CONDITIONAL
LETTER OF MAP REVISION
US-34A and US-34D
PERMANENT FLOOD REPAIRS

~~June 25, 2014~~ REVISED 8/26/2014

Prepared for:
Colorado Department of Transportation, Region 4
20068, PR 0342-057

Submitted to:
FEMA Region VIII / Weld County

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TSH Project No. 1400416D

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DRAWINGS

PROPOSED US-34A BRIDGE OVER SECONDARY CHANNEL (4 SHEETS)

AS-BUILT PLANS OF US-34A BRIDGE OVER MAIN CHANNEL (3 SHEETS)

AS-BUILT GENERAL LAYOUT OF US-34D BRIDGE OVER MAIN CHANNEL (1 SHEET)

AS-BUILT US-34A CULVERT FOR LATHAM DITCH OUTLET (1 SHEET)

AS-BUILT US-34D CULVERTS (5 SHEETS)

WORKMAP – CORRECTED EFFECTIVE WITH 5' CONTOURS (1 SHEET)

WORKMAP – REVISED EFFECTIVE WITH 5' CONTOURS (1 SHEET)

WORKMAP – CORRECTED EFFECTIVE WITH EXISTING FIRM (1 SHEET)

WORKMAP – REVISED EFFECTIVE WITH EXISTING FIRM (1 SHEET)

ELECTRONIC FILES (ON CD)

PDF OF THIS REPORT

PDF OF DRAWINGS (SEE ABOVE)

CURRENT EFFECTIVE FIRM MAPS (SCANNED)

CORRECTED EFFECTIVE / REVISE EFFECTIVE WORKMAPS

ORIGINAL HEC-2 MODEL (SCANNED)

US34PR HEC-RAS (VERSION 4.1.0)

INPUT/OUTPUT FOR 2-DIMENSIONAL MODEL AdH

WORKMAP ELECTRONIC GIS FILES (ARCVIEW)

PURPOSE AND NEED

This CLOMR has been prepared for the purpose of documenting the changes in flood elevations associated with the repair of two highway routes, US-34A and US-34D that cross the South Platte River in Weld County, Colorado. These two highways were severely damaged by the September 2013 flood on the South Platte River. They are in urgent need of permanent repairs as they are critical transportation routes that serve the City of Greeley and surrounding areas of northern Colorado. The damaged highways are located within the limits of FEMA disaster declaration DR-4145. Map changes are based on the effects of natural changes in stream course that occurred within the SFHA of the South Platte River.

Repairs to US-34D consist of reconstructing the highway embankment to current Colorado Department of Transportation (CDOT) standards. The profile of US-34D will remain unchanged but the cross section of the roadway embankment will be widened to provide standard shoulders and embankment slopes. The width of the new roadway embankment will average 88 feet compared to the current width of 60 feet. Drainage improvements to US-34A will reduce the flood elevations at US-34D, which allows the profile to remain unchanged.

Repairs to US-34A are more extensive and consist of adding a new bridge to cross a secondary channel of the South Platte River that is located on the right overbank of the floodplain. The new bridge will supplement the existing 10-foot by 6-foot box culvert. This culvert will now function solely as an irrigation slough. Because of the critical role of this highway in the state transportation system, the highway needs to be passable during a 100-year flood event. The new bridge will increase the resiliency of the highway by meeting CDOT design standards for 100-year flow capacity, structure freeboard and foundation scour. An additional box culvert will be located north of the new bridge at the lowest point in the highway profile to prevent overtopping of the highway. In addition to these drainage improvements, the alignment of US-34A will be improved to provide increased design speed and acceleration / deceleration lanes for the intersection with US-34D. The width of the highway will increase slightly to accommodate the additional lane width and the alignment will shift to the south to accommodate the longer curves needed for the higher design speed.

OVERVIEW & CONCURRENCE FORM (3 PAGES)

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

☒ CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☐ LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Example: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
080266	Weld County	CO	0637C	0637C	09/28/82
080266	Weld County	CO	0639C	0639C	09/28/82

2. a. Flooding Source: South Platte River

   b. Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH) ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: US-34 Permanent Repair / CDOT Proj. No. 20068, PR 0342-057

4. FEMA zone designations affected: A6 (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

   a. The basis for this revision request is (check all that apply)

   ☒ Physical Change ☐ Improved Methodology/Data ☐ Regulatory Floodway Revision ☐ Base Map Changes
   ☐ Coastal Analysis ☒ Hydraulic Analysis ☐ Hydrologic Analysis ☐ Corrections
   ☐ Weir-Dam Changes ☐ Levee Certification ☐ Alluvial Fan Analysis ☒ Natural Changes
   ☒ New Topographic Data ☐ Other (Attach Description)

   Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following structures (check all that apply)

Structures: ☐ Channelization ☐ Levee/Floodwall ☒ Bridge/Culvert

☐ Dam ☐ Fill ☐ Other (Attach Description)

6. ☐ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $4400

☐ No, Attach Explanation

Please see the DHS-FEMA Web site at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm **for Fee Amounts and Exemptions.**

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name:	Company:	
Mailing Address:	Daytime Telephone No.:	Fax No.:
	E-Mail Address:	
Signature of Requester (required):	Date:	

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title:	Community Name:	
Mailing Address:	Daytime Telephone No.:	Fax No.:
	E-Mail Address:	
Community Official's Signature (required):	Date:	

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: George K Cotton	License No.: 19501	Expiration Date: 10/31/2015
Company Name: Tsiouvaras Simmons Holderness	Telephone No.: 303.771.6200	Fax No.: 303.771.6800
Signature:	Date:	E-Mail Address: george.cotton@tshengineering.com

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	Required if …
☒ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☒ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans

Seal (Optional)

RIVERINE HYDROLOGY & HYDRAULICS FORM (3 PAGES)

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

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PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: South Platte River

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☒ Not revised (skip to section B) ☐ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☐ Precipitation/Runoff Model → Specify Model: _____
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation..

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit*	1,316,800	F	4615.6 (NAVD88)	4615.6
Upstream Limit*	1,339,430	S	4641.3 (NAVD88)	

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: HEC-RAS version 4.1.0

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4.

Models Submitted	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name: US34PR	Plan Name: DE	File Name:	Plan Name:	NAVD88
Corrected Effective Model*	File Name: US34PR	Plan Name: CE	File Name:	Plan Name:	NAVD88
Existing or Pre-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	
Revised or Post-Project Conditions Model	File Name: US34PR	Plan Name: RE	File Name:	Plan Name:	NAVD88
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

* For details, refer to the corresponding section of the instructions.

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A **certified topographic work map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

☒ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: Post flood arial LiDAR survey of South Platte Rive

Source: U.S. Geological Survey Date: October 2013 to January 2014

Accuracy: 0.1 ft RMSEv (0.2 ft LE95)

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☒ No

   a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:

      - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
      - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.

   b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☐ Yes ☐ No

      If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notifications can be found in the MT-2 Form 2 Instructions.

2. Does the request involve the placement or proposed placement of fill? ☒ Yes ☐ No

   If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

   If Yes, attach **evidence of regulatory floodway revision notification**. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being established. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA).

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

RIVERINE STRUCTURES FORM (4 PAGES)

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B. NO. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

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DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: South Platte River

Note**:** Fill out one form for each flooding source studied.

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization.....complete Section B
Bridge/Culvert.....complete Section C
Dam.....complete Section D
Levee/Floodwall.....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Modeled Structure

1. Name of Structure: US-34A - Secondary Channel / CDOT Structure No. CE-18-FE (NEW) also include existing CBC

   Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: Right overbank secondary channel

   Downstream Limit/Cross Section: M

   Upstream Limit/Cross Section: N

2. Name of Structure: US-34A - Main Channel / CDOT Structure No. C-18-ED and C-18-EQ (EXISTING)

   Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: Main channel / River distance

   Downstream Limit/Cross Section: M

   Upstream Limit/Cross Section: N

3. Name of Structure: US-34D - Main Channel / CDOT Structure No. C-18-J (EXISTING)

   Type (check one) ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: Main Channel / River distance

   Downstream Limit/Cross Section: I

   Upstream Limit/Cross Section: J

NOTE: FOR MORE STRUCTURES, ATTACH ADDITIONAL PAGES AS NEEDED.

B. CHANNELIZATION

Flooding Source: NOT USED

Name of Structure: _____

1. Hydraulic Considerations

The channel was designed to carry _____ (cfs) and/or the _____-year flood.

The design elevation in the channel is based on (check one):

☐ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions

☐ Other locations (specify): _____

2. Channel Design Plans

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Accessory Structures

The channelization includes (check one):

☐ Levees [Attach Section E (Levee/Floodwall)] ☐ Drop structures ☐ Superelevated sections

☐ Transitions in cross sectional geometry ☐ Debris basin/detention basin [Attach Section D (Dam/Basin)] ☐ Energy dissipator

☐ Weir ☐ Other (Describe):

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: South Platte River

Name of Structure: CE-18-FE and existing Latham Outlet box cuvlert previously not modeled

1. This revision reflects (check one):

☒ Bridge/culvert not modeled in the FIS

☐ Modified bridge/culvert previously modeled in the FIS

☐ Revised analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): HEC-RAS
If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

☒ Dimensions (height, width, span, radius, length)

☐ Shape (culverts only)

☐ Material

☐ Beveling or Rounding

☐ Wing Wall Angle

☒ Skew Angle

☒ Distances Between Cross Sections

☒ Erosion Protection

☒ Low Chord Elevations – Upstream and Downstream

☒ Top of Road Elevations – Upstream and Downstream

☒ Structure Invert Elevations – Upstream and Downstream

☒ Stream Invert Elevations – Upstream and Downstream

☒ Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

B. CHANNELIZATION

Flooding Source: NOT USED

Name of Structure: _____

1. Hydraulic Considerations

The channel was designed to carry _____ (cfs) and/or the _____-year flood.

The design elevation in the channel is based on (check one):

☐ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions

☐ Other locations (specify): _____

2. Channel Design Plans

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Accessory Structures

The channelization includes (check one):

☐ Levees [Attach Section E (Levee/Floodwall)] ☐ Drop structures ☐ Superelevated sections

☐ Transitions in cross sectional geometry ☐ Debris basin/detention basin [Attach Section D (Dam/Basin)] ☐ Energy dissipator

☐ Weir ☐ Other (Describe):

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: South Platte River

Name of Structure: C-18-ED and C-18-EQ

1. This revision reflects (check one):

☐ Bridge/culvert not modeled in the FIS

☐ Modified bridge/culvert previously modeled in the FIS

☒ Revised analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): HEC-RAS
If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

☒ Dimensions (height, width, span, radius, length)

☐ Shape (culverts only)

☐ Material

☐ Beveling or Rounding

☐ Wing Wall Angle

☒ Skew Angle

☒ Distances Between Cross Sections

☒ Erosion Protection

☒ Low Chord Elevations – Upstream and Downstream

☒ Top of Road Elevations – Upstream and Downstream

☒ Structure Invert Elevations – Upstream and Downstream

☒ Stream Invert Elevations – Upstream and Downstream

☒ Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

B. CHANNELIZATION

Flooding Source: NOT USED

Name of Structure: _____

1. Hydraulic Considerations

The channel was designed to carry _____ (cfs) and/or the _____-year flood.

The design elevation in the channel is based on (check one):

☐ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions

☐ Other locations (specify): _____

2. Channel Design Plans

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Accessory Structures

The channelization includes (check one):

☐ Levees [Attach Section E (Levee/Floodwall)] ☐ Drop structures ☐ Superelevated sections

☐ Transitions in cross sectional geometry ☐ Debris basin/detention basin [Attach Section D (Dam/Basin)] ☐ Energy dissipator

☐ Weir ☐ Other (Describe):

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: South Platte River

Name of Structure: C-18-J

1. This revision reflects (check one):

☐ Bridge/culvert not modeled in the FIS

☐ Modified bridge/culvert previously modeled in the FIS

☒ Revised analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): HEC-RAS
If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

☒ Dimensions (height, width, span, radius, length)

☐ Shape (culverts only)

☐ Material

☐ Beveling or Rounding

☐ Wing Wall Angle

☒ Skew Angle

☒ Distances Between Cross Sections

☒ Erosion Protection

☒ Low Chord Elevations – Upstream and Downstream

☒ Top of Road Elevations – Upstream and Downstream

☒ Structure Invert Elevations – Upstream and Downstream

☒ Stream Invert Elevations – Upstream and Downstream

☒ Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

Photo 1. Looking west on US-34A, up valley along the right overbank of the South Platte River. Intersection with US-34D is shown, just west of the roadway breach failure (photo taken by Colorado Civil Air Patrol). There were two overtopping locations that damaged the highway. The westerly overtopping is labeled as the "Spill", which is the lowest elevation in the highway profile of US-34A across the South Platte River floodplain. The highway embankment breached further to the east at the location labeled "Breach" where the valley of the right overbank is deepest. The secondary channel within the right overbank is clearly visible in this photo, as is the overflow from the main channel to the secondary channel (upper left corner of the photo).

Photo 2. Looking north on US-34D at flood damage as a result of roadway overtopping (photo taken by TSH Engineering)

Photo 3. Looking west on US-34A near the "Breach" before failure (September 12, 2013) (photo taken by Colorado Department of Transportation). The overtopping extended west of the intersection with US-34D.

Photo 4. Looking west on US-34A near the "Breach" at highway damage following flood (photo taken by Colorado Department of Transportation)

METHOD OF COMPUTING
FLOW SPLIT TO SECONDARY CHANNEL OF SOUTH PLATTE RIVER

Observed Flow Pattern

The September 2013 flood allowed for observation of floodplain flow patterns in the reach of South Platte River between US-34 and US-85. Both ground reconnaissance, aerial and satellite imagery of flooding were made during and after the flooding. Figure 1 summarizes the observed flow pattern of the 2013 flood.

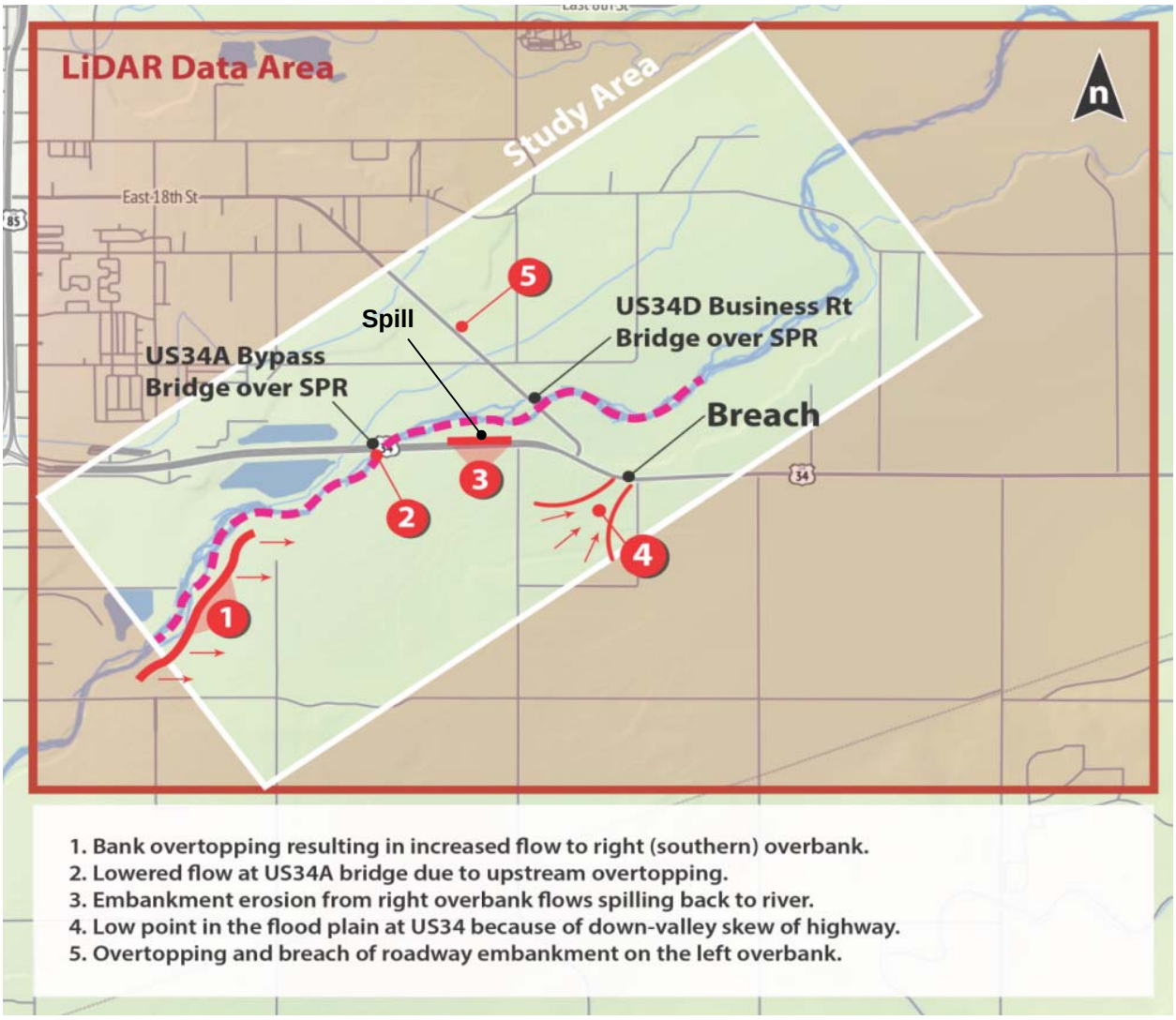


Figure 1. Conceptual summary of flow patterns observed during the 2013 flood

While the FIS shows the pattern of flow on the floodplain as a parallel to the main channel of the South Platte River, this was not the flow pattern observed during the 2013 flood. Instead, flows were observed to spill from the right bank of the river to the floodplain and then concentrate

along the US-34A highway embankment, unable to return to the main river channel. The result was overtopping of the highway at two locations, with the eventually breaching of the highway at the most easterly location. The overflow to the right overbank of the floodplain concentrated in a secondary channel that parallels the main channel. Historically, this channel has been used as a slough for irrigation tailwater and as a spillway for the Latham Ditch. Geomorphically, the secondary channel is the floodplain conveyance for Bebe Draw, a 180 square mile plains tributary of the South Platte River that is now dammed by Latham Reservoir.

The main direction of the overflow from the South Platte River to the right overbank is directly east, across WRC-43 and WCR-45. These county roads act to control flow depths on the right overbank. However, these roads slope down valley and are complex to model using weir flow routines available in HEC-RAS. As the flow approaches US-34A, some flow in the right overbank returns to the main channel. The dividing line between flow that stays in the right overbank or returns to the main channel is not defined by a topographic feature.

Given the complex flow pattern within the right overbank, the decision was made to evaluate the flow split using a 2-dimensional model. Split flows were then input into the 1-dimensional model that is the basis for the revised calculation of FIS flood elevations.

The Army Corps of Engineers AdH program (version 4.4) was used to compute the 2-dimensional flow pattern in the reach of the South Platte River from FIS cross section “F” to US-85. ADH is a finite element hydraulic model, developed and maintained by the ACE Coastal Hydraulics Laboratory. Pre- and post-processing was performed using the Surface Water Modeling System (SMS) software (Aquaveo, 2014). Topographic data was obtained from post flood LiDAR survey (UTM coordinates and metric units) contracted by the U.S. Geological Survey. Floodplain and channel roughness were mapped based on land use and were consistent with roughness values that were used in the effective HEC-2 model. In the overbank areas the finite element mesh has a spatial resolution of 30 meters, and near the bridges the mesh was refined to 8 meters. Figure 2 shows an overview of the AdH model.

AdH was used to estimate the bankfull capacity of the South Platte River, and to determine split flow to the right overbank for the 10-, 50- and 100-year floods. The 500-year split flow was determined by trial and error by balancing water surface elevations at upper end of the secondary channel with water surface elevation in the main channel. Split flow was sampled at an overbank transect located above the “Spill” location on US-34A (see Figure 3). That resulting split flow estimates are summarized in Table 1.

Table 1. Summary of Split Flows to Right Overbank

Frequency	Bankfull	10-year	50-year	100-year	500-year
Total Discharge, cfs	7,000	11,000	24,500	32,500	57,500
Split Flow, cfs	0	3,960	13,100	18,000	32,775
% of Total	0%	36.0%	53.5%	55.4%	57.0%

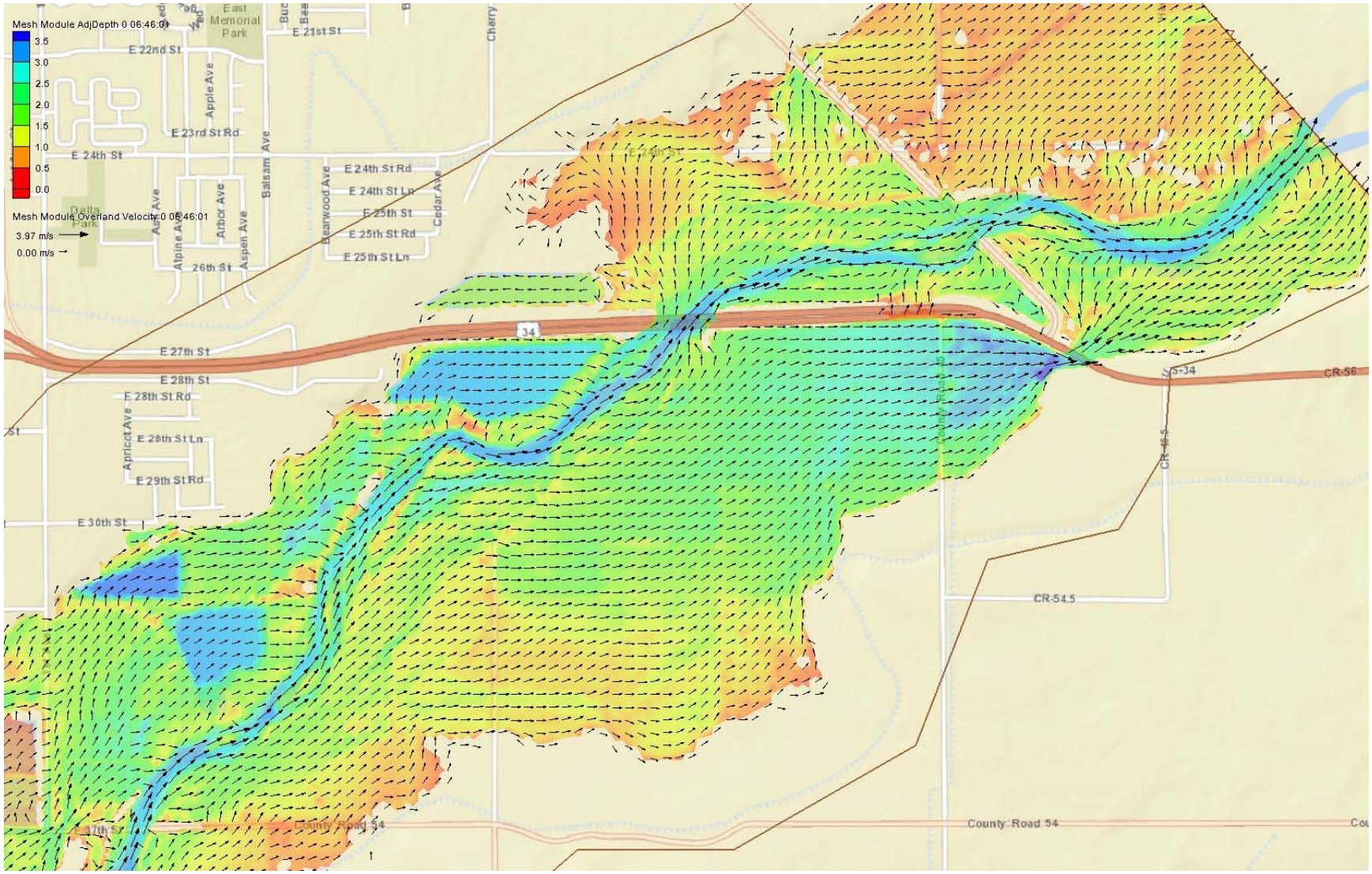


Figure 2. Overview of 100-year flood flow pattern near US-34A and US-34D (depth in meters)

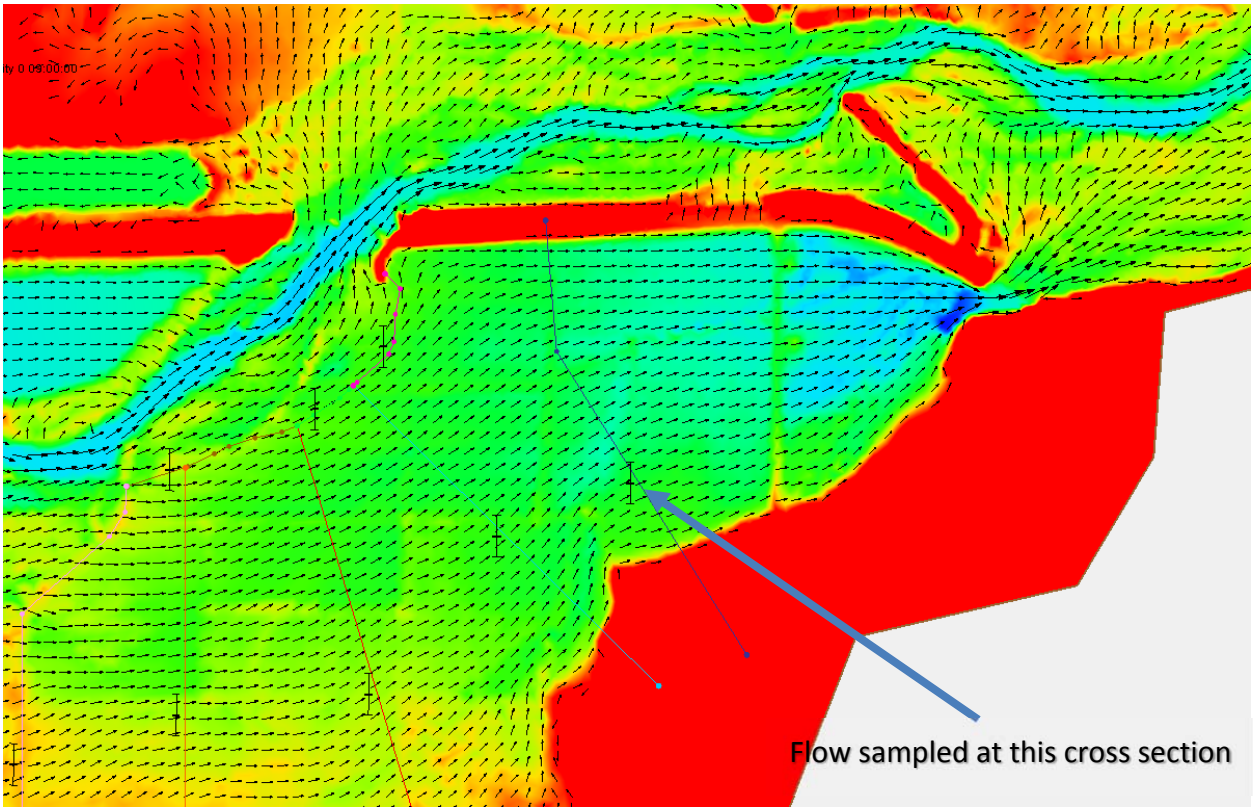


Figure 3. Detail of 2-dimensional split flow showing location of cross section for flow measurement

MAPPING DATUM

Post-flood airborne topographic LiDAR was performed by Photo Science under contract to the U.S. Geological Survey for areas within the South Platte watershed in Colorado. The accuracy of the topographic mapping was evaluated by an independent survey of ground points (Compass Data). The USGS project was jointly funded and coordinated with FEMA, the State of Colorado, and the Denver Regional Council of Governments (DRCOG).

Project specifications (see reference sited below):

Accuracy: 3 cm RMSEz (6 cm LE95)
Coordinate system: NAD83 (2011)
Vertical Datum: NAVD88 (Geoid 12A)
Projection: UTM and Colorado State Plane
Zone: 13 North
Units: Meters and U.S. Survey Feet
Survey date: October 2013 - January 2014

Source: Photo Science, 2014, "Report of Survey - Ground and Quality Control Points, South Platte River, Colorado Flood LiDAR" prepared for the U.S. Geological Survey (USGS Contract G10PC00026, Task Order G14D00001), January 31, 2014.

For this project, the 2-dimensional modeling was performed in the original UTM projection (metric units). For the HEC-RAS analysis, the mapping was converted to the State Plane projection, Colorado North Zone.

STARTING WATER SURFACE ELEVATIONS

Water surface elevations were obtained from the effective model at FIS cross section F (HEC-2 cross-section 3) and were used as the downstream starting water surface elevations. Elevations from the original HEC-2 printouts are in the NGVD29 vertical datum. According to the new FIS for Weld County the conversion from NGVD29 to NAVD88 on the South Platte River is 2.7 feet (e-mail from Gladwell to Cotton of pages from the new Weld County FIS). Table 2 summarizes starting water surface elevations at FIS cross section F.

Table 2. Starting water surface elevations (FIS cross section F)

Frequency	10-year	50-year	100-year	500-year
Total Discharge, cfs	11,000	24,500	32,500	57,500
Elevation (NAVD88)	4611.34	4614.08	4615.60	4617.61
Elevation (NGVD29)	4608.64	4611.38	4612.90	4614.91

DESCRIPTION OF HYDRAULIC MODEL CORRECTIONS AND REVISIONS

Description of Duplicate Effective Model

A scanned copy of the effective model for the South Platte River in Weld County was obtained from the Public Works Department of Weld County. The FIRM work maps were also obtained and scanned. HEC-2 information is dated October and November 1977. The HEC-2 data was converted to HEC-RAS version 4.1.0 for this restudy. There are no map-revisions within the study reach for this project.

New studies have been completed upstream of WCR-54 (FIS cross-section "T") and downstream of FIS cross-section "G". Our understanding is that the upstream project is an approved LOMR. The downstream tie-in for that LOMR is upstream of the tie-in for this CLOMR (FIS cross-section "S"). It is our understanding that the downstream CLOMR is currently in review. The upstream tie-in for this project is FIS cross-section "G". This cross section is located within the split flow reach of the FIS. Flood observations and our analysis show that this split flow does not exist. The downstream tie-in for our CLOMR is therefore at FIS cross-section "F". This cross section is a full valley cross section.

Description of Corrected Effective Model

The corrected effective model includes:

- New LiDAR mapping was used to update FIS cross sections "G" through "O". Cross-section layout was based on FIS work maps. There was general agreement between the new and old cross sections with the new topography providing increased detail.
- Channel and overbank roughness coverage was updated to be consistent with the pattern of land use within the river valley.
- The geometries of the main channel bridges for highways US-34A and US-34D were updated to more accurately show pier, abutment and superstructure based on as-built drawings. Existing floodplain reliever culverts were added to the bridge analysis for US-34D, making this a multi-opening analysis.
- The split flow on the left overbank downstream of US-34D was eliminated. This split was based on the assumption that an uncertified levee along the left bank of the river would prevent floodwater from entering the left overbank. Flood observations and 2-dimensional modeling show numerous penetrations of this levee and that it was not an ineffective flow barrier.
- A river branch was added to the model to account for the secondary channel on the right overbank of the floodplain. The secondary channel branch includes the existing Latham Ditch 10' by 6' box culvert under US-34A.
- An additional "spill" branch was added that allows flow to overtop US-34A at the low profile and return to the main channel as was observed during the 2013 flood.
- Flow in the secondary channel was determined by trial and error by balancing the water surface elevation near the upper end of the secondary channel branch with the nearest upstream main channel cross section. Based on flood history, it was assumed that no prior overtopping of US-34A had occurred. The largest flood prior to 2013 flood occurred in 1995 with an estimated peak flow at US-34A of 19,500 cfs.

Description of Revised Effective Model

The revised effective model includes:

- The geometry of the proposed bridge over the secondary channel was added. The existing Latham Ditch culvert was maintained in the cross-section making this a multi-opening bridge/culvert analysis.
- A new 12'x6' box culvert was added to the "spill" branch through US-34A.
- Split flows to the secondary channel were determined based 2-dimensional modeling (see "Method of computing flow split to secondary channel of South Platte River").

TABULATION OF FLOOD ELEVATIONS AND DIFFERENCES

There is a decrease in floodplain elevations due to the construction of an additional bridge for highway US-34A over the right overbank secondary channel of the South Platte River. Table 3 summarizes 100-year water surface elevations for the duplicate effective (DE), corrected effective (CE), and revised effective (RE) conditions. The water surface elevations are for the main channel of the South Platte River. All elevations are given in the NAVD88 datum.
No changes are proposed to the floodway in this reach of the South Platte River. Since the proposed project will not alter the floodway boundaries, no floodway analysis was conducted for this CLOMR.

Table 3. Computed 100-year Water Surface Elevations (WSEL).

Cross-Section		River	100-year WSEL		
FIS	HEC-2	Distance	DE	CE	RE
F	3	1316800	4615.60	4615.60	4615.60
G	4	1321021	4618.02	4618.04	4618.04
H	5	1323241	4622.39	4622.16	4622.16
	5.5	1324751			
I	52	1325971	4624.53	4626.01	4625.08
Bridge		1326070	4627.22		
J	53	1326071	4627.59	4627.09	4625.47
K	6	1326891	4628.56	4628.17	4626.23
L	7	1328521	4629.52	4629.34	4627.50
M	8	1329361	4630.12	4630.02	4628.66
Bridge	8.2	1329405			
		1329406	4630.22		
	8.4	1329470	4630.29		
		1329510			
N	9	1329515	4630.38	4633.25	4631.02
O	10	1330845	4631.73	4634.16	4631.99
P	11	1333055	4632.79	4634.47	4633.09
Q	12	1334685	4634.89	4635.08	4634.87
R	13	1337195	4639.29	4639.32	4639.37
S	55	1339345	4641.71	4641.75	4641.73

(1) FIS cross-sections in bold are original HEC-2 cross sections.

Table 4 summarizes the proposed change in 100-year water surface elevation for the corrected and revised conditions. Water surface elevations are generally lower by 0.9 to 2.2 feet between the US-34D and US-34A bridges. Water surface elevations remain lower in the reach between US-34A and WCR-54 (37th Avenue), matching back to existing water surface elevations at FIS cross section "S".

Table 4. Difference in computed 100-year Water Surface Elevations (WSEL)

Cross-Section		River	100-year WSEL	
FIS	HEC-2	Distance	CE-DE	RE-CE
F	3	1316800	0.00	0.00
G	4	1321021	0.02	0.00
H	5	1323241	-0.23	0.00
	5.5	1324751		
I	52	1325971	1.48	-0.93
Bridge		1326070		
J	53	1326071	-0.50	-1.62
K	6	1326891	-0.39	-1.94
L	7	1328521	-0.18	-1.84
M	8	1329361	-0.10	-1.36
Bridge	8.2	1329405		
		1329406		
	8.4	1329470		
		1329510		
N	9	1329515	2.87	-2.23
O	10	1330845	2.43	-2.17
P	11	1333055	1.68	-1.38
Q	12	1334685	0.19	-0.21
R	13	1337195	0.03	0.05
S	55	1339345	0.04	-0.02

TABULATION OF FLOODWAY INFORMATION

Floodway limits were modified for the corrected effective model and new floodway limits were added for the secondary channel in revised effective model. The resulting surcharges are summarized in Table 5a for the corrected effective model and Table 5b for the revised effective model.

A revised effective floodway analysis was added to the HEC-RAS model for the "Secondary Channel". The floodway delineation also preserves flow capacity for overflow to a new cross culvert, which is referred to as the "Spill Channel". The resulting surcharges are summarized in Table 5c for the corrected effective model and Table 5d for the revised effective model.

Table 5a. Corrected Effective Floodway

Letter of Map Revision		Base Flood Water Surface Elevation		
Cross Section	Distance, ft	without Floodway	with Floodway	Increase
F	1316800	4615.60	4615.80	0.20
G	1321020	4618.04	4619.04	1.00
H	1323460	4622.16	4622.22	0.06
I	1325582	4626.01	4626.76	0.75
I	1326071	4627.09	4627.91	0.82
J	1325789	4628.17	4628.99	0.82
K	1326880	4628.17	4628.99	0.82
L	1328510	4629.34	4630.09	0.75
M	1329258	4630.02	4630.65	0.63
N	1330034	4633.25	4633.35	0.10
O	1330930	4634.16	4634.33	0.17
P	1333140	4634.47	4634.88	0.41
Q	1334770	4635.08	4636.05	0.97
R	1337280	4639.32	4639.64	0.32
S	1339430	4641.75	4642.63	0.88

Table 5b. Revised Effective Floodway – Main Channel

Letter of Map Revision		Base Flood Water Surface Elevation		
Cross Section	Distance, ft	without Floodway	with Floodway	Increase
F	1316800	4615.60	4615.80	0.20
G	1321020	4618.04	4619.04	1.00
H	1323460	4622.16	4622.22	0.06
I	1325582	4625.08	4625.83	0.75
I	1326071	4625.47	4626.06	0.59
J	1325789	4626.23	4626.81	0.58
K	1326880	4627.50	4628.20	0.70
L	1328510	4628.66	4629.08	0.42
M	1329258	4631.02	4631.09	0.07
N	1330034	4631.99	4632.15	0.16
O	1330930	4633.09	4633.68	0.59
P	1333140	4634.87	4635.77	0.90
Q	1334770	4639.37	4639.69	0.32
R	1337280	4641.73	4642.62	0.89
S	1339430	4615.60	4615.80	0.20

Table 5c. Corrected Effective Floodway – Secondary Channel

Letter of Map Revision		Base Flood Water Surface Elevation		
Cross Section	Distance, ft	without Floodway	with Floodway	Increase
	830.28	4623.75	4624.42	0.67
	1271.35	4628.49	4628.49	0.00
	1535.144	4633.95	4633.95	0.00
	1992.716	4633.95	4633.95	0.00
	2531.345	4633.95	4633.95	0.00
	2983.796	4633.95	4633.95	0.00
	4686.703	4633.95	4633.96	0.00
	5704.566	4633.96	4633.96	0.00

Corrected Effective Floodway – Secondary Spill Channel

Letter of Map Revision		Base Flood Water Surface Elevation		
Cross Section	Distance, ft	without Floodway	with Floodway	Increase
	644.159	4628.37	4629.35	0.97
	1018.617	4633.95	4633.95	0.00

Table 5d. Revised Effective Floodway – Secondary Channel

Letter of Map Revision		Base Flood Water Surface Elevation		
Cross Section	Distance, ft	without Floodway	with Floodway	Increase
	830.28	4624.44	4625.31	0.87
	1271.35	4625.87	4625.88	0.02
	1535.144	4628.90	4629.13	0.23
	1992.716	4630.19	4630.47	0.28
	2531.345	4630.54	4631.22	0.68
	2983.796	4630.64	4631.42	0.77
	4686.703	4630.98	4631.85	0.87
	5704.566	4631.28	4632.25	0.96

Revised Effective Floodway – Secondary Spill Channel

Letter of Map Revision		Base Flood Water Surface Elevation		
Cross Section	Distance, ft	without Floodway	with Floodway	Increase
	644.159	4626.86	4627.77	0.91
	1018.617	4630.66	4630.66	0.00

LETTER FROM U.S. FISH AND WILDLIFE SERVICE ON T&E IMPACTS

United States Department of the Interior

FISH AND WILDLIFE SERVICE
COLORADO FIELD OFFICE/LAKEWOOD
P.O. BOX 25486, DENVER FEDERAL CENTER
DENVER, COLORADO 80225-0486

IN REPLY REFER TO
ES/CO: CDOT
TAILS: 06E24000-2014-I-0670; 06E24000-2013-B-0007

JUN - 5 2014

Jeff Peterson
Colorado Department of Transportation
4201 East Arkansas Avenue, Shumate Building
Denver, Colorado 80222

Dear Mr. Peterson:

Under the authority conferred by the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 *et seq.*), on June 3, 2013, the U.S. Fish and Wildlife Service (Service) received your report regarding construction of permanent repairs to US34A and US34D east of Greeley, Weld County, Colorado, and its potential effects on the Preble's meadow jumping mouse (*Zapus hudsonius preblei*) and the Ute ladies'-tresses orchid (*Spiranthes diluvialis*). Segments of these highways were damaged during the September 2013 flooding. They were temporarily repaired under emergency consultation provisions to allow for safe vehicular travel. At this time, permanent repairs are being planned.

Repairs will occur on US34A from milepost 114 to 116. An 8 x 10-foot concrete box culvert will be placed at milepost 115, just west of CR45, to act as a relief for any future flood events. At approximately milepost 115.5, a bridge over the South Platte River will be replaced. In addition, the temporary road will be removed in its entirety and the damaged roadway will be replaced to pre-flood conditions. The US34A and US34D intersection will be shifted approximately 40 feet west of its existing location in order to improve line-of-sight for both eastbound and westbound drivers. Sideslopes may need to be extended past the existing right-of-way at the east end of the project corridor in order to accommodate the new bridge as well as the intersection improvements.

Repairs on US34D will extend from milepost 14.71 to 17.71, which is the intersection with US34A. The road will be built to full standards with 6-foot shoulders and standard side slopes. All culverts will be extended as much as 15 feet on both sides of the roadway. Two large concrete box culverts located south of the South Platte River bridge and within the floodway will be extended by as much as 10 feet on both sides of the road. At this time, no work is planned for the bridge over the river. Work is planned for late fall into early winter 2014.

Vegetation along US34A was largely removed or buried during the flooding. The area downstream of the bridge location is primarily a sediment-filled field, and in some areas, the sediment is estimated to be 6 – 8 feet deep. Although some cottonwood trees remain, the river valley has been scoured and little vegetation is left. At US34D, some vegetation including

cottonwood trees, snowberry bushes, thistle, and smooth brome remain. Vegetation here is dense, and soils are sandy, making its occupation by the Ute ladies'-tresses orchid unlikely. Areas upstream and downstream of the location have been denuded and there is no linkage to other riparian areas. Several pre-flood surveys for the Preble's meadow jumping mouse have taken place in the project vicinity, and the nearest positive trapping location is approximately 9 miles upstream of the project area.

The US34A location provides no habitat for either the Preble's meadow jumping mouse or the Ute ladies'-tresses orchid; therefore, it is unlikely that they occur in this area and the effects of the project are expected to be disountable. US34D also does not provide habitat for the Preble's meadow jumping mouse and numerous trapping surveys for the species conducted prior to the flood indicate that the species likely did not occupy the area at that time; therefore, impacts to the Preble's meadow jumping mouse due to the project are expected to be discountable. However, some pockets of potential Ute ladies'-tresses orchid habitat exist in the US34A project vicinity and although the vegetation is dense and the soil type is not ideal, the species' occurrence here cannot be completely dismissed; therefore, the area will be surveyed during 2014. In the unlikely event that any individuals are detected, consultation will be reinitiated.

Given your habitat and project descriptions, the Service finds the report acceptable and concurs with your determination that the impacts resulting from the proposed project are not likely to adversely affect the continued existence of the Preble's meadow jumping mouse. A survey will be conducted to ensure that the Ute ladies'-tresses orchid does not occupy the area.

Please note that should project plans change or if additional information regarding listed or proposed species becomes available, this determination may be reconsidered under the ESA. If the proposed project has not commenced within one year, please contact the Colorado Field Office to request an extension.

We appreciate your submitting this report to our office for review and comment. If the Service can be of further assistance, please contact Alison Deans Michael of my staff at (303) 236-4758.

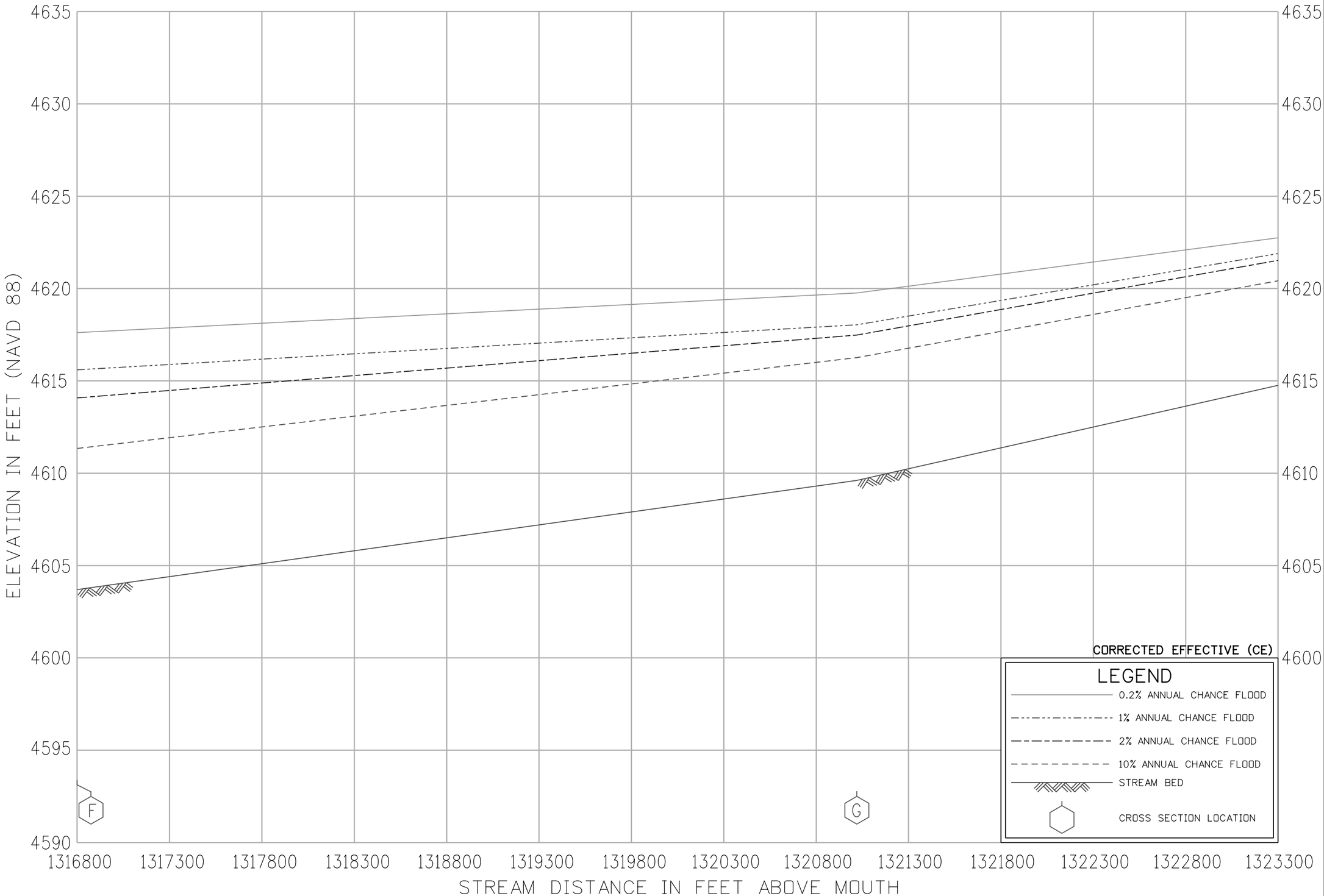
Sincerely,

Susan C. Linner
Colorado Field Supervisor

ec: CDOT, R4 (Jim Eussen)
Michael

Ref: Alison\H:\My Documents\CDOT 2007+\Region 4\SH34 at SPR\US34A_&_US34D_PMJM_ULTO_concur.docx

FLOOD PROFILES (RAS PLOT)



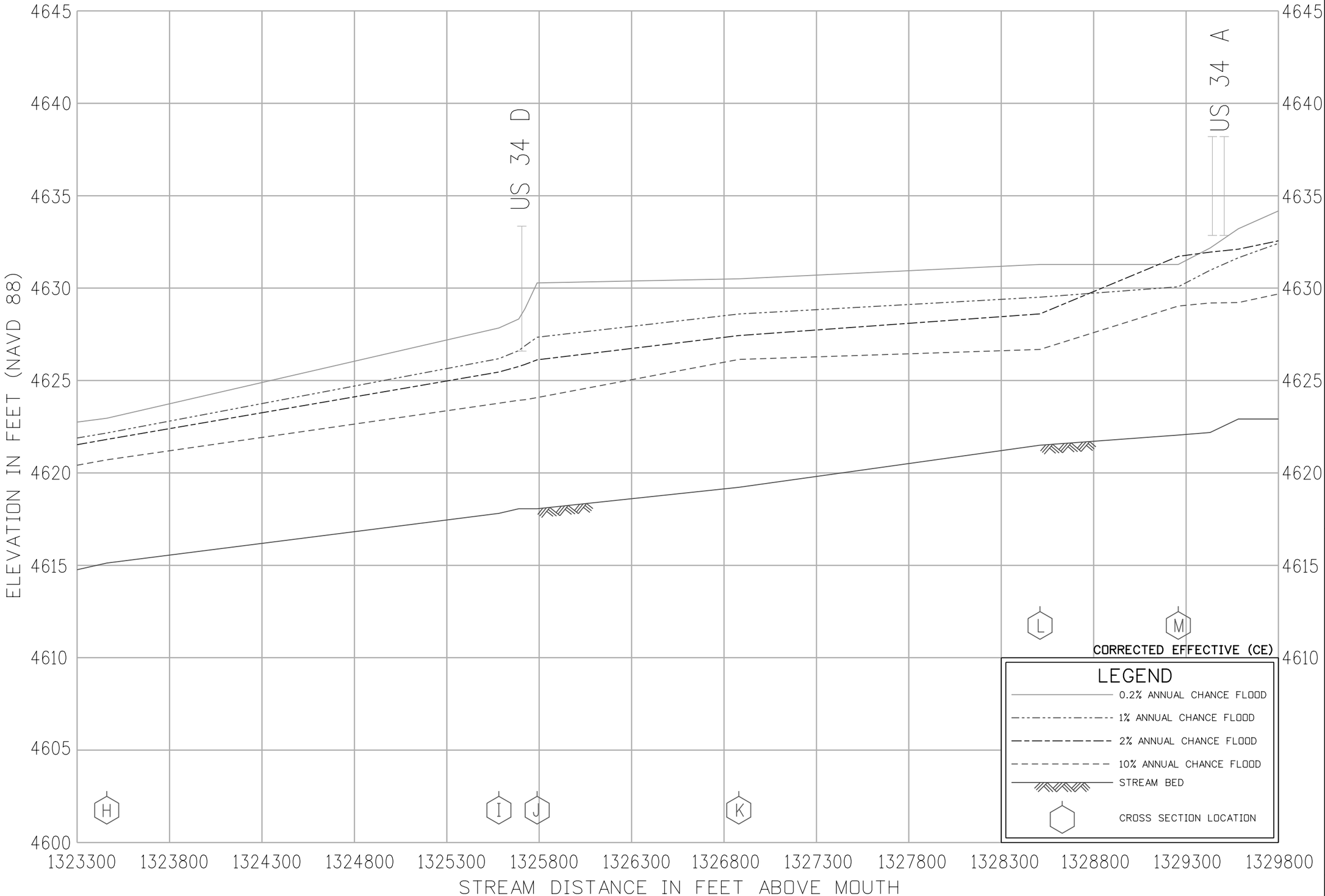
FLOOD PROFILES

SOUTH PLATTE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WELD COUNTY, CO
(UNINCORPORATED AREAS)

01P



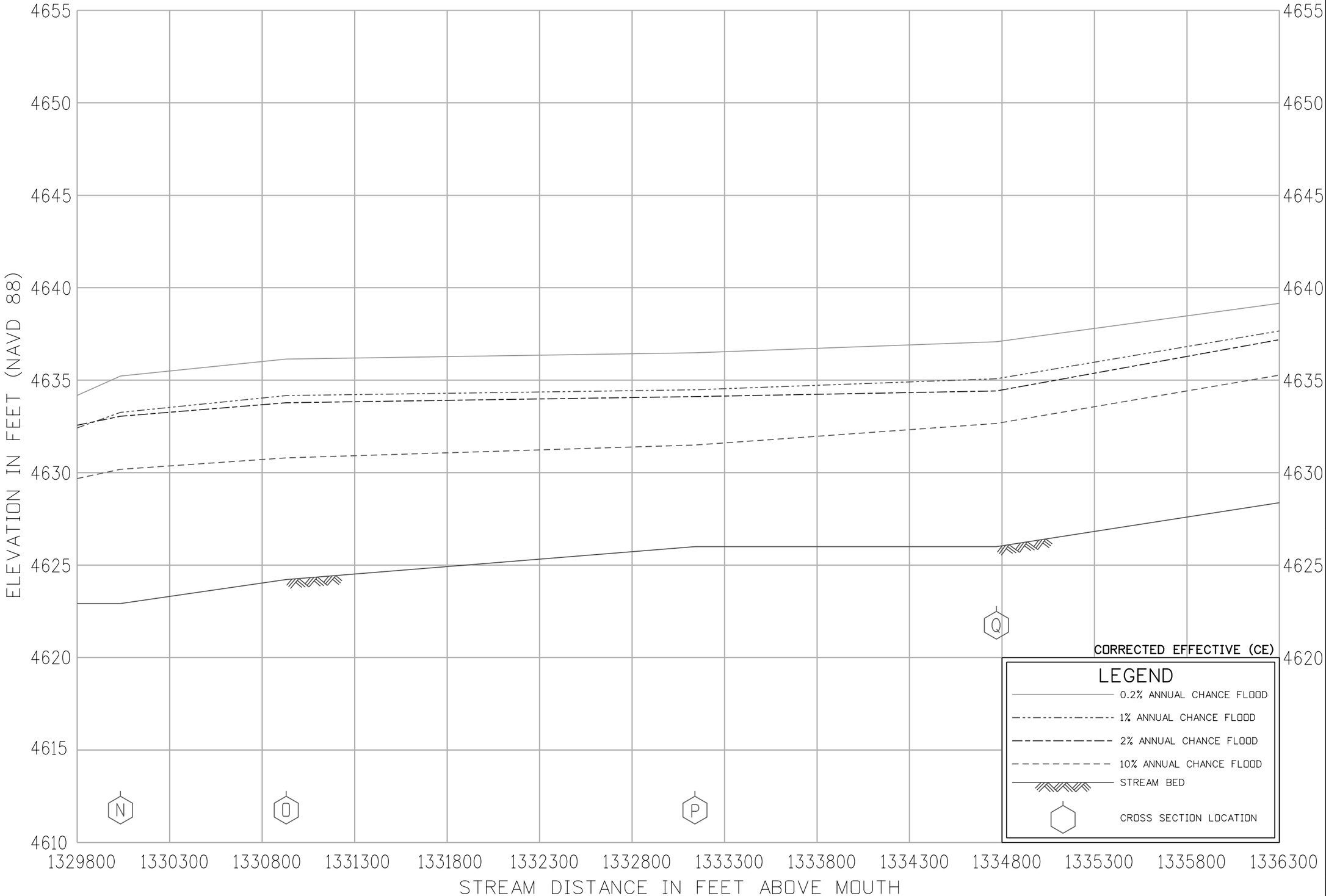
FLOOD PROFILES

SOUTH PLATTE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WELD COUNTY, CO
(UNINCORPORATED AREAS)

02P



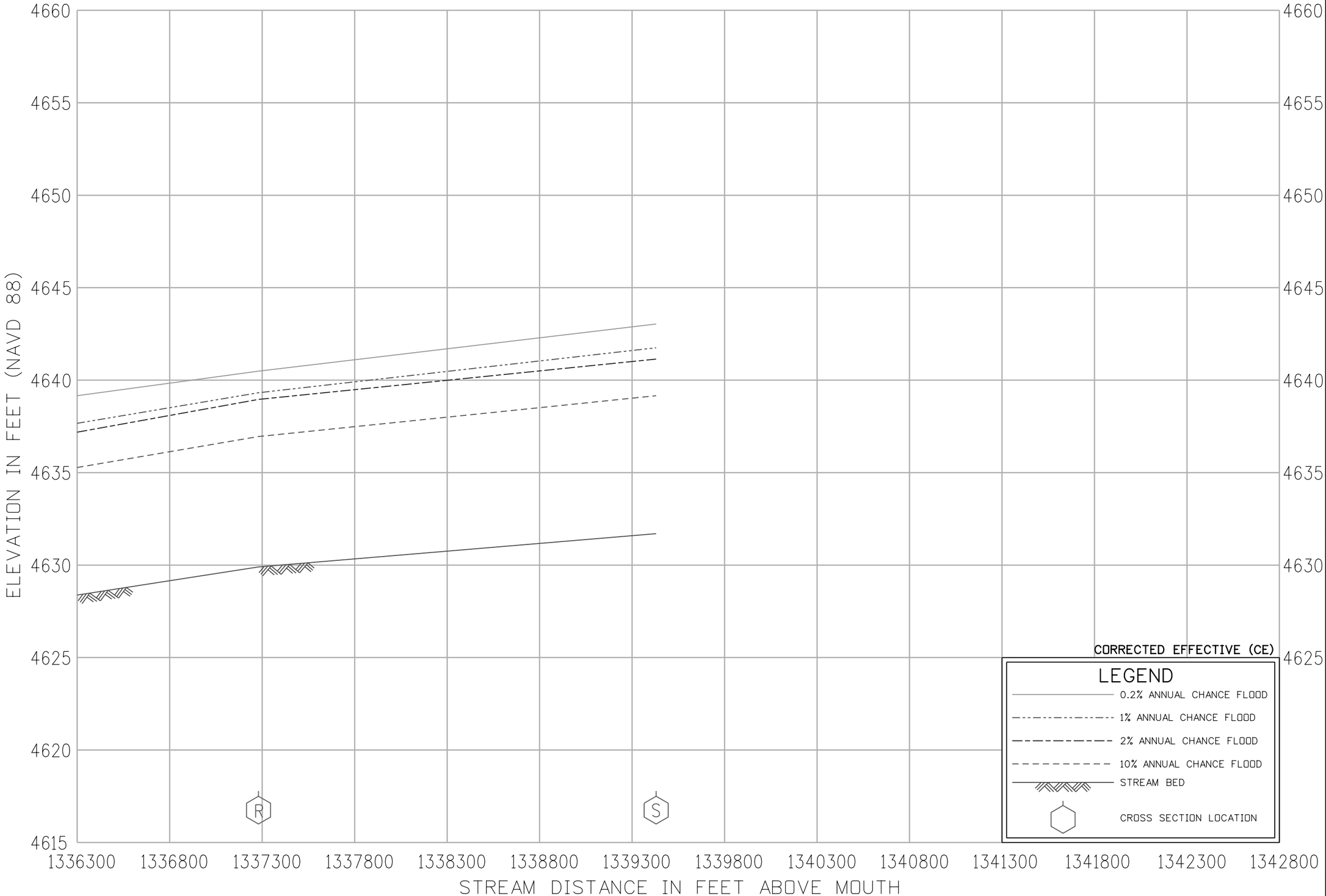
FLOOD PROFILES

SOUTH PLATTE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WELD COUNTY, CO
(UNINCORPORATED AREAS)

03P



FLOOD PROFILES

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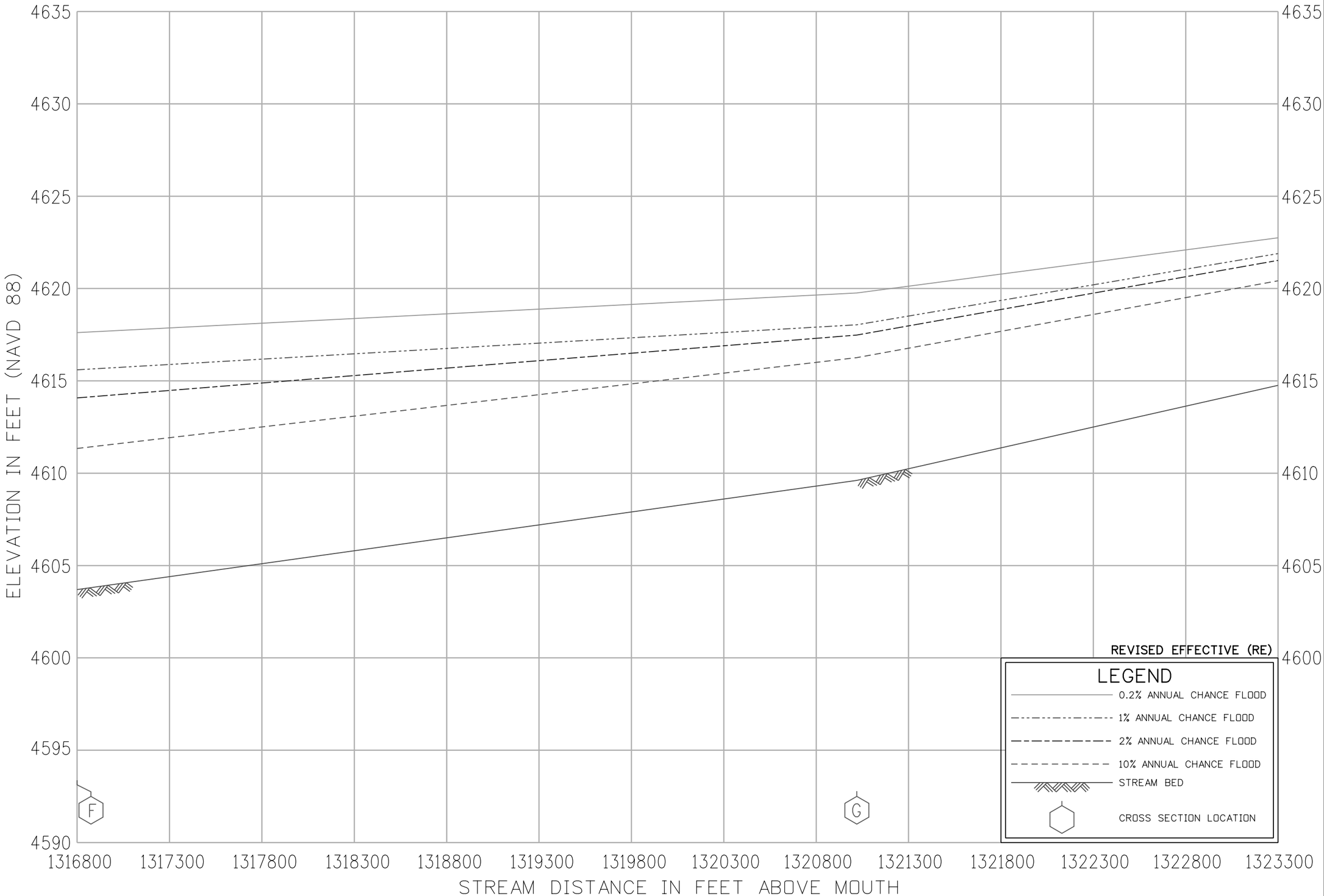
04P



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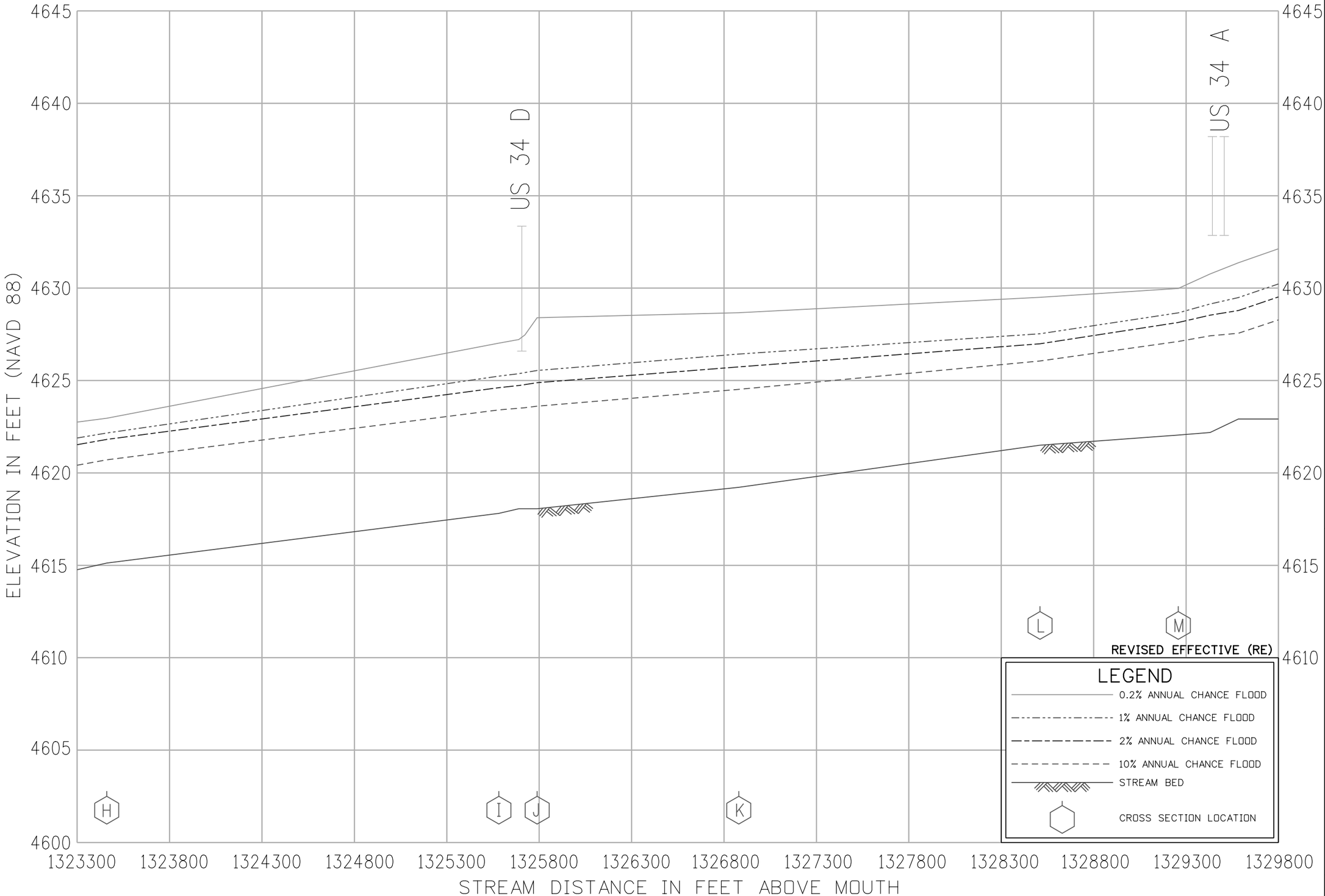

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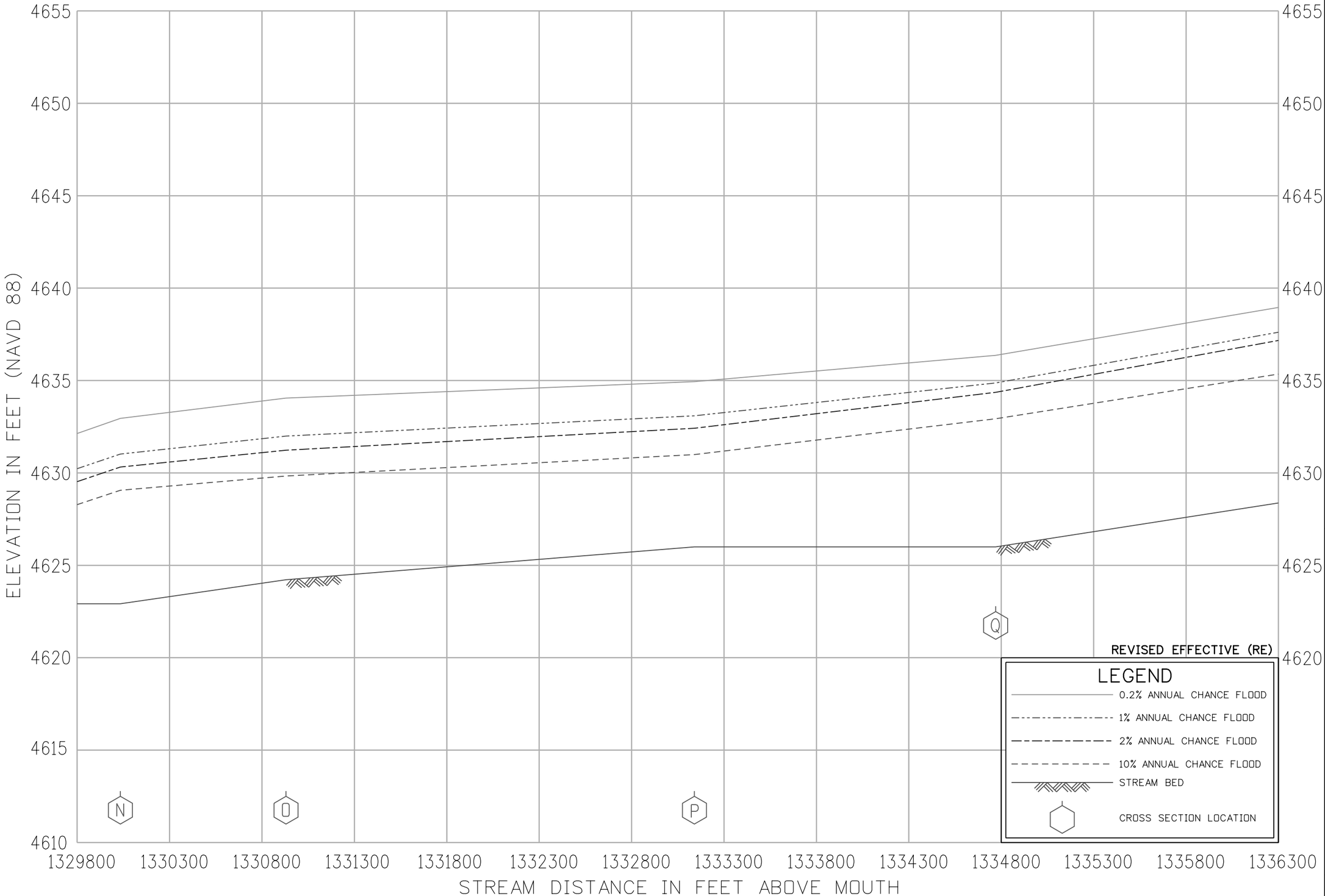

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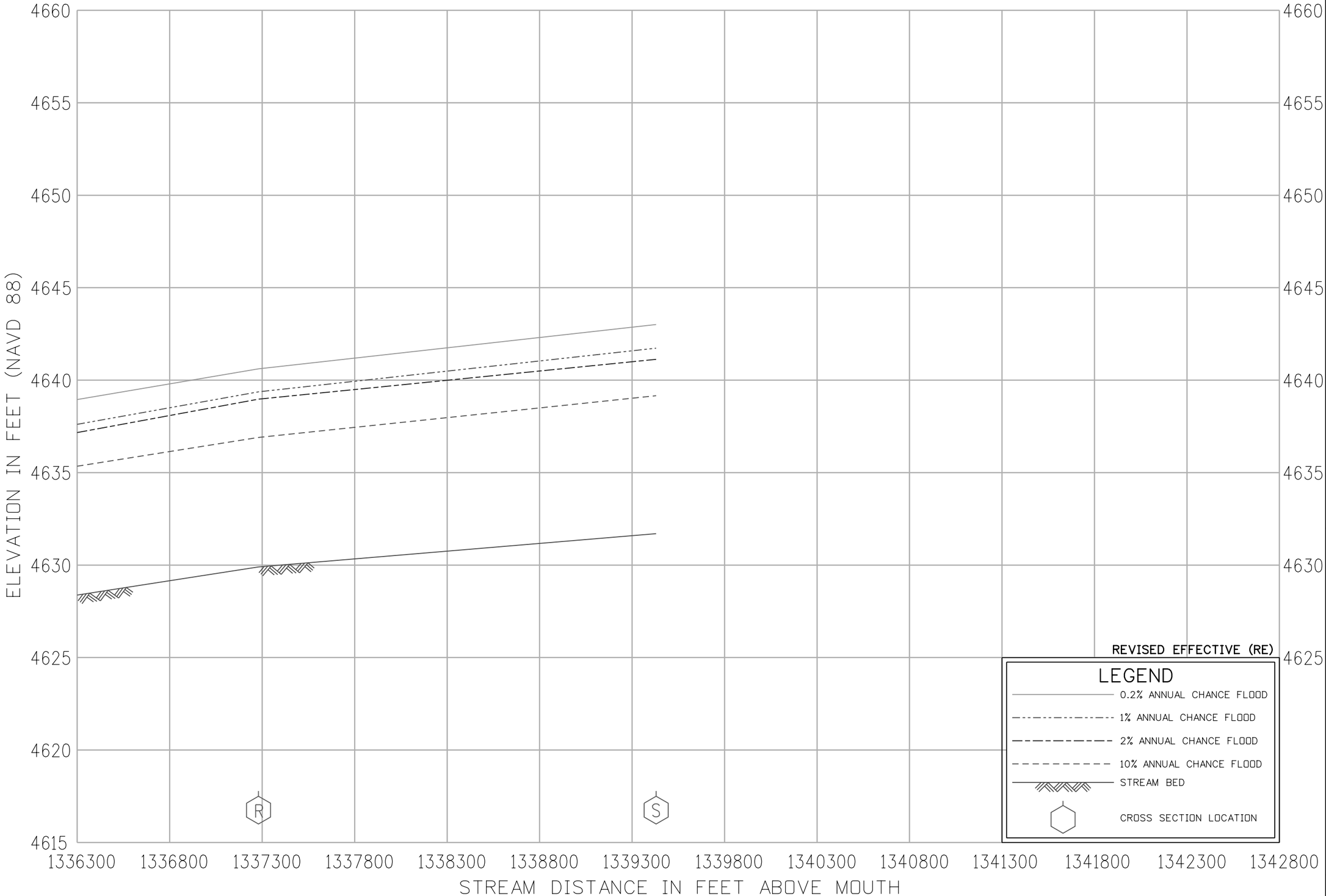

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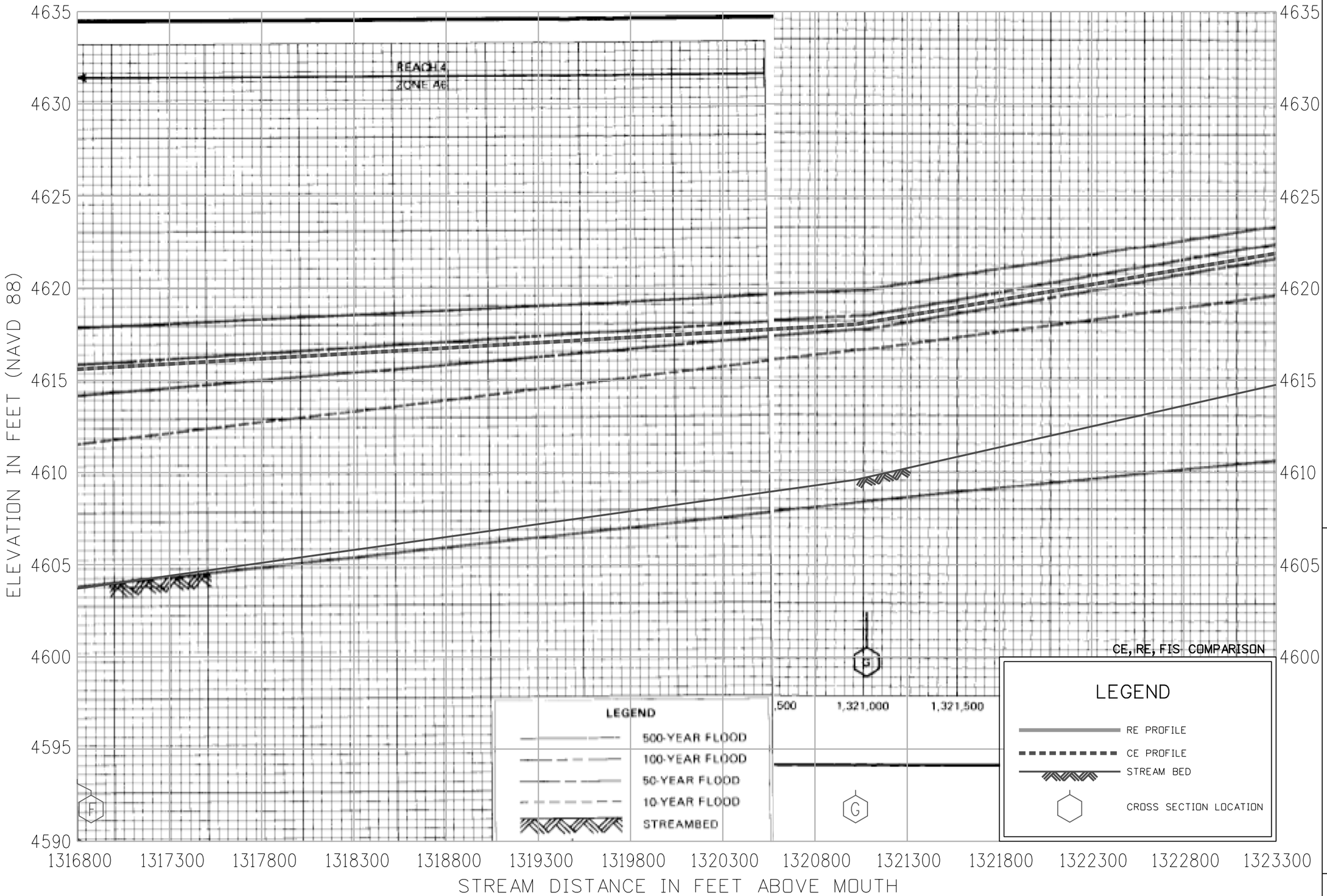

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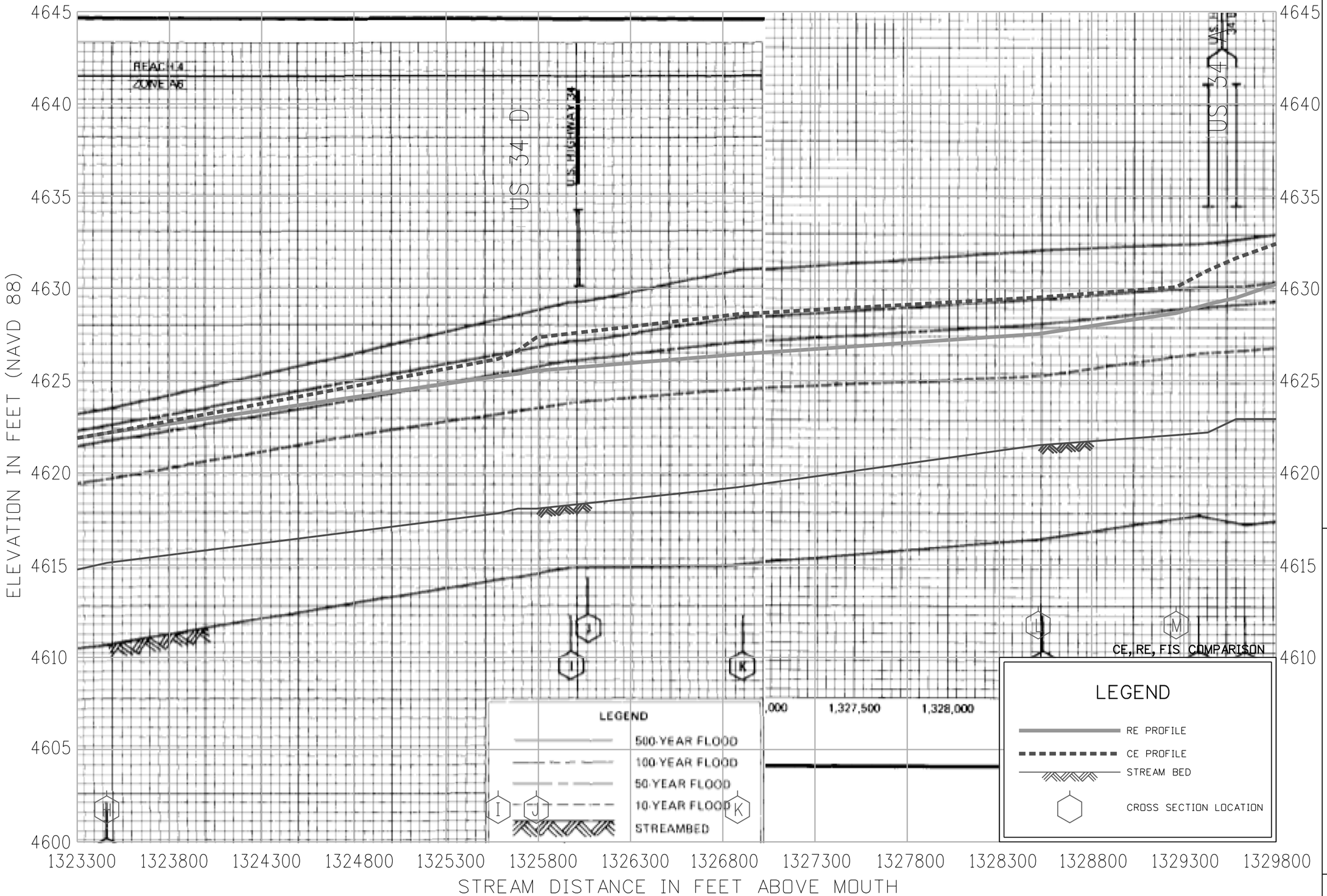

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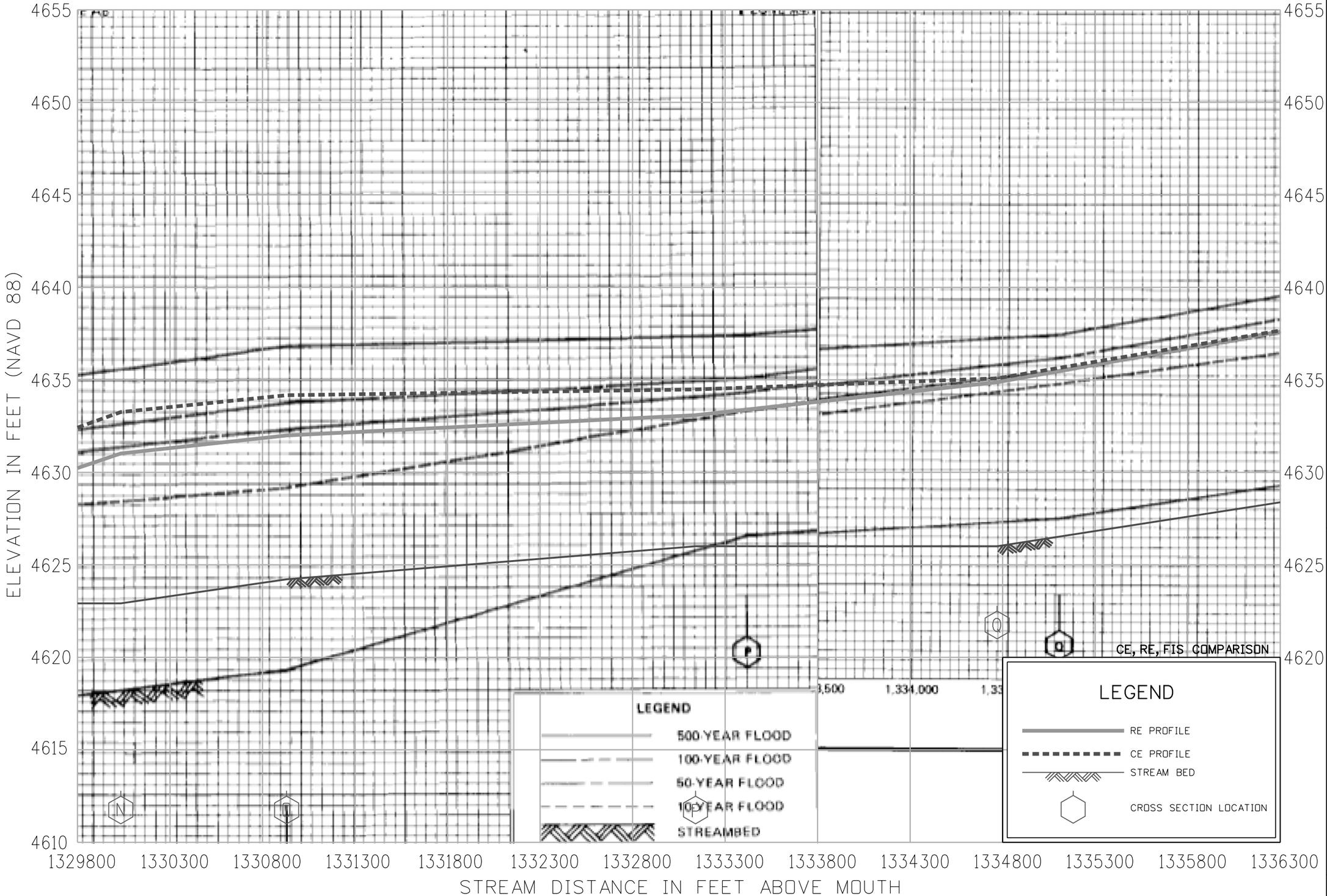

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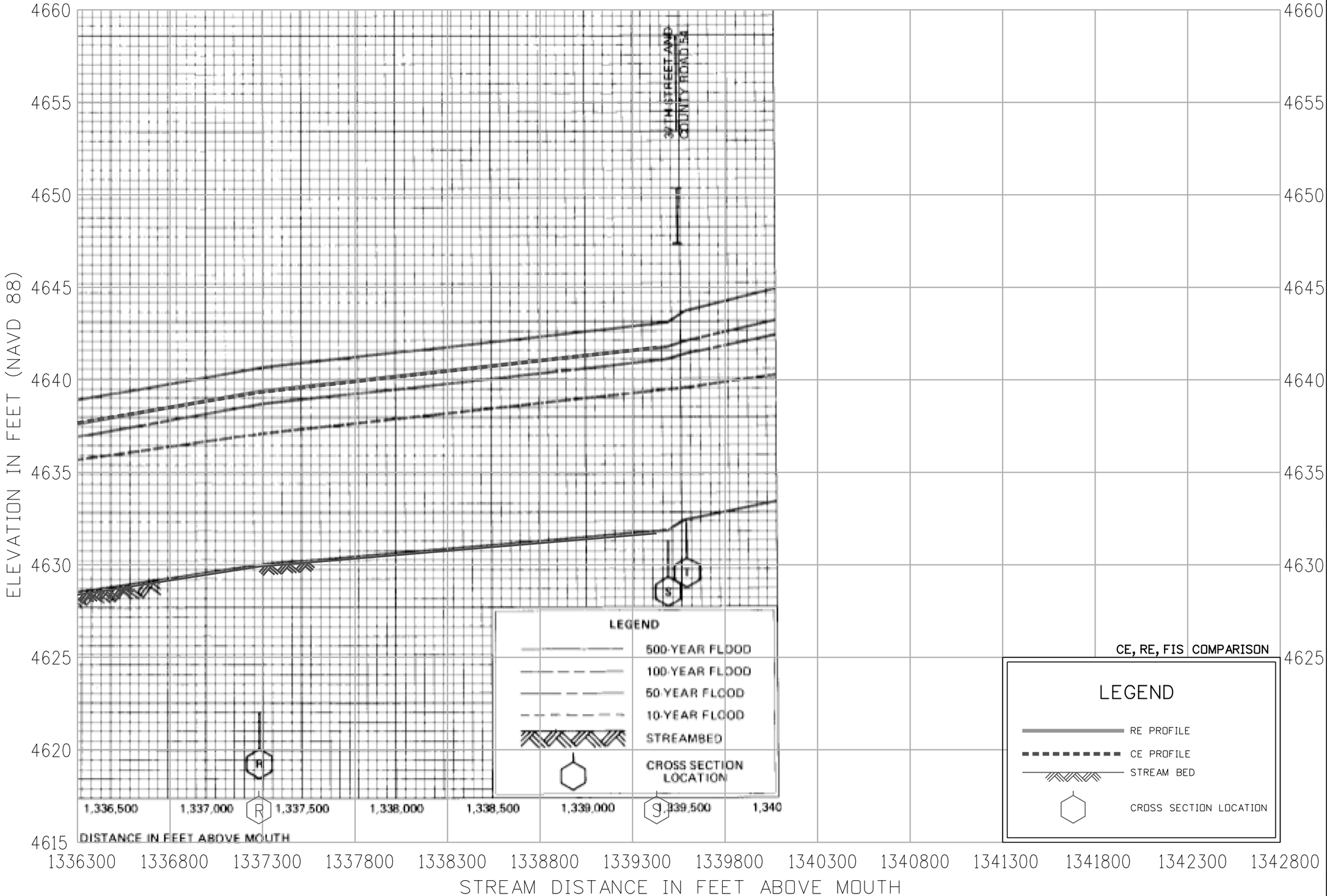

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