.17
12	1.00	0.80	0.235	0.038	0.20
13	1.08	0.80	0.235	0.038	0.20
14	1.17	0.80	0.235	0.038	0.20
15	1.25	0.80	0.235	0.038	0.20
16	1.33	0.80	0.235	0.038	0.20
17	1.42	0.80	0.235	0.038	0.20
18	1.50	0.80	0.235	0.038	0.20
19	1.58	0.80	0.235	0.038	0.20
20	1.67	0.80	0.235	0.038	0.20
21	1.75	0.80	0.235	0.038	0.20
22	1.83	0.80	0.235	0.038	0.20
23	1.92	0.80	0.235	0.038	0.20
24	2.00	0.90	0.265	0.038	0.23
25	2.08	0.80	0.235	0.038	0.20
26	2.17	0.90	0.265	0.038	0.23
27	2.25	0.90	0.265	0.038	0.23
28	2.33	0.90	0.265	0.038	0.23
29	2.42	0.90	0.265	0.038	0.23
30	2.50	0.90	0.265	0.038	0.23
31	2.58	0.90	0.265	0.038	0.23
32	2.67	0.90	0.265	0.038	0.23
33	2.75	1.00	0.294	0.038	0.26
34	2.83	1.00	0.294	0.038	0.26
35	2.92	1.00	0.294	0.038	0.26
36	3.00	1.00	0.294	0.038	0.26

37	3.08	1.00	0.294	0.038	---	0.26
38	3.17	1.10	0.323	0.038	---	0.29
39	3.25	1.10	0.323	0.038	---	0.29
40	3.33	1.10	0.323	0.038	---	0.29
41	3.42	1.20	0.353	0.038	---	0.31
42	3.50	1.30	0.382	0.038	---	0.34
43	3.58	1.40	0.412	0.038	---	0.37
44	3.67	1.40	0.412	0.038	---	0.37
45	3.75	1.50	0.441	0.038	---	0.40
46	3.83	1.50	0.441	0.038	---	0.40
47	3.92	1.60	0.470	0.038	---	0.43
48	4.00	1.60	0.470	0.038	---	0.43
49	4.08	1.70	0.500	0.038	---	0.46
50	4.17	1.80	0.529	0.038	---	0.49
51	4.25	1.90	0.559	0.038	---	0.52
52	4.33	2.00	0.588	0.038	---	0.55
53	4.42	2.10	0.617	0.038	---	0.58
54	4.50	2.10	0.617	0.038	---	0.58
55	4.58	2.20	0.647	0.038	---	0.61
56	4.67	2.30	0.676	0.038	---	0.64
57	4.75	2.40	0.706	0.038	---	0.67
58	4.83	2.40	0.706	0.038	---	0.67
59	4.92	2.50	0.735	0.038	---	0.70
60	5.00	2.60	0.764	0.038	---	0.73
61	5.08	3.10	0.911	0.038	---	0.87
62	5.17	3.60	1.058	0.038	---	1.02
63	5.25	3.90	1.147	0.038	---	1.11
64	5.33	4.20	1.235	0.038	---	1.20
65	5.42	4.70	1.382	0.038	---	1.34
66	5.50	5.60	1.646	0.038	---	1.61
67	5.58	1.90	0.559	0.038	---	0.52
68	5.67	0.90	0.265	0.038	---	0.23
69	5.75	0.60	0.176	0.038	---	0.14
70	5.83	0.50	0.147	0.038	---	0.11
71	5.92	0.30	0.088	0.038	---	0.05
72	6.00	0.20	0.059	0.038	---	0.02
Sum =		100.0			Sum =	26.7

Flood volume = Effective rainfall 2.22(In)
 times area 6.3(Ac.)/[(In)/(Ft.)] = 1.2(Ac.Ft)
 Total soil loss = 0.23(In)
 Total soil loss = 0.120(Ac.Ft)
 Total rainfall = 2.45(In)
 Flood volume = 50796.0 Cubic Feet
 Total soil loss = 5231.9 Cubic Feet

 Peak flow rate of this hydrograph = 7.921(CFS)

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

 Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0004	0.05	Q				
0+10	0.0023	0.28	VQ				
0+15	0.0060	0.53	V Q				
0+20	0.0105	0.66	V Q				
0+25	0.0155	0.72	V Q				
0+30	0.0209	0.78	V Q				
0+35	0.0269	0.87	V Q				
0+40	0.0333	0.94	V Q				
0+45	0.0401	0.98	V Q				
0+50	0.0470	1.00	V Q				
0+55	0.0540	1.02	V Q				
1+ 0	0.0612	1.05	V Q				
1+ 5	0.0689	1.12	V Q				
1+10	0.0770	1.18	V Q				
1+15	0.0853	1.20	V Q				

1+20	0.0937	1.22	VQ				
1+25	0.1021	1.23	VQ				
1+30	0.1106	1.23	VQ				
1+35	0.1191	1.24	Q				
1+40	0.1277	1.24	Q				
1+45	0.1363	1.25	Q				
1+50	0.1449	1.25	Q				
1+55	0.1535	1.25	QV				
2+ 0	0.1622	1.26	Q				
2+ 5	0.1712	1.31	Q				
2+10	0.1803	1.32	QV				
2+15	0.1895	1.34	QV				
2+20	0.1991	1.39	QV				
2+25	0.2088	1.40	Q V				
2+30	0.2185	1.41	Q V				
2+35	0.2283	1.42	Q V				
2+40	0.2381	1.43	Q V				
2+45	0.2480	1.44	Q V				
2+50	0.2584	1.50	Q V				
2+55	0.2691	1.56	Q V				
3+ 0	0.2800	1.58	Q V				
3+ 5	0.2910	1.59	Q V				
3+10	0.3021	1.62	Q V				
3+15	0.3137	1.68	Q V				
3+20	0.3257	1.74	Q V				
3+25	0.3379	1.78	Q V				
3+30	0.3507	1.86	Q V				
3+35	0.3645	2.00	Q V				
3+40	0.3792	2.13	Q V				
3+45	0.3946	2.24	Q V				
3+50	0.4107	2.34	Q V				
3+55	0.4275	2.44	Q V				
4+ 0	0.4449	2.53	Q V				
4+ 5	0.4630	2.63	Q V				
4+10	0.4819	2.74	Q V				
4+15	0.5018	2.89	Q V				
4+20	0.5228	3.05	Q V				
4+25	0.5450	3.22	Q V				
4+30	0.5683	3.38	Q V				
4+35	0.5924	3.50	Q V				
4+40	0.6175	3.63	Q V				
4+45	0.6436	3.79	Q V				
4+50	0.6708	3.95	Q V				
4+55	0.6988	4.07	Q V				
5+ 0	0.7277	4.20	Q V				
5+ 5	0.7581	4.41	Q V				
5+10	0.7917	4.87	Q V				
5+15	0.8297	5.52	Q V				
5+20	0.8719	6.13	Q V				
5+25	0.9182	6.72	Q V				
5+30	0.9697	7.47	Q V				
5+35	1.0242	7.92	Q V				
5+40	1.0676	6.30	Q				
5+45	1.0958	4.09	Q				
5+50	1.1153	2.83	Q				
5+55	1.1298	2.10	Q				
6+ 0	1.1405	1.55	Q				
6+ 5	1.1481	1.11	Q				
6+10	1.1536	0.79	Q				
6+15	1.1575	0.58	Q				
6+20	1.1604	0.42	Q				
6+25	1.1625	0.30	Q				
6+30	1.1640	0.21	Q				
6+35	1.1650	0.15	Q				
6+40	1.1656	0.09	Q				
6+45	1.1659	0.04	Q				
6+50	1.1660	0.02	Q				
6+55	1.1661	0.01	Q				
7+ 0	1.1661	0.01	Q				
7+ 5	1.1661	0.00	Q				
7+10	1.1661	0.00	Q				

Unit Hydrograph Analysis

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Study date 01/26/21 File: 2997UNIHYP24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6145

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Chartwell - Rider at Redlands Ind
100 YEAR STORM EVENT - PROPOSED CONDITION
UNIT HYDROGRAPH STUDY - 24 HR
2997UNIHYP

Drainage Area = 6.30 (Ac.) = 0.010 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 6.30 (Ac.) = 0.010
Sq. Mi.

USER Entry of lag time in hours
Lag time = 0.147 Hr.
Lag time = 8.85 Min.
25% of lag time = 2.21 Min.
40% of lag time = 3.54 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00 (CFS)

2 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
6.30	1.65	10.40

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
6.30	4.25	26.77

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.650 (In)
Area Averaged 100-Year Rainfall = 4.250 (In)

Point rain (area averaged) = 4.250 (In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.250 (In)

Sub-Area Data:

Area(Ac.) Runoff Index Impervious %
 6.300 68.00 0.900
 Total Area Entered = 6.30(Ac.)

RI RI Infil. Rate Impervious Adj. Infil. Rate Area% F
 AMC2 AMC-3 (In/Hr) (Dec.%) (In/Hr) (Dec.) (In/Hr)
 68.0 83.8 0.201 0.900 0.038 1.000 0.038
 Sum (F) = 0.038

Area averaged mean soil loss (F) (In/Hr) = 0.038
 Minimum soil loss rate ((In/Hr)) = 0.019
 (for 24 hour storm duration)
 Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h
 VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.510	0.473
2	0.167	113.020	1.994
3	0.250	169.530	1.755
4	0.333	226.040	0.699
5	0.417	282.550	0.401
6	0.500	339.060	0.273
7	0.583	395.570	0.199
8	0.667	452.080	0.141
9	0.750	508.590	0.111
10	0.833	565.099	0.089
11	0.917	621.609	0.067
12	1.000	678.119	0.051
13	1.083	734.629	0.038
14	1.167	791.139	0.036
15	1.250	847.649	0.024
	Sum = 100.000	Sum=	6.349

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)		Effective
(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1	0.08	0.07	0.034	0.068 0.006	0.03
2	0.17	0.07	0.034	0.067 0.006	0.03
3	0.25	0.07	0.034	0.067 0.006	0.03
4	0.33	0.10	0.051	0.067 0.009	0.04
5	0.42	0.10	0.051	0.067 0.009	0.04
6	0.50	0.10	0.051	0.066 0.009	0.04
7	0.58	0.10	0.051	0.066 0.009	0.04
8	0.67	0.10	0.051	0.066 0.009	0.04
9	0.75	0.10	0.051	0.066 0.009	0.04
10	0.83	0.13	0.068	0.065 ---	0.00
11	0.92	0.13	0.068	0.065 ---	0.00
12	1.00	0.13	0.068	0.065 ---	0.00
13	1.08	0.10	0.051	0.064 0.009	0.04
14	1.17	0.10	0.051	0.064 0.009	0.04
15	1.25	0.10	0.051	0.064 0.009	0.04
16	1.33	0.10	0.051	0.064 0.009	0.04
17	1.42	0.10	0.051	0.063 0.009	0.04
18	1.50	0.10	0.051	0.063 0.009	0.04
19	1.58	0.10	0.051	0.063 0.009	0.04

20	1.67	0.10	0.051	0.063	0.009	0.04
21	1.75	0.10	0.051	0.062	0.009	0.04
22	1.83	0.13	0.068	0.062	---	0.01
23	1.92	0.13	0.068	0.062	---	0.01
24	2.00	0.13	0.068	0.062	---	0.01
25	2.08	0.13	0.068	0.061	---	0.01
26	2.17	0.13	0.068	0.061	---	0.01
27	2.25	0.13	0.068	0.061	---	0.01
28	2.33	0.13	0.068	0.061	---	0.01
29	2.42	0.13	0.068	0.060	---	0.01
30	2.50	0.13	0.068	0.060	---	0.01
31	2.58	0.17	0.085	0.060	---	0.03
32	2.67	0.17	0.085	0.060	---	0.03
33	2.75	0.17	0.085	0.059	---	0.03
34	2.83	0.17	0.085	0.059	---	0.03
35	2.92	0.17	0.085	0.059	---	0.03
36	3.00	0.17	0.085	0.059	---	0.03
37	3.08	0.17	0.085	0.059	---	0.03
38	3.17	0.17	0.085	0.058	---	0.03
39	3.25	0.17	0.085	0.058	---	0.03
40	3.33	0.17	0.085	0.058	---	0.03
41	3.42	0.17	0.085	0.058	---	0.03
42	3.50	0.17	0.085	0.057	---	0.03
43	3.58	0.17	0.085	0.057	---	0.03
44	3.67	0.17	0.085	0.057	---	0.03
45	3.75	0.17	0.085	0.057	---	0.03
46	3.83	0.20	0.102	0.056	---	0.05
47	3.92	0.20	0.102	0.056	---	0.05
48	4.00	0.20	0.102	0.056	---	0.05
49	4.08	0.20	0.102	0.056	---	0.05
50	4.17	0.20	0.102	0.055	---	0.05
51	4.25	0.20	0.102	0.055	---	0.05
52	4.33	0.23	0.119	0.055	---	0.06
53	4.42	0.23	0.119	0.055	---	0.06
54	4.50	0.23	0.119	0.054	---	0.06
55	4.58	0.23	0.119	0.054	---	0.06
56	4.67	0.23	0.119	0.054	---	0.07
57	4.75	0.23	0.119	0.054	---	0.07
58	4.83	0.27	0.136	0.054	---	0.08
59	4.92	0.27	0.136	0.053	---	0.08
60	5.00	0.27	0.136	0.053	---	0.08
61	5.08	0.20	0.102	0.053	---	0.05
62	5.17	0.20	0.102	0.053	---	0.05
63	5.25	0.20	0.102	0.052	---	0.05
64	5.33	0.23	0.119	0.052	---	0.07
65	5.42	0.23	0.119	0.052	---	0.07
66	5.50	0.23	0.119	0.052	---	0.07
67	5.58	0.27	0.136	0.051	---	0.08
68	5.67	0.27	0.136	0.051	---	0.08
69	5.75	0.27	0.136	0.051	---	0.08
70	5.83	0.27	0.136	0.051	---	0.09
71	5.92	0.27	0.136	0.051	---	0.09
72	6.00	0.27	0.136	0.050	---	0.09
73	6.08	0.30	0.153	0.050	---	0.10
74	6.17	0.30	0.153	0.050	---	0.10
75	6.25	0.30	0.153	0.050	---	0.10
76	6.33	0.30	0.153	0.049	---	0.10
77	6.42	0.30	0.153	0.049	---	0.10
78	6.50	0.30	0.153	0.049	---	0.10
79	6.58	0.33	0.170	0.049	---	0.12
80	6.67	0.33	0.170	0.049	---	0.12
81	6.75	0.33	0.170	0.048	---	0.12
82	6.83	0.33	0.170	0.048	---	0.12

83	6.92	0.33	0.170	0.048	---	0.12
84	7.00	0.33	0.170	0.048	---	0.12
85	7.08	0.33	0.170	0.047	---	0.12
86	7.17	0.33	0.170	0.047	---	0.12
87	7.25	0.33	0.170	0.047	---	0.12
88	7.33	0.37	0.187	0.047	---	0.14
89	7.42	0.37	0.187	0.047	---	0.14
90	7.50	0.37	0.187	0.046	---	0.14
91	7.58	0.40	0.204	0.046	---	0.16
92	7.67	0.40	0.204	0.046	---	0.16
93	7.75	0.40	0.204	0.046	---	0.16
94	7.83	0.43	0.221	0.046	---	0.18
95	7.92	0.43	0.221	0.045	---	0.18
96	8.00	0.43	0.221	0.045	---	0.18
97	8.08	0.50	0.255	0.045	---	0.21
98	8.17	0.50	0.255	0.045	---	0.21
99	8.25	0.50	0.255	0.044	---	0.21
100	8.33	0.50	0.255	0.044	---	0.21
101	8.42	0.50	0.255	0.044	---	0.21
102	8.50	0.50	0.255	0.044	---	0.21
103	8.58	0.53	0.272	0.044	---	0.23
104	8.67	0.53	0.272	0.043	---	0.23
105	8.75	0.53	0.272	0.043	---	0.23
106	8.83	0.57	0.289	0.043	---	0.25
107	8.92	0.57	0.289	0.043	---	0.25
108	9.00	0.57	0.289	0.043	---	0.25
109	9.08	0.63	0.323	0.042	---	0.28
110	9.17	0.63	0.323	0.042	---	0.28
111	9.25	0.63	0.323	0.042	---	0.28
112	9.33	0.67	0.340	0.042	---	0.30
113	9.42	0.67	0.340	0.042	---	0.30
114	9.50	0.67	0.340	0.041	---	0.30
115	9.58	0.70	0.357	0.041	---	0.32
116	9.67	0.70	0.357	0.041	---	0.32
117	9.75	0.70	0.357	0.041	---	0.32
118	9.83	0.73	0.374	0.041	---	0.33
119	9.92	0.73	0.374	0.040	---	0.33
120	10.00	0.73	0.374	0.040	---	0.33
121	10.08	0.50	0.255	0.040	---	0.21
122	10.17	0.50	0.255	0.040	---	0.22
123	10.25	0.50	0.255	0.040	---	0.22
124	10.33	0.50	0.255	0.039	---	0.22
125	10.42	0.50	0.255	0.039	---	0.22
126	10.50	0.50	0.255	0.039	---	0.22
127	10.58	0.67	0.340	0.039	---	0.30
128	10.67	0.67	0.340	0.039	---	0.30
129	10.75	0.67	0.340	0.039	---	0.30
130	10.83	0.67	0.340	0.038	---	0.30
131	10.92	0.67	0.340	0.038	---	0.30
132	11.00	0.67	0.340	0.038	---	0.30
133	11.08	0.63	0.323	0.038	---	0.29
134	11.17	0.63	0.323	0.038	---	0.29
135	11.25	0.63	0.323	0.037	---	0.29
136	11.33	0.63	0.323	0.037	---	0.29
137	11.42	0.63	0.323	0.037	---	0.29
138	11.50	0.63	0.323	0.037	---	0.29
139	11.58	0.57	0.289	0.037	---	0.25
140	11.67	0.57	0.289	0.036	---	0.25
141	11.75	0.57	0.289	0.036	---	0.25
142	11.83	0.60	0.306	0.036	---	0.27
143	11.92	0.60	0.306	0.036	---	0.27
144	12.00	0.60	0.306	0.036	---	0.27
145	12.08	0.83	0.425	0.036	---	0.39

146	12.17	0.83	0.425	0.035	---	0.39
147	12.25	0.83	0.425	0.035	---	0.39
148	12.33	0.87	0.442	0.035	---	0.41
149	12.42	0.87	0.442	0.035	---	0.41
150	12.50	0.87	0.442	0.035	---	0.41
151	12.58	0.93	0.476	0.035	---	0.44
152	12.67	0.93	0.476	0.034	---	0.44
153	12.75	0.93	0.476	0.034	---	0.44
154	12.83	0.97	0.493	0.034	---	0.46
155	12.92	0.97	0.493	0.034	---	0.46
156	13.00	0.97	0.493	0.034	---	0.46
157	13.08	1.13	0.578	0.034	---	0.54
158	13.17	1.13	0.578	0.033	---	0.54
159	13.25	1.13	0.578	0.033	---	0.54
160	13.33	1.13	0.578	0.033	---	0.54
161	13.42	1.13	0.578	0.033	---	0.55
162	13.50	1.13	0.578	0.033	---	0.55
163	13.58	0.77	0.391	0.032	---	0.36
164	13.67	0.77	0.391	0.032	---	0.36
165	13.75	0.77	0.391	0.032	---	0.36
166	13.83	0.77	0.391	0.032	---	0.36
167	13.92	0.77	0.391	0.032	---	0.36
168	14.00	0.77	0.391	0.032	---	0.36
169	14.08	0.90	0.459	0.032	---	0.43
170	14.17	0.90	0.459	0.031	---	0.43
171	14.25	0.90	0.459	0.031	---	0.43
172	14.33	0.87	0.442	0.031	---	0.41
173	14.42	0.87	0.442	0.031	---	0.41
174	14.50	0.87	0.442	0.031	---	0.41
175	14.58	0.87	0.442	0.031	---	0.41
176	14.67	0.87	0.442	0.030	---	0.41
177	14.75	0.87	0.442	0.030	---	0.41
178	14.83	0.83	0.425	0.030	---	0.39
179	14.92	0.83	0.425	0.030	---	0.40
180	15.00	0.83	0.425	0.030	---	0.40
181	15.08	0.80	0.408	0.030	---	0.38
182	15.17	0.80	0.408	0.029	---	0.38
183	15.25	0.80	0.408	0.029	---	0.38
184	15.33	0.77	0.391	0.029	---	0.36
185	15.42	0.77	0.391	0.029	---	0.36
186	15.50	0.77	0.391	0.029	---	0.36
187	15.58	0.63	0.323	0.029	---	0.29
188	15.67	0.63	0.323	0.029	---	0.29
189	15.75	0.63	0.323	0.028	---	0.29
190	15.83	0.63	0.323	0.028	---	0.29
191	15.92	0.63	0.323	0.028	---	0.29
192	16.00	0.63	0.323	0.028	---	0.29
193	16.08	0.13	0.068	0.028	---	0.04
194	16.17	0.13	0.068	0.028	---	0.04
195	16.25	0.13	0.068	0.028	---	0.04
196	16.33	0.13	0.068	0.027	---	0.04
197	16.42	0.13	0.068	0.027	---	0.04
198	16.50	0.13	0.068	0.027	---	0.04
199	16.58	0.10	0.051	0.027	---	0.02
200	16.67	0.10	0.051	0.027	---	0.02
201	16.75	0.10	0.051	0.027	---	0.02
202	16.83	0.10	0.051	0.027	---	0.02
203	16.92	0.10	0.051	0.026	---	0.02
204	17.00	0.10	0.051	0.026	---	0.02
205	17.08	0.17	0.085	0.026	---	0.06
206	17.17	0.17	0.085	0.026	---	0.06
207	17.25	0.17	0.085	0.026	---	0.06
208	17.33	0.17	0.085	0.026	---	0.06

209	17.42	0.17	0.085	0.026	---	0.06
210	17.50	0.17	0.085	0.026	---	0.06
211	17.58	0.17	0.085	0.025	---	0.06
212	17.67	0.17	0.085	0.025	---	0.06
213	17.75	0.17	0.085	0.025	---	0.06
214	17.83	0.13	0.068	0.025	---	0.04
215	17.92	0.13	0.068	0.025	---	0.04
216	18.00	0.13	0.068	0.025	---	0.04
217	18.08	0.13	0.068	0.025	---	0.04
218	18.17	0.13	0.068	0.025	---	0.04
219	18.25	0.13	0.068	0.024	---	0.04
220	18.33	0.13	0.068	0.024	---	0.04
221	18.42	0.13	0.068	0.024	---	0.04
222	18.50	0.13	0.068	0.024	---	0.04
223	18.58	0.10	0.051	0.024	---	0.03
224	18.67	0.10	0.051	0.024	---	0.03
225	18.75	0.10	0.051	0.024	---	0.03
226	18.83	0.07	0.034	0.024	---	0.01
227	18.92	0.07	0.034	0.024	---	0.01
228	19.00	0.07	0.034	0.023	---	0.01
229	19.08	0.10	0.051	0.023	---	0.03
230	19.17	0.10	0.051	0.023	---	0.03
231	19.25	0.10	0.051	0.023	---	0.03
232	19.33	0.13	0.068	0.023	---	0.05
233	19.42	0.13	0.068	0.023	---	0.05
234	19.50	0.13	0.068	0.023	---	0.05
235	19.58	0.10	0.051	0.023	---	0.03
236	19.67	0.10	0.051	0.023	---	0.03
237	19.75	0.10	0.051	0.022	---	0.03
238	19.83	0.07	0.034	0.022	---	0.01
239	19.92	0.07	0.034	0.022	---	0.01
240	20.00	0.07	0.034	0.022	---	0.01
241	20.08	0.10	0.051	0.022	---	0.03
242	20.17	0.10	0.051	0.022	---	0.03
243	20.25	0.10	0.051	0.022	---	0.03
244	20.33	0.10	0.051	0.022	---	0.03
245	20.42	0.10	0.051	0.022	---	0.03
246	20.50	0.10	0.051	0.022	---	0.03
247	20.58	0.10	0.051	0.021	---	0.03
248	20.67	0.10	0.051	0.021	---	0.03
249	20.75	0.10	0.051	0.021	---	0.03
250	20.83	0.07	0.034	0.021	---	0.01
251	20.92	0.07	0.034	0.021	---	0.01
252	21.00	0.07	0.034	0.021	---	0.01
253	21.08	0.10	0.051	0.021	---	0.03
254	21.17	0.10	0.051	0.021	---	0.03
255	21.25	0.10	0.051	0.021	---	0.03
256	21.33	0.07	0.034	0.021	---	0.01
257	21.42	0.07	0.034	0.021	---	0.01
258	21.50	0.07	0.034	0.021	---	0.01
259	21.58	0.10	0.051	0.020	---	0.03
260	21.67	0.10	0.051	0.020	---	0.03
261	21.75	0.10	0.051	0.020	---	0.03
262	21.83	0.07	0.034	0.020	---	0.01
263	21.92	0.07	0.034	0.020	---	0.01
264	22.00	0.07	0.034	0.020	---	0.01
265	22.08	0.10	0.051	0.020	---	0.03
266	22.17	0.10	0.051	0.020	---	0.03
267	22.25	0.10	0.051	0.020	---	0.03
268	22.33	0.07	0.034	0.020	---	0.01
269	22.42	0.07	0.034	0.020	---	0.01
270	22.50	0.07	0.034	0.020	---	0.01
271	22.58	0.07	0.034	0.020	---	0.01

272	22.67	0.07	0.034	0.020	---	0.01
273	22.75	0.07	0.034	0.020	---	0.01
274	22.83	0.07	0.034	0.020	---	0.01
275	22.92	0.07	0.034	0.019	---	0.01
276	23.00	0.07	0.034	0.019	---	0.01
277	23.08	0.07	0.034	0.019	---	0.01
278	23.17	0.07	0.034	0.019	---	0.01
279	23.25	0.07	0.034	0.019	---	0.01
280	23.33	0.07	0.034	0.019	---	0.01
281	23.42	0.07	0.034	0.019	---	0.01
282	23.50	0.07	0.034	0.019	---	0.01
283	23.58	0.07	0.034	0.019	---	0.01
284	23.67	0.07	0.034	0.019	---	0.01
285	23.75	0.07	0.034	0.019	---	0.01
286	23.83	0.07	0.034	0.019	---	0.01
287	23.92	0.07	0.034	0.019	---	0.01
288	24.00	0.07	0.034	0.019	---	0.01
Sum =		100.0			Sum =	41.0

Flood volume = Effective rainfall 3.42 (In)
 times area 6.3 (Ac.) / [(In) / (Ft.)] = 1.8 (Ac.Ft)
 Total soil loss = 0.83 (In)
 Total soil loss = 0.436 (Ac.Ft)
 Total rainfall = 4.25 (In)
 Flood volume = 78187.9 Cubic Feet
 Total soil loss = 19004.2 Cubic Feet

Peak flow rate of this hydrograph = 3.389 (CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time (h+m)	Volume Ac.Ft	Q (CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.01	Q				
0+10	0.0006	0.07	Q				
0+15	0.0014	0.12	Q				
0+20	0.0024	0.14	Q				
0+25	0.0036	0.18	Q				
0+30	0.0051	0.21	Q				
0+35	0.0067	0.23	Q				
0+40	0.0083	0.24	Q				
0+45	0.0100	0.25	Q				
0+50	0.0116	0.23	Q				
0+55	0.0127	0.16	Q				
1+ 0	0.0134	0.09	Q				
1+ 5	0.0140	0.09	Q				
1+10	0.0151	0.15	Q				
1+15	0.0165	0.21	Q				
1+20	0.0181	0.23	Q				
1+25	0.0198	0.24	Q				
1+30	0.0215	0.25	Q				
1+35	0.0232	0.25	VQ				
1+40	0.0250	0.26	VQ				
1+45	0.0267	0.26	VQ				
1+50	0.0284	0.24	Q				
1+55	0.0296	0.17	Q				
2+ 0	0.0304	0.11	Q				
2+ 5	0.0310	0.09	Q				
2+10	0.0315	0.08	Q				

2+15	0.0320	0.07	Q
2+20	0.0324	0.06	Q
2+25	0.0328	0.06	Q
2+30	0.0332	0.06	Q
2+35	0.0336	0.06	Q
2+40	0.0343	0.10	Q
2+45	0.0351	0.13	Q
2+50	0.0361	0.14	Q
2+55	0.0371	0.14	Q
3+ 0	0.0381	0.15	Q
3+ 5	0.0392	0.15	Q
3+10	0.0403	0.16	Q
3+15	0.0414	0.16	Q
3+20	0.0425	0.17	Q
3+25	0.0437	0.17	Q
3+30	0.0449	0.17	Q
3+35	0.0460	0.17	QV
3+40	0.0472	0.17	QV
3+45	0.0485	0.18	QV
3+50	0.0497	0.19	QV
3+55	0.0513	0.22	QV
4+ 0	0.0530	0.25	Q
4+ 5	0.0548	0.27	Q
4+10	0.0567	0.27	Q
4+15	0.0587	0.28	Q
4+20	0.0607	0.29	Q
4+25	0.0630	0.33	Q
4+30	0.0655	0.36	Q
4+35	0.0681	0.38	Q
4+40	0.0708	0.39	Q
4+45	0.0735	0.40	Q
4+50	0.0763	0.41	Q
4+55	0.0794	0.45	Q
5+ 0	0.0827	0.48	Q
5+ 5	0.0860	0.48	Q
5+10	0.0889	0.42	Q
5+15	0.0915	0.37	QV
5+20	0.0940	0.36	QV
5+25	0.0966	0.38	QV
5+30	0.0994	0.41	QV
5+35	0.1023	0.42	QV
5+40	0.1055	0.46	QV
5+45	0.1089	0.50	QV
5+50	0.1124	0.51	Q
5+55	0.1160	0.52	Q
6+ 0	0.1196	0.53	Q
6+ 5	0.1233	0.54	Q
6+10	0.1273	0.58	Q
6+15	0.1315	0.61	Q
6+20	0.1358	0.63	QV
6+25	0.1402	0.64	QV
6+30	0.1446	0.64	QV
6+35	0.1491	0.66	QV
6+40	0.1539	0.69	QV
6+45	0.1589	0.73	QV
6+50	0.1640	0.74	QV
6+55	0.1692	0.75	Q
7+ 0	0.1744	0.76	Q
7+ 5	0.1797	0.76	QV
7+10	0.1850	0.77	QV
7+15	0.1903	0.77	QV
7+20	0.1957	0.78	QV
7+25	0.2014	0.82	QV

7+30	0.2072	0.85	QV				
7+35	0.2132	0.87	QV				
7+40	0.2196	0.92	QV				
7+45	0.2261	0.95	Q V				
7+50	0.2328	0.98	Q V				
7+55	0.2399	1.02	QV				
8+ 0	0.2472	1.06	QV				
8+ 5	0.2547	1.09	QV				
8+10	0.2628	1.17	QV				
8+15	0.2713	1.24	Q V				
8+20	0.2801	1.27	QV				
8+25	0.2890	1.29	QV				
8+30	0.2980	1.31	QV				
8+35	0.3071	1.32	QV				
8+40	0.3165	1.37	Q V				
8+45	0.3262	1.40	Q V				
8+50	0.3360	1.43	Q V				
8+55	0.3461	1.47	Q V				
9+ 0	0.3565	1.51	QV				
9+ 5	0.3671	1.54	Q V				
9+10	0.3783	1.62	Q V				
9+15	0.3899	1.69	Q V				
9+20	0.4019	1.73	Q V				
9+25	0.4141	1.78	Q V				
9+30	0.4267	1.82	Q V				
9+35	0.4395	1.85	Q V				
9+40	0.4526	1.90	Q V				
9+45	0.4660	1.94	Q V				
9+50	0.4795	1.97	Q V				
9+55	0.4934	2.02	Q V				
10+ 0	0.5076	2.06	Q	V			
10+ 5	0.5216	2.02	Q	V			
10+10	0.5339	1.80	Q	V			
10+15	0.5449	1.60	Q	V			
10+20	0.5554	1.52	Q	V			
10+25	0.5656	1.48	Q	V			
10+30	0.5756	1.45	Q	V			
10+35	0.5857	1.47	Q	V			
10+40	0.5969	1.63	Q	V			
10+45	0.6091	1.77	Q	V			
10+50	0.6216	1.82	Q	V			
10+55	0.6343	1.84	Q	V			
11+ 0	0.6471	1.86	Q	V			
11+ 5	0.6600	1.87	Q	V			
11+10	0.6727	1.84	Q	V			
11+15	0.6852	1.82	Q	V			
11+20	0.6978	1.82	Q	V			
11+25	0.7103	1.82	Q	V			
11+30	0.7228	1.82	Q	V			
11+35	0.7352	1.80	Q	V			
11+40	0.7472	1.74	Q	V			
11+45	0.7588	1.68	Q	V			
11+50	0.7702	1.66	Q	V			
11+55	0.7818	1.68	Q	V			
12+ 0	0.7936	1.70	Q	V			
12+ 5	0.8057	1.77	Q	V			
12+10	0.8196	2.01	Q	V			
12+15	0.8348	2.22	Q	V			
12+20	0.8507	2.31	Q	V			
12+25	0.8672	2.39	Q	V			
12+30	0.8841	2.46	Q	V			
12+35	0.9014	2.51	Q	V			
12+40	0.9193	2.60	Q	V			

12+45	0.9378	2.68		Q	V		
12+50	0.9566	2.73		Q	V		
12+55	0.9758	2.79		Q	V		
13+ 0	0.9953	2.84		Q	V		
13+ 5	1.0153	2.90		Q	V		
13+10	1.0366	3.09		Q	V		
13+15	1.0590	3.25		Q	V		
13+20	1.0818	3.32		Q	V		
13+25	1.1050	3.36		Q	V		
13+30	1.1283	3.39		Q	V		
13+35	1.1512	3.32		Q	V		
13+40	1.1716	2.96		Q	V		
13+45	1.1898	2.65		Q	V		
13+50	1.2072	2.53		Q	V		
13+55	1.2242	2.46		Q	V		
14+ 0	1.2408	2.41		Q	V		
14+ 5	1.2574	2.41		Q	V		
14+10	1.2748	2.53		Q	V		
14+15	1.2929	2.63		Q	V		
14+20	1.3111	2.65		Q	V		
14+25	1.3293	2.63		Q	V		
14+30	1.3473	2.61		Q	V		
14+35	1.3652	2.61		Q	V		
14+40	1.3832	2.61		Q	V		
14+45	1.4011	2.61		Q	V		
14+50	1.4190	2.60		Q	V		
14+55	1.4367	2.57		Q	V		
15+ 0	1.4542	2.54		Q	V		
15+ 5	1.4716	2.52		Q	V		
15+10	1.4888	2.49		Q	V		
15+15	1.5056	2.45		Q	V		
15+20	1.5224	2.43		Q	V		
15+25	1.5388	2.39		Q	V		
15+30	1.5550	2.35		Q	V		
15+35	1.5709	2.30		Q	V		
15+40	1.5858	2.16		Q	V		
15+45	1.5998	2.03		Q	V		
15+50	1.6134	1.98		Q	V		
15+55	1.6268	1.95		Q	V		
16+ 0	1.6401	1.93		Q	V		
16+ 5	1.6525	1.79		Q	V		
16+10	1.6613	1.28	Q				V
16+15	1.6669	0.82	Q				V
16+20	1.6713	0.64	Q				V
16+25	1.6749	0.53	Q				V
16+30	1.6781	0.46	Q				V
16+35	1.6808	0.40	Q				V
16+40	1.6830	0.32	Q				V
16+45	1.6849	0.27	Q				V
16+50	1.6865	0.23	Q				V
16+55	1.6879	0.21	Q				V
17+ 0	1.6892	0.19	Q				V
17+ 5	1.6906	0.20	Q				V
17+10	1.6923	0.25	Q				V
17+15	1.6944	0.31	Q				V
17+20	1.6967	0.33	Q				V
17+25	1.6991	0.34	Q				V
17+30	1.7015	0.35	Q				V
17+35	1.7039	0.36	Q				V
17+40	1.7064	0.36	Q				V
17+45	1.7090	0.37	Q				V
17+50	1.7115	0.36	Q				V
17+55	1.7138	0.33	Q				V

18+ 0	1.7159	0.31	Q				V
18+ 5	1.7179	0.30	Q				V
18+10	1.7199	0.29	Q				V
18+15	1.7219	0.29	Q				V
18+20	1.7238	0.28	Q				V
18+25	1.7258	0.28	Q				V
18+30	1.7277	0.28	Q				V
18+35	1.7296	0.27	Q				V
18+40	1.7313	0.24	Q				V
18+45	1.7327	0.21	Q				V
18+50	1.7340	0.19	Q				V
18+55	1.7350	0.15	Q				V
19+ 0	1.7358	0.11	Q				V
19+ 5	1.7366	0.11	Q				V
19+10	1.7375	0.13	Q				V
19+15	1.7386	0.16	Q				V
19+20	1.7398	0.17	Q				V
19+25	1.7412	0.21	Q				V
19+30	1.7429	0.24	Q				V
19+35	1.7446	0.25	Q				V
19+40	1.7461	0.22	Q				V
19+45	1.7475	0.20	Q				V
19+50	1.7488	0.18	Q				V
19+55	1.7498	0.15	Q				V
20+ 0	1.7506	0.12	Q				V
20+ 5	1.7514	0.11	Q				V
20+10	1.7523	0.14	Q				V
20+15	1.7534	0.16	Q				V
20+20	1.7546	0.17	Q				V
20+25	1.7558	0.18	Q				V
20+30	1.7571	0.18	Q				V
20+35	1.7583	0.18	Q				V
20+40	1.7596	0.18	Q				V
20+45	1.7609	0.18	Q				V
20+50	1.7621	0.18	Q				V
20+55	1.7631	0.14	Q				V
21+ 0	1.7639	0.12	Q				V
21+ 5	1.7646	0.11	Q				V
21+10	1.7656	0.14	Q				V
21+15	1.7668	0.17	Q				V
21+20	1.7679	0.17	Q				V
21+25	1.7689	0.14	Q				V
21+30	1.7696	0.11	Q				V
21+35	1.7704	0.11	Q				V
21+40	1.7714	0.14	Q				V
21+45	1.7725	0.17	Q				V
21+50	1.7737	0.17	Q				V
21+55	1.7746	0.14	Q				V
22+ 0	1.7754	0.11	Q				V
22+ 5	1.7762	0.11	Q				V
22+10	1.7772	0.14	Q				V
22+15	1.7784	0.17	Q				V
22+20	1.7795	0.17	Q				V
22+25	1.7805	0.14	Q				V
22+30	1.7813	0.12	Q				V
22+35	1.7821	0.11	Q				V
22+40	1.7828	0.10	Q				V
22+45	1.7834	0.10	Q				V
22+50	1.7841	0.10	Q				V
22+55	1.7848	0.10	Q				V
23+ 0	1.7854	0.10	Q				V
23+ 5	1.7861	0.09	Q				V
23+10	1.7867	0.09	Q				V

23+15	1.7874	0.09	Q				V
23+20	1.7880	0.09	Q				V
23+25	1.7887	0.09	Q				V
23+30	1.7893	0.09	Q				V
23+35	1.7900	0.09	Q				V
23+40	1.7906	0.09	Q				V
23+45	1.7913	0.09	Q				V
23+50	1.7919	0.09	Q				V
23+55	1.7926	0.09	Q				V
24+ 0	1.7932	0.09	Q				V
24+ 5	1.7938	0.09	Q				V
24+10	1.7942	0.06	Q				V
24+15	1.7944	0.03	Q				V
24+20	1.7946	0.02	Q				V
24+25	1.7947	0.02	Q				V
24+30	1.7948	0.01	Q				V
24+35	1.7948	0.01	Q				V
24+40	1.7949	0.01	Q				V
24+45	1.7949	0.00	Q				V
24+50	1.7949	0.00	Q				V
24+55	1.7949	0.00	Q				V
25+ 0	1.7949	0.00	Q				V
25+ 5	1.7949	0.00	Q				V
25+10	1.7949	0.00	Q				V

Appendix D

Detention Routing Calculations

**Chartwell - Rider at Redlands Ave
Basin Routing Study Summary**

Stage Storage Table

#	Depth	Elevation	Area (sf)	Incremental volume (cf) from Contech	Total Volume (cf)	Total Volume (acre-ft)	Outflow Q 10"	Notes
1	0.00	1,437.50	3,634	0	0.0	-	0.0	Bottom of Pipe (No gravel base credit)
2	0.50	1,438.00	3,634	727	1,054.0	0.024	1.9	
3	1.00	1,438.50	3,634	727	2,556.0	0.059	2.7	
4	1.50	1,439.00	3,634	600	3,526.0	0.081	3.3	
5	2.00	1,439.50	3,634	600	4,826.0	0.111	3.8	
6	2.50	1,440.00	3,634	1,817	6,126.0	0.141	4.3	
7	3.00	1,441.00	3,634	1,817	7,396.0	0.170	4.7	
8	3.50	1,441.50	3,634	1,817	8,597.0	0.197	5.1	
9	4.00	1,442.00	3,634	1,817	9,651.0	0.222	5.4	
10	5.00	1,442.50	3,634	3,634	11,344.0	0.260	6.1	

*WQMP Design Capture Volume is not applicable, treatment provided by wetland modular system:

Depth over 10" pipe	Q outlet pipe (10") Orifice	Q outlet pipe (10") Weir			
0.00	0.0	0.0			
0.50	1.9	3.1			
1.00	2.7	8.6			
1.50	3.3	15.9			
2.00	3.8	24.4			
2.50	4.3	34.1			
3.00	4.7	44.9			
3.50	5.1	56.6			
4.00	5.4	69.1			
5.00	6.1	96.6			

10" Outlet CMP Riser

10 0 =Orifice Plate Size (inches)

0.55 0.00 = Orifice Plate Area, A (SF)

2.62 0.00 = Orifice Plate Perimeter (ft)

3.3 3.3 = C (Sharp Crested Weir)

0.62 0.62 = Cd (Sharp Edge Orifice)

Orifice Control Equation = $CA \cdot (2gh)^{1/2}$

Weir Control Equation = $CP \cdot h^{1.5}$

Basin A Routing Summary Table

100 YEAR STORM	1 Hour	3 Hour	6 Hour	24 Hour
Existing Q Out (CFS)	9.3	7.4	6.3	3.0
Basin Q Out (CFS) after Routing	5.9	5.5	5.1	2.0
Max. Q: Basin + MWS (1 cfs)	6.9	6.5	6.1	3.0
WSE	1442.3	1441.6	1441.0	1438.2

From Unit Hydrograph Study for Existing Condition

From Routing Study

Note:

1. Peak discharge of 6.9 CFS occurs during the 100 year 1 hour event, which is less than the existing Q out 9.3 CFS (UH 100 year 1 hour event) and the existing Q out 9.4 CFS (100 year Rational Method).
2. WSE MAX is 1442.3 for 100 year storm.
3. Rock = 40% voids

FLOOD HYDROGRAPH ROUTING PROGRAM
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Study date: 07/21/21

CHARTWELL - RIDER AT REDLANDS IND
100 YEAR STORM - 1 HOUR DURATION
PROPOSED CONDITION - BASIN ROUTING

Program License Serial Number 6145

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

From study/file name: 2997UNIHYDP1100.rte
*****HYDROGRAPH DATA*****
Number of intervals = 26
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 13.687 (CFS)
Total volume = 0.610 (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 = 26
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 Storage Outflow (S-O*dt/2) (S+O*dt/2)

(Ft.)	(Ac.Ft)	(CFS)	(Ac.Ft)	(Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.024	1.900	0.017	0.031
1.000	0.059	2.700	0.050	0.068
1.500	0.081	3.300	0.070	0.092
2.000	0.111	3.800	0.098	0.124
2.500	0.141	4.300	0.126	0.156
3.000	0.170	4.700	0.154	0.186
3.500	0.197	5.100	0.179	0.215
4.000	0.222	5.400	0.203	0.241
5.000	0.260	6.100	0.239	0.281

Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	3.4	6.84	10.27	13.69	Depth (Ft.)
0.083	0.27	0.06	0.001	O					0.02
0.167	1.41	0.39	0.005	O I					0.10
0.250	2.48	1.06	0.013	I O I					0.28
0.333	3.10	1.80	0.023	I O I					0.47
0.417	3.57	2.09	0.032	I O I					0.62
0.500	4.08	2.34	0.043	I O I					0.78
0.583	4.70	2.64	0.056	I O I					0.96
0.667	5.41	3.04	0.072	I O I					1.29
0.750	6.43	3.45	0.090	I O I					1.65
0.833	9.17	3.92	0.118	I O I			I		2.12
0.917	13.69	4.67	0.167	I O I				I	2.96
1.000	11.96	5.39	0.221	I O I			I		3.98
1.083	7.52	5.90	0.249	I O I					4.72
1.167	4.67	5.93	0.251	I O I					4.75
1.250	2.85	5.67	0.237	I O I					4.38
1.333	1.99	5.32	0.215	I O I					3.87
1.417	1.44	5.02	0.192	I O I					3.40
1.500	1.09	4.66	0.167	I O I					2.95
1.583	0.84	4.32	0.143	I O I					2.53
1.667	0.63	3.94	0.119	I O I					2.14
1.750	0.47	3.57	0.097	I O I					1.77
1.833	0.34	3.18	0.077	I O I					1.40
1.917	0.26	2.69	0.059	I O I					0.99
2.000	0.16	2.33	0.043	I O I					0.77
2.083	0.05	2.00	0.029	I O I					0.56
2.167	0.02	1.36	0.017	I O I					0.36
2.250	0.00	0.78	0.010	IO					0.21
2.333	0.00	0.45	0.006	IO					0.12
2.417	0.00	0.26	0.003	O					0.07
2.500	0.00	0.15	0.002	O					0.04
2.583	0.00	0.08	0.001	O					0.02
2.667	0.00	0.05	0.001	O					0.01
2.750	0.00	0.03	0.000	O					0.01
2.833	0.00	0.02	0.000	O					0.00

2.917	0.00	0.01	0.000	O					0.00
3.000	0.00	0.01	0.000	O					0.00
3.083	0.00	0.00	0.000	O					0.00

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

Number of intervals = 37

Time interval = 5.0 (Min.)

Maximum/Peak flow rate = 5.927 (CFS)

Total volume = 0.610 (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
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CHARTWELL - RIDER AT REDLANDS IND
100 YEAR STORM - 3 HOUR DURATION
PROPOSED CONDITION - BASIN ROUTING

Program License Serial Number 6145

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

From study/file name: 2997UNIHYDP3100.rte
*****HYDROGRAPH DATA*****
Number of intervals = 50
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 9.330 (CFS)
Total volume = 0.937 (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 = 50
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 Storage Outflow (S-O*dt/2) (S+O*dt/2)

(Ft.)	(Ac.Ft)	(CFS)	(Ac.Ft)	(Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.024	1.900	0.017	0.031
1.000	0.059	2.700	0.050	0.068
1.500	0.081	3.300	0.070	0.092
2.000	0.111	3.800	0.098	0.124
2.500	0.141	4.300	0.126	0.156
3.000	0.170	4.700	0.154	0.186
3.500	0.197	5.100	0.179	0.215
4.000	0.222	5.400	0.203	0.241
4.500	0.260	6.100	0.239	0.281

Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	2.3	4.66	7.00	9.33	Depth (Ft.)
0.083	0.12	0.03	0.000	O					0.01
0.167	0.64	0.18	0.002	O I					0.05
0.250	1.07	0.47	0.006	O I					0.12
0.333	1.20	0.75	0.010	O I					0.20
0.417	1.41	0.99	0.013	O I					0.26
0.500	1.64	1.22	0.015	O I					0.32
0.583	1.84	1.44	0.018	O I					0.38
0.667	1.92	1.63	0.021	O I					0.43
0.750	2.02	1.77	0.022	O					0.47
0.833	2.13	1.90	0.024	O I					0.50
0.917	2.07	1.93	0.025	O I					0.52
1.000	2.05	1.95	0.026	O I					0.53
1.083	2.21	1.98	0.027	O I					0.55
1.167	2.48	2.03	0.030	O I					0.58
1.250	2.68	2.11	0.033	O I					0.63
1.333	2.75	2.20	0.037	O I					0.69
1.417	2.77	2.28	0.041	O I					0.74
1.500	3.01	2.37	0.045	O I					0.79
1.583	3.26	2.48	0.049	O I					0.86
1.667	3.29	2.60	0.054	O I					0.93
1.750	3.44	2.71	0.059	O I					1.01
1.833	3.81	2.87	0.065	O I					1.14
1.917	3.99	3.04	0.072	O I					1.29
2.000	3.96	3.20	0.077	O I					1.42
2.083	3.99	3.32	0.082	O I					1.52
2.167	4.20	3.41	0.087	O I					1.61
2.250	4.85	3.53	0.095	O I					1.73
2.333	5.52	3.71	0.105	O I		I			1.91
2.417	5.71	3.91	0.118	O I		I			2.11
2.500	6.91	4.17	0.133	O I		I			2.37
2.583	8.47	4.51	0.157	O I		I		I	2.77
2.667	9.33	4.93	0.185	O I		I		I	3.28
2.750	8.59	5.28	0.212	O I		I		I	3.80
2.833	6.26	5.47	0.226	O I		I		I	4.05

2.917	4.50	5.46	0.225				I		O				4.04
3.000	3.64	5.33	0.216				I		O				3.88
3.083	2.65	5.16	0.202				I		O				3.60
3.167	1.71	4.88	0.182		I				O				3.23
3.250	1.17	4.56	0.160		I				O				2.82
3.333	0.86	4.22	0.136		I				O				2.42
3.417	0.63	3.85	0.114		I				O				2.05
3.500	0.47	3.49	0.092		I				O				1.69
3.583	0.35	3.07	0.072		I				O				1.31
3.667	0.24	2.61	0.055	I			O						0.94
3.750	0.16	2.26	0.040	I			O						0.72
3.833	0.09	1.95	0.026	I			O						0.53
3.917	0.04	1.23	0.015	I		O							0.32
4.000	0.03	0.72	0.009	I	O								0.19
4.083	0.01	0.42	0.005	I	O								0.11
4.167	0.00	0.24	0.003	O									0.06
4.250	0.00	0.14	0.002	O									0.04
4.333	0.00	0.08	0.001	O									0.02
4.417	0.00	0.05	0.001	O									0.01
4.500	0.00	0.03	0.000	O									0.01
4.583	0.00	0.01	0.000	O									0.00
4.667	0.00	0.01	0.000	O									0.00
4.750	0.00	0.00	0.000	O									0.00
4.833	0.00	0.00	0.000	O									0.00

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

Number of intervals = 58

Time interval = 5.0 (Min.)

Maximum/Peak flow rate = 5.474 (CFS)

Total volume = 0.937 (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
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Study date: 07/21/21

CHARTWELL - RIDER AT REDLANDS IND
100 YEAR STORM - 6 HOUR DURATION
PROPOSED CONDITION - BASIN ROUTING

Program License Serial Number 6145

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

From study/file name: 2997UNIHYDP6100.rte
*****HYDROGRAPH DATA*****
Number of intervals = 86
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 7.921 (CFS)
Total volume = 1.166 (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 = 86
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 Storage Outflow (S-O*dt/2) (S+O*dt/2)

(Ft.)	(Ac.Ft)	(CFS)	(Ac.Ft)	(Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.024	1.900	0.017	0.031
1.000	0.059	2.700	0.050	0.068
1.500	0.081	3.300	0.070	0.092
2.000	0.111	3.800	0.098	0.124
2.500	0.141	4.300	0.126	0.156
3.000	0.170	4.700	0.154	0.186
3.500	0.197	5.080	0.180	0.214
4.000	0.222	5.430	0.203	0.241
5.000	0.260	6.100	0.239	0.281

Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	2.0	3.96	5.94	7.92	Depth (Ft.)
0.083	0.05	0.01	0.000	O					0.00
0.167	0.28	0.08	0.001	OI					0.02
0.250	0.53	0.22	0.003	O I					0.06
0.333	0.66	0.38	0.005	OI					0.10
0.417	0.72	0.51	0.006	O					0.14
0.500	0.78	0.62	0.008	OI					0.16
0.583	0.87	0.71	0.009	OI					0.19
0.667	0.94	0.79	0.010	O					0.21
0.750	0.98	0.86	0.011	O					0.23
0.833	1.00	0.92	0.012	OI					0.24
0.917	1.02	0.96	0.012	OI					0.25
1.000	1.05	0.99	0.013	O					0.26
1.083	1.12	1.03	0.013	O					0.27
1.167	1.18	1.08	0.014	O					0.28
1.250	1.20	1.13	0.014	O					0.30
1.333	1.22	1.16	0.015	O					0.31
1.417	1.23	1.19	0.015	O					0.31
1.500	1.23	1.21	0.015	O					0.32
1.583	1.24	1.22	0.015	OI					0.32
1.667	1.24	1.23	0.016	OI					0.32
1.750	1.25	1.24	0.016	OI					0.33
1.833	1.25	1.24	0.016	O					0.33
1.917	1.25	1.24	0.016	O					0.33
2.000	1.26	1.25	0.016	O					0.33
2.083	1.31	1.27	0.016	O					0.33
2.167	1.32	1.29	0.016	O					0.34
2.250	1.34	1.31	0.016	O					0.34
2.333	1.39	1.33	0.017	O					0.35
2.417	1.40	1.36	0.017	O					0.36
2.500	1.41	1.38	0.017	O					0.36
2.583	1.42	1.40	0.018	O					0.37
2.667	1.43	1.41	0.018	O					0.37
2.750	1.44	1.42	0.018	O					0.37
2.833	1.50	1.44	0.018	OI					0.38

2.917	1.56	1.48	0.019		OI							0.39
3.000	1.58	1.52	0.019		O							0.40
3.083	1.59	1.55	0.020		O							0.41
3.167	1.62	1.57	0.020		O							0.41
3.250	1.68	1.60	0.020		O							0.42
3.333	1.74	1.65	0.021		OI							0.43
3.417	1.78	1.70	0.021		OI							0.45
3.500	1.86	1.75	0.022		O							0.46
3.583	2.00	1.83	0.023		OI							0.48
3.667	2.13	1.91	0.024		OI							0.51
3.750	2.24	1.95	0.026		O	I						0.53
3.833	2.34	2.00	0.028		OI							0.56
3.917	2.44	2.06	0.031		OI							0.60
4.000	2.53	2.12	0.034		O	I						0.64
4.083	2.63	2.19	0.037		O	I						0.68
4.167	2.74	2.26	0.040			O	I					0.72
4.250	2.89	2.34	0.043			O	I					0.77
4.333	3.05	2.43	0.047			O	I					0.83
4.417	3.22	2.54	0.052				O	I				0.90
4.500	3.38	2.65	0.057				O	I				0.97
4.583	3.50	2.77	0.062				O	I				1.06
4.667	3.63	2.91	0.067				O	I				1.18
4.750	3.79	3.05	0.072				O	I				1.29
4.833	3.95	3.19	0.077				O	I				1.41
4.917	4.07	3.32	0.082				O	I				1.52
5.000	4.20	3.41	0.087				O	I				1.61
5.083	4.41	3.51	0.093				O	I				1.71
5.167	4.87	3.63	0.101				O		I			1.83
5.250	5.52	3.80	0.111				O			I		2.00
5.333	6.13	4.02	0.124				O			I		2.22
5.417	6.72	4.28	0.140					O			I	2.48
5.500	7.47	4.54	0.158					O			I	2.80
5.583	7.92	4.83	0.179					O			I	3.17
5.667	6.30	5.04	0.194					O		I		3.45
5.750	4.09	5.05	0.195					I	O			3.46
5.833	2.83	4.91	0.185				I		O			3.27
5.917	2.10	4.68	0.169			I			O			2.98
6.000	1.55	4.42	0.150			I			O			2.65
6.083	1.11	4.11	0.130		I				O			2.31
6.167	0.79	3.77	0.109		I				O			1.97
6.250	0.58	3.43	0.089		I				O			1.63
6.333	0.42	3.01	0.070		I				O			1.26
6.417	0.30	2.57	0.054		I				O			0.92
6.500	0.21	2.24	0.039	I				O				0.71
6.583	0.15	1.94	0.026	I		O						0.52
6.667	0.09	1.23	0.016	I	O							0.32
6.750	0.04	0.73	0.009	I	O							0.19
6.833	0.02	0.43	0.005	IO								0.11
6.917	0.01	0.25	0.003	IO								0.07
7.000	0.01	0.15	0.002	O								0.04
7.083	0.00	0.09	0.001	O								0.02
7.167	0.00	0.05	0.001	O								0.01
7.250	0.00	0.03	0.000	O								0.01
7.333	0.00	0.02	0.000	O								0.00

7.417	0.00	0.01	0.000	O					0.00
7.500	0.00	0.01	0.000	O					0.00
7.583	0.00	0.00	0.000	O					0.00

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

Number of intervals = 91
 Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 5.053 (CFS)
 Total volume = 1.166 (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
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Study date: 07/21/21

CHARTWELL - RIDER AT REDLANDS IND
100 YEAR STORM - 24 HOUR DURATION
PROPOSED CONDITION - BASIN ROUTING

Program License Serial Number 6145

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

From study/file name: 2997UNIHYDP24100.rte
*****HYDROGRAPH DATA*****
Number of intervals = 302
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 3.389 (CFS)
Total volume = 1.795 (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 = 302
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 Storage Outflow (S-O*dt/2) (S+O*dt/2)

(Ft.)	(Ac.Ft)	(CFS)	(Ac.Ft)	(Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.021	2.800	0.011	0.031
1.000	0.045	3.900	0.032	0.058
1.500	0.070	4.800	0.053	0.087
2.000	0.095	5.500	0.076	0.114
2.500	0.121	6.200	0.100	0.142
3.000	0.146	6.800	0.123	0.169
3.500	0.170	7.300	0.145	0.195
4.000	0.191	7.800	0.164	0.218
4.500	0.207	8.300	0.178	0.236

Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	0	0.8	1.69	2.54	3.39	Depth (Ft.)
0.083	0.01	0.00	0.000	O					0.00
0.167	0.07	0.03	0.000	O					0.00
0.250	0.12	0.07	0.001	OI					0.01
0.333	0.14	0.11	0.001	IO					0.02
0.417	0.18	0.14	0.001	IO					0.03
0.500	0.21	0.18	0.001	IOI					0.03
0.583	0.23	0.21	0.002	IOI					0.04
0.667	0.24	0.22	0.002	I O					0.04
0.750	0.25	0.24	0.002	I O					0.04
0.833	0.23	0.24	0.002	I O					0.04
0.917	0.16	0.21	0.002	IO					0.04
1.000	0.09	0.16	0.001	IO					0.03
1.083	0.09	0.12	0.001	IO					0.02
1.167	0.15	0.12	0.001	IO					0.02
1.250	0.21	0.16	0.001	IO					0.03
1.333	0.23	0.20	0.001	IOI					0.04
1.417	0.24	0.22	0.002	I O					0.04
1.500	0.25	0.24	0.002	I O					0.04
1.583	0.25	0.25	0.002	I O					0.04
1.667	0.26	0.25	0.002	I O					0.04
1.750	0.26	0.25	0.002	I O					0.05
1.833	0.24	0.25	0.002	I O					0.04
1.917	0.17	0.22	0.002	IO					0.04
2.000	0.11	0.17	0.001	IO					0.03
2.083	0.09	0.13	0.001	IO					0.02
2.167	0.08	0.10	0.001	O					0.02
2.250	0.07	0.08	0.001	O					0.01
2.333	0.06	0.07	0.001	O					0.01
2.417	0.06	0.06	0.000	O					0.01
2.500	0.06	0.06	0.000	O					0.01
2.583	0.06	0.06	0.000	O					0.01
2.667	0.10	0.07	0.001	O					0.01
2.750	0.13	0.10	0.001	OI					0.02
2.833	0.14	0.12	0.001	IO					0.02

2.917	0.14	0.13	0.001	O				0.02
3.000	0.15	0.14	0.001	O				0.03
3.083	0.15	0.15	0.001	O				0.03
3.167	0.16	0.15	0.001	O				0.03
3.250	0.16	0.16	0.001	O				0.03
3.333	0.17	0.16	0.001	O				0.03
3.417	0.17	0.16	0.001	O				0.03
3.500	0.17	0.17	0.001	O				0.03
3.583	0.17	0.17	0.001	O				0.03
3.667	0.17	0.17	0.001	O				0.03
3.750	0.18	0.17	0.001	O				0.03
3.833	0.19	0.18	0.001	O				0.03
3.917	0.22	0.19	0.001	OI				0.03
4.000	0.25	0.22	0.002	O				0.04
4.083	0.27	0.25	0.002	O				0.04
4.167	0.27	0.26	0.002	O				0.05
4.250	0.28	0.27	0.002	O				0.05
4.333	0.29	0.28	0.002	O				0.05
4.417	0.33	0.30	0.002	OI				0.05
4.500	0.36	0.33	0.002	O				0.06
4.583	0.38	0.36	0.003	O				0.06
4.667	0.39	0.37	0.003	O				0.07
4.750	0.40	0.39	0.003	O				0.07
4.833	0.41	0.40	0.003	O				0.07
4.917	0.45	0.42	0.003	OI				0.07
5.000	0.48	0.45	0.003	O				0.08
5.083	0.48	0.47	0.004	O				0.08
5.167	0.42	0.46	0.003	IO				0.08
5.250	0.37	0.42	0.003	O				0.07
5.333	0.36	0.38	0.003	O				0.07
5.417	0.38	0.38	0.003	O				0.07
5.500	0.41	0.39	0.003	O				0.07
5.583	0.42	0.41	0.003	OI				0.07
5.667	0.46	0.43	0.003	O				0.08
5.750	0.50	0.46	0.003	O				0.08
5.833	0.51	0.49	0.004	O				0.09
5.917	0.52	0.50	0.004	O				0.09
6.000	0.53	0.52	0.004	O				0.09
6.083	0.54	0.53	0.004	OI				0.09
6.167	0.58	0.55	0.004	O				0.10
6.250	0.61	0.58	0.004	O				0.10
6.333	0.63	0.60	0.005	O				0.11
6.417	0.64	0.62	0.005	O				0.11
6.500	0.64	0.63	0.005	OI				0.11
6.583	0.66	0.64	0.005	O				0.11
6.667	0.69	0.66	0.005	O				0.12
6.750	0.73	0.69	0.005	O				0.12
6.833	0.74	0.72	0.005	OI				0.13
6.917	0.75	0.74	0.006	OI				0.13
7.000	0.76	0.75	0.006	O				0.13
7.083	0.76	0.76	0.006	O				0.14
7.167	0.77	0.76	0.006	O				0.14
7.250	0.77	0.77	0.006	O				0.14
7.333	0.78	0.77	0.006	O				0.14

7.417	0.82	0.79	0.006		O				0.14
7.500	0.85	0.82	0.006		OI				0.15
7.583	0.87	0.85	0.006		OI				0.15
7.667	0.92	0.88	0.007		O				0.16
7.750	0.95	0.91	0.007		O				0.16
7.833	0.98	0.95	0.007		OI				0.17
7.917	1.02	0.98	0.007		O				0.17
8.000	1.06	1.02	0.008		OI				0.18
8.083	1.09	1.05	0.008		OI				0.19
8.167	1.17	1.10	0.008		OI				0.20
8.250	1.24	1.17	0.009		O				0.21
8.333	1.27	1.22	0.009		OI				0.22
8.417	1.29	1.26	0.009		OI				0.23
8.500	1.31	1.28	0.010		O				0.23
8.583	1.32	1.30	0.010		O				0.23
8.667	1.37	1.33	0.010		O				0.24
8.750	1.40	1.36	0.010		OI				0.24
8.833	1.43	1.40	0.010		O				0.25
8.917	1.47	1.43	0.011		O				0.26
9.000	1.51	1.47	0.011		OI				0.26
9.083	1.54	1.50	0.011		O				0.27
9.167	1.62	1.55	0.012		OI				0.28
9.250	1.69	1.62	0.012		O				0.29
9.333	1.73	1.68	0.013		OI				0.30
9.417	1.78	1.73	0.013		O				0.31
9.500	1.82	1.77	0.013		OI				0.32
9.583	1.85	1.82	0.014		O				0.32
9.667	1.90	1.86	0.014		O				0.33
9.750	1.94	1.90	0.014		OI				0.34
9.833	1.97	1.94	0.015		O				0.35
9.917	2.02	1.97	0.015		OI				0.35
10.000	2.06	2.01	0.015		O				0.36
10.083	2.02	2.03	0.015		O				0.36
10.167	1.80	1.95	0.015		IO				0.35
10.250	1.60	1.79	0.013		IO				0.32
10.333	1.52	1.65	0.012		IO				0.29
10.417	1.48	1.55	0.012		IO				0.28
10.500	1.45	1.50	0.011		IO				0.27
10.583	1.47	1.47	0.011		O				0.26
10.667	1.63	1.52	0.011		OI				0.27
10.750	1.77	1.63	0.012		OI				0.29
10.833	1.82	1.73	0.013		OI				0.31
10.917	1.84	1.79	0.013		OI				0.32
11.000	1.86	1.83	0.014		O				0.33
11.083	1.87	1.85	0.014		O				0.33
11.167	1.84	1.85	0.014		O				0.33
11.250	1.82	1.84	0.014		O				0.33
11.333	1.82	1.83	0.014		O				0.33
11.417	1.82	1.82	0.014		O				0.33
11.500	1.82	1.82	0.014		O				0.32
11.583	1.80	1.81	0.014		O				0.32
11.667	1.74	1.79	0.013		O				0.32
11.750	1.68	1.74	0.013		IO				0.31
11.833	1.66	1.70	0.013		IO				0.30

11.917	1.68	1.68	0.013				O					0.30
12.000	1.70	1.69	0.013				OI					0.30
12.083	1.77	1.72	0.013				O					0.31
12.167	2.01	1.82	0.014				OI					0.33
12.250	2.22	2.01	0.015				O I					0.36
12.333	2.31	2.17	0.016				OI					0.39
12.417	2.39	2.28	0.017				OI					0.41
12.500	2.46	2.37	0.018				OI					0.42
12.583	2.51	2.44	0.018				O					0.44
12.667	2.60	2.51	0.019				OI					0.45
12.750	2.68	2.59	0.019				OI					0.46
12.833	2.73	2.66	0.020				O					0.48
12.917	2.79	2.72	0.020				OI					0.49
13.000	2.84	2.78	0.021				O					0.50
13.083	2.90	2.82	0.021				OI					0.51
13.167	3.09	2.86	0.022				O I					0.53
13.250	3.25	2.95	0.024				O I					0.57
13.333	3.32	3.04	0.026				O I					0.61
13.417	3.36	3.12	0.028				O I					0.65
13.500	3.39	3.19	0.030				OI					0.68
13.583	3.32	3.24	0.031				OI					0.70
13.667	2.96	3.21	0.030				I O					0.69
13.750	2.65	3.10	0.028				I O					0.64
13.833	2.53	2.96	0.024				I O					0.57
13.917	2.46	2.83	0.022				I O					0.51
14.000	2.41	2.62	0.020				I O					0.47
14.083	2.41	2.49	0.019				IO					0.44
14.167	2.53	2.48	0.019				O					0.44
14.250	2.63	2.54	0.019				OI					0.45
14.333	2.65	2.60	0.020				OI					0.46
14.417	2.63	2.63	0.020				O					0.47
14.500	2.61	2.62	0.020				O					0.47
14.583	2.61	2.62	0.020				O					0.47
14.667	2.61	2.61	0.020				O					0.47
14.750	2.61	2.61	0.020				O					0.47
14.833	2.60	2.60	0.020				O					0.47
14.917	2.57	2.59	0.019				O					0.46
15.000	2.54	2.57	0.019				O					0.46
15.083	2.52	2.55	0.019				IO					0.45
15.167	2.49	2.52	0.019				O					0.45
15.250	2.45	2.49	0.019				O					0.44
15.333	2.43	2.46	0.018				IO					0.44
15.417	2.39	2.43	0.018				O					0.43
15.500	2.35	2.39	0.018				O					0.43
15.583	2.30	2.35	0.018				IO					0.42
15.667	2.16	2.28	0.017				IO					0.41
15.750	2.03	2.16	0.016				IO					0.39
15.833	1.98	2.06	0.015				IO					0.37
15.917	1.95	2.00	0.015				O					0.36
16.000	1.93	1.96	0.015				O					0.35
16.083	1.79	1.90	0.014				IO					0.34
16.167	1.28	1.67	0.013			I	O					0.30
16.250	0.82	1.28	0.010		I	O						0.23
16.333	0.64	0.93	0.007		I O							0.17

16.417	0.53	0.71	0.005	I O				0.13
16.500	0.46	0.57	0.004	IO				0.10
16.583	0.40	0.48	0.004	IO				0.09
16.667	0.32	0.40	0.003	O				0.07
16.750	0.27	0.34	0.003	IO				0.06
16.833	0.23	0.28	0.002	O				0.05
16.917	0.21	0.24	0.002	IO				0.04
17.000	0.19	0.22	0.002	IO				0.04
17.083	0.20	0.20	0.002	O				0.04
17.167	0.25	0.22	0.002	O				0.04
17.250	0.31	0.26	0.002	O				0.05
17.333	0.33	0.29	0.002	OI				0.05
17.417	0.34	0.32	0.002	O				0.06
17.500	0.35	0.34	0.003	O				0.06
17.583	0.36	0.35	0.003	O				0.06
17.667	0.36	0.36	0.003	O				0.06
17.750	0.37	0.36	0.003	O				0.06
17.833	0.36	0.36	0.003	O				0.07
17.917	0.33	0.35	0.003	O				0.06
18.000	0.31	0.33	0.002	IO				0.06
18.083	0.30	0.31	0.002	O				0.06
18.167	0.29	0.30	0.002	O				0.05
18.250	0.29	0.29	0.002	O				0.05
18.333	0.28	0.29	0.002	O				0.05
18.417	0.28	0.29	0.002	O				0.05
18.500	0.28	0.28	0.002	O				0.05
18.583	0.27	0.28	0.002	O				0.05
18.667	0.24	0.27	0.002	O				0.05
18.750	0.21	0.24	0.002	IO				0.04
18.833	0.19	0.21	0.002	IO				0.04
18.917	0.15	0.19	0.001	O				0.03
19.000	0.11	0.15	0.001	O				0.03
19.083	0.11	0.13	0.001	O				0.02
19.167	0.13	0.12	0.001	O				0.02
19.250	0.16	0.14	0.001	O				0.02
19.333	0.17	0.15	0.001	O				0.03
19.417	0.21	0.18	0.001	O				0.03
19.500	0.24	0.21	0.002	OI				0.04
19.583	0.25	0.23	0.002	O				0.04
19.667	0.22	0.23	0.002	O				0.04
19.750	0.20	0.22	0.002	IO				0.04
19.833	0.18	0.20	0.002	O				0.04
19.917	0.15	0.18	0.001	O				0.03
20.000	0.12	0.15	0.001	O				0.03
20.083	0.11	0.13	0.001	O				0.02
20.167	0.14	0.13	0.001	O				0.02
20.250	0.16	0.14	0.001	O				0.03
20.333	0.17	0.16	0.001	O				0.03
20.417	0.18	0.17	0.001	O				0.03
20.500	0.18	0.17	0.001	O				0.03
20.583	0.18	0.18	0.001	O				0.03
20.667	0.18	0.18	0.001	O				0.03
20.750	0.18	0.18	0.001	O				0.03
20.833	0.18	0.18	0.001	O				0.03

20.917	0.14	0.17	0.001	O				0.03
21.000	0.12	0.14	0.001	O				0.03
21.083	0.11	0.13	0.001	O				0.02
21.167	0.14	0.13	0.001	O				0.02
21.250	0.17	0.14	0.001	O				0.03
21.333	0.17	0.16	0.001	O				0.03
21.417	0.14	0.16	0.001	O				0.03
21.500	0.11	0.14	0.001	O				0.02
21.583	0.11	0.12	0.001	O				0.02
21.667	0.14	0.12	0.001	O				0.02
21.750	0.17	0.14	0.001	O				0.03
21.833	0.17	0.16	0.001	O				0.03
21.917	0.14	0.16	0.001	O				0.03
22.000	0.11	0.14	0.001	O				0.02
22.083	0.11	0.12	0.001	O				0.02
22.167	0.14	0.13	0.001	O				0.02
22.250	0.17	0.14	0.001	O				0.03
22.333	0.17	0.16	0.001	O				0.03
22.417	0.14	0.16	0.001	O				0.03
22.500	0.12	0.14	0.001	O				0.03
22.583	0.11	0.12	0.001	O				0.02
22.667	0.10	0.11	0.001	O				0.02
22.750	0.10	0.11	0.001	O				0.02
22.833	0.10	0.10	0.001	O				0.02
22.917	0.10	0.10	0.001	O				0.02
23.000	0.10	0.10	0.001	O				0.02
23.083	0.09	0.10	0.001	O				0.02
23.167	0.09	0.09	0.001	O				0.02
23.250	0.09	0.09	0.001	O				0.02
23.333	0.09	0.09	0.001	O				0.02
23.417	0.09	0.09	0.001	O				0.02
23.500	0.09	0.09	0.001	O				0.02
23.583	0.09	0.09	0.001	O				0.02
23.667	0.09	0.09	0.001	O				0.02
23.750	0.09	0.09	0.001	O				0.02
23.833	0.09	0.09	0.001	O				0.02
23.917	0.09	0.09	0.001	O				0.02
24.000	0.09	0.09	0.001	O				0.02
24.083	0.09	0.09	0.001	O				0.02
24.167	0.06	0.08	0.001	O				0.01
24.250	0.03	0.06	0.000	O				0.01
24.333	0.02	0.04	0.000	O				0.01
24.417	0.02	0.03	0.000	O				0.00
24.500	0.01	0.02	0.000	O				0.00
24.583	0.01	0.01	0.000	O				0.00
24.667	0.01	0.01	0.000	O				0.00
24.750	0.00	0.01	0.000	O				0.00
24.833	0.00	0.00	0.000	O				0.00
24.917	0.00	0.00	0.000	O				0.00
25.000	0.00	0.00	0.000	O				0.00
25.083	0.00	0.00	0.000	O				0.00
25.167	0.00	0.00	0.000	O				0.00
25.250	0.00	0.00	0.000	O				0.00

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

Number of intervals = 303

Time interval = 5.0 (Min.)

Maximum/Peak flow rate = 3.236 (CFS)

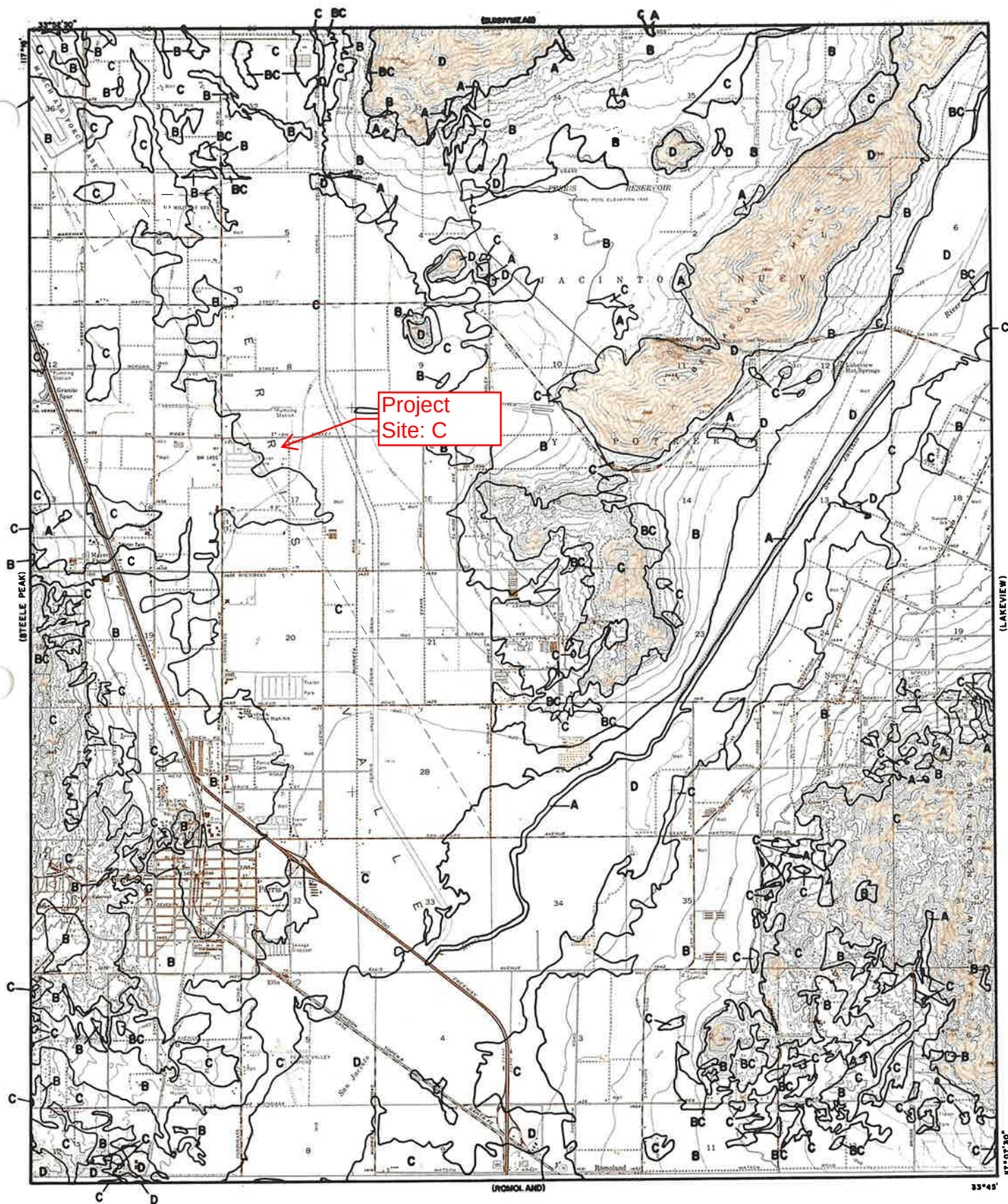
Total volume = 1.795 (Ac.Ft)

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 E

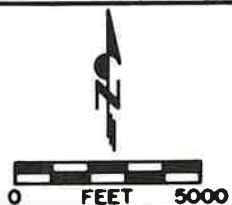
Soil Group Map and Isohyetal Map



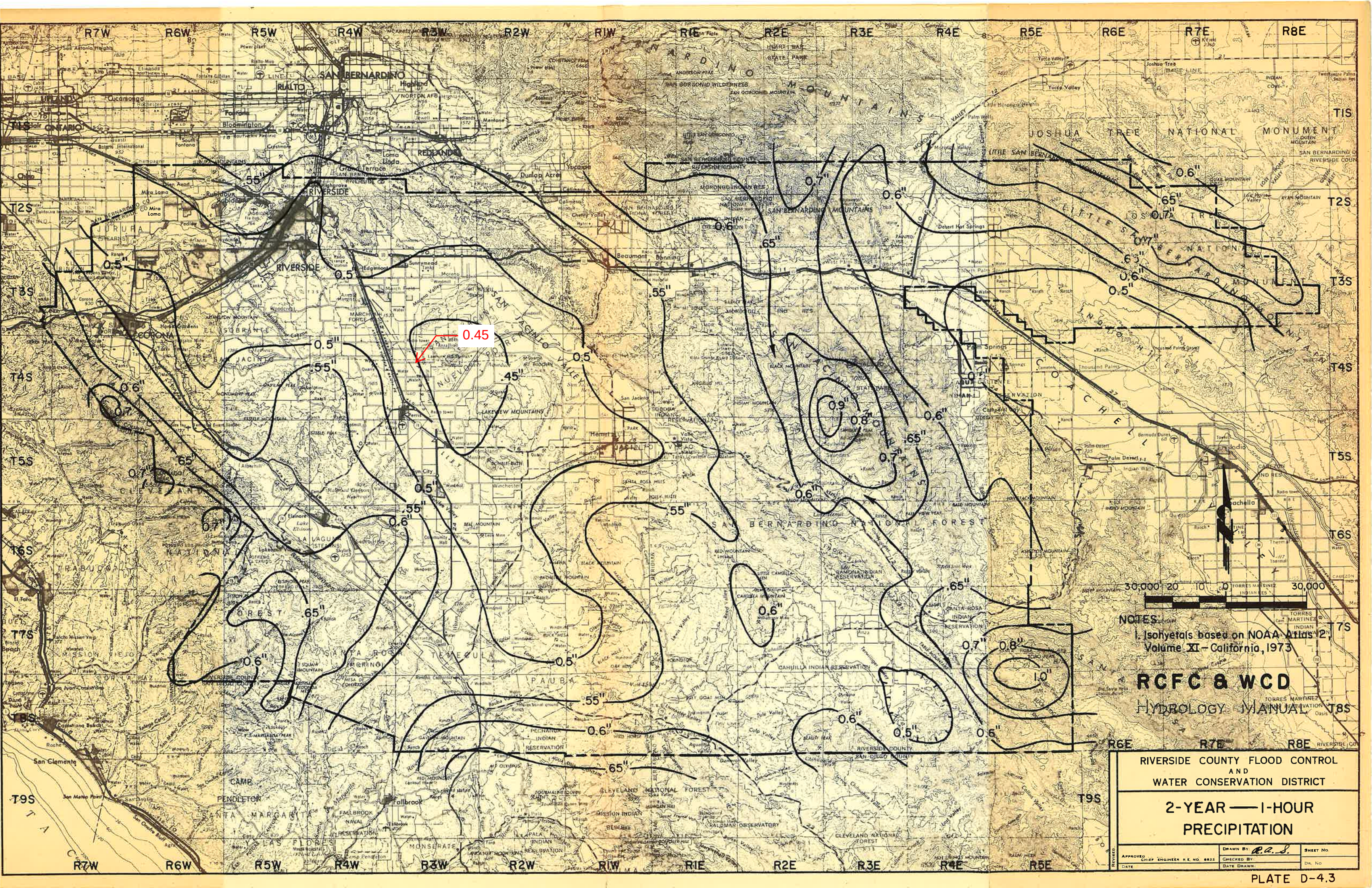
LEGEND

- SOILS GROUP BOUNDARY
- A SOILS GROUP DESIGNATION

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**HYDROLOGIC SOILS GROUP MAP
FOR
PERRIS**



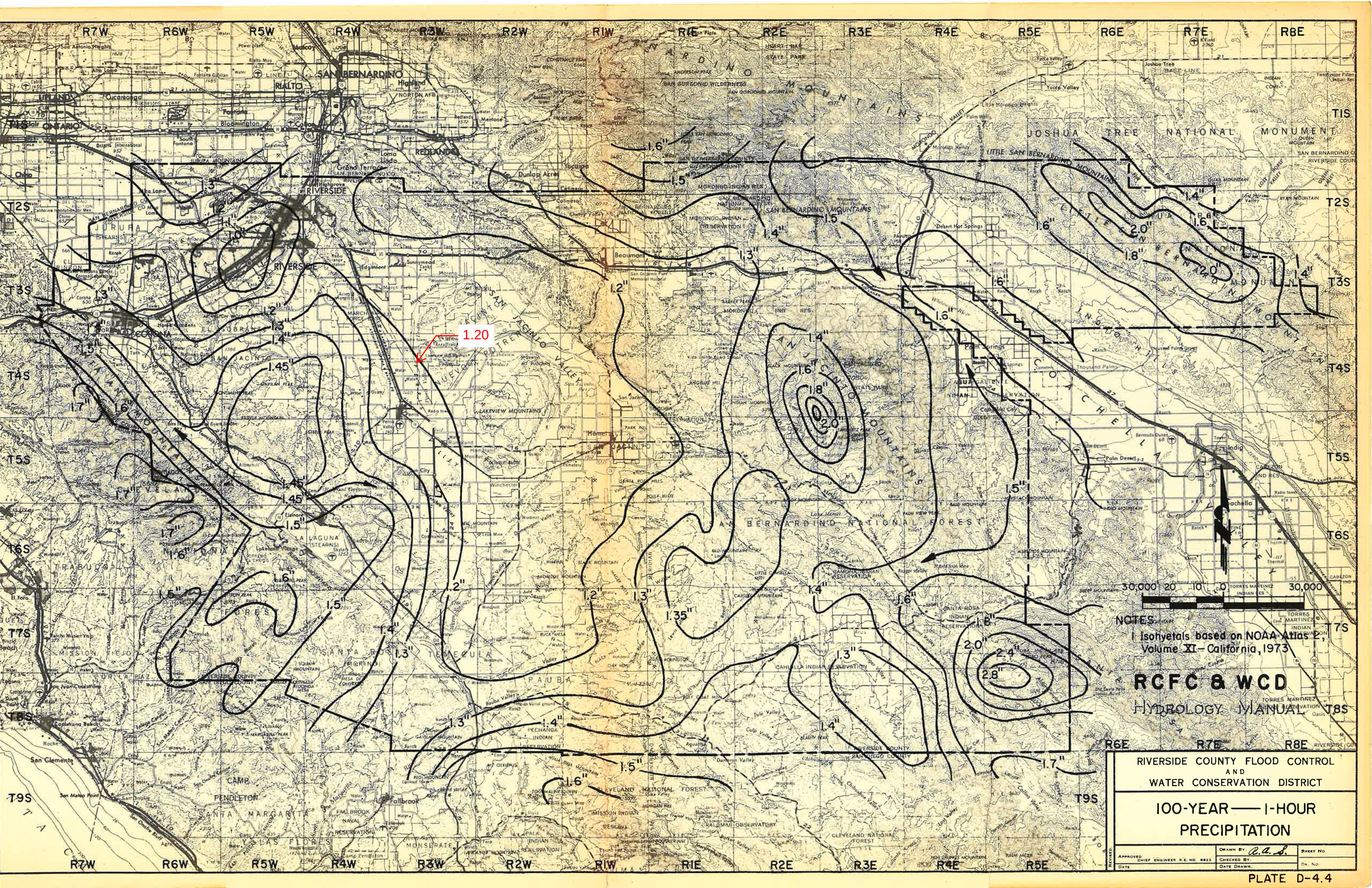
NOTES:
1. Isohyets based on NOAA Atlas 2,
Volume XI - California, 1973

RCFC & WCD HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

2-YEAR — 1-HOUR PRECIPITATION

APPROVED: CHIEF ENGINEER R.E. NO. 8822	DRAWN BY: <i>P.L.S.</i>	SHEET NO.
CHECKED BY:	DATE DRAWN:	DR. NO.



1.20

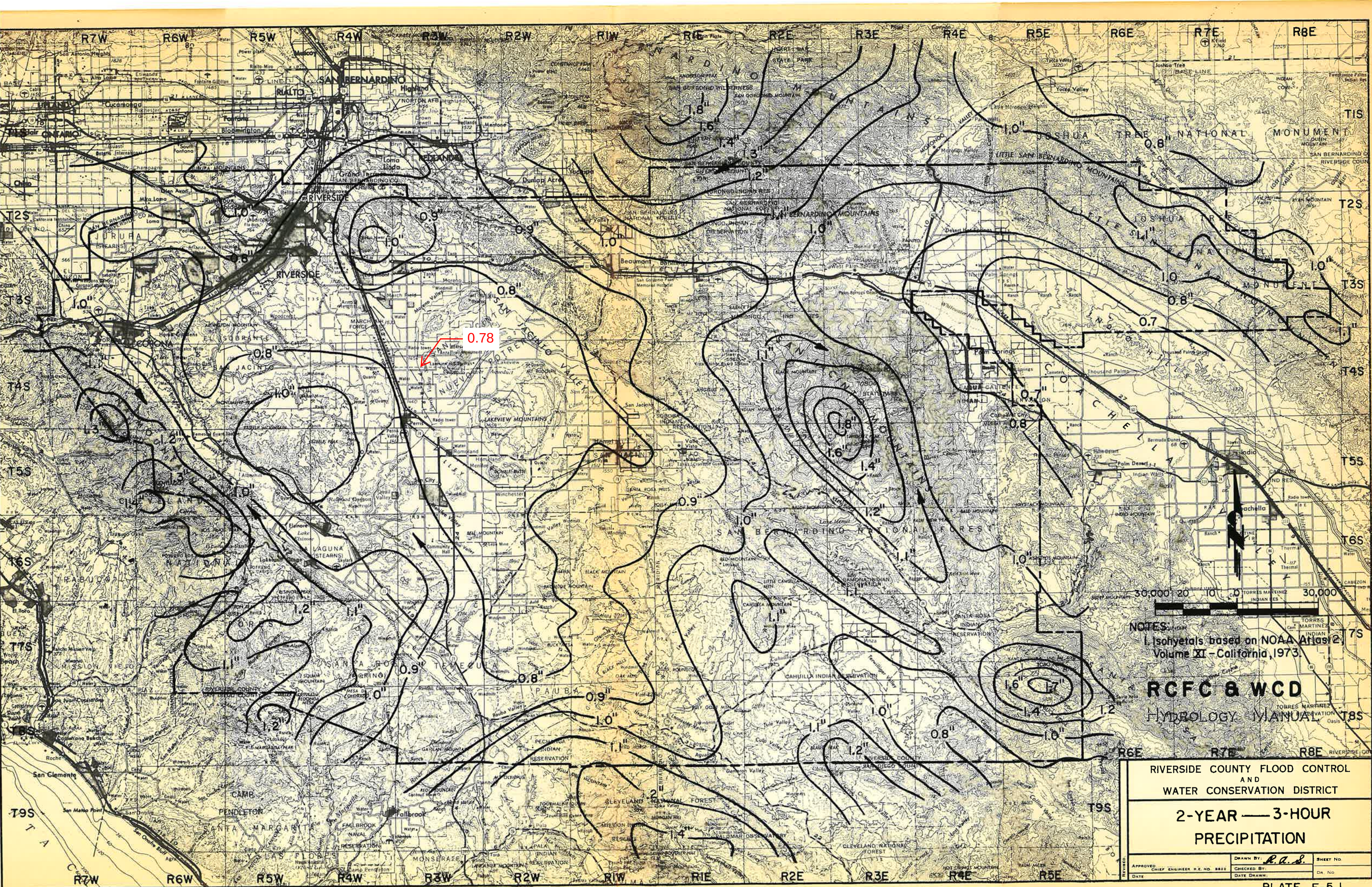
NOTES:
Isohyets based on NOAA Atlas 2,
Volume XI—California, 1973

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RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

**100-YEAR — 1-HOUR
PRECIPITATION**

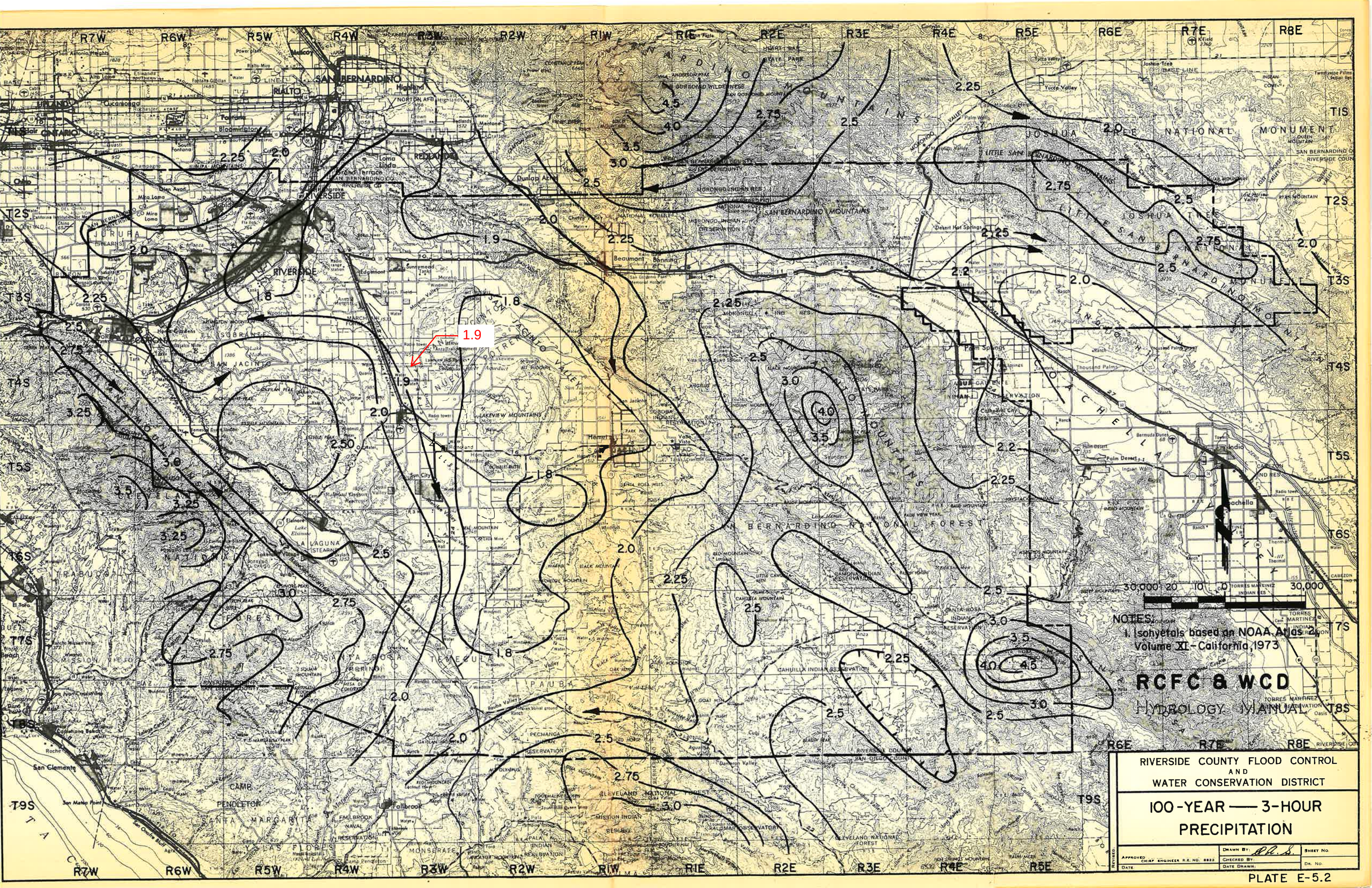
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DATE	CHECKED BY DATE DRAWN	DR. NO.



NOTES:
1. Isohyets based on NOAA Atlas 2,
Volume XI - California, 1973.

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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		
2-YEAR — 3-HOUR PRECIPITATION		
APPROVED DATE	CHIEF ENGINEER W.E. NO. 8822 CHECKED BY DATE	DRAWN BY: R.A.S. SHEET NO. Dr. No.



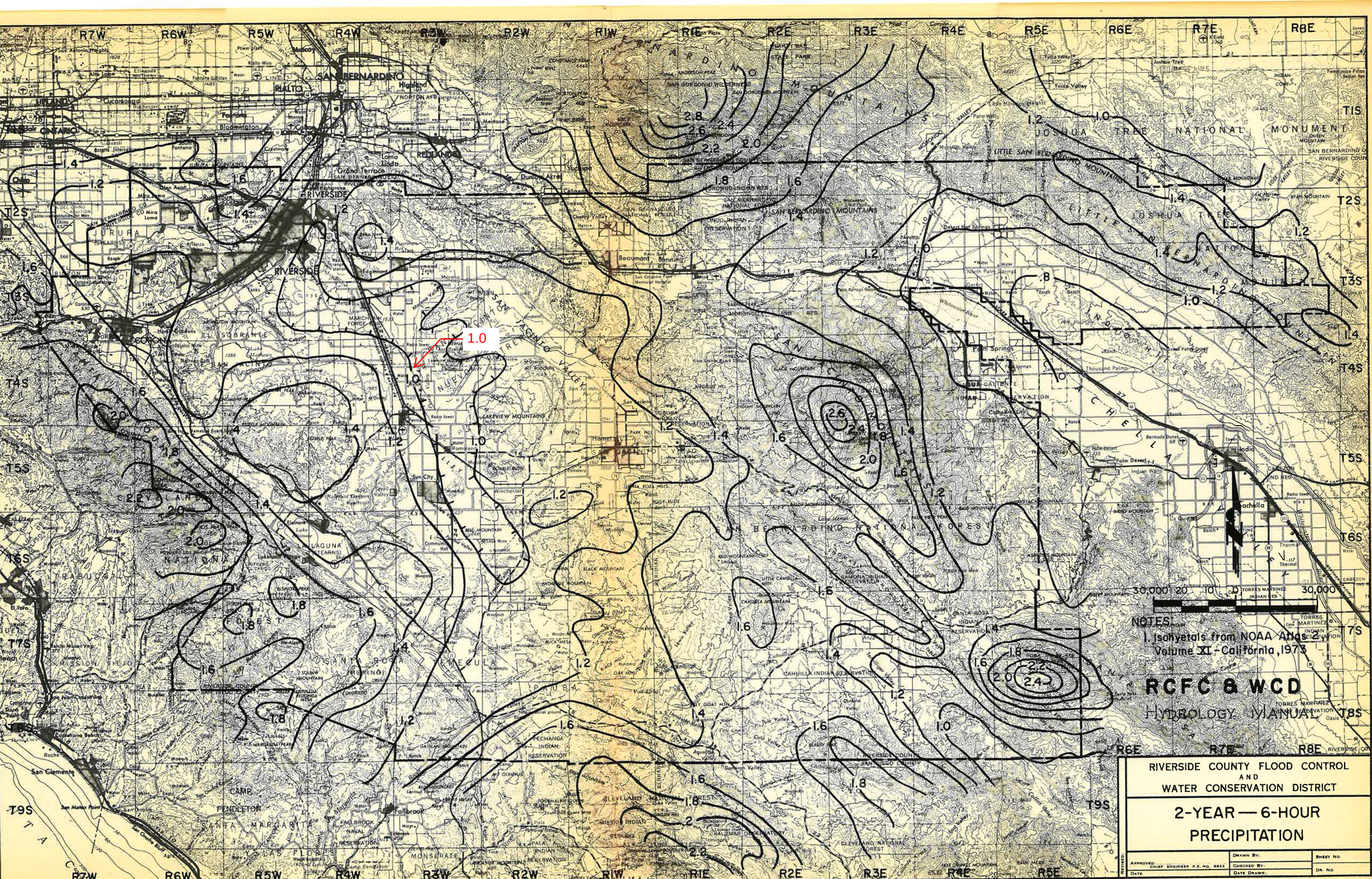
NOTES:
1. Isohyets based on NOAA Atlas 2,
Volume XI - California, 1973

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RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

**100-YEAR — 3-HOUR
PRECIPITATION**

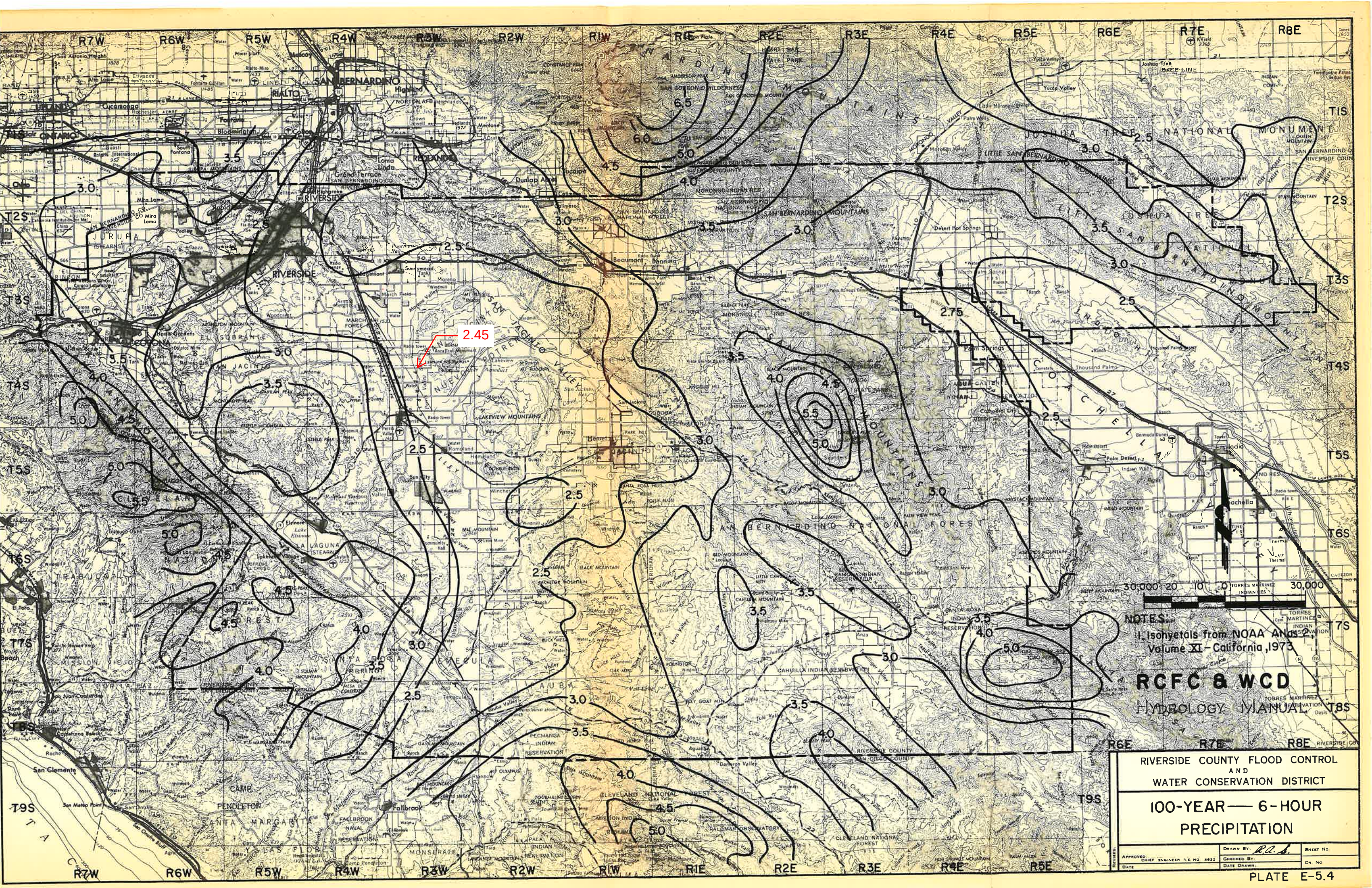
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CHECKED BY:		DATE DRAWN:	DR. NO.



NOTES:
1. Isohyets from NOAA Atlas
Volume XI - California, 1973

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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT			
2-YEAR — 6-HOUR PRECIPITATION			
APPROVED:	CHEF ENGINEER R.E. NO. 882	DRAWN BY:	SHEET NO.
CHECKED BY:		DATE DRAWN:	DR. NO.

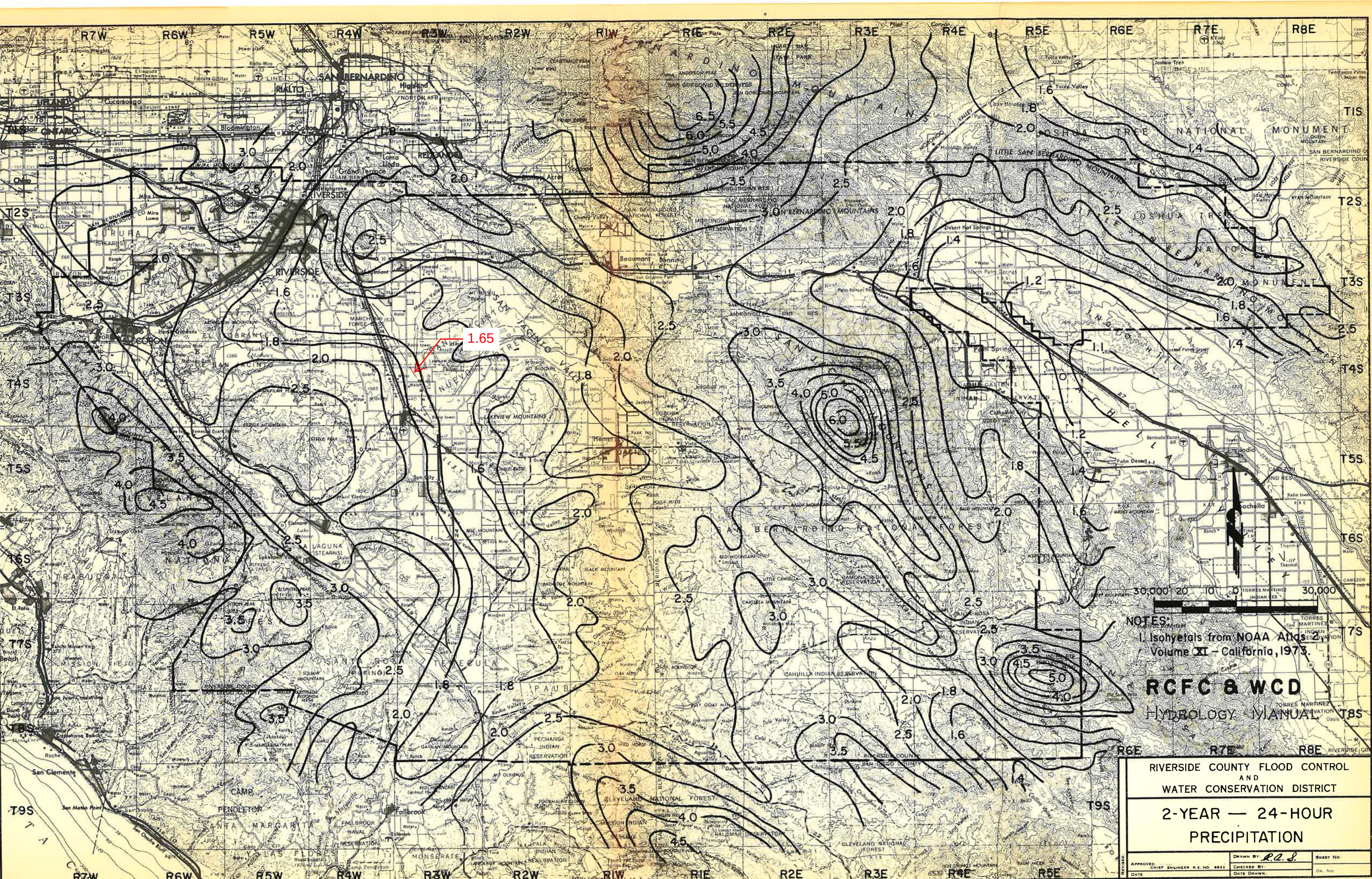


NOTES:
1. Isohyets from NOAA Atlas 2,
Volume XI - California, 1973

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**RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT**
**100-YEAR — 6-HOUR
PRECIPITATION**

APPROVED	CHIEF ENGINEER R.C. NO. 8822	DRAWN BY: <i>P.A.A.</i>	SHEET NO.
DATE		CHECKED BY:	DR. NO.



NOTES:
1. Isohyets from NOAA Atlas
Volume XI - California, 1973.

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AND
WATER CONSERVATION DISTRICT

**2-YEAR — 24-HOUR
PRECIPITATION**

APPROVED	CHIEF ENGINEER R.E. NO. 8822	DRAWN BY <i>R.A.S.</i>	SHEET NO.
DATE	CHECKED BY	DATE DRAWN	Dr. No.



NOTES:
1. Isohyets from NOAA Atlas 2,
Volume XI - California, 1973.

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AND
WATER CONSERVATION DISTRICT
**100-YEAR — 24-HOUR
PRECIPITATION**

APPROVED: CHIEF ENGINEER R.E. NO. 8822	DRAWN BY:	SHEET NO.
DATE:	CHECKED BY:	Dr. No.
	DATE DRAWN:	

Appendix F

Reference Plan

Figure 3.0-11 EXISTING STORM DRAIN PLAN

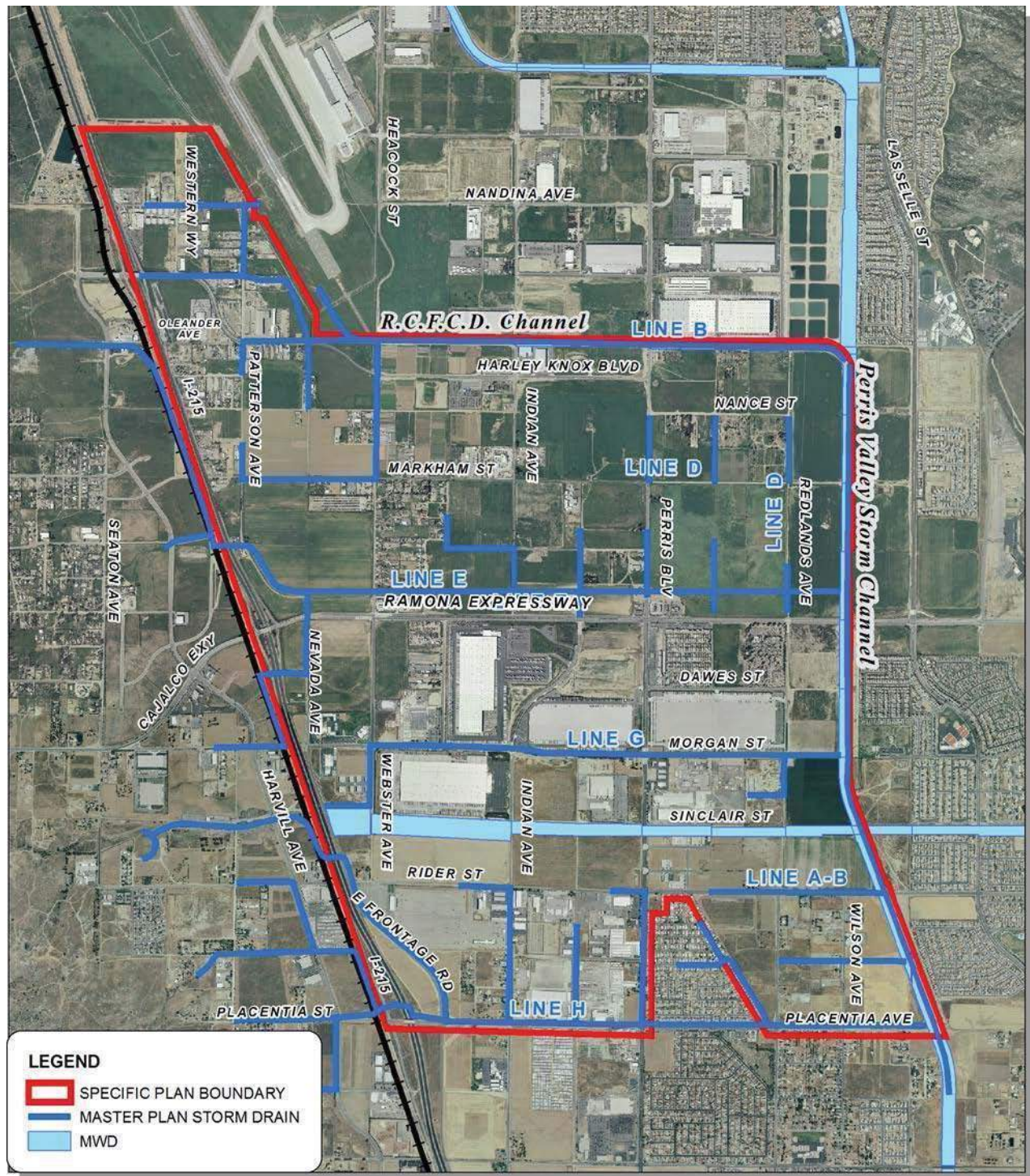
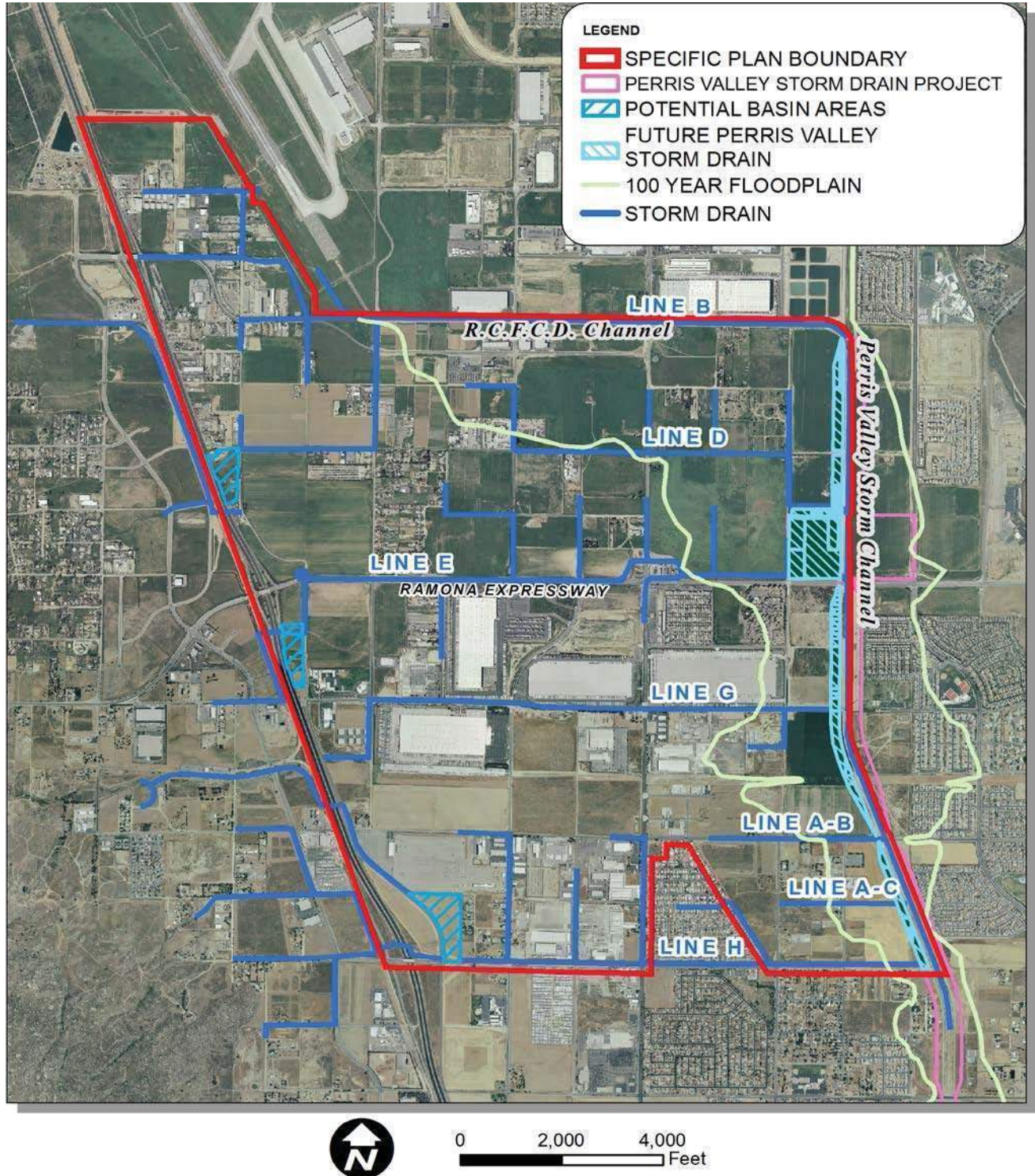


Figure 3.0-16 PROPOSED STORM DRAIN PLAN





LEGEND

- MASTER PLAN BOUNDARY
- EXISTING FACILITY
- OPEN CHANNEL (CONC. TRAPEZOIDAL CHANNEL, SB = 1.5:1; UNLESS OTHERWISE NOTED)
- STORM DRAIN (RCP UNLESS OTHERWISE NOTED)
- FLOW RATE - IN CUBIC FEET PER SECOND, 250 = DESIGN Q, 250 = 100 YR. Q

MASTER PLAN COST \$1,428,332.00

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

MASTER DRAINAGE PLAN
FOR THE
PERRIS VALLEY AREA
JULY 1987 (REVISED JUNE 1991)

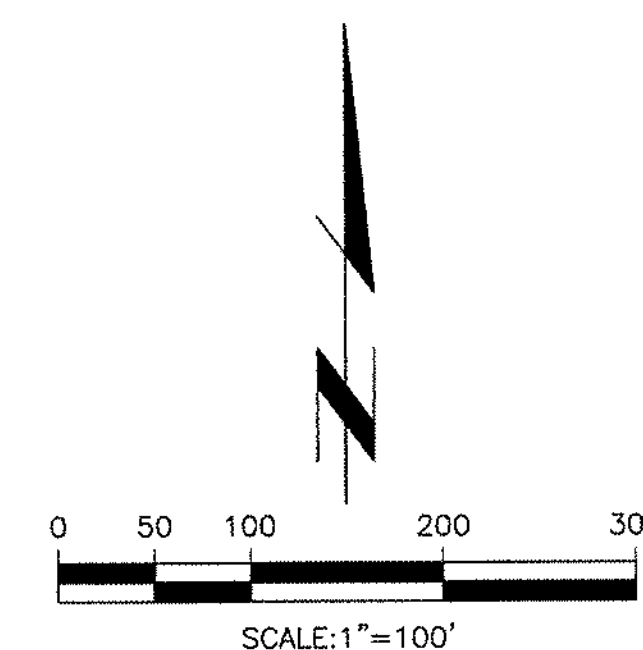
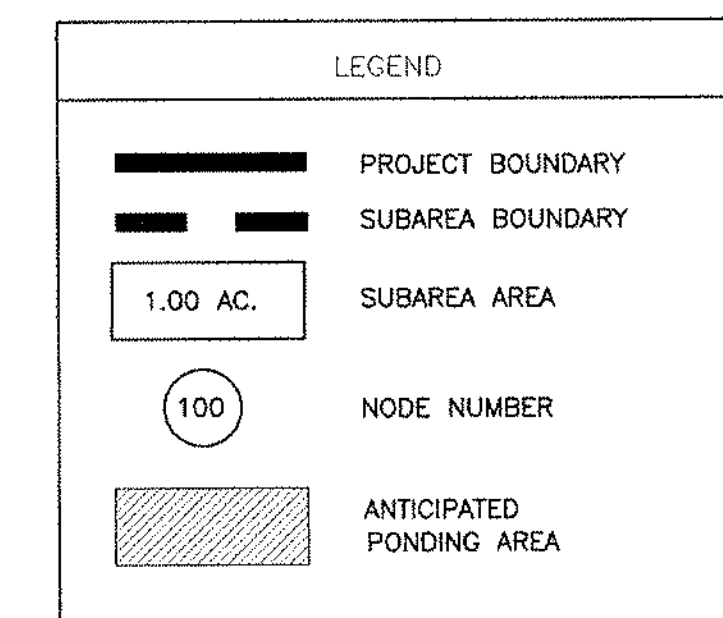
J. F. DAVIDSON ASSOCIATES
CIVIL ENGINEERS • PLANNERS • SURVEYORS

JFDA
ASSOCIATES

300 Tenth Street • Riverside, California 92501 • (714) 948-8844
10001 Mt. Vernon Ave., Suite 100, Colton, Calif. 92316



SEE SHEET NO. 2



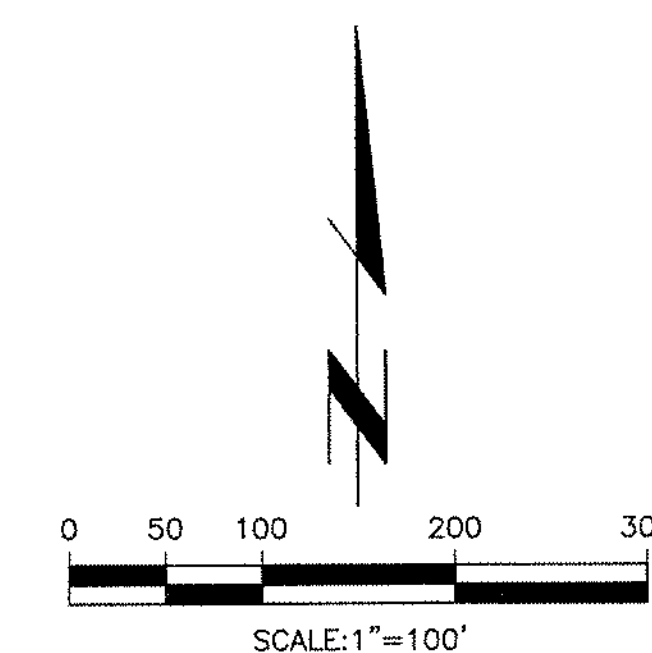
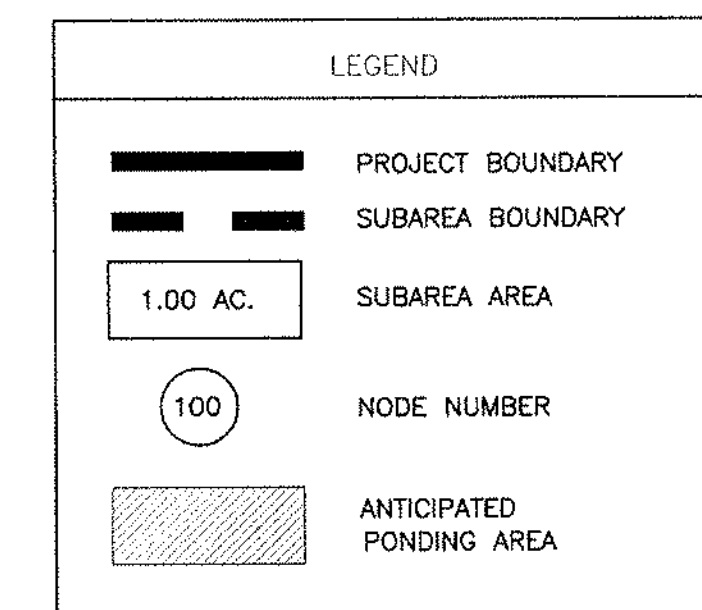
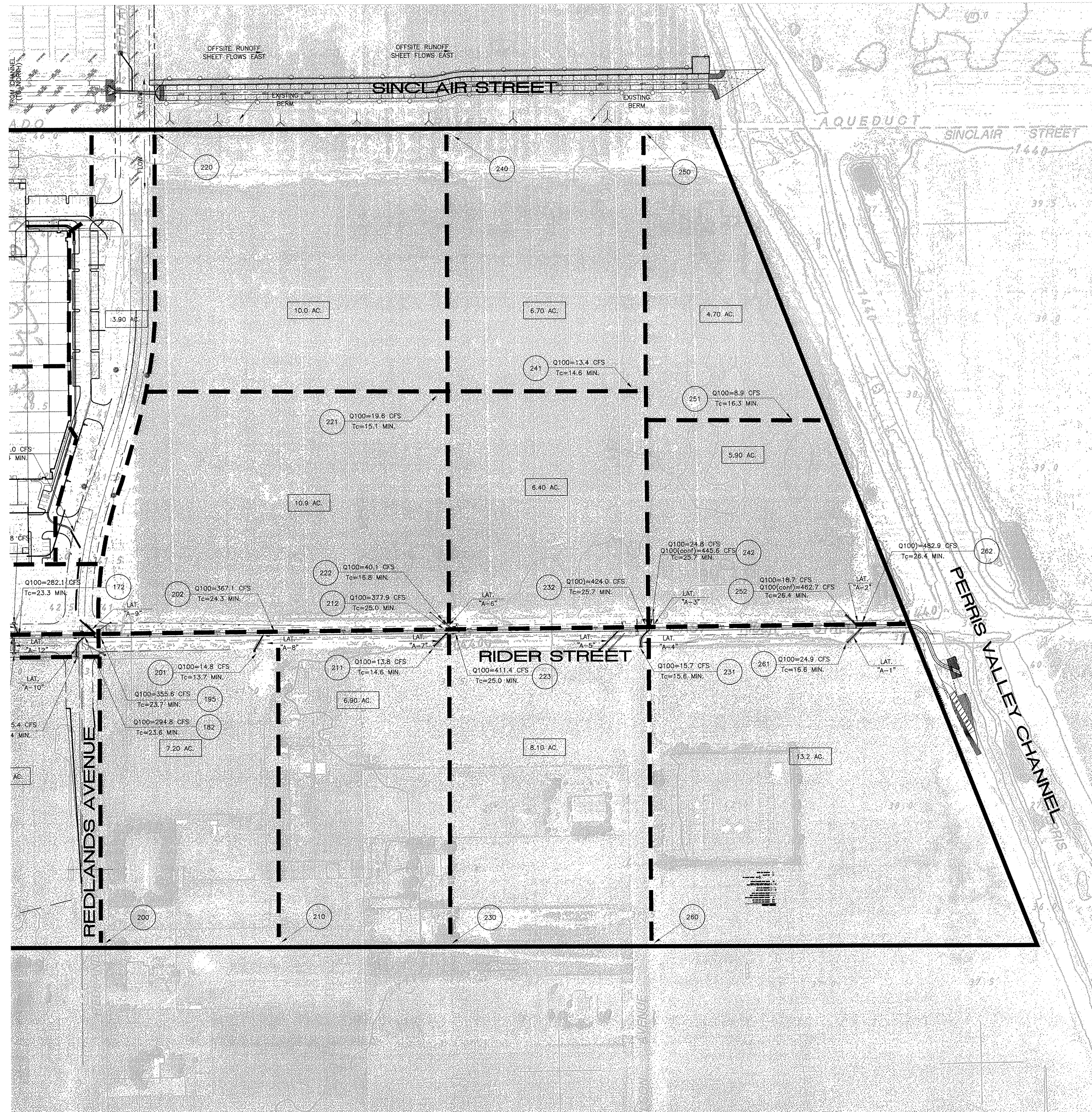
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Thienes Engineering, Inc.
CIVIL ENGINEERING & LAND SURVEYING
14319 FREESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH: 714/501-4811 FAX: 714/501-4712

CITY OF PERRIS PUBLIC WORKS DEPARTMENT			
HYDROLOGY MAP PROPOSED CONDITIONS PERRIS VALLEY MDP LINE A-B (RIDER ST.)			
Designed by	Approved by	Date	
Date			
Checked by			
Date			
Designed by	Public Works Director	R.C.E. 28129	
Date			
Checked by			
Date			
Sheet		1	of 2
		Sheets	

2702/ 1 OF 2 SHEET

SEE SHEET NO. 1



Last Update: 2/23/10
6312700-379810700-3702-hyd-mtd-box.dwg

CITY OF PERRIS PUBLIC WORKS DEPARTMENT	
HYDROLOGY MAP PROPOSED CONDITIONS	
PERRIS VALLEY MDP LINE A-B (RIDER ST.)	
Designed by _____ Date _____	Approved by _____ Date _____
Checked by _____ Date _____	Public Works Director _____ R.C.E. 28129
Designed by _____ Date _____	
Checked by _____ Date _____	
Sheet 2 of 2 Sheets	

Thienes Engineering, Inc.
CIVIL ENGINEERING - LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA BREA, CALIFORNIA 90038
PH (714) 521-4811 FAX (714) 521-4173

2702 / 2 OF 2 SHEET