PRELIMINARY HYDROLOGY STUDY FOR

Cotati Village Community
APN 046-286-021
APN 144-050-009
Cotati, CA 94931

Prepared For:
116 Associated Investors, LLC
1101 Fifth Avenue, Suite 300
San Rafael, CA 94901

MFKessler
One Venture Ste, 130
Irvine, CA 92618
(949) 339-5330
Ali Monshizadeh P.E.

Prepared: November 2021
Revised: December 2023

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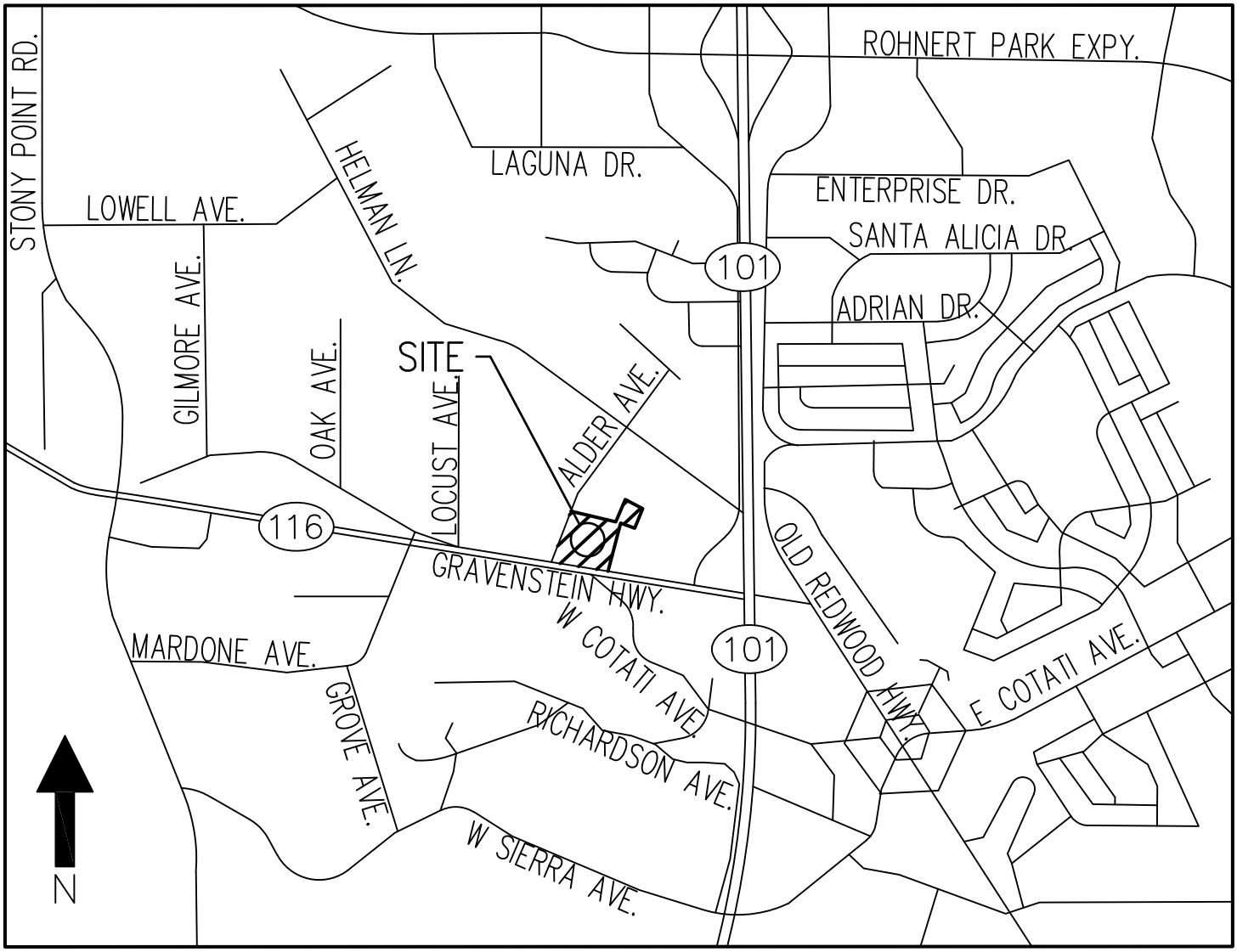


VICINITY MAP

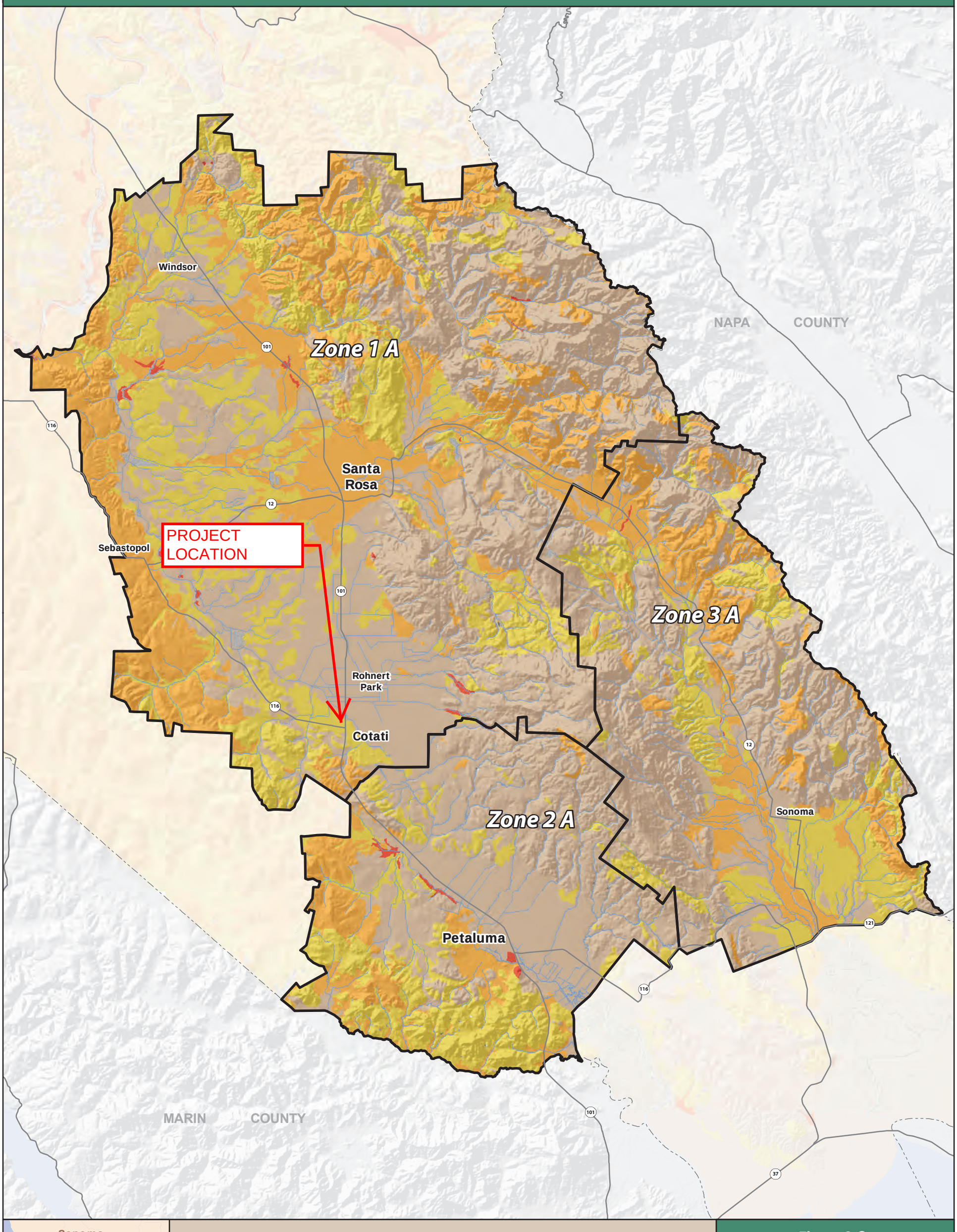
N.T.S.

II. SOILS AND RAIN FALL INTENSITY MAPS

From Sonoma County Water Agency Flood Management Design Manual
Soil Type: C

Sonoma County Water Agency

Flood Management Design Manual (FMDM)



Hydrologic Soils Group

A B C D

SCWA Flood Control Zone Boundary

Streams and Channels

Highway

Water Bodies

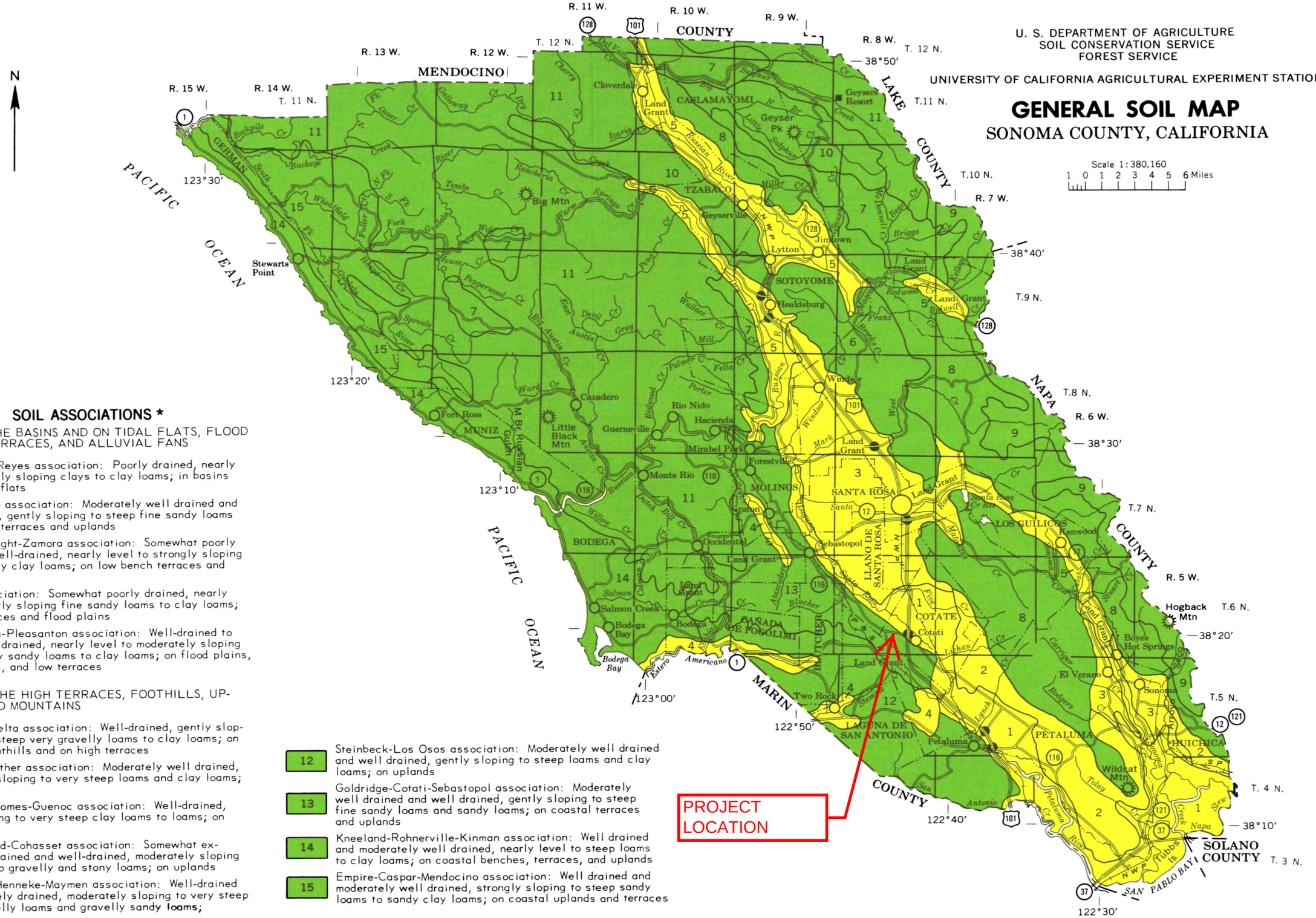
Figure 3-8
Hydrologic Soils Group

0 1 2 3 4
Miles

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FOREST SERVICE

UNIVERSITY OF CALIFORNIA AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP
SONOMA COUNTY, CALIFORNIA



This map is for general planning. It shows only the major soils and does not contain sufficient detail for operational planning.

SOIL ASSOCIATIONS *

SOILS IN THE BASINS AND ON TIDAL FLATS, FLOOD PLAINS, TERRACES, AND ALLUVIAL FANS

1	Clear Lake-Reyes association: Poorly drained, nearly level to gently sloping clays to clay loams; in basins and on tidal flats
2	Haire-Diablo association: Moderately well drained and well drained, gently sloping to steep fine sandy loams to clays; on terraces and uplands
3	Huichica-Wright-Zamora association: Somewhat poorly drained to well-drained, nearly level to strongly sloping loams to silty clay loams; on low bench terraces and alluvial fans
4	Pajaro association: Somewhat poorly drained, nearly level to gently sloping fine sandy loams to clay loams; on low terraces and flood plains
5	Yolo-Cortina-Pleasanton association: Well-drained to excessively drained, nearly level to moderately sloping very gravelly sandy loams to clay loams; on flood plains, alluvial fans, and low terraces

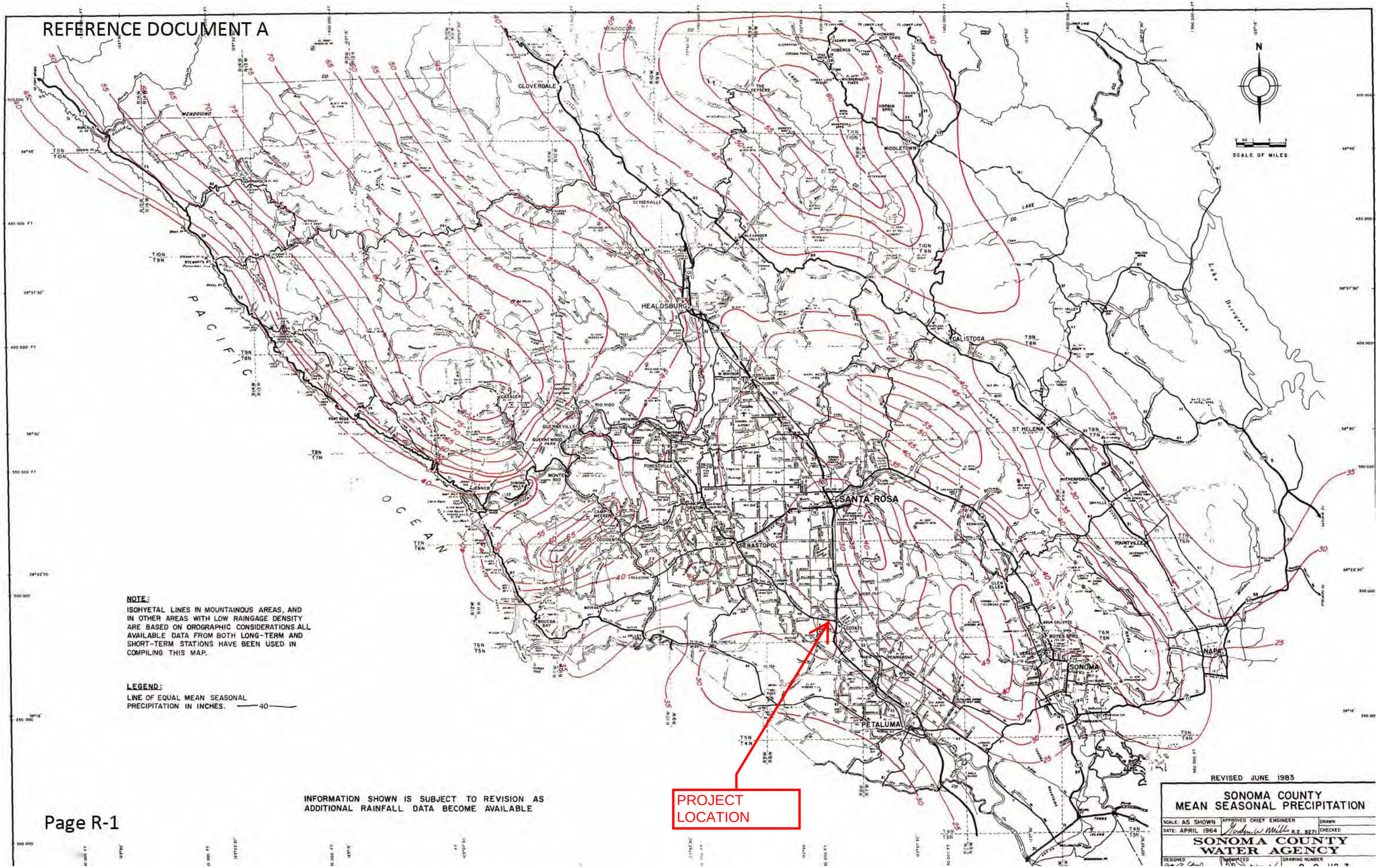
SOILS OF THE HIGH TERRACES, FOOTHILLS, UPLANDS, AND MOUNTAINS

6	Spreckels-Felta association: Well-drained, gently sloping to very steep very gravelly loams to clay loams; on mountain foothills and on high terraces
7	Yorkville-Suther association: Moderately well drained, moderately sloping to very steep loams and clay loams; on uplands
8	Goulding-Toomes-Guenoc association: Well-drained, gently sloping to very steep clay loams to loams; on uplands
9	Kidd-Forward-Cohasset association: Somewhat excessively drained and well-drained, moderately sloping to very steep gravelly and stony loams; on uplands
10	Los Gatos-Henneke-Maymen association: Well-drained to excessively drained, moderately sloping to very steep **loams**, gravelly loams and gravelly sandy **loams**; on mountains
11	Hugo-Josephine-Laughlin association: Well-drained, gently sloping to very steep gravelly loams and loams; on mountains
12	Steinbeck-Los Osos association: Moderately well drained and well drained, gently sloping to steep loams and clay loams; on uplands
13	Goldridge-Cotati-Sebastopol association: Moderately well drained and well drained, gently sloping to steep fine sandy loams and sandy loams; on coastal terraces and uplands
14	Kneeland-Rohnerville-Kinman association: Well drained and moderately well drained, nearly level to steep loams to clay loams; on coastal benches, terraces, and uplands
15	Empire-Caspar-Mendocino association: Well drained and moderately well drained, strongly sloping to steep sandy loams to sandy clay loams; on coastal uplands and terraces

* Textures described in these soil associations are for the surface layer

Published 1971

REFERENCE DOCUMENT A



NOTE:
ISOHYETAL LINES IN MOUNTAINOUS AREAS, AND IN OTHER AREAS WITH LOW RAINGAGE DENSITY ARE BASED ON OROGRAPHIC CONSIDERATIONS. ALL AVAILABLE DATA FROM BOTH LONG-TERM AND SHORT-TERM STATIONS HAVE BEEN USED IN COMPILING THIS MAP.

LEGEND:
LINE OF EQUAL MEAN SEASONAL PRECIPITATION IN INCHES. ——40——

INFORMATION SHOWN IS SUBJECT TO REVISION AS ADDITIONAL RAINFALL DATA BECOME AVAILABLE

PROJECT LOCATION

REVISED JUNE 1983

SONOMA COUNTY
MEAN SEASONAL PRECIPITATION

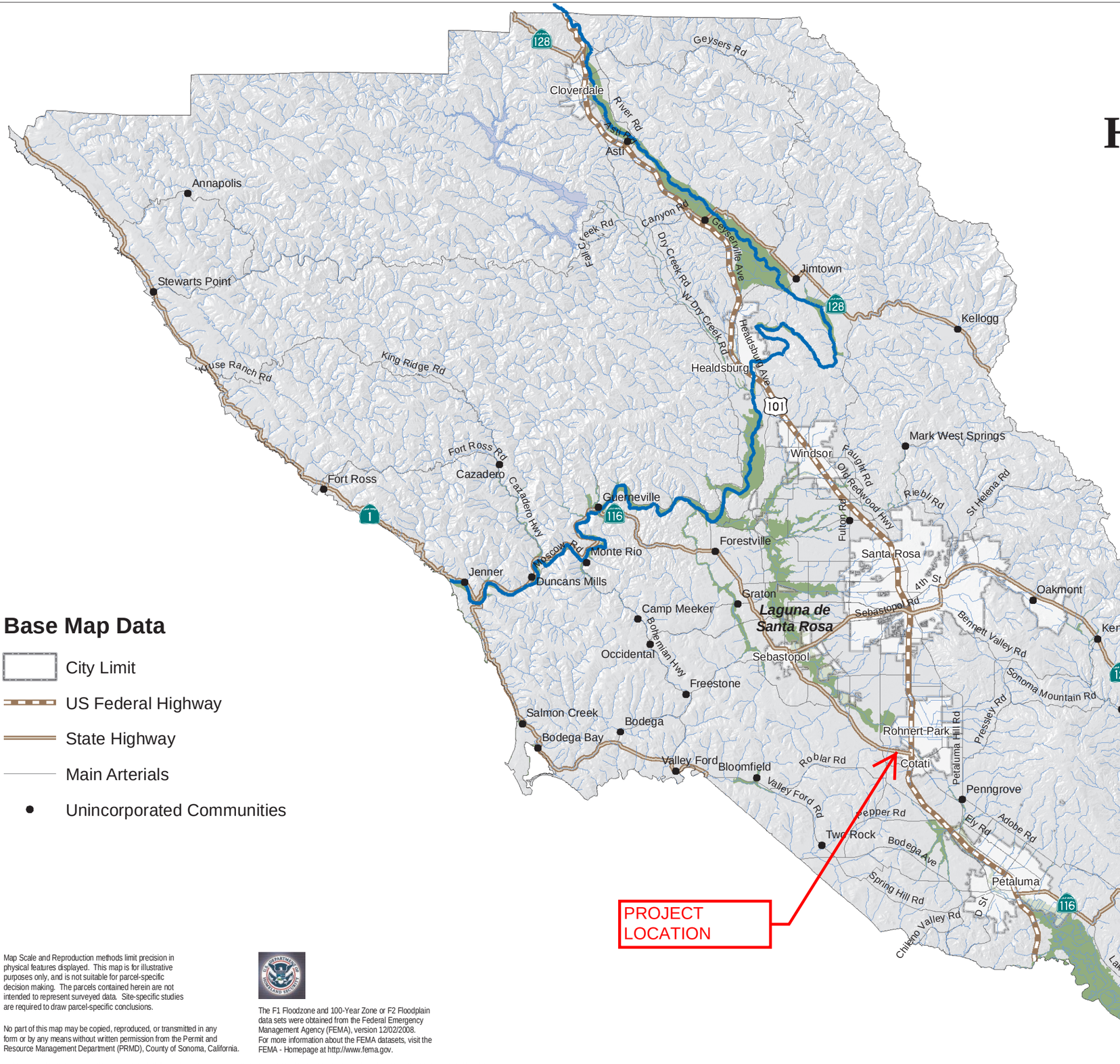
SCALE: AS SHOWN	APPROVED CHIEF ENGINEER	DRAWN
DATE: APRIL 1964	Rodney W. Mills R.E. 8271	CHECKED

SONOMA COUNTY
WATER AGENCY

DESIGNED | SUBMITTED | DRAWING NUMBER

Sonoma County Hazard Mitigation Plan

Figure 8.5
100-Year Flood Zone



Flood Zone Data

- 100-Year Zone
- Russian River
- Streams

Base Map Data

- City Limit
- US Federal Highway
- State Highway
- Main Arterials
- Unincorporated Communities

0 2.5 5 Miles

1 inch equals 5 miles

The F1 Floodzone and 100-Year Zone or F2 Floodplain data sets were obtained from the Federal Emergency Management Agency (FEMA), version 12/02/2008. For more information about the FEMA datasets, visit the FEMA - Homepage at http://www.fema.gov.

Author: PRMD Cartography: D. Reinier File Number: S:\GIS-DATA\PRMD_BASE\PRMD Department Projects\Comprehensive Planning\8_5_100_Year_Floodzone.mxd Date: 09/19/2011

County of Sonoma
Permit and Resource Management Department
2550 Ventura Avenue, Santa Rosa, California 95403
707-565-1900 FAX 707-565-1103
permit SONOMA

NOAA Atlas 14, Volume 6, Version 2
Location name: Cotati, California, USA*
Latitude: 38.3323°, Longitude: -122.7203°
Elevation: 106.17 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.161** (0.144-0.183)	**0.198** (0.176-0.225)	**0.246** (0.218-0.281)	**0.286** (0.251-0.330)	**0.343** (0.289-0.411)	**0.387** (0.318-0.476)	**0.434** (0.346-0.548)	**0.483** (0.373-0.631)	**0.551** (0.406-0.756)	**0.606** (0.429-0.866)
10-min	**0.231** (0.206-0.263)	**0.283** (0.252-0.322)	**0.353** (0.312-0.402)	**0.411** (0.360-0.473)	**0.491** (0.414-0.589)	**0.555** (0.457-0.682)	**0.622** (0.497-0.786)	**0.692** (0.535-0.904)	**0.790** (0.582-1.08)	**0.869** (0.615-1.24)
15-min	**0.280** (0.249-0.318)	**0.342** (0.304-0.389)	**0.426** (0.378-0.486)	**0.497** (0.436-0.572)	**0.594** (0.501-0.712)	**0.671** (0.552-0.825)	**0.752** (0.601-0.951)	**0.837** (0.647-1.09)	**0.955** (0.704-1.31)	**1.05** (0.744-1.50)
30-min	**0.392** (0.349-0.445)	**0.480** (0.426-0.545)	**0.598** (0.529-0.682)	**0.696** (0.610-0.801)	**0.833** (0.702-0.998)	**0.941** (0.774-1.16)	**1.05** (0.841-1.33)	**1.17** (0.906-1.53)	**1.34** (0.986-1.84)	**1.47** (1.04-2.10)
60-min	**0.556** (0.495-0.631)	**0.681** (0.605-0.774)	**0.848** (0.751-0.967)	**0.987** (0.866-1.14)	**1.18** (0.995-1.42)	**1.33** (1.10-1.64)	**1.49** (1.19-1.89)	**1.66** (1.29-2.17)	**1.90** (1.40-2.60)	**2.09** (1.48-2.98)
2-hr	**0.838** (0.745-0.951)	**1.02** (0.904-1.16)	**1.25** (1.11-1.43)	**1.45** (1.27-1.67)	**1.71** (1.44-2.05)	**1.92** (1.58-2.36)	**2.13** (1.70-2.69)	**2.35** (1.81-3.06)	**2.64** (1.95-3.63)	**2.88** (2.04-4.11)
3-hr	**1.06** (0.943-1.20)	**1.28** (1.14-1.46)	**1.58** (1.40-1.80)	**1.82** (1.59-2.09)	**2.14** (1.80-2.56)	**2.39** (1.96-2.93)	**2.64** (2.11-3.34)	**2.90** (2.24-3.79)	**3.25** (2.40-4.46)	**3.53** (2.50-5.04)
6-hr	**1.57** (1.40-1.78)	**1.91** (1.69-2.17)	**2.34** (2.07-2.67)	**2.69** (2.36-3.09)	**3.15** (2.66-3.78)	**3.51** (2.88-4.31)	**3.86** (3.09-4.88)	**4.23** (3.27-5.52)	**4.72** (3.47-6.47)	**5.09** (3.60-7.27)
12-hr	**2.17** (1.93-2.46)	**2.67** (2.37-3.03)	**3.30** (2.92-3.77)	**3.81** (3.34-4.39)	**4.49** (3.78-5.38)	**5.00** (4.11-6.14)	**5.51** (4.40-6.97)	**6.03** (4.66-7.88)	**6.72** (4.95-9.22)	**7.26** (5.13-10.4)
24-hr	**2.92** (2.62-3.31)	**3.64** (3.27-4.14)	**4.57** (4.09-5.20)	**5.30** (4.71-6.08)	**6.27** (5.42-7.41)	**7.00** (5.93-8.42)	**7.72** (6.41-9.50)	**8.45** (6.84-10.7)	**9.43** (7.35-12.3)	**10.2** (7.69-13.7)
2-day	**3.88** (3.49-4.41)	**4.87** (4.38-5.53)	**6.11** (5.48-6.96)	**7.10** (6.31-8.14)	**8.38** (7.24-9.90)	**9.34** (7.92-11.2)	**10.3** (8.54-12.7)	**11.2** (9.10-14.2)	**12.5** (9.74-16.4)	**13.4** (10.2-18.2)
3-day	**4.48** (4.03-5.08)	**5.63** (5.06-6.40)	**7.07** (6.34-8.05)	**8.20** (7.30-9.40)	**9.68** (8.36-11.4)	**10.8** (9.13-13.0)	**11.8** (9.83-14.6)	**12.9** (10.5-16.3)	**14.3** (11.2-18.8)	**15.4** (11.6-20.8)
4-day	**4.98** (4.48-5.65)	**6.28** (5.64-7.13)	**7.89** (7.07-8.98)	**9.14** (8.14-10.5)	**10.8** (9.31-12.7)	**12.0** (10.2-14.4)	**13.2** (10.9-16.2)	**14.3** (11.6-18.1)	**15.9** (12.4-20.8)	**17.0** (12.9-23.0)
7-day	**6.02** (5.41-6.83)	**7.62** (6.85-8.66)	**9.60** (8.60-10.9)	**11.1** (9.90-12.8)	**13.1** (11.3-15.5)	**14.5** (12.3-17.5)	**15.9** (13.2-19.5)	**17.3** (14.0-21.8)	**19.0** (14.8-24.9)	**20.3** (15.4-27.4)
10-day	**6.87** (6.18-7.80)	**8.73** (7.85-9.92)	**11.0** (9.86-12.5)	**12.7** (11.3-14.6)	**15.0** (12.9-17.7)	**16.5** (14.0-19.9)	**18.1** (15.0-22.2)	**19.6** (15.9-24.7)	**21.5** (16.8-28.2)	**22.9** (17.3-31.0)
20-day	**9.11** (8.19-10.3)	**11.7** (10.5-13.2)	**14.7** (13.2-16.7)	**17.0** (15.1-19.5)	**19.8** (17.1-23.4)	**21.8** (18.5-26.2)	**23.7** (19.6-29.1)	**25.5** (20.6-32.1)	**27.8** (21.6-36.3)	**29.4** (22.2-39.7)
30-day	**11.1** (9.95-12.6)	**14.2** (12.7-16.1)	**17.8** (16.0-20.3)	**20.5** (18.2-23.5)	**23.8** (20.6-28.1)	**26.1** (22.2-31.4)	**28.3** (23.5-34.8)	**30.3** (24.5-38.2)	**32.9** (25.6-43.0)	**34.7** (26.2-46.8)
45-day	**13.6** (12.2-15.4)	**17.3** (15.5-19.7)	**21.7** (19.4-24.7)	**24.8** (22.1-28.5)	**28.7** (24.8-33.9)	**31.3** (26.5-37.7)	**33.7** (28.0-41.5)	**36.0** (29.1-45.4)	**38.8** (30.2-50.7)	**40.7** (30.8-55.0)
60-day	**16.1** (14.5-18.3)	**20.5** (18.4-23.2)	**25.4** (22.8-29.0)	**29.0** (25.8-33.3)	**33.4** (28.8-39.4)	**36.3** (30.8-43.7)	**39.0** (32.3-47.9)	**41.4** (33.5-52.3)	**44.4** (34.7-58.2)	**46.5** (35.2-62.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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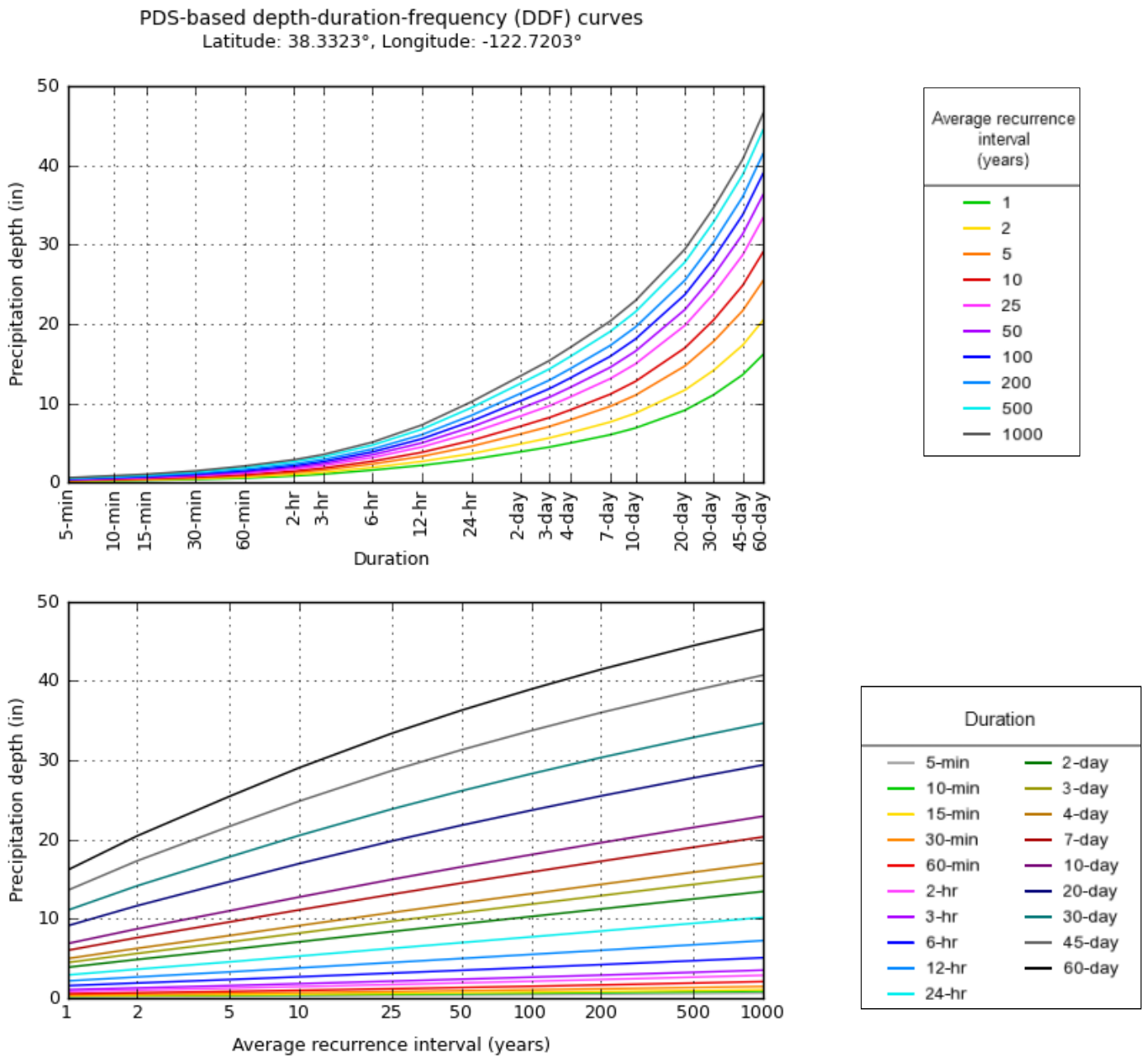
PF graphical



NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Tue Nov 16 17:45:11 2021

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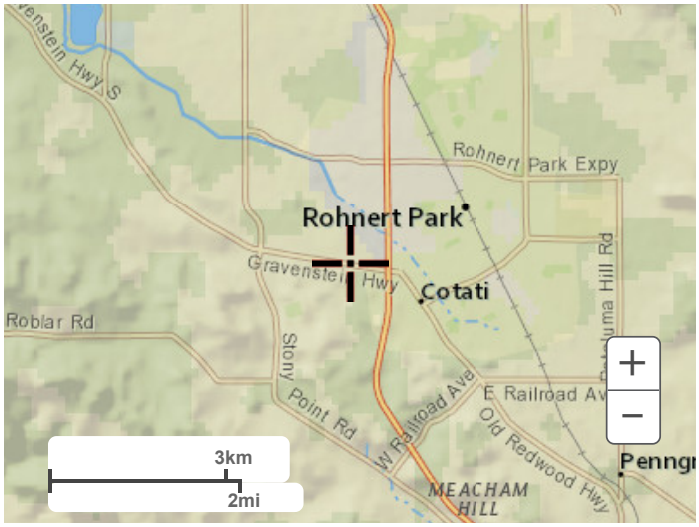
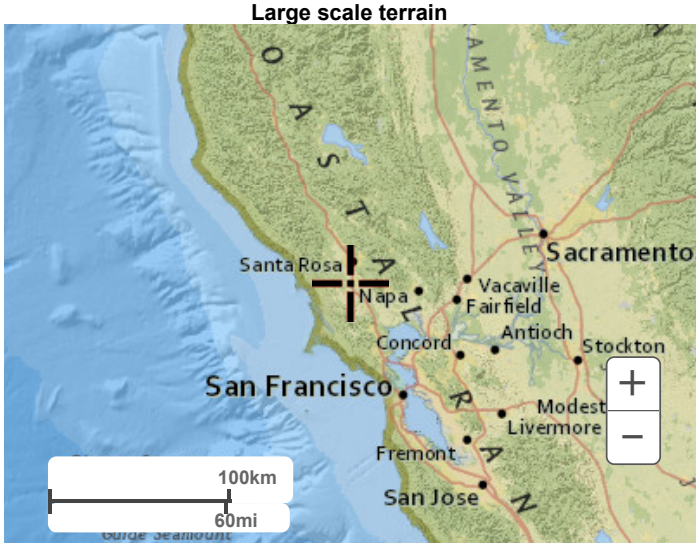
Maps & aerials

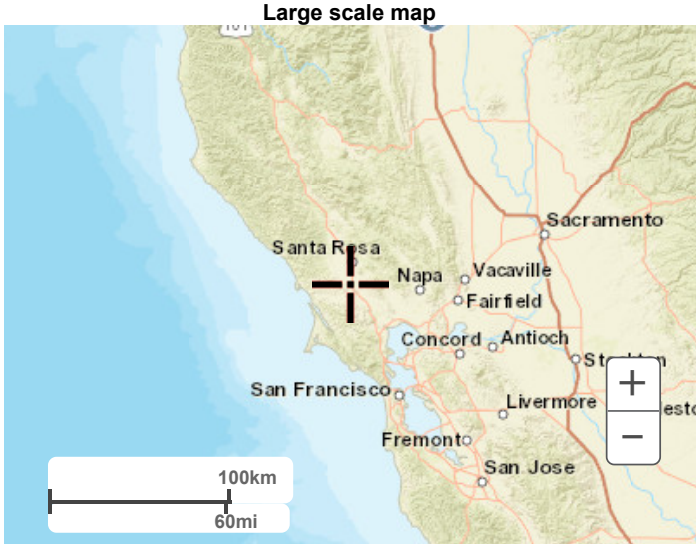
Small scale terrain



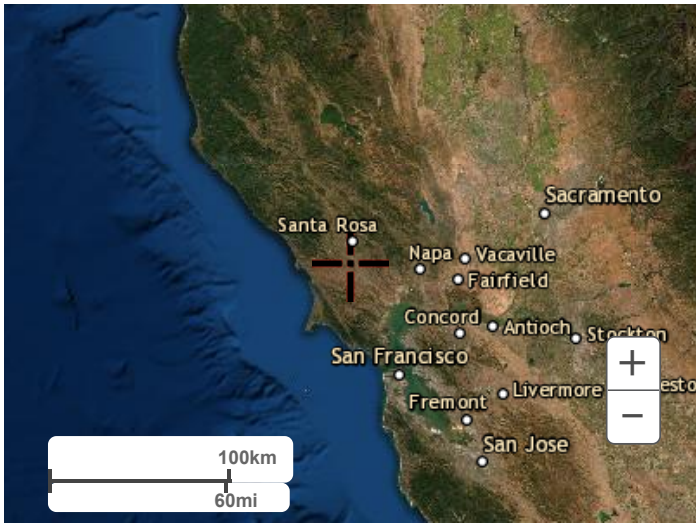
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

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 shown on this map apply only landward of 0.0' 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 tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables 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 California State Plane Zone II (FIPSZONE 402). The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM 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, N/NGS12
National Geodetic Survey
SSMC-3, #9202
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 on this FIRM was derived from multiple sources. Data was provided in digital format by the County of Sonoma Information Systems Department, derived from 1:1,200, 1:2,400, and 1:4,800 scale digital orthophotos, dated April-May 2000. Information was provided by the City of Healdsburg Department of Public Works, derived from 1:600 scale digital orthophotos, dated March 3, 2007. Additional information was derived from 1:12,000 scale U.S. Geological Survey Digital Orthophoto Quadrangles, dated 2002.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

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 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.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.

LEGEND

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

The 1% annual 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	Area to be protected from 1% annual chance flood 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.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — — — 23 — Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 2°76°000'N — 1000-meter Universal Transverse Mercator grid values, zone 10
- 600000 FT — 5000-foot grid ticks: California State Plane coordinate system, zone II (FIPSZONE 0402), Lambert Conformal Conic projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
December 2, 2008

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

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.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0878E

FIRM

FLOOD INSURANCE RATE MAP

SONOMA COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 878 OF 1150
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COTATI, CITY OF	060377	0878	E
ROHNERT PARK, CITY OF	060380	0878	E
SONOMA COUNTY	060375	0878	E

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
06097C0878E

EFFECTIVE DATE
DECEMBER 2, 2008

Federal Emergency Management Agency

III. DISCUSSION & CONCLUSION

III. DISCUSSION

Introduction

The purpose of the attached analysis is to determine the existing and proposed storm water discharge flow for the project. The project is located on a vacant lot in the City of Cotati, CA. The project is bound by Gravenstein Highway to the south, Alder Avenue to the west, residential properties to the north and vacant lots to the east.

This hydrology report will calculate the 10-year and 100-year storm water runoff for this location. The hydraulics will be calculated for the last reach of storm drain pipe at this time.

Existing Conditions

The existing 7.53 acres site is 99% pervious and is currently a vacant lot consisting of miscellaneous trees and shrubs with one driveway approach. The site is relatively flat and drains to the north west. A relatively rectangular park located in the North east corner of the site will remain unchanged and is noted as Area X2 in this report.

Runoff is collected in a couple of drop inlets where it is conveyed to the private drainage swale located along the northerly boundary of the adjacent tract “Cotati Cottages.” The proposed project site holds an easement for rights to drain to this private drainage swale.

The storm drain system located within Alder Ave starts upstream near the intersection of Gravenstein Hwy. A 30” RCP runs north-easterly where it transitions to a 36” RCP. Further downstream, the storm drain system transitions to 52” RCP where a 24” RCP connection from the private drainage swale merges from the east.

Project Description

The project proposes the construction of 3 multifamily buildings and 3 residential/ retail buildings with 4 access points. Associated improvements will include a clubhouse with pool and gym, hardscape and landscape, bioretention swales, along with modifications to the private drainage swale.
The project proposes a storm drain system that will convey storm water offsite and will connect to the City storm drain system. The hydrology report demonstrates emergency ponding elevations in the event the storm drain system fails. It can be seen that there is well over 1’ of protection between the overflow elevation and finished floor of all living spaces.

A previously reviewed and approved improvement plan for this subject parcel detailed a similar proposed storm drain system connecting to and modifying the existing drainage swale. See documents attached to this report.

Hydrology and Calculation Methodology

The hydrology study was performed utilizing Sonoma County Water Agency Flood Design Manual and City of Cotati Standards.

The hydraulics of the last reach of storm drain pipe calculated as follows.

Conclusion

The results from this hydrology and hydraulic analysis demonstrate the following:

- Per FEMA FIRM Map Number 06097C0878E Panel 878 of 1150, revised December 2, 2008, the subject site is in Zone X described as areas of 0.2% annual chance flood; areas of 1% foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood. There is no established Base Flood Elevation (BFE) for this area. Proposed building finished floors (FF) will be set at least 1 foot higher than the closest safe outlet elevation. The overflow elevation is noted on the hydrology maps attached.
- The project Q10 and Q100 flows will increase for the developed portion of the site from existing to proposed as shown in the table below and in the hydrology maps attached.
- The detention basin/ swale will be modified to accommodate the additional flows including bioretention and storage.
- The 2002 Storm Drain Master Plan identifies the storm drain system in Alder Ave, and this project is within that subwatershed. The Master Plan does not identify the private drainage swale.
- The storm drain pipe is sized to handle the anticipated 100-yr flows.

A table of pre- and post-development flows can be seen in the table below:

Condition	Area	10-YR Flow (cfs)	100-YR Flow (cfs)
Pre-Developed Condition X1	6.74	2.84	4.27
Post-Developed Condition D1	6.74	5.37	8.10
Percent Change		+89.08%	+89.7%
Undisturbed Area X2	0.79	0.3	0.45

IV. 10 & 100-YEAR HYDROLOGY CALCULATIONS – EXISTING AND DEVELOPED CONDITIONS

		Acres	2yr	10yr	50yr	100yr
Existing Area X1	Q=CIAK		**1.76**	**2.55**	**3.44**	**3.85**
	Area (SF)	6.74	293752	293752	293752	293752
	Pervious Area (SF)	6.68	290814	290814	290814	290814
	Impervious Area (SF)	0.07	2938	2938	2938	2938
	Intensity		0.68	0.99	1.33	1.49
	T From Nomograph (min.)		25	25	25	25
	Y (yr)		2	10	50	100
	C (Ag and open space >2-6%)		0.38	0.38	0.38	0.38

		Acres	2yr	10yr	50yr	100yr
Existing Area X2	Q=CIAK		**0.21**	**0.30**	**0.40**	**0.45**
	Area (SF)	0.79	34332	34332	34332	34332
	Pervious Area (SF)	0.78	33989	33989	33989	33989
	Impervious Area (SF)	0.01	343	343	343	343
	Intensity		0.68	0.99	1.33	1.49
	T From Nomograph (min.)		15	15	15	15
	Y (yr)		2	10	50	100
	C (Ag and open space >2-6%)		0.38	0.38	0.38	0.38

Existing

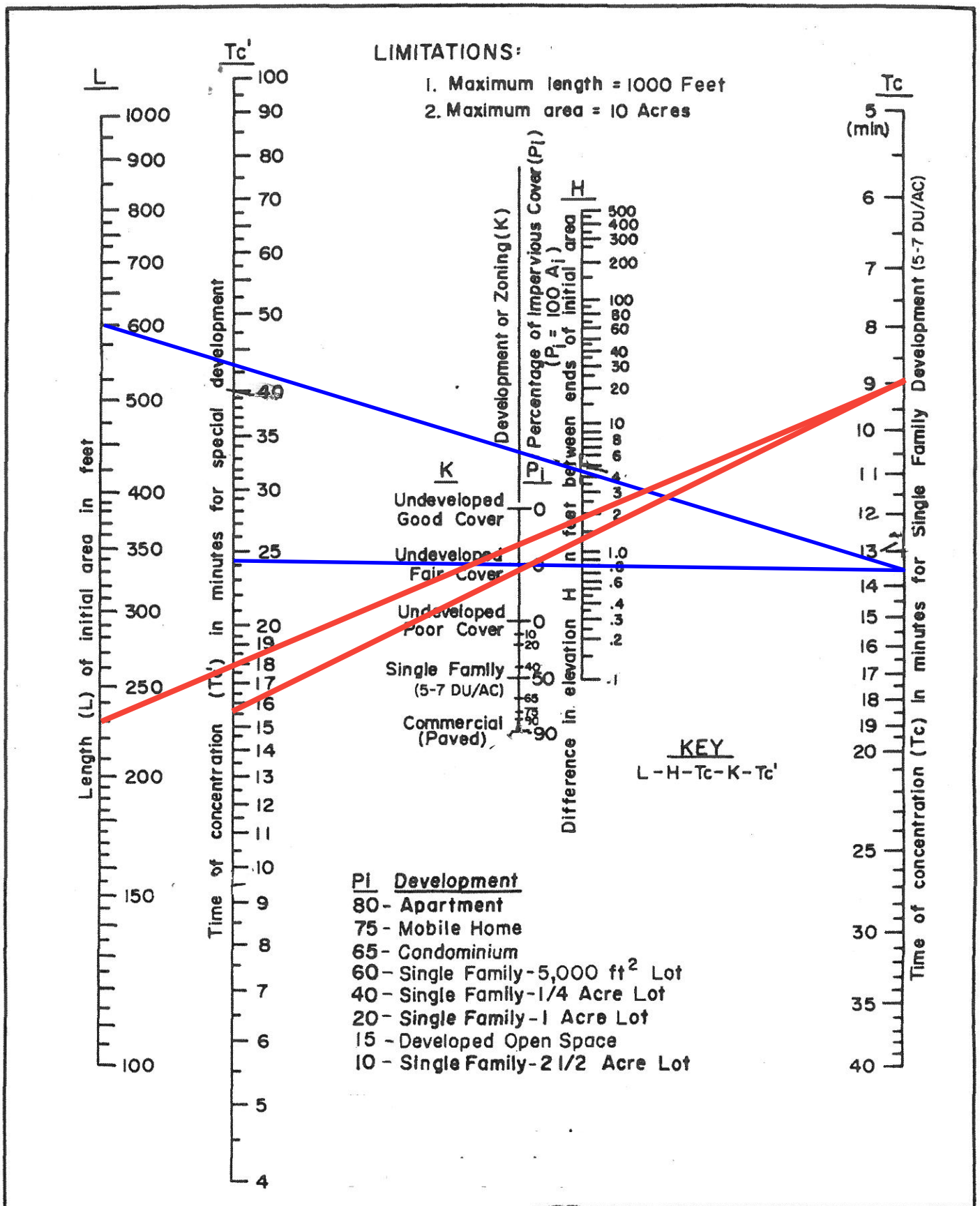


Figure D-1

		Acres	2yr	10yr	50yr	100yr
Proposed Area D1	Q=CIAK		**3.38**	**4.90**	**6.60**	**7.39**
	Area (SF)	6.74	293752	293752	293752	293752
	Pervious Area (SF)	1.96	85188	85188	85188	85188
	Impervious Area (SF)	4.79	208564	208564	208564	208564
	Intensity		0.68	0.99	1.33	1.49
	T From Nomograph (min.)		15	15	15	15
	Y (yr)		2	10	50	100
	C (Med density Residential 0-2%)		0.73	0.73	0.73	0.73

Developed

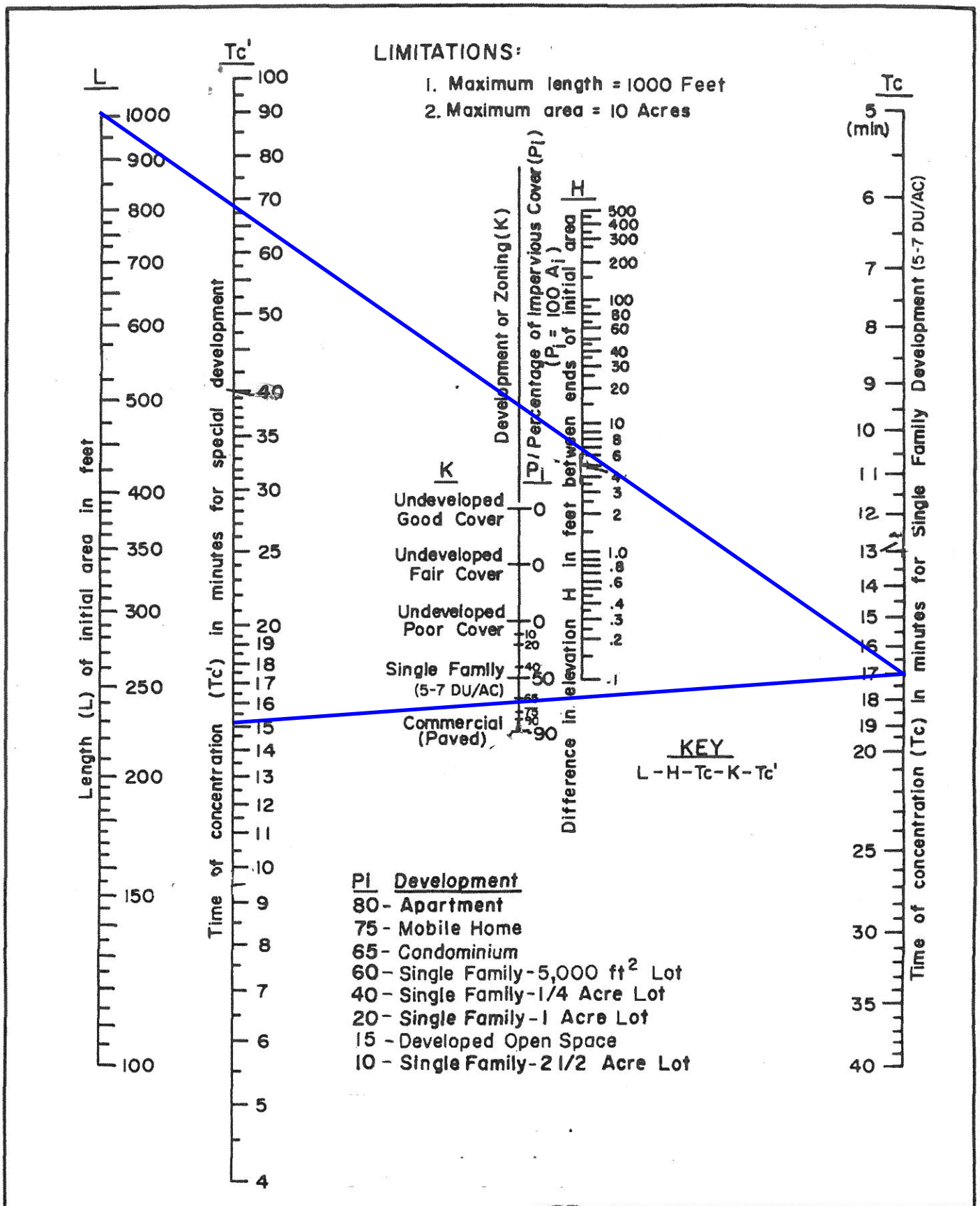


Figure D-1

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 20 2022

18 inch at 0.5% slope

Circular

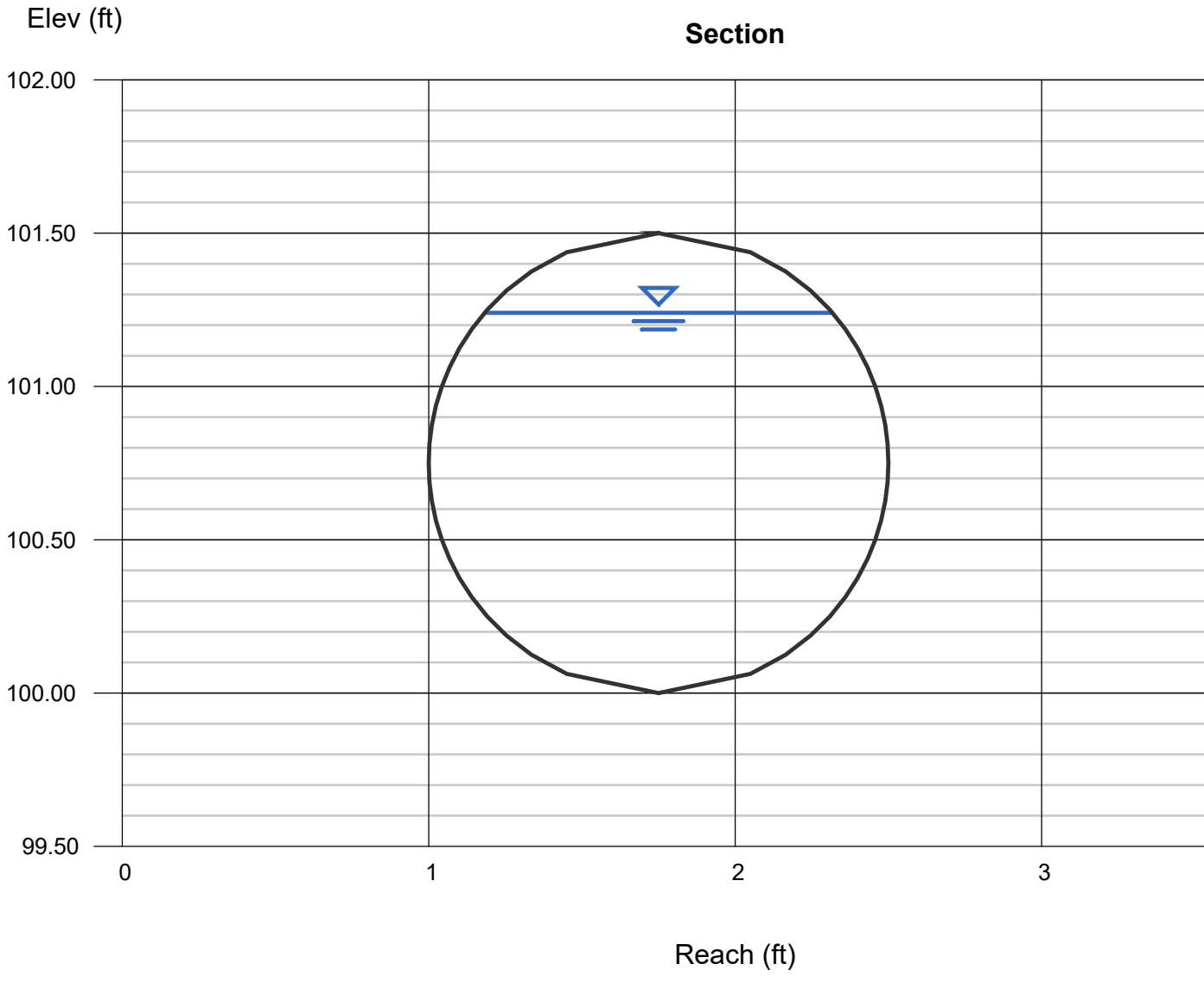
Diameter (ft)	= 1.50
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 8.10

Highlighted

Depth (ft)	= 1.24
Q (cfs)	= 8.100
Area (sqft)	= 1.56
Velocity (ft/s)	= 5.18
Wetted Perim (ft)	= 3.43
Crit Depth, Yc (ft)	= 1.11
Top Width (ft)	= 1.13
EGL (ft)	= 1.66



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 20 2022

24 inch at 0.5% slope

Circular

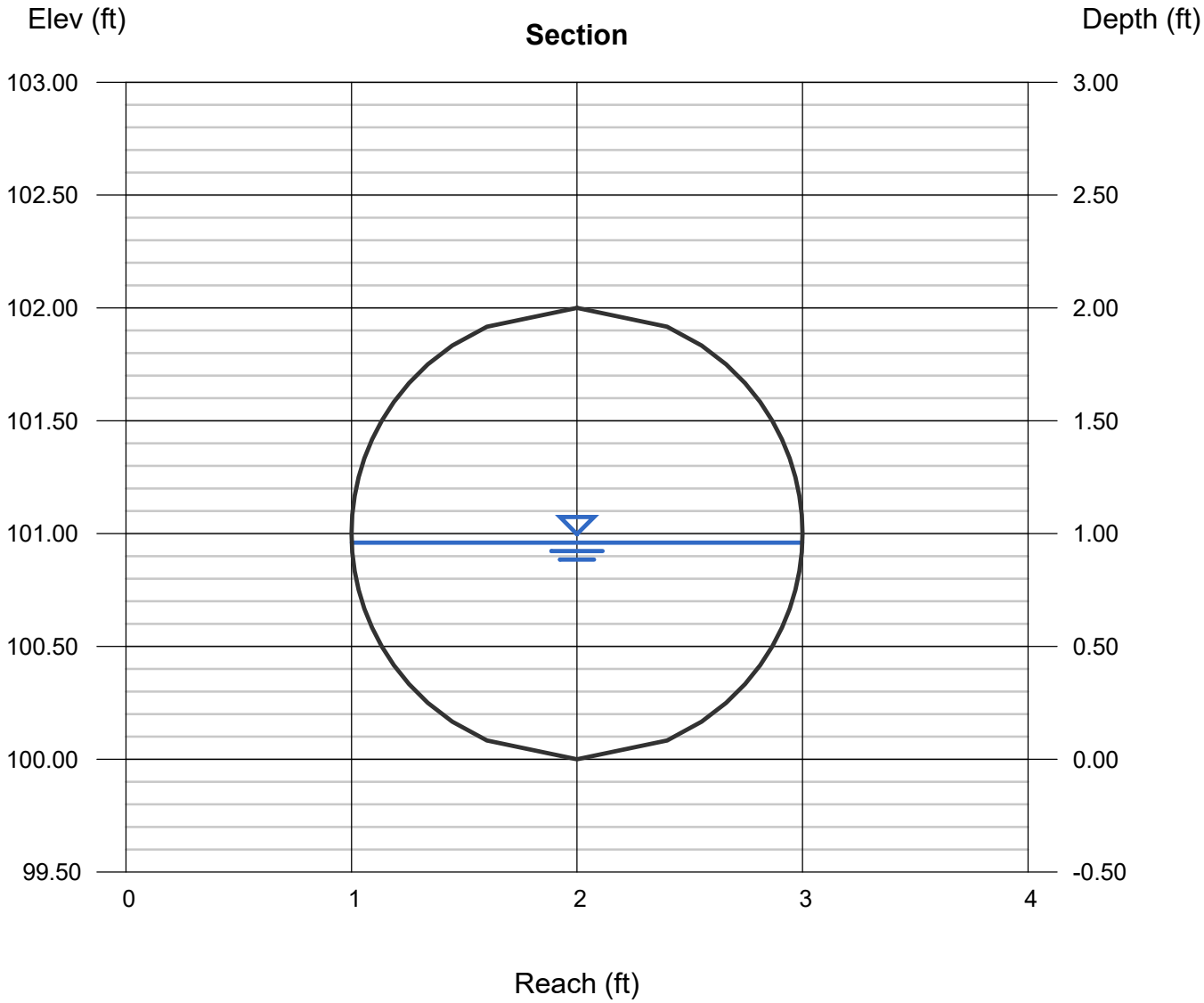
Diameter (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 8.10

Highlighted

Depth (ft)	= 0.96
Q (cfs)	= 8.100
Area (sqft)	= 1.50
Velocity (ft/s)	= 5.40
Wetted Perim (ft)	= 3.07
Crit Depth, Yc (ft)	= 1.01
Top Width (ft)	= 2.00
EGL (ft)	= 1.41



Storm Drain Capacity Full Depth Flow

$Q=(1.486/n)AR^{2/3}S^{1/2}$

	s=0.5%				s=1.0%			
Pipe Diameter (in)	**4**	**6**	**8**	**12**	**4**	**6**	**8**	**12**
S	0.005	0.005	0.005	0.005	0.010	0.010	0.010	0.010
N	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
A (sf)	0.09	0.20	0.35	0.79	0.09	0.20	0.35	0.79
R (ft)	0.08	0.13	0.17	0.25	0.08	0.13	0.17	0.25
Q (cfs)	***0.15***	***0.43***	***0.93***	***2.73***	***0.21***	***0.61***	***1.31***	***3.86***
V (fps)	1.67	2.19	2.65	3.47	2.36	3.10	3.75	4.91

	s=1.5%				s=2.0%			
Pipe Diameter (in)	**4**	**6**	**8**	**12**	**4**	**6**	**8**	**12**
S	0.015	0.015	0.015	0.015	0.020	0.020	0.020	0.020
N	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
A (sf)	0.09	0.20	0.35	0.79	0.09	0.20	0.35	0.79
R (ft)	0.08	0.13	0.17	0.25	0.08	0.13	0.17	0.25
Q (cfs)	***0.25***	***0.74***	***1.60***	***4.72***	***0.29***	***0.86***	***1.85***	***5.46***
V (fps)	2.89	3.79	4.59	6.02	3.34	4.38	5.30	6.95

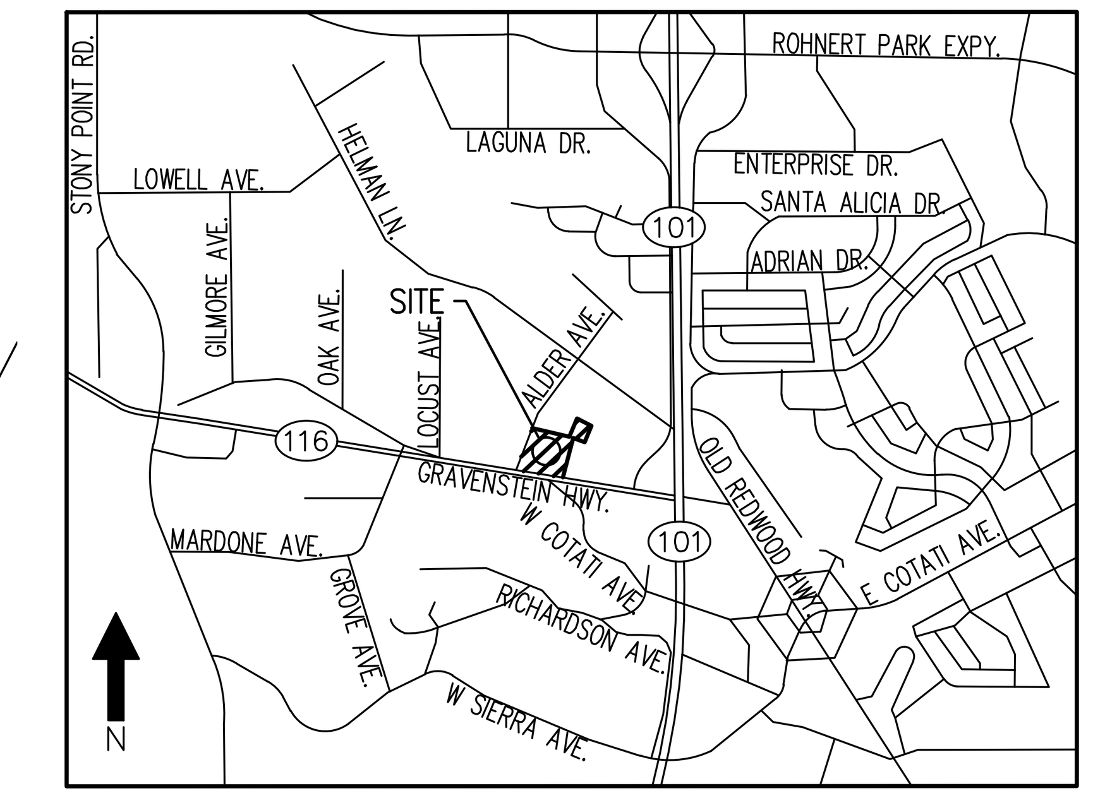
NDS Area Drain Capacity

Per NDS Catalog

Size	Area Surface (in^2)	Capacity (cfs)
9x9 Atrium	31.5	0.09
9x9 Square	39.5	0.12
9x9 Ductile	35.7	0.10
9x9 Galvanized	65	0.19
12x12 Atrium	50.6	0.15
12x12 Square	50.76	0.15
12x12 Ductile	59.5	0.17
12x12 Galvanized	122.3	0.36
12x12 ADA	36.75	0.11
18x18 Atrium	89.4	0.26
18x18 Square	104	0.30
18x18 Cast Iron	100.63	0.29
18x18 Galvanized	291	0.85
24x24 Square	231.69	0.68
24x24 Cast Iron	187	0.55
24x24 Galvanized	332.06	0.97

V. HYDROLOGY MAP-EXISTING AND DEVELOPED CONDITIONS

DRAINAGE EXHIBIT
EXISTING CONDITIONS



VICINITY MAP
N.T.S.

FLOOD NOTE:
PROJECT IS LOCATED IN ZONE X
PER FEMA MAP# 06097C0878E

LEGEND:

X1 / 0.00 AC	SUB-AREA NUMBER / ACREAGE
— · · —	MAJOR-AREA BOUNDARY PROPERTY LINE
— — — —	SUB-AREA BOUNDARY
— · · · — · · · —	FLOW PATH
(X)	NODE

OFFSITE FLOW NOTE:
THERE ARE NO OFFSITE FLOWS DISCHARGING THROUGH THE SITE IN EXISTING OR PROPOSED CONDITIONS.

SOIL TYPE: C

PRE DEVELOPMENT:

X1	=	6.74	AC.	
PERVIOUS AREA	=	6.68	AC.	(99%)
IMPERVIOUS AREA	=	0.06	AC.	(1%)
$Q_{10YR-24HR}$	=	3.62		CFS
$Q_{100YR-24HR}$	=	6.69		CFS
X2 (UNCHANGED)	=	0.79	AC.	
PERVIOUS AREA	=	0.78	AC.	(99%)
IMPERVIOUS AREA	=	0.01	AC.	(1%)
$Q_{10YR-24HR}$	=	0.30		CFS
$Q_{100YR-24HR}$	=	0.45		CFS

1" = 40'
0 10 20 40

REGISTERED PROFESSIONAL ENGINEER
ALI MONSHIZADEH
C67674
EXP. 06/30/2023
CIVIL
STATE OF CALIFORNIA

PLAN PREPARED BY:
MFKessler
Civil Engineering, Land Planning, Surveying
ONE VENTURE, SUITE 130
IRVINE, CA 92618
(949) 339-5330
MFKESSLER.COM

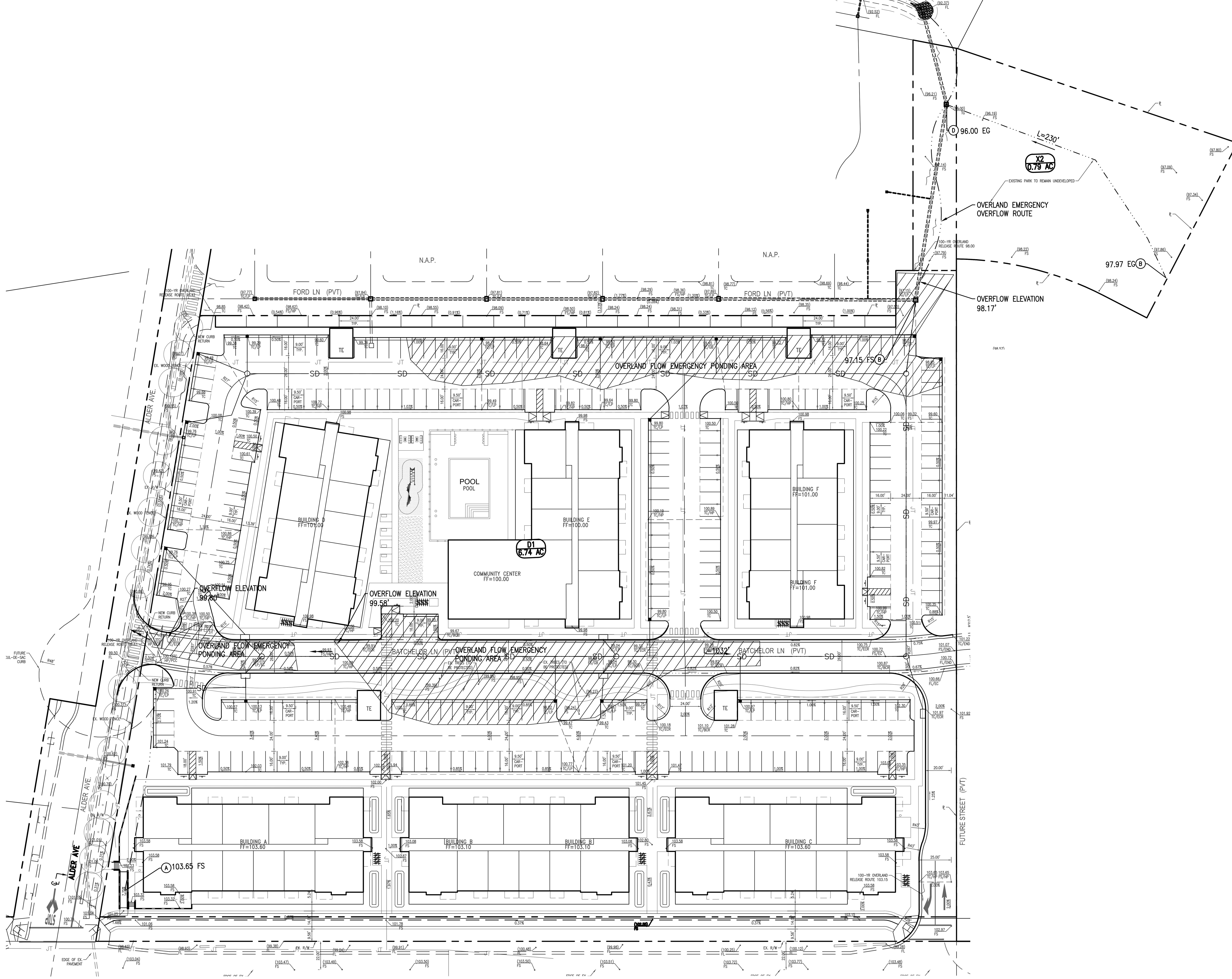
CITY OF COTATI

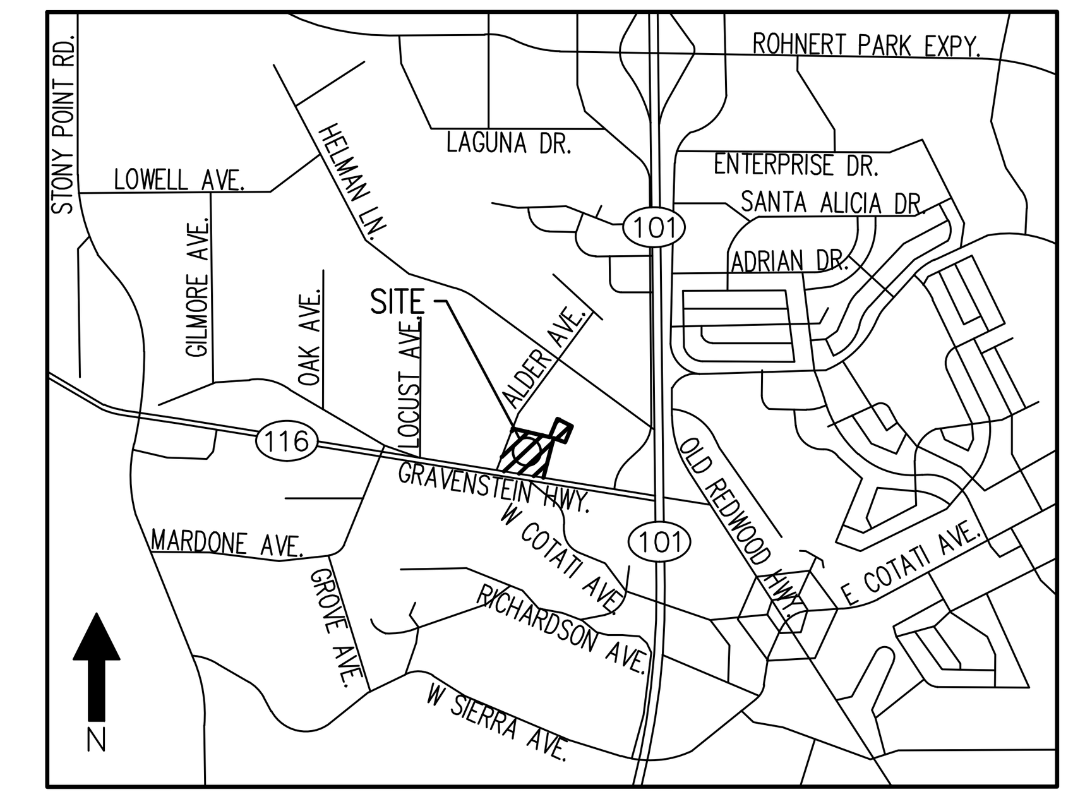
EXISTING DRAINGE EXHIBIT
8145 GRAVENSTEIN HWY
COTATI, CA 94931

SHEET 1 OF 1

PROJ: 204-002-A DWG: P:\230-006\dwg\Prelim\HY\EH-HYDRO-PRE.dwg BY: User Apr 22, 2022 - 10:21:17am

DRAINAGE EXHIBIT
DEVELOPED CONDITIONS





VICINITY MAP
N.T.S.

FLOOD NOTE:
PROJECT IS LOCATED IN ZONE X PER FEMA MAP# 06097C0878E. NO BASE FLOOD ELEVATION HAS BEEN ESTABLISHED FOR THE SUBJECT PROPERTY.

LEGEND:

Symbol	Description
D1 / 0.00 AC	SUB-AREA NUMBER / ACREAGE
— - - —	MAJOR-AREA BOUNDARY PROPERTY LINE
■ ■ ■ ■	SUB-AREA BOUNDARY
— · · · —	FLOW PATH
(X)	NODE

OFFSITE FLOW NOTE:
THERE ARE NO OFFSITE FLOWS DISCHARGING THROUGH THE SITE IN EXISTING OR PROPOSED CONDITIONS.

SOIL TYPE: C

POST DEVELOPMENT:

D1	=	6.74	AC.	
PERVIOUS AREA	=	1.96	AC.	(29%)
IMPERVIOUS AREA	=	4.79	AC.	(71%)
$Q_{10YR-24HR}$	=	8.34	CFS	
$Q_{100YR-24HR}$	=	11.70	CFS	
X2 (UNCHANGED)	=	0.79	AC.	
PERVIOUS AREA	=	0.78	AC.	(99%)
IMPERVIOUS AREA	=	0.01	AC.	(1%)
$Q_{10YR-24HR}$	=	0.30		CFS
$Q_{100YR-24HR}$	=	0.45		CFS

1" = 40'
0 10 20 40

REGISTERED PROFESSIONAL ENGINEER
ALI MONSHIZADEH
C67674
EXP. 06/30/2025
CIVIL
STATE OF CALIFORNIA

PLAN PREPARED BY:
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MFKESSLER.COM

CITY OF COTATI

DEVELOPED DRAINGE EXHIBIT
8145 GRAVENSTEIN HWY
COTATI, CA 94931

SHEET
1 OF 1

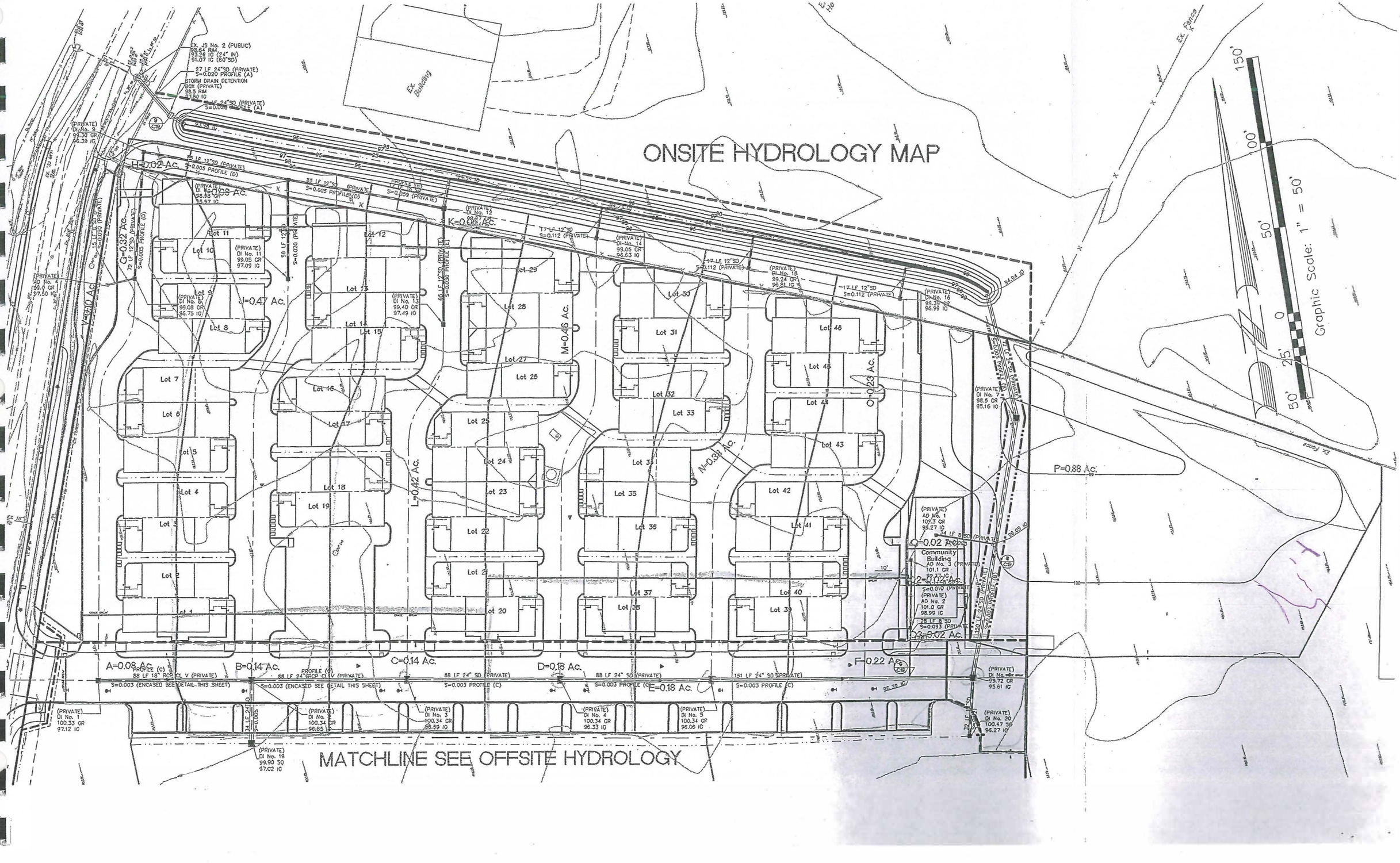
DWG: P:\230-006\dwg\Prelim\HY\EH-HYDRO-POST.dwg BY: ttan Dec 18, 2023 - 3:20:02pm
PROJ: 204-002-A

VI. AS-BUILTS AND REFERENCE DOCUMENTS

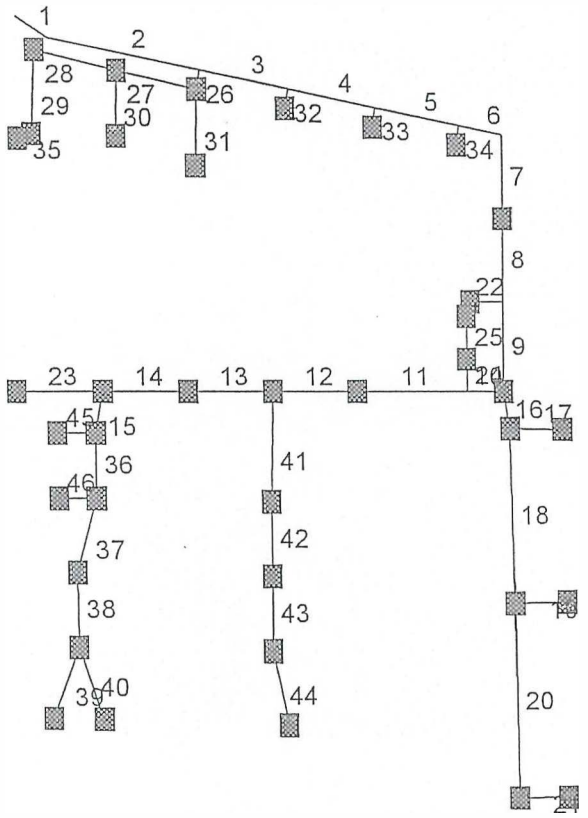
Existing Drainage Facilities

The project drains to an existing swale, inlet structure and 24” storm drain pipe north of the site.
The developed 100 year flow from the existing site to the north has been calculated per the project’s hydrology report to by 7.13 cfs. Excerpts from the approved report are attached herein.
The developed 100 year flow for the proposed site is 8.10 cfs.
The maximum flow into the swale, inlet, and 24” storm drain pipe is 15.23 cfs.
The attached capacity calculations demonstrate that the swale has a capacity of 28.55 cfs while maintaining a 1’ freeboard, the 24” inlet has the capacity for 15.23 cfs while maintaining over 3’ of freeboard, and the existing 24” storm drain pipe has a capacity of 34.65 cfs.
This demonstrates that the existing facilities have the adequate capacity to convey stormwater from the existing site.

Excerpts from approved Hydrology Report for Existing Site



Hydraflow Plan View



Project file: 02059 (Cotati Cottages-10 Yr.)11-07-02.stm	IDF file: Sonoma.IDF	No. Lines: 46	11-18-2002

Hyd. Flow Storm Sewer Tabulation

→ SEE DRAWING FOR DATUM DESIGNATION IN ANALYSIS.

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	38.0	0.00	10.86	0.00	0.00	8.41	10.0	67.9	0.8	6.46	31.99	2.09	24	2.00	93.98	93.22	95.85	95.82	98.20	98.80	JS2-End Ditch
2	1	158.0	0.00	10.86	0.00	0.00	8.41	10.0	57.6	0.8	7.05	152.5	0.87	96	0.20	94.30	93.98	95.93	95.88	98.00	98.20	Begin ditch-FL12
3	2	93.0	0.00	9.39	0.00	0.00	7.21	10.0	50.6	0.9	6.46	153.2	0.93	96	0.20	94.49	94.30	95.98	95.94	98.50	98.00	FL12-FL14
4	3	92.0	0.00	8.93	0.00	0.00	6.82	10.0	43.5	1.0	6.62	149.9	1.07	96	0.20	94.67	94.49	96.06	96.00	99.00	98.50	FL14-FL15
5	4	88.0	0.00	8.55	0.00	0.00	6.50	10.0	36.5	1.1	6.92	153.3	1.21	96	0.20	94.85	94.67	96.17	96.08	99.00	99.00	FL15-FL16
6	5	45.0	0.00	8.32	0.00	0.00	6.30	10.0	32.8	1.1	7.09	151.5	1.30	96	0.20	94.94	94.85	96.25	96.20	99.50	99.00	FL16-OUTLET
7	6	72.0	0.88	8.32	0.35	0.31	6.30	10.0	32.4	1.1	7.13	12.50	3.40	24	0.31	95.16	94.94	96.37	96.27	98.50	99.50	OUTLET-DI7
8	7	72.0	0.00	7.44	0.00	0.00	5.99	10.0	32.1	1.1	6.83	12.50	3.34	24	0.31	95.38	95.16	96.56	96.47	100.00	98.50	DI 7-INT 1
9	8	78.0	0.22	7.40	0.85	0.19	5.97	10.0	31.7	1.1	6.85	12.28	3.18	24	0.29	95.61	95.38	96.84	96.75	99.72	100.00	INT 1-DI 6
10	9	38.0	0.00	4.93	0.00	0.00	3.76	10.0	31.4	1.2	4.34	12.17	1.78	24	0.29	95.72	95.61	97.12	97.11	100.10	99.72	DI 6-INT 2
11	10	114.0	0.18	4.89	0.85	0.15	3.75	10.0	30.5	1.2	4.39	12.35	2.06	24	0.30	96.06	95.72	97.22	97.17	100.34	100.10	INT 2-DI5
12	11	88.0	0.18	4.71	0.85	0.15	3.59	10.0	29.8	1.2	4.26	12.29	2.44	24	0.30	96.32	96.06	97.32	97.26	100.34	100.34	DI 5-4
13	12	88.0	0.14	2.54	0.85	0.12	1.95	10.0	28.5	1.2	2.36	12.29	1.47	24	0.30	96.59	96.33	97.51	97.49	100.34	100.34	DI 4-3
14	13	89.0	0.14	2.40	0.85	0.12	1.83	10.0	27.2	1.2	2.27	12.46	1.92	24	0.30	96.86	96.59	97.57	97.53	100.34	100.34	DI 3-2
15	14	36.0	0.08	2.18	0.80	0.06	1.64	10.0	12.4	1.9	3.07	5.80	3.09	18	0.31	96.96	96.85	97.77	97.69	101.50	100.34	DI 2-DI A7
16	9	32.0	0.21	2.25	0.90	0.19	2.03	10.0	16.0	1.6	3.32	7.43	1.93	18	0.50	95.77	95.61	97.13	97.11	100.66	99.72	DI 6-CB C4
17	16	54.0	0.20	0.20	0.90	0.18	0.18	10.0	10.0	2.1	0.38	4.57	0.31	15	0.50	96.04	95.77	97.22	97.22	100.66	100.66	CB C4-CB C3
18	16	148.0	0.52	1.84	0.90	0.47	1.66	10.0	14.6	1.7	2.84	7.43	2.23	18	0.50	96.51	95.77	97.34	97.22	101.52	100.66	CB C4-DI C2
19	18	54.0	0.52	0.52	0.90	0.47	0.47	10.0	10.0	2.1	0.98	4.57	1.09	15	0.50	96.78	96.51	97.54	97.53	101.52	101.52	DI C2-DI C1
20	18	166.0	0.40	0.80	0.90	0.36	0.72	10.0	11.4	2.0	1.41	7.43	2.10	18	0.50	97.34	96.51	97.80	97.53	104.00	101.52	DI C2-CB C2
21	20	50.0	0.40	0.40	0.90	0.36	0.36	10.0	10.0	2.1	0.75	4.57	1.50	15	0.50	97.59	97.34	98.04	98.02	104.00	104.00	CB C2-CB C1

→ 2.0 - 94.37

Project File: 02059 (Cotati Cottages-10 Yr.)11-07-02.stm | IDF File: Sonoma.IDF | Total number of lines: 46 | Run Date: 11-18-2002

NOTES: Intensity = 7.08 / (Inlet time + 0.10) ^ 0.53; Return period = 10 Yrs. ; Initial tailwater elevation = 95.82 (ft)

Hyd flow Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	38.0	0.00	10.86	0.00	0.00	8.41	10.0	50.4	1.3	10.71	31.99	3.41	24	2.00	93.98	93.22	101.74	101.65	98.20	98.80	JS2-End Ditch
2	1	158.0	0.00	10.86	0.00	0.00	8.41	10.0	43.2	1.4	11.63	152.5	0.23	96	0.20	94.30	93.98	101.82	101.82	98.00	98.20	Begin ditch-FL12
3	2	93.0	0.00	9.39	0.00	0.00	7.21	10.0	38.4	1.5	10.62	153.2	0.22	96	0.20	94.49	94.30	101.82	101.82	98.50	98.00	FL12-FL14
4	3	92.0	0.00	8.93	0.00	0.00	6.82	10.0	33.4	1.6	10.82	149.9	0.23	96	0.20	94.67	94.49	101.82	101.82	99.00	98.50	FL14-FL15
5	4	88.0	0.00	8.55	0.00	0.00	6.50	10.0	28.5	1.7	11.22	153.3	0.24	96	0.20	94.85	94.67	101.83	101.82	99.00	99.00	FL15-FL16
6	5	45.0	0.00	8.32	0.00	0.00	6.30	10.0	25.9	1.8	11.45	151.5	0.25	96	0.20	94.94	94.85	101.83	101.83	99.50	99.00	FL16-OUTLET
7	6	72.0	0.88	8.32	0.35	0.31	6.30	10.0	25.6	1.8	11.51	12.50	3.66	24	0.31	95.16	94.94	102.02	101.83	98.50	99.50	OUTLET-DI7
8	7	72.0	0.00	7.44	0.00	0.00	5.99	10.0	25.4	1.8	11.00	12.50	3.50	24	0.31	95.38	95.16	102.29	102.12	100.00	98.50	DI 7-INT 1
9	8	78.0	0.22	7.40	0.85	0.19	5.97	10.0	25.1	1.8	11.04	12.28	3.51	24	0.29	95.61	95.38	102.67	102.48	99.72	100.00	INT 1-DI 6
10	9	38.0	0.00	4.93	0.00	0.00	3.76	10.0	24.9	1.9	6.98	12.17	2.22	24	0.29	95.72	95.61	102.99	102.96	100.10	99.72	DI 6-INT 2
11	10	114.0	0.18	4.89	0.85	0.15	3.75	10.0	24.3	1.9	7.05	12.35	2.24	24	0.30	96.06	95.72	103.18	103.07	100.34	100.10	INT 2-DI5
12	11	88.0	0.18	4.71	0.85	0.15	3.59	10.0	23.8	1.9	6.84	12.29	2.18	24	0.30	96.32	96.06	103.30	103.22	100.34	100.34	DI 5-4
13	12	88.0	0.14	2.54	0.85	0.12	1.95	10.0	22.9	1.9	3.78	12.29	1.20	24	0.30	96.59	96.33	103.43	103.41	100.34	100.34	DI 4-3
14	13	89.0	0.14	2.40	0.85	0.12	1.83	10.0	22.0	2.0	3.63	12.46	1.16	24	0.30	96.86	96.59	103.47	103.45	100.34	100.34	DI 3-2
15	14	36.0	0.08	2.18	0.80	0.06	1.64	10.0	11.7	2.8	4.54	5.80	2.57	18	0.31	96.96	96.85	103.57	103.50	101.50	100.34	DI 2-DI A7
16	9	32.0	0.21	2.25	0.90	0.19	2.03	10.0	14.2	2.5	5.07	7.43	2.87	18	0.50	95.77	95.61	103.03	102.96	100.66	99.72	DI 6-CB C4
17	16	54.0	0.20	0.20	0.90	0.18	0.18	10.0	10.0	3.0	0.54	4.57	0.44	15	0.50	96.04	95.77	103.23	103.22	100.66	100.66	CB C4-CB C3
18	16	148.0	0.52	1.84	0.90	0.47	1.66	10.0	13.2	2.6	4.30	7.43	2.43	18	0.50	96.51	95.77	103.47	103.22	101.52	100.66	CB C4-DI C2
19	18	54.0	0.52	0.52	0.90	0.47	0.47	10.0	10.0	3.0	1.41	4.57	1.15	15	0.50	96.78	96.51	103.63	103.61	101.52	101.52	DI C2-DI C1
20	18	166.0	0.40	0.80	0.90	0.36	0.72	10.0	10.9	2.9	2.07	7.43	1.17	18	0.50	97.34	96.51	103.67	103.61	104.00	101.52	DI C2-CB C2
21	20	50.0	0.40	0.40	0.90	0.36	0.36	10.0	10.0	3.0	1.08	4.57	0.88	15	0.50	97.59	97.34	103.72	103.70	104.00	104.00	CB C2-CB C1

-2.0 = 99.83

Project File: 02059 (Cotati Cottages-100 Yr.)11-07-02.stm | IDF File: Sonoma.IDF | Total number of lines: 46 | Run Date: 11-18-2002

NOTES: Intensity = 10.47 / (Inlet time + 0.20) ^ 0.54; Return period = 100 Yrs. ; Initial tailwater elevation = 101.65 (ft)

Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 6 2023

Inlet Capacity

Drop Grate Inlet

Location	= Sag
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= 3.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 2.00

Gutter

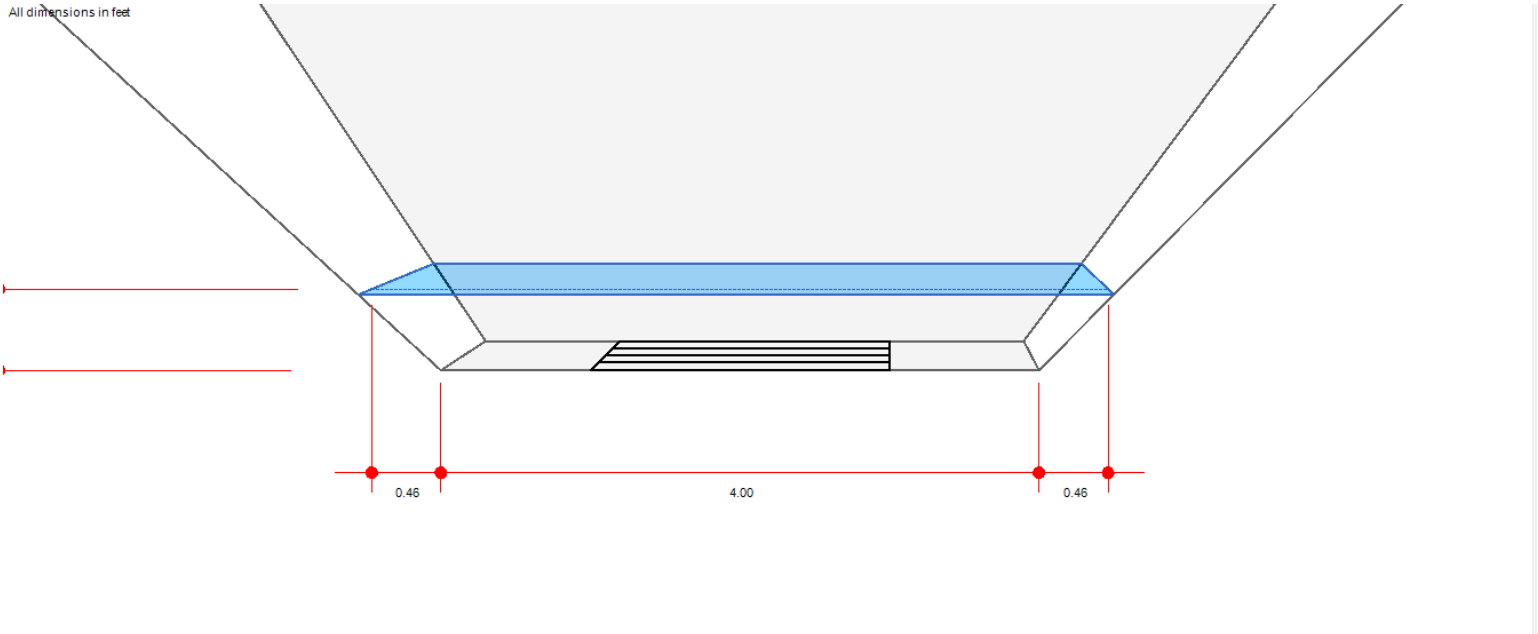
Slope, Sw (ft/ft)	= 2.000
Slope, Sx (ft/ft)	= 2.000
Local Depr (in)	= -0-
Gutter Width (ft)	= 4.00
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 15.50

Highlighted

Q Total (cfs)	= 15.50
Q Capt (cfs)	= 15.50
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 11.09
Efficiency (%)	= 100
Gutter Spread (ft)	= 4.92
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 6 2023

Pipe Capacity

Circular

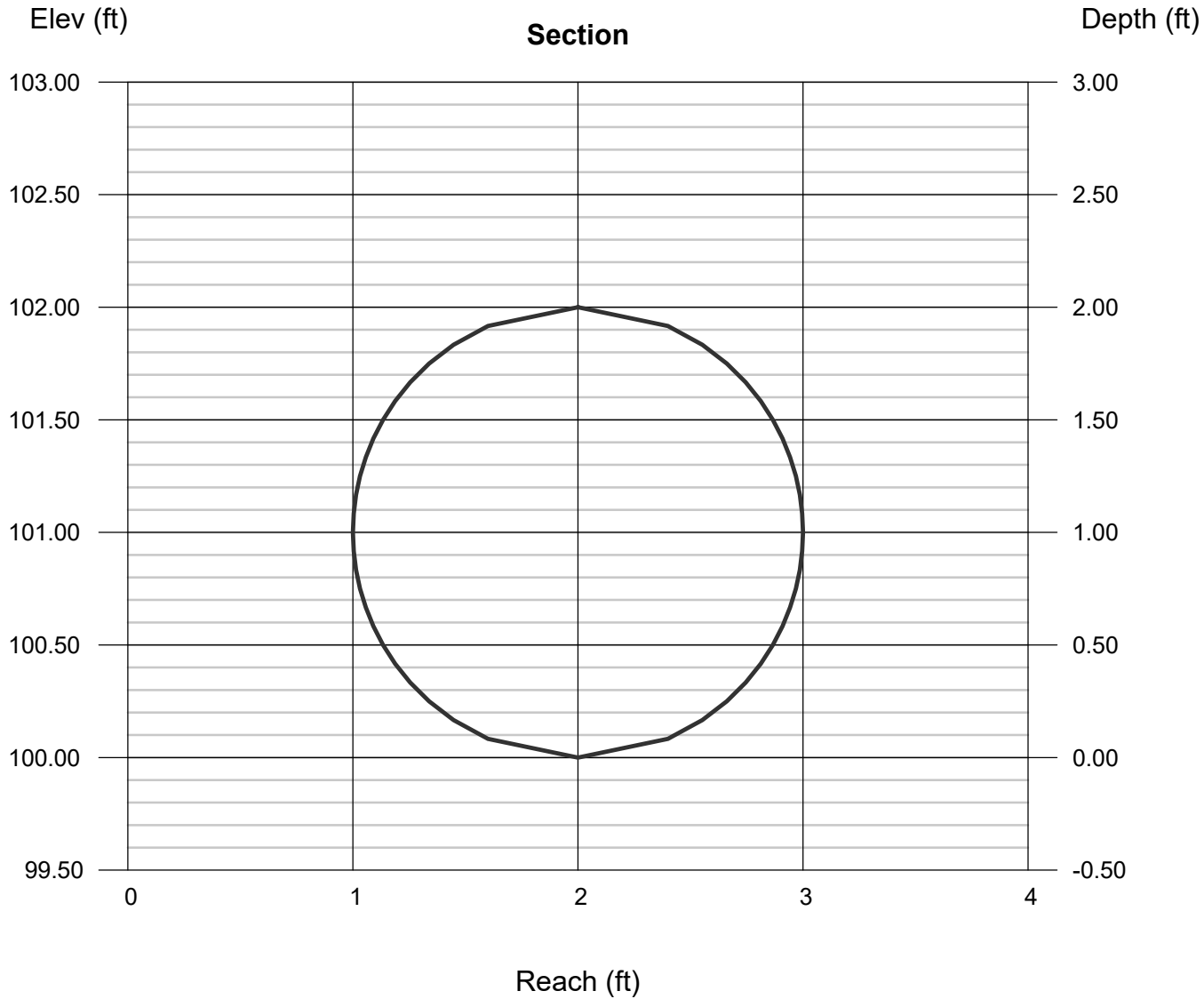
Diameter (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 2.00
N-Value	= 0.012

Calculations

Compute by:	Known Depth
Known Depth (ft)	= 2.00

Highlighted

Depth (ft)	= 2.00
Q (cfs)	= 34.65
Area (sqft)	= 3.14
Velocity (ft/s)	= 11.03
Wetted Perim (ft)	= 6.28
Crit Depth, Yc (ft)	= 1.92
Top Width (ft)	= 0.00
EGL (ft)	= 3.89



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 6 2023

Swale Capacity

Trapezoidal

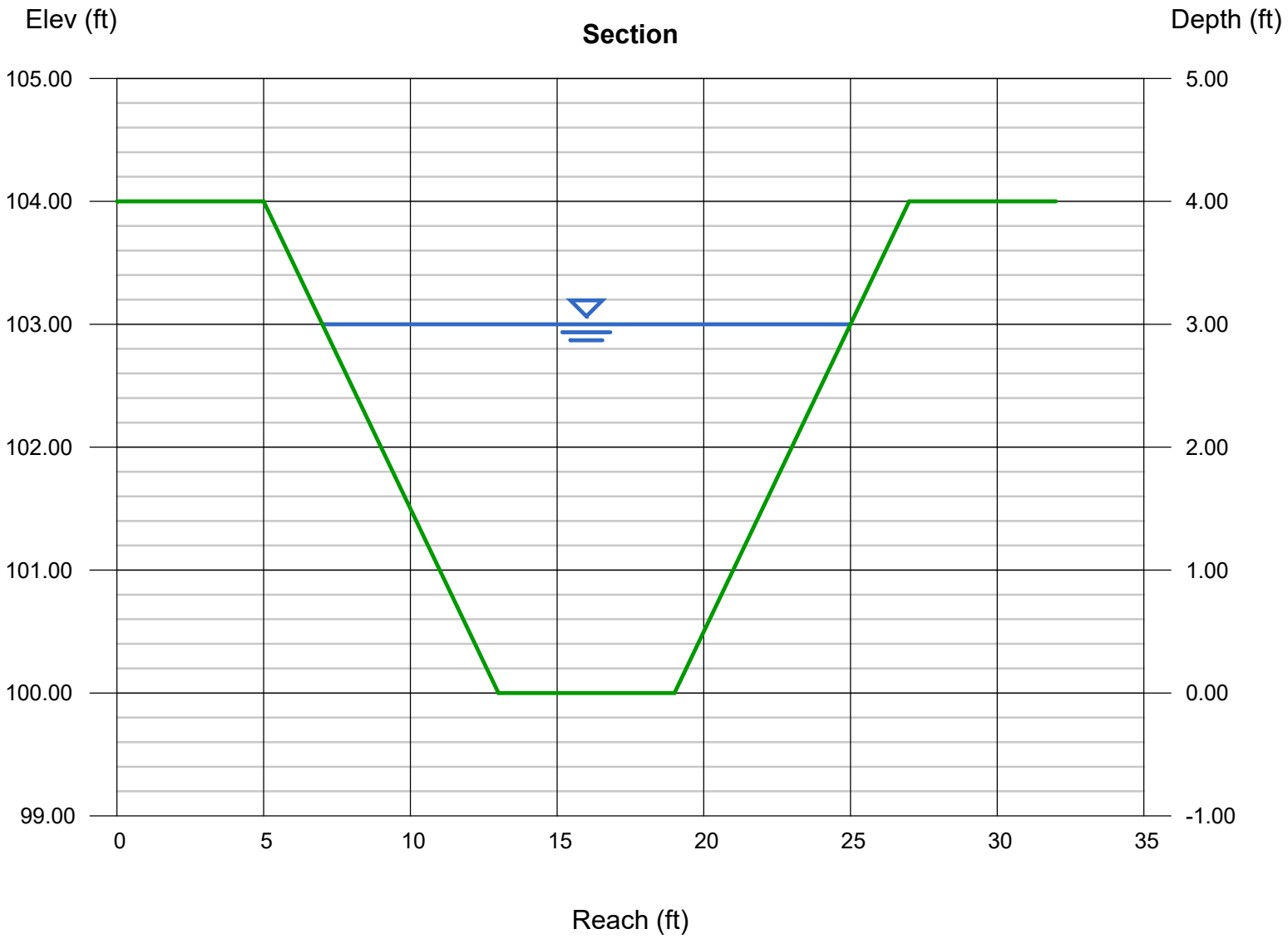
Bottom Width (ft)	= 6.00
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 4.00
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.200

Calculations

Compute by:	Known Depth
Known Depth (ft)	= 3.00

Highlighted

Depth (ft)	= 3.00
Q (cfs)	= 28.55
Area (sqft)	= 36.00
Velocity (ft/s)	= 0.79
Wetted Perim (ft)	= 19.42
Crit Depth, Yc (ft)	= 0.81
Top Width (ft)	= 18.00
EGL (ft)	= 3.01



BEGIN LINE A (A/8)
STA 1+00 BC
BEGIN NEW 1500 mm ø SD
CONNECT TO EXST PIPE
℄ HELMAN LANE
REGRADE ROADSIDE DITCH (G/10)
STA 1+87± HIGH POINT FINISHED DITCH
STA 2+33.458 END 1500 mm ø SD INSTALL
SD BEGIN 1350 mm ø SD INSTALL JS NO. 1 WITH 450 mm ø SD
LATERAL RT. AND TFI NO. 1 LT (B/6)
MATCH LINE
STA 2+80
EG @ TB–RIGHT
APPROX ℄ FINISHED DITCH
EG @ ℄ OF PIPE
EG @ TB–LEFT
EL 28.900
EL 28.670
REMOVE DRIVEWAY CULVERT & HEADWALL
EL 28.50±
0.46%
0.50%
10 YR. HGL
450 mm CMP
0.30%
EXST 750 mm ø RCP
EXST 1500 mm ø CP
MATCH EXST INVERT EXST EL 26.585
1500 mm ø SD
CIPCP
S = 0.0020
EL 26.852
1500 mm ø SD
CIPCP
S = 0.0020
1+00
1+50
2+00
2+50

℄ DATA
Δ=3°09'59"
L=16.579 m
R=300.000 m

BEGIN LINE A (A/8)
STA 1+00 BC
BEGIN NEW 1500 mm ø SD
CONNECT TO EXST PIPE
STA 1+16.579 EC
Field Inlet
PROJECT SIGN (M/11)
750 mm RCP
75 mm Tree
228 mm Val Oak
SPECIAL TRENCHING UNDER TREE, TYP
1500 mm CP
CAUTION U/G 21KV HIGH VOLTAGE AND TELEPHONE DUCTS
HELMAN LANE
CITY OF COTATI
COUNTY OF SONOMA
750 mm x 1200 mm RCB
600 mm Clump Plum
150 mm Val Oak
50 mm RCP
REMOVE & REPLACE EXST STOP SIGN. TEMPORARILY RELOCATE FOR TRAFFIC CONTROL
Gravel Driveway
S 37°02'52" W
116.879 m
1+50
2+00
ALDER AVENUE
℄ ROAD RIGHT–OF–WAY
Δ30 29.316 ++ RIR
REMOVE, TEMPORARILY RELOCATE & REPLACE MAILBOX
PG&E TO RELOCATE U/G GAS
REMOVE DRIVEWAY CULVERT & HEADWALL
STA 2+33.458 END 1500 mm ø SD INSTALL
SD BEGIN 1350 mm ø SD INSTALL JS NO. 1 WITH 450 mm ø SD
SD LATERAL RT AND TFI NO. 1 LT
1500 mm
N 52°57'08" W
125.73 m
S 37°02'52" W
132.989 m
450 mm RCP
228 mm Stump
2+50
Gate
Gravel Driveway
FG 28.70
150 mm Val Oak
228 mm Val Oaks
INSTALL IS NO. 1 (C/10)
MATCH LINE
STA 2+80

RECORD DRAWING
Date 11/14/01

5 0 5 10 20
SCALE IN METERS

NO.	DATE	REVISION	BY

SONOMA COUNTY WATER AGENCY

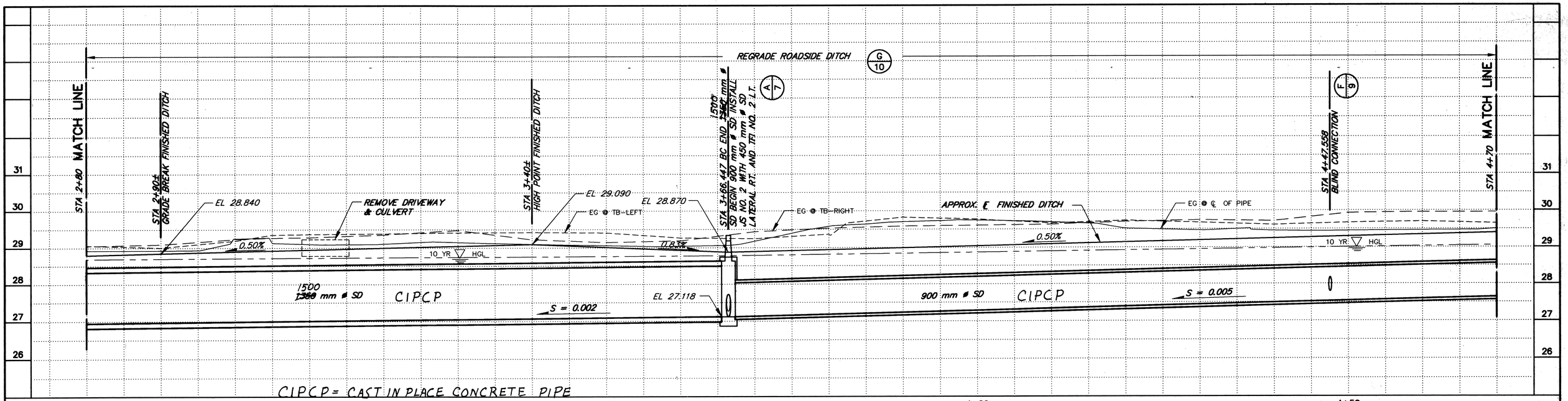
SCALE: AS SHOWN
DATE : 11 APRIL 2001
DRAWN : JLW/ADF
CHECKED :

APPROVED DEPUTY CHIEF ENGINEER RCE C046862
SUBMITTED RCE C046862
DESIGNED RCE 51532

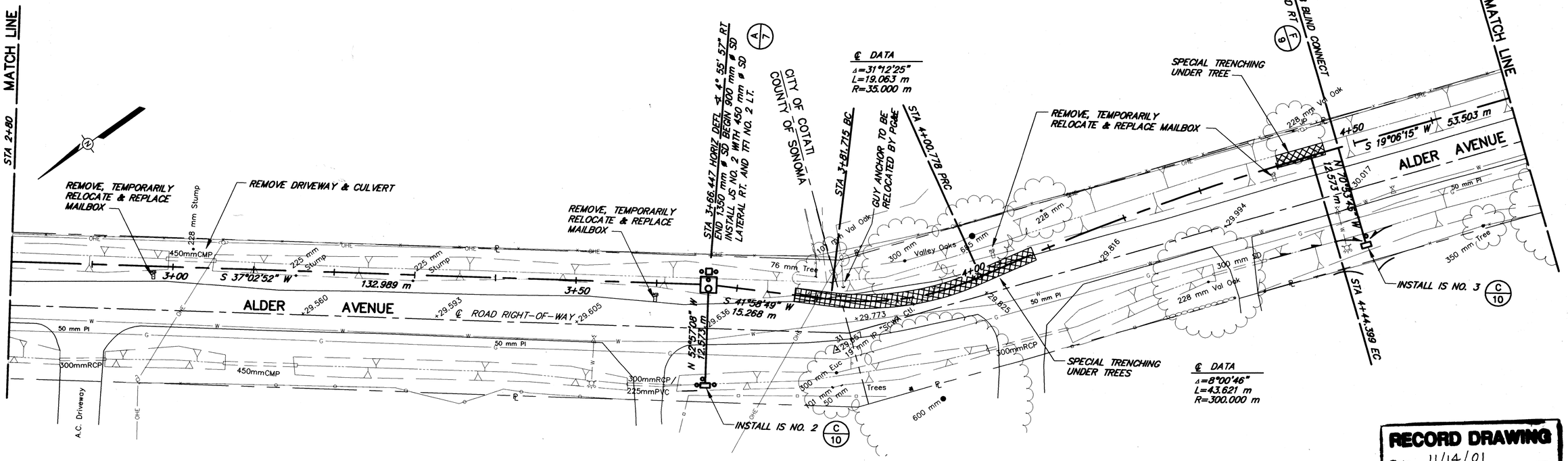
LAGUNA MARK WEST – ZONE 1A
COTATI SYSTEM B – LINE A
PLAN & PROFILE – STA 1+00 TO STA 2+80

\FLOOD CONTROL\ZONE 1A\COTATI SYS B\1-4148-002_02
DRAWING NUMBER 1-4148/002 – 102.2

SHEET NO. 2 OF 11



CIPCP = CAST IN PLACE CONCRETE PIPE



RECORD DRAWING
Date 11/14/01

5 0 5 10 20
SCALE IN METERS

NO.	DATE	REVISION	BY

SONOMA COUNTY WATER AGENCY

SCALE: AS SHOWN
DATE : 11 APRIL 2001
DRAWN : JLW/ADF
CHECKED :

APPROVED DEPUTY CHIEF ENGINEER RCE C046862
SUBMITTED RCE C046862
DESIGNED RCE 51532

LAGUNA MARK WEST – ZONE 1A
COTATI SYSTEM B – LINE A
PLAN & PROFILE – STA 2+80 TO STA 4+70

\FLOOD CONTROL\ZONE 1A\COTATI SYS B\1-4148-002_03
DRAWING NUMBER 1-4148/002 – 102.3

SHEET NO. 3 OF 11

REGRADE ROADSIDE DITCH (G/10)

STA 4+70 MATCH LINE

STA 4+88± GRADE BREAK FINISHED DITCH

STA 5+04± HIGH POINT FINISHED DITCH

STA 5+08.526 END 900 mm ø SD BEGIN 750 mm ø SD INSTALL IS NO. 4 WITH 450 mm ø SD LATERAL RT. (D/10)

EG @ TB–LEFT

EG @ TB–RIGHT

EG @ ℄ OF PIPE

℄ FINISHED DITCH (G/10)

STA 5+86.969 INSTALL MH NO. 1 INSTALL 450 mm ø SD LATERAL RT. (SEE SHT NO. 9) (B/8)

STA 5+90± GRADE BREAK FINISHED DITCH

STA 6+13± HIGH POINT FINISHED DITCH

STA 6+24.773 EC END 750 mm ø SD INSTALL IS NO. 7 (D/10)

END LINE A

EL 29.480 | EL 29.650 | EL 29.420 | EL 30.150 | EL 29.830 | EL 29.920

0.50% | 1.06% | 4.78% | 0.50% | 1.39% | 1.91%

10 YR. HGL

900 mm ø SD S=0.00506

EL 27.829 CIPCP

750 mm ø SD S=0.00508

EL 28.221 CIPCP

750 mm ø SD S=0.00518

EL 28.410

CAUTION UNDERGROUND TELEPHONE DUCTS (U/GT)

TYP. CONC. COLLAR

N-12 PLASTIC LAST 40 L.F (11/8)

5+00 | 5+50 | 6+00

STA 4+70 MATCH LINE

STA 4+97.902 BC

℄ DATA
Δ=17°23'33"
L=10.624 m
R=35.000 m

STA 5+08.526 EC END 900 mm ø SD BEGIN 750 mm ø SD INSTALL IS NO. 4 WITH 450 mm ø SD LATERAL RT (D/10)

REMOVE, TEMPORARILY RELOCATE & REPLACE MAILBOX

S 19°06'15" W 53.503 m

50 mm M.F. Oak

S 21°35'30" W 84.406 m

5+50

6+00

ALDER AVENUE

℄ ROAD RIGHT-OF-WAY

+30.165 | +30.343 | +30.450 | +30.465 | +30.453 | +30.447 | +30.568 | +30.727

50 mm PI | 50 mm PI | 50 mm PI

100 mm Spruce | 228 mm | 228 mm | 228 mm | 228 mm | 300mmRCP/228mmRCP | 152 mm

381 mm Tree

2-600 mm Rdwd

228 mm Spruce

300 mm RCP | 300 mm RCP

3-76 mm Oaks

N 70°53'45" W 14.187 m

GRADE DITCH TO DRAIN

IS NO. 5 (C/10)

REMOVE, TEMPORARILY RELOCATE & REPLACE SIGN & MAILBOX

SPECIAL TRENCH UNDER TREE

228 mm Val Oak | 150 mm Val Oak

STA 5+86.969 INSTALL MH NO. 1 INSTALL 450 mm ø SD LATERAL RT (SEE SHT NO. 9) (B/8)

STA 5+92.932 BC

℄ DATA
Δ=18°14'37"
L=31.841 m
R=100.000 m

N 70°53'45" W 10.769 m

GRADE DITCH TO DRAIN

IS NO. 6 (C/10)

A.C. Parking

Red's Recovery Room

STA 6+24.773 EC END 750 mm ø SD INSTALL IS NO. 7 END LINE A (D/10)

RIGHT OF WAY

450 mm CMP

GUY

PROJECT SIGN (M/11)

300 mm

150 mm

450mmRCP

450mmCMP

Gate

GRAVENSTEIN (HWY 116) HWY

5 0 5 10 20

SCALE : 1:250

RECORD DRAWING
Date 11/14/01

NO.	DATE	REVISION	BY

SONOMA COUNTY WATER AGENCY

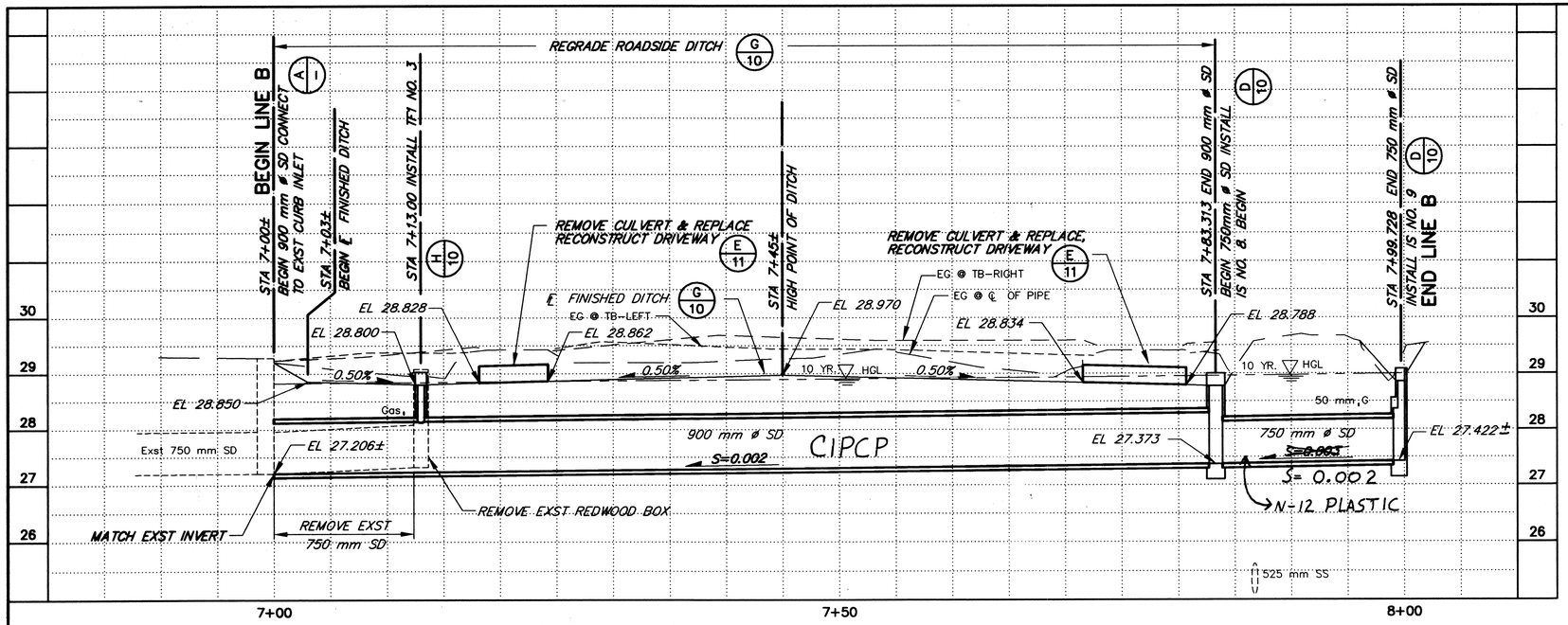
SCALE: AS SHOWN
DATE : 11 APRIL 2001
DRAWN : JLW/ADF
CHECKED :

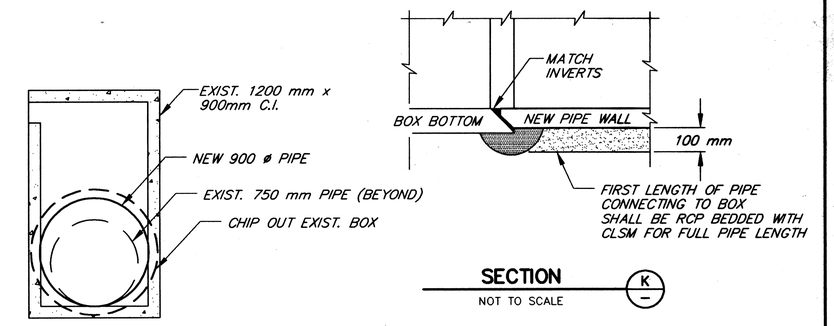
APPROVED DEPUTY CHIEF ENGINEER RCE C046862
SUBMITTED RCE C046862
DESIGNED RCE 51532

LAGUNA MARK WEST – ZONE 1A
COTATI SYSTEM B – LINE A
PLAN & PROFILE – STA 4+70 TO STA 6+24.773

\FLOOD CONTROL\ZONE 1A\COTATI SYS B\1-4148-002_04
DRAWING NUMBER 1-4148/002 – 102.4

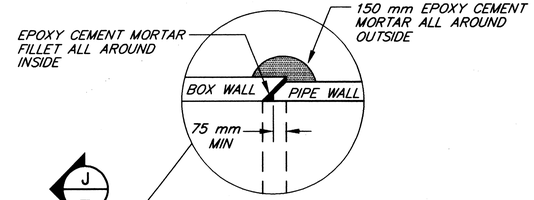
SHEET NO. 4 OF 11

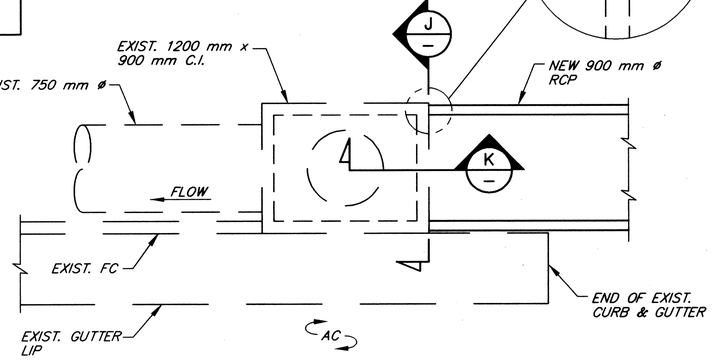




SECTION
NOT TO SCALE (K)

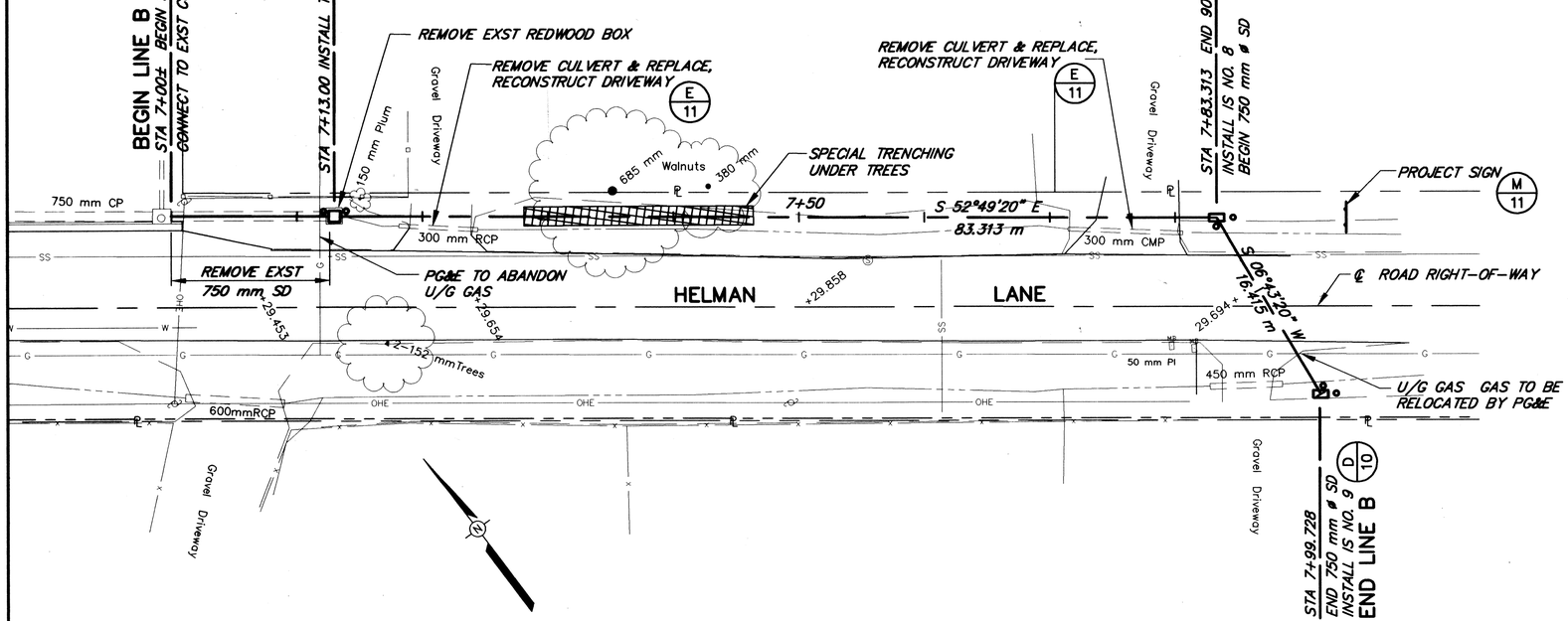
SECTION
NOT TO SCALE (J)





PLAN

CONNECTION TO EXISTING CURB INLET
NOT TO SCALE (A)



5 0 5 10 20
SCALE IN METERS

NO.	DATE	REVISION	BY

SONOMA COUNTY WATER AGENCY

SCALE: AS SHOWN
DATE : 11 APRIL 2001
DRAWN : JLW/ADF
CHECKED :

APPROVED DEPUTY CHIEF ENGINEER RCE C046862
SUBMITTED RCE C046862
DESIGNED RCE 51532

LAGUNA MARK WEST – ZONE 1A
COTATI SYSTEM B – LINE B
PLAN & PROFILE – STA 7+00 TO STA 7+99.728

\FLOOD CONTROL\ZONE 1A\COTATI SYS B\1-4148-002_05
DRAWING NUMBER 1-4148/002 – 102.5

SHEET NO. 5 OF 11

RECORD DRAWING
Date 11/14/01