

FLOOD INSURANCE STUDY



VOLUME 3 OF 3

MARIN COUNTY, CALIFORNIA AND INCORPORATED AREAS



COMMUNITY NAME	COMMUNITY NUMBER
BELVEDERE, CITY OF	060429
CORTE MADERA, TOWN OF	065023
FAIRFAX, TOWN OF	060175
LARKSPUR, CITY OF	065040
MARIN COUNTY (UNINCORPORATED AREAS)	060173
MILL VALLEY, CITY OF	060177
NOVATO, CITY OF	060178
ROSS, TOWN OF	060179
SAN ANSELMO, TOWN OF	060180
SAN RAFAEL, CITY OF	065058
SAUSALITO, CITY OF	060182
TIBURON, TOWN OF	060430

REVISED
March 16, 2016



Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
06041CV003C

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

This FIS report was revised on March 16, 2016. Users should refer to Section 10.0, Revisions Description, for further information. Section 10.0 is intended to present the most up-to-date information for specific portions of this FIS report. Therefore, users of this FIS report should be aware that the information presented in Section 10.0 supersedes information in Sections 1.0 through 9.0 of this FIS report.

Initial Countywide FIS Effective Date: May 4, 2009

Revised Countywide FIS Date: March 17, 2014 First Revision
 March 16, 2016 Second Revision

TABLE OF CONTENTS
Volume 1 - March 16, 2016

	<u>Page</u>
1.0 <u>INTRODUCTION</u>	1
1.1 Purpose of Study	1
1.2 Authority and Acknowledgments.....	1
1.3 Coordination	6
2.0 <u>AREA STUDIED</u>	8
2.1 Scope of Study	8
2.2 Community Description.....	10
2.3 Principal Flood Problems.....	11
2.4 Flood Protection Measures	22
3.0 <u>ENGINEERING METHODS</u>	26
3.1 Hydrologic Analyses	26
3.2 Hydraulic Analyses	41
3.3 Coastal Hazard Analyses for the May 4, 2009, Countywide FIS.....	53
3.4 Coastal Analyses for the March 16, 2016 Revision to the Countywide FIS.....	56
3.5 Vertical Datum.....	67
4.0 <u>FLOODPLAIN MANAGEMENT APPLICATIONS</u>	68
4.1 Floodplain Boundaries.....	68
4.2 Floodways.....	72
5.0 <u>INSURANCE APPLICATIONS</u>	77
6.0 <u>FLOOD INSURANCE RATE MAP</u>	79
7.0 <u>OTHER STUDIES</u>	80
8.0 <u>LOCATION OF DATA</u>	82
9.0 <u>BIBLIOGRAPHY AND REFERENCES</u>	83
10.0 <u>REVISION DESCRIPTIONS</u>	91
10.1 First Revision (March 17, 2014).....	92
10.2 Second Revision (March 16, 2016).....	92

TABLE OF CONTENTS, continued
 Volume 1, continued – March 16, 2016

FIGURES

Figure 1. Transect Location Map..... 55
 Figure 2. Transect Schematic..... 56
 Figure 3. San Francisco Bay Shoreline Transect Location Maps 1, 2, 3 64
 Figure 4. Floodway Schematic..... 76

TABLES

Table 1 – Base Map Sources for the March 17, 2014 Revision..... 5
 Table 2 - Initial and Final CCO Meetings..... 7
 Table 3 - Flooding Sources Studied by Detailed Methods 8
 Table 4 - Letters of Map Change 9
 Table 5 - Summary of Discharges..... 31
 Table 6 – Summary of Stillwater Elevations, Open Pacific Coast 36
 Table 6a – Summary of Stillwater Elevations, Sheltered Waters 36
 Table 7 - Manning’s “n” Values 49
 Table 8 - List of Levees 51
 Table 9 - Transect Locations..... 54
 Table 10 - San Francisco Bay Shoreline Transect Data for the March 16, 2016 Revision..... 57
 Table 11 – Community Map History 81

Volume 2 – March 16, 2016

TABLES

Table 12 – Floodway Data.....95

APPENDIX A

Figure 5. FIRM Notes to Users.....107
 Figure 6. Map Legend for FIRM.....110

EXHIBITS

Exhibit 1 - FLOOD PROFILES

Arroyo Avichi	Panels 01P-04P
Arroyo Corte Madera Del Presidio Creek	Panels 05P-09P(b)
Arroyo San Jose	Panels 10P-13P
Corte Madera Creek	Panel 14P-14P(c)
Corte Madera Creek Overflow	Panels 15P-15P(a)
Coyote Creek	Panels 16P-18P
Crest Marin Creek	Panels 19P-22P
Eskoot Creek	Panels 23P-25P
Fairfax Creek	Panels 26P-29P
Fairfax Creek Overflow	Panels 29P(a)
Hilarita Drainage	Panels 30P-31P
Ignacio Creek	Panels 32P-33P
Kittle Creek	Panels 34P-35P
Lagunitas Creek	Panels 36P-37P

TABLE OF CONTENTS, continued

Volume 2 – March 16, 2016, continued

EXHIBITS, continued

Exhibit 1 - FLOOD PROFILES (continued)

Miller Creek	Panels 38P-41P
Miller Creek-Left Overbank Channel	Panel 42P
Miller Creek-Right Overbank Channel	Panel 43P
Novato Creek	Panels 44P-48P
Old Mill Creek	Panels 49P-51P
Olema Creek	Panel 52P

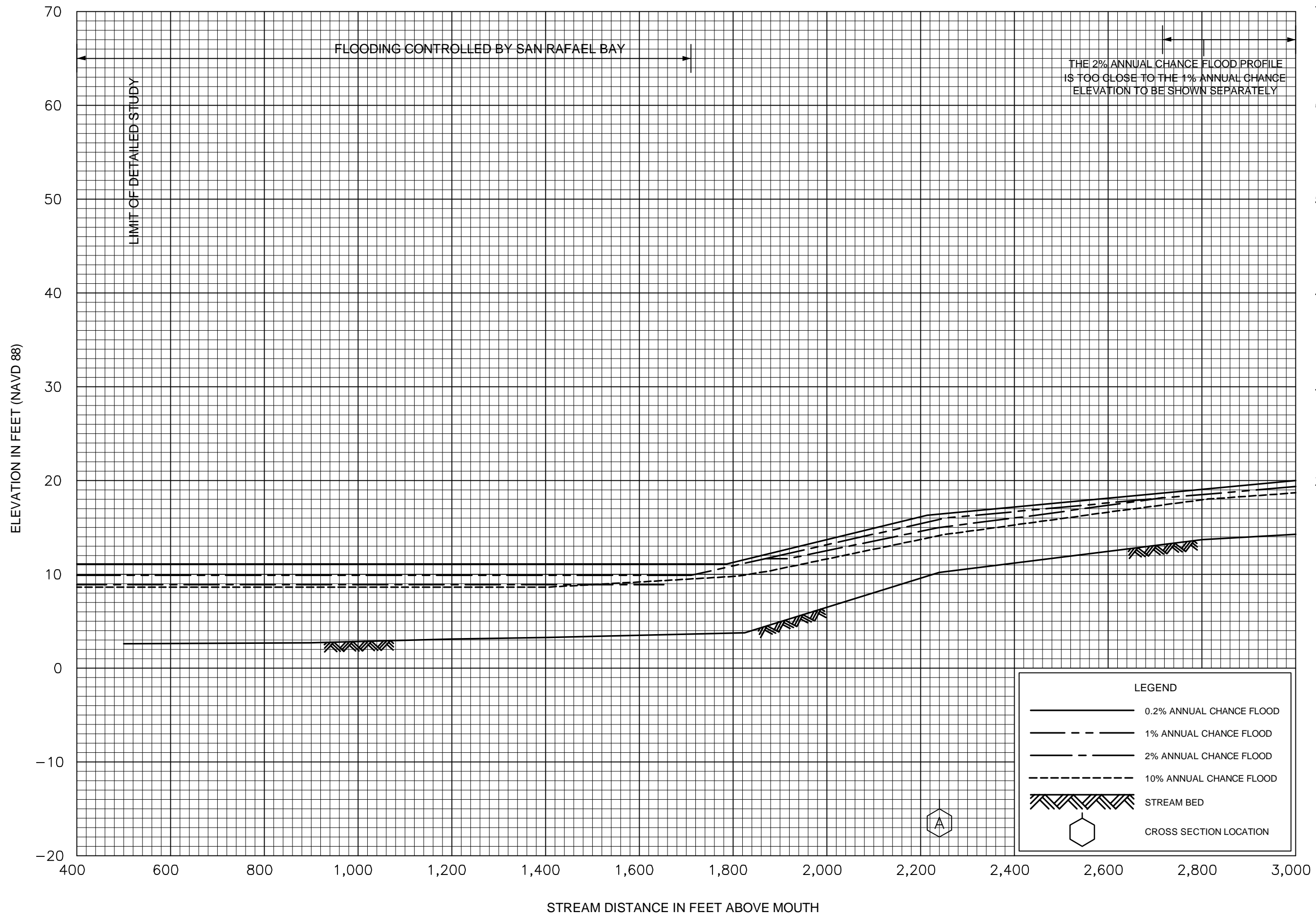
Volume 3 – March 16, 2016

EXHIBITS, continued

Exhibit 1 - FLOOD PROFILES

Pacheco Creek	Panels 53P-59P
Reed Creek	Panels 60P-61P
Reed Drainage No.1	Panels 62P-65P
Reed Drainage No.2	Panels 66P-69P
Reed Ranch Drainage	Panel 70P
Rock Hill Drainage No.1	Panels 71P-72P
Rock Hill Drainage No.2	Panel 73P
Ryan Creek	Panel 74P
San Anselmo Creek	Panels 75P-81P(d)
San Anselmo Creek Overflow	Panels 81P(e) -81P(g)
San Rafael Creek	Panels 82P-83P
Sleepy Hollow Creek	Panels 84P-86P
Sorich Drainage	Panel 87P
Sutton-Manor Creek	Panels 88P-89P
Sycamore Park Overflow	Panels 89P(a)
Tennessee Creek	Panels 90P-91P
Tiburon Downtown Drainage	Panels 92P-93P
Trestle Glen Drainage	Panels 94P-96P
Unnamed Tributary to Vineyard Creek	Panel 97P
Vineyard Creek	Panels 98P-99P
Warner Canyon Creek	Panels 100P
Warner Creek	Panels 101P-102P
Wilson Creek	Panel 103P

Exhibit 2 - Flood Insurance Rate Map Index
Flood Insurance Rate Map

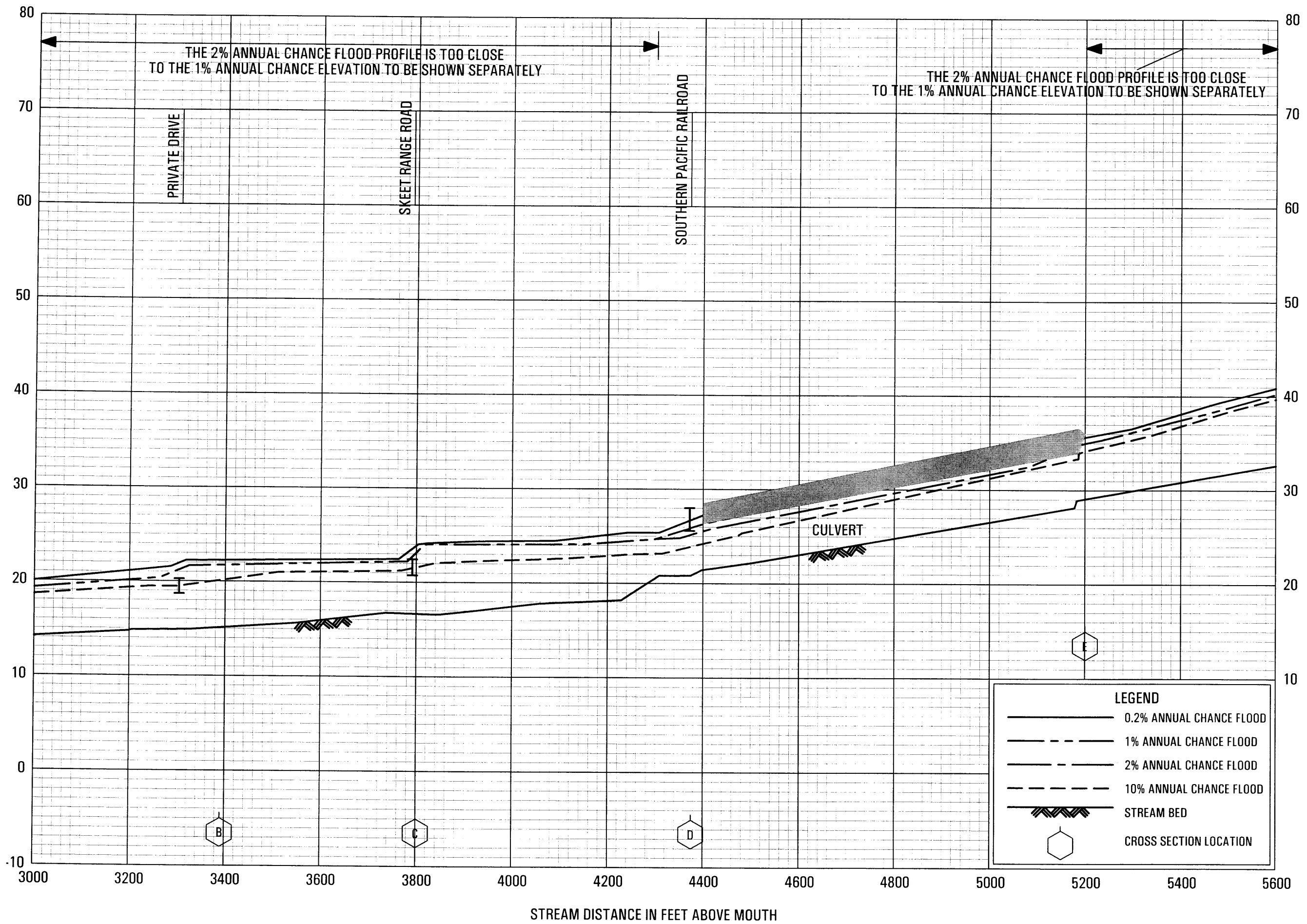


FLOOD PROFILES
PACHECO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
AND INCORPORATED AREAS

53P

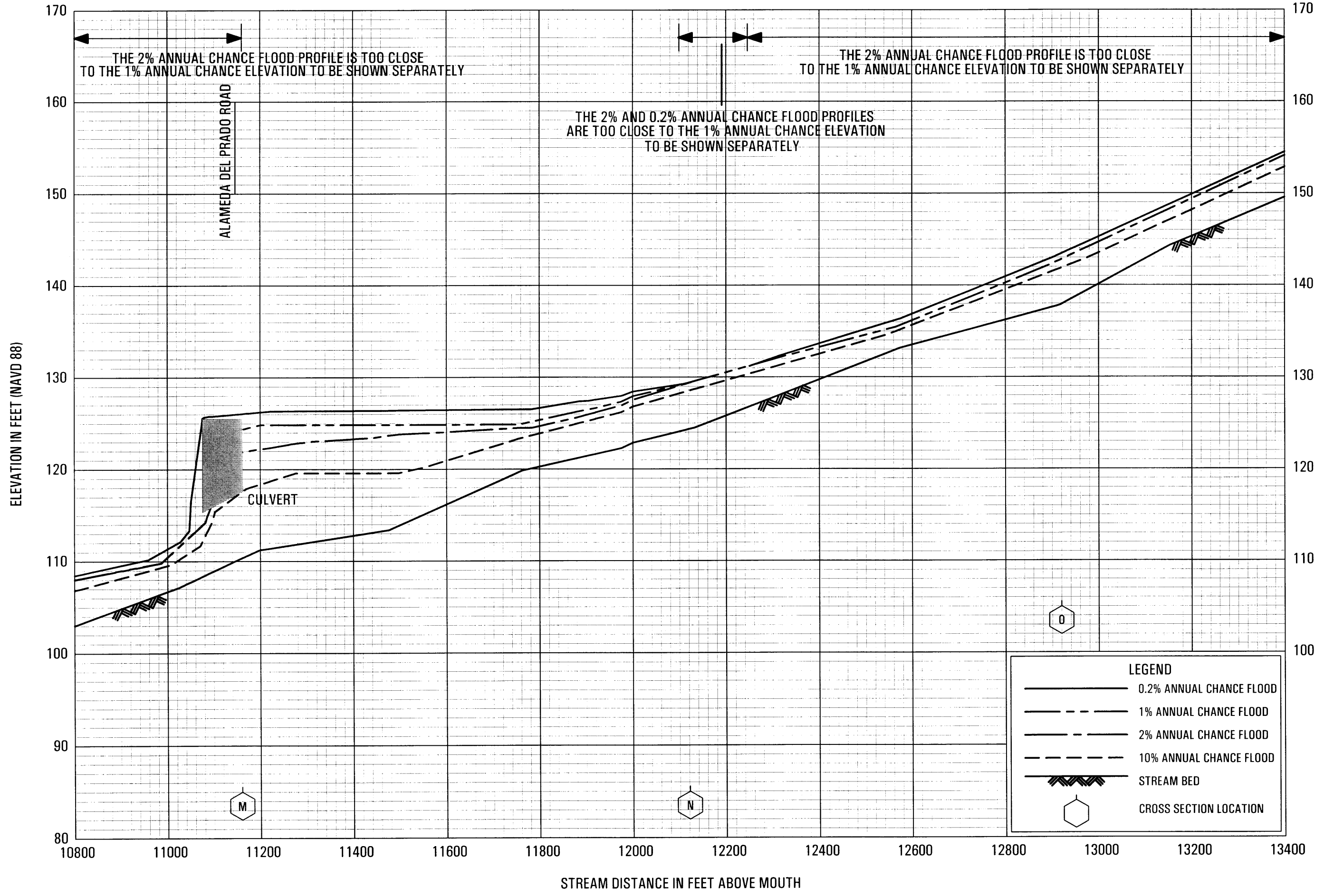
ELEVATION IN FEET (NAVD 88)



FLOOD PROFILES

PACHECO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
AND INCORPORATED AREAS

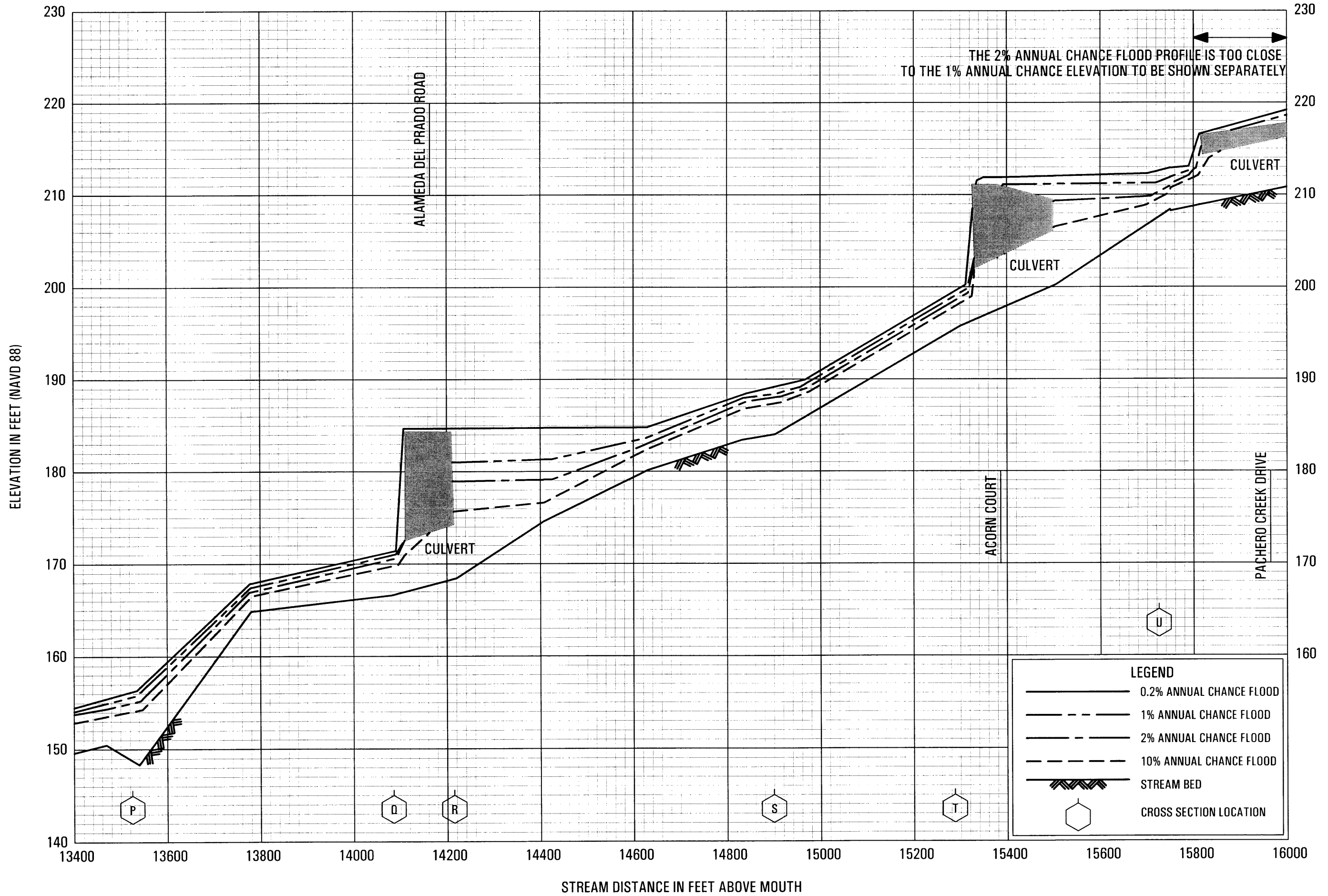


FLOOD PROFILES

PACHECO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

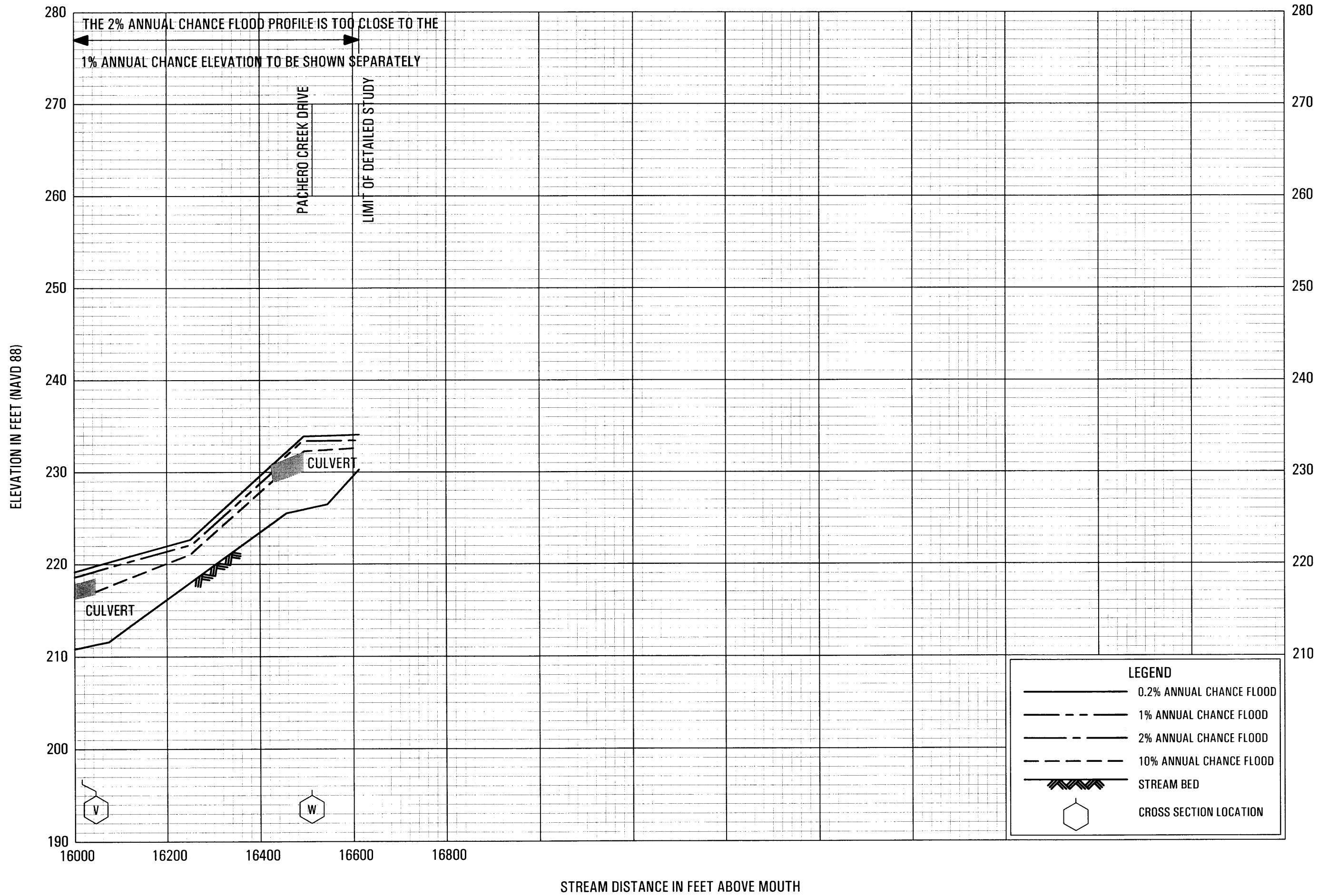


FLOOD PROFILES

PACHECO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

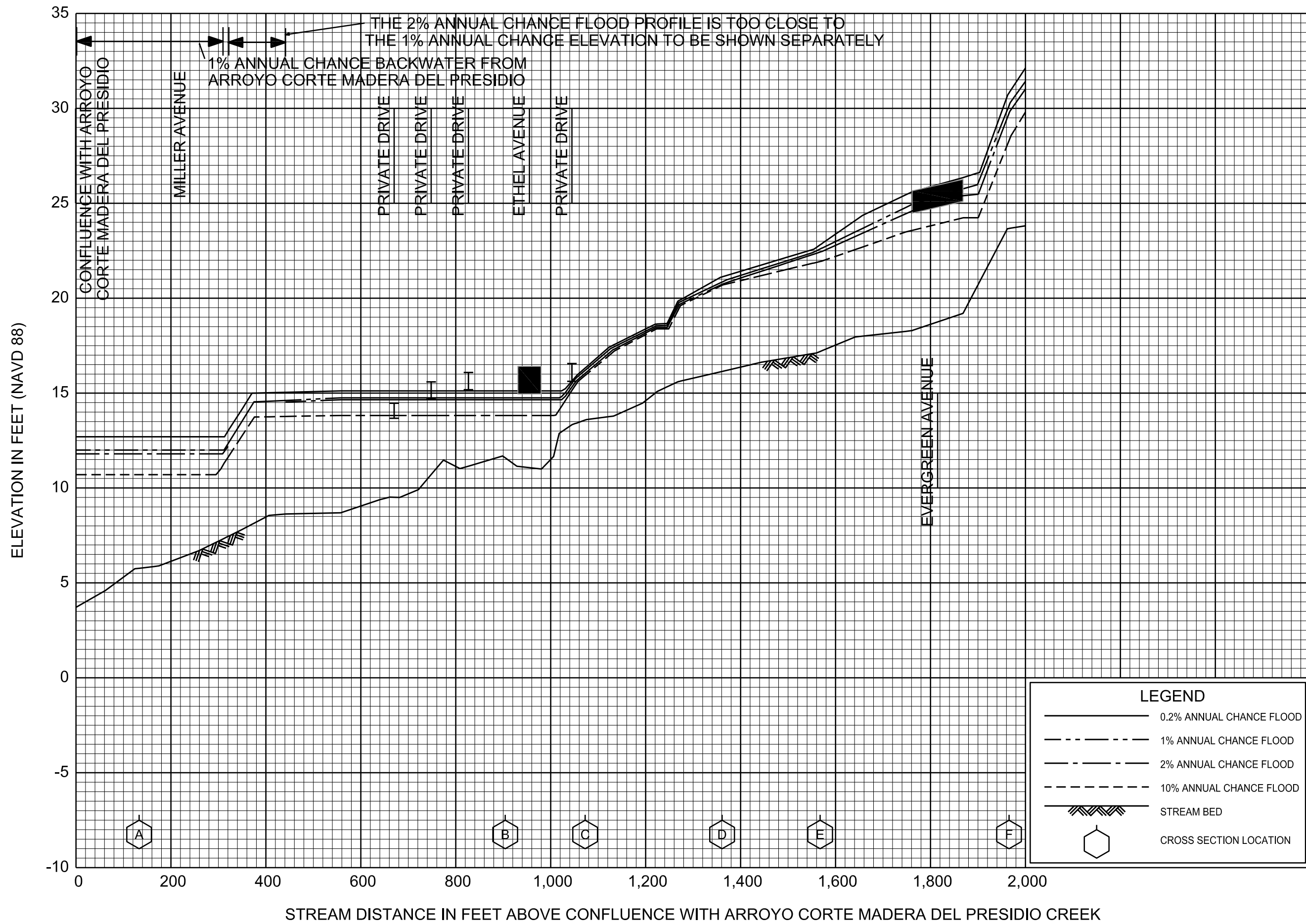


FLOOD PROFILES

PACHECO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

**MARIN COUNTY, CA
AND INCORPORATED AREAS**

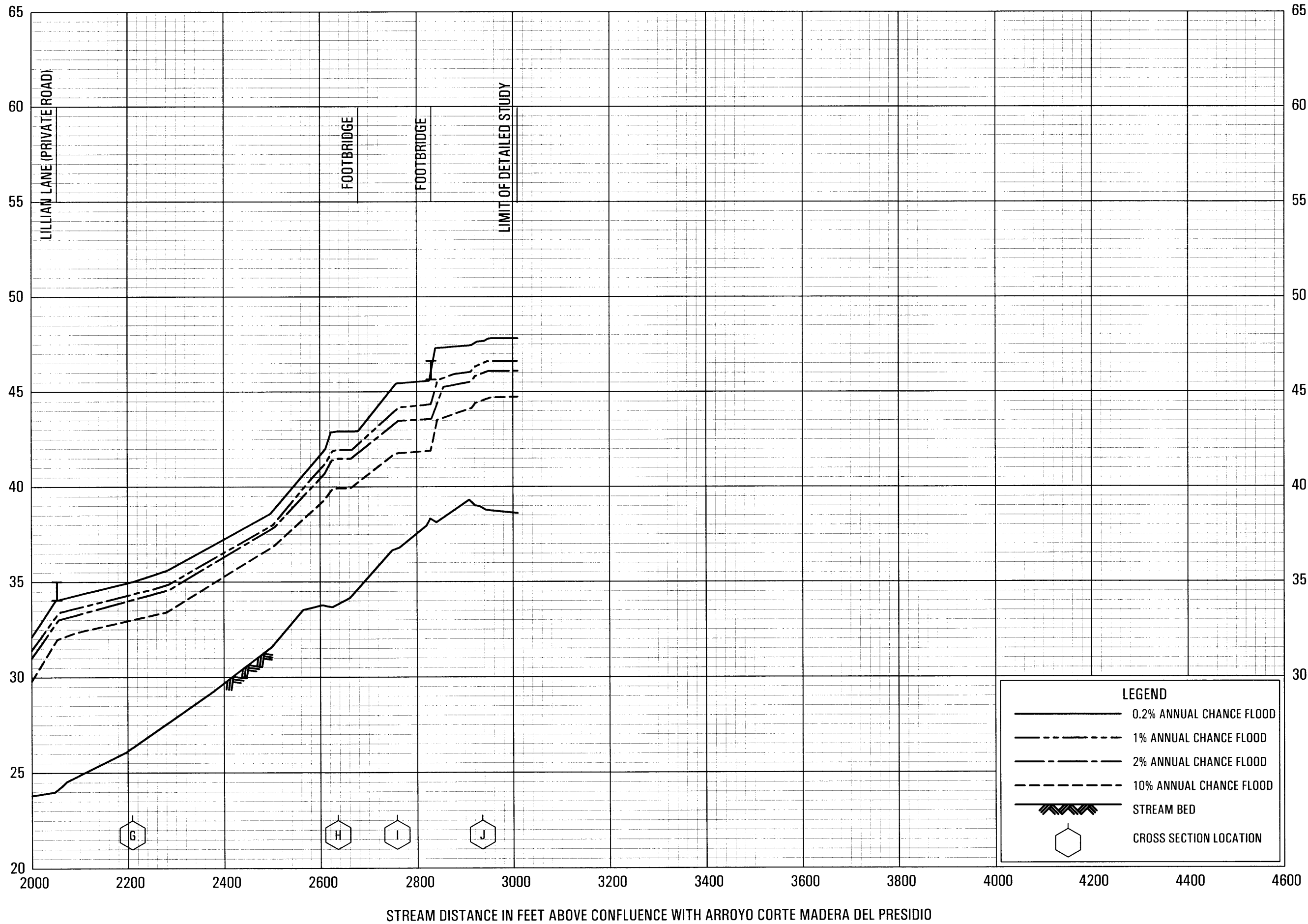


FLOOD PROFILES

REED CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
 AND INCORPORATED AREAS

ELEVATION IN FEET (NAVD 88)

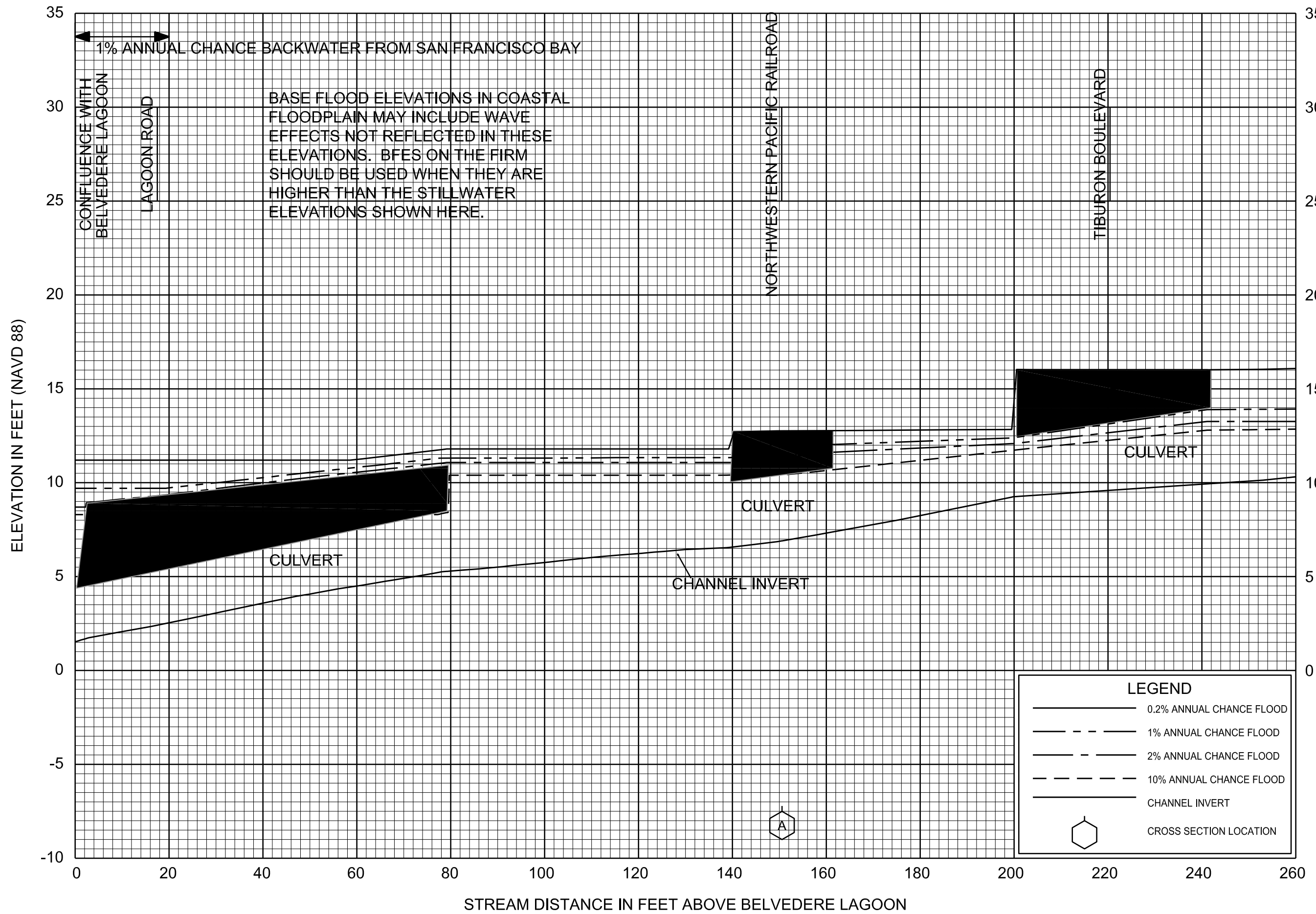


FLOOD PROFILES

REED CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

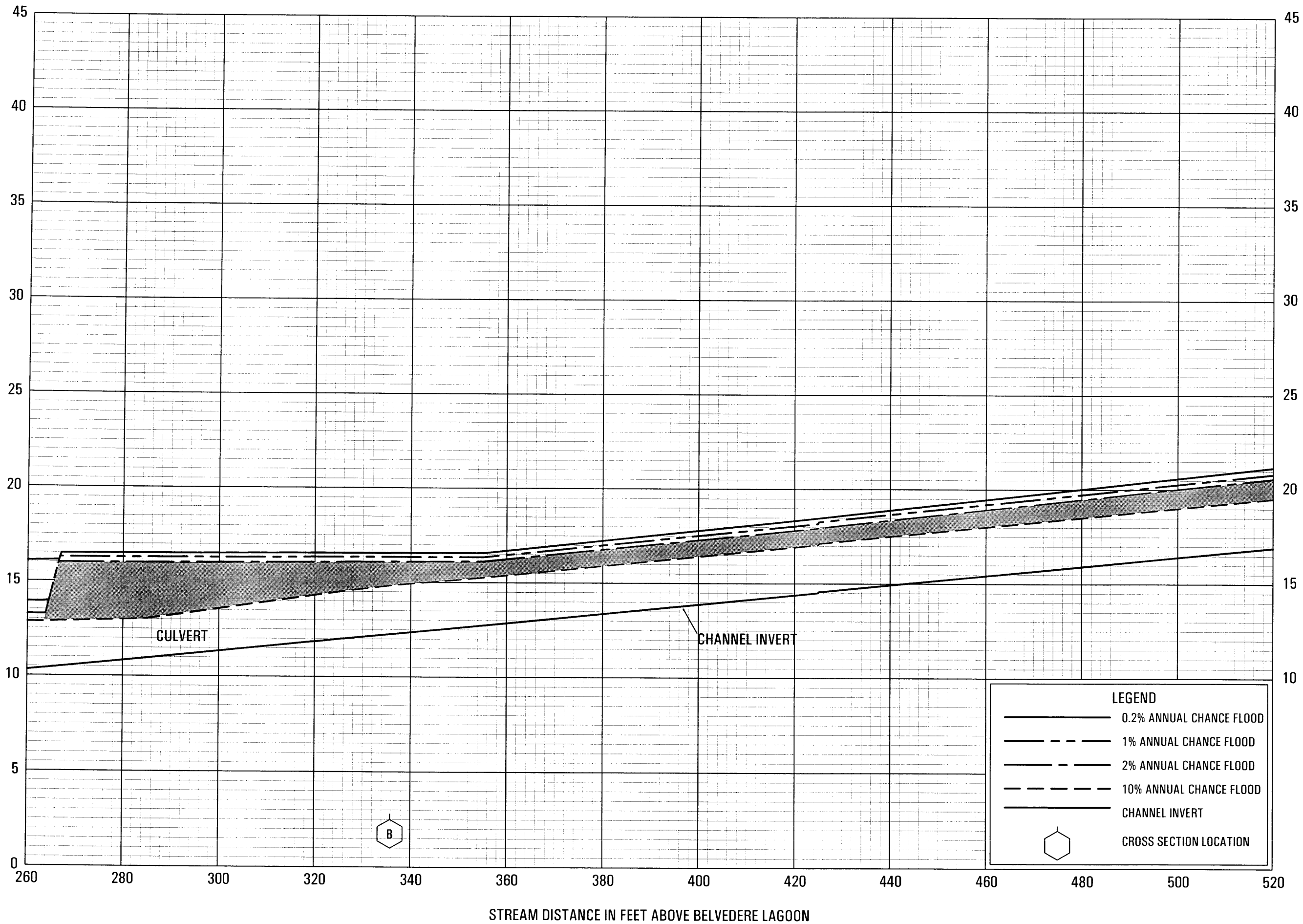


FLOOD PROFILES

REED DRAINAGE NO. 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
 AND INCORPORATED AREAS

ELEVATION IN FEET (NAVD 88)



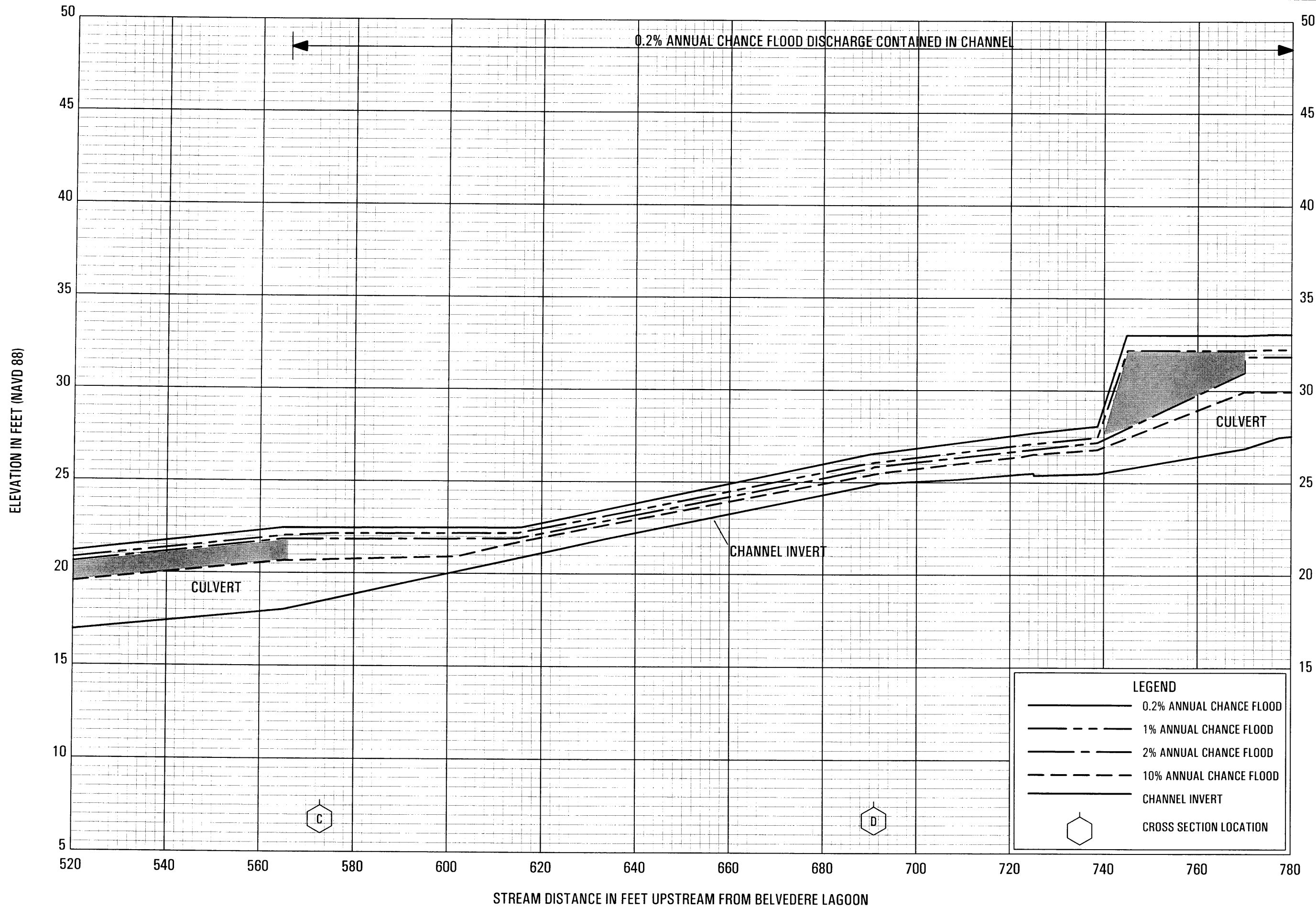
FLOOD PROFILES

REED DRAINAGE NO. 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

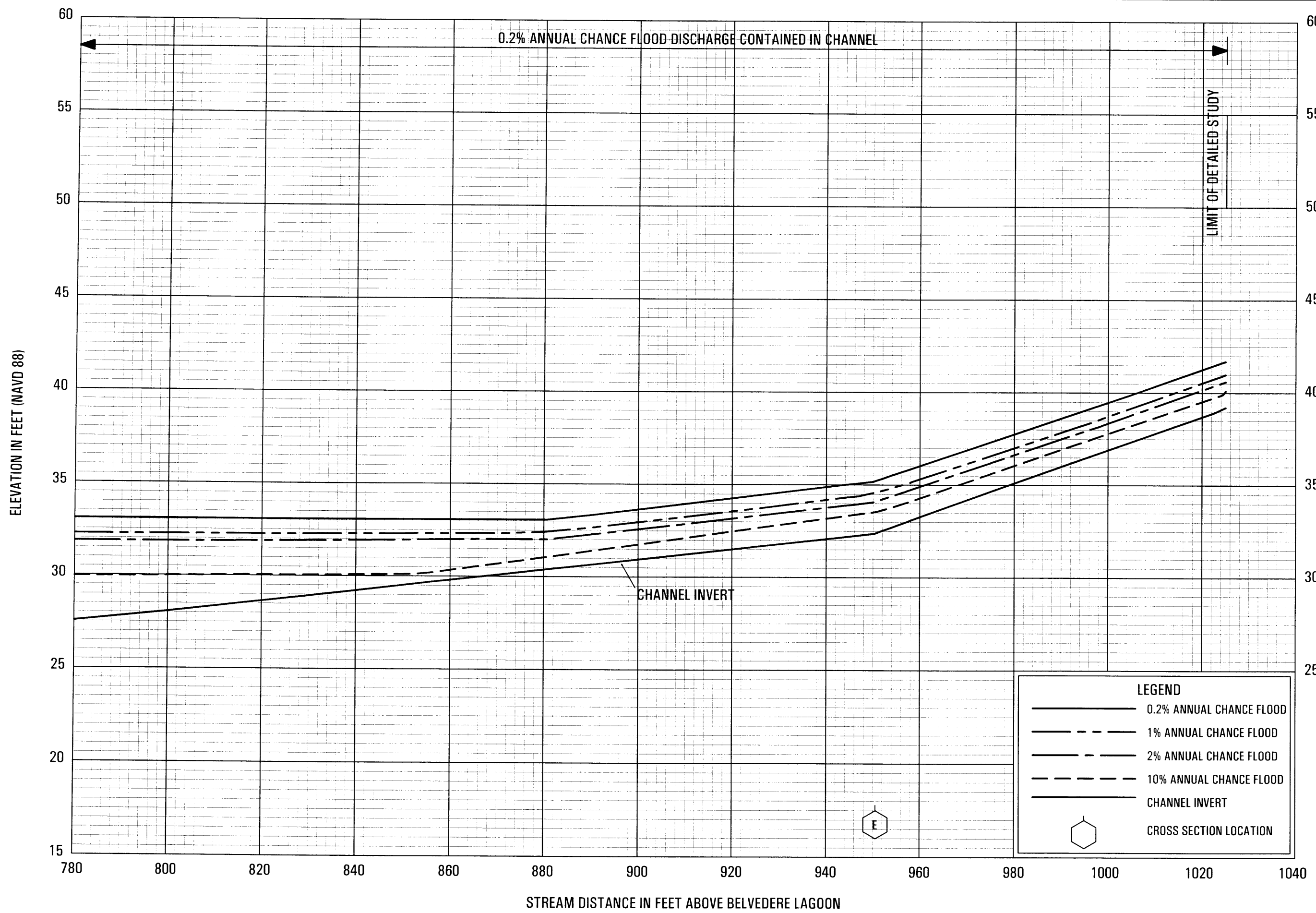
MARIN COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES
REED DRAINAGE NO. 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
AND INCORPORATED AREAS

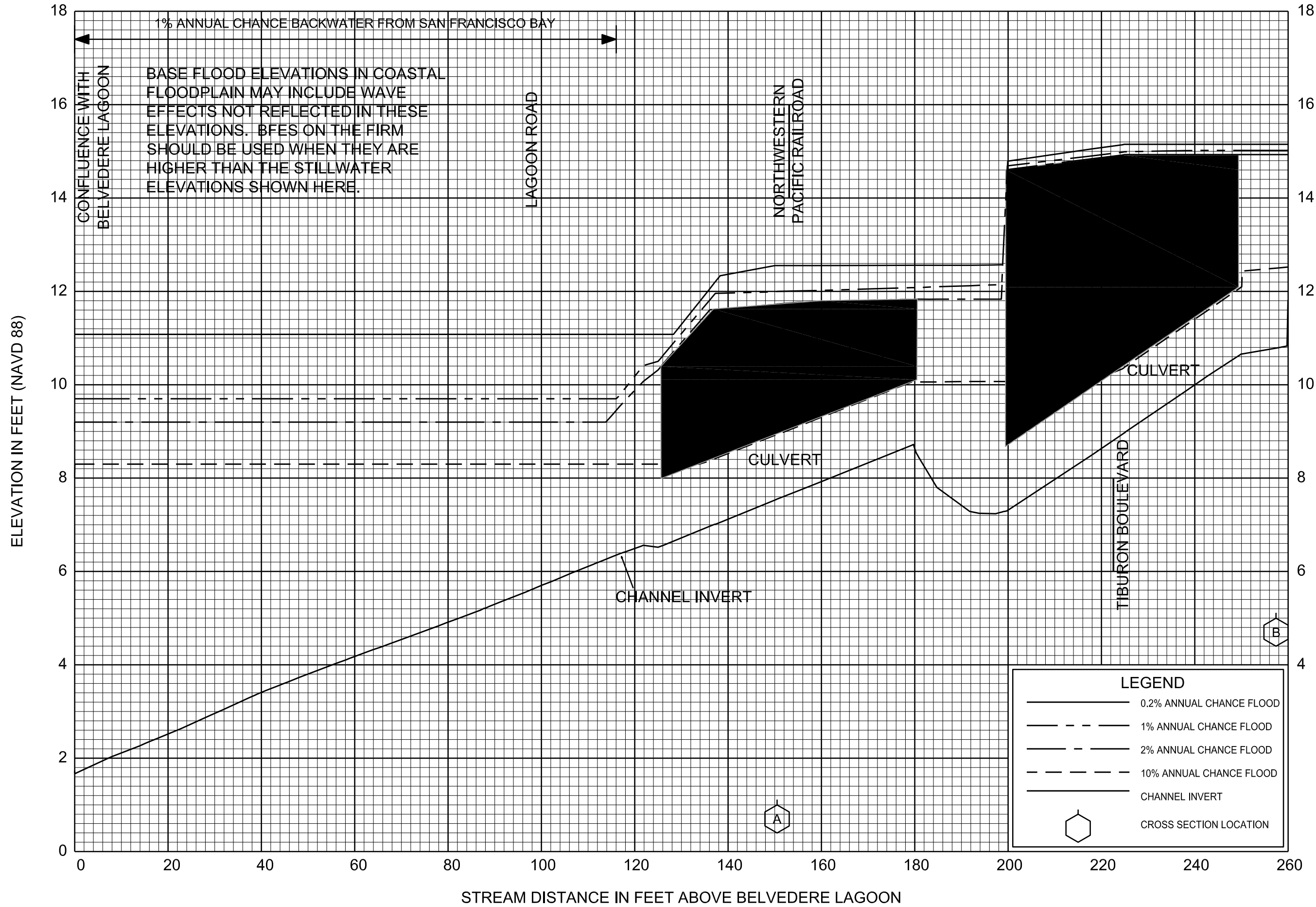


FLOOD PROFILES

REED DRAINAGE NO. 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
AND INCORPORATED AREAS

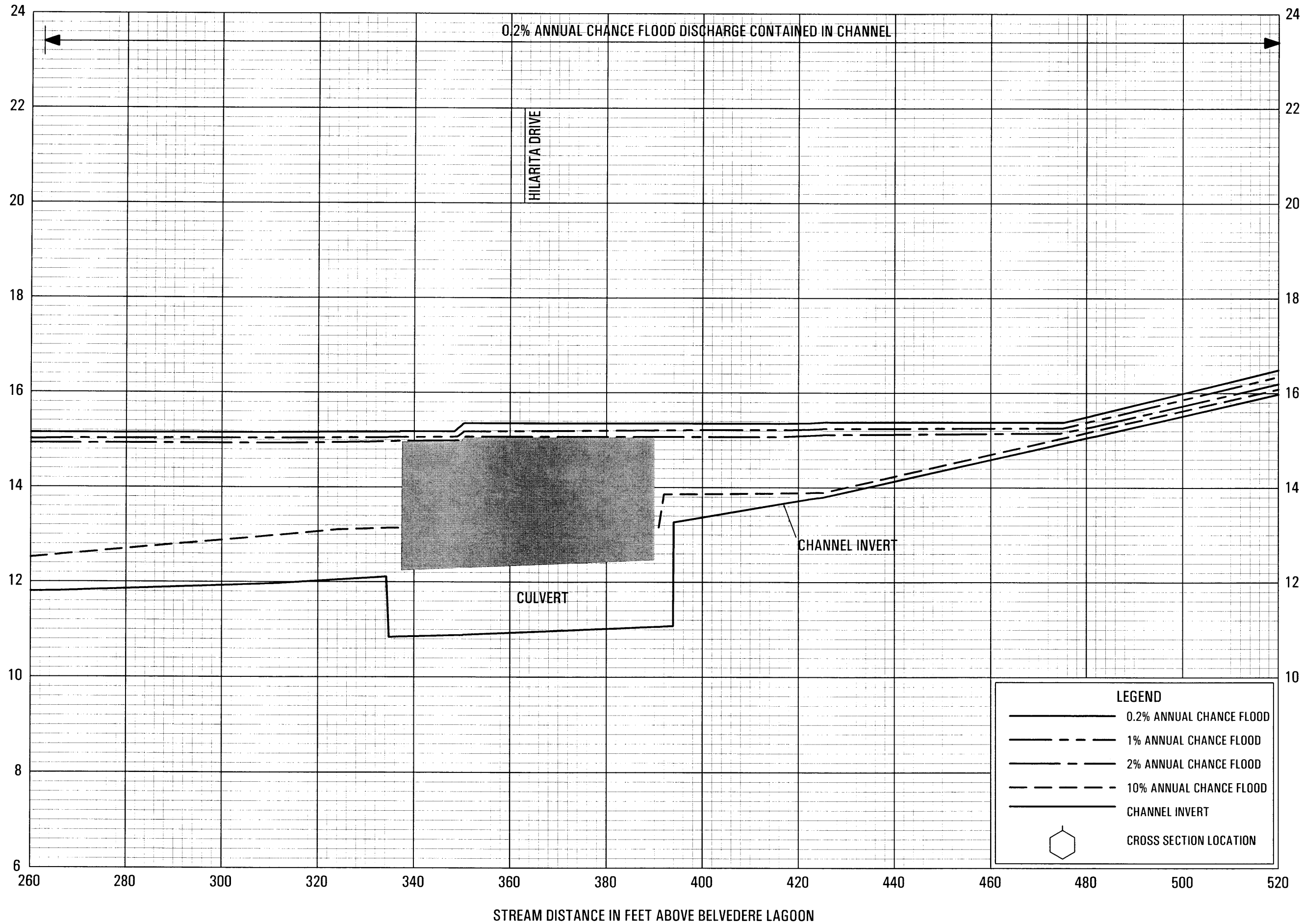
65P



FLOOD PROFILES
 REED DRAINAGE NO. 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
 MARIN COUNTY, CA
 AND INCORPORATED AREAS

ELEVATION IN FEET (NAVD 88)

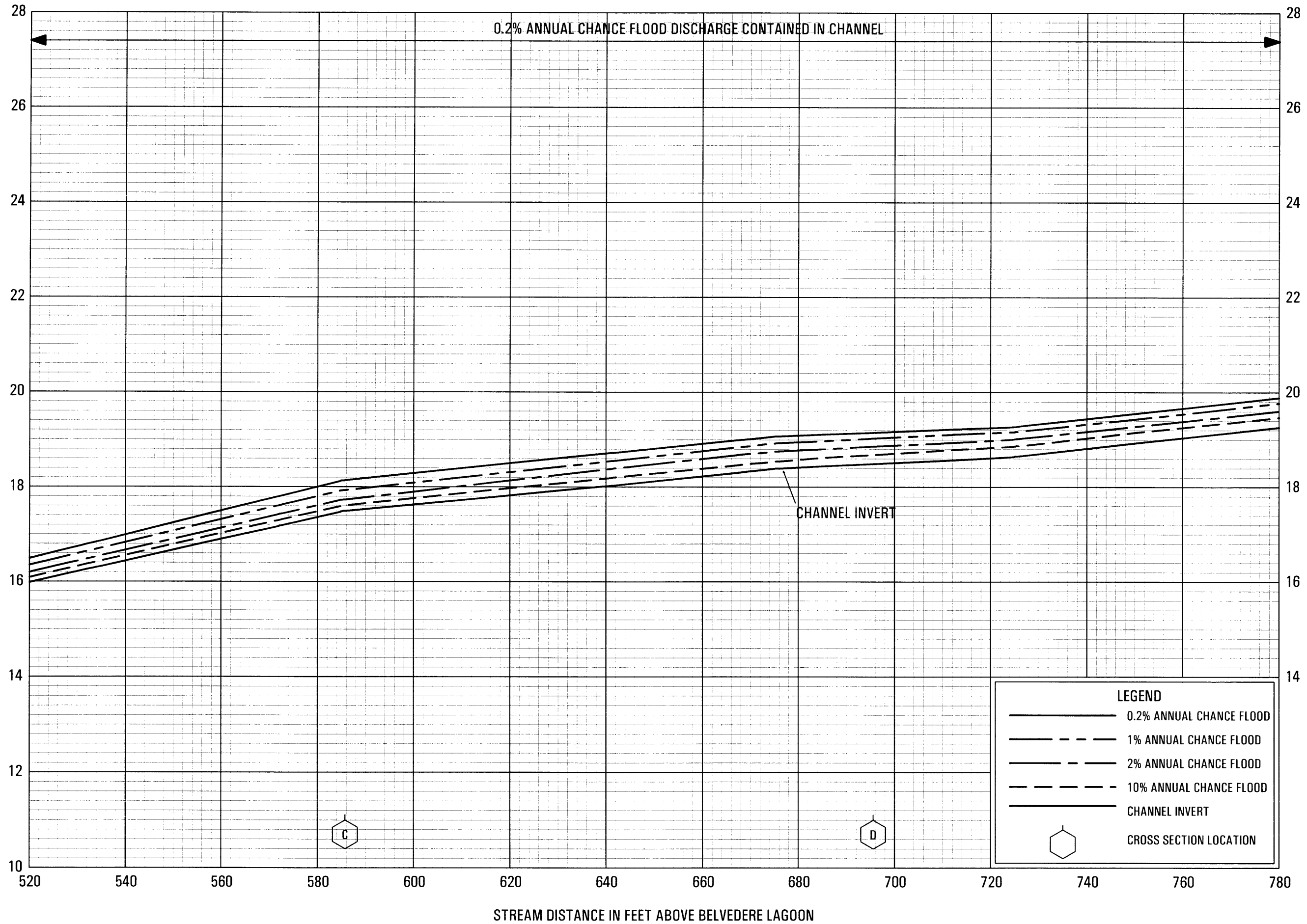


FLOOD PROFILES
REED DRAINAGE NO. 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
AND INCORPORATED AREAS

67P

ELEVATION IN FEET (NAVD 88)



LEGEND

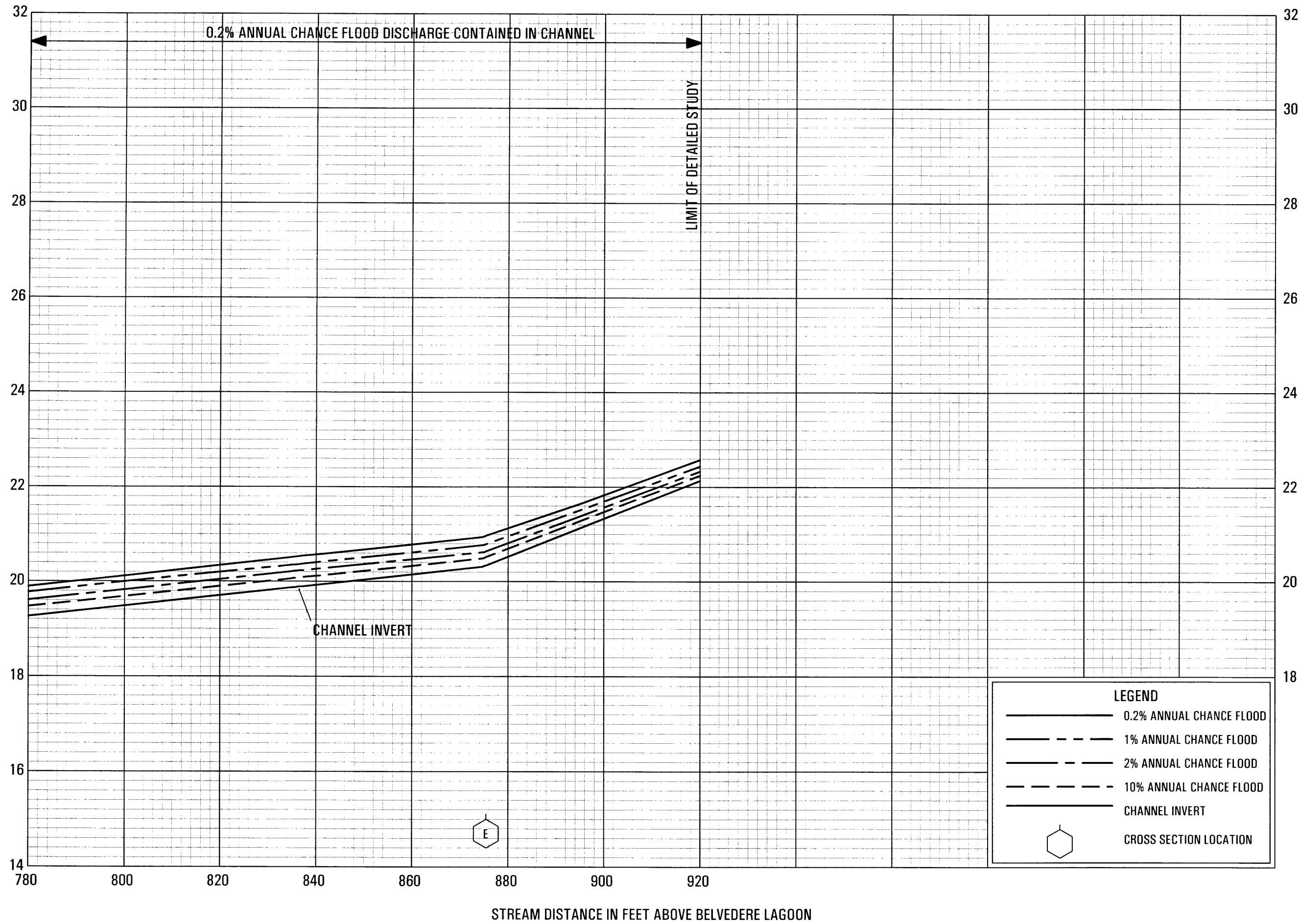
- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- CHANNEL INVERT
- CROSS SECTION LOCATION

FLOOD PROFILES

REED DRAINAGE NO. 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
AND INCORPORATED AREAS

ELEVATION IN FEET (NAVD 88)

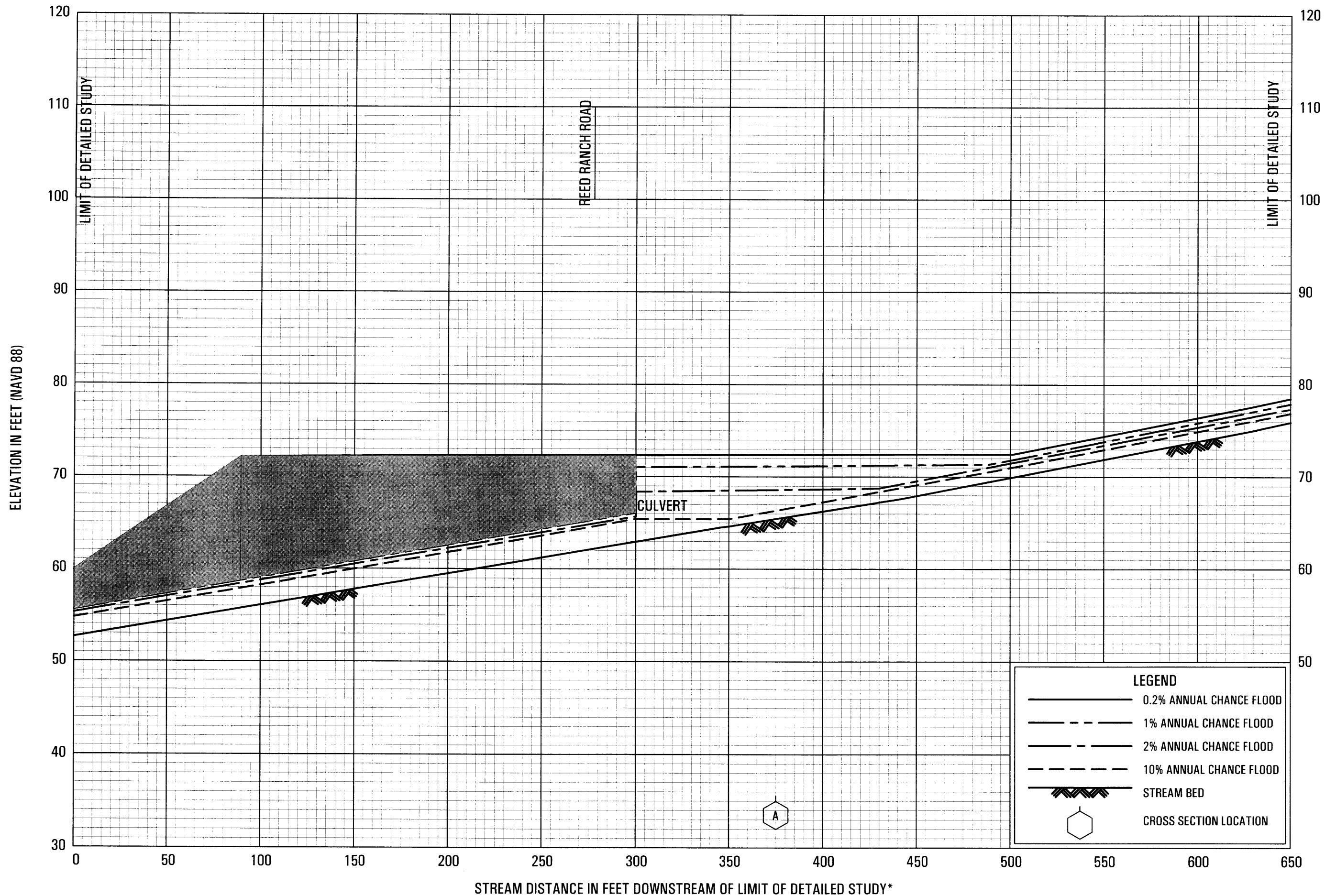


LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- CHANNEL INVERT
- CROSS SECTION LOCATION

FLOOD PROFILES
REED DRAINAGE NO. 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
AND INCORPORATED AREAS



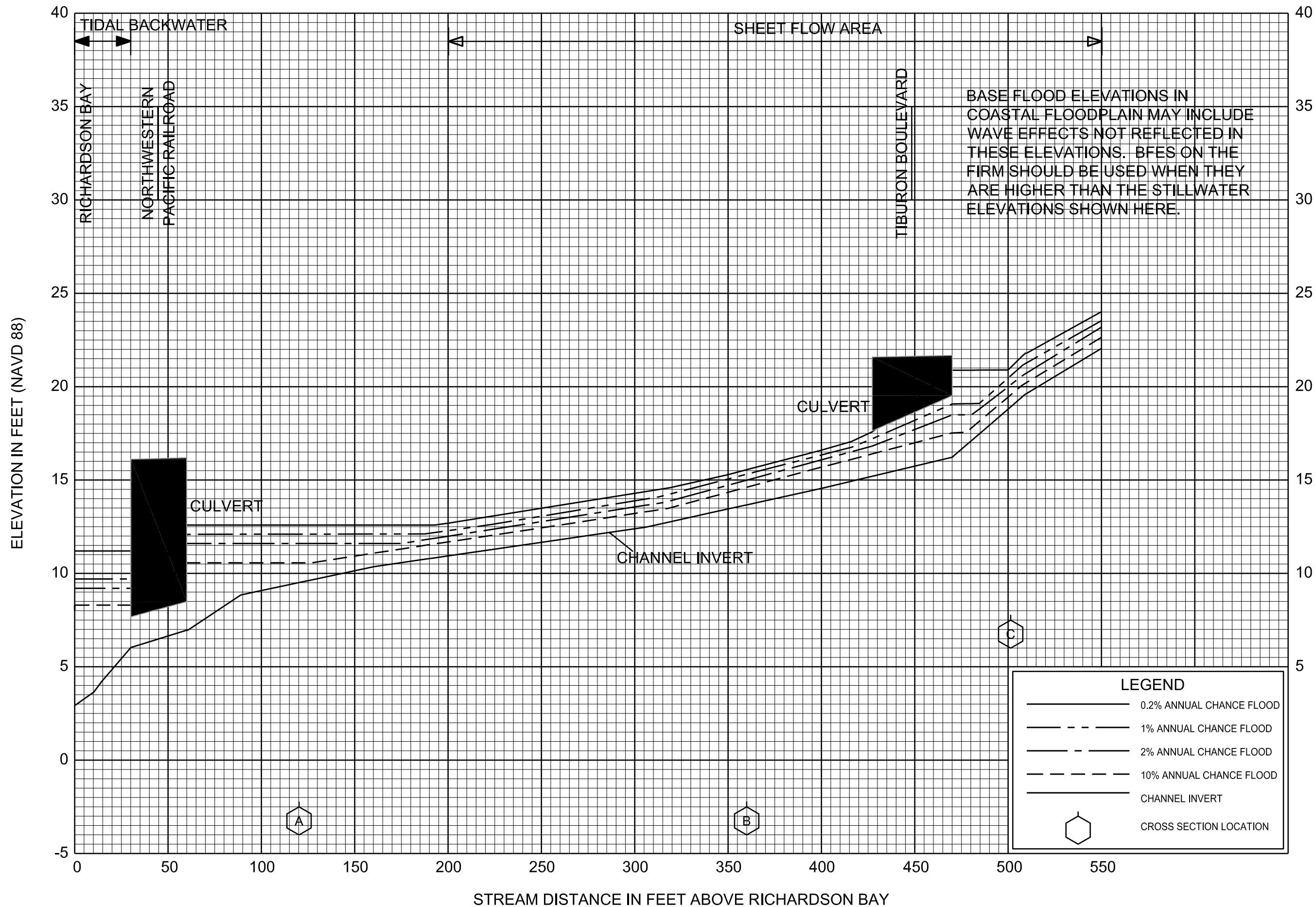
LEGEND

	0.2% ANNUAL CHANCE FLOOD
	1% ANNUAL CHANCE FLOOD
	2% ANNUAL CHANCE FLOOD
	10% ANNUAL CHANCE FLOOD
	STREAM BED
	CROSS SECTION LOCATION

FLOOD PROFILES
REED RANCH DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
AND INCORPORATED AREAS

*LIMIT OF DETAILED STUDY IS APPROXIMATELY 278 FEET DOWNSTREAM OF REED RANCH ROAD

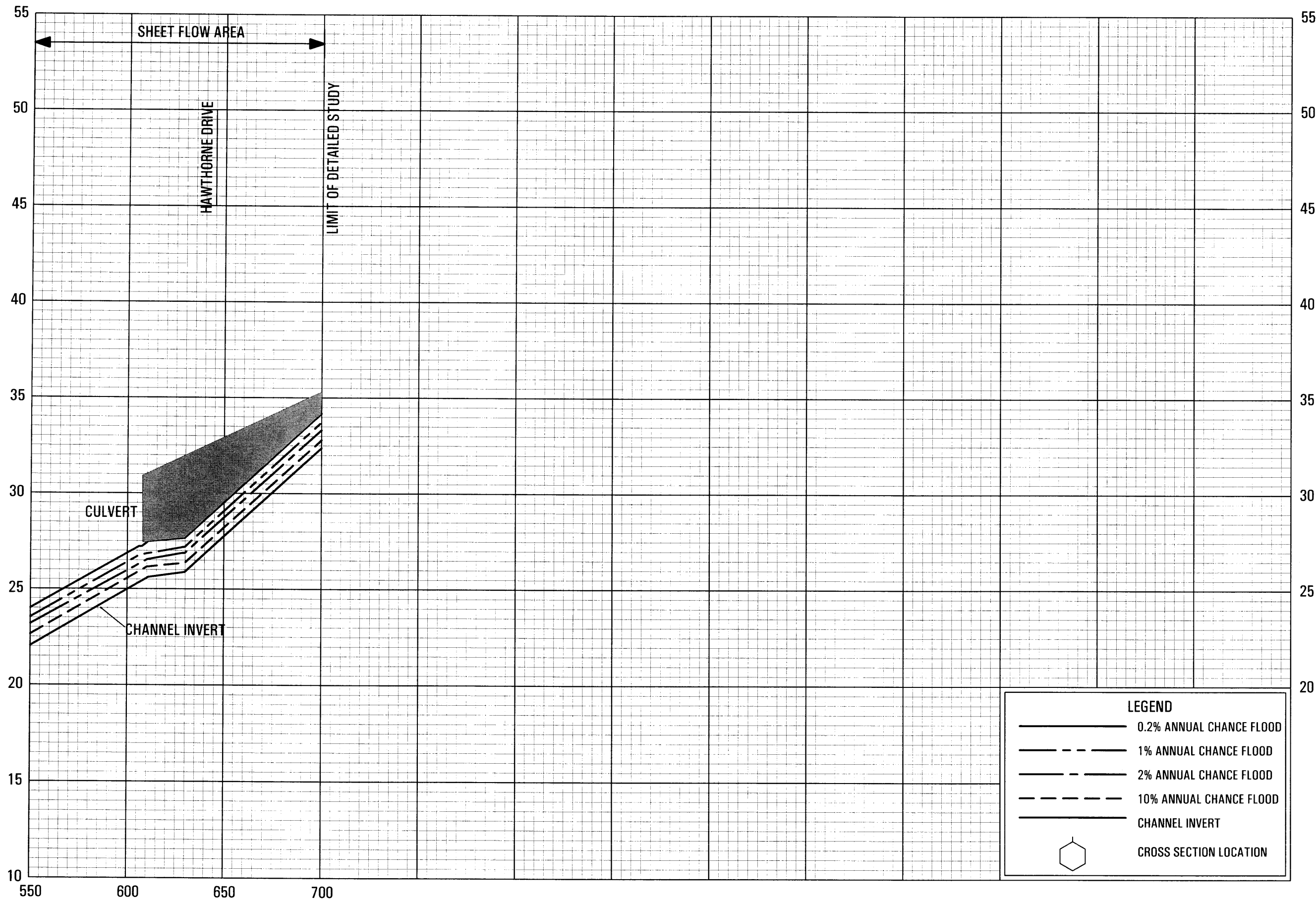


FLOOD PROFILES

ROCK HILL DRAINAGE NO. 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
 AND INCORPORATED AREAS

ELEVATION IN FEET (NAVD 88)



55
50
45
40
35
30
25
20
15
10

55
50
45
40
35
30
25
20
15
10

550 600 650 700

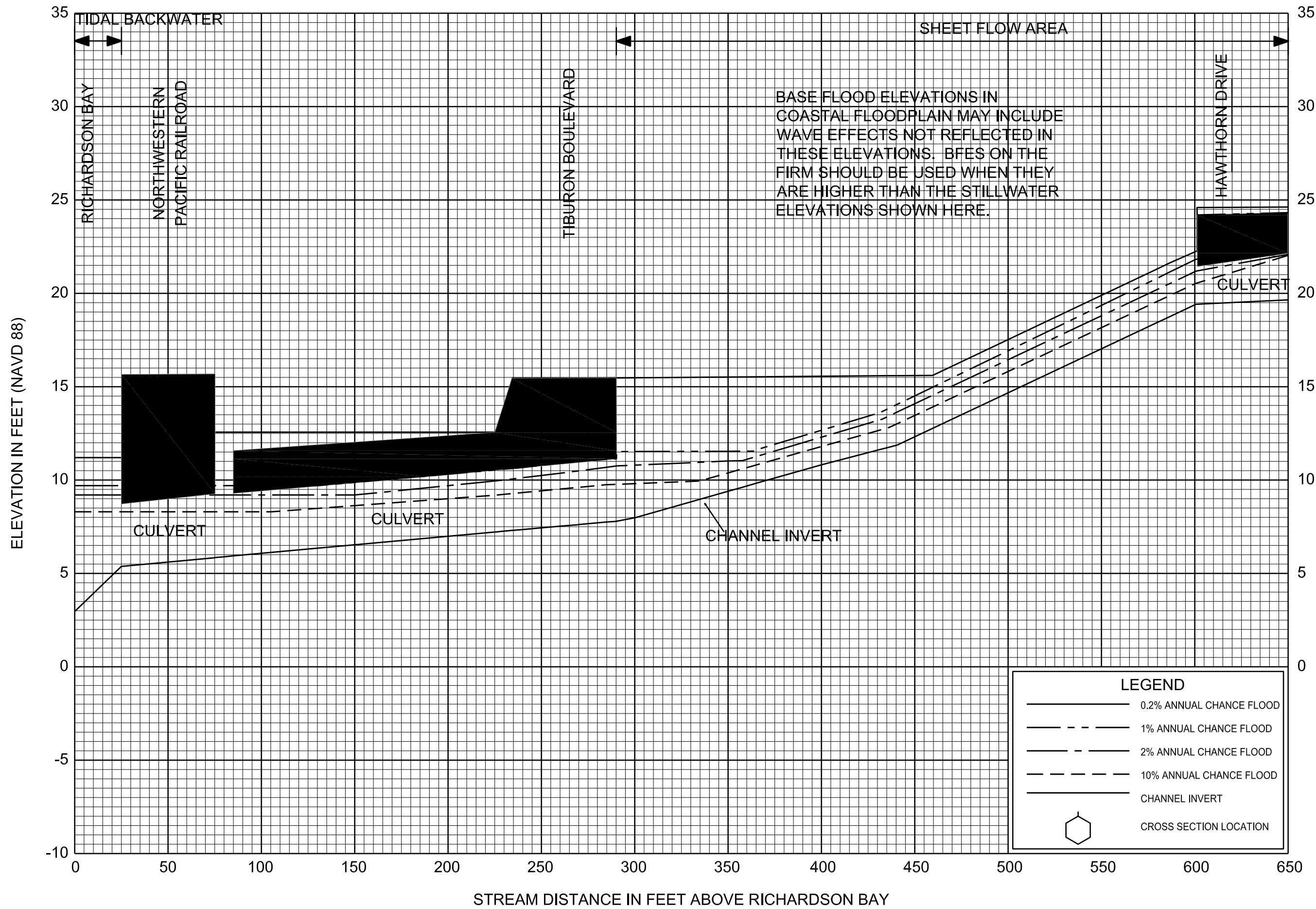
STREAM DISTANCE IN FEET ABOVE RICHARDSON BAY

FLOOD PROFILES

ROCK HILL DRAINAGE NO. 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

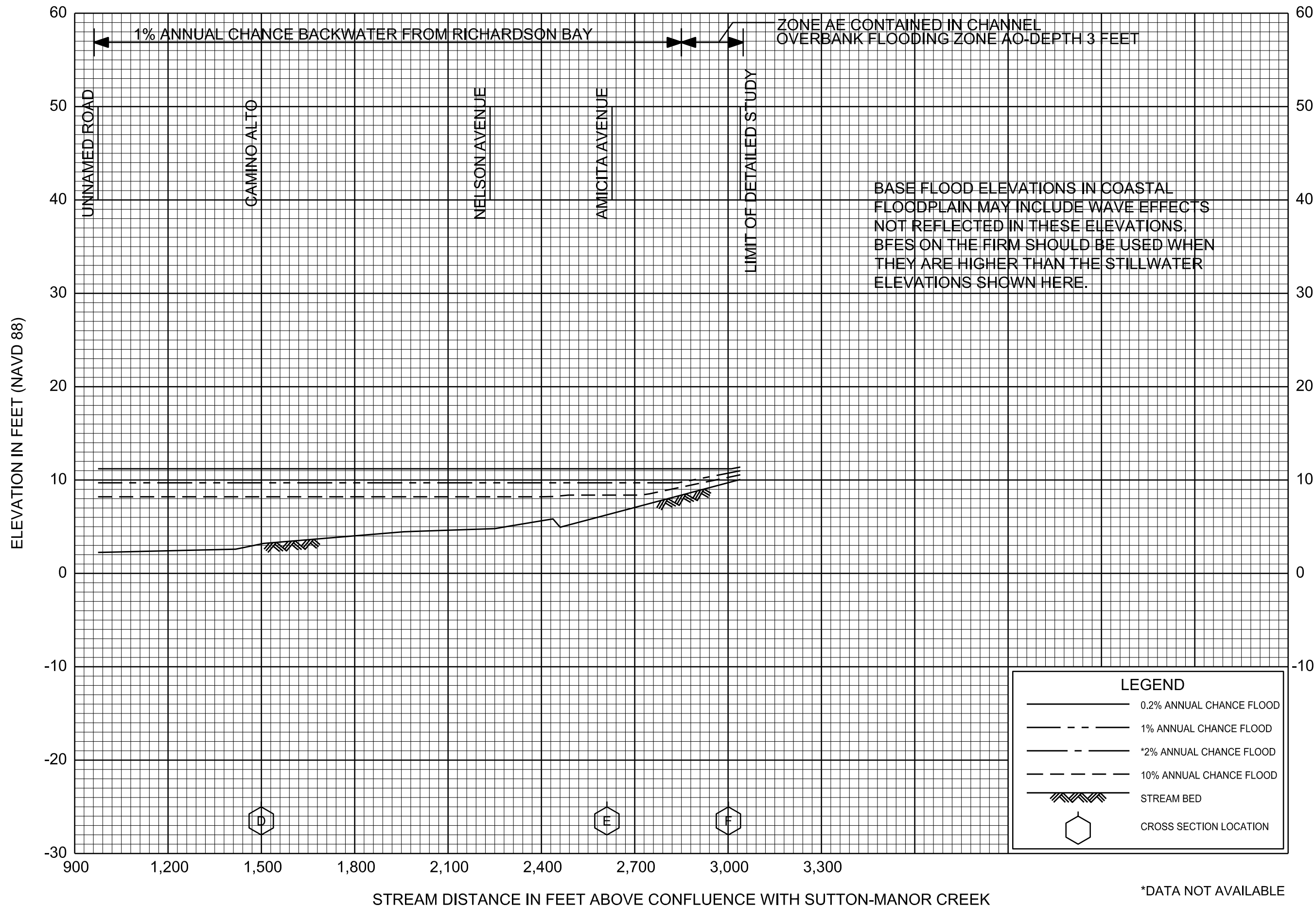


FLOOD PROFILES

ROCK HILL DRAINAGE NO. 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

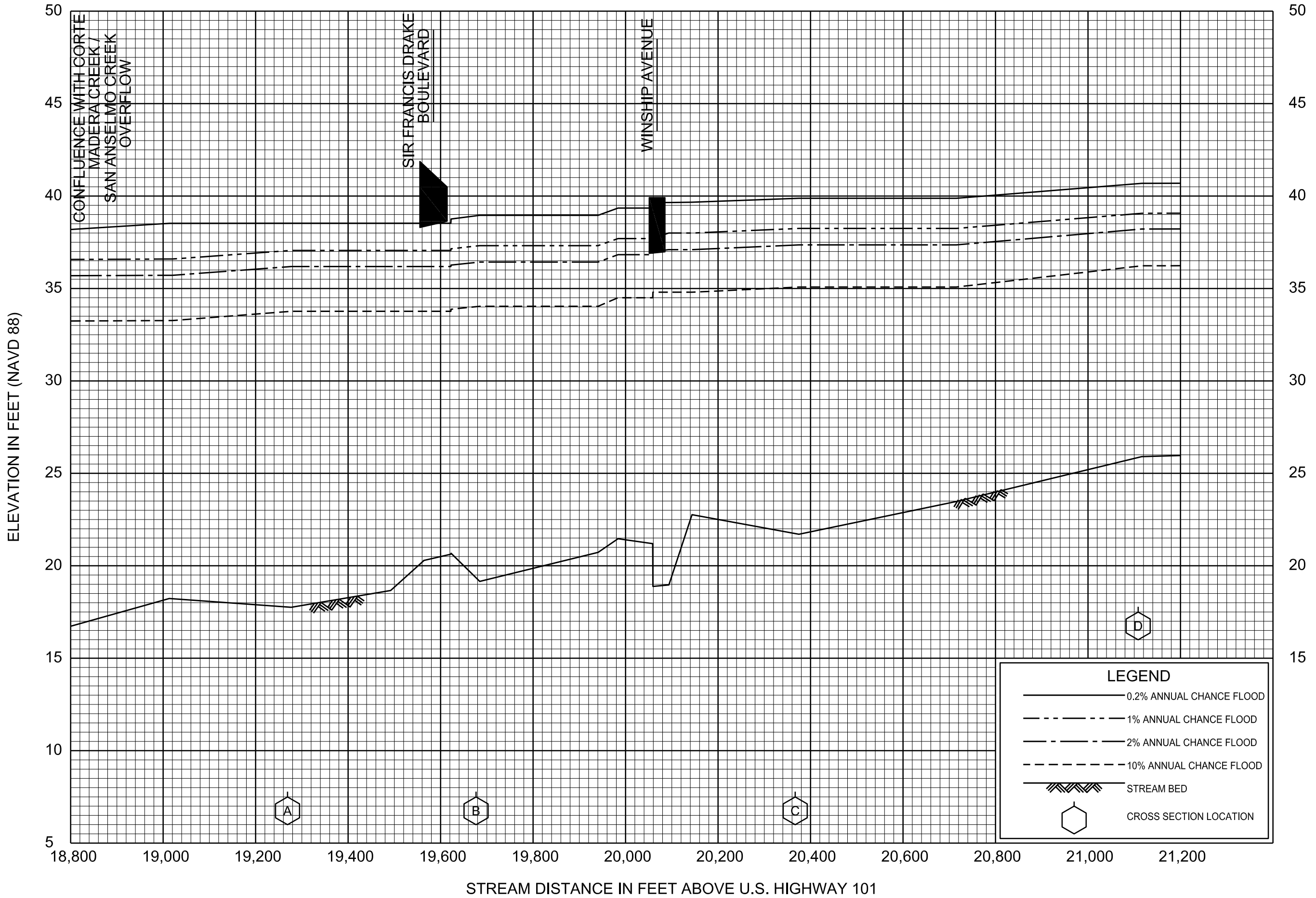
MARIN COUNTY, CA
AND INCORPORATED AREAS



FLOOD PROFILES

RYAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
 AND INCORPORATED AREAS

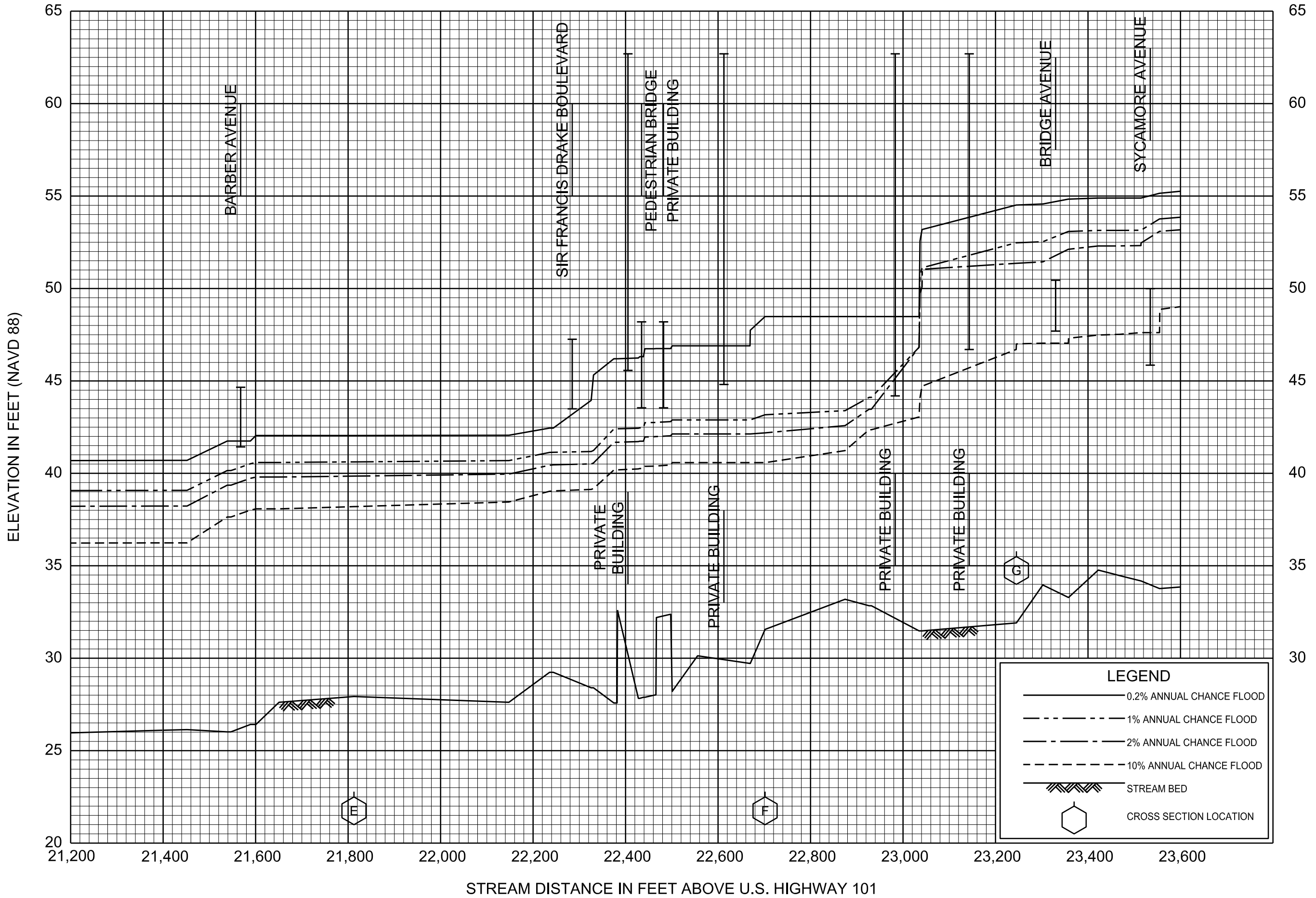


FLOOD PROFILES

SAN ANSELMO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

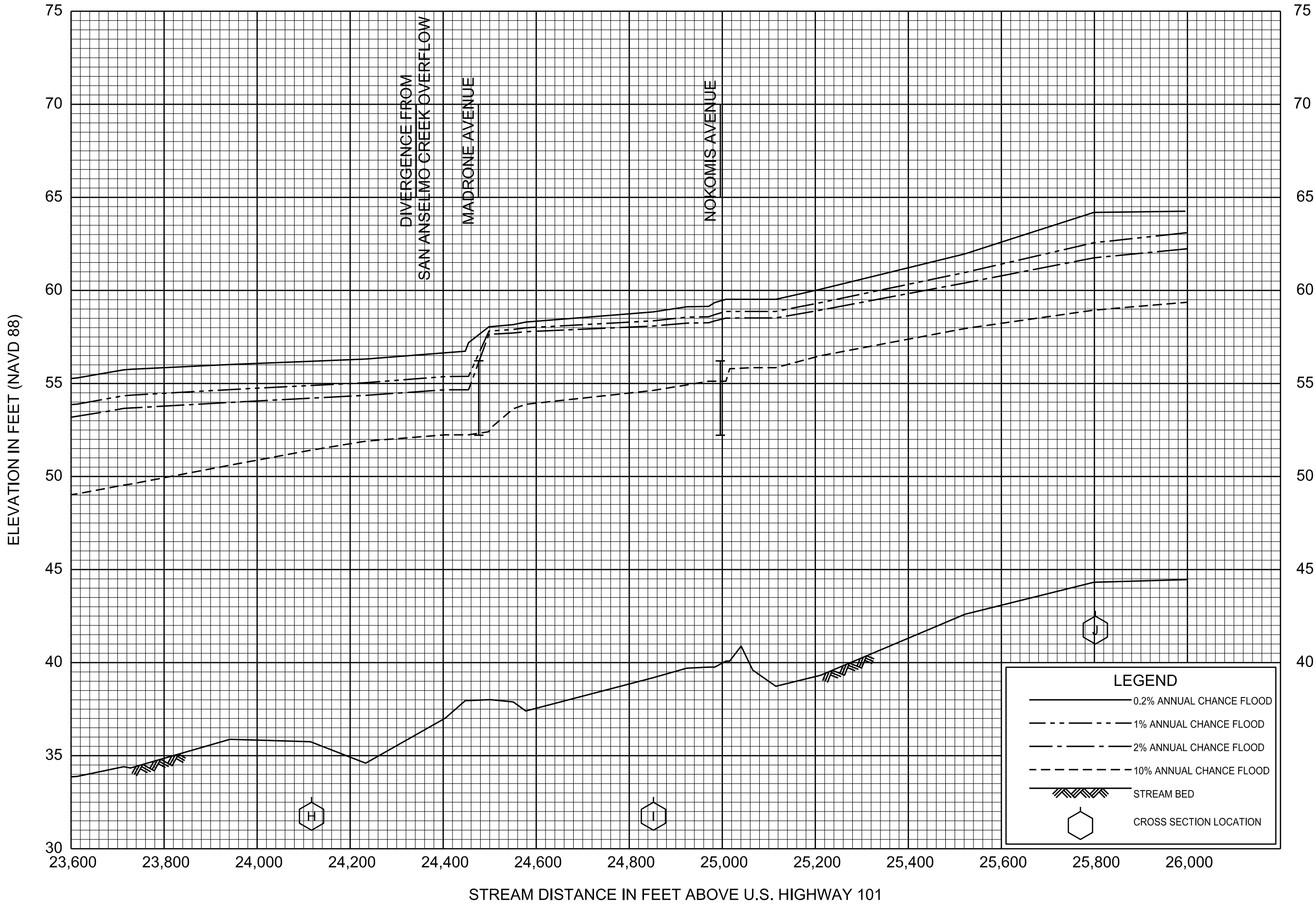


FLOOD PROFILES

SAN ANSELMO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

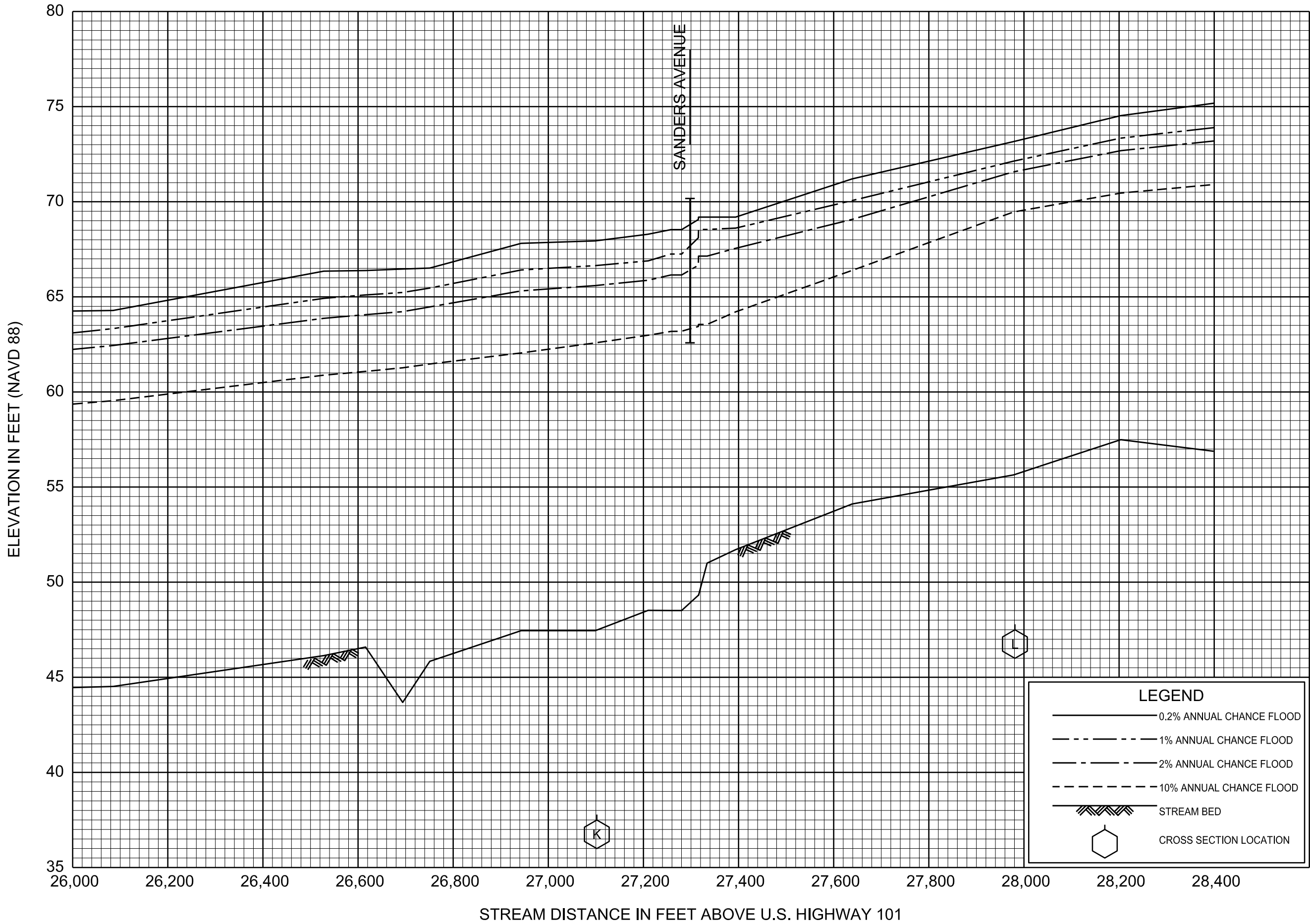


FLOOD PROFILES

SAN ANSELMO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

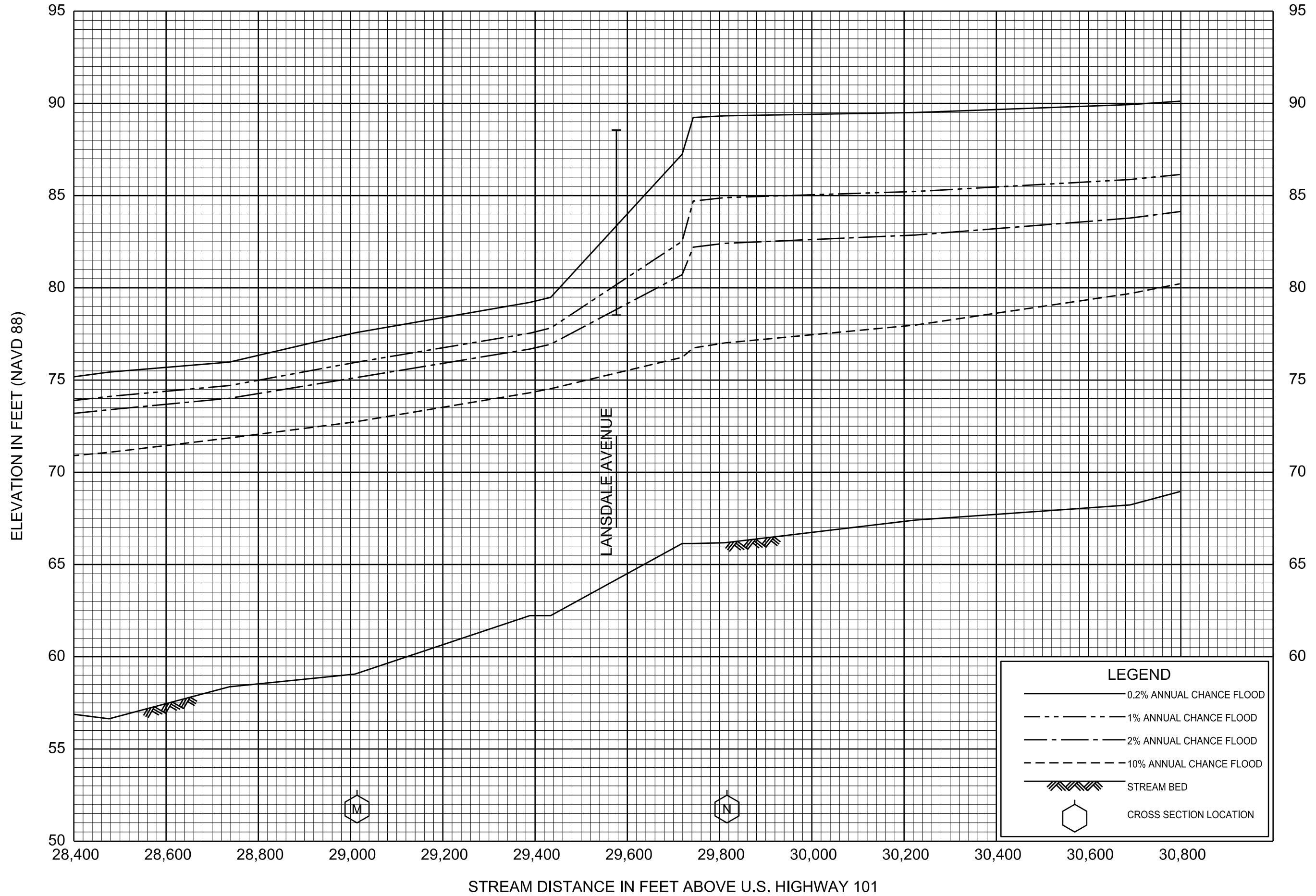


FLOOD PROFILES

SAN ANSELMO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

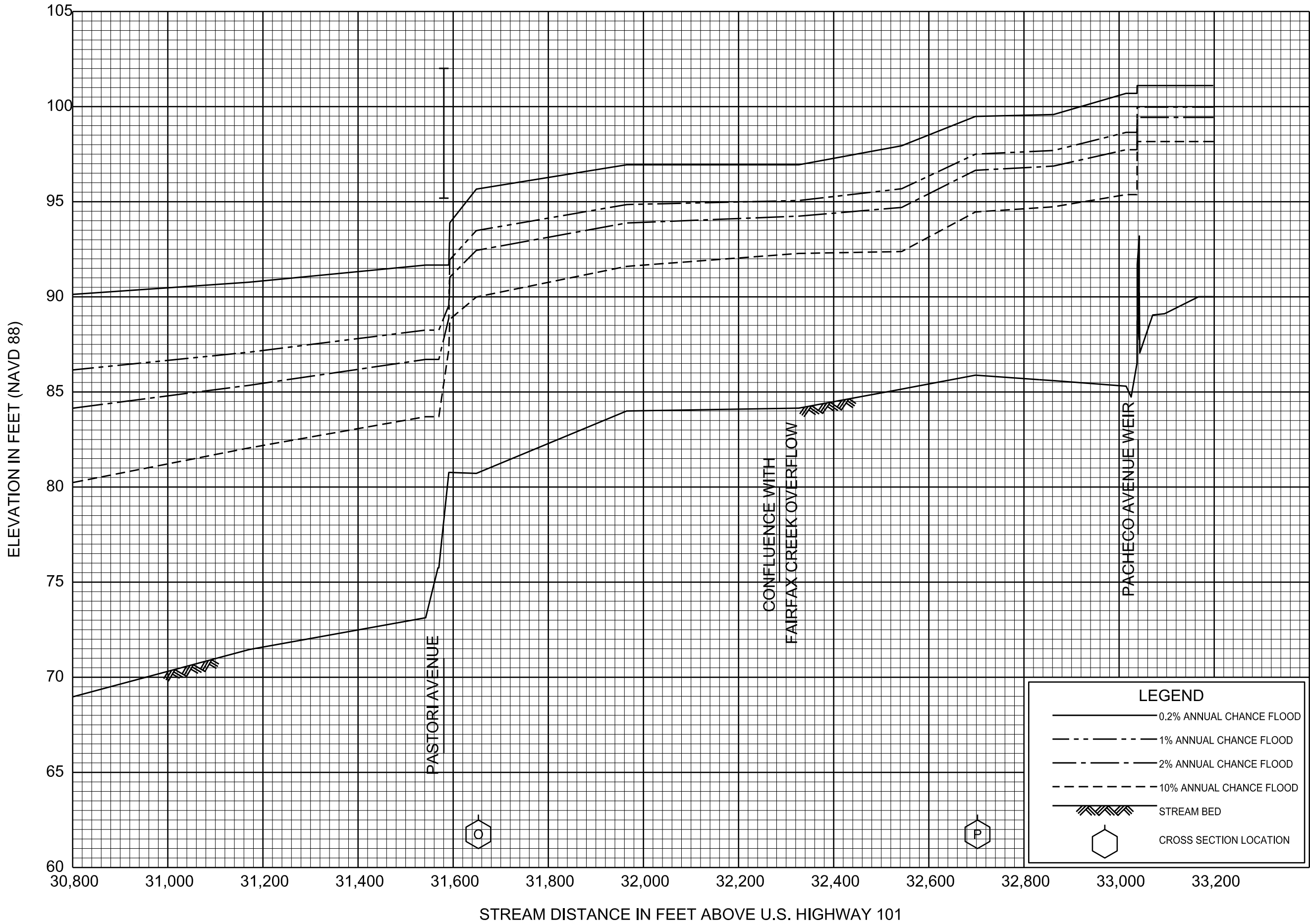


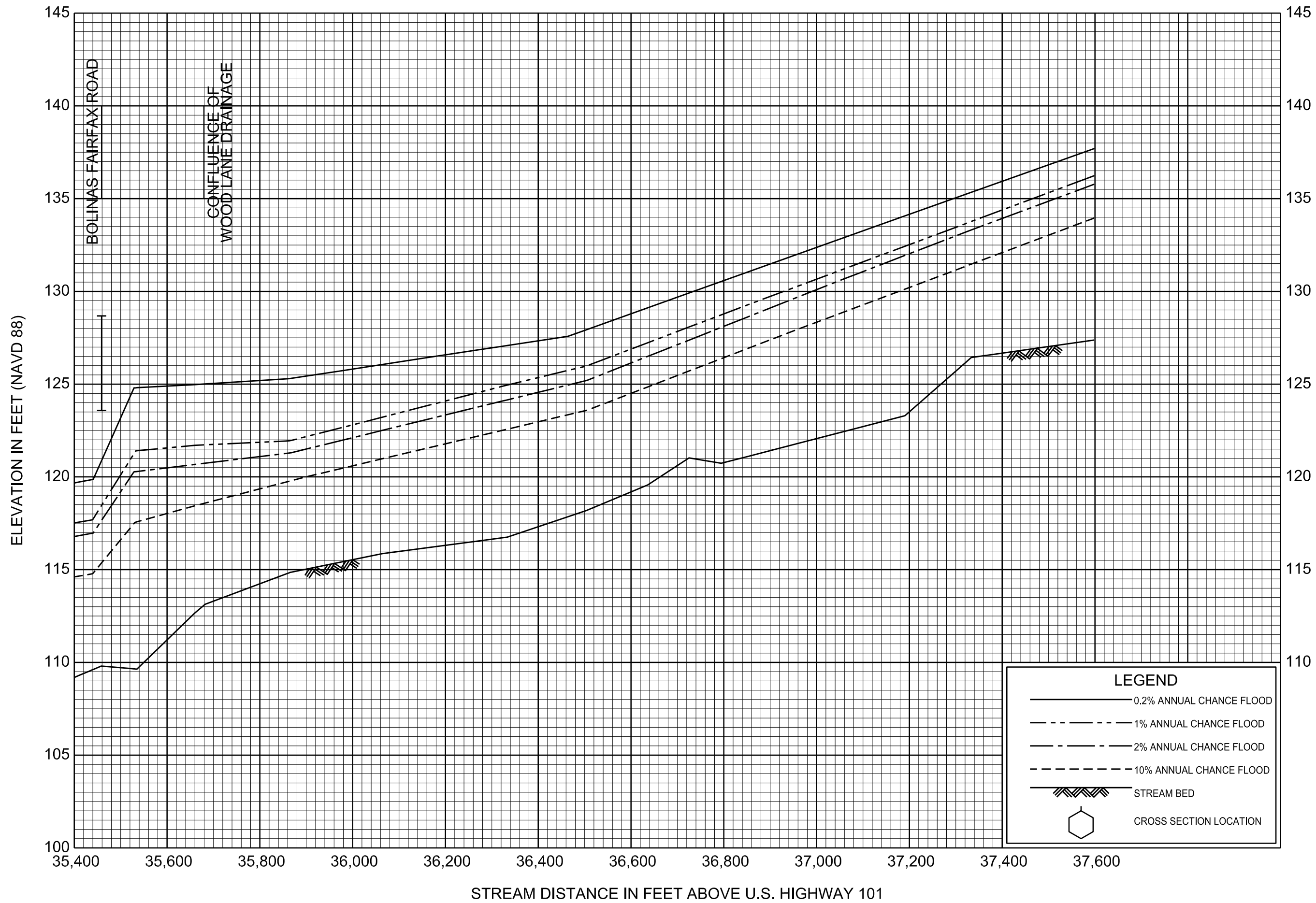
FLOOD PROFILES

SAN ANSELMO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS



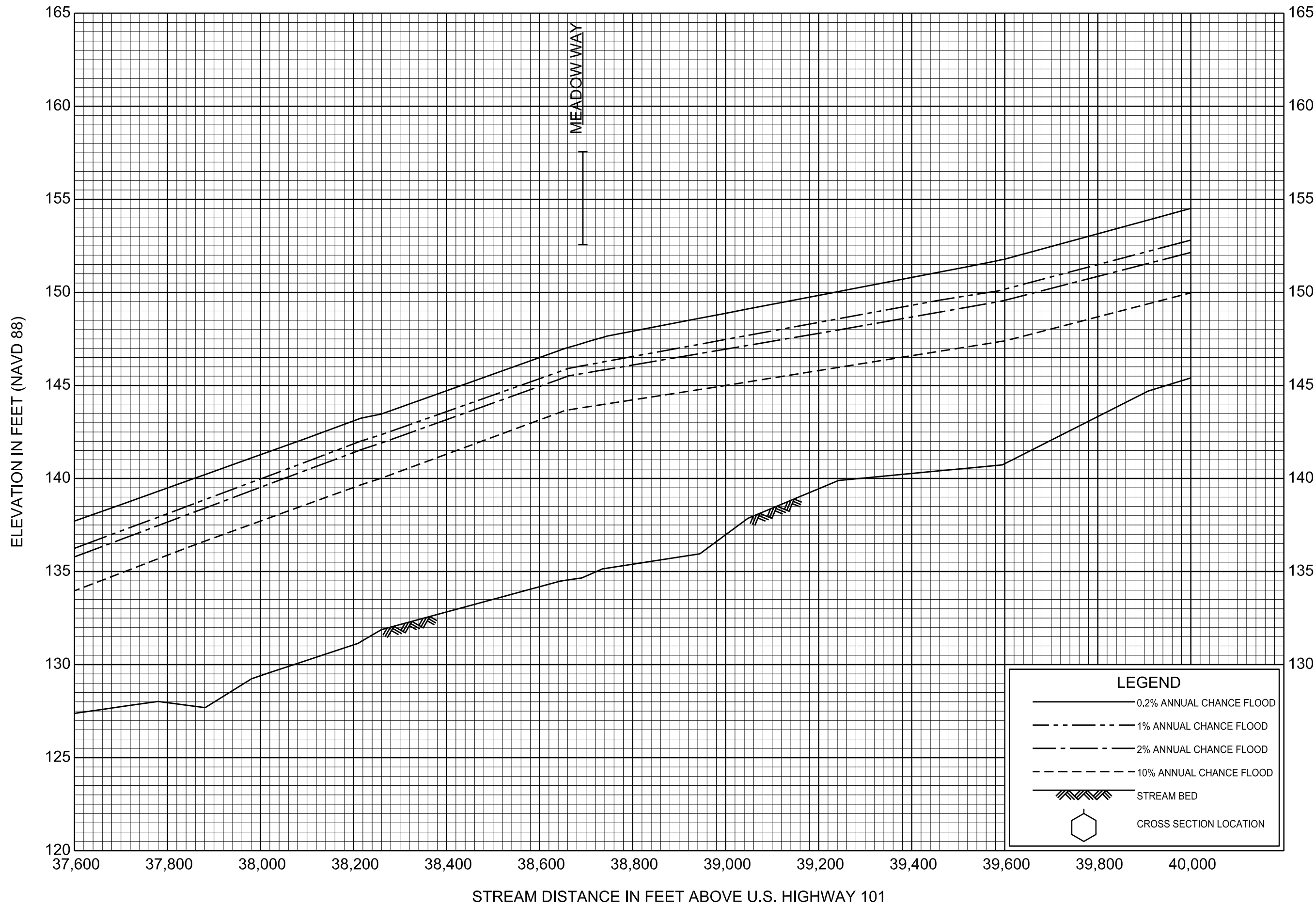


FLOOD PROFILES

SAN ANSELMO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS



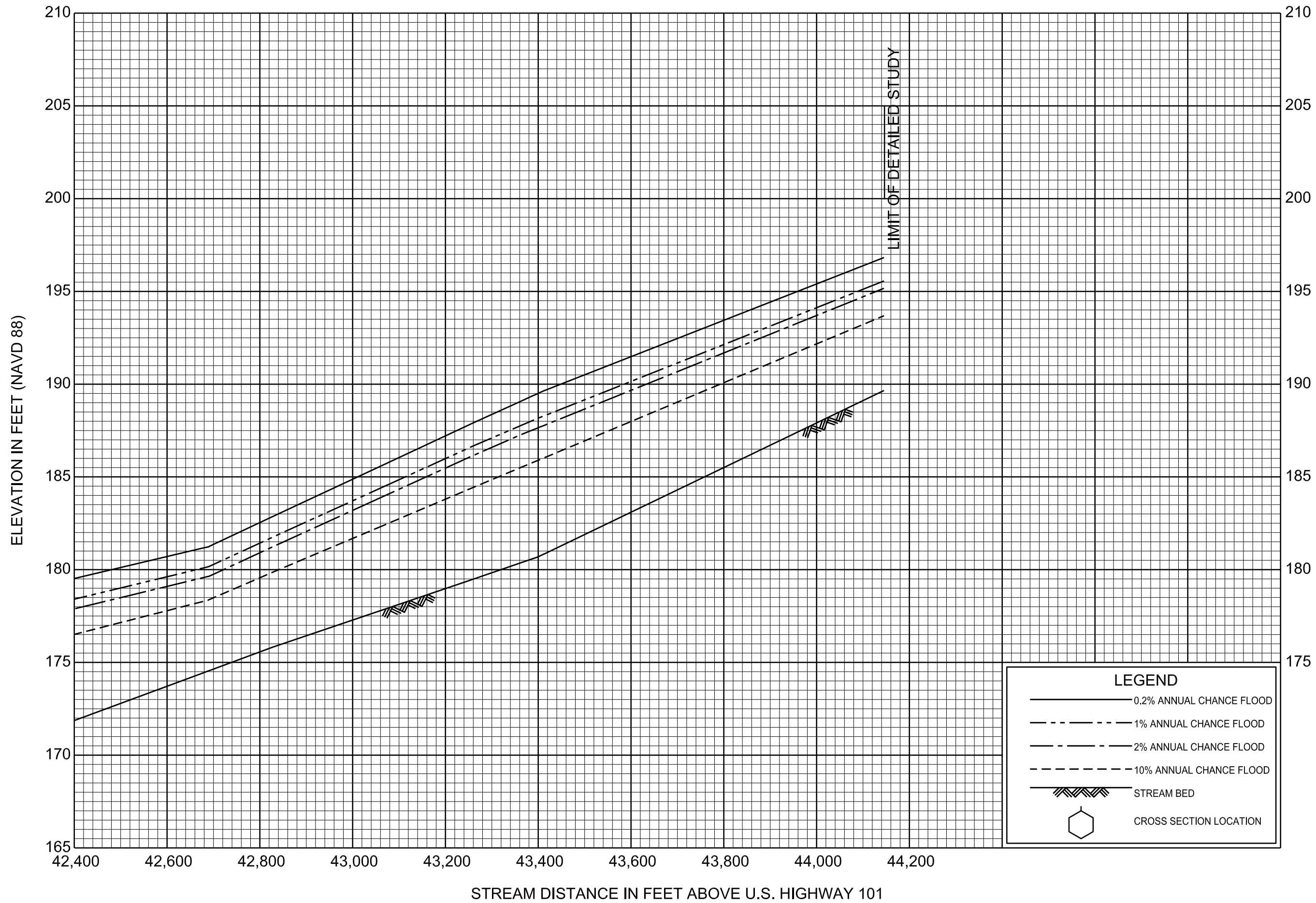
FLOOD PROFILES

SAN ANSELMO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

81P(b)

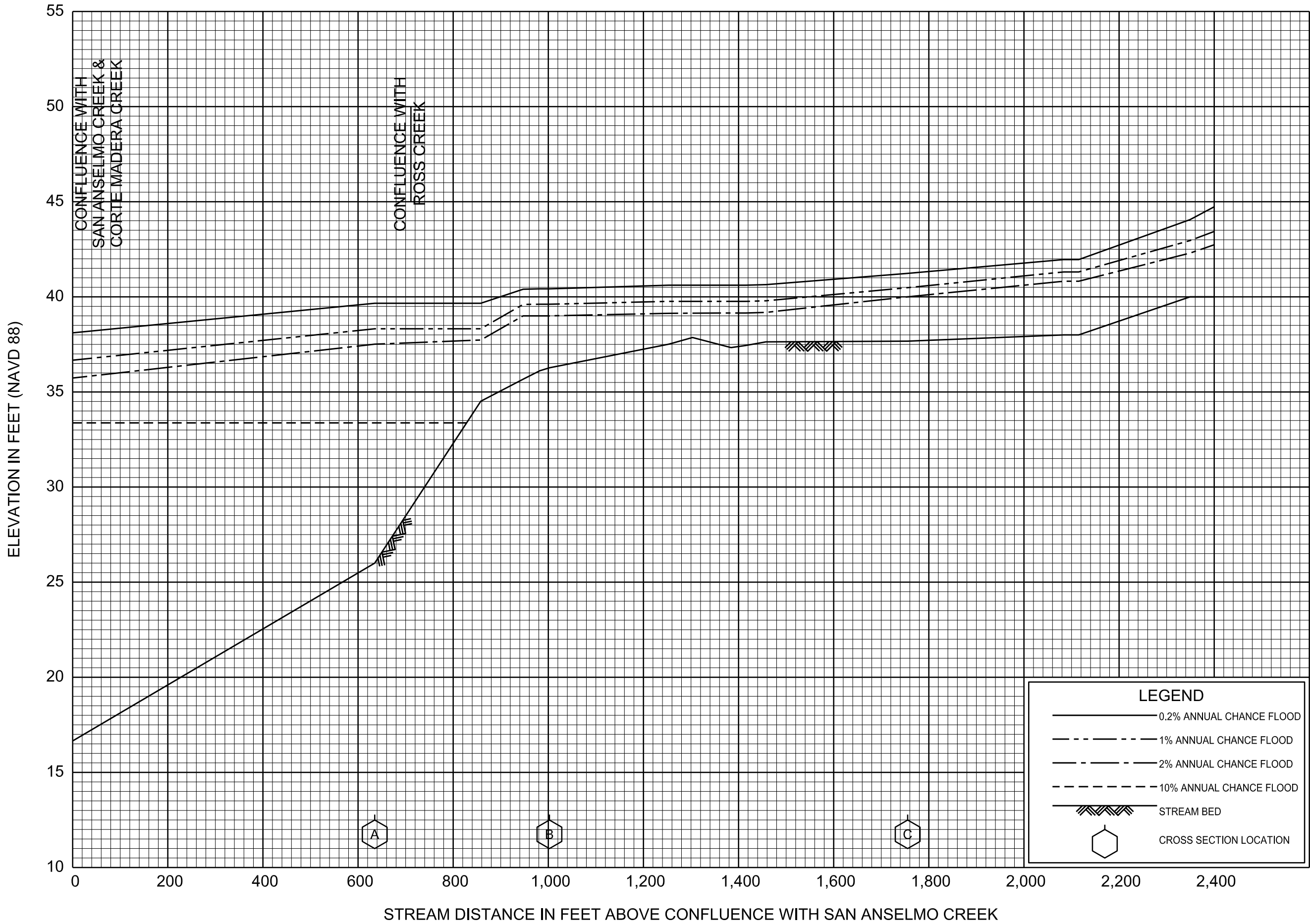


FLOOD PROFILES

SAN ANSELMO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

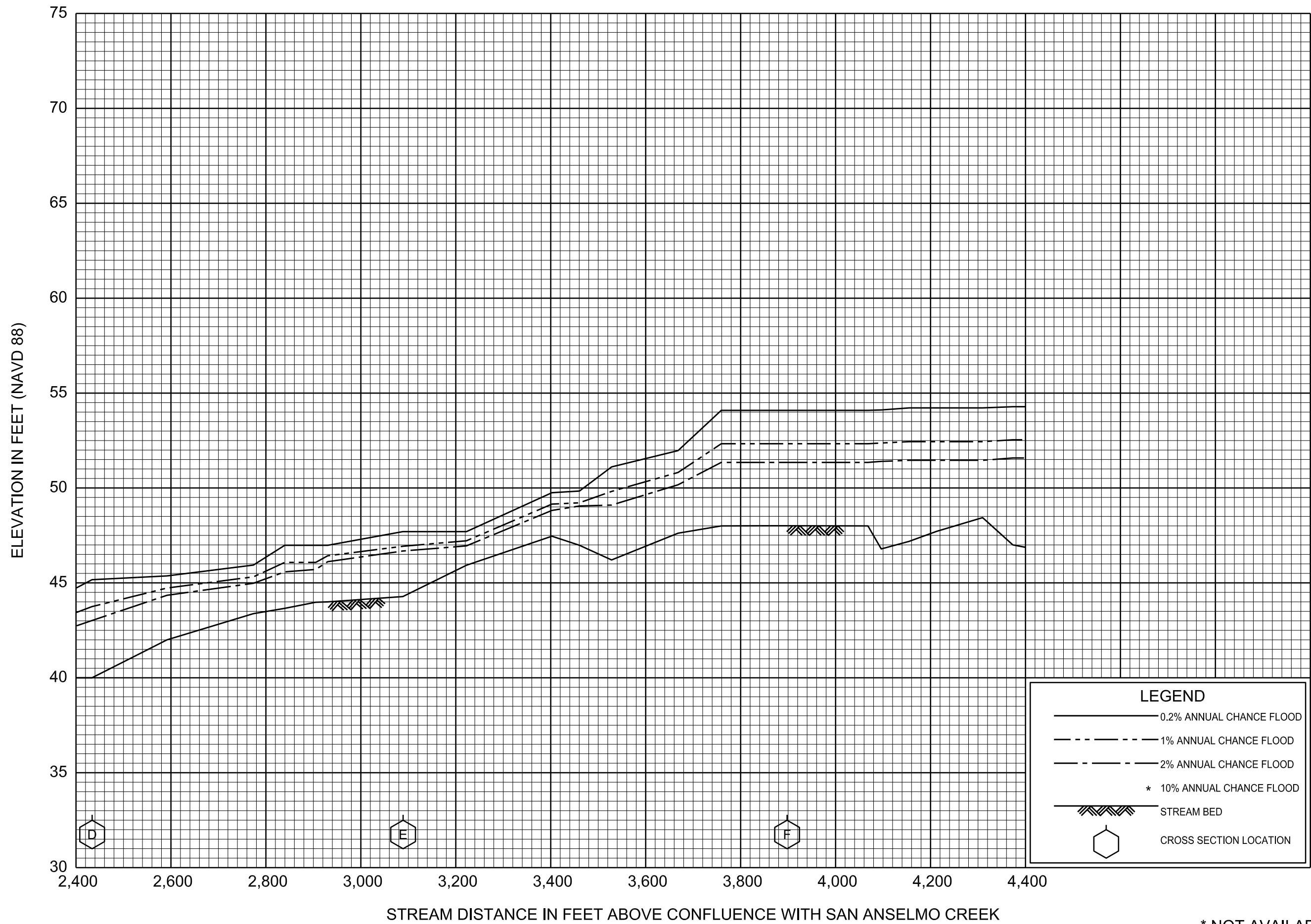


FLOOD PROFILES

SAN ANSELMO CREEK OVERFLOW

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

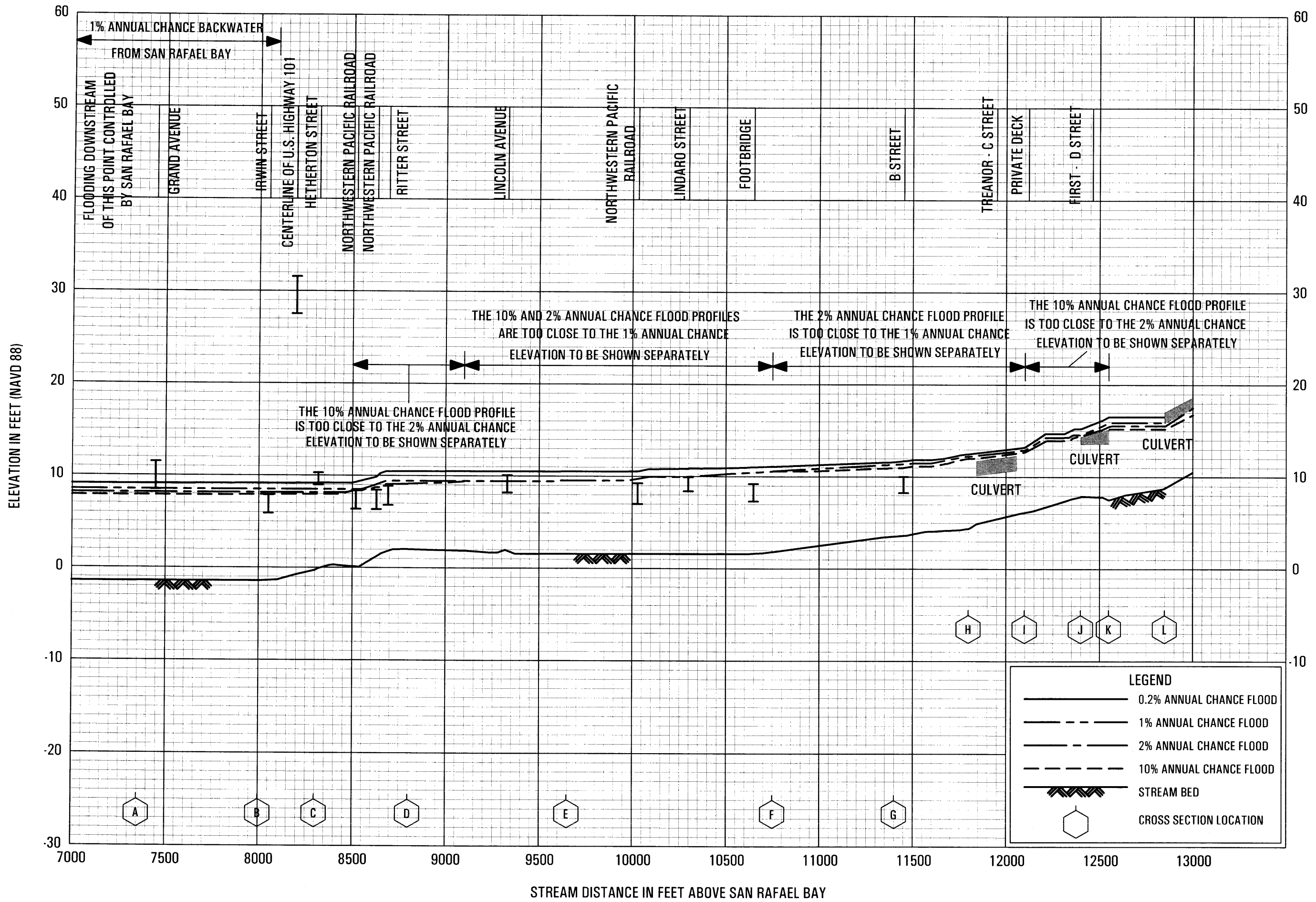


* NOT AVAILABLE

FLOOD PROFILES
SAN ANSELMO CREEK OVERFLOW

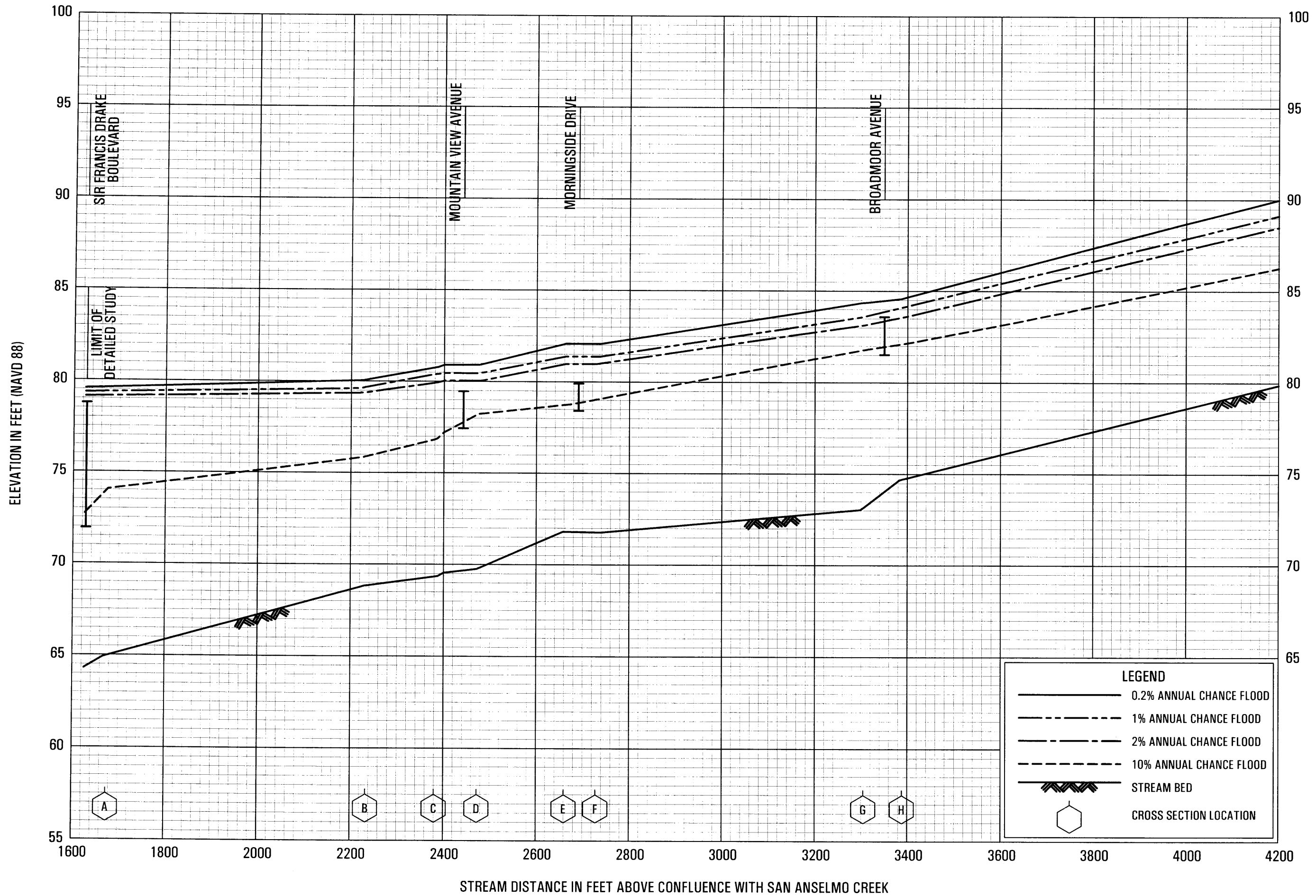
FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
 AND INCORPORATED AREAS

81P(f)



FLOOD PROFILES
SAN RAFAEL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
 AND INCORPORATED AREAS



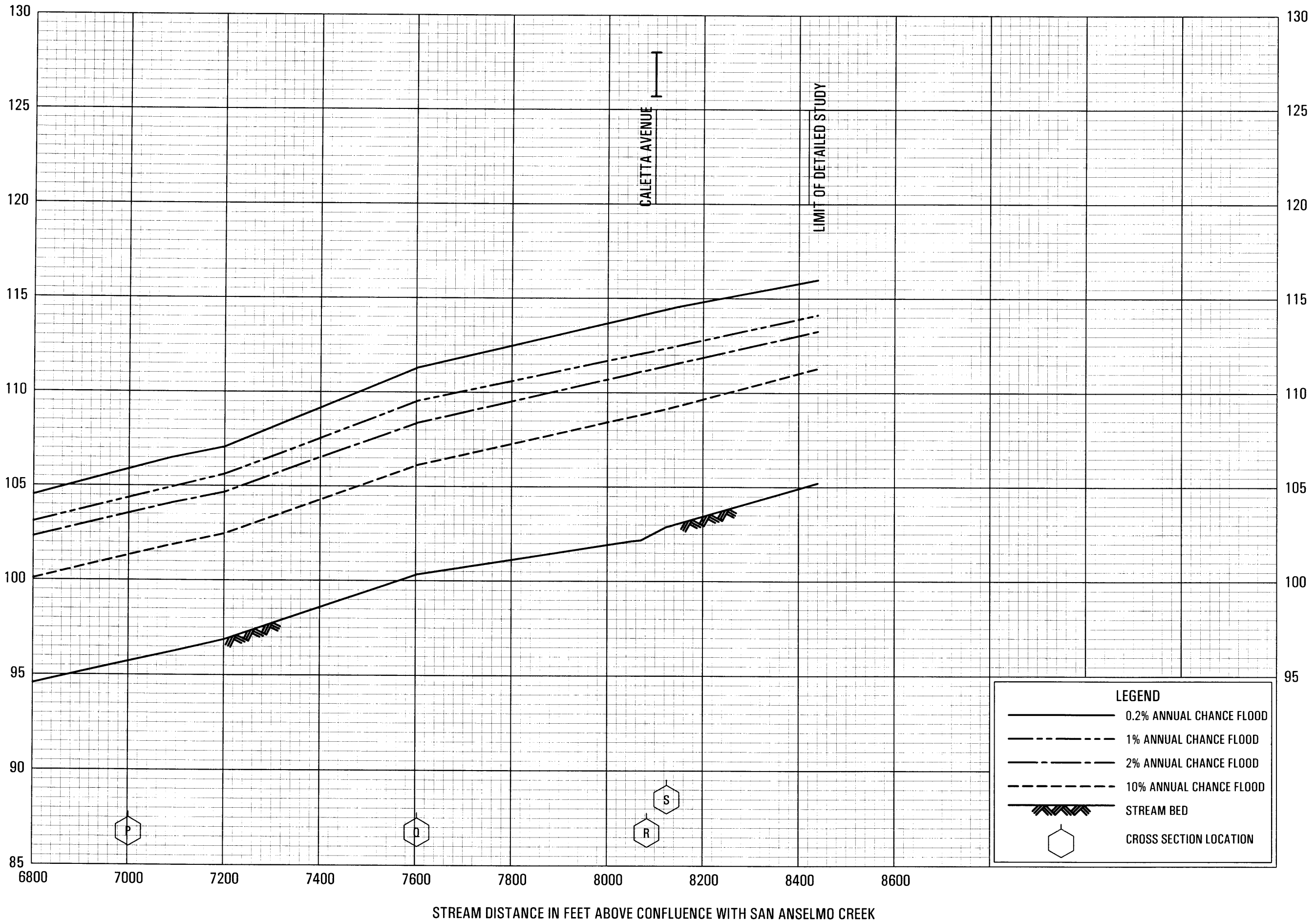
FLOOD PROFILES

SLEEPY HOLLOW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

ELEVATION IN FEET (NAVD 88)



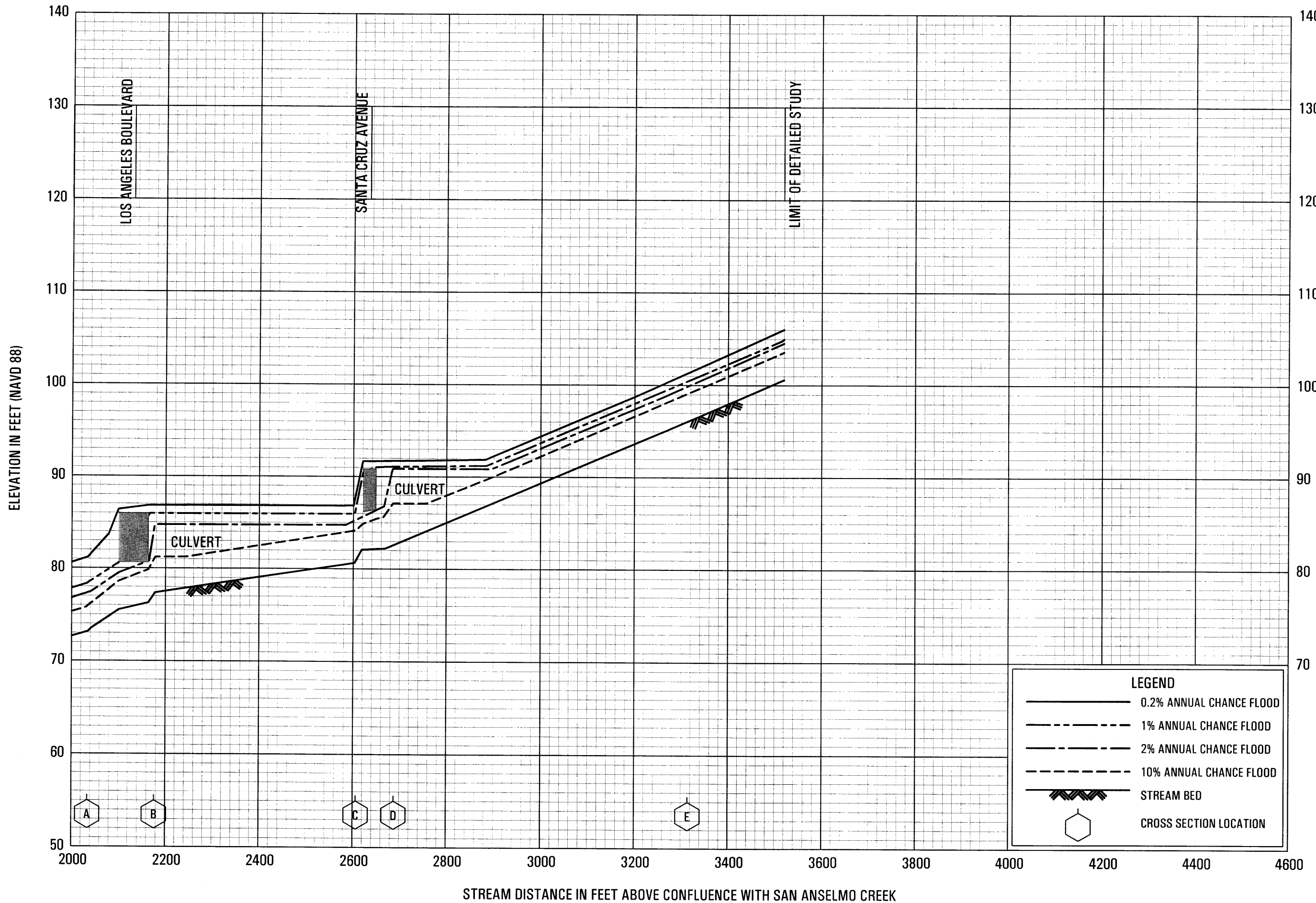
LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- - - 1% ANNUAL CHANCE FLOOD
- · - · 2% ANNUAL CHANCE FLOOD
- · - · 10% ANNUAL CHANCE FLOOD
- (with hachures) STREAM BED
- ⬡ (hexagon) CROSS SECTION LOCATION

FLOOD PROFILES
SLEEPY HOLLOW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
AND INCORPORATED AREAS

86P



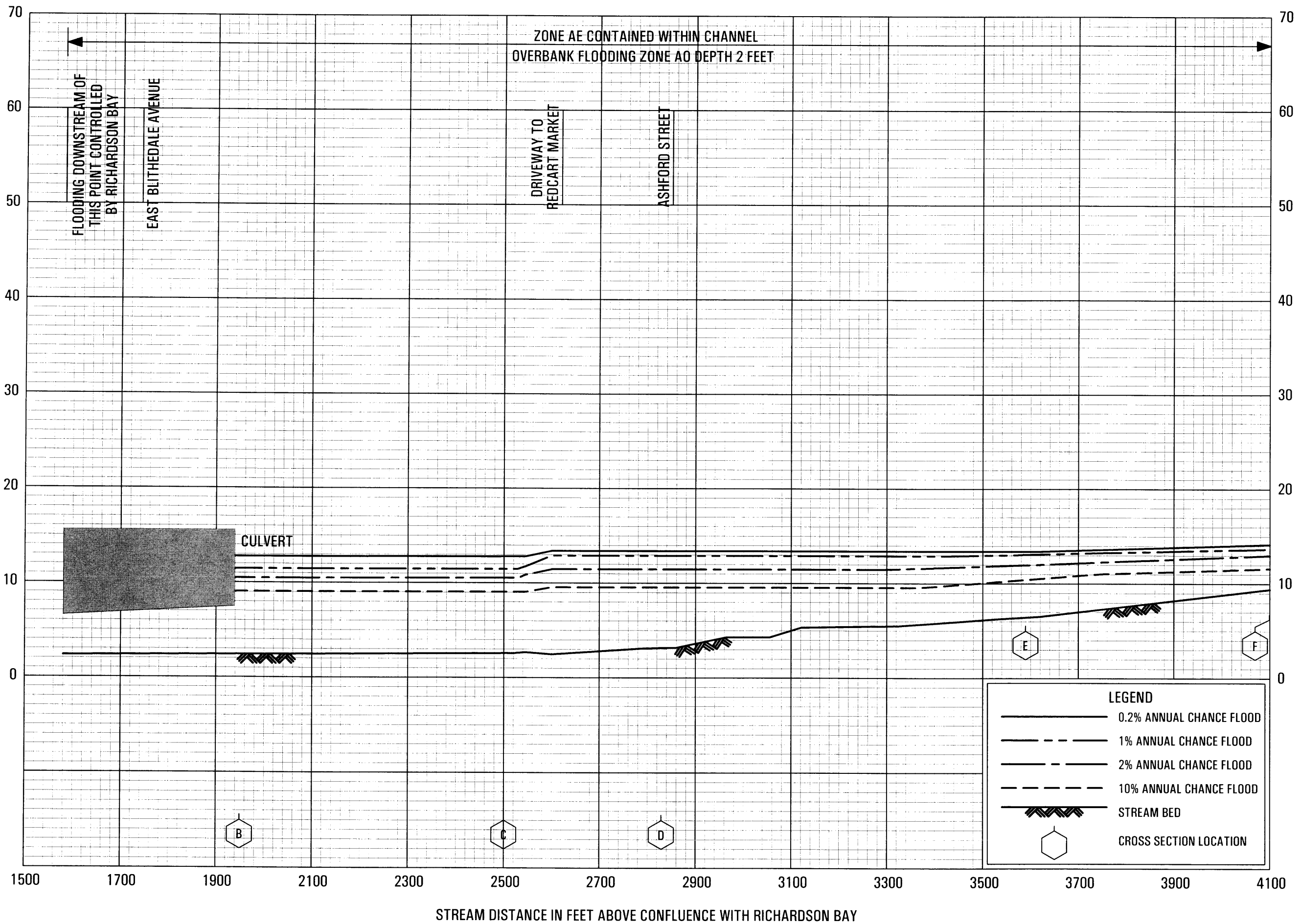
FLOOD PROFILES

SORICH DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

ELEVATION IN FEET (NAVD 88)

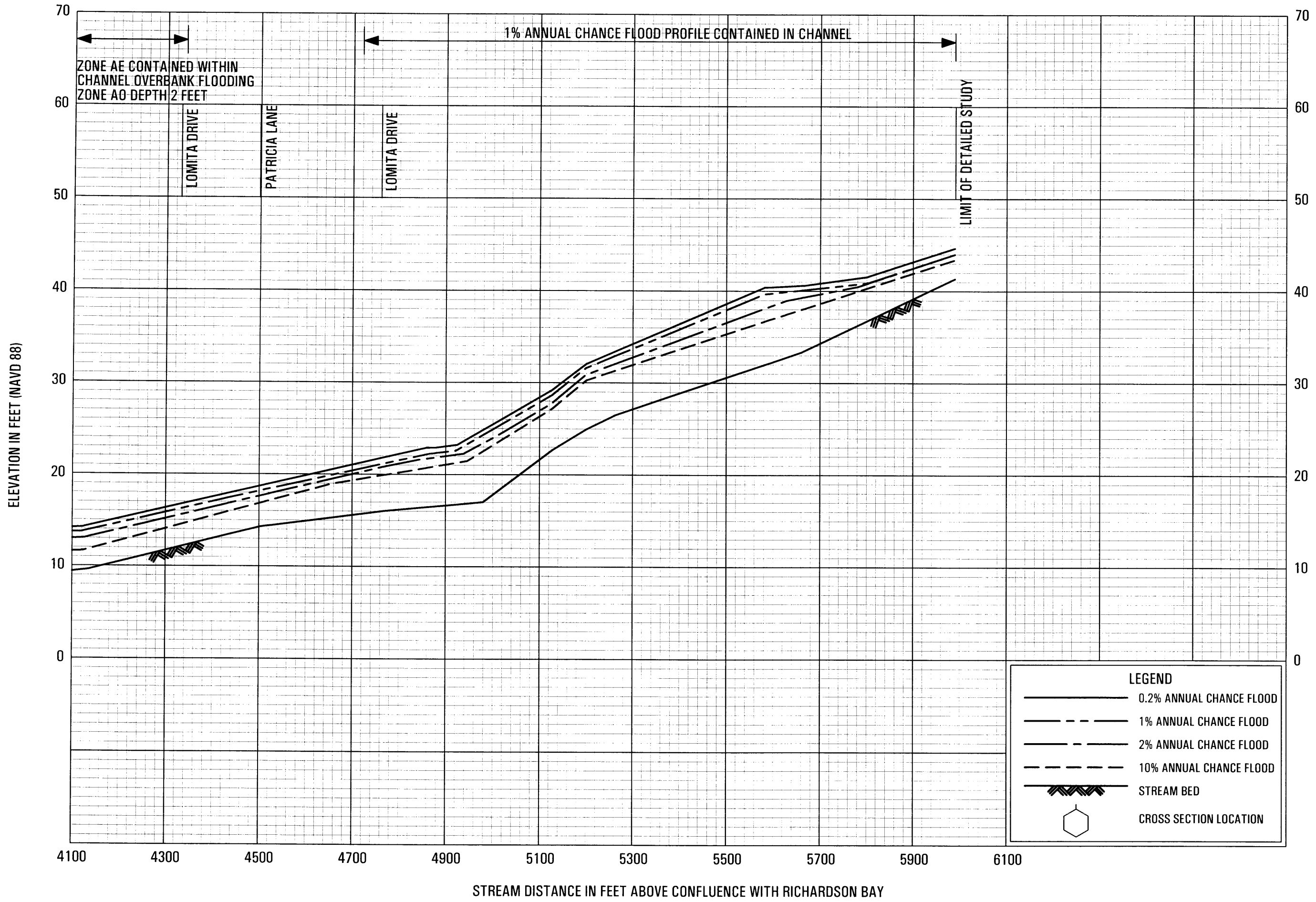


FLOOD PROFILES

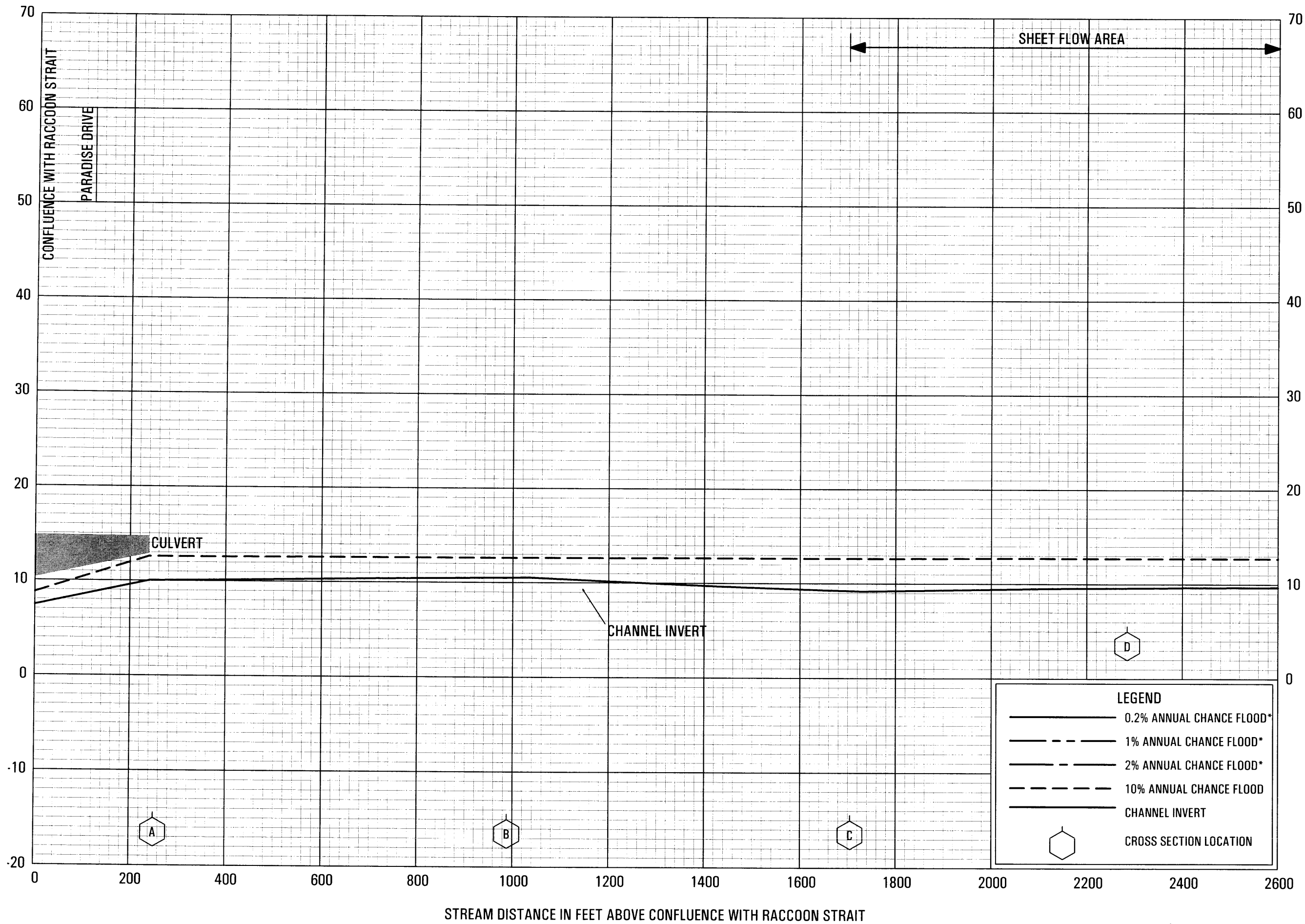
SUTTON-MANOR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS



ELEVATION IN FEET (NAVD 88)



LEGEND

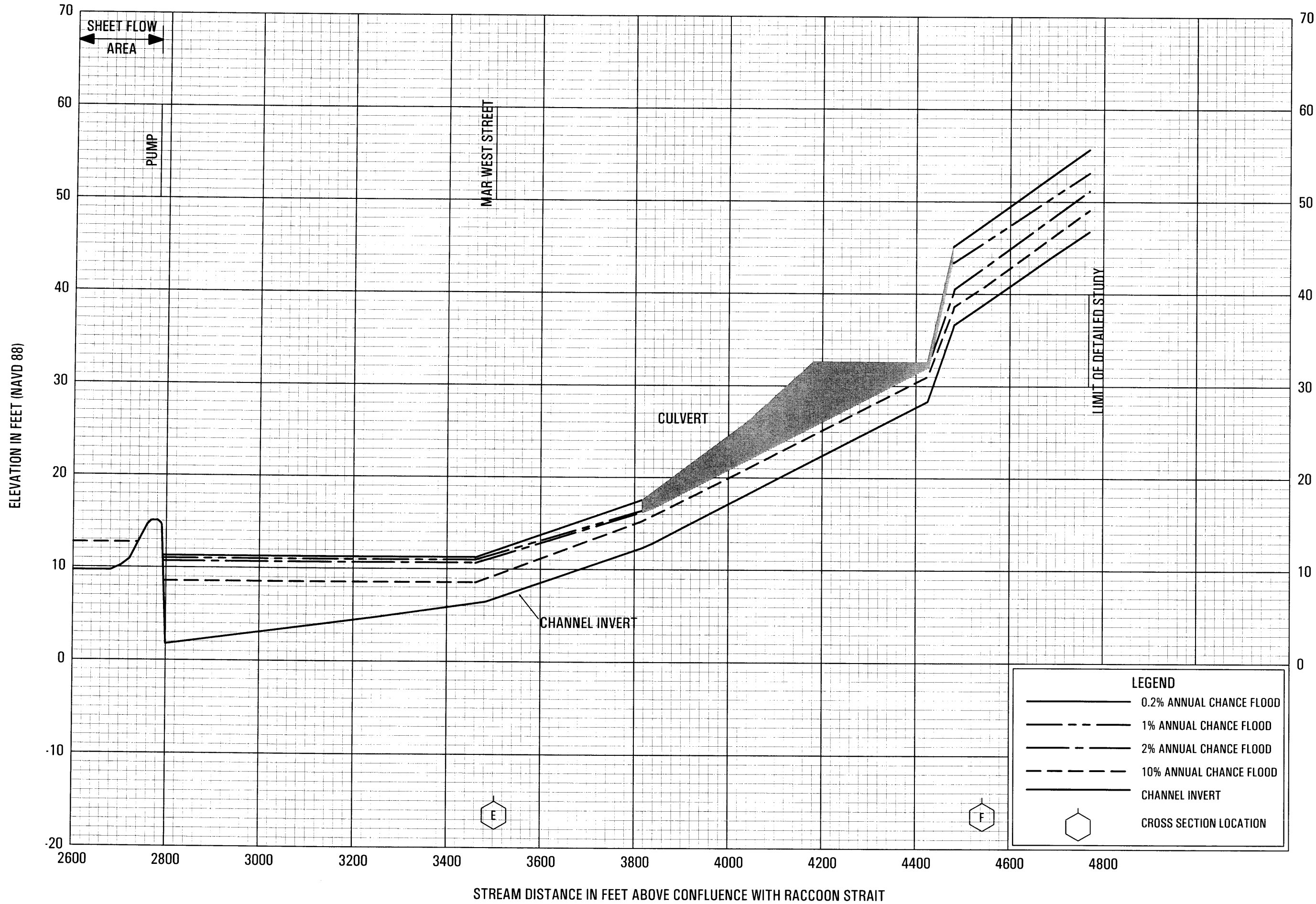
- 0.2% ANNUAL CHANCE FLOOD*
- - - 1% ANNUAL CHANCE FLOOD*
- · - 2% ANNUAL CHANCE FLOOD*
- - - 10% ANNUAL CHANCE FLOOD
- CHANNEL INVERT
- ⬡ CROSS SECTION LOCATION

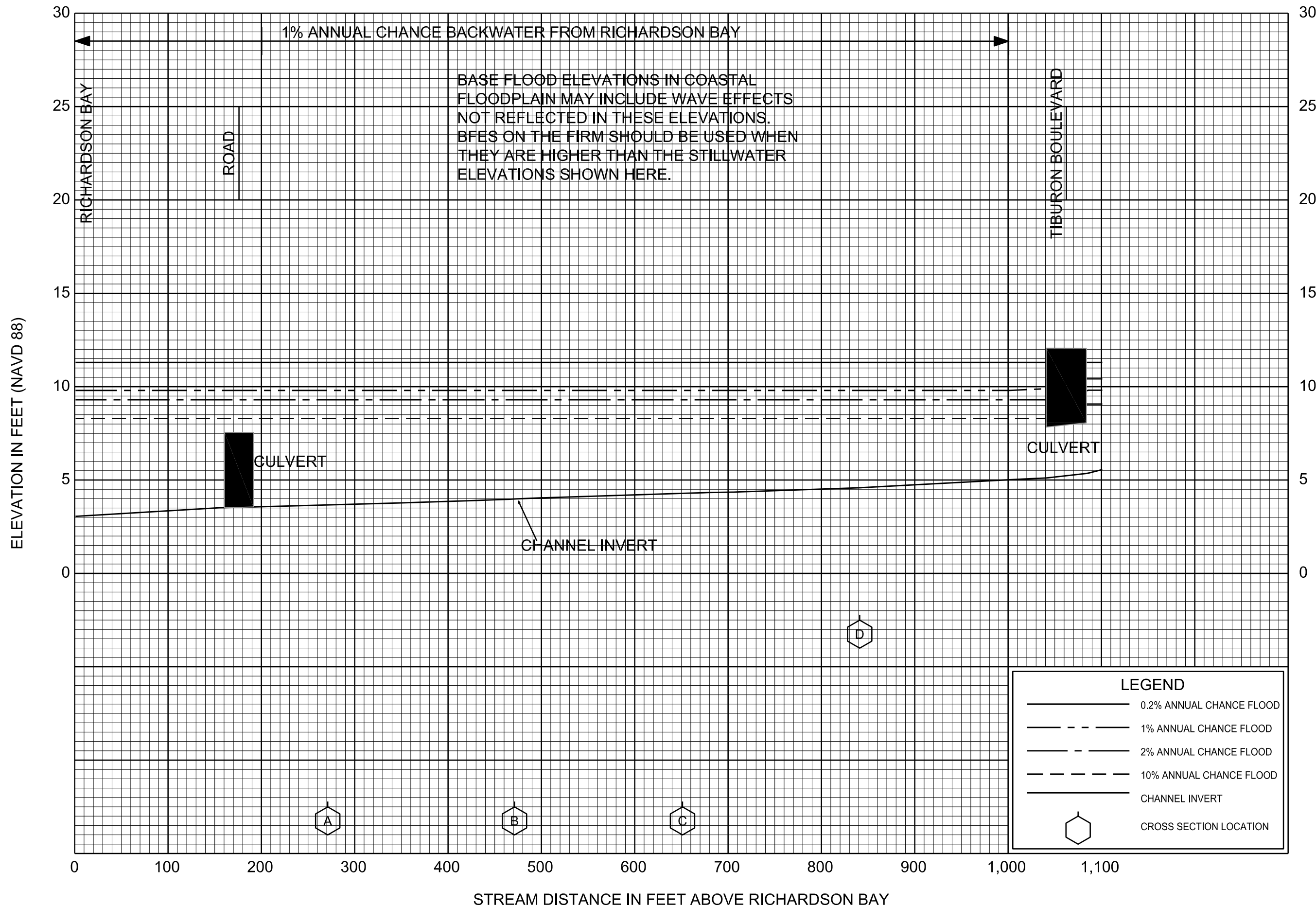
FLOOD PROFILES
TIBURON DOWNTOWN DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
AND INCORPORATED AREAS

92P

*DATA NOT AVAILABLE

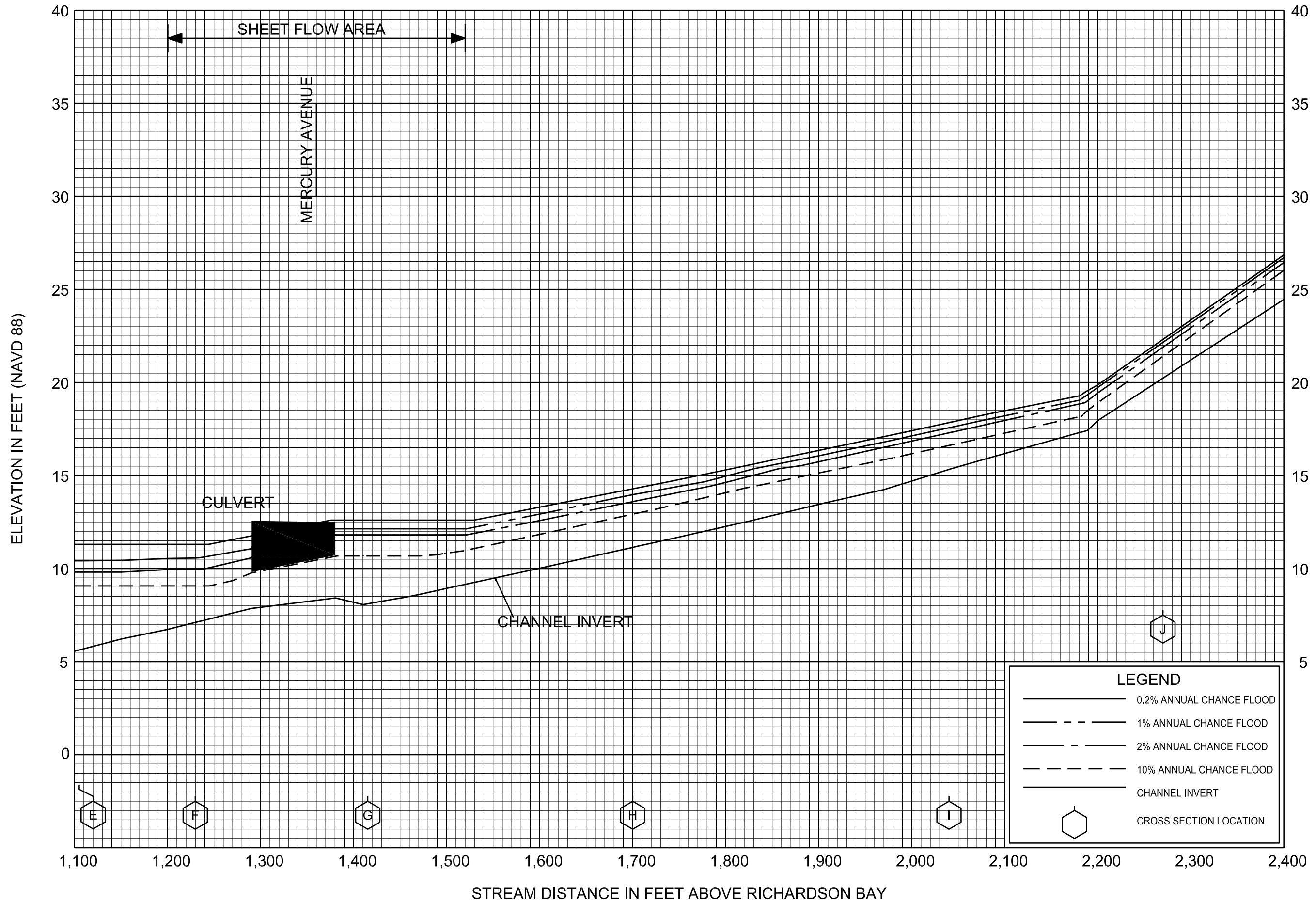




FLOOD PROFILES

TRESTLE GLEN DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
 AND INCORPORATED AREAS



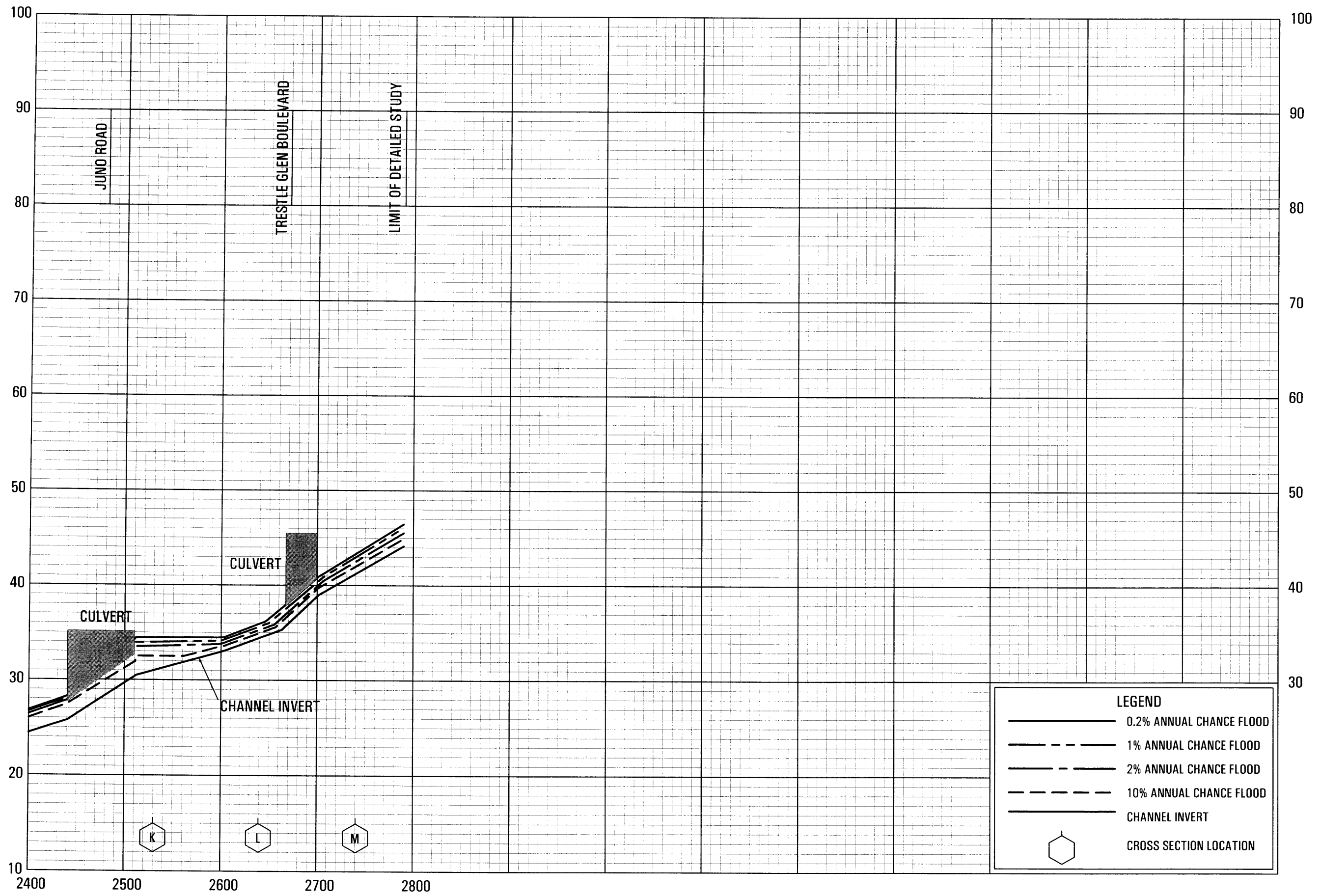
FLOOD PROFILES

TRESTLE GLEN DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

ELEVATION IN FEET (NAVD 88)



LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- - - 1% ANNUAL CHANCE FLOOD
- · - 2% ANNUAL CHANCE FLOOD
- - - 10% ANNUAL CHANCE FLOOD
- CHANNEL INVERT
- ⬡ CROSS SECTION LOCATION

2400 2500 2600 2700 2800

STREAM DISTANCE IN FEET ABOVE RICHARDSON BAY

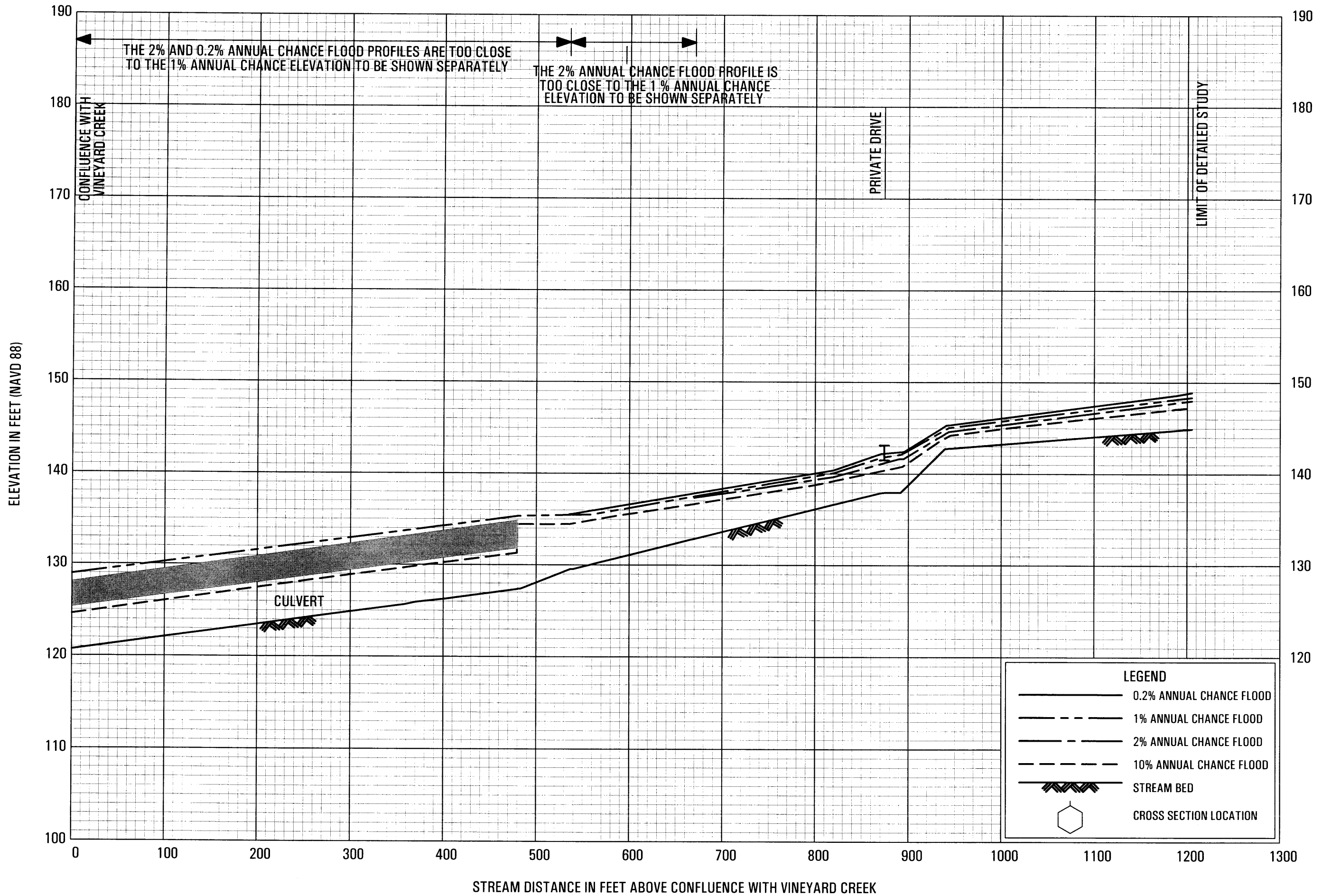
FLOOD PROFILES

TRESTLE GLEN DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS

96P

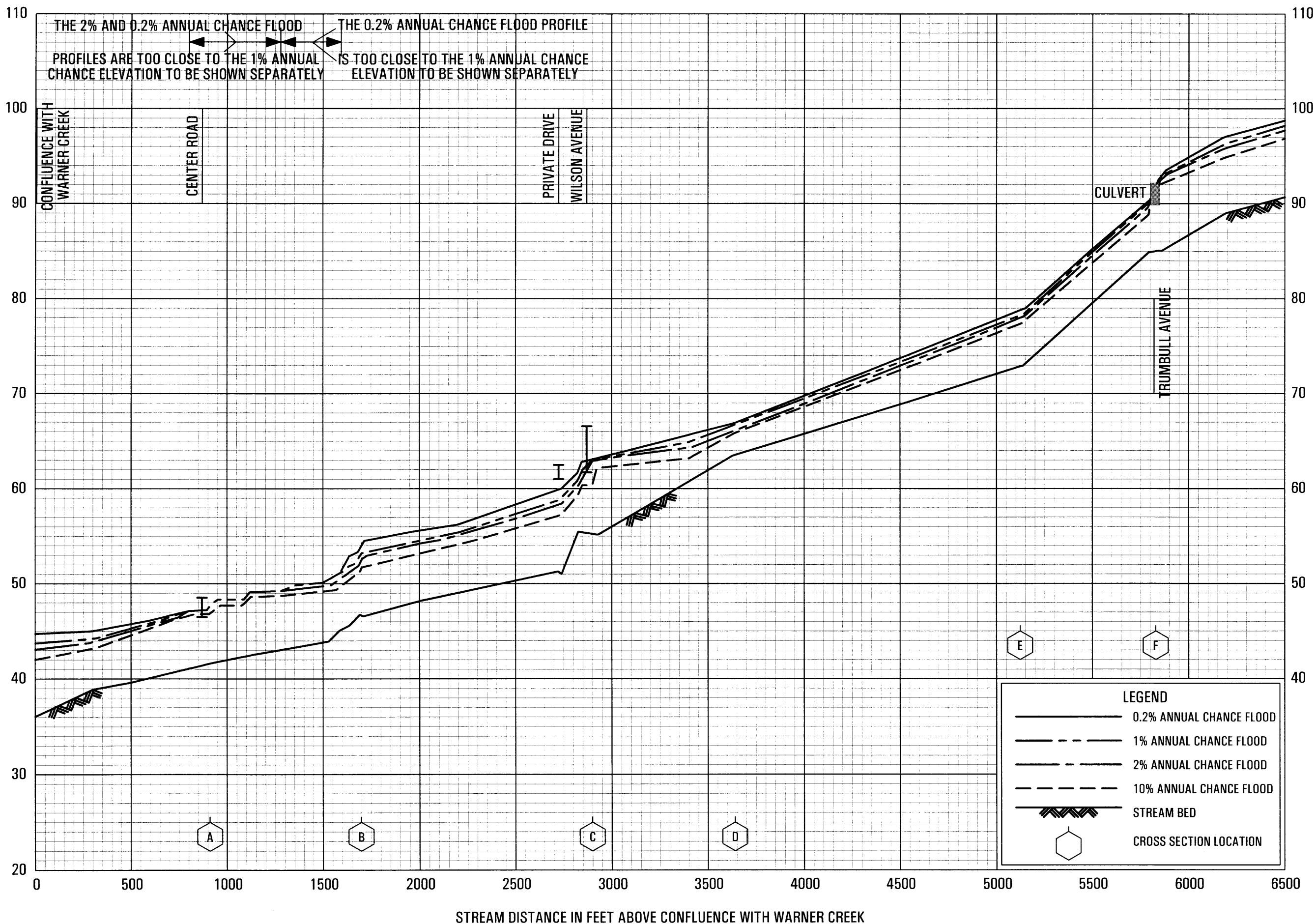


FLOOD PROFILES

UNNAMED TRIBUTARY TO VINEYARD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
 AND INCORPORATED AREAS

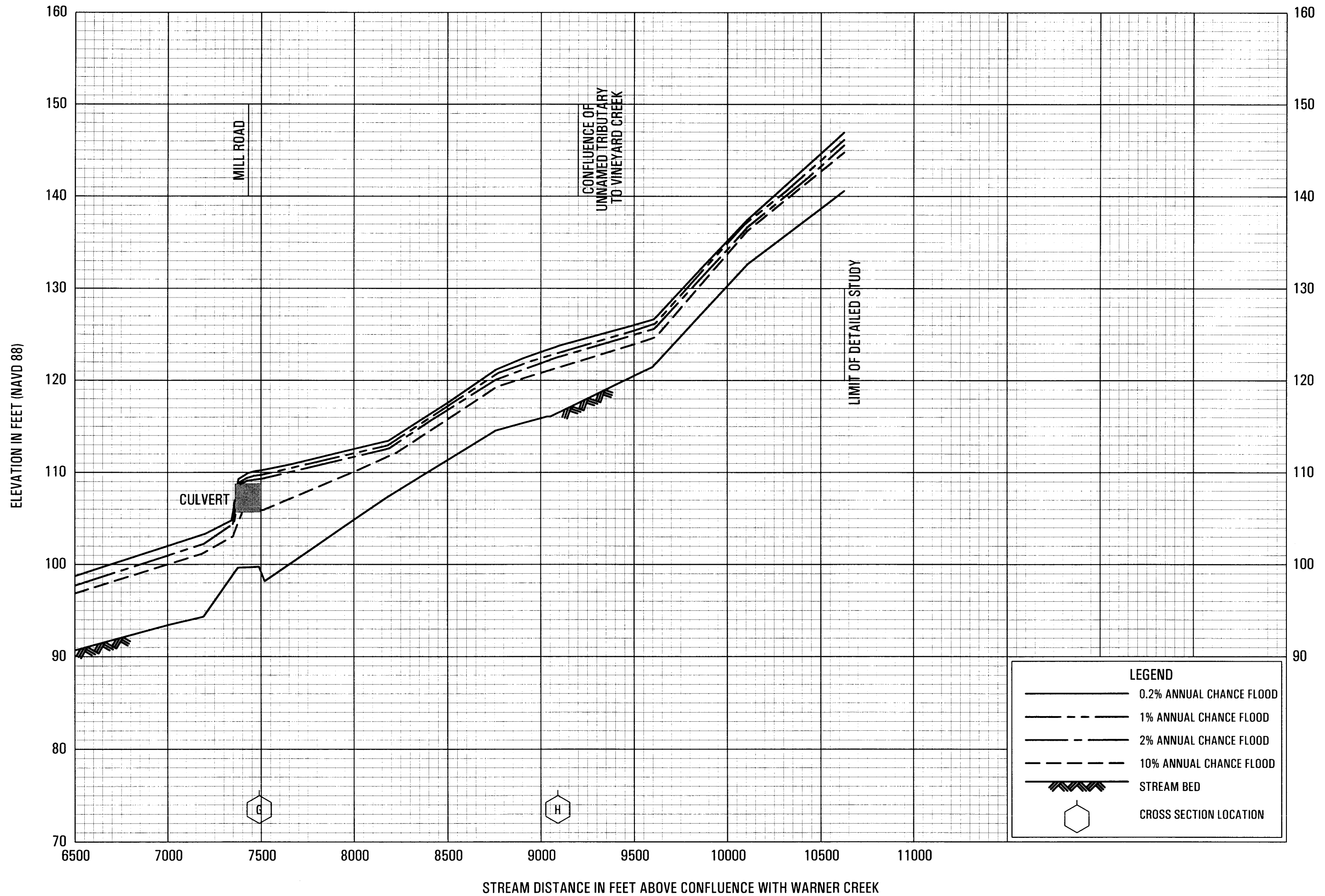
ELEVATION IN FEET (NAVD 88)



FLOOD PROFILES

VINEYARD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
AND INCORPORATED AREAS

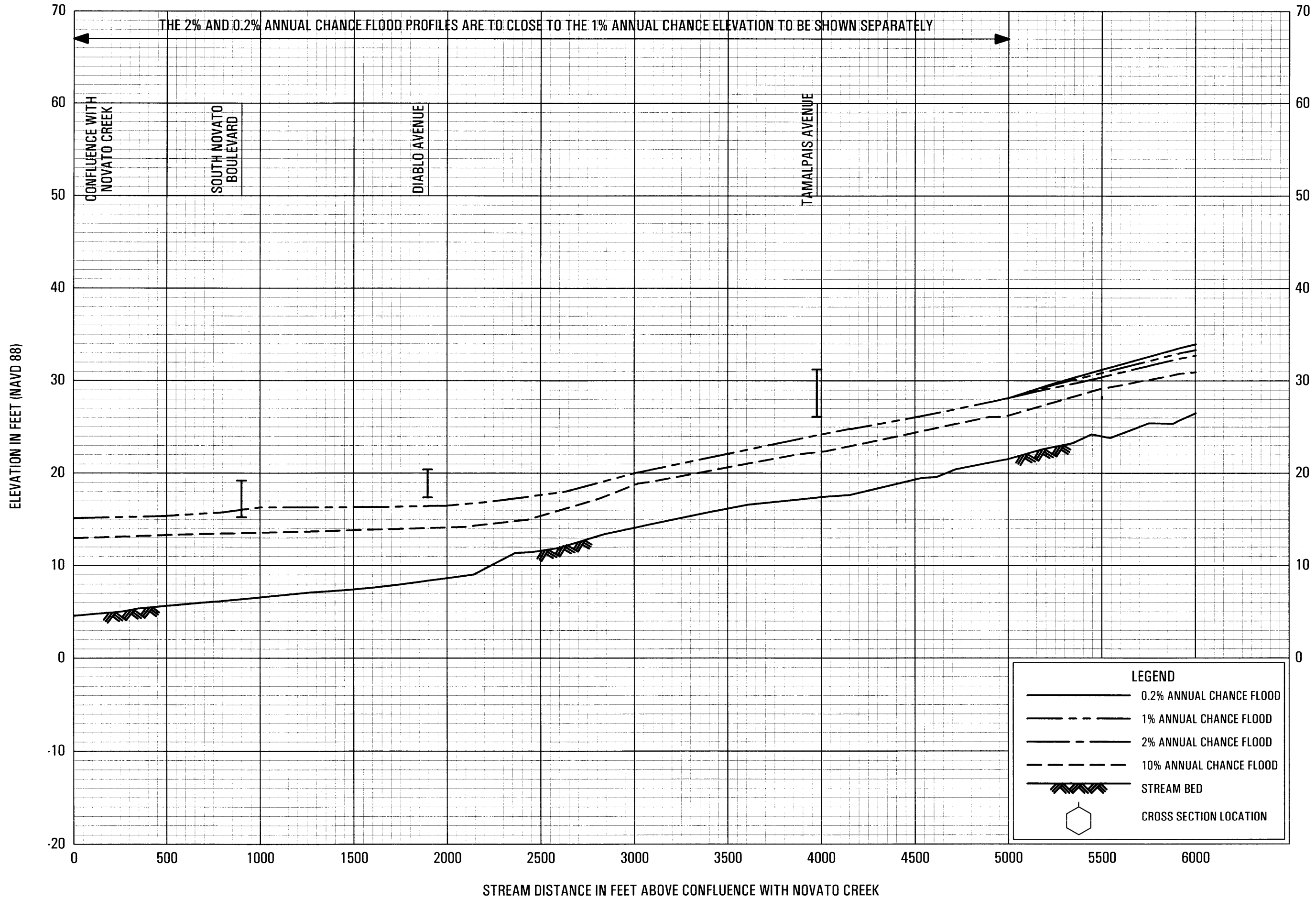


FLOOD PROFILES

VINEYARD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARIN COUNTY, CA
AND INCORPORATED AREAS



FLOOD PROFILES

WARNER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARIN COUNTY, CA
 AND INCORPORATED AREAS

