## FLOOD INSURANCE STUDY

### FEDERAL EMERGENCY MANAGEMENT AGENCY

#### **VOLUME 4 OF 4**



# KERN COUNTY, CALIFORNIA AND INCORPORATED AREAS

COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER
Arvin, City of	060076	McFarland, City of	060080
Bakersfield, City of	060077	Ridgecrest, City of	060081
California City, City of	060440	Shafter, City of	060082
Delano, City of	060078	Taft, City of	065063
Kern County, Unincorporated Areas	060075	Tehachapi, City of	060084
Maricopa, City of	060079	Wasco, City of	060085

#### **REVISED:**

October 21, 2021

FLOOD INSURANCE STUDY NUMBER 06029CV004B Version Number 2.6.3.6



#### **TABLE OF CONTENTS**

#### Volume 1

		<u>Page</u>	
<b>SEC1</b> 1.1	TION 1.0 – INTRODUCTION  The National Flood Insurance Program	<b>1</b> 1	
1.2		2	
1.3		2	
1.4	Considerations for using this Flood Insurance Study Report	12	
_	TION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS	25	
2.1	Floodplain Boundaries	25	
2.2	Floodways	31	
2.3	Base Flood Elevations	32	
	Non-Encroachment Zones	33	
2.5	Coastal Flood Hazard Areas 2.5.1 Water Elevations and the Effects of Waves	33 33	
	2.5.1 Water Elevations and the Elects of Waves  2.5.2 Floodplain Boundaries and BFEs for Coastal Areas	33	
	2.5.3 Coastal High Hazard Areas	33	
	2.5.4 Limit of Moderate Wave Action	34	
	2.5.4 Limit of Woderate Wave Action	04	
SECT	TION 3.0 – INSURANCE APPLICATIONS	34	
3.1	National Flood Insurance Program Insurance Zones	34	
SECT	TION 4.0 – AREA STUDIED	34	
4.1	Basin Description	34	
4.2	Principal Flood Problems	36	
4.3	Non-Levee Flood Protection Measures	39	
4.4	Levees	40	
SECT	TION 5.0 – ENGINEERING METHODS	53	
5.1		53	
5.2	Hydraulic Analyses	59	
5.3	Coastal Analyses	67	
	5.3.1 Total Stillwater Elevations	67	
	5.3.2 Waves	67	
	5.3.3 Coastal Erosion	67	
	5.3.4 Wave Hazard Analyses	68	
5.4	Alluvial Fan Analyses	68	
SECT	TION 6.0 – MAPPING METHODS	70	
6.1	Vertical and Horizontal Control	70	
6.2	Base Map	72	
6.3	Floodplain and Floodway Delineation	73	
Volume 2			
6.4	Coastal Flood Hazard Mapping	114	
6.5	FIRM Revisions	114	

<ul> <li>6.5.1 Letters of Map Amendment</li> <li>6.5.2 Letters of Map Revision Based on Fill</li> <li>6.5.3 Letters of Map Revision</li> <li>6.5.4 Physical Map Revisions</li> <li>6.5.5 Contracted Restudies</li> <li>6.5.6 Community Map History</li> </ul>	114 114 115 115 116 116
SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION 7.1 Contracted Studies 7.2 Community Meetings	<b>118</b> 118 120
SECTION 8.0 – ADDITIONAL INFORMATION	124
SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES	125
<u>Figures</u>	
	<u>Page</u>
Figure 1: FIRM Index Figure 2: FIRM Notes to Users Figure 3: Map Legend for FIRM Figure 4: Floodway Schematic Figure 5: Wave Runup Transect Schematic Figure 6: Coastal Transect Schematic Figure 7: Frequency Discharge-Drainage Area Curves Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas Figure 9: Transect Location Map	14 18 21 32 33 33 58 67 68
<u>Tables</u>	<u>Page</u>
Table 1: Listing of NFIP Jurisdictions Table 2: Flooding Sources Included in this FIS Report Table 3: Flood Zone Designations by Community Table 4: Basin Characteristics Table 5: Principal Flood Problems Table 6: Historic Flooding Elevations Table 7: Non-Levee Flood Protection Measures Table 8: Levees Table 9: Summary of Discharges Table 10: Summary of Non-Coastal Stillwater Elevations Table 11: Stream Gage Information used to Determine Discharges Table 12: Summary of Hydrologic and Hydraulic Analyses Table 13: Roughness Coefficients Table 14: Summary of Coastal Analyses	3 27 34 35 36 39 42 54 59 61 66 67

Table 15: Tide Gage Analysis Specifics	67
Table 16: Coastal Transect Parameters	
Table 17: Summary of Alluvial Fan Analyses	
Table 18: Results of Alluvial Fan Analyses	
Table 19: Countywide Vertical Datum Conversion	
Table 20: Stream-Based Vertical Datum Conversion	
Table 21: Base Map Sources	72
Table 22: Summary of Topographic Elevation Data used in Mapping	74
Table 23: Floodway Data	77
Volume 2	
Table 23: Floodway Data	102
	114
Table 24: Flood Hazard and Non-Encroachment Data for Selected Streams	114
Table 24: Flood Hazard and Non-Encroachment Data for Selected Streams Table 25: Summary of Coastal Transect Mapping Considerations	114
Table 25: Summary of Coastal Transect Mapping Considerations Table 26: Incorporated Letters of Map Change Table 27: Community Map History	114
Table 25: Summary of Coastal Transect Mapping Considerations Table 26: Incorporated Letters of Map Change	114 115
Table 25: Summary of Coastal Transect Mapping Considerations Table 26: Incorporated Letters of Map Change Table 27: Community Map History	114 115 117
Table 25: Summary of Coastal Transect Mapping Considerations Table 26: Incorporated Letters of Map Change Table 27: Community Map History Table 28: Summary of Contracted Studies Included in this FIS Report Table 29: Community Meetings Table 30: Map Repositories	114 115 117 118 121 124
Table 25: Summary of Coastal Transect Mapping Considerations Table 26: Incorporated Letters of Map Change Table 27: Community Map History Table 28: Summary of Contracted Studies Included in this FIS Report Table 29: Community Meetings	114 115 117 118 121

#### **Exhibits**

Flood Profiles	<u>Panel</u>
Antelope Creek	01P-06P
Blackburn Creek	07P-09P
Bodfish Creek	10P-13P
Boron Avenue Creek	14P-19P
Cache Creek	20P-25P
Caliente Creek	26P-28P
Caliente Creek near Loraine	29P-34P
Caliente Creek Tributary 1	35P-36P
Cottonwood Creek	37P-41P
Cuddy Creek	42P-63P
El Paso Wash	64P-66P
Erskine Creek	67P-72P

#### Volume 3

#### **Exhibits**

Flood Profiles	<u>Panel</u>
Indian Creek	73P-74P
Jawbone Canyon Wash	75P-80P
Kern River at Kernville	81P-87P
Kern River - With Consideration of Levees	88P-143P
Kern River - Without Consideration of Levees	144P-147P

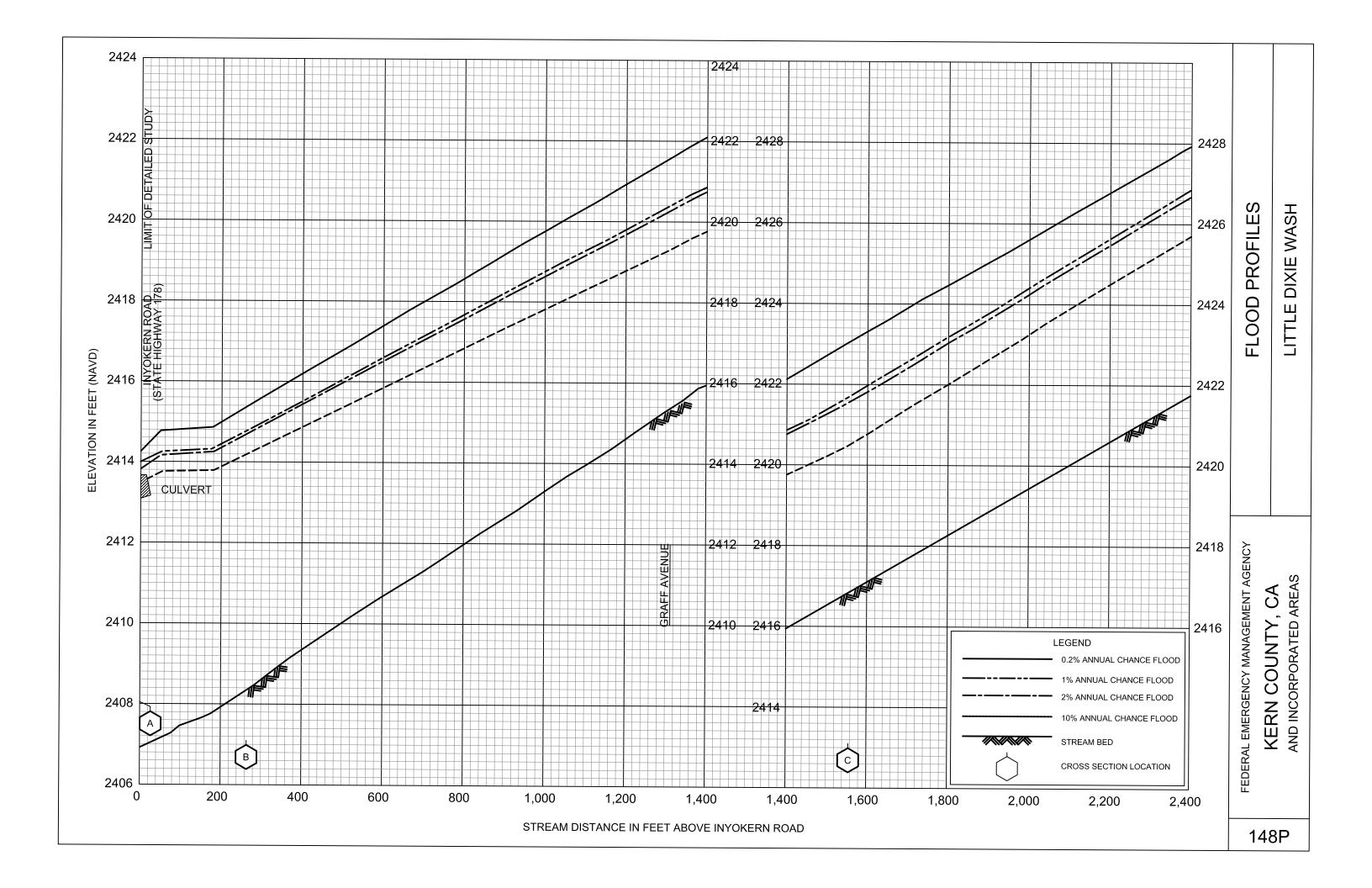
#### Volume 4

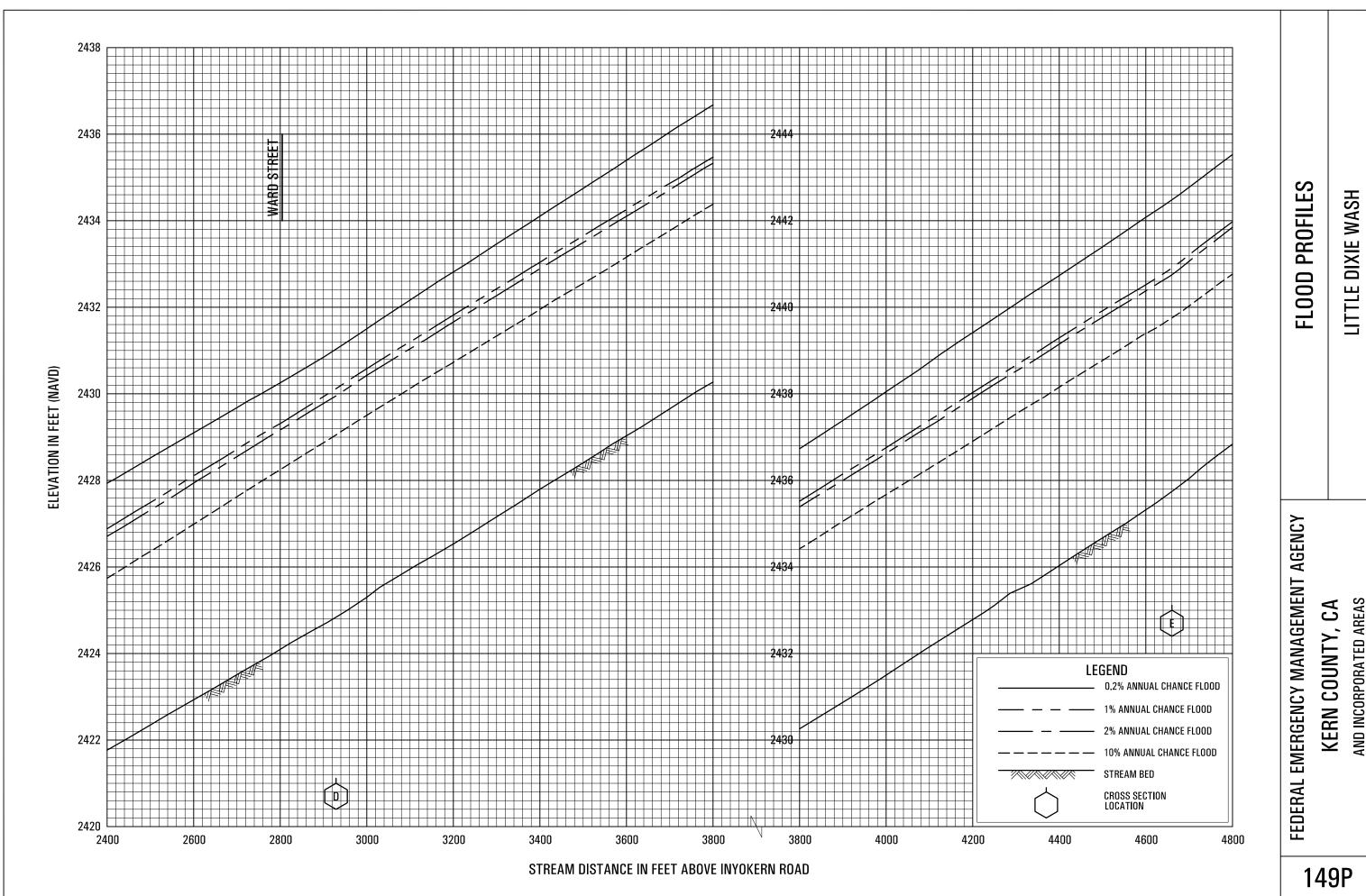
#### **Exhibits**

<u>Panel</u>
148P-151P
152P
153P-157P
158P-160P
161P-164P
165P-166P
167P-174P
175P-185P
186P-189P
190P-192P

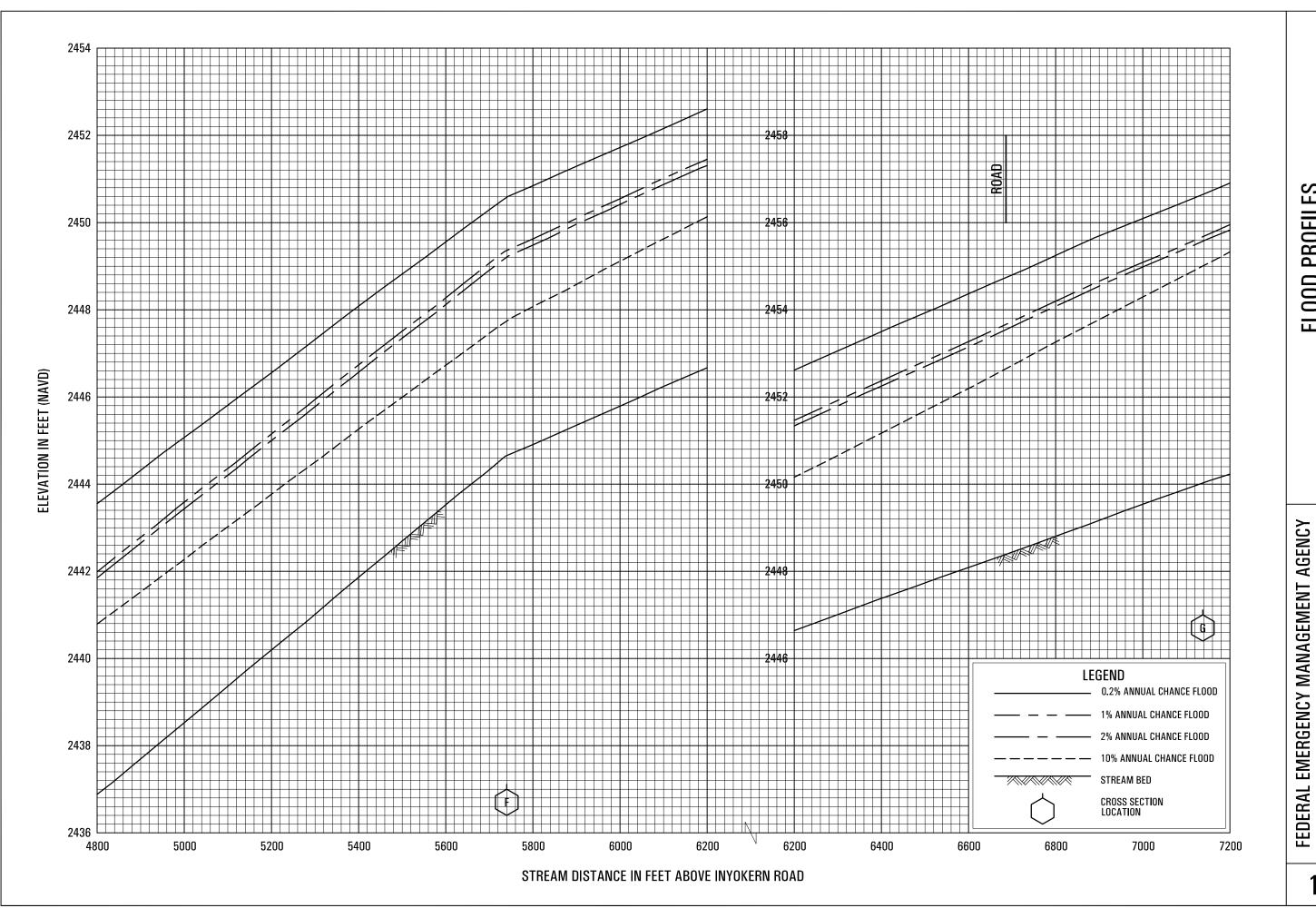
#### **Published Separately**

Flood Insurance Rate Map (FIRM)





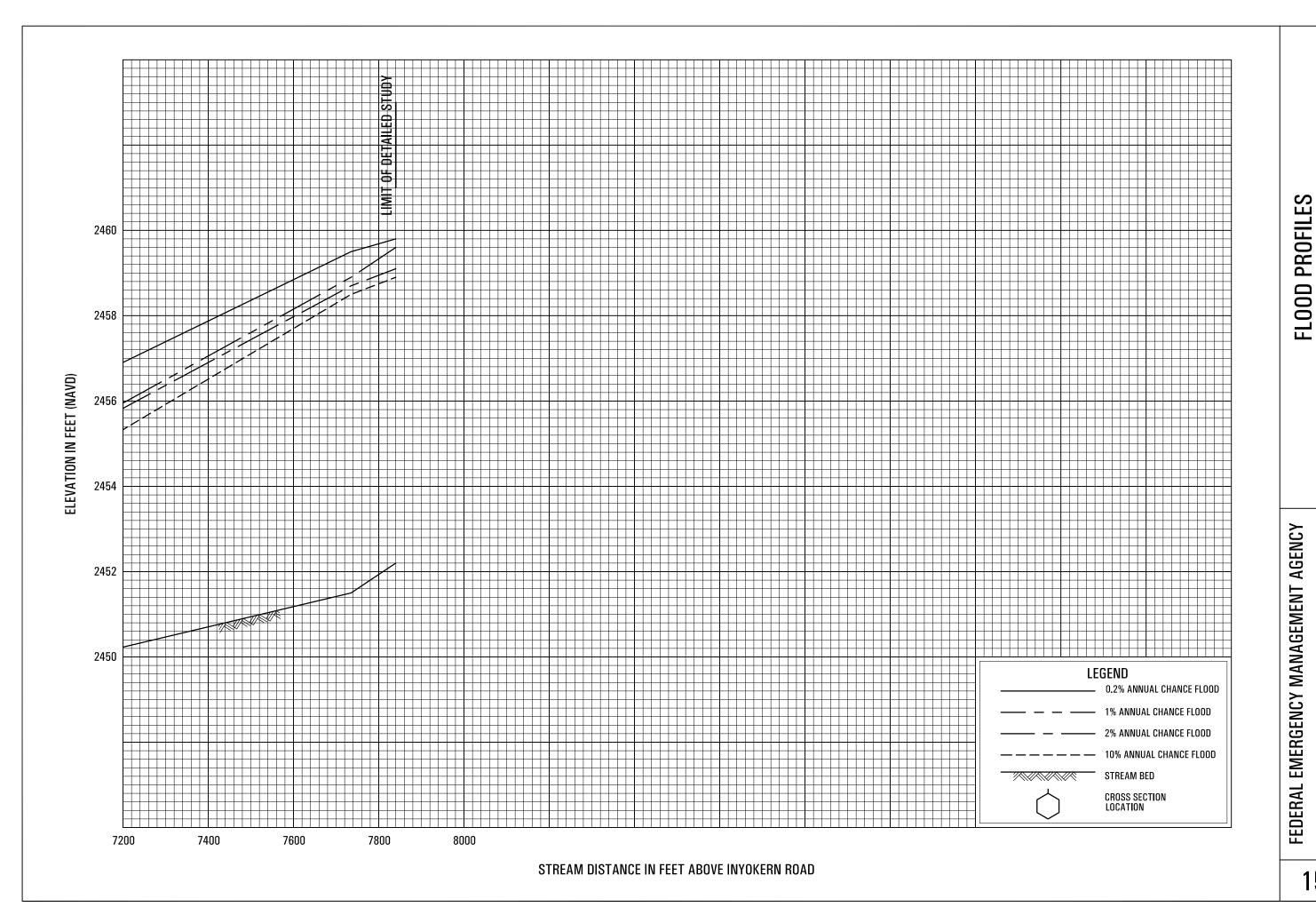
AND INCORPORATED AREAS KERN COUNTY, CA



LITTLE DIXIE WASH

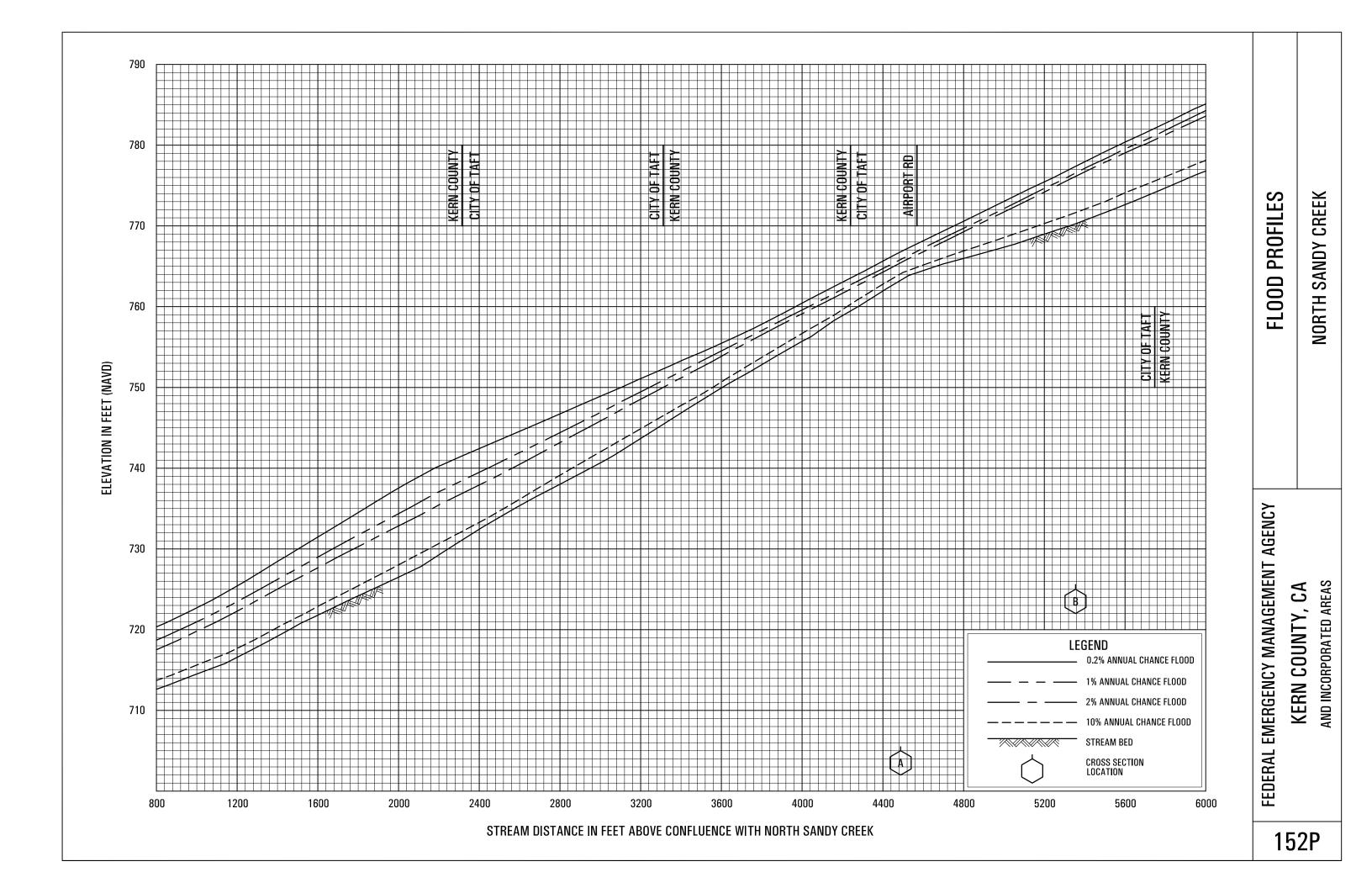
KERN COUNTY, CA

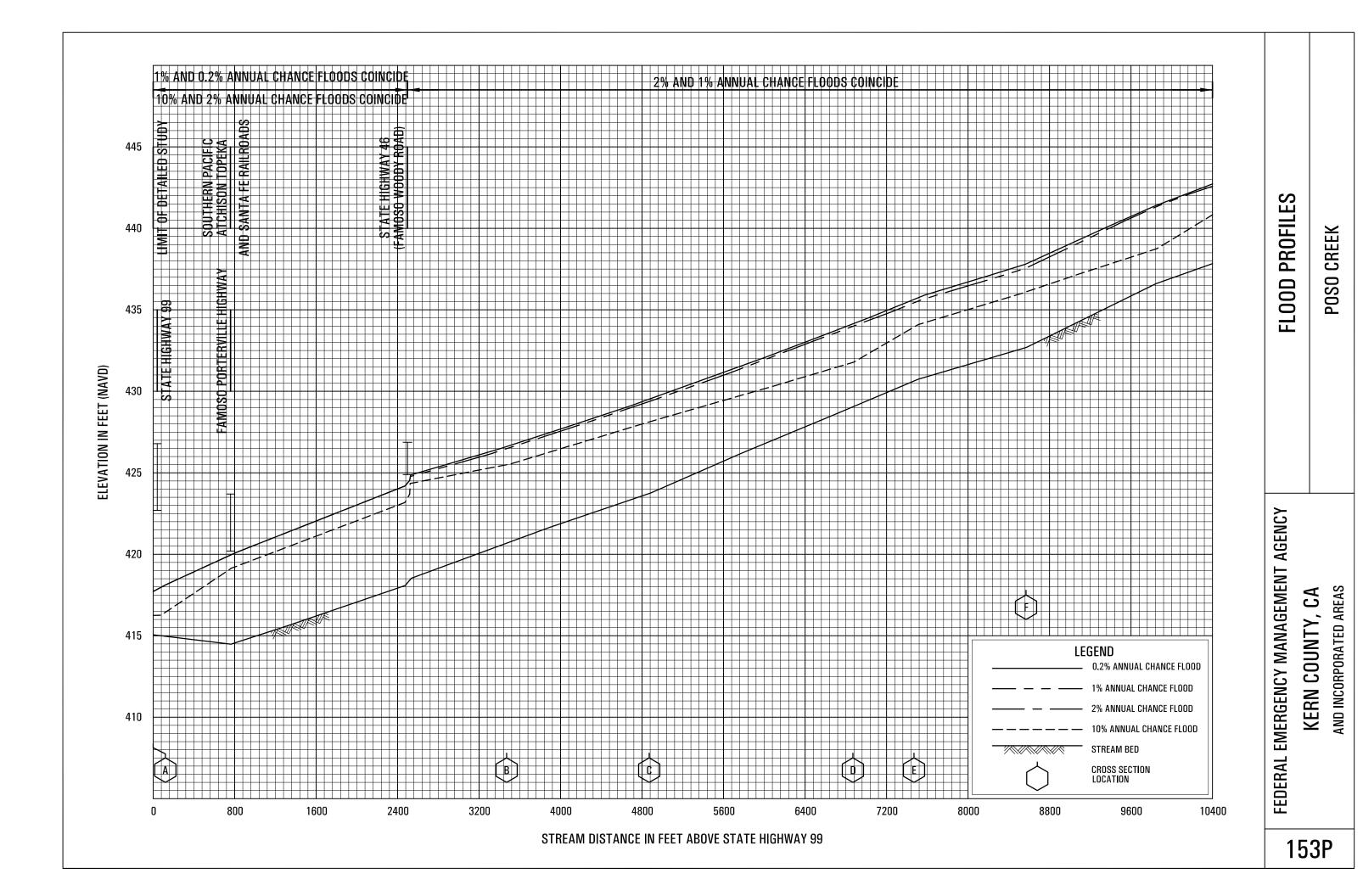
AND INCORPORATED AREAS

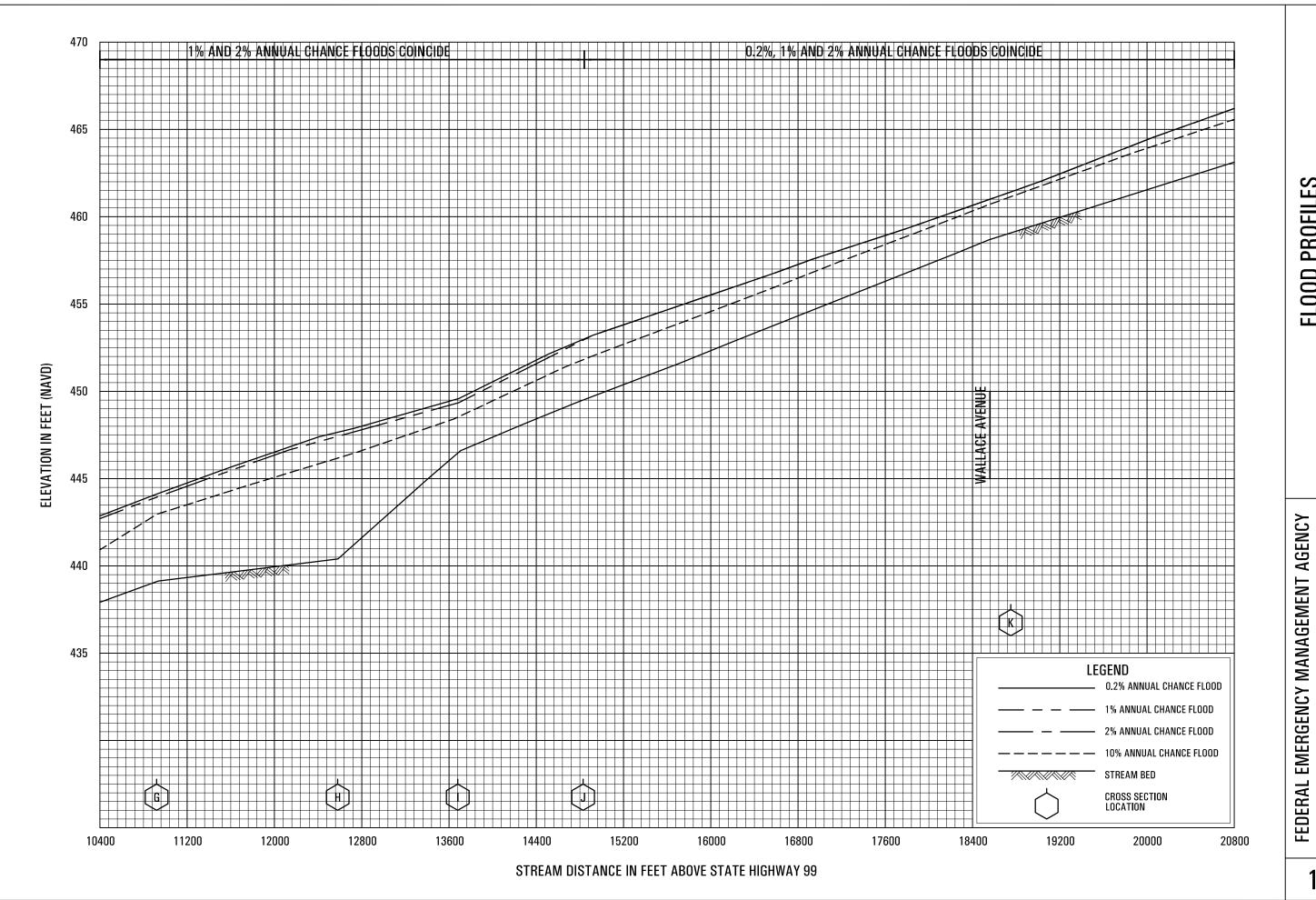


KERN COUNTY, CA
AND INCORPORATED AREAS

LITTLE DIXIE WASH

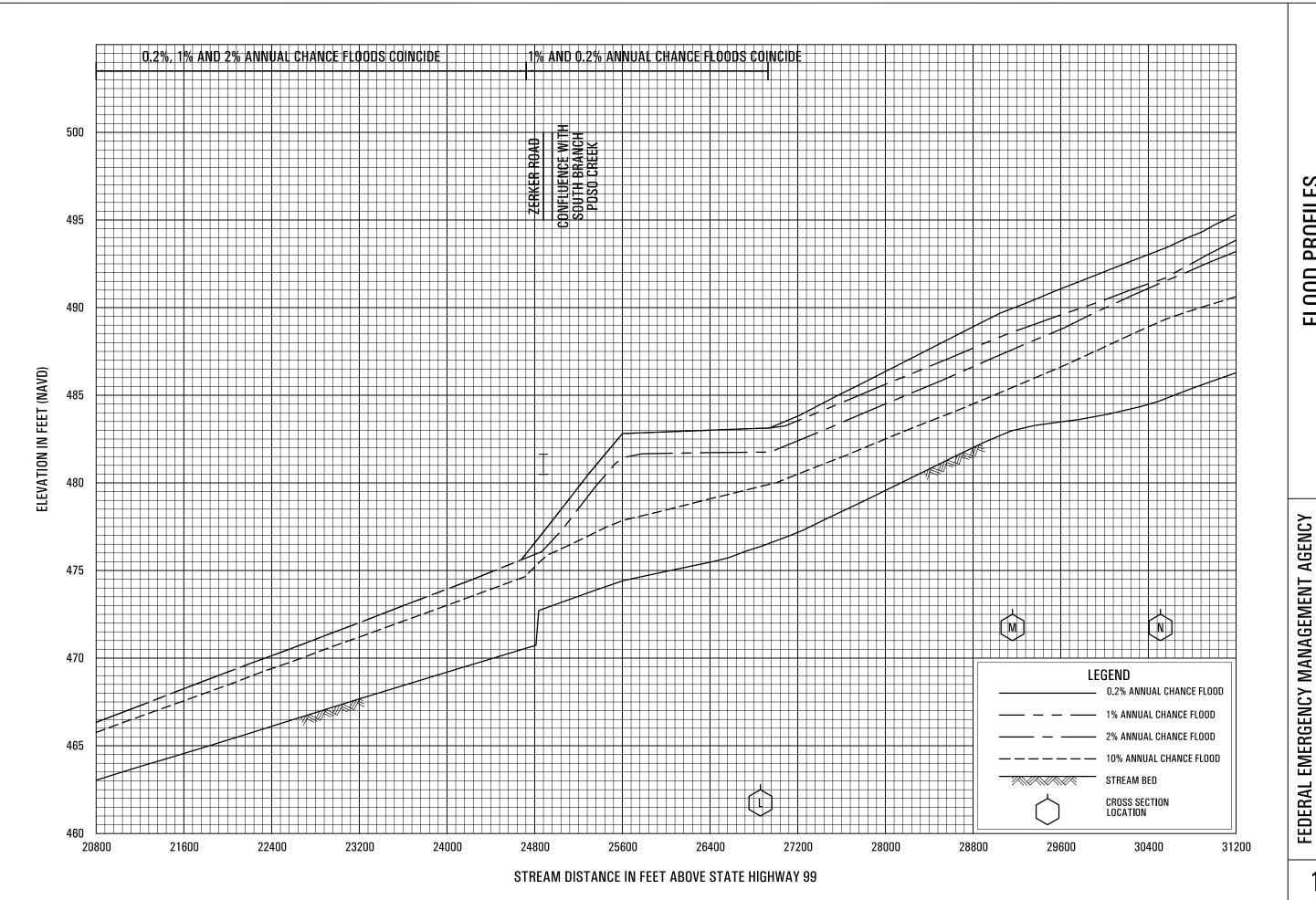






POSO CREEK

AND INCORPORATED AREAS KERN COUNTY, CA

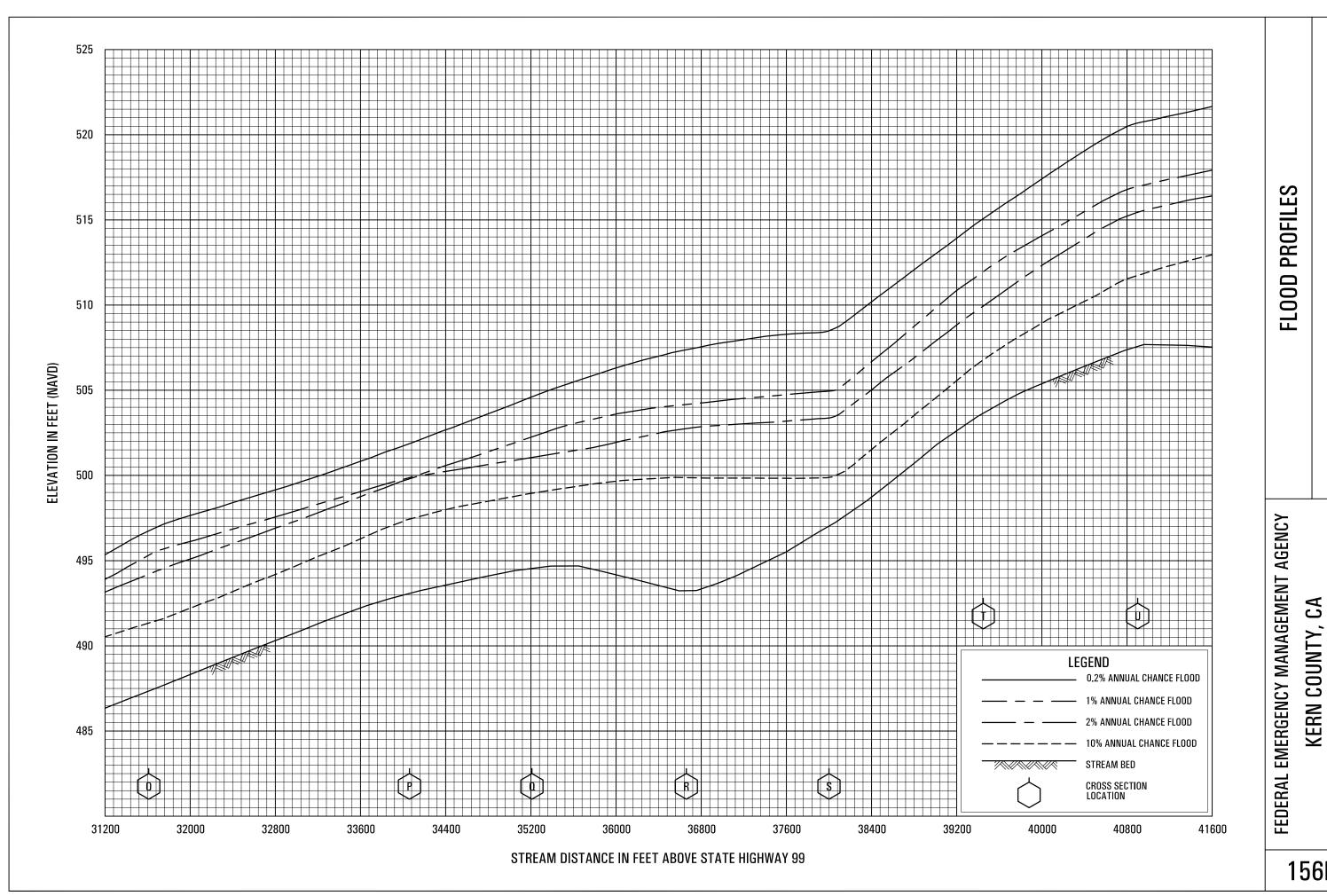


POSO CREEK

155P

AND INCORPORATED AREAS

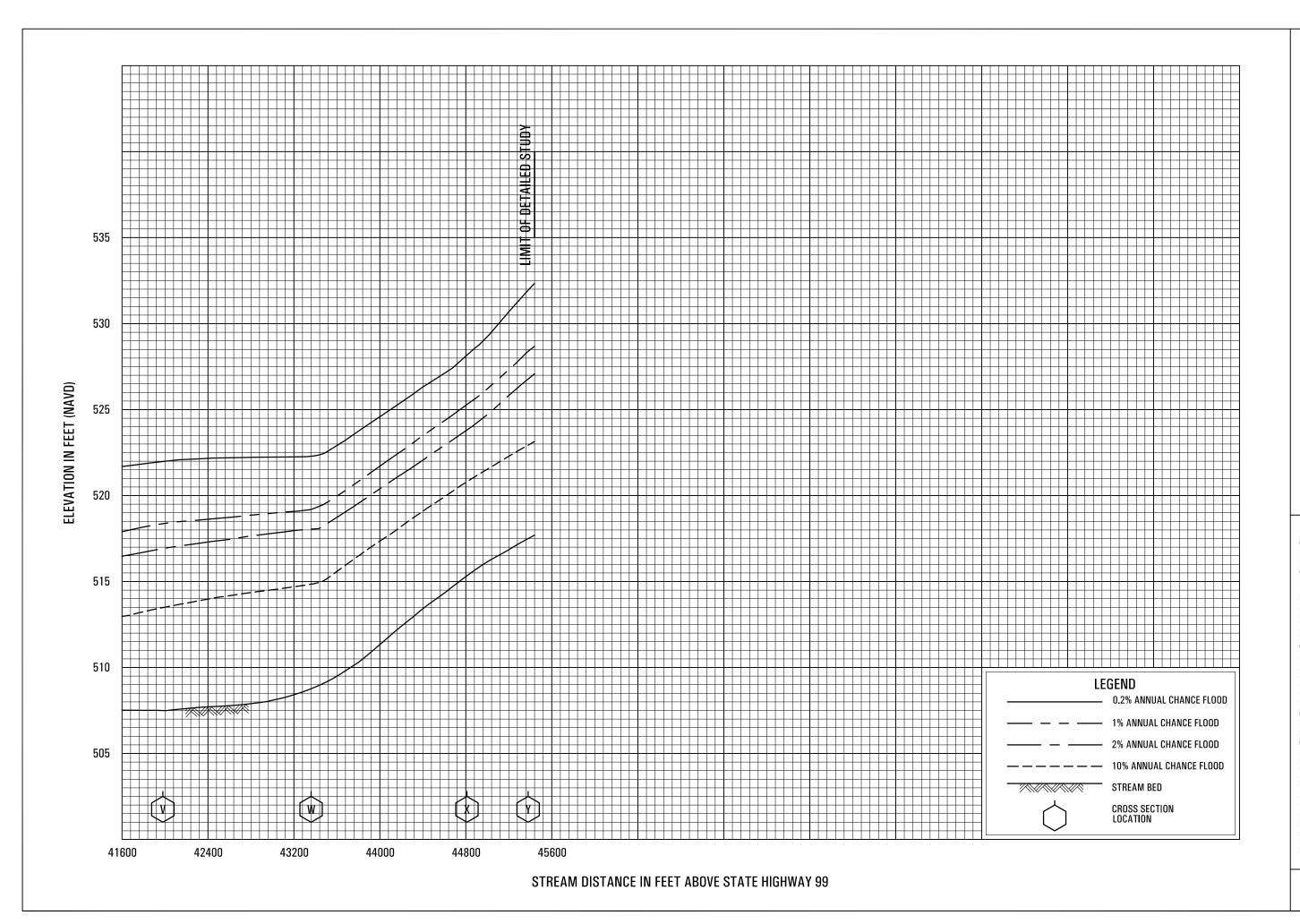
KERN COUNTY, CA



POSO CREEK

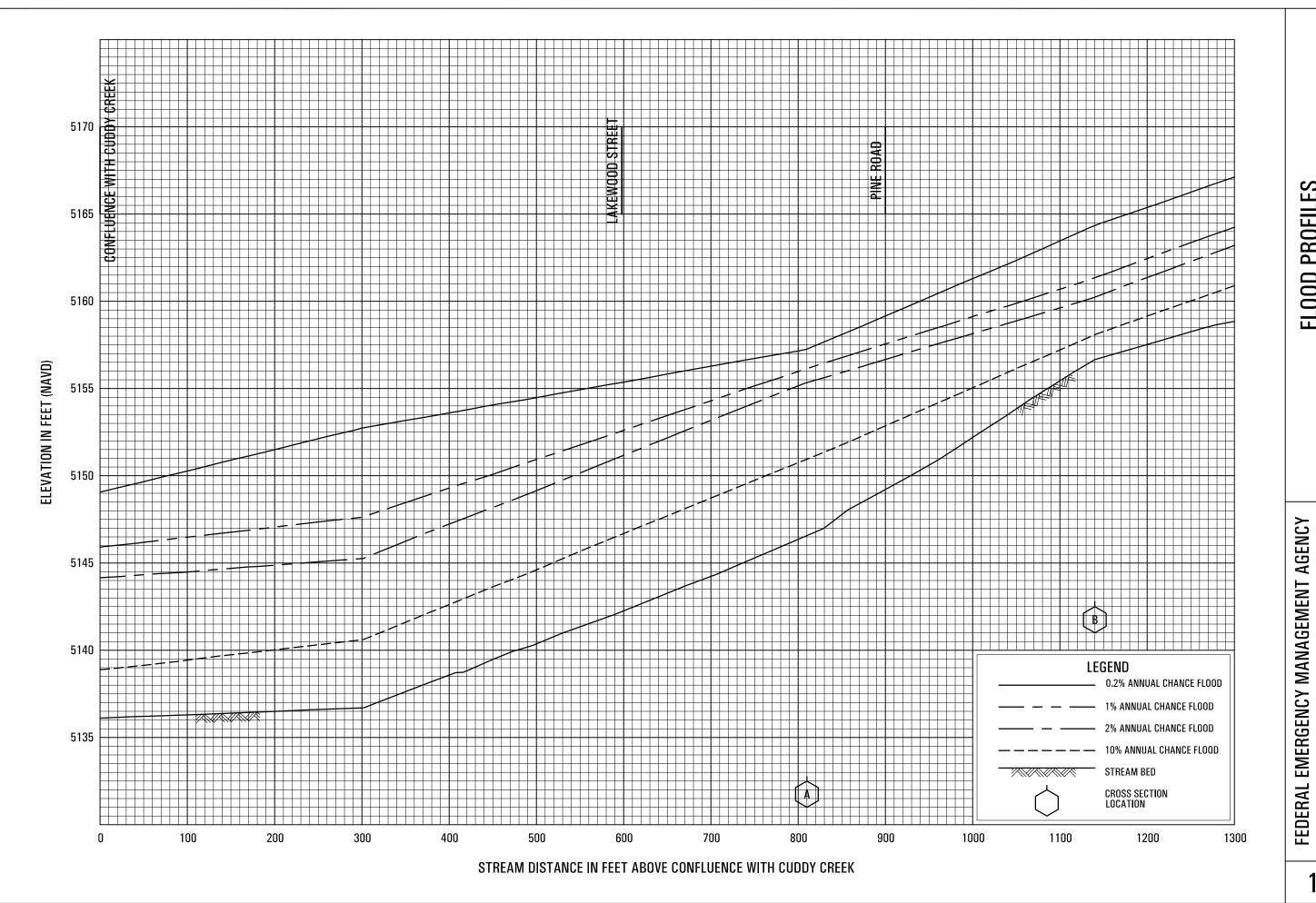
156P

AND INCORPORATED AREAS



POSO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
KERN COUNTY, CA
AND INCORPORATED AREAS

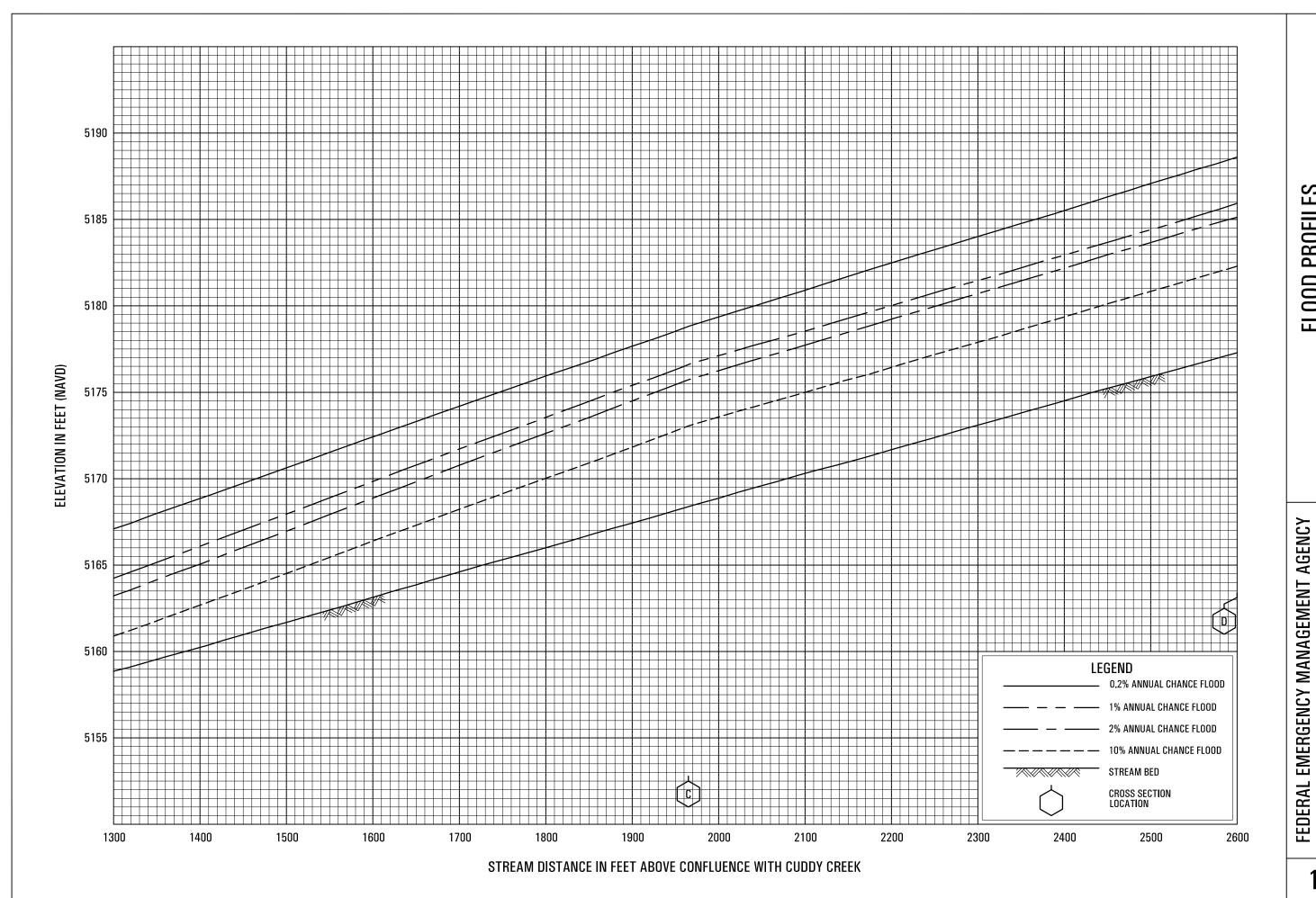


RANGER STATION CREEK

158P

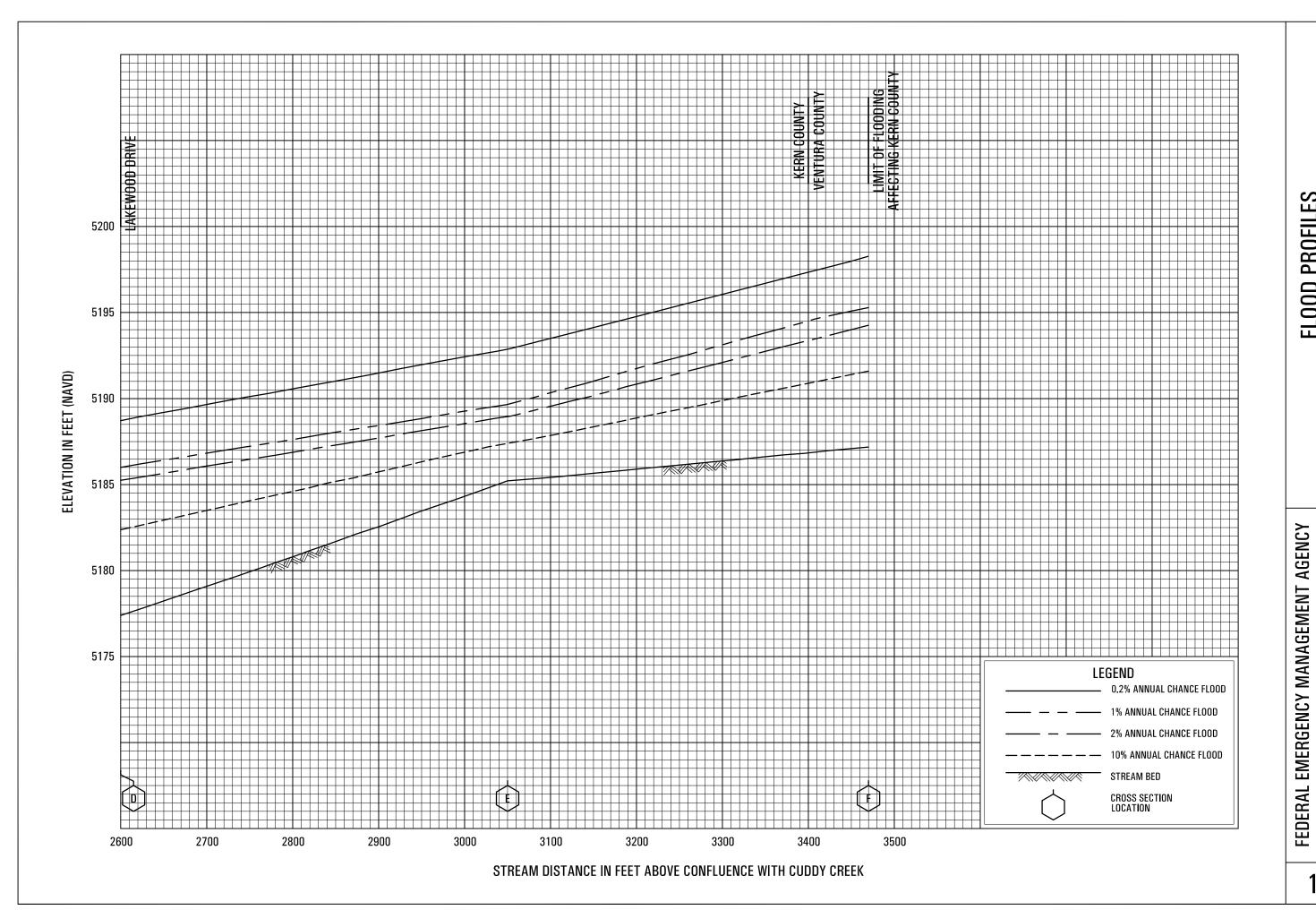
AND INCORPORATED AREAS

KERN COUNTY, CA



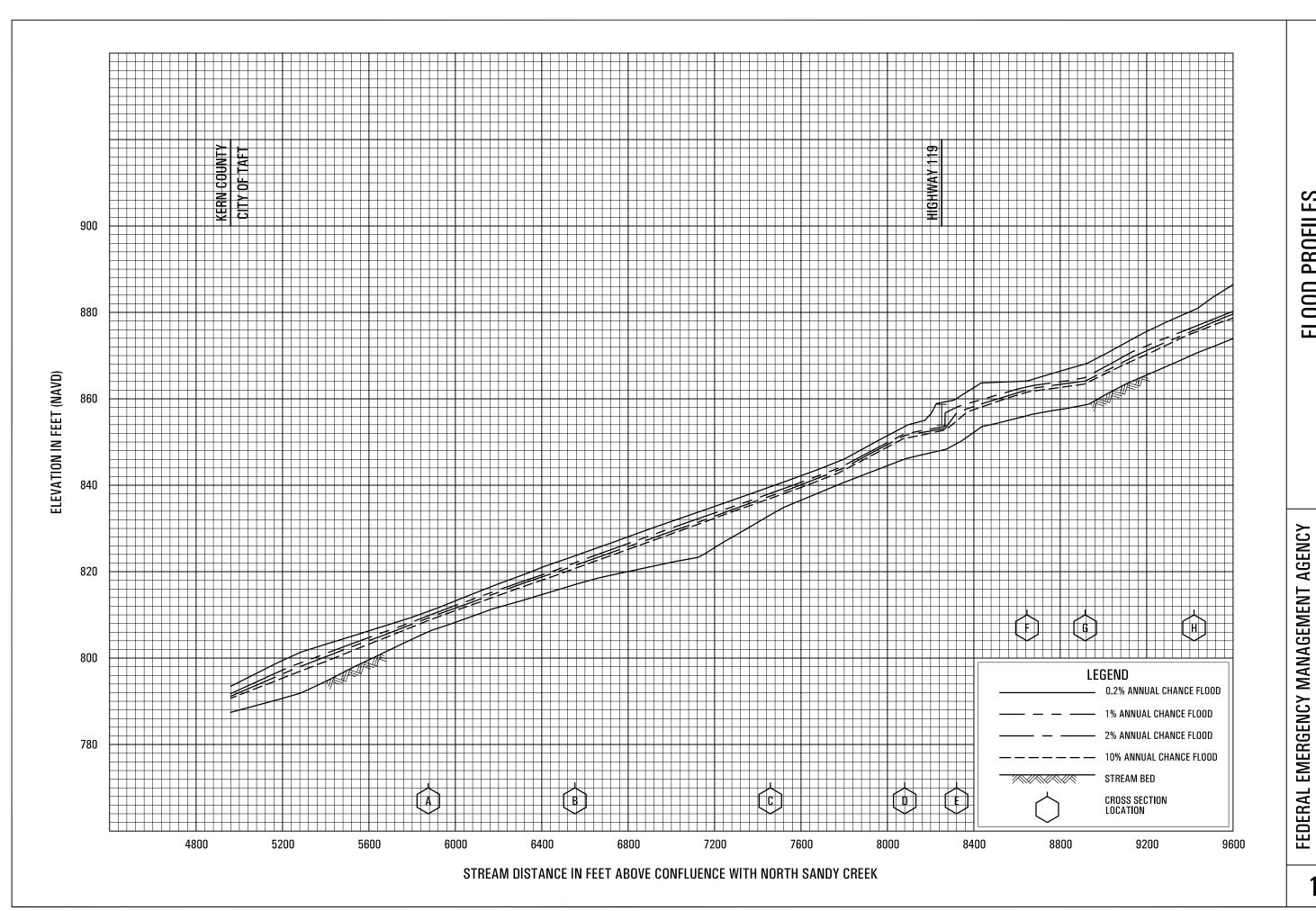
RANGER STATION CREEK

AND INCORPORATED AREAS KERN COUNTY, CA



RANGER STATION CREEK

AND INCORPORATED AREAS KERN COUNTY, CA

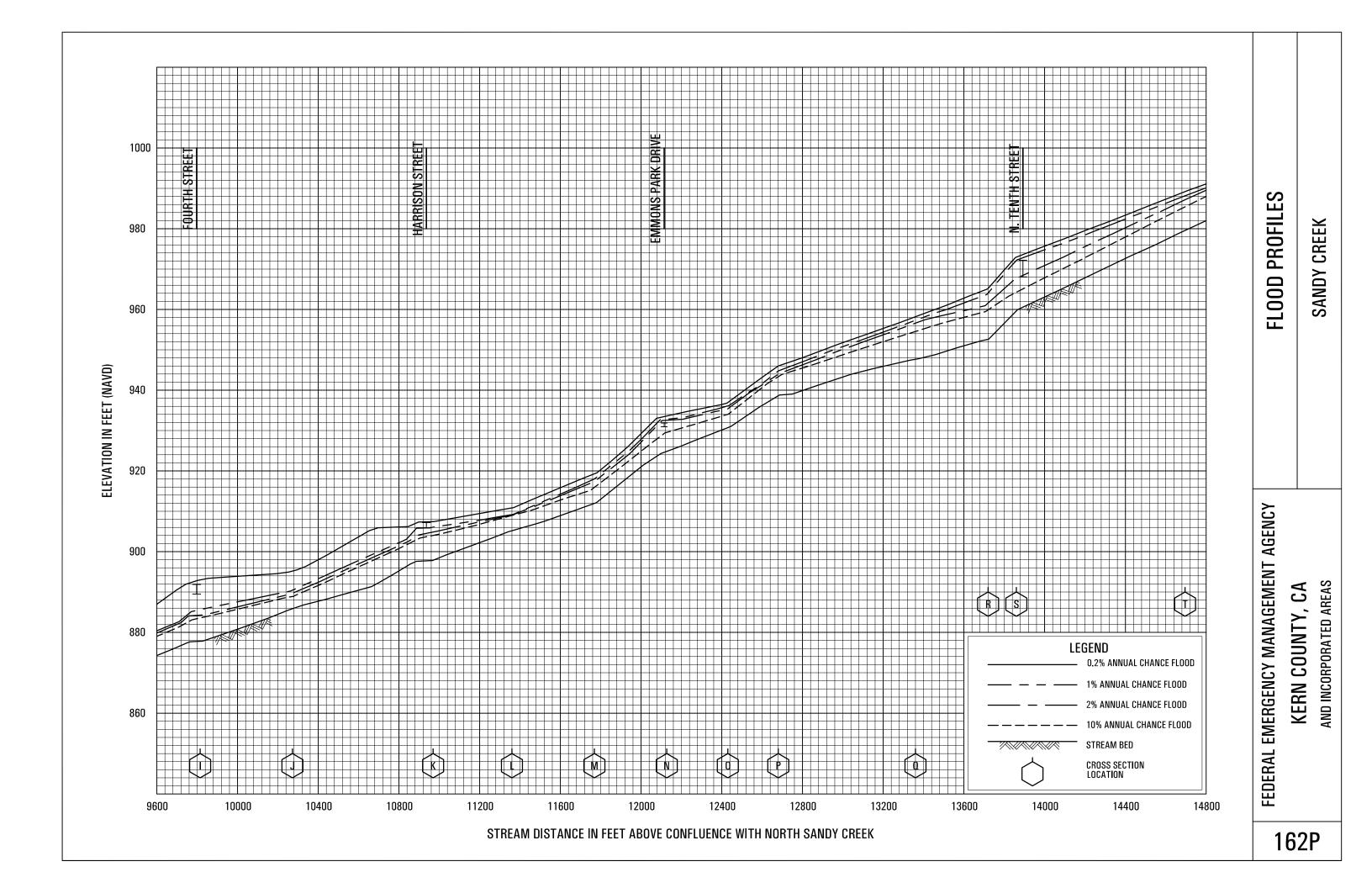


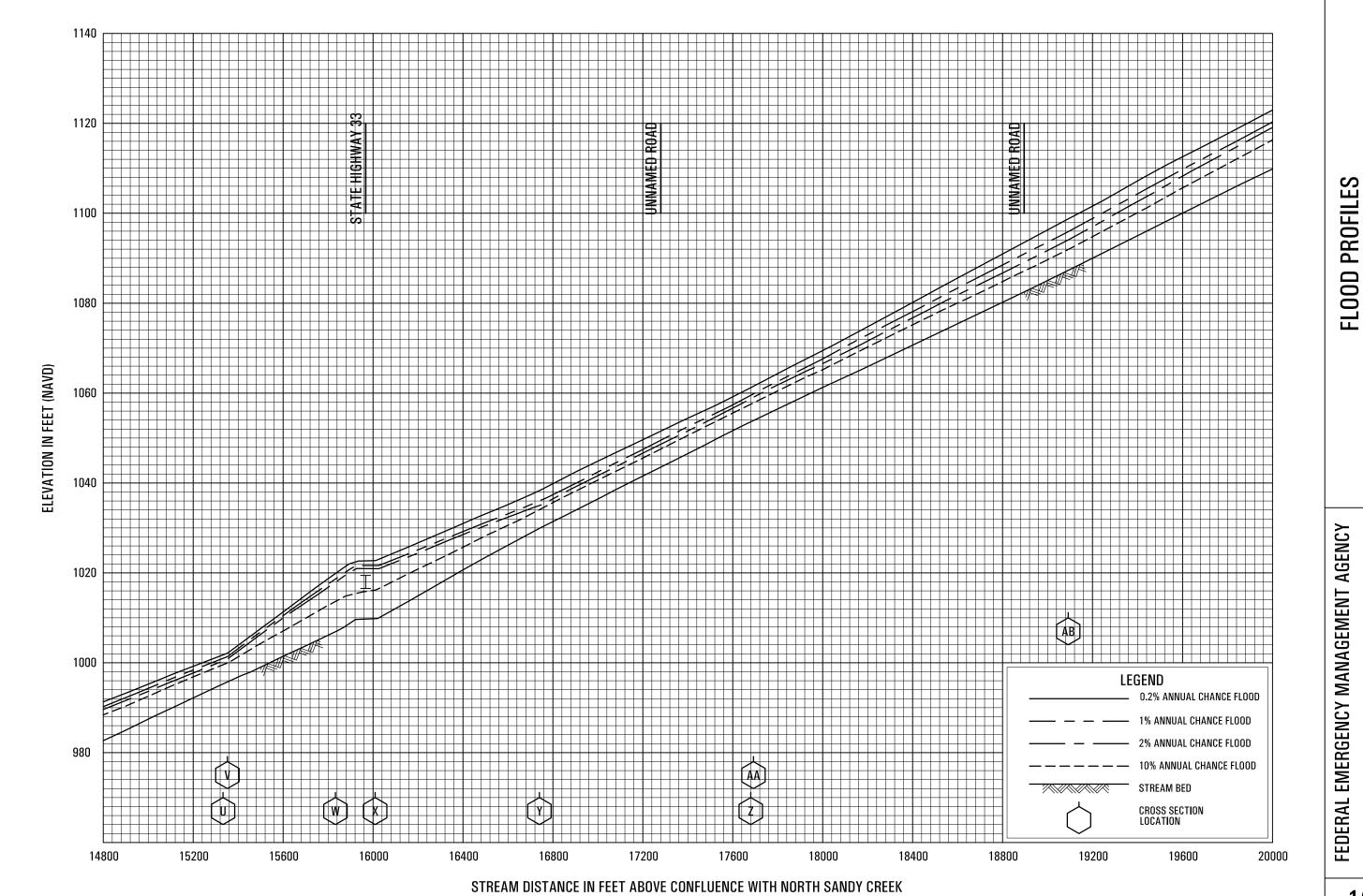
SANDY CREEK

161P

AND INCORPORATED AREAS

KERN COUNTY, CA

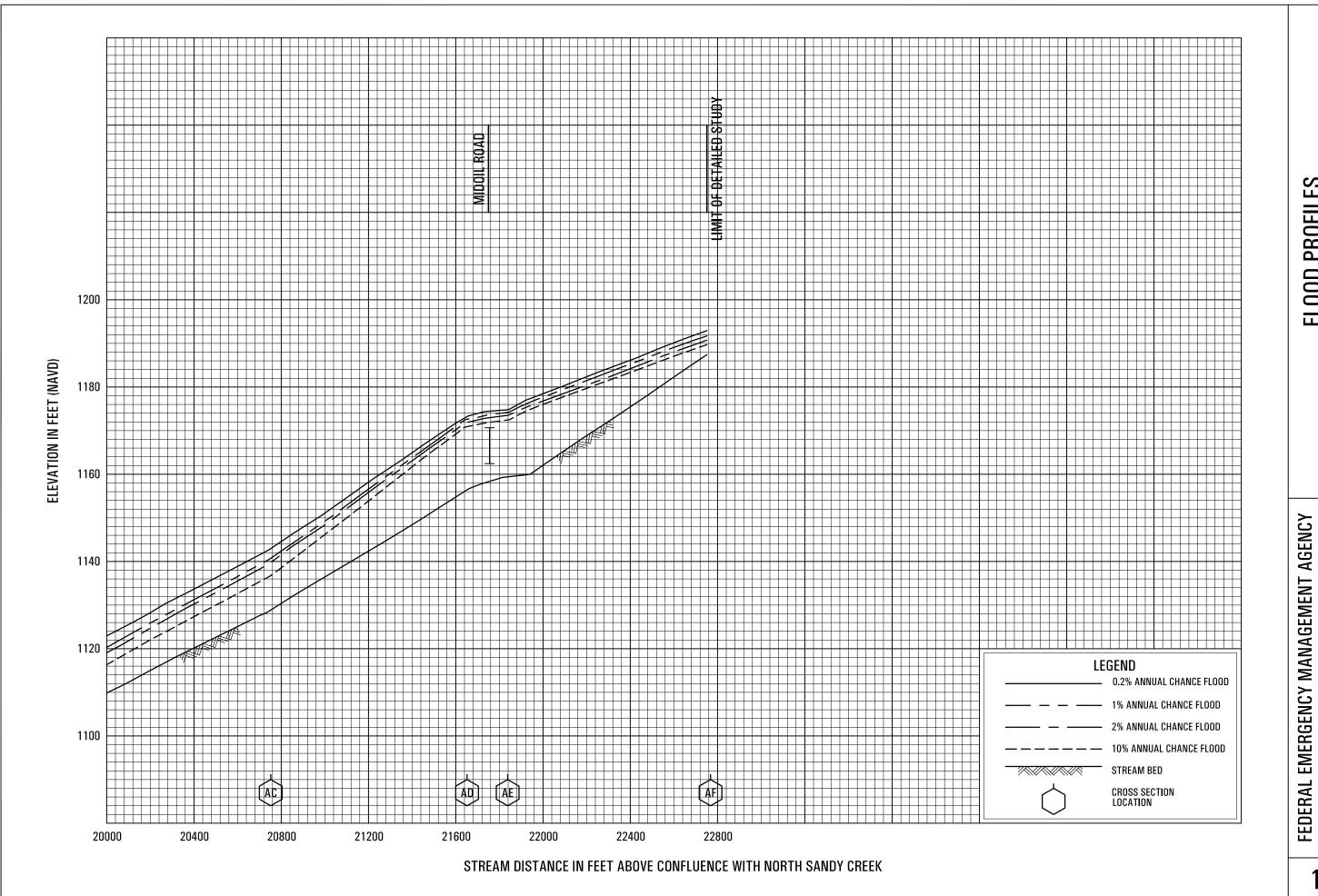




KERN COUNTY, CA

AND INCORPORATED AREAS

SANDY CREEK

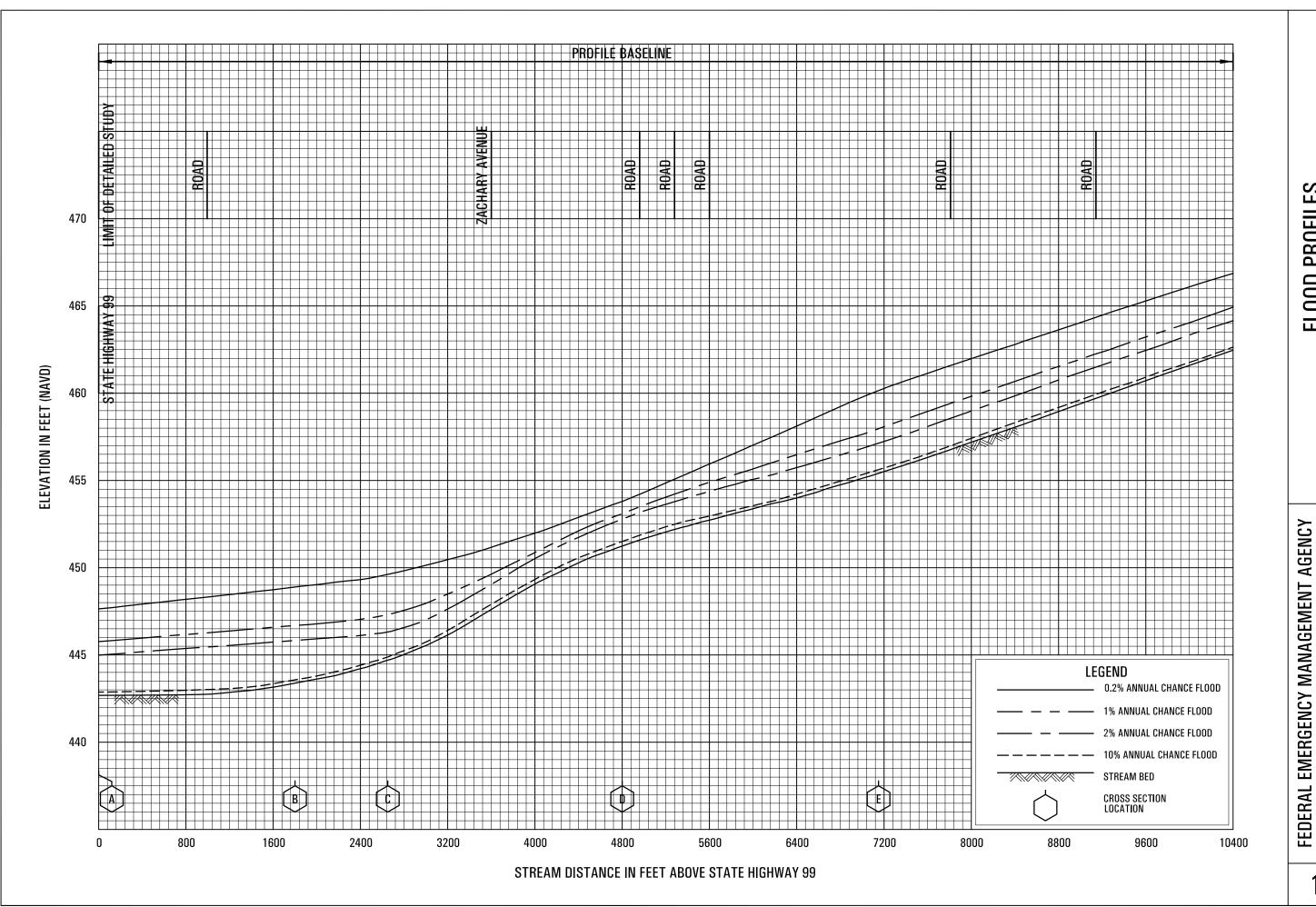


SANDY CREEK

164P

AND INCORPORATED AREAS

KERN COUNTY, CA

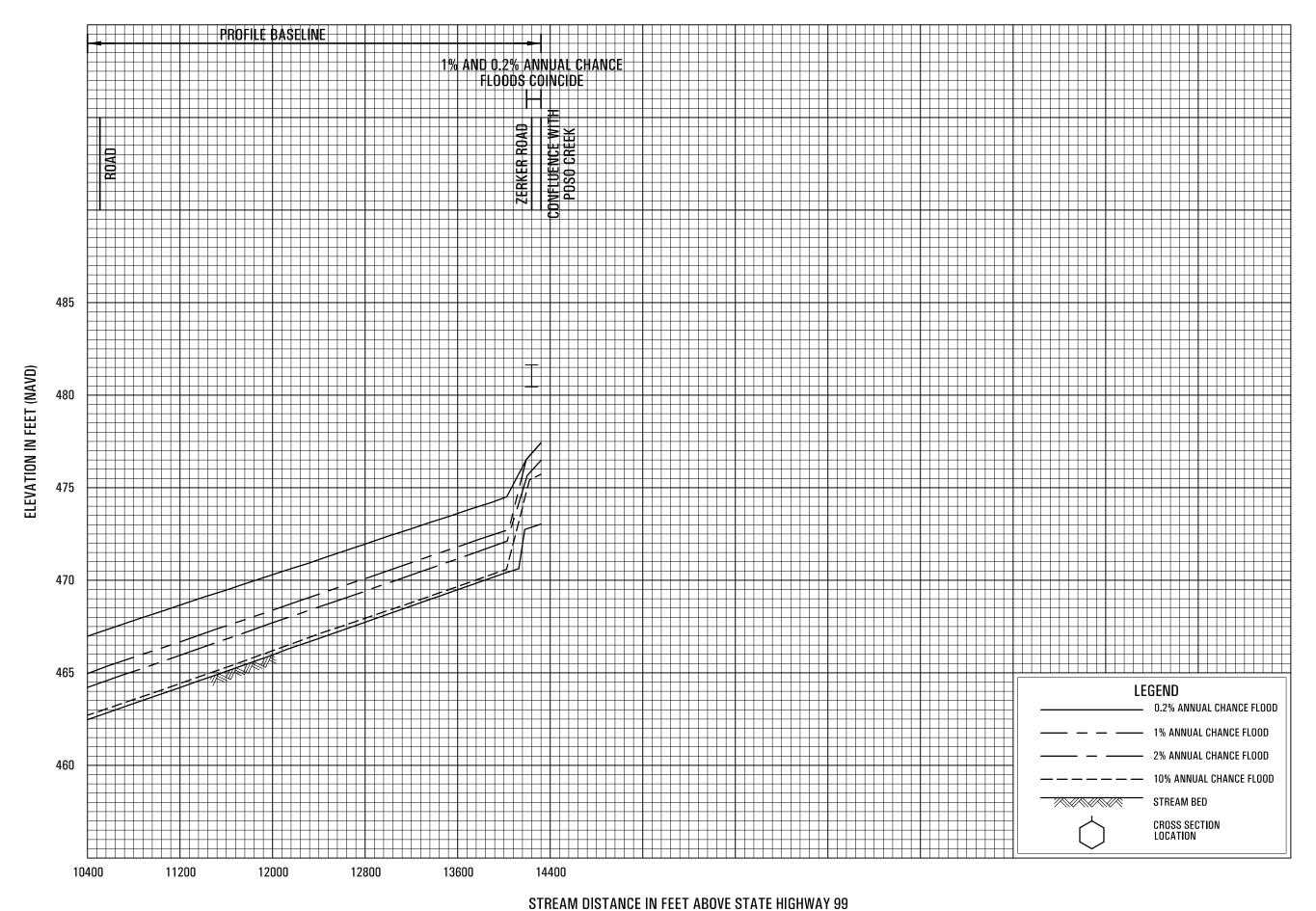


SOUTH BRANCH POSO CREEK

165P

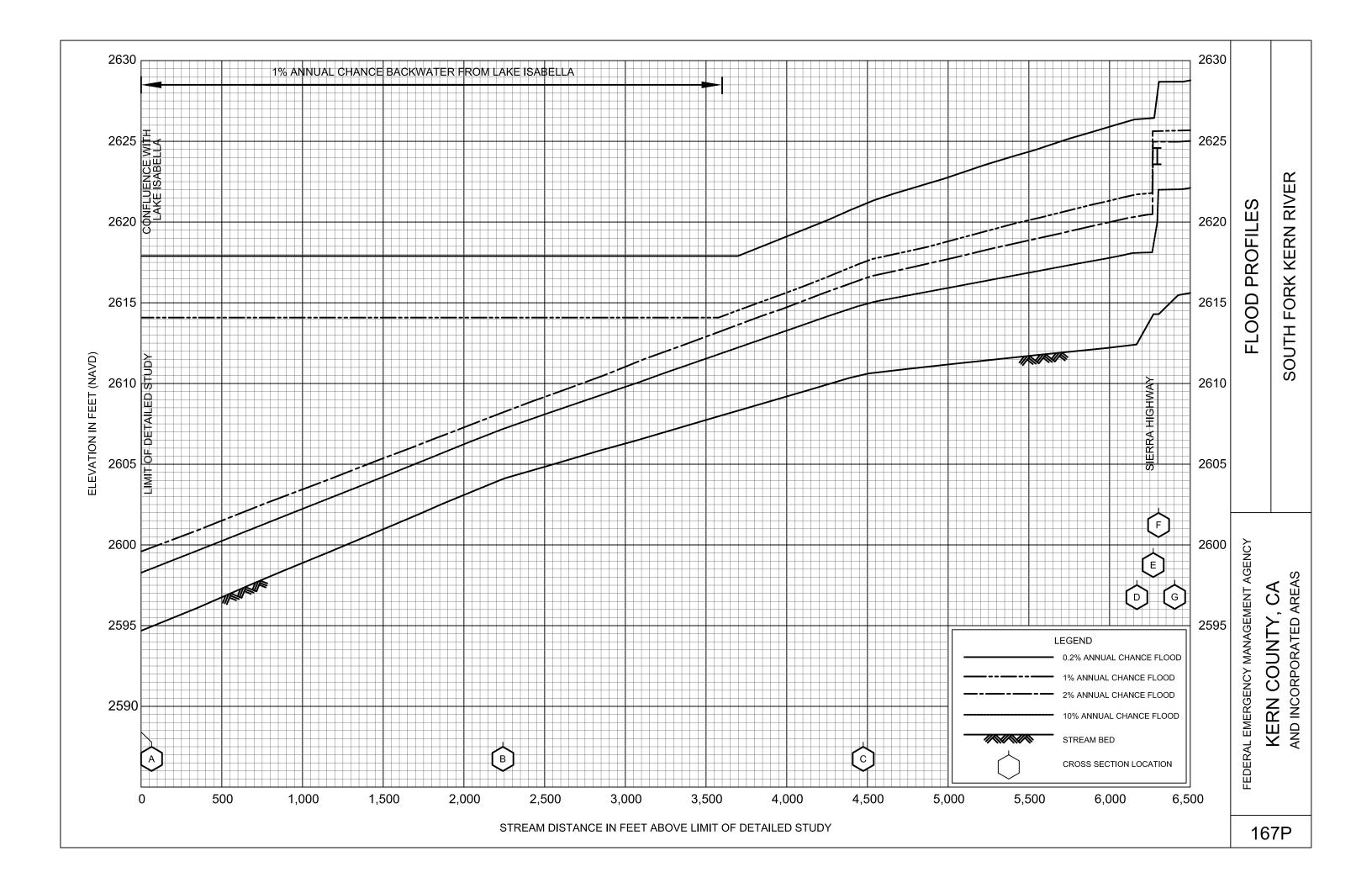
AND INCORPORATED AREAS

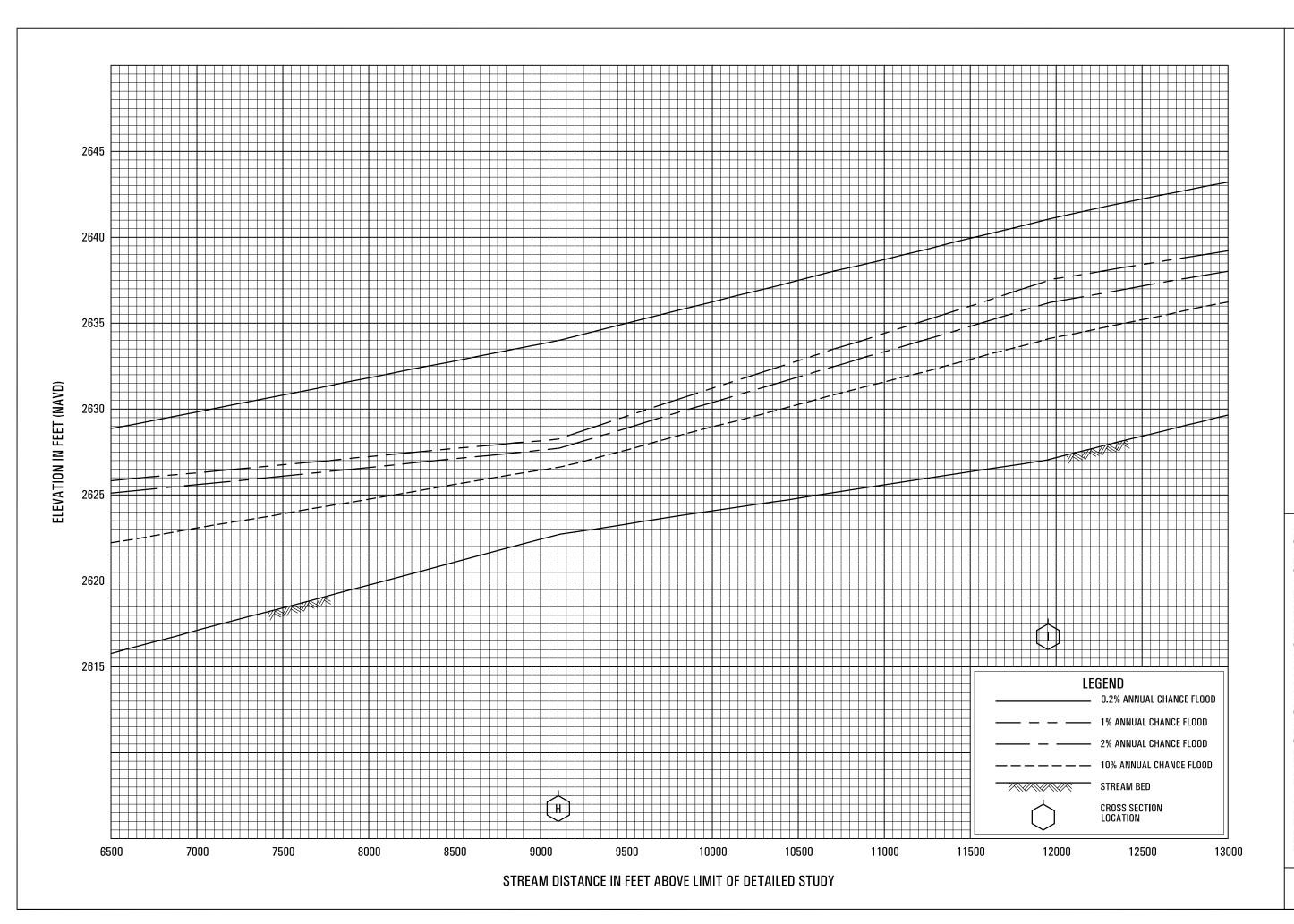
KERN COUNTY, CA



SOUTH BRANCH POSO CREEK

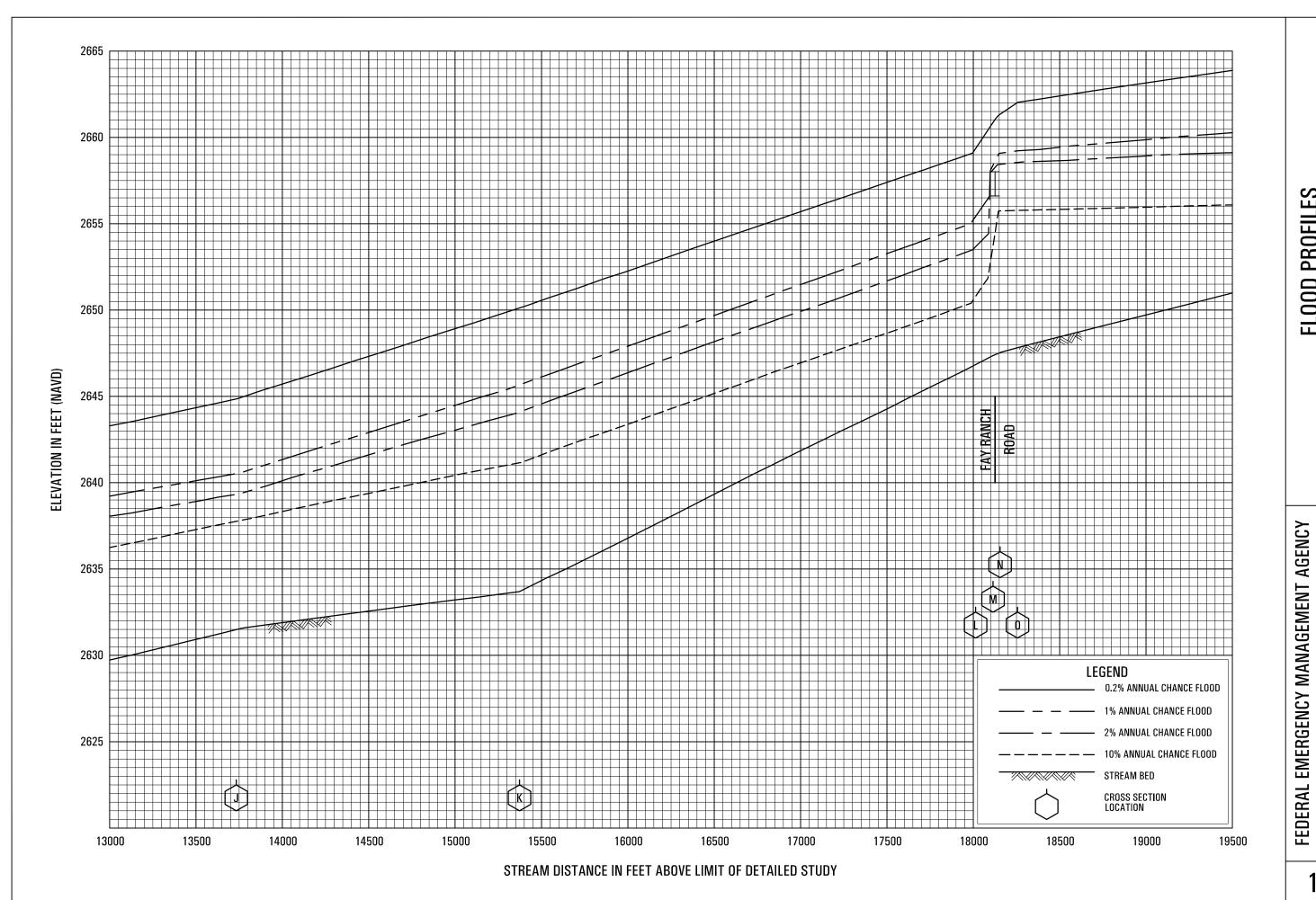
FEDERAL EMERGENCY MANAGEMENT AGENCY AND INCORPORATED AREAS KERN COUNTY, CA





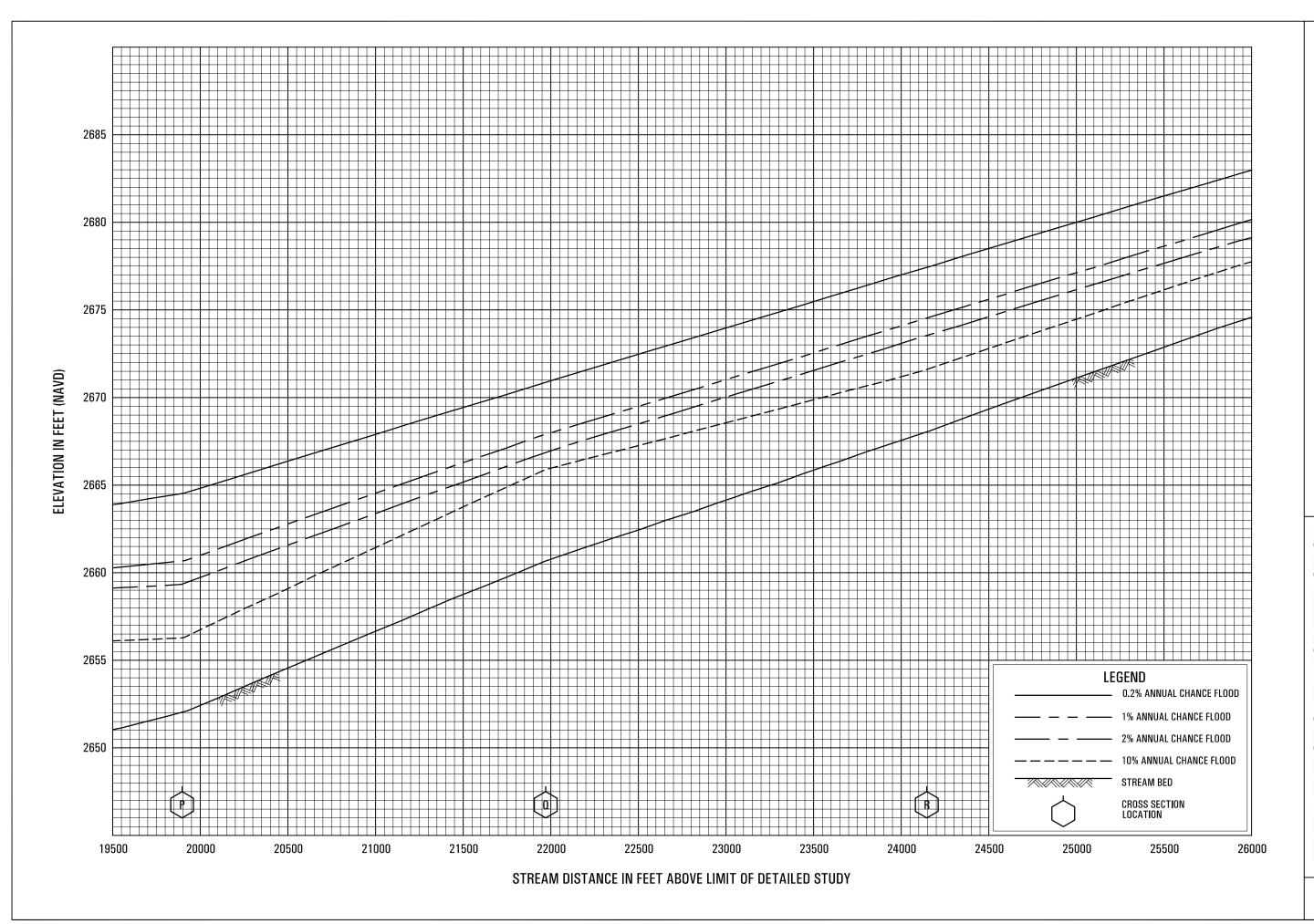
SOUTH FORK KERN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
KERN COUNTY, CA
AND INCORPORATED AREAS



SOUTH FORK KERN RIVER

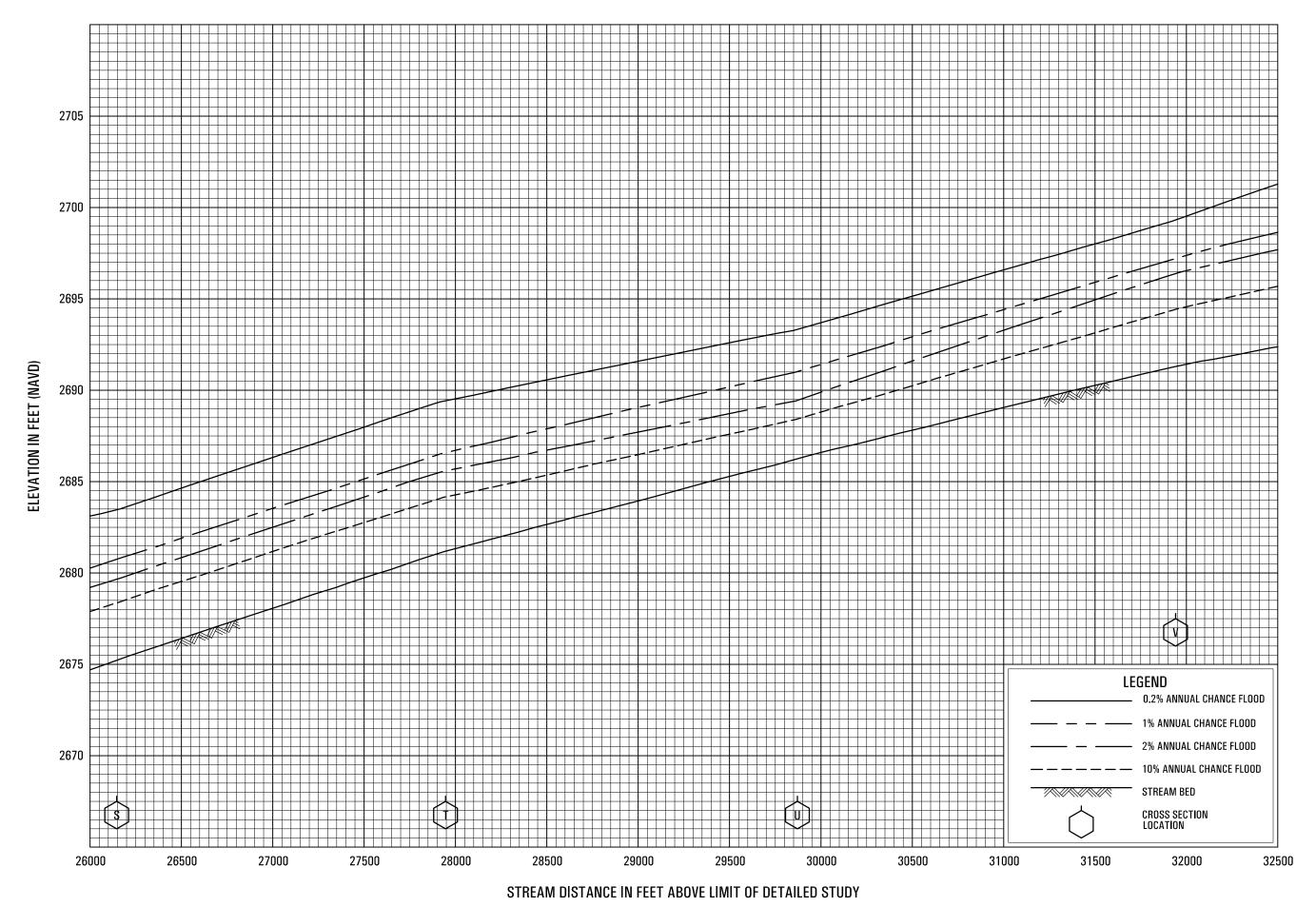
AND INCORPORATED AREAS KERN COUNTY, CA



SOUTH FORK KERN RIVER

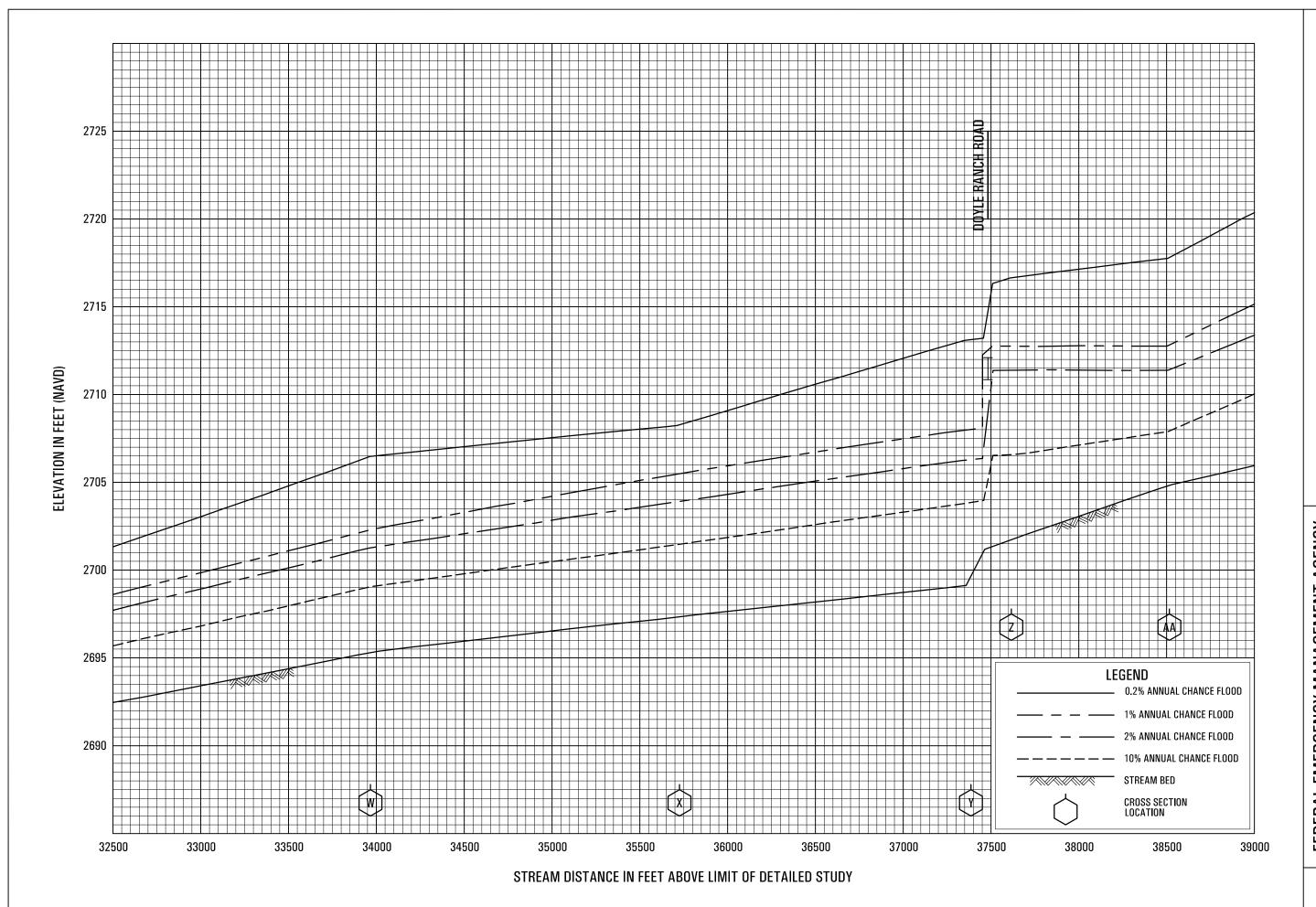
FEDERAL EMERGENCY MANAGEMENT AGENCY KERN COUNTY, CA

AND INCORPORATED AREAS



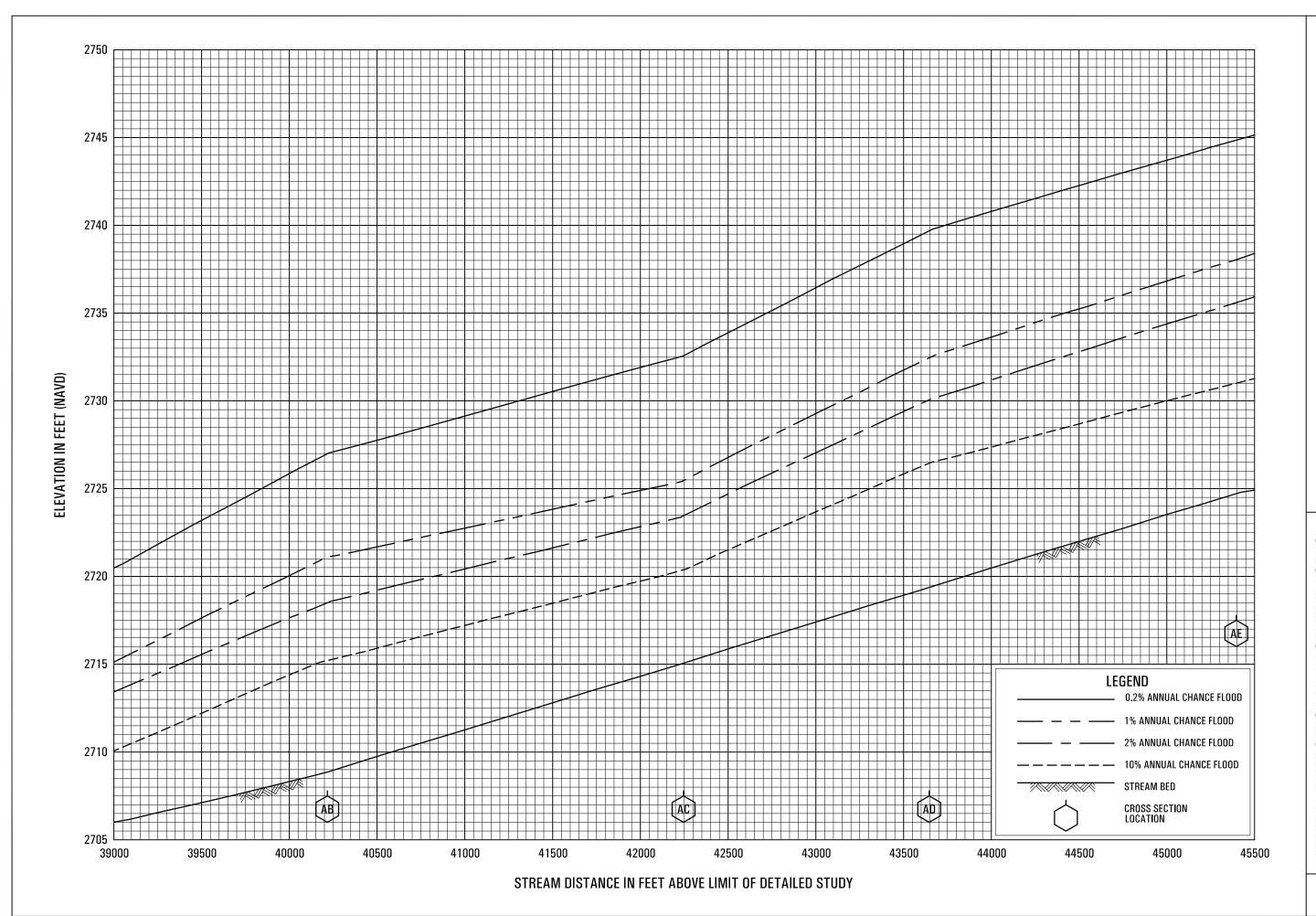
SOUTH FORK KERN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY AND INCORPORATED AREAS KERN COUNTY, CA



SOUTH FORK KERN RIVER

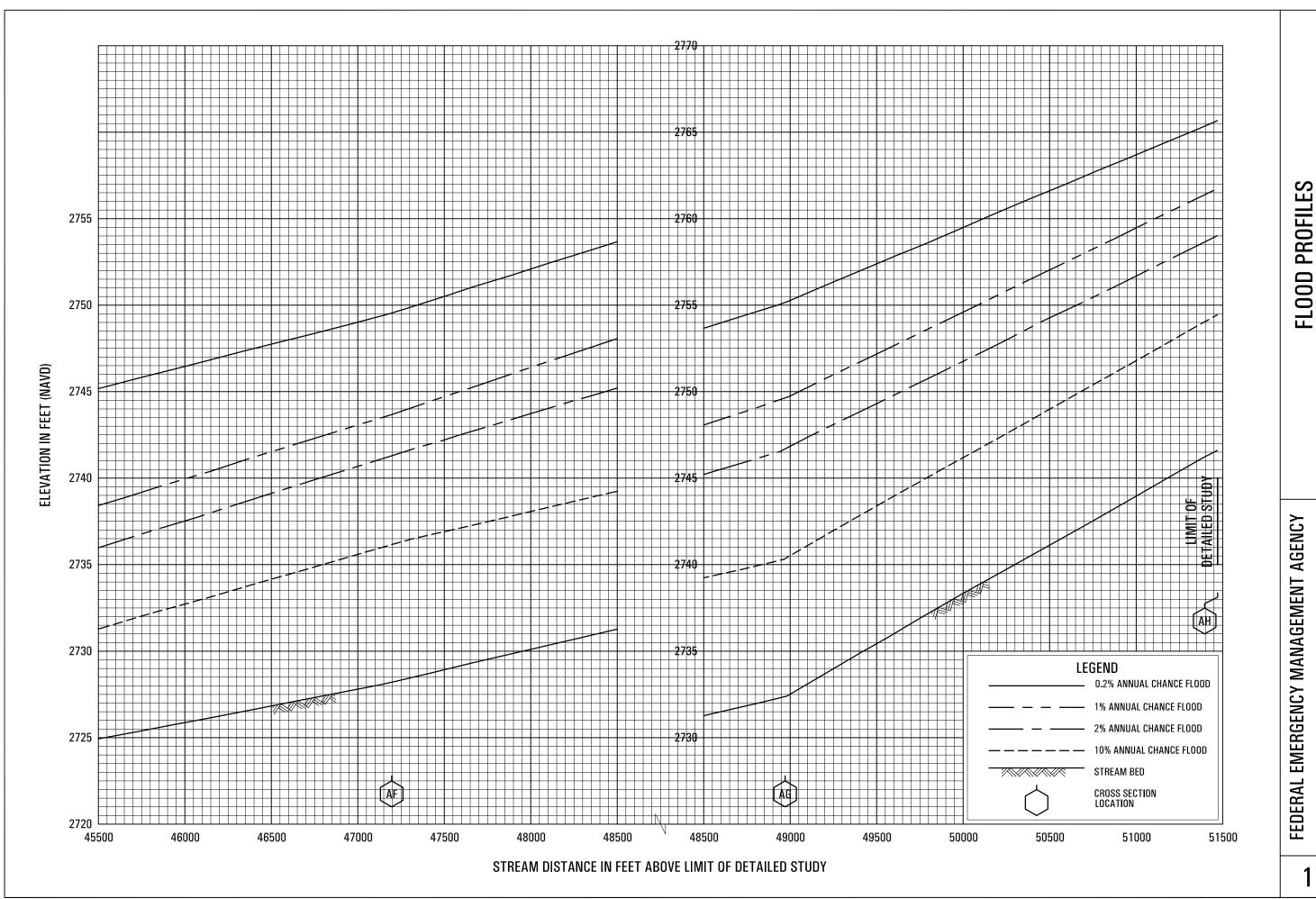
FEDERAL EMERGENCY MANAGEMENT AGENCY
KERN COUNTY, CA
AND INCORPORATED AREAS



SOUTH FORK KERN RIVER

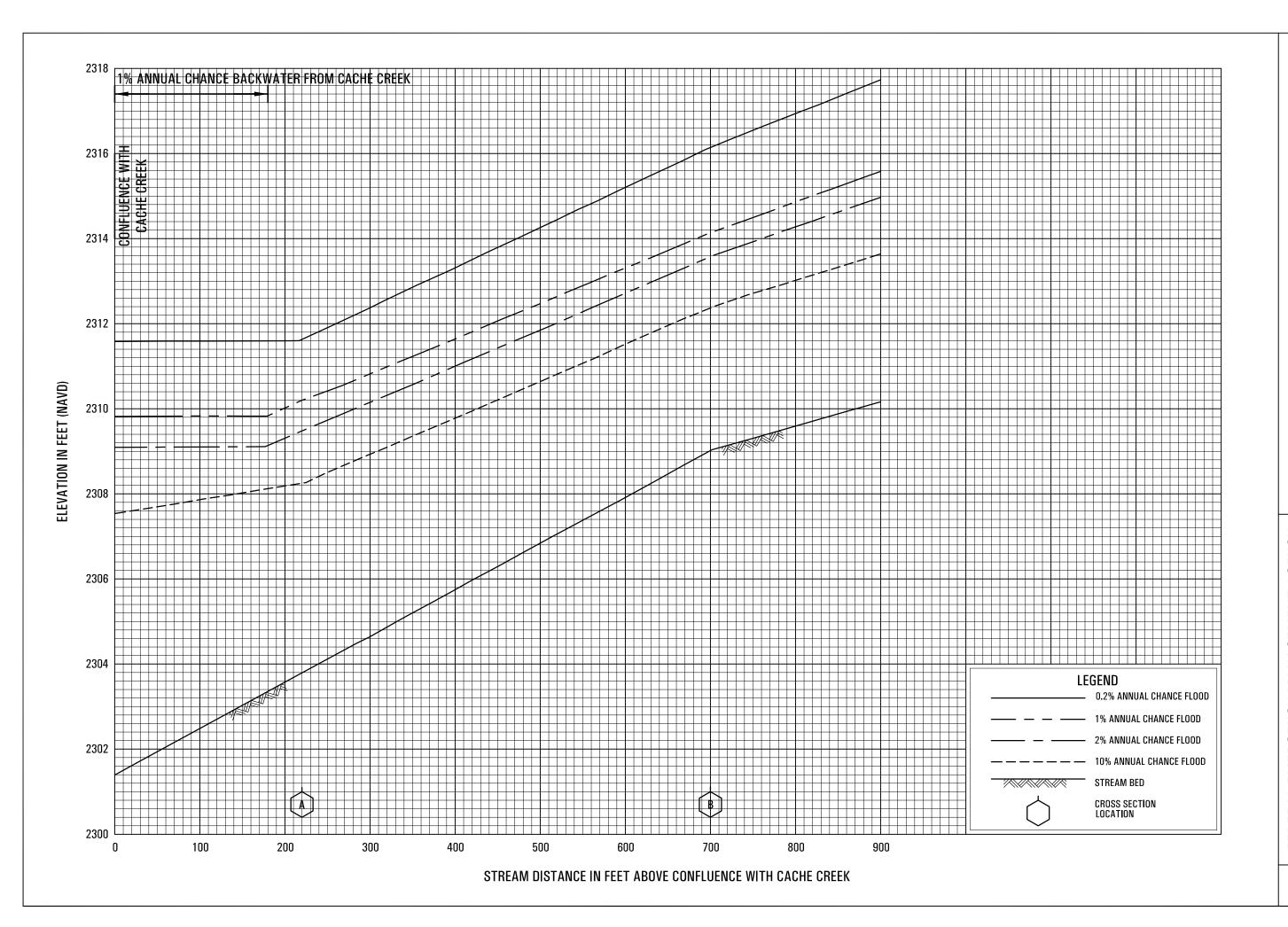
FEDERAL EMERGENCY MANAGEMENT AGENCY KERN COUNTY, CA

AND INCORPORATED AREAS



KERN COUNTY, CA
AND INCORPORATED AREAS

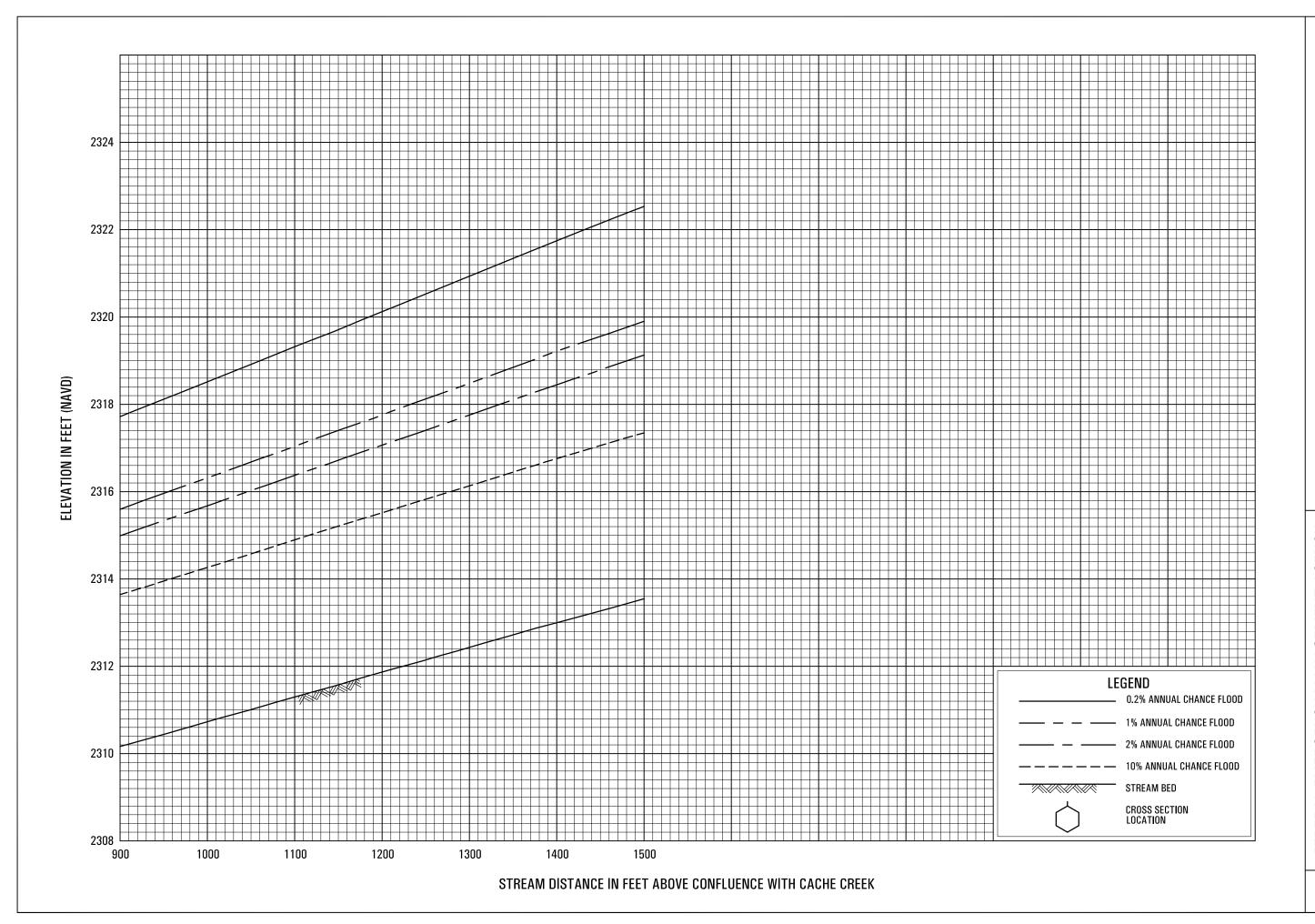
SOUTH FORK KERN RIVER



TIERRA DEL SOL CREEK

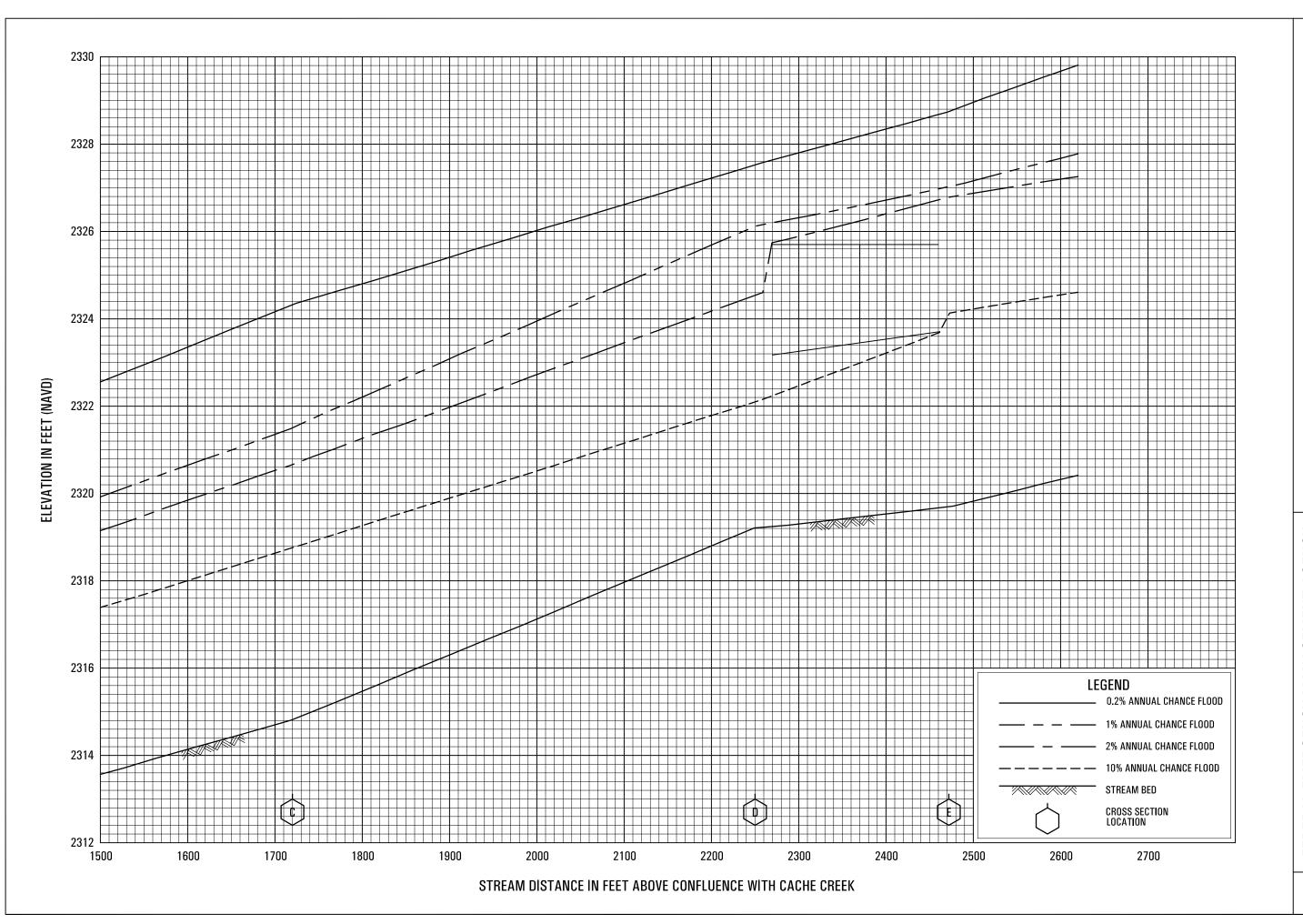
FEDERAL EMERGENCY MANAGEMENT AGENCY KERN COUNTY, CA

AND INCORPORATED AREAS



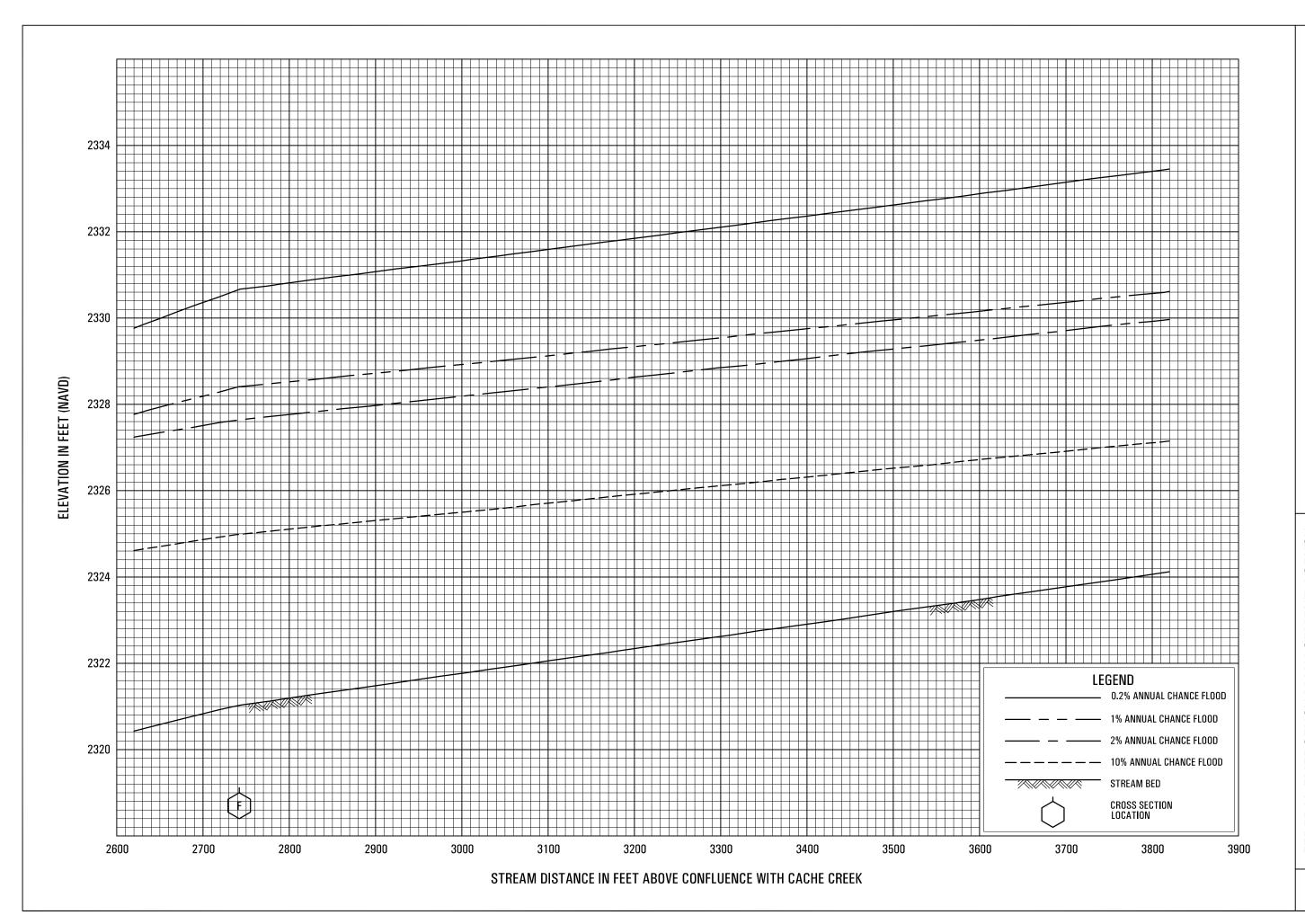
TIERRA DEL SOL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
KERN COUNTY, CA
AND INCORPORATED AREAS



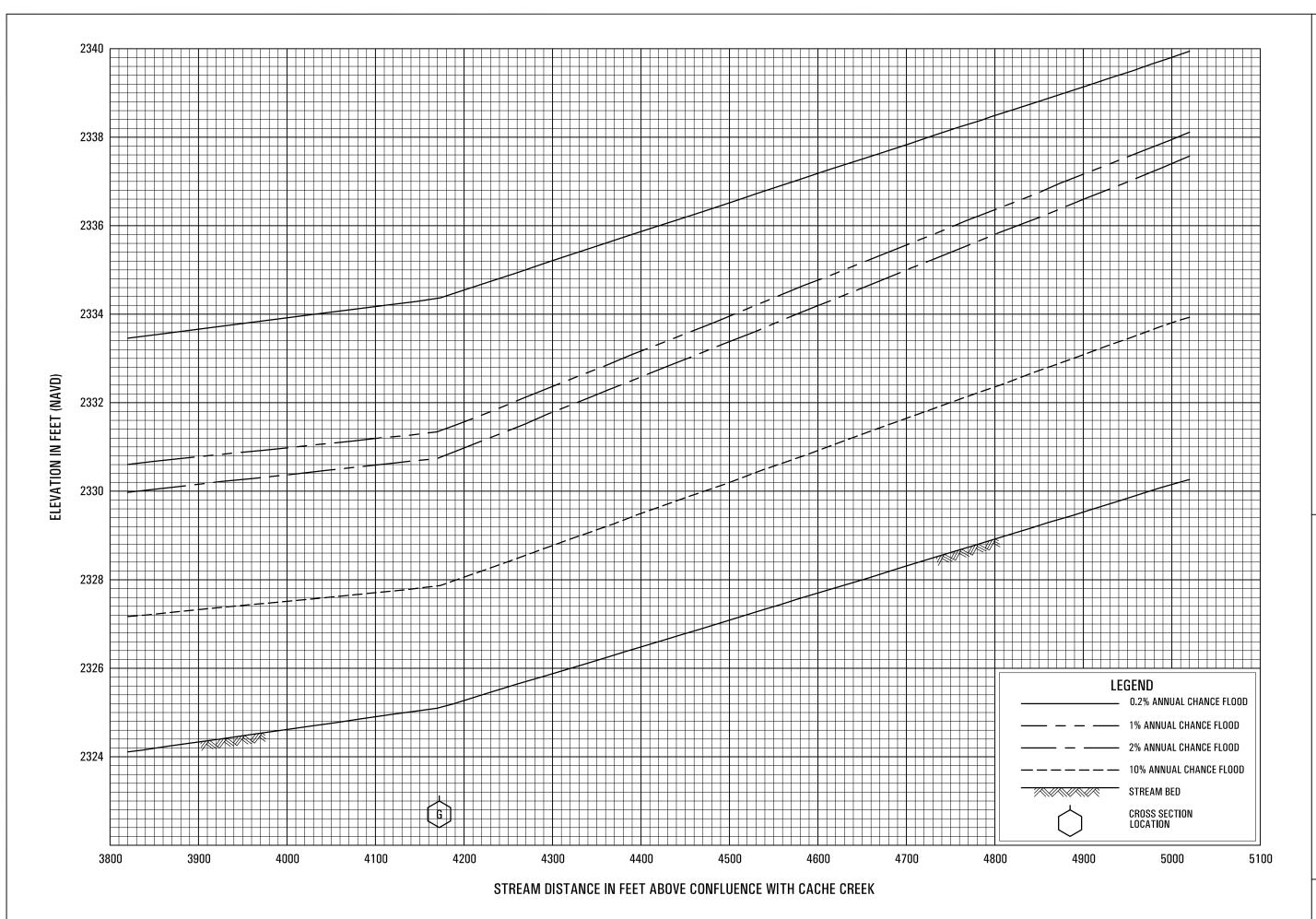
TIERRA DEL SOL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
KERN COUNTY, CA
AND INCORPORATED AREAS



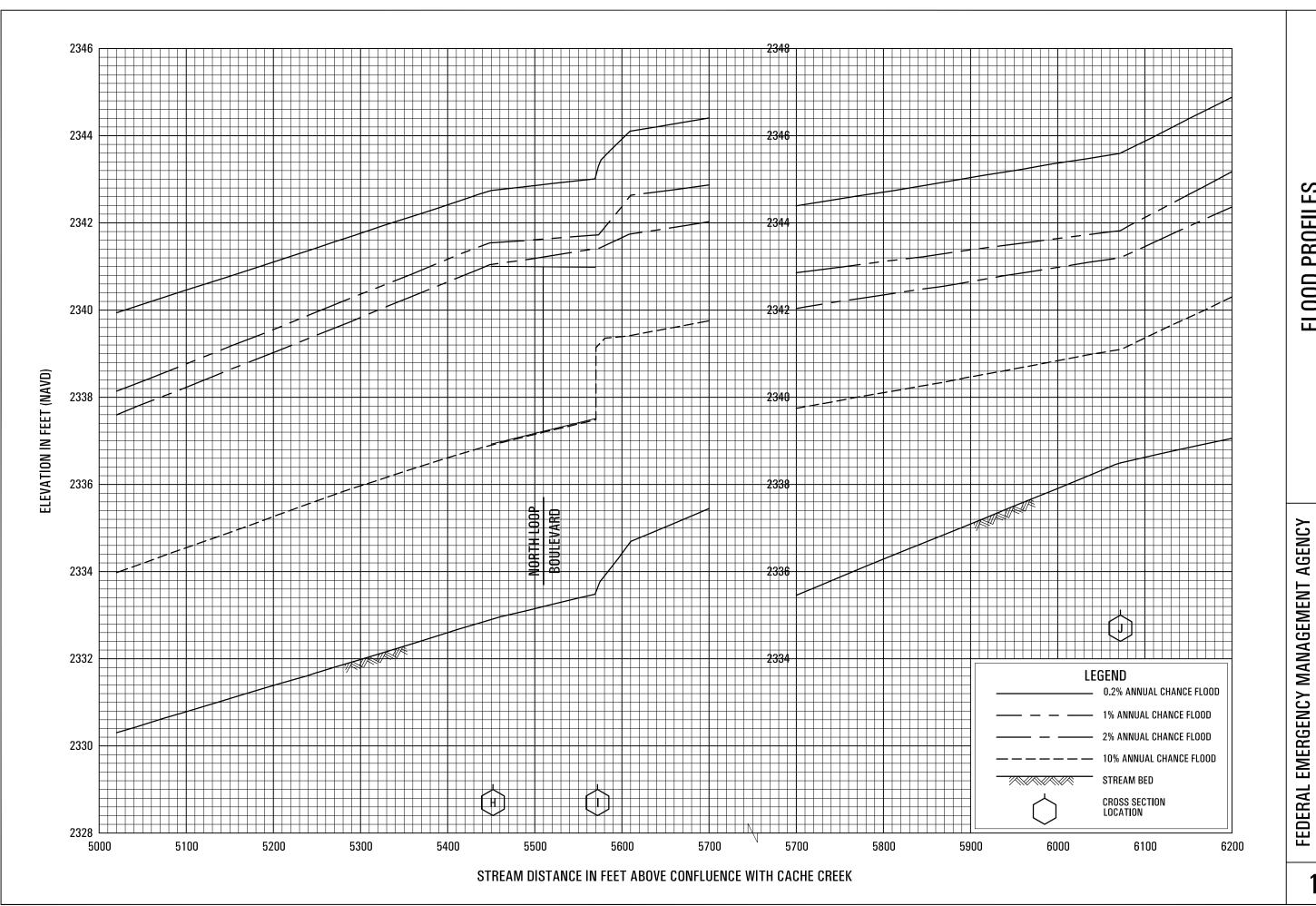
TIERRA DEL SOL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
KERN COUNTY, CA
AND INCORPORATED AREAS



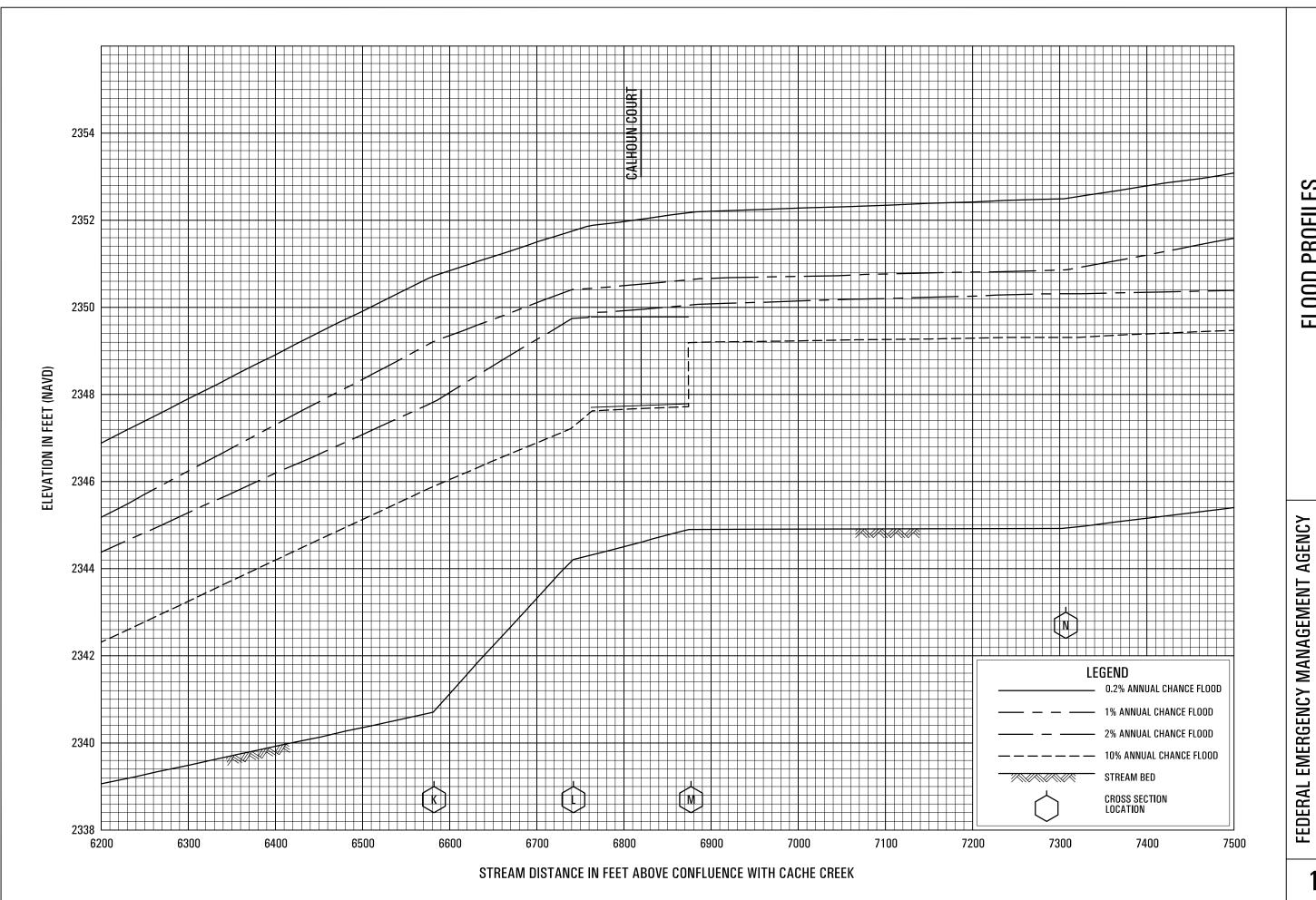
TIERRA DEL SOL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
KERN COUNTY, CA
AND INCORPORATED AREAS



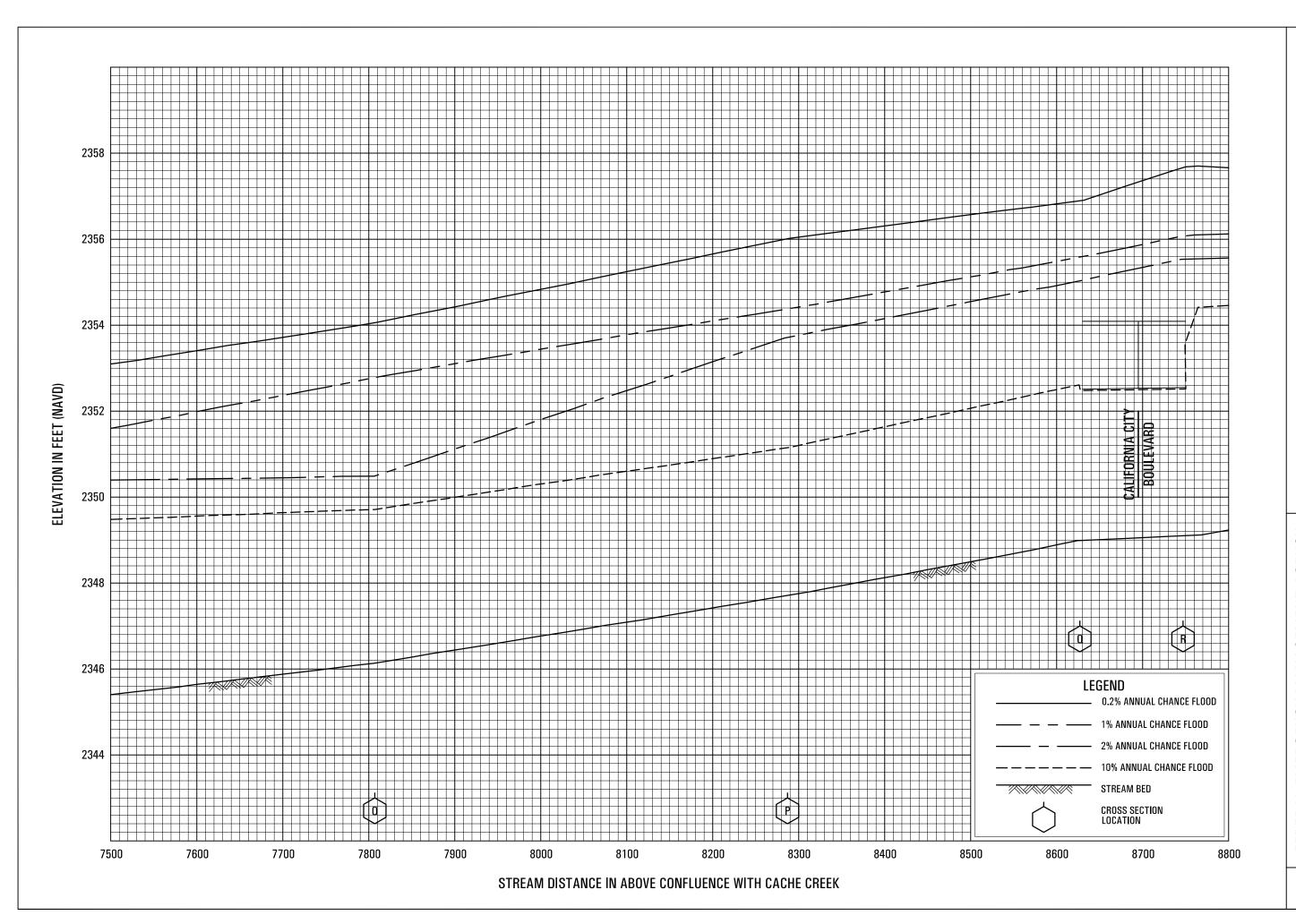
TIERRA DEL SOL CREEK

AND INCORPORATED AREAS KERN COUNTY, CA



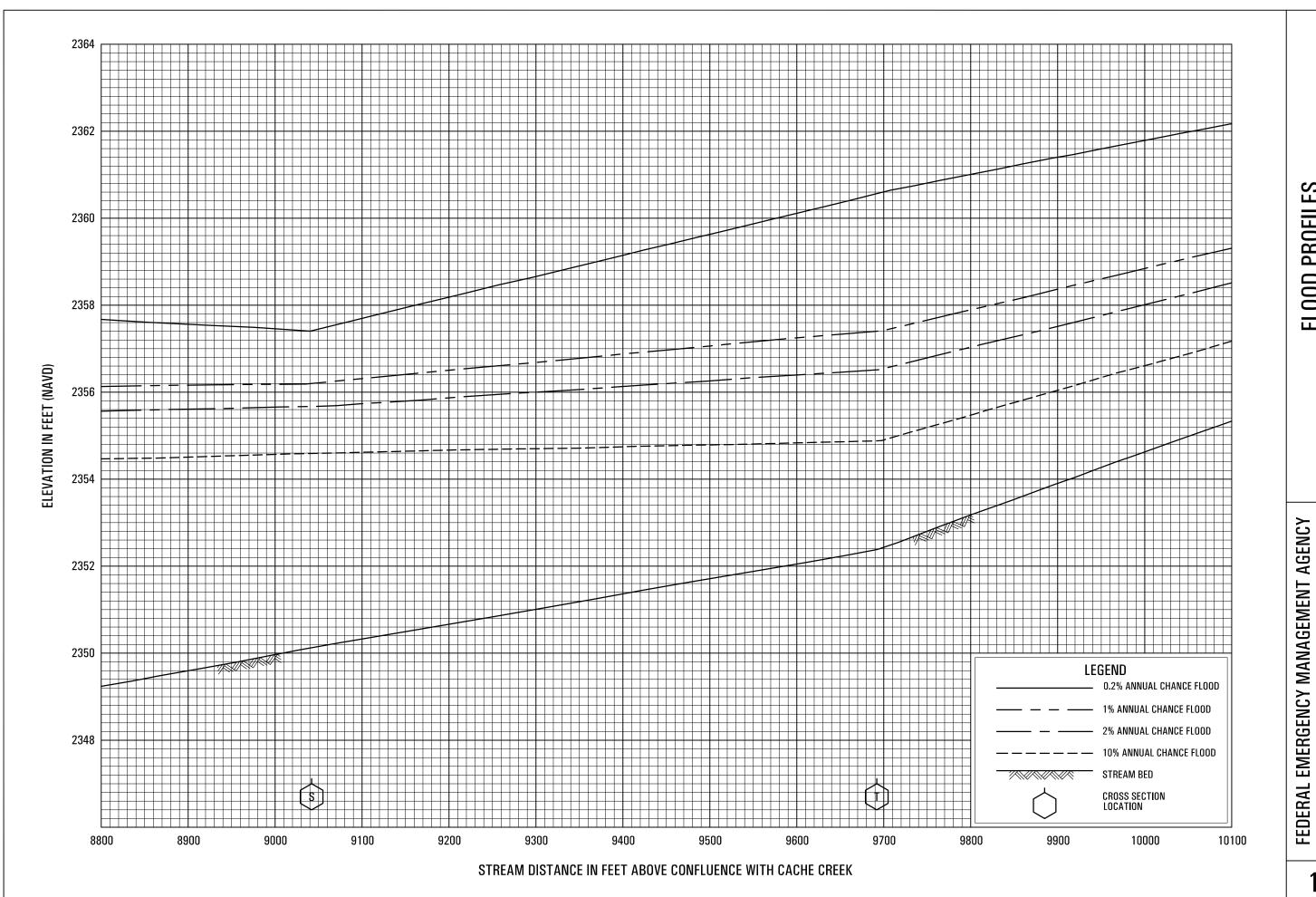
TIERRA DEL SOL CREEK

AND INCORPORATED AREAS KERN COUNTY, CA



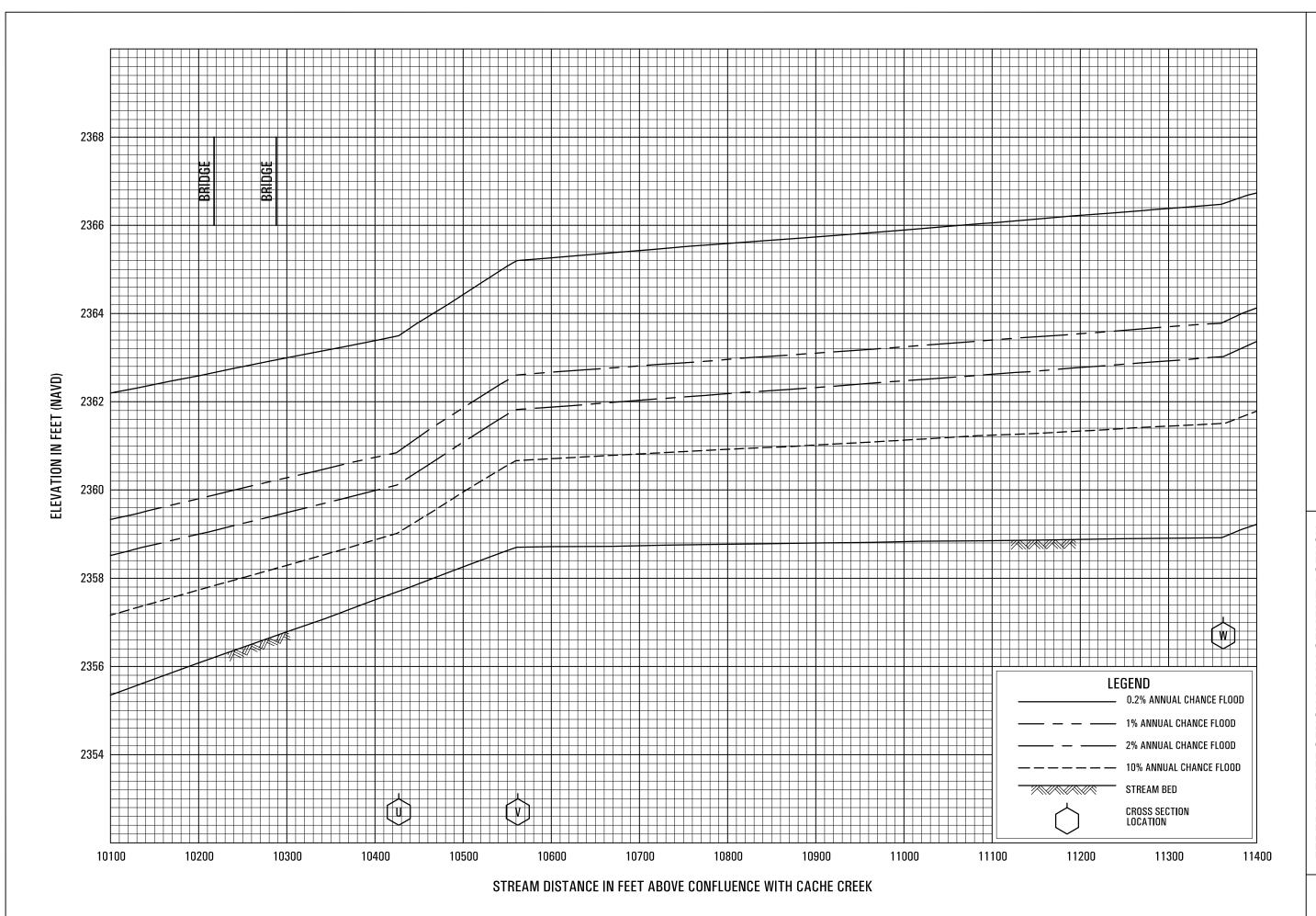
TIERRA DEL SOL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
KERN COUNTY, CA
AND INCORPORATED AREAS



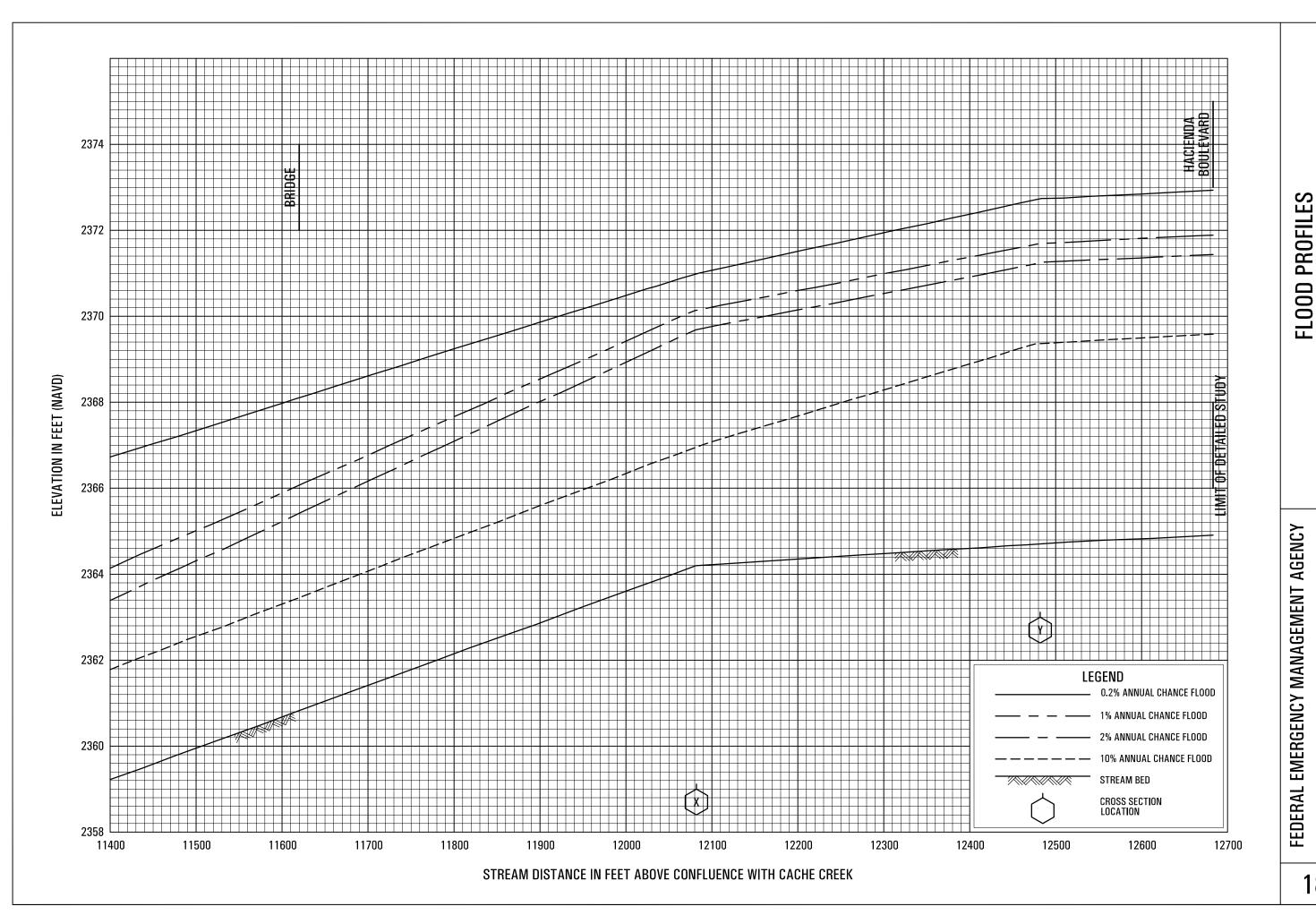
TIERRA DEL SOL CREEK

AND INCORPORATED AREAS KERN COUNTY, CA



TIERRA DEL SOL CREEK

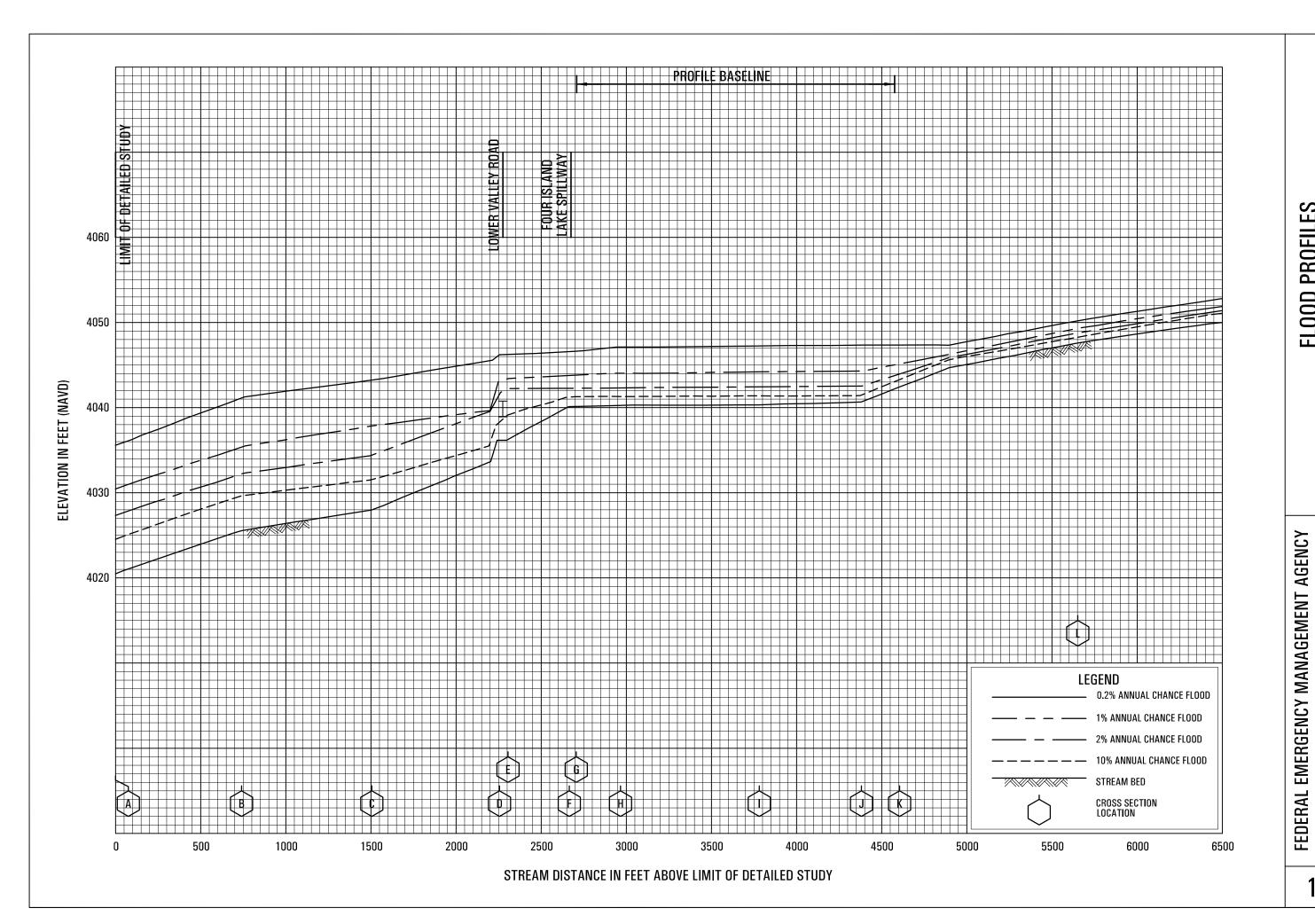
FEDERAL EMERGENCY MANAGEMENT AGENCY
KERN COUNTY, CA
AND INCORPORATED AREAS



AND INCORPORATED AREAS

KERN COUNTY, CA

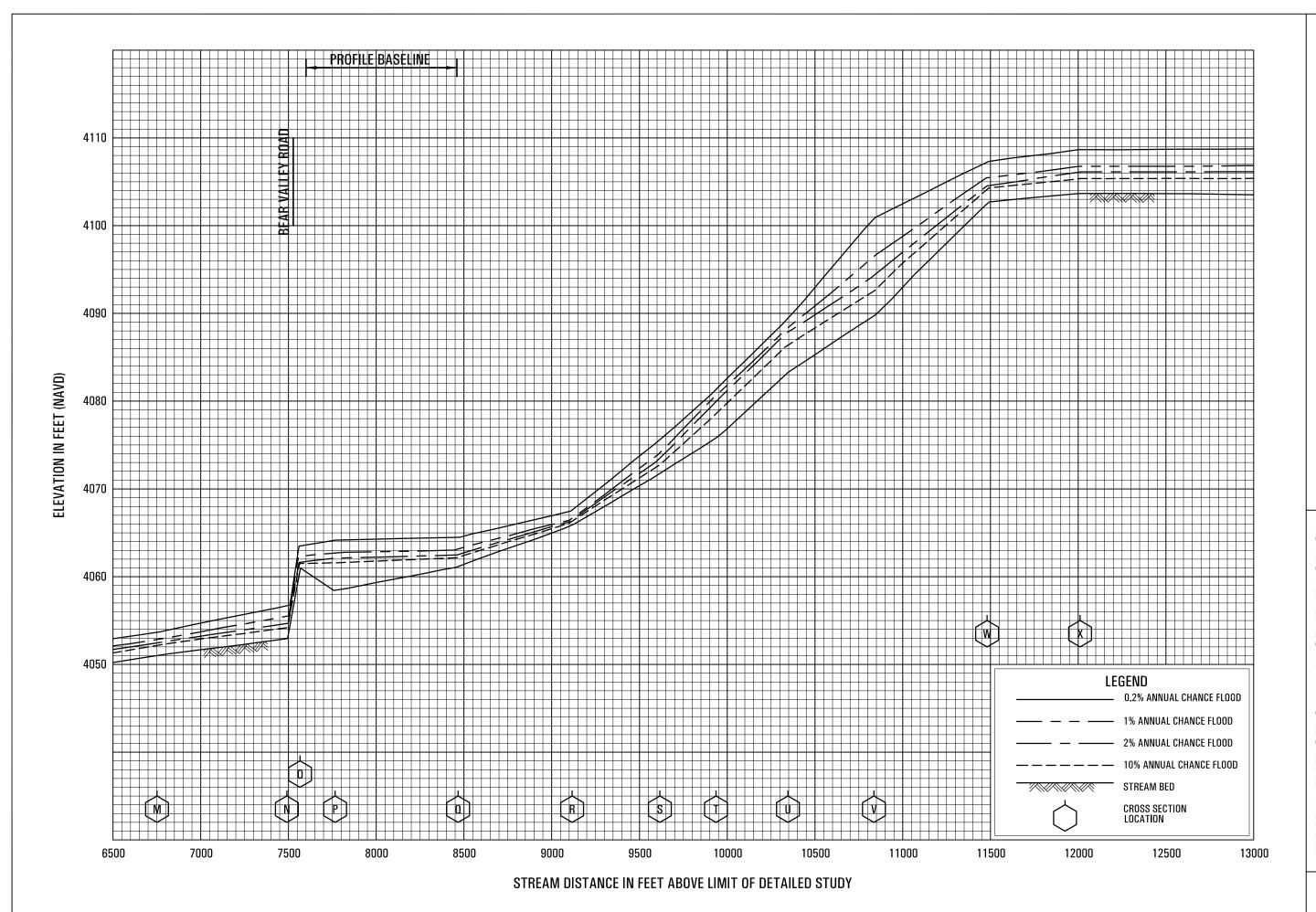
TIERRA DEL SOL CREEK



**UPPER SYCAMORE CREEK** 

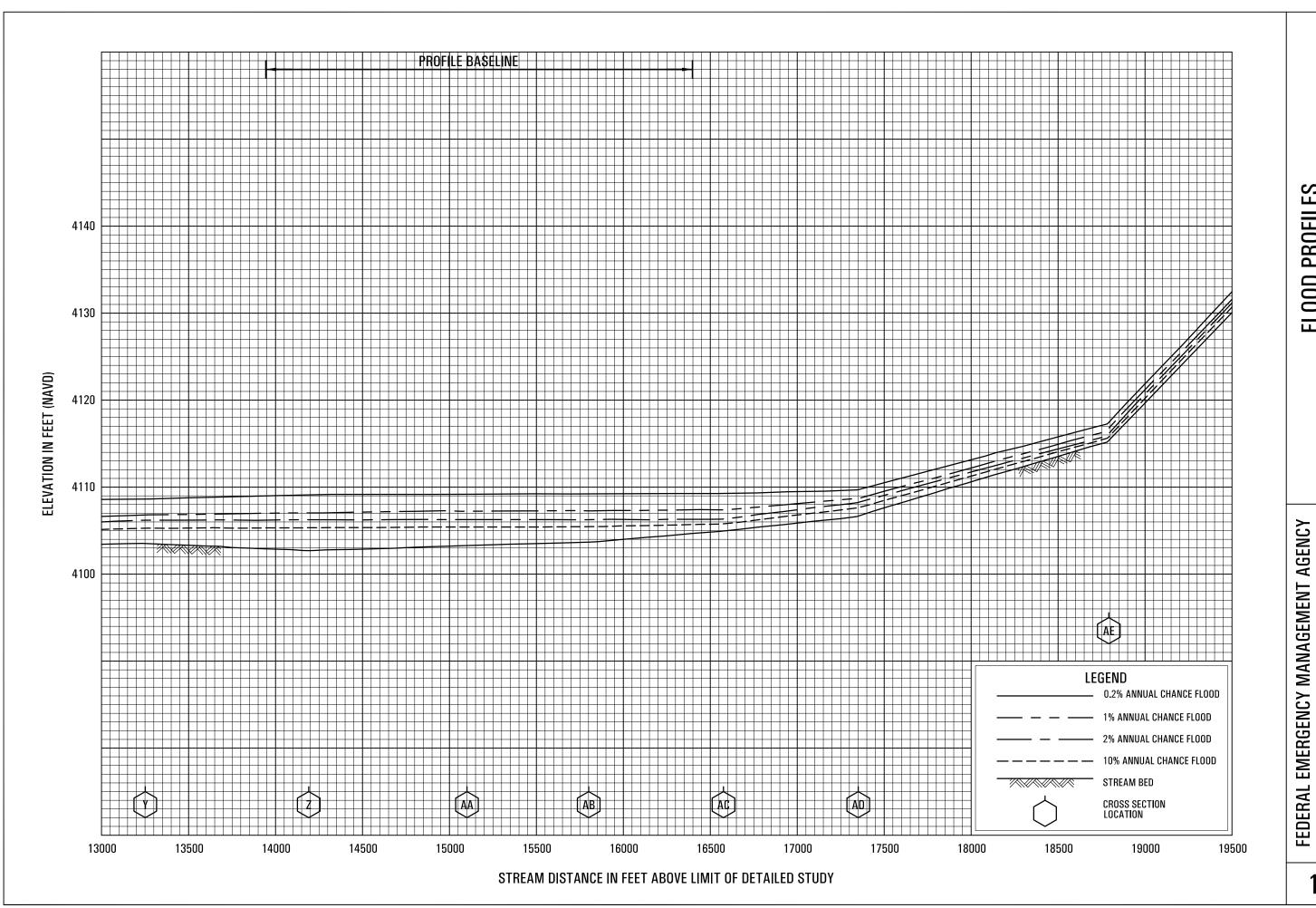
AND INCORPORATED AREAS

KERN COUNTY, CA



UPPER SYCAMORE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
KERN COUNTY, CA
AND INCORPORATED AREAS

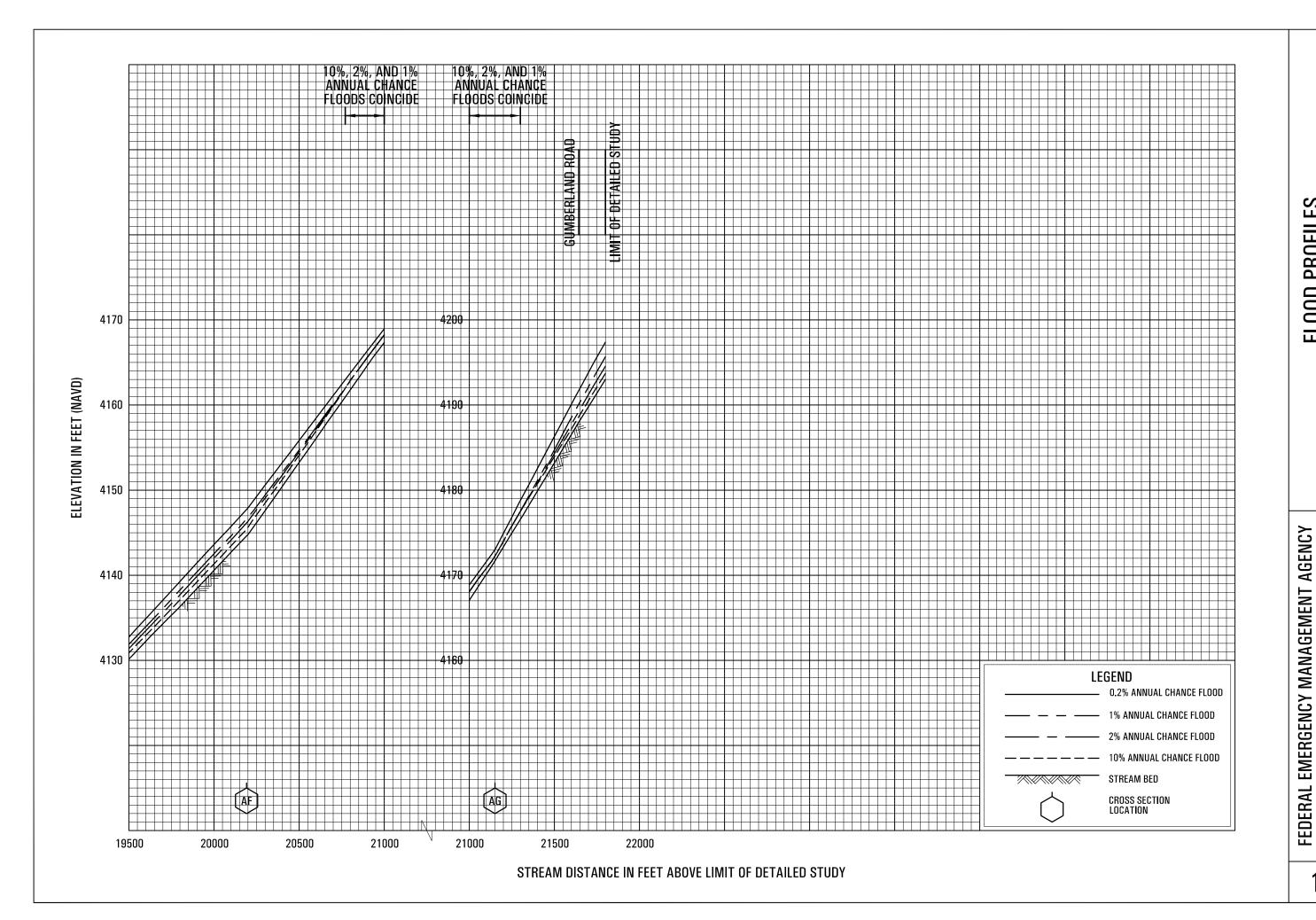


UPPER SYCAMORE CREEK

188P

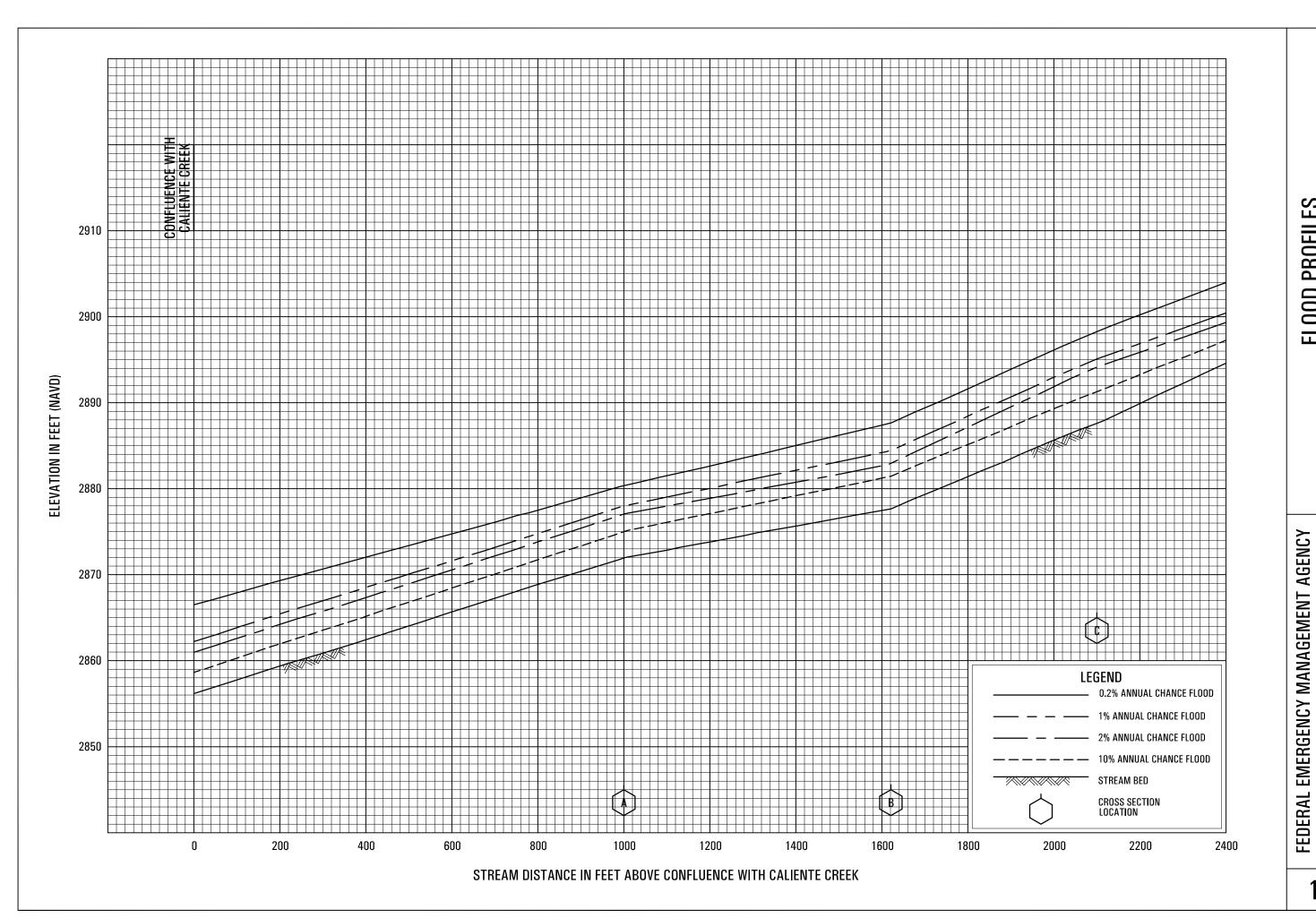
AND INCORPORATED AREAS

KERN COUNTY, CA



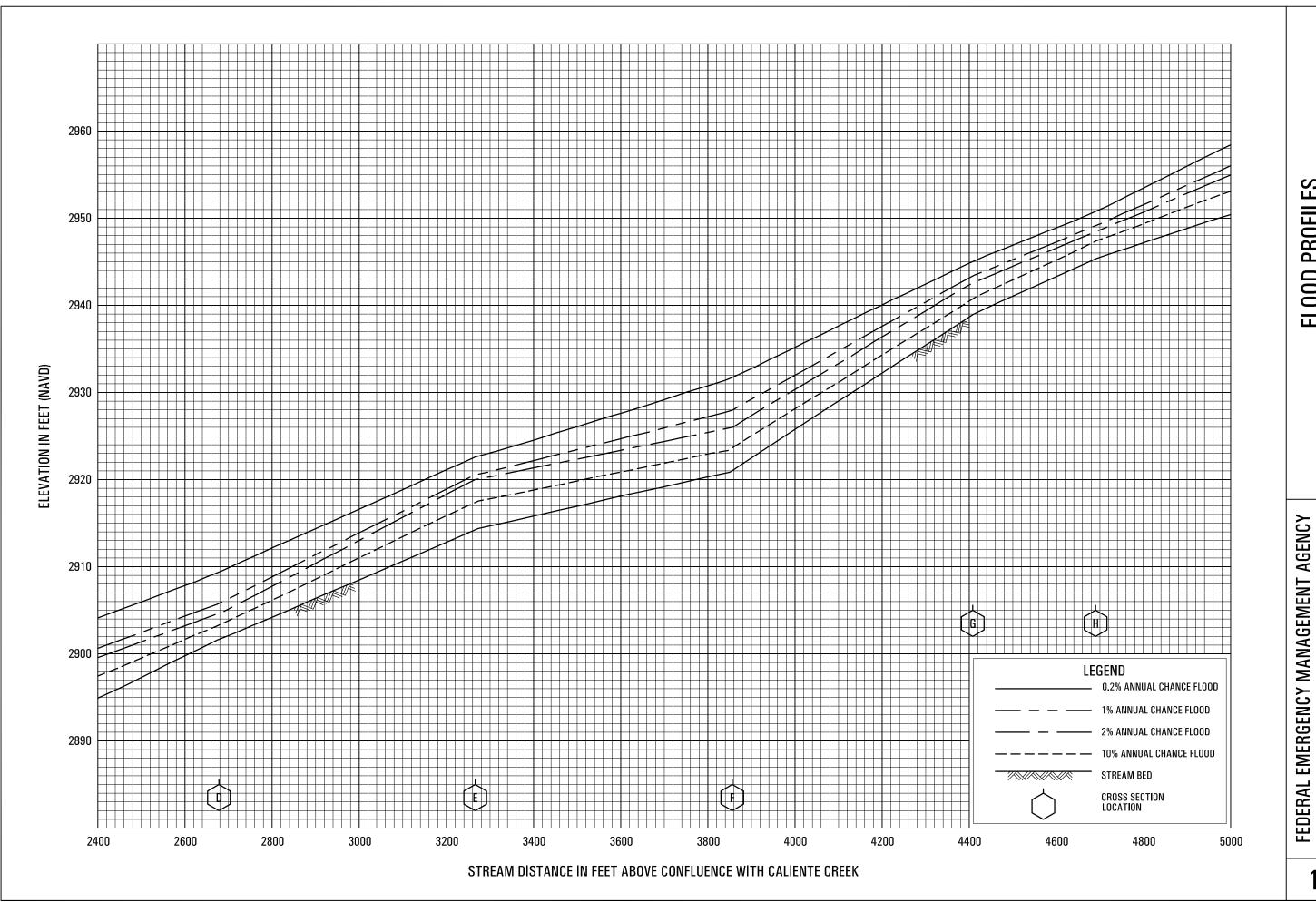
**UPPER SYCAMORE CREEK** 

AND INCORPORATED AREAS KERN COUNTY, CA



**WEAVER CREEK** 

AND INCORPORATED AREAS KERN COUNTY, CA

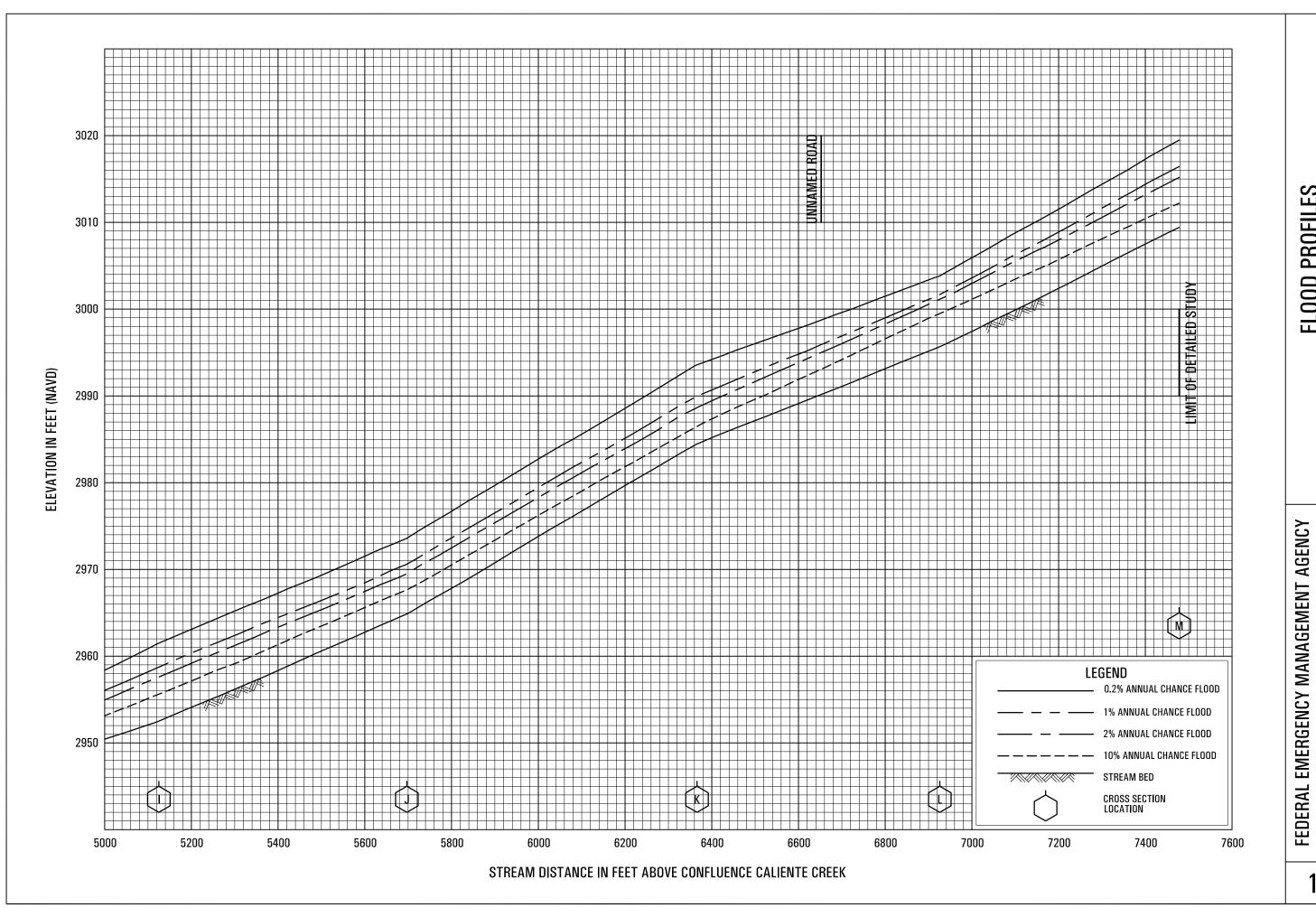


**WEAVER CREEK** 

191P

AND INCORPORATED AREAS

KERN COUNTY, CA



**WEAVER CREEK** 

192P

AND INCORPORATED AREAS

KERN COUNTY, CA