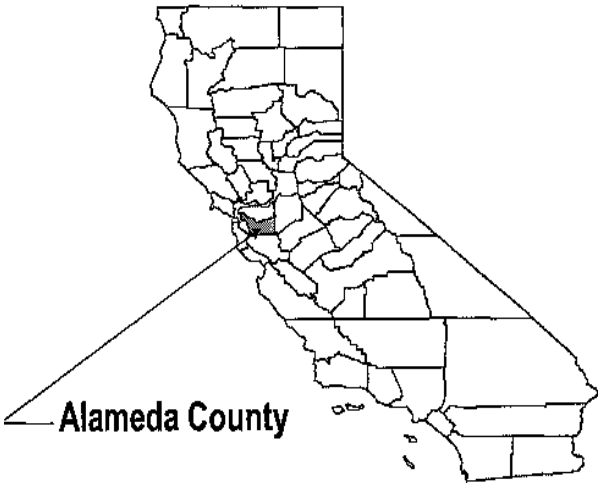
FLOOD INSURANCE STUDY

VOLUME 2 OF 3

ALAMEDA COUNTY, CALIFORNIA
AND INCORPORATED AREAS



Community Name	Community Number
ALAMEDA COUNTY (UNINCORPORATED AREAS)	060001
ALAMEDA, CITY OF	060002
ALBANY, CITY OF	060003
BERKELEY, CITY OF	060004
DUBLIN, CITY OF	060705
EMERYVILLE, CITY OF	060005
FREMONT, CITY OF	065028
HAYWARD, CITY OF	065033
LIVERMORE, CITY OF	060008
NEWARK, CITY OF	060009
OAKLAND, CITY OF	065048
* PIEDMONT, CITY OF	060011
PLEASANTON, CITY OF	060012
SAN LEANDRO, CITY OF	060013
UNION CITY, CITY OF	060014

* Non Flood-Prone Community

PRELIMINARY
4/16/2015

REVISED
Month Day, Year

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
06001CV002B

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 <date>. 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: August 3, 2009

Revised Countywide FIS Date: <date>

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8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this FIS can be obtained by contacting FEMA, Federal Insurance and Mitigation Division, 111 Broadway, Suite 1200, Oakland, California 94607-4052.

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10.0 REVISION DESCRIPTIONS

This section has been added to provide information regarding significant revisions made since the original FIS was printed. Future revisions may be made that do not result in the republishing of the FIS report. To assure that the user is aware of all revisions, it is advisable to contact the Alameda County repository of flood-hazard data located at the Alameda Public Works Agency.

10.1 First Revision (Revised Month Day, Year)

This revision includes new detailed coastal analyses for the San Francisco Bay shoreline of Alameda County north of the San Mateo Bridge (Route 92), and was completed by BakerAECOM.

Coastal Hazard Analyses

For San Francisco Bay, storm surge, swell-wave and wind-waves were modeled at a regional scale using numerical models to deterministically predict water levels and wave conditions in the bay. The regional modeling was conducted in two phases. The first phase focused on the North and Central Bay (DHI, 2011); the second phase focused on the South Bay (DHI, 2012). Coastal flooding hazards were then evaluated with one-dimensional (1D) transect-based models. Results from the North and Central Bay regional study are used in the coastal flood hazard analysis from the northern border of Alameda County to the southern end of Oakland International Airport (transects 1-57); the South Bay regional study results are used from south of the airport to the San Mateo – Hayward Bridge (transects 58-78).

The MIKE 21 Flow Model (HD) and MIKE 21 Spectral Wave (SW) model developed by DHI Water & Environment were used for the regional surge and wave modeling. The hydrodynamic model included the effects of tide, storm surge, and riverine discharge. The methodologies and model setup of the two regional modeling studies were very similar. Two notable differences between the two studies are the simulation period and the wave models. The North/Central Bay study simulated a 31-yr period from 1973 to 2003 and modeled both Pacific Ocean swell and locally generated wind-waves (seas). The South Bay study simulated a 54-yr period from 1956 to 2009 and only modeled the locally generated wind-waves. The South Bay study did not model swell waves because swell from the Pacific Ocean does not penetrate that far south into the bay.

The frequency and magnitude of storm surge and wave heights were derived statistically from the synthesized 31- or 54-year records.

Water level and wave information from the regional hydrodynamic and wave models was used as input to the 1D flood hazard analyses. Wave setup, runup, overtopping, and overland wave propagation were analyzed at representative transects. Transects are shown on the FIRM panels and depicted in the following Transect Location Maps (Figure 2). Transect profile elevations were based on the National Oceanic and Atmospheric Administration (NOAA) 2010 Central San Francisco Bay Area LiDAR, collected February to April, 2010. Bathymetric information was derived from USACE dredging surveys and NOAA/ National Ocean Service (NOS) Geophysical Data System (GEODAS) bathymetric data. In areas where the two datasets overlapped, the USACE data was given priority.

Overland wave propagation modeling, using FEMA's Wave Height Analysis for Flood Insurance Studies (WHAFIS) model, Version 4 (FEMA, 1988; Divoky, 2007), was performed for transects with gently sloping profiles where the prevailing ground is inundated by the stillwater flood level alone. WHAFIS solves the wave action conservation equation and incorporates wind-generated wave growth and dissipation by marsh grasses, rigid vegetation, and buildings.

Wave runup was calculated for transects with coastal armoring or steeply sloping ground profiles in the vicinity of the flooded shoreline. Runup was calculated using one of three methods, depending on shoreline characteristics. The Direct Integration Method (FEMA, 2005) was used to calculate runup for transects with natural, gently sloping ($m < 0.125$) profiles. The Technical Advisory Committee for Water Retaining Structures (TAW) (van der Meer 2002) method was used for shorelines with shore protection structures and steeply sloping ($m \geq 0.125$) natural shorelines. The Shore Protection Manual (SPM) method (USACE 1984) was used to calculate wave runup on vertical walls. The total runup elevation is also referred to as the total water level (TWL). Annual TWL maxima were selected from the hindcast time series, and the generalized extreme value (GEV) distribution was employed to determine the 1-percent-annual-chance TWL from the annual maxima at each transect. Wave overtopping was evaluated for transects where the runup elevation exceeded the structure or bluff crest.

Floodplain Boundaries

For this FIS, new flood zones were developed and mapped for the updated San Francisco Bay coastal hazard analysis described in Section 3.3. Detailed flood hazard boundaries along San Francisco Bay were delineated using the NOAA 2010 San Francisco Bay Area LiDAR, collected February to April 2010 (NOAA, 2010).

Areas inundated by stillwater flooding with minimal wave hazard effects were mapped as Zone AE and the flood hazard boundary is located at the point where the ground elevation equals the stillwater elevation. In areas subject to wave runup, the flood hazard boundary is located at the point where the ground elevation equals the runup elevation, or where overtopping occurs, the boundary is located at the inland extent of overtopping. The Base Flood Elevation (BFE) in these areas is rounded to the nearest whole-foot, though the boundary is mapped using precision to the tenth of a foot. Inundation flooding is mapped inland to the point where it meets continuous high ground or encounters flooding from another flooding source. Salt marsh berms are not considered barriers to flood inundation regardless of height or continuity since they are not structures that are designed for and accredited with providing protection from the base flood.

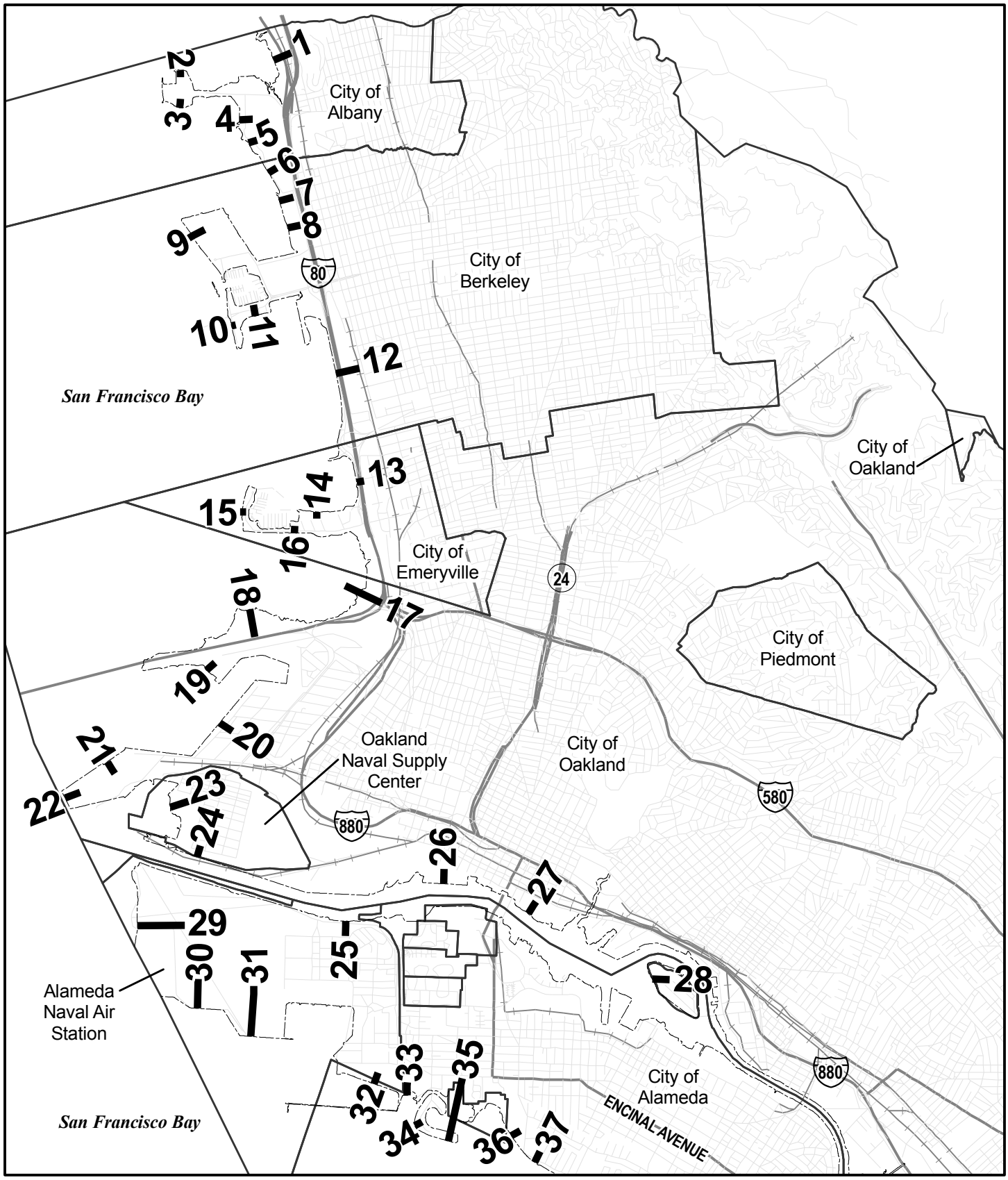


FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CALIFORNIA AND INCORPORATED AREAS

0 0.4 0.8 1.6 2.4 Miles

N

TRANSECT LOCATION MAP #1

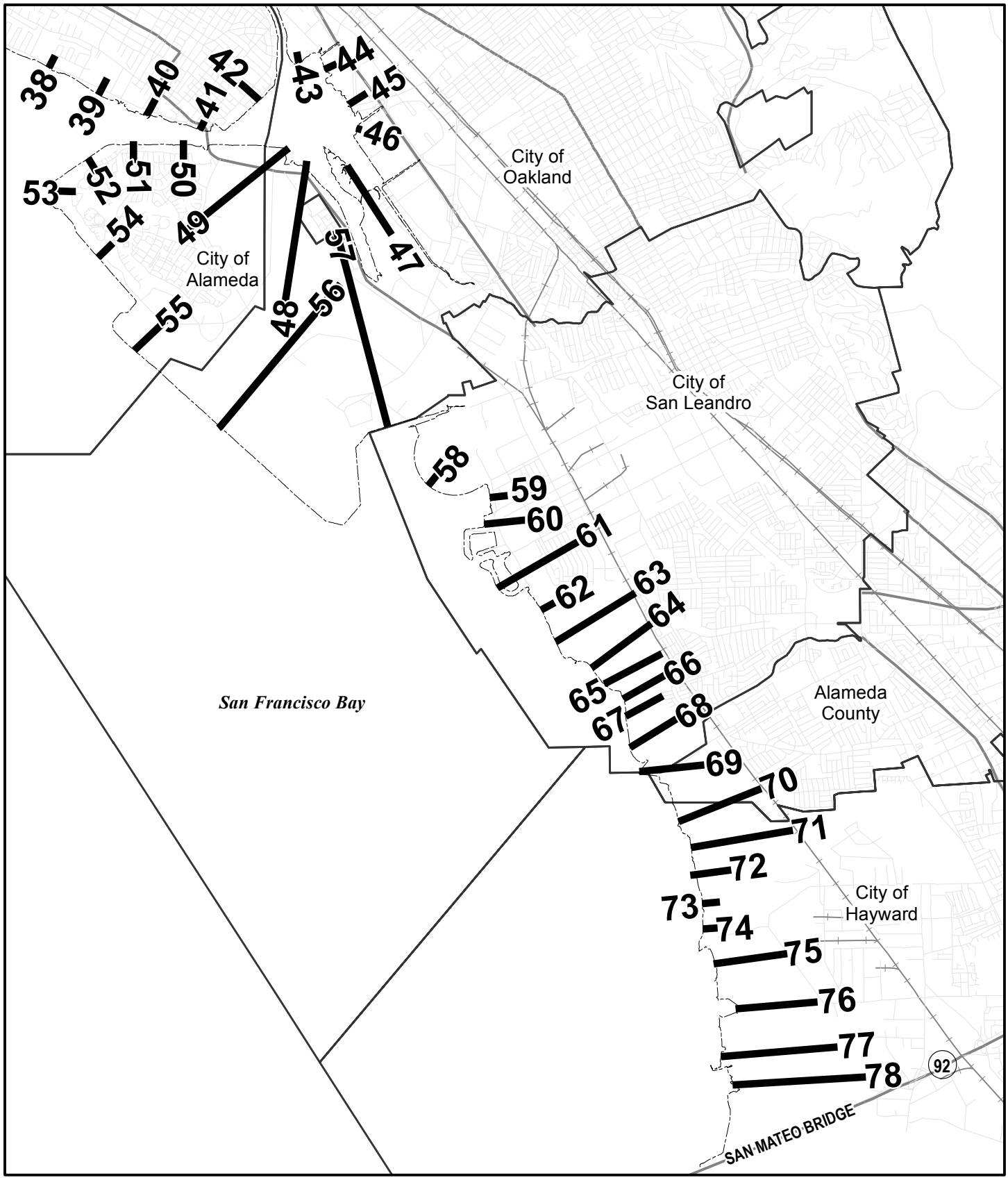


FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CALIFORNIA AND INCORPORATED AREAS

0 0.425 0.85 1.7 2.55 Miles

N

TRANSECT LOCATION MAP #2

Transect Data

Transect	XY Coordinates (Latitude/Longitude)		Stillwater Elevation (feet NAVD 88)[1]				Zone	BFE
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance		
1	37.893671	-122.310885	8.5	9.41	9.96	11.46	VE	13[2]
2	37.892438	-122.325067	8.49	9.4	9.95	11.43	AE	10
3	37.887911	-122.325163	8.49	9.39	9.94	11.4	VE	14[2]
4	37.886473	-122.316068	8.49	9.39	9.94	11.41	VE	15[2]
5	37.883732	-122.314709	8.49	9.38	9.93	11.39	VE	16[2]
6	37.880127	-122.311621	8.48	9.39	9.92	11.37	VE	13[2]
7	37.876770	-122.309976	8.48	9.39	9.91	11.37	VE AE	13[2] 10
8	37.873520	-122.308704	8.48	9.37	9.92	11.38	VE	14[2]
9	37.872532	-122.323127	8.48	9.34	9.9	11.35	VE	14[2]
10	37.861738	-122.317158	8.48	9.33	9.89	11.31	VE	13[2]
11	37.862927	-122.313532	8.49	9.33	9.9	11.32	VE	12[2]
12	37.856066	-122.301282	8.48	9.32	9.89	11.3	VE AE	13[2] 10
13	37.843024	-122.298111	8.47	9.35	9.88	11.3	AE	12[2]
14	37.839449	-122.304161	8.47	9.37	9.88	11.3	AE	11[2]
15	37.839403	-122.315446	8.47	9.36	9.86	11.24	VE	13[2]
16	37.836885	-122.307495	8.48	9.34	9.86	11.24	AE	11[2]
17	37.829932	-122.298067	8.48	9.33	9.87	11.25	AE	10-11
18	37.827714	-122.314246	8.47	9.32	9.84	11.21	AE	11
19	37.820368	-122.320764	8.5	9.38	9.76	10.94	VE AE	11 10
20	37.814058	-122.318750	8.49	9.49	9.76	10.93	VE	12[2]
21	37.809322	-122.335738	8.5	9.48	9.76	10.93	VE	12[2]
22	37.804945	-122.342126	8.52	9.48	9.71	10.77	VE	16[2]
23	37.803909	-122.326182	8.55	9.7	9.75	10.83	AE	12[2]
24	37.797971	-122.322093	8.54	9.69	9.79	10.96	AE	10
25	37.790292	-122.299529	8.52	9.7	9.78	10.97	AE	10[2]
26	37.794817	-122.284720	8.52	9.74	9.76	10.91	AE	10
27	37.791244	-122.271908	8.52	9.74	9.73	10.84	AE	10
28	37.783461	-122.253095	8.52	9.75	9.73	10.83	AE	11[2]
29	37.789674	-122.331089	8.58	9.75	9.78	10.86	VE AE	12[2] 10
30	37.779764	-122.321968	8.67	9.74	9.91	11.07	VE	12[2]
31	37.776414	-122.313868	8.67	9.57	9.9	11.05	VE AE	12[2] 10
32	37.770764	-122.295181	8.67	9.43	9.9	11.05	VE	11[2]
33	37.769404	-122.290194	8.83	9.41	10.15	11.49	VE	11[2]

Transect	XY Coordinates (Latitude/Longitude)		Stillwater Elevation (feet NAVD 88)[1]				Zone	BFE
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance		
34	37.765762	-122.289004	8.82	9.41	10.15	11.48	VE	13[2]
35	37.763915	-122.283903	8.83	9.43	10.16	11.51	VE AE	13[2] 10-12
36	37.764571	-122.274347	8.86	9.43	10.2	11.57	VE	13[2]
37	37.761392	-122.270822	8.86	9.43	10.21	11.59	VE	13[2]
38	37.757951	-122.261845	8.87	9.43	10.23	11.62	AE	11[2]
39	37.754522	-122.253799	8.87	9.43	10.22	11.63	AE	11[2]
40	37.751861	-122.246024	8.86	9.57	10.22	11.64	AE	12[2]
41	37.750013	-122.237375	8.65	9.74	10.07	11.55	AE	10
42	37.753885	-122.227673	8.32	9.74	10.03	11.85	AE	10
43	37.758682	-122.221309	8.32	9.75	10.01	11.78	AE	10
44	37.757854	-122.217185	8.32	9.79	10.01	11.78	AE	10
45	37.753349	-122.213239	8.32	9.88	10.03	11.85	AE	10
46	37.750299	-122.211967	8.32	9.96	10.03	11.85	AE	10
47	37.745494	-122.213450	8.32	9.97	10.04	11.88	AE	10
48	37.745074	-122.220175	8.32	9.74	10.04	11.88	AE	10-11
49	37.747319	-122.223523	8.32	9.74	10.04	11.88	AE	10
50	37.748143	-122.239984	8.65	9.75	10.07	11.55	AE	10
51	37.748089	-122.248101	8.86	9.77	10.22	11.64	AE	10
52	37.746350	-122.255468	8.86	9.77	10.22	11.63	AE	11[2]
53	37.742116	-122.261219	8.87	9.78	10.23	11.64	VE	13[2]
54	37.733575	-122.253778	8.9	9.8	10.27	11.71	VE	14[2]
55	37.721641	-122.247845	8.97	9.79	10.38	11.92	VE AE	13[2] 10
56	37.711831	-122.233955	9.02	9.79	10.48	12.1	VE AE	15[2] 10-11
57	37.711923	-122.206775	9.15	9.8	10.42	11.71	VE AE	12[2] 10-11
58	37.704316	-122.200152	9.09	9.81	10.05	10.88	VE	15[2]
59	37.702805	-122.190250	9.1	9.82	10.05	10.88	VE	13[2]
60	37.699392	-122.191103	9.09	9.84	10.07	10.93	AE AE	11[2] 10
61	37.691172	-122.188924	9.1	9.84	10.11	11.03	AE AE	12[2] 10
62	37.688350	-122.181809	9.11	9.85	10.1	10.98	VE	14[2]
63	37.684257	-122.179464	9.11	9.87	10.12	11.03	VE AE	13[2] 10-11
64	37.680907	-122.173629	9.12	9.88	10.14	11.07	VE AE	13 10-12

Transect	XY Coordinates (Latitude/Longitude)		Stillwater Elevation (feet NAVD 88)[1]				Zone	BFE
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance		
65	37.678850	-122.171570	9.13	9.9	10.12	11.03	VE AE	13 10-11
66	37.676910	-122.168500	9.13	9.92	10.12	11.02	VE AE	13 10-11
67	37.674714	-122.168121	9.13	9.94	10.13	11.04	VE AE	13 10-11
68	37.670647	-122.167405	9.13	9.95	10.16	11.11	VE AE	13 11
69	37.667560	-122.165877	9.13	9.96	10.17	11.15	VE AE	13 10-11
70	37.661174	-122.159499	9.15	9.95	10.19	11.16	VE AE	15[2] 10-11
71	37.657812	-122.157503	9.15	9.94	10.19	11.16	VE AE	14[2] 10-11
72	37.654352	-122.156652	9.16	9.94	10.2	11.19	VE AE	14[2] 10-11
73	37.650600	-122.155673	9.16	9.93	10.23	11.24	VE	14[2]
74	37.647332	-122.155534	9.17	9.92	10.25	11.3	VE	14[2]
75	37.642880	-122.153479	9.17	9.91	10.27	11.33	VE AE	14[2] 10-11
76	37.637090	-122.149816	9.18	9.92	10.3	11.39	VE AE	13 11-12
77	37.630929	-122.152597	9.19	9.9	10.33	11.47	VE AE	14[2] 11
78	37.627254	-122.150690	9.2	9.89	10.35	11.5	VE AE	14[2] 10-11

[1] North American Vertical Datum of 1988

[2] Wave runup elevation

11.0 APPENDIX A

Figure 3. FIRM Notes to Users

NOTES TO USERS

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.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates, refer to Table 14 in this FIS Report.

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

The map is for use in administering the NFIP. It may not identify all areas subject to flooding, particularly from local drainage sources of small size. Consult the community map repository to find updated or additional flood hazard information.

BASE FLOOD ELEVATIONS: For more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations and/or Transect Data tables within this FIS Report. Use the flood elevation data within the FIS Report in conjunction with the FIRM for construction and/or floodplain management.

Coastal Base Flood Elevations shown on the map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 888). Coastal flood elevations are also provided in the Summary of Stillwater Elevations table and Transect Data table in the FIS Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table and Transect Data table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on the FIRM.

FLOODWAY INFORMATION: 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 FIS Report for this jurisdiction.

FLOOD CONTROL STRUCTURE INFORMATION: Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to the "Flood Protection Measures" section of this FIS Report for information on flood control structures for this jurisdiction.

PROJECTION INFORMATION: The projection used in the preparation of the map was Universal Transverse Mercator (UTM) Zone 10. 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 the FIRM.

ELEVATION DATUM: Flood elevations on the FIRM 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

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed on the FIRM Index.

BASE MAP INFORMATION: Base map information shown on the FIRM was derived from Coastal California LiDAR and Digital Imagery dated 2011. USDA NAIP 2012 imagery is used in areas not covered by the Coastal California imagery.

The 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 may reflect stream channel distances that differ from what is shown on the map.

Corporate limits shown on the 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 the map was published, map users should contact appropriate community officials to verify current corporate limit locations.

NOTES FOR FIRM INDEX

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within Alameda County, USA, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to the FIRM Index to determine the most recent FIRM revision date for each community. The most recent FIRM panel effective date will correspond to the most recent index date.

SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Notes to Users section was created specifically for Alameda, CA, effective <Month Day Year>.

LIMIT OF MODERATE WAVE ACTION: Zone AE has been divided by a Limit of Moderate Wave Action (LiMWA). The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. The effects of wave hazards between the Zone VE and the LiMWA (or between the shoreline and the LiMWA for areas where Zone VE is not identified) will be similar to but less severe than, those in Zone VE.

ACCREDITED LEVEE: Check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection for areas on this panel. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at http://www.fema.gov/national-flood-insurance-program.

FLOOD RISK REPORT: A Flood Risk Report (FRR) may be available for many of the flooding sources and communities referenced in this FIS Report. The FRR is provided to increase public awareness of flood risk by helping communities identify the areas within their jurisdictions that have the greatest risks. Although non-regulatory, the information provided within the FRR can assist communities in assessing and evaluating mitigation opportunities to reduce these risks. It can also be used by communities developing or updating flood risk mitigation plans. These plans allow communities to identify and evaluate opportunities to reduce potential loss of life and property. However, the FRR is not intended to be the final authoritative source of all flood risk data for a project area; rather, it should be used with other data sources to paint a comprehensive picture of flood risk.

Figure 4. Map Legend for FIRM

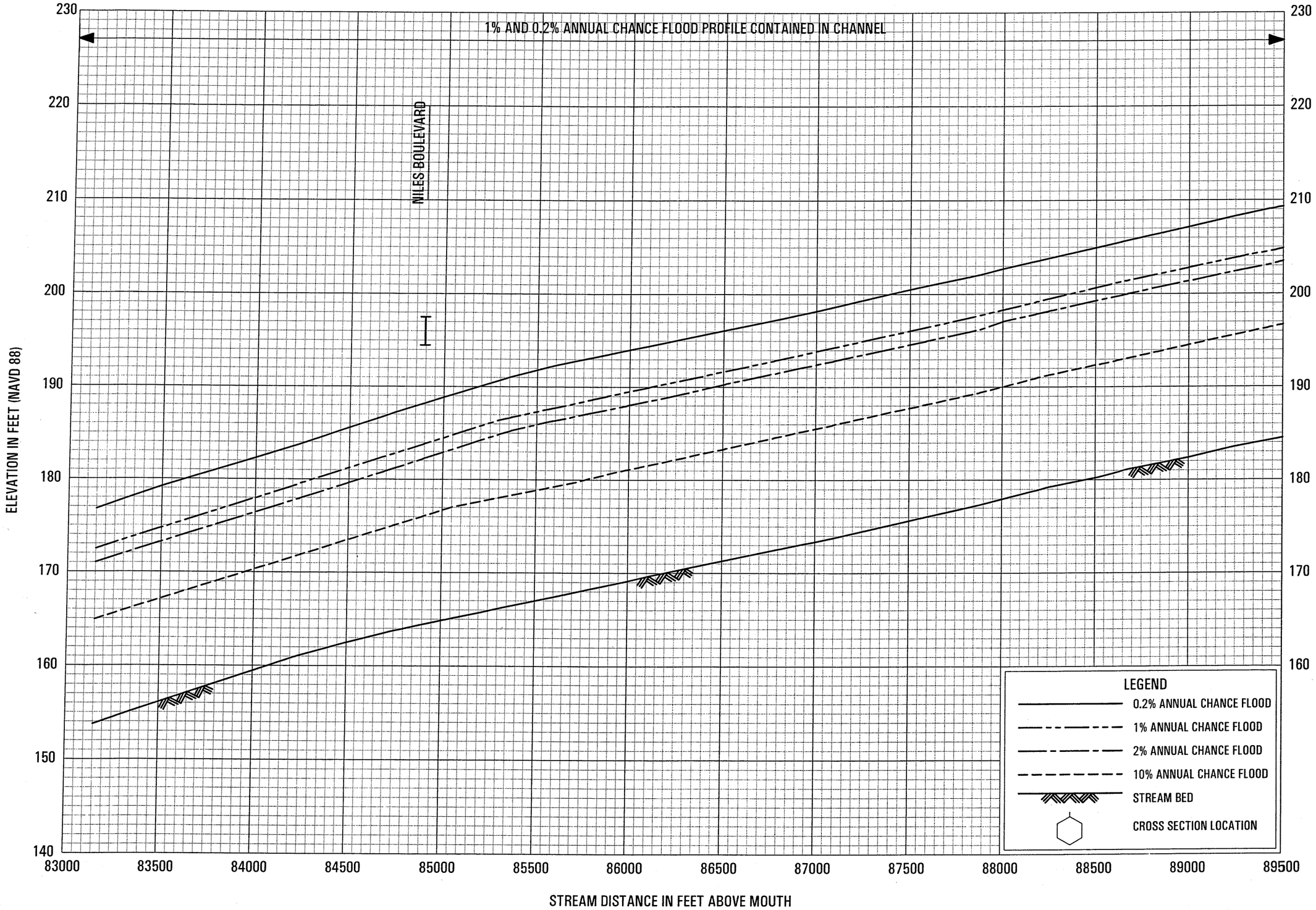
SPECIAL FLOOD HAZARD AREAS: *The 1% annual chance flood, also known as the base flood or 100-year flood, has a 1% chance of happening or being exceeded each year. Special Flood Hazard Areas are subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood. 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. See note for specific types. If the floodway is too narrow to be shown, a note is shown.*

	Special Flood Hazard Areas subject to inundation by the 1% annual chance flood (Zones A, AE, AH, AO, AR, A99, V and VE)
Zone A	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. No base (1% annual chance) flood elevations (BFEs) or depths are shown within this zone.
Zone AE	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. Base flood elevations derived from the hydraulic analyses are shown within this zone.
Zone AH	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the hydraulic analyses are shown at selected intervals within this zone.
Zone AO	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the hydraulic analyses are shown within this zone.
Zone AR	The flood insurance rate zone that corresponds to areas that were 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	The flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or flood depths are shown within this zone.
Zone V	The flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations are not shown within this zone.
Zone VE	Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations derived from the coastal analyses are shown within this zone as static whole-foot elevations that apply throughout the zone.
	Regulatory Floodway determined in Zone AE.

OTHER AREAS OF FLOOD HAZARD	
	Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile.
	Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone.
	Area with Reduced Flood Risk due to Levee: Areas where an accredited levee, dike, or other flood control structure has reduced the flood risk from the 1% annual chance flood. See Notes to Users for important information.
OTHER AREAS	
	Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.
	Unshaded Zone X: Areas of minimal flood hazard.
FLOOD HAZARD AND OTHER BOUNDARY LINES	
(ortho) (vector)	Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping)
	Limit of Study
	Jurisdiction Boundary
	Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet
GENERAL STRUCTURES	
Aqueduct *Channel* *Culvert* *Storm Sewer*	Channel, Culvert, Aqueduct, or Storm Sewer
Dam *Jetty* *Weir*	Dam, Jetty, Weir
	Levee, Dike, or Floodwall
Bridge	Bridge

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AND OTHERWISE PROTECTED AREAS (OPA): *CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas. See Notes to Users for important information.*	
CBRS AREA 09/30/2009	Coastal Barrier Resources System Area: Labels are shown to clarify where this area shares a boundary with an incorporated area or overlaps with the floodway.
OTHERWISE PROTECTED AREA 09/30/2009	Otherwise Protected Area
REFERENCE MARKERS	
22.0	River mile Markers
CROSS SECTION & TRANSECT INFORMATION	
B 20.2	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
5280 21.1	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
17.5	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
8	Coastal Transect
	Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation.
	Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping.
513	Base Flood Elevation Line

ZONE AE (EL 16)	Static Base Flood Elevation value (shown under zone label)
ZONE AO (DEPTH 2)	Zone designation with Depth
ZONE AO (DEPTH 2) (VEL 15 FPS)	Zone designation with Depth and Velocity
BASE MAP FEATURES	
Missouri Creek	River, Stream or Other Hydrographic Feature
234	Interstate Highway
234	U.S. Highway
234	State Highway
234	County Highway
MAPLE LANE	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
RAILROAD	Railroad
	Horizontal Reference Grid Line
	Horizontal Reference Grid Ticks
+	Secondary Grid Crosshairs
Land Grant	Name of Land Grant
7	Section Number
R. 43 W. T. 22 N.	Range, Township Number
$^{42}76^{000m}$E	Horizontal Reference Grid Coordinates (UTM)
365000 FT	Horizontal Reference Grid Coordinates (State Plane)
80° 16’ 52.5”	Corner Coordinates (Latitude, Longitude)



FLOOD PROFILES

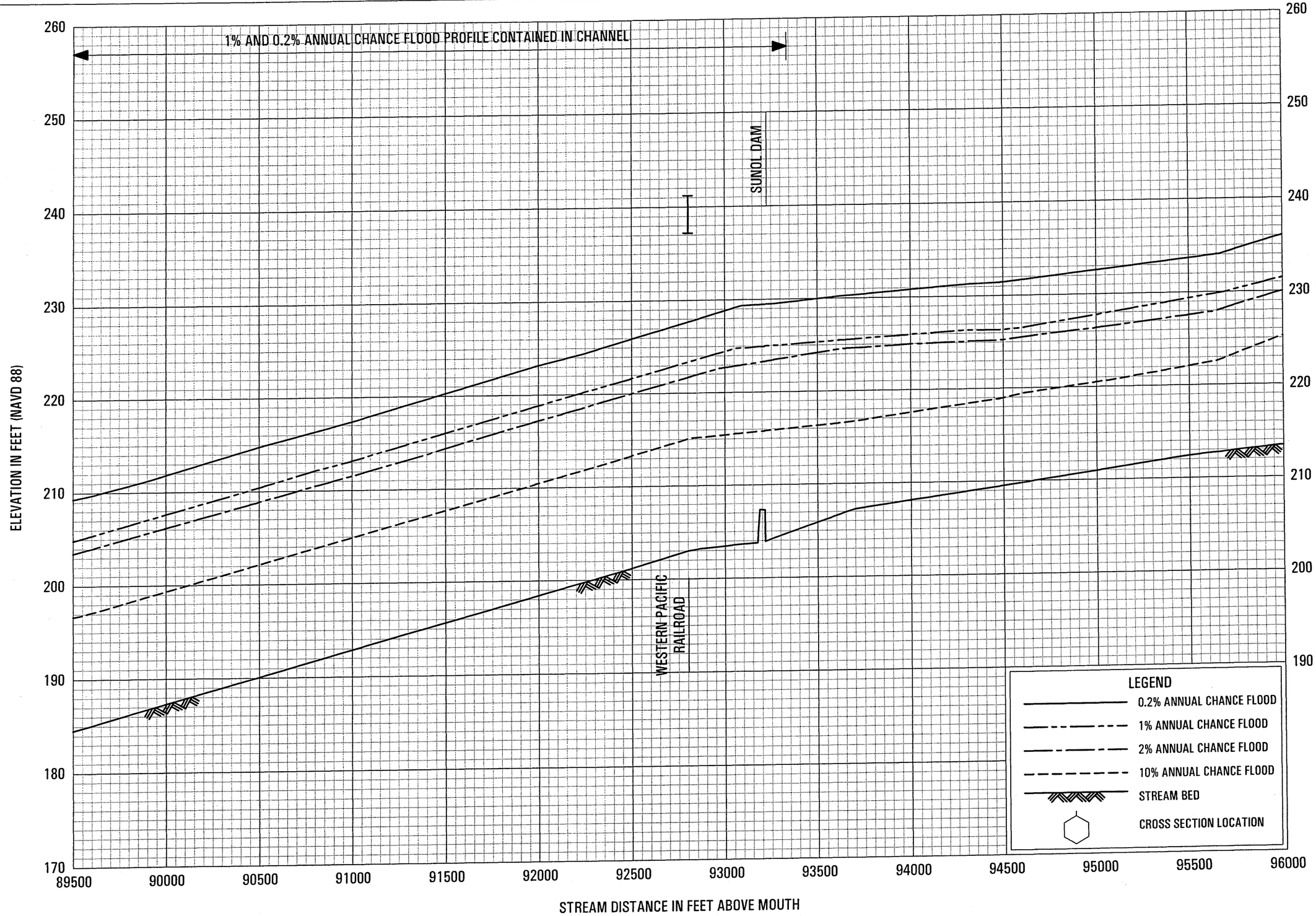
ALAMEDA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

01P



FLOOD PROFILES

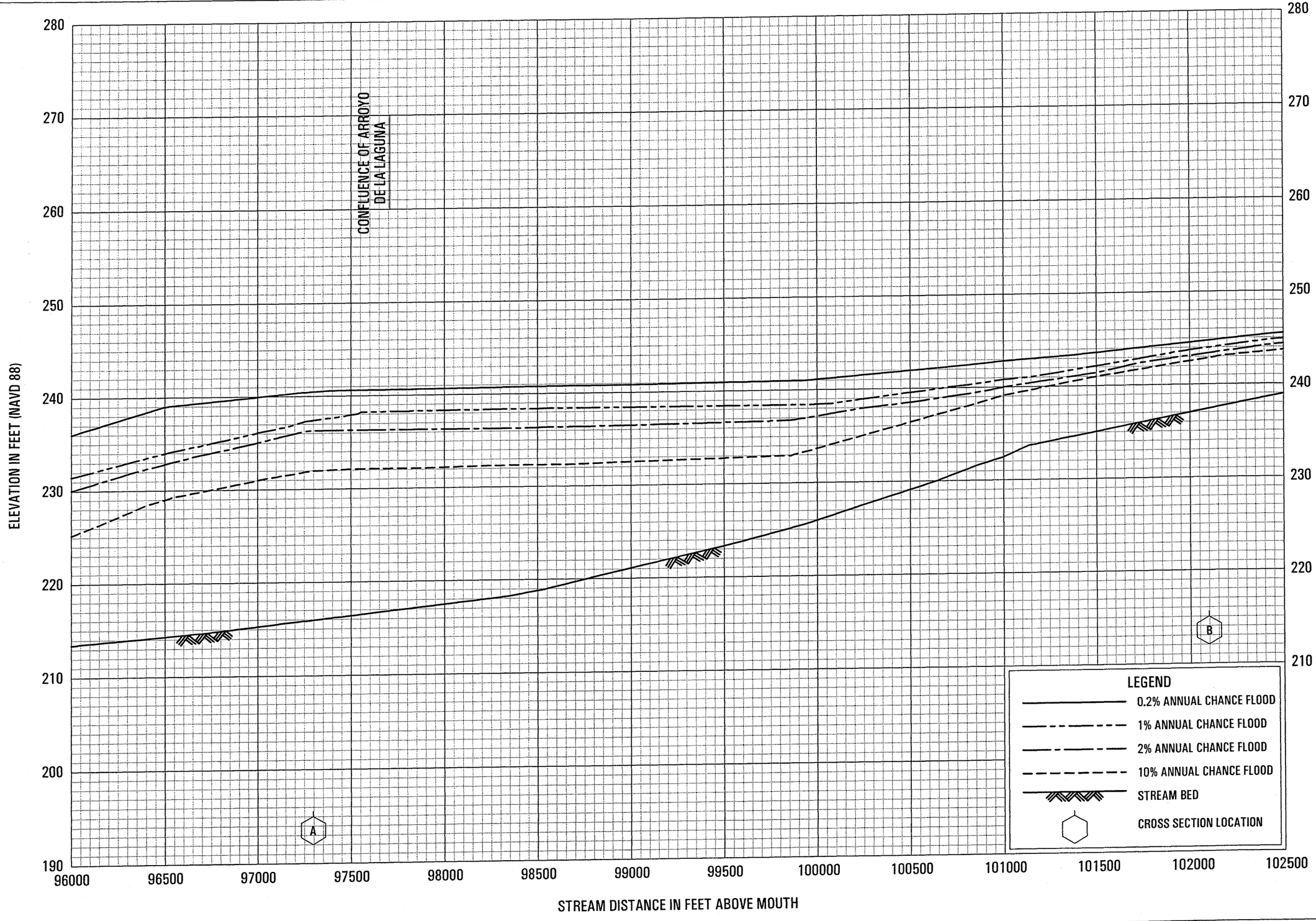
ALAMEDA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

02P



FLOOD PROFILES

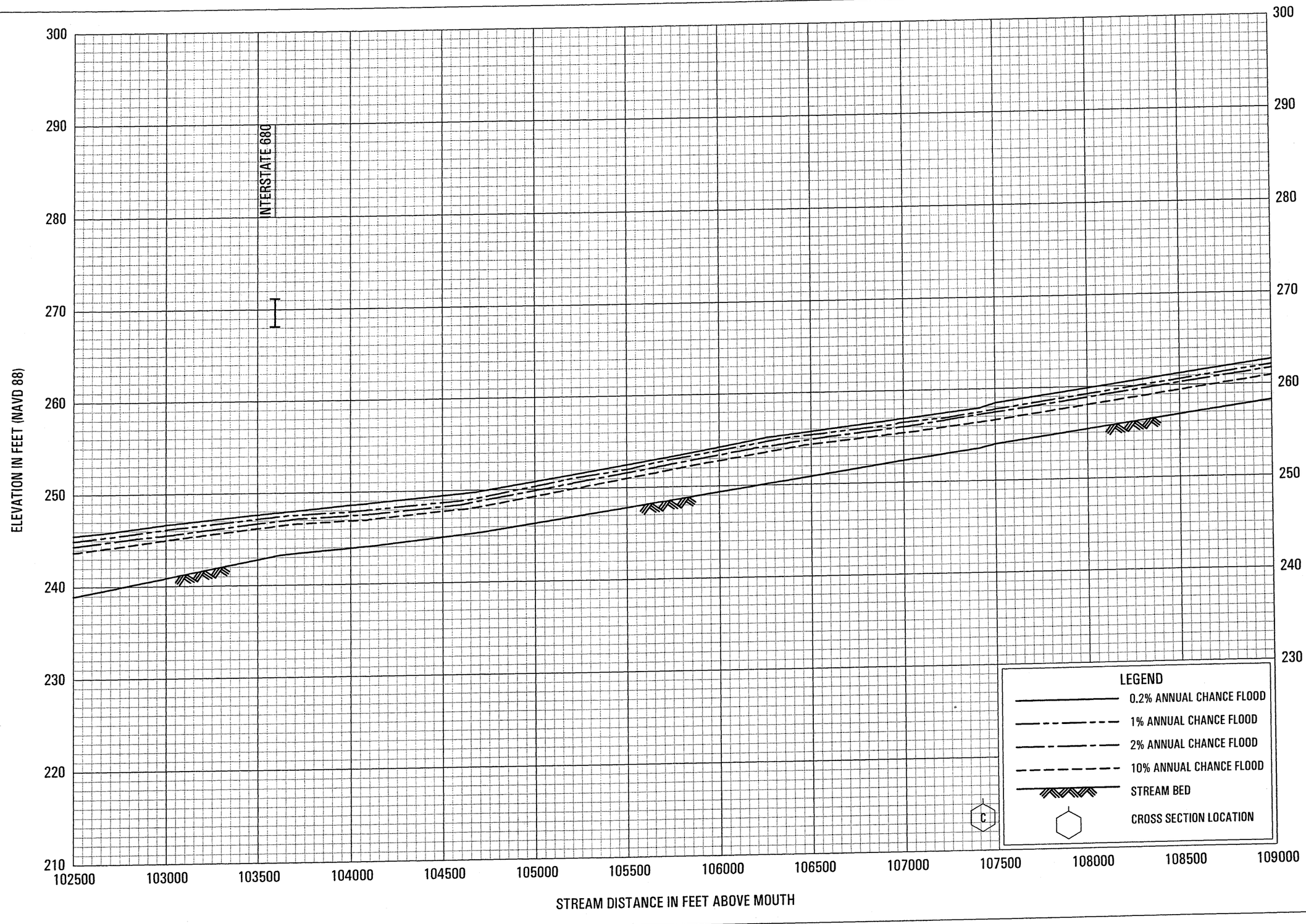
ALAMEDA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

03P



FLOOD PROFILES

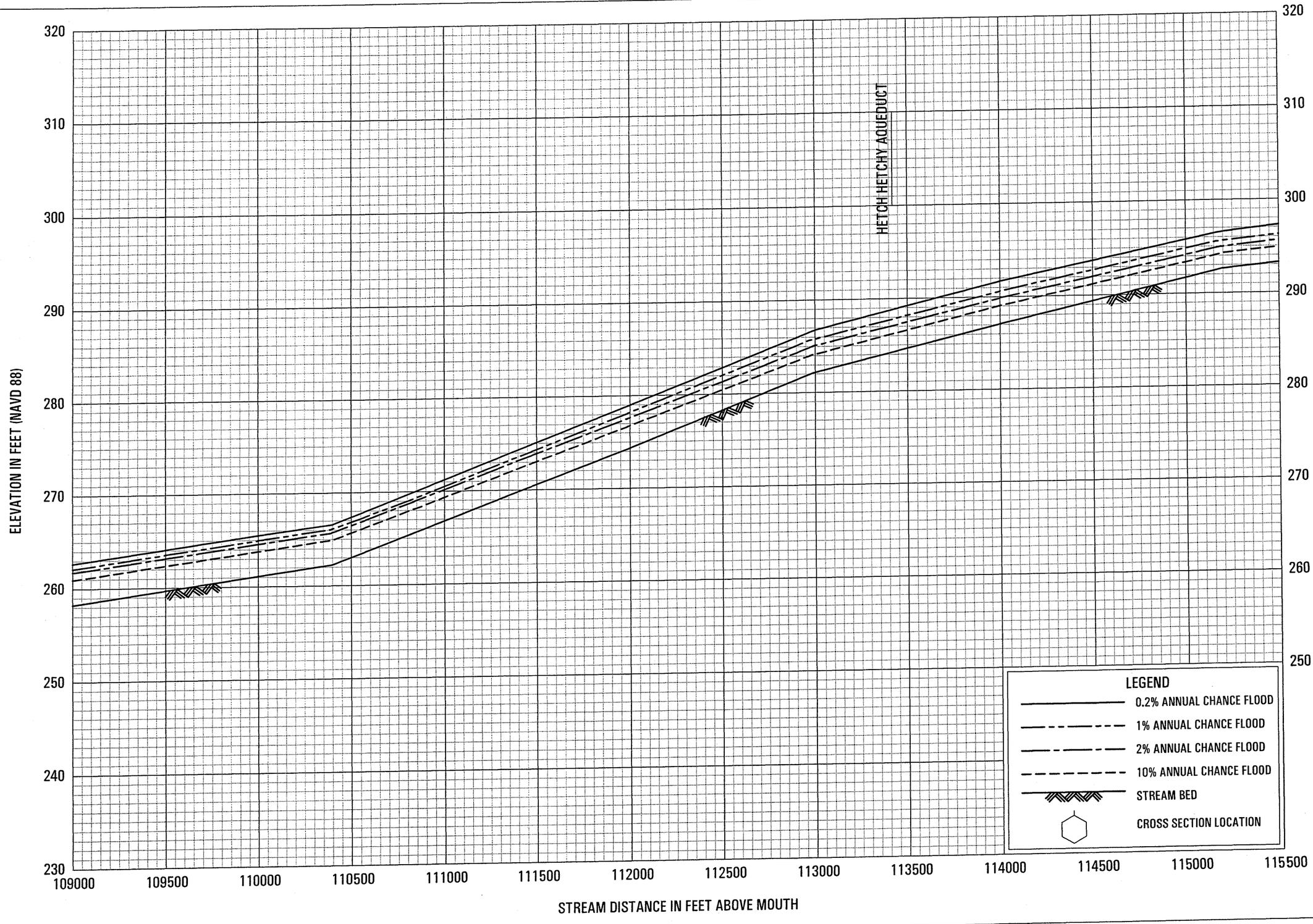
ALAMEDA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

04P



FLOOD PROFILES

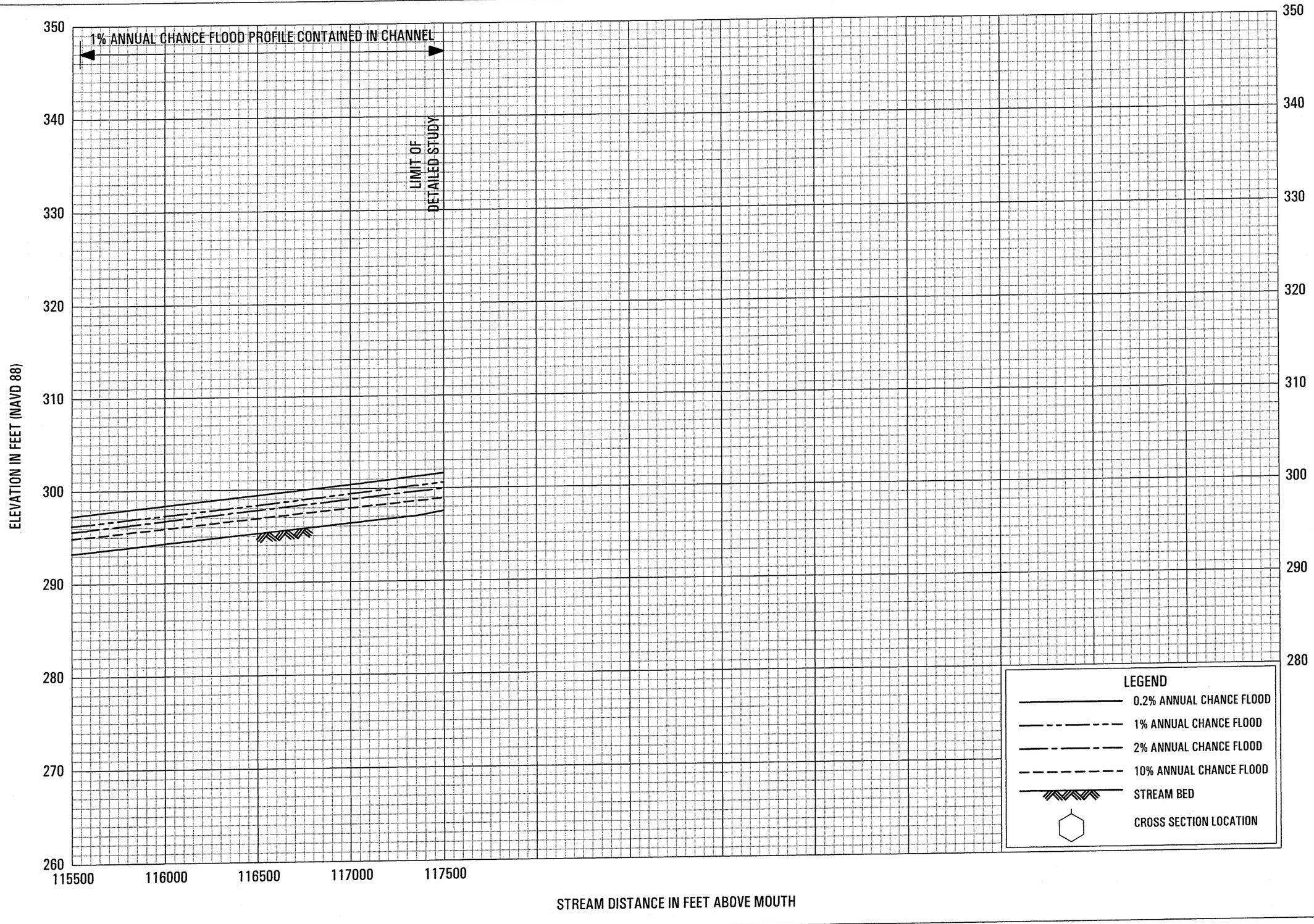
ALAMEDA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

05P



FLOOD PROFILES

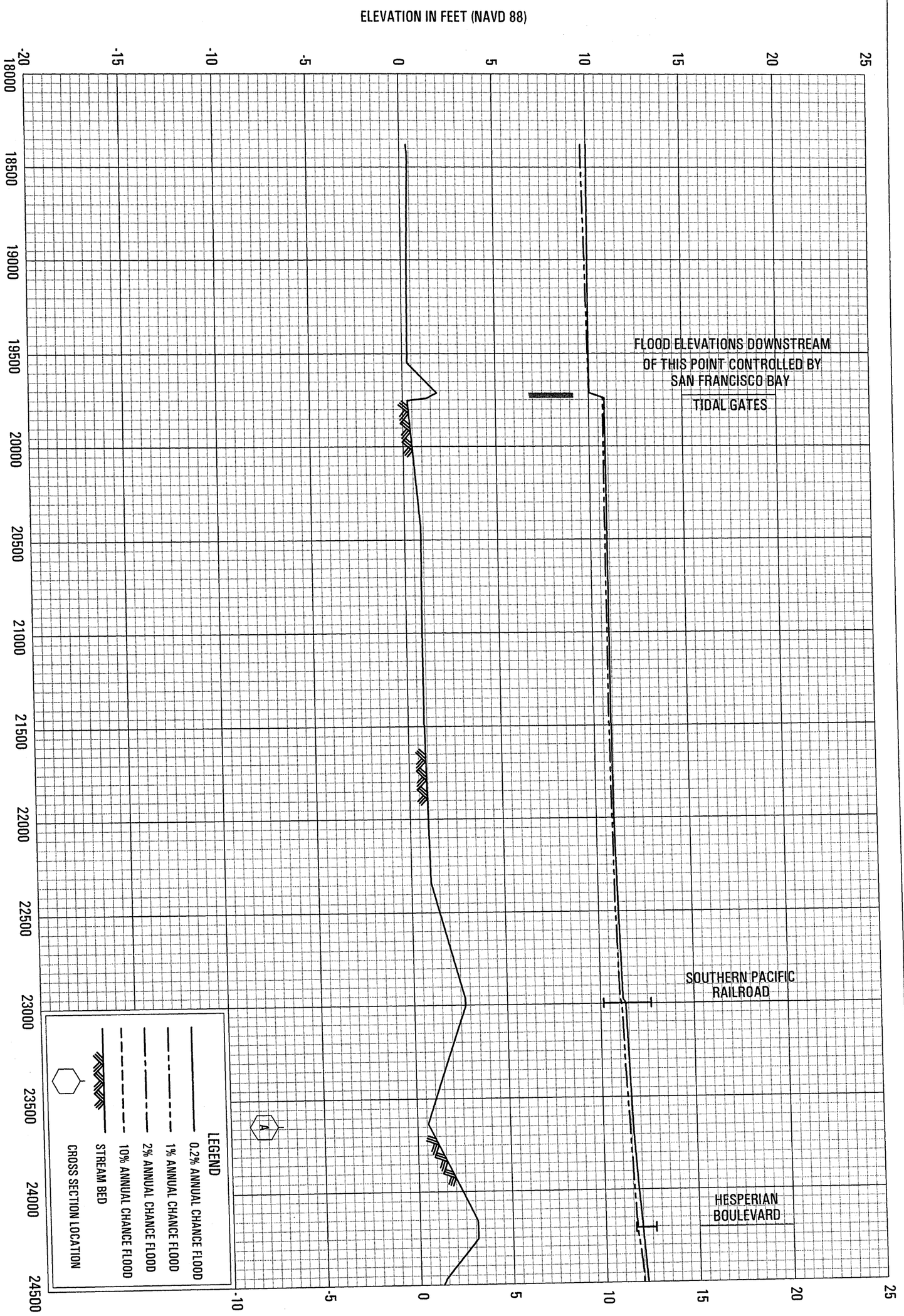
ALAMEDA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

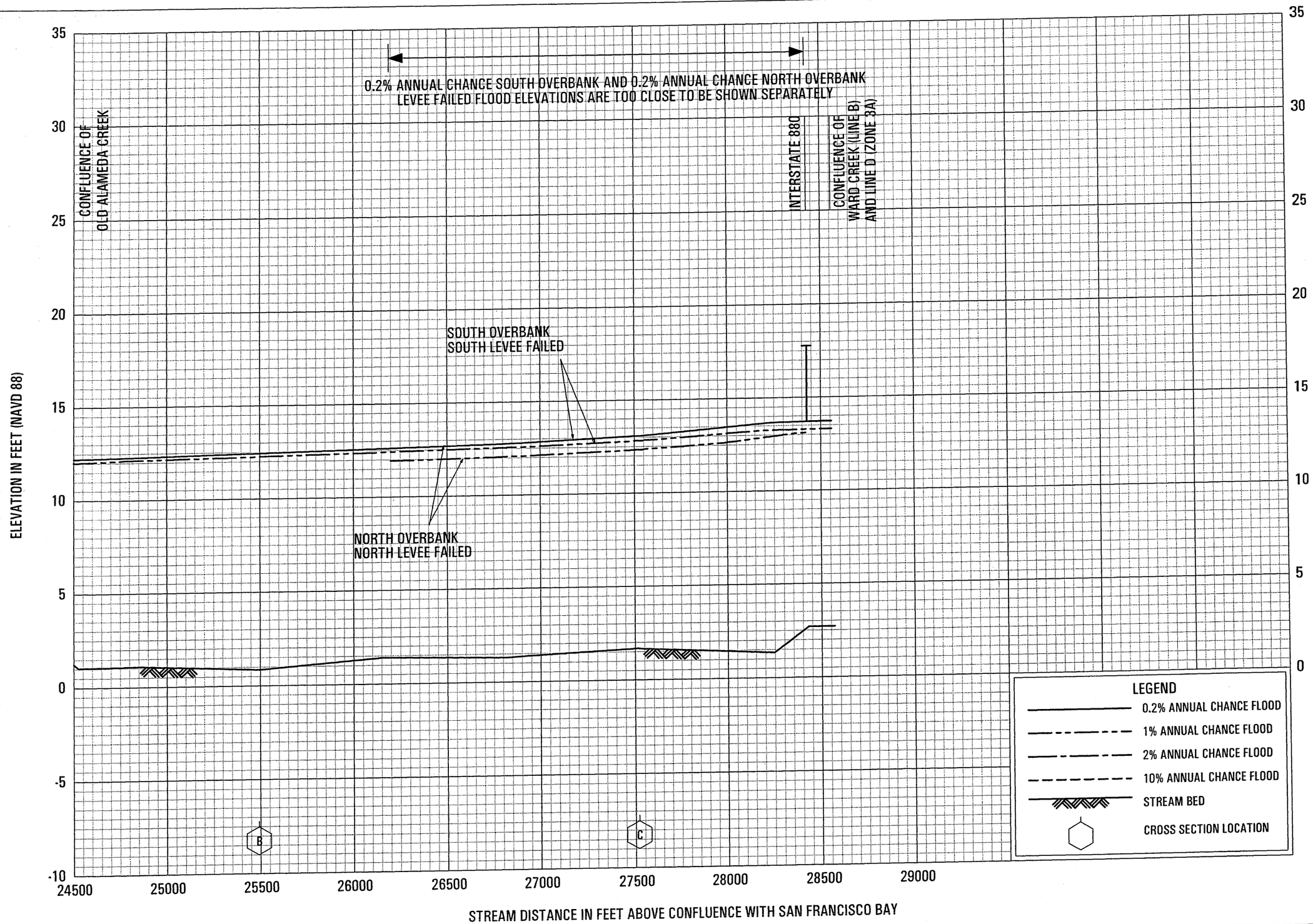
ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

06P



07P	FEDERAL EMERGENCY MANAGEMENT AGENCY ALAMEDA COUNTY, CA AND INCORPORATED AREAS	FLOOD PROFILES ALAMEDA CREEK LINE A (ZONE 3A)- LEVEE FAILED



FLOOD PROFILES

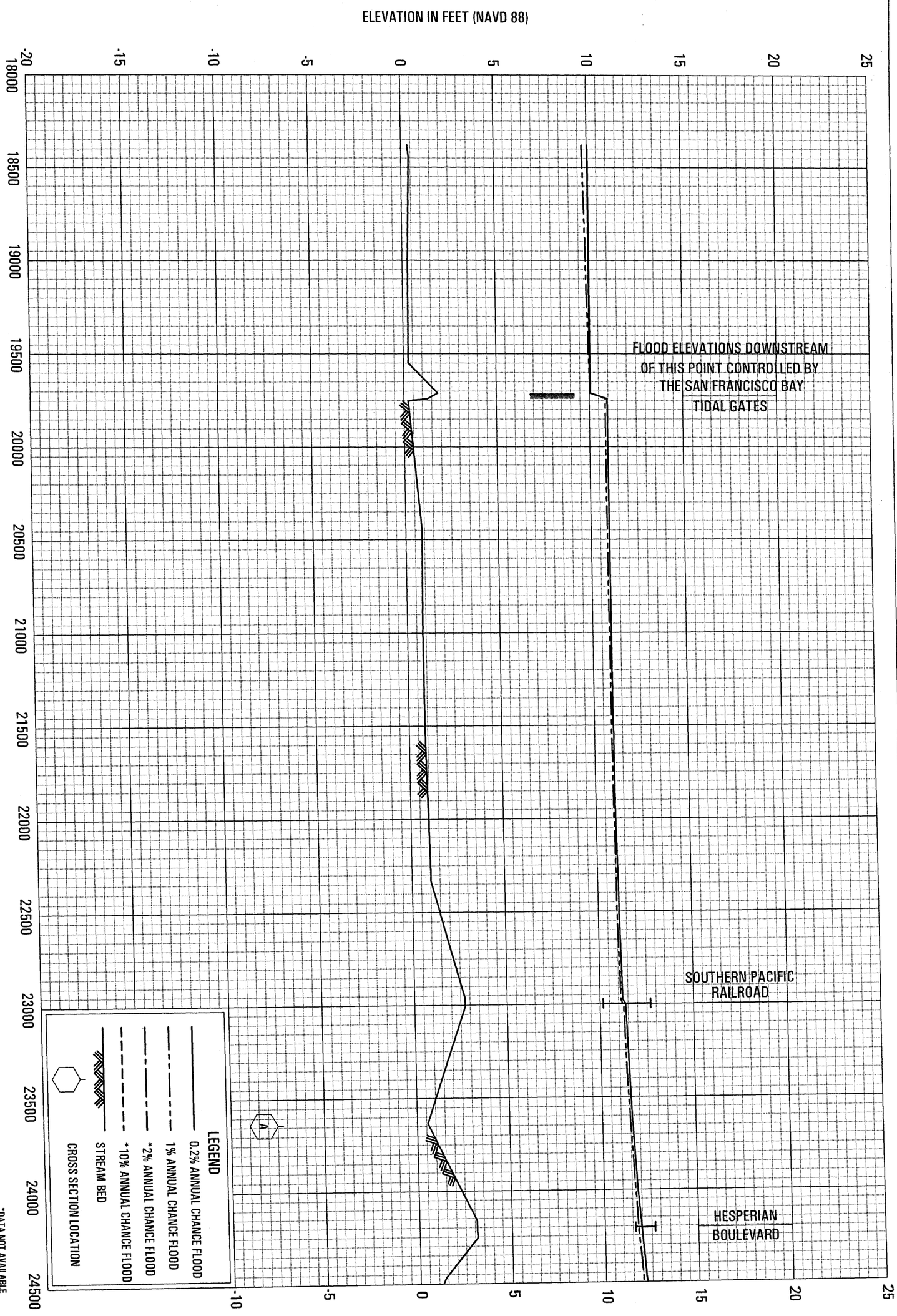
ALAMEDA CREEK LINE A (ZONE 3A)- LEVEE FAILED

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

08P



09P

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

FLOOD PROFILES

ALAMEDA CREEK LINE A (ZONE 3A)- WITH LEVEE

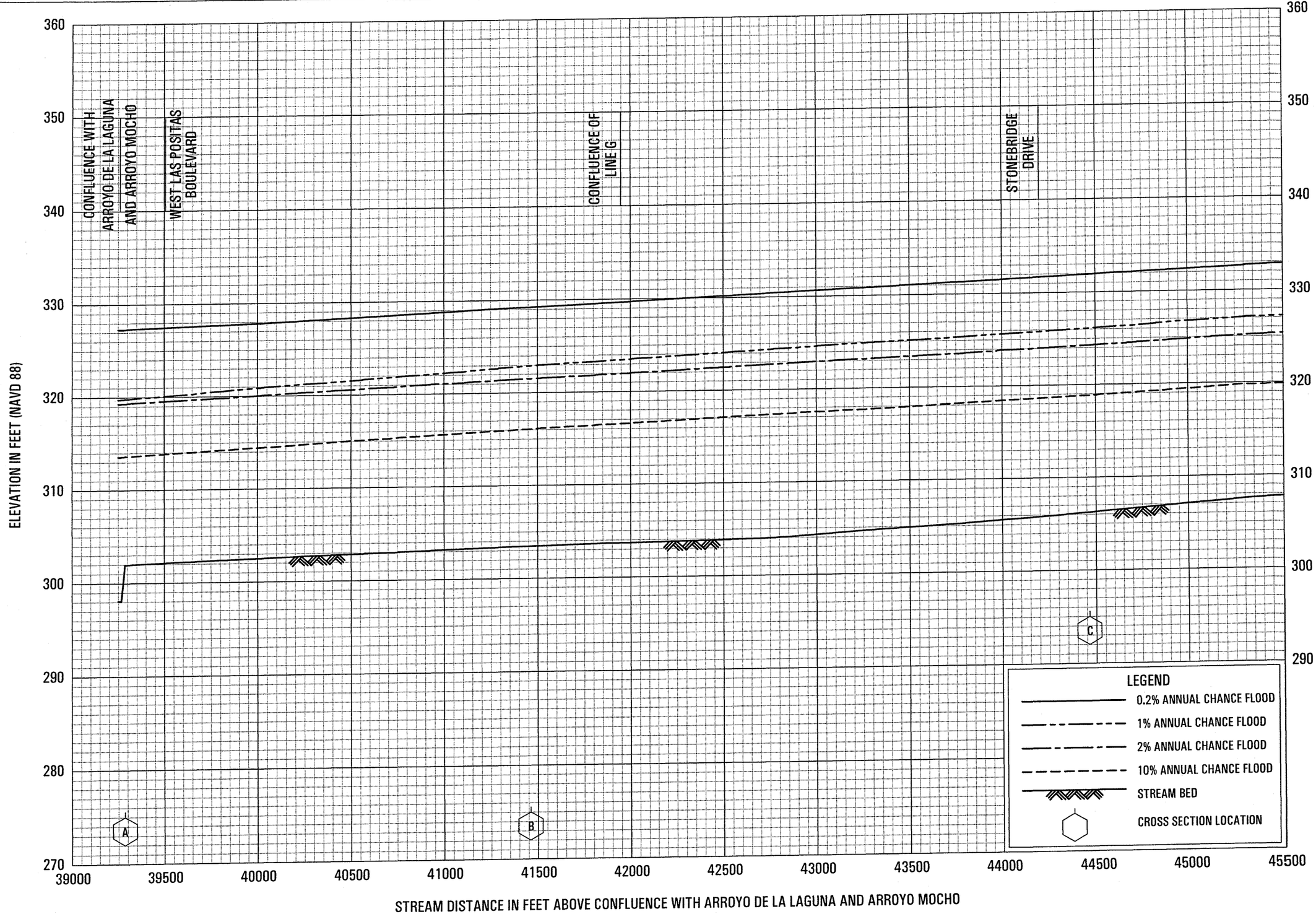
FLOOD PROFILES

ALAMEDA CREEK LINE A (ZONE 3A)- WITH LEVEE

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



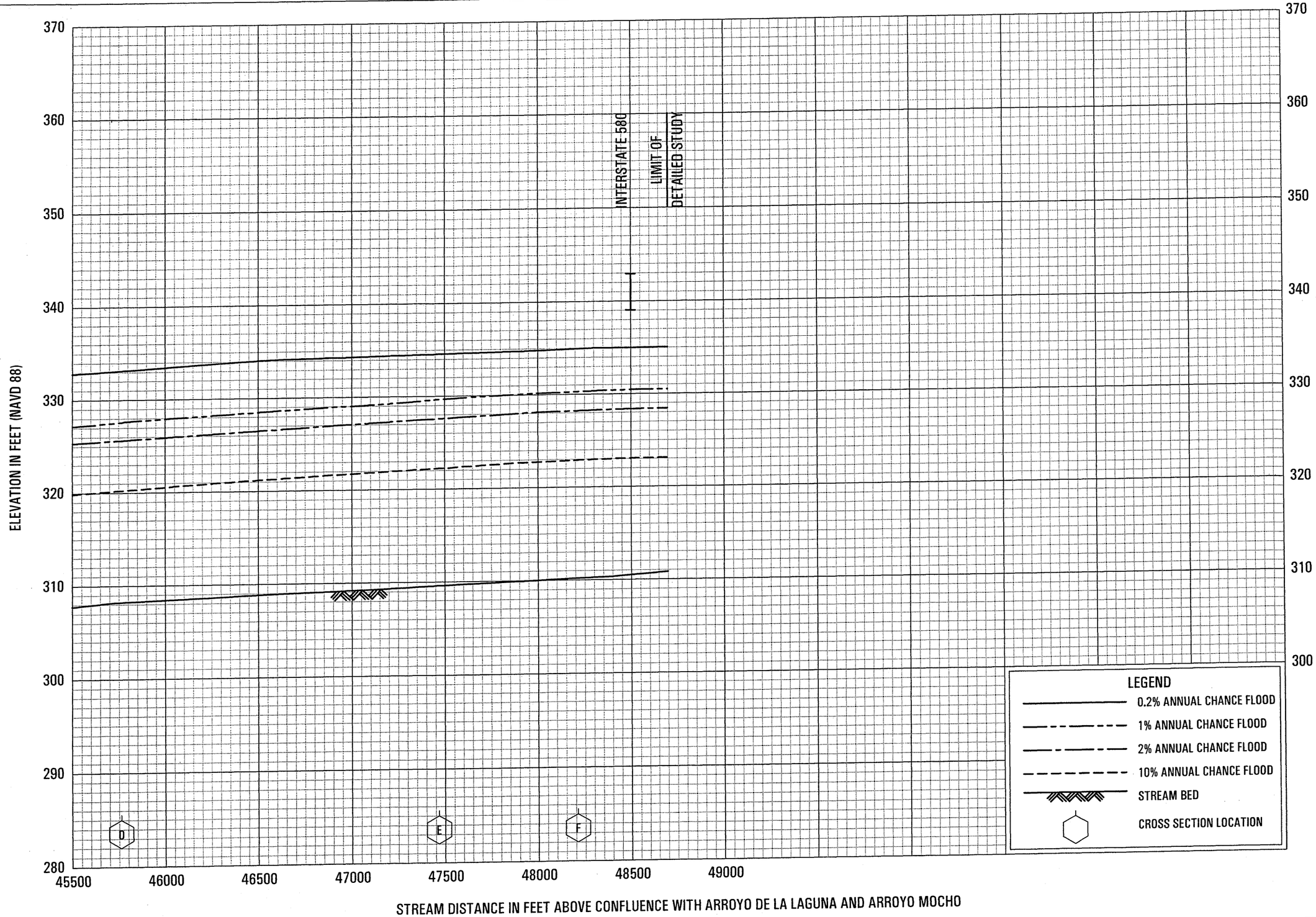
FLOOD PROFILES

ALAMO CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



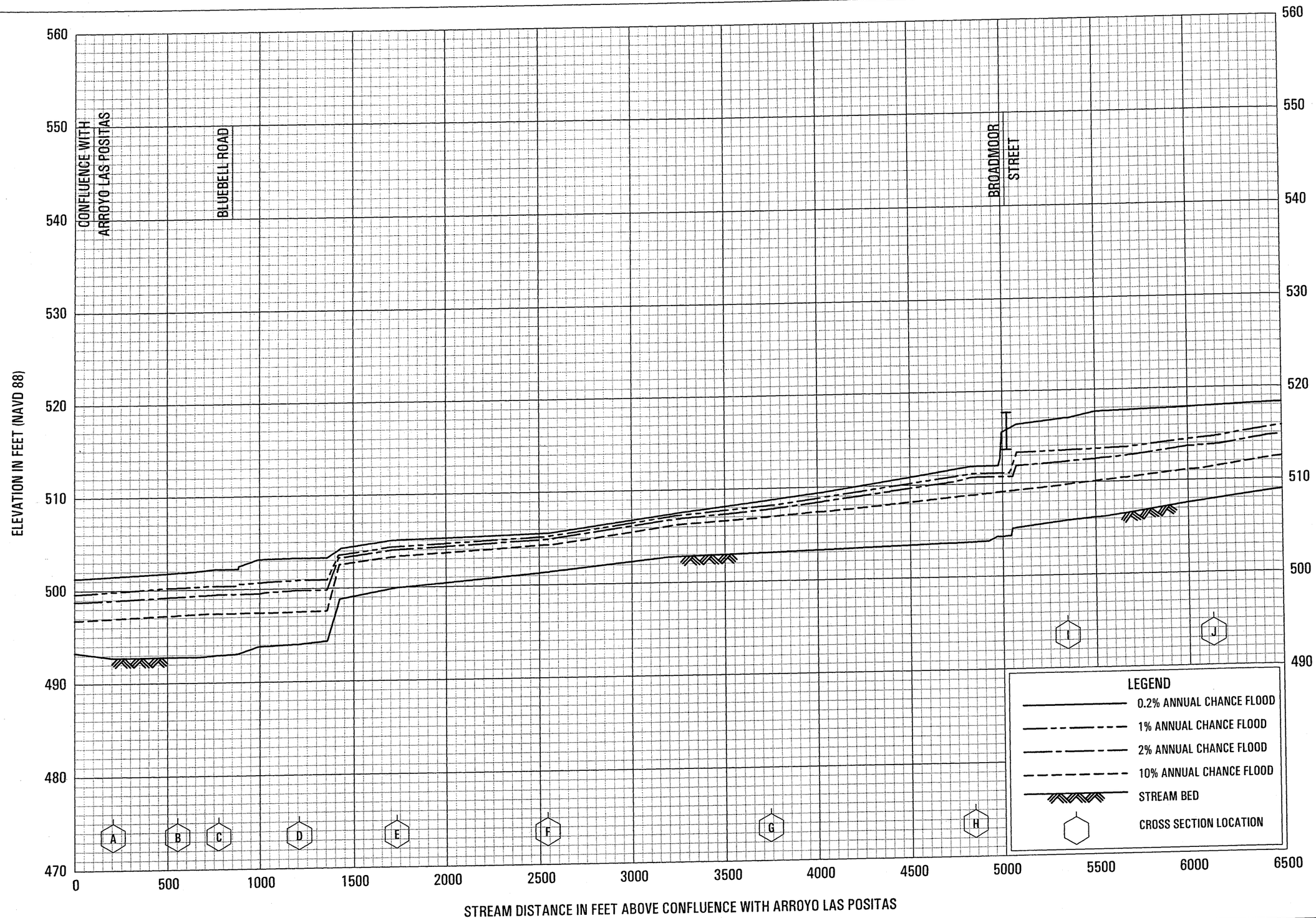
FLOOD PROFILES

ALAMO CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



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ALTAMONT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

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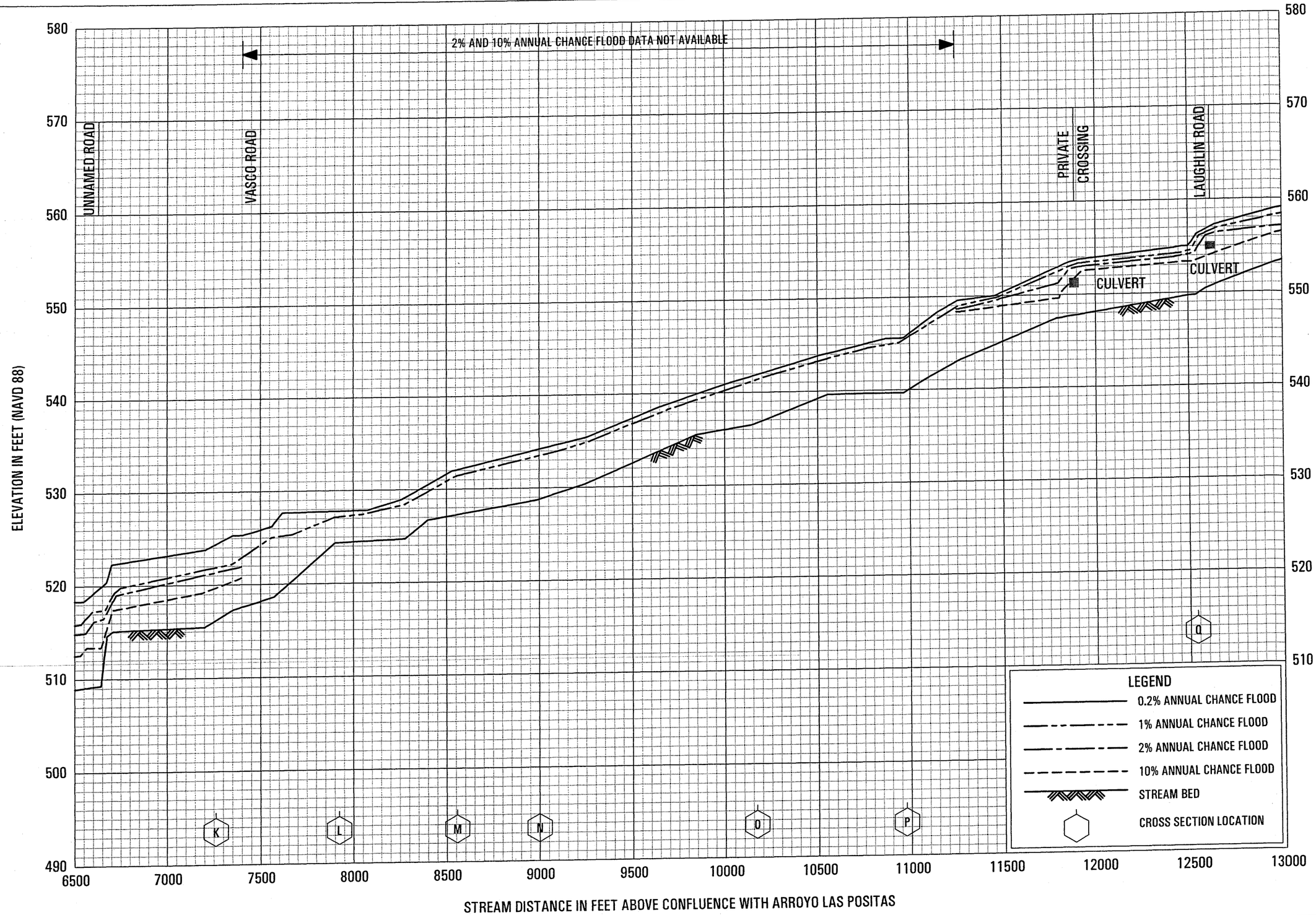

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ALAMEDA COUNTY, CA

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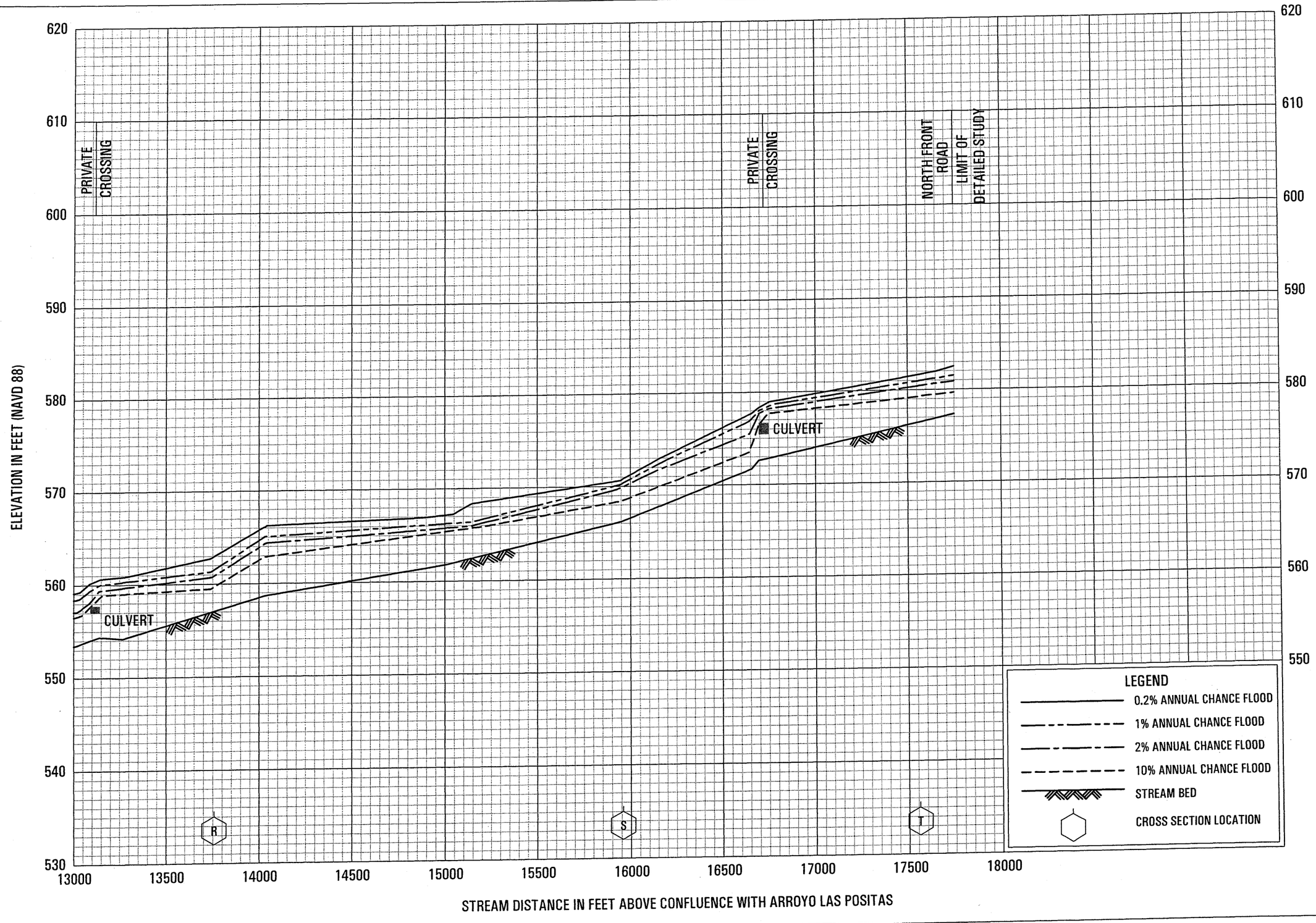

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ALAMEDA COUNTY, CA

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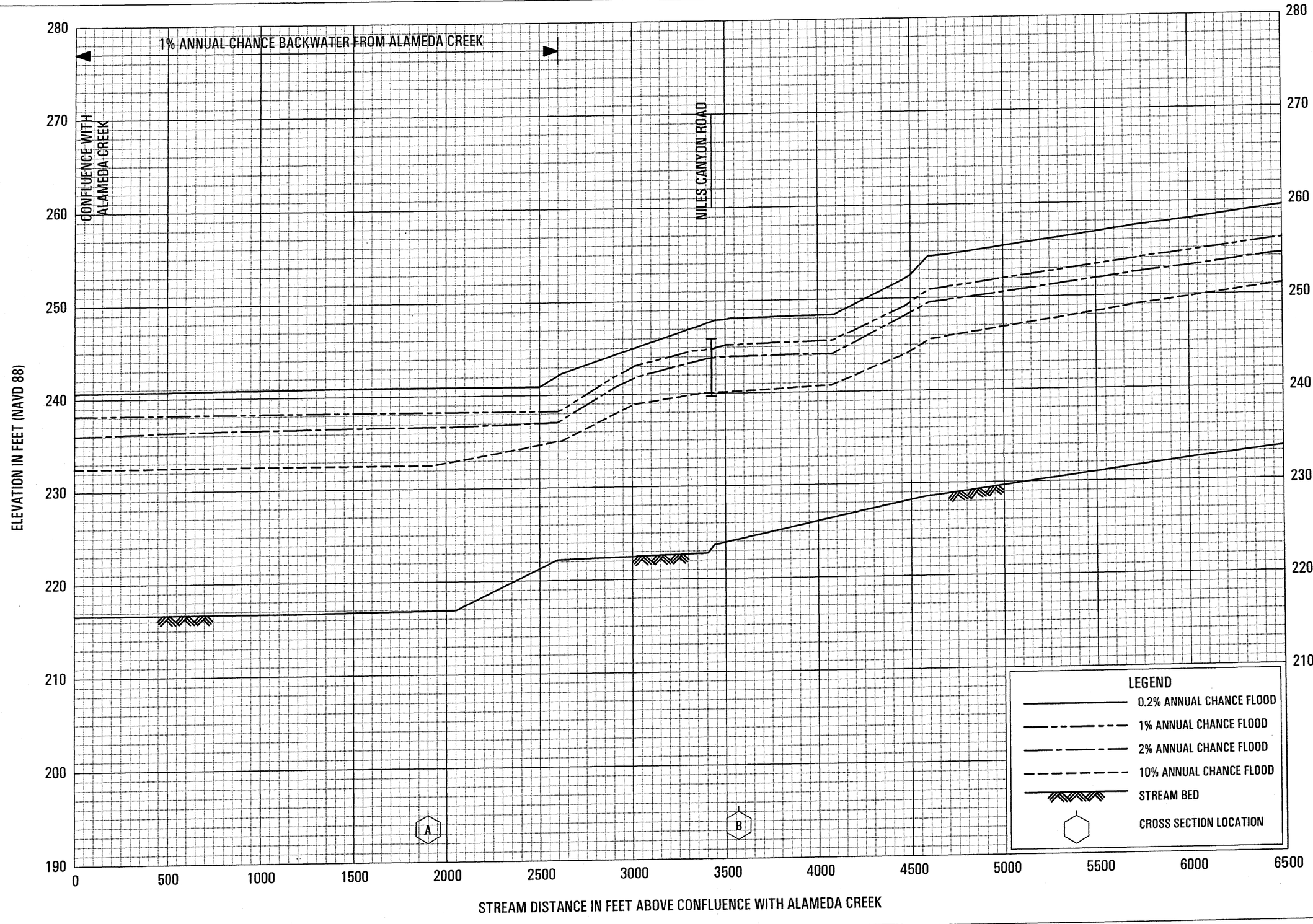

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ARROYO DE LA LAGUNA

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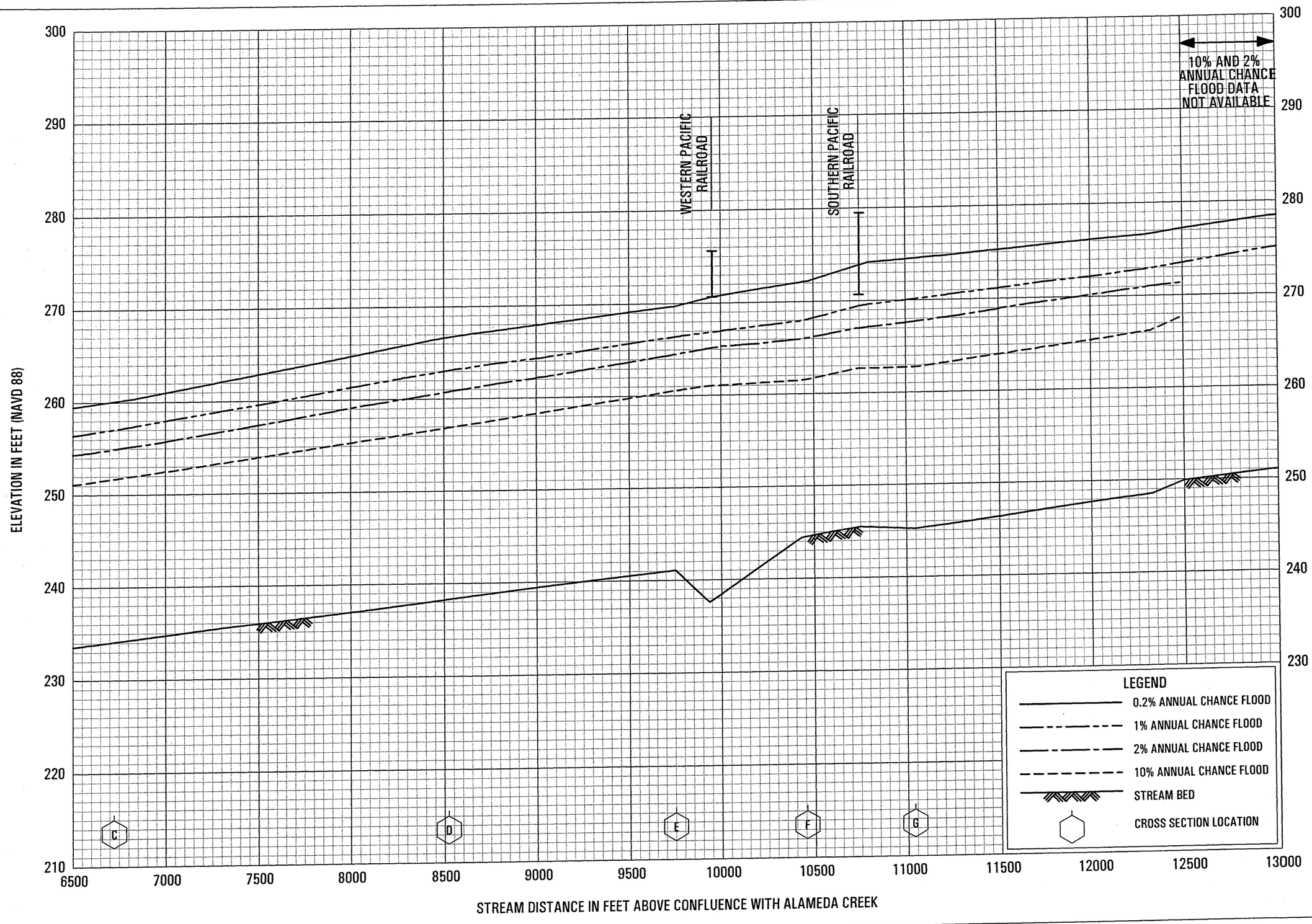

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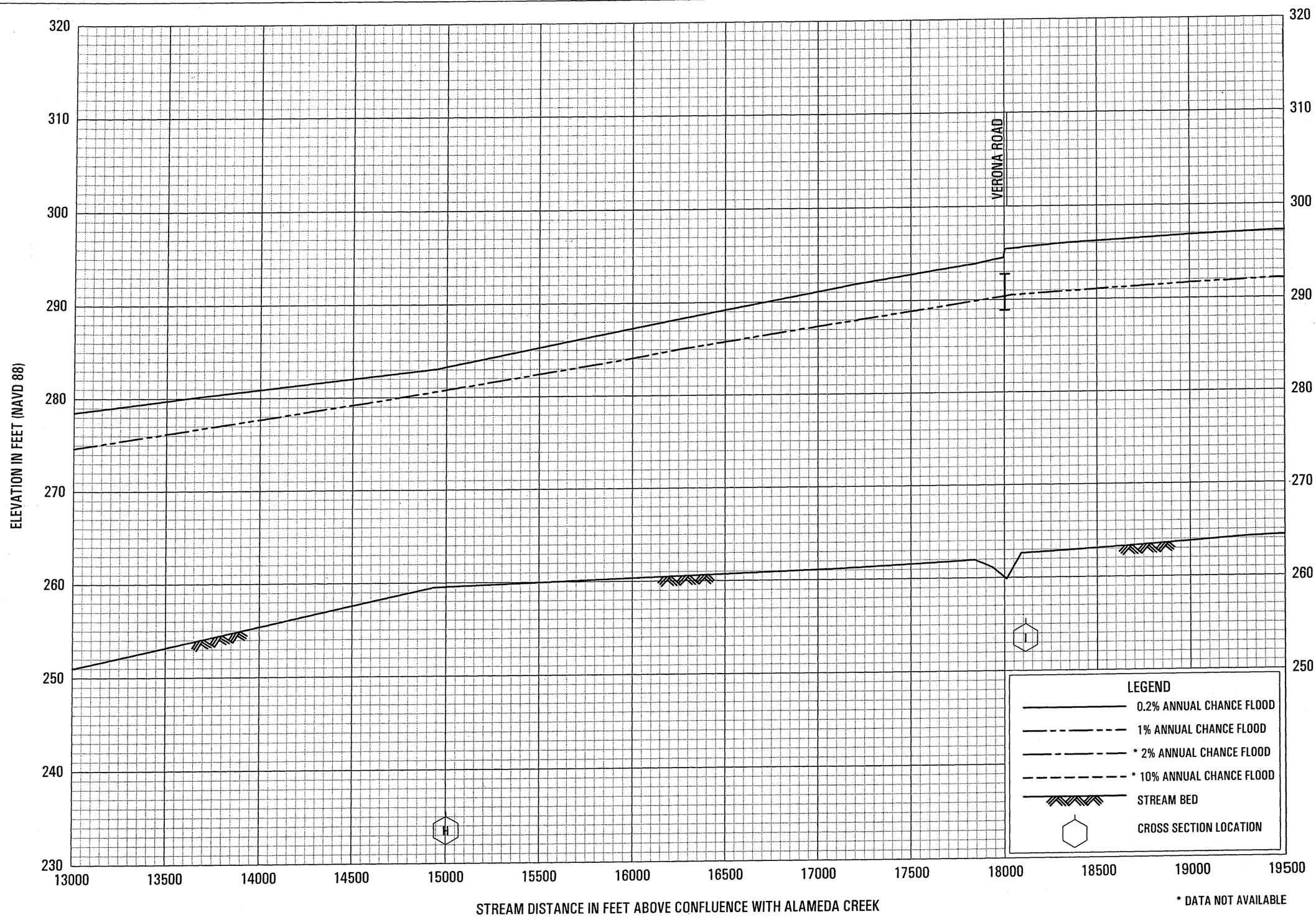

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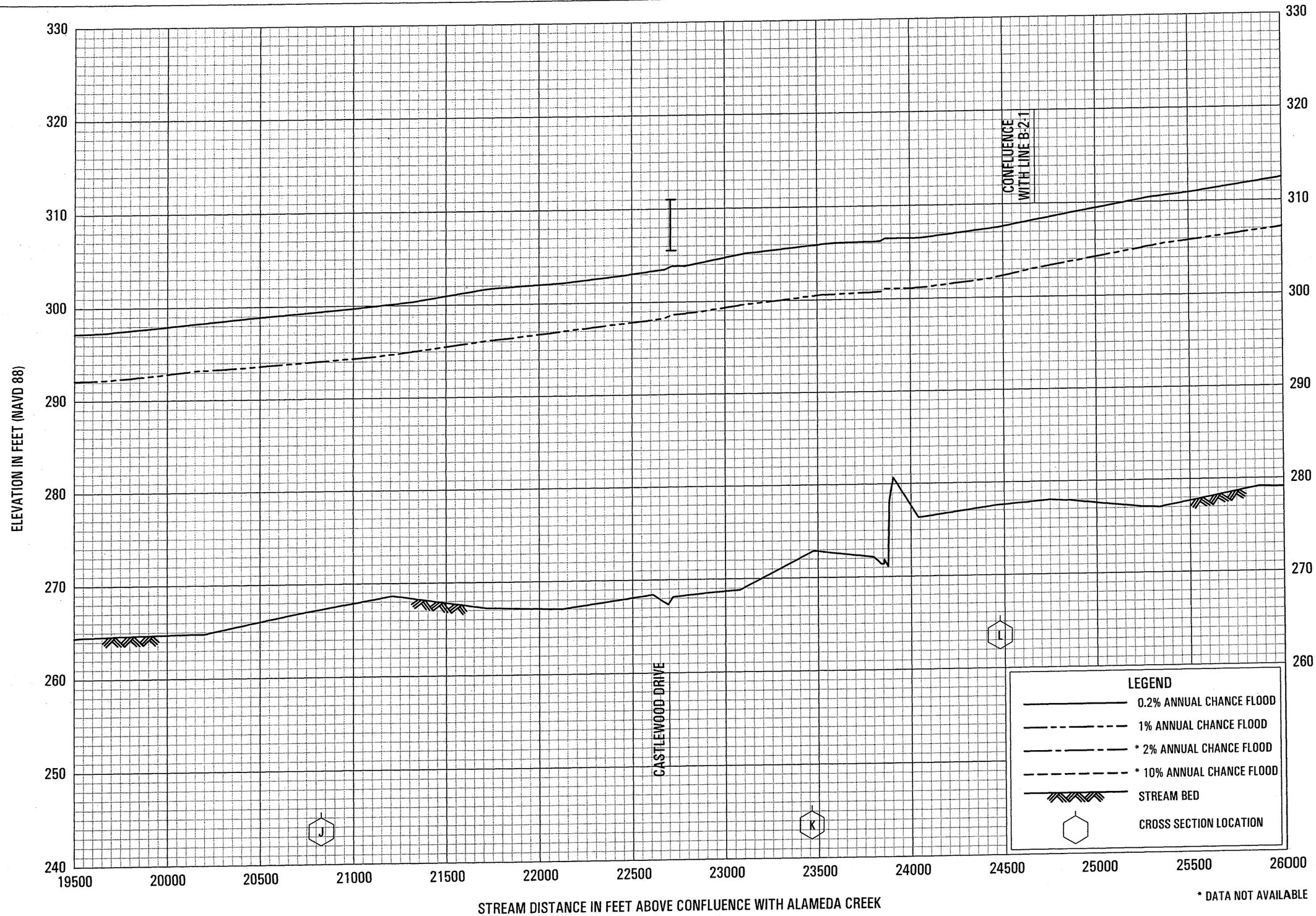

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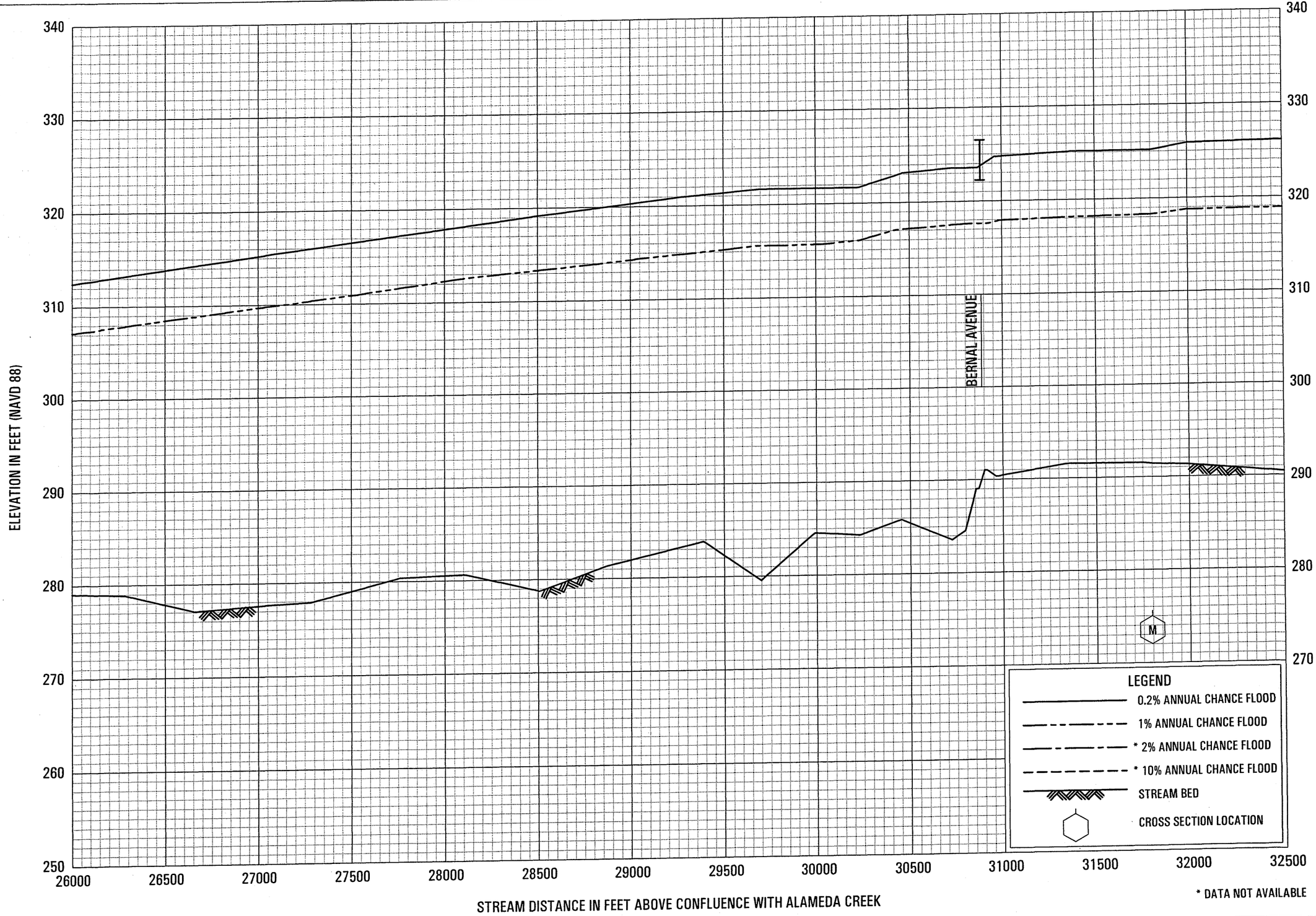

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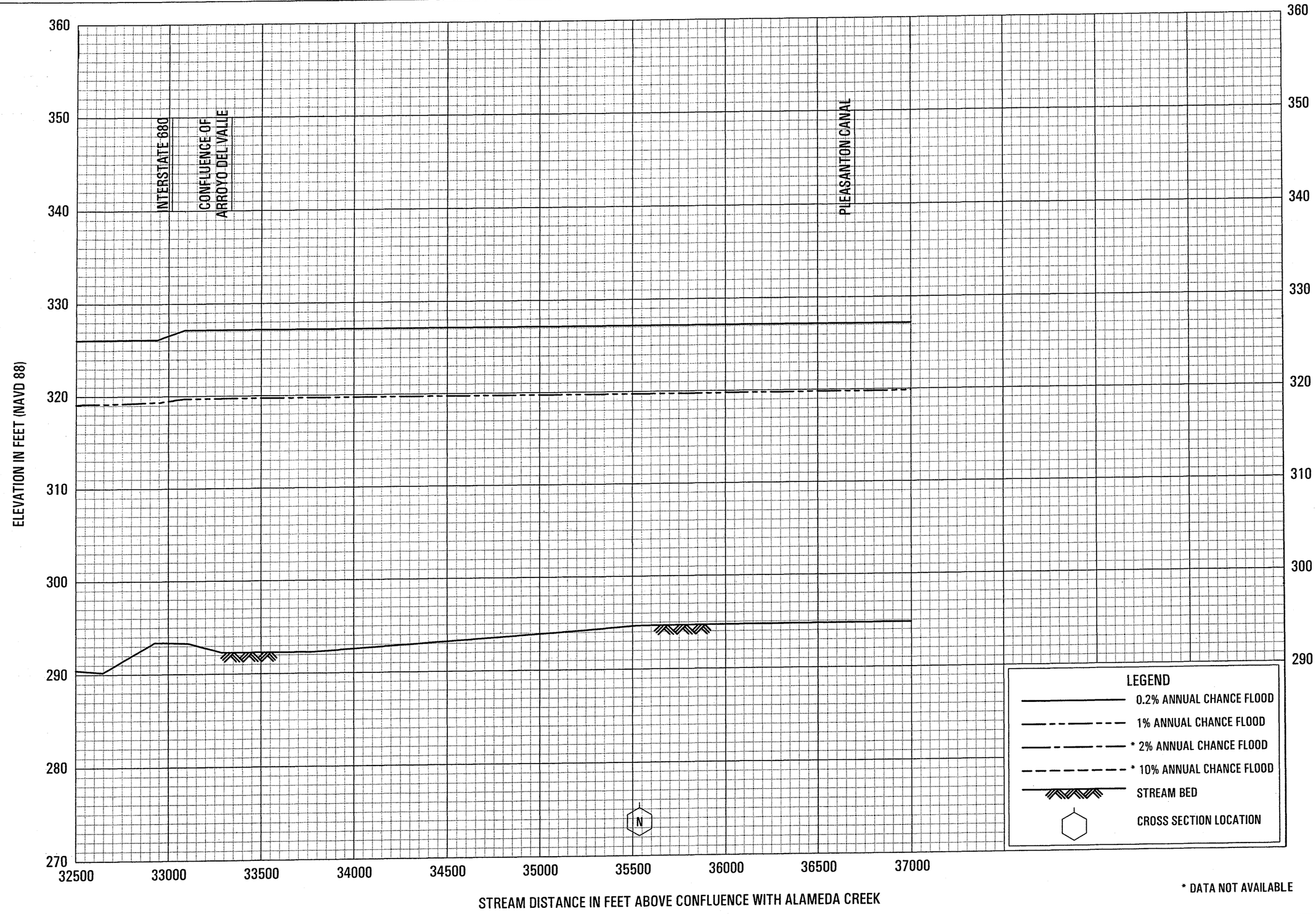

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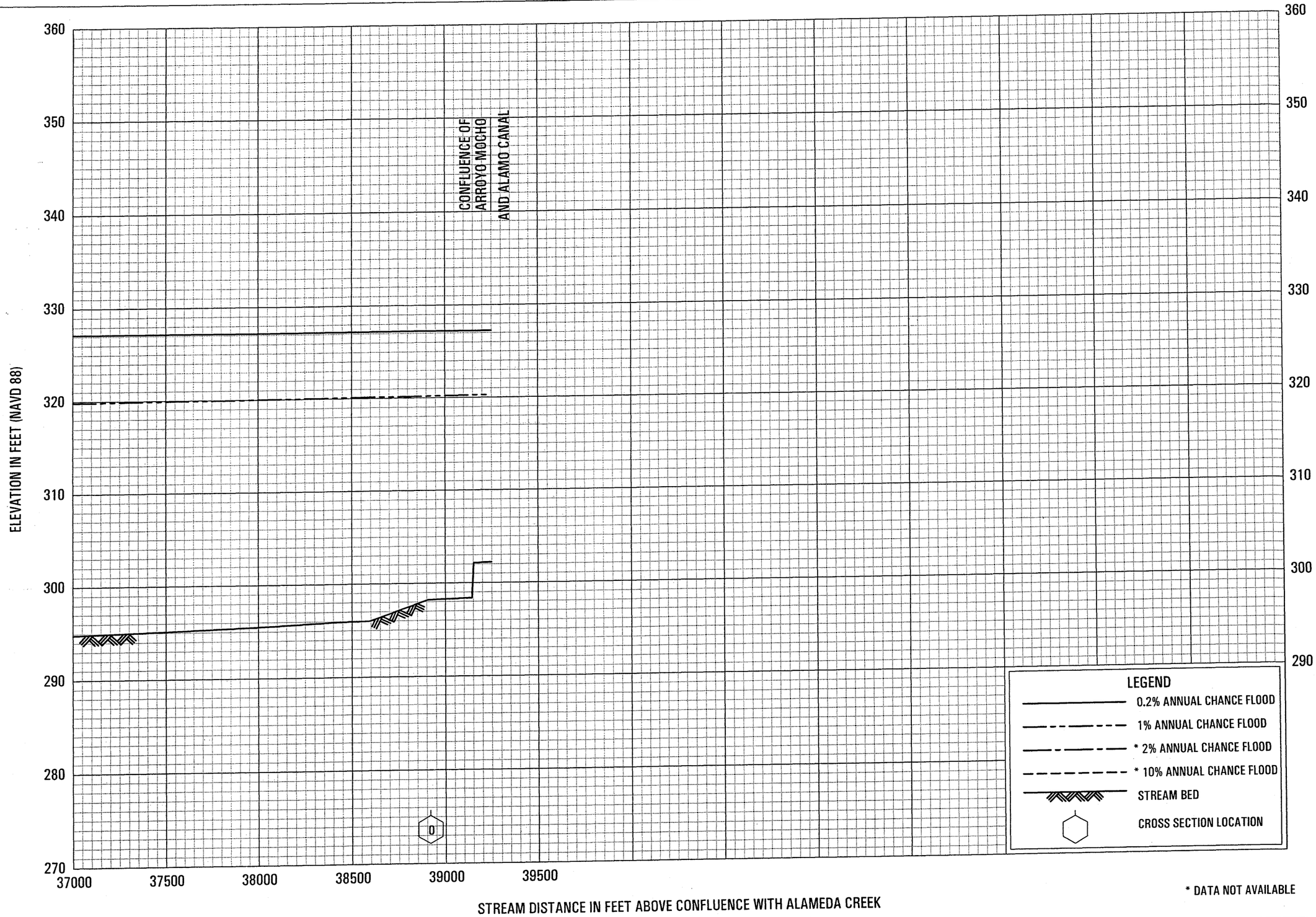

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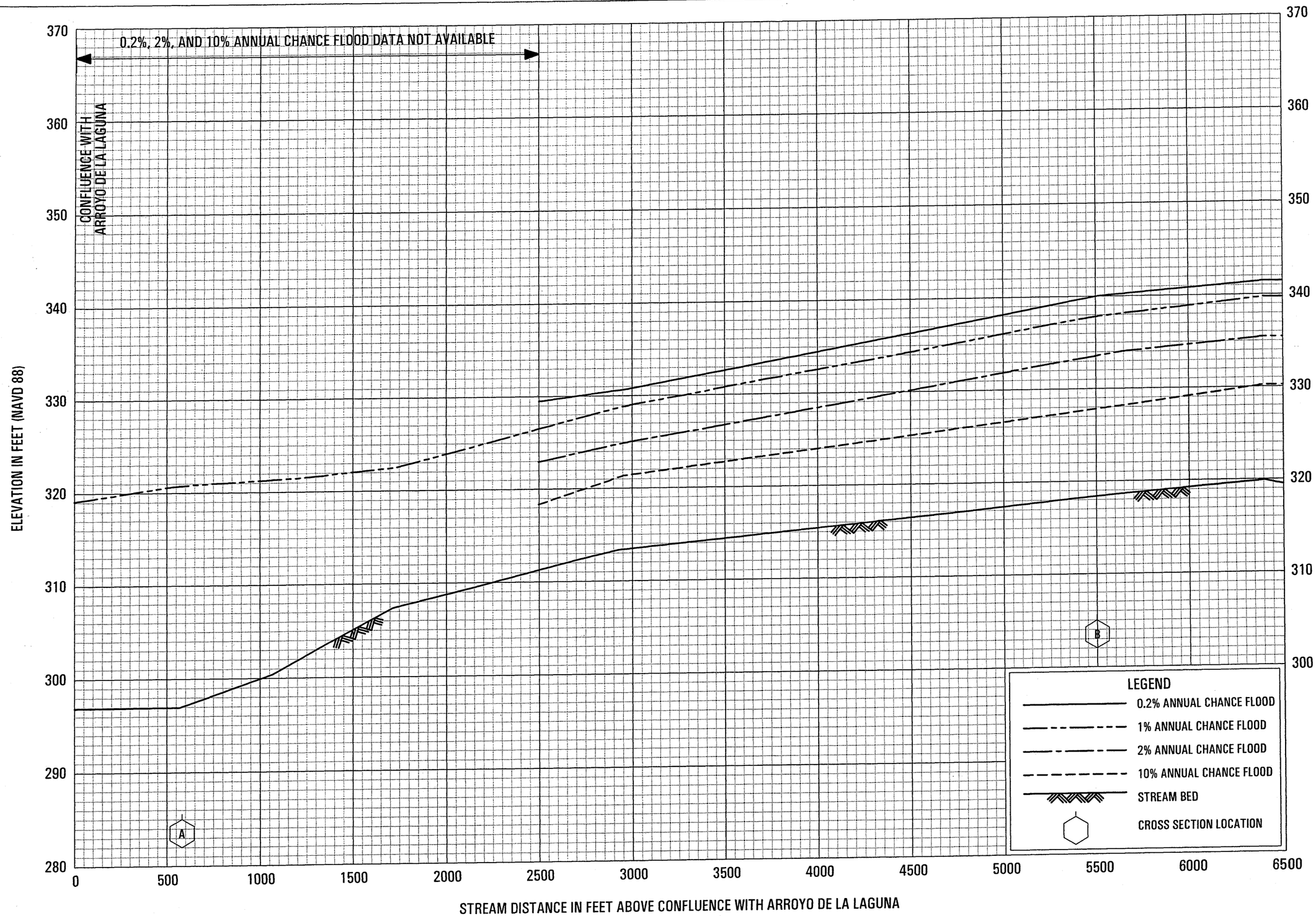

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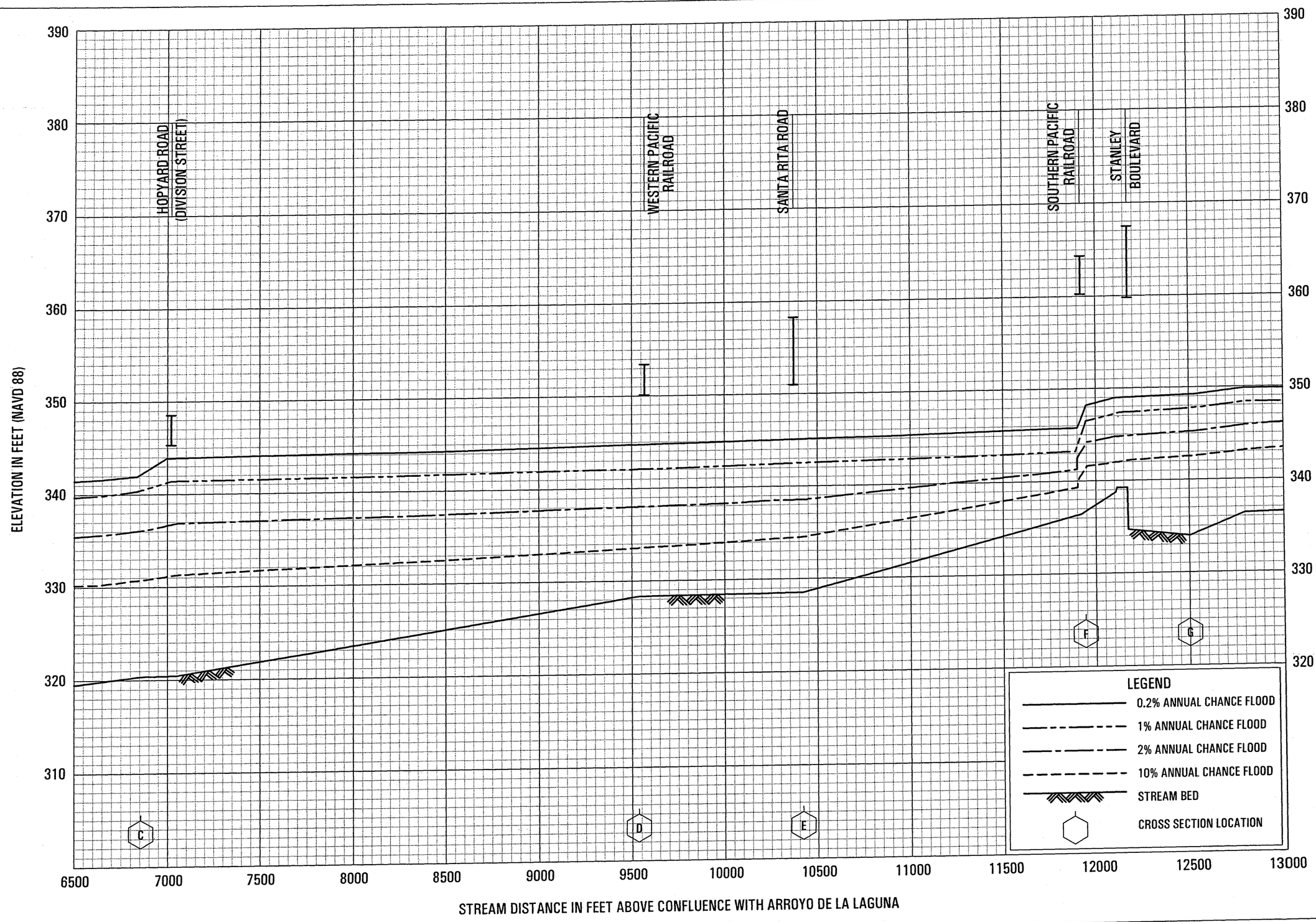

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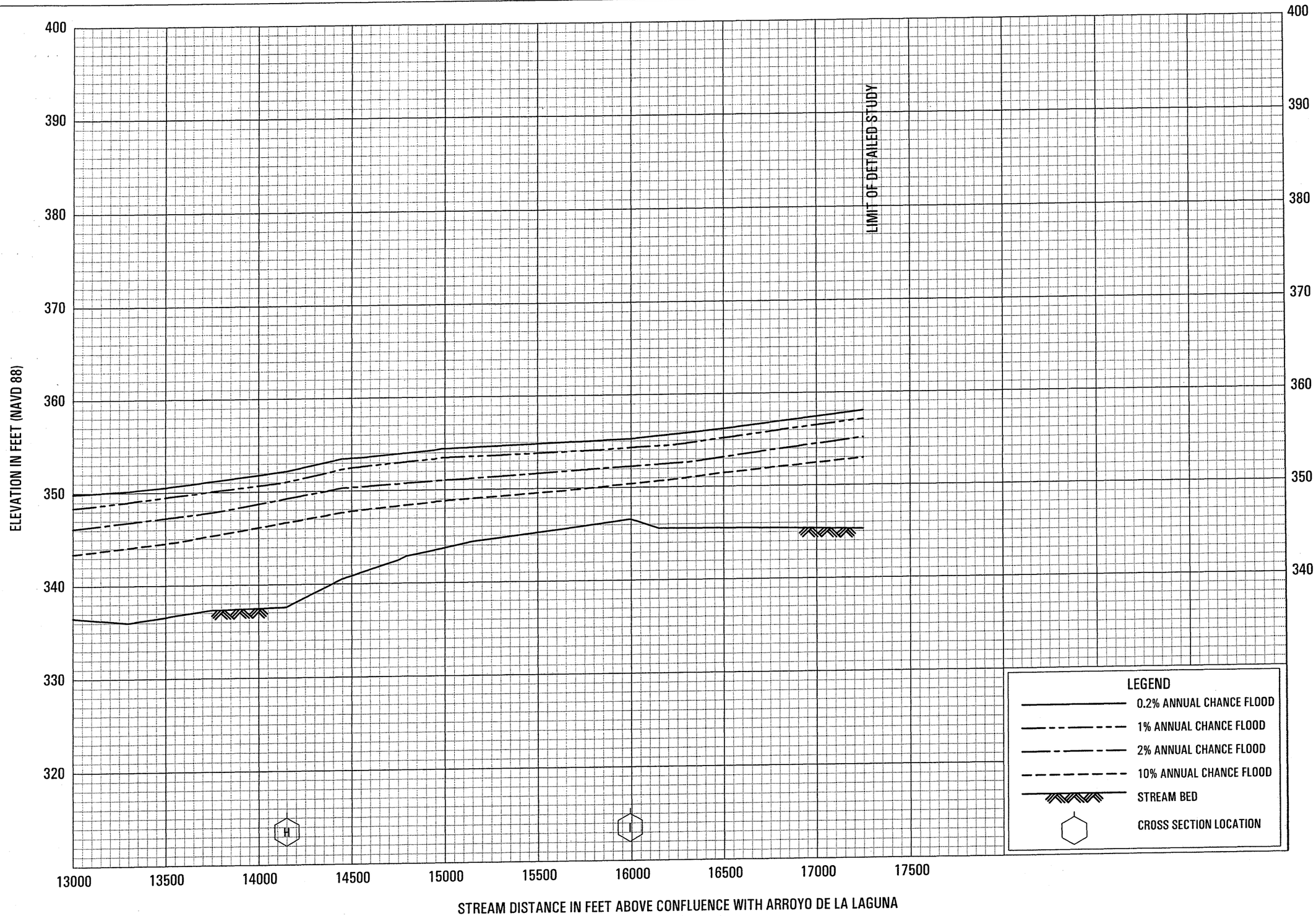

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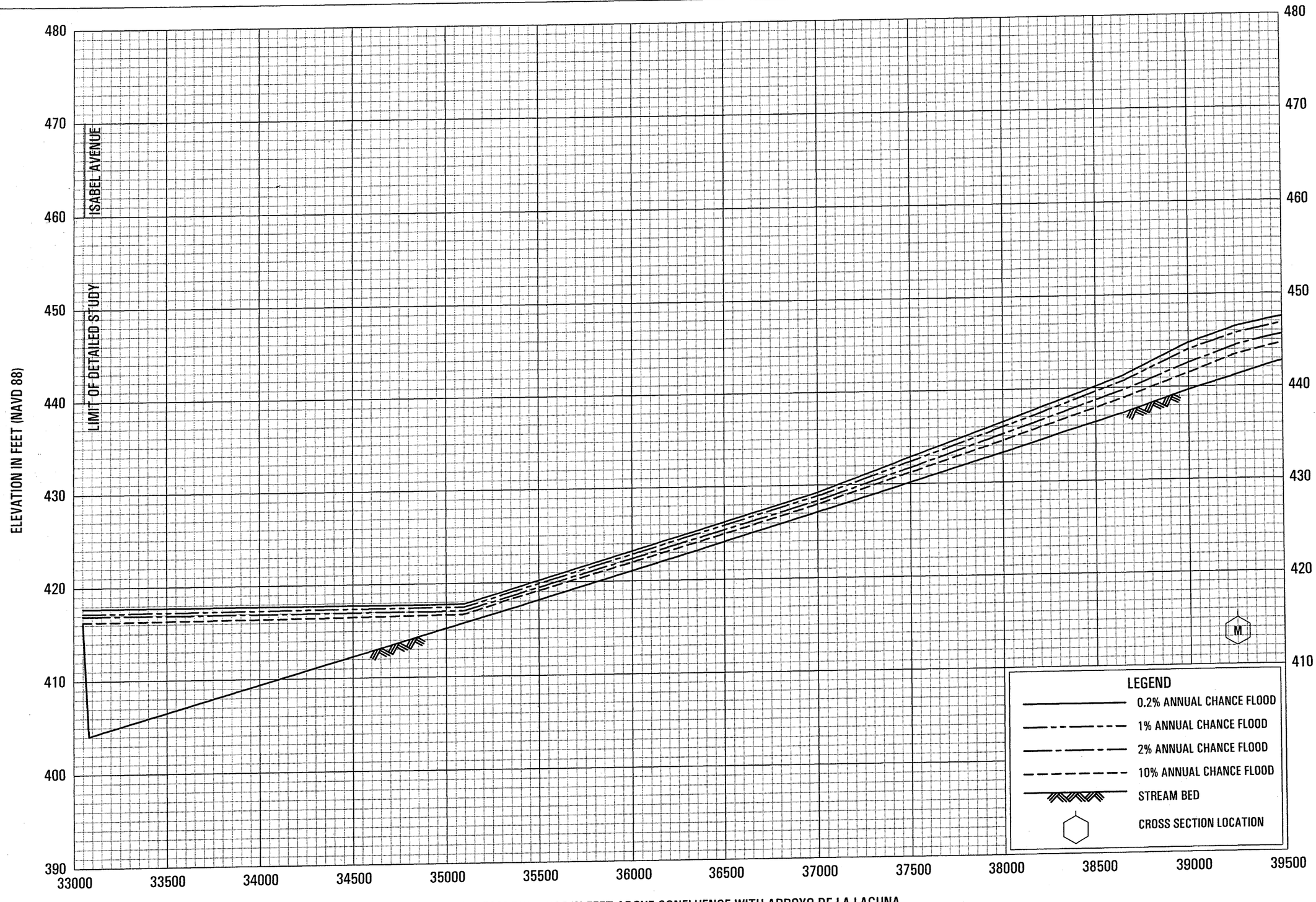

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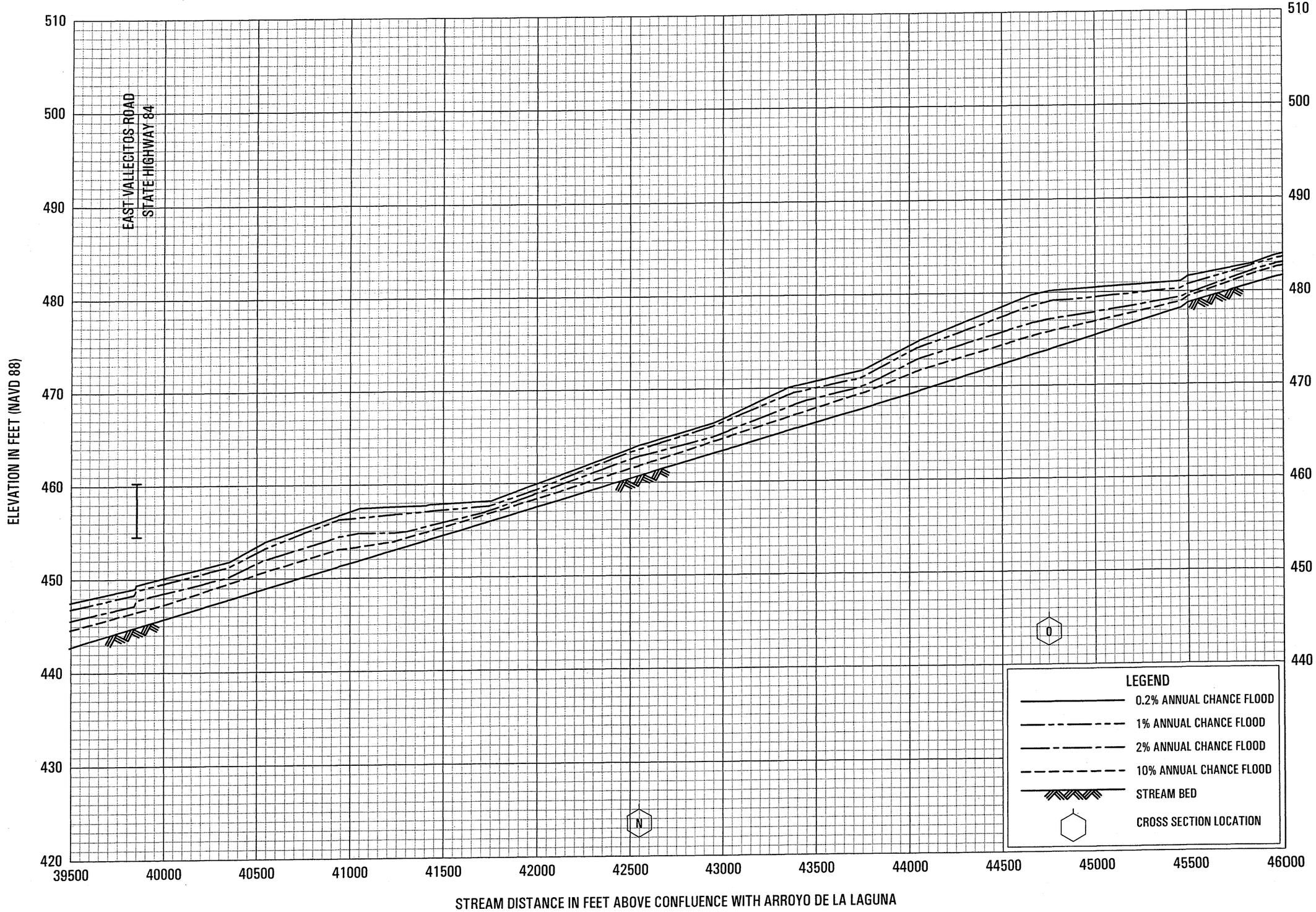

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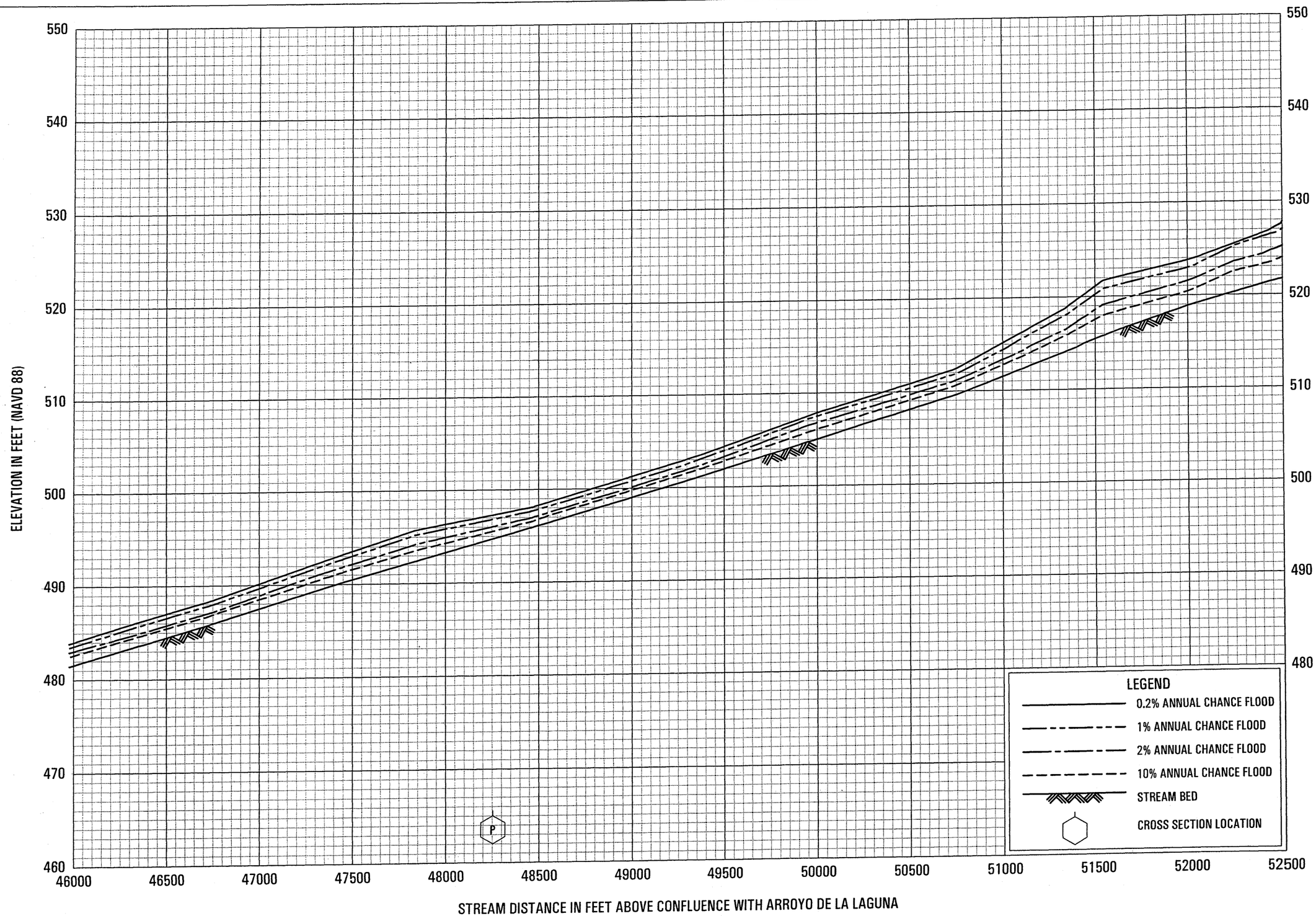

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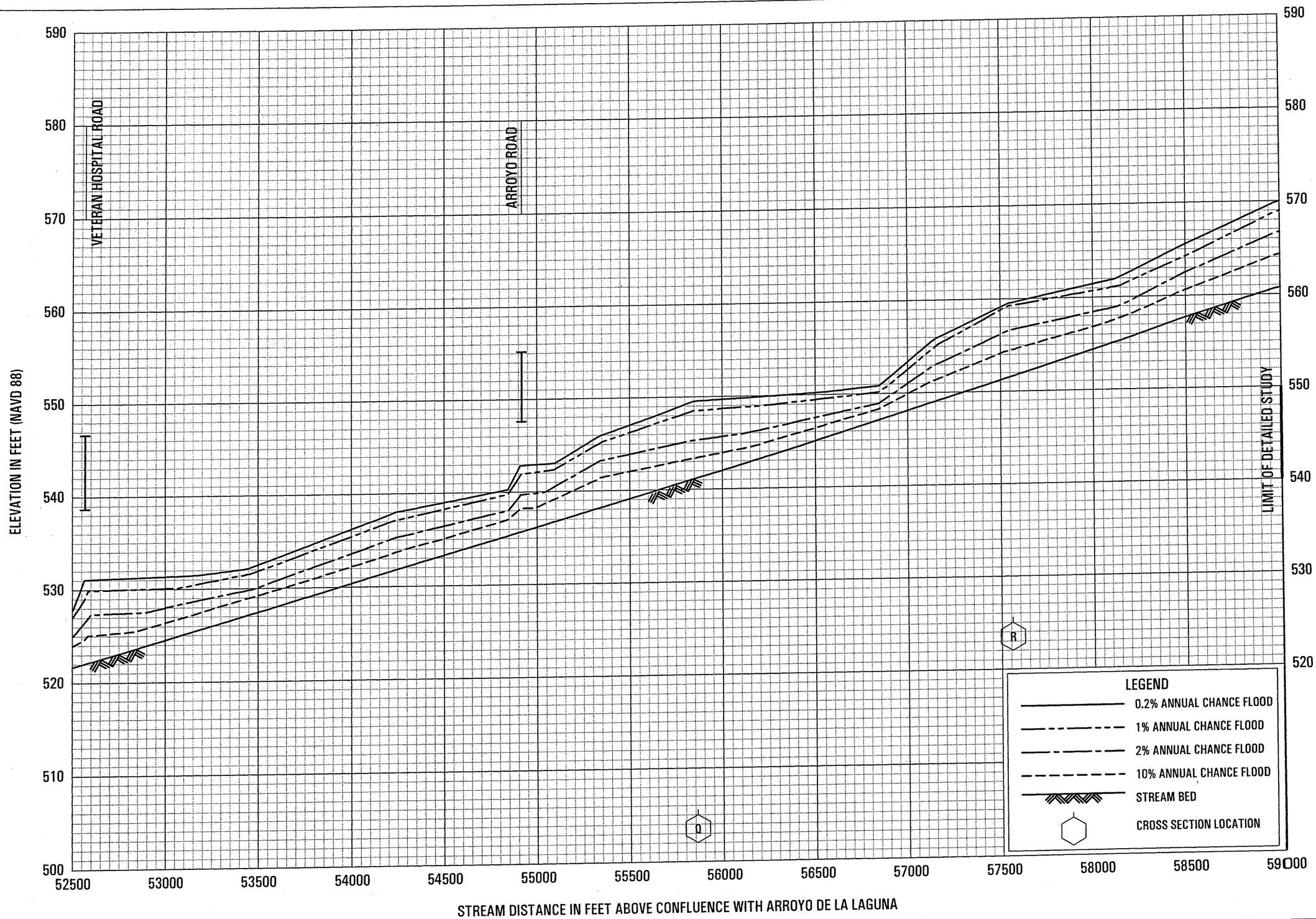

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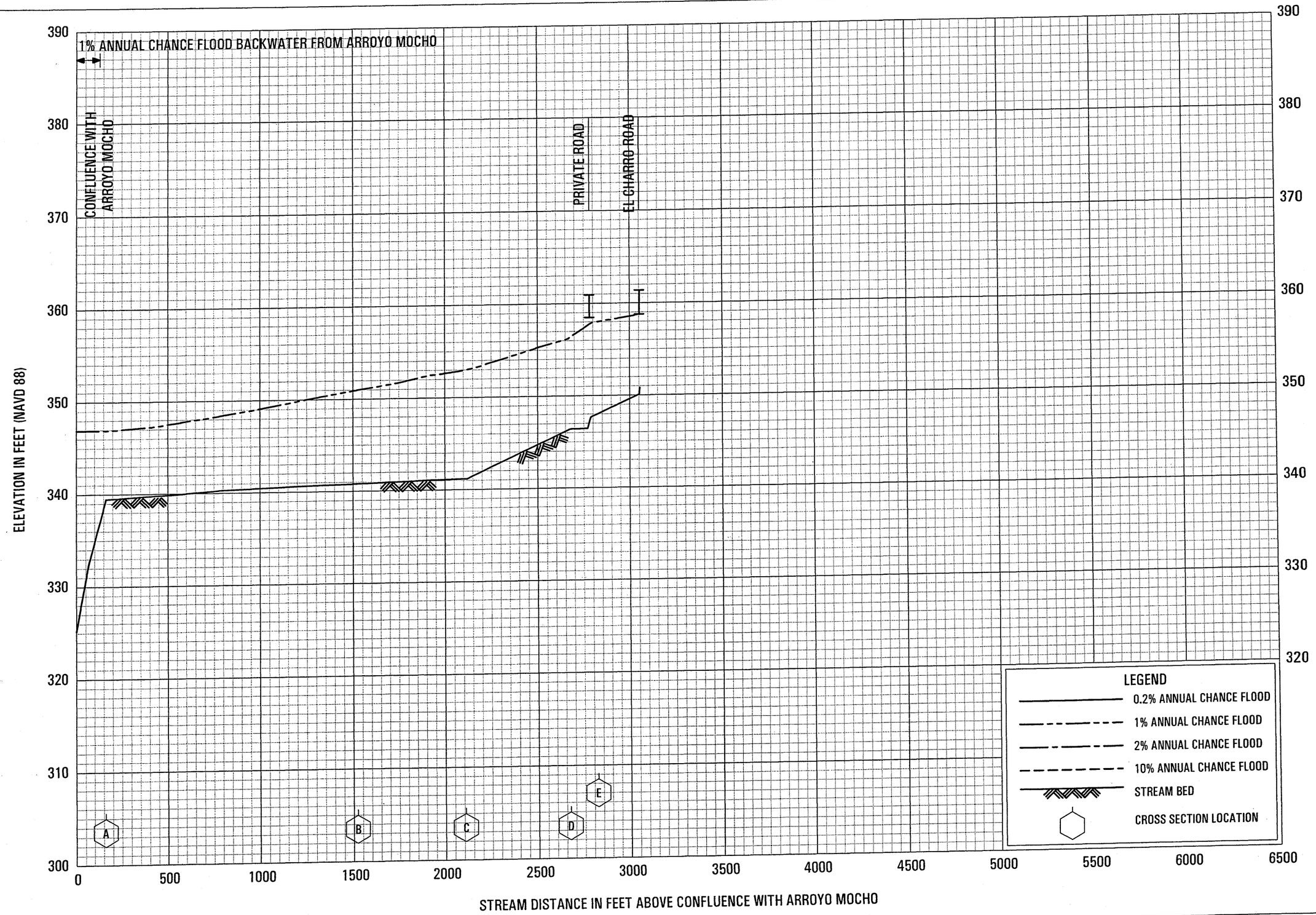

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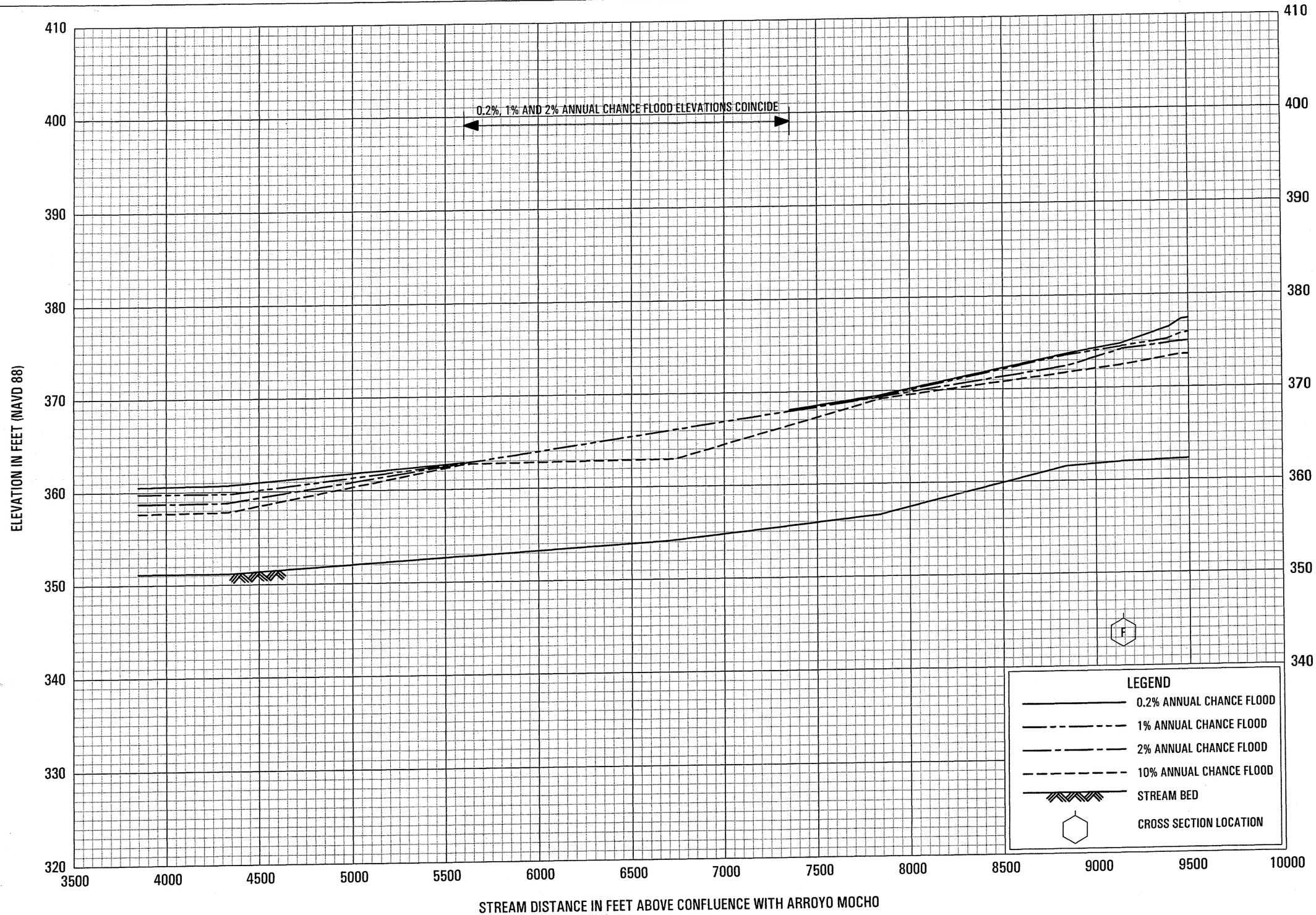

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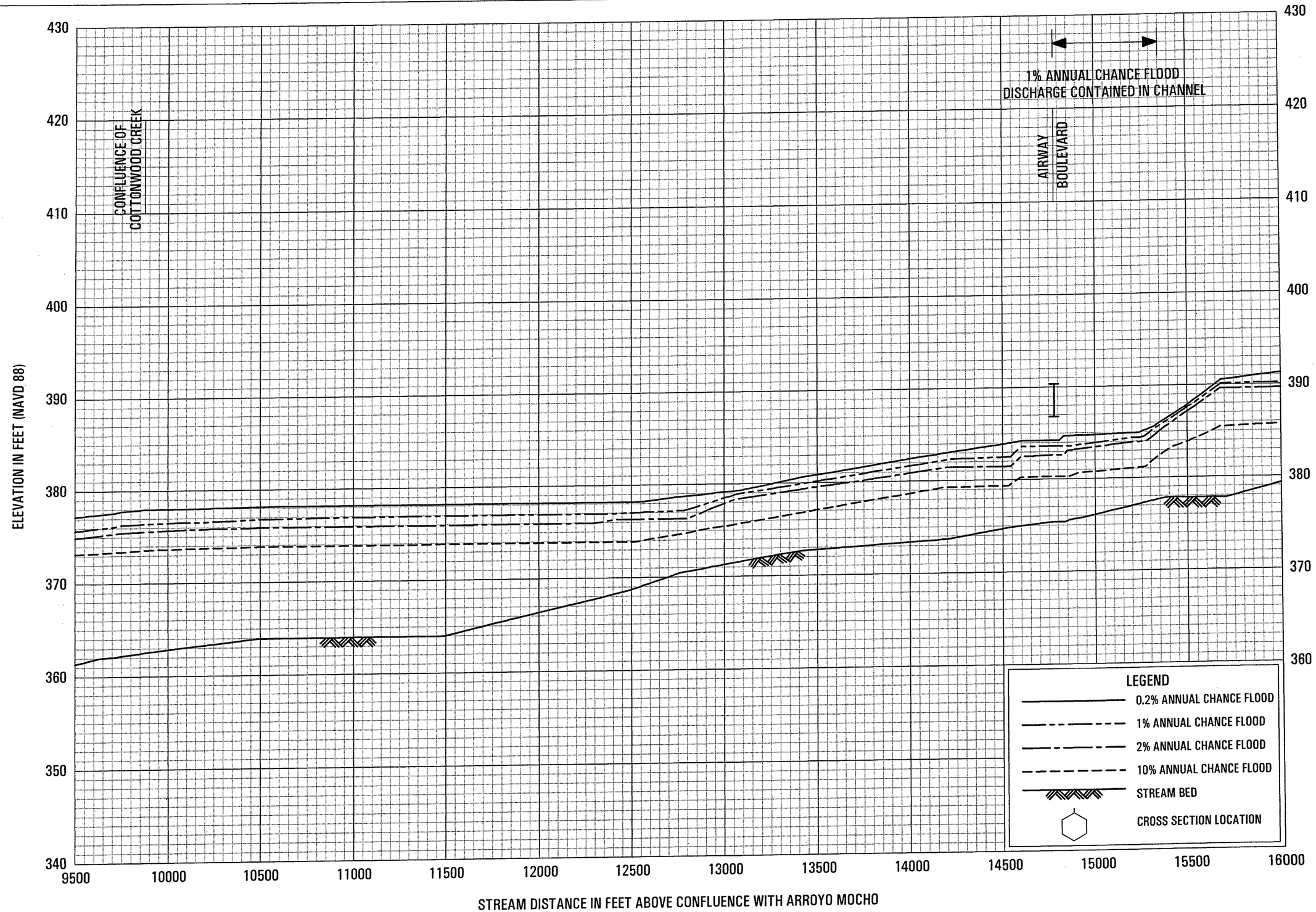

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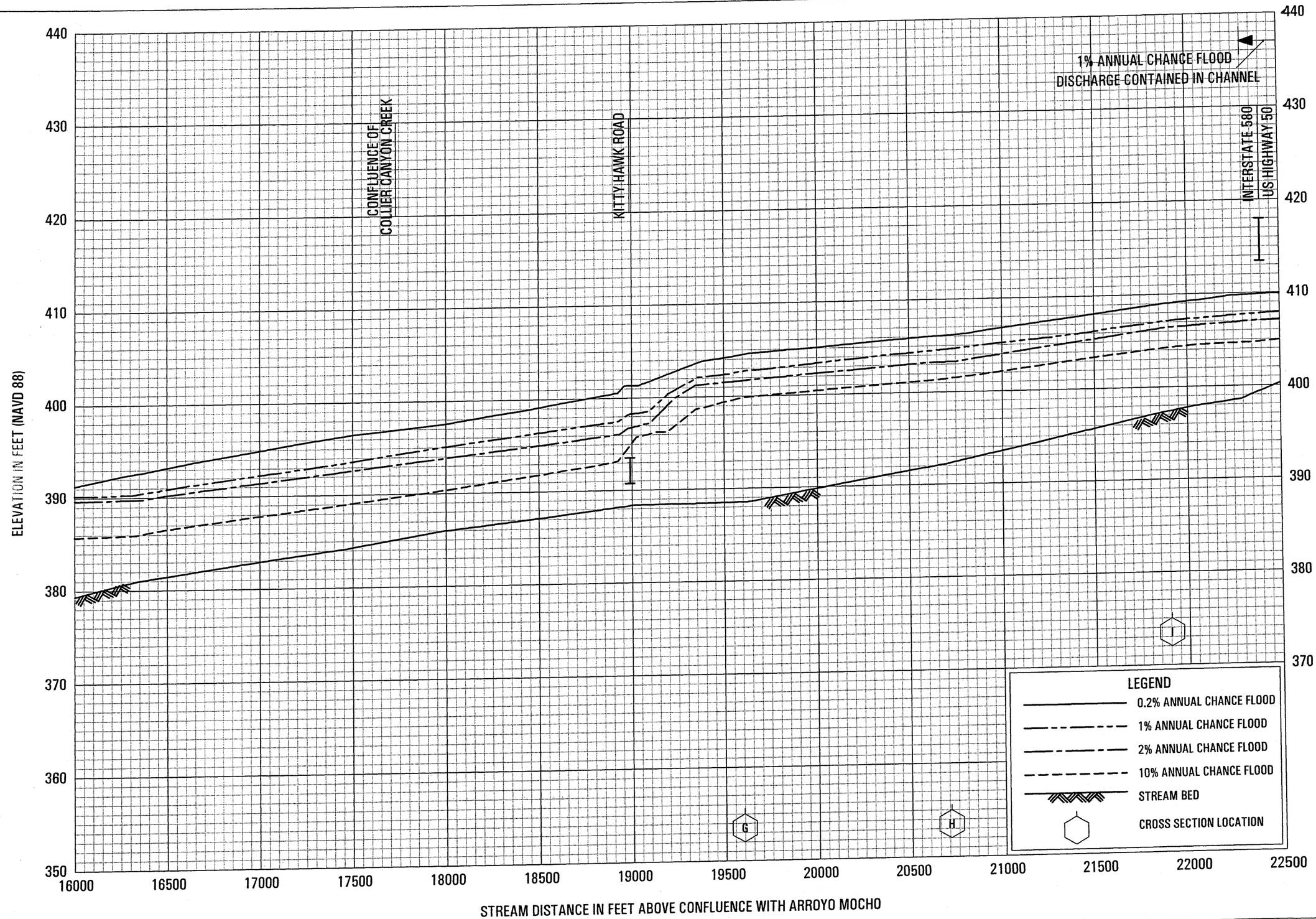

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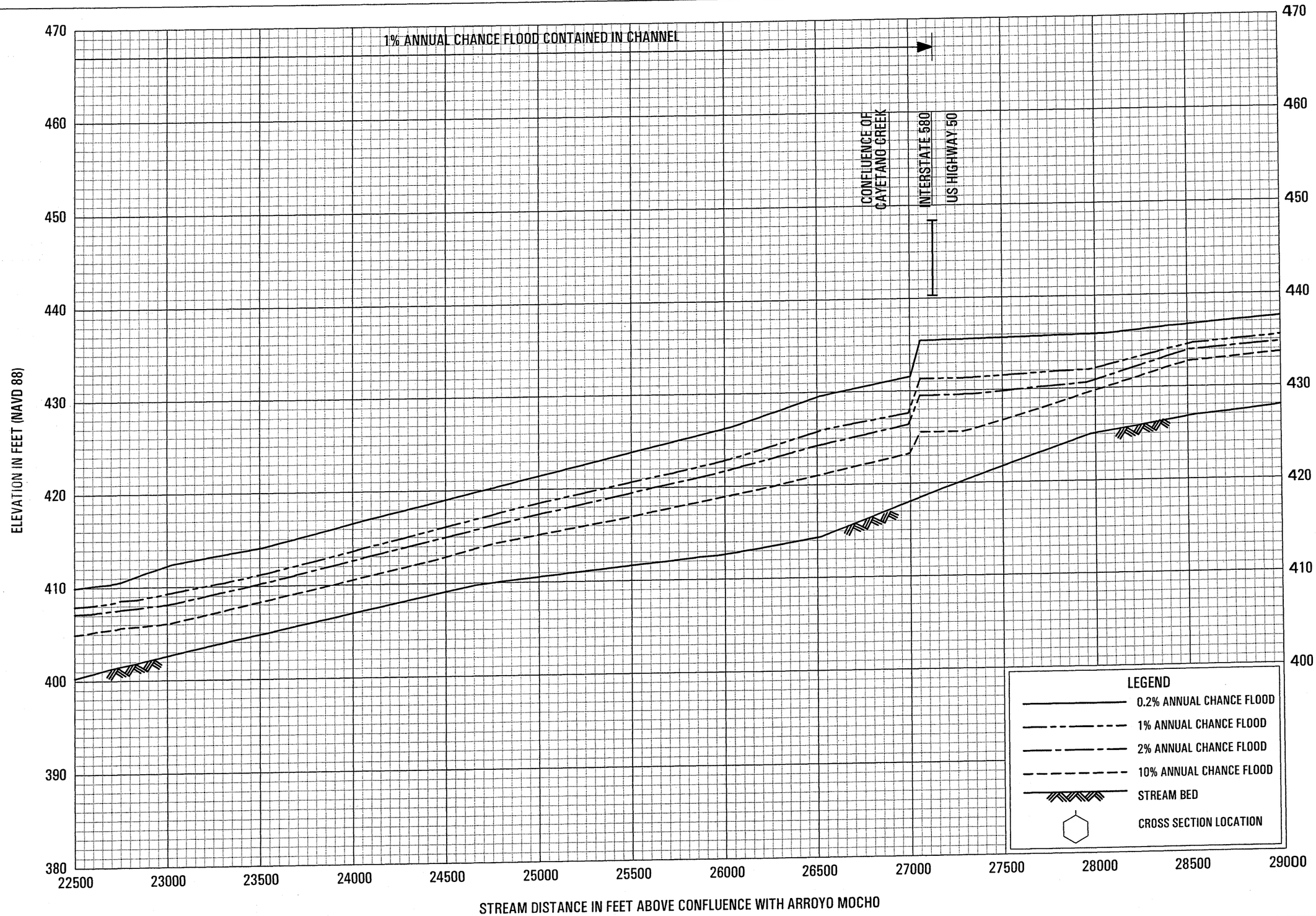

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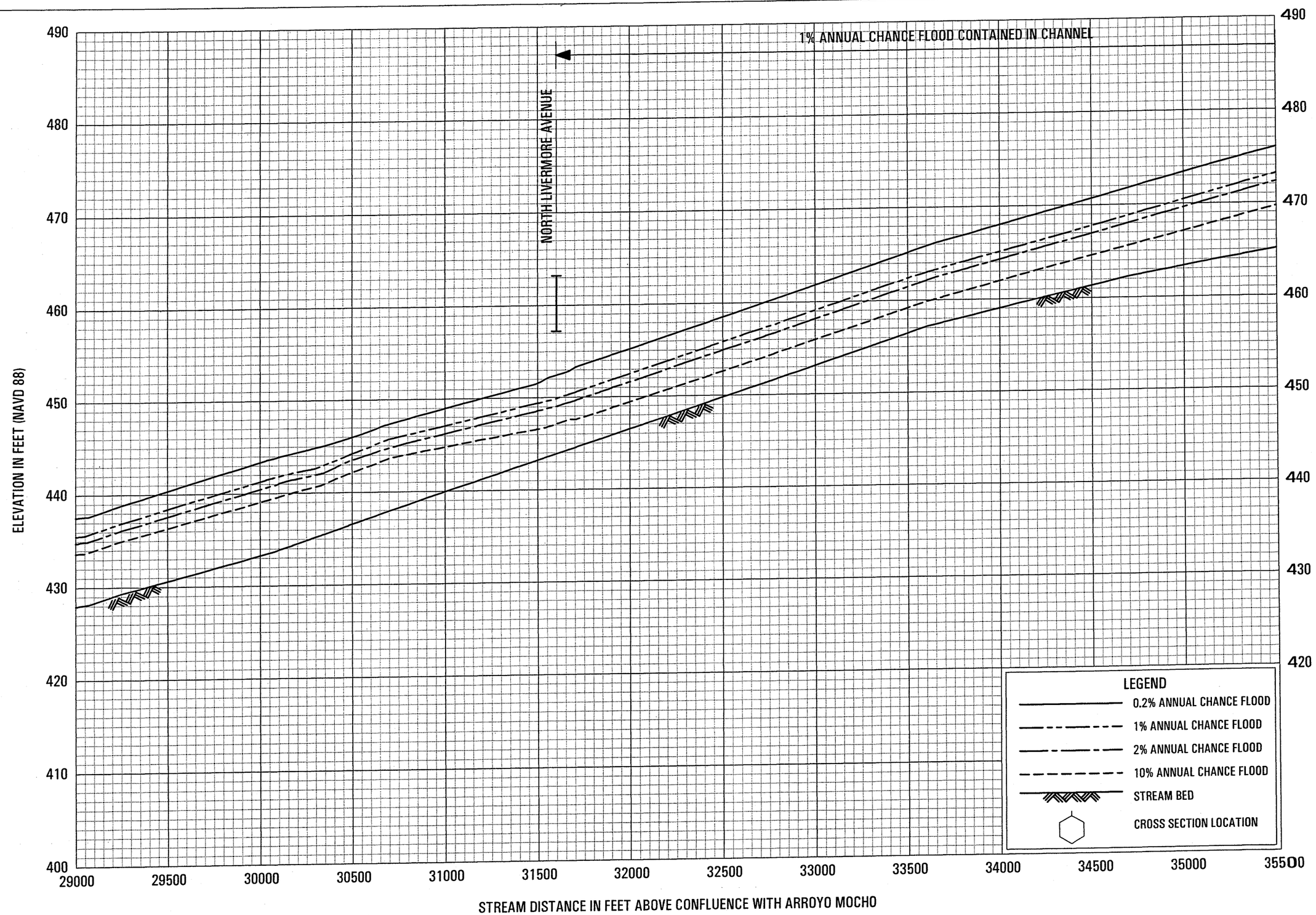

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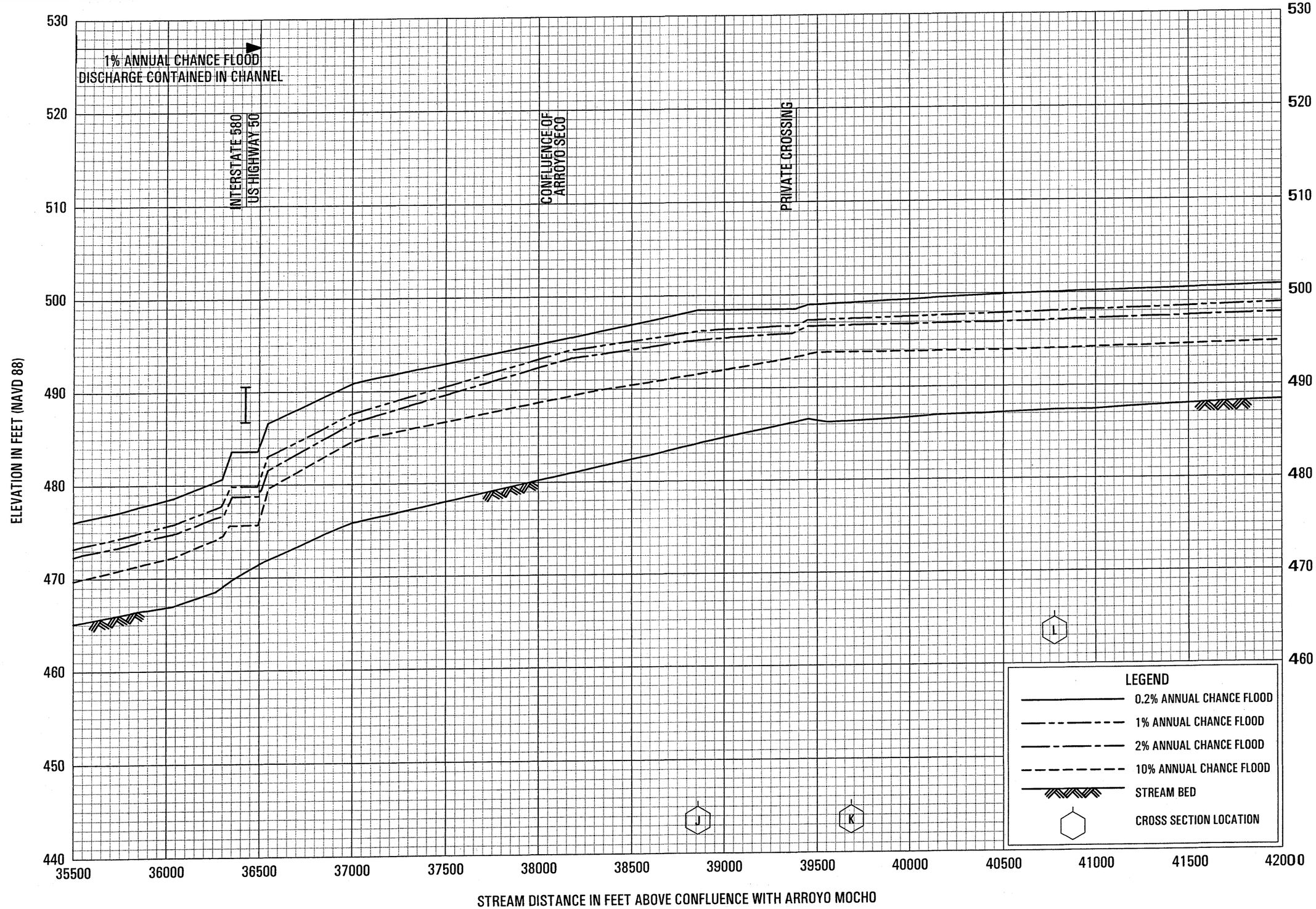

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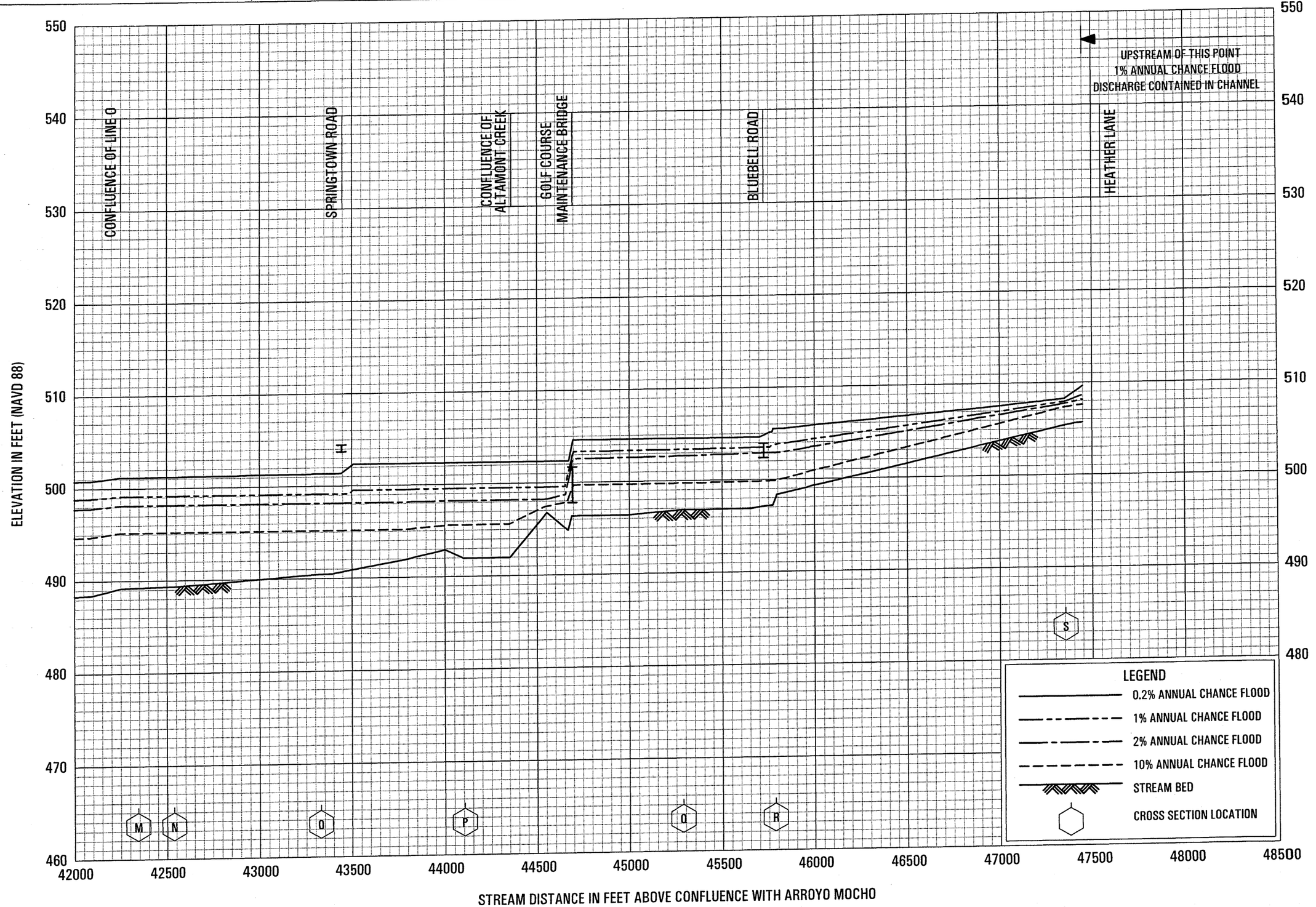

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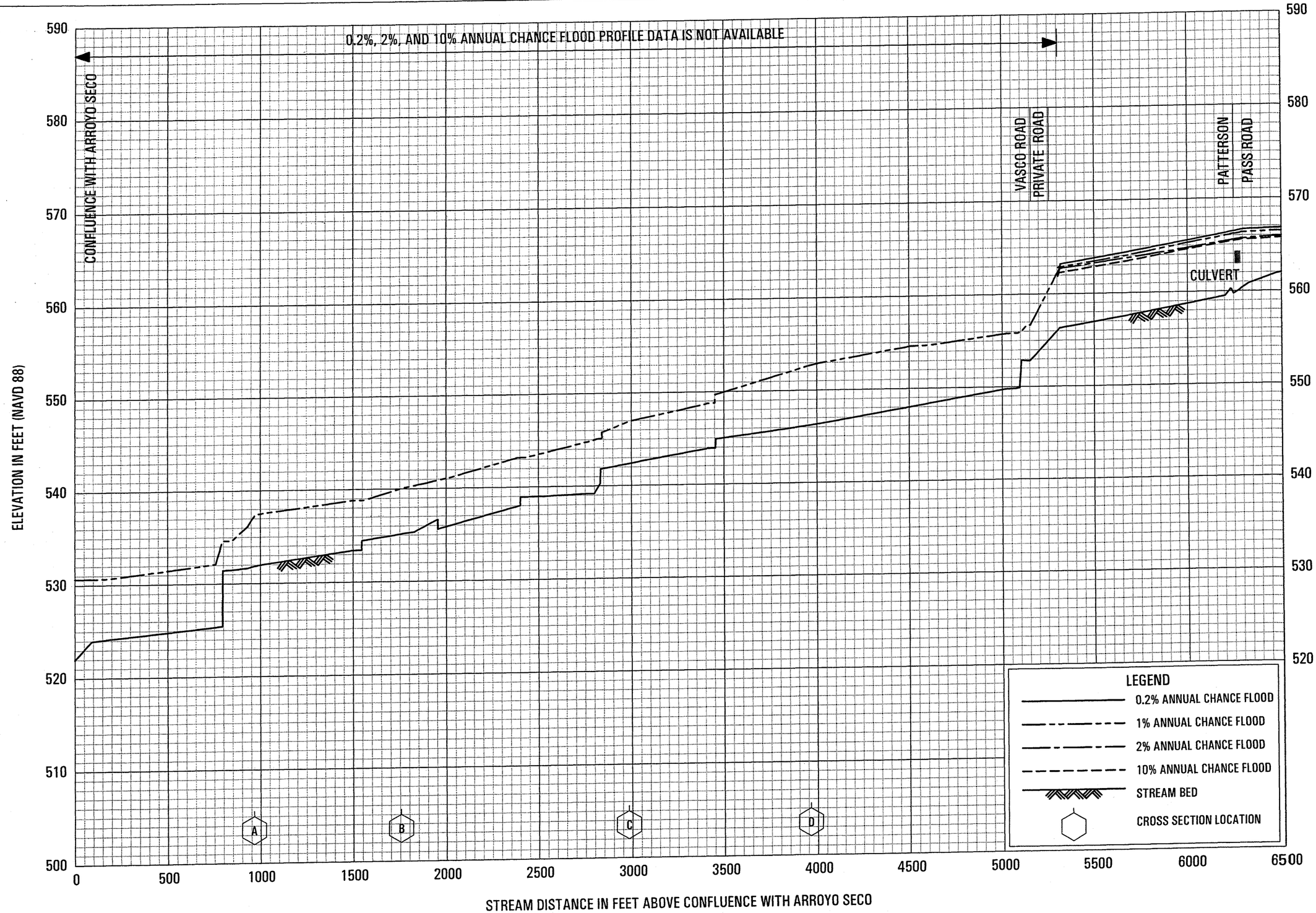

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ALAMEDA COUNTY, CA

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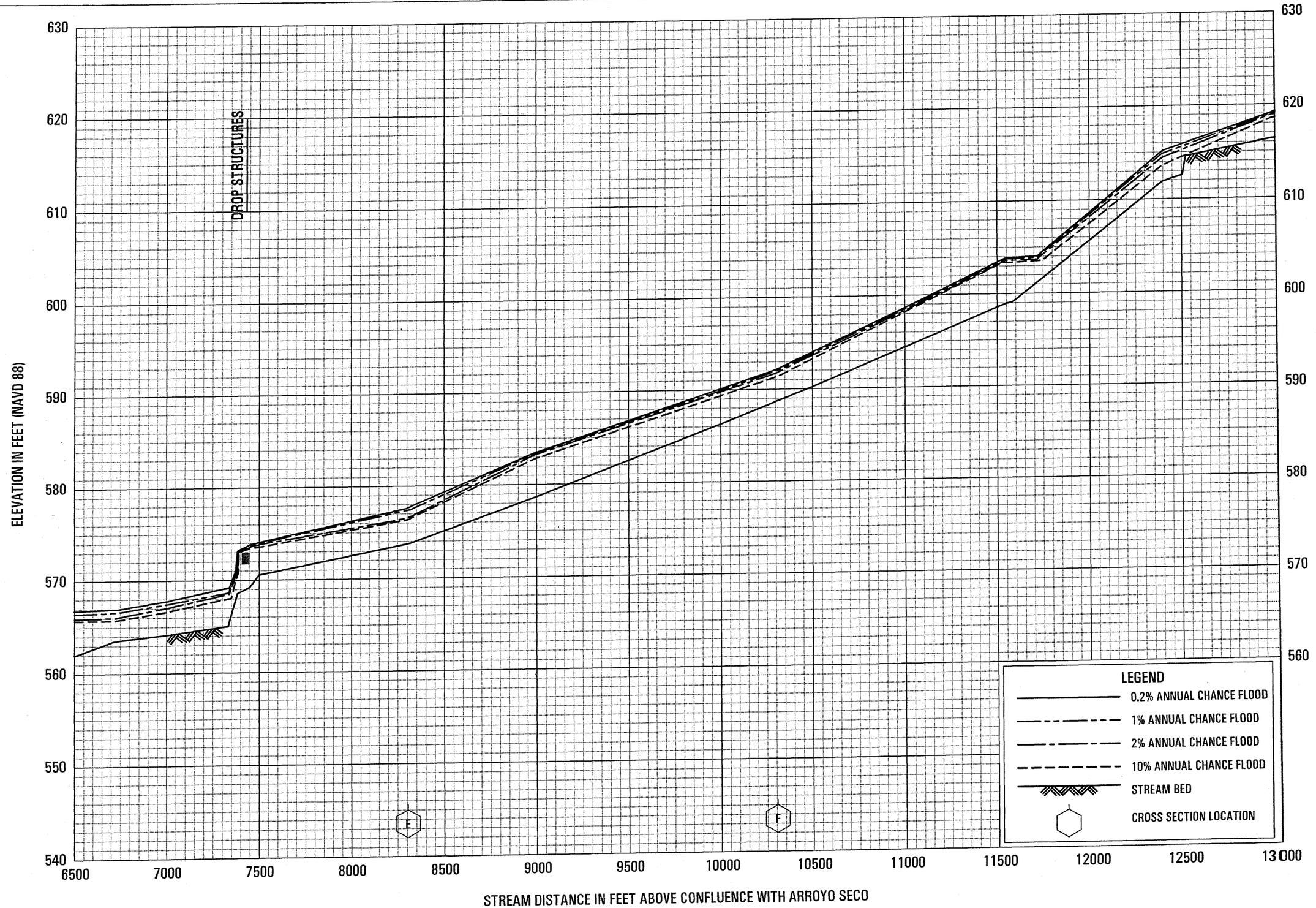

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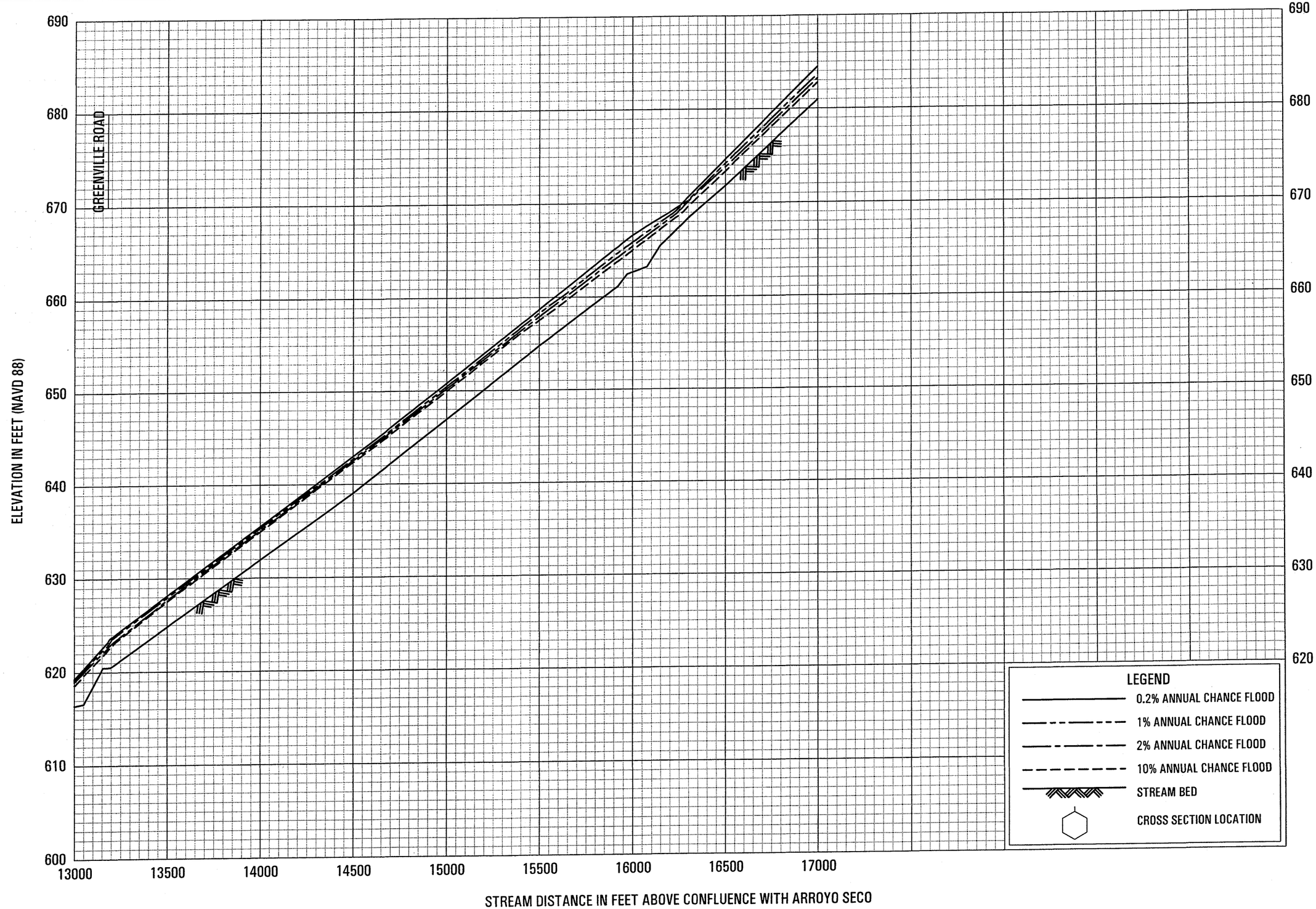

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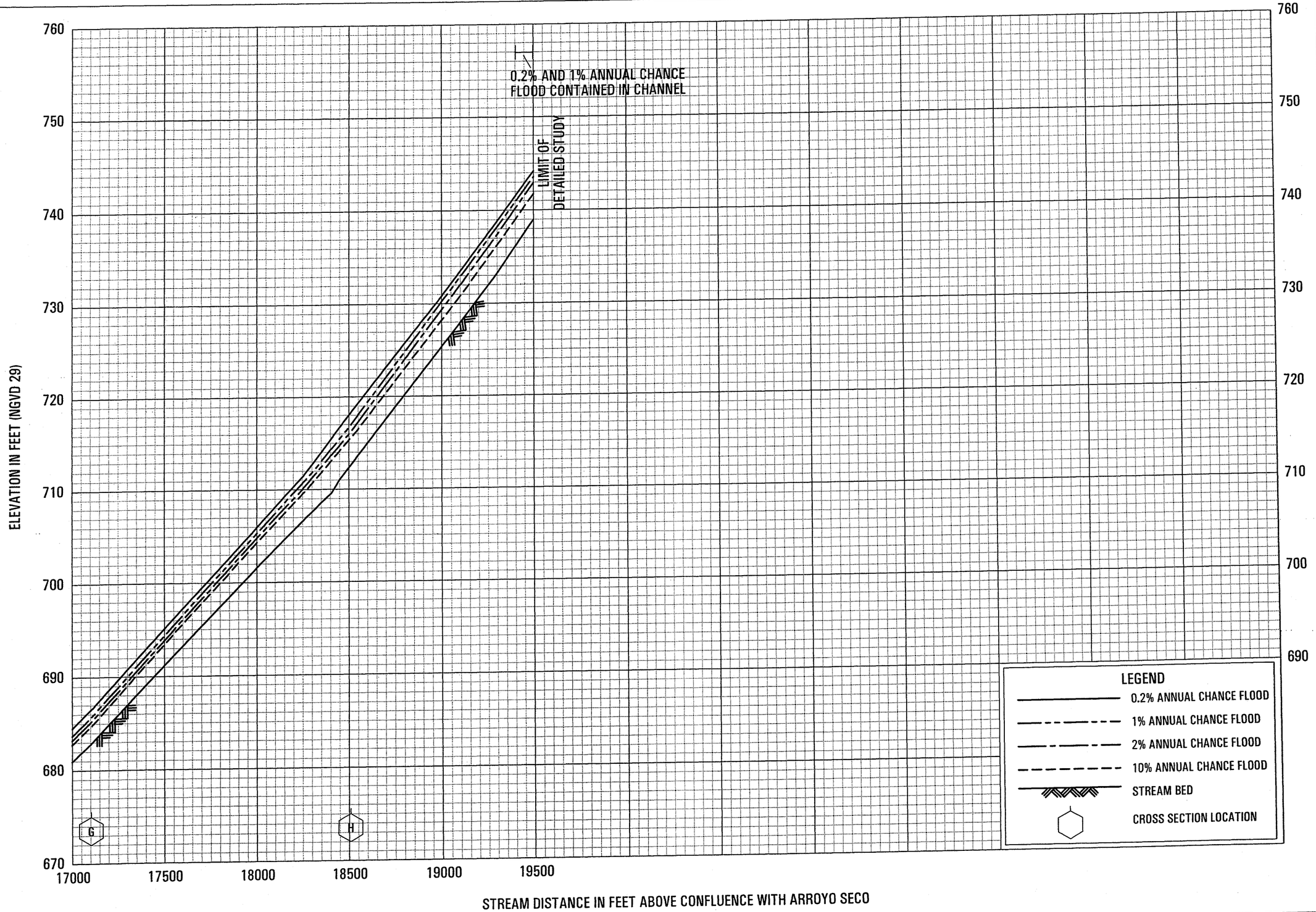

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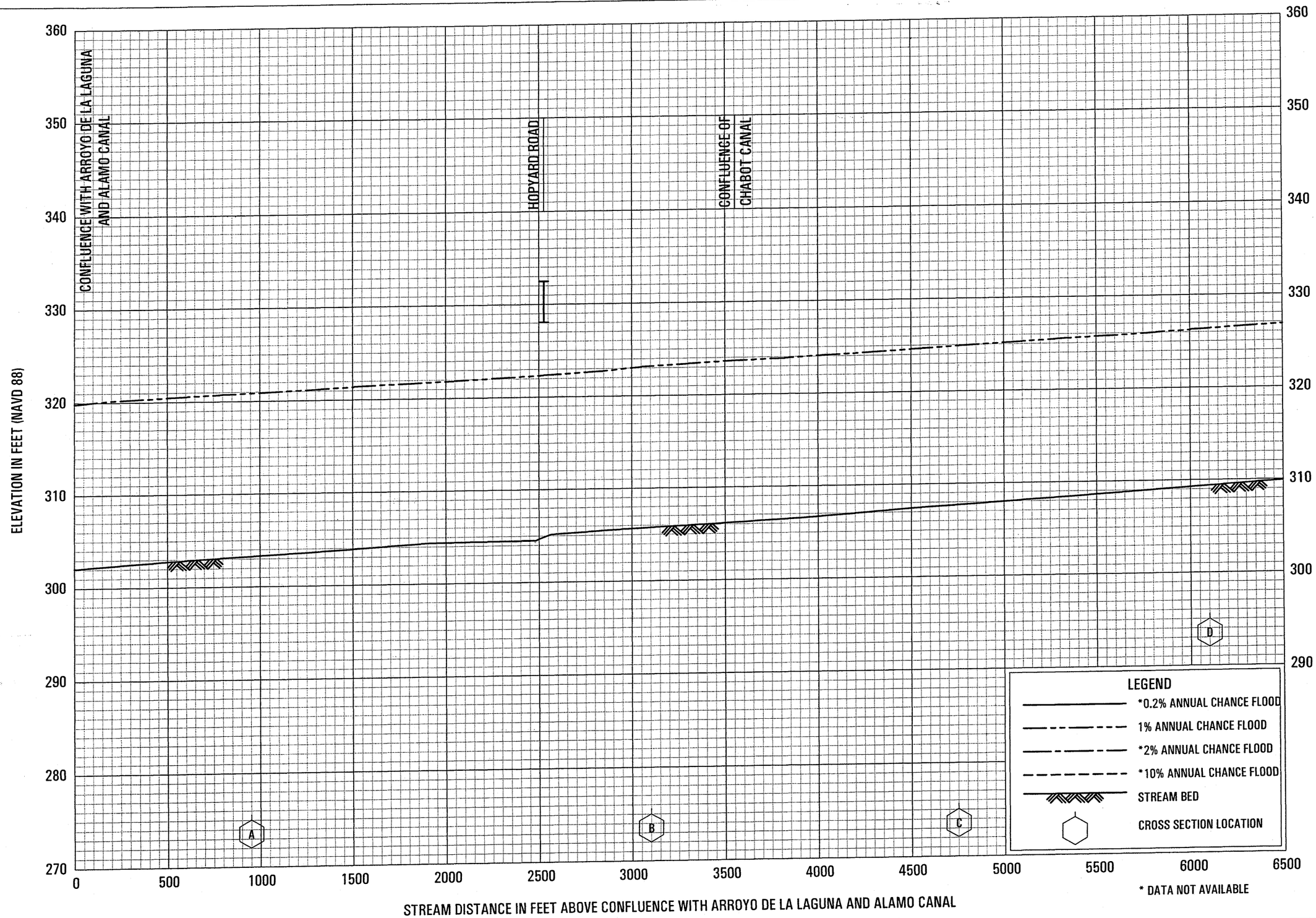

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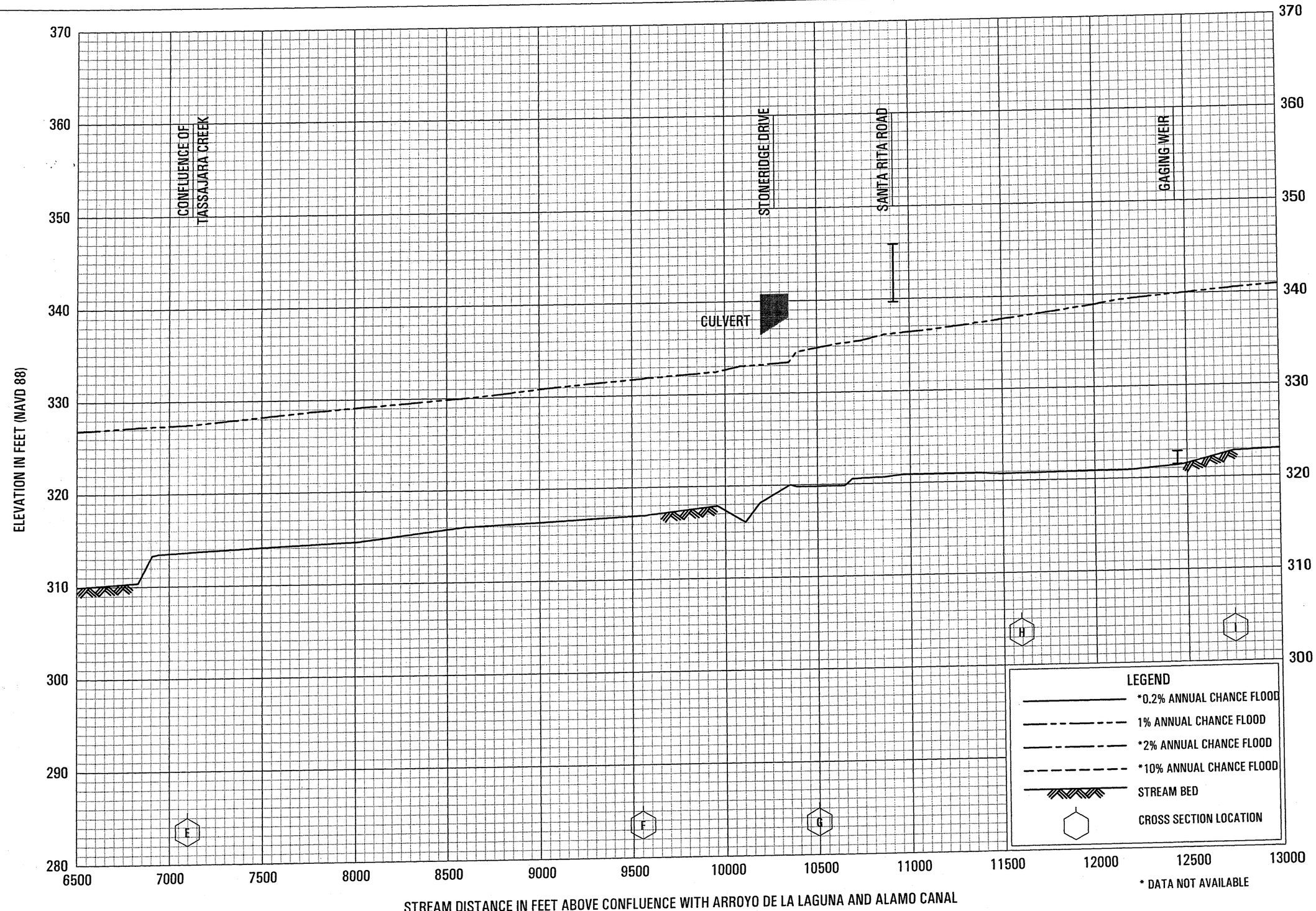

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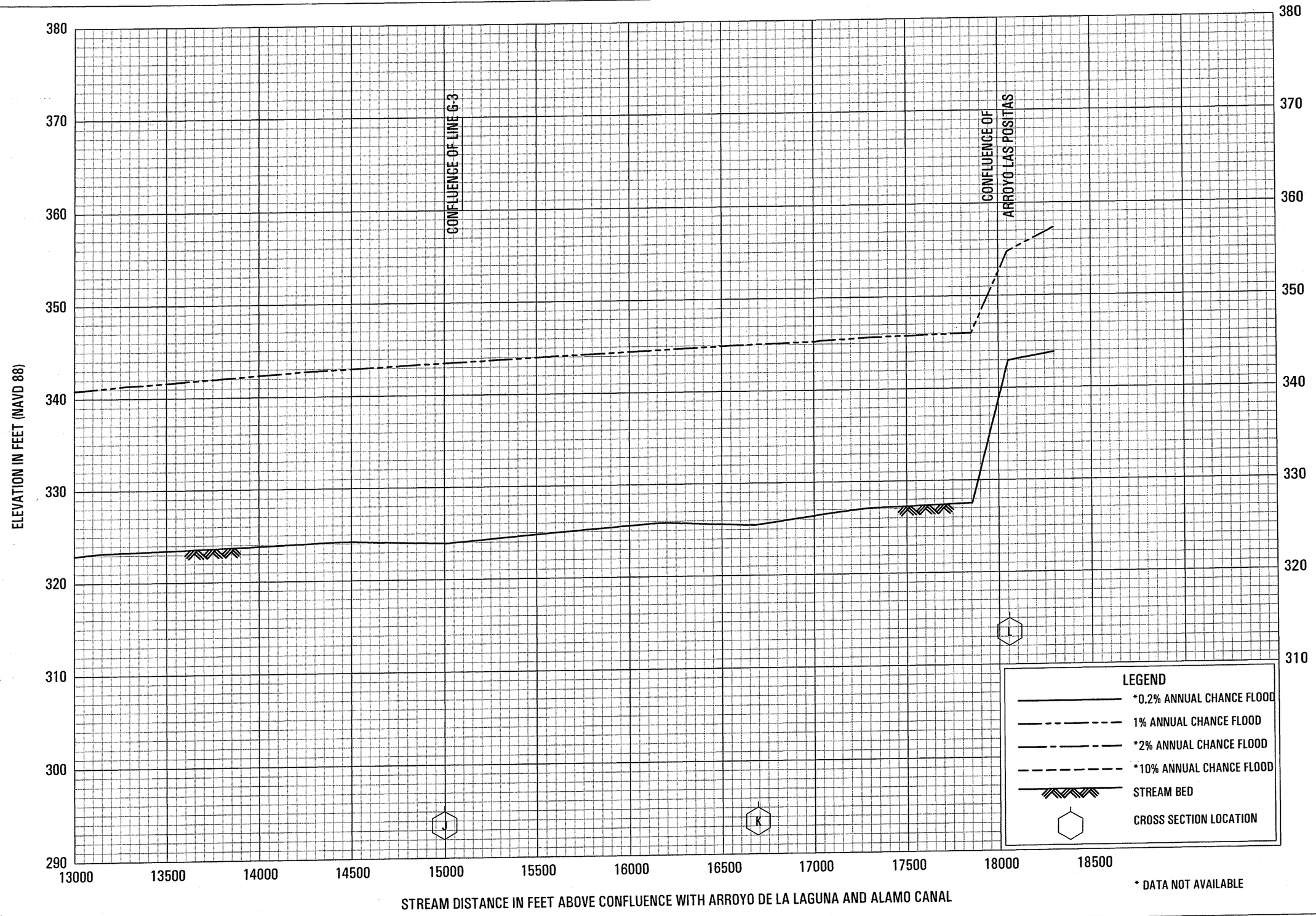

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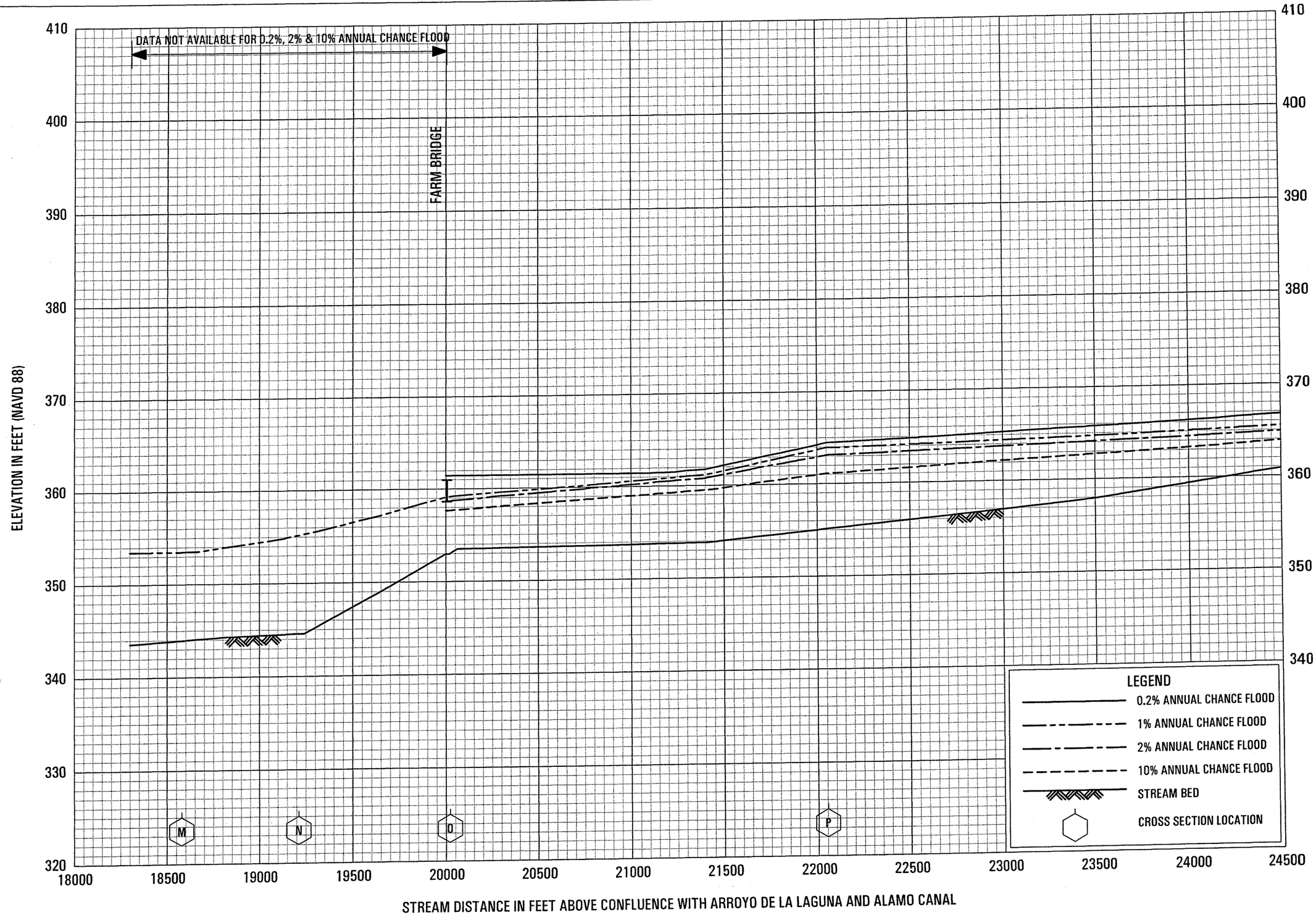

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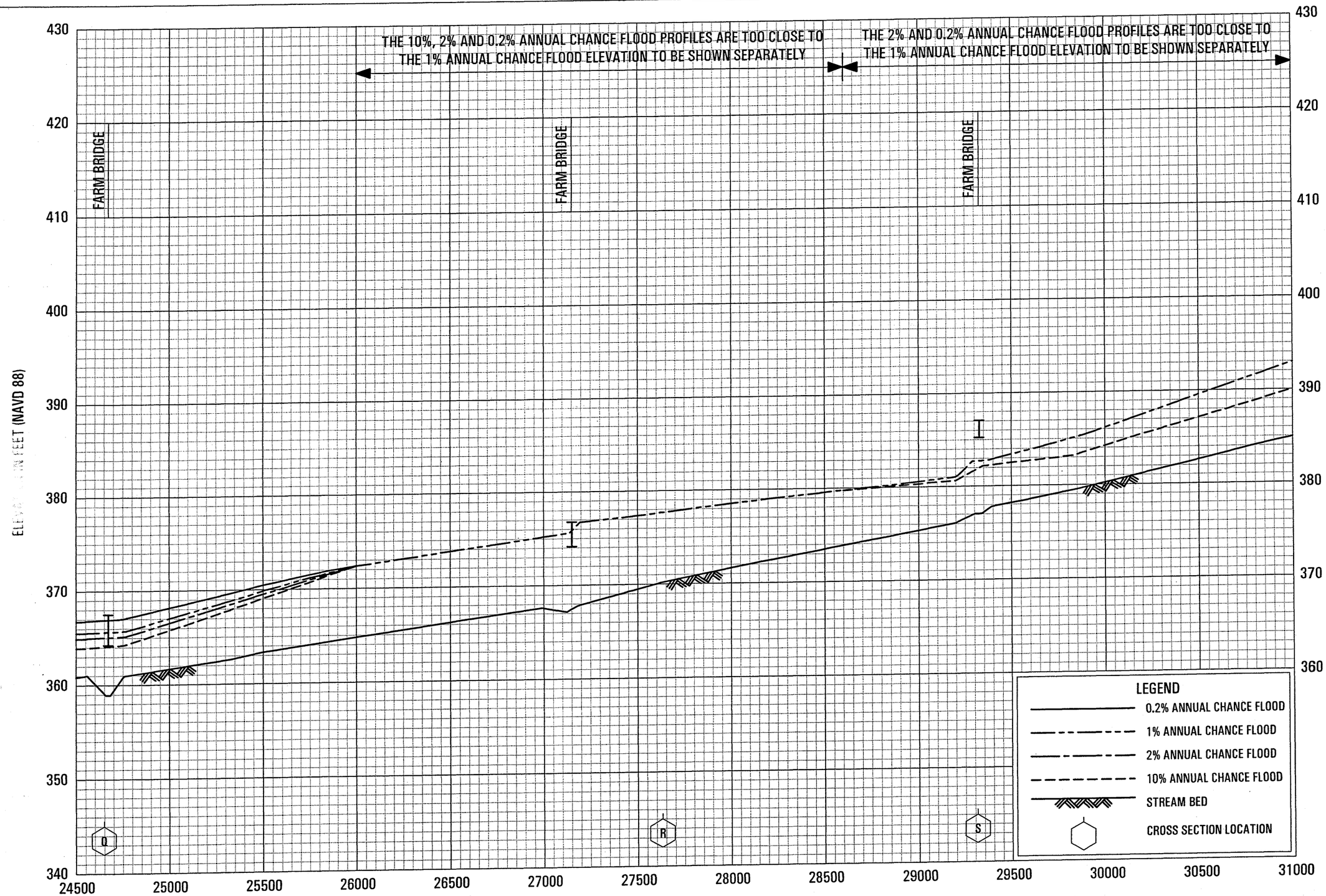

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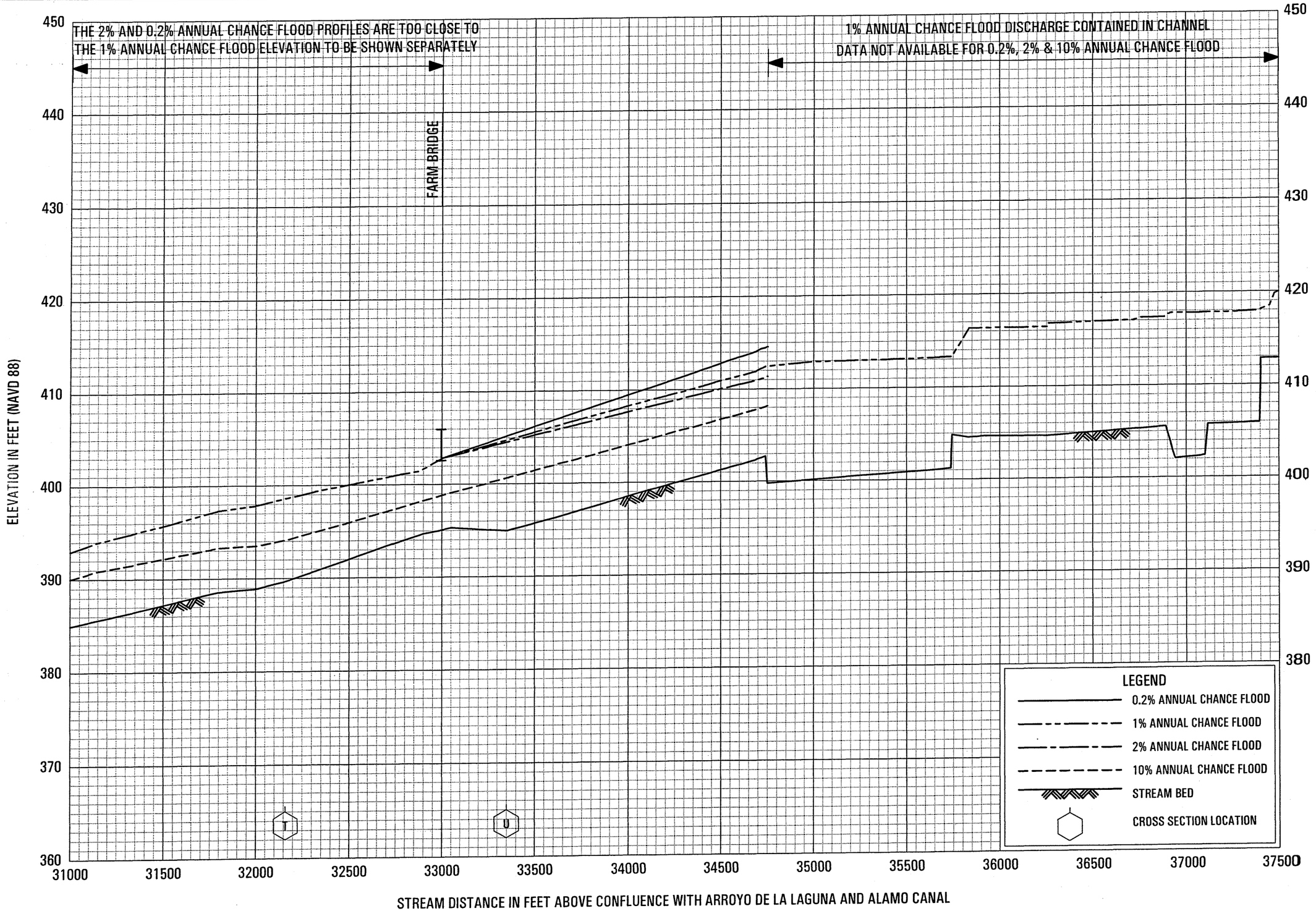

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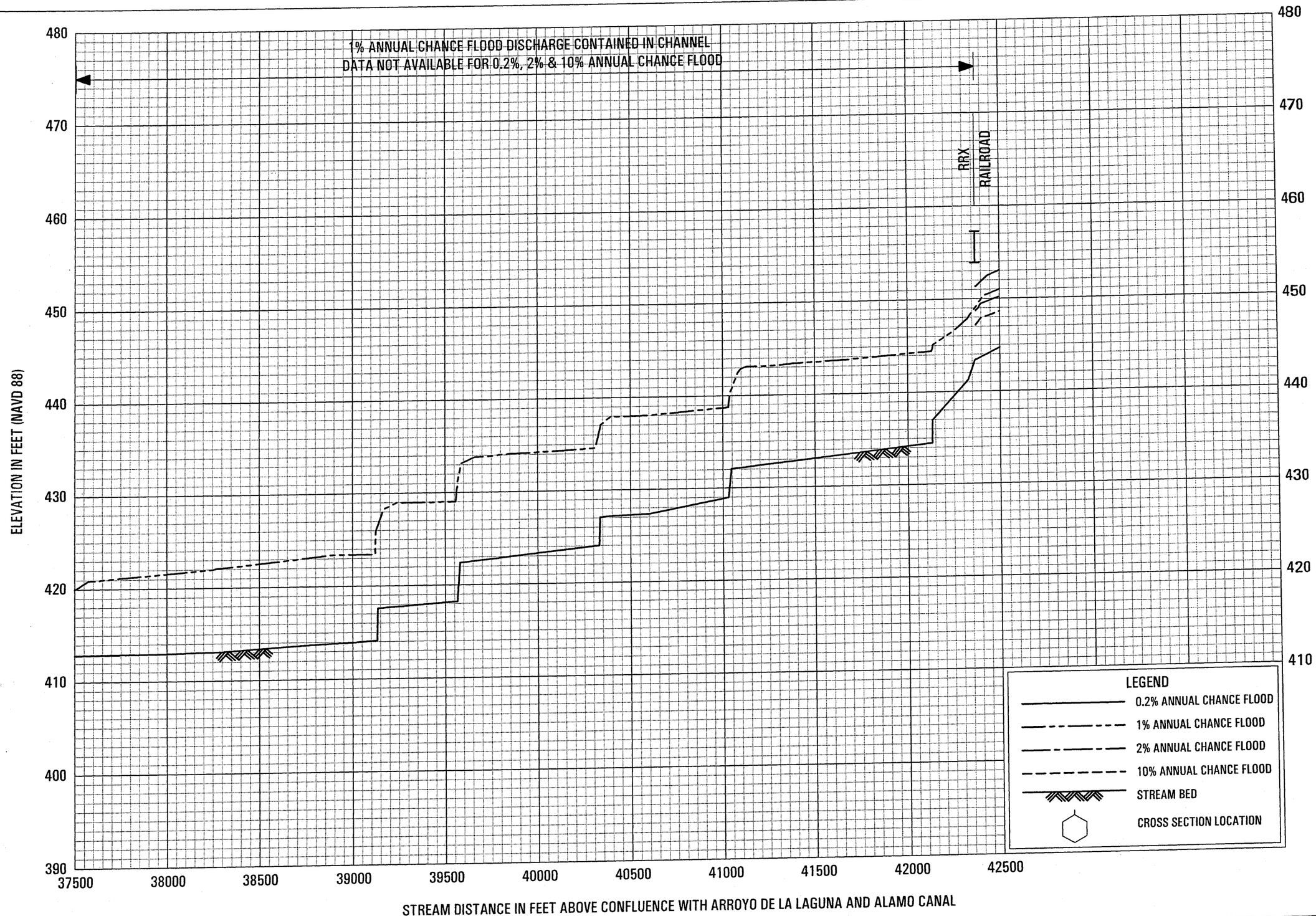

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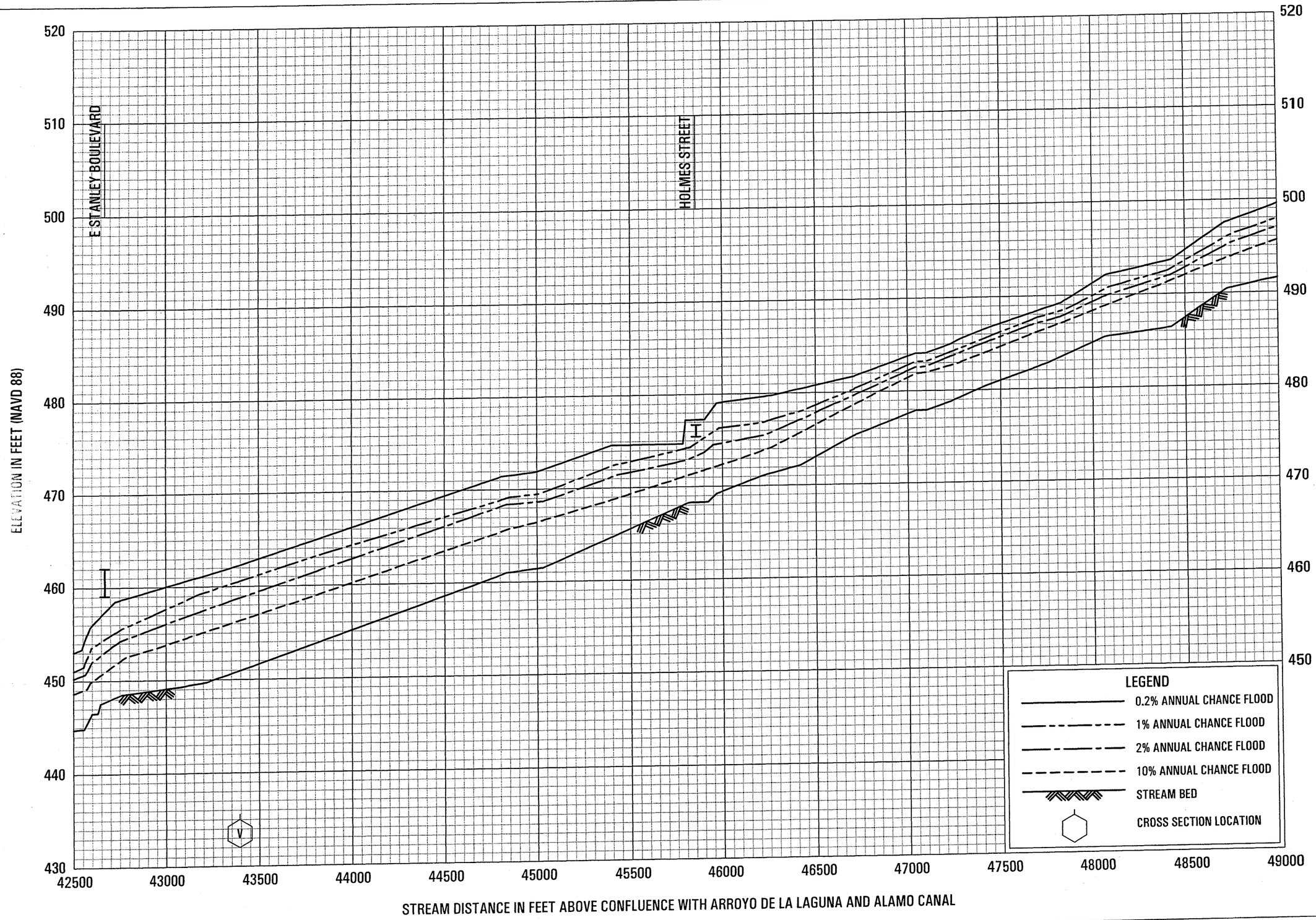

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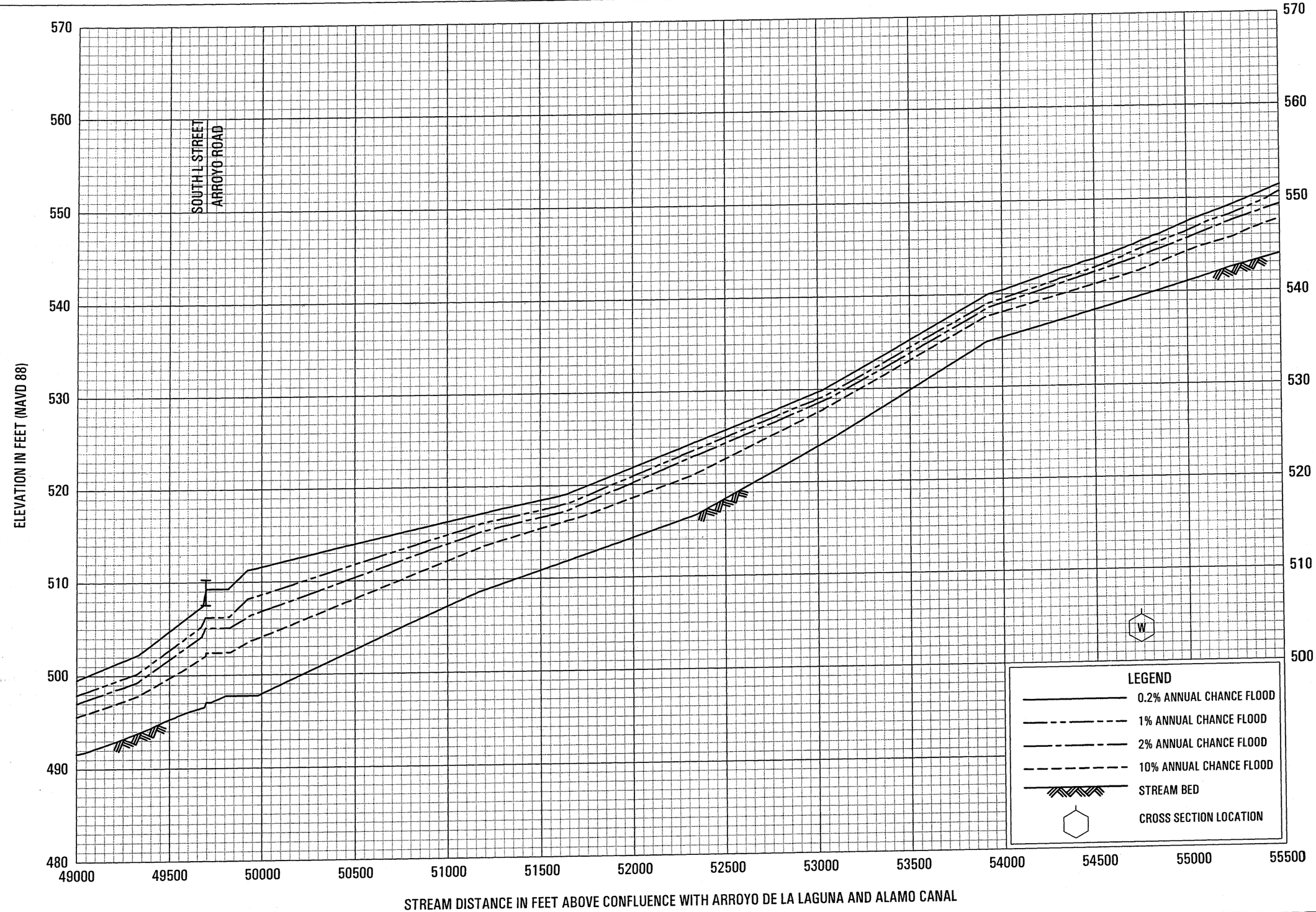

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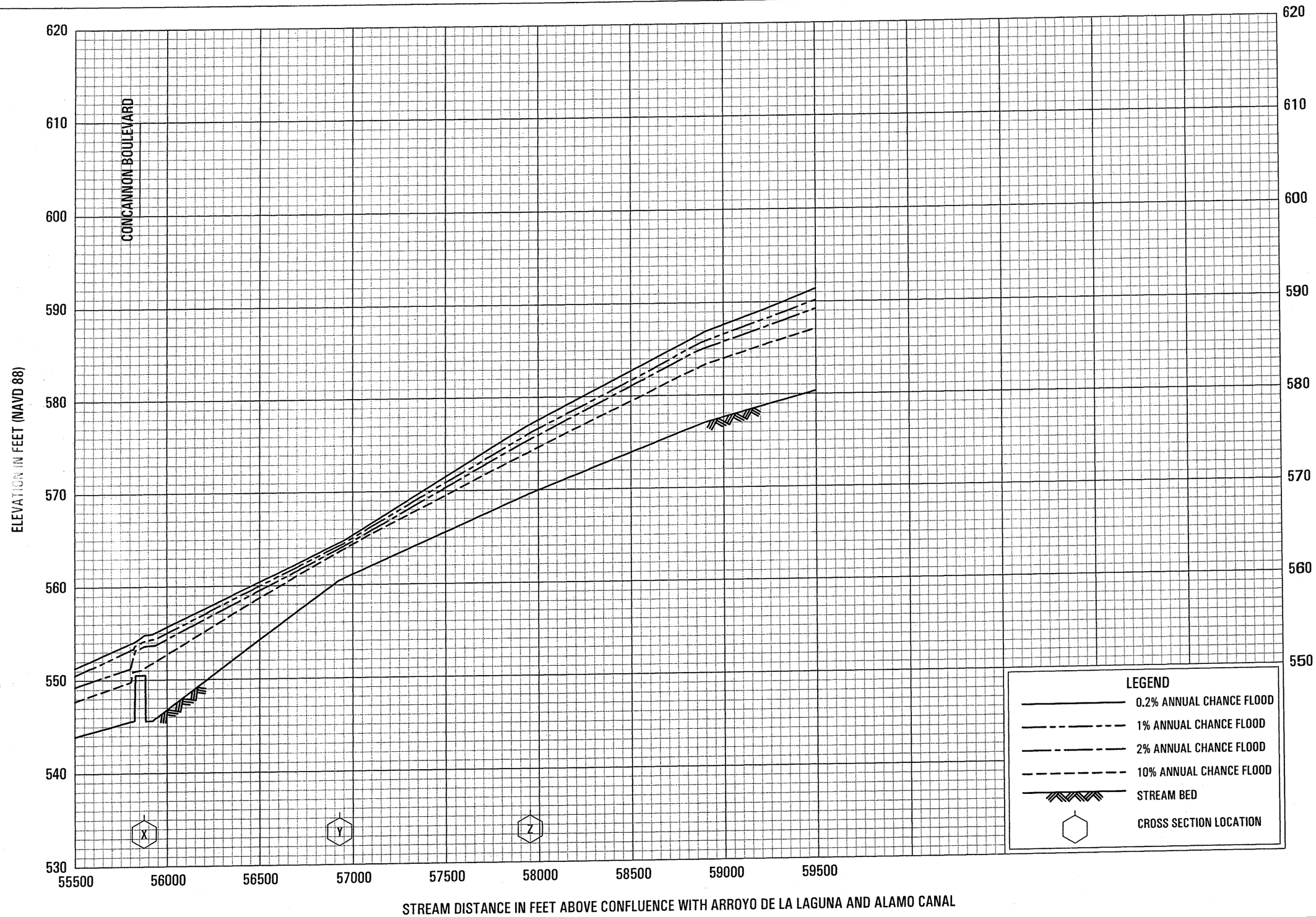

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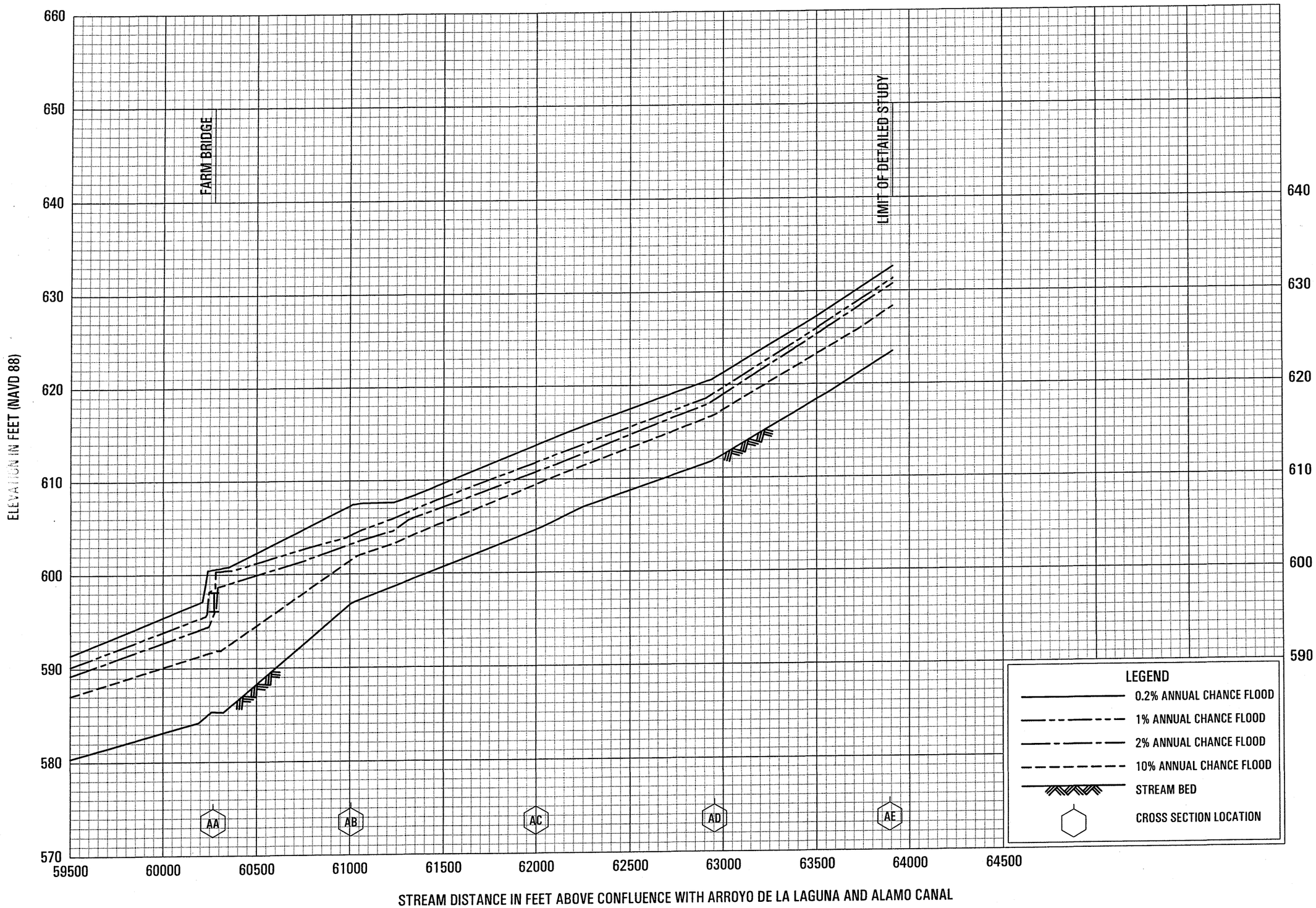

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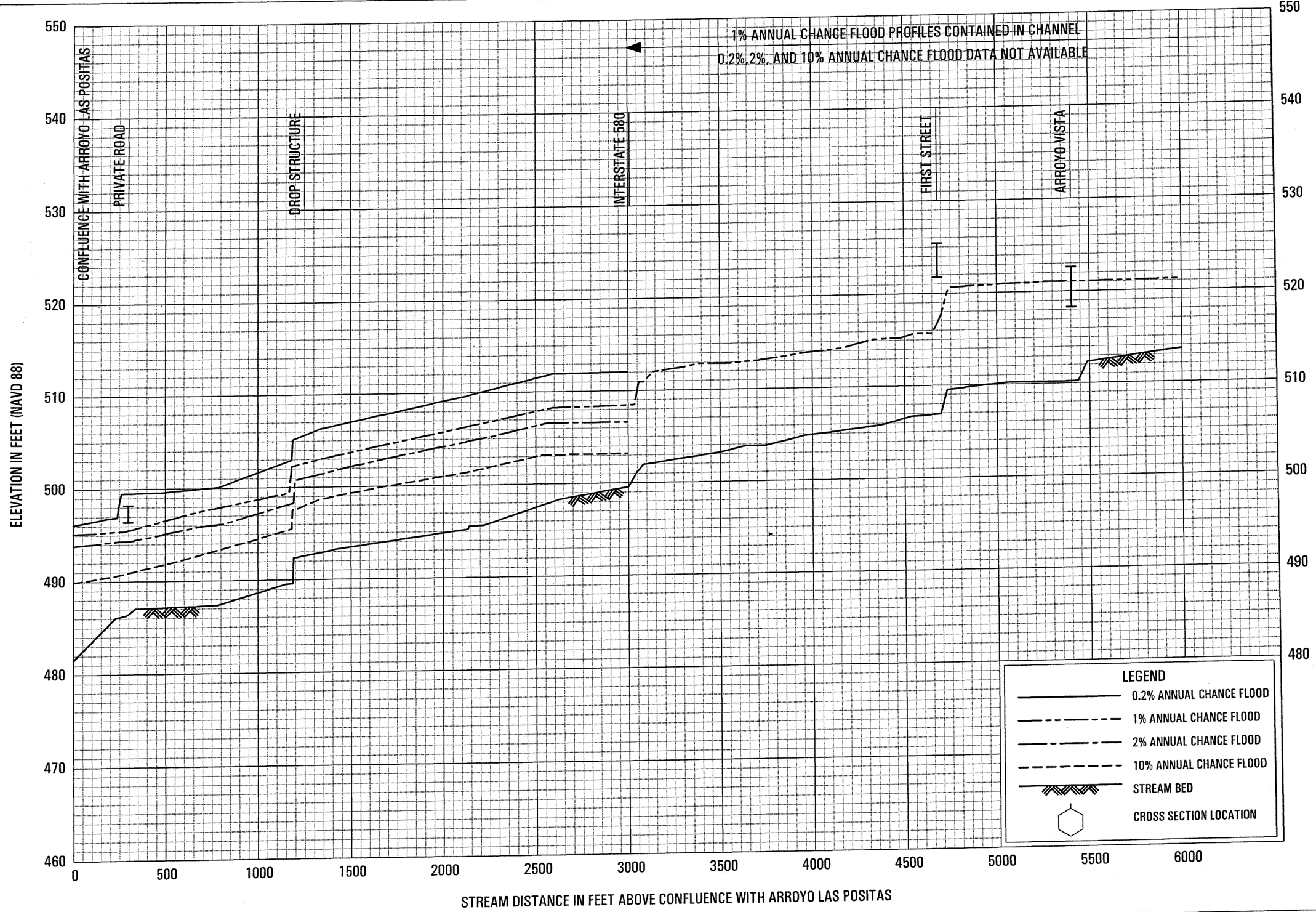

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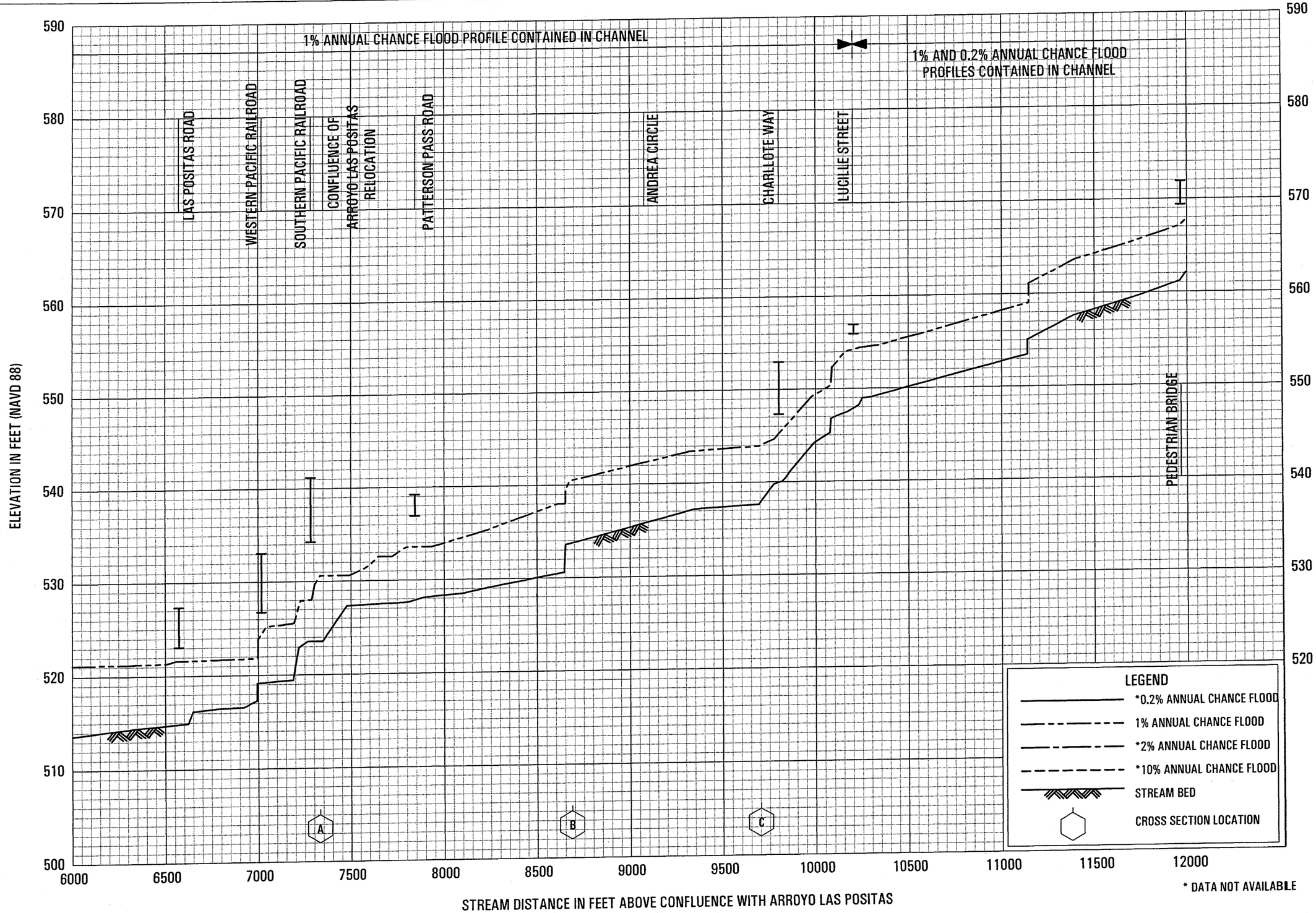

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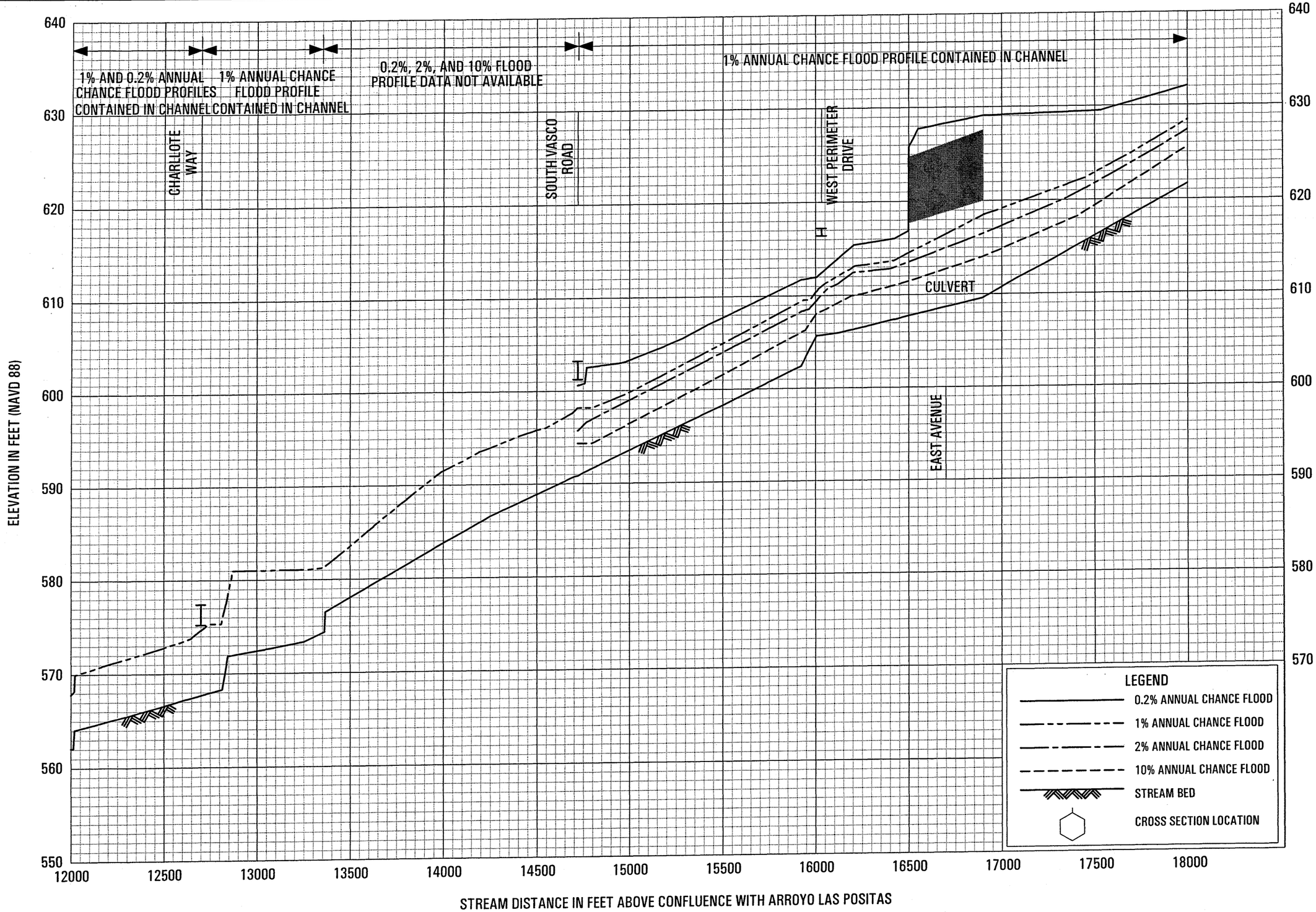

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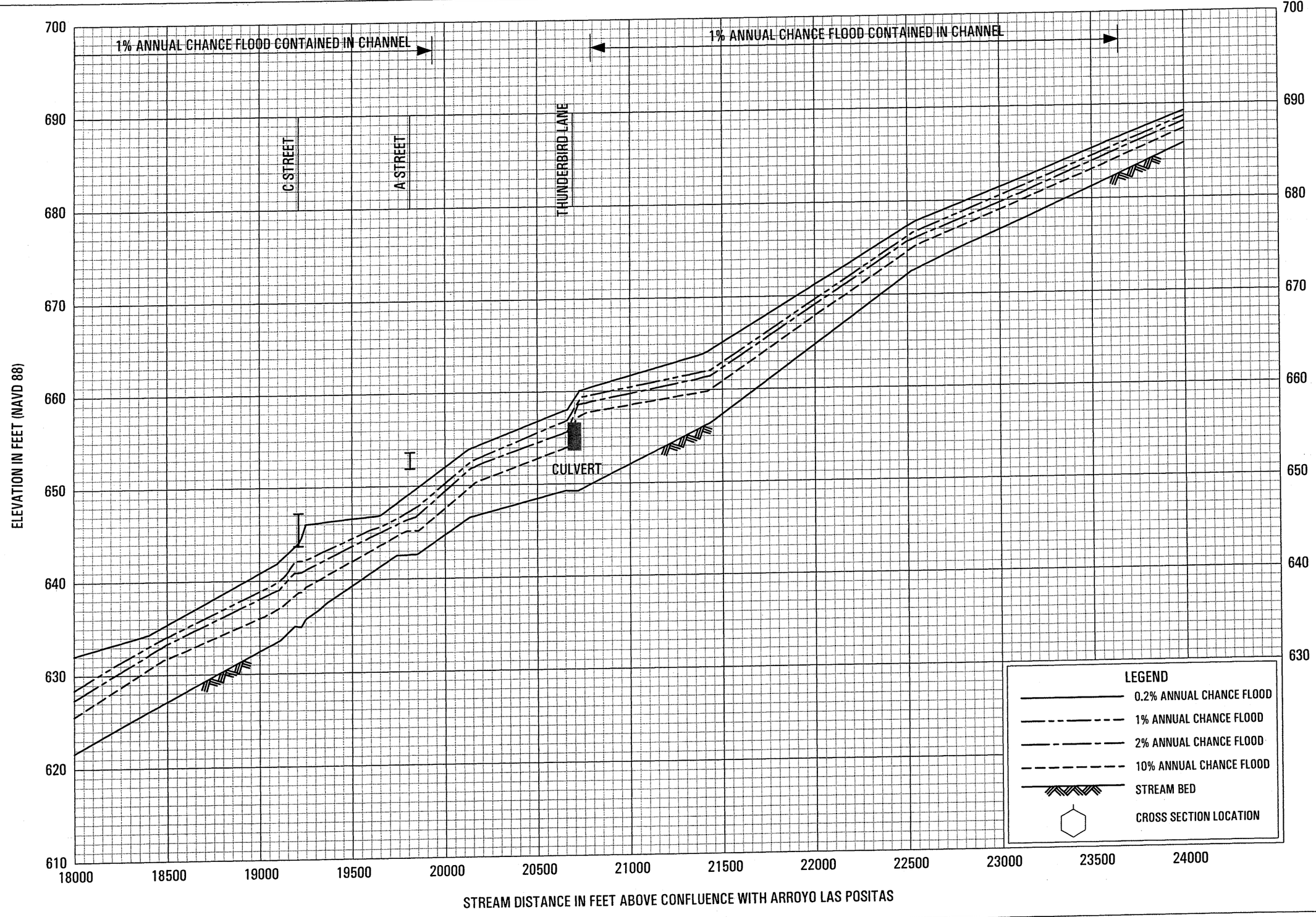

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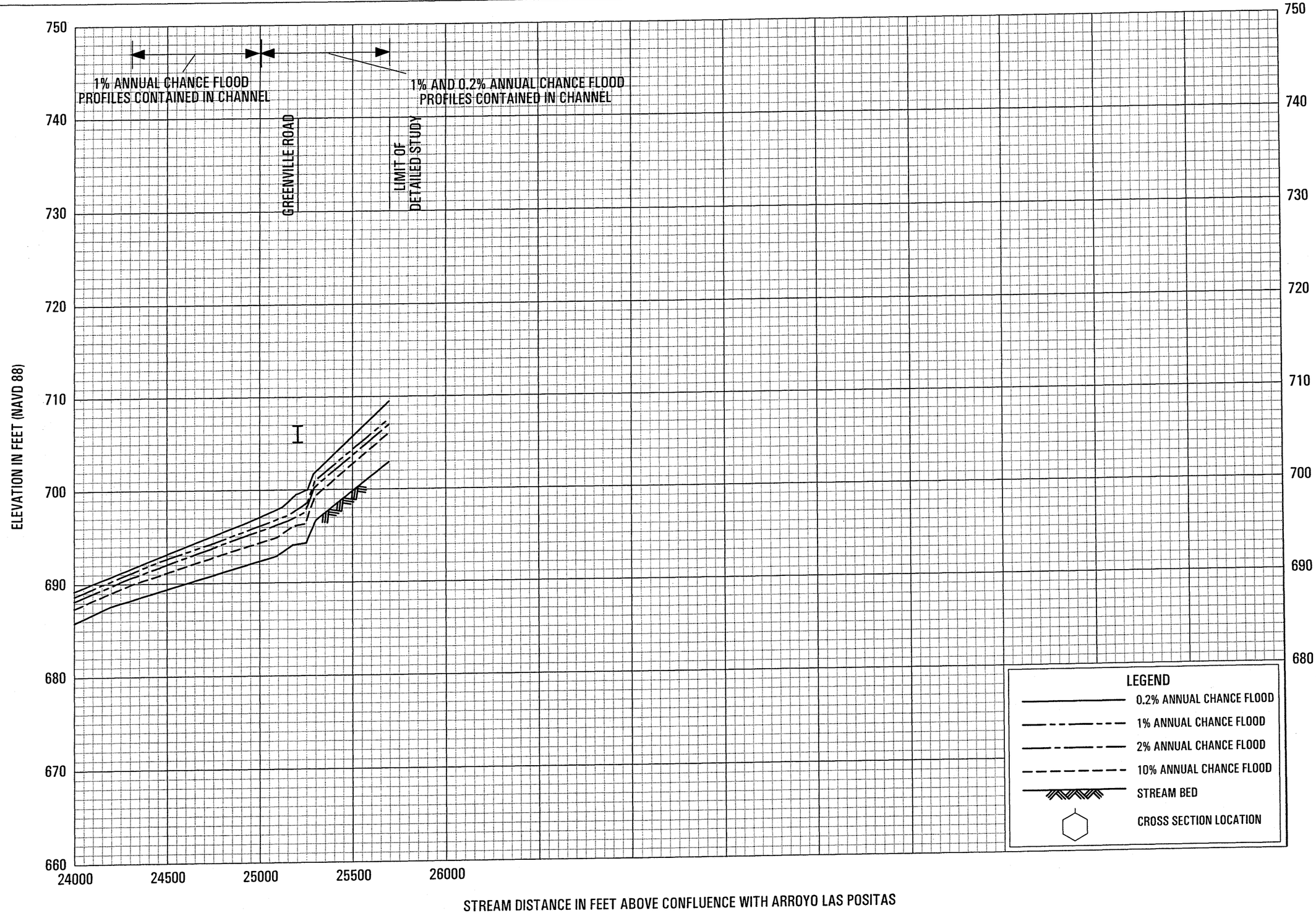

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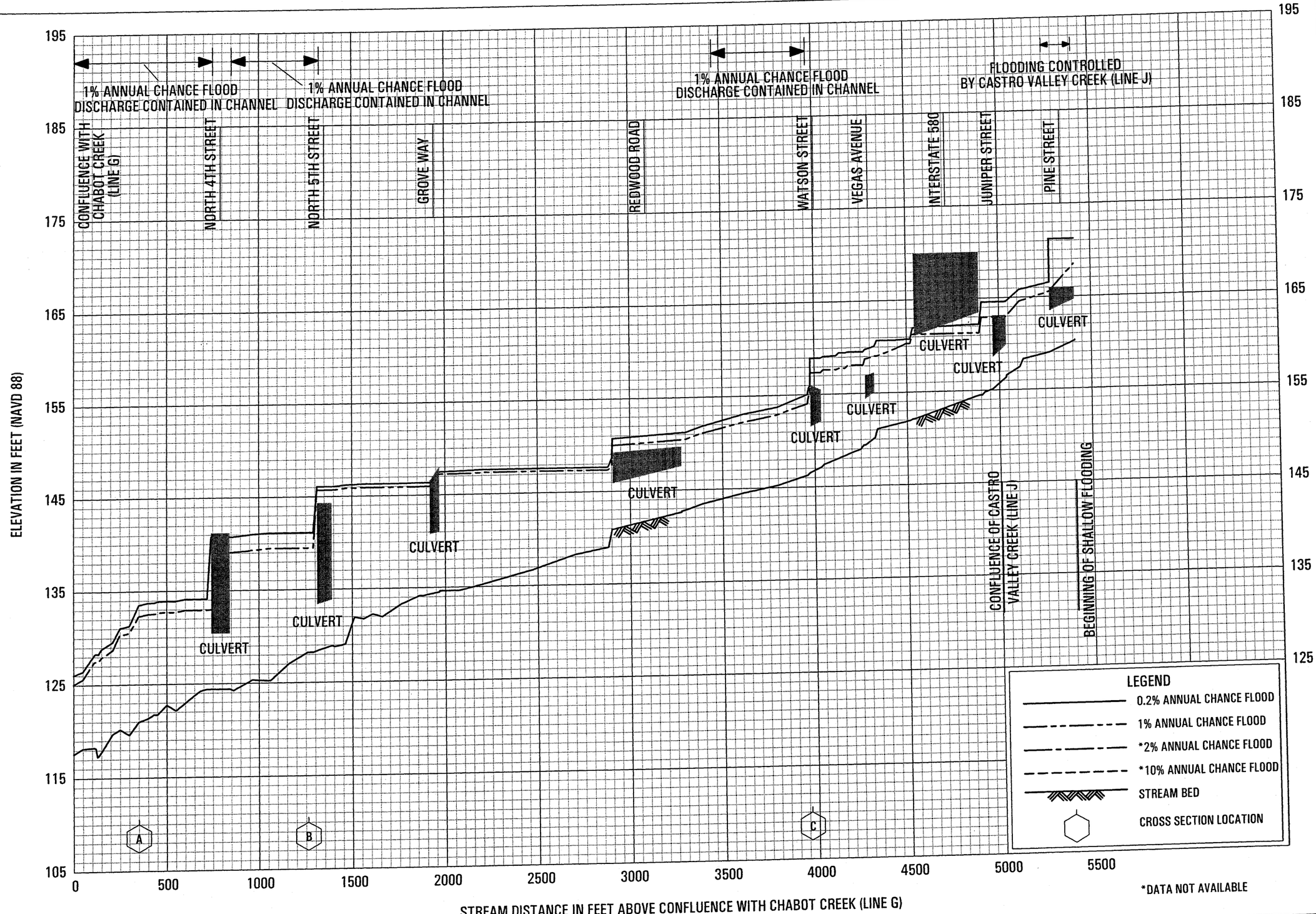
ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



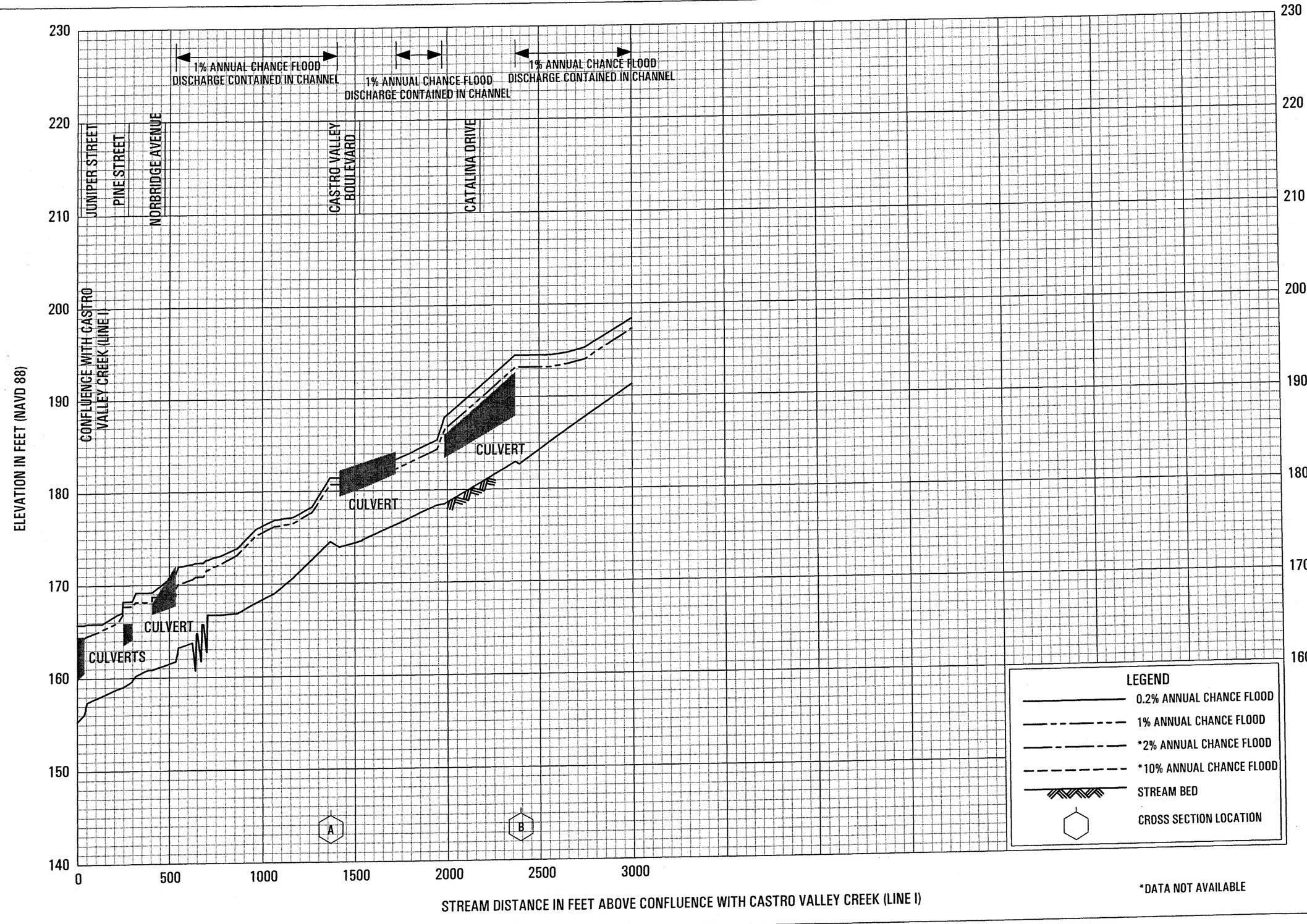
FLOOD PROFILES

CASTRO VALLEY CREEK (LINE I)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



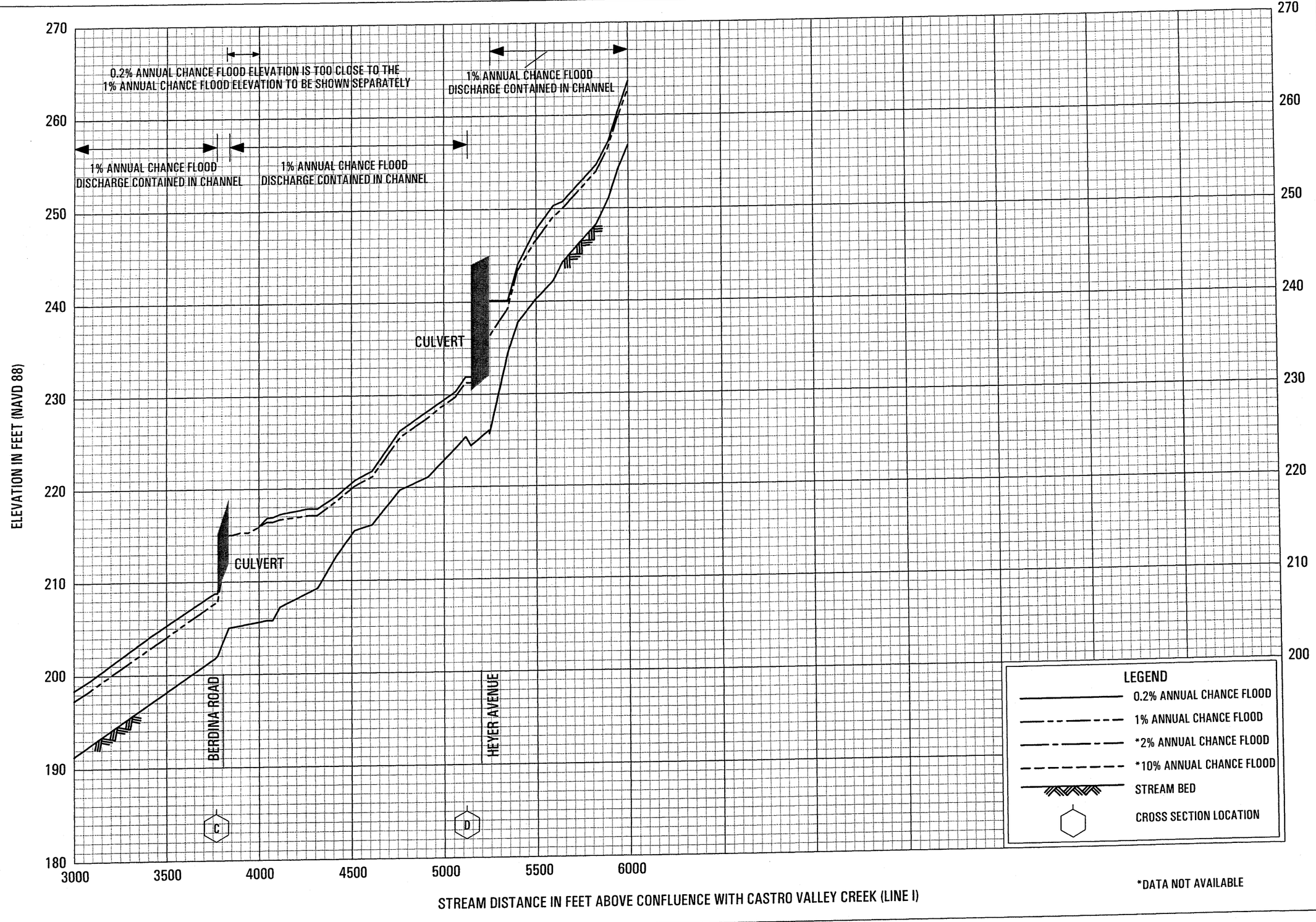
FLOOD PROFILES

CASTRO VALLEY CREEK (LINE J)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



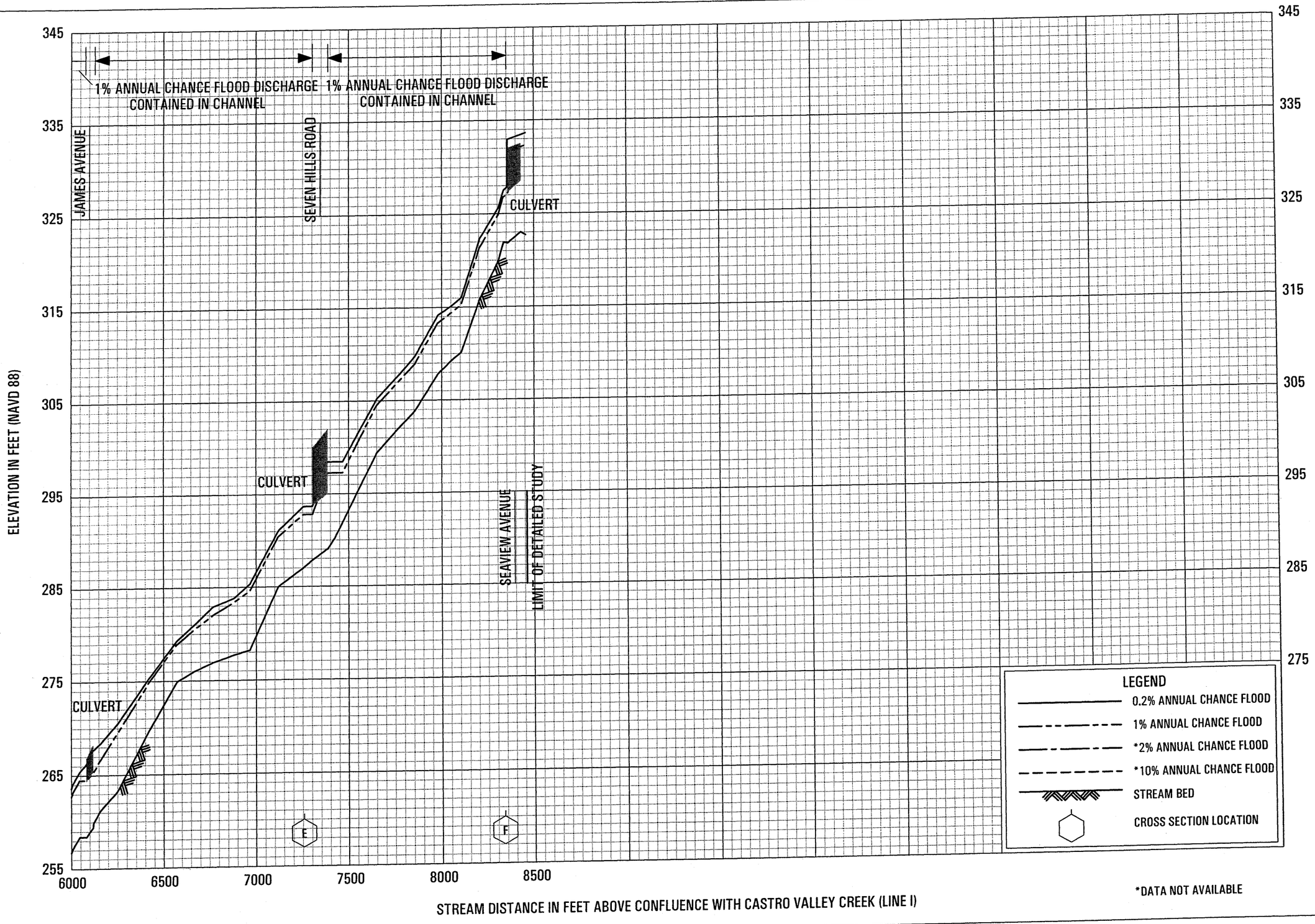
FLOOD PROFILES

CASTRO VALLEY CREEK (LINE J)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

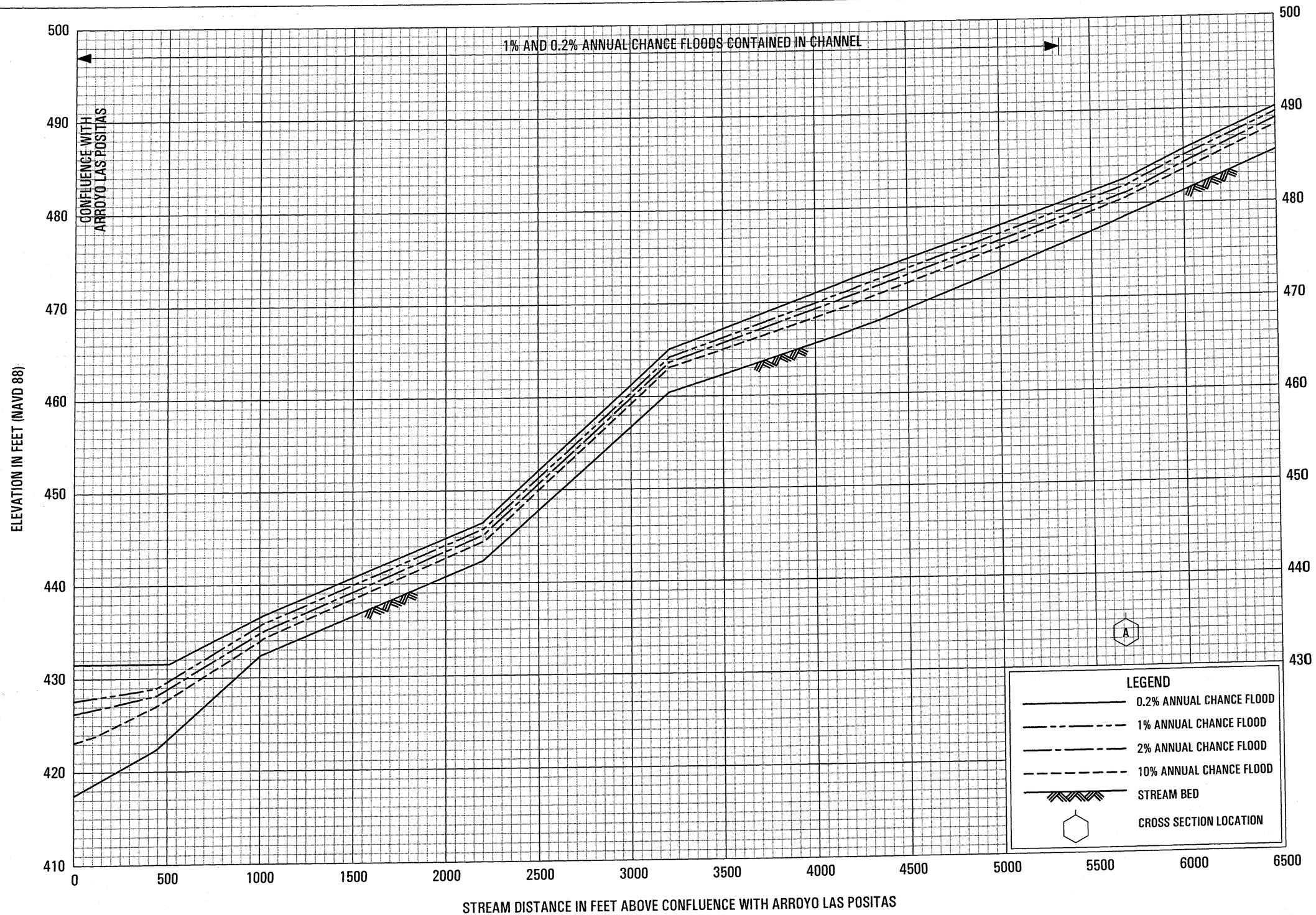
CASTRO VALLEY CREEK (LINE J)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

61P



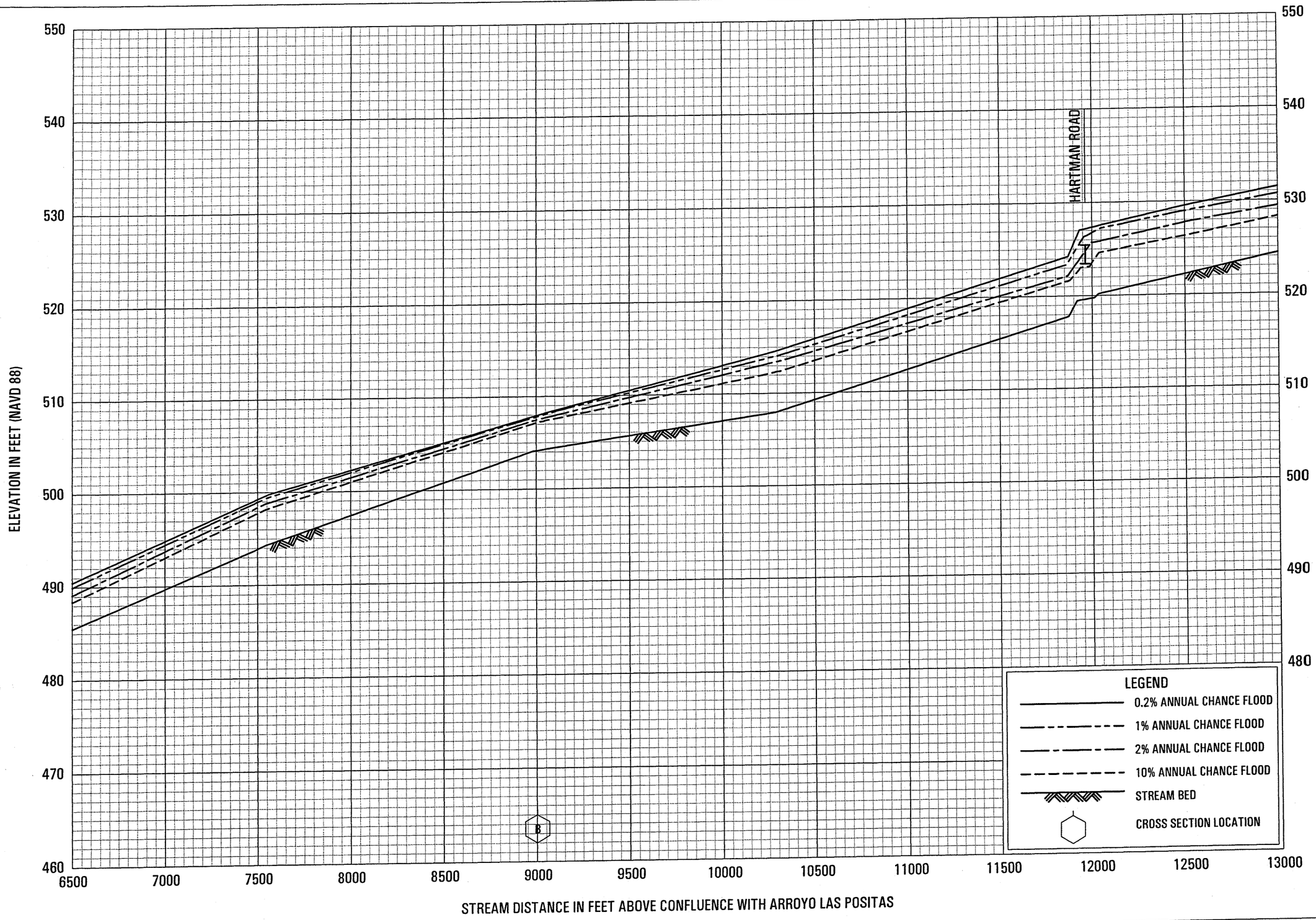
FLOOD PROFILES

CAYETANO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



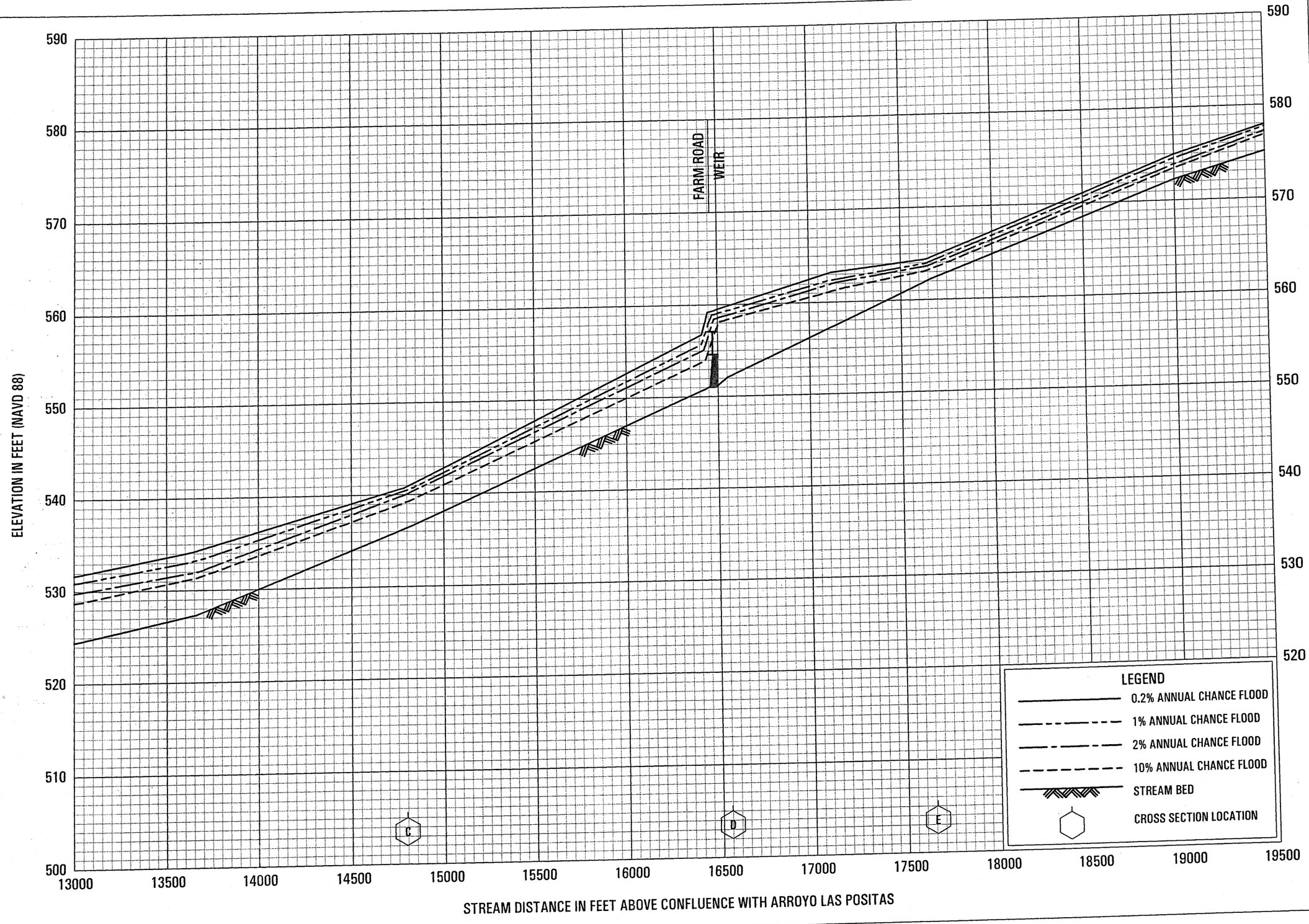
FLOOD PROFILES

CAYETANO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



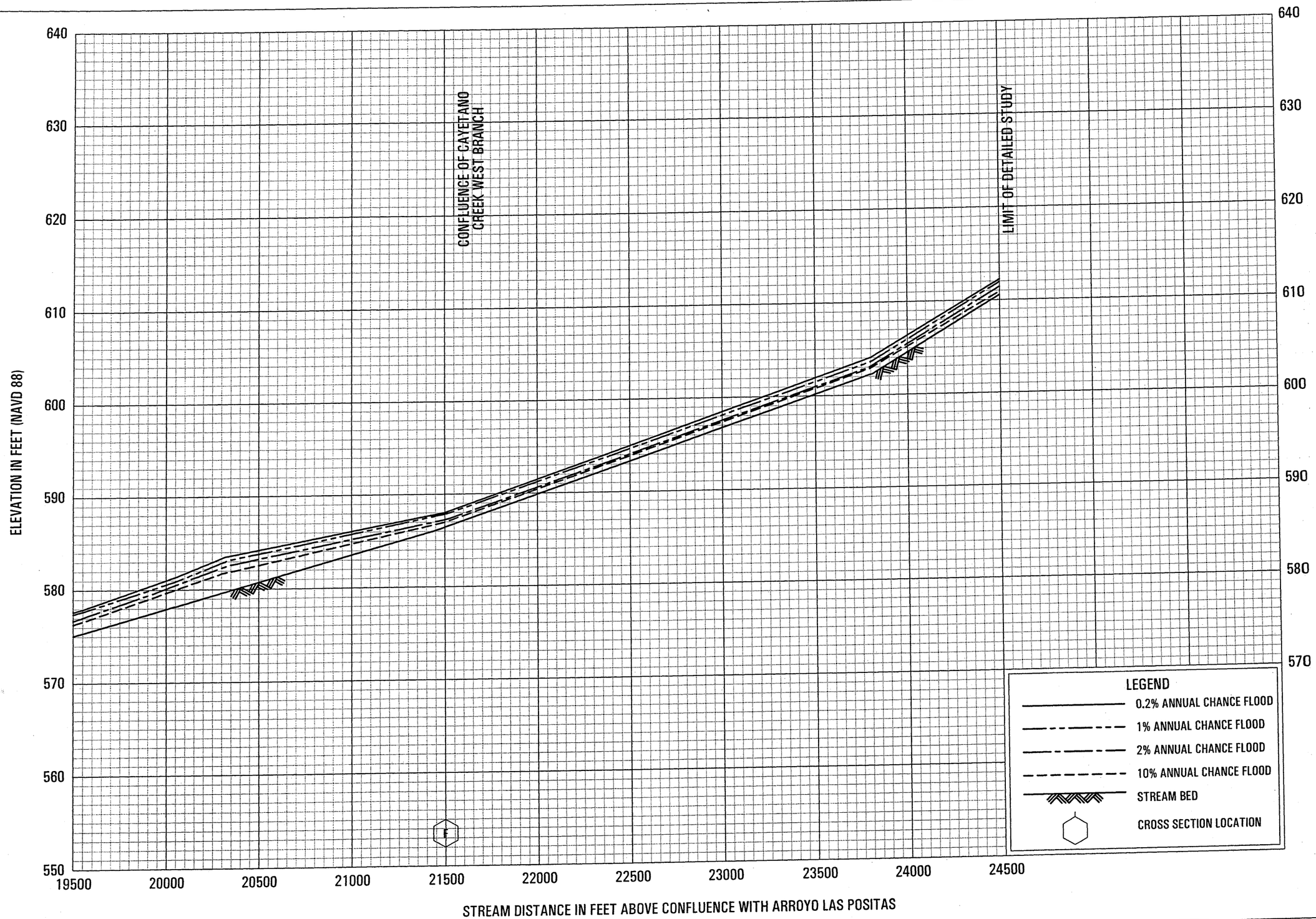
FLOOD PROFILES

CAYETANO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



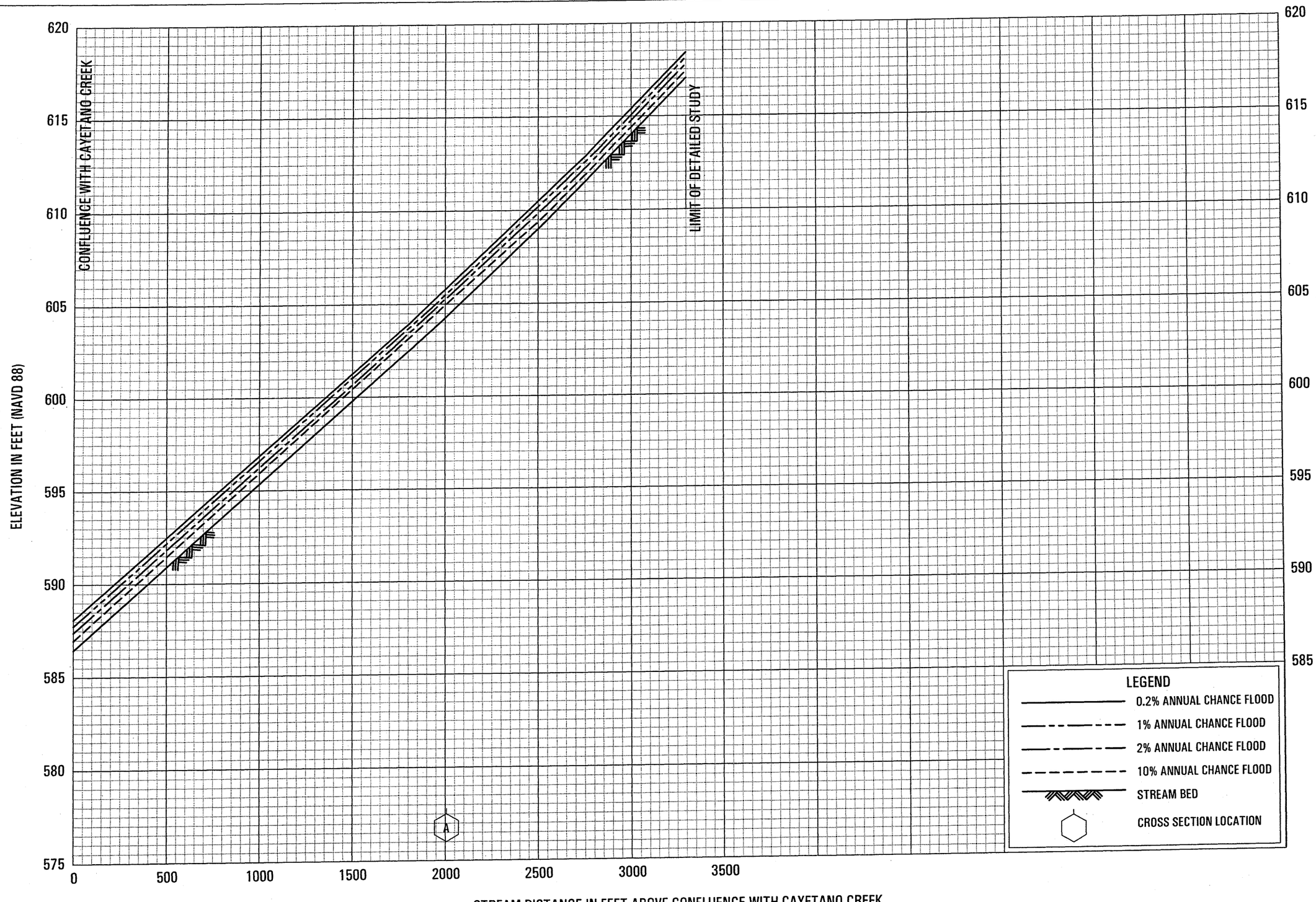
FLOOD PROFILES

CAYETANO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



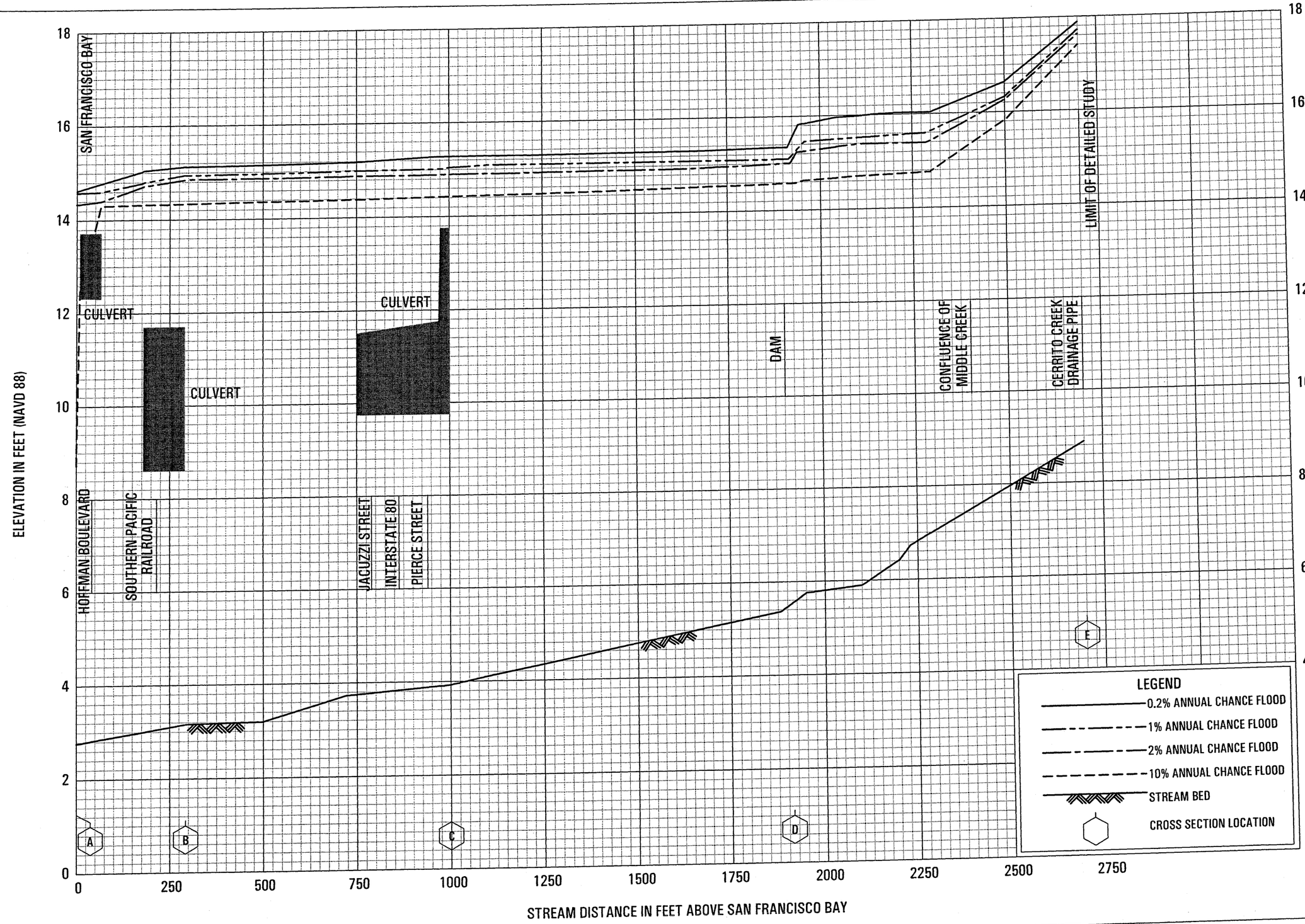
FLOOD PROFILES

CAYETANO CREEK (WEST BRANCH)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



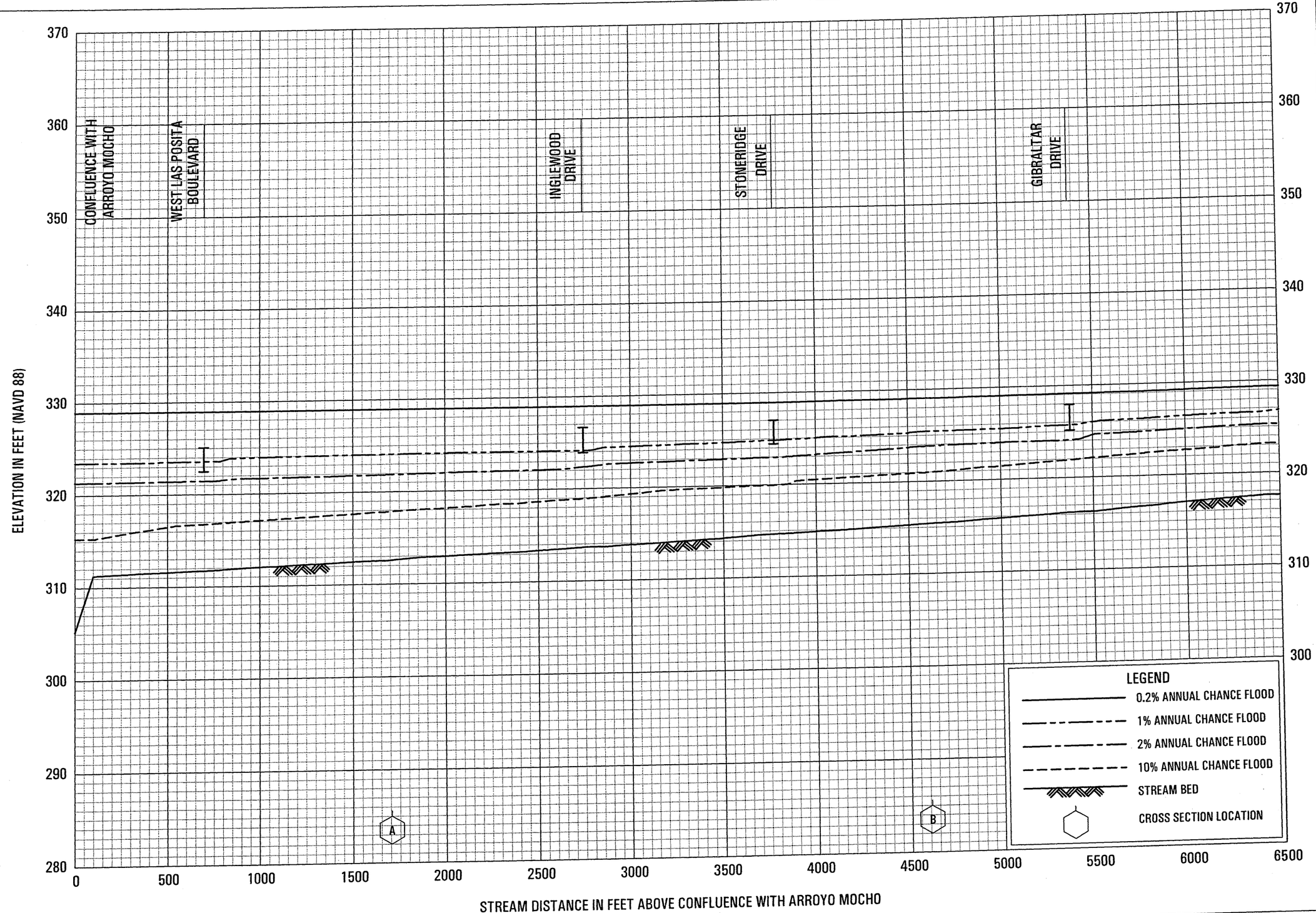
FLOOD PROFILES

CERRITO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



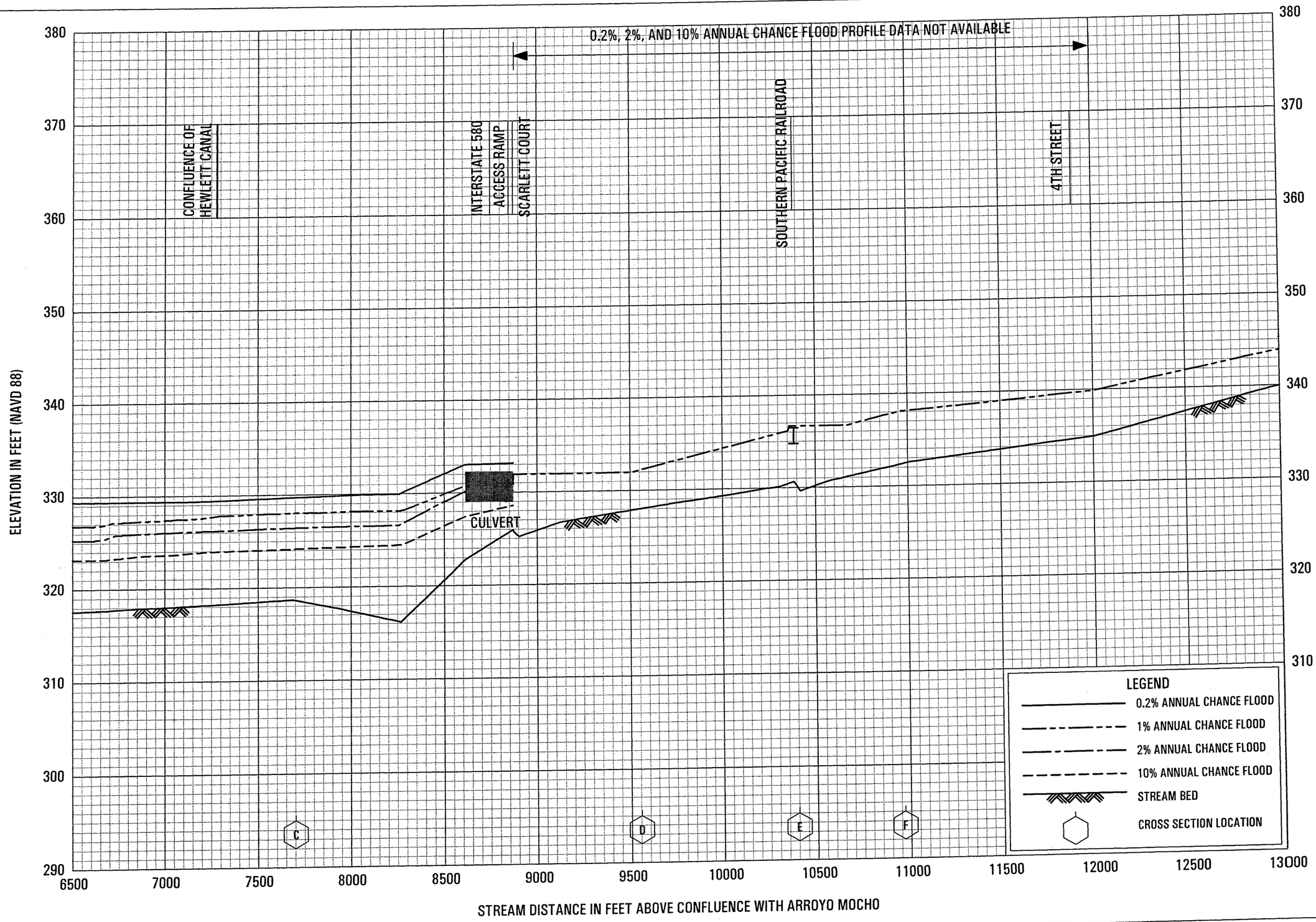
FLOOD PROFILES

CHABOT CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



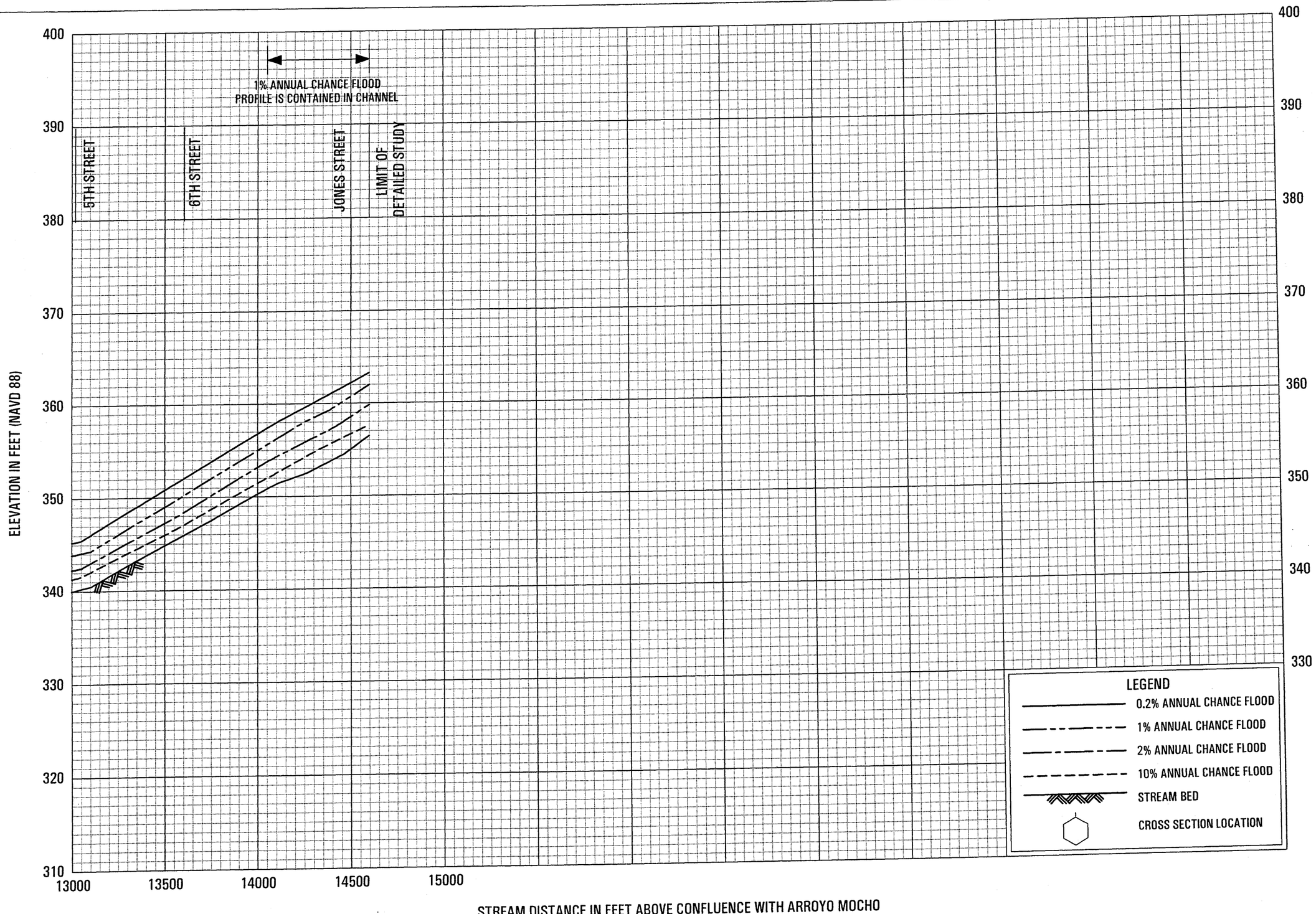
FLOOD PROFILES

CHABOT CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



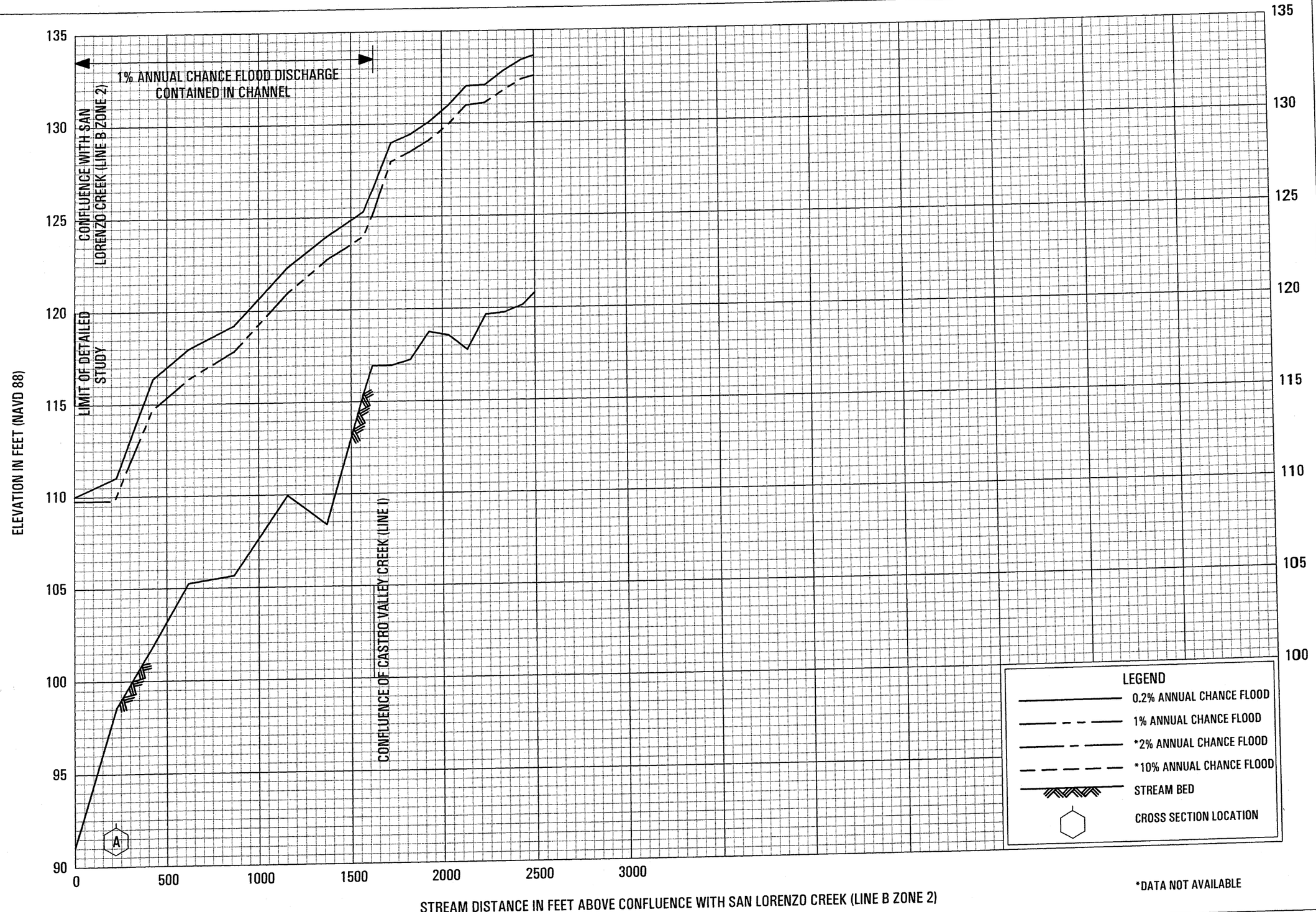
FLOOD PROFILES

CHABOT CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



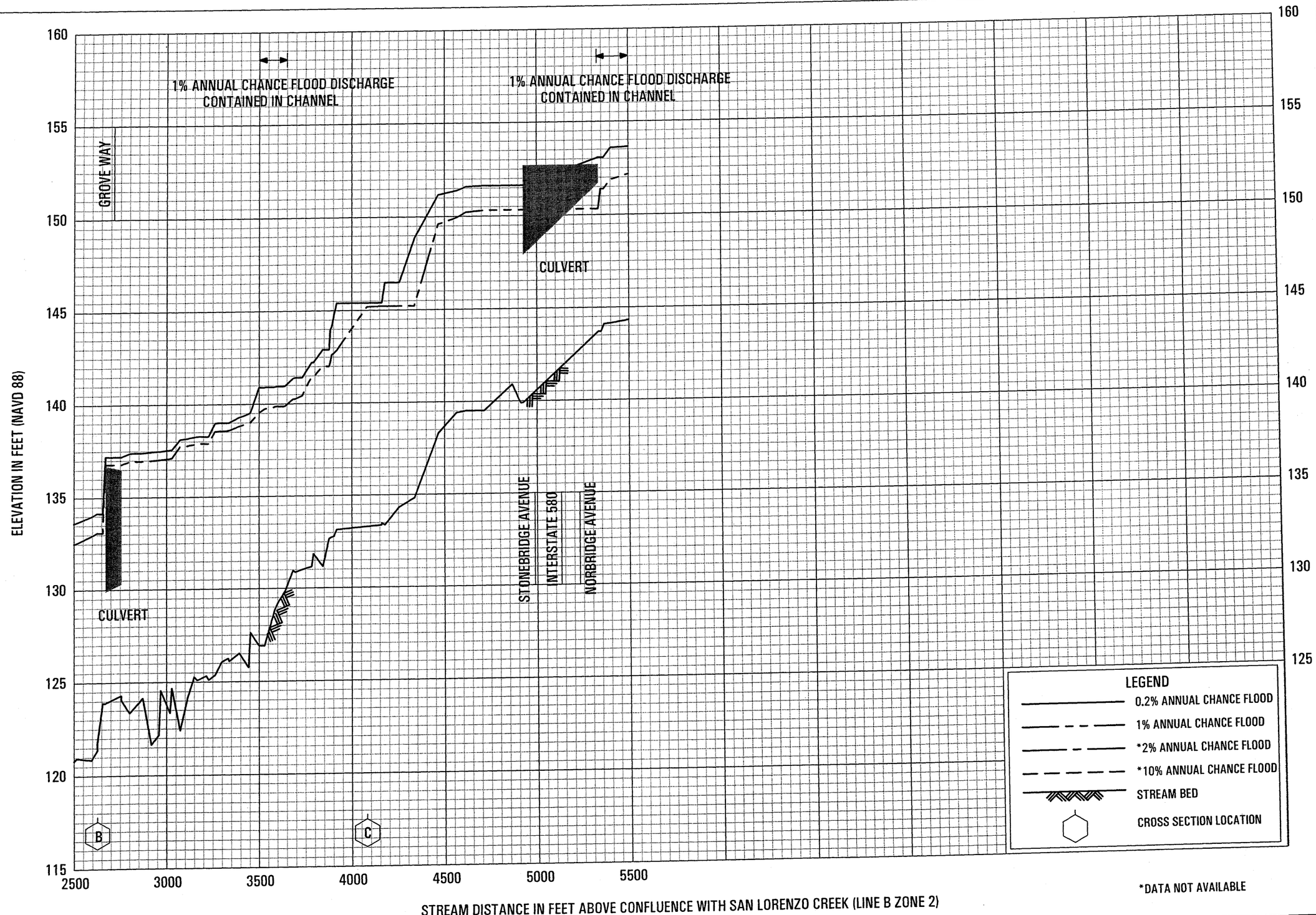
FLOOD PROFILES

CHABOT CREEK (LINE G)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



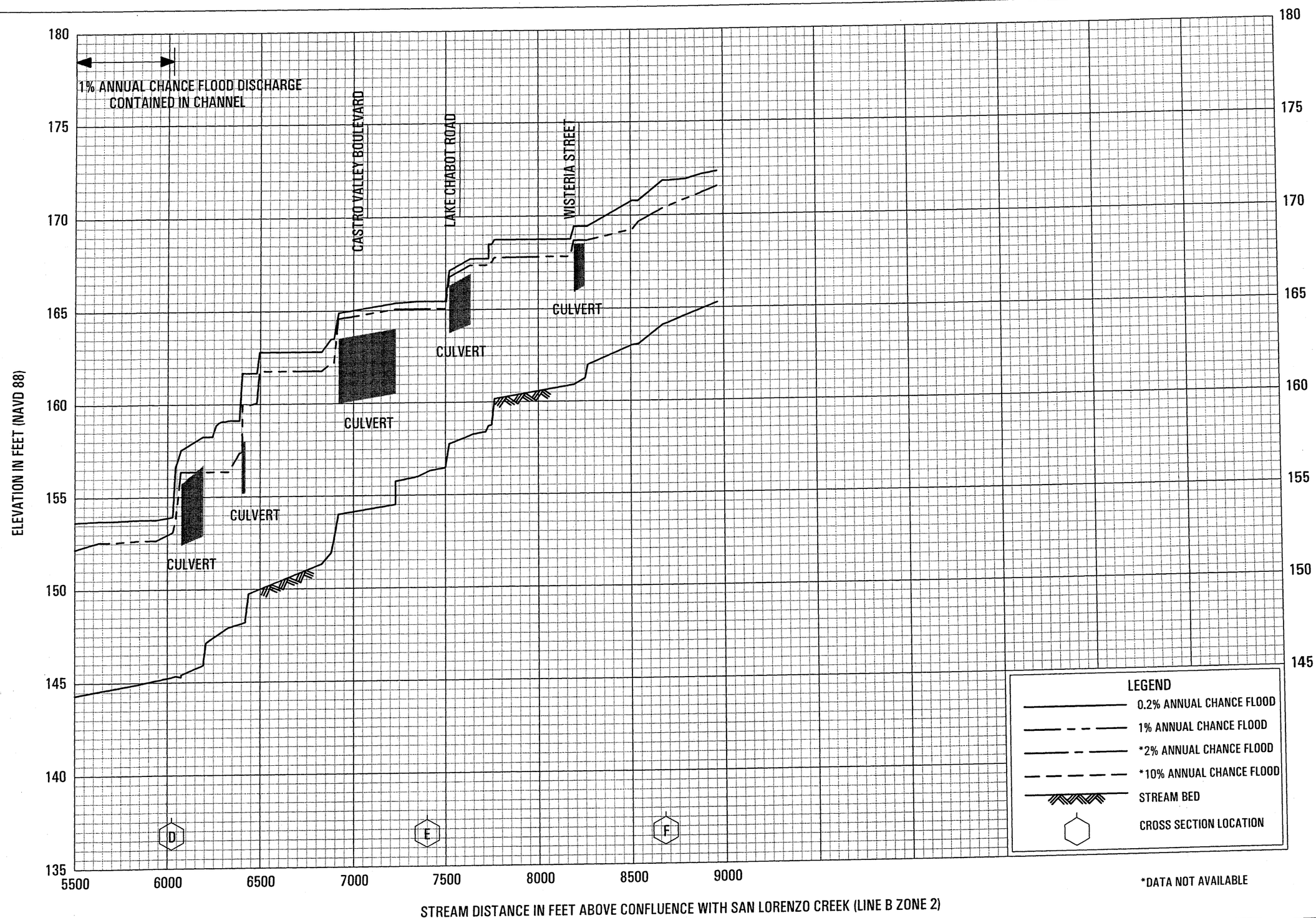
FLOOD PROFILES

CHABOT CREEK (LINE G)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



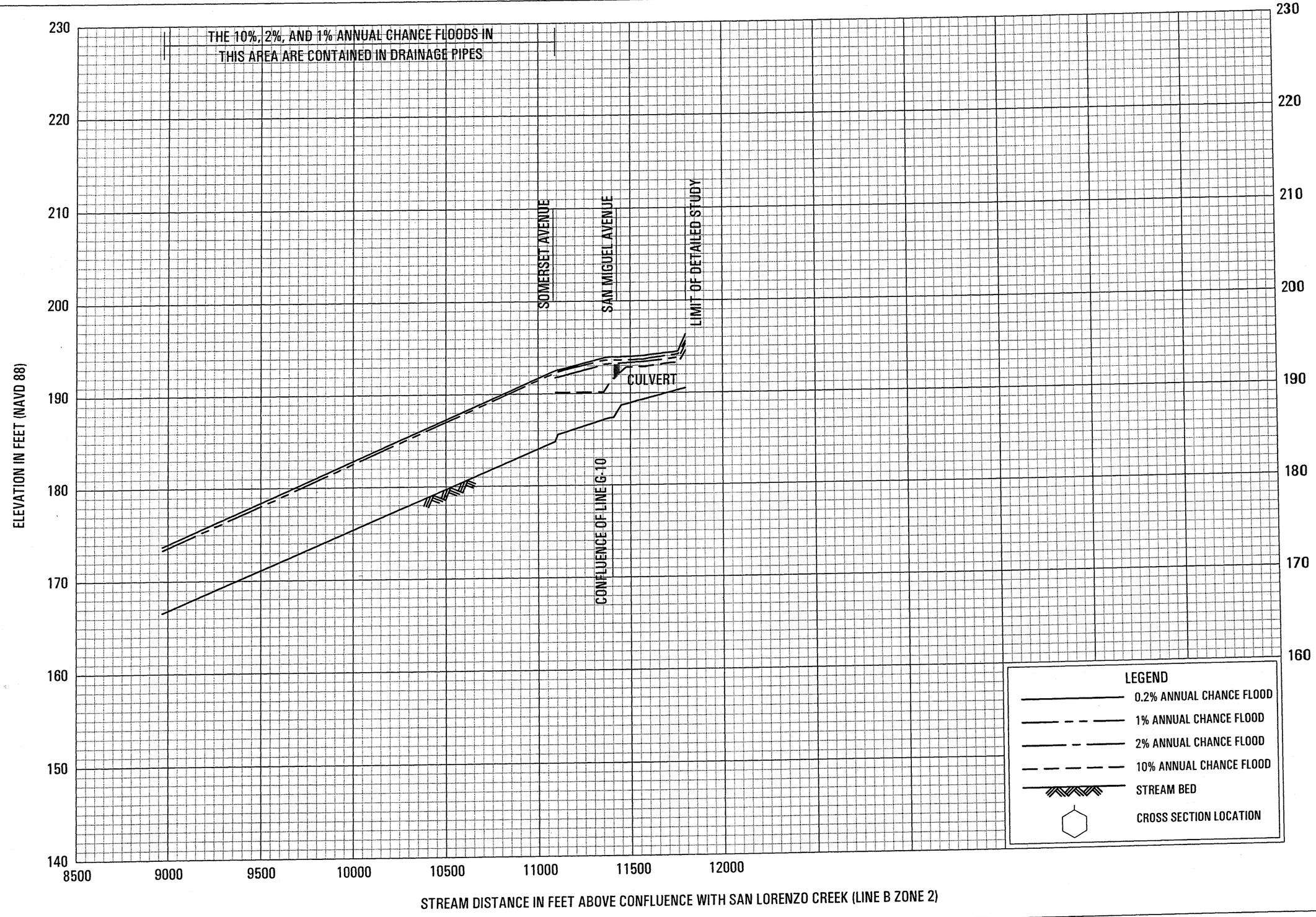
FLOOD PROFILES

CHABOT CREEK (LINE G)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



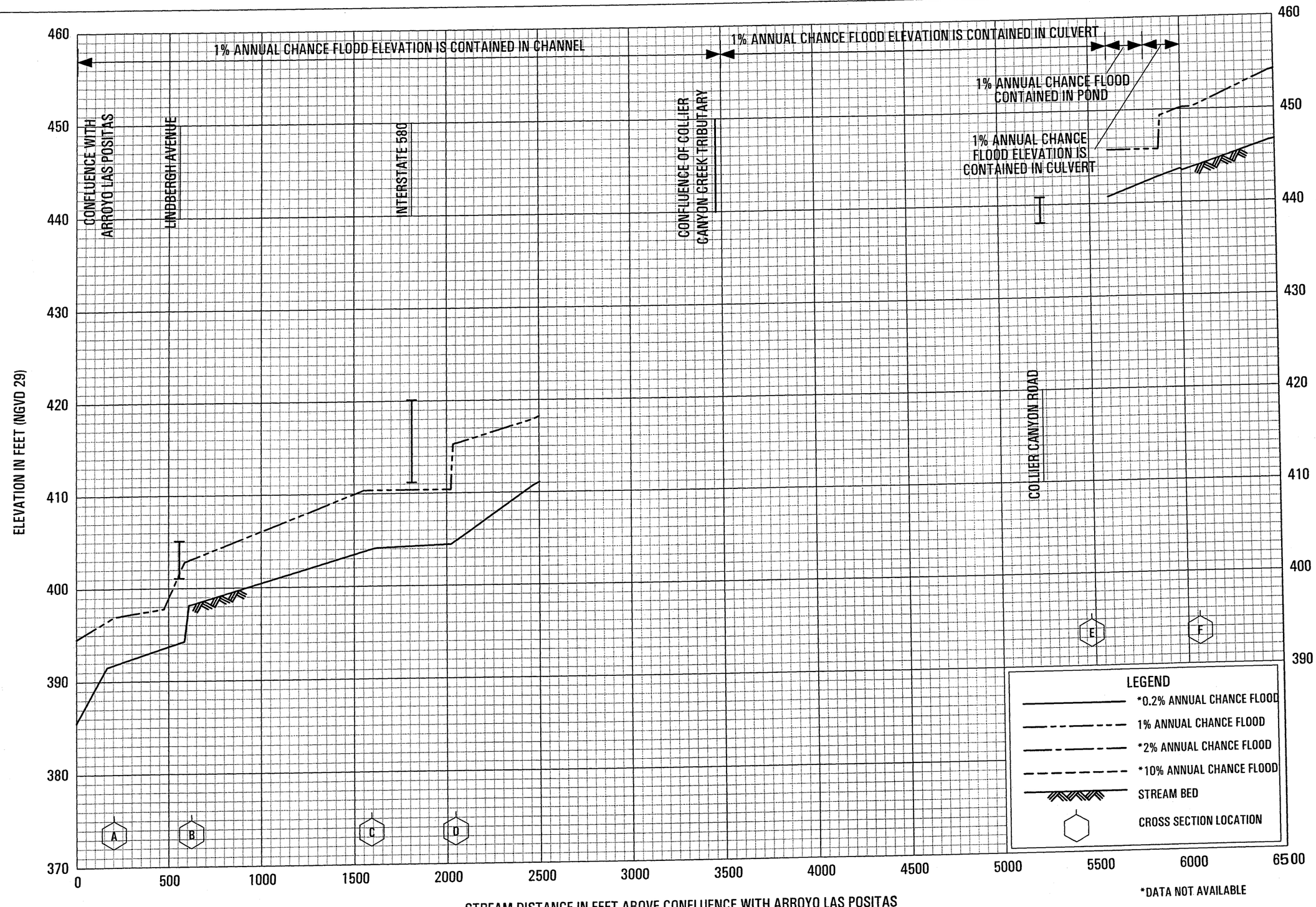
FLOOD PROFILES

CHABOT CREEK (LINE G)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



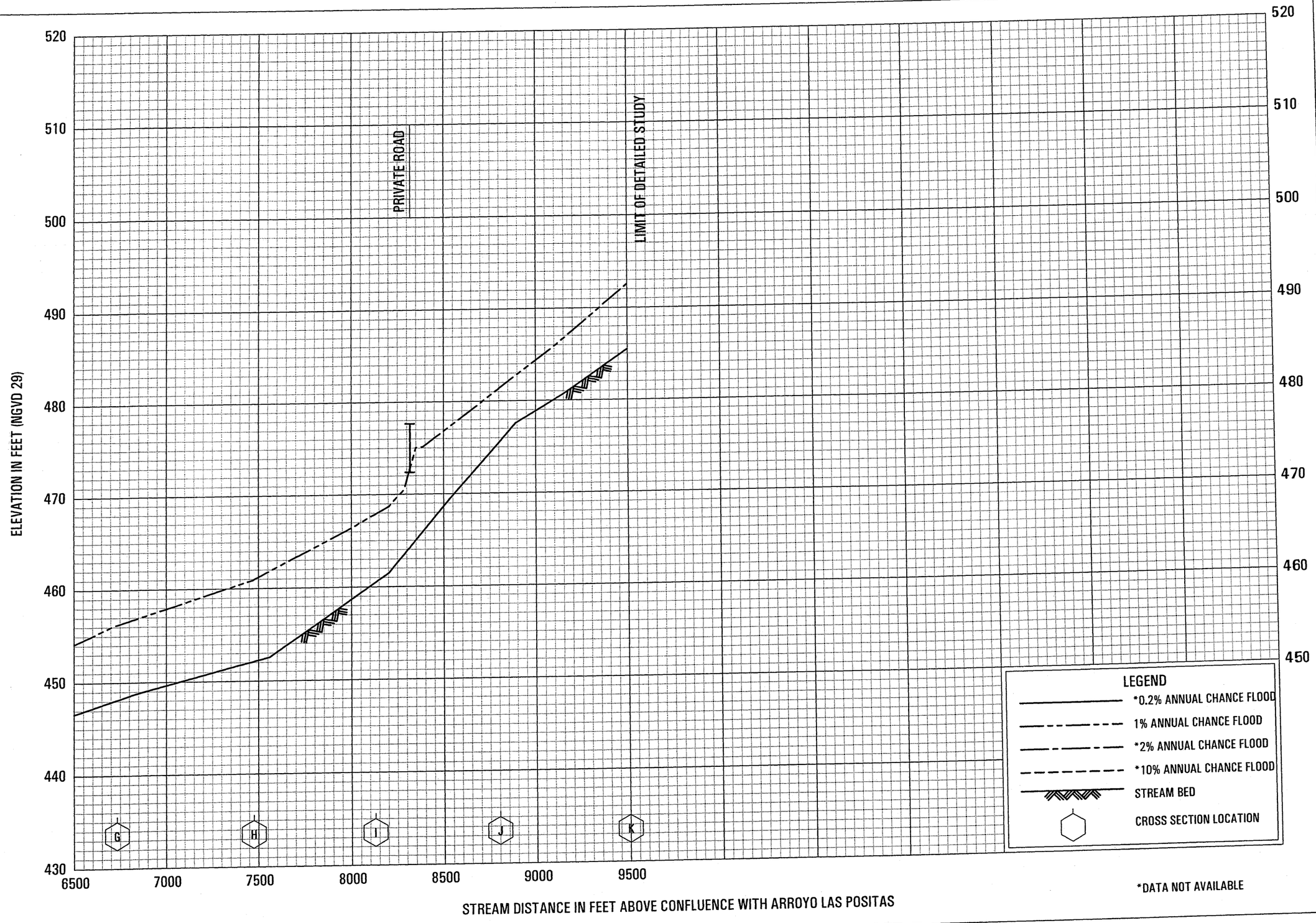
FLOOD PROFILES

COLLIER CANYON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

(AND INCORPORATED AREAS)



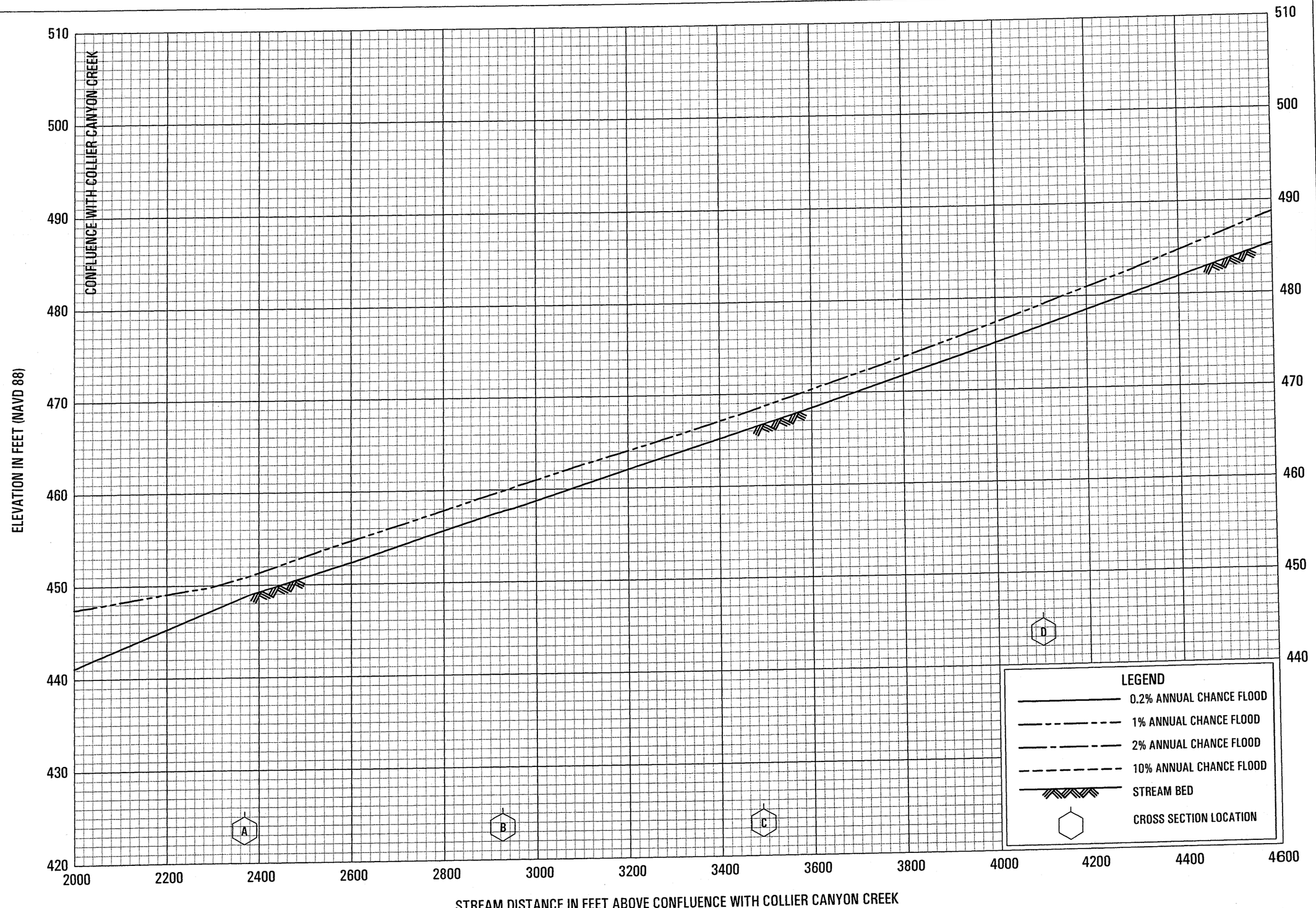
FLOOD PROFILES

COLLIER CANYON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

(AND INCORPORATED AREAS)



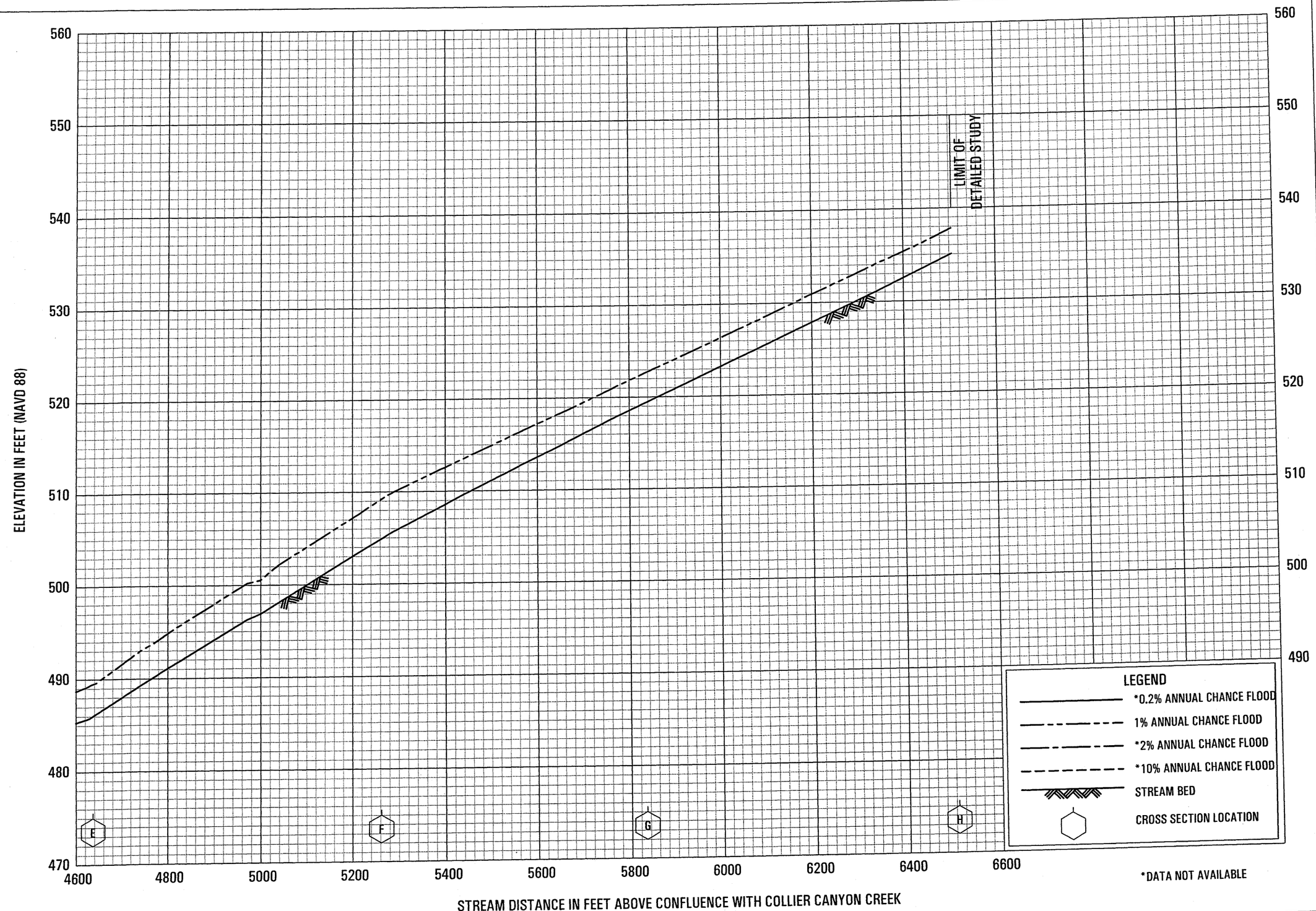
FLOOD PROFILES

COLLIER CANYON CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



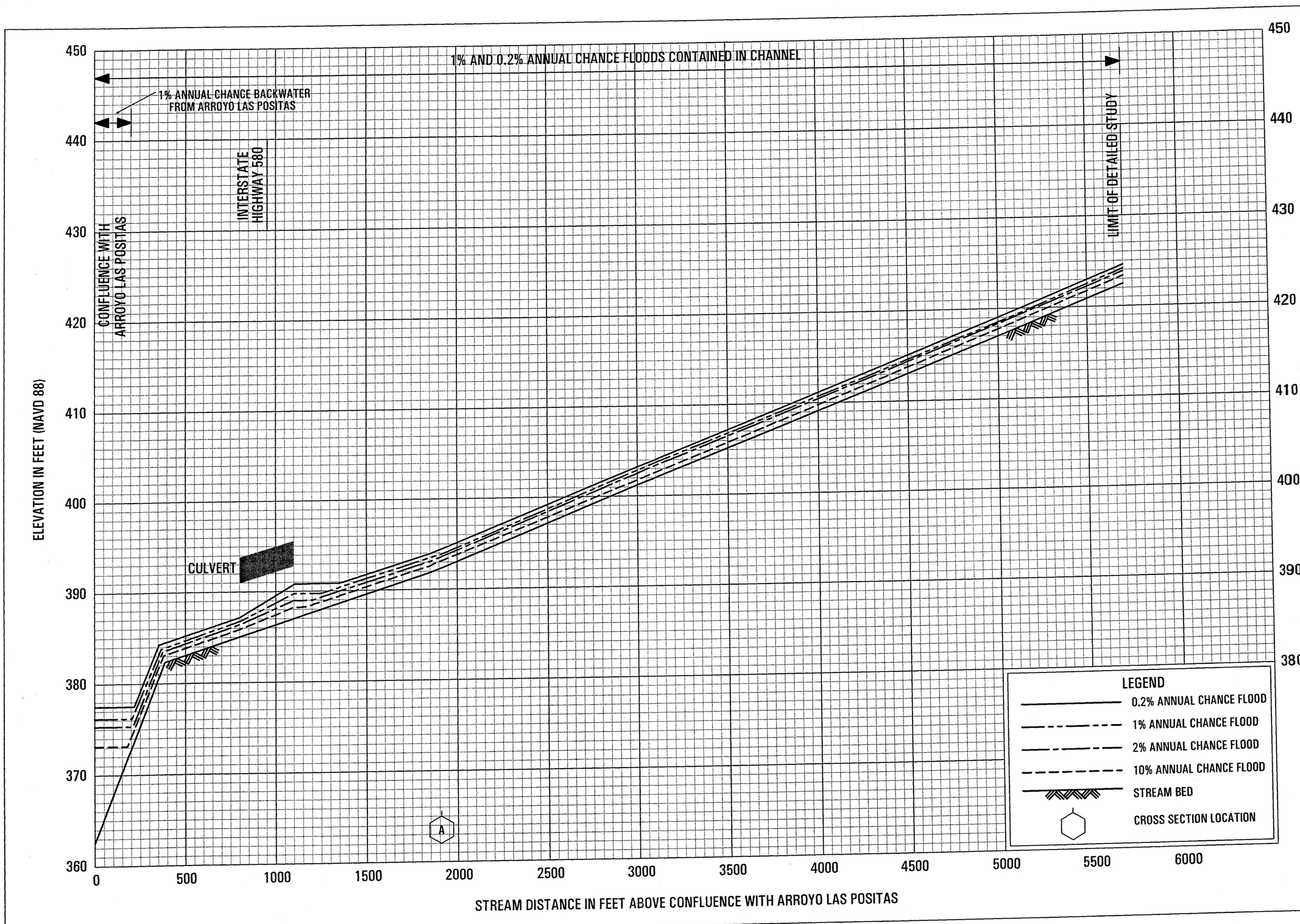
FLOOD PROFILES

COLLIER CANYON CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



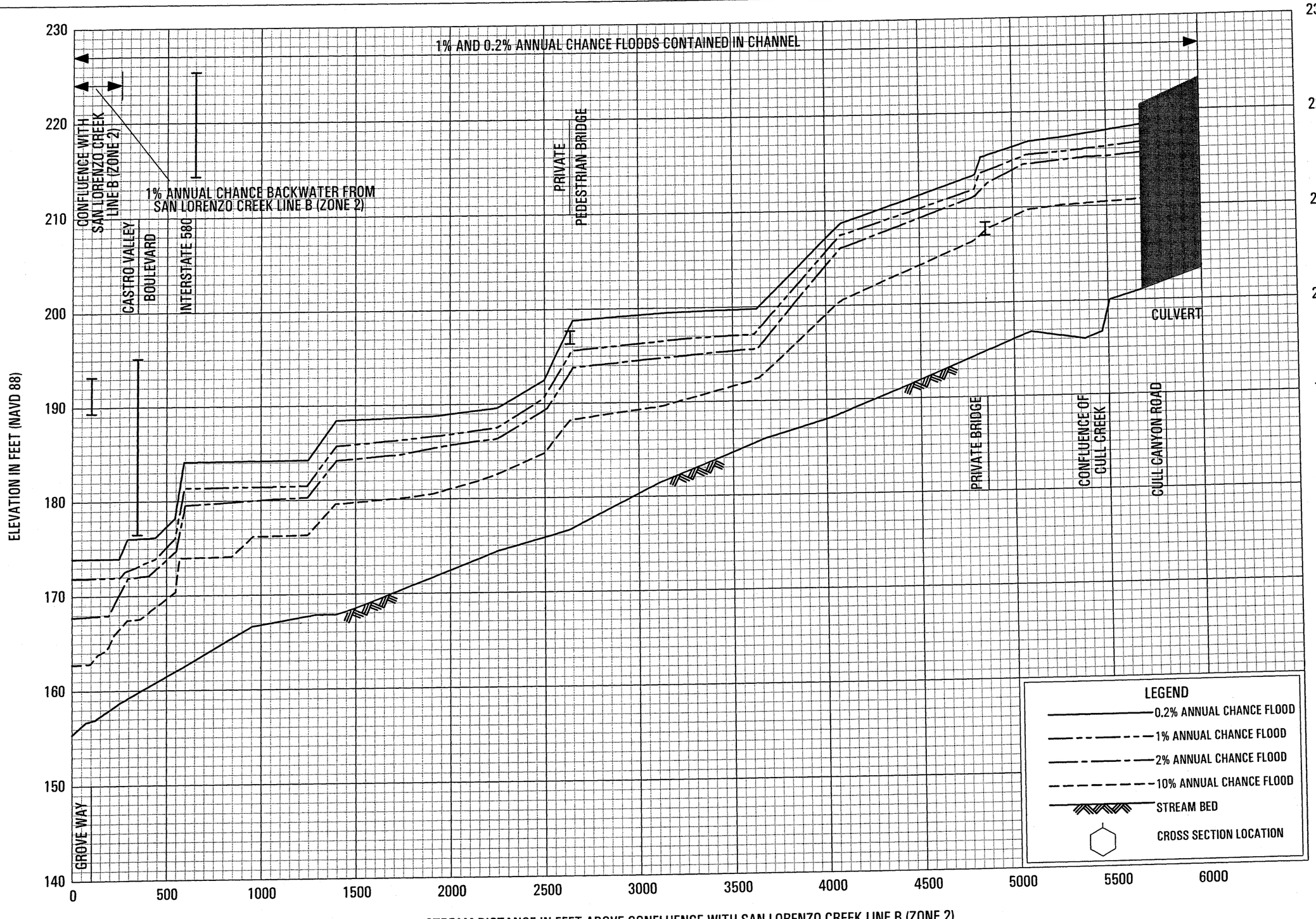
FLOOD PROFILES

COTTONWOOD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



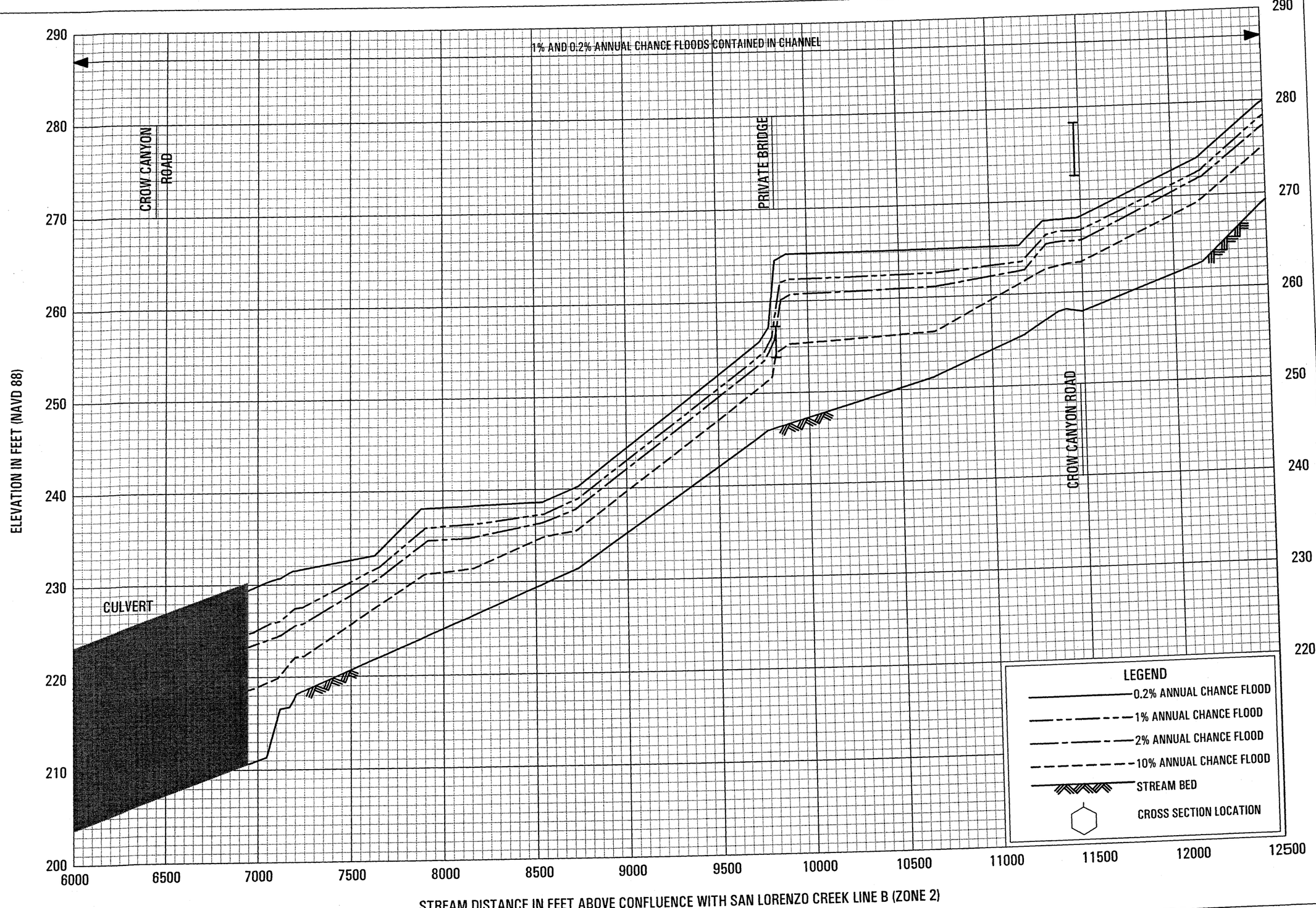
FLOOD PROFILES

CROW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

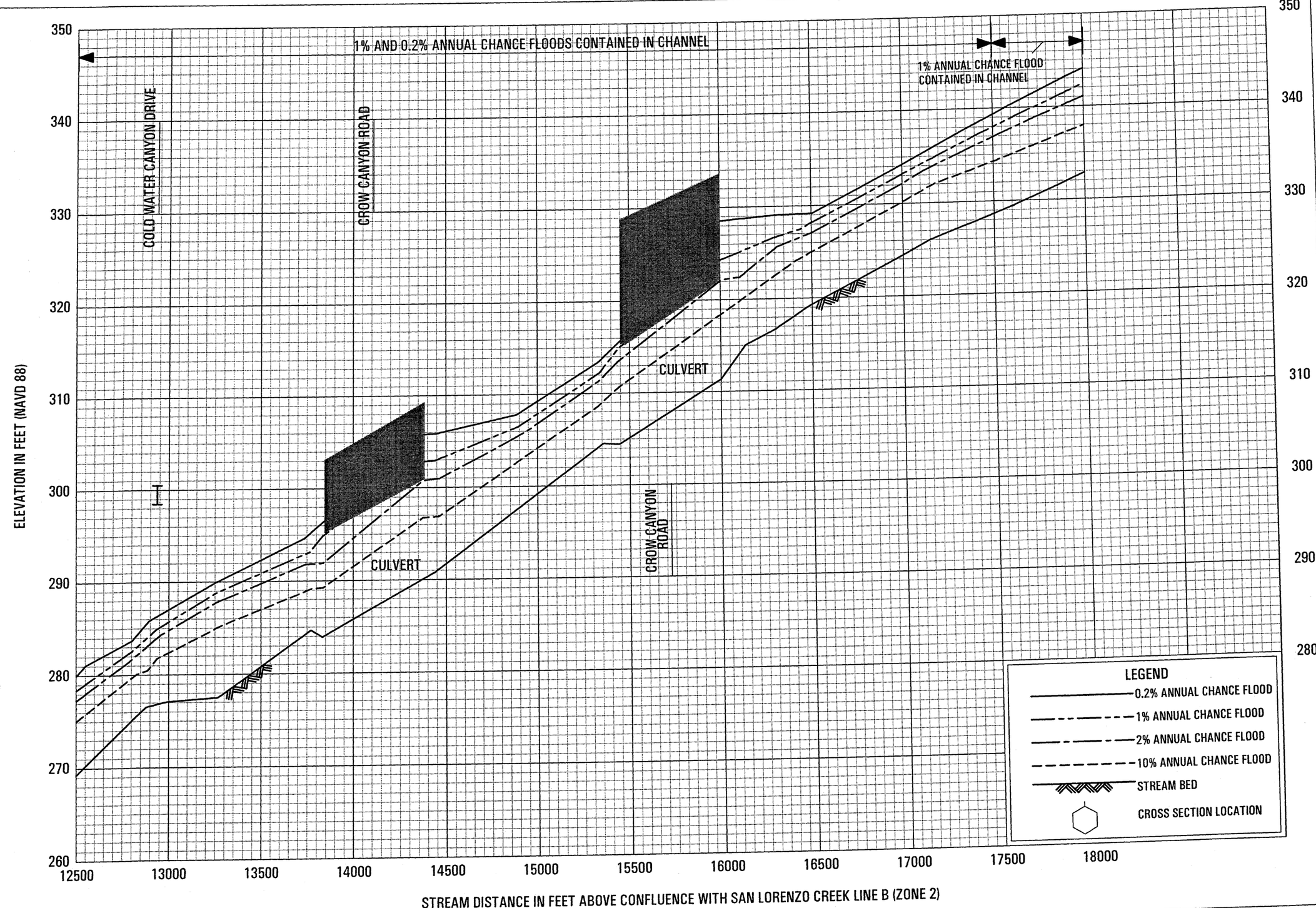
CROW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

81P



FLOOD PROFILES

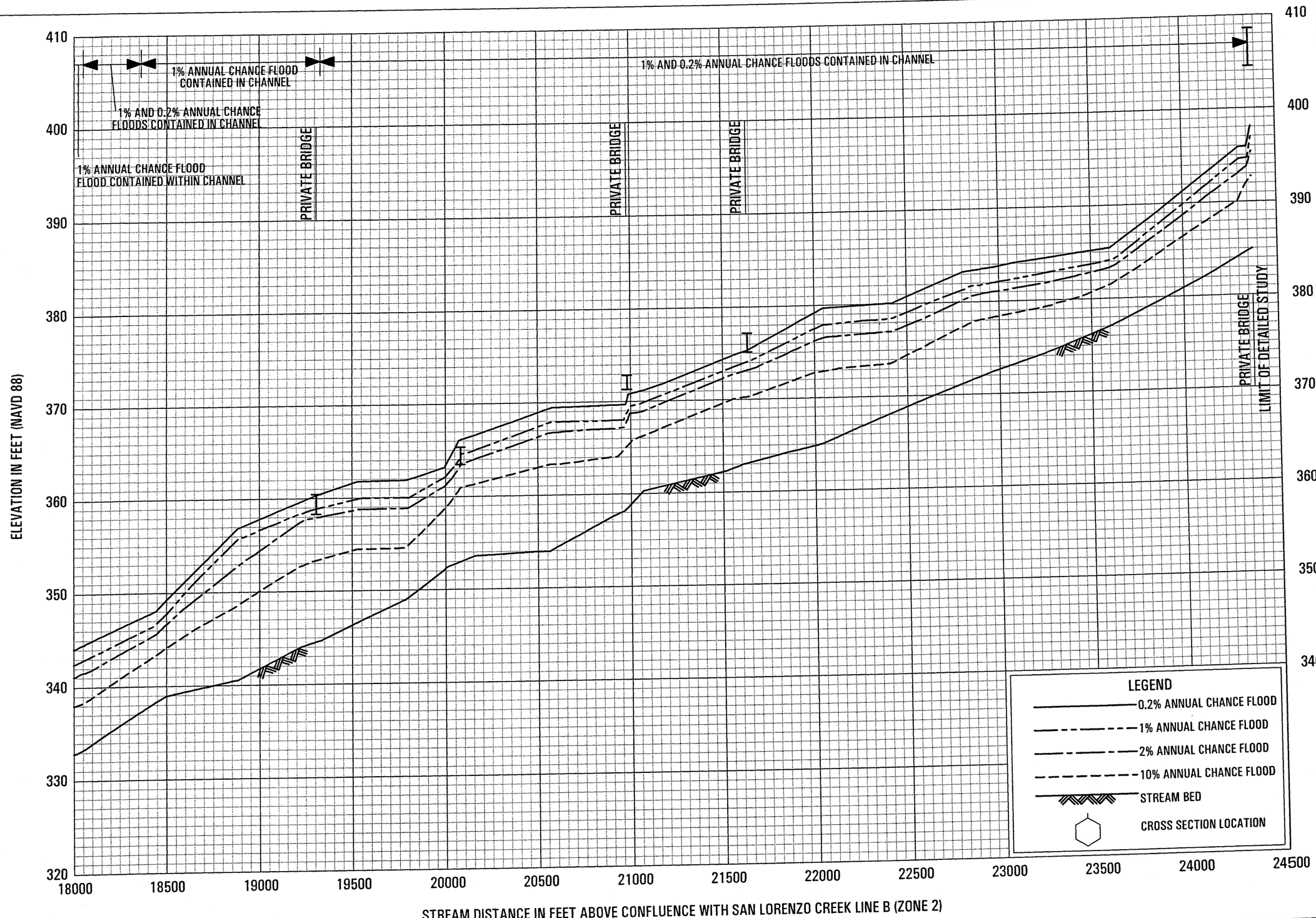
CROW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

82P



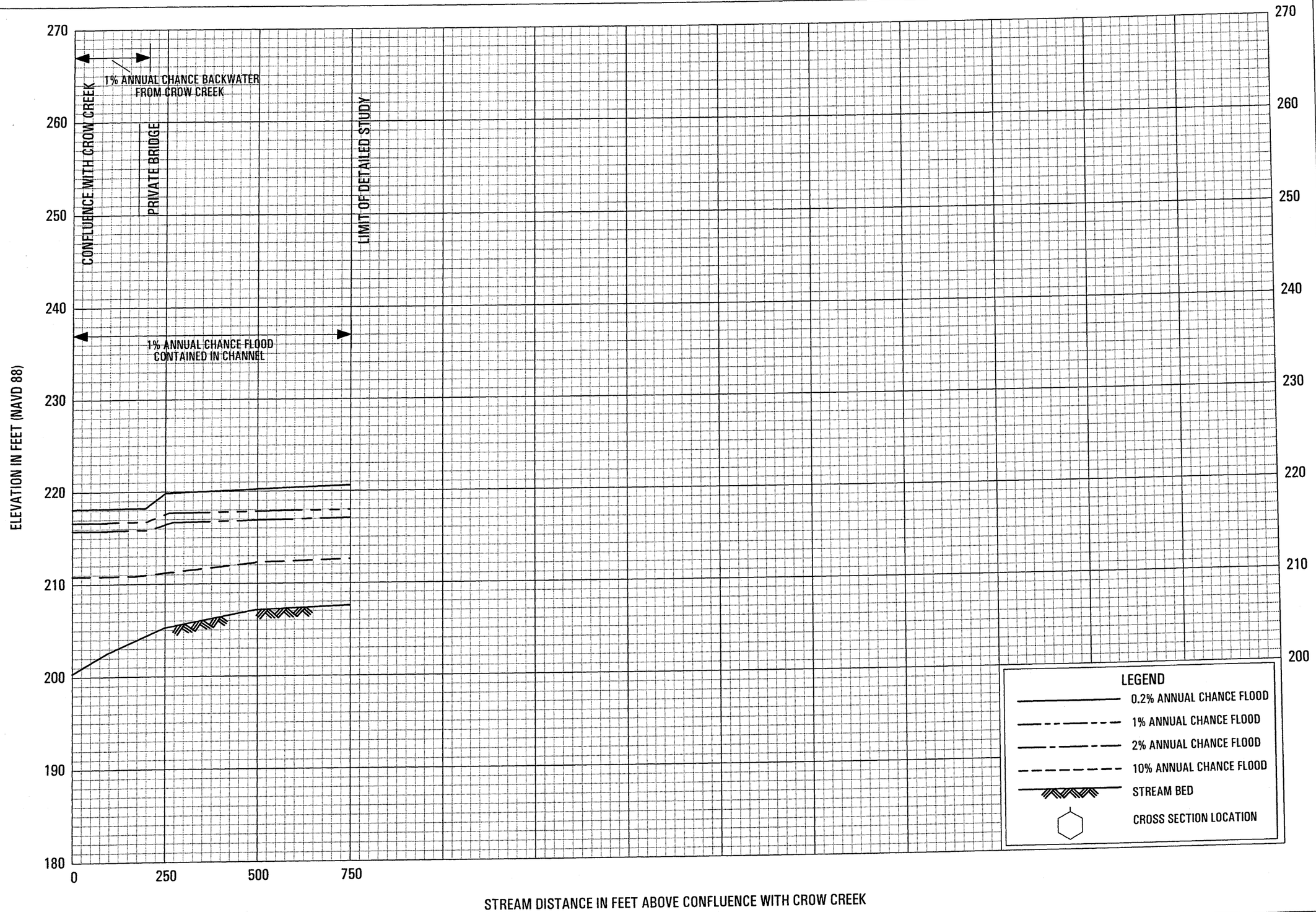
FLOOD PROFILES

CROW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



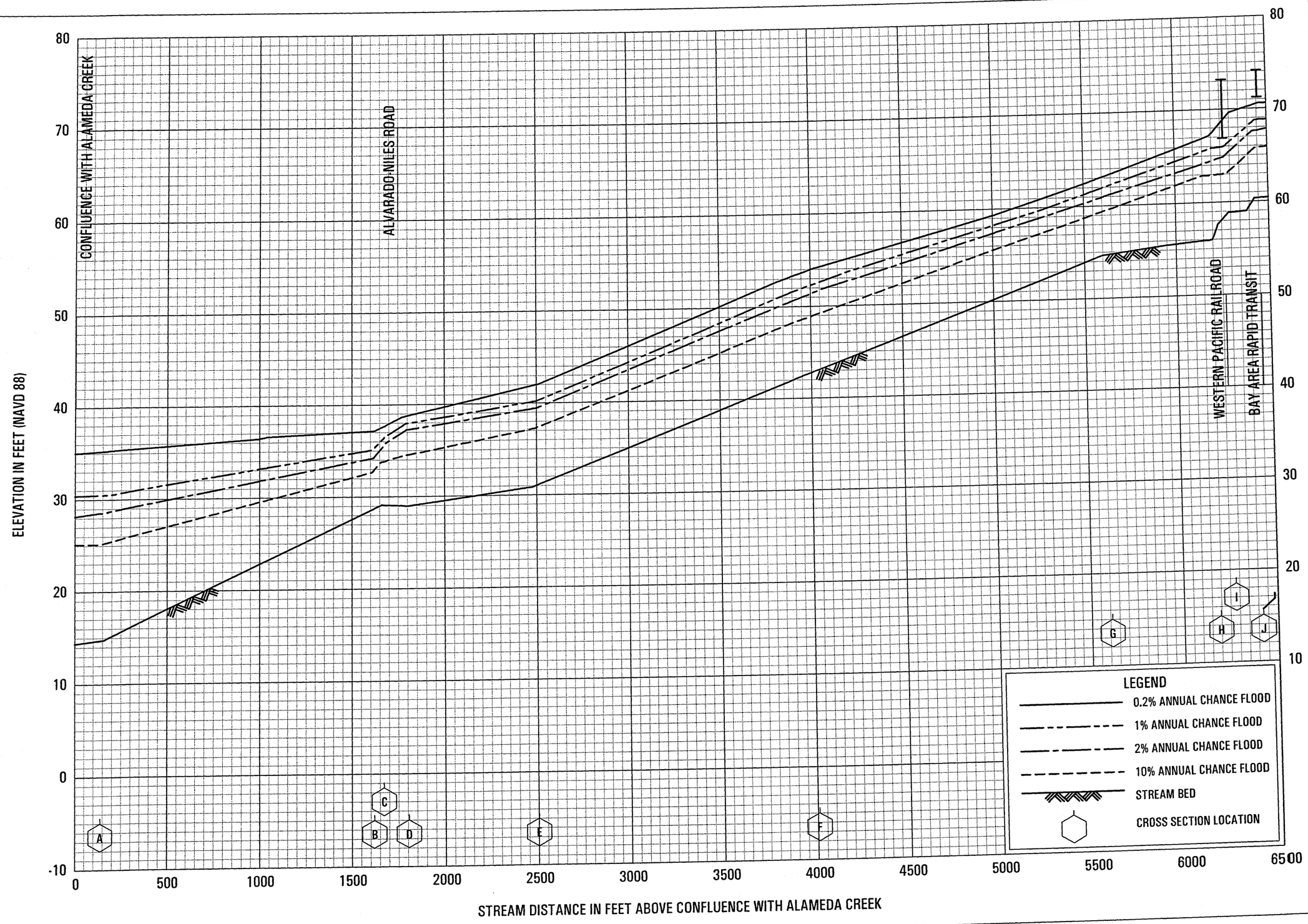
FLOOD PROFILES

CULL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



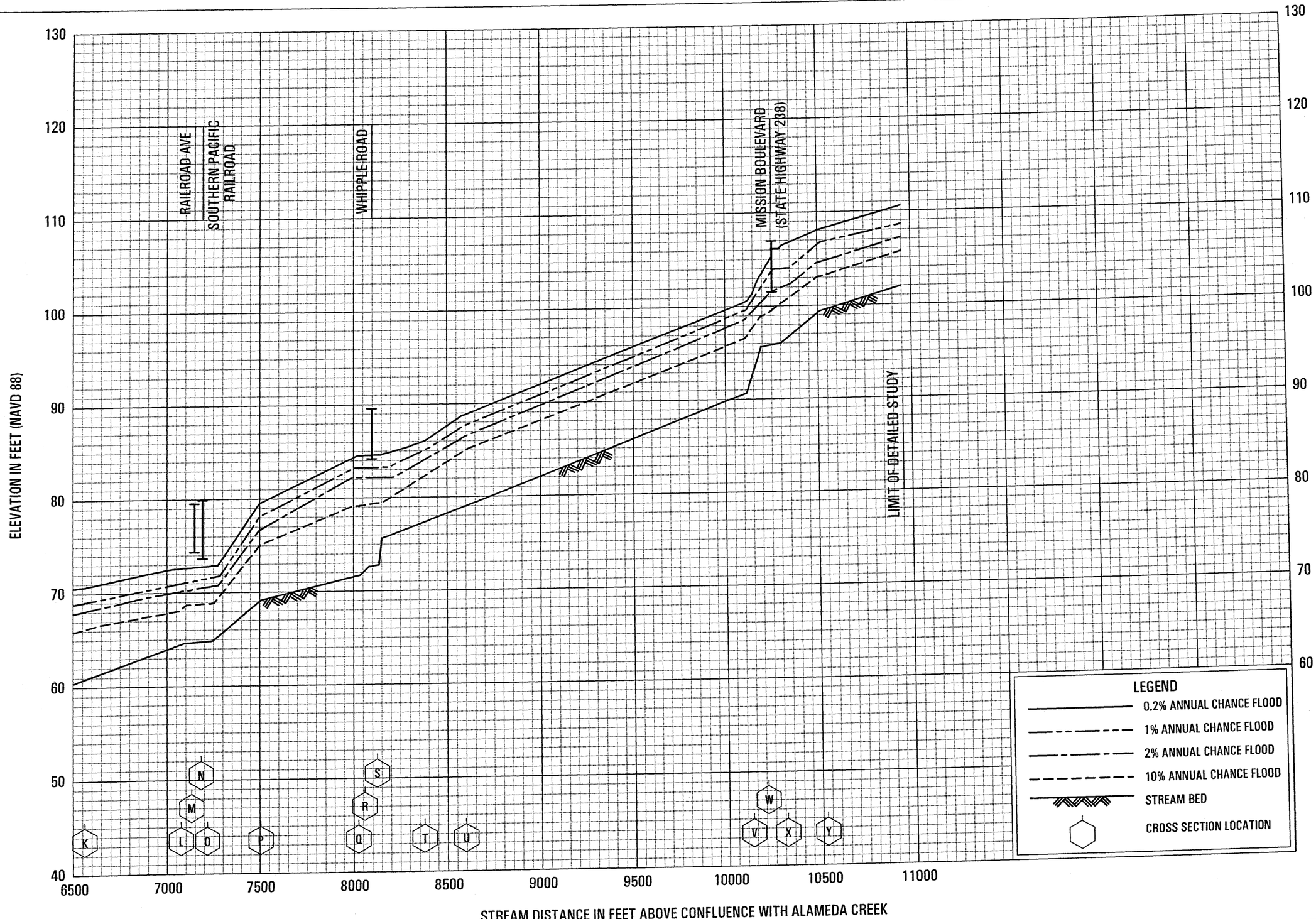
FLOOD PROFILES

DRY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



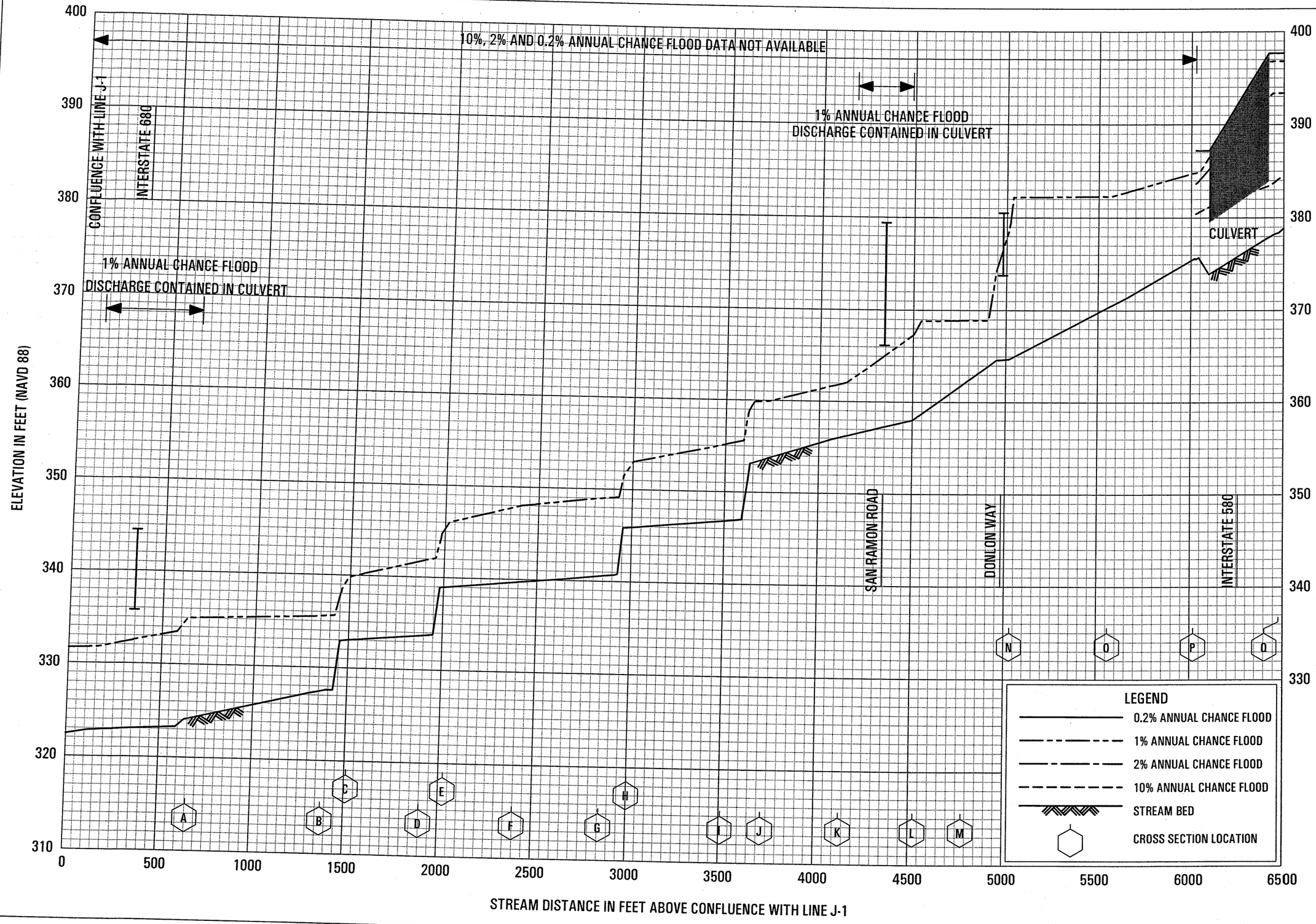
FLOOD PROFILES

DRY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



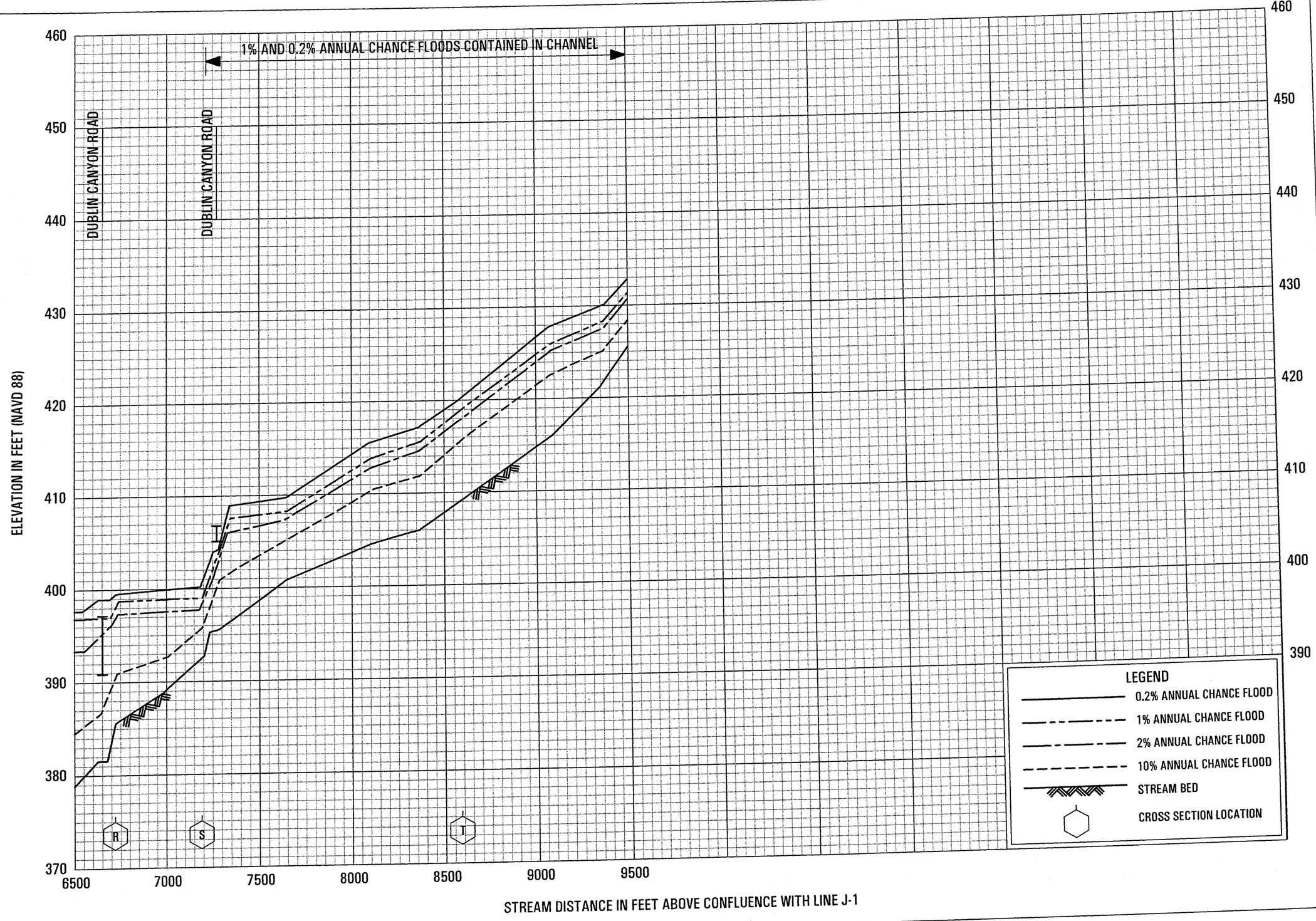
FLOOD PROFILES

DUBLIN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

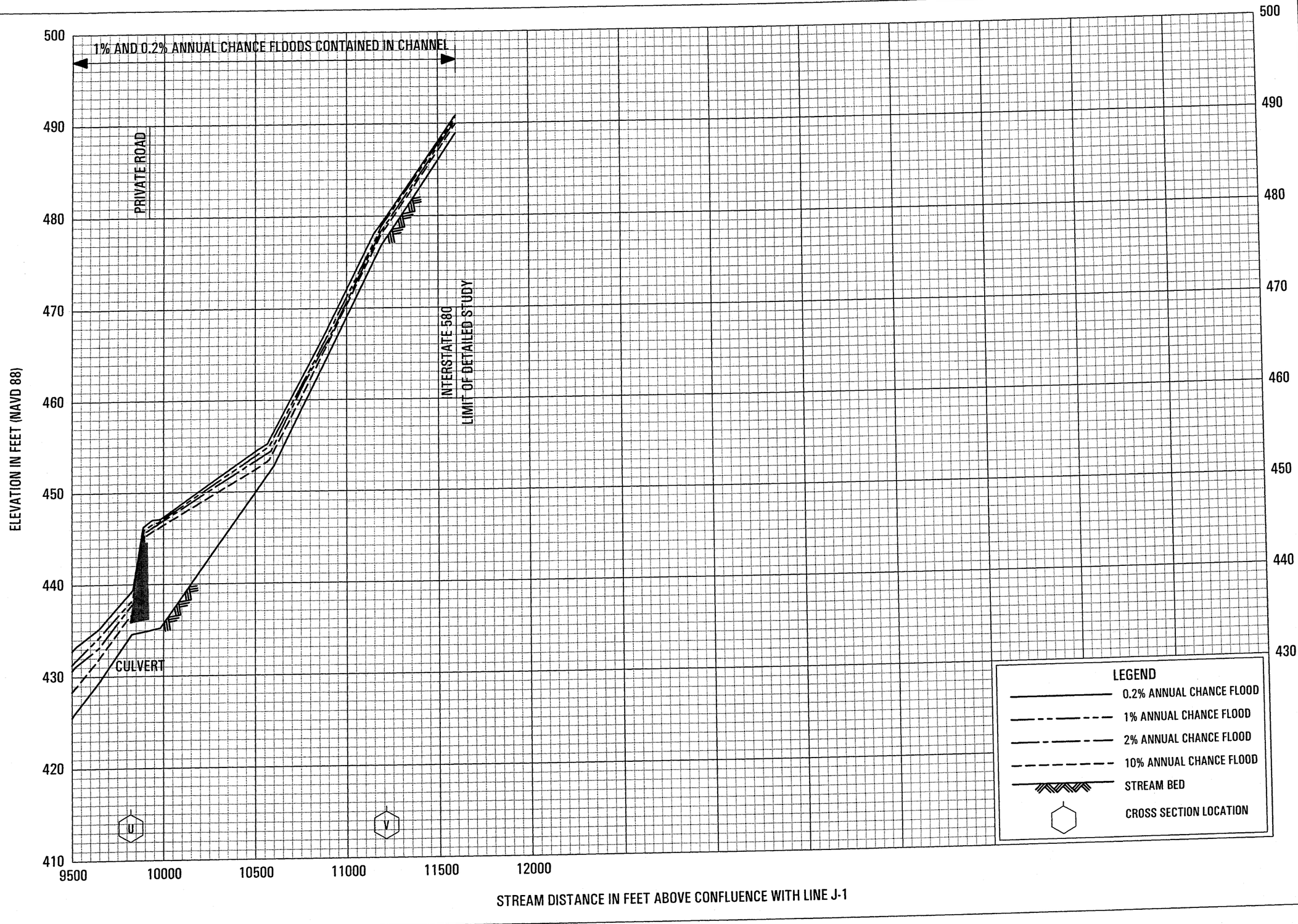
DUBLIN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

88P



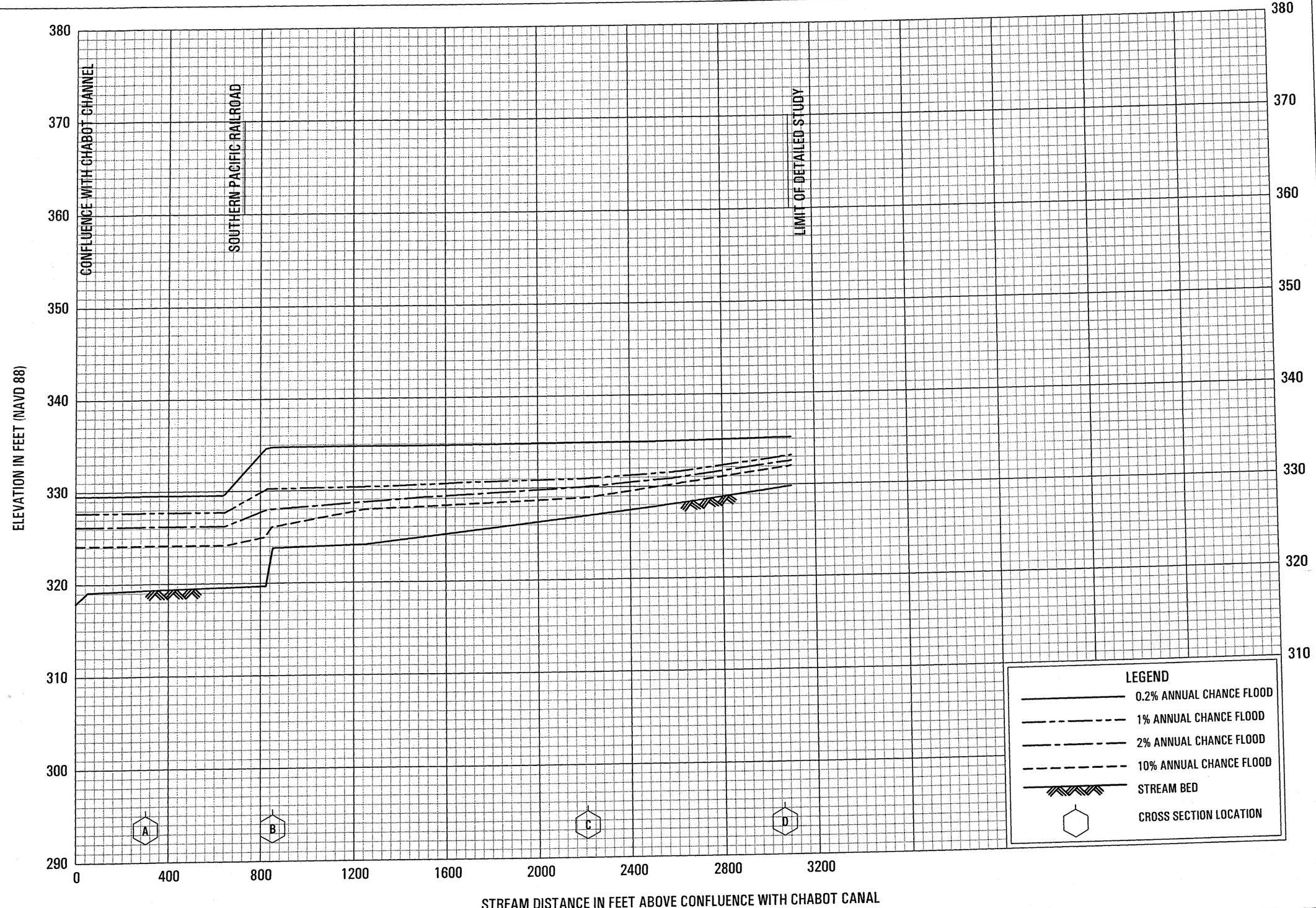
FLOOD PROFILES

DUBLIN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



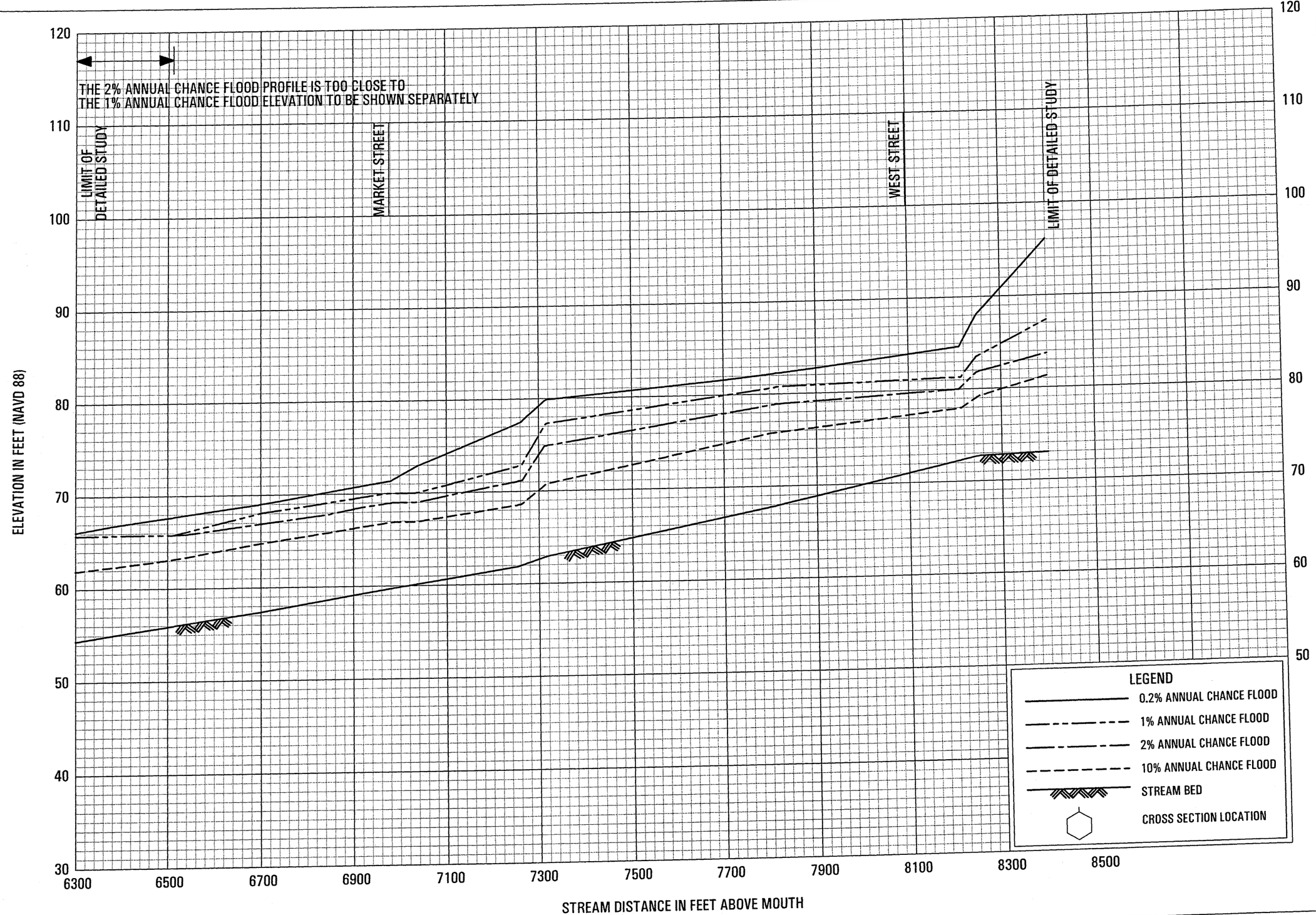
FLOOD PROFILES

HEWLETT CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

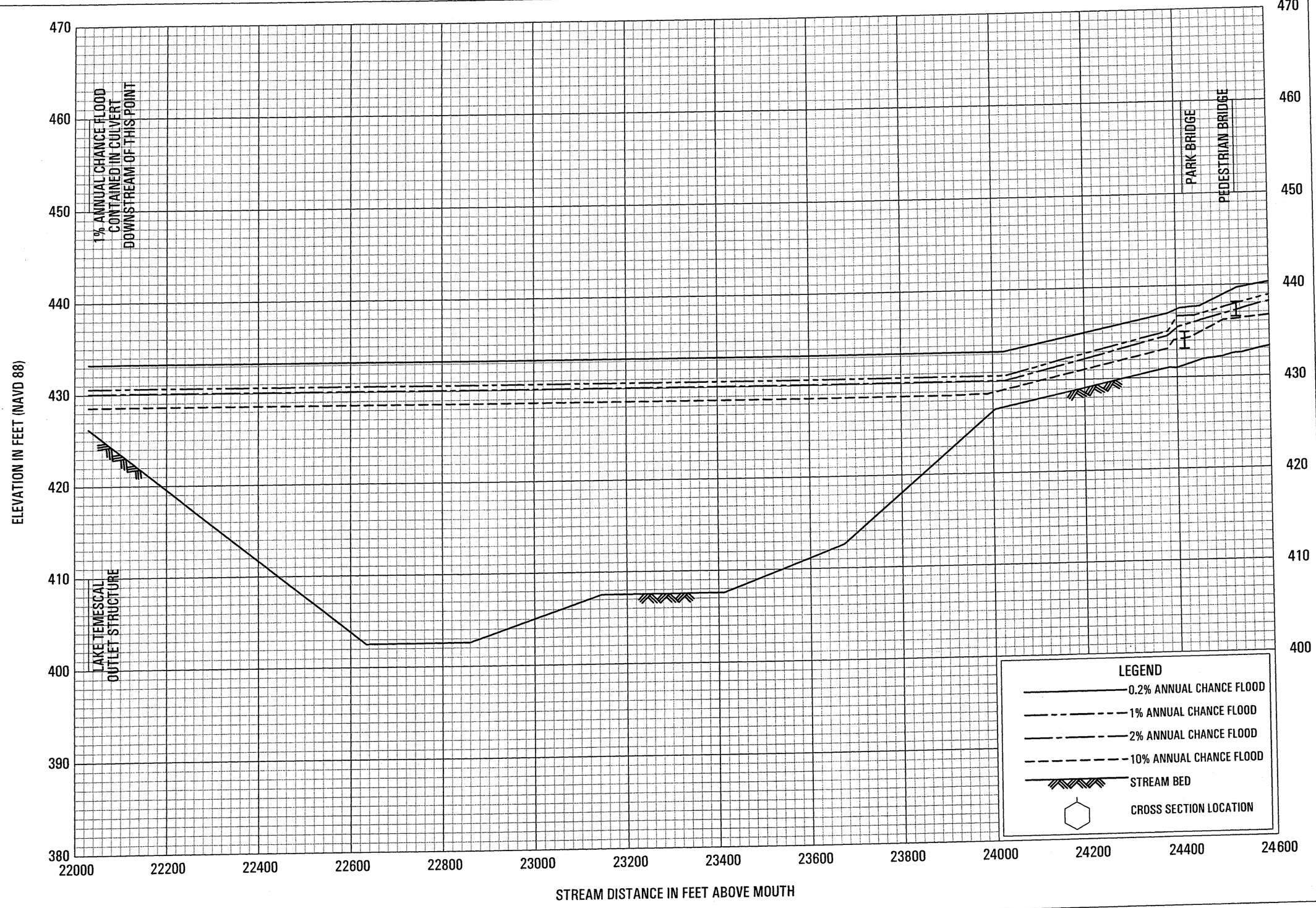
LINE A (TEMESCAL CREEK)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

91P



FLOOD PROFILES

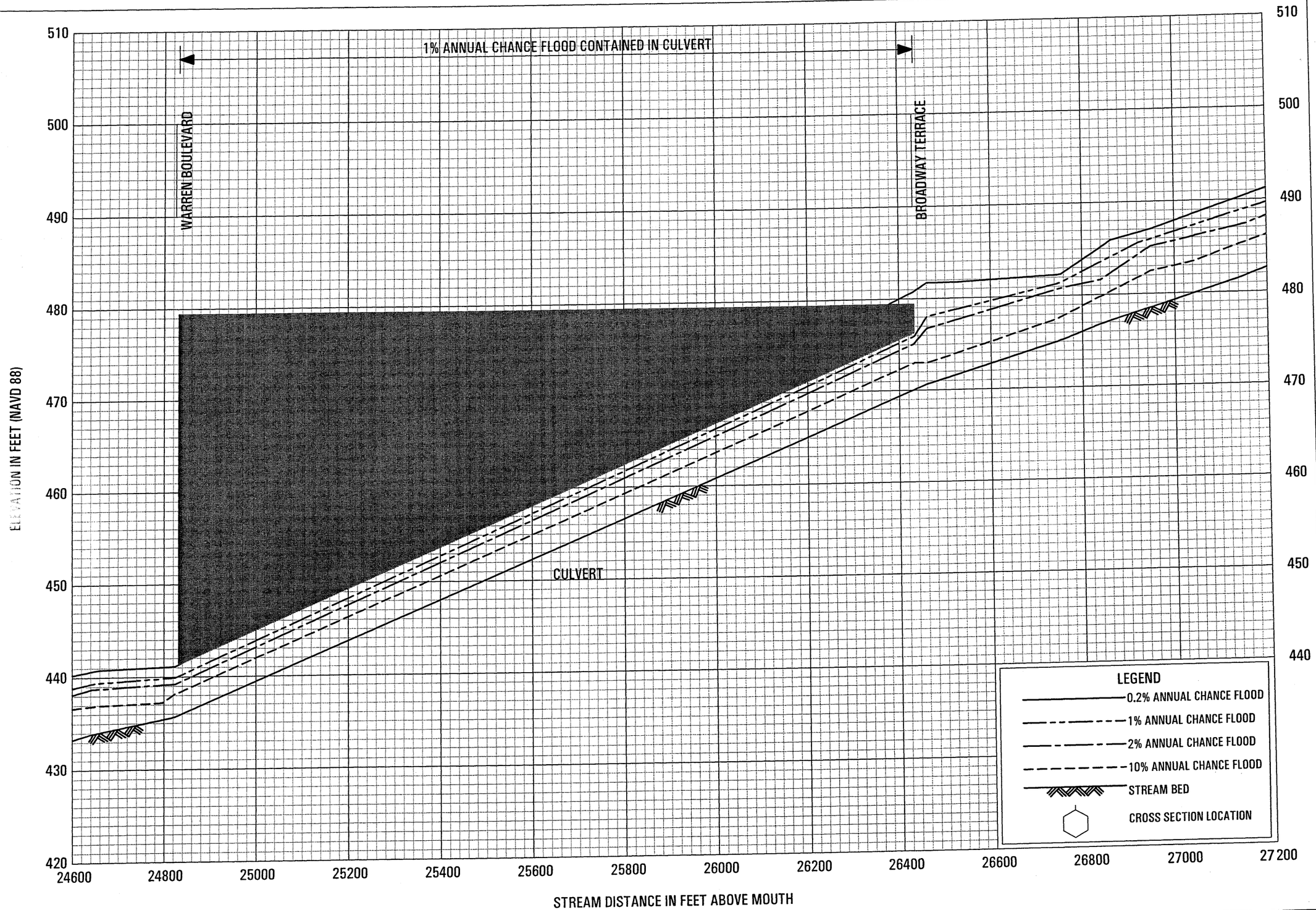
LINE A (TEMESCAL CREEK)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

92P



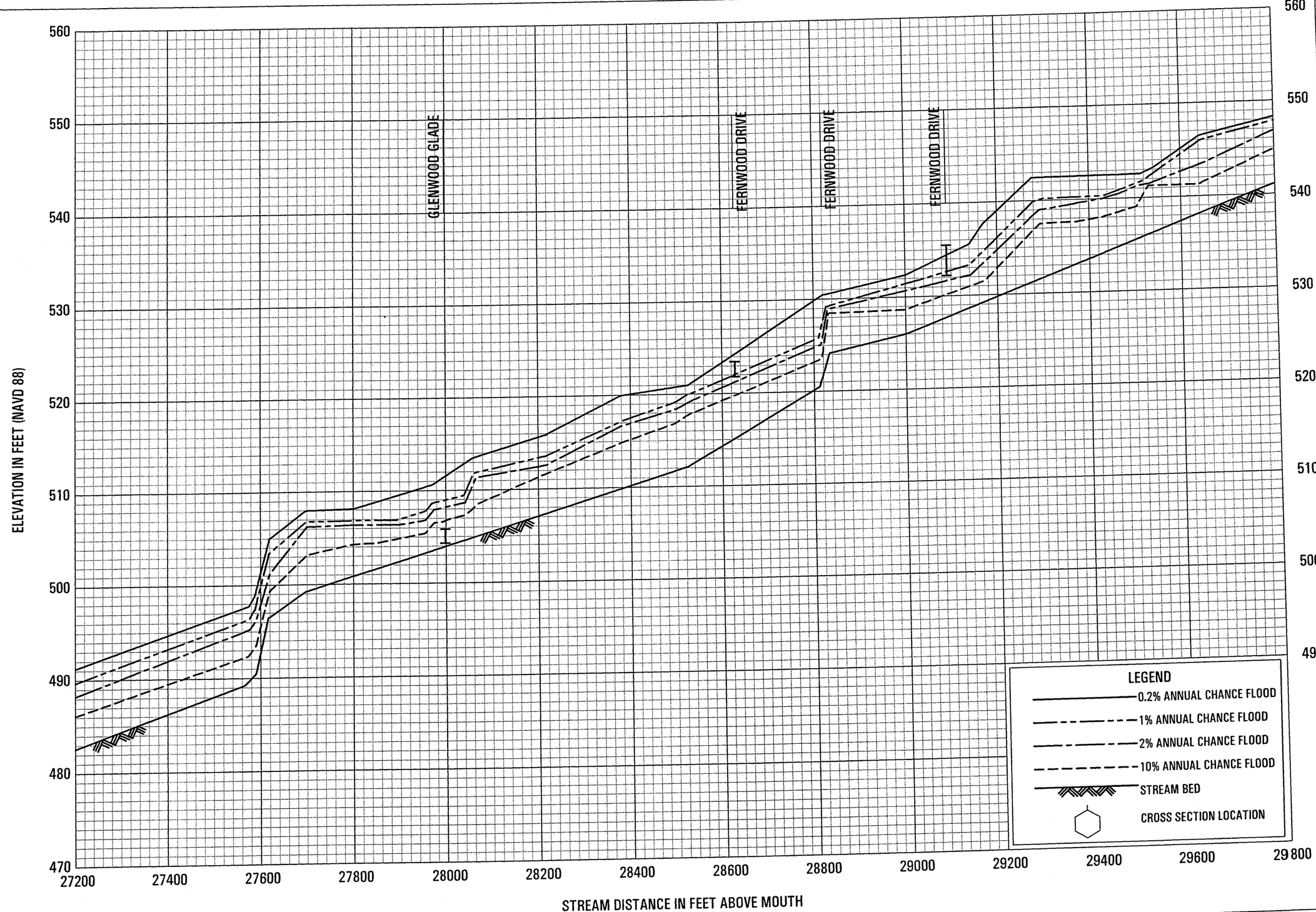
FLOOD PROFILES

LINE A (TEMESCAL CREEK)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



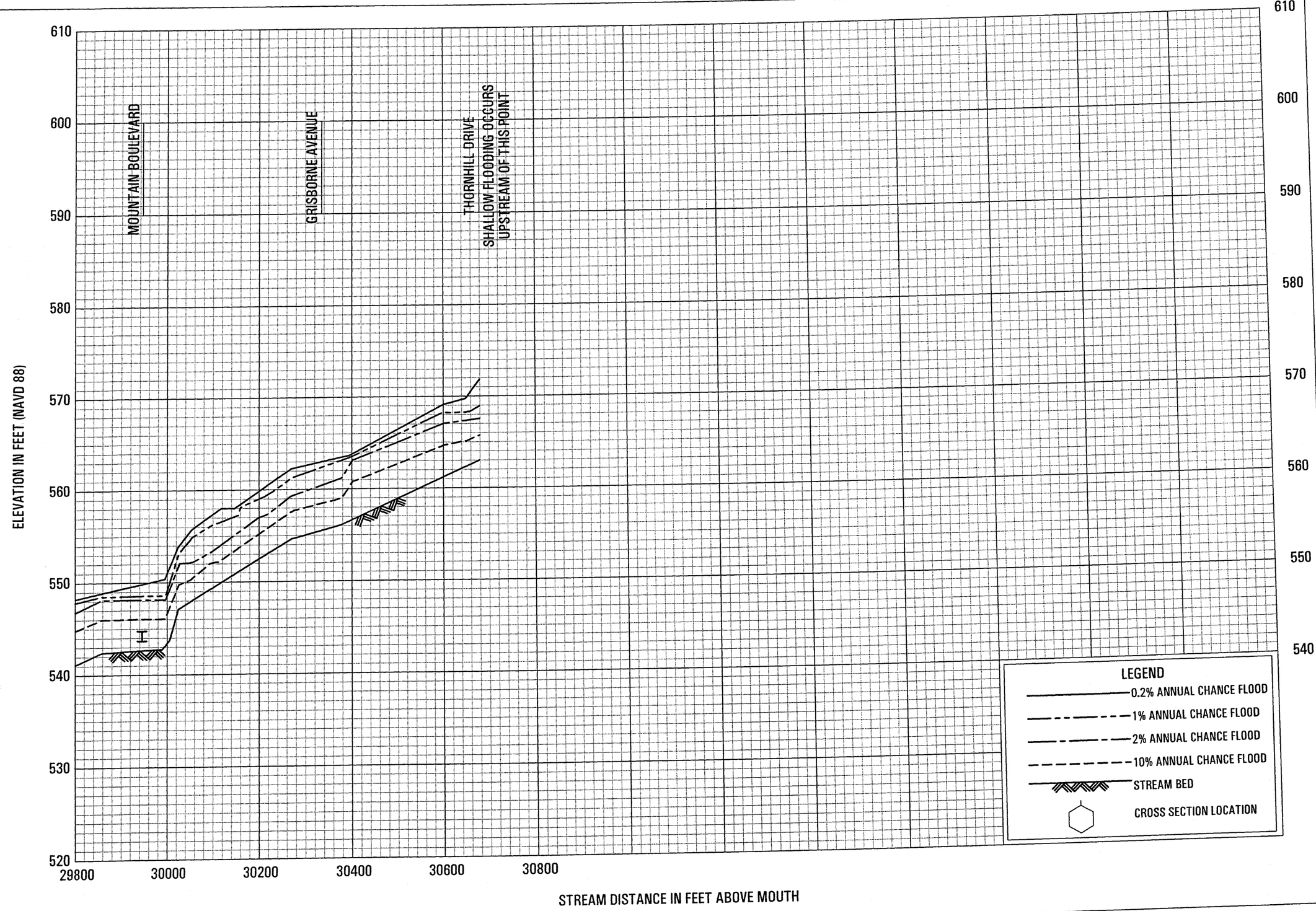
FLOOD PROFILES

LINE A (TEMESCAL CREEK)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



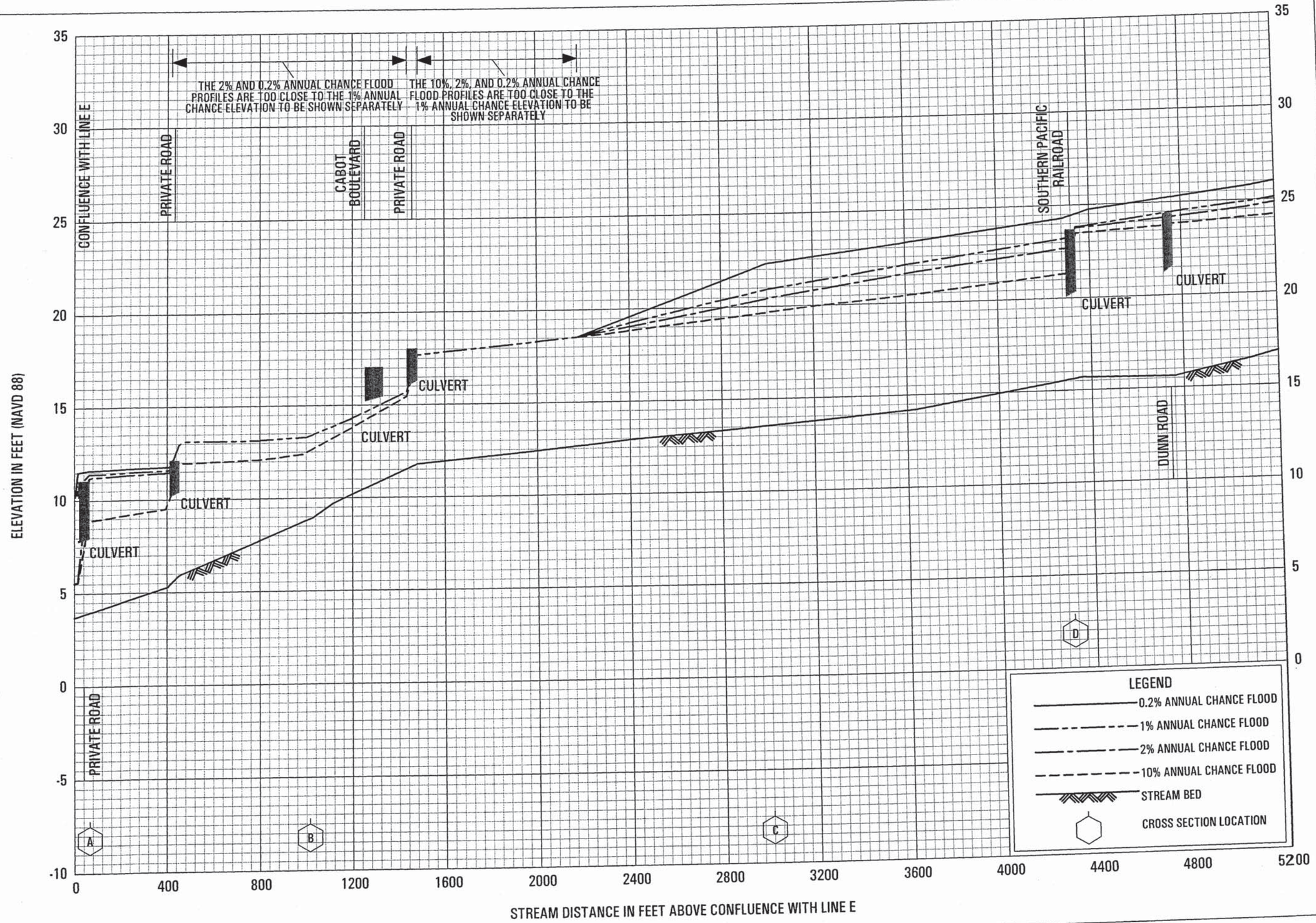
FLOOD PROFILES

LINE A (TEMESCAL CREEK)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

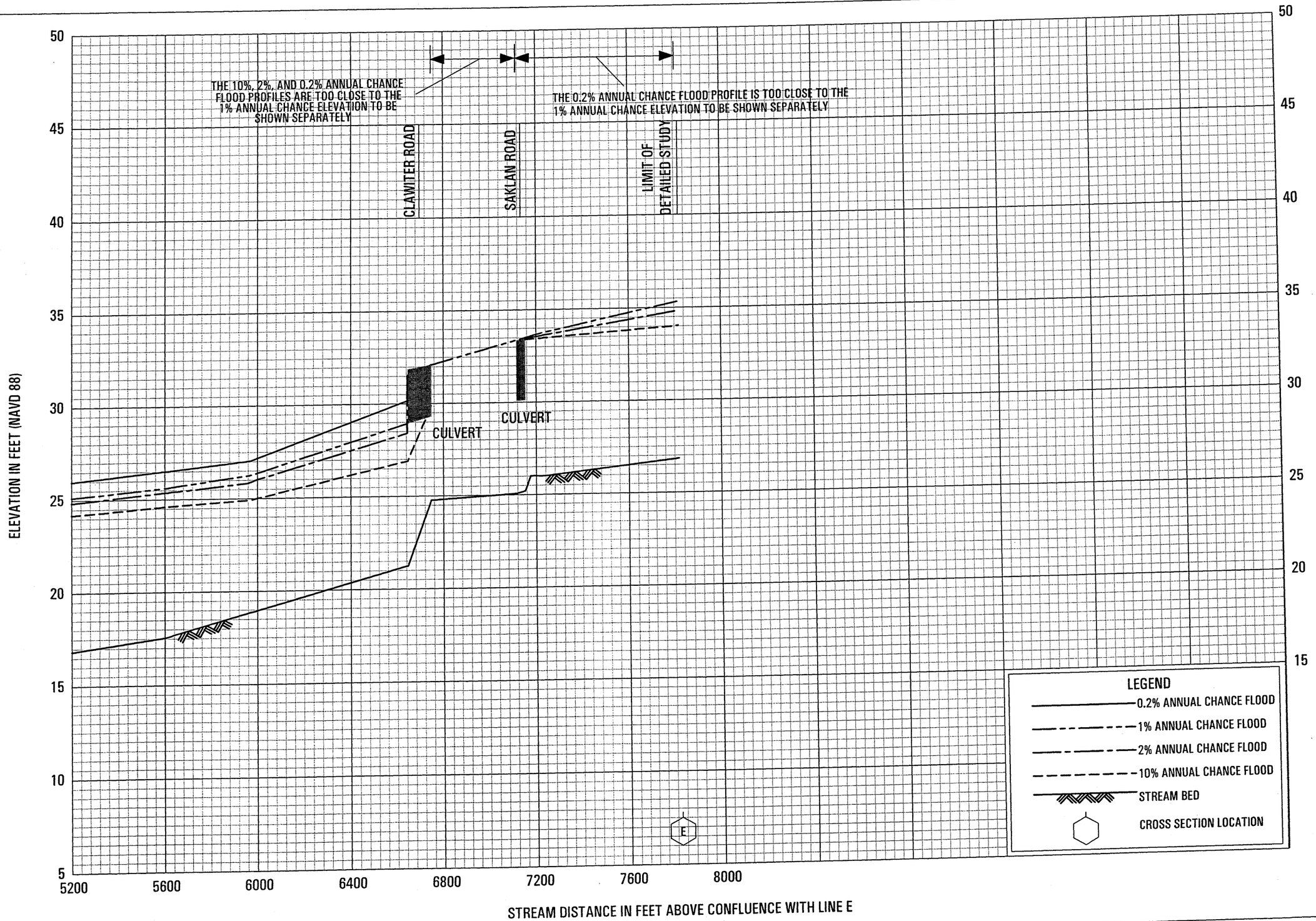
LINE A (ZONE 4)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

96P



FLOOD PROFILES

LINE A (ZONE 4)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

97P

FLOOD PROFILES

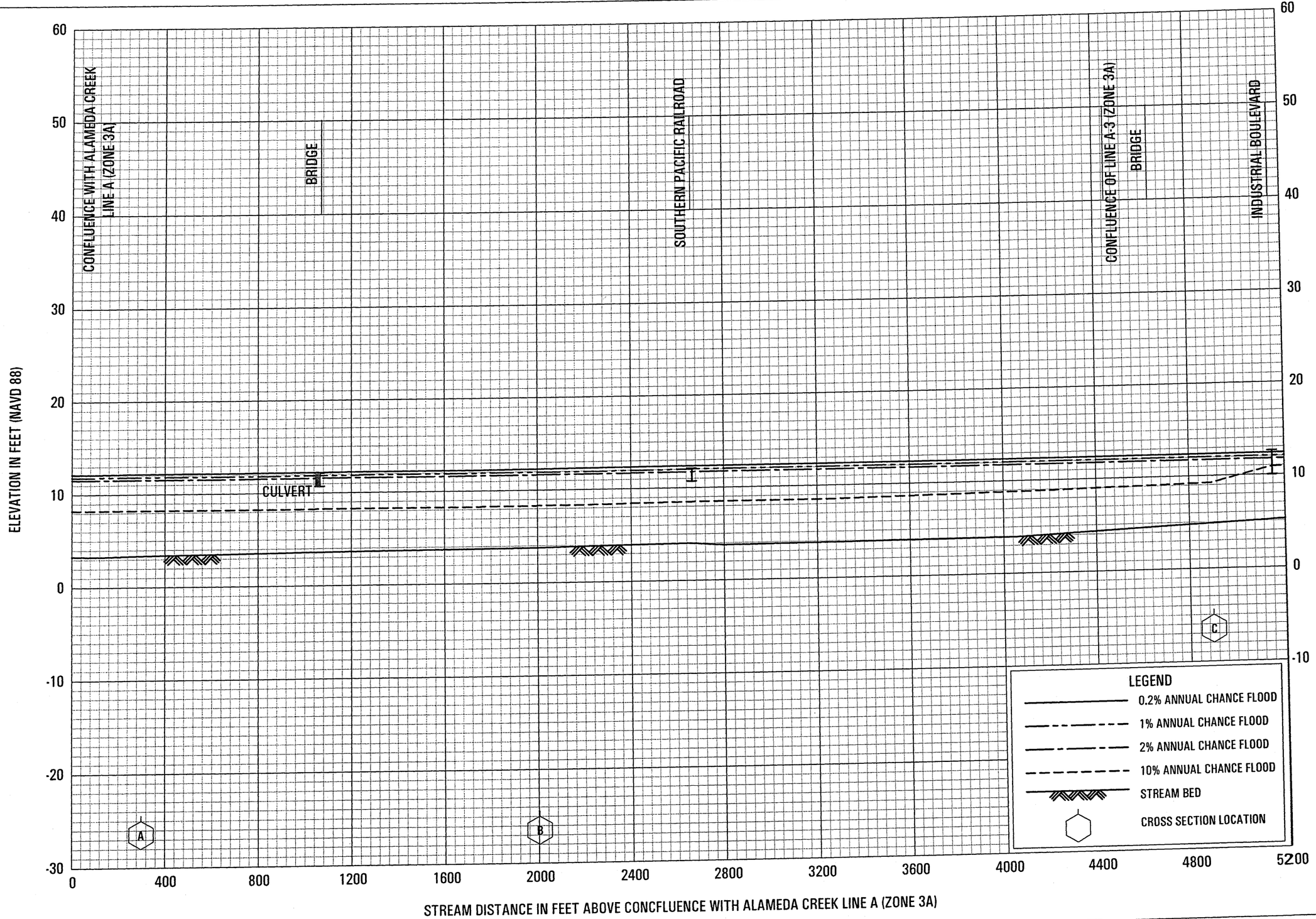
LINE A (ZONE 6) (SCOTT CREEK)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

98P



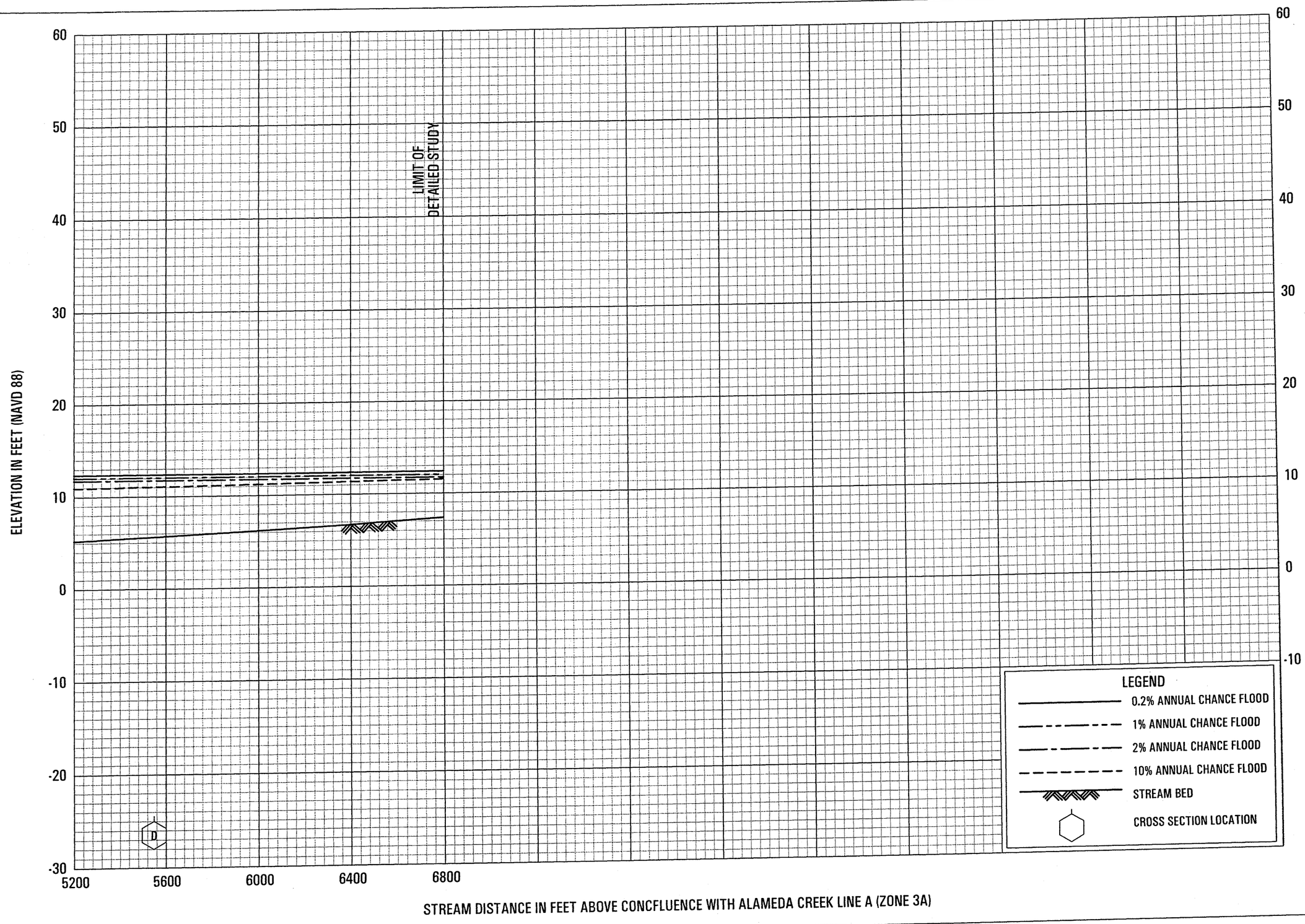
FLOOD PROFILES

LINE A-2 (ZONE 3A)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

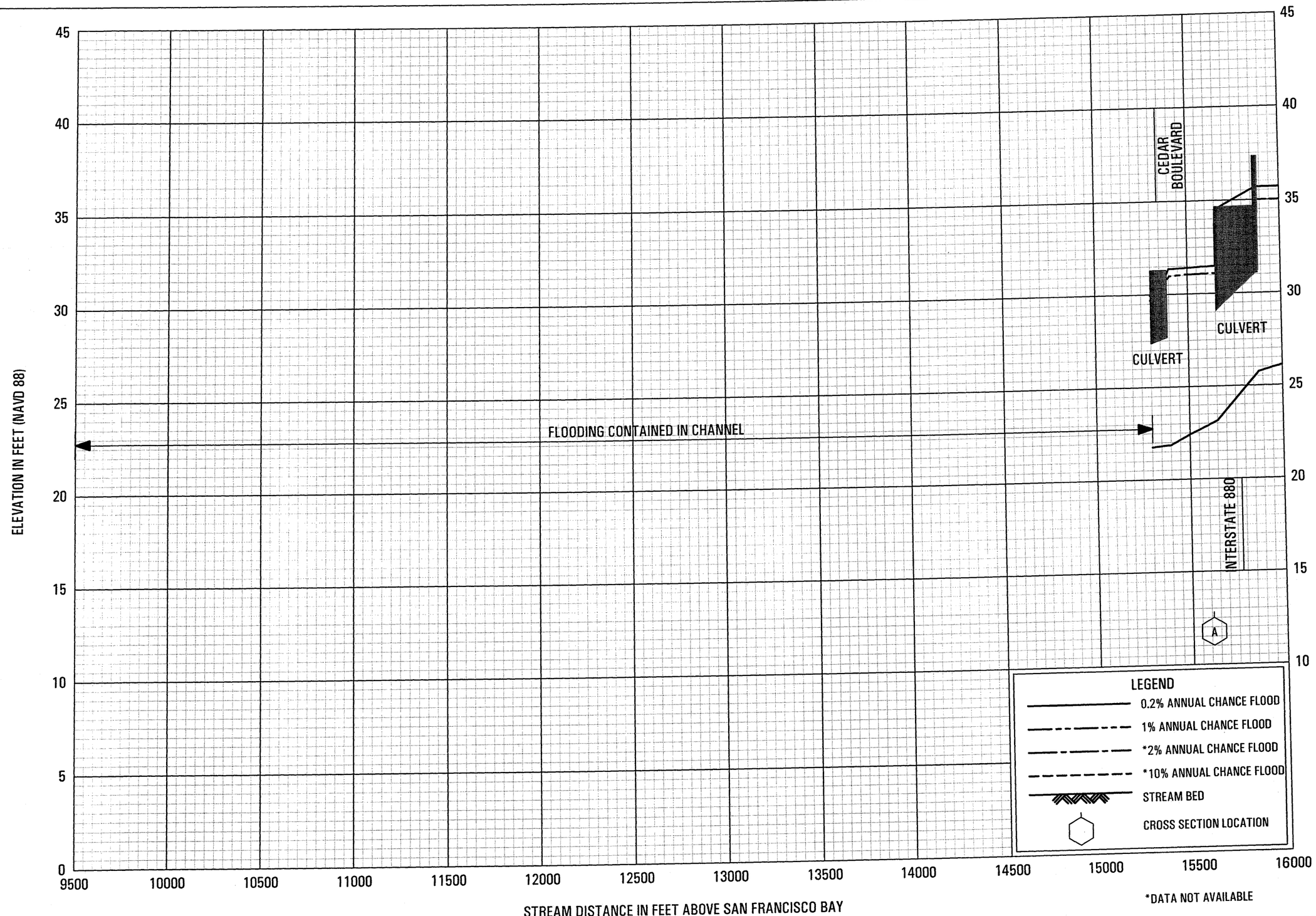
LINE A-2 (ZONE 3A)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

100P



FLOOD PROFILES

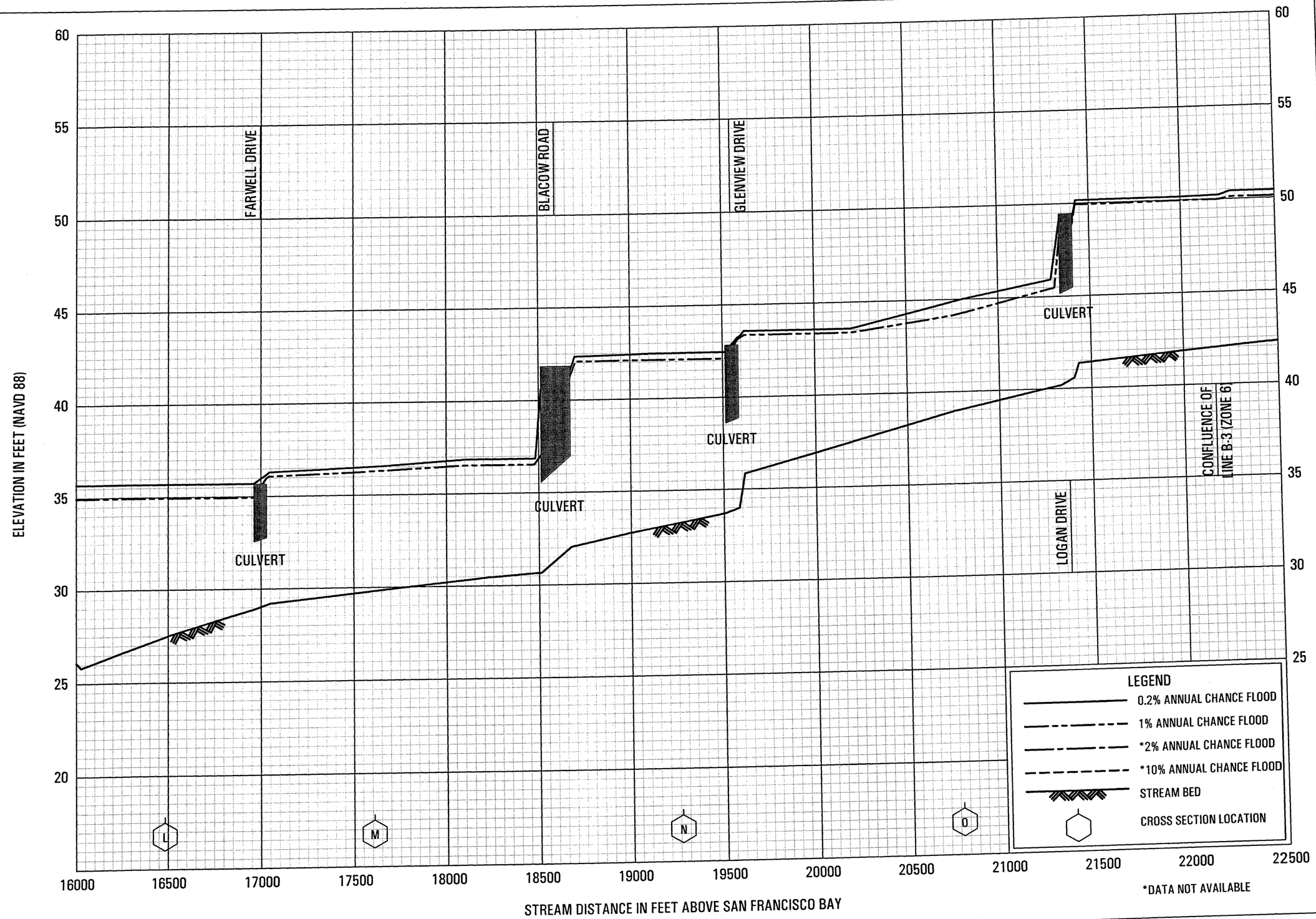
LINE B (ZONE 5)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

101P



FLOOD PROFILES

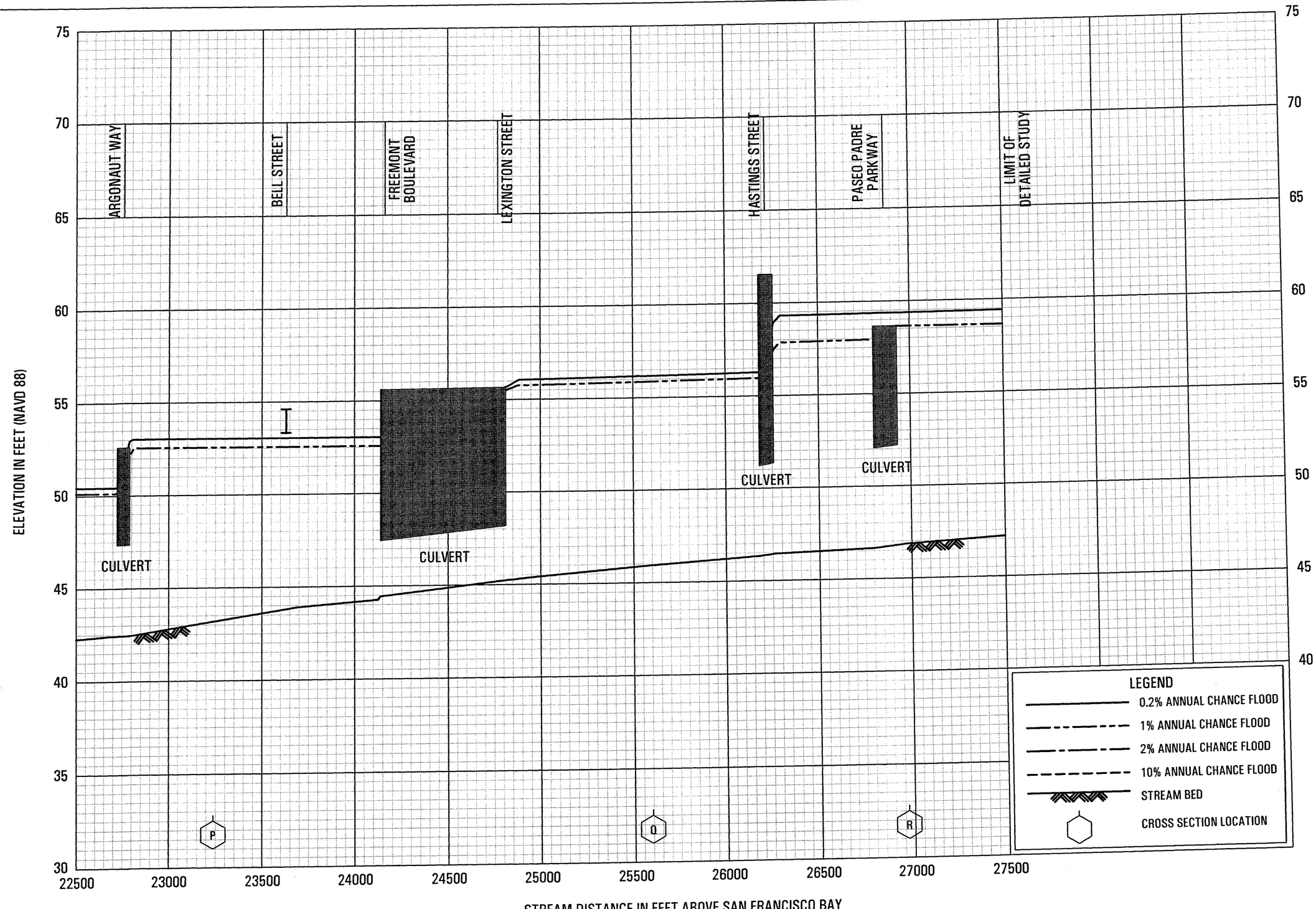
LINE B (ZONE 5)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

102P



FLOOD PROFILES

LINE B (ZONE 5)

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMEDA COUNTY, CA

AND INCORPORATED AREAS

103P