

FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 1



ALPINE COUNTY, CALIFORNIA UNINCORPORATED AREAS

COMMUNITY NAME	NUMBER
ALPINE COUNTY, UNINCORPORATED AREAS	060632

TRIBAL NATION**
WASHOE TRIBE OF NEVADA AND CALIFORNIA*

*No Special Flood Hazard Areas

**Federally Recognized Tribal Nations



FEMA

PRELIMINARY
4/28/2022

EFFECTIVE:

TBD

FLOOD INSURANCE STUDY NUMBER

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TABLE OF CONTENTS

Volume 1

	<u>Page</u>
SECTION 1.0 – INTRODUCTION	1
1.1 The National Flood Insurance Program	1
1.2 Purpose of this Flood Insurance Study Report	2
1.3 Jurisdictions Included in the Flood Insurance Study Project	2
1.4 Considerations for using this Flood Insurance Study Report	4
SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS	13
2.1 Floodplain Boundaries	13
2.2 Floodways	16
2.3 Base Flood Elevations	17
2.4 Non-Encroachment Zones	17
2.5 Coastal Flood Hazard Areas	17
2.5.1 Water Elevations and the Effects of Waves	17
2.5.2 Floodplain Boundaries and BFEs for Coastal Areas	18
2.5.3 Coastal High Hazard Areas	18
2.5.4 Limit of Moderate Wave Action	18
SECTION 3.0 – INSURANCE APPLICATIONS	18
3.1 National Flood Insurance Program Insurance Zones	18
SECTION 4.0 – AREA STUDIED	18
4.1 Basin Description	18
4.2 Principal Flood Problems	19
4.3 Dams and Other Flood Hazard Reduction Measures	20
4.4 Levee Systems	20
SECTION 5.0 – ENGINEERING METHODS	20
5.1 Hydrologic Analyses	21
5.2 Hydraulic Analyses	23
5.3 Coastal Analyses	26
5.3.1 Total Stillwater Elevations	26
5.3.2 Waves	26
5.3.3 Coastal Erosion	26
5.3.4 Wave Hazard Analyses	26
5.4 Alluvial Fan Analyses	27
SECTION 6.0 – MAPPING METHODS	27
6.1 Vertical and Horizontal Control	27
6.2 Base Map	28
6.3 Floodplain and Floodway Delineation	29
6.4 Coastal Flood Hazard Mapping	33
6.5 FIRM Revisions	33

6.5.1	Letters of Map Amendment	33
6.5.2	Letters of Map Revision Based on Fill	33
6.5.3	Letters of Map Revision	34
6.5.4	Physical Map Revisions	34
6.5.5	Contracted Restudies	35
6.5.6	Community Map History	35
SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION		36
7.1	Contracted Studies	36
7.2	Community Meetings	37
SECTION 8.0 – ADDITIONAL INFORMATION		37
SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES		38

Figures

	<u>Page</u>
Figure 1: FIRM Index	5
Figure 2: FIRM Notes to Users	6
Figure 3: Map Legend for FIRM	9
Figure 4: Floodway Schematic	16
Figure 5: Wave Runup Transect Schematic	17
Figure 6: Coastal Transect Schematic	18
Figure 7: Frequency Discharge-Drainage Area Curves	22
Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas	26
Figure 9: Transect Location Map	27

Tables

	<u>Page</u>
Table 1: Listing of NFIP Jurisdictions	3
Table 2: Flooding Sources Included in this FIS Report	14
Table 3: Flood Zone Designations by Community	18
Table 4: Basin Characteristics	19
Table 5: Principal Flood Problems	19
Table 6: Historic Flooding Elevations	20
Table 7: Dams and Other Flood Hazard Reduction Measures	20
Table 8: Levee Systems	20
Table 9: Summary of Discharges	22
Table 10: Summary of Non-Coastal Stillwater Elevations	23
Table 11: Stream Gage Information used to Determine Discharges	23
Table 12: Summary of Hydrologic and Hydraulic Analyses	24
Table 13: Roughness Coefficients	26
Table 14: Summary of Coastal Analyses	26

Table 15: Tide Gage Analysis Specifics	26
Table 16: Coastal Transect Parameters	27
Table 17: Summary of Alluvial Fan Analyses	27
Table 18: Results of Alluvial Fan Analyses	27
Table 19: Countywide Vertical Datum Conversion	28
Table 20: Stream-Based Vertical Datum Conversion	28
Table 21: Base Map Sources	28
Table 22: Summary of Topographic Elevation Data used in Mapping	29
Table 23: Floodway Data	31
Table 24: Flood Hazard and Non-Encroachment Data for Selected Streams	33
Table 25: Summary of Coastal Transect Mapping Considerations	33
Table 26: Incorporated Letters of Map Change	34
Table 27: Community Map History	36
Table 28: Summary of Contracted Studies Included in this FIS Report	36
Table 29: Community Meetings	37
Table 30: Map Repositories	37
Table 31: Additional Information	38
Table 32: Bibliography and References	39

Volume 1

Exhibits

Flood Profiles	<u>Panel</u>
Bear Creek	01-07 P
Bloods Creek	08-16 P
West Fork Carson River	17-37 P

Published Separately

Flood Insurance Rate Map (FIRM)

FLOOD INSURANCE STUDY REPORT ALPINE COUNTY, CALIFORNIA

SECTION 1.0 – INTRODUCTION

1.1 The National Flood Insurance Program

The National Flood Insurance Program (NFIP) is a voluntary Federal program that enables property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

For decades, the national response to flood disasters was generally limited to constructing flood-control works such as dams, levees, sea-walls, and the like, and providing disaster relief to flood victims. This approach did not reduce losses nor did it discourage unwise development. In some instances, it may have actually encouraged additional development. To compound the problem, the public generally could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

In the face of mounting flood losses and escalating costs of disaster relief to the general taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances, and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for the protection.

The U.S. Congress established the NFIP on August 1, 1968, with the passage of the National Flood Insurance Act of 1968. The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973 and other legislative measures. It was further modified by the National Flood Insurance Reform Act of 1994 and the Flood Insurance Reform Act of 2004. The NFIP is administered by the Federal Emergency Management Agency (FEMA), which is a component of the Department of Homeland Security (DHS).

Participation in the NFIP is based on an agreement between local communities and the Federal Government. If a community adopts and enforces floodplain management regulations to reduce future flood risks to new construction and substantially improved structures in Special Flood Hazard Areas (SFHAs), the Federal Government will make flood insurance available within the community as a financial protection against flood losses. The community's floodplain management regulations must meet or exceed criteria established in accordance with Title 44 Code of Federal Regulations (CFR) Part 60, *Criteria for Land Management and Use*.

SFHAs are delineated on the community's Flood Insurance Rate Maps (FIRMs). Under the NFIP, buildings that were built before the flood hazard was identified on the community's FIRMs are generally referred to as "Pre-FIRM" buildings. When the NFIP was created, the U.S. Congress recognized that insurance for Pre-FIRM buildings would be prohibitively expensive if the premiums were not subsidized by the Federal Government. Congress also recognized that most of these floodprone buildings were built

by individuals who did not have sufficient knowledge of the flood hazard to make informed decisions. The NFIP requires that full actuarial rates reflecting the complete flood risk be charged on all buildings constructed or substantially improved on or after the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later. These buildings are generally referred to as “Post-FIRM” buildings.

1.2 Purpose of this Flood Insurance Study Report

This Flood Insurance Study (FIS) Report revises and updates information on the existence and severity of flood hazards for the study area. The studies described in this report developed flood hazard data that will be used to establish actuarial flood insurance rates and to assist communities in efforts to implement sound floodplain management.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive than the minimum Federal requirements. Contact your State NFIP Coordinator to ensure that any higher State standards are included in the community’s regulations.

1.3 Jurisdictions Included in the Flood Insurance Study Project

This FIS Report covers the entire geographic area of Alpine County, CA.

The jurisdictions that are included in this project area, along with the Community Identification Number (CID) for each community and the United States Geological Survey (USGS) 8-digit Hydrologic Unit Code (HUC-8) sub-basins affecting each, are shown in Table 1. The FIRM panel numbers that affect each community are listed. If the flood hazard data for the community is not included in this FIS Report, the location of that data is identified.

Table 1: Listing of NFIP Jurisdictions

Community/Tribal Nation	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Alpine County, Unincorporated Areas	060632	16050101, 16050201, 16050302, 18020129, 18040010, 18040012	06003C0025B ² , 06003C0050B ² , 06003C0075B ² , 06003C0100B ² , 06003C0109B, 06003C0116B, 06003C0117B, 06003C0120B ² , 06003C0125B ² , 06003C0150B ² , 06003C0175B ² , 06003C0200B ² , 06003C0225B ² , 06003C0250B ² , 06003C0275B ² , 06003C0300B ² , 06003C0325B ² , 06003C0350B ² , 06003C0375B ² , 06003C0400B ² , 06003C0402B ² , 06003C0404B, 06003C0406B, 06003C0407B, 06003C0408B, 06003C0409B, 06003C0417B ² , 06003C0426B, 06003C0430B ² , 06003C0450B ² , 06003C0475B ² , 06003C0500B ² , 06003C0525B ² , 06003C0550B ² , 06003C0575B ² , 06003C0600B ² , 06003C0625B ²	
Washoe Tribe of Nevada and California ¹	N/A	16050201	06003C0116B, 06003C0117B, 06003C0125B ² , 06003C0150B ²	

¹ No Special Flood Hazard Areas Identified

² Panel Not Printed

1.4 Considerations for using this Flood Insurance Study Report

The NFIP encourages State and local governments to implement sound floodplain management programs. To assist in this endeavor, each FIS Report provides floodplain data, which may include a combination of the following: 10-, 4-, 2-, 1-, and 0.2-percent annual chance flood elevations (the 1-percent-annual-chance flood elevation is also referred to as the Base Flood Elevation (BFE)); delineations of the 1-percent-annual-chance and 0.2-percent-annual-chance floodplains; and 1-percent-annual-chance floodway. This information is presented on the FIRM and/or in many components of the FIS Report, including Flood Profiles, Floodway Data tables, Summary of Non-Coastal Stillwater Elevations tables, and Coastal Transect Parameters tables (not all components may be provided for a specific FIS).

This section presents important considerations for using the information contained in this FIS Report and the FIRM, including changes in format and content. Figures 1, 2, and 3 present information that applies to using the FIRM with the FIS Report.

- Part or all of this FIS Report may be revised and republished at any time. In addition, part of this FIS Report may be revised by a Letter of Map Revision (LOMR), which does not involve republication or redistribution of the FIS Report. Refer to Section 6.5 of this FIS Report for information about the process to revise the FIS Report and/or FIRM.

It is, therefore, the responsibility of the user to consult with community officials by contacting the community repository to obtain the most current FIS Report components. Communities participating in the NFIP have established repositories of flood hazard data for floodplain management and flood insurance purposes. Community map repository addresses are provided in Table 30, "Map Repositories," within this FIS Report.

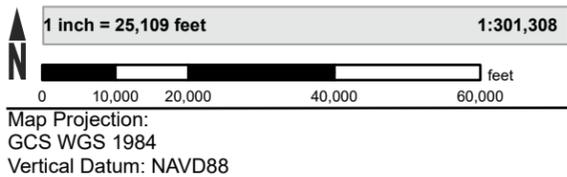
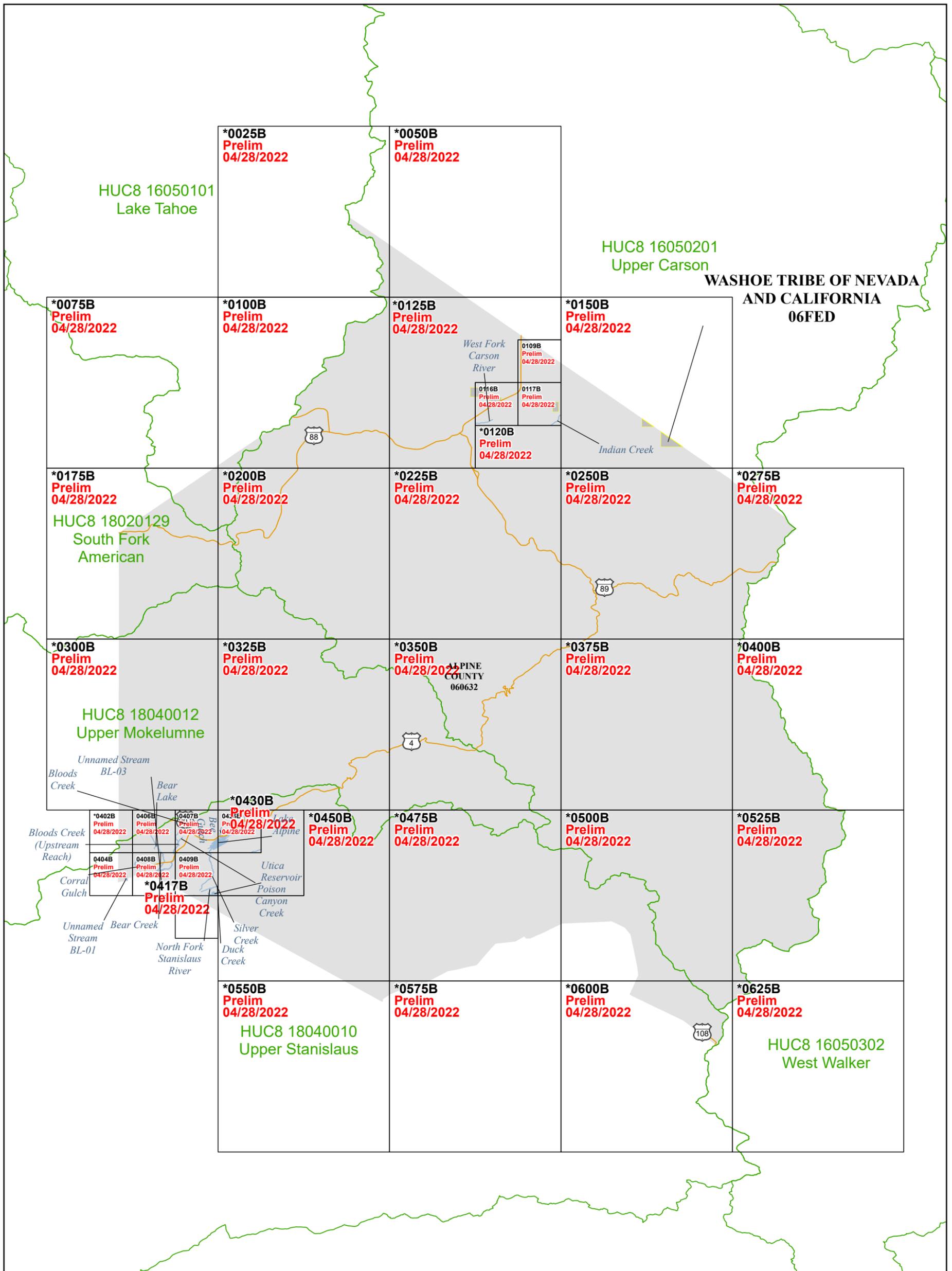
- New FIS Reports are frequently developed for multiple communities, such as entire counties. A countywide FIS Report incorporates previous FIS Reports for individual communities and the unincorporated area of the county (if not jurisdictional) into a single document and supersedes those documents for the purposes of the NFIP.

The initial Countywide FIS Report for Alpine County became effective on TBD. Refer to Table 27 for information about subsequent revisions to the FIRMs.

- FEMA has developed a *Guide to Flood Maps* (FEMA 258) and online tutorials to assist users in accessing the information contained on the FIRM. These include how to read panels and step-by-step instructions to obtain specific information. To obtain this guide and other assistance in using the FIRM, visit the FEMA Web site at www.fema.gov/flood-maps/tutorials.

The FIRM Index in Figure 1 shows the overall FIRM panel layout within Alpine County, and also displays the panel number and effective date for each FIRM panel in the county. Other information shown on the FIRM Index includes community boundaries, flooding sources, watershed boundaries, and USGS HUC-8 codes.

Figure 1: FIRM Index



THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTPS://MSC.FEMA.GOV](https://MSC.FEMA.GOV)

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

* PANEL NOT PRINTED - AREA IN ZONE D

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP INDEX

ALPINE COUNTY, CALIFORNIA Unincorporated Areas

PANELS PRINTED:

0109, 0116, 0117, 0404, 0406, 0407, 0408, 0409, 0426



FEMA

MAP NUMBER
06003CIND1B

EFFECTIVE DATE
Prelim Issue Date: 04/28/2022

Each FIRM panel may contain specific notes to the user that provide additional information regarding the flood hazard data shown on that map. However, the FIRM panel does not contain enough space to show all the notes that may be relevant in helping to better understand the information on the panel. Figure 2 contains the full list of these notes.

Figure 2: FIRM Notes to Users

<p style="text-align: center;">NOTES TO USERS</p> <p>For information and questions about this Flood Insurance Rate Map (FIRM), 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 Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at 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 Flood Map Service Center website or by calling the FEMA Mapping and Insurance eXchange.</p> <p>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 Flood Map Service Center at the number listed above.</p> <p>For community and countywide map dates, refer to Table 27 in this FIS Report.</p> <p>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.</p> <p>PRELIMINARY FIS REPORT: FEMA maintains information about map features, such as street locations and names, in or near designated flood hazard areas. Requests to revise information in or near designated flood hazard areas may be provided to FEMA during the community review period, at the final Consultation Coordination Officer's meeting, or during the statutory 90-day appeal period. Approved requests for changes will be shown on the final printed FIRM.</p>
<p>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.</p> <p>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 Non-Coastal Stillwater Elevations 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.</p>

Figure 2. FIRM Notes to Users

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 have reduced flood hazards due to flood control structures. Refer to Section 4.3 "Dams and Other Flood Hazard Reduction Measures" 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 State Plane Lambert Conformal Conic, California II Zone 0402. The horizontal datum was the North American Datum of 1983 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 www.ngs.noaa.gov.

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed in Table 30 of this FIS Report.

BASE MAP INFORMATION: Base map information shown on the FIRM was provided by Basemap information shown on this FIRM was provided in digital format by the United States Geological Survey (USGS) at a scale of 1:6,000. For information about base maps, refer to Section 6.2 "Base Map" in this FIS Report.

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 Alpine County, CA, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to Table 27 of this FIS Report 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.

ATTENTION: The corporate limits shown on this FIRM Index are based on the best information available at the time of publication. As such, they may be more current than those shown on FIRM panels issued before TBD.

Figure 2. FIRM Notes to Users

SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Notes to Users section was created specifically for Alpine County, CA, effective TBD.

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.

Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Alpine County.

Figure 3: Map Legend for FIRM

<p>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.</p>	
	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.

Figure 3: Map Legend for FIRM

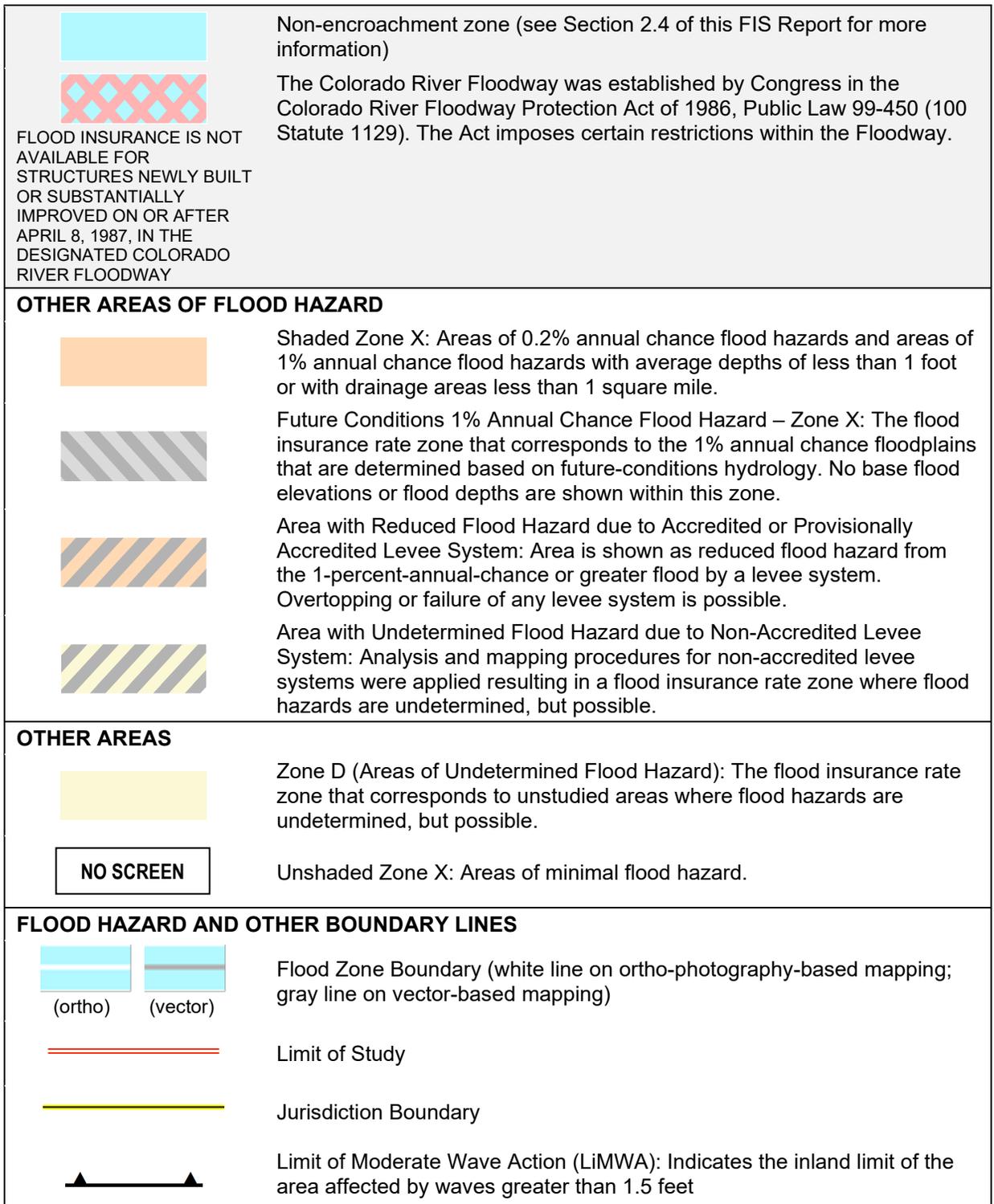


Figure 3: Map Legend for FIRM

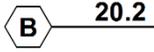
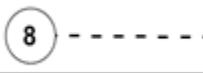
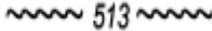
GENERAL STRUCTURES	
 <i>Aqueduct</i> <i>Channel</i> <i>Culvert</i> <i>Storm Sewer</i>	Channel, Culvert, Aqueduct, or Storm Sewer
 <i>Dam</i> <i>Jetty</i> <i>Weir</i>	Dam, Jetty, Weir
	Levee, Dike, or Floodwall
 <i>Bridge</i>	Bridge
REFERENCE MARKERS	
 22.0	River mile Markers
CROSS SECTION & TRANSECT INFORMATION	
	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
	Coastal Transect
 	<p>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.</p> <p>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.</p>
	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

Figure 3: Map Legend for FIRM

BASE MAP FEATURES	
 <i>Missouri Creek</i>	River, Stream or Other Hydrographic Feature
	Interstate Highway
	U.S. Highway
	State Highway
	County Highway
	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
	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
4276⁰⁰⁰mE	Horizontal Reference Grid Coordinates (UTM)
365000 FT	Horizontal Reference Grid Coordinates (State Plane)
80° 16' 52.5"	Corner Coordinates (Latitude, Longitude)

SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS

2.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance (500-year) flood is employed to indicate additional areas of flood hazard in the community.

Each flooding source included in the project scope has been studied and mapped using professional engineering and mapping methodologies that were agreed upon by FEMA and Alpine County as appropriate to the risk level. Flood risk is evaluated based on factors such as known flood hazards and projected impact on the built environment. Engineering analyses were performed for each studied flooding source to calculate its 1-percent-annual-chance flood elevations; elevations corresponding to other floods (e.g. 10-, 4-, 2-, 0.2-percent annual chance, etc.) may have also been computed for certain flooding sources. Engineering models and methods are described in detail in Section 5.0 of this FIS Report. The modeled elevations at cross sections were used to delineate the floodplain boundaries on the FIRM; between cross sections, the boundaries were interpolated using elevation data from various sources. More information on specific mapping methods is provided in Section 6.0 of this FIS Report.

Depending on the accuracy of available topographic data (Table 22), study methodologies employed (Section 5.0), and flood risk, certain flooding sources may be mapped to show both the 1-percent and 0.2-percent-annual-chance floodplain boundaries, regulatory water surface elevations (BFEs), and/or a regulatory floodway. Similarly, other flooding sources may be mapped to show only the 1-percent-annual-chance floodplain boundary on the FIRM, without published water surface elevations. In cases where the 1-percent and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM. Figure 3, “Map Legend for FIRM”, describes the flood zones that are used on the FIRMs to account for the varying levels of flood risk that exist along flooding sources within the project area. Table 2 and Table 3 indicate the flood zone designations for each flooding source and each community within Alpine County, respectively.

Table 2, “Flooding Sources Included in this FIS Report,” lists each flooding source, including its study limits, affected communities, mapped zone on the FIRM, and the completion date of its engineering analysis from which the flood elevations on the FIRM and in the FIS Report were derived. Descriptions and dates for the latest hydrologic and hydraulic analyses of the flooding sources are shown in Table 12. Floodplain boundaries for these flooding sources are shown on the FIRM (published separately) using the symbology described in Figure 3. On the map, the 1-percent-annual-chance floodplain corresponds to the SFHAs. The 0.2-percent-annual-chance floodplain shows areas that, although out of the regulatory floodplain, are still subject to flood hazards.

Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data. The procedures to remove these areas from the SFHA are described in Section 6.5 of this FIS Report.

Table 2: Flooding Sources Included in this FIS Report

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Bear Creek	Alpine County, Unincorporated Areas	At confluence with Bloods Creek	At Lake Reba Dam	18040010	1.7		Y	AE	2020
Bee Gulch	Alpine County, Unincorporated Areas	At confluence with Silver Creek	Approximately 2,500 ft upstream of Highway 4	18040010	0.7		N	A	2021
Bloods Creek	Alpine County, Unincorporated Areas	Approximately 1,650 feet downstream of confluence with Bear Creek	At Highway 4	18040010	2.0		Y	AE	2020
Bloods Creek (Upstream Reach)	Alpine County, Unincorporated Areas	At confluence with Highway 4	Approximately 3,600 feet downstream of Mt. Reba Rd	18040010	1.0		N	A	2021
Corral Gulch	Alpine County, Unincorporated Areas	At confluence with Bear Creek	Approximately 100 feet downstream of NF-7N35	18040010	1.6		N	A	2021
Poison Canyon Creek	Alpine County, Unincorporated Areas	At confluence with Bloods Creek (Upstream Reach)	Approximately 1,000 ft downstream of Highway 4	18040010	0.3		N	A	2021
Silver Creek	Alpine County, Unincorporated Areas	Downstream of Lake Alpine	Approximately 600 feet downstream of Highway 4	18040010	2.5		N	A	2021
Stream BI-01	Alpine County, Unincorporated Areas	At confluence with Bloods Creek (Downstream Creek)	Approximately 500 feet downstream of Alpine County Boundary	18040010	0.7		N	A	2021

Table 2: Flooding Sources Included in this FIS Report (Continued)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Stream BI-03	Alpine County, Unincorporated Areas	At confluence with Bloods Creek (Downstream Creek)	Approximately 70 feet upstream of Alpine County Boundary	18040010	0.01		N	A	2021
West Fork Carson River	Alpine County, Unincorporated Areas	At confluence with the east fork of Carson River	At National Forest	16050201	21.4		N	AE	2014

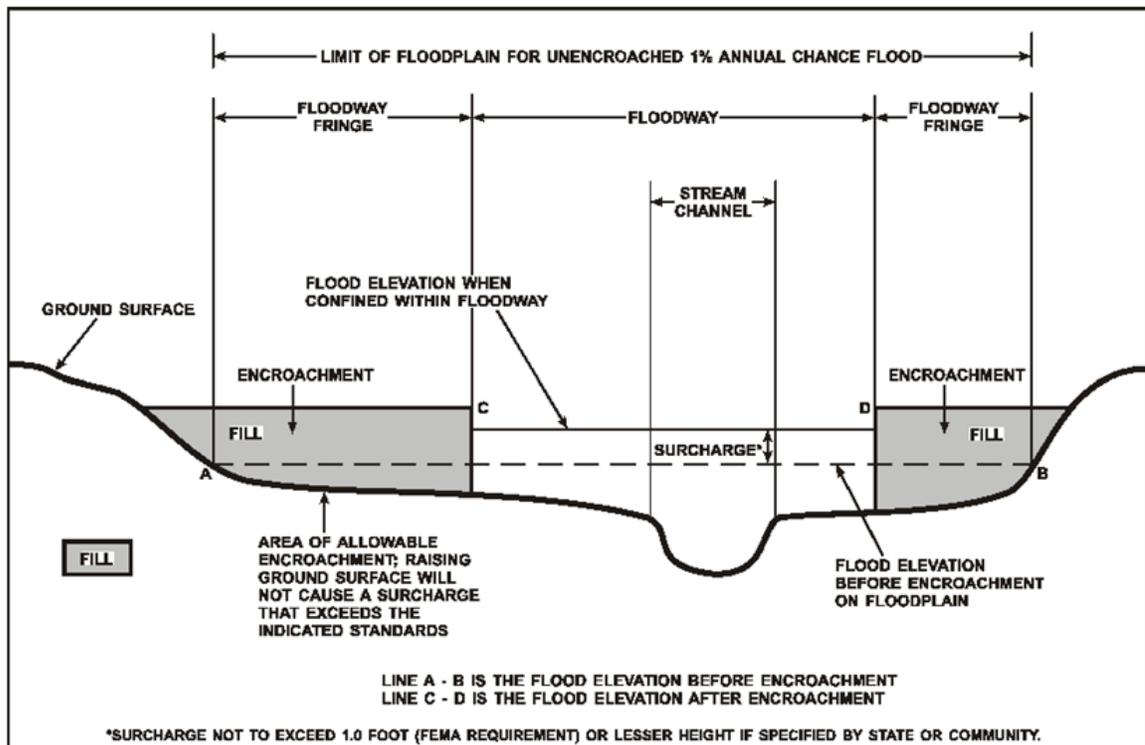
2.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard.

For purposes of the NFIP, a floodway is used as a tool to assist local communities in balancing floodplain development against increasing flood hazard. With this approach, the area of the 1-percent-annual-chance floodplain on a river is divided into a floodway and a floodway fringe based on hydraulic modeling. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order to carry the 1-percent-annual-chance flood. The floodway fringe is the area between the floodway and the 1-percent-annual-chance floodplain boundaries where encroachment is permitted. The floodway must be wide enough so that the floodway fringe could be completely obstructed without increasing the water surface elevation of the 1-percent-annual-chance flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.

To participate in the NFIP, Federal regulations require communities to limit increases caused by encroachment to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this project are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway projects.

Figure 4: Floodway Schematic



Floodway widths presented in this FIS Report and on the FIRM were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. For certain stream segments, floodways were adjusted so that the amount of floodwaters conveyed on each side of the floodplain would be reduced equally. The results of the floodway computations have been tabulated for selected cross sections and are shown in Table 23, "Floodway Data."

All floodways that were developed for this Flood Risk Project are shown on the FIRM using the symbology described in Figure 3. In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown on the FIRM. For information about the delineation of floodways on the FIRM, refer to Section 6.3.

2.3 Base Flood Elevations

The hydraulic characteristics of flooding sources were analyzed to provide estimates of the elevations of floods of the selected recurrence intervals. The BFE is the elevation of the 1-percent-annual-chance flood. These BFEs are most commonly rounded to the whole foot, as shown on the FIRM, but in certain circumstances or locations they may be rounded to 0.1 foot. Cross section lines shown on the FIRM may also be labeled with the BFE rounded to 0.1 foot. Whole-foot BFEs derived from engineering analyses that apply to coastal areas, areas of ponding, or other static areas with little elevation change may also be shown at selected intervals on the FIRM.

BFEs are primarily intended for flood insurance rating purposes. Cross sections with BFEs shown on the FIRM correspond to the cross sections shown in the Floodway Data table and Flood Profiles in this FIS Report. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. For example, the user may use the FIRM to determine the stream station of a location of interest and then use the profile to determine the 1-percent annual chance elevation at that location. Because only selected cross sections may be shown on the FIRM for riverine areas, the profile should be used to obtain the flood elevation between mapped cross sections. Additionally, for riverine areas, whole-foot elevations shown on the FIRM may not exactly reflect the elevations derived from the hydraulic analyses; therefore, elevations obtained from the profile may more accurately reflect the results of the hydraulic analysis.

2.4 Non-Encroachment Zones

This section is not applicable to this Flood Risk Project.

2.5 Coastal Flood Hazard Areas

This section is not applicable to this Flood Risk Project.

2.5.1 Water Elevations and the Effects of Waves

This section is not applicable to this Flood Risk Project.

Figure 5: Wave Runup Transect Schematic
[Not Applicable to this Flood Risk Project]

2.5.2 Floodplain Boundaries and BFEs for Coastal Areas

This section is not applicable to this Flood Risk Project.

2.5.3 Coastal High Hazard Areas

This section is not applicable to this Flood Risk Project.

Figure 6: Coastal Transect Schematic
[Not Applicable to this Flood Risk Project]

2.5.4 Limit of Moderate Wave Action

This section is not applicable to this Flood Risk Project.

SECTION 3.0 – INSURANCE APPLICATIONS

3.1 National Flood Insurance Program Insurance Zones

For flood insurance applications, the FIRM designates flood insurance rate zones as described in Figure 3, “Map Legend for FIRM.” Flood insurance zone designations are assigned to flooding sources based on the results of the hydraulic or coastal analyses. Insurance agents use the zones shown on the FIRM and depths and base flood elevations in this FIS Report in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

The 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (e.g. Zones A, AE, V, VE, etc.), and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of additional flood hazards.

Table 3 lists the flood insurance zones in Alpine County.

Table 3: Flood Zone Designations by Community

Community/Tribal Nation	Flood Zone(s)
Alpine County, Unincorporated Areas	A, AE, D, X
Washoe Tribe of Nevada and California	D, X

SECTION 4.0 – AREA STUDIED

4.1 Basin Description

Table 4 contains a description of the characteristics of the HUC-8 sub-basins within which each community falls. The table includes the main flooding sources within each basin, a

brief description of the basin, and its drainage area.

Table 4: Basin Characteristics

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (square miles)
Lake Tahoe	16050101	Lake Tahoe	Lake Tahoe basin covers a small northwestern portion of Alpine County.	507
South Fork American	18020129	South Fork American	Southwest Fork American basin covers a small western portion of Alpine County.	850
Upper Carson	16050201	Upper Carson	Upper Carson basin covers the majority of Alpine County, including the entirety of the northern and eastern borders.	958
Upper Mokelumne	18040012	Upper Mokelumne	Upper Mokelumne basin covers a western portion of Alpine County.	1,266
Upper Stanislaus	18040010	Upper Stanislaus	Upper Stanislaus basin covers Alpine County's entire southern border.	1,197
West Walker	16050302	West Walker	West Walker basin runs along the entire eastern border of Alpine County.	1,042

4.2 Principal Flood Problems

Table 5 contains a description of the principal flood problems that have been noted for Alpine County by flooding source.

Table 5: Principal Flood Problems

Flooding Source	Description of Flood Problems
Bear Creek and Bloods Creek	<p>There is typically flooding in Bear Valley during winter months (November to March) according to Cole Creek stream gage near Salt Springs Dam, CA. Specifically rain-on-snow flooding typically occurs between January and April, mostly in March. Contributing hydrological features in the area include snowmelt and exposed granite that prevents infiltration.</p> <p>There were unique flooding events in Bear Valley in 1997 and 2017. Snow created a new terrain for water to flow in these events. In 2017, this was a result of approximately 15 feet of snow already on the ground that buried, rather than clogged, culverts. Flooding paths were created by melting snow and did not necessarily follow Bear or Blood Creeks' creek beds.</p>

Table 6 contains information about historic flood elevations in the communities within Alpine County.

Table 6: Historic Flooding Elevations
[Not Applicable to this Flood Risk Project]

4.3 Dams and Other Flood Hazard Reduction Measures

Table 7 contains information about non-levee flood hazard reduction measures within Alpine County such as dams or jetties. Levee systems are addressed in Section 4.4 of this FIS Report.

Table 7: Dams and Other Flood Hazard Reduction Measures
[Not Applicable to this Flood Risk Project]

4.4 Levee Systems

This section is not applicable to this Flood Risk Project.

Table 8: Levee Systems
[Not Applicable to this Flood Risk Project]

SECTION 5.0 – ENGINEERING METHODS

For the flooding sources in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded at least once on the average during any 10-, 25-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 2-, 1-, and 0.2-percent-annual-chance, respectively, of being equaled or exceeded during any year.

Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

In addition to these flood events, the “1-percent-plus”, or “1%+”, annual chance flood elevation has been modeled and included on the flood profile for certain flooding sources in this FIS Report. While not used for regulatory or insurance purposes, this flood event has been calculated to help illustrate the variability range that exists between the regulatory 1-percent-annual-chance flood elevation and a 1-percent-annual-chance

elevation that has taken into account an additional amount of uncertainty in the flood discharges (thus, the 1% “plus”). For flooding sources whose discharges were estimated using regression equations, the 1%+ flood elevations are derived by taking the 1-percent-annual-chance flood discharges and increasing the modeled discharges by a percentage equal to the average predictive error for the regression equation. For flooding sources with gage- or rainfall-runoff-based discharge estimates, the upper 84-percent confidence limit of the discharges is used to compute the 1%+ flood elevations.

5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or methodologies may be applied. A summary of the hydrologic methods applied to develop the discharges used in the hydraulic analyses for each stream is provided in Table 12. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

A summary of the discharges is provided in Table 9. Stream gage information is provided in Table 11.

Table 9: Summary of Discharges

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Bear Creek	At confluence with Bloods Creek	3.2	409	661	915	1,218	2,140
Bear Creek	Approximately 0.4 mi downstream of Alpine State Hwy	1.7	238	387	537	718	1,267
Bear Creek	At Alpine State Hwy	1.2	178	291	405	541	959
Bear Creek	At Lake Reba Reservoir	0.8	118	194	271	363	647
Bloods Creek	Downstream most end of Bloods Creek	7.1	841	1,348	1,856	2,462	4,294
Bloods Creek	Just downstream of confluence with Bear Creek	6.4	768	1,232	1,698	2,253	3,934
Bloods Creek	Just upstream of confluence with Bear Creek	3.2	416	673	931	1,240	2,179
Bloods Creek	Approximately 0.5 mi downstream of HWY-4	2.7	354	574	796	1,061	1,867
Bloods Creek	At HWY-4	2.4	322	523	725	967	1,704
West Fork Carson River	At EFCR Garnerville Streamgaging Station (10309000)	356	7,181	*	15,780	21,350	40,970
West Fork Carson River	At EFCR Markleeville Streamgaging Station (10308200)	276	7,880	*	17,166	22,974	42,575
West Fork Carson River	At WFCR Woodfords Streamgaging Station (10310000)	65.4	2,289	*	5,124	6,985	13,630

*Not calculated for this Flood Risk Project

Figure 7: Frequency Discharge-Drainage Area Curves

[Not applicable to this Flood Risk Project]

Table 10: Summary of Non-Coastal Stillwater Elevations

[Not applicable to this Flood Risk Project]

Table 11: Stream Gage Information used to Determine Discharges

Flooding Source	Gage Identifier	Agency that Maintains Gage	Site Name	Drainage Area (Square Miles)	Period of Record	
					From	To
West Fork Carson River	10308200	USGS	E FK CARSON RV BLW MARKLEEVILLE CK NR MARKLEEVILLE	276	1/1/1961	1/1/2010
West Fork Carson River	10309000	USGS	E FK CARSON RV NR GARDNERVILLE, NV	356	1/1/1890	1/1/2010
West Fork Carson River	10310000	USGS	W FK CARSON RV AT WOODFORDS, CA	65.4	1/1/1890	1/1/2010

5.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Base flood elevations on the FIRM represent the elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations. These whole-foot elevations may not exactly reflect the elevations derived from the hydraulic analyses. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. The hydraulic analyses for this FIS were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

For streams for which hydraulic analyses were based on cross sections, locations of selected cross sections are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 6.3), selected cross sections are also listed in Table 23, "Floodway Data."

A summary of the methods used in hydraulic analyses performed for this project is provided in Table 12. Roughness coefficients are provided in Table 13. Roughness coefficients are values representing the frictional resistance water experiences when passing overland or through a channel. They are used in the calculations to determine water surface elevations. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

Table 12: Summary of Hydrologic and Hydraulic Analyses

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Bear Creek	At confluence with Bloods Creek	At Lake Reba Dam	Regression Equations	HEC-RAS 5.0 and up	12/10/2020	AE w/ Floodway	At the downstream end of Bear Creek, flow that exceeds the airport runway will leave the Bear Creek system and enter Bloods Creek. For the 1-percent-annual-chance-event, approximately 365 cfs leaves Bear Creek.
Bee Gulch	At confluence with Silver Creek	Approximately 2,500 ft upstream of Highway 4	Regression Equations	HEC-RAS 5.0 and up	2/28/2021	A	
Bloods Creek	Approximately 1,650 feet downstream of confluence with Bear Creek	At Highway 4	Regression Equations	HEC-RAS 5.0 and up	12/10/2020	AE w/ Floodway	At the downstream end of Bear Creek, flow that exceeds the airport runway that separates Bear Creek from Bloods Creek, will leave the Bear Creek system and enter Bloods Creek. For the 1-percent-annual-chance-event, approximately 365 cfs leaves Bear Creek and enters Bloods Creek.
Bloods Creek (Upstream Reach)	At confluence with Highway 4	Approximately 3,600 feet downstream of Mt. Reba Rd	Regression Equations	HEC-RAS 5.0 and up	2/28/2021	A	
Corral Gulch	At confluence with Bear Creek	Approximately 100 feet downstream of NF-7N35	Regression Equations	HEC-RAS 5.0 and up	2/28/2021	A	
Poison Canyon Creek	At confluence with Bloods Creek (Upstream Reach)	Approximately 1,000 ft downstream of Highway 4	Regression Equations	HEC-RAS 5.0 and up	2/28/2021	A	

Table 12: Summary of Hydrologic and Hydraulic Analyses (Continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Silver Creek	Downstream of Lake Alpine	Approximately 600 feet downstream of Highway 4	Regression Equations	HEC-RAS 5.0 and up	2/28/2021	A	
Stream BI-01	At confluence with Bloods Creek (Downstream Creek)	Approximately 500 feet downstream of Alpine County Boundary	Regression Equations	HEC-RAS 5.0 and up	2/28/2021	A	
Stream BI-03	At confluence with Bloods Creek (Downstream Creek)	Approximately 70 feet upstream of Alpine County Boundary	Regression Equations	HEC-RAS 5.0 and up	2/28/2021	A	
West Fork Carson River	At confluence with the east fork of Carson River	At National Forest	HEC-SSP 1.1 (April 2009) and up	HEC-RAS 3.1.1 and up	5/27/2014	AE	

Table 13: Roughness Coefficients

Flooding Source	Channel "n"	Overbank "n"
Bear Creek	0.035 - 0.080	0.020 - 0.120
Bee Gulch	0.013 - 0.120	0.013 - 0.120
Bloods Creek	0.020 - 0.120	0.020 - 0.120
Bloods Creek (Upstream Reach)	0.055 - 0.120	0.055 - 0.120
Corral Gulch	0.040 - 0.120	0.040 - 0.120
Poison Canyon Creek	0.120	0.120
Silver Creek	0.013 - 0.120	0.013 - 0.120
Stream BI-01	0.055 - 0.120	0.055 - 0.120
Stream BI-03	0.055 - 0.120	0.055 - 0.120
West Fork Carson River	0.040 - 0.050	0.040 - 0.063

5.3 Coastal Analyses

**Table 14: Summary of Coastal Analyses
[Not Applicable to this Flood Risk Project]**

5.3.1 Total Stillwater Elevations

This section is not applicable to this Flood Risk Project.

**Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas
[Not Applicable to this Flood Risk Project]**

**Table 15: Tide Gage Analysis Specifics
[Not Applicable to this Flood Risk Project]**

5.3.2 Waves

This section is not applicable to this Flood Risk Project.

5.3.3 Coastal Erosion

This section is not applicable to this Flood Risk Project.

5.3.4 Wave Hazard Analyses

This section is not applicable to this Flood Risk Project.

Table 16: Coastal Transect Parameters

[Not Applicable to this Flood Risk Project]

Figure 9: Transect Location Map

[Not applicable to this Flood Risk Project]

5.4 Alluvial Fan Analyses

This section is not applicable to this Flood Risk Project.

Table 17: Summary of Alluvial Fan Analyses

[Not applicable to this Flood Risk Project]

Table 18: Results of Alluvial Fan Analyses

[Not applicable to this Flood Risk Project]

SECTION 6.0 – MAPPING METHODS

6.1 Vertical and Horizontal Control

All FIS Reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS Reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the completion of the North American Vertical Datum of 1988 (NAVD88), many FIS Reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

Flood elevations shown in this FIS Report and on the FIRMs are referenced to NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between NGVD29 and NAVD88 or other datum conversion, visit the National Geodetic Survey website at www.ngs.noaa.gov.

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the archived project documentation associated with the FIS Report and the FIRMs for this community. Interested individuals may contact FEMA to access these data.

To obtain current elevation, description, and/or location information for benchmarks in the area, please visit the NGS website at www.ngs.noaa.gov.

The datum conversion locations and values that were calculated for Alpine County are provided in Table 19.

Table 19: Countywide Vertical Datum Conversion

[Not Applicable to this Flood Risk Project]

Table 20: Stream-Based Vertical Datum Conversion

[Not Applicable to this Flood Risk Project]

6.2 Base Map

The FIRMs and FIS Report for this project have been produced in a digital format. The flood hazard information was converted to a Geographic Information System (GIS) format that meets FEMA’s FIRM Database specifications and geographic information standards. This information is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community. The FIRM Database includes most of the tabular information contained in the FIS Report in such a way that the data can be associated with pertinent spatial features. For example, the information contained in the Floodway Data table and Flood Profiles can be linked to the cross sections that are shown on the FIRMs. Additional information about the FIRM Database and its contents can be found in FEMA’s *Guidelines and Standards for Flood Risk Analysis and Mapping*, www.fema.gov/flood-maps/guidance-partners/guidelines-standards.

Base map information shown on the FIRM was derived from the sources described in Table 21.

Table 21: Base Map Sources

Data Type	Data Provider	Data Date	Data Scale	Data Description
Alpine County Boundary	Alpine County, CA Planning Department	2019		County Boundary provided by Alpine Co. Planning Department (S_Pol_Ar)
American Indian Area Related Geodatabase	U.S. Census Bureau	2021		Tribal Block Group
California NHD: Streamlines, Water Areas and HUC8 Boundaries	U.S. Geological Survey, National Geospatial Program	2019	1:24,000	Streams, Rivers, Waterbodies and HUC8 Boundaries derived from NHD data (S_Wtr_Ln, S_Wtr_Ar, S_Subbasins)
California Public Land Survey System	California Department of Pesticide Regulation	2014		California Public Land Survey System (S_PLSS_Ar)

Table 21: Base Map Sources (Continued)

Data Type	Data Provider	Data Date	Data Scale	Data Description
Road Centerlines in Alpine County	Alpine County, CA Planning Department	2019		Street Centerlines provided by Alpine Co. Planning Department (S_Trnsport_Ln)
USGS National Map: Orthoimagery	U.S. Geological Survey	2020		Aerial Imagery for Alpine County, CA (S_Base_Index)

6.3 Floodplain and Floodway Delineation

The FIRM shows tints, screens, and symbols to indicate floodplains and floodways as well as the locations of selected cross sections used in the hydraulic analyses and floodway computations.

For riverine flooding sources, the mapped floodplain boundaries shown on the FIRM have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using the topographic elevation data described in Table 22.

In cases where the 1-percent and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

The floodway widths presented in this FIS Report and on the FIRM were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. Table 2 indicates the flooding sources for which floodways have been determined. The results of the floodway computations for those flooding sources have been tabulated for selected cross sections and are shown in Table 23, “Floodway Data.”

Table 22: Summary of Topographic Elevation Data used in Mapping

Community	Flooding Source	Source for Topographic Elevation Data			
		Description	Vertical Accuracy	Horizontal Accuracy	Citation
Alpine County, Unincorporated Areas	All Sources in HUC 18040010	2017 USGS LiDAR	NVA 0.46 ft (95% confidence interval), VVA 0.89 ft at 95th percentile on Bare Earth DEM	1.66 ft (95% confidence level)	NOAA, 2018
Alpine County, Unincorporated Areas	West Fork Carson River	2004 LiDAR collected by BAE Systems/Woolpert	N/A	N/A	HDR, 2014

BFEs shown at cross sections on the FIRM represent the 1-percent-annual-chance water surface elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report.

Table 23: Floodway Data

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	97	148	246	3.4	7,045.7	7,045.7	7,045.9	0.2
B	196	176	237	3.5	7,046.3	7,046.3	7,046.4	0.1
C	542	144	271	3.7	7,047.4	7,047.4	7,047.4	0.0
D	967	79	154	7.3	7,048.9	7,048.9	7,049.2	0.3
E	1,183	89	234	4.9	7,051.2	7,051.2	7,051.2	0.0
F	2,042	45	94	7.6	7,053.7	7,053.7	7,053.9	0.2
G	2,342	53	158	4.5	7,057.3	7,057.3	7,058.0	0.7
H	2,734	63	177	4.1	7,058.9	7,058.9	7,059.4	0.5
I	3,076	39	110	6.5	7,061.0	7,061.0	7,061.0	0.0
J	3,694	27	116	6.2	7,064.6	7,064.6	7,065.1	0.5
K	4,275	32	94	5.7	7,071.0	7,071.0	7,071.8	0.8
L	4,992	16	67	8.1	7,080.0	7,080.0	7,080.3	0.3
M	5,481	22	77	7	7,086.4	7,086.4	7,086.5	0.1
N	6,092	47	138	3.9	7,095.4	7,095.4	7,096.1	0.7
O	6,466	28	66	8.2	7,101.5	7,101.5	7,102.1	0.6
P	7,507	28	73	7.4	7,130.3	7,130.3	7,130.5	0.2
Q	8,340	20	90	6	7,155.8	7,155.8	7,156.7	0.9
R	8,773	32	118	4.6	7,171.3	7,171.3	7,172.2	0.9
S	8,840	12	48	11.2	7,178.5	7,178.5	7,178.8	0.3

¹Stream distance in feet above confluence with Bloods Creek

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALPINE COUNTY, CA

UNINCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: BEAR CREEK

Table 23: Floodway Data (Continued)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	543	70	343	7.2	7,024.5	7,024.5	7,025.4	0.9
B	1,076	98	392	6.3	7,037.0	7,037.0	7,037.1	0.1
C	1,497	239	663	3.7	7,043.5	7,043.5	7,044.4	0.9
D	2,326	211	606	2.7	7,047.8	7,047.8	7,048.2	0.4
E	3,876	170	484	2.6	7,052.4	7,052.4	7,053.2	0.8
F	4,557	131	305	4.3	7,054.2	7,054.2	7,054.6	0.4
G	5,374	148	418	3	7,057.3	7,057.3	7,058.3	1.0
H	6,695	121	257	4.8	7,061.6	7,061.6	7,061.8	0.2
I	8,139	96	350	3	7,071.5	7,071.5	7,072.5	1.0
J	8,355	50	256	4.1	7,075.2	7,075.2	7,075.9	0.7
K	9,011	40	328	3.2	7,082.3	7,082.3	7,082.9	0.6
L	9,312	35	174	6.1	7,093.9	7,093.9	7,094.7	0.8
M	9,641	60	327	3.2	7,100.6	7,100.6	7,101.2	0.6
N	10,368	66	380	2.8	7,106.3	7,106.3	7,106.9	0.6
O	10,628	64	234	4.5	7,107.4	7,107.4	7,108.3	0.9

¹Stream distance in feet above a point approximately 1,650 feet downstream of confluence with Bear Creek

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALPINE COUNTY, CA

UNINCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: BLOODS CREEK

**Table 24: Flood Hazard and Non-Encroachment Data for Selected Streams
[Not Applicable to this Flood Risk Project]**

6.4 Coastal Flood Hazard Mapping

This section is not applicable to this Flood Risk Project.

**Table 25: Summary of Coastal Transect Mapping Considerations
[Not Applicable to this Flood Risk Project]**

6.5 FIRM Revisions

This FIS Report and the FIRM are based on the most up-to-date information available to FEMA at the time of its publication; however, flood hazard conditions change over time. Communities or private parties may request flood map revisions at any time. Certain types of requests require submission of supporting data. FEMA may also initiate a revision. Revisions may take several forms, including Letters of Map Amendment (LOMAs), Letters of Map Revision Based on Fill (LOMR-Fs), Letters of Map Revision (LOMRs) (referred to collectively as Letters of Map Change (LOMCs)), Physical Map Revisions (PMRs), and FEMA-contracted restudies. These types of revisions are further described below. Some of these types of revisions do not result in the republishing of the FIS Report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data (shown in Table 30, “Map Repositories”).

6.5.1 Letters of Map Amendment

A LOMA is an official revision by letter to an effective NFIP map. A LOMA results from an administrative process that involves the review of scientific or technical data submitted by the owner or lessee of property who believes the property has incorrectly been included in a designated SFHA. A LOMA amends the currently effective FEMA map and establishes that a specific property is not located in a SFHA.

To obtain an application for a LOMA, visit www.fema.gov/flood-maps/change-your-flood-zone and download the form “MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill”. Visit the “Flood Map-Related Fees” section to determine the cost, if any, of applying for a LOMA.

FEMA offers a tutorial on how to apply for a LOMA. The LOMA Tutorial Series can be accessed at www.fema.gov/flood-maps/tutorials.

For more information about how to apply for a LOMA, call the FEMA Mapping and Insurance eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627).

6.5.2 Letters of Map Revision Based on Fill

A LOMR-F is an official revision by letter to an effective NFIP map. A LOMR-F states FEMA’s determination concerning whether a structure or parcel has been elevated on fill above the base flood elevation and is, therefore, excluded from the SFHA.

Information about obtaining an application for a LOMR-F can be obtained in the same manner as that for a LOMA, by visiting www.fema.gov/flood-maps/change-your-flood-zone for the “MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill” or by calling the FEMA Mapping and Insurance eXchange, toll free, at 1-877-FEMA MAP (1-877-336-2627). Fees for applying for a LOMR-F, if any, are listed in the “Flood Map-Related Fees” section.

A tutorial for LOMR-F is available at www.fema.gov/flood-maps/tutorials.

6.5.3 Letters of Map Revision

A LOMR is an official revision to the currently effective FEMA map. It is used to change flood zones, floodplain and floodway delineations, flood elevations and planimetric features. All requests for LOMRs should be made to FEMA through the chief executive officer of the community, since it is the community that must adopt any changes and revisions to the map. If the request for a LOMR is not submitted through the chief executive officer of the community, evidence must be submitted that the community has been notified of the request.

To obtain an application for a LOMR, visit www.fema.gov/flood-maps/change-your-flood-zone and download the form “MT-2 Application Forms and Instructions for Conditional Letters of Map Revision and Letters of Map Revision”. Visit the “Flood Map-Related Fees” section to determine the cost of applying for a LOMR. For more information about how to apply for a LOMR, call the FEMA Mapping and Insurance eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627) to speak to a Map Specialist.

Previously issued mappable LOMCs (including LOMRs) that have been incorporated into the Alpine County FIRM are listed in Table 26.

**Table 26: Incorporated Letters of Map Change
[Not Applicable to this Flood Risk Project]**

6.5.4 Physical Map Revisions

A Physical Map Revisions (PMR) is an official republication of a community’s NFIP map to effect changes to base flood elevations, floodplain boundary delineations, regulatory floodways and planimetric features. These changes typically occur as a result of structural works or improvements, annexations resulting in additional flood hazard areas or correction to base flood elevations or SFHAs.

The community’s chief executive officer must submit scientific and technical data to FEMA to support the request for a PMR. The data will be analyzed and the map will be revised if warranted. The community is provided with copies of the revised information and is afforded a review period. When the base flood elevations are changed, a 90-day appeal period is provided. A 6-month adoption period for formal approval of the revised map(s) is also provided.

For more information about the PMR process, please visit www.fema.gov and visit the Floods & Maps “Change Your Flood Zone Designation” section.

6.5.5 Contracted Restudies

The NFIP provides for a periodic review and restudy of flood hazards within a given community. FEMA accomplishes this through a national watershed-based mapping needs assessment strategy, known as the Coordinated Needs Management Strategy (CNMS). The CNMS is used by FEMA to assign priorities and allocate funding for new flood hazard analyses used to update the FIS Report and FIRM. The goal of CNMS is to define the validity of the engineering study data within a mapped inventory. The CNMS is used to track the assessment process, document engineering gaps and their resolution, and aid in prioritization for using flood risk as a key factor for areas identified for flood map updates. Visit www.fema.gov to learn more about the CNMS or contact the FEMA Regional Office listed in Section 8 of this FIS Report.

6.5.6 Community Map History

The current FIRM presents flooding information for the entire geographic area of Alpine County. Previously, separate FIRMs, Flood Hazard Boundary Maps (FHBM) and/or Flood Boundary and Floodway Maps (FBFM) may have been prepared for the incorporated communities and the unincorporated areas in the county that had identified SFHAs. Current and historical data relating to the maps prepared for the project area are presented in Table 27, "Community Map History." A description of each of the column headings and the source of the date is also listed below.

- *Community Name* includes communities falling within the geographic area shown on the FIRM, including those that fall on the boundary line, nonparticipating communities, and communities with maps that have been rescinded. Communities with No Special Flood Hazards are indicated by a footnote. If all maps (FHBM, FBFM, and FIRM) were rescinded for a community, it is not listed in this table unless SFHAs have been identified in this community.
- *Initial Identification Date (First NFIP Map Published)* is the date of the first NFIP map that identified flood hazards in the community. If the FHBM has been converted to a FIRM, the initial FHBM date is shown. If the community has never been mapped, the upcoming effective date or "pending" (for Preliminary FIS Reports) is shown. If the community is listed in Table 27 but not identified on the map, the community is treated as if it were unmapped.
- *Initial FHBM Effective Date* is the effective date of the first FHBM. This date may be the same date as the Initial NFIP Map Date.
- *FHBM Revision Date(s)* is the date(s) that the FHBM was revised, if applicable.
- *Initial FIRM Effective Date* is the date of the first effective FIRM for the community.
- *FIRM Revision Date(s)* is the date(s) the FIRM was revised, if applicable. This is the revised date that is shown on the FIRM panel, if applicable. As countywide studies are completed or revised, each community listed should have its FIRM dates updated accordingly to reflect the date of the countywide study. Once the FIRMs exist in countywide format, as PMRs of FIRM panels within the county are completed, the FIRM Revision Dates in the table for each community affected by the PMR are updated with the date of the PMR, even if the PMR did not revise all the panels within that community.

Table 27: Community Map History

Community Name	Initial Identification Date	Initial FHBM Effective Date	FHBM Revision Date(s)	Initial FIRM Effective Date	FIRM Revision Date(s)
Alpine County, Unincorporated Areas	11/19/1987	N/A	N/A	11/19/1987	TBD

SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION

7.1 Contracted Studies

Table 28 provides a summary of the contracted studies, by flooding source, that are included in this FIS Report.

Table 28: Summary of Contracted Studies Included in this FIS Report

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Bear Creek	TBD	STARR II	HSFE60-15-D-0005	December 2020	Alpine County, Unincorporated Areas
Bee Gulch	TBD	STARR II	HSFE60-15-D-0005	February 2021	Alpine County, Unincorporated Areas
Bloods Creek	TBD	STARR II	HSFE60-15-D-0005	December 2020	Alpine County, Unincorporated Areas
Bloods Creek (Upstream Reach)	TBD	STARR II	HSFE60-15-D-0005	February 2021	Alpine County, Unincorporated Areas
Corral Gulch	TBD	STARR II	HSFE60-15-D-0005	February 2021	Alpine County, Unincorporated Areas
Poison Canyon Creek	TBD	STARR II	HSFE60-15-D-0005	February 2021	Alpine County, Unincorporated Areas
Silver Creek	TBD	STARR II	HSFE60-15-D-0005	February 2021	Alpine County, Unincorporated Areas
Stream BL-01	TBD	STARR II	HSFE60-15-D-0005	February 2021	Alpine County, Unincorporated Areas
Stream BL-03	TBD	STARR II	HSFE60-15-D-0005	February 2021	Alpine County, Unincorporated Areas
West Fork Carson River	TBD	HDR Engineering, Inc.	CON0066912	May 2014	Alpine County, Unincorporated Areas

7.2 Community Meetings

The dates of the community meetings held for this Flood Risk Project and previous Flood Risk Projects are shown in Table 29. These meetings may have previously been referred to by a variety of names (Community Coordination Officer (CCO), Scoping, Discovery, etc.), but all meetings represent opportunities for FEMA, community officials, study contractors, and other invited guests to discuss the planning for and results of the project.

Table 29: Community Meetings

Community	FIS Report Dated	Date of Meeting	Meeting Type	Attended By
Alpine County, Unincorporated Areas	TBD	11/14/2019	Other	Representatives of Alpine County, Alpine County Board of Supervisors, Alpine County Community Development, Alpine Water Co, Bear Valley Fire Department, Bear Valley Water District, FEMA, STARR II
		6/30/2021	Flood Risk Review	Representatives of Alpine County Board of Supervisors, Alpine County Community Development, CWSD, DWR, FEMA, HDR, STARR II
		TBD	Final CCO	TBD

SECTION 8.0 – ADDITIONAL INFORMATION

Information concerning the pertinent data used in the preparation of this FIS Report can be obtained by submitting an order with any required payment to the FEMA Engineering Library. For more information on this process, see www.fema.gov.

Table 30 is a list of the locations where FIRMs for Alpine County can be viewed. Please note that the maps at these locations are for reference only and are not for distribution. Also, please note that only the maps for the community listed in the table are available at that particular repository. A user may need to visit another repository to view maps from an adjacent community.

Table 30: Map Repositories

Community	Address	City	State	Zip Code
Alpine County, Unincorporated Areas	Alpine County Public Works Community Development 50 Diamond Valley Road	Markleeville	CA	96120

The National Flood Hazard Layer (NFHL) dataset is a compilation of effective FIRM Databases and LOMCs. Together they create a GIS data layer for a State or Territory. The NFHL is updated as studies become effective and extracts are made available to the public monthly. NFHL data can be viewed or ordered from the website shown in Table 31.

Table 31 contains useful contact information regarding the FIS Report, the FIRM, and other relevant flood hazard and GIS data. In addition, information about the State NFIP

Coordinator and GIS Coordinator is shown in this table. At the request of FEMA, each Governor has designated an agency of State or territorial government to coordinate that State's or territory's NFIP activities. These agencies often assist communities in developing and adopting necessary floodplain management measures. State GIS Coordinators are knowledgeable about the availability and location of State and local GIS data in their state.

Table 31: Additional Information

FEMA and the NFIP	
FEMA and FEMA Engineering Library website	www.fema.gov/flood-maps/products-tools/know-your-risk/engineers-surveyors-architects
NFIP website	www.fema.gov/flood-insurance
NFHL Dataset	msc.fema.gov
FEMA Region IX	FEMA Regional Center IX 1111 Broadway, Suite 1200 Oakland, CA 94607 510-627-7181
Other Federal Agencies	
USGS website	www.usgs.gov
Hydraulic Engineering Center website	www.hec.usace.army.mil
State Agencies and Organizations	
State NFIP Coordinator	Kelly Soule State NFIP Coordinator Chief, Community Assistance & Risk Awareness Branch Office of Floodplain Management Division of Flood Management CA Department of Water Resources 3464 El Camino Ave, Suite 200 Sacramento, California 95821
State Floodplain Manager	Mike Mierzwa State Floodplain Manager CA Department of Water Resources 3464 El Camino Ave, Suite 200 Sacramento, California 95821
State GIS Coordinator	David Harris Agency Information Officer California Natural Resources Agency 1416 Ninth Street, Room 1311 Sacramento, CA 95814 916-445-5088 david.harris@resources.ca.gov

SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES

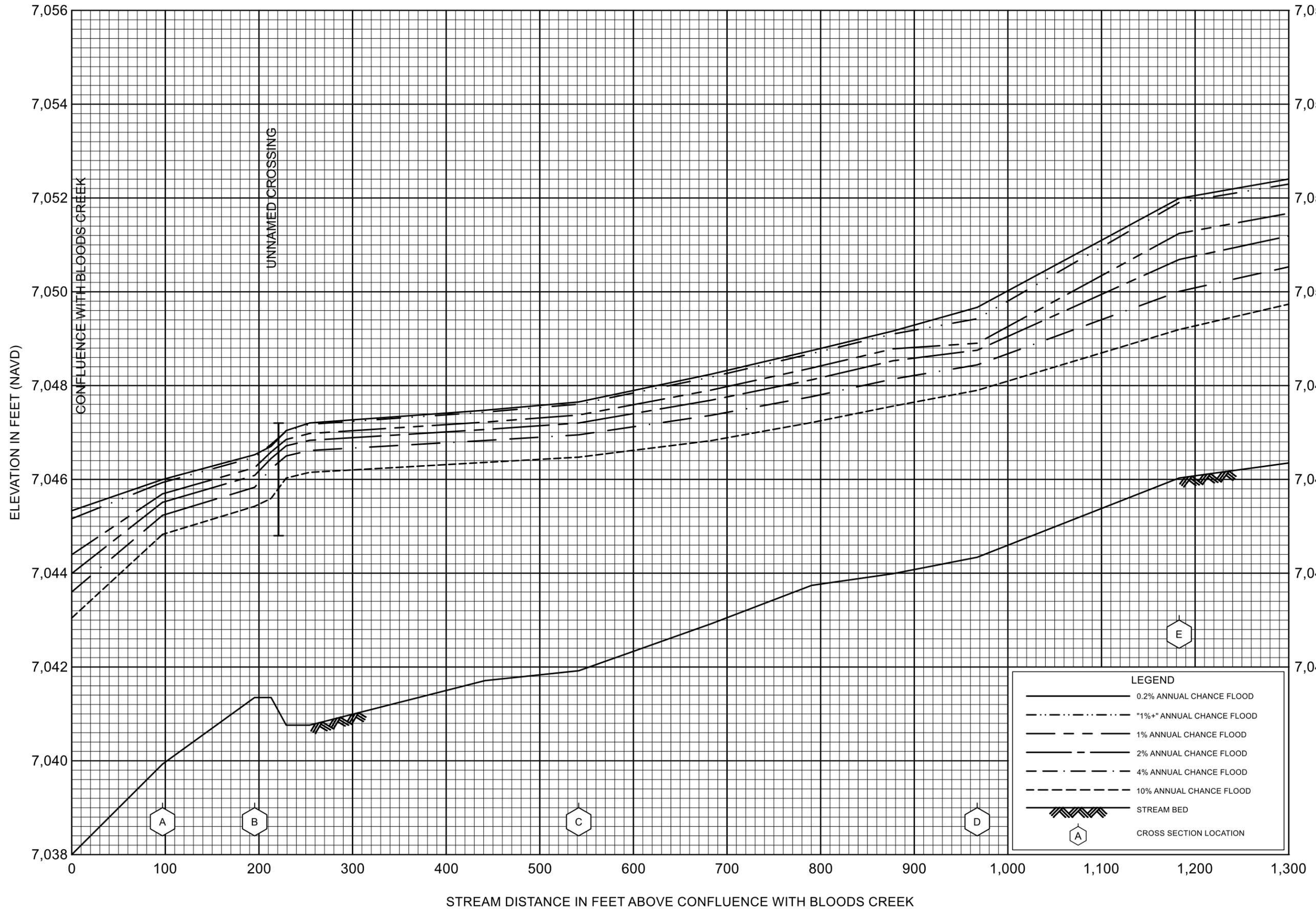
Table 32 includes sources used in the preparation of and cited in this FIS Report as well as additional studies that have been conducted in the study area.

Table 32: Bibliography and References

Citation in this FIS	Publisher/ Issuer	<i>Publication Title, "Article,"</i> Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
ACPD, 2019	Alpine County, CA Planning Department	Road Centerlines in Alpine County	Alpine County, CA Planning Department	Markleeville, CA	11/22/2019	https://www.alpinecountypca.gov/index.aspx?NID=165
CDPR, 2014	California Department of Pesticide Regulation	California Public Land Survey System	California Department of Pesticide Regulation	Sacramento, CA	7/23/2014	https://www.cdpr.ca.gov/docs/emon/grndwtr/gis_shapefiles.htm
CENSUS, 2021	U.S. Census Bureau	American Indian Area Related Geodatabase	U.S. Census Bureau	Suitland, MD	8/4/2021	https://www2.census.gov/geo/tiger/TGRGDB21/
HDR, 2014	Federal Emergency Management Agency	Flood Study for West Fork Carson River	HDR Engineering, Inc.	Carson City, NV	5/31/2014	
NOAA, 2018	NOAA Office for Coastal Management	2017 California FEMA R9 LiDAR	Dewberry	Charleston, SC	3/5/2018	https://coast.noaa.gov/htdata/lidar3_z/geoid18/data/8979/
STARR II, 2021a	Federal Emergency Management Agency	Alpine CA, Bear Valley FY19	STARRII	Chandler, AZ	NP	https://hazards.fema.gov/femaportal/wps/myportal
STARR II, 2021b	Federal Emergency Management Agency	Base Level Engineering, Alpine County, California	STARRII	Washington, D.C.	2/28/2021	
TEALE, 2019	Alpine County, CA Planning Department	Alpine County Boundary	Teale GIS Solutions Group	Oroville, CA	11/22/2019	

Table 32: Bibliography and References (Continued)

Citation in this FIS	Publisher/ Issuer	<i>Publication Title, "Article,"</i> Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USGS, 2020	U.S. Geological Survey	USGS National Map: Orthoimagery	U.S. Geological Survey		10/1/2020	
USGS, 2019	U.S. Geological Survey, National Geospatial Program	California NHD: Streamlines, Water Areas and HUC8 Boundaries	U.S. Geological Survey, National Geospatial Program	Reston, VA	10/18/2019	http://prd-tnm.s3-website-us-west-2.amazonaws.com/?prefix=StagedProducts/Hydrography/NHD/State/HighResolution/



FLOOD PROFILES

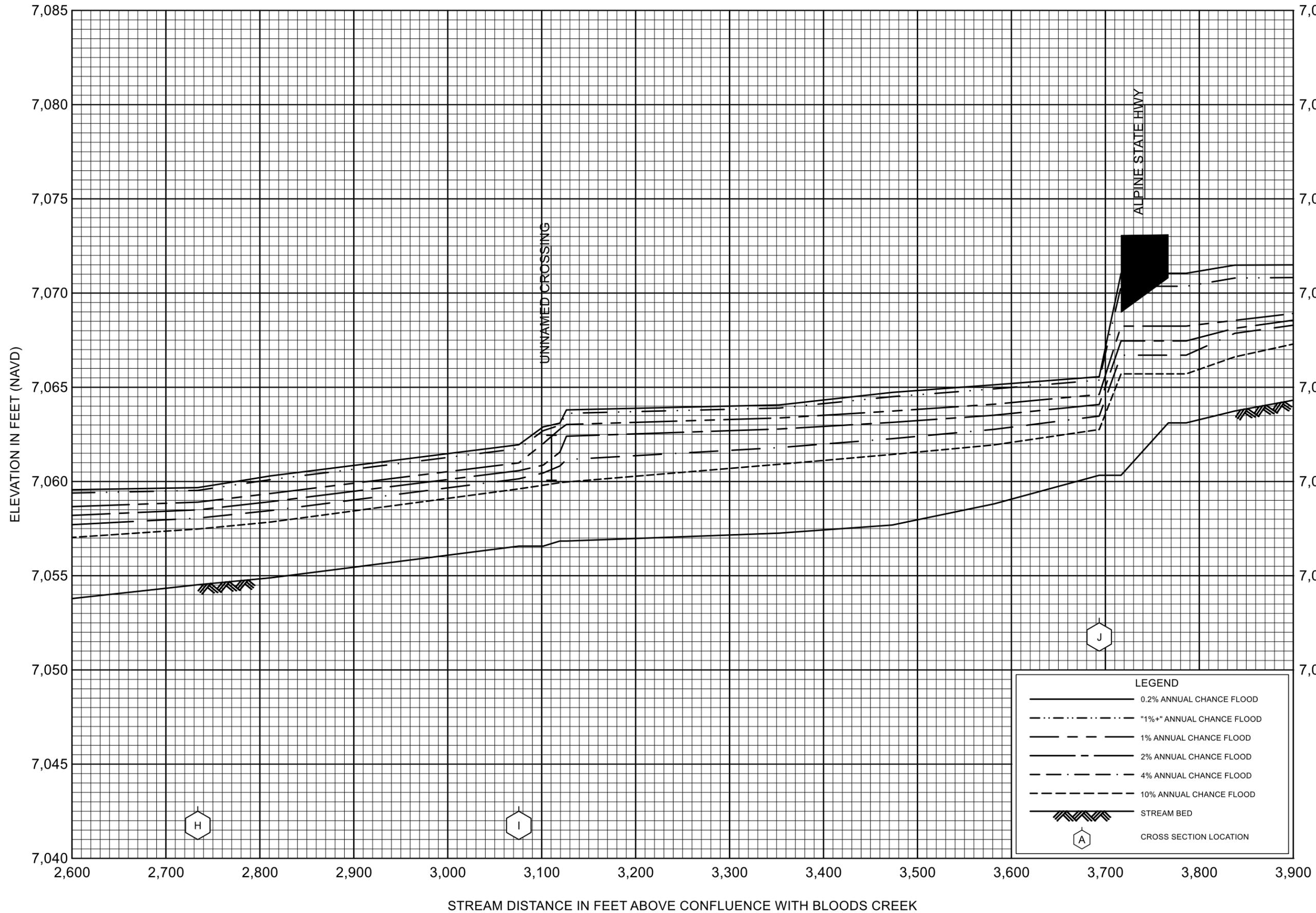
BEAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALPINE COUNTY, CA

UNINCORPORATED AREAS

01P



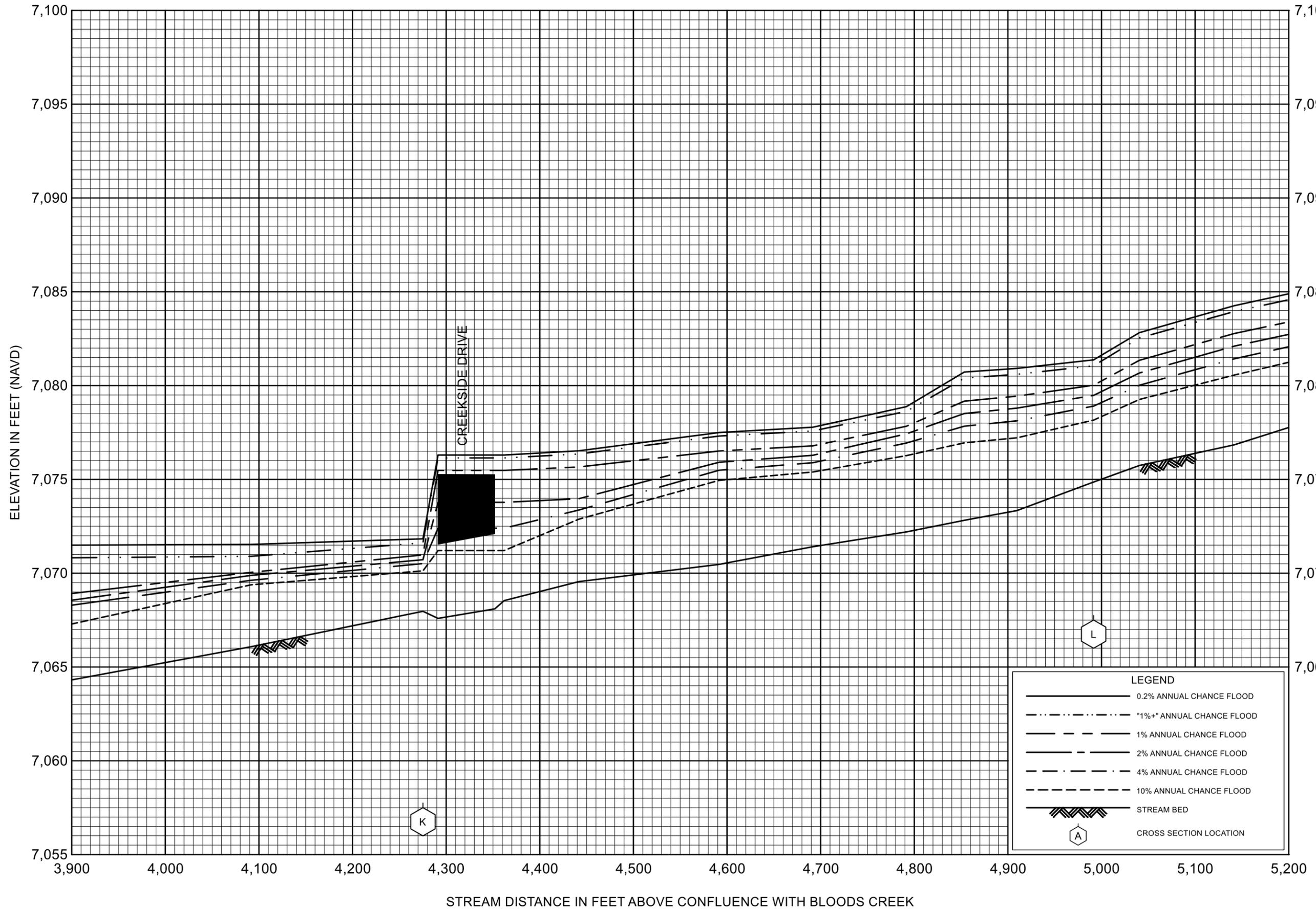
FLOOD PROFILES

BEAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALPINE COUNTY, CA

UNINCORPORATED AREAS



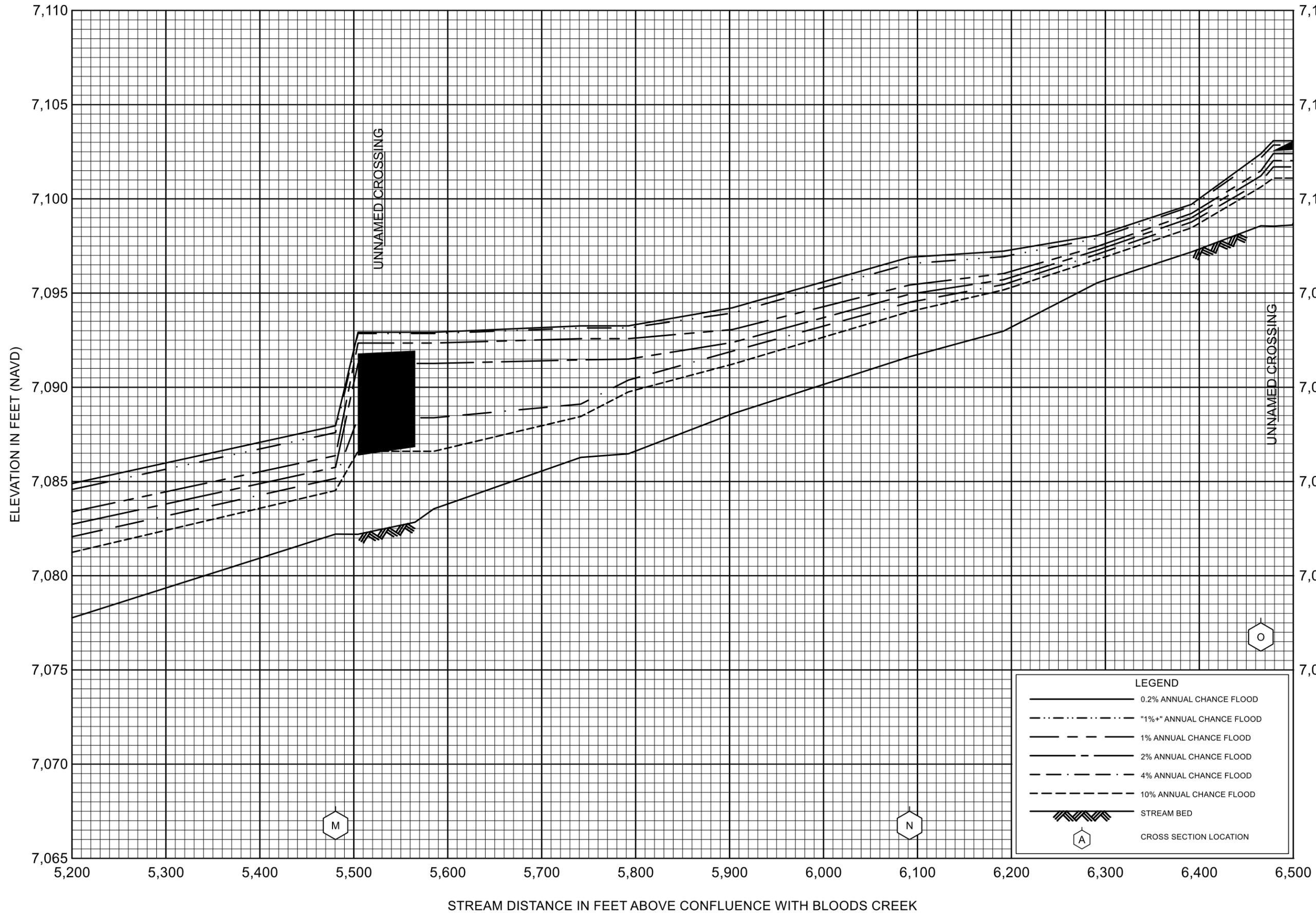
FLOOD PROFILES

BEAR CREEK

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ALPINE COUNTY, CA

UNINCORPORATED AREAS



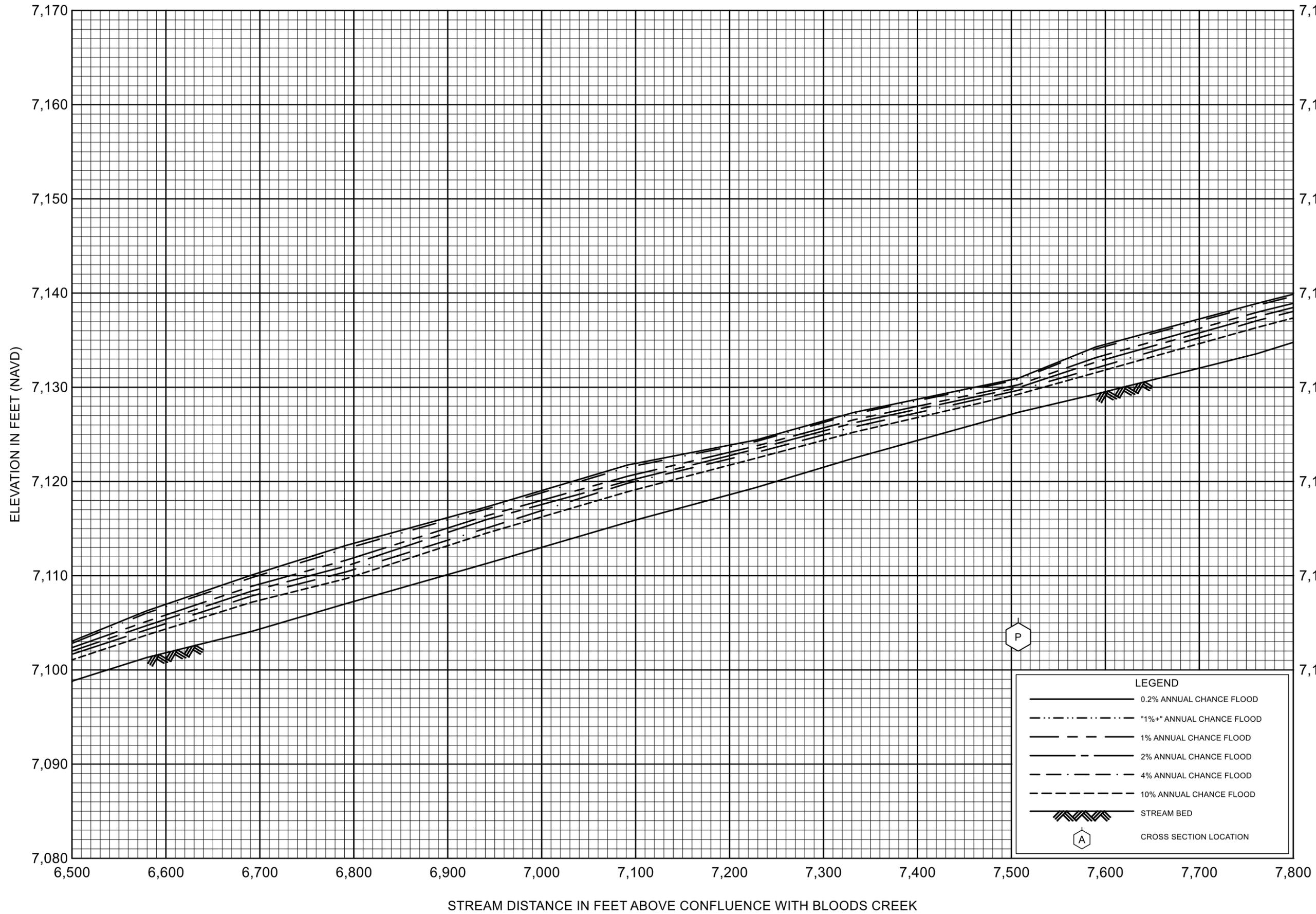
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BEAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

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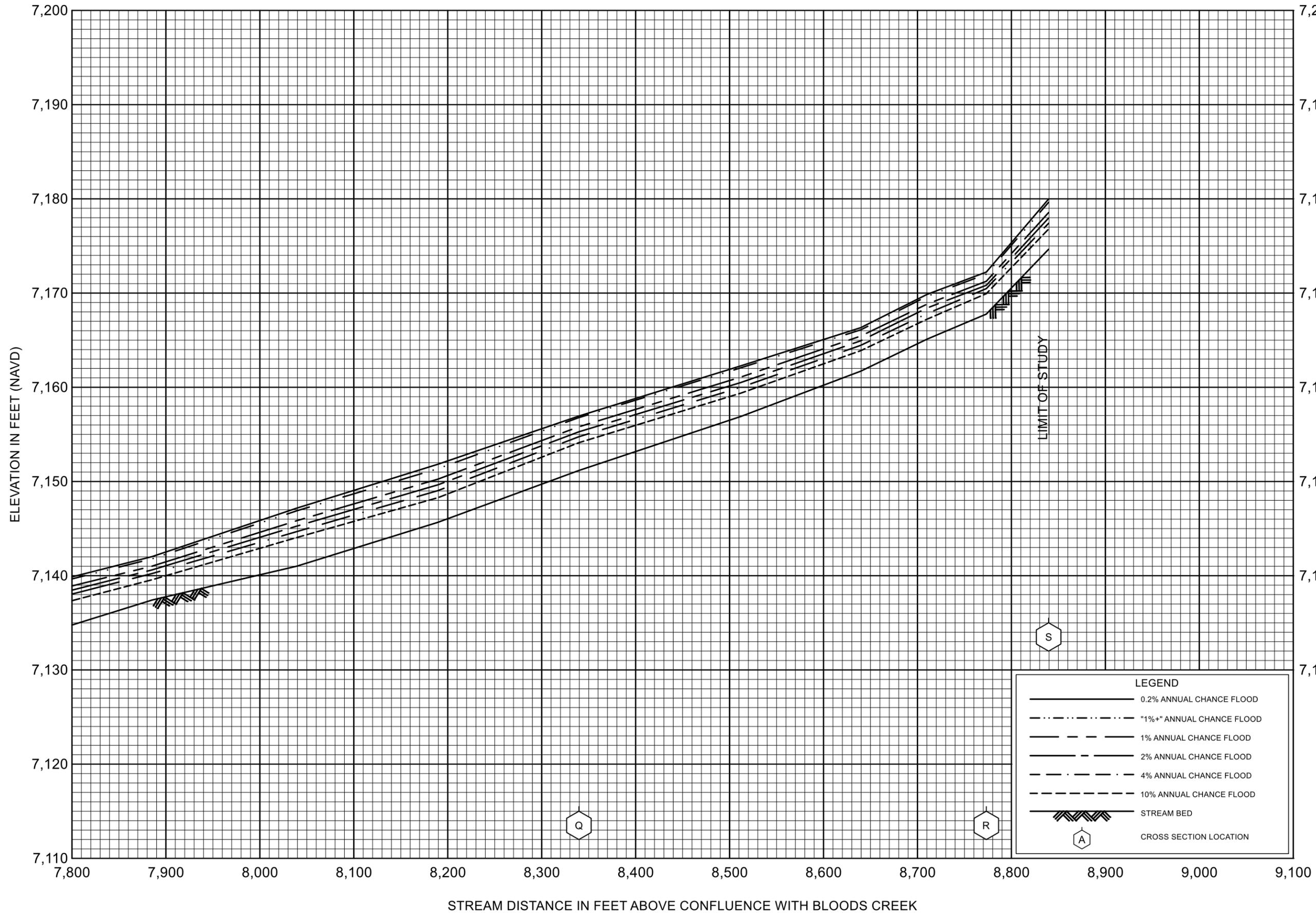
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ALPINE COUNTY, CA

UNINCORPORATED AREAS

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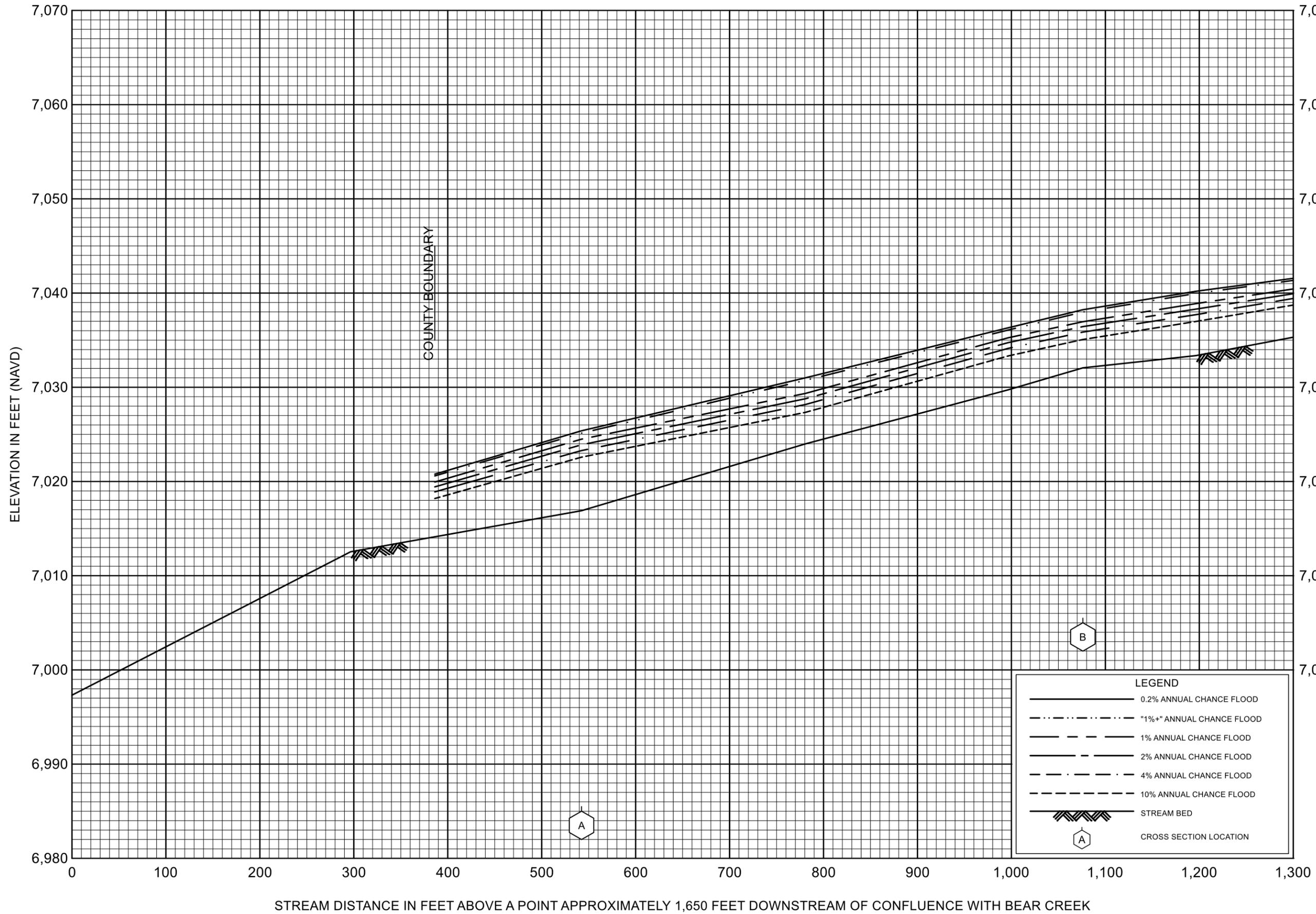
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BEAR CREEK

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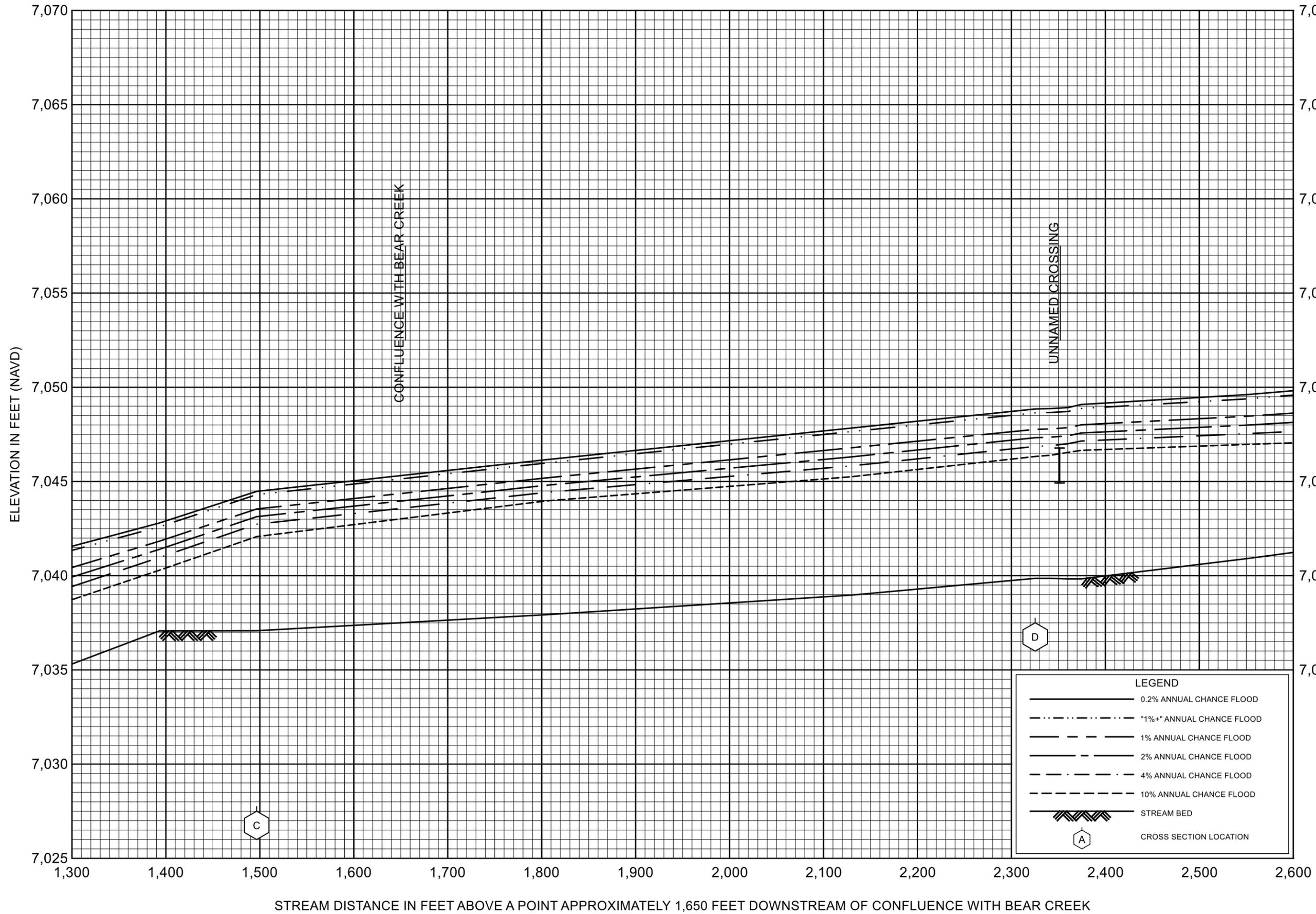
BLOODS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALPINE COUNTY, CA

UNINCORPORATED AREAS

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FLOOD PROFILES

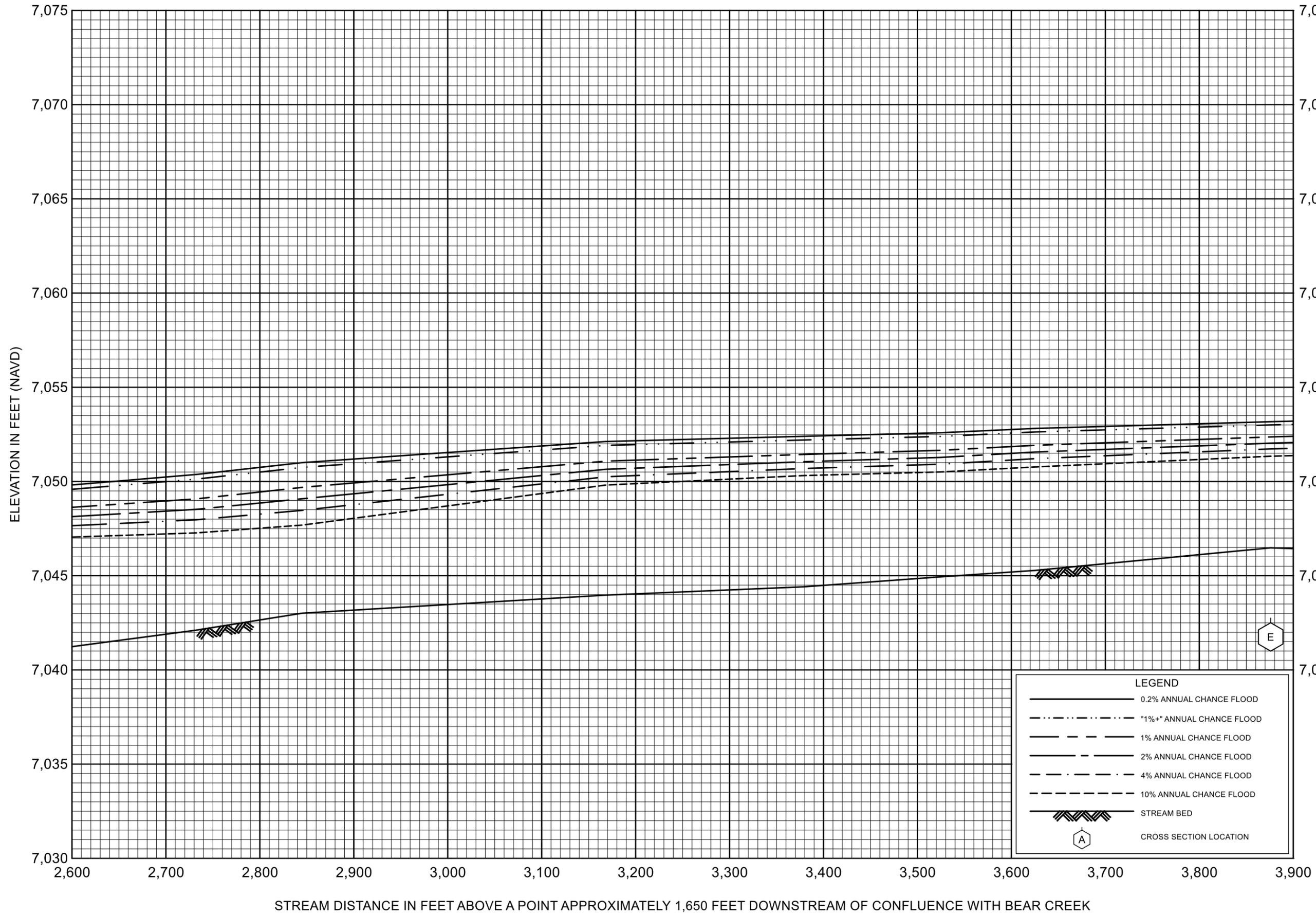
BLOODS CREEK

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ALPINE COUNTY, CA

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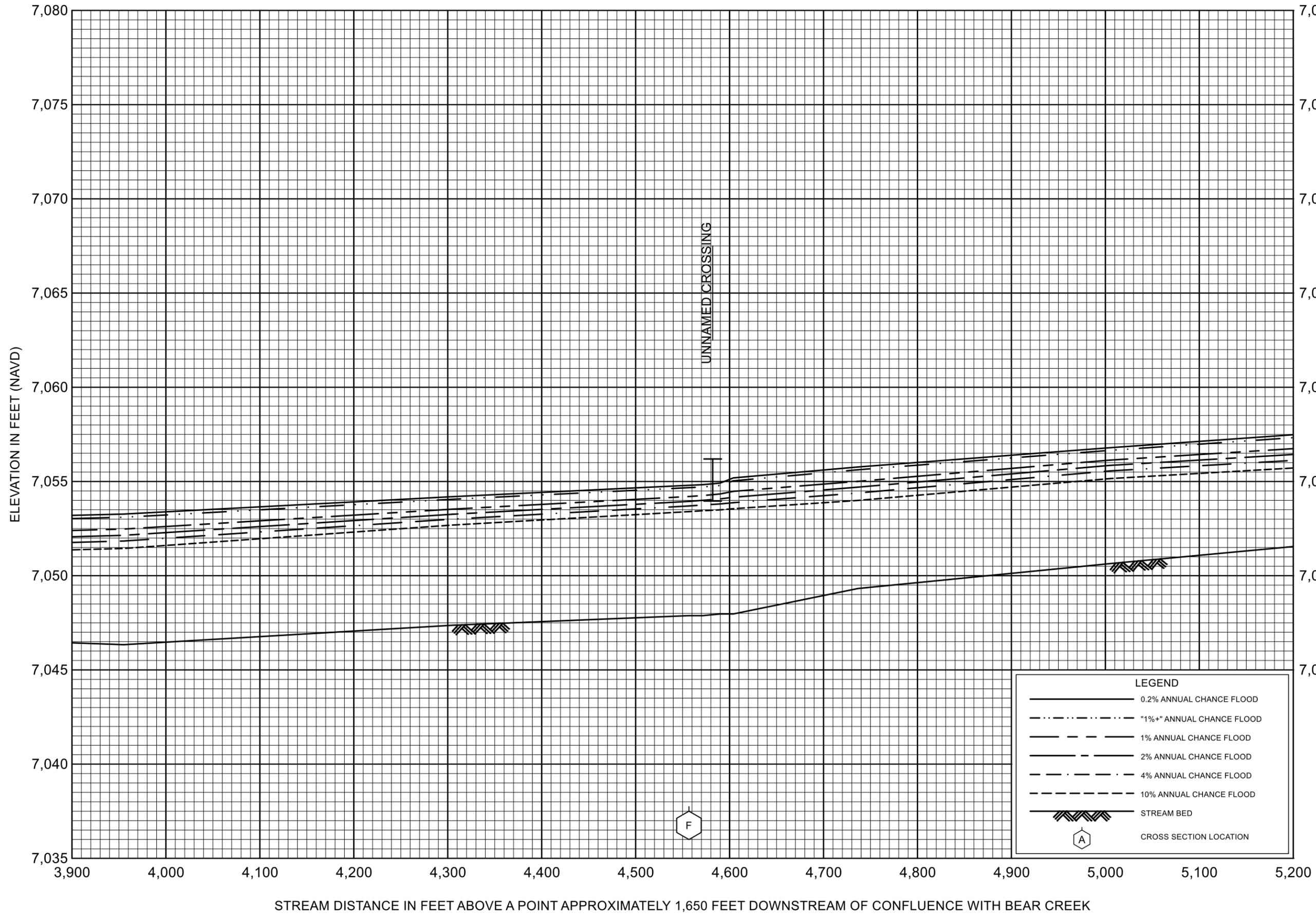
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BLOODS CREEK

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ALPINE COUNTY, CA

UNINCORPORATED AREAS



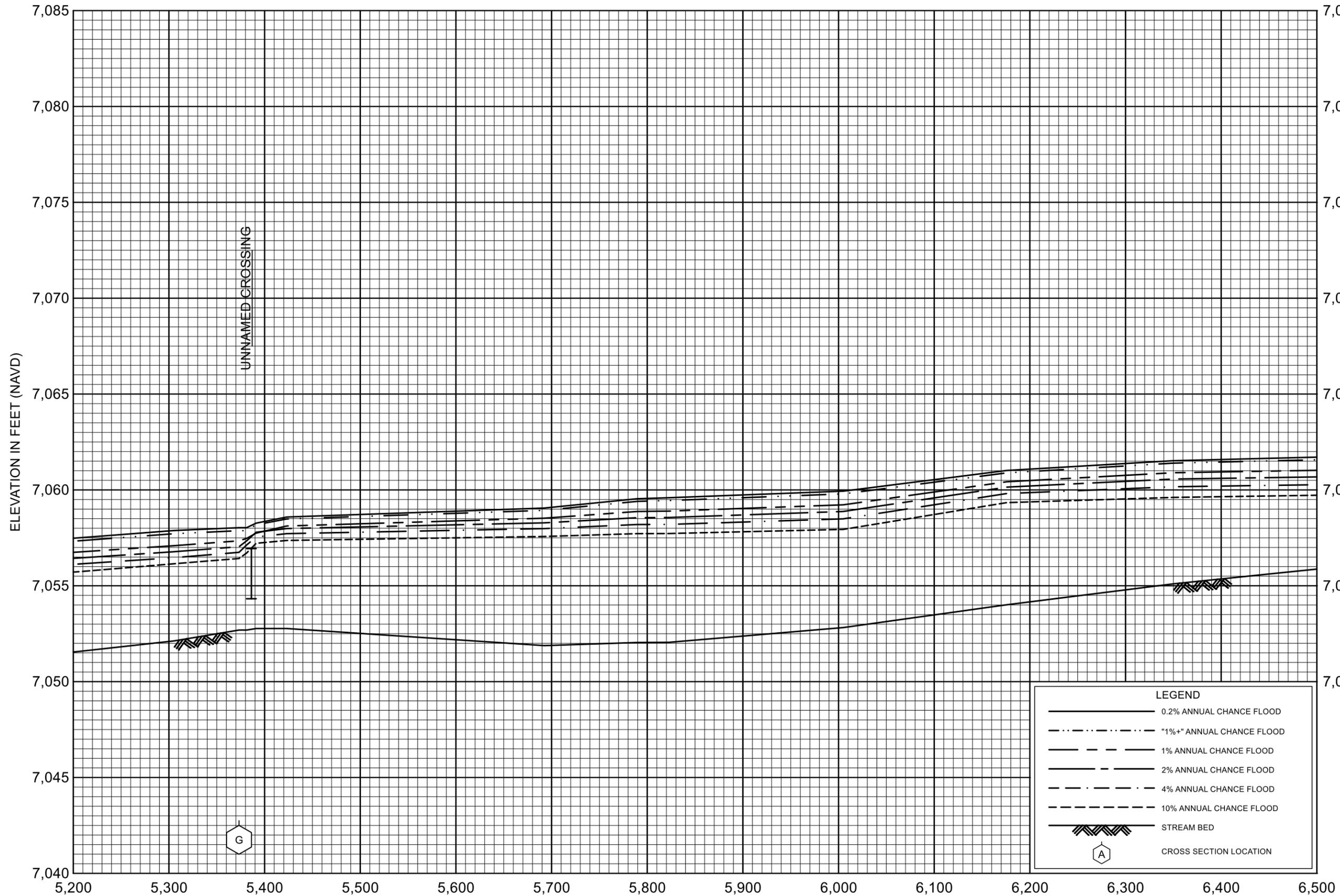
FLOOD PROFILES

BLOODS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALPINE COUNTY, CA

UNINCORPORATED AREAS



STREAM DISTANCE IN FEET ABOVE A POINT APPROXIMATELY 1,650 FEET DOWNSTREAM OF CONFLUENCE WITH BEAR CREEK

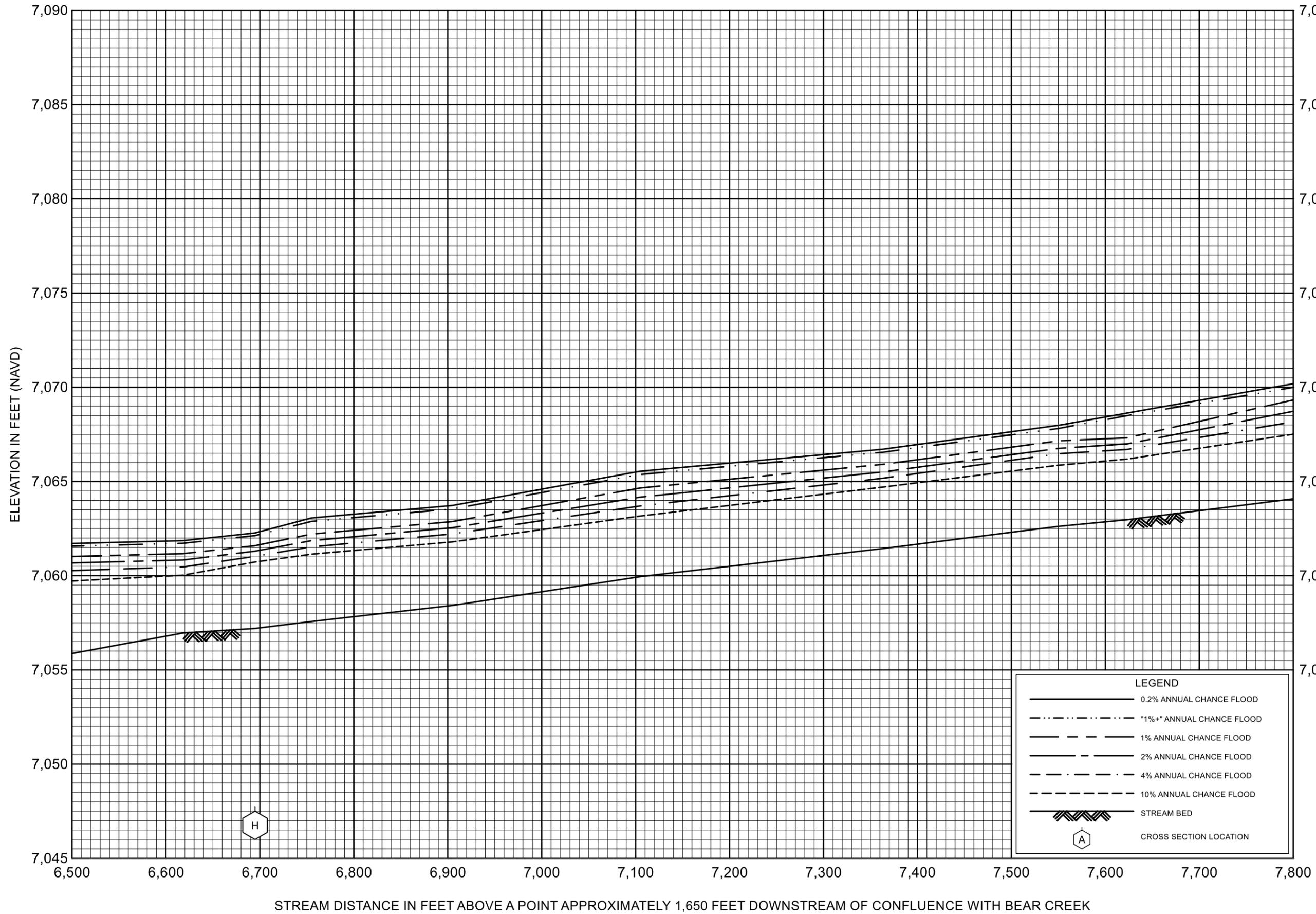
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BLOODS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALPINE COUNTY, CA

UNINCORPORATED AREAS



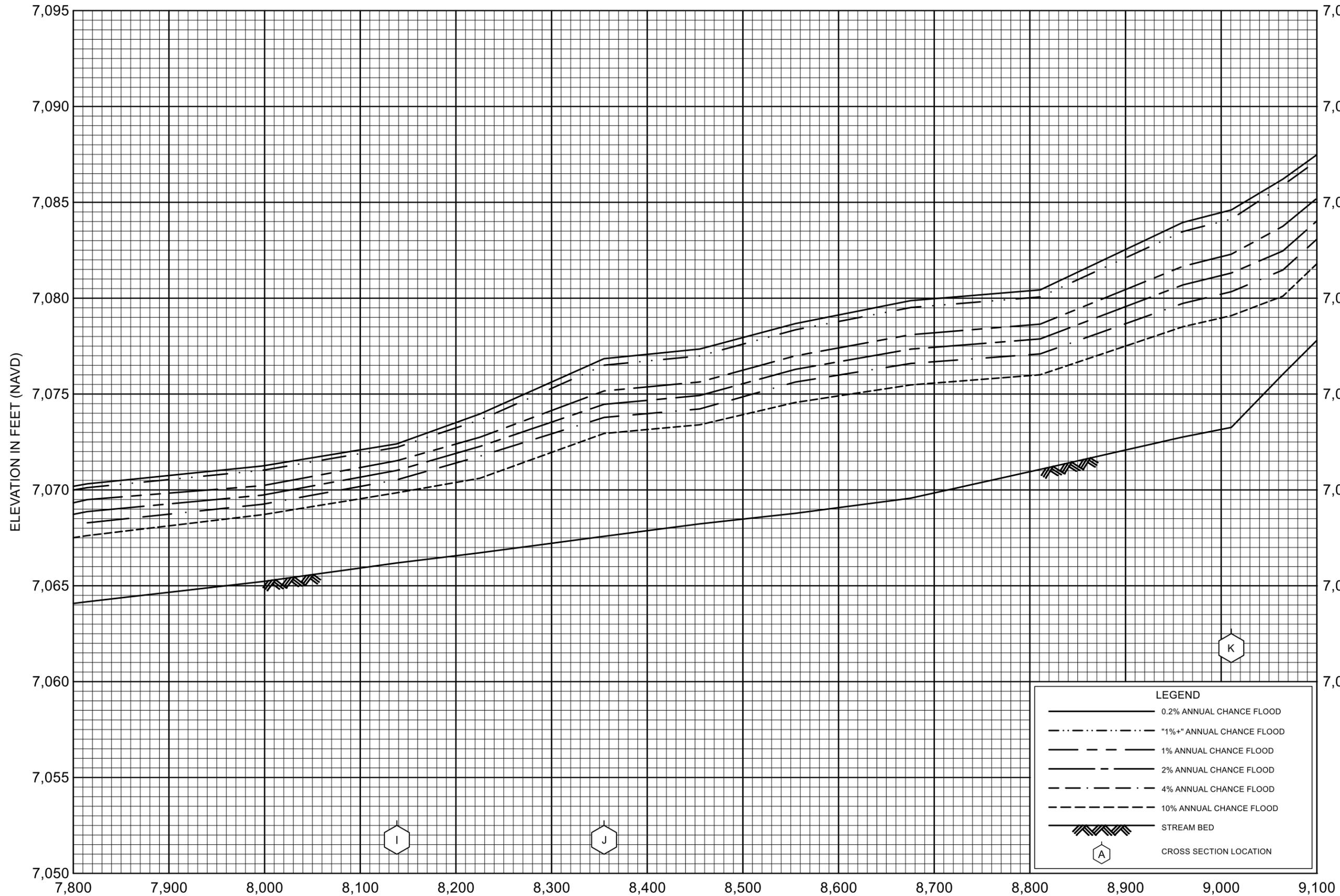
FLOOD PROFILES

BLOODS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALPINE COUNTY, CA

UNINCORPORATED AREAS



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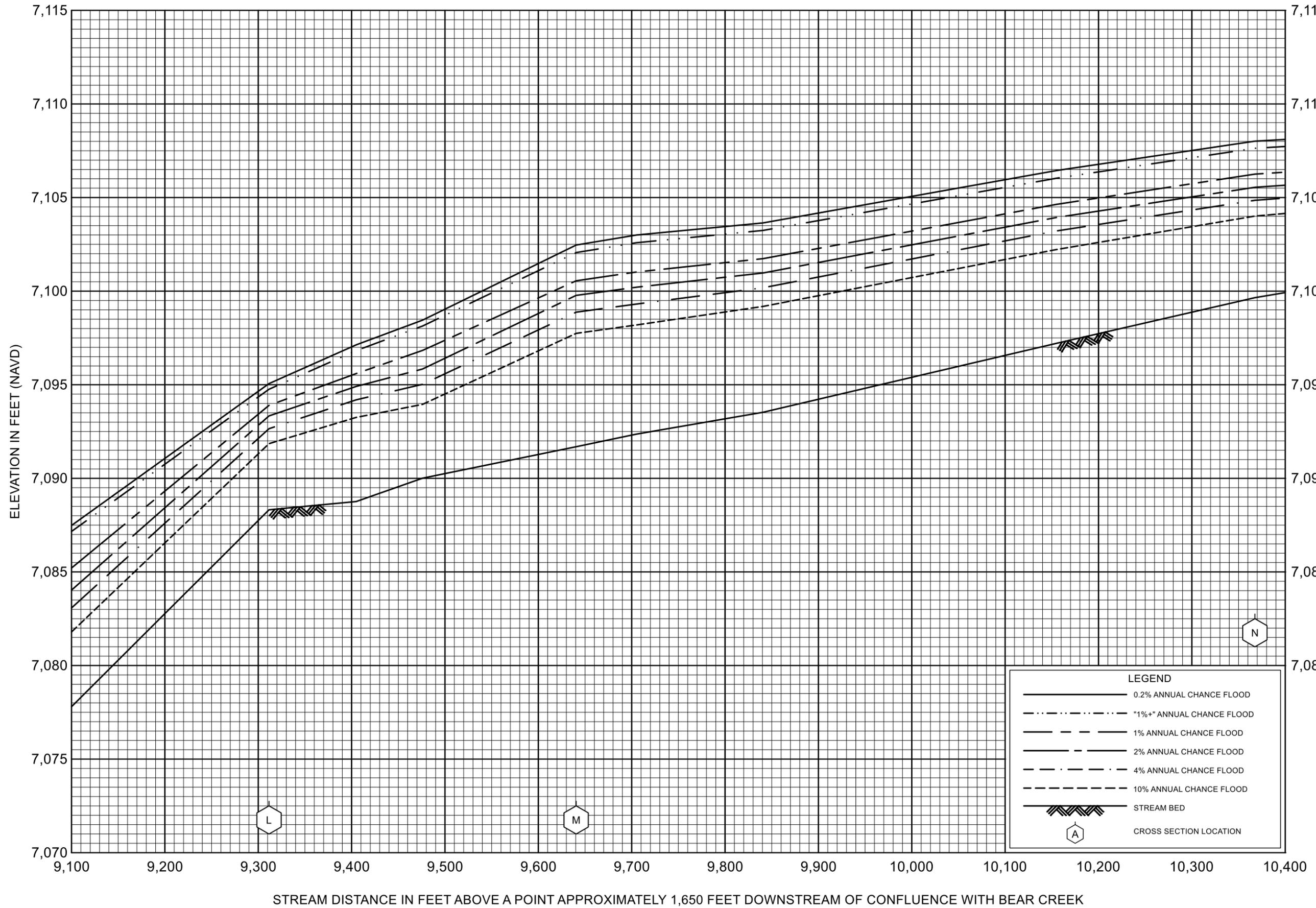
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BLOODS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

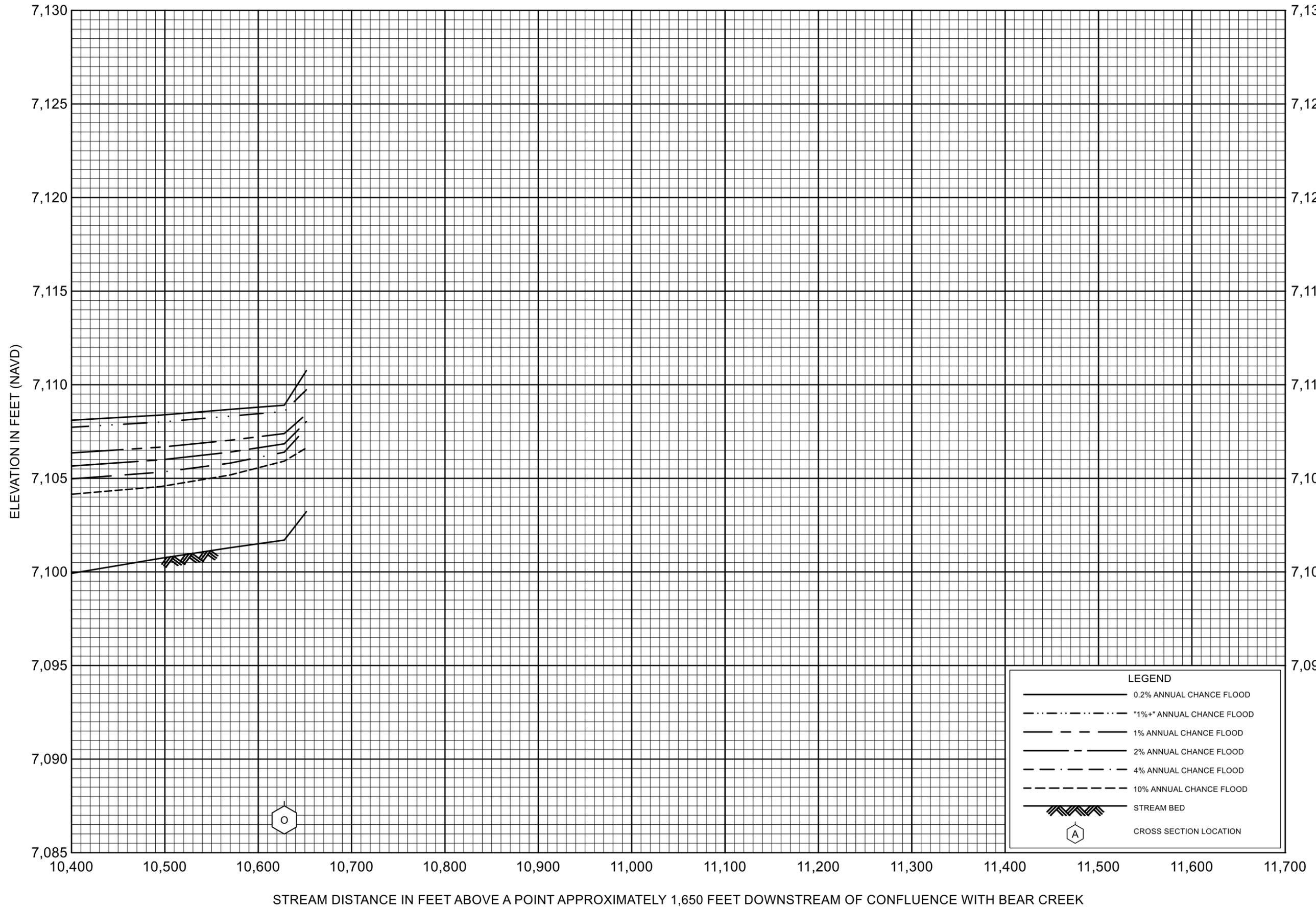
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BLOODS CREEK

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ALPINE COUNTY, CA
UNINCORPORATED AREAS



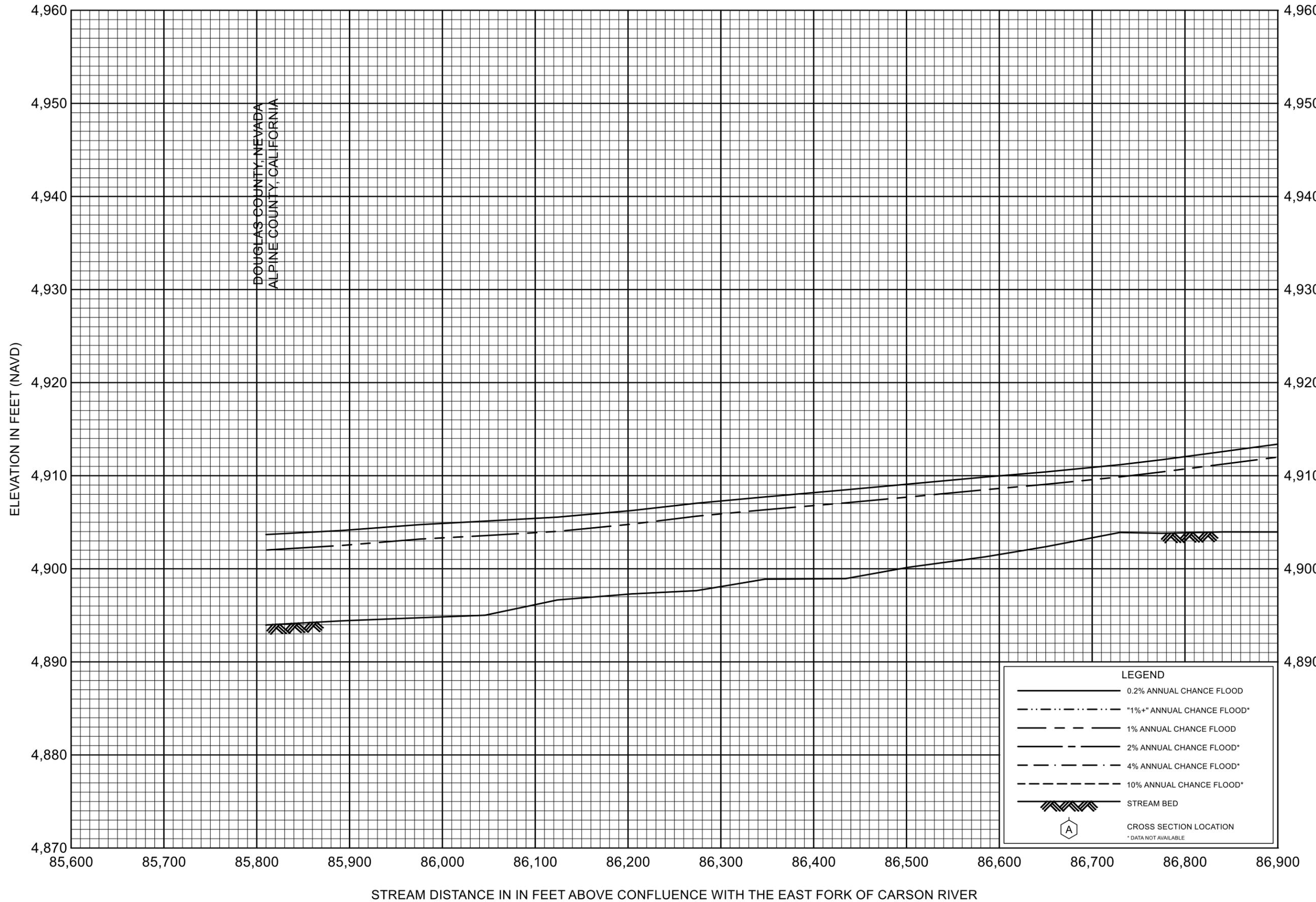
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UNINCORPORATED AREAS



DOUGLAS COUNTY, NEVADA
ALPINE COUNTY, CALIFORNIA

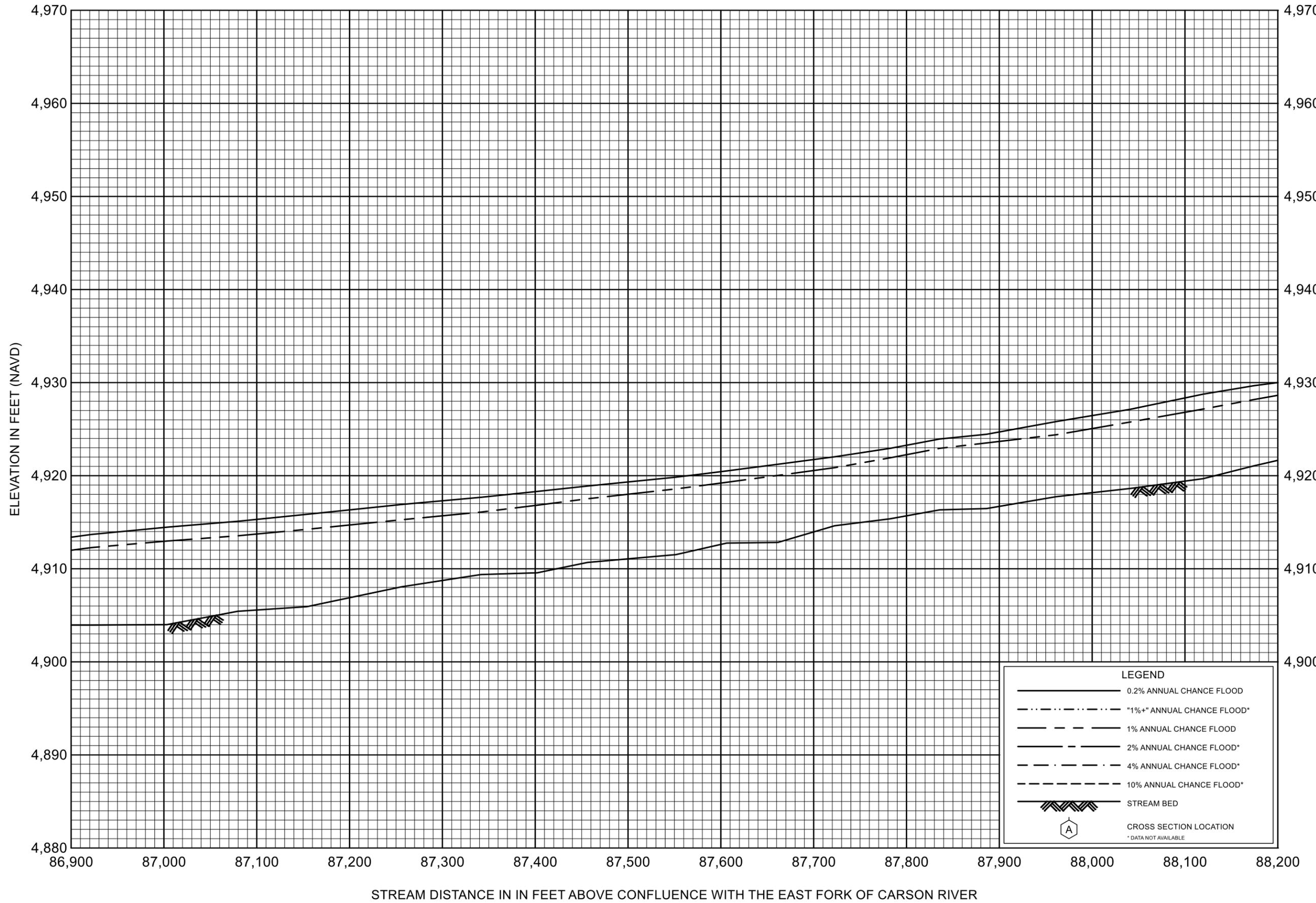
FLOOD PROFILES

WEST FORK CARSON RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALPINE COUNTY, CA

UNINCORPORATED AREAS



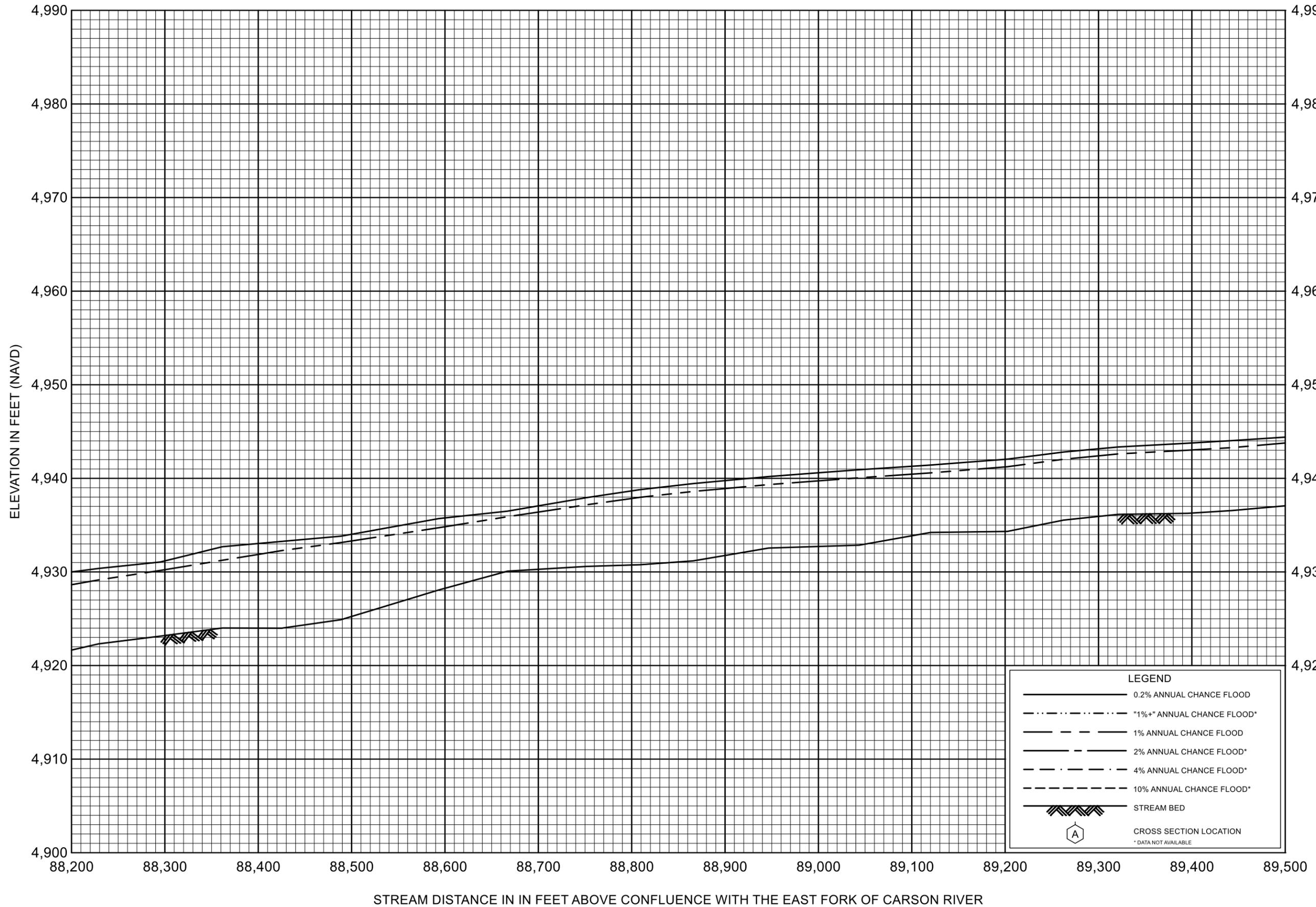
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ALPINE COUNTY, CA

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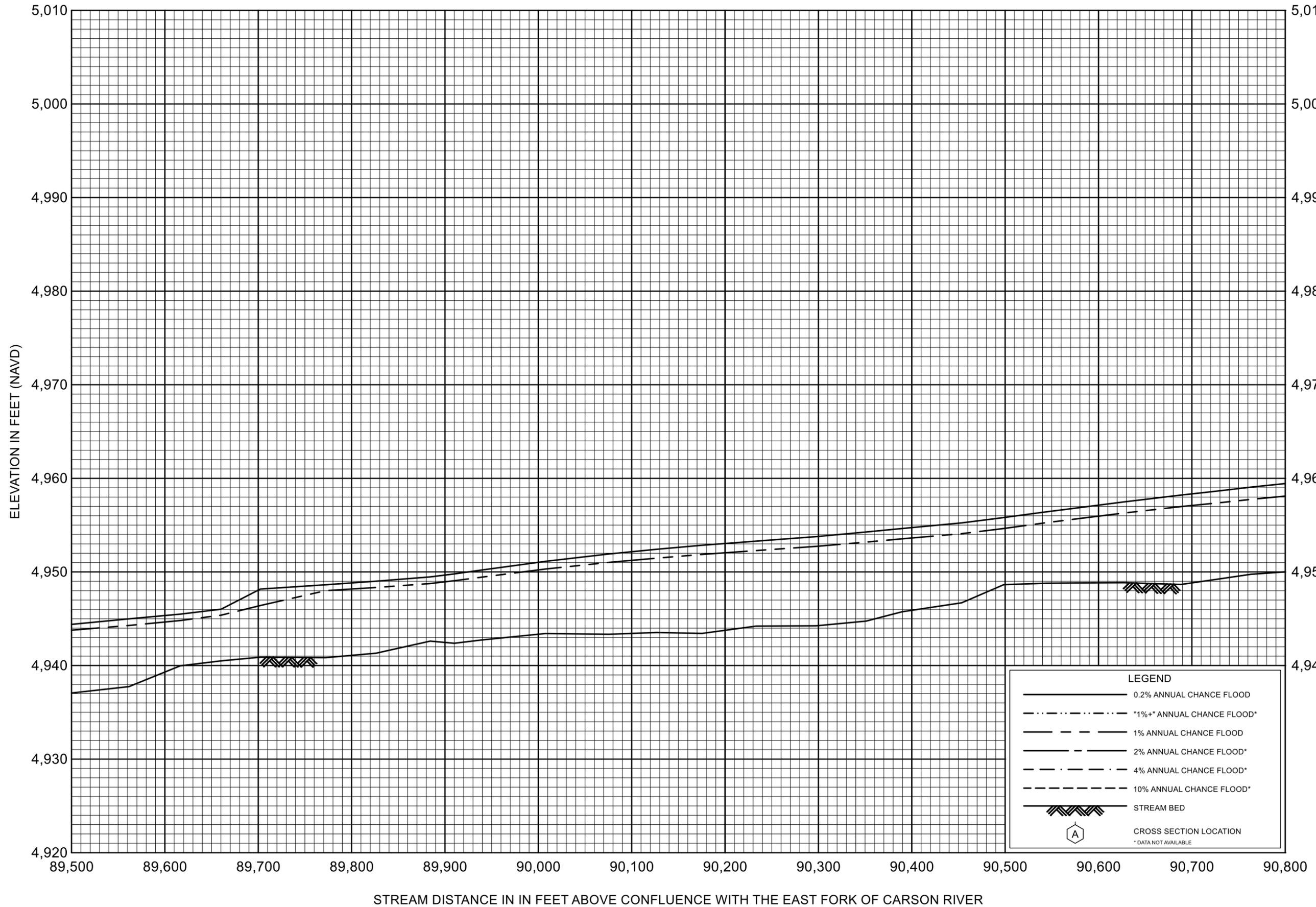
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ALPINE COUNTY, CA

UNINCORPORATED AREAS



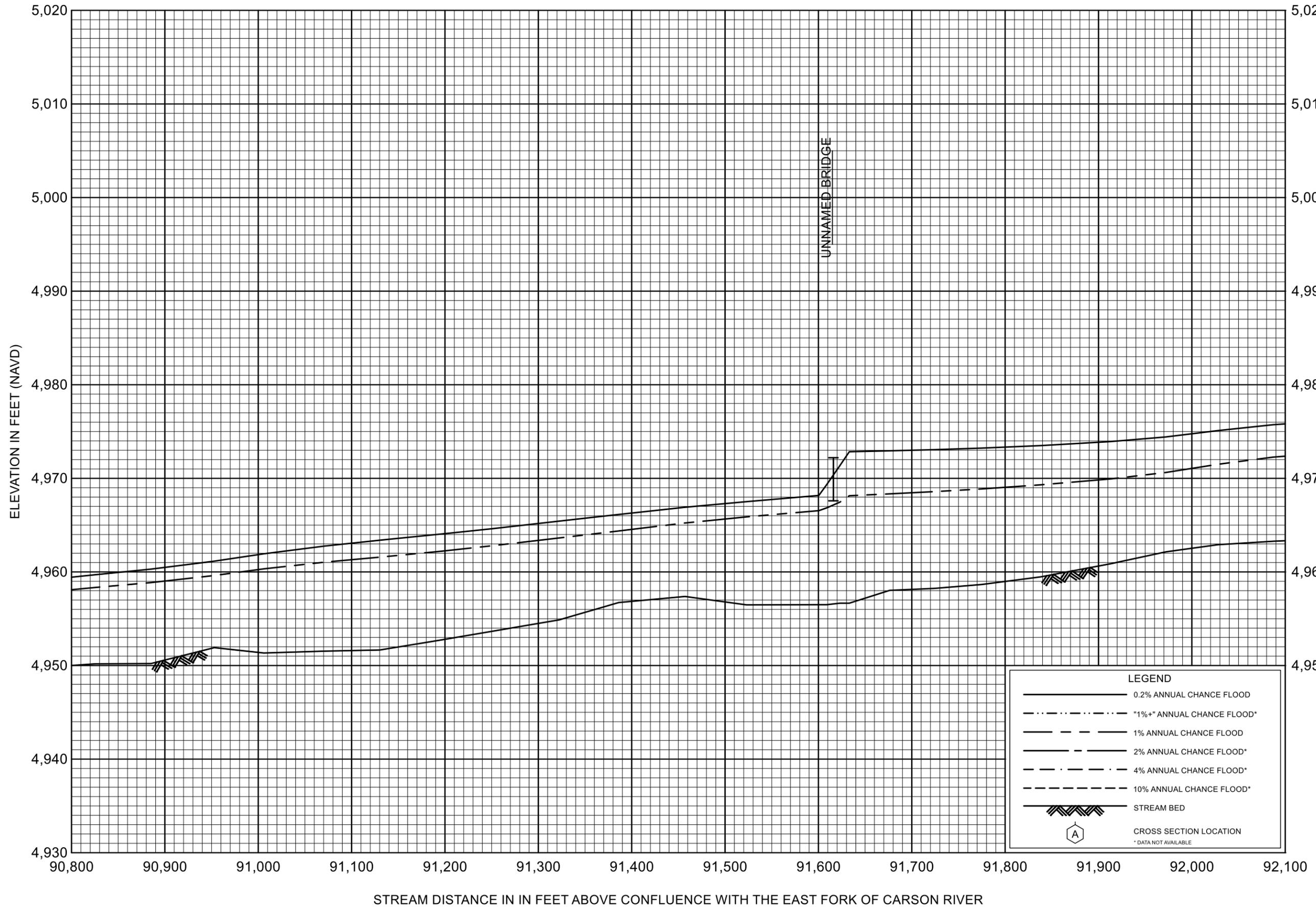
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ALPINE COUNTY, CA

UNINCORPORATED AREAS



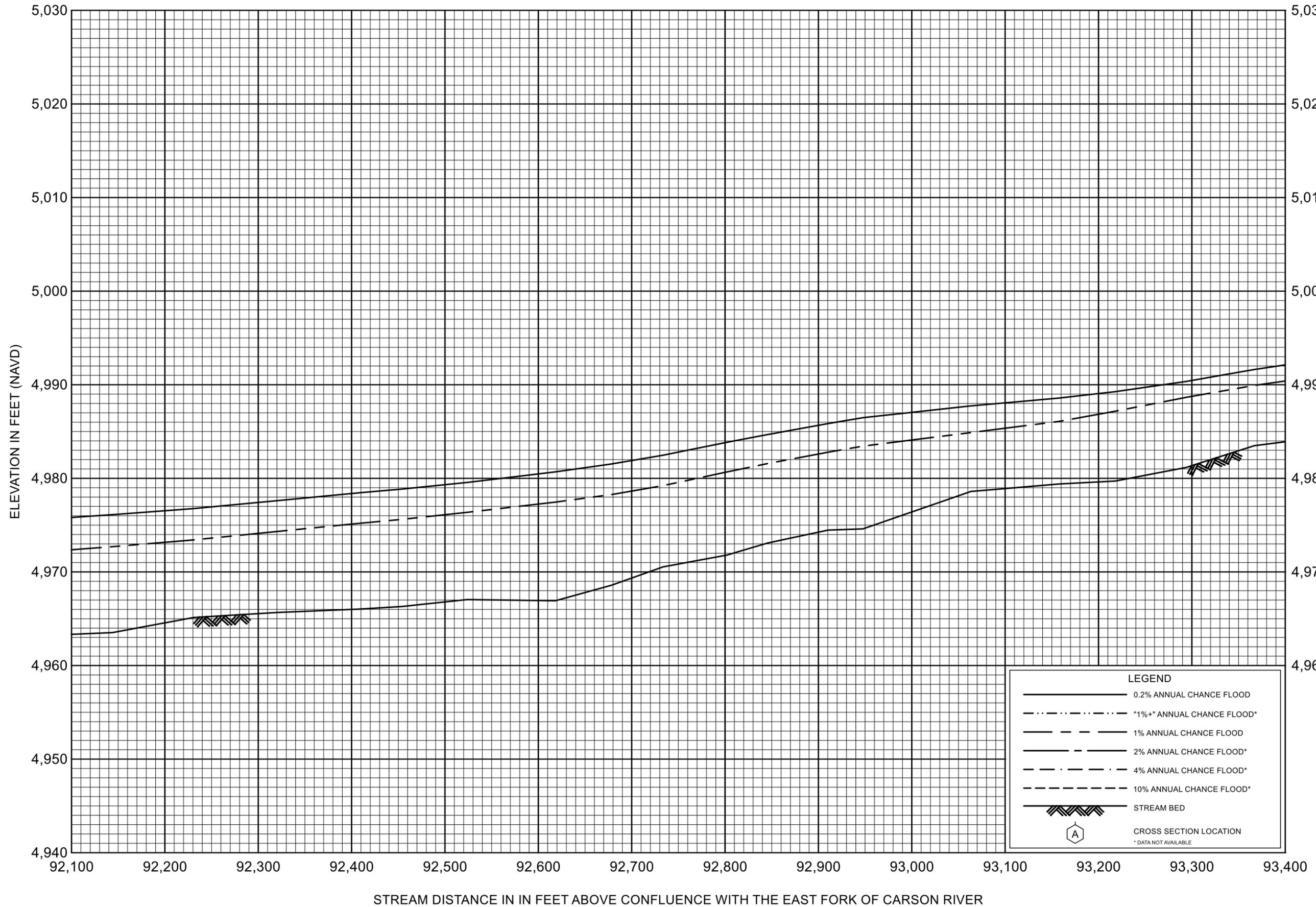
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ALPINE COUNTY, CA

UNINCORPORATED AREAS



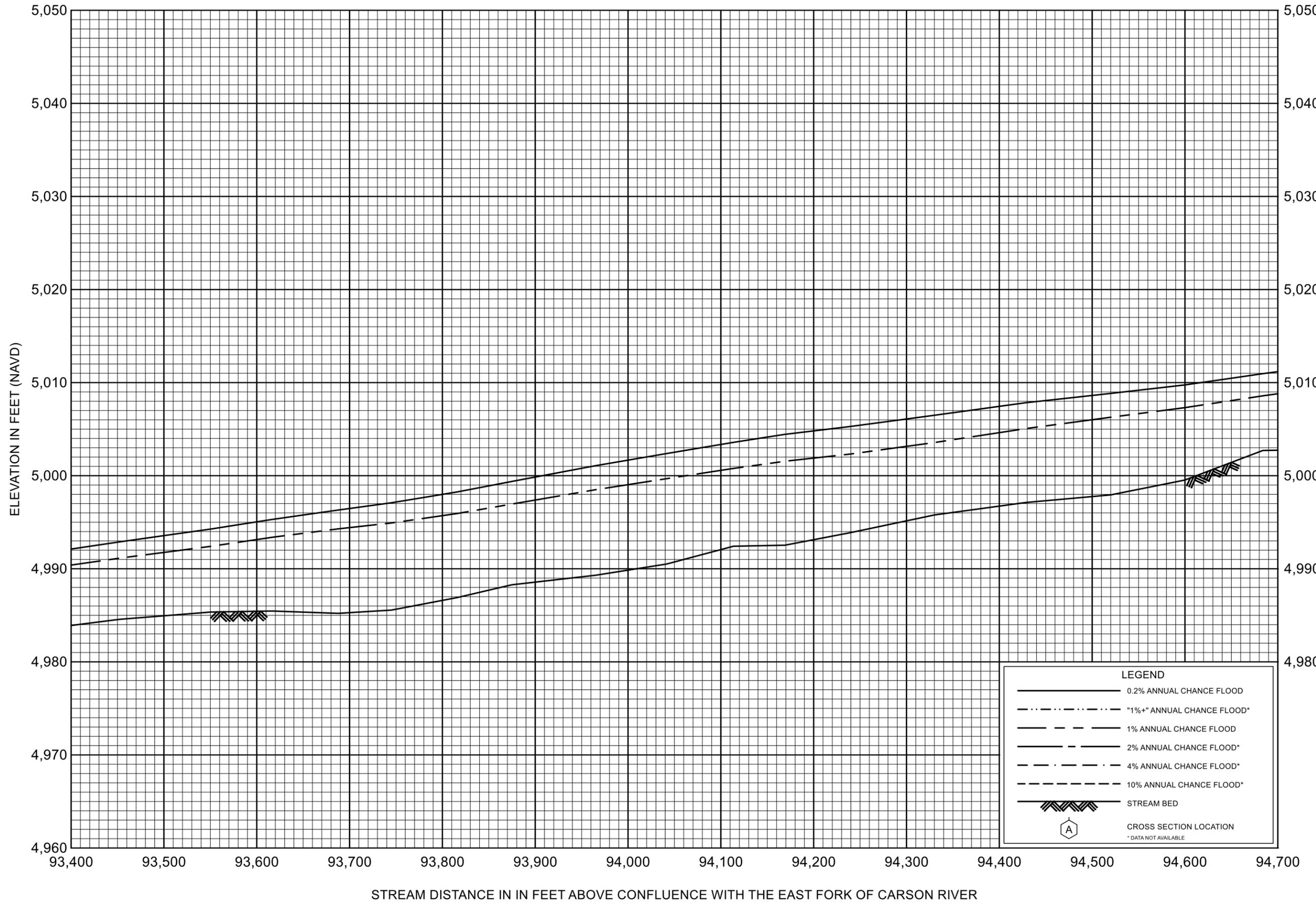
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UNINCORPORATED AREAS



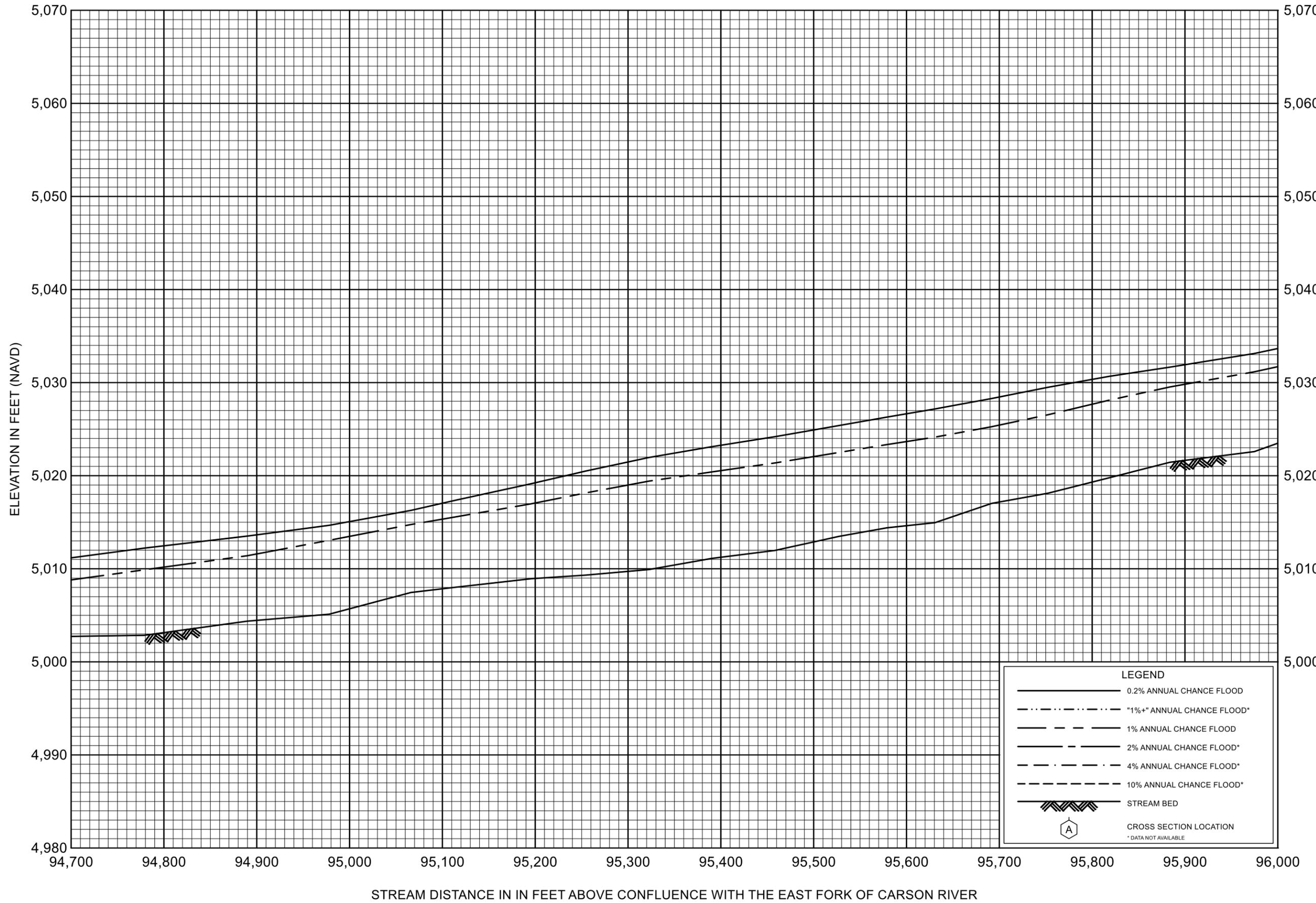
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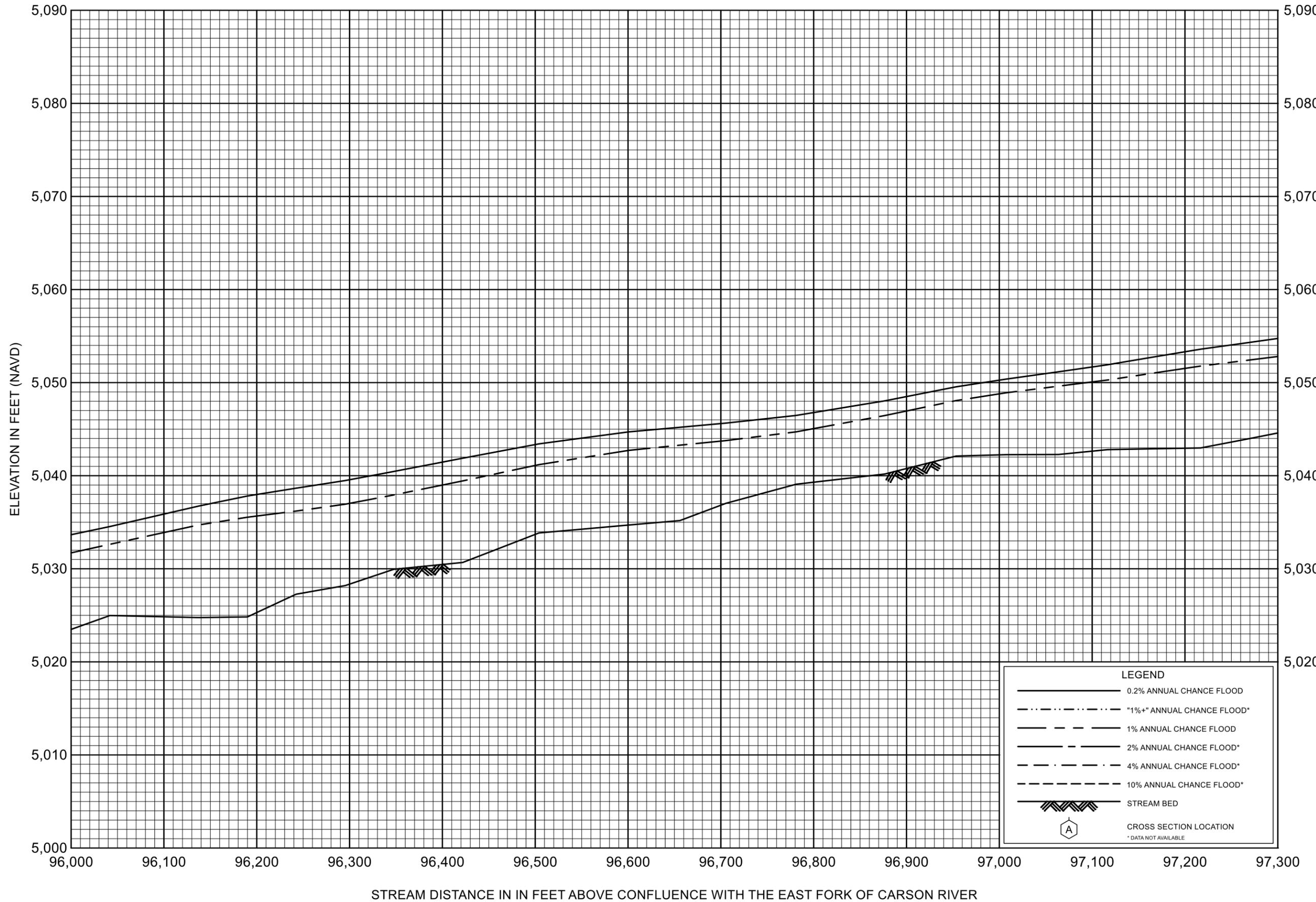
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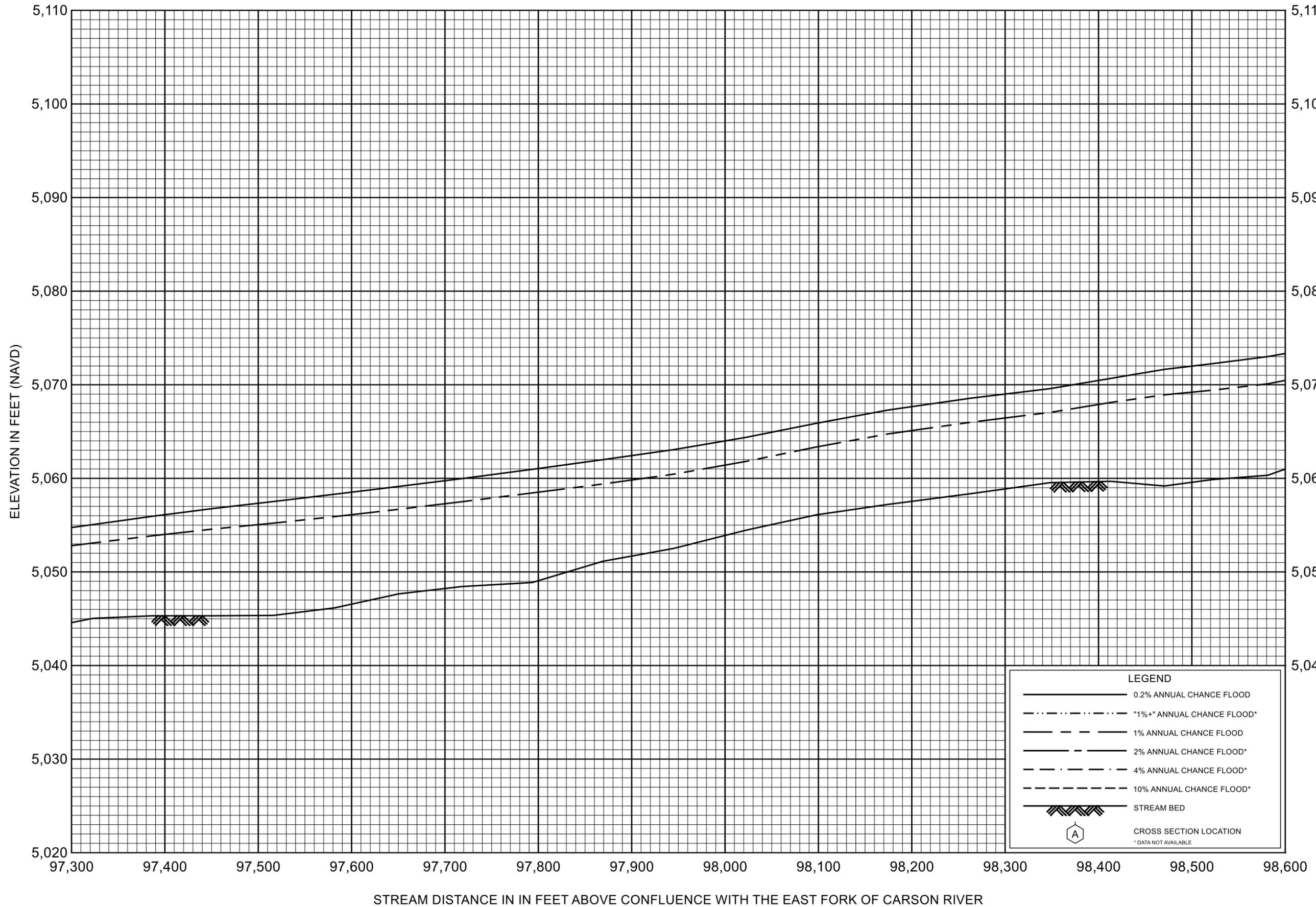
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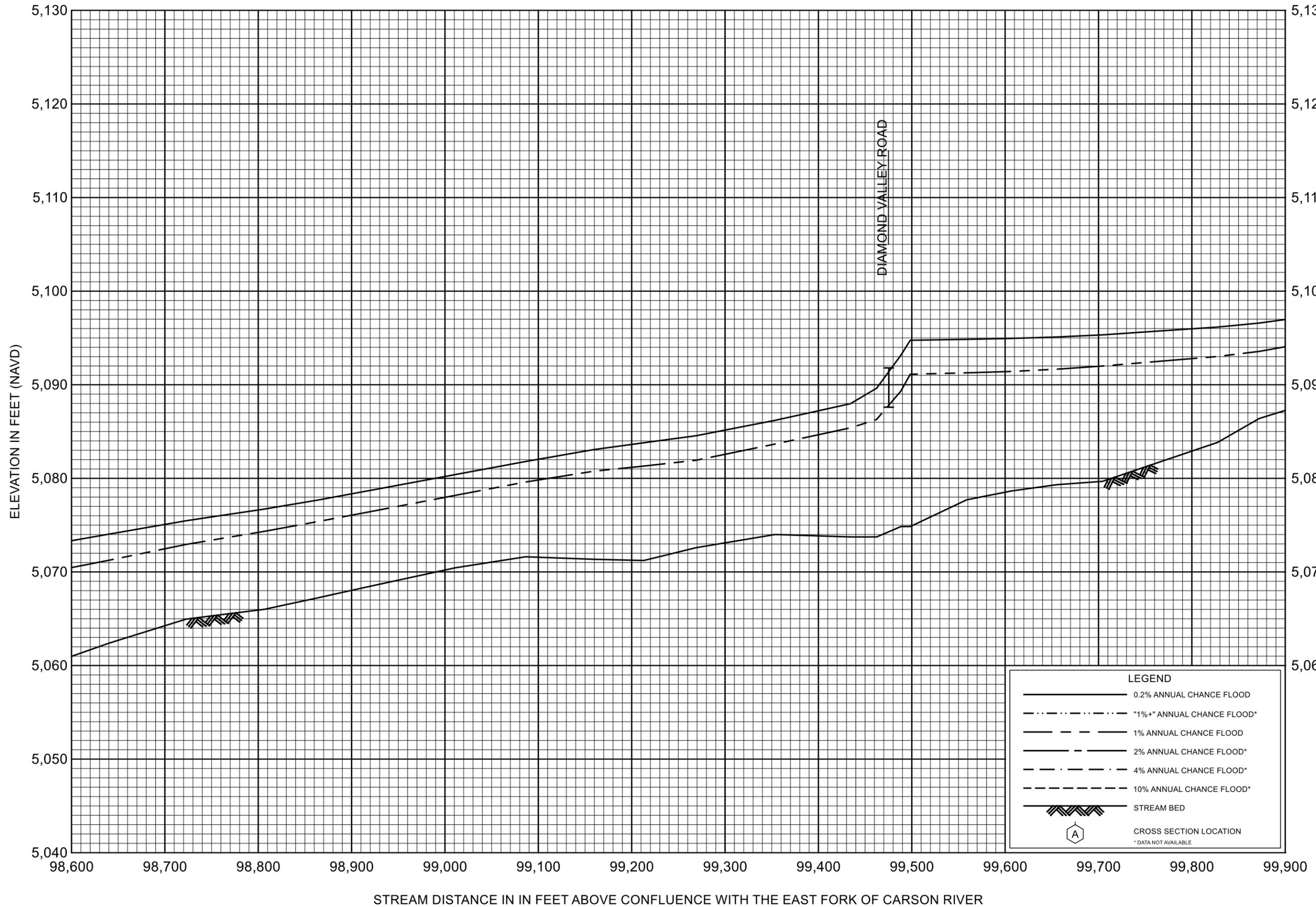
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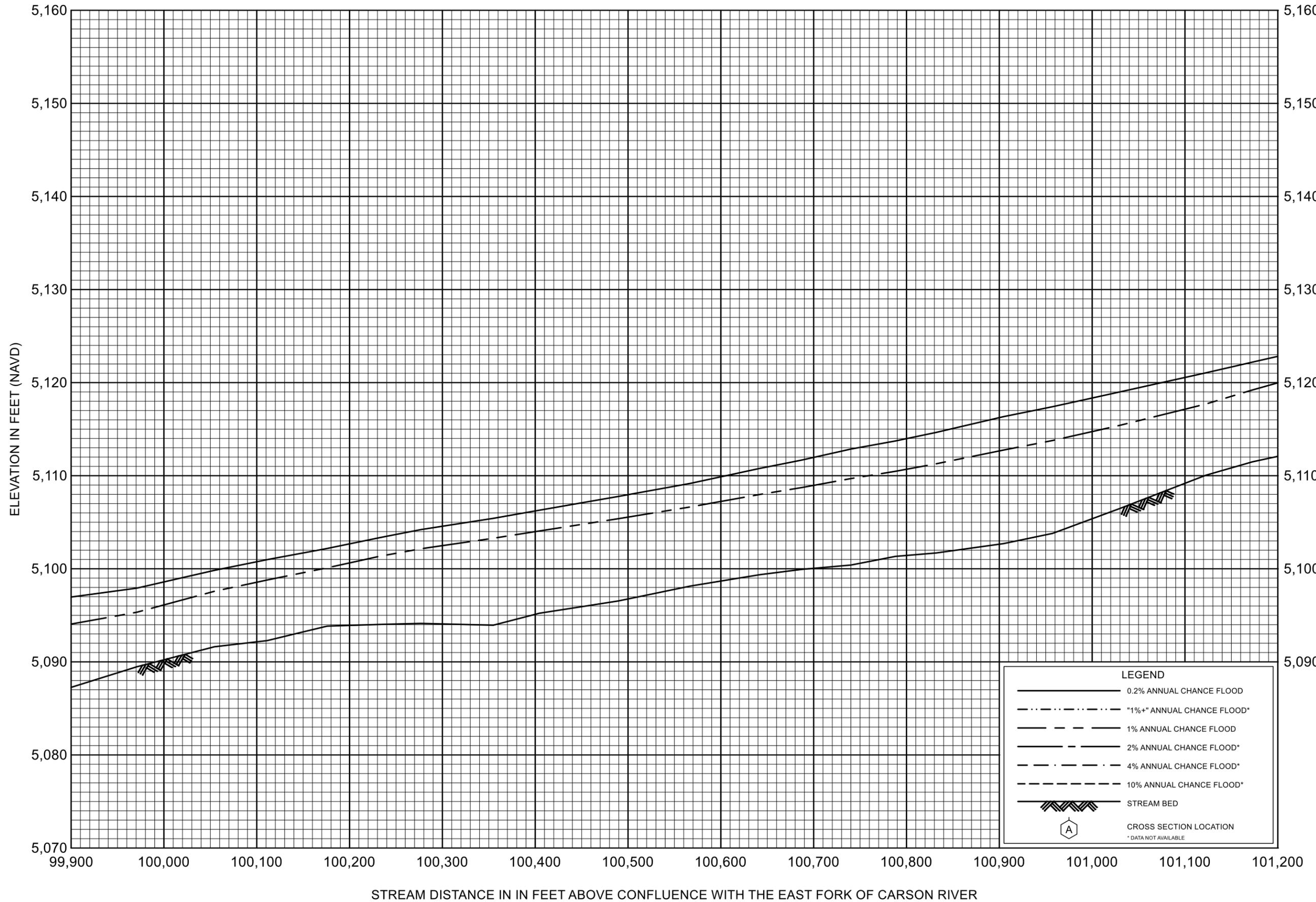
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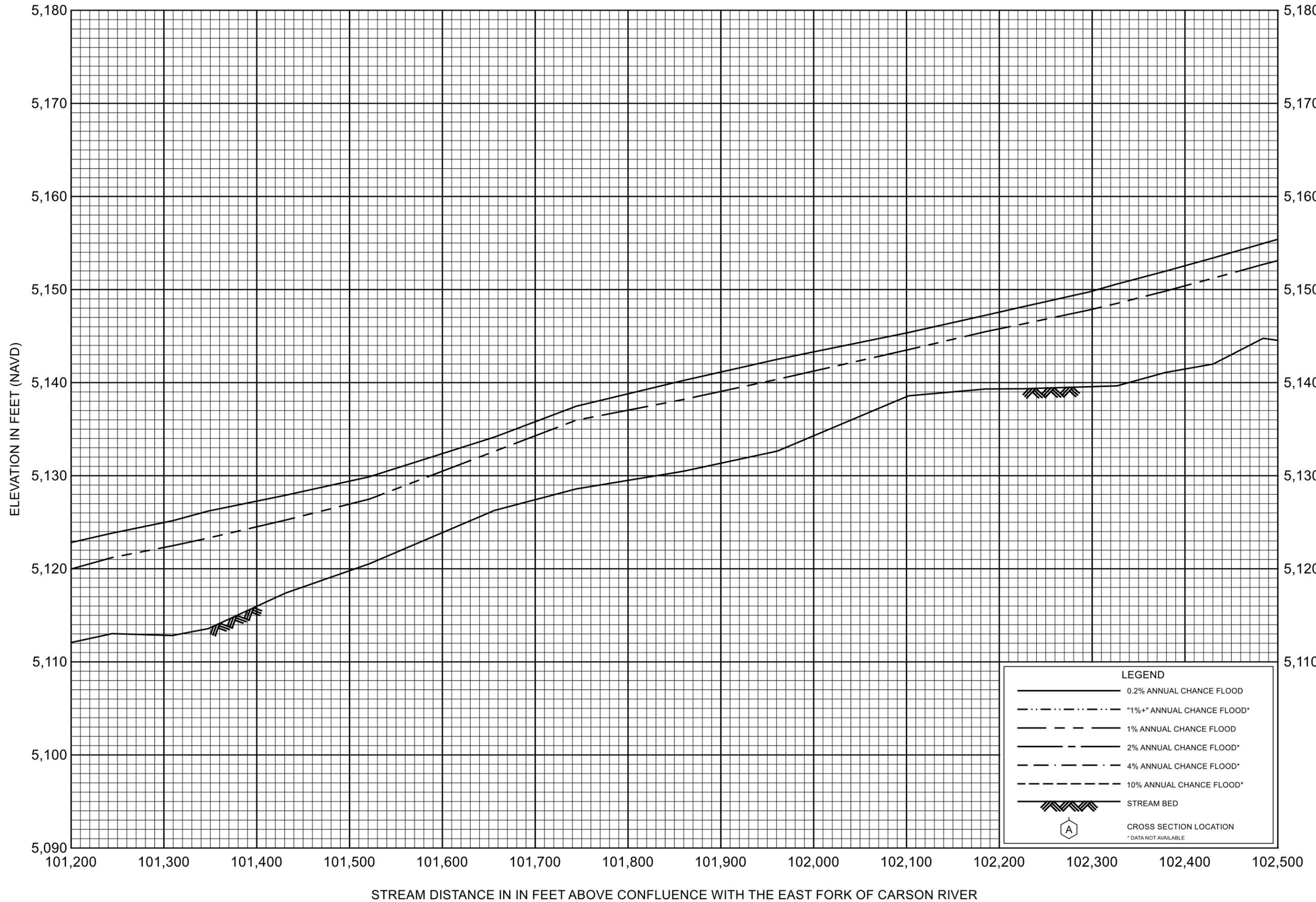
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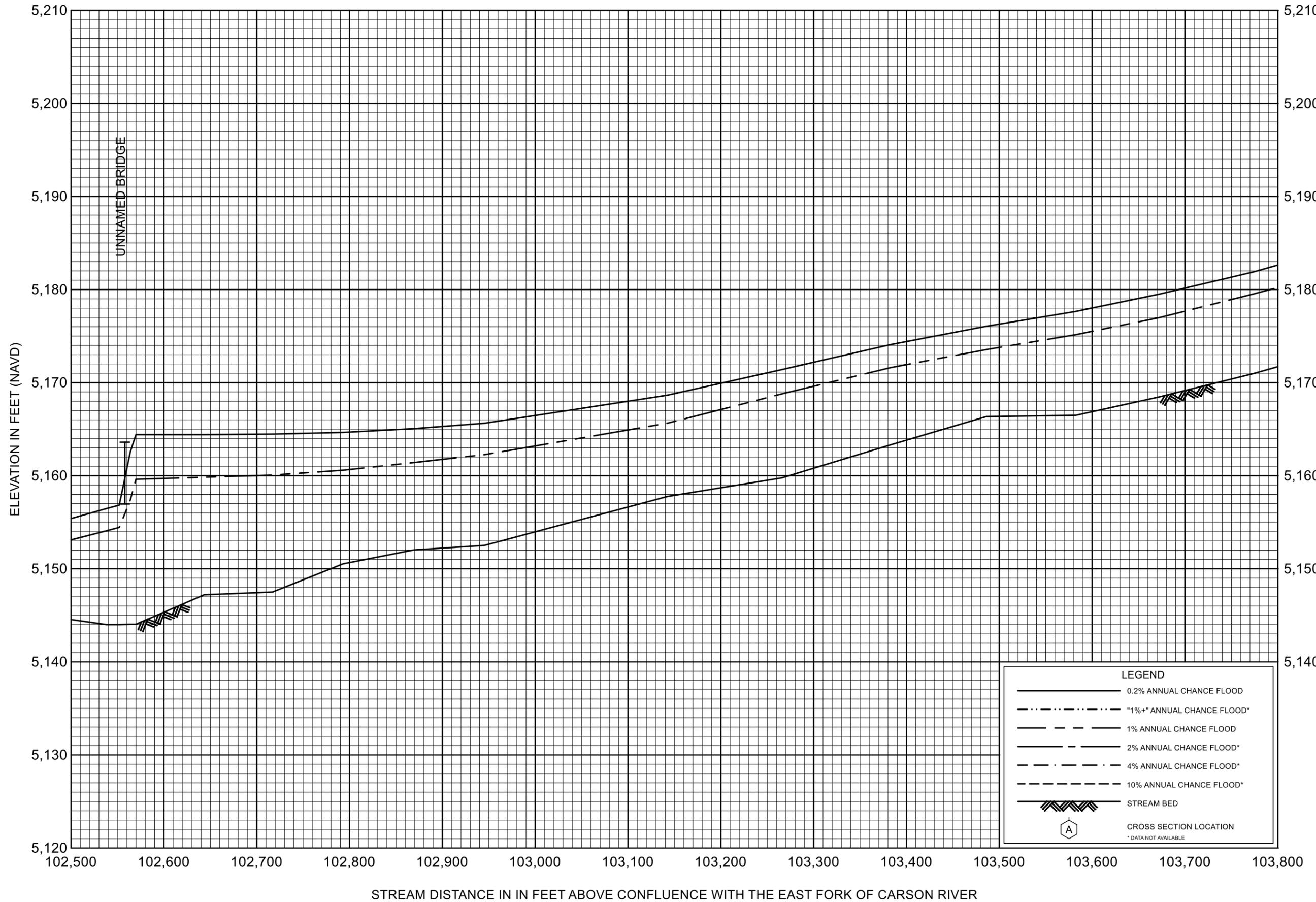
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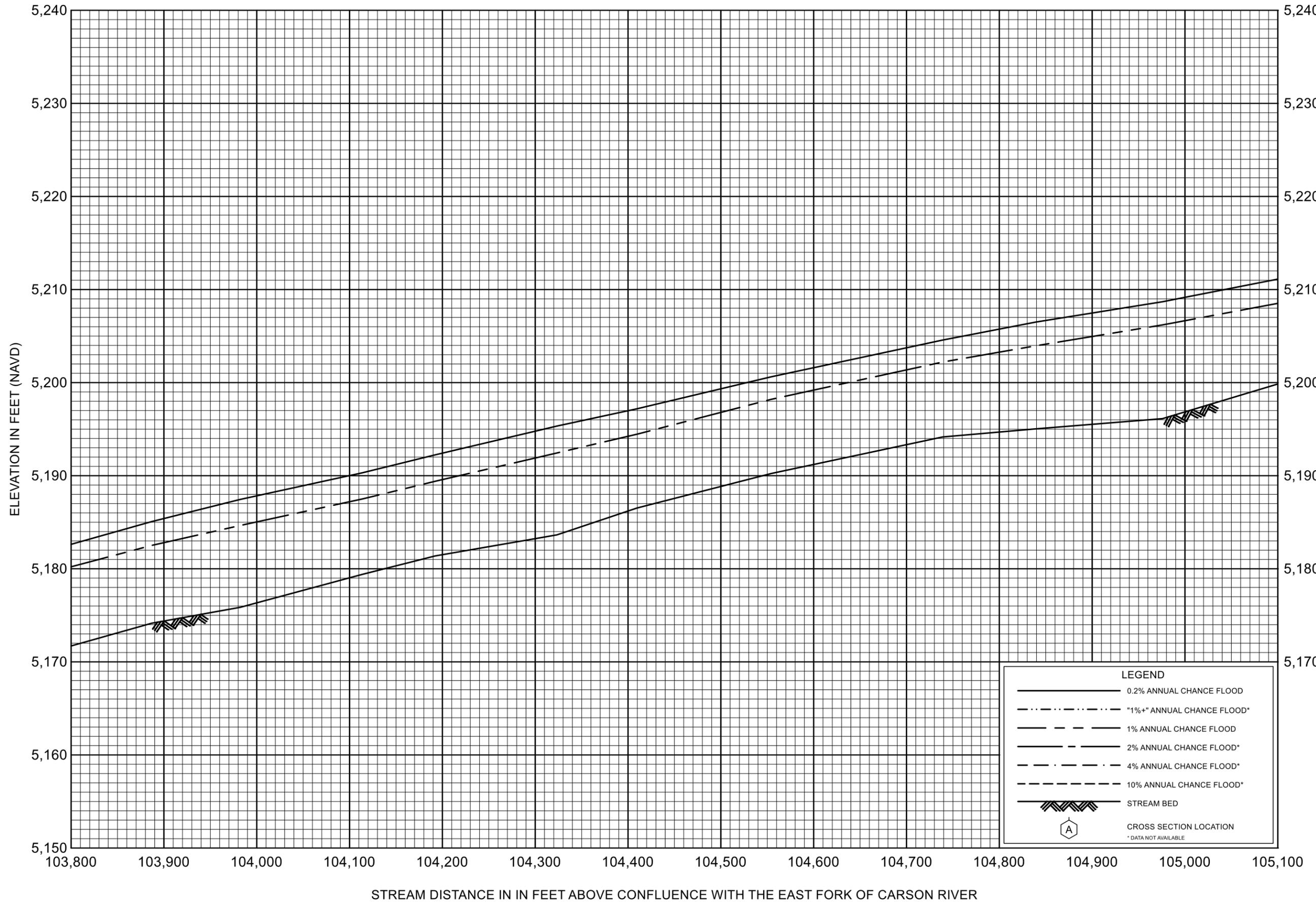
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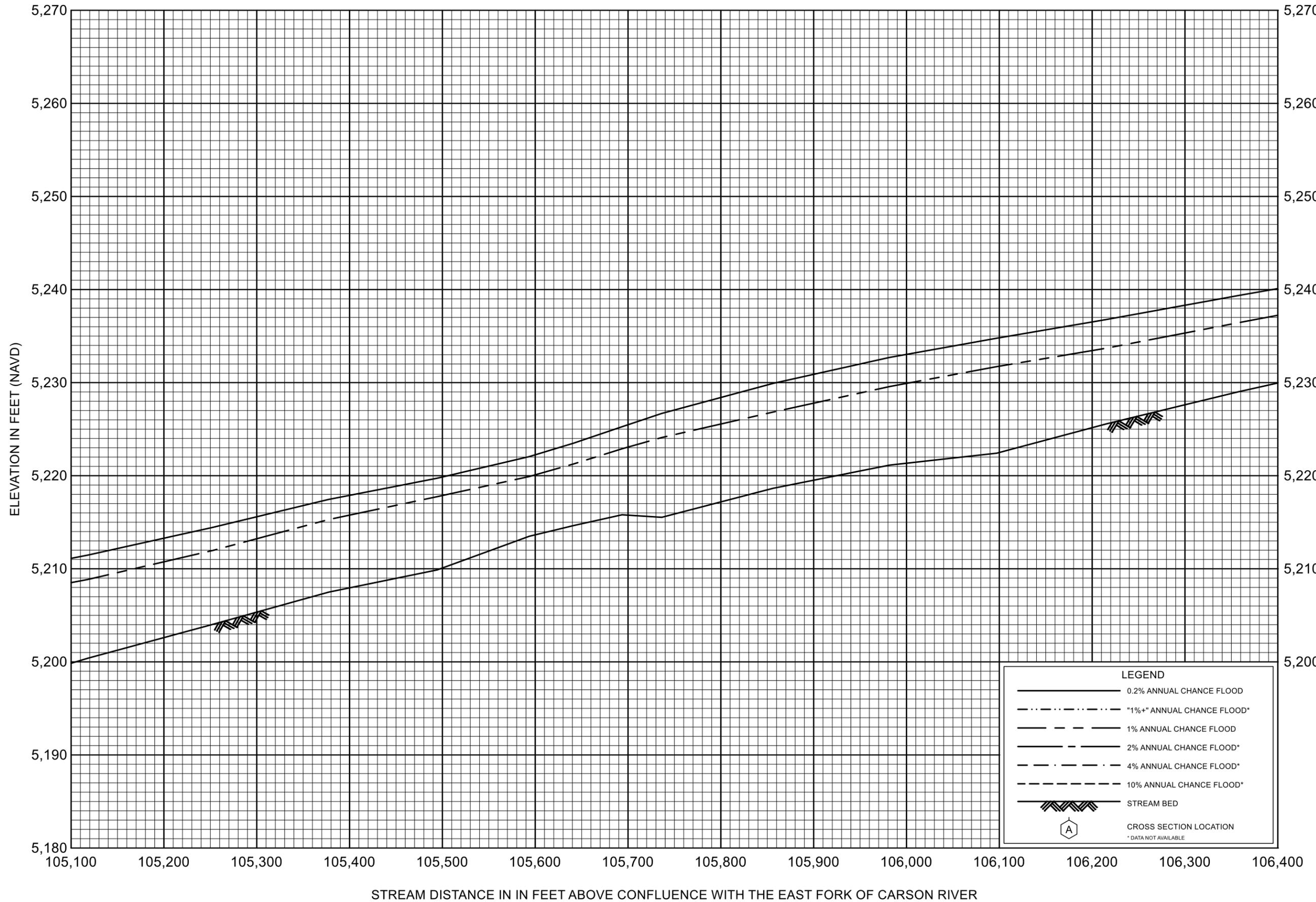
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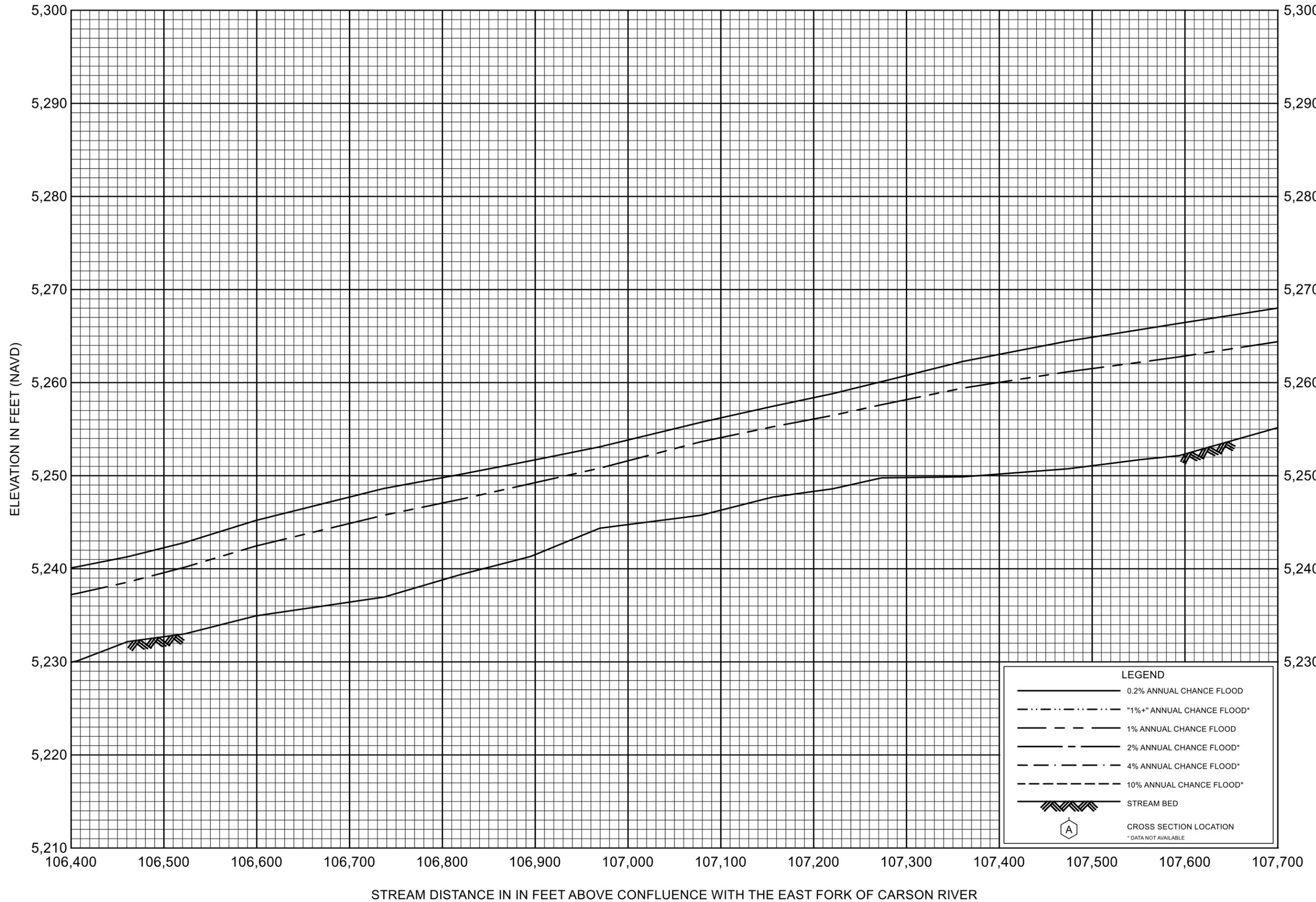
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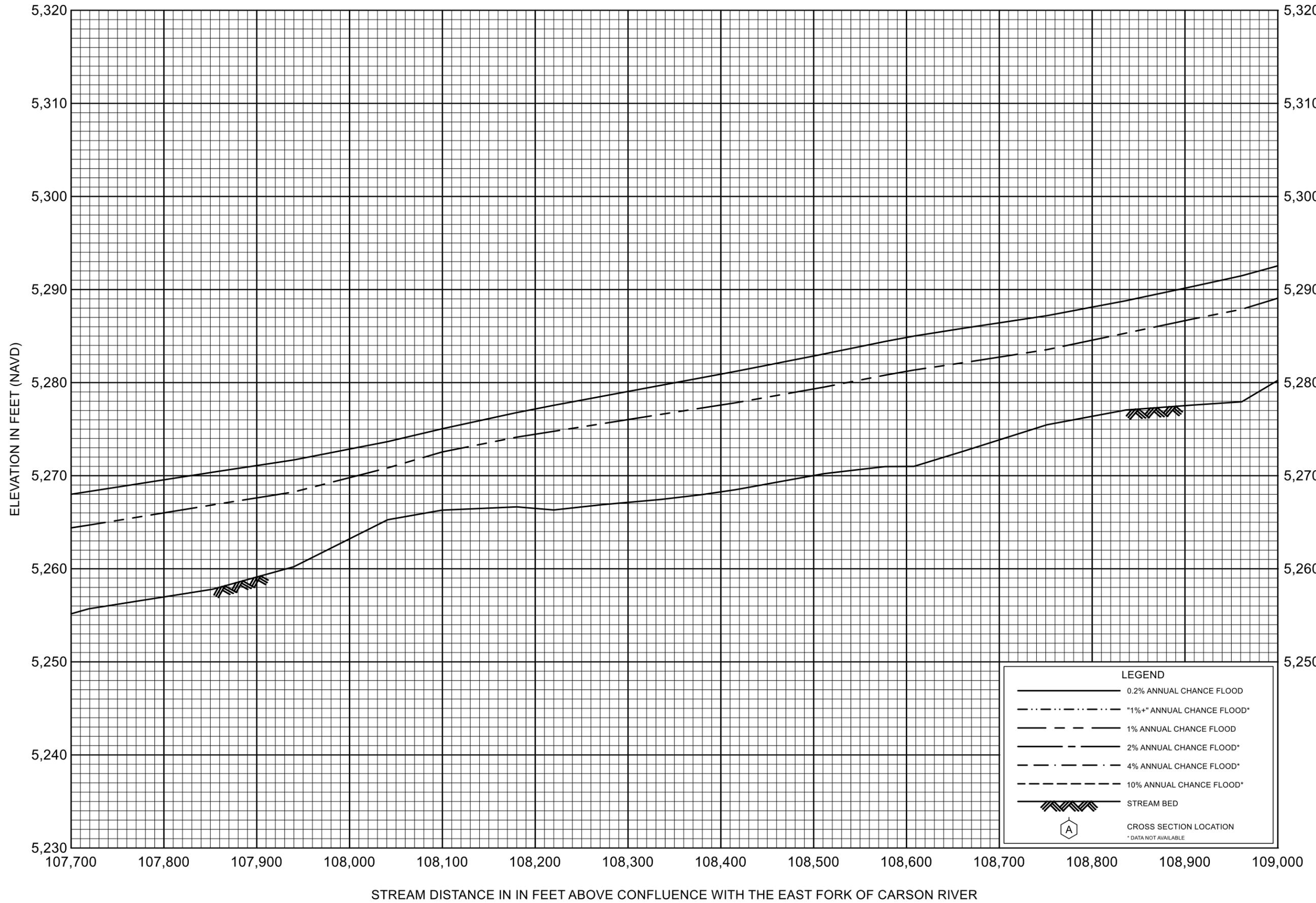
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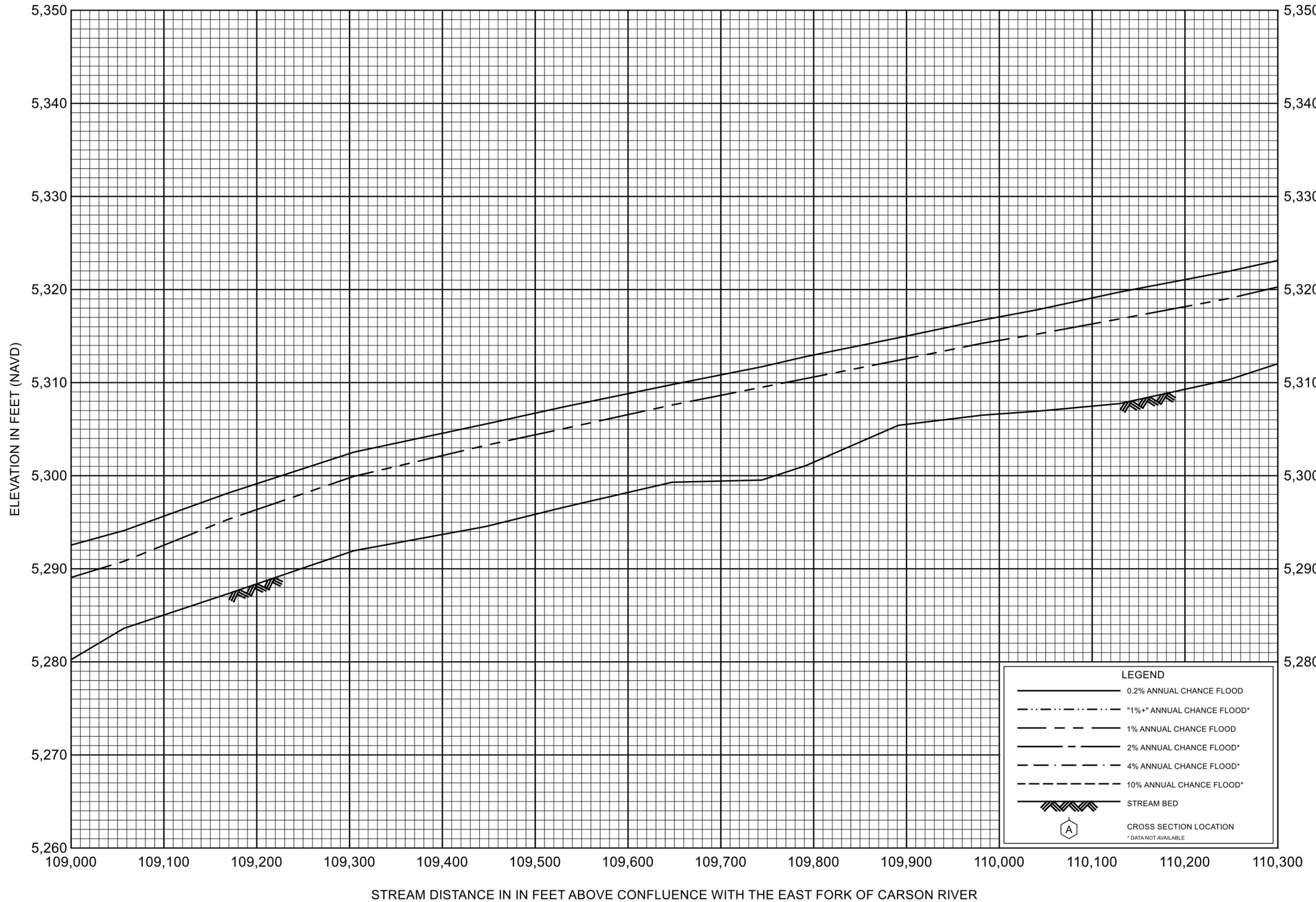
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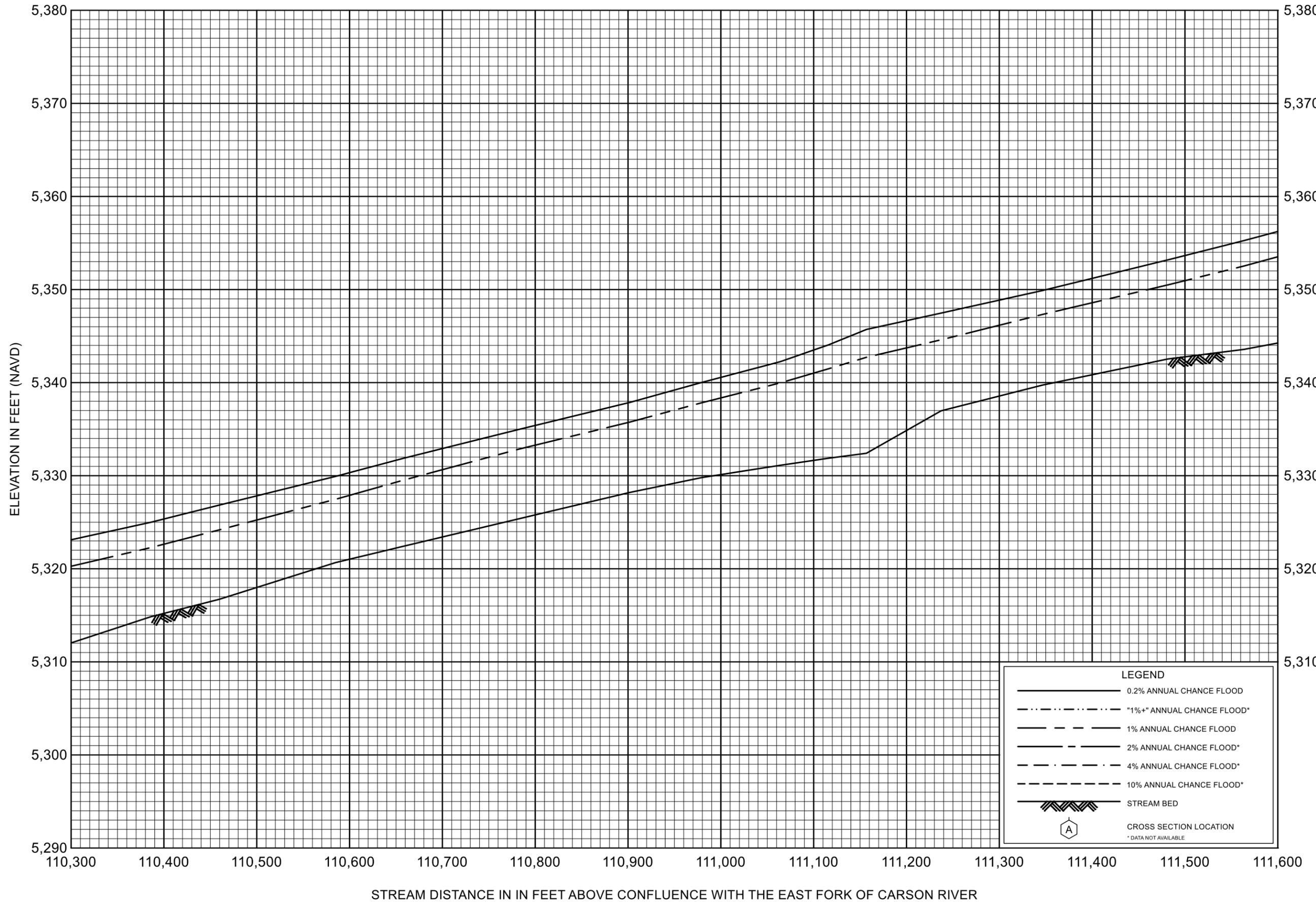
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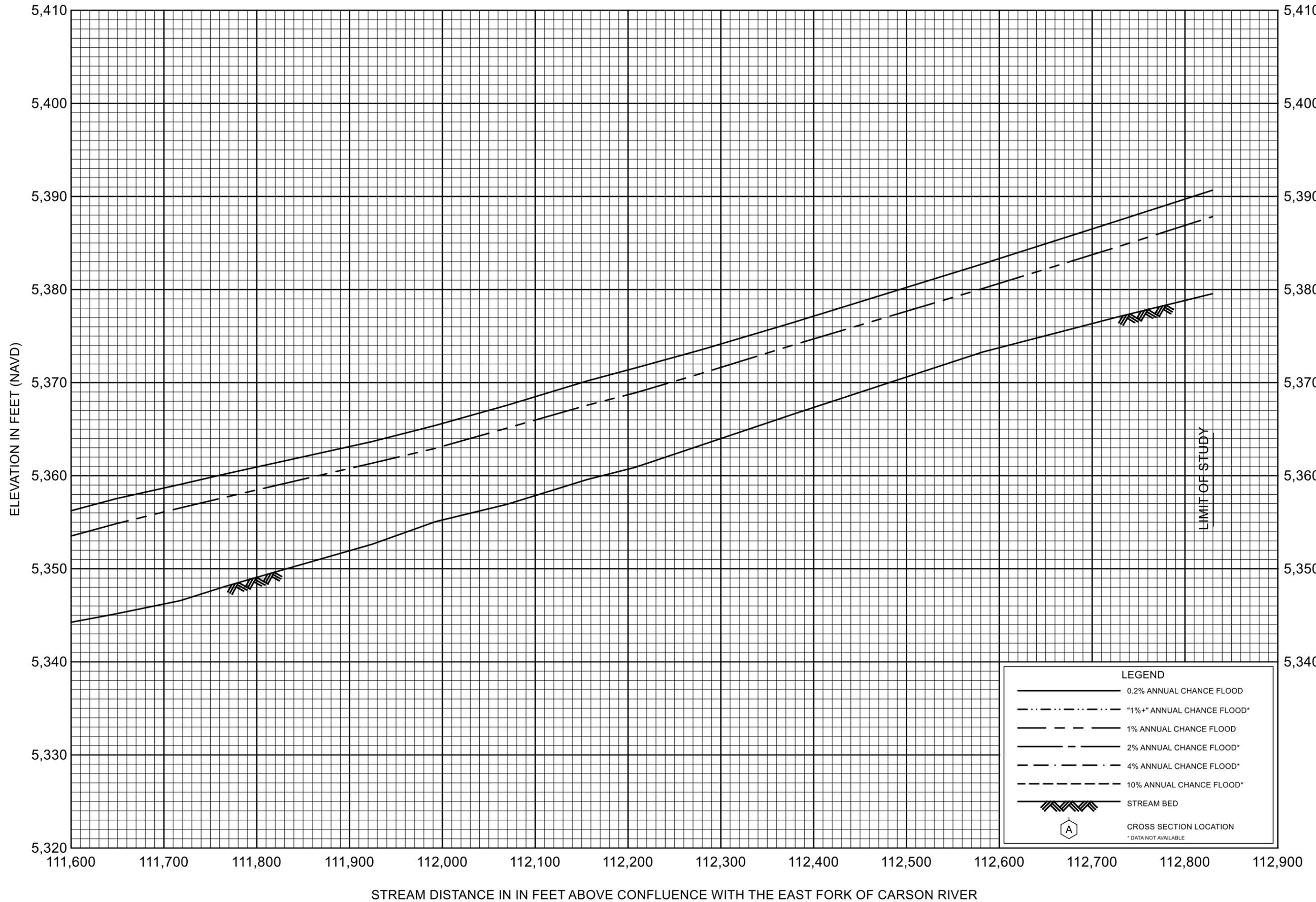
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