

Appendix G-1

(Site 1 – North Nance)

Preliminary Hydrology Calculations for Perris
Trailer Yard Nance Street and Webster Avenue

Thienes Engineering, Inc.

November 15, 2022



Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING

PRELIMINARY HYDROLOGY CALCULATIONS

FOR

PERRIS TRAILER YARD
NANCE STREET AND WEBSTER AVENUE
PERRIS, CALIFORNIA

PREPARED FOR

LAKE CREEK INDUSTRIAL
1302 BRITTANY CROSS ROAD
SANTA ANA, CA 92705

JULY 22, 2022
REVISED NOVEMBER 15, 2022

JOB NO. 4108

PREPARED BY

THIENES ENGINEERING
14349 FIRESTONE BLVD.
LA MIRADA, CALIFORNIA 90638
PHONE: (714) 521-4811
FAX: (714) 521-4173

**PRELIMINARY HYDROLOGY
CALCULATIONS**

FOR

PERRIS TRAILER YARD

PREPARED UNDER
THE SUPERVISION OF

REINHARD STENZEL
R.C.E. 56155
EXP. 12/31/2022

DATE:

INTRODUCTION

A: PROJECT LOCATION

The project site is located on the northwest corner of Nance Street and N. Webster Avenue in the city of Perris, California. Please see following page for vicinity map.

B: STUDY PURPOSE

The purpose of this study is to determine the existing condition and proposed condition 100-year peak flow rates from the project site.

C: PROJECT STAFF:

Thienes Engineering staff involved in this study include:

Reinhard Stenzel
Kristie Ferronato



SITE



DISCUSSION

Project Description

The project site encompasses approximately 5.18 acres. Proposed improvements include one small building and a trailer parking area. Landscaped areas will front Nance Street and N. Webster Avenue and will also be located throughout the site.

Master Plan Storm Drain

Per the drainage study for the Perris Valley MDP Lateral B-5 dated October 2016 by Albert A. Webb Associates (WEBB) the project site is part of a 20-acre parcel of land tabled to Lateral B-5. The project site will discharge to the existing 5'W X 5'H RCB via an onsite storm drain connection.

See Appendix "A" for referenced material.

FEMA Flood Zone

The project site is within flood Zone D, "areas in which flood hazards are undetermined, but possible" per FEMA FIRM Map 06065C1430H, effective August 18, 2014.

See Appendix "A" for FEMA FIRM map.

Existing Conditions

The site is currently an undeveloped lot with sparse vegetation. The site (Nodes 100-101 on Existing Condition Hydrology Map) generally sheet flows northeasterly to N. Webster Avenue. Flows are conveyed northerly in the street and discharge into an existing catch basin in N. Webster Avenue. The total 100-year peak flow rate from the project site is approximately 6.2 cfs.

Aerial topography suggests that the northerly adjacent site sheet flows northeasterly parallel to the project site and discharges into N. Webster Street. The topography also suggests a small ridge along the northerly property line that appears to be intended to prevent runoff from entering the project site.

See Appendix "B" for existing condition hydrology calculations and Appendix "D" for the existing condition hydrology map.

Proposed Conditions

The site will continue to generally drain northeasterly in the proposed condition.

The westerly parking lot, landscaped area and patio area (Nodes 100-101 on Proposed Condition Hydrology Map) drains to a catch basin located in the parking lot. A proposed onsite storm drain system will convey water easterly around the proposed building and northeasterly through the trailer parking area. The trailer parking area (Nodes 110-111) will drain northeasterly to catch basins located in the parking area. Flows will confluence with runoff from the west (Node 112) and continue easterly toward N. Webster Avenue. Flows will ultimately discharge into the existing RCB in N. Webster Avenue. The 100-year peak flow rate to the existing storm drain system will be approximately 12.1 cfs.

The driveway and landscaped area fronting Nance Street and the landscaped area fronting N. Webster Avenue sheet flow to each respective street. Flows will be conveyed northerly in N. Webster Avenue and discharge into the existing curb opening catch basin. The 100-year peak flow rate to the existing curb-opening catch basin is approximately 1.8 cfs.

The total 100-year peak flow rate from the project site is approximately 13.9 cfs.

See Appendix “A” for referenced material, Appendix “B” for proposed condition hydrology calculations, and Appendix “D” for the proposed condition hydrology map.

Detention

Per WEBB’s hydrology report, the allowable discharge to Lateral B-5 from the entire 20-acre parcel of land is approximately 33.93 cfs. The allowable discharge from the project site will be prorated based off the percentage of project site area that reaches the existing storm drain via the proposed onsite connection. The landscaped areas and driveway fronting Nance Street and N. Webster Street (approximately 0.82 acres) will not reach the Lat B-5 until further downstream in the system. Therefore, only 4.36 acres (5.18 acres-0.82 acres) will be included in the proration calculation (4.36 acres/20.0 acres = .218). The allowable discharge from the project site to the existing storm drain will be limited to approximately 7.4 cfs (.218 x 33.93 cfs).

The table below summarizes the values from the four northerly hydrograph routings. From the table, the maximum discharge from the trailer parking area will be approximately 7.8 cfs. The storage volume required to detain the remaining flows is approximately 0.09 acre-ft at a depth of .71 ft.

Event	Discharge (cfs)	Volume (acre-ft)	Depth (ft)
1-hr	7.8	0.090	0.71
3-hr	7.2	0.033	0.47
6-hr	7.0	0.013	0.38
24-hr	2.7	0.004	0.14

The total discharge to Lateral B-5 will be approximately 7.8 cfs. This is comparable to the allowable discharge from the site.

See Appendix “C” for detention analysis.

Methodology

Hydrology calculations were computed using the Advanced Engineering Software’s (AES) Rational Method Hydrology program for Riverside County. Hydrograph and detention calculations were performed using the CIVILD program for Riverside County. The site has a soil type of “B” per the Riverside County Hydrology Manual.

See Appendix “A” for referenced materials.

APPENDIX

DESCRIPTION

A

REFERENCE MATERIAL

B

HYDROLOGY CALCULATIONS

C

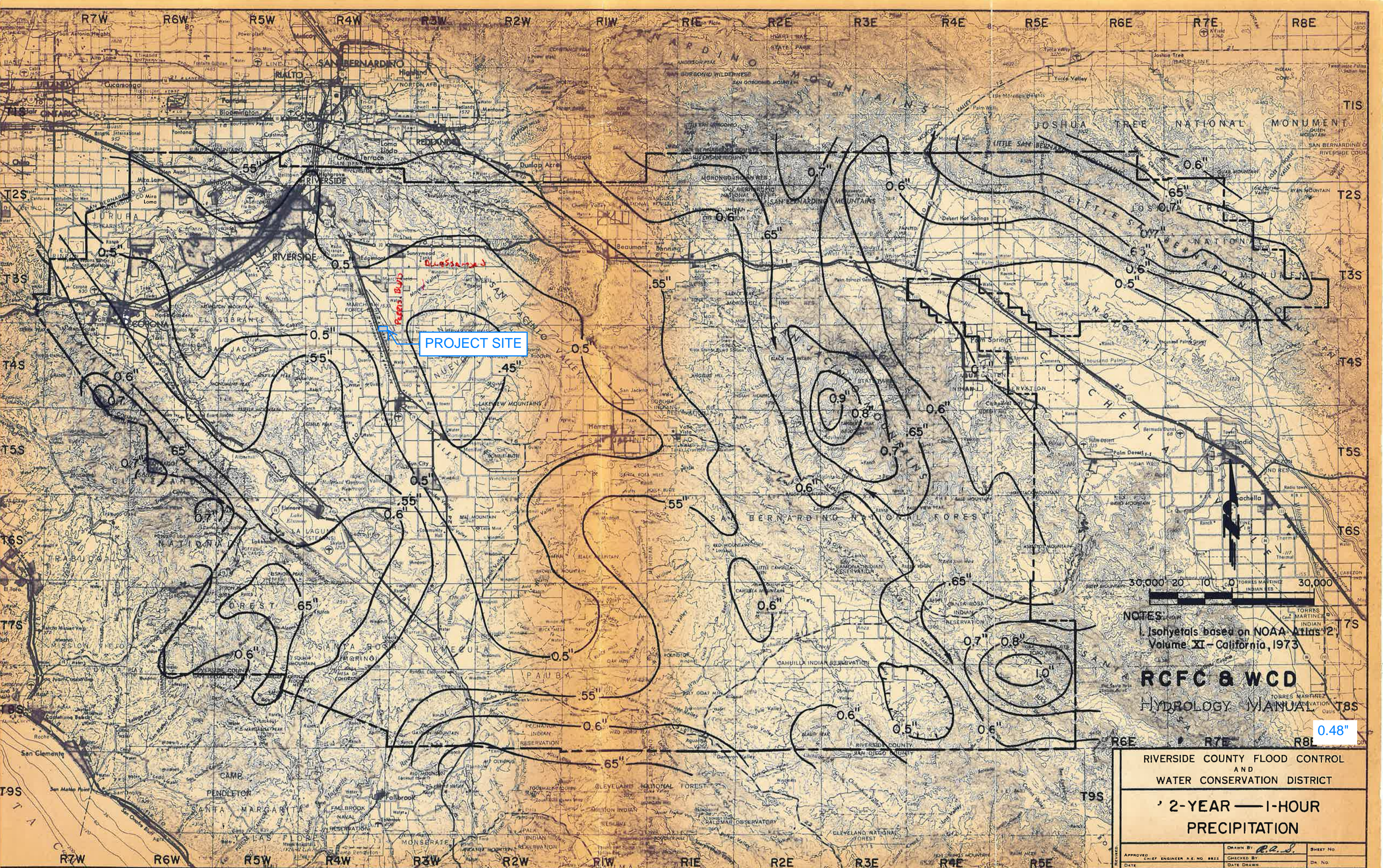
DETENTION CALCULATIONS

D

HYDROLOGY MAPS

APPENDIX A

REFERENCE MATERIAL



PROJECT SITE

NOTES:
 1. Isohyets based on NOAA Atlas 12,
 Volume XI - California, 1973

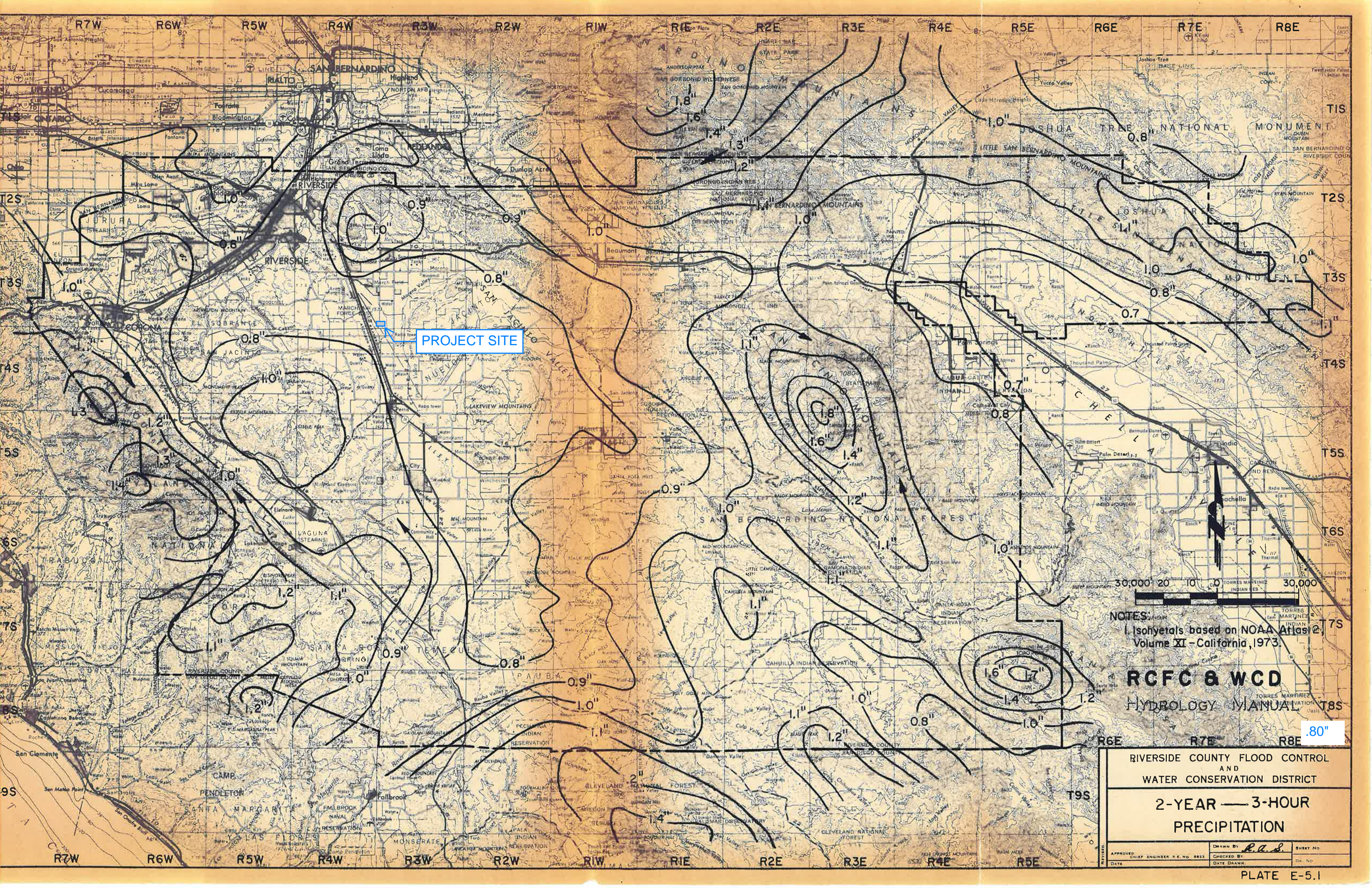
RCFC & WCD
 HYDROLOGY MANUAL

0.48"

RIVERSIDE COUNTY FLOOD CONTROL
 AND
 WATER CONSERVATION DISTRICT

' 2-YEAR — 1-HOUR
 PRECIPITATION

APPROVED	DATE	CHIEF ENGINEER R.E. NO. 8822	DRAWN BY	DATE DRAWN	SHEET NO.
			<i>R.C.S.</i>		



PROJECT SITE

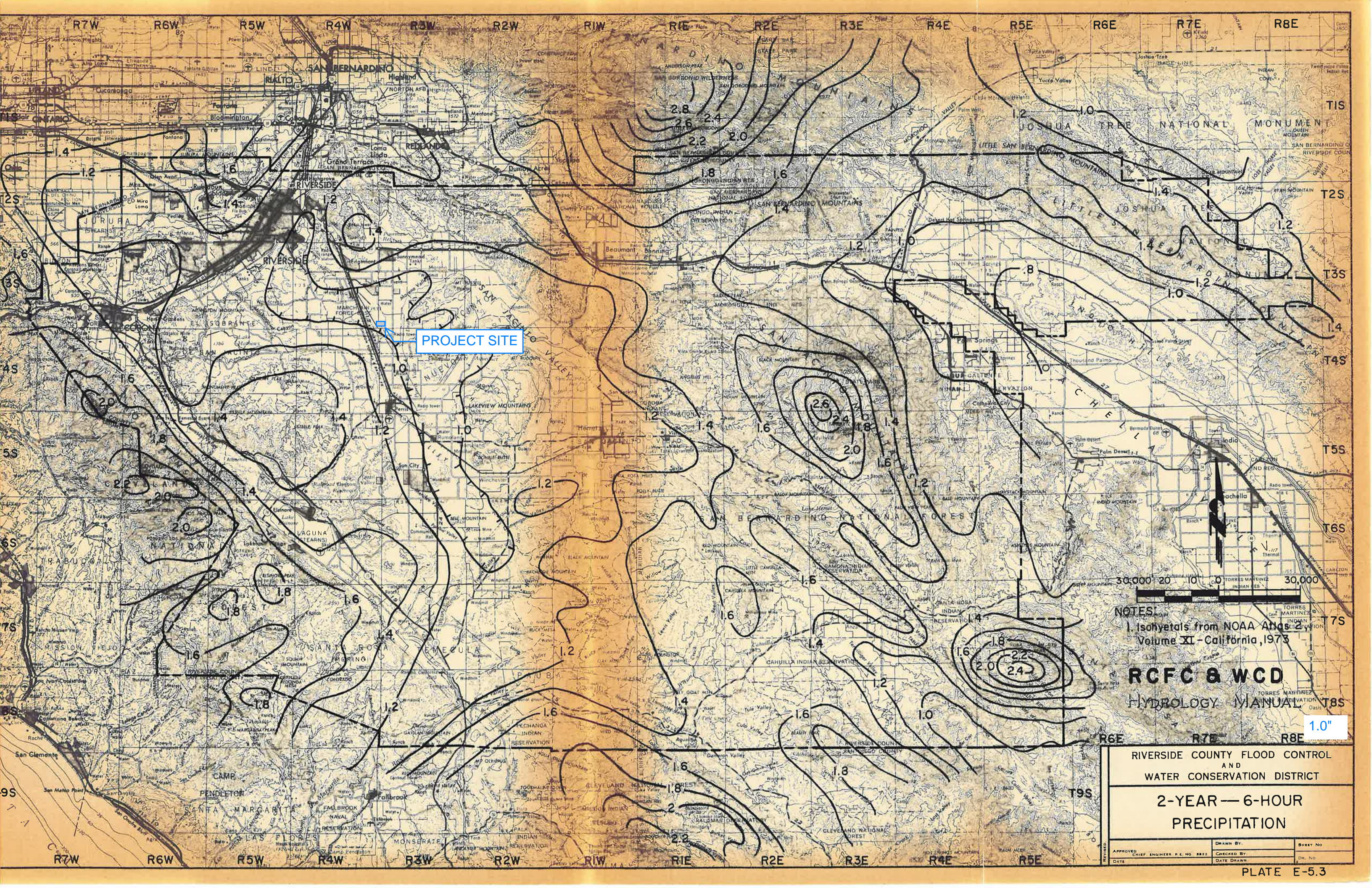
NOTES:
 1. Isohyets based on NOAA Atlas 2,
 Volume XI - California, 1973.

RCFC & WCD
 HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
 AND
 WATER CONSERVATION DISTRICT
**2-YEAR — 3-HOUR
 PRECIPITATION**

APPROVED	DATE	CHIEF ENGINEER R.E. NO. 8823	DRAWN BY	DATE DRAWN	SHEET No.	Of No.
			<i>R.A.S.</i>			

.80"



PROJECT SITE

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

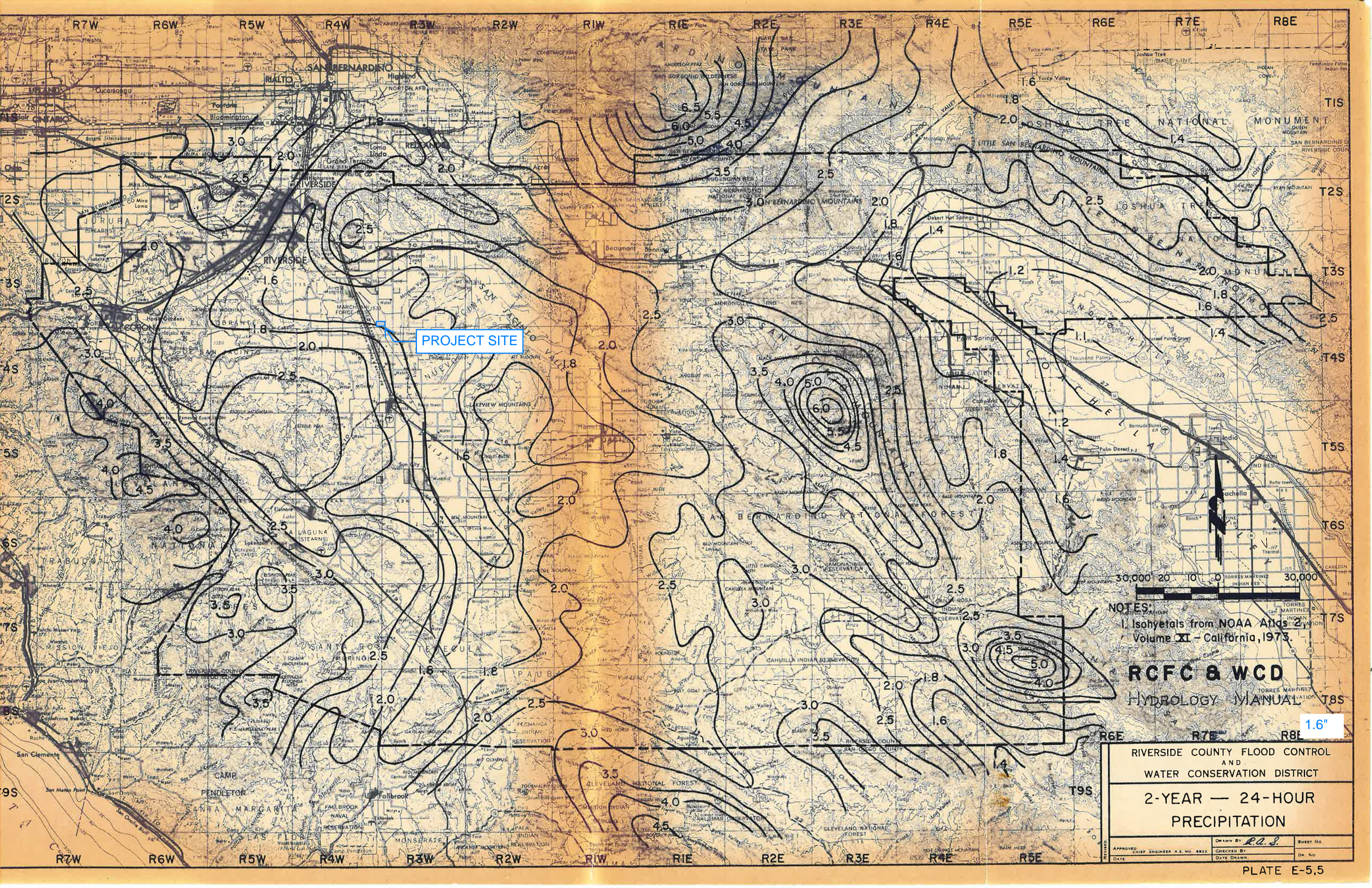
RCFC & WCD
HYDROLOGY MANUAL

1.0"

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

**2-YEAR — 6-HOUR
PRECIPITATION**

APPROVED	DRAWN BY	SHEET NO
CHIEF ENGINEER R.C. NO. 8822	CHECKED BY	DR. NO.
DATE	DATE DRAWN	

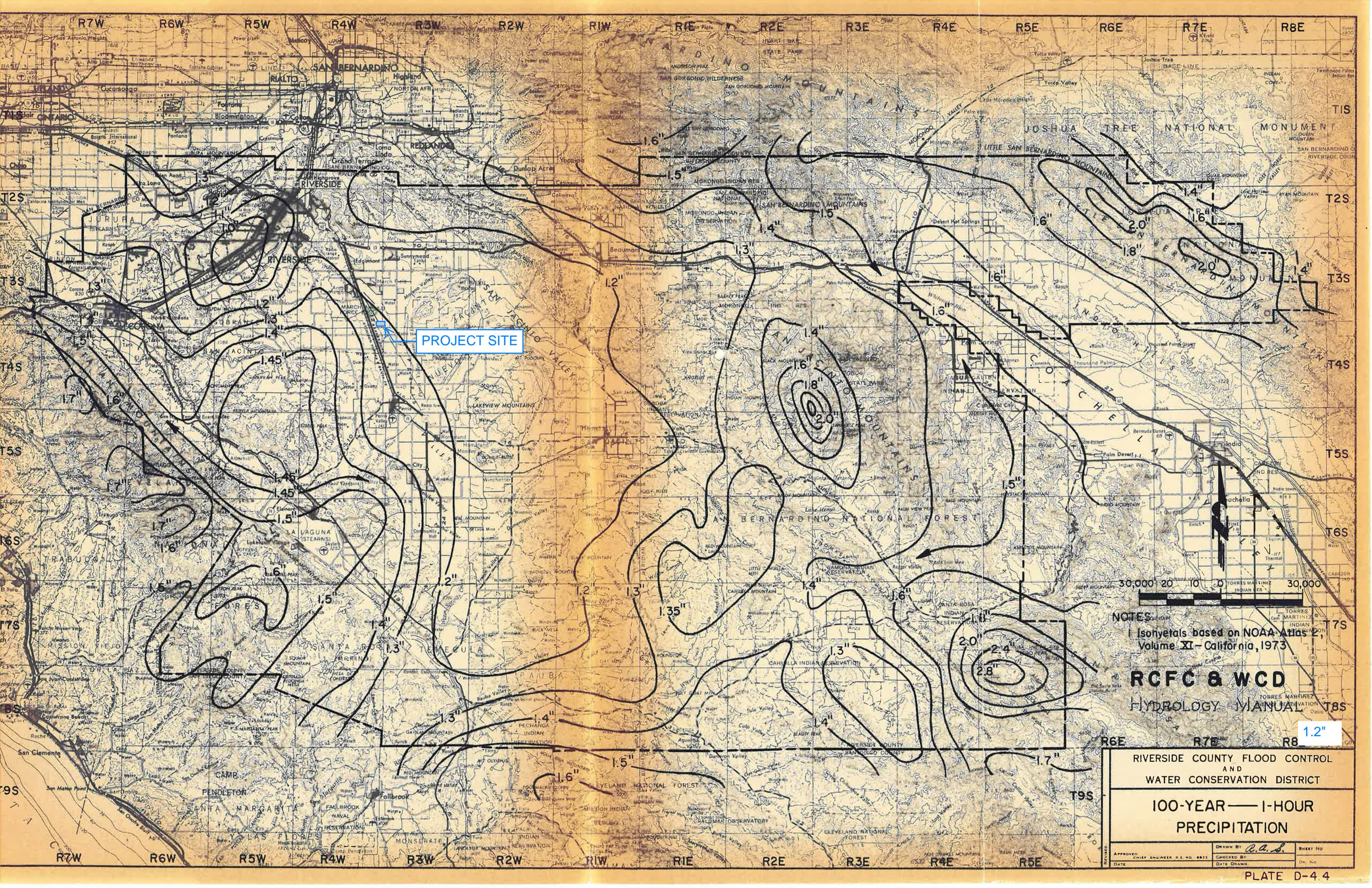


PROJECT SITE

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

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT			
2-YEAR — 24-HOUR PRECIPITATION			
APPROVED	DATE	CHECKED BY	DATE
CHIEF ENGINEER R.E. NO. 8822		<i>R.A.S.</i>	
DRAWN BY		SHEET NO.	
DATE		DR. NO.	



PROJECT SITE

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

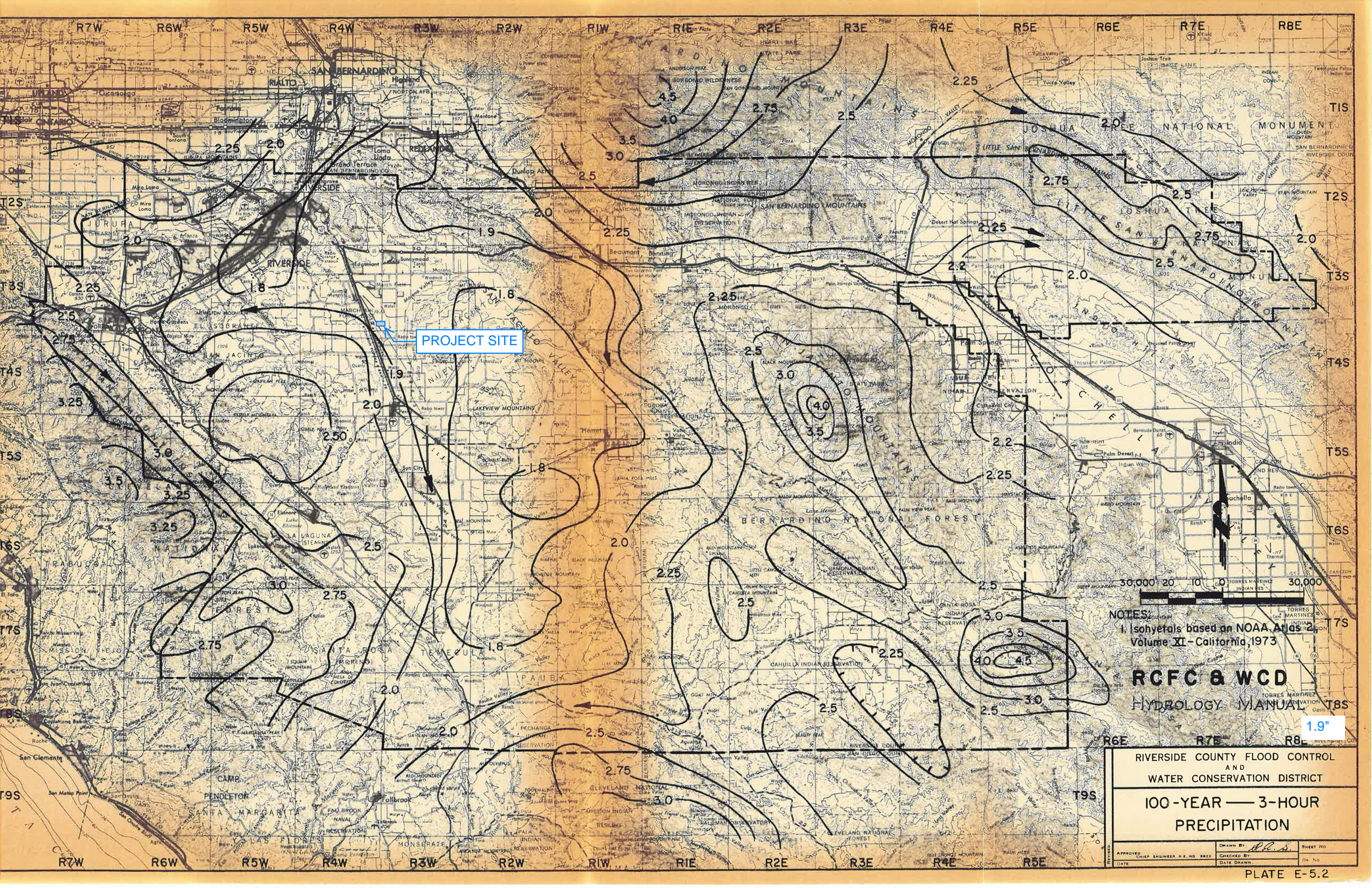
RCFC & WCD
HYDROLOGY MANUAL

1.2"

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

100-YEAR — 1-HOUR
PRECIPITATION

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



PROJECT SITE

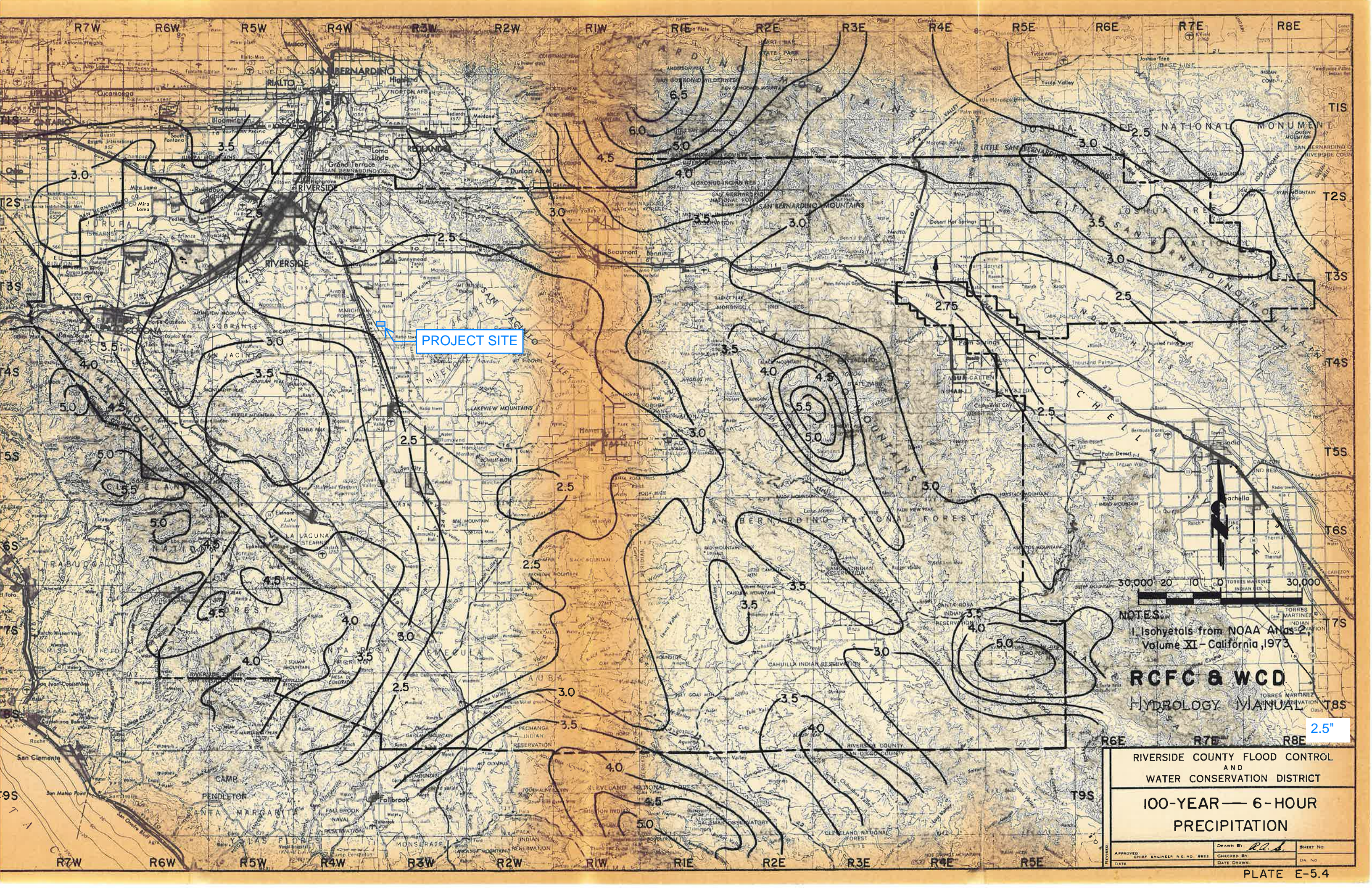
NOTES:
 1. Isohyets based on NOAA Atlas 2
 Volume XI - California, 1973

RCFC & WCD
 HYDROLOGY MANUAL

1.9"

RIVERSIDE COUNTY FLOOD CONTROL
 AND
 WATER CONSERVATION DISTRICT
**100-YEAR — 3-HOUR
 PRECIPITATION**

APPROVED	DRAWN BY	SHEET NO.
CHIEF ENGINEER R.E. NO. 8832	<i>R.C.S.</i>	
CHECKED BY	DATE DRAWN	DATE



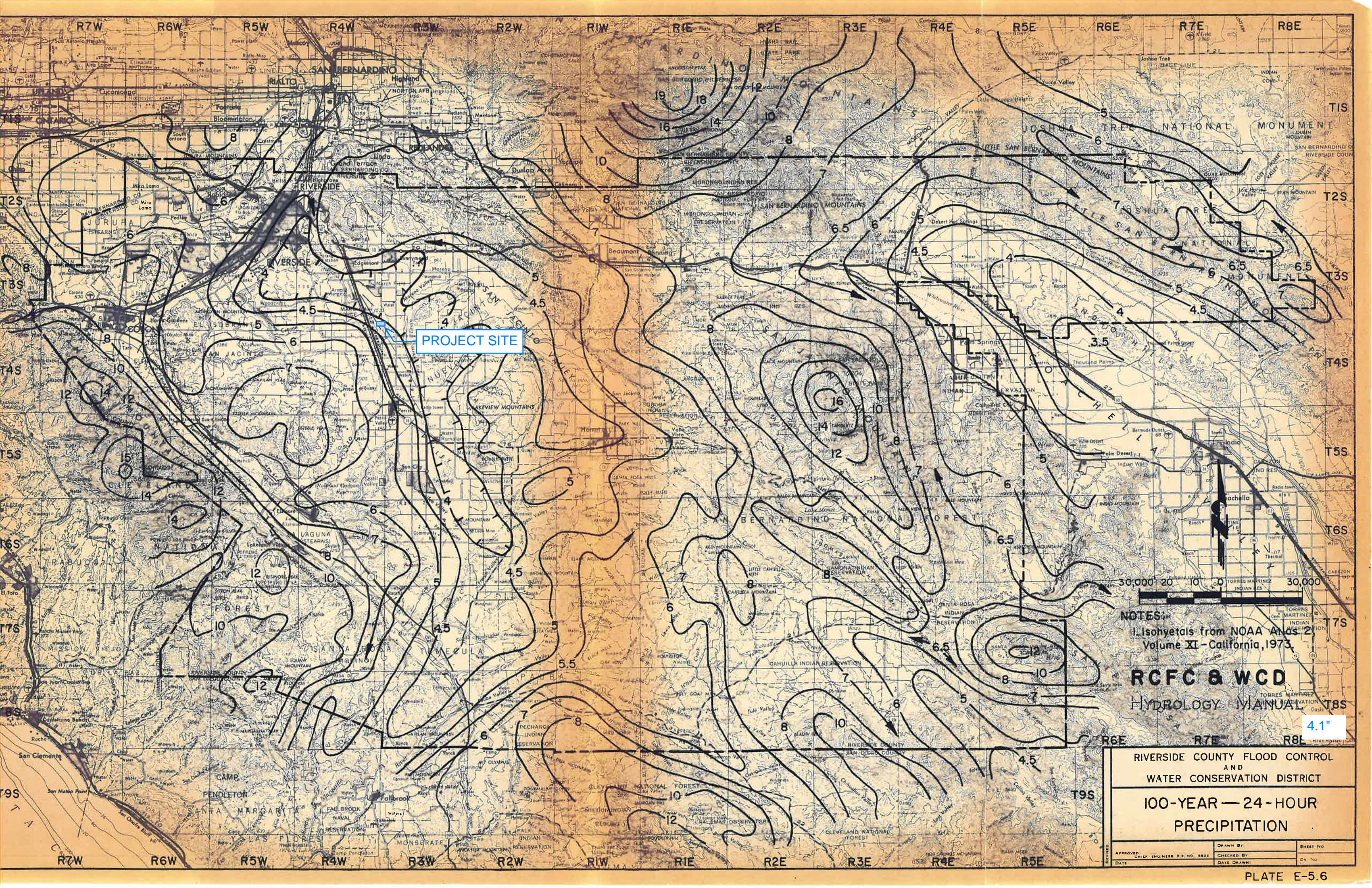
PROJECT SITE

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

RCFC & WCD
 HYDROLOGY MANUAL

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

APPROVED	DATE	CHIEF ENGINEER R.E. NO. 8883	DRAWN BY	DATE	CHECKED BY	DATE DRAWN	SHEET NO.	DR. NO.
			R.C.A.					



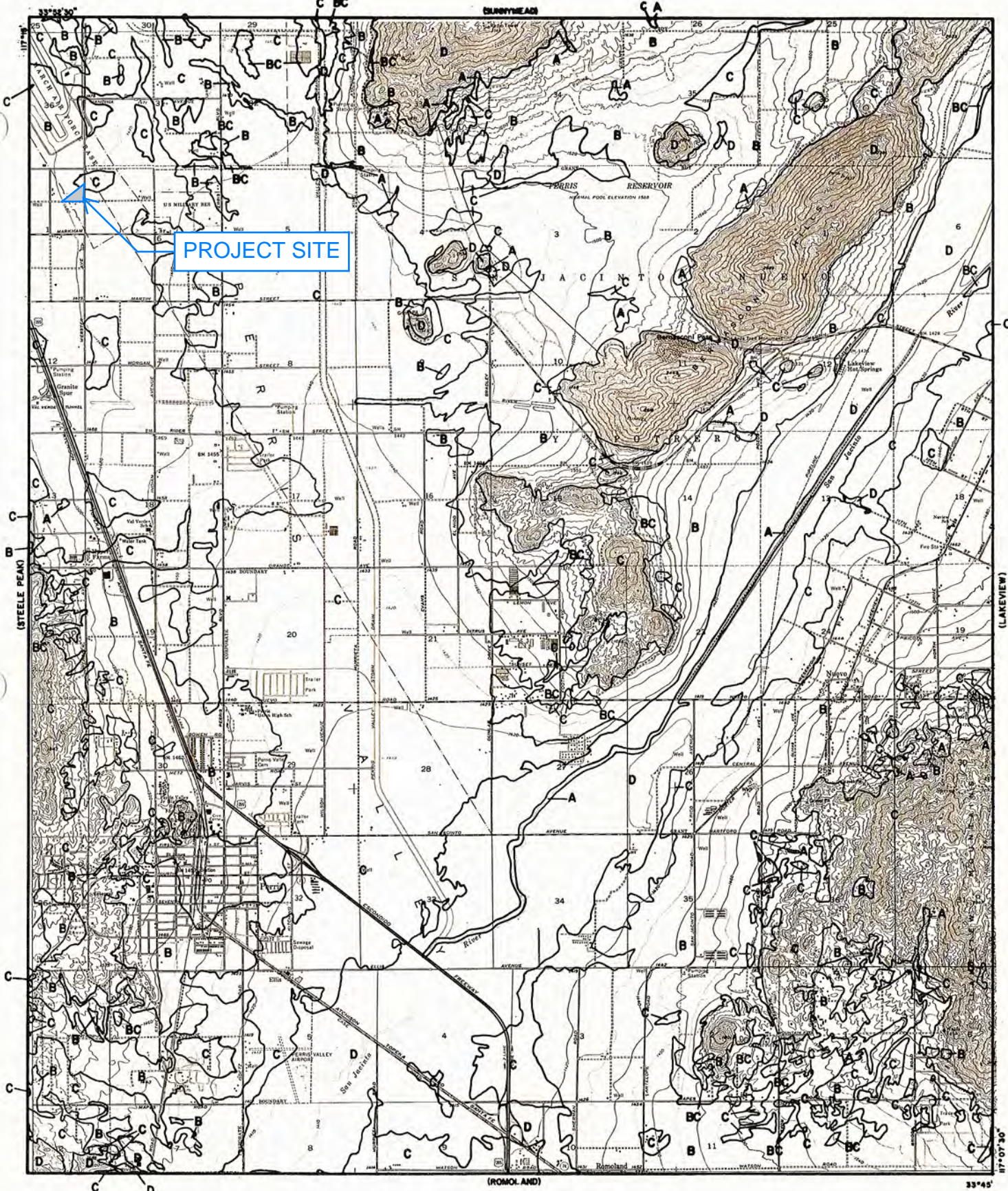
PROJECT SITE

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

RCFC & WCD
 HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
 AND
 WATER CONSERVATION DISTRICT
 100-YEAR — 24-HOUR
 PRECIPITATION

APPROVED	DRAWN BY	SHEET NO.
DATE	CHECKED BY	OF NO.
	DATE DRAWN	



PROJECT SITE

SOIL TYPE B

LEGEND

— SOILS GROUP BOUNDARY
 A SOILS GROUP DESIGNATION

RCFC & WCD
 HYDROLOGY MANUAL

0 FEET 5000

**HYDROLOGIC SOILS GROUP MAP
 FOR
 PERRIS**

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

GENERAL NOTES

1. THE CONTRACTOR SHALL CONSTRUCT THE FLOOD CONTROL IMPROVEMENTS SHOWN ON THE DRAWINGS IN CONFORMANCE WITH THE REQUIREMENTS OF THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT'S M.O.U. STANDARD SPECIFICATIONS DATED JUNE 24, 2006, AND RCFC&WCD STANDARD MANUAL. FOR THE LATEST DRAWINGS OF THE STANDARD MANUAL, PLEASE REFER TO THE "PUBLICATIONS AND RECORDS" PAGE FOUND ON THE DISTRICT'S WEBSITE.
2. CONTACT THE ENCROACHMENT PERMIT ENGINEER AT 951.955-1286 IF AN ENCROACHMENT PERMIT IS REQUIRED FROM RIVERSIDE COUNTY FLOOD CONTROL. AFTER THE PERMIT IS ISSUED THE DISTRICT MUST BE NOTIFIED ONE WEEK PRIOR TO CONSTRUCTION.
3. CONTACT CONTRACT ADMINISTRATION 951.955.1288 IF CONSTRUCTION INSPECTION WILL BE PERFORMED BY RIVERSIDE COUNTY FLOOD CONTROL. THE DISTRICT MUST BE NOTIFIED TWENTY DAYS (20) PRIOR TO CONSTRUCTION.
4. ALL STATIONING REFERS TO CENTERLINE OF CONSTRUCTION UNLESS OTHERWISE NOTED.
5. STATIONING FOR LATERALS AND CONNECTOR PIPE REFER TO THE CENTERLINE INTERSECTION STATIONS.
6. FORTY-EIGHT HOURS BEFORE EXCAVATION, CALL UNDERGROUND SERVICE ALERT 1-800-227-2800.
7. ALL ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF BASED ON THE NATIONAL GEODETIC VERTICAL DATUM (NGVD 88).
8. ALL COORDINATES ARE SHOWN IN FEET AND DECIMALS THEREOF BASED ON THE NORTH AMERICAN DATUM (NAD 83), CALIFORNIA COORDINATE SYSTEM (CCS), ZONE 6 AND EPOCH 2010.00
9. ALL CROSS SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
10. ELEVATIONS OF UTILITIES ARE APPROXIMATE UNLESS OTHERWISE NOTED.
11. UNLESS OTHERWISE SPECIFIED, MINIMUM STREET RECONSTRUCTION SHALL BE 4" TYPE "B" HOT MIX ASPHALT OVER 6" CLASS 2 AGGREGATE BASE OR AS SPECIFIED BY THE ENGINEER.
12. OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES TO BE ABANDONED SHALL BE SEALED WITH 6" OF CLASS "B" CONCRETE.
13. PIPE CONNECTED TO THE MAINLINE PIPE SHALL CONFORM TO JUNCTION STRUCTURE NO. 4 (JS 228) UNLESS OTHERWISE NOTED.
14. PIPE BEDDING SHALL CONFORM TO RCFC&WCD STD. DWG. NO. MB15 EXCEPT FOR COVER < 2 FEET. FOR COVER < 2 FEET, CONCRETE SLURRY (2000 PSI - 2 SACK) SHALL BE USED. THE ENTIRE TRENCH SHALL BE SLURRY EXTENDING 4 INCHES MINIMUM AND 12 INCHES MAXIMUM ABOVE THE TOP OF THE PIPE.
15. "V" IS THE DEPTH OF CATCH BASINS MEASURED FROM THE TOP OF CURB TO INVERT OF CONNECTOR PIPE.
16. CATCH BASINS SHALL BE LOCATED SO THAT LOCAL DEPRESSION SHALL BEGIN AT EXISTING CURB RETURN JOINT, UNLESS OTHERWISE SPECIFIED.
17. ALL CURBS, CUTTERS, SIDEWALKS, DRIVEWAYS AND OTHER EXISTING IMPROVEMENTS TO BE RECONSTRUCTED IN KIND AND AT THE SAME ELEVATION AND LOCATION AS THE EXISTING IMPROVEMENTS UNLESS OTHERWISE NOTED.
18. STANDARD DRAWINGS CALLED FOR ON THE PLAN AND PROFILE SHALL CONFORM TO DISTRICT STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
19. THE CONTRACTOR IS REQUIRED TO CALL ALL UTILITY AGENCIES REGARDING TEMPORARY SHORING AND SUPPORT REQUIREMENTS FOR THE VARIOUS UTILITY LINES SHOWN ON THESE PLANS.
20. DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL SHOULD BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO ADJACENT PROPERTIES.
21. APPROVAL OF THESE PLANS BY THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT DOES NOT RELIEVE THE DEVELOPER'S ENGINEER OF RESPONSIBILITY FOR THE ENGINEERING DESIGN. IF FIELD CHANGES ARE REQUIRED, IT WILL BE THE RESPONSIBILITY OF THE DESIGN ENGINEER TO MAKE THE NECESSARY CORRECTIONS.
22. THE CONTRACTOR OR DEVELOPER SHALL SECURE ALL REQUIRED ENCROACHMENT AND/OR STATE AND FEDERAL REGULATORY PERMITS PRIOR TO THE COMMENCEMENT OF ANY WORK.
23. THE CONCRETE COATINGS ON THE INSIDE OF ALL REINFORCED CONCRETE PIPES AND BOX CULVERT MUST BE INCREASED TO PROVIDE A MINIMUM OF 1-1/2 INCHES OVER THE REINFORCING AND INCREASED TO A MINIMUM OF 3-1/2 INCHES OVER REINFORCING FOR BOX CULVERT, WHEN DESIGN VELOCITIES EXCEED 20 FEET PER SECOND. THE CONCRETE DESIGN STRENGTH IN THESE REACHES SHALL BE FC=5,000 PSI FOR VELOCITIES EXCEEDING 20 FEET PER SECOND AND FC=6,000 PSI FOR VELOCITIES EXCEEDING 30 FEET PER SECOND.
24. CONSTRUCTION JOINT FOR CALTRANS STANDARD REINFORCED CONCRETE BOX SHALL BE ACCORDING TO RCFC&WCD STANDARD DRAWING NO. BX 401.
25. CONTRACTOR SHALL SUBMIT DETAILED SHOP DRAWINGS FOR ALL JUNCTION STRUCTURES, MANHOLES, TRANSITION STRUCTURES AND CONNECTIONS TO EXISTING FACILITIES. THESE SUBMITTALS SHALL BE WET SIGNED AND STAMPED BY A REGISTERED ENGINEER FOR APPROVAL PRIOR TO THE PRECONSTRUCTION MEETING.

BEGIN PROJECT

OLEANDER CHANNEL

SEE LEFT BELOW

SHEET 5

VICINITY MAP

R.C.F.C. & W.C.D. STANDARD DRAWINGS

- JS 227 JUNCTION STRUCTURE NO. 2
- JS 228 JUNCTION STRUCTURE NO. 3
- JS 229 JUNCTION STRUCTURE NO. 4
- JS 231 JUNCTION STRUCTURE NO. 6
- MH 253 MANHOLE NO. 3
- # 910 CONCRETE BULKHEAD
- TS 301 TRANSITION STRUCTURE NO. 1
- TS 302 TRANSITION STRUCTURE NO. 2

CALTRANS STANDARD DRAWINGS

- DB0 CAST-IN-PLACE REINFORCED CONCRETE SINGLE BOX CULVERT
- DB88 PIPE CULVERT HEADWALLS AND WARPED WINGWALLS
- 911-47 CABLE RAILING

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

- 360-2 SLOPED PROTECTION BARRIER
- 360-1 PRECAST REINFORCED CONCRETE BOX

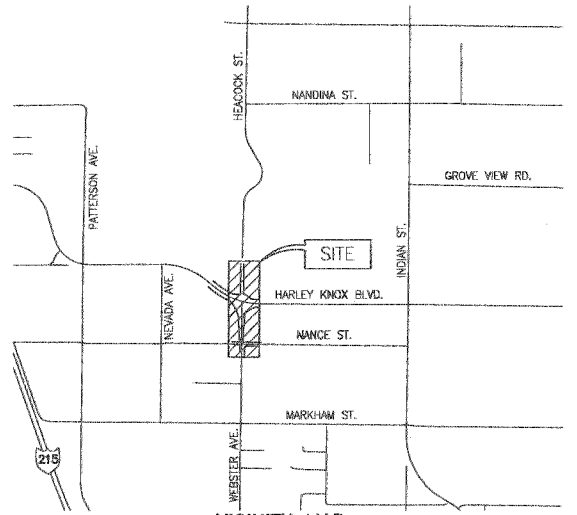
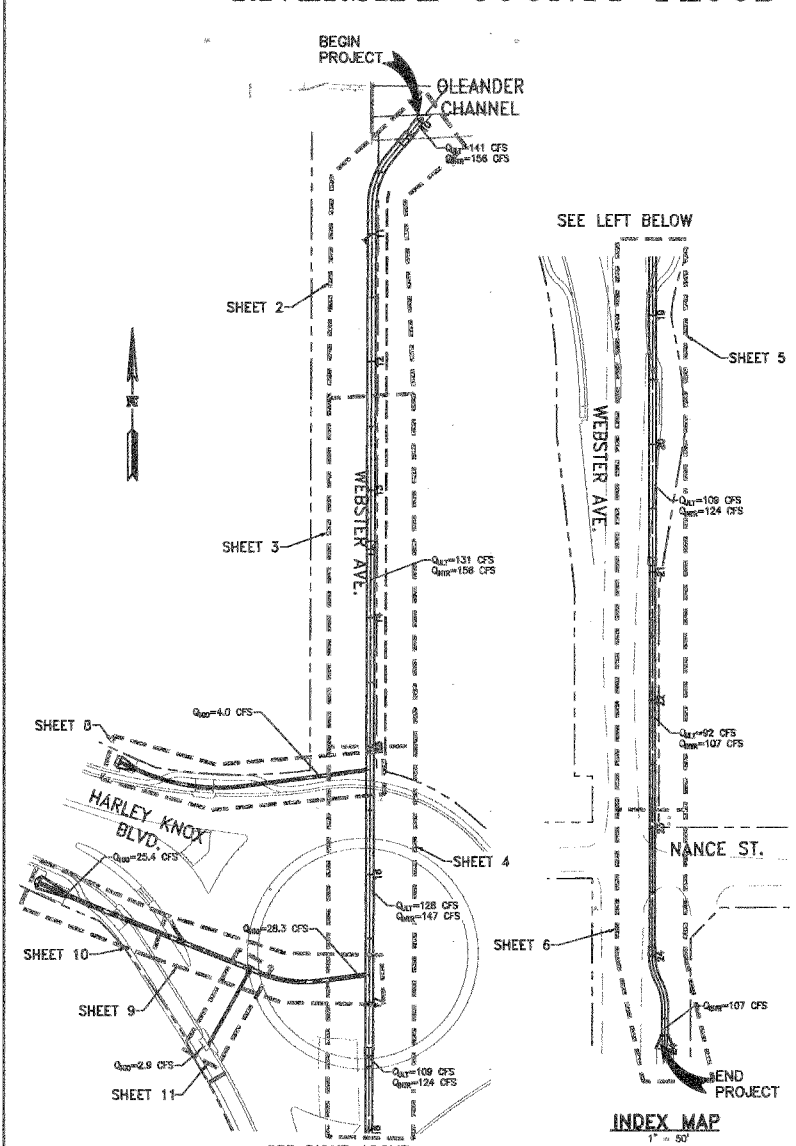
SHEET INDEX

- TITLE SHEET
- PLAN & PROFILE
- DETAILS
- LATERAL PLAN & PROFILE

- SHEET NO.
- 1
- 2-6
- 7
- 8-11

INDEX MAP

1" = 50'



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of buried
utility lines.
Don't disrupt
what you see.

ALBERT A. ENGINEERING CONSULTANTS
WEBB ASSOCIATES
3799 MACCARY STREET,
INDIENO CA 92039
PH (951) 698-1530
FAX (951) 786-1256



CITY OF PERRIS
APPROVED BY: [Signature]
DATE: 3-1-17
CITY ENGINEER

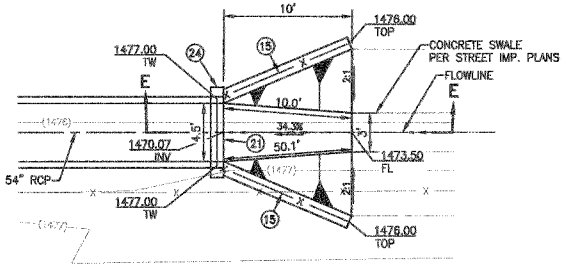
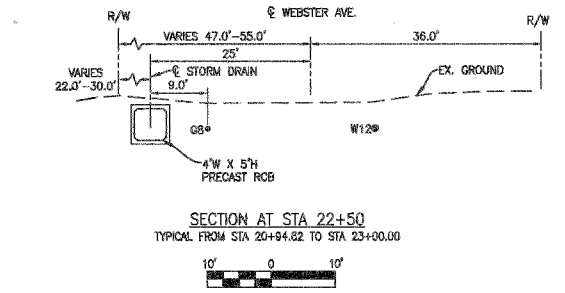
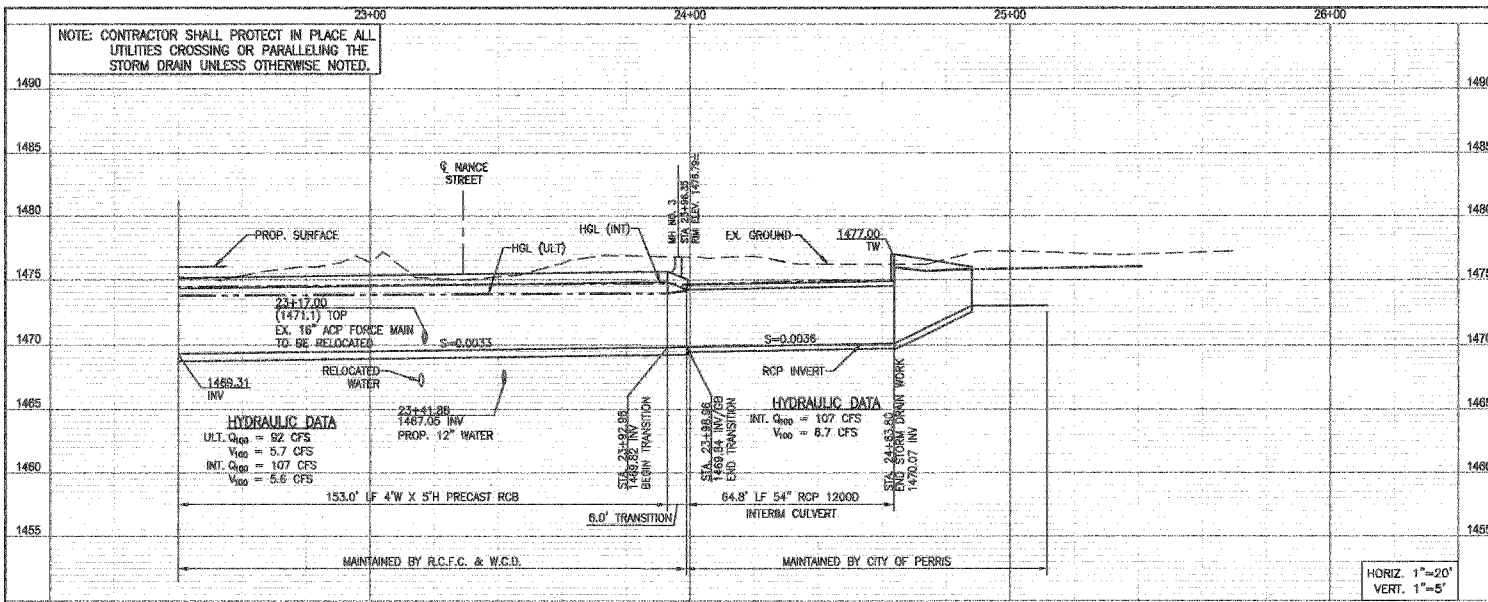
BENCH MARK:
STATION IS ABOUT 4-1/2 MILES W OF LAKEVIEW, ABOUT ONE
MILE W OF THE PASS THROUGH THE BERKSHAM MOUNTAINS,
ABOUT 200 FEET SW OF THE INTERSECTION OF HARLEY ROAD
AND WILKIN AVENUE, 70 FEET S OF CENTER LINE OF
WILKIN AVENUE, IN A LARGE SQUARE AND MARKED WITH A
TEE. MARK IS A METROPOLITAN WATER DISTRICT OF SOUTHERN
OK STANDARD DISK STAMPED 40 Y 1931.
ELEV. = 1498.35 (NAVD 88) NAD83 -- 2.45 = NAD82

REVISIONS	DATE	DESCRIPTION

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: [Signature]
PLANNING ENGINEER
DATE: 3/15/2017

PM 38726
PERRIS VALLEY MDP
LATERAL G-5
STAGE 1
TITLE SHEET
PROJECT NO. 4-0-00481
DRAWING NO. 4-1109
SHEET NO. 1 OF 11

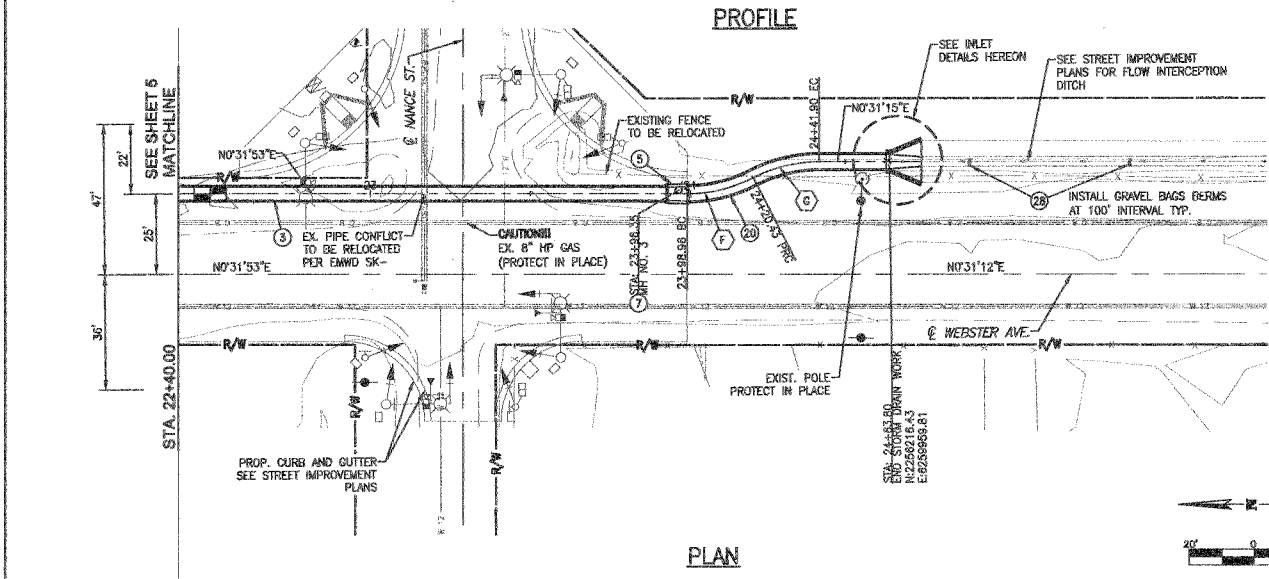
63201515-COMPLAINTS/PAN SHEETS (A-1547) - C - 50 - COVER-INTERNAL BLOWN 2/23/2017 10:54:29 AM



F CURVE DATA
 $\Delta = 27'20.23$
 $R = 45.0'$
 $T = 10.95'$
 $L = 21.47'$
 $BC = 23+39.96$
 $EC = 24+20.43$
 $PI = N 225.6249.80$
 $E 625.9950.24$

G CURVE DATA
 $\Delta = 27'19.48$
 $R = 45.00'$
 $T = 10.94'$
 $L = 21.48'$
 $BC = 24+20.43$
 $EC = 24+41.90$
 $PI = N 225.6249.27$
 $E 625.9960.11$

LATERAL R-5 INLET DETAIL
 SCALE: 1"=5'
 SEE SHEET 5 FOR SECTION DETAILS



CONSTRUCTION NOTES:

- 3) CONSTRUCT PRECAST RCB PER SPPWC STD. DWG. 390-1 (FOR SHALLOW COVER FROM 0' TO 2')
- 5) CONSTRUCT TRANSITION STRUCTURE NO. 1 PER R.C.F.C. & W.C.D. STD. DWG. TSS01. REINFORCEMENT AND CONCRETE THICKNESS SHALL BE THAT OF A 6'6"X5'H RCB PER CALTRANS STD D80
- 7) CONSTRUCT MANHOLE NO. 3 PER R.C.F.C. & W.C.D. STD. DWG. NO. NH253
- 15) CONSTRUCT CABLE RAILING PER CALTRANS STD. DWG. NO. B11-47
- 20) CONSTRUCT 54" RCP D-LOAD PER PLAN
- 21) CONSTRUCT TRASH RACK (INCLINED) PER SPPWC STD 360-2
- 22) CONSTRUCT PIPE CULVERT HEADWALL AND WARPED WINGWALLS PER CALTRANS STD. DWG. NO. D86B AND DETAILS HEREON.
- 24) INSTALL GRAVEL BAG BERM PER EROSION CONTROL DETAIL CASDA SE-7 AND CALTRANS STANDARD SPECIFICATIONS 2015. SEE DETAIL ON SHEET 6

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 for the location
 of buried
 utility lines.
 Don't disrupt
 vital services.
 Call before you dig

ALBERTA ENGINEERING CONSULTANTS
WEBB ASSOCIATES
 3789 MACPHERY STREET
 MISSISSAUGA, ONTARIO L4X 1L3
 TEL (905) 885-1070
 FAX (905) 708-1294



CITY OF PERRIS
 APPROVED BY: *[Signature]*
 DATE: 3/15/17

BENCH MARK:
 STATION IS ABOUT 4-1/2 MILES W OF LAKEVIEW, ABOUT ONE MILE W OF THE PASS THROUGH THE VERMONT MOUNTAINS, ABOUT 200 FEET SW OF THE INTERSECTION OF BRADLEY ROAD AND WALNUT AVENUE, 70 FEET S OF CENTER LINE OF WALNUT AVENUE, IN A LARGE BOLLARD, AND MARKED WITH A TEE. MARK IS A METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA STANDARD DISK STAMPED 40 Y 1931.

REVISIONS	DATE	DESCRIPTION

RECOMMENDED FOR APPROVAL BY: *[Signature]*
 DATE: 3/15/2017

IRVINE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
 APPROVED BY: *[Signature]*
 DATE: 3/15/2017

PM 36726
PERRIS VALLEY MDP LATERAL B-5 STAGE 1 PLAN AND PROFILE
 STA.22+40.00 TO STA. 23+95.54

PROJECT NO. 4-0-00461
 DRAWING NO. 4-1109
 SHEET NO. 6 OF 11

6:2017A15-05-DRAWINGS/PLAN SHEETS/15-0047 - C - SD - LATERAL BUILDING 2/23/2017 10:55:14 AM



Drainage Study
IPT Perris Industrial Project
Perris Valley MDP Lateral B-5

PM 36726

City of Perris, CA

Prepared For:
Industrial Property Trust
4675 MacArthur Court, Suite 625
Newport Beach, CA 92660

RECEIVED
NOV 07 2016

RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT
DEVELOPMENT REVIEW/PLAN CHECK

Prepared By:
Albert A. Webb Associates
3788 McCray St
Riverside, CA 92506

*F
save*

Date: January 2016
Revised: October 2016

keep

+++++
Process from Point/Station 14.000 to Point/Station 15.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.870
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 57.30
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 19.33 min.
Rainfall intensity = 1.951(In/Hr) for a 100.0 year storm
Subarea runoff = 33.934(CFS) for 20.000(Ac.)
Total runoff = 108.662(CFS) Total area = 60.000(Ac.)

+++++
Process from Point/Station 15.000 to Point/Station 16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1472.630(Ft.)
Downstream point/station elevation = 1472.340(Ft.)
Pipe length = 95.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 108.662(CFS)
Nearest computed pipe diameter = 54.00(In.)
Calculated individual pipe flow = 108.662(CFS)
Normal flow depth in pipe = 44.25(In.)
Flow top width inside pipe = 41.54(In.)
Critical Depth = 36.79(In.)
Pipe flow velocity = 7.79(Ft/s)
Travel time through pipe = 0.20 min.
Time of concentration (TC) = 19.53 min.

+++++
Process from Point/Station 15.000 to Point/Station 16.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 56.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 19.53 min.
Rainfall intensity = 1.941(In/Hr) for a 100.0 year storm
Subarea runoff = 22.589(CFS) for 13.400(Ac.)
Total runoff = 131.251(CFS) Total area = 73.400(Ac.)

+++++
Process from Point/Station 16.000 to Point/Station 17.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

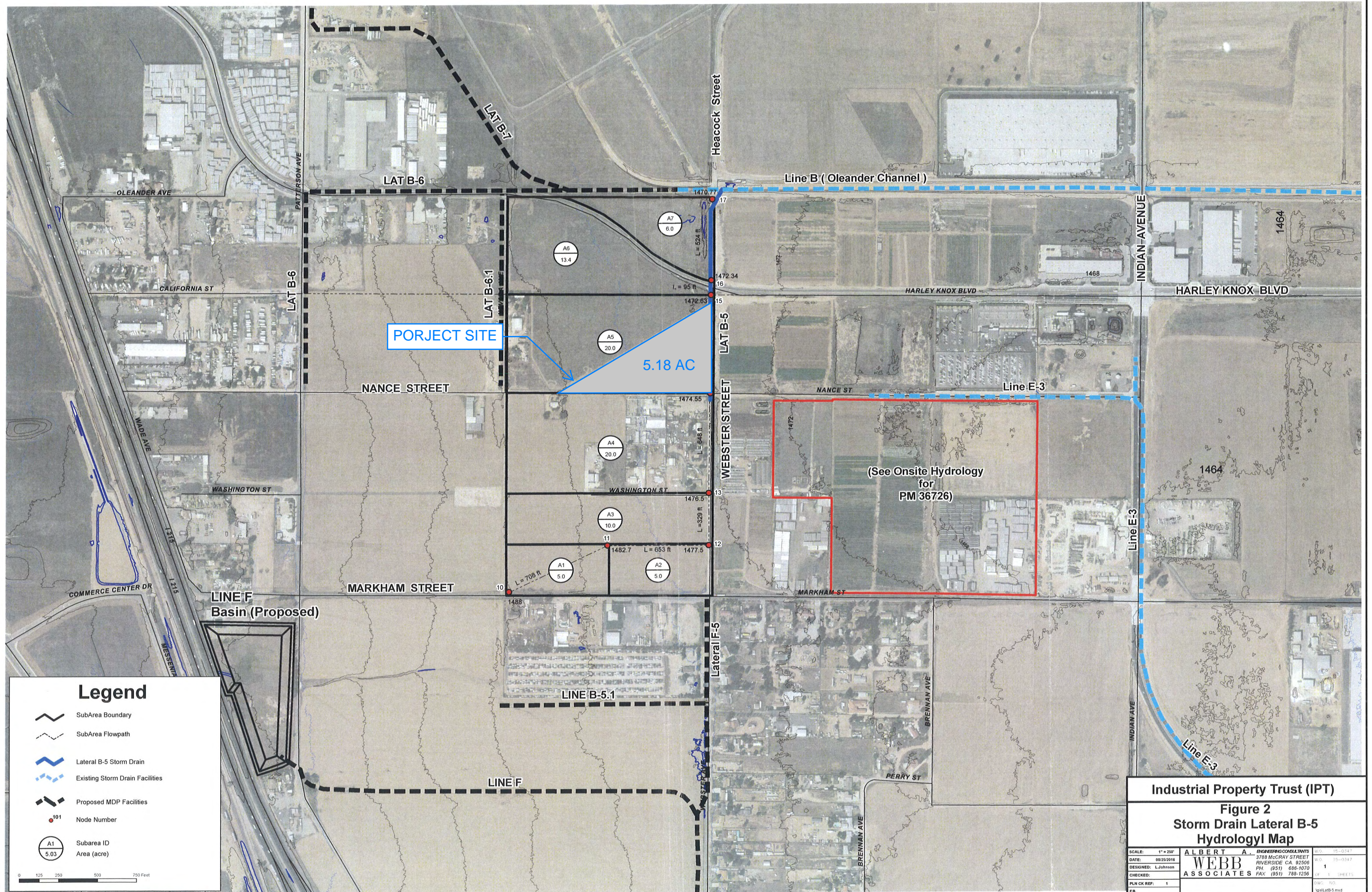
Upstream point/station elevation = 1472.340(Ft.)
Downstream point/station elevation = 1470.770(Ft.)
Pipe length = 524.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 131.251(CFS)
Nearest computed pipe diameter = 57.00(In.)
Calculated individual pipe flow = 131.251(CFS)
Normal flow depth in pipe = 50.25(In.)
Flow top width inside pipe = 36.83(In.)
Critical Depth = 39.94(In.)
Pipe flow velocity = 7.93(Ft/s)
Travel time through pipe = 1.10 min.
Time of concentration (TC) = 20.63 min.

+++++
Process from Point/Station 16.000 to Point/Station 17.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 56.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 20.63 min.
Rainfall intensity = 1.890(In/Hr) for a 100.0 year storm
Subarea runoff = 9.840(CFS) for 6.000(Ac.)
Total runoff = 141.090(CFS) Total area = 79.400(Ac.)
End of computations, total study area = 79.40 (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 = 56.3

Path: G:\2016\160347\GIS\LatB5.mxd



Legend

- SubArea Boundary
- SubArea Flowpath
- Lateral B-5 Storm Drain
- Existing Storm Drain Facilities
- Proposed MDP Facilities
- Node Number
- Subarea ID
Area (acre)

0 125 250 500 750 Feet

Industrial Property Trust (IPT)

Figure 2
Storm Drain Lateral B-5
Hydrology Map

SCALE: 1" = 250'	ENGINEER: ALBERT A. WEBB ASSOCIATES	DWG. NO.: 15-0347
DATE: 08/25/2016	3759 MCCRAY STREET RIVERSIDE CA 92506	R.O. NO.: 15-0347
DESIGNED: L. Johnson	PH: (951) 688-1070	SHEET NO.: 1
CHECKED:	FAX: (951) 788-1256	TOTAL SHEETS: 1
PLN CK REF: 1		DWG. NO.:
FB:		IP/LatB5.mxd

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.7 North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NUNCS 12
National Geodetic Survey
SSMC-3, #6202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at <http://www.ngs.noaa.gov/>.

Base map information shown on this FIRM was derived from multiple sources including the Riverside County, CA effective database, and the National Geodetic Survey. Base map imagery for Riverside County, CA is a mosaic of the NAIP 2009 images, 1 meter resolution.

The "profile base lines" depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line", in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels, community map repository addresses, and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at <http://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

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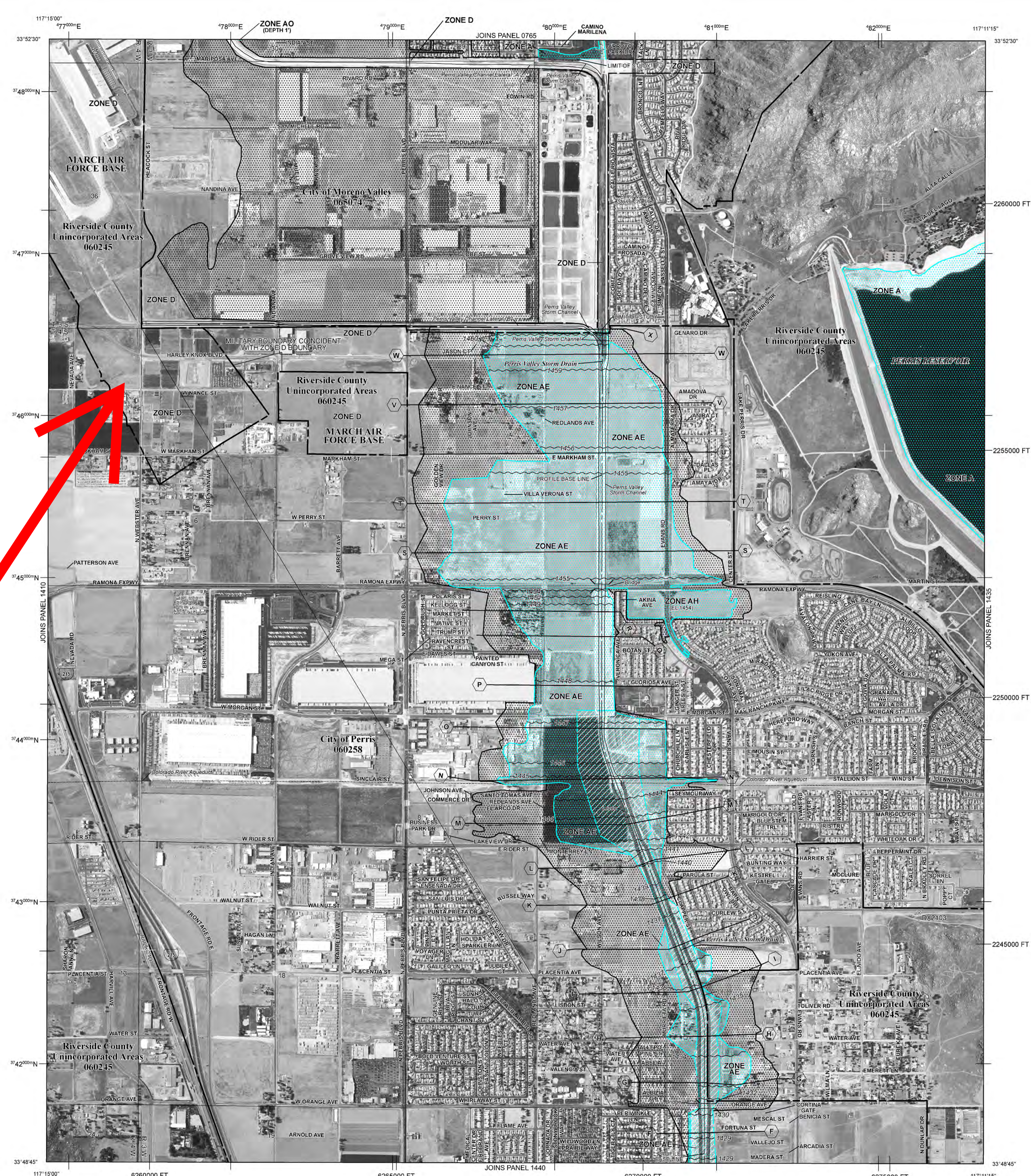
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LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

3000-meter Universal Transverse Mercator grid ticks, zone 11

5000-foot grid values; California State Plane coordinate system, Zone VI (NAD 83 = 406), Lambert projection

Bench mark (see explanation in Notes to Users section of this FIRM panel)

MAP REPOSITORIES

Refer to Map Repositories List on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

August 18, 2014; for a description of revisions, see Notice to Users page in the Flood Insurance Study report.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1430H

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 1430 OF 3805

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MORENO VALLEY, CITY OF	065074	1430	H
PERRIS, CITY OF	060258	1430	H
RIVERSIDE COUNTY UNINCORPORATED AREAS	060245	1430	H

Notice to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER 06065C1430H

MAP REVISED AUGUST 18, 2014

Federal Emergency Management Agency

APPENDIX B

HYDROLOGY CALCULATIONS

EXISTING CONDITION

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
(RCFC&WCD) 1978 HYDROLOGY MANUAL
(c) Copyright 1982-2016 Advanced Engineering Software (aes)
(Rational Tabling Version 23.0)
Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

THIENES ENGINEERING, INC.
14349 FIRESTONE BLVD
LA MIRIADA, CA 90638
714-521-4811

***** DESCRIPTION OF STUDY *****
* TEI JOB NUMBER 4108 *
* EXISTING CONDITIONS *
* 100-YEAR STORM EVENT *

FILE NAME: W:\4108\X100.DAT
TIME/DATE OF STUDY: 09:08 06/22/2022

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
2-YEAR, 1-HOUR PRECIPITATION(INCH) = 0.480
100-YEAR, 1-HOUR PRECIPITATION(INCH) = 1.200
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 100.00 1-HOUR INTENSITY(INCH/HOUR) = 1.200
SLOPE OF INTENSITY DURATION CURVE = 0.5000
RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
FOR ALL DOWNSTREAM ANALYSES

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GEOMETRIES: LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
 $TC = K * [(LENGTH**3)/(ELEVATION CHANGE)]**.2$
INITIAL SUBAREA FLOW-LENGTH(FEET) = 919.00
UPSTREAM ELEVATION(FEET) = 1480.76
DOWNSTREAM ELEVATION(FEET) = 1472.84
ELEVATION DIFFERENCE(FEET) = 7.92
 $TC = 0.533 * [(919.00**3)/(7.92)]**.2 = 21.118$
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.023
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5929
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 6.21
TOTAL AREA(ACRES) = 5.18 TOTAL RUNOFF(CFS) = 6.21

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 5.2 TC(MIN.) = 21.12
PEAK FLOW RATE(CFS) = 6.21

END OF RATIONAL METHOD ANALYSIS



PROPOSED CONDITION

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
(RCFC&WCD) 1978 HYDROLOGY MANUAL
(c) Copyright 1982-2016 Advanced Engineering Software (aes)
(Rational Tabling Version 23.0)
Release Date: 07/01/2016 License ID 1435

Analysis prepared by:

THIENES ENGINEERING, INC.
14349 FIRESTONE BLVD
LA MIRIADA, CA 90638
714-521-4811

***** DESCRIPTION OF STUDY *****
* TEI JOB NUMBER 4108 *
* PROPOSED CONDITIONS *
* 100-YEAR STORM EVENT *

FILE NAME: W:\4108\P100.DAT
TIME/DATE OF STUDY: 13:52 06/22/2022

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
2-YEAR, 1-HOUR PRECIPITATION(INCH) = 0.480
100-YEAR, 1-HOUR PRECIPITATION(INCH) = 1.200
COMPUTED RAINFALL INTENSITY DATA:
STORM EVENT = 100.00 1-HOUR INTENSITY(INCH/HOUR) = 1.200
SLOPE OF INTENSITY DURATION CURVE = 0.5000
RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
FOR ALL DOWNSTREAM ANALYSES

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	WIDTH (FT)	CROSSFALL (FT)	IN- / OUT- / PARK- SIDE / SIDE/ WAY	HEIGHT (FT)	WIDTH (FT)	LIP (FT)	HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
 $TC = K * [(LENGTH**3)/(ELEVATION CHANGE)]**.2$
INITIAL SUBAREA FLOW-LENGTH(FEET) = 150.00
UPSTREAM ELEVATION(FEET) = 1479.33
DOWNSTREAM ELEVATION(FEET) = 1477.72
ELEVATION DIFFERENCE(FEET) = 1.61
 $TC = 0.303 * [(150.00**3)/(1.61)]**.2 = 5.570$
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.938
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8811
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) = 1.74
TOTAL AREA(ACRES) = 0.50 TOTAL RUNOFF(CFS) = 1.74

FLOW PROCESS FROM NODE 101.00 TO NODE 112.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1473.72 DOWNSTREAM(FEET) = 1468.69
FLOW LENGTH(FEET) = 676.00 MANNING'S N = 0.012

DEPTH OF FLOW IN 12.0 INCH PIPE IS 6.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.21
 ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1.74
 PIPE TRAVEL TIME(MIN.) = 2.68 Tc(MIN.) = 8.25
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 112.00 = 826.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 8.25
 RAINFALL INTENSITY(INCH/HR) = 3.24
 TOTAL STREAM AREA(ACRES) = 0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.74

 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

=====

ASSUMED INITIAL SUBAREA UNIFORM
 DEVELOPMENT IS COMMERCIAL
 $TC = K * [(LENGTH ** 3) / (ELEVATION CHANGE)] ** .2$
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 510.00
 UPSTREAM ELEVATION(FEET) = 1478.96
 DOWNSTREAM ELEVATION(FEET) = 1473.34
 ELEVATION DIFFERENCE(FEET) = 5.62
 $TC = 0.303 * [(510.00 ** 3) / (5.62)] ** .2 = 9.040$
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.091
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8772
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) = 10.47
 TOTAL AREA(ACRES) = 3.86 TOTAL RUNOFF(CFS) = 10.47

 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1469.34 DOWNSTREAM(FEET) = 1468.69
 FLOW LENGTH(FEET) = 104.00 MANNING'S N = 0.012
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.10
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 10.47
 PIPE TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 9.32
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 614.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.32
 RAINFALL INTENSITY(INCH/HR) = 3.04
 TOTAL STREAM AREA(ACRES) = 3.86
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 10.47

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	1.74	8.25	3.237	0.50
2	10.47	9.32	3.044	3.86

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	10.99	8.25	3.237

2 12.10 9.32 3.044

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 12.10 Tc(MIN.) = 9.32
TOTAL AREA(ACRES) = 4.4
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 112.00 = 826.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1468.69 DOWNSTREAM(FEET) = 1463.33
FLOW LENGTH(FEET) = 108.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 15.0 INCH PIPE IS 10.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.74
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.10
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 9.46
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 113.00 = 934.00 FEET.

FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.023
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8768
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 0.18 SUBAREA RUNOFF(CFS) = 0.48
TOTAL AREA(ACRES) = 4.5 TOTAL RUNOFF(CFS) = 12.58
TC(MIN.) = 9.46

FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.023
UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6684
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) = 0.64 SUBAREA RUNOFF(CFS) = 1.29
TOTAL AREA(ACRES) = 5.2 TOTAL RUNOFF(CFS) = 13.87
TC(MIN.) = 9.46

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 5.2 TC(MIN.) = 9.46
PEAK FLOW RATE(CFS) = 13.87

*** PEAK FLOW RATE TABLE ***

	Q(CFS)	Tc(MIN.)
1	12.90	8.38
2	13.87	9.46

=====

END OF RATIONAL METHOD ANALYSIS

▲

APPENDIX C

DETENTION CALCULATIONS

166TH STREET INDUSTRIAL BUILDING
PONDING IN EASTERLY TRUCK YARD

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)	
1473.34	0.00	0	3	6	0.00	
1473.40	0.06	112	48	54	0.00	
1473.50	0.16	847	156	210	0.00	
1473.60	0.26	2265	332	541	0.01	6.90
1473.70	0.36	4368	576	1,117	0.03	7.20
1473.80	0.46	7155	888	2,005	0.05	7.40
1473.90	0.56	10597	1237	3,242	0.07	7.60
1474.00	0.66	14147	1720	4,962	0.11	7.90
1474.10	0.76	20260	2197	7,160	0.16	8.1
1474.20	0.86	23680	2585	9,744	0.22	8.3
1474.30	0.96	28014				

 TEI JOB NUMBER 4108
 PROPOSED CONDITION HYDROGRAPH
 100-YEAR 1 HOUR

Program License Serial Number 6400

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

 From study/file name: 4108PR1001100.rte
 *****HYDROGRAPH DATA*****
 Number of intervals = 14
 Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 16.879 (CFS)
 Total volume = 0.493 (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 100.000 to Point/Station 101.000
 **** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

 Total number of inflow hydrograph intervals = 14
 Hydrograph time unit = 5.000 (Min.)
 Initial depth in storage basin = 0.00(Ft.)

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

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-0*dt/2) (Ac.Ft)	(S+0*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.360	0.010	6.900	-0.014	0.034
0.460	0.030	7.200	0.005	0.055
0.560	0.050	7.400	0.025	0.075
0.660	0.070	7.600	0.044	0.096
0.760	0.110	7.900	0.083	0.137
0.860	0.160	8.100	0.132	0.188
0.960	0.220	8.300	0.191	0.249

 Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	Depth (Ft.)
0.083	1.81	1.28	0.002	0.07
0.167	2.81	2.73	0.004	0.14
0.250	3.26	3.16	0.005	0.16
0.333	3.44	3.43	0.005	0.18
0.417	3.84	3.73	0.005	0.19
0.500	4.37	4.26	0.006	0.22
0.583	5.00	4.86	0.007	0.25

0.667	5.81	5.63	0.008		OI				0.29
0.750	7.90	6.93	0.012		OI				0.37
0.833	16.88	7.38	0.048		0			I	0.55
0.917	10.51	7.75	0.090		0		I		0.71
1.000	4.51	7.74	0.089		I	0			0.71
1.083	1.31	7.46	0.056		I	0			0.59
1.167	0.11	6.93	0.012		I	0			0.37
1.250	0.00	0.00	0.000		0				0.00

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

Number of intervals = 15
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 7.753 (CFS)
Total volume = 0.505 (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

 TEI JOB NUMBER 4108
 PROPOSED CONDITION HYDROGRAPH
 100-YEAR 3 HOUR

Program License Serial Number 6400

***** HYDROGRAPH INFORMATION *****
 From study/file name: 4108PR1003100.rte
 *****HYDROGRAPH DATA*****
 Number of intervals = 38
 Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 9.051 (CFS)
 Total volume = 0.760 (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 100.000 to Point/Station 101.000
 **** RETARDING BASIN ROUTING ****

 User entry of depth-outflow-storage data

 Total number of inflow hydrograph intervals = 38
 Hydrograph time unit = 5.000 (Min.)
 Initial depth in storage basin = 0.00(Ft.)

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

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-0*dt/2) (Ac.Ft)	(S+0*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.360	0.010	6.900	-0.014	0.034
0.460	0.030	7.200	0.005	0.055
0.560	0.050	7.400	0.025	0.075
0.660	0.070	7.600	0.044	0.096
0.760	0.110	7.900	0.083	0.137
0.860	0.160	8.100	0.132	0.188
0.960	0.220	8.300	0.191	0.249

 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	4.53	6.79	9.05	Depth (Ft.)
0.083	0.88	0.62	0.001	OI					0.03
0.167	1.35	1.32	0.002	0					0.07
0.250	1.26	1.30	0.002	0					0.07
0.333	1.46	1.38	0.002	OI					0.07
0.417	1.59	1.58	0.002	0					0.08
0.500	1.81	1.75	0.003	0					0.09
0.583	1.71	1.77	0.003	0					0.09

0.667	1.82	1.77	0.003	0						0.09
0.750	1.92	1.91	0.003	0						0.10
0.833	1.73	1.78	0.003	0						0.09
0.917	1.69	1.67	0.002	0						0.09
1.000	1.85	1.81	0.003	0						0.09
1.083	2.19	2.11	0.003	0						0.11
1.167	2.34	2.33	0.003	0						0.12
1.250	2.36	2.36	0.003	0						0.12
1.333	2.22	2.26	0.003	0						0.12
1.417	2.56	2.45	0.004	0I						0.13
1.500	2.85	2.81	0.004	0I						0.15
1.583	2.69	2.75	0.004	0						0.14
1.667	2.80	2.74	0.004	0						0.14
1.750	3.35	3.21	0.005	0						0.17
1.833	3.45	3.48	0.005	0						0.18
1.917	3.25	3.29	0.005	0						0.17
2.000	3.23	3.22	0.005	0						0.17
2.083	3.34	3.32	0.005	0						0.17
2.167	4.22	3.97	0.006	0						0.21
2.250	5.26	5.05	0.007	0I						0.26
2.333	4.49	4.80	0.007	IO						0.25
2.417	6.42	5.72	0.008	0I						0.30
2.500	8.04	6.97	0.014	0						0.38
2.583	9.05	7.12	0.025	0						0.43
2.667	7.69	7.23	0.033	0I						0.47
2.750	3.91	7.10	0.024	I						0.43
2.833	2.16	4.08	0.006	0						0.21
2.917	1.94	1.22	0.002	0I						0.06
3.000	1.11	1.65	0.002	IO						0.09
3.083	0.28	0.31	0.000	IO						0.02
3.167	0.02	0.09	0.000	0						0.00
3.250	0.00	0.00	0.000	0						0.00

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

Number of intervals = 39
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 7.230 (CFS)
Total volume = 0.760 (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

 TEI JOB NUMBER 4108
 PROPOSED CONDITION HYDROGRAPH
 100-YEAR 6 HOUR

Program License Serial Number 6400

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

From study/file name: 4108PR1006100.rte
 *****HYDROGRAPH DATA*****
 Number of intervals = 74
 Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 7.931 (CFS)
 Total volume = 0.989 (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 100.000 to Point/Station 101.000
 **** RETARDING BASIN ROUTING ****

 User entry of depth-outflow-storage data

 Total number of inflow hydrograph intervals = 74
 Hydrograph time unit = 5.000 (Min.)
 Initial depth in storage basin = 0.00(Ft.)

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

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-0*dt/2) (Ac.Ft)	(S+0*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.360	0.010	6.900	-0.014	0.034
0.460	0.030	7.200	0.005	0.055
0.560	0.050	7.400	0.025	0.075
0.660	0.070	7.600	0.044	0.096
0.760	0.110	7.900	0.083	0.137
0.860	0.160	8.100	0.132	0.188
0.960	0.220	8.300	0.191	0.249

 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	3.97	5.95	7.93	Depth (Ft.)
0.083	0.45	0.32	0.000	0					0.02
0.167	0.77	0.73	0.001	OI					0.04
0.250	0.84	0.84	0.001	0					0.04
0.333	0.85	0.85	0.001	0					0.04
0.417	0.85	0.85	0.001	0					0.04
0.500	0.94	0.91	0.001	0					0.05
0.583	0.98	0.98	0.001	0					0.05

0.667	0.99	0.99	0.001	0						0.05
0.750	0.99	0.99	0.001	0						0.05
0.833	0.99	0.99	0.001	0						0.05
0.917	0.99	0.99	0.001	0						0.05
1.000	1.08	1.05	0.002	0						0.05
1.083	1.12	1.12	0.002	0						0.06
1.167	1.13	1.13	0.002	0						0.06
1.250	1.13	1.13	0.002	0						0.06
1.333	1.13	1.13	0.002	0						0.06
1.417	1.13	1.13	0.002	0						0.06
1.500	1.13	1.13	0.002	0						0.06
1.583	1.13	1.13	0.002	0						0.06
1.667	1.13	1.13	0.002	0						0.06
1.750	1.13	1.13	0.002	0						0.06
1.833	1.13	1.13	0.002	0						0.06
1.917	1.13	1.13	0.002	0						0.06
2.000	1.22	1.19	0.002	0						0.06
2.083	1.17	1.20	0.002	0						0.06
2.167	1.22	1.20	0.002	0						0.06
2.250	1.26	1.26	0.002	0						0.07
2.333	1.27	1.27	0.002	0						0.07
2.417	1.27	1.27	0.002	0						0.07
2.500	1.27	1.27	0.002	0						0.07
2.583	1.27	1.27	0.002	0						0.07
2.667	1.27	1.27	0.002	0						0.07
2.750	1.36	1.33	0.002	0						0.07
2.833	1.41	1.40	0.002	0						0.07
2.917	1.41	1.41	0.002	0						0.07
3.000	1.41	1.41	0.002	0						0.07
3.083	1.41	1.41	0.002	0						0.07
3.167	1.50	1.47	0.002	OI						0.08
3.250	1.55	1.54	0.002	0						0.08
3.333	1.55	1.55	0.002	0						0.08
3.417	1.64	1.61	0.002	0						0.08
3.500	1.78	1.75	0.003	0						0.09
3.583	1.92	1.89	0.003	0						0.10
3.667	1.97	1.97	0.003	0						0.10
3.750	2.06	2.04	0.003	0						0.11
3.833	2.11	2.11	0.003	0						0.11
3.917	2.20	2.18	0.003	0						0.11
4.000	2.25	2.25	0.003	0						0.12
4.083	2.35	2.32	0.003	OI						0.12
4.167	2.48	2.45	0.004	OI						0.13
4.250	2.62	2.59	0.004	0						0.14
4.333	2.77	2.74	0.004	0						0.14
4.417	2.93	2.89	0.004	0						0.15
4.500	2.98	2.98	0.004	0						0.16
4.583	3.09	3.06	0.004	0						0.16
4.667	3.24	3.21	0.005	OI						0.17
4.750	3.40	3.36	0.005	0						0.18
4.833	3.45	3.45	0.005	0						0.18
4.917	3.56	3.53	0.005	0						0.18
5.000	3.71	3.68	0.005	0						0.19
5.083	4.26	4.11	0.006	OI						0.21
5.167	5.03	4.86	0.007		OI					0.25
5.250	5.61	5.50	0.008		0					0.29
5.333	6.09	5.99	0.009			0				0.31
5.417	6.76	6.60	0.010				OI			0.34
5.500	7.93	6.95	0.013				0	I		0.38
5.583	4.75	6.79	0.010		I		0			0.35
5.667	1.98	1.97	0.003	0						0.10
5.750	1.05	1.33	0.002	IO						0.07
5.833	0.77	0.74	0.001	OI						0.04
5.917	0.53	0.61	0.001	0						0.03
6.000	0.34	0.36	0.001	0						0.02
6.083	0.11	0.17	0.000	0						0.01
6.167	0.01	0.01	0.000	0						0.00
6.250	0.00	0.00	0.000	0						0.00

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

Number of intervals = 75
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 6.952 (CFS)
Total volume = 0.989 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

FLOOD HYDROGRAPH ROUTING PROGRAM
 Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014
 Study date: 06/22/22

 TEI JOB NUMBER 4108
 PROPOSED CONDITION HYDROGRAPH
 100-YEAR 24 HOUR

Program License Serial Number 6400

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

 From study/file name: 4108PR10024100.rte
 *****HYDROGRAPH DATA*****
 Number of intervals = 290
 Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 2.652 (CFS)
 Total volume = 1.594 (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 100.000 to Point/Station 101.000
 **** RETARDING BASIN ROUTING ****

 User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 290
 Hydrograph time unit = 5.000 (Min.)
 Initial depth in storage basin = 0.00(Ft.)

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

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-0*dt/2) (Ac.Ft)	(S+0*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.360	0.010	6.900	-0.014	0.034
0.460	0.030	7.200	0.005	0.055
0.560	0.050	7.400	0.025	0.075
0.660	0.070	7.600	0.044	0.096
0.760	0.110	7.900	0.083	0.137
0.860	0.160	8.100	0.132	0.188
0.960	0.220	8.300	0.191	0.249

 Hydrograph Detention Basin Routing

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

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	Depth (Ft.)
0.083	0.10	0.07	0.000	0.00
0.167	0.15	0.15	0.000	0.01
0.250	0.15	0.15	0.000	0.01
0.333	0.20	0.19	0.000	0.01
0.417	0.23	0.23	0.000	0.01
0.500	0.23	0.23	0.000	0.01
0.583	0.23	0.23	0.000	0.01

0.667	0.23	0.23	0.000	0					0.01
0.750	0.23	0.23	0.000	0					0.01
0.833	0.28	0.27	0.000	0					0.01
0.917	0.31	0.30	0.000	0					0.02
1.000	0.31	0.31	0.000	0					0.02
1.083	0.26	0.27	0.000	0					0.01
1.167	0.23	0.24	0.000	0					0.01
1.250	0.23	0.23	0.000	0					0.01
1.333	0.23	0.23	0.000	0					0.01
1.417	0.23	0.23	0.000	0					0.01
1.500	0.23	0.23	0.000	0					0.01
1.583	0.23	0.23	0.000	0					0.01
1.667	0.23	0.23	0.000	0					0.01
1.750	0.23	0.23	0.000	0					0.01
1.833	0.28	0.27	0.000	0					0.01
1.917	0.31	0.30	0.000	0					0.02
2.000	0.31	0.31	0.000	0					0.02
2.083	0.31	0.31	0.000	0					0.02
2.167	0.31	0.31	0.000	0					0.02
2.250	0.31	0.31	0.000	0					0.02
2.333	0.31	0.31	0.000	0					0.02
2.417	0.31	0.31	0.000	0					0.02
2.500	0.31	0.31	0.000	0					0.02
2.583	0.36	0.34	0.000	0					0.02
2.667	0.38	0.38	0.001	0					0.02
2.750	0.39	0.39	0.001	0					0.02
2.833	0.39	0.39	0.001	0					0.02
2.917	0.39	0.39	0.001	0					0.02
3.000	0.39	0.39	0.001	0					0.02
3.083	0.39	0.39	0.001	0					0.02
3.167	0.39	0.39	0.001	0					0.02
3.250	0.39	0.39	0.001	0					0.02
3.333	0.39	0.39	0.001	0					0.02
3.417	0.39	0.39	0.001	0					0.02
3.500	0.39	0.39	0.001	0					0.02
3.583	0.39	0.39	0.001	0					0.02
3.667	0.39	0.39	0.001	0					0.02
3.750	0.39	0.39	0.001	0					0.02
3.833	0.43	0.42	0.001	0					0.02
3.917	0.46	0.46	0.001	0					0.02
4.000	0.46	0.46	0.001	0					0.02
4.083	0.46	0.46	0.001	0					0.02
4.167	0.46	0.46	0.001	0					0.02
4.250	0.46	0.46	0.001	0					0.02
4.333	0.51	0.50	0.001	OI					0.03
4.417	0.54	0.54	0.001	0					0.03
4.500	0.54	0.54	0.001	0					0.03
4.583	0.54	0.54	0.001	0					0.03
4.667	0.54	0.54	0.001	0					0.03
4.750	0.54	0.54	0.001	0					0.03
4.833	0.59	0.57	0.001	OI					0.03
4.917	0.61	0.61	0.001	0					0.03
5.000	0.62	0.62	0.001	0					0.03
5.083	0.52	0.55	0.001	0					0.03
5.167	0.47	0.47	0.001	0					0.02
5.250	0.46	0.46	0.001	0					0.02
5.333	0.51	0.50	0.001	OI					0.03
5.417	0.54	0.54	0.001	0					0.03
5.500	0.54	0.54	0.001	0					0.03
5.583	0.59	0.57	0.001	OI					0.03
5.667	0.61	0.61	0.001	0					0.03
5.750	0.62	0.62	0.001	0					0.03
5.833	0.62	0.62	0.001	0					0.03
5.917	0.62	0.62	0.001	0					0.03
6.000	0.62	0.62	0.001	0					0.03
6.083	0.67	0.65	0.001	OI					0.03
6.167	0.69	0.69	0.001	0					0.04
6.250	0.69	0.69	0.001	0					0.04
6.333	0.69	0.69	0.001	0					0.04
6.417	0.69	0.69	0.001	0					0.04
6.500	0.69	0.69	0.001	0					0.04
6.583	0.74	0.73	0.001	0					0.04
6.667	0.77	0.77	0.001	0					0.04
6.750	0.77	0.77	0.001	0					0.04
6.833	0.77	0.77	0.001	0					0.04
6.917	0.77	0.77	0.001	0					0.04
7.000	0.77	0.77	0.001	0					0.04
7.083	0.77	0.77	0.001	0					0.04
7.167	0.77	0.77	0.001	0					0.04

7.250	0.77	0.77	0.001	0			0.04
7.333	0.82	0.81	0.001	0			0.04
7.417	0.85	0.84	0.001	0			0.04
7.500	0.85	0.85	0.001	0			0.04
7.583	0.90	0.88	0.001	0			0.05
7.667	0.92	0.92	0.001	0			0.05
7.750	0.93	0.93	0.001	0			0.05
7.833	0.97	0.96	0.001	0			0.05
7.917	1.00	1.00	0.001	0			0.05
8.000	1.00	1.00	0.001	0			0.05
8.083	1.10	1.07	0.002	OI			0.06
8.167	1.15	1.15	0.002	0			0.06
8.250	1.16	1.16	0.002	0			0.06
8.333	1.16	1.16	0.002	0			0.06
8.417	1.16	1.16	0.002	0			0.06
8.500	1.16	1.16	0.002	0			0.06
8.583	1.21	1.19	0.002	0			0.06
8.667	1.23	1.23	0.002	0			0.06
8.750	1.23	1.23	0.002	0			0.06
8.833	1.28	1.27	0.002	0			0.07
8.917	1.31	1.31	0.002	0			0.07
9.000	1.31	1.31	0.002	0			0.07
9.083	1.41	1.38	0.002	0			0.07
9.167	1.46	1.46	0.002	0			0.08
9.250	1.46	1.46	0.002	0			0.08
9.333	1.51	1.50	0.002	0			0.08
9.417	1.54	1.54	0.002	0			0.08
9.500	1.54	1.54	0.002	0			0.08
9.583	1.59	1.58	0.002	0			0.08
9.667	1.62	1.61	0.002	0			0.08
9.750	1.62	1.62	0.002	0			0.08
9.833	1.67	1.65	0.002	OI			0.09
9.917	1.69	1.69	0.002	0			0.09
10.000	1.70	1.70	0.002	0			0.09
10.083	1.35	1.45	0.002	IO			0.08
10.167	1.17	1.19	0.002	0			0.06
10.250	1.16	1.16	0.002	0			0.06
10.333	1.16	1.16	0.002	0			0.06
10.417	1.16	1.16	0.002	0			0.06
10.500	1.16	1.16	0.002	0			0.06
10.583	1.40	1.33	0.002	0			0.07
10.667	1.53	1.52	0.002	0			0.08
10.750	1.54	1.54	0.002	0			0.08
10.833	1.54	1.54	0.002	0			0.08
10.917	1.54	1.54	0.002	0			0.08
11.000	1.54	1.54	0.002	0			0.08
11.083	1.49	1.51	0.002	0			0.08
11.167	1.47	1.47	0.002	0			0.08
11.250	1.46	1.46	0.002	0			0.08
11.333	1.46	1.46	0.002	0			0.08
11.417	1.46	1.46	0.002	0			0.08
11.500	1.46	1.46	0.002	0			0.08
11.583	1.37	1.40	0.002	0			0.07
11.667	1.32	1.32	0.002	0			0.07
11.750	1.31	1.31	0.002	0			0.07
11.833	1.36	1.34	0.002	0			0.07
11.917	1.39	1.38	0.002	0			0.07
12.000	1.39	1.39	0.002	0			0.07
12.083	1.73	1.63	0.002	OI			0.08
12.167	1.91	1.90	0.003	OI			0.10
12.250	1.93	1.93	0.003	0			0.10
12.333	1.98	1.96	0.003	0			0.10
12.417	2.00	2.00	0.003	0			0.10
12.500	2.00	2.00	0.003	0			0.10
12.583	2.10	2.07	0.003	0			0.11
12.667	2.15	2.15	0.003	0			0.11
12.750	2.16	2.16	0.003	0			0.11
12.833	2.21	2.19	0.003	0			0.11
12.917	2.23	2.23	0.003	0			0.12
13.000	2.24	2.24	0.003	0			0.12
13.083	2.50	2.42	0.004	OI			0.13
13.167	2.63	2.62	0.004	0			0.14
13.250	2.65	2.65	0.004	0			0.14
13.333	2.65	2.65	0.004	0			0.14
13.417	2.65	2.65	0.004	0			0.14
13.500	2.65	2.65	0.004	OI			0.14
13.583	2.09	2.26	0.003	I O			0.12
13.667	1.80	1.82	0.003	0			0.10
13.750	1.77	1.77	0.003	0			0.09

13.833	1.77	1.77	0.003			0		0.09
13.917	1.77	1.77	0.003			0		0.09
14.000	1.77	1.77	0.003			0		0.09
14.083	1.97	1.91	0.003			0		0.10
14.167	2.07	2.06	0.003			0		0.11
14.250	2.08	2.08	0.003			0		0.11
14.333	2.03	2.05	0.003			0		0.11
14.417	2.01	2.01	0.003			0		0.10
14.500	2.00	2.00	0.003			0		0.10
14.583	2.00	2.00	0.003			0		0.10
14.667	2.00	2.00	0.003			0		0.10
14.750	2.00	2.00	0.003			0		0.10
14.833	1.96	1.97	0.003			0		0.10
14.917	1.93	1.93	0.003			0		0.10
15.000	1.93	1.93	0.003			0		0.10
15.083	1.88	1.89	0.003			0		0.10
15.167	1.85	1.85	0.003			0		0.10
15.250	1.85	1.85	0.003			0		0.10
15.333	1.80	1.82	0.003			0		0.09
15.417	1.78	1.78	0.003			0		0.09
15.500	1.77	1.77	0.003			0		0.09
15.583	1.58	1.64	0.002			0		0.09
15.667	1.48	1.48	0.002			0		0.08
15.750	1.46	1.47	0.002			0		0.08
15.833	1.46	1.46	0.002			0		0.08
15.917	1.46	1.46	0.002			0		0.08
16.000	1.46	1.46	0.002			0		0.08
16.083	0.73	0.95	0.001	I	0			0.05
16.167	0.35	0.37	0.001	0				0.02
16.250	0.31	0.31	0.000	0				0.02
16.333	0.31	0.31	0.000	0				0.02
16.417	0.31	0.31	0.000	0				0.02
16.500	0.31	0.31	0.000	0				0.02
16.583	0.26	0.27	0.000	0				0.01
16.667	0.23	0.24	0.000	0				0.01
16.750	0.23	0.23	0.000	0				0.01
16.833	0.23	0.23	0.000	0				0.01
16.917	0.23	0.23	0.000	0				0.01
17.000	0.23	0.23	0.000	0				0.01
17.083	0.33	0.30	0.000	0				0.02
17.167	0.38	0.38	0.001	0				0.02
17.250	0.39	0.39	0.001	0				0.02
17.333	0.39	0.39	0.001	0				0.02
17.417	0.39	0.39	0.001	0				0.02
17.500	0.39	0.39	0.001	0				0.02
17.583	0.39	0.39	0.001	0				0.02
17.667	0.39	0.39	0.001	0				0.02
17.750	0.39	0.39	0.001	0				0.02
17.833	0.34	0.35	0.001	0				0.02
17.917	0.31	0.31	0.000	0				0.02
18.000	0.31	0.31	0.000	0				0.02
18.083	0.31	0.31	0.000	0				0.02
18.167	0.31	0.31	0.000	0				0.02
18.250	0.31	0.31	0.000	0				0.02
18.333	0.31	0.31	0.000	0				0.02
18.417	0.31	0.31	0.000	0				0.02
18.500	0.31	0.31	0.000	0				0.02
18.583	0.26	0.27	0.000	0				0.01
18.667	0.23	0.24	0.000	0				0.01
18.750	0.23	0.23	0.000	0				0.01
18.833	0.18	0.20	0.000	0				0.01
18.917	0.16	0.16	0.000	0				0.01
19.000	0.15	0.15	0.000	0				0.01
19.083	0.20	0.19	0.000	0				0.01
19.167	0.23	0.23	0.000	0				0.01
19.250	0.23	0.23	0.000	0				0.01
19.333	0.28	0.27	0.000	0				0.01
19.417	0.31	0.30	0.000	0				0.02
19.500	0.31	0.31	0.000	0				0.02
19.583	0.26	0.27	0.000	0				0.01
19.667	0.23	0.24	0.000	0				0.01
19.750	0.23	0.23	0.000	0				0.01
19.833	0.18	0.20	0.000	0				0.01
19.917	0.16	0.16	0.000	0				0.01
20.000	0.15	0.15	0.000	0				0.01
20.083	0.20	0.19	0.000	0				0.01
20.167	0.23	0.23	0.000	0				0.01
20.250	0.23	0.23	0.000	0				0.01
20.333	0.23	0.23	0.000	0				0.01

20.417	0.23	0.23	0.000	0					0.01
20.500	0.23	0.23	0.000	0					0.01
20.583	0.23	0.23	0.000	0					0.01
20.667	0.23	0.23	0.000	0					0.01
20.750	0.23	0.23	0.000	0					0.01
20.833	0.18	0.20	0.000	0					0.01
20.917	0.16	0.16	0.000	0					0.01
21.000	0.15	0.15	0.000	0					0.01
21.083	0.20	0.19	0.000	0					0.01
21.167	0.23	0.23	0.000	0					0.01
21.250	0.23	0.23	0.000	0					0.01
21.333	0.18	0.20	0.000	0					0.01
21.417	0.16	0.16	0.000	0					0.01
21.500	0.15	0.15	0.000	0					0.01
21.583	0.20	0.19	0.000	0					0.01
21.667	0.23	0.23	0.000	0					0.01
21.750	0.23	0.23	0.000	0					0.01
21.833	0.18	0.20	0.000	0					0.01
21.917	0.16	0.16	0.000	0					0.01
22.000	0.15	0.15	0.000	0					0.01
22.083	0.20	0.19	0.000	0					0.01
22.167	0.23	0.23	0.000	0					0.01
22.250	0.23	0.23	0.000	0					0.01
22.333	0.18	0.20	0.000	0					0.01
22.417	0.16	0.16	0.000	0					0.01
22.500	0.15	0.15	0.000	0					0.01
22.583	0.15	0.15	0.000	0					0.01
22.667	0.15	0.15	0.000	0					0.01
22.750	0.15	0.15	0.000	0					0.01
22.833	0.15	0.15	0.000	0					0.01
22.917	0.15	0.15	0.000	0					0.01
23.000	0.15	0.15	0.000	0					0.01
23.083	0.15	0.15	0.000	0					0.01
23.167	0.15	0.15	0.000	0					0.01
23.250	0.15	0.15	0.000	0					0.01
23.333	0.15	0.15	0.000	0					0.01
23.417	0.15	0.15	0.000	0					0.01
23.500	0.15	0.15	0.000	0					0.01
23.583	0.15	0.15	0.000	0					0.01
23.667	0.15	0.15	0.000	0					0.01
23.750	0.15	0.15	0.000	0					0.01
23.833	0.15	0.15	0.000	0					0.01
23.917	0.15	0.15	0.000	0					0.01
24.000	0.15	0.15	0.000	0					0.01
24.083	0.06	0.09	0.000	IO					0.00
24.167	0.01	0.01	0.000	0					0.00
24.250	0.00	0.00	0.000	0					0.00

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

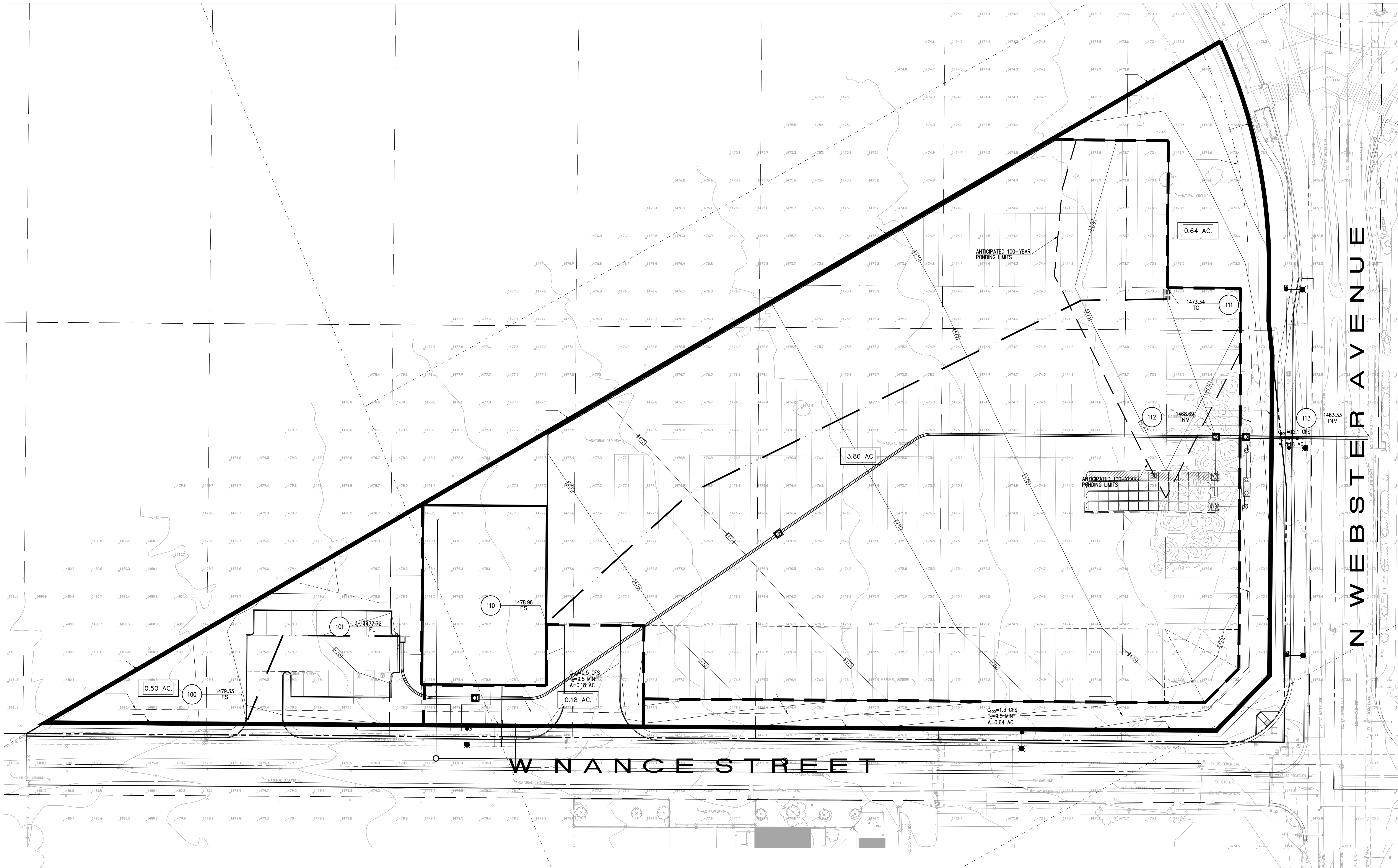
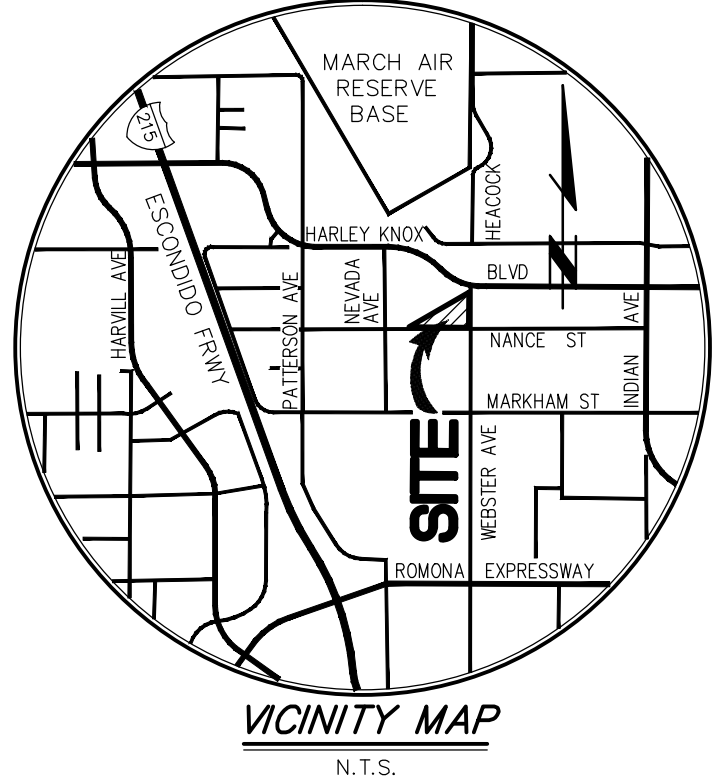
Number of intervals = 291
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 2.652 (CFS)
Total volume = 1.594 (Ac.Ft)

Status of hydrographs being held in storage

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

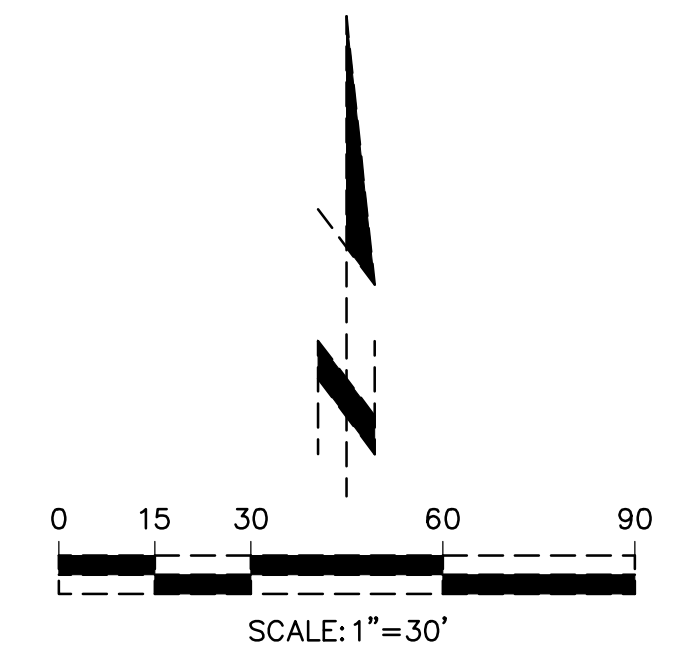
APPENDIX D

HYDROLOGY MAPS



LEGEND

	PROJECT BOUNDARY
	SUBAREA BOUNDARY
	FLOW PATH
	SUBAREA AREA
	NODE NUMBER
	FLOW DIRECTION
	PONDING LIMITS



CITY OF PERRIS
PUBLIC WORKS DEPARTMENT

PROPOSED CONDITION HYDROLOGY MAP
PERRIS TRAILER YARD
NANCE ST. AND WEBSTER AVE.

Designed by _____	Approved by _____	Date _____
Checked by _____	Public Works Director _____	R.C.E. XXXXX
Designed by _____		
Date _____		

Sheet **1** of **1** Sheets

JUN. 4108

PREPARED FOR:
LAKE CREEK INDUSTRIAL, LLC
1302 BRITANNY CROSS RD.
SANTA ANA, CA. 92705
CONTACT: MIKE TONKONOCY

