FLOOD HAZARD AREA DELINEATION
CLEAR CREEK

Prepared for:

Mile High Flood District

Jefferson County

Adams County

City and County of Denver

City of Golden

City of Wheat Ridge

City of Arvada

September 2022

Prepared by:

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September 2, 2022

Ms. Brooke Seymour, P.E., CFM
Planning and Floodplain Management Director
Urban Drainage and Flood Control District
2480 W. 26th Avenue, Suite 156B
Denver, Colorado 80211-5304

RE: Clear Creek FHAD Report – Agreement No. 15-11.07

Dear Ms. Seymour,

ICON Engineering, Inc., is pleased to submit this report, *"Flood Hazard Area Delineation – Clear Creek"* from the confluence with the South Platte River to approximately 2,040 feet upstream of U.S. Highway 6. This study identifies flood prone areas along Clear Creek impacting Jefferson County, Adams County, the City and County of Denver, as well as the Cities of Wheat Ridge, Golden, and Arvada.

The floodplain information presented in this study will be provided by the District to assist the impacted communities in floodplain management and regulation along this reach of Clear Creek.

This study provides documentation and drawings identifying the 1%-annual-chance (100-year) and 0.2%-annual-chance (500-year) floodplain limits, as well as the 10%- and 2%-annual-chance flood surface profiles, representative channel cross-sections, and major road crossings. Tabular information is included showing floodplain data and floodway information based on a 0.5-foot maximum increase in energy grade line.

For this project, the hydrology was revised by Wright Water Engineers, Inc. and reviewed by the Federal Emergency Management Agency (FEMA) in a Conditional Letter of Map Revision, or CLOMR (FEMA Case No. 16-08-0917R). The CLOMR was approved by FEMA on December 28, 2016.

We would like to acknowledge, and thank, you, the rest of the District Staff, as well as all of the project stakeholders for their assistance and contribution to this study.

Sincerely,

ICON Engineering, Inc.

Troy W. Carmann, P.E., CFM
Principal

Justen A. Hamann, P.E.
Project Manager

TABLE OF CONTENTS

SECTION 1 – INTRODUCTION 1
1.1 Authorization 1
1.2 Purpose and Scope 1
1.3 FHAD Process 1
1.4 Mapping & Field Surveys 1
1.5 Data Collection 2
1.6 Federal and Local Regulations 2
1.7 Acknowledgements 3
SECTION 2 – STUDY AREA DESCRIPTION 4
2.1 Project Area 4
2.2 Land Use 4
2.3 Reach Description 4
2.4 Flood History 10
2.5 Wetland and Riparian Zones 10
2.6 Wildlife and Threatened or Endangered Species 10
SECTION 3 – HYDROLOGIC ANALYSIS 12
3.1 Overview 12
3.2 Previous Studies 12
3.3 Hydrology 12
SECTION 4 – HYDRAULIC ANALYSIS 13
4.1 General 13
4.2 Hydraulic Evaluation of Existing Facilities 13
4.3 Split Flow Areas 14
4.4 Two-Dimensional Hydraulic Analysis 14
4.5 Floodway Encroachment Analysis 14
4.6 Flooded Areas 14
4.7 Comparison with the Effective Flood Insurance Study 15
4.8 500-Year Flood Hazard Analysis 16
SECTION 5 – REFERENCES 17

List of Tables

Table 1: Project Participants and Stakeholders 3
Table 2: Major Crossing Structure Inventory 6
Table 3: Clear Creek Summary of Discharges 12

List of Figures

Figure 1. Study Area Location Map 7
Figure 2. Basin Boundary Map 8
Figure 3. Reach Location Map 9

List of Appendices

Appendix A: Project Correspondence .....
Appendix B: Hydrologic Analysis Support Documents .....
Appendix C: Hydraulic Analysis Support Documents .....
Appendix D: Floodplain and Floodway Data Tables .....
Appendix E: Flood Maps .....
Appendix F: Flood Profiles .....

SECTION 1 – INTRODUCTION

1.1 Authorization

The “Flood Hazard Area Delineation – Clear Creek” study was authorized by the Mile High Flood District (District) under joint sponsorship with Jefferson and Adams County, the City and County of Denver, City of Wheat Ridge, City of Golden, and the City of Arvada under Agreement No. 15-11.07. Notice to proceed for this Agreement was provided by the District on December 8, 2015.

1.2 Purpose and Scope

The intent of this report is to update two previous FHAD studies with new hydrologic information. The first study was completed in December 2005 by Ayres Associates and is titled “Flood Hazard Area Delineation – Clear Creek (Adams County).” The second study is dated April 2007 by ICON Engineering, Inc. and is titled “Flood Hazard Area Delineation – Clear Creek – Jefferson County & City and County of Denver.”

This study supersedes the previous studies and provides an up-to-date analysis of the existing floodplain along Clear Creek so that project stakeholders, and other users, can implement floodplain zoning ordinances, floodplain regulations, and other land-use controls, as needed, to reduce potential damages and adverse development in the floodplain. This report includes information on past flooding events and defines the nature and extent of probable future floods along an 18.2-mile reach of Clear Creek, from the confluence with the South Platte River to approximately 2,040 feet upstream of U.S. Highway 6 in the City of Golden.

The hydrology presented in this report was prepared by Wright Water Engineers, Inc. (WWE) and submitted for review to the Federal Emergency Management Agency (FEMA) as a Conditional Letter of Map Revision (CLOMR). The CLOMR was assigned a FEMA Case Number of 16-08-0917R and approved by FEMA on December 28, 2016. The WWE analysis was modified at the North Overflow to address the various split flow conditions.

The following is a summary of the scope of work for this study:

1. Coordination and Meetings with District and project stakeholders;
2. Field verification of bridge/culvert hydraulic parameters;
3. Calculation of water surface profiles for the 10-, 50-, 100, and 500-year flood events;
4. Delineation of the 100-year floodplain boundary on Flood Hazard Area Maps;
5. Determination of floodways based on encroachment resulting in a maximum increase in the energy grade line of 0.5 foot;
6. Preparation of a report which builds on the information presented in the previous studies and updates.

The floodplain delineation and flood profiles are based on existing floodplain and channel conditions. Flood elevations and the corresponding floodplains are often altered by road and bridge construction, floodplain development, flood control improvements, or natural processes. Prior to the utilization of this report for planning or design purposes, the user is advised to contact the District, or other local jurisdictions, to determine if the information presented in this report has been amended.

1.3 FHAD Process

This FHAD report was discussed at periodic meetings held between the engineer, project sponsors, and various project stakeholders at the District. Meetings with the District and local agencies were held as needed to document best available information and determine the most effective hydraulic modeling approach for given areas. Meetings with specific property owners, generally related to FEMA Letters of Map Revision, were held occasionally through the study period to incorporate and update specific mapping changes. Meetings with intergovernmental agencies and special districts were held to convey information on multi-jurisdictional projects such as the light rail line and other roadway projects. A public meeting was held virtually (due to the COVID-19 precautions in place at the time) in December 2020. Project correspondence is located in Appendix A.

1.4 Mapping & Field Surveys

The United States Geological Survey (USGS) provided the topographic mapping used for this study in the 2014 LiDAR mapping project. The mapping was prepared in accordance with FEMA and District specifications. LiDAR point cloud data was compiled for the project area as a raster grid digital elevation model by ICON Engineering, Inc. One-foot contours were developed by ICON Engineering, Inc. from the DEM across the project area on North American Vertical Datum of 1988 (NAVD88). The contours are depicted on work maps on the State Plane HARN (EPSG 2877) projection.

Project mapping was based on Federal Emergency Management Agency (FEMA) 2013 Post-flood LiDAR mapping completed by the U.S. Army Corps of Engineers with the following base terrain data attributes:

Name: 2013 South Platte River Flood Area 1
Collection Date: Fall 2013 – Spring 2014
Vertical Accuracy: 9.25 cm RMSE
Point Spacing: 0.7 m
Vertical Datum: NAVD88
Horizontal Datum: NAD83

The base terrain data was modified in several locations through the project area. In the course of the study, several locations were noticed along Clear Creek in which the LiDAR topography in the channel and overbanks did not accurately represent existing conditions. The areas consisted of cross sections near bridge crossings, new development in Golden, industrial land use stockpile areas, and other areas with verifiable terrain data were identified. After discussion with the District the decision was that topography from the effective studies could be used to supplement the FEMA LiDAR in these specific areas.

To represent more accurately a smooth thalweg profile along Clear Creek, a template of varying widths and depths was used to represent the channel section below the water surface. In general, the channel template characteristics was determined by comparing LiDAR elevation data with known surveyed elevations along the channel and at bridges, along with estimates of the low flow channel width from aerial photography. This modified the channel geometry in the hydraulic model without any modification to the project DEM.

Through the course of the study, there have been several supplemental surveys on the bridge crossings. As originally scoped, the bridges from both Jefferson County and Adams County FHADs were merged into a single model. This included field verification of the bridges, piers, and armoring conditions to ensure the combined model did not omit obvious changes to the Creek since the early 2000s. Also, in the course of ongoing floodplain management in the City of Arvada, a floodplain permit applicant completed independent survey on several bridges over Clear Creek and identified a vertical elevation discrepancy. Upon further review, it was decided that multiple bridges in the Arvada section of Clear Creek should be surveyed and checked against the elevations from the 2005 and 2007 FHADs.

Bridge deck information for crossings modeled in the 2005 and 2007 FHADs was directly carried forward to this study without modification. Several additional bridges were identified as being new or absent from the 2005 and 2007 FHADs. New bridges were surveyed under a separate contract with the District and included in the current HEC-RAS modeling.

Several on-ramp bridges near I-25 and I-270 were not included in the 2005 FHAD HEC-RAS model since they were significantly elevated above the floodplain elevations. Blocked obstructions have been used at bounding cross sections to represent the reduction in flow area caused by the piers. Previous FHAD bridge survey information was compiled from GEOSURV, Inc. in January 2006. Additional bridge and survey information was obtained by ICON Engineering, Inc. in April 2006, July 2006 and March 2007.

Additional visual survey on key bridges was collected by ICON in 2017 to verify as-built conditions and bridge geometry. The locations are generally within the City of Arvada and Wheat Ridge. More specific location information is provided in the technical appendices.

Additional field survey provided by the City of Arvada in 2016 for 11 specific bridges within the City Limits identified more specific bridge geometry information than originally collected in 2005 and 2006. Private sector survey and flood modeling efforts identified changes in the bridge geometries and led to an updated survey check on the 11 bridges. A 2021 survey in Golden measured the south bank near Ford/Washington. Survey information was incorporated into the latest hydraulic modeling.

1.5 Data Collection

This study started with the data collected from the two previous FHADs for Clear Creek, combining the upstream and downstream studies. Additional data was incorporated based on updated ground conditions and new study information. These data sources are summarized here:

- *Hydrology – Clear Creek, Jefferson and Adams Counties, Colorado*, US Army Corps of Engineers, Omaha District, 1978
- *Flood Hazard Area Delineation Clear Creek Adams County & Jefferson County*, Gingery Associates, Inc., 1979
- *Major Drainageway Planning Clear Creek Phase B*, Wright-McLaughlin Engineers, October 1981
- *Major Drainageway Planning Clear Creek Youngfield Through Golden Phase B Report*, Wright-McLaughlin Engineers, September 1982
- *Major Drainageway Planning Lower Clear Creek Phase B Update*, David J. Love & Associates, Inc., June 1988
- *Flood Hazard Area Delineation Clear Creek (Adams County)*, AYRES Associates, December 2005
- CLOMR, Case #16-08-0917R, Hydrology change for Clear Creek, Wright Water Engineers. February 2016
- CLOMR/LOMR, Case #13-08-0099R, for RTD Gold Line

1.6 Federal and Local Regulations

Flood hazards along Clear Creek have been designated and identified on the Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) for Jefferson County and Incorporated Areas, dated January 15, 2021, the FIS and FIRM for Adams County, dated September 28, 2018, and in the FIS and FIRM for the City and County of Denver, dated September 4, 2020. Community ordinances have adopted the FEMA FIRM and FIS reports to be utilized for the regulation of the floodplain. Please note that the information presented in this report updates the information on the FIS and on the FIRM. Until the information in this report is adopted into the FEMA's effective FIS and FIRM for each community through the Physical Map Revision (PRM) process, the current information shown on FIS and FIRM must still be utilized for regulation of the FEMA flood hazards and for flood insurance applications. However, each community is strongly encouraged to also use this report as a guide for regulating future development in the floodplain until it's adopted into the respective FEMA FIS and FIRMs.

1.7 Acknowledgements

This report was prepared with cooperation from local officials as well as public and private interests. In particular, we would like to acknowledge the assistance received from the District, Jefferson County, City and County of Denver, Adams County, Cities of Golden, Wheat Ridge, and Arvada. Finally, we would also like to express our appreciation for the work product provided by the engineers and consulting firms who had prepared the earlier studies on Clear Creek that have been relied upon for background information. A list of project participant stakeholders is provided in Table 1.

Table 1 - Project Participants and Stakeholders

Organization	Participant Name	Title
Mile High Flood District	Shea Thomas, P.E.	Manager, Master Planning Program
Mile High Flood District	Terri Fead, P.E.	Manager, Floodplain Management Program
Mile High Flood District	Brooke Seymour, P.E., CFM	Engineering Services Manager
Mile High Flood District	Dan Hill, PE	West Watershed, Watershed Manager
Mile High Flood District	Hung Teng Ho, P.E., CFM	Hydraulic Modeler
Jefferson County	Patrick O'Connell	Engineering Geologist
ICON Engineering, Inc.	Troy Carmann, P.E., CFM	Principal
ICON Engineering, Inc.	Craig Jacobson, P.E., CFM	Principal
ICON Engineering, Inc.	Justen Hamann, P.E.	Project Manager
ICON Engineering, Inc.	Ben Smith, P.E.	Project Engineer
ICON Engineering, Inc.	Brian LeDoux, P.E., CFM	Project Manager
ICON Engineering, Inc.	Jacob Marquez	Project Engineer
ICON Engineering, Inc.	John Klier	GIS Specialist
ICON Engineering, Inc.	Amanda Blair	Project Engineer
ICON Engineering, Inc.	Darren Harder	Engineering Technologist
City of Golden	Joe Puhr	City Engineer
City of Golden	Joseph Lammers, P.E., CFM	Civil Engineer
City of Wheat Ridge	Mark Westberg, P.E., CFM	Projects Supervisor
City of Arvada	Andrew Stewart, P.E., CFM	Senior Utilities Engineer/Floodplain Manager
City of and County of Denver	Jeremy Hamer, P.E., CFM	Engineering Supervisor/Floodplain Manager
Adams County	Greg Labrie. P.E., CFM	Senior Engineer

SECTION 2 – STUDY AREA DESCRIPTION

2.1 Project Area

The area included in this study extends from the confluence with the South Platte River in Adams County, at the downstream study limit and the City of Golden in Jefferson County, at the upstream study limit. The drainage basin is displayed in Figure 1. From Golden, Clear Creek flows through private property (Coors Brewing, Inc.) and through the Cities of Wheat Ridge and Arvada, the City and County of Denver, Jefferson County and Adams County. There are several interstate roadway crossings including Interstate-70 (I-70), Interstate-76 (I-76); arterial roadway crossings, including Kipling Street, and Wadsworth Boulevard, and Federal Boulevard; and several other collector and local roads located within the study reach. During the course of this study, many small-scale changes took place within the watershed but there were no large-scale changes affecting surface drainage at the watershed level.

Clear Creek is a left bank tributary to the South Platte River. The source of water for Clear Creek begins high in the Rocky Mountains, west of Denver and generally flows in an easterly direction from the Continental Divide towards the Denver Metropolitan Area. Prior to entering the Denver Metropolitan Area, Clear Creek exits Clear Creek Canyon and passes through the high plains around Golden. The drainage area at the Golden gage near the bluff line is approximately 400 square miles. From Golden, Clear Creek flows in a northeasterly direction, through the Denver Metropolitan Area to its confluence with the South Platte River, near the Derby neighborhood. At the Derby gage, located approximately 0.6 miles upstream from the mouth, Clear Creek has a drainage area of approximately 570 square miles. Elevations within the Clear Creek basin range from approximately 5,100 feet above mean sea level at the mouth to over 14,000 feet above mean sea level in the Rocky Mountains. The study area map for Clear Creek is shown in Figure 2.

The channel is well defined and consists of a gravelly bottom with mature vegetation along the channel banks. Shallow bedrock exists in several locations along Clear Creek between Sheridan Boulevard and the City of Golden. Development adjacent to the creek primarily consists of municipal, commercial, and residential areas.

NRCS soils information is available through the web portal. https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm The watershed shape is polygonal with long axis from west to east, short axis north to south. Long axis is approximately 8 times the length of the short axis of the watershed. Clear Creek has an average slope of 0.7%.

2.2 Land Use

The land use for the study reach has generally reached a fully developed condition. Due to this and the previous hydrology CLOMR by WWE, the existing and future land use conditions were not evaluated/compared as they would be in a typical FHAD study. Because of this, the typical table applying impervious values based on land use types is not valid here either.

From the South Platte River to the City of Golden, land use adjacent to Clear Creek is predominately residential with areas of municipal and commercial development scattered throughout the basin. There are many major arterial streets and highways that extend adjacent to and across the Clear Creek drainageway.

The study reach is comprised of a mix of developed and undeveloped land. Although much of the floodplain is devoted to open space and parks, residential and commercial areas exist along the creek. Additionally, large lakes and water storage ponds exist adjacent to Clear Creek and various water supply and agricultural ditches draw from Clear Creek. For over 150 years, the Coors Brewing Company has owned and maintained a significant portion of property adjacent to the channel between I-70, near Youngfield Street, and Golden. Many other, smaller parcels within the Clear Creek floodplain are legacy properties with a high likelihood for redevelopment.

Current land use maps are available from participating communities.

2.3 Reach Description

Clear Creek was divided into several smaller reaches, along the overall length of this study in order to provide descriptions and detail of the floodplain characteristics and flooding problem areas. Reach locations and limits are shown in Figure 3.

- ***Reach 1: Confluence with South Platte River to York Street -*** The flooding along the lower part of Clear Creek in Adams County from the South Platte River to York Street is primarily confined to lowlands and gravel pits. No residential areas are at risk in this reach. Commercial redevelopment and gravel mining operations are present in this reach. Past improvements to regional recreational trails, the Peaks to Plains trail along Clear Creek is a prime example, and open space bring public uses into the floodplain.

- ***Reach 2: York Street to Interstate 25 -*** Upstream of York Street, the commercial and industrial land use (auto auction parking lot) dominates the right overbank. The left overbank continues the open space and recreational trail uses. Past work on the interchange connecting I-270 to I-76 is elevated in several locations. The extension of I-270 added a two-bridge overpass crossing Clear Creek and except for the support piers, the bridge decks are well above the 100-year flood elevation in this area.

  From I-270 to Washington Street, the I-76 embankment on the south side of the creek contains the floodplain, and the north side abuts Colorado Highway 224 (E. 70th Ave). At Washington Street, the commercial and industrial land uses on the north side of the creek continue along 70th, but there is also a single residential parcel within the south bank of the channel. Outfalls and ponds are also included in the south overbank.

  Between Washington Street and I-25, there are two ramps with bridges that cross Clear Creek well above the 100-year floodplain. There are three small CDOT drop structures in the vicinity of I-25. These structures were incorporated into the hydraulic model using field-surveyed data for each structure.

- ***Reach 3: Interstate 25 to Federal Boulevard –*** the open space adjacent to the channel widens in this area, but overbank and floodplain areas remain multi-use. Recreation, open space, commercial, and residential land uses are in and adjacent to the creek corridor. Residential redevelopment in the last five years on the north overbank has followed the extension of light rail along Little Dry Creek. Mining and material handling operations associated with Martin Marietta and Brannan Sand and Gravel exist within this reach.

  Just upstream of the Regional Transportation District (RTD) B Line and the Burlington Northern and Santa Fe (BNSF) Railroad is the mouth of Little Dry Creek. Little Dry Creek is a notable tributary for recreational and multi-use connections. Little Dry Creek also has notable contributions to the base and peak flows in Clear Creek.

- ***Reach 4: Federal Boulevard to Sheridan Boulevard --*** Upstream of Federal, this reach includes park and open space property on the north bank. Upstream of I-76 the channel is more constrained. The south overflow is an overflow area on the south side of Clear Creek, immediately west of Sheridan Boulevard. The south overflow spills back to the main Clear Creek channel just downstream of the I-76 crossing. Approaching Sheridan, the north overflow spills north of I-76 and has significant modeling to address complex hydraulic conditions. The north overflow is the result of Clear Creek splitting into two separate flow paths. Clear Creek splits approximately 370 feet upstream of Sheridan Boulevard. The North overflow rejoins the main channel just before the Union Pacific (UP) Railroad and the RTD Gold (G) Line just upstream of Federal Boulevard.

- ***Reach 5: Upstream of Sheridan Boulevard to Wadsworth Boulevard –*** This reach is located within the City and County of Denver and the Cities of Wheat Ridge and Arvada. The reach contains approximately 2.0 miles of drainageway. Included in this reach are crossings with I-76, 52nd Avenue, Marshall Street, I-70, and Wadsworth Boulevard. The channel is well defined with abundant vegetation and an average channel slope around 0.5%. Isolated areas of channel degradation and scour exist. Bedrock has also been observed within the channel bed in several areas. The channel corridor includes parks, trails, open space areas, and areas of residential and commercial development. Additionally, Ralston Creek confluences into Clear Creek just upstream of Sheridan Boulevard.

- ***Reach 6: Wadsworth Boulevard to Kipling Street*** - This reach is located within the City of Wheat Ridge and covers approximately 1.9 miles of drainageway. Included within this reach are crossings with 44th Avenue, Kipling Street, and several pedestrian bridges. The development areas along this reach are predominately residential with areas for parks, trails, and open space. The residential areas encroach significantly into the 100-year Clear Creek floodplain. The channel is abundant with vegetation, and bedrock has been observed within the channel bed at several locations. Lena Gulch confluences with Clear Creek just downstream of Kipling Street. The channel invert for Lena Gulch is lower than Clear Creek and therefore Lena Gulch does not drain well at its downstream end.

- ***Reach 7: Kipling Street to Interstate-70 -*** This reach is located within the City of Wheat Ridge and covers approximately 1.9 miles of drainageway. Included within this reach are crossings with Youngfield Street, I-70, and several pedestrian bridges. Development areas along this reach are predominately residential and commercial with areas for parks, trails, and open space. The channel through this reach is abundant with vegetation and has an average channel slope of around 0.6%. Prospect Lake, Tabor Lake, and West Lake are located along the channel, downstream of Youngfield Street. Clear Creek's 100-year floodplain extends into these three lakes. The Wheat Ridge Greenbelt is also located in this reach.

  Reach 8: Interstate-70 to McIntyre Street - This reach is located within unincorporated areas of Jefferson County and covers approximately 1.7 miles of drainageway. Much of the property is owned and maintained by Coors Brewing Company. Areas adjacent to I-70 are currently being redevelopment by Coors. Additional development in the City of Wheat Ridge upstream of I-70 has expanded the land use on the south overbank. Generally, Clear Creek is well vegetated and stable, with an average channel slope of 0.9%. Much of the channel has been channelized in the past between the Coors Railroad tracks and an embankment separating Clear Creek from Coors's large water storage ponds, located to the south of Clear Creek. A large drop structure exists downstream of the pedestrian bridge and several smaller drops exists downstream of the Coors Railroad crossing.

- ***Reach 9: McIntyre Street to the Confluence with Tucker Gulch -*** This reach is located within unincorporated areas of Jefferson County and the City of Golden and covers approximately 2.6 miles of drainageway. Much of the property is owned and maintained by Coors Brewing Company. Included within this reach are crossings of a railroad bridge, three vehicle access bridges, and three pedestrian bridges. Several irrigation ditch diversions are located along this reach. Clear Creek is vegetated through this reach, however, much of the drainageway has been channelized over time and the channel no longer reflects its natural state.

- ***Reach 10: Confluence with Tucker Gulch to Upstream Study Limits -*** This reach is located within unincorporated areas of Jefferson County and the City of Golden. The reach covers approximately 1.4 miles of drainageway, with an average channel slope of around 0.9%. Much of the land use adjacent to the channel is residential, commercial, and municipal. Many improvements have been constructed along Clear Creek to create a river walk setting. Additionally, a kayak course has been built within the creek and is a very popular recreational activity. Within Golden, Clear Creek crosses several pedestrian bridges, as well as roadway bridges at Ford Street, Washington Street, and Highway 6.

Table 2 – Major Crossing Structure Inventory

Reach	Structure
2	I-270 Overpass
2	Two Ramps with Bridges
4	I-76 Overpass
5	I-76 Overpass
5	52nd Avenue Bridge
5	Marshall Street Bridge
5	I-70 Overpass
5	Wadsworth Blvd Bridge
6	44th Avenue Bridge
6	Kipling Street Bridge
6	Multiple Pedestrian Bridges
7	Youngfield Street Bridge
7	I-70 Overpass
7	Multiple Pedestrian Bridges
9	Railroad Bridge
9	Three Vehicle Access Bridges
9	Three Pedestrian Bridges
10	Multiple Pedestrian Bridges
10	Ford Street Bridge
10	Washington Street Bridge
10	Highway 6 Bridge

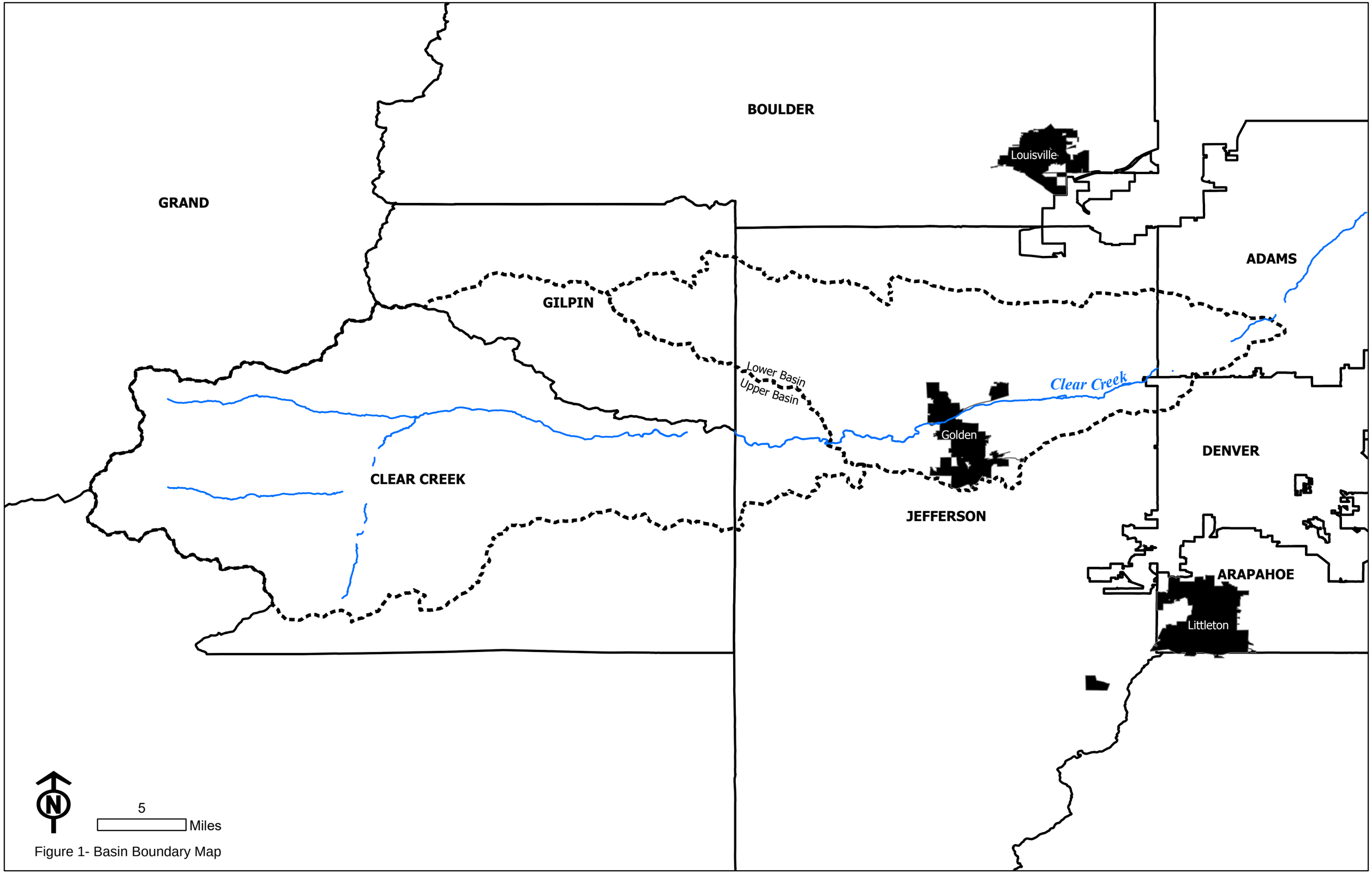

Figure 1- Basin Boundary Map

Project Area

6,000 Feet

N

Figure 2 - Vicinity Map

1 - Confluence with South Platte River to I25

2 - I25 to N. Pecos St

3 - N. Pecos St to Federal Blvd

4 - Federal Blvd to Sheridan Blvd

5 - Sheridan Blvd to Wadsworth Blvd

6 - Wadsworth Blvd to Kipling St

7 - Kipling St to I70

8 - I70 to McIntyre St

9 - McIntyre St to the Confluence with Tucker Gulch

10 - Confluence with Tucker Gulch to Upstream Study Limits

5,000 Feet

Figure 3 - Reach Map

2.4 Flood History

Historically, flooding in the Clear Creek basin has been relatively infrequent. Since 1864, twelve floods have been reported on Clear Creek and its tributaries. No lives have been reported lost due to flood related causes in the Clear Creek basin. The following descriptions of the floods of August 1888, June 1956, and July 1965 are typical of the information currently available (Gingery 1979), with additional information regarding the recent September 2013 Flood.

August 1888: This flood resulted from cloudbursts on the eastern slope of the Front Range of the Rocky Mountains. A discharge of 8,700 cubic feet per second (cfs) was reported at the mouth of Clear Creek canyon. This is the largest measured discharge in the history of this gaging station, which is located 1.5 miles upstream from Golden.

June 1956: Unusually heavy snowmelt runoff resulted in the failure of the Georgetown Dam located about 1 mile downstream from Georgetown. The peak discharge passing the gage above Golden was 5,250 cfs. By the time the crest reached the gaging station near the mouth of Clear Creek, it was reduced to 2,880 cfs.

July 23-26, 1965: On July 23 and 24, during severe storms over the headwaters of Clear Creek and Tucker Gulch, 4.5 inches of rain was reported to have fallen in Tucker Gulch in an hour, which caused flash flooding in Golden, however, flooding extended only a short distance downstream. In Golden, flood waters from Tucker Gulch spread over about 17 blocks and caused an estimated $112,000 damage to 69 residences, three commercial enterprises, three railroad bridges, four street bridges, and utility lines. At Georgetown, debris blocked the channel and diverted the waters down a street, thereby causing extensive washing of the surface and the flooding of several basements.

September 2013: One of the largest floods on record affecting the front range of Colorado, this event was focused generally north of Clear Creek. The Clear Creek basin experienced limited damages from storm discharges compared to communities in Boulder, Lyons, Longmont, and Estes Park. However, with a small meteorological shift south in the storm path, the Clear Creek basin and associated floodplain properties would have seen significant damages.

2.5 Wetland and Riparian Zones

An assessment of wetland and riparian areas was completed by ERO Resources, Inc. in July 2006 along the Clear Creek channel reach. Wetland and riparian areas were evaluated based on existing aerial photography and limited field assessments. This was completed for a previous FHAD and thus was not necessary to update for this version.

Vegetation in the study area has been modified by past development and by current recreation use. Because of the modifications and the overall reduction in the extent of plant communities, the remaining vegetation becomes especially important. The remaining riparian community along Clear Creek is the primary reason the corridor is so heavily used by wildlife and recreation users.

Riparian vegetation in the corridor is dominated by mature stands of plains cottonwood, with Siberian elm and Russian olive (non-native species) also present in great numbers. Sandbar willow, a fast-growing shrub, is a major understory component of the riparian community in many places. Because of past development and stream channelization, in most reaches, the riparian community along Clear Creek is limited to narrow bands of trees along the banks. In places, particularly parks and open space areas, the riparian community extends across much of the floodplain. Although riparian vegetation is not protected by local, state, or federal regulations, government entities typically discourage removal of riparian vegetation and often require replacing removed trees at some replacement ratio.

As with the riparian community, wetlands along Clear Creek are often limited to narrow strips along the stream banks. An exception is an area south of Clear Creek just east of I-70 in the Wheat Ridge Greenbelt. This area was mined in the past for gravel, so there are open water bodies, and supplemental sources of groundwater support extensive wetlands along the base of a bluff that overlooks the area. Wetlands are also present around the margins of many of the ponds and lakes in the study area. Some wetlands are protected by Section 404 of the Clean Water Act. Activities such as constructing drop structures, stabilizing banks, or changing channel geometry that would impact wetlands adjacent to waters (streams, lakes, ponds, etc.) under jurisdiction of the COE would require authorization.

2.6 Wildlife and Threatened or Endangered Species

Because of its highly developed setting, Clear Creek is a regionally important natural resource. Golden, Wheat Ridge, and Jefferson County have several parks and open space areas along the drainageway and within the study area. These provide areas of forage and shelter for a variety of wildlife such as waterfowl, songbirds, deer, coyote, and red fox. Aside from birds using the Clear Creek corridor as a stopping point during migration, most of the wildlife species found in the corridor are tolerant of development and the presence of humans. Despite their tolerance for human proximity, they still rely on areas such as the Clear Creek corridor for refuge. In addition to terrestrial wildlife, fish are also present in the study area. Clear Creek, lakes, and ponds support a variety of native and non-native species, including rainbow trout, carp, largemouth bass, bluegill, and minnows. The Colorado Division of Wildlife stocks some of the lakes in the study area with largemouth bass and bluegill. The poor water quality in Clear Creek limits the fish population.

Some species of plants and animals are protected or managed by state and federal entities. The Colorado Division of Wildlife manages and enforces regulation related to wildlife, including fish. Federally threatened and endangered species are protected under the Endangered Species Act of 1973 (ESA). Significant adverse effects to a federally listed species or its habitat require consultation with the U.S. Fish and Wildlife Service under Section 7 or 10 of the ESA. Migratory birds, their active nests, and eggs are protected by the Migratory Bird Treaty Act. It is illegal to kill, harm, or harass a migratory bird or to damage an active nest or eggs.

Three species listed as threatened under the ESA are known to occur in, or in the vicinity of, the study area – Preble's meadow jumping mouse, Ute ladies'-tresses orchid, and bald eagle. Preble's

and the orchid are associated with wetlands and streams along the foothills. Bald eagle use lakes and riparian areas for feeding, roosting, and nesting. Much of the study area is located in the Preble's meadow jumping mouse block clearance zone, within which Preble's is assumed to be absent. Clear Creek west of I-70 is not in the clearance zone. Ute ladies'-tresses orchid is present on Clear Creek at the west end of the study area, just west of State Hwy. 93 and in Prospect Park just east of I-70 in the Wheat Ridge Greenbelt. While no bald eagle roosts or nests have been identified in the study area at the time of this study, the number of bald eagles in the Denver Metropolitan area has been increasing and it would not be unusual for eagles to roost or nest in the Clear Creek riparian corridor.

SECTION 3 – HYDROLOGIC ANALYSIS

3.1 Overview

The hydrology summary prepared for this study was taken directly from the CLOMR (FEMA Case No. 16-08-0917R) prepared by Wright Water Engineers.

Before the completion of the CLOMR in 2016 previous hydrology came from District FHAD and Master Planning reports.

3.2 Previous Studies

Hydrology along Clear Creek was originally calculated by the (COE) in a report provided to the District in 1979. The COE hydrology is the source of hydrology in subsequent District FHAD and Master Planning studies. Additionally, the COE hydrology has been accepted and used by the Federal Emergency Management Agency (FEMA) in Flood Insurance Studies for incorporated and unincorporated areas in both Jefferson and Adams Counties. A listing of District and FEMA studies incorporating the previous COE hydrology is listed below. The hydrology recommended for this study is from previous CLOMR reports.

3.3 Hydrology

As previously mentioned, the hydrology for this study was taken from CLOMR Case #16-08-0917R. Full hydrologic analysis and FEMA review information is provided in the technical appendix.

Table 3 - Clear Creek Peak Discharge Summary

Peak Discharge Flows (cfs)				
Clear Creek Location	10-yr	50-yr	100-yr	500-yr
US Highway 6	3300	6900	8600	18300
Ford Street	3300	7000	8800	18600
McIntyre Street	3500	7500	9500	19800
I-70	3500	7500	9500	19800
44th Avenue	3700	8000	10200	21100
U/S Ralston / I-76	3700	8000	10200	21100
Sheridan Blvd	4500	9600	12600	19200
Federal Blvd	4500	9600	12800	25500
Broadway	4900	10400	14100	27700
Washington St	4900	10400	14100	27700
S. Platte Confluence	4900	10400	14100	27700

SECTION 4 – HYDRAULIC ANALYSIS

4.1 General

A Flood Hazard Area Delineation (FHAD) has been completed for Clear Creek. FHAD maps have been generated and are contained in the Appendix of this study. The purpose of the FHAD mapping is to identify areas, structures, and property which have the potential of being inundated in flood events. In addition to the FHAD mapping, floodways have been defined along Clear Creek to establish the portion of the channel that must remain free of obstruction to allow for conveyance of the 100-year flood without increases over 0.5-foot in water surface elevation.

4.2 Hydraulic Evaluation of Existing Facilities

The 100-year and 500-year floodplain delineation are shown on FHAD maps in Appendix E. Additionally, profiles for the 10-year and 50-year events, typical channel cross-sections, and cross-sections at hydraulic structures are also presented on the FHAD profiles sheets in Appendix F. The pertinent floodplain and floodway data are displayed in Table 3. This table identifies the channel cross-section locations; thalweg elevations; 10-, 50-, 100-, and 500-year discharges and water surface elevations, 100-year velocities; channel topwidths, and cross-sectional area; and left, right and total floodway widths the 0.5-foot floodway.

Water surface elevations were determined using the U.S. Army Corps of Engineer's step backwater program HEC-RAS, version 5.0.7. Cross-section data was developed from the digital elevation model (DEM) and filtered to reduce the number of points in each cross-section. Estimates of channel and overbank roughness were made from aerial photographs and field observations. Manning's 'n' values ranged from 0.03 to 0.045 in the channel and from 0.03 to 0.12 in the overbank areas. Blocked obstructions and ineffective flow were utilized to account for large structures and flow conveyance paths.

Through the course of this study, several specific reaches of Clear Creek required in depth analysis and careful consideration of modeling variables. Technical backup on many of these areas is included in Appendix C. A brief summary of select reaches is provided here:

- *Tabor Lake Split.* The hydraulic modeling along the main channel of Clear Creek has a natural and obvious split at Tabor Lake, on the north bank downstream of Youngfield Street. Lateral structures were used in the one-dimensional hydraulic model to estimate the flow split into the lake and continuing along the main channel. Hydraulic conditions between the active channel and static water surface controlled by lake embankments are estimated by the lateral structures. Floodway encroachment analysis was not performed for this flow split.
- *2D modeling.* Additional information on the 2D modeling is included herein and with technical memos included in Appendix C for the North Overflow, South Overflow and 44th Avenue. Through the course of the study, the limitations on one-dimensional analyses of these areas were clear – flow paths would align with engineering judgement for one direction but become disconnected from expectations for other related flow paths. Two-dimensional modeling allowed for multiple flow paths to be more accurately represented then entered into the one-dimensional model based on known water surface elevations, peak discharges, and other set variables. See Appendix C and following split flow narrative. Below is a summary of the areas requiring in-depth analysis.
- *North Overflow.* The North Overflow is located east of Sheridan Boulevard and north of I-76. The North Overflow rejoins the main channel downstream of Lowell Boulevard. The 2D analysis provides the best information on the assumptions and results for the North Overflow floodplain delineation. This is a modification of the WWE CLOMR specific to the split flow conditions. In general, the overtopping split at Sheridan Boulevard starts the overflow path, but detailed analysis had to consider the complexity of right overbank flow upstream of I-76 as well. Moving downstream, identifying a centerline for the flowpath is highly subjective based on existing topography and benefited greatly from the 2D modeling results. Future work should consider a channel alignment adjacent to the interstate as the most direct flow path following the Recommended Plan from the 2005 MDP by Ayres Associates, then work overbank capacity and floodway delineation northward from that channel alignment.
- *South Overflow.* The South Overflow is located southeast of I-76, west of Sheridan Boulevard and north of west 52nd Avenue. As the North Overflow work developed, the complexity of flow south of the interstate and influence of an embankment led the project stakeholders to consider 2D analysis of the South Overflow to inform south overbank flooding and spills. Flow between Sheridan and 52nd Avenue was a focus of a specific analysis to evaluate the embankment and overland flows.
- *44th Avenue.* Overbank flooding near 44th Avenue benefited from the 2D analysis in defining flood depth and flow direction. The number of residential structures compounded the flood risk and the cross sections were not sufficient to represent risk across the residential areas. A 2D model provided additional information to inform the 1D model and better represent the flood risks specific to residential land use.
- *Pecos Street*. The right overbank spill on Pecos Street was identified in the original 1D modeling as a potential split flow. Based on the complexity of roadway embankments and overpasses in this location, additional 2D analysis provided a more reasonable hydraulic result and floodplain than the initial 1D HEC-RAS analysis.
- *Bridge Survey.* Through the course of the study, there have been several supplemental surveys on the bridge crossings. As originally scoped, the bridges from both Jefferson County and Adams County FHADs were merged into a single model. This included field verification of the bridges, piers, and armoring conditions to ensure the combined model did not omit obvious changes to the Creek since the early 2000s. Also, in the course of ongoing floodplain management in the City of Arvada, a floodplain permit applicant completed independent survey on several bridges over Clear Creek and identified a vertical elevation discrepancy. Upon further review, it was decided that multiple bridges in the Arvada section of Clear Creek should be surveyed and checked against the elevations from the 2005 and 2007 FHADs.
- *The RTD Gold Line.* The RTD G Line is located north of I-76, east of Lowell Boulevard, and west of Federal Boulevard. The light rail project was designed and constructed in the course of this study. A number of updated studies and as-built conditions affected the floodplain delineation along Clear Creek in the vicinity of the Little Dry Creek confluence. This study

incorporated CLOMR information as it was available and ultimately integrated as-built LOMR information. There was not a LOMR for either CLOMR 13-08-099R (for the Gold Line near Federal) or 13-08-0217R (for the B Line at the mouth of Little Dry Creek). This study incorporates the final data for these two CLOMR cases.

- *RTD B Line/Mouth of Little Dry Creek.* The hydraulic conditions at Little Dry Creek are based on the CLOMR, participating agencies agreed to incorporate as-built changes through the FHAD and subsequent PMR.
- *Stockpile analysis.* In two locations on the lower reaches of Clear Creek there are active construction operations that include stockpiles in and near the floodplain. Ongoing floodplain management of these land-uses manage the responsibilities and restrictions of those stockpiles. For the purpose of this study, certain assumptions on existing conditions and existing topography had to be documented. The Brannan and Martin Marietta operations were studied, surveyed, and modeled to provide a baseline condition for future regulatory mapping and alignment with the ongoing floodplain management strategies.
- *City of Golden upstream of Ford Street.* The LiDAR topography and initial modeling for areas upstream of Ford Street in Golden did not reflect previously permitted wall and building elevations. With additional survey information and reference to floodplain permit information, the delineation on the south overbank upstream of Ford Street was refined to more accurately reflect flood risk on the multi-family residentials structures adjacent to the Clear Creek trail.

Detailed technical information is available is available in the full technical memorandums in Appendix C.

4.3 Split Flow Areas

Several areas of split flows were identified along the project reach. These areas are described in more detail in the Flooded Areas (Section 4.6) and have been discussed in multiple stakeholder meetings over the course of the study. Split flows were typically evaluated by defining a lateral spill weir and balancing water surface elevations and discharge of the flow leaving the main channel with the flow continuing downstream. This was completed using the lateral structure optimization routine in HEC-RAS. Once the flow balance was established, the overall discharges were changed in the HEC-RAS model to match the optimization and the models were re-run without activating the optimization routine. The split flow reaches were exported into an independent hydraulic model.

Two-dimensional flood modeling was used to inform the one-dimensional model in several locations in the study area, with particular benefit for split flow locations. The 2D models provided higher resolution on multiple flow directions across the natural and developed topography of Clear Creek. Please see discussion in the previous section on the location requiring more in-depth analysis with 2D modeling.

4.4 Two-Dimensional Hydraulic Analysis

In an effort to assist the Clear Creek FHAD hydraulic 1D modeling effort, a series of 2D models were developed at key locations along Clear Creek. These locations include:

- Left overbank spill across 44th Avenue from Kipling to XS 48477
- Right overbank spill across Sheridan Boulevard from 52nd Avenue to XS 32573 (the “South Overflow”)
- Right overbank spill across I-76 and Federal Boulevard from XS 28381 to XS23255 (the “Federal Split”)
- Right overbank spill between XS 22613 to XS 22088 (Pecos Area)
- Left overbank spill in the ‘North Overflow’ area

The purpose of these models is to provide spill discharge information, approximate floodplain limits, and to provide flow path alignments for the key areas noted above as needed.

The 2D modeling was completed using HEC-RAS (v. 5.0.7). General modeling parameters include the following:

- 30 ft by 30 ft mesh spacing
- Break lines at key locations (channels, top of bank etc.)
- Bridge structures where deck is close to or below 100-year 1D water surface elevations (bridge structures are approximated by culverts in 2D HEC-RAS)
- Buildings were integrated into the elevation surface for the model and set as breaklines

Additional information is provided in the technical appendix in the full technical memorandums in Appendix C.

4.5 Floodway Encroachment Analysis

The 0.5-foot floodway was established predominately using encroachment method 4 in HEC-RAS. Method 4 encroachment provides an equal loss of conveyance in the cross-section overbanks to achieve a target change in water surface elevation and resulting energy grade line. In areas where the method 4 encroachment was resulting in floodway surcharges outside of the allowable change in energy grade, or negative floodway surcharges occurred, either no encroachment, or a method 1, encroachment option was utilized. For a method 1 encroachment, the exact location of the floodway stationing was defined manually. Typically, when the method 1 encroachment was used, the floodway width was set equivalent to the 100-year floodplain top width (i.e., no encroachment). The floodway left and right widths are measured from the channel stationing line which correlates approximately to the centerline of the channel. Pertinent floodway data is displayed in Appendix C.

4.6 Flooded Areas

The work maps and online flood map viewer are very useful tools for evaluating flooded areas within the study reach. Pan, zoom, and various base map functions allow for user driven review

of basic inundation limits up through a risk assessment for specific locations. There are a few areas with noteworthy flooding limits summarized here.

- Upstream of York Street, north overbank flooding with the 500-year storm inundates commercial properties with the south overbank only slightly elevated above the same flood risk.
- Upstream of I-25, complex flow paths and transportation related obstructions to the flow path cause backwater and diverted flows to inundate several properties.
- Between Broadway and Pecos, a significant constriction in the flow path results in backwater flooding towards Pecos and diverted flow paths around properties towards Broadway during the 500-year storm. Influences from industrial/gravel operations and irrigation canals further complicates the flood risk mapping in this area.
- Flood risk upstream and downstream of Federal Boulevard is highly congested by transportation infrastructure, existing commercial and private structures, and natural topography. Split flow analyses and detailed modeling in this area provides a best estimate of clear water flood risk.
- At Sheridan Boulevard, the North Overflow is one of the most distinct and difficult features of the Clear Creek floodplain analysis. Additional 2D analysis, detailed survey, land use assumptions, and multi-variable dynamic conditions make for a very complicated representation of flood risk. The interstate bisects a natural topography for the Clear Creek floodplain. With sufficient planning, the north overflow can restore a functional North Overbank flow path that reduces flood risk on north and south overbanks of Clear Creek.
- Downstream of 44th Avenue, overbank flooding affects multiple residential structures in the north overbank. Natural topography in this area and existing development leads towards individual structure mitigation or structural flood control alternatives that further restrict the natural floodplain conditions.
- Flood risk from approximately Kipling to McIntyre is not complicated by interstate transportation infrastructure. Flooding follows generally natural topography and active floodplain management on land use, natural area maintenance, and other interactive strategies can be effective.
- The Coors Brewery property is the most channelized section of Clear Creek to protect not only private industrial infrastructure, but also the wastewater treatment plant shared with Jefferson County and the City of Golden.
- Upstream of Tucker Gulch, the City of Golden's Clear Creek corridor has multiple residential and commercial mixed-use properties adjacent to the creek with intentional recreational opportunities within the creek. Flood risk is generally contained, but should be monitored during large-scale events.

4.7 Comparison with the Effective Flood Insurance Study

A comparison was made between the information presented in the FHAD and the effective Flood Insurance Study (FIS). In general, the 100-year Base Flood Elevations (BFEs) along Clear Creek remain similar, or increase, as compared to the effective water surface elevations presented in the FIS reports and on the FEMA Flood Insurance Rate Maps (FIRMs).

Areas where split flows have been identified generally result in increased flood hazard area delineation. Other areas were identified where the channel has been shifted due to development, such as within the City and County of Denver, adjacent to I-76.

The differences in the model results between this study and the previous studies and reports primarily result from, basin development and changes, updated detailed mapping, and cross-section selection and placement.

4.8 500-Year Flood Hazard Analysis

The 500-year flood hazard area and flood elevations were identified as part of this study. 500-year water surface elevations are presented in Appendix D. A supplemental flood hazard delineation was developed for eventual use in the FEMA Flood Insurance Study. It should be noted that at some locations, the 500-year discharges are not completely contained within the hydraulic cross-section's limits modeled in this study and the flood hazard delineation extended beyond the project mapping limits. As a result, the ends of these sections are vertically extended.

SECTION 5 – REFERENCES

CLOMR, Case #16-08-0917R, Hydrology change for Clear Creek, Wright Water Engineers. February 2016

Flood Hazard Area Delineation Clear Creek (Adams County), Ayres Associates, December 2005

Flood Hazard Area Delineation Clear Creek (Jefferson County), ICON Engineering, April 2007

Flood Hazard Area Delineation Clear Creek Adams County & Jefferson County, Gingery Associates, Inc., 1979

Flood Insurance Study, Adams County, Colorado and Incorporated Areas, Federal Emergency Management Agency, September 28, 2018

Flood Insurance Study, City and County of Denver, Colorado, Federal Emergency Management Agency, September 4, 2020

Flood Insurance Study, Jefferson County, Colorado and Incorporated Areas, Federal Emergency Management Agency, January 15, 2021

Major Drainageway Planning Clear Creek Phase B, Wright-McLaughlin Engineers, October 1981

Major Drainageway Planning Clear Creek Youngfield Through Golden Phase B Report, Wright-McLaughlin Engineers, September 1982

Major Drainageway Planning Lower Clear Creek Phase B Update, David J. Love & Associates, Inc., June 1988

U.S. Army Corps of Engineers, 1978A. Flood Plain Information, Metropolitan Region, Denver, CO, Volume III, Clear Creek.

U.S. Army Corps of Engineers, 1978B. Hydrology for Clear Creek, Jefferson and Adams Counties, Colorado, by Omaha District.

U.S. Army Corps of Engineers, March 2019, HEC-RAS River Analysis System, Version 5.0.7

Appendix A: Project Correspondence

2016

Troy Carmann

From: Terri Fead <tfead@udfcd.org>
Sent: Wednesday, April 13, 2016 10:31 AM
To: Justen Hamann
Cc: David Mallory; Shea Thomas; Craig Jacobson; Nick Stone
Subject: Modeling of minor drops along Clear Creek

Justen,

Just wanting to clarify that the minor drops along Clear Creek will not require the standard 4 XSs – especially if not near insurable structures.

Thanks,
Terri

Terri L. Fead, P.E., CFM
Project Manager
Floodplain Management Program
Urban Drainage and Flood Control District
303-455-6277
tfead@udfcd.org

Clear Creek FHAD Update 2016
Progress Meeting
April 13, 2016, 8:30 AM

Urban Drainage and Flood Control District
Meeting Minutes

Attendees:	Terri Fead	Urban Drainage and Flood Control District
	Shea Thomas	Urban Drainage and Flood Control District
	David Mallory	Urban Drainage and Flood Control District
	Craig Jacobson	ICON Engineering, Inc.
	Justen Hamann	ICON Engineering, Inc.
	Nick Stone	ICON Engineering, Inc.

1. Channel Thalweg Comparisons
   - Compared Ayres cross-sections with 2013 LiDAR
     - About 1.2 feet to 3.5 feet difference
   - Compared ICON cross-sections with 2013 LiDAR
     - LiDAR not supplemented with survey, but old FHAD does in areas
     - About 18 inches to 2 feet difference
   - Compared ICON cross-sections with 2013 LiDAR that had no survey
     - Appeared to have good correlation
2. Flow Analysis at Golden Gage for Time of 2013 LiDAR
   - Presented graphical analysis
     - About 150 cfs to 200 cfs, corresponds to about 2% of proposed 8,600 cfs
   - Thoughts and Discussion on Thalweg:
     - UDFCD wants survey with LiDAR to get an average depth between structures
     - Previous survey did not cover entire channel along cross-sections
     - UDFCD generally encouraged by the fact that only minor discrepancies occur along the thalweg, affecting low flows, and the rest of the channel containing 100-year flows is pretty similar.
3. Crossing Structures
   - New or added and revised bridges
     - Need survey for first two bridges starting from upstream
     - Bridges near Coors probably do not need survey or modeling
     - Some new bridges might be too high to need modeling
     - Proposed site visits are needed to confirm bridges and heights
     - UDFCD believes the size of pipe crossing and whether or not they are encased would make a difference in modeling approach.
     - UDFCD also interested in showing pipe crossings on profiles
     - Need to survey and remodel new ramp to I-70 from Golden Freeway
     - Need to survey and model footbridge approximately 300 feet downstream of I-76
     - UDFCD believes the RTD bridge upstream of Federal Boulevard is high enough to where it will not impact the floodplain.
     - RTD bridge upstream of Federal Boulevard is in the LOMR process and the resulting data needs to be incorporated into this FHAD.

- RTD bridge approximately 2,000 feet upstream of Pecos Street is “a 1,000 foot bridge,” and should not impact the floodplain.
- UDFCD pointed out that the railroad bridge adjacent to the RTD bridge approximately 2,000 feet upstream of Pecos Street was reconstructed, and now there is some debate on who will cover it with a LOMR.
- There was a general consensus to wait for data from the LOMR(s) that cover the newly constructed railroad bridge and RTD light-rail bridges and incorporate that data into this FHAD.
- UDFCD mentioned current improvements to Clay Street outfall that may need to be incorporated into this FHAD

- Survey needs or As-built plans
  - ICON will assemble a list of field-verified bridges that need surveying and UDFCD would look into surveying these structures.

4. New and revised drop structures
   - Viewed map for examples of new and revised drop structures
     - UDFCD agreed that all drop structures need to be accounted for.
     - Both parties were unsure if as-builts exist for all the drop structure.
     - UDFCD clarified that all drop structures need to be shown on profiles.
     - Mutual agreement to use survey for larger drop structures, but field measurements will suffice for small drops, less than 3 feet, especially in areas where there are no insurable structures.
     - ICON will field-verify the large drop structures that need surveying and UDFCD would look into surveying these structures.
     - UDFCD mentioned overflow channel improvements adjacent to Clear Creek and railroad crossing approximately 900 feet downstream of McIntyre Street. This may have been processed with a LOMR, and the more recent data needs to be incorporated into this FHAD.
5. Soil Stockpiles
   - Discussion about Brannan project area
     - The project mined and reclaimed the area approximately 2,000 feet downstream of Federal Boulevard, and now contains unpermitted soil stockpiles.
     - Adams County was proposing to take action to remove the stockpiles by 2019 but had little leverage to ensure their removal.
     - The project raised ground on the right overbank causing the water surface elevation to rise 4 to 5 feet, significantly impacting the floodplain along the left overbank.
     - UDFCD believes a recent LOMR will provide more data for this area that can be incorporated into this FHAD.
     - There was a general consensus to account for the stockpiles as of now, but UDFCD still needs to have an internal discussion and final judgment is to be determined.
6. Conclusions
   - Survey is a priority
     - Need as much reasonable information as we can get – ICON will assemble a list of bridges and large drops.
   - Review of Thalweg comparisons
     - Determined the LiDAR is sufficient and minor discrepancies in the channel will not impact overall flows for a 100-year event.

- END OF MEETING--

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein. Failure to do so will constitute acceptance of these minutes as statements of fact in which you concur.

Minutes prepared by:

Nick Stone
ICON Engineering, Inc.

April 29, 2016

Troy Carmann

From: David Mallory <dmallory@udfcd.org>
Sent: Tuesday, July 19, 2016 1:14 PM
To: Greg Labrie
Cc: Monica Unger; Tom Jansen; Ryan Carlson; Brabenec, Dawn (dawn.brabenec@fema.dhs.gov); Terri Fead; Shea Thomas; Justen Hamann
Subject: RE: Clear Creek Near I-76 Floodway, Floodplain and Fill
Attachments: 57th and Lowell Blvd.pdf; FM08001C0591H (1).pdf

Greg,

The property owner and engineer have requested a meeting to discuss how to place fill within the Clear Creek floodway (see attachments). We understand that a previous owner placed fill on this parcel without an Adams County floodplain development permit. If that is true, we will be obligated to notify FEMA of the possible floodplain violation. The outcome would depend on the effective floodplain information at the time of fill placement.

Additionally, the site is immediately east of the proposed Adams County regional park. We are currently processing the CLOMR for that project. The existing and proposed fill on this current proposal will likely change the flow split at Lowell Boulevard and I-76. For all of these reasons, we believe it's important to have your attendance at the meeting, and the meeting should be rescheduled should you be unavailable. I'm available to discuss any questions or concerns you may have. Thanks,

David

David Mallory | UDFCD
303.455.6277 dmallory@udfcd.org
"Protecting people, property, and the environment"

The 2015 Edition of Flood Hazard News is now available

-----Original Appointment-----
From: Monica Unger [mailto:munger@jansenstrawn.com]
Sent: Monday, July 18, 2016 5:05 PM
To: Monica Unger; Tom Jansen; Ryan Carlson; David Mallory
Subject: Clear Creak Near I-76 Floodway, Floodplain and Fill
When: Tuesday, July 26, 2016 3:30 PM-4:30 PM (UTC-07:00) Mountain Time (US & Canada).
Where: Urban Drainage Office

Clear Creek FHAD
Progress Meeting
August 4, 2016 10:00 AM

UDFCD Offices

Meeting Minutes

Attendees:	*Shea Thomas,*	*UDFCD*
	Terri Fead,	*UDFCD*
	Craig Jacobson,	*ICON*
	Justen Hamann,	*ICON*
	Jeremy Deischer,	*ICON*

Project Update

- Bridge deck information for crossings modeled in the effective models had been carried forward to this study.
- Bridges that had been constructed since the previous FHADs were surveyed and incorporated into the model. The crest and toe elevations of drop structures had also been surveyed. Craig noted it wasn't the most comprehensive survey on some of the structures (1 or 2 shots for the most part) but by supplementing the survey with LiDAR information, the team felt the structures could be reasonably modeled.
- Several bridges around the I-25 crossing with Clear Creek had not been modeled in the previous study. This area actually has about 6 bridges but previous study only modeled 2 of them. No bridge survey data is currently available. After discussion, the team decided that ICON would use photos and field measurements to model any obstructions, including any piers, and no survey information would be obtained since the low chord of the bridge decks were significantly higher than the 500-year water surface level.
- The status of the hydrology CLOMR was discussed. UDFCD stated that they didn't think it had been reviewed yet but were hopeful they would see comments sometime in the next few weeks.
- The status of the two RTD Light-Rail LOMRs and CLOMRs was discussed. At the time of the meeting the CLOMR cross sections for the RTD bridge near Federal (FEMA Case No. 13-08-0099R) have been used with updated LiDAR. After discussion, it was decided that the LOMR data (including topography) will be used for the FHAD but for CLOMR incorporation, the cross-section alignment and bridge data will be used but the cross-sections should be recut with the topography being used for the FHAD. Shortly before the meeting the LOMR for the RTD Fastracks Northwest Electrified Segment (FEMA Case No. 16-08-1204P) had been submitted and will be incorporated into the model once the case was reviewed. The status of the other upstream LOMR—following the 13-08-0099R CLOMR—was unknown but it was thought that the consultant was currently working on preparing it. The previous CLOMRs excluded the soil stockpiles in this area but UDFCD says the LOMRs should include the piles. The FHAD will also account for the soil stockpiles in the area.
- Just downstream of McIntyre St. there appears to be improvements near the overflow location identified in the effective FHAD. ICON believes these improvements were designed by CDM Smith and stitched into the DFIRM at some point. Terri will look into this area as ICON will need the hydraulics in order to maintain the assumptions.

Modeling Assumptions:

- ICON identified several areas, specifically around bridges and through the walled sections near the Coors Brewery that the LiDAR wasn't accurately representing the topography. Topography from the effective studies was used to supplement the LiDAR in these areas. Documentation of each cross-section that was modified will need to be included in the report and where the modified data comes from. An example of the modification would also be helpful to include.
- Five bridges were identified to have a skew in excess of 45 degrees (50 to 57 degrees). The I-76 Bridge was the worst case. After some discussion, it was decided that the skew will be accounted for manually either by changing the bounding cross-sections to run perpendicular to the direction of flow or by modifying the internal bridge sections to account for the actual flow obstruction and/or reduction in flow conveyance.

Profile Adjustments:

- Craig described how the profile had been adjusted by incorporating small pilot channel in-between areas of survey. UDFCD liked the pilot channel thalweg approach as long ICON thought it was reasonable and defendable. ICON will document this approach in the report.

Preliminary Post-RAS Results

- The 6th Ave. split flow will be carried forward to this study. Most of the other splits should remain but be reduced.
- The Ford St. split flow has been eliminated with the reduction in discharge.
- There was a noticeable reduction in flooding in Wheat Ridge east of Kipling but the flow is still not contained in the channel.
- The Clear Creek North Overflow will remain with flow overtopping Sheridan. The flow is currently being subtracted from the main channel and it was agreed this would be maintained with the FHAD as there currently are no plans to eliminate the overflow.

The team will begin to incorporate split flows along Clear Creek for the first submittal for the FHAD. UDFCD explained the requirements for the first submittal and Shea will provide the team the updated FHAD Submittal Form.

- END OF MEETING--

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein. Failure to do so will constitute acceptance of these minutes as statements of fact in which you concur.

Minutes prepared by: Jeremy Deischer

Jeremy Deischer
ICON Engineering, Inc.

September 1, 2016

Troy Carmann

From: Andrew Earles <aearles@wrightwater.com>
Sent: Wednesday, October 5, 2016 10:14 AM
To: Anderson, Paul
Cc: dmallory@udfcd.org; Murphy, Brian M.; Justen Hamann; Ken MacKenzie; Shea Thomas; Plaza, Samuel A.; Eichenwald, Zachary T.; Shannon Tillack; plazasa@cdmsmith.com
Subject: RE: Case No. 16-08-0917R - Clear Creek Hydrology CLOMR

Thanks for your quick reply Paul. I probably used the wrong word asking for "suspension." We should have this analysis completed in the next few weeks, well before the deadline, so if you can keep this open, we will get you additional data before the end of the month. Thanks, Andrew

Andrew Earles, Ph.D., P.E., D.WRE
Vice President

Wright Water Engineers, Inc.
Over 50 Years of Service
2490 W. 26th Avenue Suite 100A
Denver, CO 80211
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(303) 480-1020 FAX
HTTP://www.wrightwater.com

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From: Anderson, Paul [mailto:andersonp@cdmsmith.com]
Sent: Wednesday, October 05, 2016 9:28 AM
To: Andrew Earles <aearles@wrightwater.com>
Cc: dmallory@udfcd.org; Murphy, Brian M. <MurphyBM@cdmsmith.com>; jhamann@iconeng.com; Ken MacKenzie <kmackenzie@udfcd.org>; Shea Thomas <sthomas@udfcd.org>; Plaza, Samuel A. <plazasa@cdmsmith.com>; Eichenwald, Zachary T. <eichenwaldzt@cdmsmith.com>; Shannon Tillack <stillack@wrightwater.com>
Subject: RE: Case No. 16-08-0917R - Clear Creek Hydrology CLOMR

Andrew,

Thanks for the information. I just wanted to double check since you have until the 17th of November to get the information in. If you need more time I understand and can suspend the case.

For future reference Sam Plaza's email is to plazasa@cdmsmith.com. It might have just been typed incorrectly.

Thanks,

Paul Anderson, P.E., CFM
CDM Smith, a member of **Compass PTS JV**
Telephone: 303-383-2418
Email: andersonp@cdmsmith.com

From: Andrew Earles [mailto:aearles@wrightwater.com]
Sent: Wednesday, October 05, 2016 9:18 AM
To: Anderson, Paul <andersonp@cdmsmith.com>
Cc: dmallory@udfcd.org; Murphy, Brian M. <MurphyBM@cdmsmith.com>; jhamann@iconeng.com; Ken MacKenzie <kmackenzie@udfcd.org>; Shea Thomas <sthomas@udfcd.org>; plazas@cdmsmith.com; Eichenwald, Zachary T. <eichenwaldzt@cdmsmith.com>; Shannon Tillack <stillack@wrightwater.com>
Subject: Case No. 16-08-0917R - Clear Creek Hydrology CLOMR

Hi Paul:

Upstream of the Rio Grande Railroad to Sheridan Boulevard, I-76 splits Clear Creek into two separate flow paths that rejoin between I-76 and the Rio Grande Railroad. The split flow from Clear Creek is called the North Overflow. The Clear Creek (Adams County) FHAD prepared by Ayres Associates in 2005 evaluated this flow split. Subsequently, the January 2016 Adams County FIS accounted for the North Overflow in the 100-year peak discharge of Clear Creek. The Clear Creek hydrology CLOMR request prepared by Wright Water Engineers and dated May 23, 2016 does not account for the North Overflow.

After discussions with UDFCD, it has been determined that the Clear Creek hydrology CLOMR request should account for the North Overflow split flow. Therefore, we are requesting that the review of the May 23, 2016 Clear Creek hydrology CLOMR request and subsequent AD response letter submitted on September 27, 2016 for Case No. 16-08-0917R be suspended until revised peak discharges and profiles are re-submitted to you for review. There will only be adjustments to the peak discharges and profiles between the east and west crossings of I-76. We are working diligently to make these adjustments and will re-submit the information for your review shortly.

Please let us know if you have any questions.

Best regards,
Andrew

Andrew Earles, Ph.D., P.E., D.WRE
Vice President of Water Resources

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Over 50 Years of Service
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Denver, CO 80211
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(303) 475-9816 CELL
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2017

Troy Carmann

From: David Mallory <dmallory@udfcd.org>
Sent: Wednesday, January 4, 2017 10:40 AM
To: Ken MacKenzie; Andrew Earles (aearles@wrightwater.com)
Cc: Terri Fead; Shea Thomas; Justen Hamann
Subject: FW: Determination Documents for 16-08-0917R
Attachments: 16-08-0917R-080001.pdf; 16-08-0917R-080046.pdf; 16-08-0917R-080087.pdf; 16-08-0917R-080090.pdf; 16-08-0917R-085072.pdf; 16-08-0917R-085079.pdf

The Clear Creek Hydrology CLOMR has been approved.

David Mallory
Manager | Floodplain Management
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
P: 303.455.6277 | www.udfcd.org
Protecting people, property, and the environment

From: Plaza, Samuel A. [mailto:plazasa@cdmsmith.com]
Sent: Wednesday, January 04, 2017 9:52 AM
To: David Mallory <dmallory@udfcd.org>
Subject: Determination Documents for 16-08-0917R

Hello Mr. Mallory,

Henry Poburka mentioned that you were looking for copies of the final 104 documents for 16-08-0917R. You should be receiving copies in the mail, but I have attached the documents to this email for your record.

Thank you,

Sam Plaza, E.I.
CDM Smith, a member of **Compass PTS JV**
Telephone: 303-383-2367
plazasa@cdmsmith.com

Troy Carmann

From: Justen Hamann
Sent: Wednesday, February 8, 2017 3:24 PM
To: Terri Fead; Craig Jacobson
Cc: Shea Thomas; David Mallory; Robert Krehbiel (Robert_Krehbiel@matrixdesigngroup.com)
Subject: RE: Clear Creek FHAD Information - composite topographic contour data?
Attachments: MEMO-Clear_Creek_FHAD_Modeling_Notes.pdf

Hi Terri,

We have a contour shapefile which should cover the majority of the drainageway. I have uploaded this shapefile to the Clear Creek FHAD Dropbox and have also provided a direct link below to download. As stated in our modeling notes, the contours are based on the FEMA 2013 Post-flood LiDAR. We do not have a composite contour layer or surface which takes into account the areas we noticed during the modeling which we felt did not accurately represent the existing channel conditions (discussed in more detail in the attached memo). These areas were manually adjusted in HEC-RAS using the previous FHAD geometry as a guide.

https://www.dropbox.com/s/4p3ccvg3mk6fcdk/CC_Contours.zip?dl=0

Let me know if you have any questions on this or need more information.

Thanks,

Justen Hamann, P.E.
Project Manager

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Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Terri Fead [mailto:tfead@udfcd.org]
Sent: Wednesday, February 8, 2017 11:02 AM
To: Justen Hamann <jhamann@iconeng.com>; Craig Jacobson <cjacobson@iconeng.com>
Cc: Shea Thomas <sthomas@udfcd.org>; David Mallory <dmallory@udfcd.org>; Robert Krehbiel (Robert_Krehbiel@matrixdesigngroup.com) <Robert_Krehbiel@matrixdesigngroup.com>
Subject: Clear Creek FHAD Information - composite topographic contour data?

Hello Justen and Craig,

Do you have a composite topographic contour layer or surface for the various sources of topographic data used for the Clear Creek FHAD information? This would help expedite the technical review.

Thanks,
Terri

Terri Fead, P.E.
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211

Troy Carmann

From: Justen Hamann
Sent: Wednesday, April 12, 2017 8:29 AM
To: Brooke Seymour
Cc: Craig Jacobson; Terri Fead; Shea Thomas
Subject: RE: Clear Creek FHAD model review

Hi Brooke,

We have received the review files and moved them off of the Dropbox.

Thanks,

Justen Hamann, P.E.
Project Manager

ICON ENGINEERING, INC.
7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Tuesday, April 11, 2017 11:12 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Craig Jacobson <cjacobson@iconeng.com>; Terri Fead <tfead@udfcd.org>; Shea Thomas <sthomas@udfcd.org>
Subject: Clear Creek FHAD model review

Justen,

We have completed compiling review comments for the Clear Creek FHAD model submitted 9/26/2016. Technical comments are included in a pdf summary supported with recommended shapefiles. Additionally, pdf maps prepared to assist with the review have been included for your reference. All information has been uploaded to Dropbox. Please confirm once you receive the files.

Please don't hesitate to reach out to me or Terri with any questions.

Regards,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
P: 303.455.6277 | www.udfcd.org
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Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, April 13, 2017 11:56 AM
To: Justen Hamann
Cc: Craig Jacobson; Terri Fead; Shea Thomas
Subject: RE: Clear Creek FHAD model review
Attachments: UDFCD Review Table_Clear Creek FHAD_09-26-2017.xlsx

Justen – the accompanying spreadsheet is attached to this email. Sorry I overlooked it!

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
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From: Justen Hamann [mailto:jhamann@iconeng.com]
Sent: Wednesday, April 12, 2017 4:48 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Craig Jacobson <cjacobson@iconeng.com>; Terri Fead <tfead@udfcd.org>; Shea Thomas <sthomas@udfcd.org>
Subject: RE: Clear Creek FHAD model review

Hi Brooke,

The Matrix review memo mentions an accompanying Excel Table which contains the detailed review notes. I didn't see an Excel file in the information downloaded from Dropbox. Can we get a copy of that emailed or added to the Dropbox?

Thanks,

Justen Hamann, P.E.
Project Manager

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7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Tuesday, April 11, 2017 11:12 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Craig Jacobson <cjacobson@iconeng.com>; Terri Fead <tfead@udfcd.org>; Shea Thomas <sthomas@udfcd.org>
Subject: Clear Creek FHAD model review

Justen,

We have completed compiling review comments for the Clear Creek FHAD model submitted 9/26/2016. Technical comments are included in a pdf summary supported with recommended shapefiles. Additionally, pdf maps prepared to assist with the review have been included for your reference. All information has been uploaded to Dropbox. Please confirm once you receive the files.

Please don't hesitate to reach out to me or Terri with any questions.

Troy Carmann

From: Justen Hamann
Sent: Monday, May 22, 2017 12:31 PM
To: Brooke Seymour
Cc: Shea Thomas; Terri Fead; Craig Jacobson
Subject: RE: Clear Creek FHAD

Thanks Brooke!

I'll go ahead and send out a meeting invite for Thursday June 1st from 9:30 to 10:30AM and hopefully that will still work for everyone. We can do a few other options too if that time is no longer available. Just let me know.

Justen Hamann, P.E.
Project Manager

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---

From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Friday, May 19, 2017 10:11 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Shea Thomas <sthomas@udfcd.org>; Terri Fead <tfead@udfcd.org>; Craig Jacobson <cjacobson@iconeng.com>
Subject: RE: Clear Creek FHAD

We'd be happy to meet with you Justen. I'll be on vacation next week, so let's target the following week. It looks like Terri and I have the following availability:

- Tue. 5/30 – 11:30-12:30
- Wed 5/31 – 11:30-12:30, 2:30 or later
- Thur. 5/32 – 9:30-11:30, 2:30 or later

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
Protecting people, property, and the environment

From: Justen Hamann [mailto:jhamann@iconeng.com]
Sent: Friday, May 19, 2017 9:57 AM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Shea Thomas <sthomas@udfcd.org>; Terri Fead <tfead@udfcd.org>; Craig Jacobson <cjacobson@iconeng.com>
Subject: RE: Clear Creek FHAD

Hi Brooke,

We have begun reviewing the comments and addressing a few of them but we'd like to schedule a meeting with you, Terri and possibly Shea to go over some of the comments and make sure we're all on the same page before I can give you a better estimate of our timeline for resubmittal. Can I prepare a Doodle poll or get a few times in the next week or two when we could meet with you?

Troy Carmann

From: Justen Hamann
Sent: Thursday, July 6, 2017 9:31 AM
To: Brooke Seymour; 'Terri Fead (tfead@udfcd.org)'
Cc: Troy Carmann
Subject: Clear Creek - Coors Railroad Bridge
Attachments: Coors-Railroad-Bridge.pdf; Coors-RR-Bridge-XSECTS.PDF

Hi Brooke & Terri,

We completed our field work for the bridge photos on Clear Creek and are currently working on incorporating some changes into the HEC-RAS model. We found some differences at the Coors Railroad Bridge that we'd like to run by you to get your opinion on. The upstream and downstream pictures are in the attached PDF file "Coors-Railroad-Bridge.pdf" and the current cross-section plots from RAS model are in the file "Coors-RR-Bridge-XSECTS.pdf".

Our question relates to the low-hanging pipe shown on the downstream picture. This appears to be a good size pipe that the current model does not appear to account for. We estimated its size to be 3 to 4 feet in diameter and is hanging roughly 5 to 6 feet below the low-chord of the bridge. We couldn't find any survey for this crossing so we were planning on incorporating it into the model by increasing the bridge deck by an approximate amount (say 4 feet) to account for the obstruction. Will this approach work for you?

Let me know if you have any questions or need more information from me.

Thanks,

Justen Hamann, P.E.
Project Manager

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Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

Troy Carmann

From: Justen Hamann
Sent: Thursday, July 13, 2017 11:49 AM
To: Brooke Seymour; Terri Fead
Cc: Troy Carmann
Subject: RE: Clear Creek FHAD - Ped. Bridge Upstream of I-70

Brooke,

Unfortunately, we don't have a measurement on it but I would estimate its size to be in the 3 to 5-foot range.

Thanks,
Justen

From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Thursday, July 13, 2017 11:36 AM
To: Justen Hamann <jhamann@iconeng.com>; Terri Fead <tfead@udfcd.org>
Cc: Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD - Ped. Bridge Upstream of I-70

Justen - What is the size of the culvert?

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
Protecting people, property, and the environment

From: Justen Hamann [mailto:jhamann@iconeng.com]
Sent: Thursday, July 13, 2017 11:09 AM
To: Brooke Seymour <bseymour@udfcd.org>; Terri Fead <tfead@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: Clear Creek FHAD - Ped. Bridge Upstream of I-70

Hi Brooke & Terri,

Our Clear Creek FHAD field visit found a culvert within an embankment at the pedestrian bridge upstream of I-70 that we were unaware of until we visited the site. I prepared the attached PDF which shows a plan view of the area with our current cross-section layout as well as the pictures that we took during the site visit. Currently, we have assumed this culvert is fully blocked and are modeling it with a single cross-section (XS 68566) along the top of the embankment.

Let me know if you have any questions on this or need more information.

Thanks,

Justen Hamann, P.E.

Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, July 18, 2017 5:10 PM
To: Justen Hamann; Terri Fead
Cc: Troy Carmann
Subject: RE: Clear Creek FHAD - Youngfield Street

Justen,

Please assume 100% blockage between the bridge deck and the estimated pipe. The 500-yr water surface appears to be below the pipe, so this won't have any impact on the floodplain limits.

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
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From: Justen Hamann [mailto:jhamann@iconeng.com]
Sent: Thursday, July 13, 2017 12:26 PM
To: Brooke Seymour <bseymour@udfcd.org>; Terri Fead <tfead@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: Clear Creek FHAD - Youngfield Street

Brooke & Terri,

Another unaccounted-for item from our site visit was a low-hanging culvert found under Youngfield Street. Attached are the pictures. We estimated the pipe to be about 24-inch in size hanging below the bridge deck approximately 4 feet. Our planned approach for this culvert is similar to the low-hanging pipe found at the Coors Railroad bridge – decrease the low chord of the bridge deck by 2 feet to account for the added obstruction.

Thanks,

Justen Hamann, P.E.
Project Manager

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Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

Troy Carmann

From: Craig Jacobson
Sent: Wednesday, July 19, 2017 3:34 PM
To: Brooke Seymour
Cc: Justen Hamann; Terri Fead; Shea Thomas; Troy Carmann
Subject: RE: Clear Creek FHAD scope discussion

Hi Brooke,
Thanks for setting this up. We just confirmed. Any of those times will work for us. Just let us know. Thanks.

Craig

From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Tuesday, July 18, 2017 11:41 AM
To: Craig Jacobson <cjacobson@iconeng.com>
Cc: Justen Hamann <jhamann@iconeng.com>; Terri Fead <tfead@udfcd.org>; Shea Thomas <sthomas@udfcd.org>
Subject: Clear Creek FHAD scope discussion

Craig,

Following up on our discussion from last week, here is our upcoming availability to meet to discuss scope concerns for the Clear Creek FHAD:

- Wed. 8/2 – 9:00-12:00
- Mon. 8/7 – 10:00-12:00, 2:00-4:00
- Tue. 8/8 – 2:00-4:00

Please let me know if there is a time that works well for you.

Thank you,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
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Protecting people, property, and the environment

Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Monday, July 24, 2017 8:58 AM
To: Justen Hamann
Cc: Terri Fead; Troy Carmann
Subject: FW: Clear Creek FHAD - Ped. Bridge Upstream of I-70

Justen,

The culvert at the pedestrian bridge upstream of I-70 is remnant of a previous road for Coors that used to cross Clear Creek. It is not being maintained, so we would be most comfortable assuming that it is blocked.

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
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From: Andrew Earles [mailto:aearles@wrightwater.com]
Sent: Monday, July 24, 2017 7:34 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: FW: Clear Creek FHAD - Ped. Bridge Upstream of I-70

Hi Brooke: Please see below regarding culvert. I think the best approach is to assume it is plugged since it is not maintained and probably does not provide a lot of conveyance in the big picture. Andrew

Andrew Earles, Ph.D., P.E., D.WRE
Vice President

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Denver, CO 80211
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HTTP://www.wrightwater.com

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From: Moore, Todd [mailto:Todd.Moore@millercoors.com]
Sent: Monday, July 24, 2017 7:30 AM
To: Andrew Earles <aearles@wrightwater.com>; Johnson III, Axel <Axel.Johnson@millercoors.com>; Moline, Ben <Ben.Moline@MOLSONCOORS.COM>; Santangelo, Neal <neal.santangelo@molsoncoors.com>
Cc: Jon Jones <jonjones@wrightwater.com>; Berry, Bill <William.Berry@millercoors.com>; Crespin, Mark

<Mark.Crespin@millercoors.com>
Subject: RE: Clear Creek FHAD - Ped. Bridge Upstream of I-70

I believe that culvert was used when we maintained a road across Clear Creek. All of the concrete culverts on the north side of Clear creek were in place and a road went across them . that culvert was an overflow in case beavers or something else plugged some of the main pipes. To my knowledge nobody maintains or keeps it clean.

Todd Moore
Field Engineering
Contractor Management Team
Phone 303-277-3912
Pager 303-230-8703
Cell 720-480-3489

From: Andrew Earles [mailto:aearles@wrightwater.com]
Sent: Monday, July 24, 2017 7:22 AM
To: Johnson III, Axel; Moline, Ben; Santangelo, Neal
Cc: Jon Jones; Moore, Todd; Berry, Bill; Crespin, Mark
Subject: FW: Clear Creek FHAD - Ped. Bridge Upstream of I-70

Hi Axel: Please see email below and attachment for another question from UDFCD on Clear Creek. They are updating floodplain mapping based on revised (lower) peak discharge hydrology, and they are trying to be sure they are representing the floodplain correctly. Please review the email and attachment and let me know if you have questions. I think the main thing UDFCD would need to know about this culvert is whether or not it is owned by Coors, and if so, if it is maintained. If it is not regularly maintained then the assumption that it is blocked in a big flood is probably a good assumption. Thank you for letting me know what you know about this culvert. Andrew

Andrew Earles, Ph.D., P.E., D.WRE
Vice President

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HTTP://www.wrightwater.com

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From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Friday, July 21, 2017 12:48 PM
To: Andrew Earles <aearles@wrightwater.com>
Subject: FW: Clear Creek FHAD - Ped. Bridge Upstream of I-70

Hi Andrew,

I have another question related to the Clear Creek FHAD that I'm hoping you can help out with. Please see Justen's email below and the attached multi-page pdf. I believe that Coors owns the ponds to the south, adjacent to the river. I'm trying to learn a little more about this pipe and the mound it runs through to decide how it should be modeled. Jefferson County has no information on it.

Many thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
Protecting people, property, and the environment

From: Justen Hamann [mailto:jhamann@iconeng.com]
Sent: Thursday, July 13, 2017 11:09 AM
To: Brooke Seymour <bseymour@udfcd.org>; Terri Fead <tfead@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: Clear Creek FHAD - Ped. Bridge Upstream of I-70

Hi Brooke & Terri,

Our Clear Creek FHAD field visit found a culvert within an embankment at the pedestrian bridge upstream of I-70 that we were unaware of until we visited the site. I prepared the attached PDF which shows a plan view of the area with our current cross-section layout as well as the pictures that we took during the site visit. Currently, we have assumed this culvert is fully blocked and are modeling it with a single cross-section (XS 68566) along the top of the embankment.

Let me know if you have any questions on this or need more information.

Thanks,

Justen Hamann, P.E.
Project Manager

ICON ENGINEERING, INC.
7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Monday, August 7, 2017 3:51 PM
To: Justen Hamann
Cc: Craig Jacobson; Terri Fead
Subject: RE: McIntyre St. Overflow

Forgot to include the Dropbox link:

https://www.dropbox.com/preview/Clear%20Creek%20FHAD/McIntyreSt_Coors.zip?role=work

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
Protecting people, property, and the environment

From: Brooke Seymour
Sent: Monday, August 7, 2017 3:50 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Craig Jacobson <cjacobson@iconeng.com>; Terri Fead <tfead@udfcd.org>
Subject: McIntyre St. Overflow

Justen,

The Record Drawings for the McIntyre Overflow Improvements are attached to this email. I've also uploaded a Zip file that includes the HEC-RAS files and supporting information.

Will the pdf as-builts be sufficient, or do you need us to track down the CAD files? It would probably be a while before we could track down CAD drawings because the engineer is out of country until September. Please let me know.

Thank you,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
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Protecting people, property, and the environment

Troy Carmann

From: Craig Jacobson
Sent: Wednesday, October 4, 2017 11:11 AM
To: Justen Hamann
Subject: FW: Clear Creek fee estimate

From: Shea Thomas [mailto:sthomas@udfcd.org]
Sent: Wednesday, August 23, 2017 10:53 AM
To: Craig Jacobson <cjacobson@iconeng.com>
Subject: Clear Creek fee estimate

Craig –

We've been meeting with the owner of one of the properties with the stockpiles adjacent to Clear Creek to get them to either move the piles or mitigate for them. One potential solution is for them to fill in that shallow flooding area so the floodplain is at least reduced on their property. But in order to do that we would need to know the floodway in that reach. Could you please provide me the following:

1. A fee for determining the without stockpiles floodway from Federal to the RR (realizing this would be different cross sections that what you are using now since the stockpiles would be removed).
2. An estimated date when you would have the first draft of the above.

If we decide to look into this, the property owner would pay the fees. As a reminder, the property is shown in the image below (it would only be this property where we would reflect the topo without stockpiles, not the other stockpile properties owned by someone else).

Shea Thomas

Manager | Watershed Services

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Colorado Association of Stormwater and Floodplain Managers Chair | CASFM

Troy Carmann

From: Justen Hamann
Sent: Thursday, November 9, 2017 4:02 PM
To: Brooke Seymour
Subject: RE: Clear Creek FHAD - Matrix Check Model

Thanks Brooke! I successfully retrieved the model.

Justen

From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Thursday, November 9, 2017 3:58 PM
To: Justen Hamann <jhamann@iconeng.com>
Subject: Clear Creek FHAD - Matrix Check Model

Justen,

I've uploaded to Dropbox the model from Matrix that included adjusted IEFAs. Please let me know if you have any questions.

https://www.dropbox.com/preview/Clear%20Creek%20FHAD/Clear%20Creek%20FHAD_HEC-RAS_2nd%20Submittal_Matrix%20Check.zip?role=work

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Wednesday, November 29, 2017 10:24 AM
To: Justen Hamann
Subject: RE: Clear Creek Schedule

Great – thanks, Justen.

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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From: Justen Hamann [mailto:jhamann@iconeng.com]
Sent: Wednesday, November 29, 2017 10:23 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek Schedule

Hi Brooke,

Hope you had a nice Thanksgiving as well! We've started addressing some of the model comments and we are meeting internally this afternoon to go over the status and to get a better estimate on the schedule for the resubmittal. I'll get back to you with an update after we have that meeting (probably sometime tonight or early tomorrow).

Thanks,

Justen Hamann, P.E.
Project Manager

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7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Wednesday, November 29, 2017 9:59 AM
To: Justen Hamann <jhamann@iconeng.com>
Subject: Clear Creek Schedule

Justen,

When do you expect to resubmit the Clear Creek FHAD? Wheat Ridge is looking for an update.

Hope you had a nice Thanksgiving!

Thanks,
Brooke

Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Wednesday, December 13, 2017 11:54 AM
To: Justen Hamann
Subject: Clear Creek diversion structure - survey pt

Justen,

I've confirmed that the survey point on the diversion was from the 5/31/16 survey. Please proceed using this crest elevation and assume that the gates are closed.

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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2018

Thanks,

Justen Hamann, P.E.
Project Manager

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Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, March 8, 2018 6:54 PM
To: Justen Hamann <jhamann@iconeng.com>
Subject: RE: Clear Creek FHAD Review Comments

Justen,

Checking in to make sure you received the review comments. Do you have any questions?

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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From: Brooke Seymour
Sent: Tuesday, February 27, 2018 7:43 PM
To: 'Justen Hamann' <jhamann@iconeng.com>
Cc: 'Craig Jacobson' <cjacobson@iconeng.com>; Terri Fead <tfead@udfcd.org>; Shea Thomas <sthomas@udfcd.org>
Subject: Clear Creek FHAD Review Comments

Justen,

Attached are UDFCD's review comments for the 12/15/2017 Clear Creek FHAD model submittal. We recommend one more model review to confirm that all comments have been addressed (this should be quick) before the 100-year mapping is revised and resubmitted.

Please look through the comments and let me know if you have questions. We would be happy to meet to go through the comments if requested.

Thank you for your hard work on this!

Regards,
Brooke

Brooke Seymour, P.E., CFM
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Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Wednesday, May 16, 2018 3:46 PM
To: Justen Hamann
Subject: FW: Clear Creek North Overflow
Attachments: WET2018-00005, JFW TRUCKING, INERT FILL, 4710 W 58TH AVE, MAPS & PLANS.pdf; WET2018-00005, JFW TRUCKING, INERT FILL, 4710 W 58TH AVE, CONDITIONS.pdf; WET2018-00005, JFW TRUCKING, INERT FILL, 4710 W 58TH AVE, FUP CHECKLIST.pdf

FYI

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From: Greg Labrie <GLabrie@adcogov.org>
Sent: Wednesday, May 16, 2018 9:44 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek North Overflow

Brooke,

I have attached the approved grading plan and some of the supporting documentation that was associated with the floodplain use permit and stormwater permit issued by Adams County for the site located near 58th and Tennyson.

Email or call with questions.

Sincerely,

T. Greg Labrie, PE, CFM
Senior Engineer
Adams County
Development Engineering Services
4430 S. Adams County Parkway
Brighton, CO 80601
Ph # 720-523-6824

From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Tuesday, May 15, 2018 5:47 PM
To: Greg Labrie
Subject: FW: Clear Creek North Overflow

Greg,

Please see the email below from Mike McDermid. It would be helpful to get a little bit more information regarding the grading changes he is writing about so that we can assess whether it will impact the FHAD. How much do you know about this area?

Thanks,
Brooke

Brooke Seymour, P.E., CFM
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From: Mike McDermid <mike@ccwre.com>
Sent: Tuesday, May 15, 2018 11:01 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: Re: Clear Creek North Overflow

Good Morning Brooke -

The model you sent shows the stationing line turning to the north across the 1st pond east of Sheridan toward West 58th Avenue, thence along West 58th Avenue to Tennyson.

Two comments:

- The owner of the second parcel east of Sheridan, with the two ponds shown on the map, has filled the smaller north pond and the portion of the parcel along West 58th shown to be in the flood fringe in the 2007 FHAD. This fill will block flow from the south. This was done under several permits issued by Adams County. Also, the ditch along the south side of West 58th Avenue is small, debris choked, and blocked by culverts. It is for the purpose of draining the properties on the north side of West 58th, and has not been improved.
- The majority of the North Overflow will probably continue east through the low spots in the concrete plant and the CDOT drainage facilities along I-76 to Tennyson.

I suggest that the stationing line be relocated to reflect the conditions.

I would be happy to meet at your offices and I can show you what I'm thinking.

Thanks, Mike

On 5/7/2018 9:25 AM, Brooke Seymour wrote:

> Mike,
>
> I've uploaded the draft model to Dropbox (see link below). Please try to open this version and let me know if you are still running into problems.

Troy Carmann

From: Justen Hamann
Sent: Thursday, July 19, 2018 11:03 AM
To: Brooke Seymour
Cc: 'Terri Fead (tfead@udfcd.org)'
Subject: RE: Clear Creek - Property filled
Attachments: 05-08-0564R-ConsultantWorkmap.pdf; 05-08-0564R-080001-104.pdf

Brooke,

I reviewed these files and it looks like they're for the area we identified but the files don't contain any maps or grading plans to compare to the topography we have.

I went ahead and looked into this area a bit more on the LOMC side, and it looks like this permit was followed up with a CLOMR submittal (Case No. 05-08-0564R) that we reviewed back in 2005. I've attached a workmap from that case as well as the approved 104 letter. That case proposed the fill but also mitigated it with a proposed overflow channel and some box culverts (5- 16'x8' boxes) at Lowell. We don't have any record of a follow-up LOMR and the 2014 topography doesn't indicate any overflow channel or box culverts was constructed in this area.

Let me know if you have any questions or need me to look into anything more for this area.

Thanks,

Justen Hamann, P.E.
Project Manager

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---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Wednesday, July 18, 2018 11:09 AM
To: Justen Hamann <jhamann@iconeng.com>
Subject: FW: Clear Creek - Property filled

Justen,

Attached is the floodplain use permit for the fill project at the property located to the northeast of I-76 and Lowell Blvd. Does this seems to coordinate with what the current topo and model are showing?

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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From: Greg Labrie <GLabrie@adcogov.org>
Sent: Wednesday, July 18, 2018 10:58 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek - Property filled

Brooke,

There was a permit issued to allow stockpiles of fill material in this area back in 2003. I have attached the associated documentation that was submitted with the floodplain use permit application.

Email or call with questions.

Sincerely,

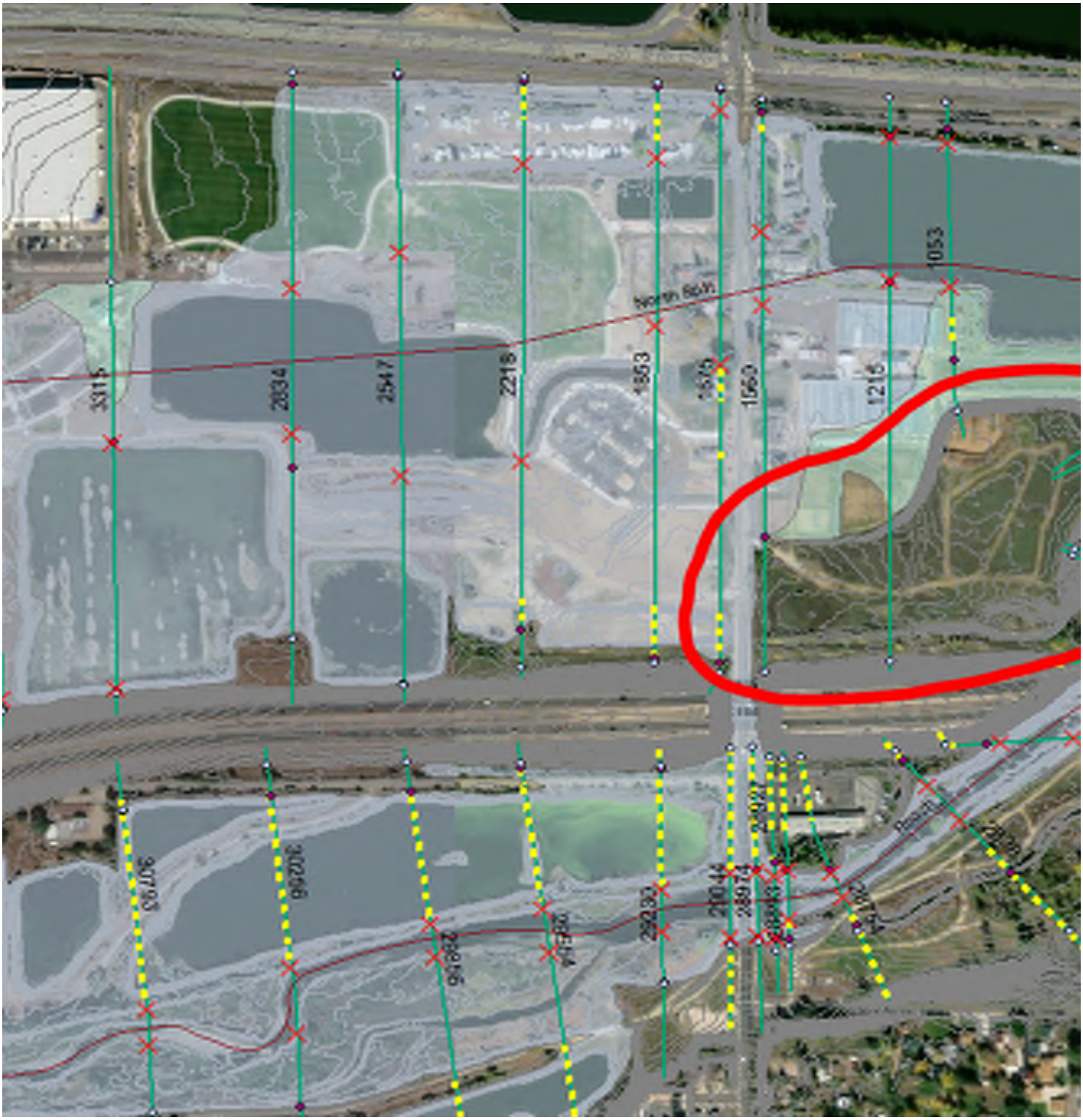
T. Greg Labrie, PE, CFM
Senior Engineer
Adams County
Development Engineering Services
4430 S. Adams County Parkway
Brighton, CO 80601
Ph # 720-523-6824

From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Monday, July 16, 2018 4:39 PM
To: Greg Labrie
Subject: Clear Creek - Property filled

Hi Greg,

As a part of the FHAD study, ICON identified a property located to the northeast of I-76 and Lowell Blvd. that has been filled substantially since the previous study (circled in the screenshot below). This fill area is primarily located within the effective floodway. Do you have any information about this project?

Thanks,
Brooke



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Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Monday, July 23, 2018 10:28 AM
To: Justen Hamann
Subject: RE: Clear Creek North Overflow

Thanks Justen – I'll request an etransmit.

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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From: Justen Hamann <jhamann@iconeng.com>
Sent: Monday, July 23, 2018 10:22 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek North Overflow

Hi Brooke,

I can open it but there isn't much in it except for a few symbols. There were 3 orphaned xrefs though so perhaps they should use "etransmit" to pull everything together.

Thanks,

Justen Hamann, P.E.
Project Manager

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---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Monday, July 23, 2018 10:06 AM
To: Justen Hamann <jhamann@iconeng.com>
Subject: FW: Clear Creek North Overflow

Justen,

Attached are the design contours for the fill area along the North Overflow (where the centerline will need to be realigned). Can you open the drawing? I'm having issues with the version.

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services

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From: Mike McDermid <mike@ccwre.com>
Sent: Monday, July 23, 2018 9:56 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: Re: Clear Creek North Overflow

Good Morning Brooke -

Attached is a copy of the ESC Phase III grading plan.

I checked yesterday and it looks like they've completed the filling operation. The remaining pond shown on the west side is no longer needed and was filled in.

If they are done, I'll get some as-built grade shots for a substantial completion certification for the County.

Let me know of any questions.

Thanks, Mike

On 7/18/2018 8:47 AM, Brooke Seymour wrote:

> Sounds good – thanks Mike. Enjoy your trip!
>
> Brooke Seymour, P.E., CFM
> Project Manager | Watershed Services
> URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
> 2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
> Office: 303.455.6277 | Direct: 303.749.5422 | www.udfcd.org
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>
> From: Mike McDermid <mike@ccwre.com>
> Sent: Wednesday, July 18, 2018 2:10 AM
> To: Brooke Seymour <bseymour@udfcd.org>
> Subject: RE: Clear Creek North Overflow
>
> Good morning Brooke
>
> We are still in Denmark until Saturday. I think that I have it and will get it to you Monday.
>
> Please let me know if you got this email so I know that I'm communicating
>
> Thanks, Mike

On Jul 17, 2018 2:11 PM, Brooke Seymour <bseymour@udfcd.org<mailto:bseymour@udfcd.org>> wrote:

Hi Mike,

Checking in to see if you have electronic topography for the fill site so that we can incorporate it into the FHAD study?

Thanks,
Brooke

Brooke Seymour, P.E., CFM

Project Manager | Watershed Services

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From: Mike McDermid <mike@ccwre.com<mailto:mike@ccwre.com>>
Sent: Tuesday, May 29, 2018 11:44 AM
To: Brooke Seymour <bseymour@udfcd.org<mailto:bseymour@udfcd.org>>
Subject: Re: Clear Creek North Overflow

Good Morning Brooke -

Do you have a copy of the mapping that was used as the basis for the North Split floodplain model and cross sections that you can send me?

Appreciate your help with this,

Mike

On 5/17/2018 5:22 PM, Brooke Seymour wrote:

Mike,

Thanks for the information. We will follow up with Adams County.

Regards,

Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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From: Mike McDermid <mike@ccwre.com>
Sent: Monday, July 23, 2018 11:03 AM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Friess, Don <dfriess@d2cad.com>
Subject: Re: Clear Creek North Overflow

Brooke -

There are several frozen layers that seem to have the existing and finish contours - why frozen I don't know.

Try that and if it doesn't work get back to me and I'll contact the ACAD drafter.

Mike

On 7/23/2018 10:27 AM, Brooke Seymour wrote:

> Mike,
>
> There doesn't appear to be much information in the drawing you sent, but it looks like there are orphaned xrefs that may include the information we need. Perhaps using "etransmit" would pull everything together for us?
>
> Thanks,
> Brooke
>
> Brooke Seymour, P.E., CFM
> Project Manager | Watershed Services
> URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
> 2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
> Office: 303.455.6277 | Direct: 303.749.5422 | www.udfcd.org
> Protecting people, property, and the environment
>
> From: Mike McDermid <mike@ccwre.com>
> Sent: Monday, July 23, 2018 9:56 AM
> To: Brooke Seymour <bseymour@udfcd.org>
> Subject: Re: Clear Creek North Overflow
>
> Good Morning Brooke -
>
> Attached is a copy of the ESC Phase III grading plan.
>
> I checked yesterday and it looks like they've completed the filling operation. The remaining pond shown on the west side is no longer needed and was filled in.

Troy Carmann

From: Justen Hamann
Sent: Monday, July 23, 2018 11:26 AM
To: Brooke Seymour
Cc: Craig Jacobson
Subject: RE: Brannan pit r
Attachments: BRANNAN SAND & 07-20-18 10h38.wav

Brooke,

Craig got this email and attached voicemail from Brannon on Friday. Before we give them a call back, we wanted to check with you if this was something you wanted to be involved with?

Thanks,

Justen Hamann, P.E.
Project Manager

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Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

-----Original Message-----
From: Fred Marvel <fmarvel@brannan1.com>
Sent: Friday, July 20, 2018 10:47 AM
To: Craig Jacobson <cjacobson@iconeng.com>
Subject: RE: Brannan pit r

Craig,
We have talked before about our site on 60th/Federal, Pit R.
We were working with UDFCD and Adams County to satisfy some requirements we have agreed upon.
Could you please give me a call and see where we can go from here.
Thanks
Fred

-----Original Message-----
From: Craig Jacobson [mailto:cjacobson@iconeng.com]
Sent: Friday, November 17, 2017 10:48 AM
To: Shea Thomas; Fred Marvel
Subject: RE: Brannan pit r

Hi Fred,
Good talking to you today about your needs. Here are the GIS files for the project. As we discussed, ICON did not complete any survey with this project. Our control is more geospatially based and referenced to "NAD_1983_StatePlane_Colorado_Central_FIPS_0502_Feet" Your surveyor and/or engineer should be able to translate this information to local control based on onsite scale factors or other references. Let us know if you have any problems. Thanks

Craig

Craig D. Jacobson, PE, CFM
Principal
ICON ENGINEERING, INC.
7000 S. Yosemite Street I Suite 120 I Centennial CO 80112 Ofc I 303-221-0802 I Web I www.iconeng.com I Email I cjacobson@iconeng.com

-----Original Message-----
From: Shea Thomas [mailto:sthomas@udfcd.org]
Sent: Tuesday, November 14, 2017 1:19 PM
To: Fred Marvel <fmarvel@brannan1.com>
Cc: Craig Jacobson <cjacobson@iconeng.com>
Subject: RE: Brannan pit r

My contact at ICON is Craig Jacobson. He's cc'ed on this email.

Shea Thomas
Watershed Services Manager
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT

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Colorado Association of Stormwater and Floodplain Managers Chair | CASFM

-----Original Message-----
From: Fred Marvel [mailto:fmarvel@brannan1.com]
Sent: Tuesday, November 14, 2017 12:25 PM
To: Shea Thomas <sthomas@udfcd.org>
Subject: Brannan pit r

Hi Shea, hope all is well.
I mentioned to you about obtaining survey control data from ICON so we can have the area staked.
Is there a contact at ICON or you can help?let me know.
Thanks

Fred J. Marvel, P.E

Troy Carmann

From: Justen Hamann
Sent: Tuesday, July 24, 2018 11:14 AM
To: Brooke Seymour
Subject: RE: Re: Fwd: RE: FW: Clear Creek North Overflow 1 of 2

Brooke,

Those files appear to be complete with both existing and proposed contours.

Thanks,
Justen

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, July 24, 2018 10:54 AM
To: Justen Hamann <jhamann@iconeng.com>
Subject: FW: Re: Fwd: RE: FW: Clear Creek North Overflow 1 of 2

Justen – Will you please try this version?

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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From: Mike McDermid <mike@ccwre.com>
Sent: Tuesday, July 24, 2018 10:22 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: Fwd: Re: Fwd: RE: FW: Clear Creek North Overflow 1 of 2

Good Morning Brooke -

Please try this procedure and let me know if it works.

Thanks, Mike

-------- Forwarded Message --------
Subject: Re: Fwd: RE: FW: Clear Creek North Overflow 1 of 2
Date: Tue, 24 Jul 2018 09:43:13 -0600
From: Don Friess <dfriess@d2cad.com>
Organization:d2 CAD Consulting
To: Mike McDermid <mike@ccwre.com>

Mike,
Sorry for the delay. For some reason my email wasn't sending them yesterday. So here is another shot at it.
All files must be in the same folder for all the links to work correctly. Also, Civil3D 2010 or later must be used to open files.
Regular Autocad will not render any contours or surface data.
If regular Autocad is being used, let me know and I can go through the files and modify all surface data accordingly.

On 7/23/2018 6:45 PM, Mike McDermid wrote:
>
> Can you do this?
>
>
>
> -------- Forwarded Message --------
> Subject: RE: FW: Clear Creek North Overflow
> Date: Mon, 23 Jul 2018 23:29:53 +0000
> From: Brooke Seymour <bseymour@udfcd.org>
> To: Mike McDermid <mike@ccwre.com>
>
>
>
> Mike - I wasn’t able to open the drawing because of the version, so I was getting Justen’s help. Could you try exporting to ACAD 2017?
>
> Brooke Seymour, P.E., CFM
> Project Manager | Watershed Services
> URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
> 2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
> Office: 303.455.6277 | Direct: 303.749.5422 |www.udfcd.org
> Protecting people, property, and the environment
>
> From: Mike McDermid<mike@ccwre.com>
> Sent: Monday, July 23, 2018 2:06 PM
> To: Brooke Seymour<bseymour@udfcd.org>
> Subject: Re: FW: Clear Creek North Overflow
>
>
> Maybe too new a version? He's sending me a copy saved back to ACAD 2010.
>
> On 7/23/2018 1:39 PM, Brooke Seymour wrote:
>
> Mike,
>
>
>
> Please see Justen’s email below. Any ideas?
>
>
>
> Thanks,
>
> Brooke
>
>
>
> Brooke Seymour, P.E., CFM
>
> Project Manager | Watershed Services

Troy Carmann

From: Craig Jacobson
Sent: Thursday, August 2, 2018 8:21 PM
To: Brooke Seymour
Cc: Justen Hamann
Subject: Re: Clear Creek Spills

Hi Brooke,
Yes we some pretty large models set up already in that area. I'll get the limits to Justen tomorrow and we can see what it takes to connect the two. Very interesting.
Have a great evening.

Craig

Sent from my mobile world

On Aug 2, 2018, at 7:39 PM, Brooke Seymour <bseymour@udfcd.org> wrote:

> Justen,
>
> We've reached out to Denver to see if they would be willing to help fund 2D modeling for the spill to Globeville. They mentioned that ICON has already prepared a 2D model of the Globeville area. Would you be able to expand the previous model north to Clear Creek to utilize for the spill under I-76?
>
> Thanks,
> Brooke
>
> Brooke Seymour, P.E., CFM
> Project Manager | Watershed Services
> **URBAN DRAINAGE AND FLOOD CONTROL DISTRICT**
> 2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
> **Office**: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org
>
> ***Protecting people, property, and the environment***

From: Justen Hamann <jhamann@iconeng.com>
Sent: Thursday, July 19, 2018 8:49 AM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Craig Jacobson <cjacobson@iconeng.com>
Subject: RE: Clear Creek Spills

Good Morning Brooke,

We have prepared the attached fee estimate for the 2D spill pocket areas we discussed in our meeting last week and revised the costs for the North Overflow to reflect some cost savings associated with doing this work alongside the other 2D work. Let us know if you have any comments or want to show these estimates any differently.

Thanks,

Justen Hamann, P.E.
Project Manager

ICON ENGINEERING, INC.
7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Wednesday, July 11, 2018 1:24 PM
To: Craig Jacobson <cjacobson@iconeng.com>
Cc: Justen Hamann <jhamann@iconeng.com>
Subject: Clear Creek spills

Craig and Justen,

Please hold off on modeling the spills until I can approve the fee estimate - I need to be sure we can find funds to cover it. Sorry for this change in direction!

Also, please focus on preparing the scope and fee estimate for the FHAD modeling. I'll provide more information about the stock pile mitigation analysis before long to help you prepare a scope for that.

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

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Troy Carmann

From: Craig Jacobson
Sent: Tuesday, August 14, 2018 8:02 AM
To: Brooke Seymour; Justen Hamann
Subject: RE: Clear Creek Spills
Attachments: Globeville FLO-2D.pdf

Hi Brooke.
Sorry for taking a while to get back to you on this. Been coordinating in and out of vacations, but did sit down with Brian this morning. Attached is the limits of the FLO-2D model we prepared for Denver. It extends up to where the rail lines diverge into Globeville. In talking with Brian, it would be better to add a separate model for the splits, as we had been discussing prior, but should water end up flowing this way, too, our Globeville model could be used to run those flows without having to build a new model. We would just take the hydrograph out of the Clear Creek models and add it to this one……if that makes sense. Also, we would remove the localized hydrology from the pre-existing Globeville model such that the Clear Creek spills could be isolated. Let me know if there are questions on that.

Thanks

Craig

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, August 2, 2018 7:39 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Craig Jacobson <cjacobson@iconeng.com>
Subject: RE: Clear Creek Spills

Justen,

We've reached out to Denver to see if they would be willing to help fund 2D modeling for the spill to Globeville. They mentioned that ICON has already prepared a 2D model of the Globeville area. Would you be able to expand the previous model north to Clear Creek to utilize for the spill under I-76?

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

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From: Justen Hamann <jhamann@iconeng.com>
Sent: Thursday, July 19, 2018 8:49 AM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Craig Jacobson <cjacobson@iconeng.com>
Subject: RE: Clear Creek Spills

Good Morning Brooke,

Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, August 30, 2018 4:54 PM
To: Justen Hamann
Subject: RE: Clear Creek Spills

Justen,

They don't have as-built data (still under construction), so we are planning to incorporate the design contours for now. I'll reach out to the engineer to get coordinate information.

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

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From: Justen Hamann <jhamann@iconeng.com>
Sent: Thursday, August 30, 2018 4:50 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Craig Jacobson <cjacobson@iconeng.com>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek Spills

Brooke,

That is great news! We'll keep an eye out for the amendment.

I believe the only topography we need is for any of the fill that was placed in the North Overflow area. I believe you and I went back and forth on reading some CAD design files for one of those areas last month (see attached email). We would need the as-built data (if available) or survey info. to incorporate these changes into our DEM. The CAD design files that I looked at seem to use a local coordinate system so we would need to know the horizontal datum and mapping projection information if you wanted us to use these files.

Thanks,

Justen Hamann, P.E.
Project Manager

ICON ENGINEERING, INC.
7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, August 30, 2018 2:56 PM
To: Justen Hamann <jhamann@iconeng.com>

Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Wednesday, September 5, 2018 9:38 AM
To: dfriess@d2cad.com
Cc: Mike McDermid; Justen Hamann
Subject: FW: Clear Creek North Overflow

Don and Mike,

Please see Justen's email below regarding the coordinates. We need to get the information into NAD 83 Colorado State Plane North to be incorporated in the current floodplain study. Can you coordinate directly with Justen Hamann? I'll be away from my desk most of the day.

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
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From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, September 5, 2018 9:34 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek North Overflow

Brooke,

The FHAD is using NAD 83 Colorado State Plane Central. The drawings we have are not using a known datum and projection even though they set it as NAD 83 Colorado State Plane North. Here are the X-Y coordinates we are seeing for comparison.

Approx. Site Centroid

State Plane Central: X: 3126889.45
Y: 1717137.46

Their DWG: X: 6357.46
Y: 6159.21

Thanks,
Justen

-----Original Message-----
From: Brooke Seymour <bseymour@udfcd.org>
Sent: Wednesday, September 5, 2018 9:14 AM

To: Justen Hamann <jhamann@iconeng.com>
Subject: FW: Clear Creek North Overflow

Justen,

Please see Don's email below regarding coordinates. Is the Clear Creek FHAD in Central or North CO State Plane?

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | Direct: 303.749.5422 | www.udfcd.org Protecting people, property, and the environment

-----Original Message-----
From: Don Friess <dfriess@d2cad.com>
Sent: Wednesday, September 5, 2018 6:25 AM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Mike McDermid <mike@ccwre.com>
Subject: Clear Creek North Overflow

Brooke,
Mike McDermid of CCWRE requested that I send you the coordinate and datum used for the drawings. I am showing a coordinate system of NAD83 Colorado State Plane, North Zone, US foot and a vertical datum of NAVD88.

--
Thank You
Don Friess
d2 CAD Consulting, LLC
720-722-2396
http://www.d2cad.com

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Troy Carmann

From: Don Friess <dfriess@d2cad.com>
Sent: Wednesday, September 5, 2018 4:42 PM
To: Justen Hamann
Subject: Re: Clear Creak North Overflow
Attachments: Clear Creek Overflow.zip

I didn't include the pdf. If you need the pdf to display in the drawing, you will need to get it from previous communications.
The drawing set should be in NAD83 Colorado State Plane, North Zone, US Foot with a vertical datum of NAVD88

On 9/5/2018 1:48 PM, Justen Hamann wrote:

> Tomorrow is fine. Thanks Don!
>
> Justen
>
> ---
>
> **From:** Don Friess <dfriess@d2cad.com>
> **Sent:** Wednesday, September 5, 2018 1:33 PM
> **To:** Justen Hamann <jhamann@iconeng.com>
> **Subject:** Re: Clear Creak North Overflow
>
> Ok, I can do that. Does late this evening or early tomorrow morning work for you?
>
> On 9/5/2018 1:31 PM, Justen Hamann wrote:
>
> > Don,
> >
> > Yes, if you can provide me updated grading in the correct datum and grid projection that would be great.
> >
> > Thanks,
> > Justen
> >
> > ---
> >
> > **From:** Don Friess <dfriess@d2cad.com>
> > **Sent:** Wednesday, September 5, 2018 1:27 PM
> > **To:** Justen Hamann <jhamann@iconeng.com>
> > **Subject:** Re: Clear Creak North Overflow
> >
> > Justen,
> > The following text is in the original survey.
> >
> > BENCHMARK: WEST ADAMS COUNTY DENSIFICATION NAME: HIDDEN, STATION NUMBER 0026, A STANDARD ADAMS COUNTY 3-1/4" ALUMINUM SURVEY MARK DISK STAMPED "HIDDEN, 1995, 3S68W S6" IN THE TOP OF A 24" DIAMETER CONCRETE, FLUSH WITH THE GROUND.
> > PUBLISHED elevation: 5285.16 (NAVD 1988)
> >
> > TEMPORARY BENCHMARK (T.B.M.): THE NORTHWEST BONNET BOLT OF THE FIRE HYDRANT ON THE NORTH SIDE OF EAST 58TH AVENUE AS SHOWN HEREON.

ELEVATION: 5251.89

Would you like me to do the transformation?

On 9/5/2018 10:05 AM, Justen Hamann wrote:

> Hi Don,
>
> Sounds good. Here's my contact info.
>
> Thanks,
>
> **Justen Hamann, P.E.**
> Project Manager
>
> ICON ENGINEERING, INC.
> **7000 S. Yosemite Street I Suite 120 I Centennial CO 80112**
> Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com
>
> -----Original Message-----
> From: Don Friess <dfriess@d2cad.com>
> Sent: Wednesday, September 5, 2018 9:58 AM
> To: Justen Hamann <jhamann@iconeng.com>
> Subject: Clear Creak North Overflow
>
> Justen,
> I have a quick meeting but can circle up after that. I will be in touch. Interesting tid-bit, I interviewed for a position with Icon a few weeks ago.
>
> --
> Thank You
> Don Friess
> d2 CAD Consulting, LLC
> 720-722-2396
> http://www.d2cad.com
>
> E-MAIL CONFIDENTIALITY NOTICE: The contents of this e-mail message and any attachments are intended solely for the addressee(s) and may contain confidential and/or legally privileged information. If you are not the intended recipient of this message or if this message has been addressed to you in error, please immediately alert the sender by reply e-mail and then delete this message and any attachments. If you are not the intended recipient, you are notified that any use, dissemination, distribution, copying, or storage of this message or any attachment is strictly prohibited.

--
Thank You
Don Friess

Troy Carmann

From: Justen Hamann
Sent: Monday, September 24, 2018 8:44 AM
To: Mike McDermid
Cc: Brooke Seymour
Subject: RE: Clear Creek North Overflow

Hi Mike,

Thanks for letting us know. Can we get an updated CAD topography drawing then?

Thanks,

Justen Hamann, P.E.
Project Manager

ICON ENGINEERING, INC.
7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Mike McDermid <mike@ccwre.com>
Sent: Friday, September 21, 2018 12:32 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>
Subject: Clear Creek North Overflow

Hello Justin -

The fill plan than Don Friess sent you is not entirely accurate as they filled the small pond on the west side of the property as well to the same elevation as the east part.

Mike

--
Ramsay M McDermid, P.E.
Consulting Civil & Water Resources Engineering LLC
mike@ccwre.com
303.903.6698

Troy Carmann

From: Justen Hamann
Sent: Wednesday, October 3, 2018 7:57 AM
To: Brooke Seymour
Subject: RE: Clear Creek North Overflow
Attachments: Re: Clear Creek North Overflow

Brooke,

No, they said it was still under construction so they didn't have anything to give us except some updated photos (see attached response).

Thanks,
Justen

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, October 2, 2018 6:46 PM
To: Justen Hamann <jhamann@iconeng.com>
Subject: RE: Clear Creek North Overflow

Justen – Did you get the CAD info?

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

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From: Justen Hamann <jhamann@iconeng.com>
Sent: Monday, September 24, 2018 8:44 AM
To: Mike McDermid <mike@ccwre.com>
Cc: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek North Overflow

Hi Mike,

Thanks for letting us know. Can we get an updated CAD topography drawing then?

Thanks,

Justen Hamann, P.E.
Project Manager

ICON ENGINEERING, INC.
7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

From: Mike McDermid <mike@ccwre.com>
Sent: Friday, September 21, 2018 12:32 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>
Subject: Clear Creek North Overflow

Hello Justin -

The fill plan than Don Friess sent you is not entirely accurate as they filled the small pond on the west side of the property as well to the same elevation as the east part.

Mike

--
Ramsay M McDermid, P.E.
Consulting Civil & Water Resources Engineering LLC
mike@ccwre.com
303.903.6698

Troy Carmann

From: Justen Hamann
Sent: Tuesday, November 6, 2018 9:54 AM
To: Brooke Seymour; 'Terri Fead (tfead@udfcd.org)'
Cc: Craig Jacobson; Troy Carmann; Brian Ledoux
Subject: Clear Creek 2D Recommendations
Attachments: MEMO-Clear_Creek_FHAD_2D_Modeling_2018_11_05.pdf

Hi Brooke and Terri,

Attached is our memo summarizing the 2D analysis we completed for the Clear Creek FHAD and our recommendations on using this information for the FHAD. Specifically, we're hoping to get your direction on the discharges for the Pecos Area so we can work on completing a 1D hydraulics resubmittal within the next few weeks.

Please let us know if you agree with our recommendations or have any comments/questions for us.

Thanks,

Justen Hamann, P.E.
Project Manager

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7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, November 29, 2018 4:49 PM
To: Justen Hamann
Subject: FW: Clear Creek - Property filled at Lowell

Justen,

Please see Greg's email below regarding the fill area at Lowell along the north overflow. We will proceed as currently modeled.

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

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From: Greg Labrie <GLabrie@adcogov.org>
Sent: Thursday, November 29, 2018 4:18 PM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek - Property filled at Lowell

Brooke,

The proposed overflow channel and the 5 box culverts were not installed at this location. Thus, it is best to proceed with the worst case scenario with the flood modeling program.

T. Greg Labrie, PE, CFM
Senior Engineer
Adams County
Development Engineering Services
4430 S. Adams County Parkway
Brighton, CO 80601
Ph # 720-523-6824

From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Wednesday, November 21, 2018 5:08 PM
To: Greg Labrie
Subject: FW: Clear Creek - Property filled at Lowell

Greg,

Checking in on my email below. Do you have any status update for this site? We need to determine how to model it in the current FHAD. At this point the site is included as worst case with fill and without mitigation…

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

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From: Brooke Seymour
Sent: Friday, October 26, 2018 5:42 PM
To: 'Greg Labrie' <GLabrie@adcogov.org>
Subject: RE: Clear Creek - Property filled at Lowell

Greg,

It looks like the fill area at the northeast corner of Lowell and I-76 had a CLOMR (Case No. 05-08-0564R) that was approved following the floodplain use permit that you sent over to me back in July. The approved CLOMR included the fill, but also mitigated it with a proposed overflow channel and 5- 16'x8' box culverts at Lowell. We don't have any record of a follow-up LOMR and our data for the FHAD doesn't indicate any overflow channel or box culverts have been constructed in this area. Do you have any additional information on the status of this site?

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

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From: Greg Labrie <GLabrie@adcogov.org>
Sent: Wednesday, July 18, 2018 10:58 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek - Property filled

Brooke,

There was a permit issued to allow stockpiles of fill material in this area back in 2003. I have attached the associated documentation that was submitted with the floodplain use permit application.

Email or call with questions.

Sincerely,

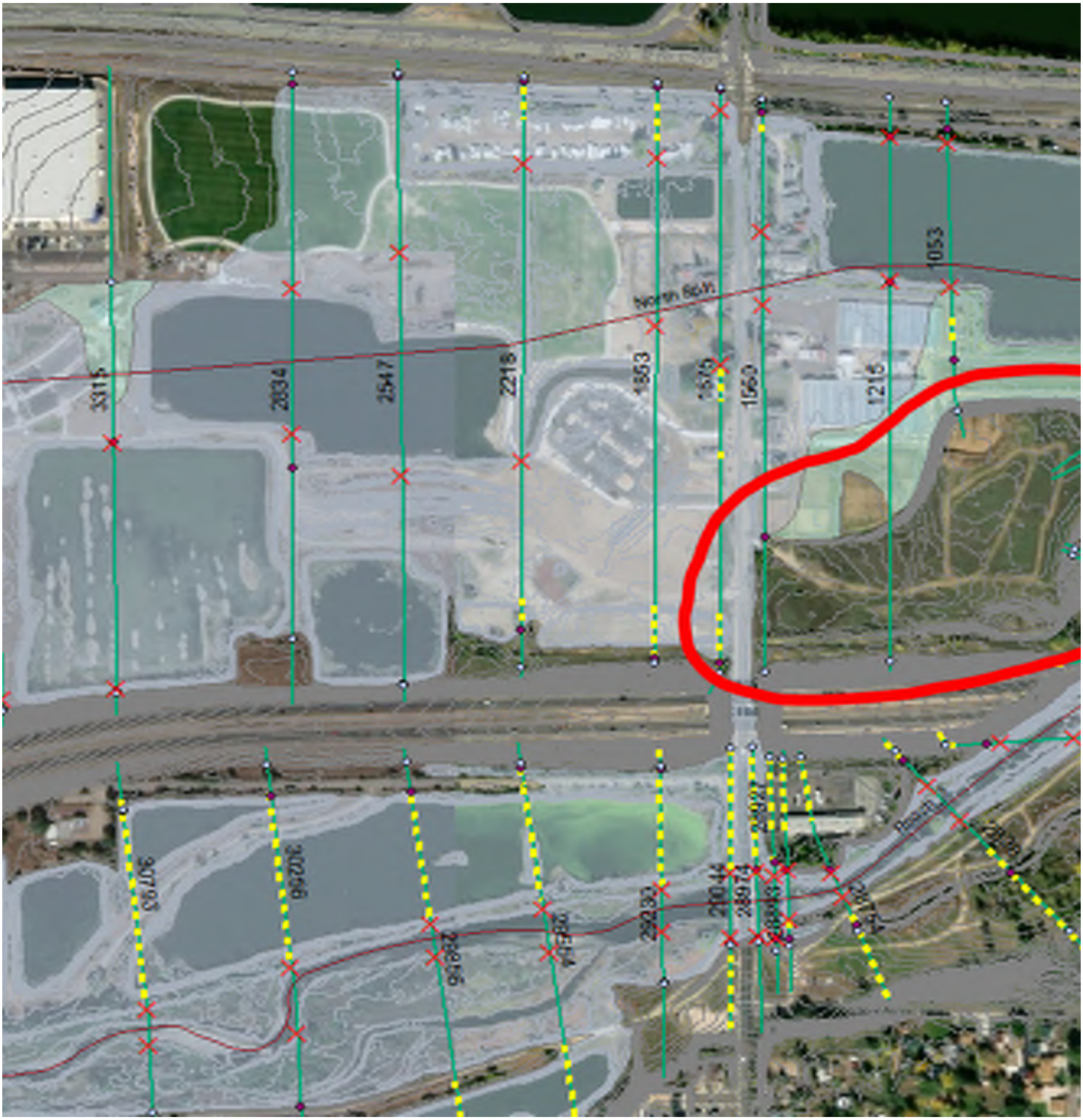
T. Greg Labrie, PE, CFM
Senior Engineer
Adams County
Development Engineering Services
4430 S. Adams County Parkway
Brighton, CO 80601
Ph # 720-523-6824

From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Monday, July 16, 2018 4:39 PM
To: Greg Labrie
Subject: Clear Creek - Property filled

Hi Greg,

As a part of the FHAD study, ICON identified a property located to the northeast of I-76 and Lowell Blvd. that has been filled substantially since the previous study (circled in the screenshot below). This fill area is primarily located within the effective floodway. Do you have any information about this project?

Thanks,
Brooke



Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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Troy Carmann

From: Justen Hamann
Sent: Wednesday, December 5, 2018 4:53 PM
To: 'Brooke Seymour'
Cc: 'Terri Fead (tfead@udfcd.org)'; Craig Jacobson; Troy Carmann; Brian Ledoux
Subject: Clear Creek 2D Spill Analysis and Recommendations
Attachments: MEMO-Clear_Creek_FHAD_2D_Modeling_2018_12_05.pdf

Hi Brooke,

Attached is our revised memo summarizing the 2D analysis we completed for the Clear Creek FHAD and our recommendations. We incorporated your comments on adding the additional info. on both the jersey barriers upstream of Sheridan Boulevard, as well as the junction modeling of the North Overflow and main channel confluence area. We also performed a 2D analysis of the Pecos Spill area with the Brannan stockpiles removed and found this reduced the spill discharges even further.

There is an additional split area I'd like to go over with you near the Calabrese fill area in the North Overflow so please give me a call when you have a few minutes to chat.

Thanks,

Justen Hamann, P.E.
Project Manager

ICON ENGINEERING, INC.
7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Monday, December 10, 2018 10:25 AM
To: Justen Hamann
Subject: RE: Clear Creek FHAD - North Overflow Split

Thanks Justen. Let me make sure that Adams County is okay with this approach and I'll get back to you.

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

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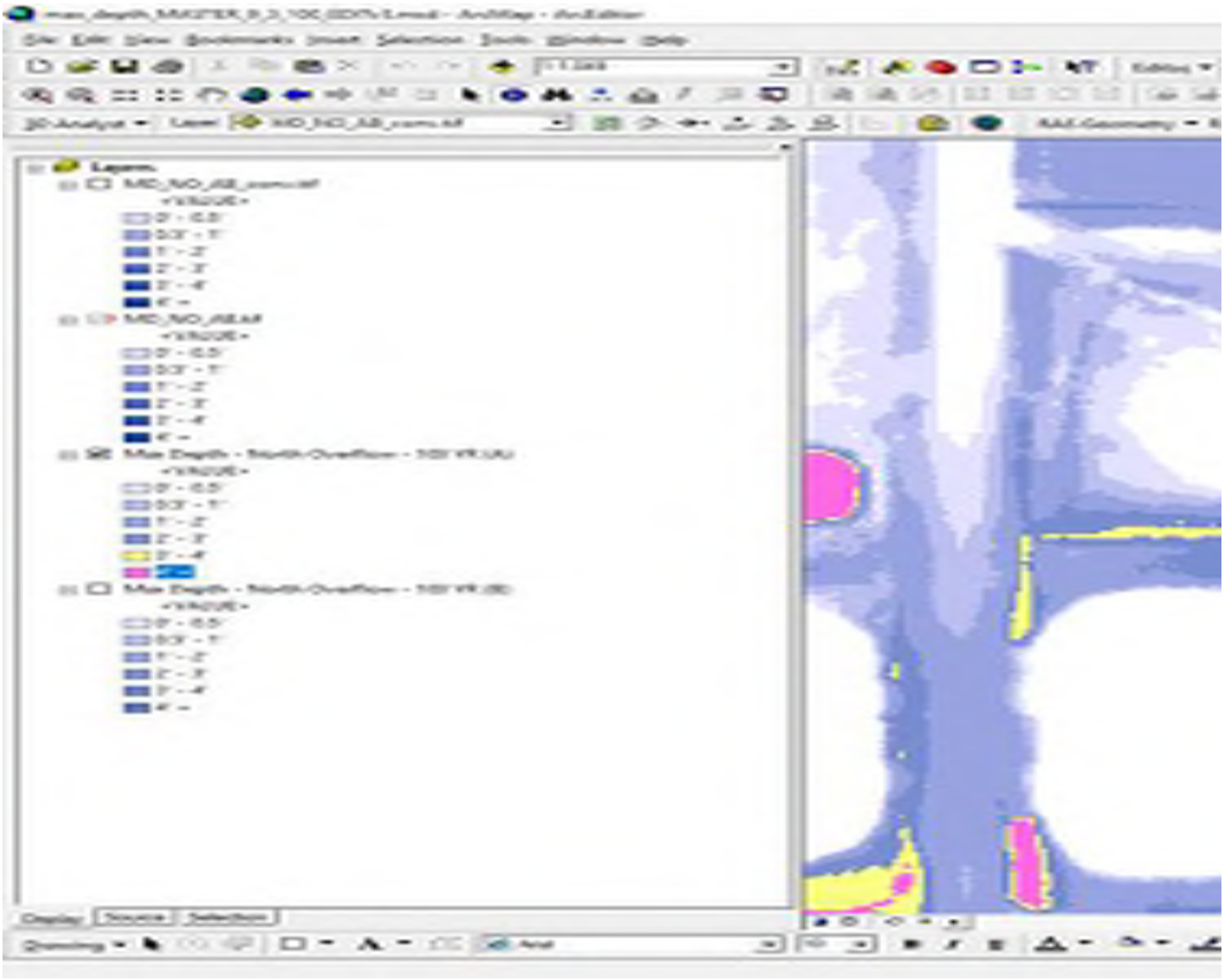
From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, December 7, 2018 9:44 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: Clear Creek FHAD - North Overflow Split

Hi Brooke,

I just left you a voicemail regarding the potential of showing this new North Overflow split area as Zone AH. We think it's possible to do that. Brian took a look at the 2D depths for the area, and he sent me the below screenshot.



Yellow in the figure below is 3’ or deeper. Average depth would likely be less than 3 feet based on these results. If we want a more detailed analysis, we can have our GIS guy run an average on all the depth grids for this area. Let me know your thoughts or if you have any more questions.

Thanks,

Justen Hamann, P.E.
Project Manager

ICON ENGINEERING, INC.
7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, December 18, 2018 9:23 AM
To: Justen Hamann
Subject: RE: Clear Creek FHAD - North Overflow Split

Justen,

I'm glad I confirmed – I mistakenly thought I had already provided direction. We are in agreement with the recommendations in the 2D memo, with the following modification:

- Please map the perched channel north of I-76 and east of Lowell as Zone AH with BFEs based on the 2D model results.

Please map the spill under I-76 near Pecos as shallow flooding based on the 2D results. Use the more conservative 2D spill assuming the piles are in place (100-yr = 150± cfs).

Let me know if you have any questions.

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

Protecting people, property, and the environment

From: Justen Hamann <jhamann@iconeng.com>
Sent: Tuesday, December 18, 2018 9:08 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD - North Overflow Split

Hi Brooke,

We're just waiting on UDFCD approval for the 2D results and summary memo. I've attached the email I sent in case it got lost in the shuffle. I think you mentioned most of the recommendations were O.K. with the District except for the Pecos Area. Therefore, we still need approval of which discharges you would like to use for that area and perhaps a written response that the other recommendations were acceptable.

The other item is the North Overflow Split (mentioned below). I believe our memo recommends studying this area by detailed methods so I just need to know if it's acceptable to not model this area using the 1D model and instead use the 2D model to develop BFEs and a floodplain delineation for an anticipated Zone AH floodplain.

Let me know if you have any questions.

Thanks,

Justen Hamann, P.E.

Project Manager

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Justen,

Are you waiting on any additional direction? When do you expect to have the model resubmitted for review?

Thanks,
Brooke

Brooke Seymour, P.E., CFM
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Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

Protecting people, property, and the environment

From: Brooke Seymour
Sent: Wednesday, December 12, 2018 11:04 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Terri Fead <tfead@udfcd.org>
Subject: FW: Clear Creek FHAD - North Overflow Split

Justen,

Please proceed with mapping the channel along the north side of I-76 east of Lowell as Zone AH with BFEs, rather than creating a separate profile. Adams County is in agreement with this approach.

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

Protecting people, property, and the environment

From: Greg Labrie <GLabrie@adcogov.org>
Sent: Wednesday, December 12, 2018 8:05 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD - North Overflow Split

Brooke,

Adams County Development Engineering is in agreement with your recommendation to model the area as Zone AH with BFEs.

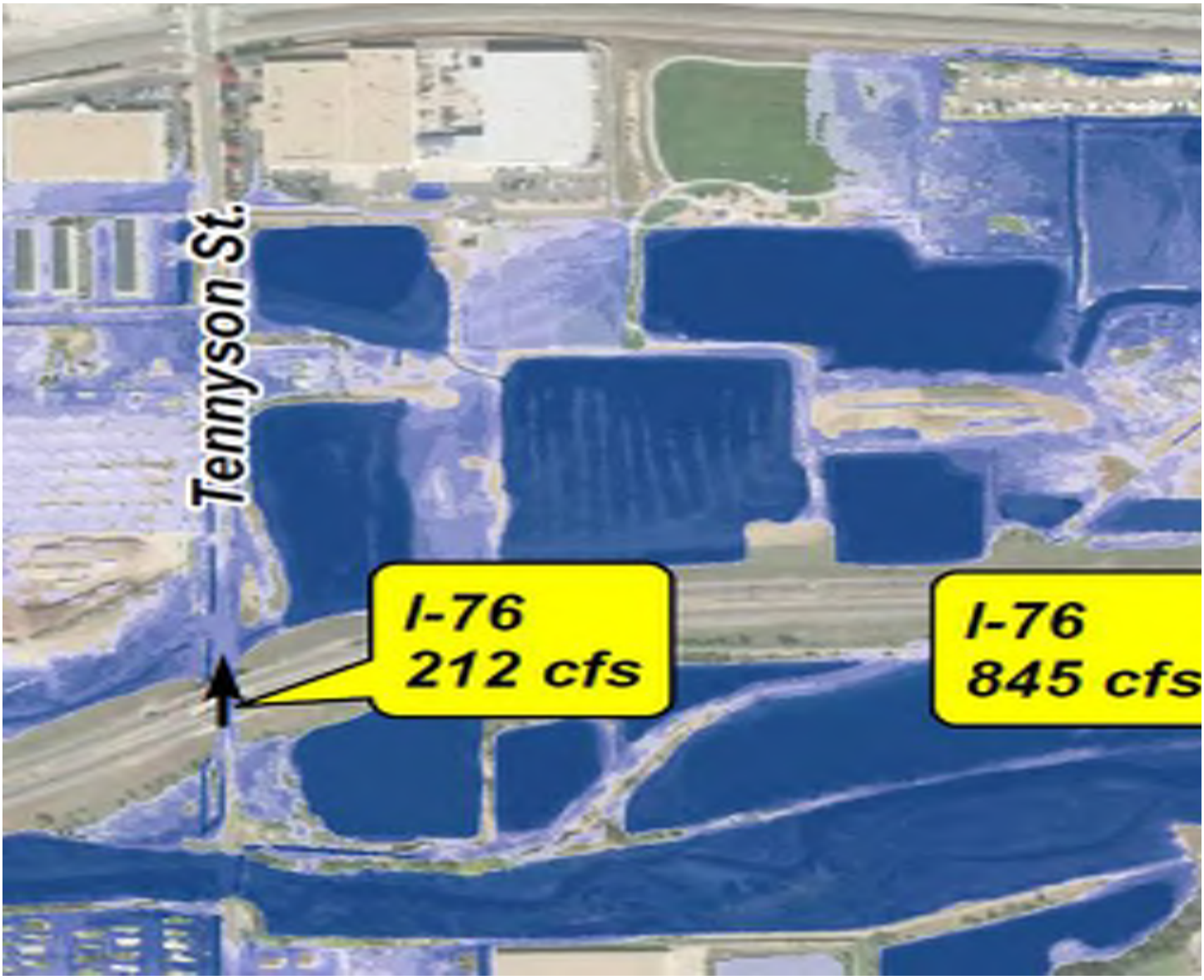
T. Greg Labrie, PE, CFM
Senior Engineer
Adams County
Development Engineering Services
4430 S. Adams County Parkway
Brighton, CO 80601
Ph # 720-523-6824

From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Monday, December 10, 2018 10:24 AM
To: Greg Labrie
Subject: FW: Clear Creek FHAD - North Overflow Split

Greg,

There is a 650 cfs split within the North Overflow along the north side of I-76 east of Lowell (see area circled in red in the image below). Instead of creating a separate profile for this split, we recommend modeling this area as Zone AH with BFEs. Is Adams County in agreement with this approach in this location?

Thanks,
Brooke



Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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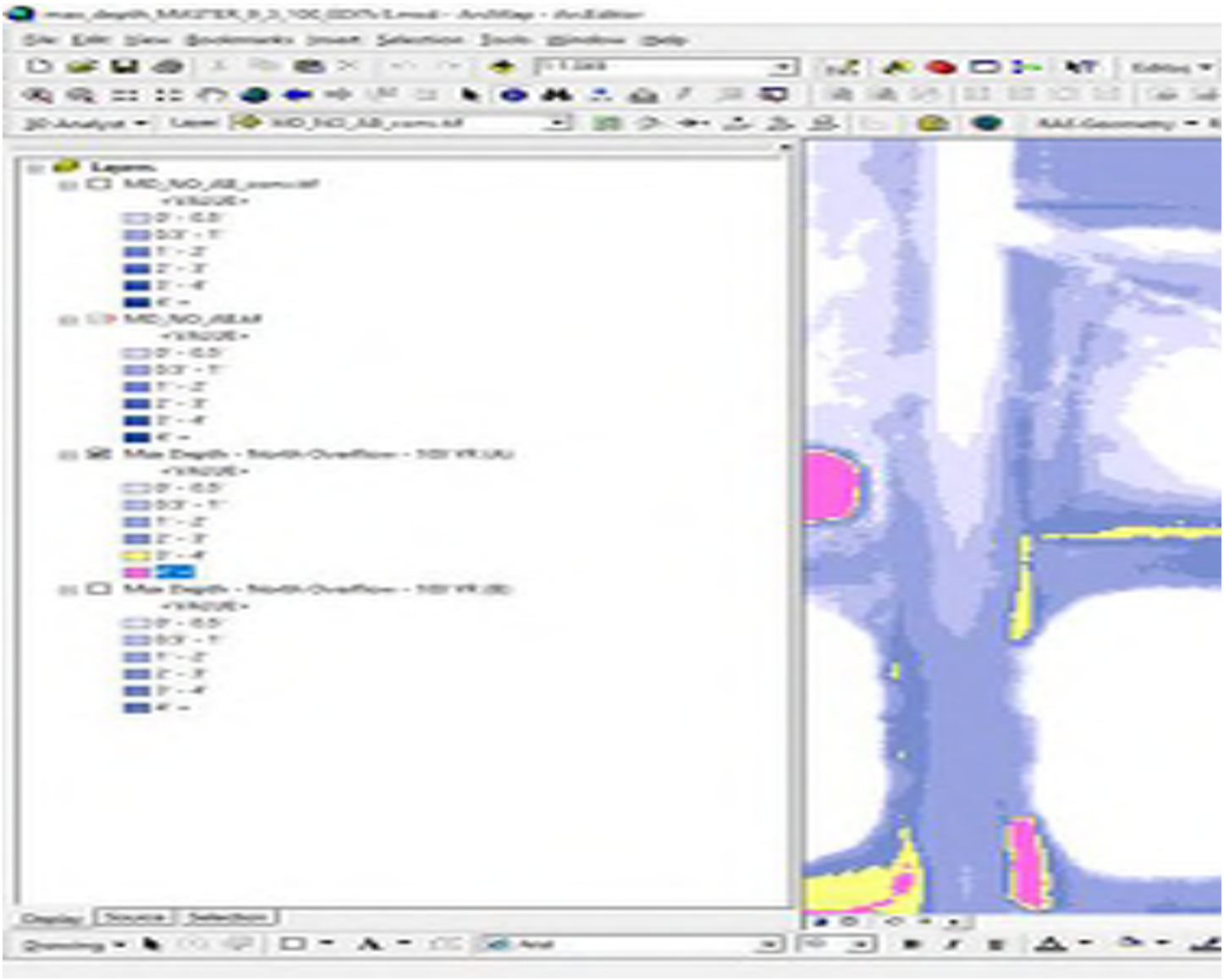
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

Protecting people, property, and the environment

From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, December 7, 2018 9:44 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: Clear Creek FHAD - North Overflow Split

Hi Brooke,

I just left you a voicemail regarding the potential of showing this new North Overflow split area as Zone AH. We think it's possible to do that. Brian took a look at the 2D depths for the area, and he sent me the below screenshot.



Yellow in the figure below is 3’ or deeper. Average depth would likely be less than 3 feet based on these results. If we want a more detailed analysis, we can have our GIS guy run an average on all the depth grids for this area. Let me know your thoughts or if you have any more questions.

Thanks,

Justen Hamann, P.E.
Project Manager

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7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

2019

Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Wednesday, February 13, 2019 3:53 PM
To: Justen Hamann
Cc: Dan Hill
Subject: RE: Clear Creek FHAD - North Overflow Split

Got it. Thanks! Dan Hill is helping with review of the last submittal and he'll contact you with any questions.

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
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Protecting people, property, and the environment

From: Justen Hamann <jhamann@iconeng.com>
Sent: Tuesday, February 12, 2019 5:06 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Dan Hill <dhill@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD - North Overflow Split

Hi Brooke,

The zipped 2D models (2D HEC-RAS 5 Models-2019-02-12.zip) have been uploaded to the Clear Creek FHAD Dropbox folder. Let me know if you have any problems accessing the data.

Thanks,

Justen Hamann, P.E.
Project Manager

ICON ENGINEERING, INC.
7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Monday, February 11, 2019 7:01 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Dan Hill <dhill@udfcd.org>; Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD - North Overflow Split

Justen,

Could you also please share the 2D models with us?

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
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Protecting people, property, and the environment

From: Justen Hamann <jhamann@iconeng.com>
Sent: Monday, January 28, 2019 4:41 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Dan Hill <dhill@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD - North Overflow Split

Brooke,

Attached is a zip file which contains shapefiles for the auto-delineated 100-YR and 500-YR floodplains for Clear Creek.

Thanks,
Justen

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Monday, January 28, 2019 1:44 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Dan Hill <dhill@udfcd.org>
Subject: RE: Clear Creek FHAD - North Overflow Split

Justin,

Can you please send the auto delineated 100-yr and 500-yr floodplains to assist with our Clear Creek model review?

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
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Protecting people, property, and the environment

From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, January 11, 2019 12:50 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Craig Jacobson <cjacobson@iconeng.com>
Subject: RE: Clear Creek FHAD - North Overflow Split

Good Afternoon Brooke,

The latest 1-D hydraulics model submittal for Clear Creek has been uploaded to the "Clear Creek FHAD" Dropbox folder and is ready for your review. As before, the files include our comment responses, revised model files, and GIS shapefiles.

Let me know if you have any questions or there is anything else I can provide to assist you with the review.

Thanks,

Justen Hamann, P.E.
Project Manager

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7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, January 4, 2019 12:59 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD - North Overflow Split

Great – thanks Justen.

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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Protecting people, property, and the environment

From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, January 4, 2019 12:45 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD - North Overflow Split

Hi Brooke,

Hope you had a good holidays as well!

We're currently working on the 1D hydraulic model resubmittal that we are planning to get to you by the end of next week.

Thanks,
Justen

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, January 4, 2019 11:25 AM
To: Justen Hamann <jhamann@iconeng.com>
Subject: RE: Clear Creek FHAD - North Overflow Split

Hi Justen,

Hope you had a nice holiday. Can you provide a schedule update for the Clear Creek FHAD resubmittal?

Thanks,
Brooke

Brooke Seymour, P.E., CFM
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Protecting people, property, and the environment

From: Brooke Seymour
Sent: Tuesday, December 18, 2018 9:23 AM
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Subject: RE: Clear Creek FHAD - North Overflow Split

Justen,

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Protecting people, property, and the environment

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Justen Hamann, P.E.
Project Manager

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Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

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Subject: RE: Clear Creek FHAD - North Overflow Split

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Protecting people, property, and the environment

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Sent: Wednesday, December 12, 2018 11:04 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Terri Fead <tfead@udfcd.org>
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From: Greg Labrie <GLabrie@adcogov.org>
Sent: Wednesday, December 12, 2018 8:05 AM
To: Brooke Seymour <bseymour@udfcd.org>
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T. Greg Labrie, PE, CFM
Senior Engineer
Adams County
Development Engineering Services
4430 S. Adams County Parkway
Brighton, CO 80601
Ph # 720-523-6824

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Sent: Monday, December 10, 2018 10:24 AM
To: Greg Labrie
Subject: FW: Clear Creek FHAD - North Overflow Split

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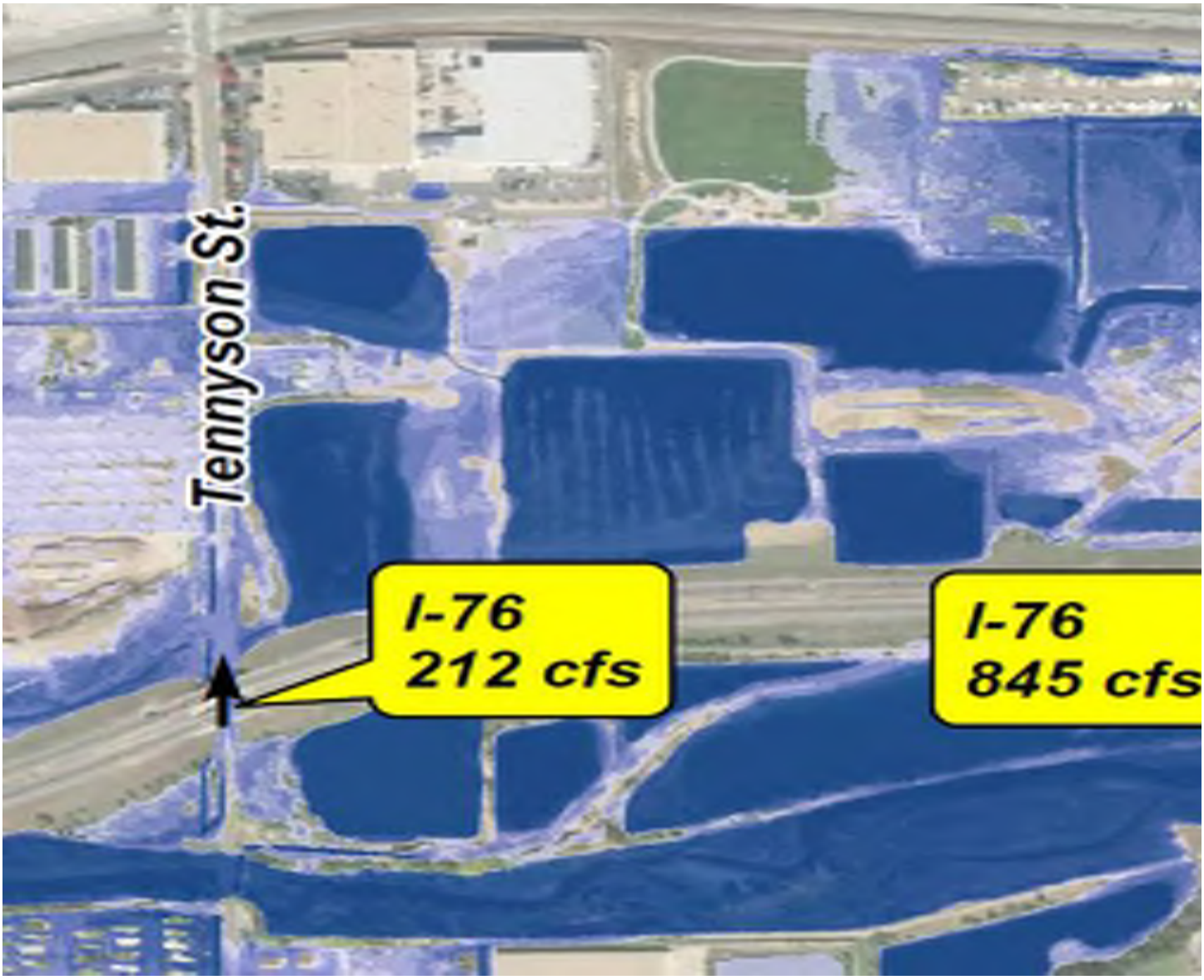

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Protecting people, property, and the environment

From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, December 7, 2018 9:44 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: Clear Creek FHAD - North Overflow Split

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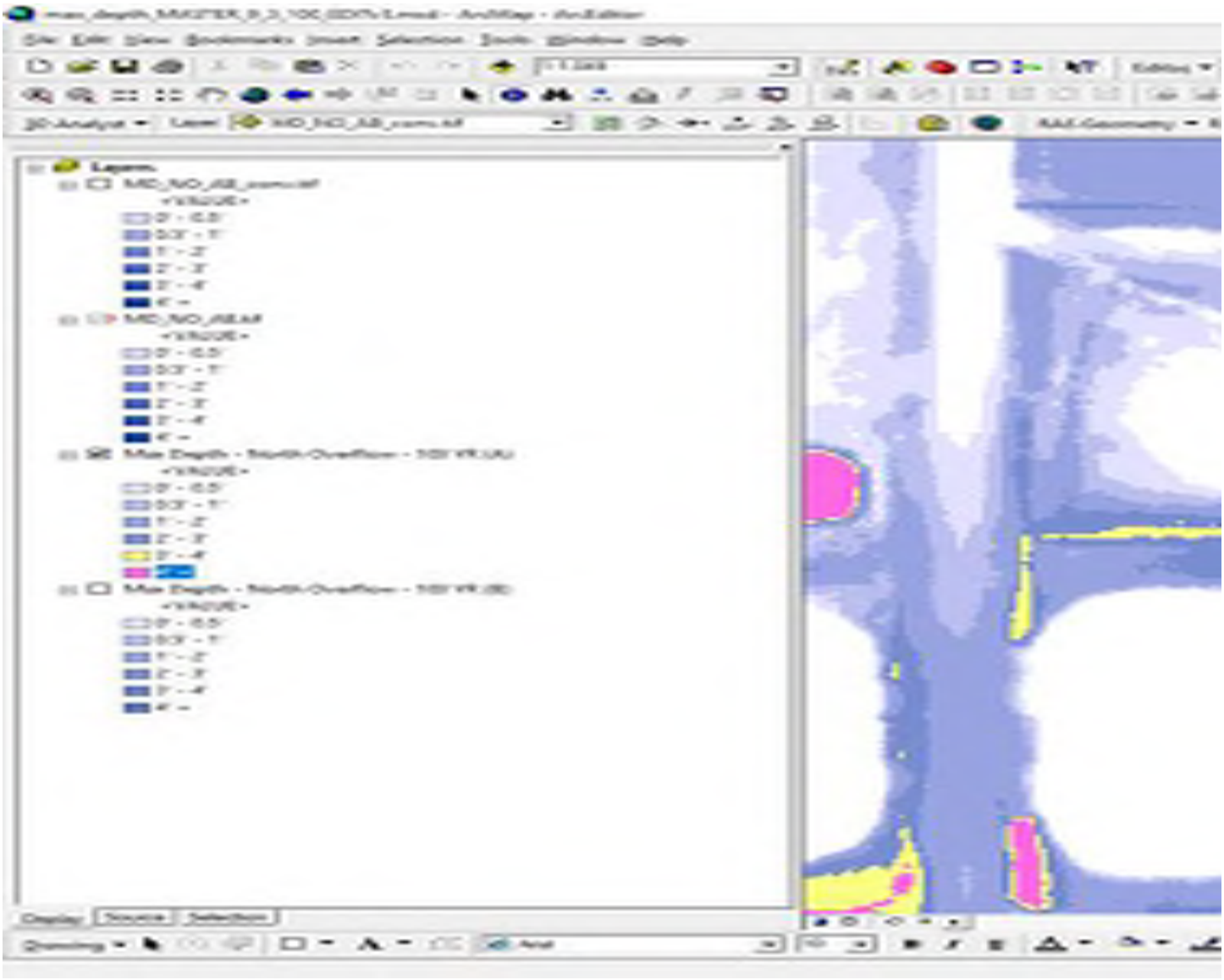

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Thanks,

Justen Hamann, P.E.
Project Manager

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Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

Troy Carmann

From: Justen Hamann
Sent: Friday, March 1, 2019 12:53 PM
To: Brooke Seymour
Cc: Troy Carmann
Subject: RE: Clear Creek at Tennyson Street Bridge

Brooke,

We were able to find some good backup information for the 2007 FHAD (JeffCo reaches) survey information including original point files, original email from UDFCD with bridge sketches, photos, and points in several CAD files. I have zipped all the info. together and uploaded it to the Clear Creek Dropbox folder.

Hopefully, this is helpful but let me know if any more questions arise.

Thanks,

Justen Hamann, P.E.
Project Manager

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Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Wednesday, February 27, 2019 4:15 PM
To: Justen Hamann <jhamann@iconeng.com>
Subject: FW: Clear Creek at Tennyson Street Bridge

Justen,

FYI - Attached is the survey for Tennyson Street from the Arvada project.

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

Protecting people, property, and the environment

From: Steinkuhler, Zachary <zsteinkuhler@Huitt-Zollars.com>
Sent: Friday, February 15, 2019 1:47 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Dan Hill <dhill@udfcd.org>
Subject: RE: Clear Creek at Tennyson Street Bridge

Kris Gardner is our contact with City of Arvada.

And attached is our survey for of Tennyson Bridge. Roadway crown on the south end of the bridge was shot to be 5248.33 and the 'concrete beam bottom' (low chord) was shot to be 5245.15 in the same location.

Let me know if you have any questions.

Thanks again for everything

Zach Steinkuhler, P.E., CFM | Huitt-Zollars, Inc.
Associate
O: 214-871-3311 Ex: 10006

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---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, February 15, 2019 2:32 PM
To: Steinkuhler, Zachary <zsteinkuhler@Huitt-Zollars.com>
Subject: RE: Clear Creek at Tennyson Street Bridge

Thanks Zach. Who is your contact at Arvada?

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

Protecting people, property, and the environment

From: Steinkuhler, Zachary <zsteinkuhler@Huitt-Zollars.com>
Sent: Friday, February 15, 2019 12:31 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Dan Hill <dhill@udfcd.org>
Subject: RE: Clear Creek at Tennyson Street Bridge

Thanks Brooke!
I'm just waiting for City of Arvada to confirm I can send their survey files. Shouldn't be an issue sharing but I just want them to know we are sending your way and for what purpose.

Will follow up with survey once I hear from them.

Thanks again,

Zach Steinkuhler, P.E., CFM | Huitt-Zollars, Inc.
Associate
O: 214-871-3311 Ex: 10006

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From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, February 14, 2019 4:35 PM
To: Steinkuhler, Zachary <zsteinkuhler@Huitt-Zollars.com>
Cc: Dan Hill <dhill@udfcd.org>
Subject: RE: Clear Creek at Tennyson Street Bridge

Zach,

Attached are the auto-delineated floodplains associated with the draft FHAD model dated 1/11/2019 for your reference.

Also, please send the survey information that you have for the Tennyson bridge to Dan Hill (copied) so that we can dig into the discrepancy.

Thank you,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
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Protecting people, property, and the environment

From: Steinkuhler, Zachary <zsteinkuhler@Huitt-Zollars.com>
Sent: Thursday, February 14, 2019 1:56 PM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek at Tennyson Street Bridge

Hi Brooke!

I just left you a voicemail at your office. I was calling you to see if UDFCD was provided the 100-year floodplain lines for the entire reach that correspond to the HEC-RAS models we were given. If so, is that something we can request from you for our visual reference? If not, that is fine too. I just wanted to double check before telling them them we can't map the entire Clear Creek reach.

Thanks!

Zach Steinkuhler, P.E., CFM | Huitt-Zollars, Inc.
Associate
O: 214-871-3311 Ex: 10006

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---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, January 29, 2019 1:12 PM
To: Steinkuhler, Zachary <zsteinkuhler@Huitt-Zollars.com>
Subject: RE: Clear Creek at Tennyson Street Bridge

Yes, it's NAVD 88.

Brooke Seymour, P.E., CFM

Project Manager | Watershed Services
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2480 W. 26TH Ave. Suite 156-B | Denver, CO 80211
Office: 303.455.6277 | **Direct**: 303.749.5422 | www.udfcd.org

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From: Steinkuhler, Zachary <zsteinkuhler@Huitt-Zollars.com>
Sent: Tuesday, January 29, 2019 12:07 PM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek at Tennyson Street Bridge

Hi Brooke! Thanks again for the modeling. I just wanted to confirm the vertical datum used to create the modeling. I'm assuming it's NAVD 88. If you could just confirm or correct my assumption, I will starting using the model for our project.

Thanks!

Zach Steinkuhler, P.E., CFM | Huitt-Zollars, Inc.
Associate
O: 214-871-3311 Ex: 10006

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From: Brooke Seymour <bseymour@udfcd.org>
Sent: Monday, January 28, 2019 2:54 PM
To: Steinkuhler, Zachary <zsteinkuhler@Huitt-Zollars.com>
Cc: Lehocky, Sean <slehocky@Huitt-Zollars.com>; Matt Knight <mknight@arvada.org>
Subject: RE: Clear Creek at Tennyson Street Bridge

Zach,

We have received a revised draft model for the Clear Creek FHAD, which is available at the Dropbox link below for your use. Please understand that this study is still in progress and the model may change before it is finalized. Please let me know if you have any questions.

https://www.dropbox.com/s/1c4m9m67q39u0mu/Jan%202019%20DRAFT%20Clear%20Creek%20Model.zip?dl=0

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
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From: Steinkuhler, Zachary <zsteinkuhler@Huitt-Zollars.com>
Sent: Tuesday, January 22, 2019 9:24 AM
To: Brooke Seymour <bseymour@udfcd.org>

Cc: Lehocky, Sean <slehocky@Huitt-Zollars.com>
Subject: RE: Clear Creek at Tennyson Street Bridge

Hi Brooke – I'm sorry if I'm sending yet another email regarding this updated model but our email server has been down and I'm not sure my email from yesterday ever made it to you. I was just following up on the updated model. If available now, I will coordinate with my Denver Office to have someone pick up.

Please let me know if or when we can obtain this Clear Creek data for our project.
Thanks!

Zach Steinkuhler, P.E., CFM | Huitt-Zollars, Inc.
Associate
O: 214-871-3311 Ex: 10006

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From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, January 4, 2019 12:23 PM
To: Steinkuhler, Zachary <zsteinkuhler@Huitt-Zollars.com>
Subject: RE: Clear Creek at Tennyson Street Bridge

Hi Zach,

The revised model is not available yet. I've asked for a schedule update – I'll let you know what I learn.

Thanks,
Brooke

Brooke Seymour, P.E., CFM
Project Manager | Watershed Services
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From: Steinkuhler, Zachary <zsteinkuhler@Huitt-Zollars.com>
Sent: Wednesday, January 2, 2019 8:53 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: Clear Creek at Tennyson Street Bridge

Good Morning Brooke & Happy New Year!

I'm reaching out to see if the updated Clear Creek HEC-RAS model is available for our Tennyson Street project? I had a reminder to contact you today based on our phone conversation last month. The City of Arvada agreed to based our hydraulic design on the new Clear Creek data (reduced flows and updated model). Let me know if the data is available or if we need to hold off more. I will need to let our PM know for schedule purposes.

Thank you!

Zach Steinkuhler, P.E., CFM | Huitt-Zollars, Inc.
Associate

Troy Carmann

From: Justen Hamann
Sent: Tuesday, March 12, 2019 12:59 PM
To: Brooke Seymour
Cc: Troy Carmann
Subject: RE: Clear Creek Bridges in Jeffco
Attachments: RR-Bridge-DS-McIntyre-NewFHAD_73703.pdf; Coors-Footbridge-NewFHAD_87099.pdf

Hi Brooke,

I did confirm that we used the data from the previous FHAD for our current model of these bridges so I did some more digging into the information from the previous FHAD. I was able to find some hand written notes for each of these bridges which appear to be based on site visits we conducted. I've attached the pertinent notes for each bridge which include pictures, measurements, elevations, and our data for coding the bridges into RAS. The Coors footbridge appears to be based in part on elevation data from the vehicle bridge just upstream so I included the notes for that bridge as well.

Thanks,

Justen Hamann, P.E.
Project Manager

ICON ENGINEERING, INC.
7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, March 8, 2019 8:52 AM
To: Justen Hamann <jhamann@iconeng.com>
Subject: Clear Creek Bridges in Jeffco

Hi Justen,

We couldn't find survey or asbuilts for the following two bridges located in Jeffco:

- RS 87099 Footbridge in Coors plant
- RS 73703 RR just downstream/E of McIntyre St

Do you have any information on these bridges?

Thanks,
Brooke

Brooke Seymour, P.E., CFM
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Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Wednesday, May 1, 2019 9:33 AM
To: Justen Hamann
Cc: Brooke Seymour
Subject: Clear Creek FHAD - Bridge Survey

Hi Justen,

We've received updated survey for the York, Broadway, Pecos, Federal, and Lowell crossings of Clear Creek. I've uploaded the .zip file we received, "finish crossings.zip", to the project folder in Dropbox here: https://www.dropbox.com/s/qbdksw6pm8ney2d/finish%20crossings.zip?dl=0.

Please let me know if you have any issues with the file.

Thanks,

Dan Hill, P.E., CFM
Engineering Technologist | Watershed Services
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Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Monday, May 13, 2019 1:30 PM
To: Justen Hamann
Cc: Dan Hill
Subject: RE: Clear Creek Bridge Survey Request
Attachments: In Progress Comments 2019-01-11.zip

Justen,

Attached are the in-progress model review comments (as a GIS shapefile) from the January submittal. We paused our review once the bridge issues were discovered, so this list does not reflect a complete review.

As always, let me know if you have questions.

Regards,
Brooke

Brooke Seymour P.E., CFM
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From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, May 8, 2019 3:18 PM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek Bridge Survey Request

Good Afternoon Brooke,

Thanks for sending this information along. Do you have any availability next week to meet and go over this? I take it you'll be out at ASFPM the following week so we could also look at scheduling something the week of the 20th if that works better for you. Just let me know what works best and we'll go from there.

Thanks,

Justen Hamann, P.E.
Project Manager

ICON ENGINEERING, INC.
7000 S. Yosemite Street I Suite 120 I Centennial CO 80112

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Sunday, May 5, 2019 12:03 PM
To: Justen Hamann <jhamann@iconeng.com>
Subject: RE: Clear Creek Bridge Survey Request

Justen,

I've uploaded to Dropbox the Clear Creek GL & NWES2 LOMR package that was prepared by Enginuity to be incorporated into the Clear Creek FHAD model.

https://www.dropbox.com/s/n4masyv1sz2bhfx/Clear%20Creek%20GL%20%26%20NWES2%20LOMR.zip?dl=0

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
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From: Brooke Seymour
Sent: Friday, May 3, 2019 11:11 AM
To: Justen Hamann <jhamann@iconeng.com>
Subject: FW: Clear Creek Bridge Survey Request

Justen,

Dan took a quick look at the Clear Creek bridge survey data and it appears that the only change that will significantly impact the 100-yr is at Tennyson St. The 500-yr results are impacted at Broadway. Please refer to the table in Dan's email below.

Dan went through a long effort to compare bridges in the model to as-builts and identified six bridges to surveyed. We also noticed that the BNSF and RTD bridges upstream of Pecos in the model do not reflect the as-built condition. I can resend the LOMR model from Enginuity when I get back in the office next week.

Let's meet to discuss. As you know, this project is a priority for us, so we would like to understand the schedule through completion.

Thanks,
Brooke

From: Dan Hill <dhill@udfcd.org>
Sent: Tuesday, April 30, 2019 1:15 PM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek Bridge Survey Request

Hi Brooke,

I've reviewed the survey data from Doug at Wilson & Company for the five crossings. Four of the five low chords in the draft FHAD model were below what was surveyed, so the floodplain shall be mostly unchanged in those areas when revised. The fifth low chord, at Broadway, was too high in the draft FHAD model versus the new survey by approximately 2'. These low chords/WSEs are all listed in the table below, along with Tennyson, where we received the data from Zach Steinkuhler/Arvada.

Index		Survey		Draft FHAD		Draft FHAD WSE	
Crossing	Note	Left	Right	Left	Right	100-YR	500-YR
York	Draft lower than 4/2019 survey – revise as needed	5114.96	5114.96	5114.79	5114.79	5114.79	5117.
Broadway	REVISE - draft much higher than 4/2019 survey	5151.58	5151.58	5153.49	5153.89	5151.67	5157.9
Pecos	Draft much lower than 4/2019 survey – revise	5184.42	5184.42	5182.66	5184.14	5186.07	5189.5
Federal	Draft lower than 4/2019 survey – revise as needed	5209.62	5209.62	5209.44	5209.54	5209.54	5216.7
Lowell	Draft much lower than 4/2019 survey – revise	5234.16	5234.16	5230.77	5233.66	5232.08	5234.6
Tennyson	REVISE - draft much higher than Arvada survey	5244.15	5245.13	5248.30	5248.30	5245.55	5246.1

I ran a coarsely adjusted RAS model with just the low chord adjusted for Broadway and Tennyson. At Broadway, the 100Y seems mostly unchanged but there's an approximate rise of 2' in the 500Y WSE from the draft FHAD model. At Tennyson, both the 100Y and 500Y WSEs rose approximately 1.5'.

Hope this helps, let me know if I can send along any more data while you're out for training. Jumping onto the RTD/BNSF LOMR comparison now.

—Dan

Dan Hill, P.E., CFM
Engineering Technologist | Watershed Services
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From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, April 16, 2019 16:01
To: Dan Hill <dhill@udfcd.org>
Subject: RE: Clear Creek Bridge Survey Request

Dan,

The LOMR submittal package for the RTD and BNSF bridge improvements for Clear Creek between Pecos and Federal is saved at \\FILE-SERVER2\Watershed Mgmt\Management\Projects\02 West\MP & FHAD\Clear Creek FHAD 2015\3-Engineering\2-Communications\Clear Creek GL & NWES2 LOMR.

Will you please compare the bridge structures in this LOMR model to the Merrick survey?

This LOMR model should have been incorporated into the Clear Creek FHAD model.

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
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From: Brooke Seymour
Sent: Tuesday, April 16, 2019 1:53 PM
To: Dan Hill <dhill@udfcd.org>
Subject: FW: Clear Creek Bridge Survey Request

Dan – The Clear Creek bridge survey is available. Can you please download the survey data and compare to the draft FHAD model?

External Access:
http://ftp.wilsonco.com
or
ftp://ftp.wilsonco.com

FTP_Site_Username: UDFCD
FTP_Site_Password: WatershedManagement

From: Ort III, Douglas H. <DHOrtIII@wilsonco.com>
Sent: Tuesday, April 16, 2019 1:51 PM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek Bridge Survey Request

Hello Brooke,

I just copies a zip file to the FTP site. The login information is in this email chain.

Best Regards,

Douglas H. Ort III, PLS* CFedS
Survey Project Manager
*Licensed in CO, WY, ND, MT, ID & UT

Wilson & Company, Inc., Engineers & Architects
1675 Broadway, Ste.200 | Denver, CO 80202
Office (303) 297-2976 | Direct (303) 501-1221 | Mobile (720) 235-9593 | Fax (303) 297-2693
www.wilsonco.com | DHOrtIII@wilsonco.com

From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Tuesday, April 16, 2019 1:02 PM
To: Ort III, Douglas H. <DHOrtIII@wilsonco.com>
Subject: RE: Clear Creek Bridge Survey Request

Doug – What is the status of the Clear Creek survey?

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
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From: Ort III, Douglas H. <DHOrtIII@wilsonco.com>
Sent: Friday, March 22, 2019 6:37 AM
To: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek Bridge Survey Request

Hello Brooke,

Here is the quote for the Clear Creek Crossings. I will get this moving and we can schedule it as soon as we can get people assigned. It probably won't be next week, likely the early half of the following week.

Also, the final version of the City Park Crossings have been posted to the FTP site in a directory entitled 28 City Park Main PO#1161.
Here is the login information for the FTP site.

External Access:
http://ftp.wilsonco.com
or
ftp://ftp.wilsonco.com

FTP_Site_Username: UDFCD
FTP_Site_Password: WatershedManagement

Best Regards,

Douglas H. Ort III, PLS* CFedS
Survey Project Manager
*Licensed in CO, WY, ND, MT & ID

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Office (303) 297-2976 | Direct (303) 501-1221 | Mobile (720) 235-9593 | Fax (303) 297-2693
www.wilsonco.com | DHOrtIII@wilsonco.com

From: Brooke Seymour [mailto:bseymour@udfcd.org]
Sent: Thursday, March 21, 2019 3:37 PM
To: Ort III, Douglas H. <DHOrtIII@wilsonco.com>
Subject: Clear Creek Bridge Survey Request

Hi Doug,

I have a high priority survey request for five bridges over Clear Creek (see attached Google kmz) as a part of the Clear Creek FHAD:

- Lowell
- Federal
- Pecos
- Broadway
- York

How soon do you think you could get this work done?

Many thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
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Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, June 4, 2019 12:13 PM
To: Justen Hamann
Cc: Troy Carmann; Dan Hill
Subject: RE: Clear Creek FHAD Status

Thanks for the schedule update. I've requested the additional survey documentation – I'll let you know.

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
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From: Justen Hamann <jhamann@iconeng.com>
Sent: Tuesday, June 4, 2019 11:58 AM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Dan Hill <dhill@udfcd.org>
Subject: RE: Clear Creek FHAD Status

Hi Brooke,

We just had an internal meeting on the FHAD and outlined our plan of attack for getting the bridge modeling updated. We are planning on making our 1D/2D model resubmittal on Friday June 21st. I'll let you know if that changes at all but that's our latest estimate.

I also have a quick item to confirm with you on the Tennyson St. Bridge. We are planning on using the Huitt-Zollars bridge survey you sent me in February (see attached email) to update the Tennyson Bridge. Is that the correct information to use for this bridge or was there something else we should be using? Assuming this info. is correct, did they share any additional survey information besides the CAD file (sketches, dimensions, photos, etc.)?

Thanks,

Justen Hamann, P.E.
Project Manager

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7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

Troy Carmann

From: Justen Hamann
Sent: Thursday, June 6, 2019 9:29 AM
To: Dan Hill
Cc: Troy Carmann; Brooke Seymour
Subject: RE: Clear Creek at Tennyson Street Bridge

Thanks Dan!

I downloaded the photos and will remove them from the Dropbox.

Justen Hamann, P.E.
Project Manager

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Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Dan Hill <dhill@udfcd.org>
Sent: Wednesday, June 5, 2019 7:16 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek at Tennyson Street Bridge

Hi Justen,

We received some additional photos from Tennyson Street and wanted to pass them along in case they may assist you. I've added them to the Clear Creek Dropbox folder (Clear Creek at Tennyson Street.zip).

Unfortunately they do not show elevations or anything to support the survey. They may contain some photos along Tennyson non-related to the bridge itself. We were notified that the folders from 2017 and 2019 have the most photos related to the bridge.

Please let us know if you have any questions, and thanks!

Dan Hill, P.E., CFM
Engineering Technologist | Watershed Services
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From: Justen Hamann <jhamann@iconeng.com>
Sent: Tuesday, June 4, 2019 12:42
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Dan Hill <dhill@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek at Tennyson Street Bridge

Brooke,

Yes, we'll work with what we have then.

Thanks,
Justen

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, June 4, 2019 12:32 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Dan Hill <dhill@udfcd.org>
Subject: FW: Clear Creek at Tennyson Street Bridge

Justen,

It doesn't sound like there is additional documentation to go with the Tennyson Street CAD survey. Are you able to work with the information provided?

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
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From: Steinkuhler, Zachary <zsteinkuhler@Huitt-Zollars.com>
Sent: Tuesday, June 4, 2019 12:29 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Robyn Brown <robrown@arvada.org>; Dan Hill <dhill@udfcd.org>
Subject: RE: Clear Creek at Tennyson Street Bridge

Not that I know of. Everything we received was existing survey of the Tennyson bridge which we are not modifying in this project. We will however eventually figure out a placement of a pedestrian bridge and have plans for that, but it sounds like that is all up in the air at this time. I will take a look at our project folder and see if there are anything else I can forward along.

Troy Carmann

From: Justen Hamann
Sent: Monday, June 24, 2019 5:29 PM
To: Brooke Seymour; Dan Hill
Cc: Ben Smith; Brian Ledoux; Troy Carmann
Subject: RE: Clear Creek

Hi Brooke & Dan,

I have uploaded a directory to the Clear Creek FHAD Dropbox called "20190624_ModelReview." It contains the latest 1D models, cross-section and centerline shapefiles, as well as some preliminary figures we prepared for the 2D results. The directory also contains a spreadsheet we used to incorporate the changes to the bridges per the provided survey information (this will help you review/track how the survey was incorporated into each of the changed bridges).

Let me know if you have any questions before we're able to talk further.

Thanks,

Justen Hamann, P.E.
Project Manager

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---

From: Dan Hill <dhill@udfcd.org>
Sent: Monday, June 24, 2019 7:32 AM
To: Brooke Seymour <bseymour@udfcd.org>; Troy Carmann <tcarmann@iconeng.com>
Cc: Justen Hamann <jhamann@iconeng.com>; Ben Smith <bsmith@iconeng.com>; Brian Ledoux <bledoux@iconeng.com>
Subject: RE: Clear Creek

Hi Troy,

I have a meeting from 9a–10a but am otherwise free to discuss. Thanks!

Dan Hill, P.E., CFM
Engineering Technologist | Watershed Services
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From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, June 21, 2019 18:00
To: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Dan Hill <dhill@udfcd.org>
Cc: Justen Hamann <jhamann@iconeng.com>; Ben Smith <bsmith@iconeng.com>; Brian Ledoux <bledoux@iconeng.com>
Subject: RE: Clear Creek

Troy,

Thanks for the update. I'll be in back-to-back meeting all day Monday, so please call Dan to discuss the 1D changes in the North Overflow. (I'd rather not delay until Tuesday, if possible.)

Also, please confirm that the model run time is sufficient for a steady flow condition – why would the flows be lower at the downstream limits than upstream?

Thanks and have a nice weekend!

-Brooke

Brooke Seymour P.E., CFM
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From: Troy Carmann <tcarmann@iconeng.com>
Sent: Friday, June 21, 2019 5:30 PM
To: Brooke Seymour <bseymour@udfcd.org>; Dan Hill <dhill@udfcd.org>
Cc: Justen Hamann <jhamann@iconeng.com>; Ben Smith <bsmith@iconeng.com>; Brian Ledoux <bledoux@iconeng.com>
Subject: Clear Creek

Good Afternoon –

An update on the Clear Creek modeling.

- RTD LOMRs are incorporated in the 1D model
- New bridge survey data is incorporated in the 1D and 2D models
- 2D models are still running and splits will be hard-coded into the 1D model by Monday morning

There are some interesting results coming from the 2D modeling. Note the attached 50 year run, a few notes:

- Tennyson bridge flows are reduced (8139-5940=2199cfs)
- Increasing north overflows at Tennyson
- But, then decreasing flow available to the north overflow at Lowell, even with the reduced bridge capacity

It will be worth a phone call between us to narrate some of the 1D changes in the north overflow.

Thanks,
@5280'
TC

Troy Carmann, PE CFM
Principal
ICON ENGINEERING, INC.
7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I tcarmann@iconeng.com

Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, July 11, 2019 7:37 PM
To: Justen Hamann
Subject: FW: Clear Creek at BNSF - Drop survey
Attachments: Clear Creek Drop Structure SurveyJuly 2019.dwg

Justen,

Attached is a CAD drawing with survey points for two existing drop structures in the vicinity of a current project along Clear Creek at the confluence with Little Dry Creek. Merrick has commented that the drop crests in the draft FHAD model geometry do not match the survey points. Will you please update the draft model to reflect the survey? Please refer to Theresa's email below.

Thank you,
Brooke

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
50th ANNIVERSARY
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
Office: 303-455-6277 | **Direct:** 303-749-5422 | www.udfcd.org
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From: Theresa Ring <theresa.ring@merrick.com>
Sent: Wednesday, July 10, 2019 4:21 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Rick McLaughlin <rick.mclaughlin@merrick.com>
Subject: RE: Clear Creek at BNSF - Drop survey

Brooke,

Please see the attached autocad file for the survey points. I've included points for:

(1) Upstream sanitary sewer encasement
(2) Drop structure downstream of the BNSF bridge. Note that the points with labels beginning with **309** are the top of the drop structure itself.

We have more points, both upstream of the bridges and downstream of the drop structure but I wanted to keep it fairly clean and simple. Let me know if you want to see any of the others.

Theresa Ring | Civil Water Engineer | Merrick & Company
T: +1 720-330-3207 | www.merrick.com

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, July 5, 2019 12:01 PM
To: Theresa Ring <theresa.ring@merrick.com>
Cc: Rick McLaughlin <rick.mclaughlin@merrick.com>
Subject: Clear Creek at BNSF - Drop survey

Theresa,

Will you please send over the drop structure survey points to be incorporated into the Clear Creek FHAD?

Regards,
Brooke

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
50th ANNIVERSARY
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Troy Carmann

From: Theresa Ring <theresa.ring@merrick.com>
Sent: Friday, August 23, 2019 2:51 PM
To: Brooke Seymour; Justen Hamann; Dan Hill
Cc: Troy Carmann; Layton Bodkins
Subject: RE: Clear Creek FHAD

Use a conversion factor of 0.999791991 to get it into state plane.

Theresa Ring | Civil Water Engineer, PE | Merrick & Company
T: +1 720-330-3207 | www.merrick.com

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, August 23, 2019 2:43 PM
To: Justen Hamann <jhamann@iconeng.com>; Dan Hill <dhill@udfcd.org>; Theresa Ring <theresa.ring@merrick.com>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Layton Bodkins <Layton.Bodkins@merrick.com>
Subject: RE: Clear Creek FHAD

Theresa,

Can you send Justen the combined factor for the Clear Creek drop structure survey data so that he can transform it to grid level State Plane?

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
MILE HIGH FLOOD DISTRICT
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---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, August 23, 2019 10:05 AM
To: Brooke Seymour <bseymour@udfcd.org>; Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD

Good Morning Brooke & Dan,

We're putting the finishing touches on our 1D model revisions for the Clear Creek FHAD and I was looking at incorporating Merrick's drop structure survey information downstream of the confluence with Little Dry Creek (see attached email). The drawing appears to use the NAD 83 horizontal datum with a Colorado State Plane Central projection but the data is shifted to the northeast (approx.. 800 feet) when we bring it into CAD. Is there a grid to ground conversion factor we need to use or another way to get this survey data into a known grid-based datum and projection so we can incorporate it?

Thanks,

Justen Hamann, P.E.
Project Manager

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Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, August 15, 2019 10:28 AM
To: Justen Hamann <jhamann@iconeng.com>; Dan Hill <dhill@udfcd.org>
Cc: Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD

Thanks for the update, Justen. We have a lot of people waiting for that draft model. If at all possible, please ensure that it is submitted to us before Monday, August 26. Thank you!

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
MILE HIGH FLOOD DISTRICT
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Office: 303-455-6277 | **Direct:** 303-749-5422 | www.udfcd.org

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MHFD
MILE HIGH FLOOD DISTRICT

From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, August 14, 2019 5:25 PM
To: Brooke Seymour <bseymour@udfcd.org>; Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD

Good Evening Brooke & Dan,

Just wanted to give you an update on the schedule for addressing 1D model comments for Clear Creek. We haven't made as much progress as we wanted to so it's currently looking like addressing the comments will push us into making a resubmittal by the end of next week.

Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Monday, August 26, 2019 4:47 PM
To: Justen Hamann; Brooke Seymour
Cc: Troy Carmann
Subject: RE: Clear Creek FHAD

Thanks Justen, I appreciate the quick turnaround.

Dan Hill, P.E., CFM
Engineering Technologist | Watershed Services
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.udfcd.org

---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Monday, August 26, 2019 16:00
To: Dan Hill <dhill@udfcd.org>; Brooke Seymour <bseymour@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD

Hey Dan!

The auto-delineated 100-year floodplain has been added to the Dropbox.

Thanks,
Justen

From: Dan Hill <dhill@udfcd.org>
Sent: Monday, August 26, 2019 2:19 PM
To: Justen Hamann <jhamann@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Cc: Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD

Justen, are you able to supply an auto-delineated 100-year floodplain shapefile? Thanks!

Dan Hill, P.E., CFM
Engineering Technologist | Watershed Services
MILE HIGH FLOOD DISTRICT
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From: Dan Hill
Sent: Monday, August 26, 2019 09:03
To: Justen Hamann <jhamann@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD

Hi Justen,

Files received, thank you! Looking good for now, we'll reach out if we have any questions.

From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, August 23, 2019 14:36
To: Brooke Seymour <bseymour@udfcd.org>; Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: Clear Creek FHAD

Hi Brooke & Dan,

Our updated 1D HEC-RAS submittal and response to the latest comments (in shapefile form) has been uploaded to the Dropbox and is ready for your review. Let me know if I missed anything you need for your review.

Thanks,

Justen Hamann, P.E.
Project Manager

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---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, August 15, 2019 10:28 AM
To: Justen Hamann <jhamann@iconeng.com>; Dan Hill <dhill@udfcd.org>
Cc: Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD

Thanks for the update, Justen. We have a lot of people waiting for that draft model. If at all possible, please ensure that it is submitted to us before Monday, August 26. Thank you!

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
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Office: 303-455-6277 | **Direct:** 303-749-5422 | www.udfcd.org

From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, August 14, 2019 5:25 PM
To: Brooke Seymour <bseymour@udfcd.org>; Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD

Good Evening Brooke & Dan,

Just wanted to give you an update on the schedule for addressing 1D model comments for Clear Creek. We haven't made as much progress as we wanted to so it's currently looking like addressing the comments will push us into making a resubmittal by the end of next week.

I'll be in touch again if this changes.

Thanks,

Justen Hamann, P.E.
Project Manager

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Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, August 8, 2019 1:45 PM
To: Justen Hamann <jhamann@iconeng.com>; Troy Carmann <tcarmann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek - 2D models

Justen and Troy,

Thanks again for the discussion today. Wanted to follow up on comment IDs 47 and 49 from the shapefile.

47, IEFAs in ROB for XSs 74344 to 68535
Understood that the ROB will oscillate between activating and not activating here. You can respond to the comment that no change is needed due to avoiding instability and crossing profiles.

49, IEFAs in ROB for 64534 to 63054 (West Lake)
I think the IEFA in the ROB for XS 64095 should switch to permanent to conform with the adjacent XSs. Keeping the IEFAs otherwise unchanged through this stretch is fine.

I'll be out tomorrow and Monday, so please contact Brooke with any immediate questions. Thanks, and talk to you next week!

Dan Hill, P.E., CFM
Engineering Technologist | Watershed Services
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---

From: Troy Carmann <tcarmann@iconeng.com>
Sent: Monday, August 5, 2019 16:17
To: Dan Hill <dhill@udfcd.org>
Subject: RE: Clear Creek - 2D models

Good Afternoon Dan –

Here's a first look at the ICON responses.

Justen is back in the office Wednesday.

Can we see if a Thursday or Friday call/web meeting is possible to review the comments?

Thanks,
@5280'
TC

From: Dan Hill <dhill@udfcd.org>
Sent: Friday, August 2, 2019 10:15 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>; Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek - 2D models

Thanks Justen, I've downloaded the 2D model data and memo and we will get back to you soon (early next week) with any immediate questions.

Dan Hill, P.E., CFM
Engineering Technologist | Watershed Services
MILE HIGH FLOOD DISTRICT
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---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Thursday, August 1, 2019 16:19
To: Dan Hill <dhill@udfcd.org>
Cc: Brooke Seymour <bseymour@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek - 2D models

Hi Dan,

I haven't been able to look too much at these comments yet but we're hoping to get that done in the next few days. Our updated 2D modeling and memo is ready for review though and is currently being uploaded to the Clear Creek FHAD Dropbox folder.

Thanks,

Justen Hamann, P.E.
Project Manager

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---

From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, August 1, 2019 9:07 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>; Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek - 2D models

Hi Justen,

Have you been able to give these comments a quick review?

I also have a follow up on Comments 2 and 3: I've confirmed with Wright Water Engineers that 25,500 cfs should be used for XSs 20985 and 21401.

Thanks,

Dan Hill, P.E., CFM
Engineering Technologist | Watershed Services
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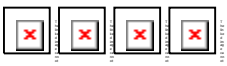

From: Dan Hill
Sent: Thursday, July 25, 2019 10:40
To: Justen Hamann <jhamann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek - 2D models

Justen,

Just kidding, please use this attachment and not the one I sent earlier ☺

From: Dan Hill
Sent: Thursday, July 25, 2019 10:29
To: Justen Hamann <jhamann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek - 2D models

Hi Justen,

Please see attached for a comment shapefile on the 6/24 1D model.

In terms of format, we're trying something out. The idea is to have you respond in the RespCat (e.g. Accept, Discuss, and/or Disagree, similar to a Resolution Code), Response, and RespDate fields of the shapefile and then send that revision back over. We will maintain the Comment, CommDate, and CommStatus fields. Hopefully it'll be easier to track everything and we keep updating it as we go forward. Feel free to add/edit the response fields as you see fit or give feedback as we go through this round.

In terms of review comments, please take a look and let me know if you would like to have a call or set up a meeting. Brooke is on vacation and will return Tuesday 8/6, but I'm hoping we can keep this moving a bit in the meantime. I will be out of the office tomorrow but am back on Monday.

Thanks!

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, July 9, 2019 11:46
To: Justen Hamann <jhamann@iconeng.com>
Cc: Dan Hill <dhill@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek - 2D models

Thanks Justen!

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
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From: Justen Hamann <jhamann@iconeng.com>
Sent: Tuesday, July 9, 2019 10:53 AM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Dan Hill <dhill@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek - 2D models

Hi Brooke,

I just added the referenced 2D models to the Clear Creek Dropbox. They have a February date as I believe we submitted the 1D models in January and added the 2D models sometime in February. We should be able to submit the revised 2D models and memo sometime next week.

Thanks,

Justen Hamann, P.E.
Project Manager

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Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Monday, July 8, 2019 8:02 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Dan Hill <dhill@udfcd.org>
Subject: Clear Creek - 2D models

Justen,

Do you have the January 2019 version of the 2D model to send to us for our records? Looks like we have the memo, but not the model. Also, once the revised 2D modeling is complete, please send the model with the memo.

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
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Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, October 25, 2019 5:24 PM
To: Dan Hill; Justen Hamann
Cc: Troy Carmann
Subject: RE: Clear Creek FHAD- 52nd Ave Spill

Justen,

The assumed IEFA in the ROB between 52nd and I-76 for the 500-yr event appears overly conservative given that there is an effective flow path under I-76 along Sheridan Blvd. Can you use the 2D model to help guide placement of IEFA? If the IEFA in the 1D model is guided by the 2D model, then I would expect that the 500-yr water surface elevations should be very similar between 1D and 2D – is this what you are seeing? Let's discuss next week.

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
MILE HIGH FLOOD DISTRICT
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---

From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, October 17, 2019 2:57 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD- 52nd Ave Spill

Hi Justen,

Looking good! Attached is an updated comment shapefile with two new comments that can be addressed going forward: lack of containment at XS 57293 and adding notes within the model geometry for XSs 53103, 53268, 53431 regarding the usage of the 2D model here in case someone gets confused picking this model up in the future.

Consider this approval to proceed to the Floodway Model / 100-Year Mapping Phase. If you'd like to make these two separate submittals, first with Floodway then 100-Year Mapping, feel free. We're comfortable with you combining these two steps with the next submittal if you wish. Please give Brooke a call if you'd like to discuss how to handle this next step.

Hope you had a great week off,

Dan Hill, P.E., CFM
Engineering Technologist | Watershed Services
MILE HIGH FLOOD DISTRICT

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Office: 303-455-6277 | **Direct:** 303-749-5427 | www.udfcd.org

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MILE HIGH FLOOD DISTRICT

From: Dan Hill
Sent: Friday, October 11, 2019 13:24
To: Justen Hamann <jhamann@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD- 52nd Ave Spill

Hi Justen,

Files received. We're planning to get everything checked next week and hoping to give you the go-ahead for the next step by the time you're back next Monday. Have a great week off, thank you!

From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, October 11, 2019 13:00
To: Brooke Seymour <bseymour@udfcd.org>; Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD- 52nd Ave Spill

Brooke & Dan,

I have finished incorporating the latest changes to the models and addressed the previous model comments. The HEC-RAS models have been added to the Dropbox in a folder with today's date and include the usual GIS shape files as well.

Let me know if you have any questions.

Thanks,

Justen Hamann, P.E.
Project Manager

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Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, October 10, 2019 5:46 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Dan Hill <dhill@udfcd.org>; Pat OConnell <poconnel@co.jefferson.co.us>; Terri Fead <tfead@udfcd.org>
Subject: RE: Clear Creek FHAD- 52nd Ave Spill

Justen,

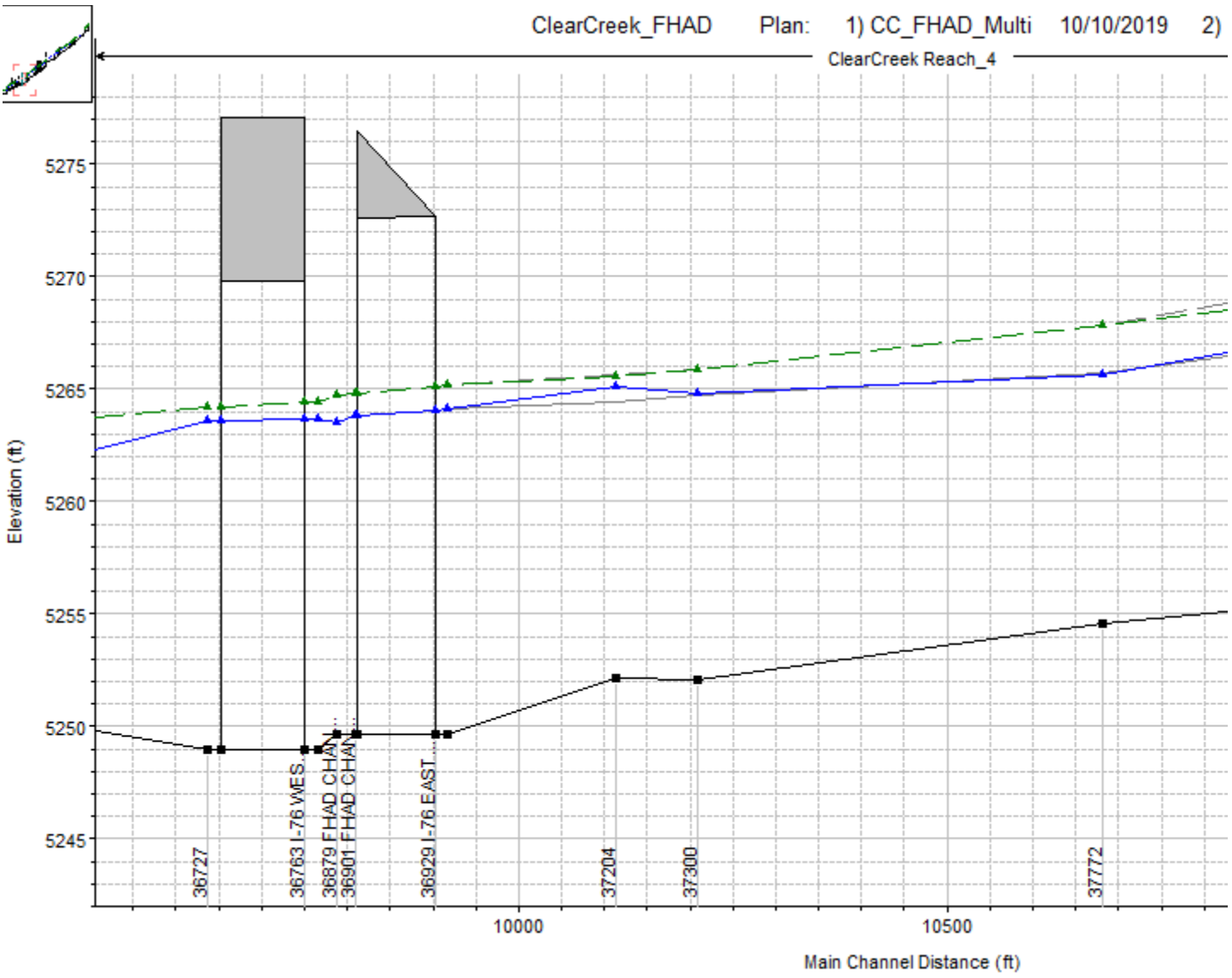
This email is to summarize our discussion today regarding the spill area upstream of I-76 and Sheridan. The natural valley analysis (a.k.a. without levee scenario) water surface elevations are very similar to the with levee scenario. The profile below compares the With Levee scenario HGL and EGL in grey and the natural valley analysis HGL and EGL in green and blue, respectively. Given these results, it does not seem necessary to have separate with and without levee scenarios. Please proceed as follows:

- Model the 100-yr event assuming all flow contained to the main channel by the non-levee embankment. The mapped 100-yr extents will include the ineffective flow area behind the non-levee embankment. Please use IEFA rather than a levee in the model.
- Model the 500-yr event (which overtops the non-levee embankment) with appropriate effective flow behind the non-levee embankment. This can hopefully be done in the same plan as the 100-yr event by adjusting the height of the IEFA and setting it to non-permanent. Please be sure to still consider IEFA for the 500-yr event due to expansion/contraction, building shadows, etc. Please check that the n-values used are appropriate for the mobile home park.
- If the 500-yr WSE's are different between the 1D and 2D models, we suggest using the BFE from the 1D model while using the 2D model to help guide mapping of the flow path.

Please let me know if I've missed anything important.

Thank you for your hard work on this!

Brooke



Brooke Seymour P.E., CFM
Project Manager | Watershed Services
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Office: 303-455-6277 | **Direct:** 303-749-5422 | www.udfcd.org

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From: Justen Hamann <jhamann@iconeng.com>
Sent: Thursday, October 10, 2019 4:33 PM
To: Brooke Seymour <bseymour@udfcd.org>

Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Dan Hill <dhill@udfcd.org>
Subject: RE: Clear Creek FHAD- Drop Structure Survey

Brooke and Dan,

Here are the latest Clear Creek models.

Thanks,
Justen

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, October 8, 2019 3:35 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Terri Fead <tfead@udfcd.org>; Dan Hill <dhill@udfcd.org>; Pat OConnell <poconnel@co.jefferson.co.us>
Subject: RE: Clear Creek FHAD- Drop Structure Survey

Agreed. Thanks Justen.

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5422 | www.udfcd.org

---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Tuesday, October 8, 2019 3:32 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Terri Fead <tfead@udfcd.org>; Dan Hill <dhill@udfcd.org>; Pat OConnell <poconnel@co.jefferson.co.us>
Subject: RE: Clear Creek FHAD- Drop Structure Survey

Hi Brooke,

Thanks for following up on this. Along those same lines I wanted to add the direction you gave us for addressing containment at one of the cross-sections for our files.

- Revise cross-section 37204 by extending the section to the south on Sheridan in order to show containment for the 500-YR event.

Thanks,

Justen Hamann, P.E.
Project Manager

ICON ENGINEERING, INC.
7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, October 8, 2019 11:48 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Terri Fead <tfead@udfcd.org>; Dan Hill <dhill@udfcd.org>; Pat OConnell <poconnel@co.jefferson.co.us>
Subject: RE: Clear Creek FHAD- Drop Structure Survey

Justen,

I've discussed the Clear Creek spill area upstream of I-76 and Sheridan with Pat O'Connell at Jefferson County and we would like to proceed as follows:

- Map the 100-yr BFEs within the channel assuming all flow contained to the main channel by the non-levee embankment, as is currently modeled (with levee condition).
- Map the 100-yr BFEs behind the non-levee embankment using a natural valley analysis (without levee condition). This will be a new plan that will allow effective flow behind the non-levee embankment. The area behind the non-levee embankment can be designated as shallow flooding if the depths are appropriate.
- A gutter line will be needed along the top of the non-levee embankment to separate risk zones with differing BFEs.
- The 500-yr flow overtops the non-levee embankment and either 1D or 2D results can be used to map the extents with effective flow behind the embankment (1D and 2D results should be similar).

Please let me know if you have any questions or concerns with this approach.

Thank you,
Brooke

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5422 | www.udfcd.org

From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, October 2, 2019 12:24 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD- Drop Structure Survey

For our discussion.

Justen

From: Dan Hill <dhill@udfcd.org>
Sent: Monday, September 16, 2019 10:29 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>; Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD- Drop Structure Survey

Justen,

Regarding Comment 19 on the North Overflow at Lowell, we suggest adding an extension to the XS cutline off to the NW along the railroad beyond the 33 contour so it ties in.

Thanks,

Dan Hill, P.E., CFM
Engineering Technologist | Watershed Services
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.udfcd.org

---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, September 13, 2019 17:17
To: Justen Hamann <jhamann@iconeng.com>; Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD- Drop Structure Survey

Hi Justen,

We have reviewed the 8/30/19 submittal and have a few comments remaining, which are summarized below and also included in the attached shapefile. Our biggest concern is the difference in the water surface elevation between the 1D and 2D model at the 52nd and Sheridan spill area (see comment highlighted below). As it is now, the 100-yr floodplain based on the 1D model is more extensive than the 500-yr floodplain based on the 2D model. This needs to be resolved before moving on to mapping. Is someone available to look into this while you are out on vacation?

Previous comments still open:

- **Comments 5, 6, 7 on XS cutline lengths:** The cutline lengths or XS widths don't appear changed in the 8/23 or 8/30 model geometries versus the 6/24 model.
- **Comments 11, 12 on XS containment:** Cutlines for 31859 and 32160 appear corrected in the 8/23 model geometry but not the 8/30 model geometry. Please reinstate the 8/23 model cutlines for these XSs going forward.
- **Containment in 2D vs. 1D:**
    - Comment 13 @ 52nd & Sheridan
        - The WSEs between the 1D and 2D models here are very different and need to be calibrated. Figure 4 in the 8/1 2D modeling memo showing the 500-year delineation has a smaller footprint and no backwater area, while the 1D model shows a larger backwater area over 52nd in the ROB. This needs to be remedied. One item driving this difference could be the differences in Manning's n used (1D: 0.05, 2D: 0.12).
    - Comments 14-16 @ 44th & Hoyt
        - Using 2D model for delineation is acceptable
    - Comment 19 @ North Overflow & Lowell
        - We're resolving this internally now – expect this will be fine.

New comment:

- **Drop structure survey inverts (new, Comments 65-67)**
    - Seems lowered about 1' versus survey (Could the elevations have accidentally been scaled with the coordinates?)

As always, please feel free to reach out to Dan or me with any questions.

Regards,
Brooke

Brooke Seymour P.E., CFM
Project Manager | Watershed Services
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From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, September 13, 2019 12:35 PM
To: Dan Hill <dhill@udfcd.org>; Brooke Seymour <bseymour@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD- Drop Structure Survey

Good Afternoon Brooke & Dan,

Just wanted to give you a heads up that I'll be out of the office next week starting Tuesday the 17th. If any questions or needs come up on Clear Creek while I'm out, feel free to contact Troy directly.

Have a good weekend!

Thanks,

Justen Hamann, P.E.
Project Manager

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7000 S. Yosemite Street I Suite 120 I Centennial CO 80112
Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

---

From: Dan Hill <dhill@udfcd.org>
Sent: Tuesday, September 3, 2019 8:16 AM
To: Justen Hamann <jhamann@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Cc: Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD- Drop Structure Survey

Thanks Justen, files received.

Dan Hill, P.E., CFM
Engineering Technologist | Watershed Services
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Office: 303-455-6277 | **Direct:** 303-749-5427 | www.udfcd.org

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MILE HIGH FLOOD DISTRICT

From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, August 30, 2019 13:09
To: Brooke Seymour <bseymour@udfcd.org>; Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: Clear Creek FHAD- Drop Structure Survey

Brooke & Dan,

We have finished incorporating the Merrick drop structure survey information near the confluence with Little Dry Creek. The updated models have been added to the Dropbox in a folder with today's date and include the usual GIS shape files for the cross-sections and reach centerlines.

Let me know if you need anything else to review these model changes.

Thanks,

Justen Hamann, P.E.
Project Manager

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Ofc I 303-221-0802 I Web I www.iconeng.com I Email I jhamann@iconeng.com

Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Monday, December 16, 2019 8:11 AM
To: Justen Hamann; Brooke Seymour
Cc: Terri Fead; Troy Carmann; Amanda Blair
Subject: RE: Clear Creek floodway model

Hi Justen,

Thank you, files received. Looking like it will be difficult to provide an overall review this week before the holidays (Brooke and I are out all next week), but we'll reach back out once she and I touch base on schedule.

Thanks!

Dan Hill, P.E., CFM
Engineering Technologist | Watershed Services
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.udfcd.org

---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, December 13, 2019 14:15
To: Brooke Seymour <bseymour@udfcd.org>; Dan Hill <dhill@udfcd.org>
Cc: Terri Fead <tfead@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Amanda Blair <ablair@iconeng.com>
Subject: RE: Clear Creek floodway model

Good Afternoon Brooke & Dan,

We have reviewed the floodway model comments and uploaded revised models and comment shapefiles to Dropbox for you to review. Let us know how this fits in with your workload next week as we're hoping to get your approval of the floodway model before we move into floodway delineation.

I took another look at cross-section 87090 in Reach 5 (the one which shows a floodway which is wider than the floodplain). It appears that setting the floodway equal to the effective floodplain width at this section causes excessive surcharges to develop for a significant distance upstream which I could not resolve. I made several attempts including changing multiple downstream encroachments to no avail. It appears that the surcharges through this reach may be tied to the bridge modeling approach options used for most of the bridges in this area and without significant revisions to both the multi-profile and floodway models, this floodway issue could not be resolved. Let me know if you have any comments or questions on this or any of our comment responses.

Thanks for your review and all your help with this project!

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
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From: Brooke Seymour <bseymour@udfcd.org>
Sent: Wednesday, December 11, 2019 12:26 PM
To: Dan Hill <dhill@udfcd.org>; Justen Hamann <jhamann@iconeng.com>
Cc: Terri Fead <tfead@udfcd.org>; Troy Carmann <tcarmann@iconeng.com>; Amanda Blair <ablair@iconeng.com>
Subject: RE: Clear Creek floodway model

Justen,

Based on feedback we received as a result of posting on the HEC-RAS Users Group, there doesn't appear to be a specific bug in the HEC-RAS version 5.07 that would be causing floodway problems. Please see the attached message that Terri received from Mark Forest with some ideas for troubleshooting near footbridge 93745.

We are following up with PTS staff to determine if a work-around using ineffective flow area (IEFA) versus an actual floodway encroachment to eliminate negative/excessive surcharge at a specific location would be acceptable to FEMA with provided justification. We will let you know once we hear back.

Regards,
Brooke

Brooke Seymour P.E., CFM
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From: Dan Hill <dhill@udfcd.org>
Sent: Tuesday, December 10, 2019 11:04 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>; Terri Fead <tfead@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Amanda Blair <ablair@iconeng.com>
Subject: Clear Creek floodway model

Hi Justen,

Please see attached for comments on the Floodway model you submitted. Please note, per your conversation yesterday with Brooke, that we weren't able to get through a "full" floodway review but have made notations on some crossing profiles and on negative surcharges.

We got some feedback on the HEC-RAS Users group on floodway development and one possible way of addressing the negative surcharges could include using ineffective flow areas (not blocked obstructions, in an effort to not add wetted perimeter) to the left and right sides near optimization results and with elevations set high. Using blocked obstructions, similar to Method 1, could be applicable assuming development could be along the floodway edge and therefore could supply wetted perimeter.

Please let us know if you have any questions as you get back into this.

Thanks!

Dan Hill, P.E., CFM
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Office: 303-455-6277 | **Direct:** 303-749-5427 | www.udfcd.org

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From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, November 22, 2019 14:03
To: Dan Hill <dhill@udfcd.org>
Cc: Brooke Seymour <bseymour@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Amanda Blair <ablair@iconeng.com>
Subject: RE: Clear Creek schedule

Good Afternoon Dan & Brooke,

We have finished our draft Floodway model and have uploaded the models and shapefiles to Dropbox for your review.

There are a few things we wanted to mention which will aid in your review of the floodway model:

- We ran into several instances where placing the encroachments at or near the limits of effective flow conveyance caused excessive or negative floodway surcharges to appear. Sometimes they were at the specific problem section and other times they occurred upstream. This is believed to be due to an error in this version of HEC-RAS and our solution was to remove the encroachments from the offending section. We still plan on limiting the plotting of the floodway to the boundaries of effective conveyance on the workmaps however, the supplied auto-delineated floodway currently does not show this. Cross-section 73557 (Reach 5) is one example of this issue.
- The only split flow reach which will have a floodway modeled and delineated is the North Overflow. The other split flows will not have a floodway but again the supplied auto-delineated floodway currently does not show this.

- Cross-section 87090 in Reach 5 currently shows a floodway which is wider than the floodplain. Despite several attempts, we could not come up with a set of encroachments downstream that would eliminate the wider floodway at this section without causing excessive or negative floodway surcharges to appear at this section or downstream. We will take another look at this area when we're addressing any other floodway model comments you come up with.

Thanks,

Justen Hamann, P.E.
Project Manager

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---

From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, November 21, 2019 2:46 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>; Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek schedule

Thanks Justen—enjoy your Thanksgiving!

Dan Hill, P.E., CFM
Engineering Technologist | Watershed Services
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---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Thursday, November 21, 2019 12:15
To: Dan Hill <dhill@udfcd.org>
Cc: Brooke Seymour <bseymour@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek schedule

Hi Dan,

Your timing is perfect as we were just thinking of emailing you and Brooke an anticipated schedule update! Here's our next few submittal goals we are currently working towards:

- November 26th -- Floodway Model Submittal
- December 3rd -- 100-YR Draft Workmap Submittal

I will be out of the office starting next week for Thanksgiving but work on the FHAD will continue in my absence. If you have any questions while I am out, please contact Troy.

Thanks and Happy Thanksgiving!

Justen Hamann, P.E.

Project Manager

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---

From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, November 21, 2019 11:16 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>
Subject: Clear Creek schedule

Hi Justen,

Hope all is well…curious if you have an idea of when Clear Creek may come back our way. I'm looking at the next few weeks and am going to sink my teeth into a different FHAD review unless you're anticipating getting Clear Creek back to us soon.

Thanks!

Dan Hill, P.E., CFM
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2020

Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Wednesday, January 29, 2020 1:22 PM
To: Brooke Seymour; Justen Hamann
Cc: Troy Carmann
Subject: RE: Clear Creek FHAD

Hi Justen,

Wanted to follow up with more of a description of the data I uploaded to the Dropbox yesterday in **ReferenceShapefilesFromFhadTools.zip**:

- tools_extents_500y100y.shp: extents of the floodplain/overall flow on each XSs, see the "Profile" field
- tools_extents_500y100y_eff.shp: extents of the effective flow on each XS, see the "Profile" field
- tools_extents_encs_all.shp: extents of the encroachments, see "Method" field for the type
- tools_extents_fw_eff.shp: extents of the effective flow from the floodway profile on each XS

I ran these with slightly different sets of inputs for the "Plot RAS Cross Section Extents" script within our FHAD Tools.

Thanks,

Dan Hill, P.E., CFM
Engineering Technologist
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---

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Wednesday, January 29, 2020 12:51
To: Justen Hamann <jhamann@iconeng.com>; Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD

Thanks Justin!

Brooke Seymour P.E., CFM
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From: Justen Hamann <jhamann@iconeng.com>
Sent: Tuesday, January 28, 2020 3:39 PM
To: Dan Hill <dhill@udfcd.org>; Brooke Seymour <bseymour@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD

Brooke and Dan,

Attached are the PDFs of the South Overflow Figures from our meeting today.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
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From: Dan Hill <dhill@udfcd.org>
Sent: Tuesday, January 28, 2020 10:32 AM
To: Justen Hamann <jhamann@iconeng.com>; Troy Carmann <tcarmann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD

Justen and Troy,

No worries at all, we assumed he'd be coming with regards to the lunches, so no need to go get the super-size for him ☺

Thanks,

Dan Hill, P.E., CFM
Engineering Technologist
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

From: Justen Hamann <jhamann@iconeng.com>
Sent: Tuesday, January 28, 2020 10:22
To: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Dan Hill <dhill@udfcd.org>
Cc: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD

Hi Dan,

We were able to convince Brian LeDoux from our office to join us for this meeting. If it's too late to change the lunch orders we can split something or I'm sure we could grab him McDonalds on the way over! Maybe ICON will spring for the super-size! HA!!

In all seriousness though, just let us know if this is too late to change something and we'll have it covered on our end.

Thanks,

Justen Hamann, P.E.
Project Manager
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From: Troy Carmann <tcarmann@iconeng.com>
Sent: Monday, January 27, 2020 4:54 PM
To: Dan Hill <dhill@udfcd.org>
Cc: Brooke Seymour <bseymour@udfcd.org>; Justen Hamann <jhamann@iconeng.com>
Subject: RE: Clear Creek FHAD

That's great, thank you!

It should be just Justen and myself.

@5280'
TC

From: Dan Hill <dhill@udfcd.org>
Sent: Monday, January 27, 2020 10:02 AM
To: Troy Carmann <tcarmann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD

Hi Troy,

Considering the hour of the day for our meeting tomorrow, we've ordered lunch for everyone.

Thanks,

Dan Hill, P.E., CFM
Engineering Technologist
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Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, February 13, 2020 9:48 AM
To: Justen Hamann
Cc: Brooke Seymour
Subject: RE: Clear Creek Model Revisions

Thanks Justen, files received. I will get back to you by mid-week on what schedule for our review will look like.

Dan Hill, P.E., CFM
Project Engineer
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MILE HIGH FLOOD DISTRICT

From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, February 12, 2020 16:30
To: Brooke Seymour <bseymour@udfcd.org>; Dan Hill <dhill@udfcd.org>
Subject: Clear Creek Model Revisions

Hi Brooke & Dan,

I have reviewed the latest floodway model comments and uploaded revised models and comment shapefiles to Dropbox for you to review. I believe I understood most of the comments and provided appropriate responses however, if any of my responses don't align with your intent just let me know.

I included new "February 2020" plans which address the comments (both floodway and multi-profile) but I also included the previous plans for comparisons in RAS.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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Troy Carmann

From: Brian Ledoux
Sent: Thursday, February 20, 2020 4:52 PM
To: Brooke Seymour; Justen Hamann
Cc: Hung-Teng Ho
Subject: RE: Clear Creek South Overflow NLE

Here you go:
https://www.dropbox.com/sh/ghdqeiz9hz6h0ll/AABmHVykS_7RXKNvJ3d3xgxxa?dl=0

Please let me know if you have any questions or issues with the files.

Brian LeDoux, P.E., CFM
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 office | www.iconeng.com | bledoux@iconeng.com
(303) 638-2304 direct

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From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, February 20, 2020 4:18 PM
To: Justen Hamann <jhamann@iconeng.com>; Brian Ledoux <bledoux@iconeng.com>
Cc: Hung-Teng Ho <hho@udfcd.org>
Subject: Clear Creek South Overflow NLE

Justen or Brian,

Would you be willing to share your latest 2D model for the Clear Creek "South Overflow" for us to use? We'd like to run a few iterations looking at non-levee embankment scenarios before proposing a solution to FEMA.

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager
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Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, March 6, 2020 5:35 PM
To: Justen Hamann
Cc: Troy Carmann; Terri Fead
Subject: RE: Clear Creek 2D NLE Breach Model
Attachments: CCF_South_Overflow_Figure_01B_max_depth_NLE_breach_100YR_9_3.pdf

Thanks Justen – this is really helpful. We'll propose this solution to FEMA to see if they are in agreement.

Brooke Seymour P.E., CFM
Project Manager
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---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, March 6, 2020 10:56 AM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek 2D NLE Breach Model

Hi Brooke,

We have completed our 2D non-levee embankment breach model for the South Overflow area of Clear Creek. Since we already had exhibits prepared for this area, we just updated one to produce the attached map of the spill condition.

The results indicate it could be pretty minor with approximately 45-cfs spilling to the east with most of that returning to the Clear Creek channel near Sheridan. We believe this low amount is due to the velocity in the channel and the relatively small area under an elevation of 5262 downstream of the breach. Obviously, additional iterations involving the location and depth of the breach could change this result, but this should give you a good starting point for discussion with FEMA.

Let us know if you have any questions or need anything else.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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From: Brooke Seymour <bseymour@udfcd.org>
Sent: Wednesday, February 26, 2020 9:44 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek 2D NLE Breach Model

Justen,

Sounds good. Please minimize the effort to pull together the results – an email identifying the spill rate with a screen shot of the inundation area is sufficient. We shouldn't need the model.

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager
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2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
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From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, February 26, 2020 3:28 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: Clear Creek 2D NLE Breach Model

Hi Brooke,

We've discussed the planned approach to the 2D non-levee embankment breach model for Clear Creek – South Overflow and come up with an anticipated schedule based on the following conditions:

1. 100-YR event model
2. 100' levee breach at a 5262 elevation
3. Breach the upstream end of the embankment to be conservative

We will provide you a map, approximate spill flow, and 2D modeling for this area by March 10th.

I also want to give you an update on our current expenditures for the South Overflow work. So far we have spent approximately $8,300 on the South Overflow work.

Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Monday, April 27, 2020 7:15 AM
To: Justen Hamann; Brooke Seymour
Cc: Brian LeDoux; Troy Carmann; Terri Fead
Subject: RE: Clear Creek FHAD - NLE at I-76

Hi Justen, 9:00am Wednesday works great. I'll send out an invite for Teams.

Dan Hill, P.E., CFM
Project Engineer
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---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, April 24, 2020 11:56
To: Dan Hill <dhill@udfcd.org>; Brooke Seymour <bseymour@udfcd.org>
Cc: Brian LeDoux <bledoux@iconeng.com>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Terri Fead <tfead@udfcd.org>
Subject: RE: Clear Creek FHAD - NLE at I-76

Hi Dan,

How about Wednesday morning? Say 9 or 9:30 if that works for all of you?

Thanks,
Justen

From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, April 23, 2020 3:38 PM
To: Justen Hamann <jhamann@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Cc: Brian LeDoux <bledoux@iconeng.com>; Troy Carmann <tcarmann@iconeng.com>; Terri Fead <tfead@udfcd.org>
Subject: RE: Clear Creek FHAD - NLE at I-76

Hi all,

We wanted to get these comments back to you, but after discussing a few of them more since Tuesday, we'd like to dive into a few of them with you more over a call to discuss them in greater detail. Specifically, the ones related to the Lena Gulch confluence, the West Lake / Tabor Lake split area, and the ROB upstream of McIntyre.

Any good days next week for your team? Looks like Monday afternoon (except 2–3pm), Tuesday afternoon, or Wednesday or Thursday morning before 10:30am would be best for us.

Thanks,

Dan Hill, P.E., CFM
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From: Dan Hill
Sent: Tuesday, April 21, 2020 16:04
To: Justen Hamann <jhamann@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Cc: Brian LeDoux <bledoux@iconeng.com>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Terri Fead <tfead@udfcd.org>
Subject: RE: Clear Creek FHAD - NLE at I-76

Hi Justen,

We're on board with your recommended approach for 2D modeling, no more iterations are needed, but please provide discussion in the FHAD Report text about this effort and do include the results in the Appendix.

For the 1D modeling, we've finished review of the February multi-profile & floodway models and added an updated comment shapefile at the following Dropbox link, along with a copy of our QC model: https://www.dropbox.com/sh/hzxiot8lprss5d0/AAAvspbvpCjX4kuk5XGecjU4a?dl=0.

Please refer to the "_qcMHFD" geometry (.g04) and plans (.p06 for floodway, .p07 for multi-profile) in that QC model as a potential solution for how to resolve some of the new comments or follow-ups on older ones. I've tried to ensure that any modified IEFAs/encroachments do not result in either crossing profiles or excessive/negative surcharges, so hopefully that makes any changes going forward much easier.

Please consider this approval of the model phase given the new comments being adequately addressed with the next submittal, and notice to proceed to the mapping phase for the floodway and 100-year floodplain. As you dig into the comments, please let us know if you'd like to discuss or set up a call (we can host on Teams, but can't on other platforms).

Thanks,

From: Justen Hamann <jhamann@iconeng.com>
Sent: Monday, April 20, 2020 13:10
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Brian LeDoux <bledoux@iconeng.com>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Dan Hill

<dhill@udfcd.org>; Terri Fead <tfead@udfcd.org>
Subject: RE: Clear Creek FHAD - NLE at I-76

Hi Brooke,

Thanks for confirming FEMA's agreement. I just want to go over our planned approach then to both the 2D and 1D Modeling and make sure we are on the right track with how to proceed.

Wrapping Up the 2D HEC-RAS Models
Our first stab at a 2D levee-breach model produced approximately 45-cfs which spills to the east with most of that spill returning to the main channel near Sheridan Blvd. Initially, we discussed looking into different iterations of breaching the levee involving changes to the breach width, location, and elevation but with FEMA's agreement—and the relatively minor nature of the spills to the east—we recommend no additional 2D modeling scenarios and sticking with this current approach. Our 1D modeling for the FHAD would maintain the intact levee in the geometry and we could provide a short description of this effort in the FHAD report as well as include the results either as an Appendix or just supplemental hydraulic information for your files?

Current State of 1D HEC-RAS Models
We made a floodway and multi-profile model submittal to the District on February 2nd of this year. Those revised models addressed or responded to comments we received on January 28, 2020, and included several plans for comparison purposes. Please let us know if our response to those comments is acceptable or if we need to meet or look at any of those areas again. Once the floodway and multi-profile models are approved, we can move further ahead on the delineations and work towards a workmap submittal.

Please let me know if you agree with our approach or if you have any questions.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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From: Brooke Seymour <bseymour@udfcd.org>
Sent: Wednesday, April 1, 2020 4:30 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Brian LeDoux <bledoux@iconeng.com>; Troy Carmann <tcarmann@iconeng.com>; Dan Hill <dhill@udfcd.org>; Terri Fead <tfead@udfcd.org>
Subject: FW: Clear Creek FHAD - NLE at I-76

Justen,

FEMA is in agreement with our proposed approach to model the non-levee feature along Clear Creek near I-76 (see emails below). Please proceed with this approach.

Thank you,
Brooke

Brooke Seymour P.E., CFM
Project Manager
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---

From: Gaynes, Christine <christine.gaynes@fema.dhs.gov>
Sent: Wednesday, April 1, 2020 11:38 AM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Terri Fead <tfead@udfcd.org>; Dan Hill <dhill@udfcd.org>
Subject: RE: Clear Creek FHAD - NLE at I-76

Hi Brooke,
Your approach makes sense and is reasonable. I apologize for the delay in my response.
Thanks,
Chris

Christine Gaynes
Civil Engineer | FEMA | Department of Homeland Security
Office: (303) 235-4359 | Mobile: (202) 480-1265
christine.gaynes@fema.dhs.gov

Federal Emergency Management Agency
fema.gov

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, March 31, 2020 7:11 PM
To: Gaynes, Christine <christine.gaynes@fema.dhs.gov>
Cc: Terri Fead <tfead@udfcd.org>; Dan Hill <dhill@udfcd.org>
Subject: RE: Clear Creek FHAD - NLE at I-76

Hi Christine,

Checking in on my email below - would you like to plan a time to discuss? Please let me know if you have questions or if there is any additional information I can provide.

Thanks,
Brooke

Brooke Seymour P.E., CFM
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From: Brooke Seymour
Sent: Thursday, March 19, 2020 4:29 PM
To: 'Gaynes, Christine' <christine.gaynes@fema.dhs.gov>
Cc: Terri Fead <tfead@udfcd.org>; Dan Hill <dhill@udfcd.org>
Subject: Clear Creek FHAD - NLE at I-76

Christine,

We would like to go over our proposed approach for handling a non-levee feature identified along Clear Creek as a part of our ongoing Flood Hazard Area Delineation study. Attached is a Google Earth pin for the location, a plan view map (showing cross sections and auto-delineated 100-yr floodplain from HEC-RAS), and HEC-RAS cross section 37204 showing the 100-yr water surface for reference.

The non-levee feature extends along the river-right (eastern) bank for approximately 330-ft upstream of the I-76 bridge abutment. There is only one cross section that cuts through the non-levee feature, cross section 37204. We initially tried to use a natural valley analysis approach, but this model doesn't provide a reasonable representation of the overbank conditions. The natural valley HEC-RAS results actually indicated that the water surface increases when the overbank areas are considered effective conveyance. There is a mobile home park behind this non-levee feature, so we want to ensure the results are as realistic as possible. We already have a 2D model set up for the right overbank for the 500-yr event since the 500-yr overtops further upstream, and we believe that we can provide a more realistic understanding of the potential 100-yr hazard behind the non-levee feature using a 2D model with a breach in the non-levee embankment. We ran a test 2D model that assumed a 100 linear ft breach in the berm down to elevation 5262 and the results are attached.

We would like to get your input and concurrence on our modeling approach for this non-levee feature before moving forward. Please let me know if you have questions. I'd be happy to discuss with you further by phone if desired.

Thanks,
Brooke

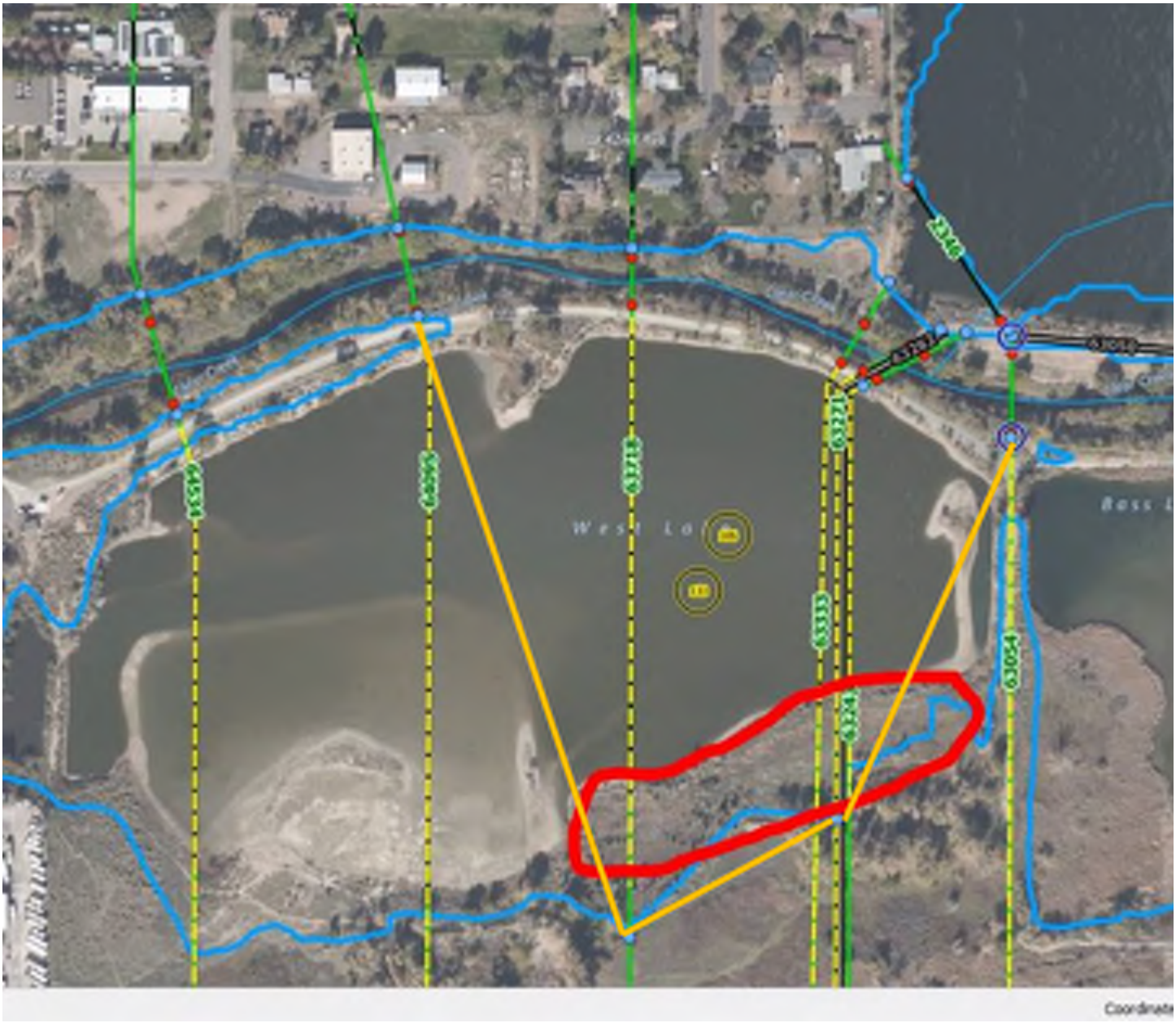
Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, April 30, 2020 1:24 PM
To: Justen Hamann
Subject: Clear Creek Floodway at West Lake/Tabor Lake Split

Hi Justen,

We heard from Wheat Ridge that the city plans to add park amenities to the area circled in red below at West Lake downstream of Youngfield St. I think it'd be difficult to justify that area as effective flow and therefore floodway (orange) to FEMA, so if a change could be made to the model to at least remove that potential park area from effective flow/floodway, I don't see any further need for the geometry and IEFAs to go in/north as far as the adjustments I'd made in the "_qcMHFD" scenario we sent over last week.

Please let me know how the implications look for the Tabor Lake Split as you go forward, if there are any, and let me know if I can help clarify any further.



Thanks!

Dan Hill, P.E., CFM
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Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Monday, June 1, 2020 11:58 AM
To: Justen Hamann
Cc: Brooke Seymour; Troy Carmann
Subject: Clear Creek at BNSF/RTD B Line

Hi Justen,

I've added both a survey from Merrick and construction plans to the following folder for the BNSF bridge paralleling RTD's B Line: https://www.dropbox.com/sh/ybvowsy0nznu261/AABranKz-L57q7FBaz99go-8a?dl=0.

These show a difference from what's in the FHAD model currently, and should be implemented with the floodway adjustments you're making now. Apologies for not getting this to you sooner—please let me know if you'd like to discuss as you take a look.

Thanks,

Dan Hill, P.E., CFM
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Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Tuesday, June 30, 2020 4:41 PM
To: Troy Carmann; Brooke Seymour
Cc: Justen Hamann; Matt Ursetta
Subject: RE: 2020 Schedule Gannt 2020-06-30.pdf

Hi Troy,

Thanks for the update on the schedule and report.

We've just received direction from FEMA this week regarding the Brannan piles, as (I think) Brooke had mentioned to you earlier was possible, and it will have some implications on modeling both the floodway and floodplain having conditions for with/without the Brannan piles.

With that in mind, I think it'd be good to have a call to discuss both the Brannan piles and schedule. We could meet as early as tomorrow (only from 12:00-1:00 or 2:00-3:00), can't Thursday, but are wide open on Monday and Tuesday afternoons.

The table of contents looks good in the report, but please use the following for the Appendices:
Appendix A: Project Correspondence
Appendix B: Hydrologic Analysis
Appendix C: Hydraulic Analysis
Appendix D: Floodplain & Floodway Data Tables
Appendix G: Flood Maps
Appendix H: Flood Profiles

For the Hydrology section of the report, please reference the CLOMR and include a table of the updated split flows and a short explanation for those updated split flows. Then in Appendix B, please include additional relevant excerpts of the overall CLOMR, but not the entire document.

I know these items keep coming up, but we are committed to finishing this on time with you and getting the PMR process initiated for this FHAD with FEMA next year.

Thanks,

Dan Hill, P.E., CFM
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From: Troy Carmann <tcarmann@iconeng.com>
Sent: Tuesday, June 30, 2020 11:31
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Dan Hill <dhill@udfcd.org>; Justen Hamann <jhamann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>
Subject: 2020 Schedule Gannt 2020-06-30.pdf

Good Morning Brooke –

Here's a look at the Clear Creek FHAD schedule.

First MHFD review period comes up 7/8.

Take a look and let us know if any of these reviews need more time, less time, or just happen to coincide with amazing vacations or other project reviews and need to shift.

Lastly, I'll send a quick word copy of the draft FHAD report in a separate email. I'm looking for a quick confirmation that the Table of Contents and format is in line with current expectations. One key content question is on Hydrology – we can reference the CLOMR and make that section really short. OR, you guys can give us a bunch of text from the CLOMR that you want us to copy and paste into it.

Thanks,
@5280'
TC

Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Monday, July 20, 2020 5:48 PM
To: Troy Carmann
Cc: Dan Hill; Justen Hamann
Subject: RE: Brannan Update

Troy,

Thanks for sending this scope and fee for us to review. One comment - please include updating the floodway to use the "without-pile" condition as the basis.

I also discussed the profiles with Terri – please plan to include profiles for both with and without pile conditions, even if the without is just an additional or "basis of floodway" profile.

Thanks,
Brooke

Brooke Seymour P.E., CFM
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From: Troy Carmann <tcarmann@iconeng.com>
Sent: Sunday, July 19, 2020 10:00 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Dan Hill <dhill@udfcd.org>; Justen Hamann <jhamann@iconeng.com>
Subject: Brannan Update

Good Morning Brooke –

Here's the scope and fee for the Brannan area update. Let me know if you have any questions.

Thanks,
@5280'
TC

Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, August 7, 2020 3:46 PM
To: Justen Hamann; Troy Carmann
Cc: Dan Hill; Terri Fead
Subject: RE: Brannan - without pile cross sections

Thanks Justen – this looks good. We'll share this with FEMA and get back to you.

Brooke Seymour P.E., CFM
Project Manager
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---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Tuesday, August 4, 2020 4:29 PM
To: Brooke Seymour <bseymour@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Cc: Dan Hill <dhill@udfcd.org>; Terri Fead <tfead@udfcd.org>
Subject: RE: Brannan - without pile cross sections

Hi Brooke,

Attached are the revised cross-section comparison sheets which should address your comments. I've also included the plan view figure for comparisons to the cross-section plots. The following section explains and documents our assumptions in creating the "without-pile" analysis:

ICON reviewed the five cross-sections which traverse the Brannan site (23845 thru 22088) for soil piles which could potentially impact the BFEs proposed for this study. Cross-sections 23255, 22876, and 22613 were identified as the sections with sizable soil piles remaining within the site according to the as-built topography provided by Brannan. In order to determine existing grade for each section, a whole foot elevation value was chosen based on the site elevation at the southern limits of the parcel near W 60th Avenue. The resulting elevations were then used to flatten the cross-section geometry at each section thereby creating an existing grade "without-pile" scenario which removes the piles but also limits all grading operations to the Brannan site.

Please let me know if you have any further comments or need additional information. We will hold off on completing any more work on the "without-pile" models until MHFD or FEMA approves of this approach.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
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From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, July 30, 2020 5:28 PM
To: Justen Hamann <jhamann@iconeng.com>; Troy Carmann <tcarmann@iconeng.com>
Cc: Dan Hill <dhill@udfcd.org>; Terri Fead <tfead@udfcd.org>
Subject: RE: Brannan - without pile cross sections

Troy,

That is definitely helpful, but we still have some questions:

- Please turn off the CC_FHAD geometry – I'm concerned that it will be confusing to people who haven't be involved through the process of the study.
- XS 23845 – Please check the geometry of the EX Brannan Topo. The pile that is shown to be removed looks like it has already been removed.
- In general, we need to document why we've made the assumptions we have. For example, the proposed "without-pile" elevations and slopes vary between sections.
- We should document the specific elevations used. We suggest creating a geometry in HEC-RAS that can be compared (rather than annotating the pdf).

Let me know if you have any other ideas or would like to discuss more.

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager
MILE HIGH FLOOD DISTRICT
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---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, July 29, 2020 4:07 PM
To: Brooke Seymour <bseymour@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Cc: Dan Hill <dhill@udfcd.org>; Terri Fead <tfead@udfcd.org>
Subject: RE: Brannan - without pile cross sections

Hi Brooke,

Does the attached figure help? It's kind of rough but has the existing Brannan topo. incorporated into the FHAD DEM.

Justen

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, July 28, 2020 6:11 PM
To: Troy Carmann <tcarmann@iconeng.com>
Cc: Justen Hamann <jhamann@iconeng.com>; Dan Hill <dhill@udfcd.org>; Terri Fead <tfead@udfcd.org>
Subject: RE: Brannan - without pile cross sections

Troy,

It would help to see the cross sections overlaid on the Brannan existing conditions topo in plan view. Would this be hard to do?

Thanks,
Brooke

Brooke Seymour P.E., CFM
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From: Troy Carmann <tcarmann@iconeng.com>
Sent: Tuesday, July 28, 2020 11:16 AM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Justen Hamann <jhamann@iconeng.com>
Subject: Brannan - without pile cross sections

Good Morning Brooke –

Here's our proposed removal for establishing the existing grade for the right overbank area between Clear Creek and 60th.

Basically cutting the piles out at the bottom of the revision clouds – see redline.

Does this work for establishing that 'existing' grade?

@5280'
TC

Troy Carmann

From: Justen Hamann
Sent: Wednesday, August 19, 2020 10:24 AM
To: Brooke Seymour
Cc: Troy Carmann; Matt Ursetta
Subject: RE: Clear Creek 2D memo - question

Hi Brooke,

The short answer is the inundation results between the two maps are from different modeling scenarios with one model reflecting a change in the steady state duration as we let the model run longer allowing shallow areas to fill up. Without getting too much into the weeds, I'd say Figure 2 is the longer duration and more conservative flooding limits based on the longer steady state model run time whereas Figure 0 shows an earlier model iteration which had a shorter run time.

Let us know if there are any other questions we can answer or if you'd like us to revise anything.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, August 18, 2020 10:28 AM
To: Justen Hamann <jhamann@iconeng.com>
Subject: Clear Creek 2D memo - question

Justen,

In the August 2019 2D model memo for Clear Creek, Figure 0 and Figure 2 are both labeled 100-yr, but show different inundation results (see screen shots below for example). Do you know why these are different?

Thanks,
Brooke

FIGURE 0

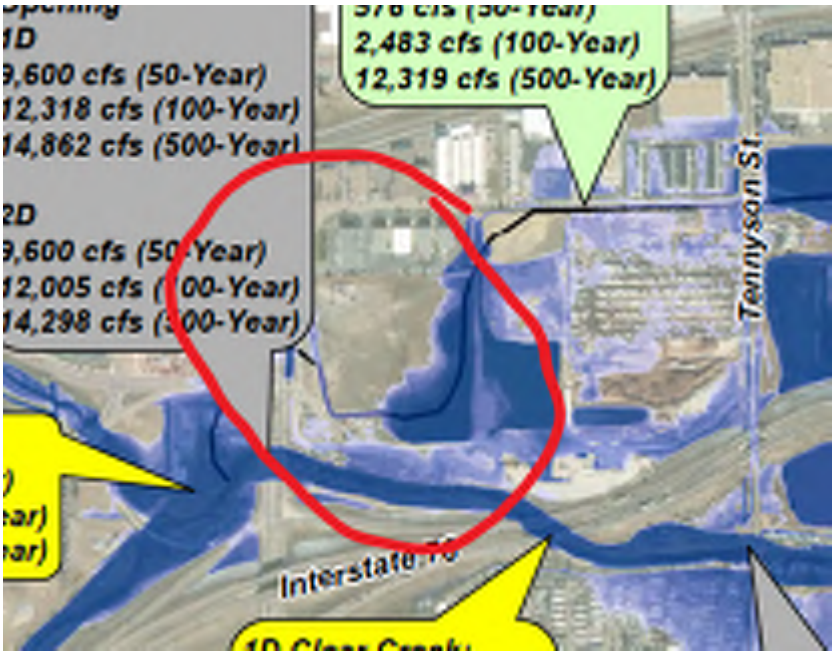
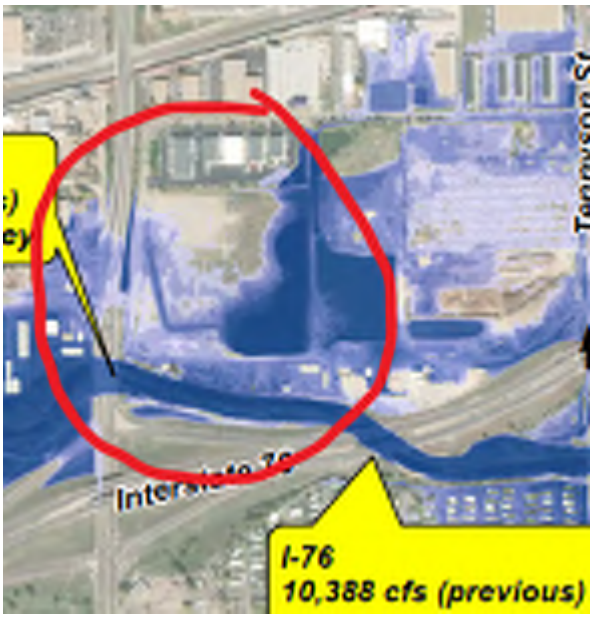


FIGURE 2



Brooke Seymour P.E., CFM
Project Manager
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
Office: 303-455-6277 | **Direct:** 303-749-5422 | www.mhfd.org

Protecting People, Property, and our Environment

MILE HIGH FLOOD DISTRICT

Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, October 22, 2020 9:54 PM
To: Justen Hamann
Cc: Troy Carmann; Dan Hill
Subject: FW: Clear Creek FHAD - Virtual Open House

Justen,

Reminder that as you refine the mapping, please eliminate the detached floodplain in the ROB near 52nd Ave. This is important to Denver, and I want to make sure it's addressed in the initial mapping submittal that will be shared with the local governments for review. ☺

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager
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Office: 303-455-6277 | **Direct:** 303-749-5422 | www.mhfd.org

---

From: Brooke Seymour
Sent: Thursday, October 22, 2020 9:48 PM
To: 'Hamer, Jeremy J. - DOTI CE0403 Engineer-Architect Supervisor' <Jeremy.Hamer@denvergov.org>; Dan Hill <dhill@udfcd.org>
Subject: RE: Clear Creek FHAD - Virtual Open House

Hi Jeremy,

The detached auto-delineated 100-yr floodplain south of 52nd will not be included in the final mapping.

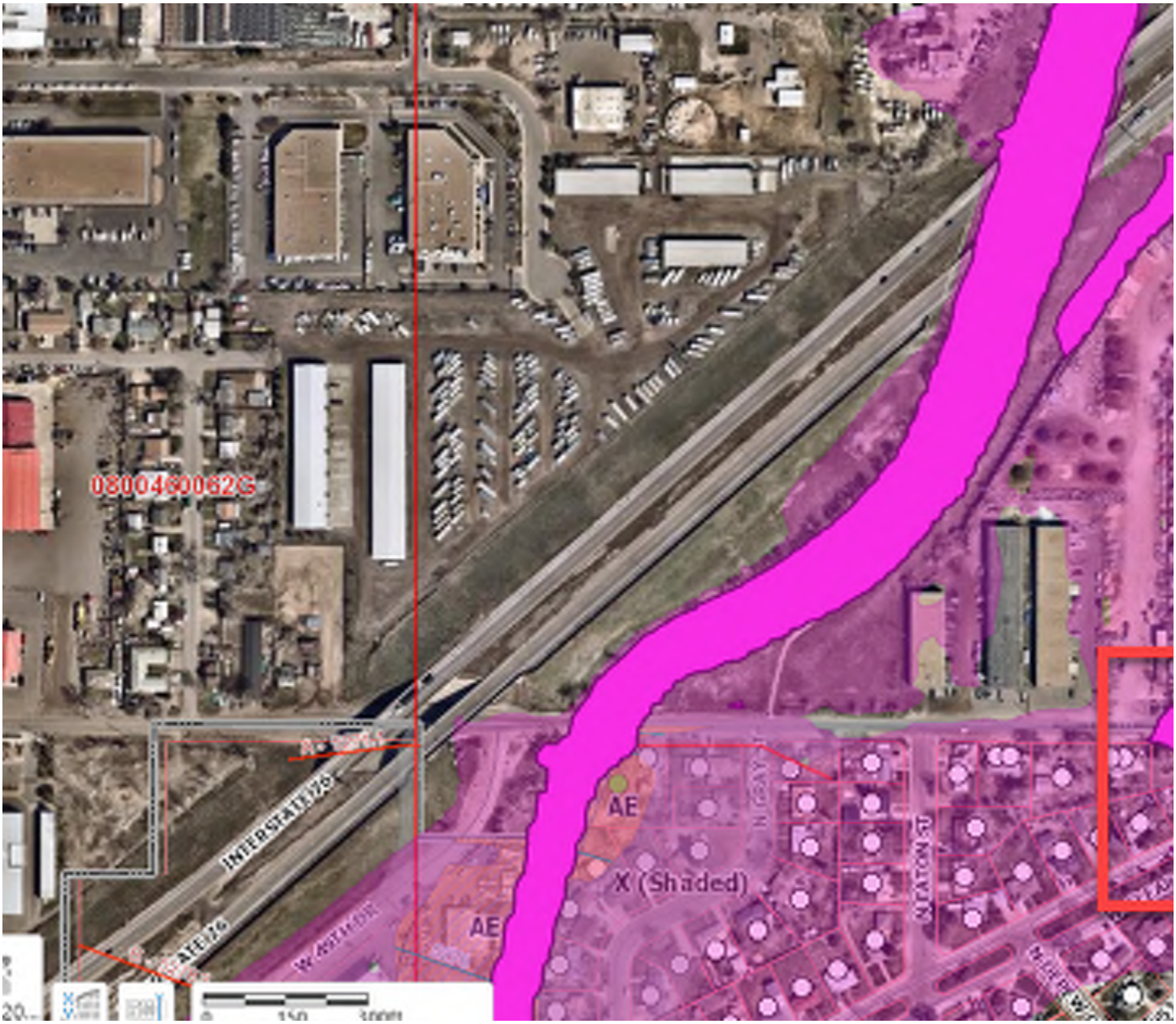
Regards,
Brooke

From: Hamer, Jeremy J. - DOTI CE0403 Engineer-Architect Supervisor <Jeremy.Hamer@denvergov.org>
Sent: Thursday, October 22, 2020 6:45 PM
To: Dan Hill <dhill@udfcd.org>
Cc: Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD - Virtual Open House

Thank Dan!

Brooke,

I've voiced some concern about this previously so just want to keep on your radar. If this disconnected area in Denver doesn't get "groomed" out by ICON, there may be a need for more detailed analysis to understand if it warrants inclusion in 100-yr mapping. You previously indicated that you didn't think 100-yr would be mapped south of 52nd, but not sure what has changed (if anything) since our prior conversation (see attached). Just don't want to show additions to 100-yr floodplain, especially in public meeting, when not justified.



Please check out our "Flood Information Webpage" at www.denvergov.org/flood for a variety of flood related resources.

Jeremy Hamer, PE, CFM | Engineer Supervisor / Floodplain Administrator
City & County of Denver
Department of Transportation & Infrastructure | Right-of-Way Services | Engineering & Regulatory
Office: 720-913-0720
Cell: 303-513-6765
jeremy.hamer@denvergov.org

From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, October 22, 2020 3:59 PM

Troy Carmann

From: Justen Hamann
Sent: Friday, November 6, 2020 2:50 PM
To: Brooke Seymour; Dan Hill
Cc: Troy Carmann; Matt Ursetta
Subject: RE: Clear Creek FHAD Model Revisions

Good Afternoon Brooke and Dan,

We are preparing a Draft Workmap submittal for Clear Creek and the GIS source information (including the floodplain and floodway shapefiles) have been uploaded to the Clear Creek Dropbox for your review. We are having some problems exporting the PDF copies of the workmaps right now but wanted to get you the delineations as soon as possible. We anticipate adding the workmap PDFs to the Dropbox as soon as possible.

Just to add some context to this submittal, I looked into our timeline on this project and we haven't submitted any workmaps to you since August 2017! Needless to say, there's been a lot of changes on this project since then so please let me know if we're missing anything that you will need for your review. We did utilize the FHAD review tools to check these delineations but given the quick timeline—and the time between submittals—we're anticipating that there will be some comments.

Thank you both for continuing to work with us on this important project and I hope both of you get to enjoy the weekend!

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, October 29, 2020 10:42 PM
To: Justen Hamann <jhamann@iconeng.com>; Dan Hill <dhill@udfcd.org>
Cc: Troy Carmann <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>
Subject: RE: Clear Creek FHAD Model Revisions

Justen thanks for the status update. I really appreciate your hard work pulling this together for us on a quick timeline.

Brooke Seymour P.E., CFM
Project Manager
MILE HIGH FLOOD DISTRICT
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Office: 303-455-6277 | **Direct:** 303-749-5422 | www.mhfd.org

Protecting People, Property, and our Environment

From: Justen Hamann <jhamann@iconeng.com>
Sent: Thursday, October 29, 2020 5:23 PM
To: Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Good Evening Dan,

I have reviewed and addressed your latest comments below. I have also added responses to each item below (in red). The revised HEC-RAS models and 2D Modeling Approach Memo have also been added to the Dropbox for your review. If you have any questions or issues accessing the data, please let me know.

Thanks,

Justen Hamann, P.E.
Project Manager
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From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, October 22, 2020 3:35 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Hi Justen,

I have some comments on the latest floodway model:

- Negative surcharges in the Brannan reach
  - Seeing a negative surcharge of -0.03 on XS 22876 for the floodway run **with** Brannan Piles (p06/g04)
  - I reviewed this surcharge and found that even completely removing the encroachment at this cross-section would not remove the negative surcharge. The modeled limits of the floodway in this area currently provides a smooth and logical floodway boundary and since the surcharge is less than 0.05 foot, it should not cause any FEMA problems once the FHAD is submitted as a PMR.
  - Seeing a negative surcharge of -0.03 on XS 22613 for the floodway run **without** Brannan Piles (p11/g10)
  - The surcharge at this cross-section has been removed by widening the floodway.
- North Overflow XS 7896 d/s Sheridan Blvd

- The cut line for this XS goes through the ditch between Sheridan Blvd and W 58th Ave (see attached PDF). The low point of W 58th Ave downstream appears to be 5257.5 which would effectively block any flow below that point in XS 7896 (100Y WSE of 5255.9). I think this ditch section of the cut line needs to be pushed downstream to align with the center of W 58th Ave and the WSE will increases as it crests the road.
- The alignment and location of this cross-section has been revised as suggested.

Also have some additional requests:

- We've provided ICON's 8/1/2019 "Clear Creek FHAD 2D Modeling Approach" memo externally with both local governments and developers to communicate the complexity around the North Overflow, and Figure 0 from that memo is adding a bit of confusion. Can you revise Figure 0 from this memo in the future to have the same 100-year floodplain as Figure 2, then have a simpler legend that doesn't include the max depth differentiation, just a simple description of "North Overflow Floodplain, 100 Year"?
- The 2D Modeling Approach Memo has been updated as requested.
- Once the floodway model comments are addressed, it will be imperative to finish mapping ASAP in preparation for the public outreach meeting tentatively scheduled for early December. This will feature a public floodplain map viewer (similar to PMR viewers) that MHFD will host.
- We are currently working on the mapping and hope to have draft workmaps submitted for review next week.

If you have any questions about these comments, especially the timeline, feel free to reach out to myself or Brooke. Unfortunately we're both in all-day trainings Monday and Tuesday but if you do have any questions please send us a message and I will try to respond ASAP.

Thanks!

Dan Hill, P.E., CFM
Project Engineer
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Thursday, September 24, 2020 08:04
To: Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Hi Dan,

Apparently, there was some sort of technical issue as Dropbox did not upload the files yesterday. I believe it has been fixed this morning but let me know if you still don't see the files and I'll try another method.

Thanks,
Justen

From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, September 24, 2020 7:40 AM
To: Justen Hamann <jhamann@iconeng.com>

Cc: Troy Carmann <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Hi Justen, I'm not seeing a new folder newer than "20200902_FWModel", could you re-upload or send through other means?

Thanks,

Dan Hill, P.E., CFM
Project Engineer
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, September 23, 2020 15:42
To: Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Good Afternoon Dan,

I have finished the modeling work for the Brannan site (Floodway and Multi-profile models for both the with- and without-pile conditions) and uploaded the HEC-RAS models to Dropbox for your review. This should complete our planned model changes and once we have your approval, will start work on the floodplain and floodway delineations for the workmaps.

Let me know if you have any questions or need anything more to review these changes.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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From: Dan Hill <dhill@udfcd.org>
Sent: Tuesday, September 15, 2020 1:52 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Hi Justen,

Thanks for providing responses to our previous comments and addressing them.

We've received concurrence from FEMA on the geometry modifications for the Brannan property. I've reviewed those proposed geometry changes and have no further comments.

Please let us know if there's anything more you need from us at this point to resume work and finalize the floodway.

Thanks,

Dan Hill, P.E., CFM
Project Engineer
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, September 2, 2020 17:10
To: Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Hi Dan,

I have finished addressing your comments below and provided responses (in red). I have uploaded revised models and a memo (in PDF format) to the Clear Creek Dropbox for your review. If you have any questions or find anything missing, please let me know.

Due to ongoing budget concerns with this project, we plan on waiting for final model approval before moving into the floodplain/floodway mapping in order to minimize any re-delineation and to make sure all MHFD model comments and concerns are addressed.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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From: Dan Hill <dhill@udfcd.org>
Sent: Wednesday, August 19, 2020 3:36 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour

<bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Hi Justen,

I have some minor comments after reviewing the model, which can be addressed going forward into the mapping phase:

p08, Flow Distribution – DS of McIntyre; FlowMaster calculations
Would you add a short explanation in the HEC-RAS plan description on which XS was used to extract the flow used for your normal depth calculations in FlowMaster, and then verify the flow used in the 500Y calculations?

- A plan description has been added to this model based on the following explanation: "This plan was used to calculate the flow distribution in a low-lying area of the LOB of Clear Creek from XS 68669 to XS 68535. Flow distributions were summed and then evaluated based on the most conservative value for the 100-YR flood event. XS 68535 was then chosen with values of 3,468-cfs for the 100-YR, and 8,285-cfs for the 500-YR. Note: the 500-YR event had flow outside of the bank station—but still in the channel—and therefore the low-lying area flow value was calculated by summing the relevant flow dist. sections." The 500-Year flow was verified and I have added a copy of the spreadsheet used to sum and evaluate the flow distribution values to the Dropbox.

I'm assuming it's XS 68535, as the 100Y LOB Q of 3,468 cfs is used in the FlowMaster PDFs. But the 500Y LOB Q in the HEC-RAS results is greater than the value used in the 500Y FlowMaster PDFs (8,306 cfs in HEC-RAS versus 8,285 cfs used in FlowMaster).

- See the above explanation as 8,306-cfs for the 500-YR event erroneously includes flow in the main channel (outside of the bank station) In the low-lying area flow value..

Can you also provide a map or figure displaying where the two sections used for the normal depth calculations were placed?

- As we discussed on the phone, we will show these normal depth cross-sections on the workmap for this area. Normal depth section 900 is equivalent to the low-lying area in the LOB of RAS XS 68327 and normal depth section 1000 is equivalent to the low-lying area in the LOB of RAS XS 68669. A shapefile was included in the previous submittal showing the location and alignment of these sections.

p01, Tabor Lake Split Determination
I was unable to duplicate the Tabor Lake flow split values now used in the hard-coded plan. Can you provide a brief memo documenting your process of optimizing the lateral structures, similar to the memo provided for the split flow values calculated with 2D modeling surrounding the North Overflow, and include a short summary or reference to it in the HEC-RAS plan description?

- Memo prepared and a short summary of the procedure has been added to the plan description.

p07, Clear Creek – 0.5' Floodway
Please specify nonzero LOB encroachments for the following XSs, or provide additional justification: 41025, 54621, 55224, 68327.

- XS 41025 – Adding a nonzero encroachment at the left STA. of the water-surface results in a water-surface surcharge of -1.23' at this cross-section and surcharges which exceed 0.5' at the next cross-section upstream.
- XS 54621 – Adding a nonzero encroachment at the left STA. of the water-surface results in a water-surface surcharge of -0.07' and an energy-grade surcharge of -0.05' at the next cross-section upstream (54961).
- XS 55224 – Adding a nonzero encroachment at the left STA. of the water-surface results in a critical error at the downstream footbridge stating the need for a multiple-opening analysis to calculate the floodway water-surface elevations.
- XS 68327 – Adding a nonzero encroachment at the left STA. of the water-surface results in a water-surface surcharge of -0.02' at this cross-section.

Brannan piles
We're still seeking concurrence from FEMA on the geometry modifications for the Brannan piles. Stay tuned.

- Please let us know once the Brannan geometry changes are approved as these model changes still need to be completed and reviewed by MHFD.

Please let me know if you'd like to discuss any of these items further.

Thanks,

Dan Hill, P.E., CFM
Project Engineer
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

Protecting People, Property, and our Environment

From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, July 8, 2020 17:24
To: Brooke Seymour <bseymour@udfcd.org>; Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>
Subject: Clear Creek FHAD Model Revisions

Good Evening Brooke & Dan,

The latest revisions to the multi-profile and floodway models are complete and I have uploaded revised models and comment shapefiles to the Clear Creek Dropbox for your review.

The HEC-RAS models include the following plans:

- The revised multi-profile and floodway runs – p06 and p07
- Plans from the previous submittal marked as February 2020 for comparison purposes – p04 and p05
- The plan used to determine the updated flow splits for Tabor Lake – p01
- A plan with the flow distribution computed for the normal depth area between McIntyre St. and I-70 – p08

Let me know if any questions come up as you take a look.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Monday, November 16, 2020 3:17 PM
To: Justen Hamann; Brooke Seymour
Cc: Troy Carmann; Matt Ursetta; Hung-Teng Ho
Subject: RE: Clear Creek FHAD Model Revisions

Hi Justen,

Some updates:

- We are planning to get you high-level comments on the delineations by COB Wednesday, and are focusing comments on floodplain islands and overtopping flows. With this in mind, you can wait on submitting an agreement table. The current plan is to mail postcard notices of the public meeting this Friday, 11/20. Hopefully any edits to the mapping we can push to the viewer soon after the postcard notices get delivered mid-week next week right before the Thanksgiving tryptophan trickles in for us all.
- Brooke, Hung-Teng and I agreed that if the contours supplied in your latest map package were derived from the LIDAR points (and not a simplified terrain surface), those are sufficient to use. Do they include the revised contours along the north bank of the North Overflow downstream of Sheridan? Again, some background on the source for these is something we'd like to understand.
- We aim to have your website point to the online viewer with draft mapping, so there will be no need to revise the workmaps for now.

With everything moving around quickly, please feel free to reach out if you'd like to discuss. Thank you!

Dan Hill, P.E., CFM
Project Engineer
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

---

From: Dan Hill
Sent: Monday, November 16, 2020 13:38
To: Justen Hamann <jhamann@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Hung-Teng Ho <hho@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Hi Justen,

We're in the process of reviewing the mapping.

I have some questions at this point:

- Can you provide an agreement table?
- Can you verify the source of the contours supplied in your latest map package? They differ from our 2014 LIDAR-derived smoothed contours, my understanding is that those were to be used. I'm wondering if the contours supplied in your latest map package were exported from the Terrain.vrt/.hdf file for the HEC-RAS model. If so,

it's more appropriate to use the original LIDAR-derived contours than those exported from the Terrain used for the HEC-RAS model. If you need an additional copy of the 2014 LIDAR-derived contours, please let me know.
- There are some overlaps between the Shallow Flooding, 100-Year Floodplain and the Floodway at XSs 68669 to 68494. I think the floodway here is wider in the left overbank than it needs to be, and should be trimmed down at 68535. I think the Shallow Flooding area is overlapping the Floodway just upstream of 68566 and shouldn't be.

Thanks,

From: Justen Hamann <jhamann@iconeng.com>
Sent: Monday, November 9, 2020 13:05
To: Brooke Seymour <bseymour@udfcd.org>; Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>
Subject: RE: Clear Creek FHAD Model Revisions

Hi Brooke and Dan,

The Workmap PDFs for Clear Creek have been added to the Dropbox.

Thanks,
Justen

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Saturday, November 7, 2020 1:07 PM
To: Justen Hamann <jhamann@iconeng.com>; Dan Hill <dhill@udfcd.org>
Cc: Troy Carmann <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>
Subject: RE: Clear Creek FHAD Model Revisions

Justen,

Thanks for the quick turnaround on this. Enjoy your weekend!

Best,
Brooke

Brooke Seymour P.E., CFM
Project Manager
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5422 | www.mhfd.org

---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, November 6, 2020 2:50 PM
To: Brooke Seymour <bseymour@udfcd.org>; Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>
Subject: RE: Clear Creek FHAD Model Revisions

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Just to add some context to this submittal, I looked into our timeline on this project and we haven't submitted any workmaps to you since August 2017! Needless to say, there's been a lot of changes on this project since then so please let me know if we're missing anything that you will need for your review. We did utilize the FHAD review tools to check these delineations but given the quick timeline—and the time between submittals—we're anticipating that there will be some comments.

Thank you both for continuing to work with us on this important project and I hope both of you get to enjoy the weekend!

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, October 29, 2020 10:42 PM
To: Justen Hamann <jhamann@iconeng.com>; Dan Hill <dhill@udfcd.org>
Cc: Troy Carmann <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>
Subject: RE: Clear Creek FHAD Model Revisions

Justen thanks for the status update. I really appreciate your hard work pulling this together for us on a quick timeline.

Brooke Seymour P.E., CFM
Project Manager
MILE HIGH FLOOD DISTRICT
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Protecting People, Property, and our Environment

MILE HIGH FLOOD DISTRICT

From: Justen Hamann <jhamann@iconeng.com>
Sent: Thursday, October 29, 2020 5:23 PM
To: Dan Hill <dhill@udfcd.org>

Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Good Evening Dan,

I have reviewed and addressed your latest comments below. I have also added responses to each item below (in red). The revised HEC-RAS models and 2D Modeling Approach Memo have also been added to the Dropbox for your review. If you have any questions or issues accessing the data, please let me know.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
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From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, October 22, 2020 3:35 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

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I have some comments on the latest floodway model:

- Negative surcharges in the Brannan reach
  - Seeing a negative surcharge of -0.03 on XS 22876 for the floodway run **with** Brannan Piles (p06/g04)
  - I reviewed this surcharge and found that even completely removing the encroachment at this cross-section would not remove the negative surcharge. The modeled limits of the floodway in this area currently provides a smooth and logical floodway boundary and since the surcharge is less than 0.05 foot, it should not cause any FEMA problems once the FHAD is submitted as a PMR.
  - Seeing a negative surcharge of -0.03 on XS 22613 for the floodway run **without** Brannan Piles (p11/g10)
  - The surcharge at this cross-section has been removed by widening the floodway.
- North Overflow XS 7896 d/s Sheridan Blvd
  - The cut line for this XS goes through the ditch between Sheridan Blvd and W 58th Ave (see attached PDF). The low point of W 58th Ave downstream appears to be 5257.5 which would effectively block any flow below that point in XS 7896 (100Y WSE of 5255.9). I think this ditch section of the cut line needs to be pushed downstream to align with the center of W 58th Ave and the WSE will increases as it crests the road.
  - The alignment and location of this cross-section has been revised as suggested.

Also have some additional requests:

- We've provided ICON's 8/1/2019 "Clear Creek FHAD 2D Modeling Approach" memo externally with both local governments and developers to communicate the complexity around the North Overflow, and Figure 0 from that memo is adding a bit of confusion. Can you revise Figure 0 from this memo in the future to have the same 100-year floodplain as Figure 2, then have a simpler legend that doesn't include the max depth differentiation, just a simple description of "North Overflow Floodplain, 100 Year"?

- The 2D Modeling Approach Memo has been updated as requested.
- Once the floodway model comments are addressed, it will be imperative to finish mapping ASAP in preparation for the public outreach meeting tentatively scheduled for early December. This will feature a public floodplain map viewer (similar to PMR viewers) that MHFD will host.
- We are currently working on the mapping and hope to have draft workmaps submitted for review next week.

If you have any questions about these comments, especially the timeline, feel free to reach out to myself or Brooke. Unfortunately we're both in all-day trainings Monday and Tuesday but if you do have any questions please send us a message and I will try to respond ASAP.

Thanks!

Dan Hill, P.E., CFM
Project Engineer
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Thursday, September 24, 2020 08:04
To: Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Hi Dan,

Apparently, there was some sort of technical issue as Dropbox did not upload the files yesterday. I believe it has been fixed this morning but let me know if you still don't see the files and I'll try another method.

Thanks,
Justen

From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, September 24, 2020 7:40 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Hi Justen, I'm not seeing a new folder newer than "20200902_FWModel", could you re-upload or send through other means?

Thanks,

Dan Hill, P.E., CFM
Project Engineer

From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, September 23, 2020 15:42
To: Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Good Afternoon Dan,

I have finished the modeling work for the Brannan site (Floodway and Multi-profile models for both the with- and without-pile conditions) and uploaded the HEC-RAS models to Dropbox for your review. This should complete our planned model changes and once we have your approval, will start work on the floodplain and floodway delineations for the workmaps.

Let me know if you have any questions or need anything more to review these changes.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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From: Dan Hill <dhill@udfcd.org>
Sent: Tuesday, September 15, 2020 1:52 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Hi Justen,

Thanks for providing responses to our previous comments and addressing them.

We've received concurrence from FEMA on the geometry modifications for the Brannan property. I've reviewed those proposed geometry changes and have no further comments.

Please let us know if there's anything more you need from us at this point to resume work and finalize the floodway.

Thanks,

Dan Hill, P.E., CFM
Project Engineer
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, September 2, 2020 17:10
To: Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Hi Dan,

I have finished addressing your comments below and provided responses (in red). I have uploaded revised models and a memo (in PDF format) to the Clear Creek Dropbox for your review. If you have any questions or find anything missing, please let me know.

Due to ongoing budget concerns with this project, we plan on waiting for final model approval before moving into the floodplain/floodway mapping in order to minimize any re-delineation and to make sure all MHFD model comments and concerns are addressed.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
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From: Dan Hill <dhill@udfcd.org>
Sent: Wednesday, August 19, 2020 3:36 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>
Subject: RE: Clear Creek FHAD Model Revisions

Hi Justen,

I have some minor comments after reviewing the model, which can be addressed going forward into the mapping phase:

p08, Flow Distribution – DS of McIntyre; FlowMaster calculations
Would you add a short explanation in the HEC-RAS plan description on which XS was used to extract the flow used for your normal depth calculations in FlowMaster, and then verify the flow used in the 500Y calculations?

- A plan description has been added to this model based on the following explanation: "This plan was used to calculate the flow distribution in a low-lying area of the LOB of Clear Creek from XS 68669 to XS 68535. Flow

distributions were summed and then evaluated based on the most conservative value for the 100-YR flood event. XS 68535 was then chosen with values of 3,468-cfs for the 100-YR, and 8,285-cfs for the 500-YR. Note: the 500-YR event had flow outside of the bank station—but still in the channel—and therefore the low-lying area flow value was calculated by summing the relevant flow dist. sections." The 500-Year flow was verified and I have added a copy of the spreadsheet used to sum and evaluate the flow distribution values to the Dropbox.

I'm assuming it's XS 68535, as the 100Y LOB Q of 3,468 cfs is used in the FlowMaster PDFs. But the 500Y LOB Q in the HEC-RAS results is greater than the value used in the 500Y FlowMaster PDFs (8,306 cfs in HEC-RAS versus 8,285 cfs used in FlowMaster).

- See the above explanation as 8,306-cfs for the 500-YR event erroneously includes flow in the main channel (outside of the bank station) In the low-lying area flow value..

Can you also provide a map or figure displaying where the two sections used for the normal depth calculations were placed?

- As we discussed on the phone, we will show these normal depth cross-sections on the workmap for this area. Normal depth section 900 is equivalent to the low-lying area in the LOB of RAS XS 68327 and normal depth section 1000 is equivalent to the low-lying area in the LOB of RAS XS 68669. A shapefile was included in the previous submittal showing the location and alignment of these sections.

p01, Tabor Lake Split Determination

I was unable to duplicate the Tabor Lake flow split values now used in the hard-coded plan. Can you provide a brief memo documenting your process of optimizing the lateral structures, similar to the memo provided for the split flow values calculated with 2D modeling surrounding the North Overflow, and include a short summary or reference to it in the HEC-RAS plan description?

- Memo prepared and a short summary of the procedure has been added to the plan description.

p07, Clear Creek – 0.5' Floodway

Please specify nonzero LOB encroachments for the following XSs, or provide additional justification: 41025, 54621, 55224, 68327.

- XS 41025 – Adding a nonzero encroachment at the left STA. of the water-surface results in a water-surface surcharge of -1.23' at this cross-section and surcharges which exceed 0.5' at the next cross-section upstream.
- XS 54621 – Adding a nonzero encroachment at the left STA. of the water-surface results in a water-surface surcharge of -0.07' and an energy-grade surcharge of -0.05' at the next cross-section upstream (54961).
- XS 55224 – Adding a nonzero encroachment at the left STA. of the water-surface results in a critical error at the downstream footbridge stating the need for a multiple-opening analysis to calculate the floodway water-surface elevations.
- XS 68327 – Adding a nonzero encroachment at the left STA. of the water-surface results in a water-surface surcharge of -0.02' at this cross-section.

Brannan piles

We're still seeking concurrence from FEMA on the geometry modifications for the Brannan piles. Stay tuned.

- Please let us know once the Brannan geometry changes are approved as these model changes still need to be completed and reviewed by MHFD.

Please let me know if you'd like to discuss any of these items further.

Thanks,

Dan Hill, P.E., CFM
Project Engineer
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MILE HIGH FLOOD DISTRICT

From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, July 8, 2020 17:24
To: Brooke Seymour <bseymour@udfcd.org>; Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Matt Ursetta <mursetta@iconeng.com>
Subject: Clear Creek FHAD Model Revisions

Good Evening Brooke & Dan,

The latest revisions to the multi-profile and floodway models are complete and I have uploaded revised models and comment shapefiles to the Clear Creek Dropbox for your review.

The HEC-RAS models include the following plans:

- The revised multi-profile and floodway runs – p06 and p07
- Plans from the previous submittal marked as February 2020 for comparison purposes – p04 and p05
- The plan used to determine the updated flow splits for Tabor Lake – p01
- A plan with the flow distribution computed for the normal depth area between McIntyre St. and I-70 – p08

Let me know if any questions come up as you take a look.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
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Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Sunday, November 22, 2020 8:22 PM
To: Justen Hamann
Cc: Dan Hill; Hung-Teng Ho
Subject: RTD Gold Line at Clear Creek 13-08-0099R

Justen,

Here is a link to the model, mapping and survey from the RTD Gold Line at Clear Creek CLOMR 13-08-099R: https://www.dropbox.com/s/u1pmqqtpst5rsda/13-08-0099R.zip?dl=0. Hopefully this will help with the mapping issue for the Federal split.

Please let me know if there is additional information that would be helpful.

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager
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MILE HIGH FLOOD DISTRICT

Troy Carmann

From: Justen Hamann
Sent: Friday, December 4, 2020 8:28 AM
To: Brooke Seymour
Cc: Troy Carmann; Dan Hill
Subject: RE: Clear Creek Mapping - Status?

Hi Brooke,

We wrapped up our changes late yesterday and are working on cleaning up the resulting shapefiles today. We plan on resubmitting as soon as that's done (which should be later on today).

That sounds fine for next week's presentation.

Thanks,
Justen

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, December 3, 2020 8:18 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Dan Hill <dhill@udfcd.org>
Subject: Clear Creek Mapping - Status?

Hi Justen,

Can you provide a status update for the Clear Creek mapping? Do you have any questions for us?

We've had lots of interest in the public meeting! MHFD will take care of the majority of the formal presentation. We'd like ICON to present the FHAD viewer and show how individuals can use it to look-up results at their property – does that sound good?

Thanks,
Brooke

Brooke Seymour P.E., CFM
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Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, December 11, 2020 1:59 PM
To: Arbogast, Dennis
Cc: Greg Labrie; Justen Hamann
Subject: RE: Clear Creek FHAD follow-up

Dennis,

At this time, I do not see that the master plan concept would be altered, just that the improvements in the North Overflow could be designed for the lower flow.

Regards,
Brooke

Brooke Seymour P.E., CFM
Project Manager
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MILE HIGH FLOOD DISTRICT

From: Arbogast, Dennis <dennis.arbogast@aecom.com>
Sent: Friday, December 11, 2020 11:03 AM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Greg Labrie <glabrie@adcogov.org>; jhamann@iconeng.com
Subject: Clear Creek FHAD follow-up

Hi Brooke,

Thanks for the chat this morning. One question that came to me after the call was - Given the much reduced 100-yr discharge for Clear Creek and split flow north of I-76, is the District/ICON looking at a potential project that could eliminate the split flow completely? I think the spill/split occurs at Sheridan Blvd. due to highway bridges? Eliminating the split flow would be a project with substantial benefit by removing a lot of property from the floodplain.

Thanks for your time.

Dennis

Dennis Arbogast, P.E., LEED AP
D 303-796-4751 M 303-638-2642

2021

Troy Carmann

From: Justen Hamann
Sent: Tuesday, January 5, 2021 10:07 AM
To: Dan Hill
Cc: Brooke Seymour
Subject: RE: Clear Creek 2D Models - 100-Year Spill at 52nd and Sheridan

Good Morning Dan,

The 2D models for this area (we called it the South Overflow) have been uploaded to the Clear Creek FHAD Dropbox. A download link has also been included below.

https://www.dropbox.com/sh/gszvfr4hwskdude/AACBvkWXQBdHbO2wbz9Vr8H3a?dl=0

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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From: Dan Hill <dhill@udfcd.org>
Sent: Wednesday, December 30, 2020 4:33 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>
Subject: Clear Creek 2D Models - 100-Year Spill at 52nd and Sheridan

Hi Justen,

Could you provide the 2D models that back up the figure in the attached from March? The latest 2D models we received from August 2019 didn't cover the 100-year analysis for this non-levee embankment at 52nd and Sheridan.

Thanks,

Dan Hill, P.E., CFM
Project Engineer
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Troy Carmann

From: Justen Hamann
Sent: Thursday, January 7, 2021 5:40 PM
To: Dan Hill
Cc: Brooke Seymour; Hung-Teng Ho; 'Troy Carmann'
Subject: RE: Clear Creek mapping - contour data source
Attachments: ClearCrk_SHEET4_UPDATE.docx

Hi Dan,

The source of the contours is indeed the 2014 post-flood LiDAR data but the contours were generated by ICON in late 2015 or even early 2016 from what I can remember. I don't believe we were ever given any "smoothed contours" by the District, but did explore using "smoothed" and "unsmoothed" versions and ultimately went with the "unsmoothed" ones as some problems were identified with the 2014 LiDAR data near structures (the channel appeared to be artificially widened near structures) and we didn't feel comfortable editing the LiDAR source data from then on. The contours were not produced from the HEC-RAS model but built directly from the LiDAR point data files.

The contours supplied with the early November 2020 map package were the unedited, unsmoothed versions from the 2014 LiDAR. We looked into incorporating the fill along the north overbank of the North Overflow downstream of Sheridan and within the Brannan site. Attached is a Word Doc with some screen captures showing before and after images of these areas.

Let me know if you have any more questions.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, January 7, 2021 2:43 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Brooke Seymour <bseymour@udfcd.org>; Hung-Teng Ho <hho@udfcd.org>
Subject: Clear Creek mapping - contour data source

Hi Justen,

Wanted to revisit our previous discussion from November (attached) regarding contours. Can you remind us of the answers to these?

- Can you verify the source of the contours supplied in your latest map package? They differ from our 2014 LIDAR-derived smoothed contours, my understanding is that those were to be used. I'm wondering if the contours

supplied in your latest map package were exported from the Terrain.vrt/.hdf file for the HEC-RAS model. If so, it's more appropriate to use the original LIDAR-derived contours than those exported from the Terrain used for the HEC-RAS model. If you need an additional copy of the 2014 LIDAR-derived contours, please let me know.

- Brooke, Hung-Teng and I agreed that if the contours supplied in your latest map package were derived from the LIDAR points (and not a simplified terrain surface), those are sufficient to use. Do they include the revised contours along the north bank of the North Overflow downstream of Sheridan? Again, some background on the source for these is something we'd like to understand.

Thanks!

Dan Hill, P.E., CFM
Project Engineer
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Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Thursday, January 7, 2021 6:46 PM
To: Justen Hamann
Cc: Dan Hill
Subject: RE: 660 11th St. - Clear Creek Floodplain

Justen,

Have you had a chance to take a look into the topography at this location from the 2008 FHAD and see how it compares to the 2014 contours? I know that we've found a number of issues in the 2014 LiDAR with walls.

If we can't get the wall elevations from the previous FHAD or the site LOMR, then we'll need to get a surveyor out there.

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5422 | www.mhfd.org

---

From: Brooke Seymour
Sent: Friday, December 4, 2020 2:10 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Dan Hill <dhill@udfcd.org>
Subject: RE: 660 11th St. - Clear Creek Floodplain

Justen,

The quality of the plans from Golden is poor and it's hard to read the elevations (and it looks like the top of wall elevations vary quite a bit so spatial info would be important). The package documents that the LOMR for this site development went effective on 11/14/2002, so we should be able to get the necessary data from the LOMR. However, I'm wondering if the 2008 FHAD had better elevation data at this location that we could use – that may be the simplest. Can you take a look?

Thanks,
Brooke

From: Joseph Lammers <jlammers@cityofgolden.net>
Sent: Friday, December 4, 2020 1:52 PM
To: Brooke Seymour <bseymour@udfcd.org>; Joe Puhr <jpuhr@cityofgolden.net>
Cc: Dan Hill <dhill@udfcd.org>; Justen Hamann <jhamann@iconeng.com>
Subject: RE: 660 11th St. - Clear Creek Floodplain

Brooke,
I was able to dig up some old plans. The plans for 660 weren't great so I've attached plans for 640 which show retaining wall information for both 660 and 640. I can do some more digging if these don't do the trick.
Thanks,

Joseph A. Lammers
Civil Engineer
City of Golden
Public Works
1445 10th Street
Golden, Colorado 80401
303.384.8156
jlammers@cityofgolden.net

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, December 4, 2020 11:48 AM
To: Joe Puhr <jpuhr@cityofgolden.net>
Cc: Joseph Lammers <jlammers@cityofgolden.net>; Dan Hill <dhill@udfcd.org>; Justen Hamann <jhamann@iconeng.com>
Subject: RE: 660 11th St. - Clear Creek Floodplain

The most important are the walls that run along the buildings that can be seen in the Google view below.

Brooke Seymour P.E., CFM
Project Manager

MILE HIGH FLOOD DISTRICT
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---

From: Joe Puhr <jpuhr@cityofgolden.net>
Sent: Friday, December 4, 2020 11:45 AM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Joseph Lammers <jlammers@cityofgolden.net>
Subject: RE: 660 11th St. - Clear Creek Floodplain

We can dig into records and see. Are you wanting both building and trail wall information?

Joseph E. Puhr
City Engineer
City of Golden
Public Works
1445 10th Street
Golden, CO 80401
303 384 8115
jpuhr@cityofgolden.net

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, December 4, 2020 11:43 AM
To: Joe Puhr <jpuhr@cityofgolden.net>
Cc: Joseph Lammers <jlammers@cityofgolden.net>
Subject: FW: 660 11th St. - Clear Creek Floodplain

Joe,

The LiDAR data in the vicinity of the condos at 660 11th St along Clear Creek looks suspect (see image below). Do you happen to have as-builts for this development that show the wall elevations?

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager
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MILE HIGH FLOOD DISTRICT

From: Brooke Seymour
Sent: Monday, November 30, 2020 1:54 PM
To: karenoxman@aol.com

Cc: Dan Hill <dhill@udfcd.org>; John Klier <jklier@iconeng.com>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Justen Hamann <jhamann@iconeng.com>; Joe Puhr <jpuhr@cityofgolden.net>
Subject: 660 11th St. - Clear Creek Floodplain

Ms. Oxman,

Thank you for reaching out to us with your question about the Clear Creek Flood Hazard Area Delineation. For the condos at 660 11th St, the draft maps still show portions of the buildings within the 100-yr floodplain. We hope to have the map viewer available on the project website by the end of this week.

I've copied Joseph Puhr, City Engineer for Golden, on this email. Please don't hesitate to reach out to Joseph or me with additional questions.

Regards,
Brooke

Troy Carmann

From: Troy Carmann
Sent: Tuesday, January 12, 2021 1:22 PM
To: Brooke Seymour; Justen Hamann
Cc: Dan Hill; Hung-Teng Ho
Subject: RE: Clear Creek Floodplains

Good Afternoon Brooke –

Following up on this question, we do not have better information on the walls from the as-built LOMR.

The preferred approach would be sending a surveyor to confirm top of wall elevations between Ford Street and Washington Street along the Clear Creek trail.

We have surveyor, SurvWest, working in the area with established NAVD88 control. Would you like me to get a proposal and schedule for them to collect this data?

@5280'
TC

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Friday, December 4, 2020 11:54 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Dan Hill <dhill@udfcd.org>; Troy Carmann <tcarmann@iconeng.com>; Hung-Teng Ho <hho@udfcd.org>
Subject: RE: Clear Creek Floodplains

Thanks Justen! We really appreciate your team's effort to turn this around so quickly.

I've followed up with Golden to see if we can get asbuilts for the walls near 660 11th St. The LiDAR is not picking up the walls in front of the buildings. I think there is a good chance that these buildings are elevated above the 100-yr once the walls are reflected.

Brooke Seymour P.E., CFM
Project Manager
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
Office: 303-455-6277 | **Direct:** 303-749-5422 | www.mhfd.org

Protecting People, Property, and our Environment

MILE HIGH FLOOD DISTRICT

From: Justen Hamann <jhamann@iconeng.com>
Sent: Friday, December 4, 2020 10:43 AM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Dan Hill <dhill@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Hung-Teng Ho <hho@udfcd.org>
Subject: Clear Creek Floodplains

Brooke,

I have uploaded our revised delineation shapefiles to the Clear Creek Dropbox (or they can be downloaded directly with this link: https://www.dropbox.com/sh/7at5zhl8w4bp4cr/AADsBxQQ1fDxYVmrZhhcwL8Ra?dl=0).

I was able to update the model in order to get the below property out of the floodway the best I can (see below screenshot). The building at XS 89163 is right adjacent to the channel so I couldn't apply any more encroachment without causing negative surcharges there but, I was able to add an IFA and a corresponding encroachment to XS 89421 without causing a negative surcharge.

Let me know if you have any further questions or need anything else.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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From: Brooke Seymour <bseymour@udfcd.org>
Sent: Tuesday, December 1, 2020 9:40 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Dan Hill <dhill@udfcd.org>; Troy Carmann <tcarmann@iconeng.com>; Hung-Teng Ho <hho@udfcd.org>
Subject: RE: 660 11th St. - Clear Creek Floodplain

Justen,

Adding to my email below, it looks like the FHAD BFE is lower than effective at this location, so this is likely a LiDAR issue. Please take a look.

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
Office: 303-455-6277 | **Direct:** 303-749-5422 | www.mhfd.org

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MILE HIGH FLOOD DISTRICT

From: Brooke Seymour
Sent: Monday, November 30, 2020 1:58 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Dan Hill <dhill@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Hung-Teng Ho <hho@udfcd.org>
Subject: FW: 660 11th St. - Clear Creek Floodplain

Justen,

Please take a closer look at the floodplain and floodway delineation near 660 11th St in Golden. This is a location with walls where the LiDAR may not be accurate. Right now, floodway = floodplain at this location – would it be possible to encroach to the channel banks to keep the condos out of the floodway (see black line in screenshot below).

Thanks,
Brooke

From: Brooke Seymour
Sent: Monday, November 30, 2020 1:54 PM
To: karenoxman@aol.com
Cc: Dan Hill <dhill@udfcd.org>; John Klier <jklier@iconeng.com>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Justen Hamann <jhamann@iconeng.com>; Joe Puhr <jpuhr@cityofgolden.net>
Subject: 660 11th St. - Clear Creek Floodplain

Ms. Oxman,

Thank you for reaching out to us with your question about the Clear Creek Flood Hazard Area Delineation. For the condos at 660 11th St, the draft maps still show portions of the buildings within the 100-yr floodplain. We hope to have the map viewer available on the project website by the end of this week.

I've copied Joseph Puhr, City Engineer for Golden, on this email. Please don't hesitate to reach out to Joseph or me with additional questions.

Regards,
Brooke

Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Wednesday, January 13, 2021 3:27 PM
To: Troy Carmann; Justen Hamann
Cc: Brooke Seymour
Subject: RE: Clear Creek FHAD - Project Plan

Hi Troy and Justen,

An additional item we'd like to discuss regarding modeling is the Martin Marietta piles on the south bank between Pecos and BNSF/Little Dry Creek.

These stockpiles were permitted in 2004 by Adams County, before there was there was a FEMA mapped floodway. Similar to how we are handling the Brannan piles, the floodway model should be based on the **without piles** condition to avoid "floodway creep." However, since the encroachment from these is permitted (unlike Brannan), we should strive to place the ROB floodway encroachment station appropriately to reflect the actual encroachment of the existing piles. However, we may not be able to achieve a 05-ft floodway with this configuration. If needed, the encroachment station will be adjusted to achieve a 0.5-ft floodway. For the floodplain, we can proceed with the **with piles** condition BFEs, which are more conservative and reflect the current condition.

Please let us know if you'd like to discuss ahead of next week's meeting.

Thanks,

Dan Hill, P.E., CFM
Project Engineer
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

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-----Original Appointment-----
From: Troy Carmann <tcarmann@iconeng.com>
Sent: Tuesday, January 12, 2021 14:27
To: Justen Hamann; Dan Hill; Brooke Seymour
Subject: Clear Creek FHAD - Project Plan
When: Wednesday, January 20, 2021 10:00-11:00 (UTC-07:00) Mountain Time (US & Canada).
Where: Microsoft Teams Meeting

Draft Agenda

1. Rothlisberger and Nye Channels. (Introduction)
2. Public Meeting review, website
3. Modeling
    a. 1D: Upstream Ford Street, wall survey
    b. 2D: topo and data for N. Overflow
4. Mapping
    a. Follows modeling
    b. Work maps – PDF, digital, printed
5. Report
6. Publication
7. Contract: public meeting, survey, modeling, other
8. Other
9. Completion.

Microsoft Teams meeting

Join on your computer or mobile app
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Troy Carmann

From: Brooke Seymour <bseymour@udfcd.org>
Sent: Wednesday, February 3, 2021 6:13 PM
To: Troy Carmann
Cc: Justen Hamann; Dan Hill
Subject: RE: Golden - Clear Creek

Troy,

Thanks for getting this proposal - please proceed with the survey as soon as possible. Do we need to do an amendment specifically for the survey work, or can this be included in the larger amendment request that will be coming from ICON (soon)?

Thanks,
Brooke

Brooke Seymour P.E., CFM
Project Manager
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
Office: 303-455-6277 | **Direct:** 303-749-5422 | www.mhfd.org

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MILE HIGH FLOOD DISTRICT

From: Troy Carmann <tcarmann@iconeng.com>
Sent: Wednesday, February 3, 2021 3:40 PM
To: Brooke Seymour <bseymour@udfcd.org>
Cc: Justen Hamann <jhamann@iconeng.com>
Subject: FW: Golden - Clear Creek

Good Afternoon Brooke –

$6000 for wall survey along Clear Creek to support the model refinements related to adjacent buildings.

My original contact with SurvWest, doing work for Coors, has left the company. And his replacement has been delayed in getting back to me. I'm going with a long time friend and trusted surveyor as our best option. He returned this proposal in a day.

Let me know what you think about moving ahead on this survey work.

Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Thursday, February 4, 2021 5:10 PM
To: Justen Hamann
Cc: Troy Carmann; Brooke Seymour; Hung-Teng Ho
Subject: RE: Clear Creek - review of 12/4/20 delineation submittal

Justen,

Following the additional evaluation of the floodway downstream of Kipling I mentioned previously, Hung-Teng has made more model adjustments, and that's been uploaded to the Review folder in Dropbox.

HEC-RAS 5.07_Test_2021-02-03.zip:

- Please be aware that both floodplain and floodway models have been revised.
- The revised models include the reach that was already provided with floodway adjustments upstream of Youngfield St and I-70. The total revised reach in this most recent model is from cross section 42287 to cross section 68947.
- One interpolated cross section at 47741.9* was provided to fix a drawdown. You may need to cut a physical cross section in the proximity to finalize the model.
- The expansion coefficient was increased to 0.8 at cross section 47979 to eliminate a drawdown.
- There are a few negative surcharges, but they are no more than -0.04.
- Cross section 44466 could be either FP=FW or no encroachment. If FP=FW, there will be negative surcharges at the two cross sections.
- Unfortunately, I noticed that the 50-year crosses the 100-year event at cross section 67024. Please tweak this model so the profiles no longer cross.

Please let me know if you'd like to discuss these as you proceed. I'll be out tomorrow and Monday but will be back on Tuesday, feel free to reach out to Brooke or Hung-Teng in the meantime.

Thanks!

Dan Hill, P.E., CFM
Project Engineer
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2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
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MILE HIGH FLOOD DISTRICT

From: Dan Hill
Sent: Wednesday, January 27, 2021 17:23

To: Justen Hamann (jhamann@iconeng.com) <jhamann@iconeng.com>
Cc: Troy Carmann (tcarmann@iconeng.com) <tcarmann@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>; Hung-Teng Ho <hho@udfcd.org>
Subject: RE: Clear Creek - review of 12/4/20 delineation submittal

Hi Justen,

I've attached our more detailed comments on the floodway and 100-year delineations in a geodatabase. Please take into consideration our general comments for the 500-year delineation as well: contour crossing, shallow flooding, etc.

I've attached two other Word documents:

- **Future_Apartment_Hospital_Upstream_I-70.docx**, I should have included this yesterday along with the "Clear Creek FHAD_Test Model.zip" for the suggested floodway adjustments upstream of Youngfield St & I-70, it's a few pages of notes and comparison with the latest floodway plan.
- **Drawdown at Marshall St ds (comment 93).docx**, a bit more explanation into comment 93 of the attached geodatabase for the drawdown downstream of Marshall St and how it could be addressed with adjusting the contraction/expansion coefficients.

We are still evaluating some possible floodway adjustments downstream of Kipling and will have an additional model to you soon with a potential solution.

I feel we should go through another mapping submittal and review before your full submittal, as we are still looking for some modeling adjustments and since we didn't review an Agreement Table or Floodplain & Floodway Data Table with this submittal and therefore didn't go through an in-depth top width analysis this round.

Please let me know if you'd like to discuss or set up another meeting as you get into the comments.

Thanks!

From: Dan Hill
Sent: Tuesday, January 26, 2021 08:22
To: Justen Hamann (jhamann@iconeng.com) <jhamann@iconeng.com>
Cc: Troy Carmann (tcarmann@iconeng.com) <tcarmann@iconeng.com>; Brooke Seymour <bseymour@udfcd.org>; Hung-Teng Ho <hho@udfcd.org>
Subject: Clear Creek - review of 12/4/20 delineation submittal

Hi Justen,

We're wrapping up the detailed comments on the 12/4/20 delineation submittal and will have that to you later this week. I wanted to give you an overview of what we've had comments on, please let me know if you'd like to discuss.

Modeling

- Treat the Martin Marietta stockpiles similarly to the Brannan piles in the with/without piles geometries, following our call last week.
- The floodway upstream of Youngfield St & I-70 needs to better reflect the ongoing development in the right overbank. I've have added a model to the Dropbox (see the "Review" folder) that has a test plan revising encroachments in this reach. Please review and incorporate.

Mapping

- Please use a consistent projection for all GIS, I'd suggest using the same State Plane Colorado Central (ftUS) projection as the HEC-RAS model.

- Contour crossing – please see attached for point intersection layers of the submitted contours and submitted 100-year floodplain. In many areas we are seeing multiple contour crossings and these should be simplified.
- Brannan mapping extent should be informed by the without-piles geometry.
- Federal Split at RTD Gold Line should reflect LOMR 13-08-0099R (data provided 11/22/20).
- 2D modeling should inform delineation at South Overflow / Sheridan & 52nd.
- 2D modeling should inform overtopping of W 44th Ave at Holland St.
- Normal depth calculations should inform LOB delineation at XSs 68327 – 66656.

Thanks,

Troy Carmann

From: Troy Carmann
Sent: Wednesday, March 3, 2021 7:52 AM
To: Justen Hamann
Subject: FW: Clear Creek
Attachments: 39948SURV_TopoElevations10Scale01.dwg; 39948SURV_TopoNames10Scale01.dwg; 39948SURV_TopoSymbols10Scale01.dwg; 39948SURV_Topo50Scale01.dwg; 39948SURV_TopoCodes10Scale01.dwg

Here's the survey for the walls along the south bank of Clear Creek upstream of Ford Street.

Thanks,
@5280'
TC

From: Chet Smith <Chet.Smith@topographic.com>
Sent: Tuesday, March 2, 2021 2:44 PM
To: Troy Carmann <tcarmann@iconeng.com>
Subject: Clear Creek

Troy,
Attached is an ASCII file (Point, Northing, Easting, Elevation, Description) containing all the points that were surveyed. I have stratified the survey as before with all the files referenced into the main "39948SURV_Topo50Scale01.dwg". When I hear back from SurvWest regarding the control I will let you know what I find out. If you hear from someone in the mean time and have an answer or a phone call is needed I'm available for that as well. I don't think for your purposes the horizontal is going to be a factor but I can adjust if needed after we get some answers. Thanks Troy.

The Lund Partnership is now Topographic!

Chet Smith, PLS | Sr. Project Manager Civil Surveying
Topographic Land Surveyors
12265 W. Bayaud Ave., Suite 130
Lakewood, CO 80228
o: 303.989.1461 x 602 | c: 303.842.7757 | f: 303.989.4094
Firm Registration and Disclaimer

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Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Wednesday, March 10, 2021 3:21 PM
To: Justen Hamann
Cc: Brooke Seymour; Hung-Teng Ho
Subject: RE: Clear Creek FHAD
Attachments: CC_Floodway_Updated_2021-02-03.gdb.zip; HTH Adjustments.zip; Initial Floodplain Delineation with ArcMap's Surface Difference.pdf

Hi Justen,

Thanks again for the call this morning, please see either attached or the Dropbox for:

ClearCreek_2020-12-04_Mapping_FHADReview.gdb.zip

- Zipped GDB from Hung-Teng's HEC-GeoRAS of Floodway adjustments, if you look at dataset "WaterSurfaceExtents_Points" and field Profile and compare the two profiles, you can see where Hung-Teng's encroachments are.

HTH Adjustments.zip

- HTH Adjustments.xlsx, a spreadsheet summarizing Hung-Teng's adjustments to Floodway Encroachments and XS Geometry Settings
- ClearCreek 201029 icon.g04, geometry file from 10/29/20 submittal
- ClearCreek 210203 hth.g02, geometry file from 2/3/20 edits by Hung-Teng
- 201029 vs 210203.docx, Word file comparing the two geometry files above, if you look at the Reviewing Pane or the Changes, it'll highlight what Hung-Teng changed. I summarized this by XS in the spreadsheet above.

Initial Floodplain Delineation with ArcMap's Surface Difference.pdf

- Walkthrough of alternative to HEC-RAS auto-delineation, HEC-GeoRAS will do this as well.

Thanks,

Dan Hill, P.E., CFM
Project Manager
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

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MILE HIGH FLOOD DISTRICT

From: Justen Hamann <jhamann@iconeng.com>
Sent: Monday, March 8, 2021 16:13
To: Dan Hill <dhill@udfcd.org>
Subject: Clear Creek FHAD

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Good Afternoon Dan!

Hope you're doing well and getting to enjoy the weather before the next snowstorm arrives. My family and I are headed to FL for a "rescheduled from last year" spring break trip towards the end of this week and I'm starting to wonder if we should just stay here and enjoy this weather instead!

I'm starting to look into the latest comments on Clear Creek and I wondered if you would have time on Tuesday or Wednesday this week to walk through some of these together and make sure you and I are on the same page on the anticipated level of effort expected for the model changes?

I have a few conflicts tomorrow but am currently open all day on Wednesday.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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Troy Carmann

From: Chet Smith <Chet.Smith@topographic.com>
Sent: Friday, April 2, 2021 1:05 PM
To: Justen Hamann
Cc: Troy Carmann
Subject: Re: Clear Creek

Justen,
We used the control provided by ICON to do the survey. I do not know the origin of the project control or datum. This has been a source of confusion for me as well as SurvWest hasn't been able to provide us any clarification on the control either. Troy maybe you can pass along the control we used?

Sent from my iPhone

> On Apr 2, 2021, at 12:15 PM, Justen Hamann <jhamann@iconeng.com> wrote:
>
> Hi Chet,
>
> We've started working on trying to incorporate this survey and we're running into problems aligning it with the horizontal datum and mapping projection we're using for our project which is ""NAD_1983_StatePlane_Colorado_Central_FIPS_0502_Feet." I've attached a few of our GIS shapefiles (cross-sections and building polygons) for comparison.
>
> Can you provide us with the conversion information to convert the survey files to our project's datum and projection or alternatively provide the survey files in this datum and projection so they align with our data?
>
> Thanks,
>
> [http://icon.clientcentral.pro/wp-content/uploads/2019/12/ICON-logo-bl
> ack-300px-T.png]
> Justen Hamann, P.E.
> Project Manager
> 7000 S. Yosemite St, Suite 120, Centennial, CO 80112
> (303) 221-0802 | www.iconeng.com<http://www.iconeng.com/> |
> jhamann@iconeng.com<mailto:jhamann@iconeng.com>
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>
>
> From: Troy Carmann <tcarmann@iconeng.com>
> Sent: Wednesday, March 3, 2021 7:52 AM
> To: Justen Hamann <jhamann@iconeng.com>
> Subject: FW: Clear Creek
>
> Here's the survey for the walls along the south bank of Clear Creek upstream of Ford Street.
>
> Thanks,

> @5280’
> TC
>
> From: Chet Smith
> <Chet.Smith@topographic.com<mailto:Chet.Smith@topographic.com>>
> Sent: Tuesday, March 2, 2021 2:44 PM
> To: Troy Carmann <tcarmann@iconeng.com<mailto:tcarmann@iconeng.com>>
> Subject: Clear Creek
>
> Troy,
> Attached is an ASCII file (Point, Northing, Easting, Elevation, Description) containing all the points that were surveyed. I have stratified the survey as before with all the files referenced into the main “39948SURV_Topo50Scale01.dwg”.
> When I hear back from SurvWest regarding the control I will let you know what I find out. If you hear from someone in the mean time and have an answer or a phone call is needed I’m available for that as well. I don’t think for your purposes the horizontal is going to be a factor but I can adjust if needed after we get some answers. Thanks Troy.
>
> The Lund Partnership is now Topographic!
>
> Chet Smith, PLS | Sr. Project Manager Civil Surveying Topographic Land
> Surveyors
> 12265 W. Bayaud Ave., Suite 130
> Lakewood, CO 80228
> o: 303.989.1461 x 602 | c: 303.842.7757 | f: 303.989.4094 Firm
> Registration and
> Disclaimer<https://www.topographic.com/wp-content/uploads/2019/07/firm
> _disclaimer.jpg>
>
> [Topographic_PrimaryLogo_NoHighlight_Blk]<http://www.topographic.com/>
>
>
>
> <Example_ClearCrk_Shapes.zip>

Troy Carmann

From: Chet Smith <Chet.Smith@topographic.com>
Sent: Monday, April 5, 2021 5:28 AM
To: Justen Hamann
Subject: FW: Golden - Clear Creek
Attachments: 2020-11-15 Control Points.zip

Justen,
This is the control we were provided and used to perform the survey. Feel free to give me a call if you need anything.

The Lund Partnership is now Topographic!

Chet Smith, PLS | Sr. Project Manager Civil Surveying
Topographic Land Surveyors
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Lakewood, CO 80228
o: 303.989.1461 x 602 | c: 303.842.7757 | f: 303.989.4094
Firm Registration and Disclaimer

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From: Troy Carmann <tcarmann@iconeng.com>
Sent: Wednesday, February 3, 2021 11:43 AM
To: Chet Smith <Chet.Smith@topographic.com>
Subject: RE: Golden - Clear Creek

See attached.

@5280'
TC

From: Chet Smith <Chet.Smith@topographic.com>
Sent: Wednesday, February 3, 2021 10:20 AM
To: Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Golden - Clear Creek

Troy,
I am busy this week but I can hand this off to Jeremy our Erik in my office to get you a proposal. Can you send me over the control from SurvWest so we can see how close control is to the site and what we need to do to get some control to the site to get it done.

The Lund Partnership is now Topographic!

Chet Smith, PLS | Sr. Project Manager Civil Surveying
Topographic Land Surveyors
12265 W. Bayaud Ave., Suite 130
Lakewood, CO 80228
o: 303.989.1461 x 602 | c: 303.842.7757 | f: 303.989.4094
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Troy Carmann

From: Justen Hamann
Sent: Wednesday, April 21, 2021 12:05 PM
To: Dan Hill; Brooke Seymour
Cc: Troy Carmann
Subject: RE: Clear Creek FHAD - Golden Survey Results

Hi Dan,

I've uploaded a folder to the Dropbox called "Survey Data" which has a point shapefile that we used (and was rectified with our horizontal datum/mapping projection) as well as the raw CAD drawings that we got from the surveyor (unrectified). The direct download link is below.

https://www.dropbox.com/sh/2ao4rf2q3giybop/AABfovORoWeLCM1BJishH0gPa?dl=0

Thanks,
Justen

From: Dan Hill <dhill@udfcd.org>
Sent: Wednesday, April 21, 2021 8:55 AM
To: Justen Hamann <jhamann@iconeng.com>; Brooke Seymour <bseymour@mhfd.org>
Cc: Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD - Golden Survey Results

Thanks Justen, can you also provide the raw survey data?

Dan Hill, P.E., CFM
Project Manager
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MILE HIGH FLOOD DISTRICT

From: Justen Hamann <jhamann@iconeng.com>
Sent: Monday, April 19, 2021 11:57
To: Brooke Seymour <bseymour@mhfd.org>; Dan Hill <dhill@udfcd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: Clear Creek FHAD - Golden Survey Results

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Hi Brooke and Dan,

I've uploaded the HEC-RAS models and the memo we went over today in our meeting to the Clear Creek FHAD Dropbox under a folder with today's date. I've also included a link for direct download below. We'll continue moving forward with the other revision areas, but please let us know if you have any comments or concerns with the revisions to this area in Golden.

https://www.dropbox.com/sh/ibjn5pgnhktcpdf/AADYgrELr0cLlLe6XSaW6fcDa?dl=0

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Wednesday, June 30, 2021 12:44 PM
To: Justen Hamann
Cc: Brooke Seymour; Hung-Teng Ho
Subject: RE: Clear Creek FHAD Meeting Notes
Attachments: Meeting-Notes-06-17-21-Justen.docx

Hi Justen,

Returning to some of the discussion items in the attached file you sent.

Federal/Comment 142
Flow was not removed from the mainstem in order to evaluate the floodway on the mainstem, correct? I am seeing 12,800 cfs in the mainstem for XSs 26669 > 24755, which extends beyond the reaches of the Federal Split. Given that your floodway analysis has 100% conveyance under the railroad and not Federal, we will be able to revise with no floodway under Federal with appropriate documentation.

Lowell and Tennyson/Comment 152
Given flow is being subtracted from the mainstem and added to North Overflow in this reach, we need a little more analysis for these locations. If the 217 cfs (Tennyson spill), 728 cfs (Lowell spill), or 945 cfs (Tennyson + Lowell spills) is kept in the mainstem, does the mainstem experience an HGL/EGL rise ≥ 0.5'? If the answer is yes, we should retain the appropriate effective floodway area.

XS 28088 / Comment 77
Agreed with Hung-Teng, having tie-in on I-76 embankment helps simplify the floodplain/way distinctions here. Please proceed with ROB realignment of XS.

Any more direction on these items that you need from us?

Thanks,

Dan Hill, P.E., CFM
Watershed Manager
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

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MILE HIGH FLOOD DISTRICT

From: Hung-Teng Ho <hho@udfcd.org>
Sent: Monday, June 21, 2021 15:50
To: Dan Hill <dhill@udfcd.org>
Cc: Brooke Seymour <bseymour@mhfd.org>
Subject: FW: Clear Creek FHAD Meeting Notes

Dan,

Attached is the meeting notes provided by Justen.
Please be aware of that Point Comment Item #142, 152 and split flow at Tennyson St need further discussion because of removing the effective floodway. Comment #77 is not critical that is for removing a likely unrealistic 100-year floodplain.
Please let me know if you have any questions.

Thanks,
Hung-Teng

Hung-Teng Ho, P.E., CFM
Hydraulic Modeler
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave. Suite 156-B | Denver, CO 80211
Office: 303-455-6277 | | www.mhfd.org

Protecting People, Property, and our Environment

From: Justen Hamann <jhamann@iconeng.com>
Sent: Thursday, June 17, 2021 4:18 PM
To: Hung-Teng Ho <hho@udfcd.org>
Subject: Clear Creek FHAD Meeting Notes

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Hi Hung-Teng,

Attached are my meeting notes for this morning's meeting on Clear Creek. Let me know if you have any comments or changes I can incorporate before passing these on to Dan and Brooke.

Thanks,

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

Troy Carmann

From: Dan Hill <dhill@udfcd.org>
Sent: Monday, August 2, 2021 4:12 PM
To: Justen Hamann
Cc: Hung-Teng Ho; Brooke Seymour; Troy Carmann
Subject: RE: Clear Creek FHAD

Hi Justen, files received. We will start diving in.

Thanks,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

From: Justen Hamann <jhamann@iconeng.com>
Sent: Monday, August 2, 2021 14:07
To: Dan Hill <dhill@udfcd.org>
Cc: Hung-Teng Ho <hho@udfcd.org>; Brooke Seymour <bseymour@mhfd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: Clear Creek FHAD

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Good Afternoon Dan,

First off – we have completed our changes to the Floodway and Multi-Profile HEC-RAS hydraulic models for the Clear Creek FHAD and have uploaded the models and a comment response point shapefile to Dropbox for your review. A direct link to download the files is also included below. Please note that the comment response point shapefile has valid responses to the District comments pertaining to any hydraulic model revisions. Any comment responses related to workmap/delineation fixes should be considered preliminary at this stage and will be fully addressed in a future workmap submittal after the hydraulic models are approved.

https://www.dropbox.com/sh/9sz5mqwmxv74tpv/AAAVWx2WR2ePTvXXqXnfGy3Ga?dl=0

Secondly – thank you very much for your willingness to work with us on a cost amendment. We will work internally on putting together a spreadsheet to estimate our costs for the additional work. Let us know if you have any deadlines that we need to meet for requesting the additional funds.

Finally – as you review the updated modeling, we have a few items below that we want to bring to your attention to assist with your review, and to identify as items that are worth more discussion before making our next workmap submittal.

1. We incorporated Hung-Teng's revised Floodway and Multi-Profile modeling and tried to stick with using it as much as possible. However, due to the changes requested in some of the other comments, as well as the need to fix any crossing profile or floodway surcharge issues, further modeling changes were also required. As you review the latest models, please let us know if you'd like to chat about any specific areas.
2. The current floodway model still has some negative surcharges (and a few excessive surcharges) in both EGL and HGL. These surcharges all round to either 0.0 or 0.5 (i.e. -0.04 to 0.54). It is our understanding—from previous direction given—that these are acceptable surcharges both to the District and FEMA.
3. Several comments concerning joining small low-lying floodplain areas will need to be addressed in our revised workmap submittal. Most of these occur in areas with nearby insurable structures and we would like to discuss several of these with you before making the changes to the delineations.
4. Comment/ObjectID 104 mentions a few cross-sections in the North Overflow where the bank stations are outside of the 100-YR floodplain. We have been through multiple iterations over the years for the North Overflow where the location of the channel thalweg (and bank stations) were revised for the 1D model before we finally arrived at our current solution of using a 2D model to define the North Overflow. Since our current iteration is understood to be a 1D approximation of the results from our 2D model, we haven't revised the bank stations in this area.
5. Comment/ObjectID 155 mentions trying to get a logical floodway top-width transition at the Tennyson Street crossing where more flow leaves the main channel of Clear Creek and enters the North Overflow. We looked into the floodway model for this area with the goal of adding the floodway to the LOB of cross-sections 31778 thru 31387. Unfortunately, this change caused profile crossing issues in the Multi-Profile model. We'd be interested in hearing your thoughts on this and if we could agree on utilizing just a mapping solution here with an explanation provided as to why the mapping and modeling were different in this area.

Thanks,
Justen

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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From: Dan Hill <dhill@udfcd.org>
Sent: Wednesday, July 28, 2021 10:27 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Brooke Seymour <bseymour@mhfd.org>; Hung-Teng Ho <hho@udfcd.org>; Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD

Justen,

Thanks for the update. We will keep an eye out for the submittal at the end of the week.

Brooke is out all next week on PTO, I anticipate needing to verify a few things with her after reviewing the model. So that 8/6 approval date may shift a bit.

Would you still like to send us an amendment? We had some funds open up so the previously discussed $30K could increase. We are in the budget-wrapping season ahead of 2022 budget planning season so let us know if you have any questions before sending an amendment request over. I know these efforts have been more than originally planned.

Thanks,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
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Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

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MHFD
MILE HIGH FLOOD DISTRICT

From: Justen Hamann <jhamann@iconeng.com>
Sent: Saturday, July 24, 2021 09:57
To: Dan Hill <dhill@udfcd.org>
Cc: Brooke Seymour <bseymour@mhfd.org>; Hung-Teng Ho <hho@udfcd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: Clear Creek FHAD

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Hi Dan,

Just wanted to give you an update on some of the progress we have made on Clear Creek and go over our anticipated schedule with you. Your comments (in blue) and our responses/updates (in red) on several of the remaining issues are below:

Federal/Comment 142
Flow was not removed from the mainstem in order to evaluate the floodway on the mainstem, correct? Correct. I am seeing 12,800 cfs in the mainstem for XSs 26669 > 24755, which extends beyond the reaches of the Federal Split. Given that your floodway analysis has 100% conveyance under the railroad and not Federal, we will be able to revise with no floodway under Federal with appropriate documentation. Understood. No changes to the FW will be made in this area.

Lowell and Tennyson/Comment 152
Given flow is being subtracted from the mainstem and added to North Overflow in this reach, we need a little more analysis for these locations. If the 217 cfs (Tennyson spill), 728 cfs (Lowell spill), or 945 cfs (Tennyson + Lowell spills) is kept in the mainstem, does the mainstem experience an HGL/EGL rise ≥ 0.5'? If the answer is yes, we should retain the appropriate effective floodway area. I have looked more into this area and did some more analysis.

The main channel of Clear Creek unfortunately cannot handle the additional flow (no spill at Tennyson + Lowell = 945-cfs) for the floodway run without exceeding the HGL/EGL 0.5 foot requirement. 3 cross-sections between I-76 and the Lowell crossings (28381,28754, and 28893) would experience surcharges of up to 0.75' in the EGL and 0.71' in the HGL if the spills are eliminated for both crossings. I also tried eliminating just the Lowell spill (728-cfs) and that led to surcharges of up to 0.58' in the EGL and 0.55' in the HGL. Just eliminating the minor spill at Tennyson did result in acceptable surcharges so we wouldn't have to join the floodways from the North Overflow and the main channel at this location if we didn't want to. Let me know if you want any more information on this.

At this point, we plan on revising the floodway modeling and delineation in order to maintain the floodway at the Tennyson and Lowell crossings. We estimate that this should take a week or less at a cost not to exceed $10K.

XS 28088 / Comment 77
Agreed with Hung-Teng, having tie-in on I-76 embankment helps simplify the floodplain/way distinctions here. Please proceed with ROB realignment of XS. We are proceeding with these changes.

We have reviewed/addressed approximately 205 out of the 218 comments given to us in the point shapefile and are checking the addressed comments with an internal QC effort. The remaining comments are being worked on now and we plan to have those changes complete by 7/30/21.

Our anticipated schedule for the completion of the FHAD is below.

7/30/21	Model resubmittal
8/6/21	Model approval, including pocket areas, from MHFD
8/13/21	Workmap submittal
8/20/21	Workmap approval
8/27/21	Report – text, profiles, references submittal
9/3/21	Final comments on FHAD report due back
9/9/21	Final submittal to MHFD
9/16/21	Approval of FHAD at MHFD Board Meeting

Let us know if you have questions on any of this or foresee any problems in our meeting this schedule. One other thing – would you be interested in scheduling a weekly meeting to discuss these final steps and go over any questions? Maybe Tuesday afternoons at 2pm?

Thanks Dan!

Justen

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
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Troy Carmann

From: Dan Hill <dhill@mhfd.org>
Sent: Monday, August 16, 2021 11:27 AM
To: Justen Hamann; Troy Carmann
Cc: Brooke Seymour; Hung-Teng Ho
Subject: RE: Clear Creek FHAD - 8/2 Submittal

Justen and Troy,

Wanted to follow up on our discussion from this morning on the 4 XSs (2 on mainstem, 2 on Federal split) at the RTD Gold Line.

Please check if this link works for you: https://enginuity.egnyte.com/fl/3QVgKYv4B4/Clear_Creek_Gold_Line_.

Jeff Sickles/Enginuity had prepared this LOMC submittal but not gone through with the submittal per direction from Terri Fead.

This should include some as-built information along with a folder structure that echoes that of a DLOMC submittal.

Please let me know if these materials don't have something we can provide as sufficient documentation that the Gold Line is not inundated in the 500y (or if the link doesn't work).

Thank you,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

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From: Dan Hill
Sent: Thursday, August 12, 2021 16:28
To: Justen Hamann <jhamann@iconeng.com>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Cc: Brooke Seymour <bseymour@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Subject: RE: Clear Creek FHAD - 8/2 Submittal

Hi Justen, I'm out of the office tomorrow morning. I can talk Monday morning between 9-10:30am or 2-4pm if that helps ahead of Wednesday, or 1pm tomorrow.

Thanks,

From: Justen Hamann <jhamann@iconeng.com>
Sent: Thursday, August 12, 2021 10:49
To: Dan Hill <dhill@mhfd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Cc: Brooke Seymour <bseymour@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Subject: RE: Clear Creek FHAD - 8/2 Submittal

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Good Morning Dan,

I'm currently working through these comments and would like to schedule a call with you (and maybe Hung-Teng) to discuss some of the comments to make sure we're on the same page on those items. Do you have any availability tomorrow morning before noon?

In regards to the weekly meeting, I'll send out a recurring invite for Wednesday mornings from 9:30 to 11. I don't know if we'll need all of that timespan but wanted to get some time set aside and then work within that slot as needed. Let me know if this time works for you.

Thanks,
Justen

From: Dan Hill <dhill@mhfd.org>
Sent: Wednesday, August 11, 2021 8:25 AM
To: Justen Hamann <jhamann@iconeng.com>; Troy Carmann <tcarmann@iconeng.com>
Cc: Brooke Seymour <bseymour@mhfd.org>; Hung-Teng Ho <hho@udfcd.org>
Subject: RE: Clear Creek FHAD - 8/2 Submittal

Justen, sorry about that, the attached should work and have geometric features, please let me know if you see any more issues.

Thanks,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Tuesday, August 10, 2021 12:09
To: Dan Hill <dhill@mhfd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Cc: Brooke Seymour <bseymour@mhfd.org>; Hung-Teng Ho <hho@udfcd.org>
Subject: RE: Clear Creek FHAD - 8/2 Submittal

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Dan,

I've started taking a look at these but the comments shapefile has new comments in it but no geometric feature or point to map for any of those comments. Can you send a new shapefile with the relevant points?

Thanks,
Justen

From: Dan Hill <dhill@mhfd.org>
Sent: Monday, August 9, 2021 5:30 PM
To: Justen Hamann <jhamann@iconeng.com>; Troy Carmann <tcarmann@iconeng.com>
Cc: Brooke Seymour <bseymour@mhfd.org>; Hung-Teng Ho <hho@udfcd.org>
Subject: Clear Creek FHAD - 8/2 Submittal

Justen and Troy,

Updated comment shapefile, comments spreadsheet, and example adjusted model now on Dropbox at: https://www.dropbox.com/sh/dmchmndn7f4x6dx/AADuGbPXvQz_WIqYwHWQeoKPa?dl=0.

Comments Shapefile
We've kept a lot of comments open since they were related to mapping and we're anticipating your next submittal soon when we can revisit those. We do have new comments on the floodway. Most related to bank/channel station locations outside 100Y, or encroachments not within effective flow. One comment is related to the RTD Gold Line—more to come on that.

Comments Spreadsheet
This should provide more context to Hung-Teng's comments. Split across two tabs, one mostly follow-up from previous comments and the second on floodway encroachments.

Example Adjusted Model
Similar to our comments provided in January/February, Hung-Teng took first cut at adjusting the floodway model to address some excessive (negative and positive) surcharges. Please use this as a means/go-by of addressing some of his comments.

Other items:

- Weekly Meeting: Troy suggested this in an earlier email to me. I think this would be great to keep the ball rolling. Monday afternoons at 2pm are good for me, Wednesday mornings also good, Tuesdays are generally difficult but workable.
- Amendment: Troy – your proposal looks good, I will respond to that email directly as well but you can PDF what you sent and we can start drafting an amendment.
- Schedule/upcoming mapping submittal: let us know if these comments change your anticipated schedule for mapping submittal.

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
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Troy Carmann

From: Dan Hill <dhill@mhfd.org>
Sent: Friday, August 20, 2021 8:15 AM
To: Justen Hamann
Cc: Hung-Teng Ho; Brooke Seymour; Troy Carmann
Subject: RE: Clear Creek FHAD Model Submittal

Thanks Justen, files received.

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
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Protecting People, Property, and our Environment

MILE HIGH FLOOD DISTRICT

From: Justen Hamann <jhamann@iconeng.com>
Sent: Thursday, August 19, 2021 17:40
To: Dan Hill <dhill@mhfd.org>
Cc: Hung-Teng Ho <hho@mhfd.org>; Brooke Seymour <bseymour@mhfd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: Clear Creek FHAD Model Submittal

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Hi Dan,

We have completed reviewing and addressing the latest model comments and have uploaded the models and GIS shapefiles (including our comment responses in the usual point shapefile format) to OneDrive. Please use the link below to download the files and let me know if you run into any problems accessing the files.

20210819_ModelReview

Thanks,
Justen

Troy Carmann

From: Dan Hill <dhill@mhfd.org>
Sent: Wednesday, September 1, 2021 10:22 AM
To: Justen Hamann; Hung-Teng Ho
Cc: Troy Carmann; Brooke Seymour
Subject: RE: Clear Creek submittal 8/19

Justen,

Model is approved. Let's move on to mapping, which you've submitted already and we have begun reviewing.

Since we reviewed just the multi-profile and floodway plans with your 8/25 submittal, please start working toward assembling a complete HEC-RAS model. This should include all geometries and plans, the main overall surface, the relevant projection file in the model folder for RAS Mapper, and removal of anything in RAS Mapper associated with superceded geometries or results.

Please let us know if you have any questions.

Thanks,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

---

From: Dan Hill
Sent: Monday, August 30, 2021 17:13
To: Justen Hamann <jhamann@iconeng.com>; Hung-Teng Ho <hho@mhfd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Brooke Seymour <bseymour@mhfd.org>
Subject: RE: Clear Creek submittal 8/19

Justen,

Let's move forward using the geometry **without** reach length corrections. This will simplify Agreement Tables, report, other associated documents for now by not needing to retitle each XS #.

I'd made this same comment on previous model submittals. We'd moved forward without reach length corrections based on the fact that the cumulative error was a very small fraction of the overall reach length of Clear Creek Reach_1 (per your email below, 0.022%). While this may be following current FEMA Guidelines and Standards, we are getting this comment from more and more as we go through PMRs. It's easier to revise now than a few years in the future when a consultant has finished their contract. Something to keep in mind when we go through other FHADs in the future.

Thanks,

From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, August 25, 2021 17:16
To: Hung-Teng Ho <hho@mhfd.org>; Dan Hill <dhill@mhfd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek submittal 8/19

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Hi Hung-Teng,

I have taken a look at your comments and addressed them in updated HEC-RAS models that can be downloaded using the below link.

20210825_ModelReview

Here are my responses to the comments as well.

1. The channel reach lengths for Reach 1 were recut based on the current centerline using GEO-HEC-RAS and then saved as new plans in the HEC-RAS models. I then compared both sets of reach lengths and documented those results in the attached spreadsheet. I only updated the channel reach lengths and not the left or right overbanks. The updated models include plans containing multi-profile and floodway runs for both "Reach Length Corrected" and original reach length versions (4 plans in total) so comparisons can be easily made. The impact to the results was very minimal but there a few drawbacks to the "Reach Length Corrected" versions. Since the cross-section numbering is based on the original reach length distances, there is now a slight discrepancy between the cross-section name and total channel reach length at each section as one moves up the drainageway. Additionally, since many of the floodway encroachment stations are based on the exact STA. where the 100-YR WSEL intersects the cross-section, this may introduce areas where the floodway encroachments are slightly outside of limits of effective flow. On the positive side, I didn't see any crossing profile issues or unallowable floodway surcharges due to the change in reach lengths. Please review and let us know which set of models you would like us to use. I believe both model sets will meet FEMA allowable tolerance requirements as the total channel reach length discrepancy in the original length versions is off by 0.022% when compared to what will be shown on the maps.
2. The floodway encroachments at 41282 and 41357 have been changed (in both sets of plans) to be located exactly at the IFA stations at both of these cross-sections. This caused some negative FW surcharges to develop requiring changes to the bank stations at sections 41282, 41357, and 41417.

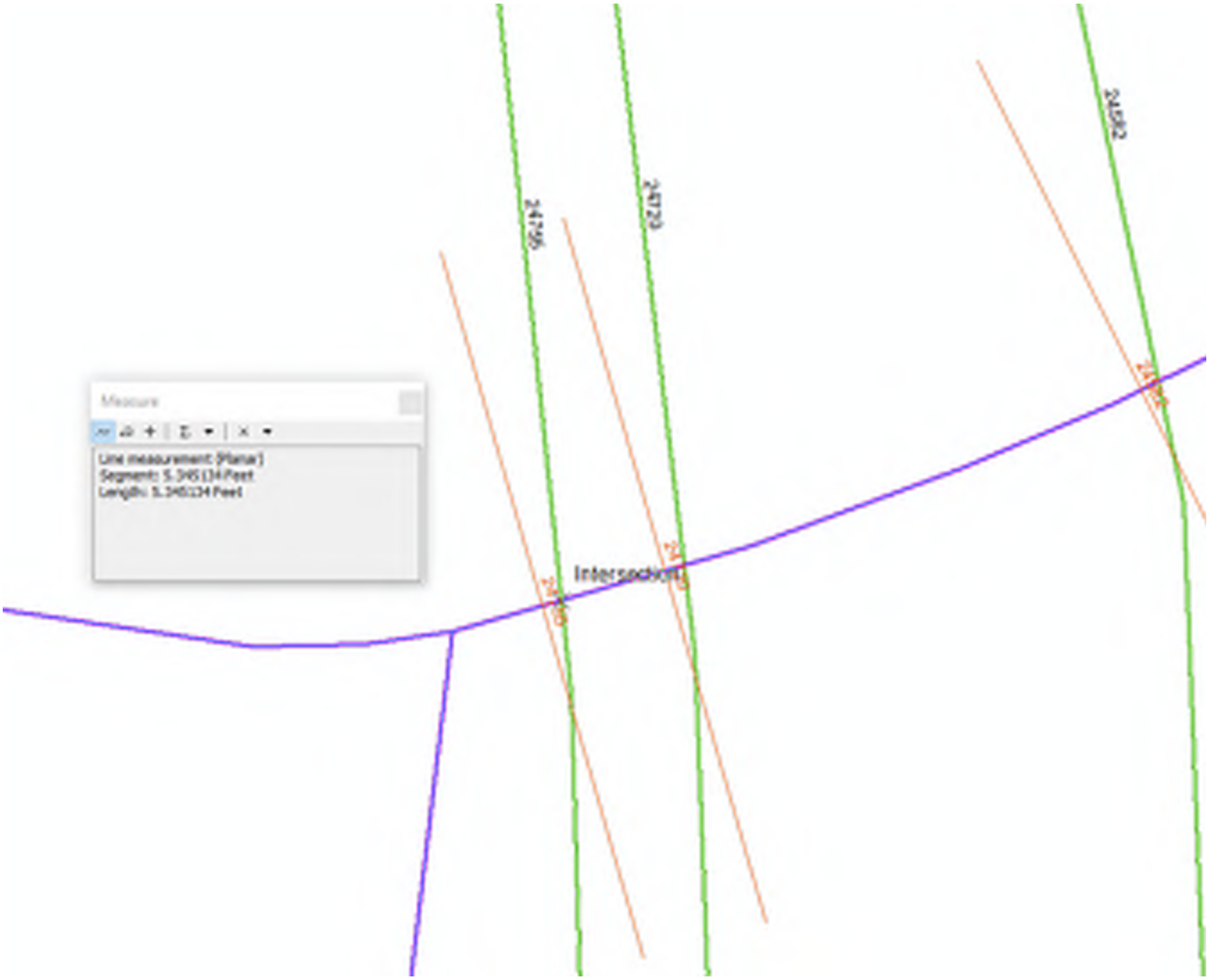
Thanks,
Justen

From: Hung-Teng Ho <hho@mhfd.org>
Sent: Wednesday, August 25, 2021 9:52 AM
To: Justen Hamann <jhamann@iconeng.com>; Dan Hill <dhill@mhfd.org>
Cc: Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek submittal 8/19

Justen,

I have two comments about the hydraulic model.

1. The reach lengths in the HEC-RAS hydraulic model do not match the reach lengths measured along the stream centerline.



2. The following comments about floodway were missed.

154	252	Point		290	8/9/2021	Open	Floodway	Regarding previous comment 93: see comment spreadsheet.

Thanks,
Hung-Teng

Hung-Teng Ho, P.E., CFM
Hydraulic Modeler
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From: Justen Hamann <jhamann@iconeng.com>
Sent: Tuesday, August 24, 2021 2:05 PM
To: Dan Hill <dhill@mhfd.org>
Cc: Hung-Teng Ho <hho@mhfd.org>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek submittal 8/19

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Hi Dan,

I reviewed the below comments you had and have a new set of models to download which addresses these issues.

20210824_ModelReview

I also have a table with responses to the comments in No. 1 below. We can also go over these at the meeting tomorrow.

River	Reach	River Sta	Test L, ft	Test R, ft	Response
ClearCreek	Reach_1	2942	ok	986.17	Fixed
ClearCreek	Reach_4	31387	-539.95	ok	These are just downstream of Tennyson St. bridge. Based on the meeting before submittal with MHFD, the LOB will be shown as FW without changing IFAs.
ClearCreek	Reach_4	31579	-500.22	ok	
ClearCreek	Reach_4	31778	-373.33	ok	
ClearCreek	Reach_5	61187	-3.35	4.28	Due to bridge modeling approach option error at D/S Ped. Bridge which is now fixed.
ClearCreek	Reach_5	65211	-0.72	1.47	Fixed
ClearCreek	Reach_5	90603	-2.56	1001.1	Caused neg. surcharges but was able to change bank STAs. to fix.
ClearCreek	Reach_5	91865	-2.76	907.98	Fixed
ClearCreek	Reach_5	91890	ok	925.82	Fixed

Comment 2 concerned me a bit as we didn't have many changes or comments to address in this area from the previous submittal. After some model investigation, it turns out that the ped. Bridge in this area somehow had the bridge modeling approach options changed to exclude pressure/weir flow. It has now been switched back to consider pressure/weir which fixed the FW surcharge and encroachment issue @ 61187 mentioned in the table.

Thanks,
Justen

From: Dan Hill <dhill@mhfd.org>
Sent: Tuesday, August 24, 2021 11:45 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Hung-Teng Ho <hho@mhfd.org>
Subject: Clear Creek submittal 8/19

Justen,

Ahead of our meeting tomorrow I wanted to mention two things I've noticed with Friday's submittal.

1. I'm still seeing some floodway encroachments outside of effective flow for the following XSs:

River	Reach	River Sta	Test L, ft	Test R, ft
ClearCreek	Reach_1	2942	ok	986.17
ClearCreek	Reach_4	31387	-539.95	ok
ClearCreek	Reach_4	31579	-500.22	ok
ClearCreek	Reach_4	31778	-373.33	ok
ClearCreek	Reach_5	61187	-3.35	4.28
ClearCreek	Reach_5	65211	-0.72	1.47
ClearCreek	Reach_5	90603	-2.56	1001.1
ClearCreek	Reach_5	91865	-2.76	907.98
ClearCreek	Reach_5	91890	ok	925.82

2. WS or EG Profile increases > 0.5' at ClearCreek, Reach_4, XS 60806 (EG, 1.19') and ClearCreek, Reach_5, XS 61187 (WS, 1.74'). These two XSs bound the downstream end of the Tabor Lake Split. Tabor Lake Split XS 435 also seeing large deltas but we don't have a FW for the split flow.

Thanks,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
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Troy Carmann

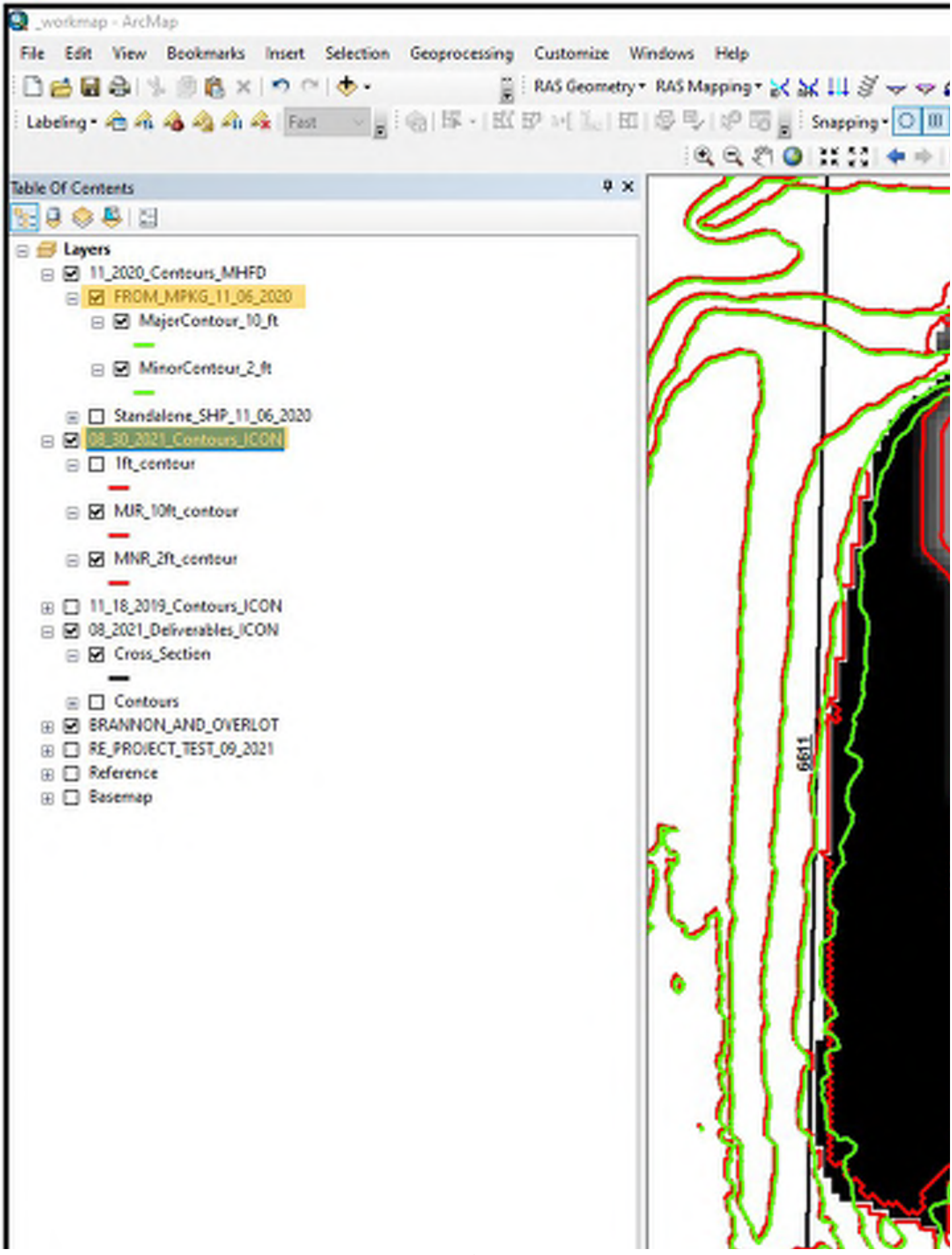
From: John Klier
Sent: Tuesday, September 7, 2021 12:41 PM
To: Dan Hill; Hung-Teng Ho
Cc: Justen Hamann; Troy Carmann; Darren Harder
Subject: RE: Clear Creek FHAD Contours

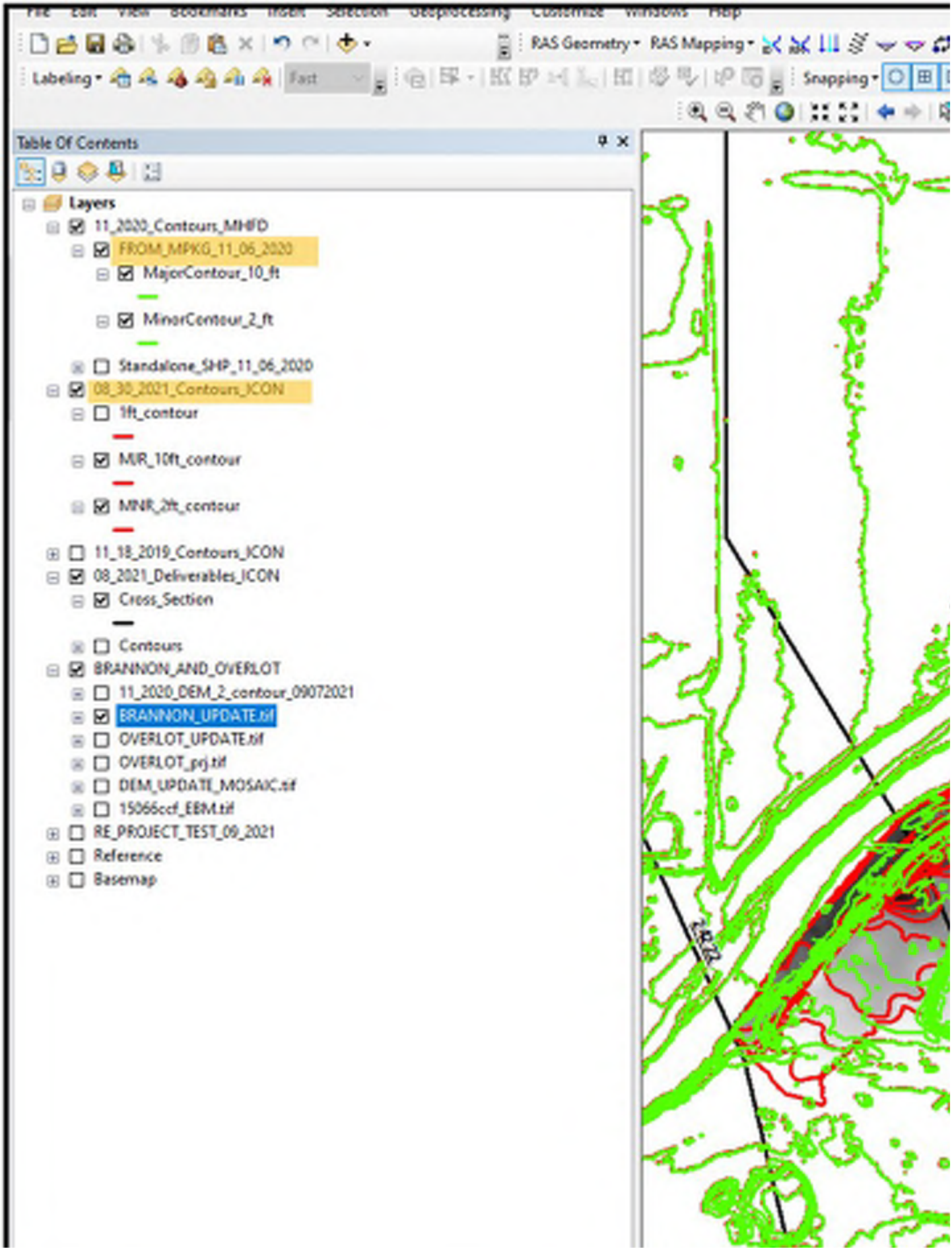
Good afternoon Dan,

I hope you had an excellent holiday weekend.

Many thanks for sending the original dropbox link. I can say with confidence that you are good to move forward utilizing the August 30, 2021 deliverable contours as the guide for comments.

I was able to locate the contour shapefiles and map package on our server that match what was in dropbox. The map package was sent 11/06/2020 and would have prompted the Brannon + Overlot updates. The current deliverable contours were generated 11/18/2020 and didn't make it over in deliverable file format until this most recent August 30, 2021 delivery (see screen shots below for comparison of the 11/06/20 map package contours vs 08/30/21 contours (Brannon + Overlot update)). Any shift seen outside the Brannon or Overlot areas would have been introduced by the EPSG updates, but the current delineation is based off the 11/18/20 set, factoring in any shift compared to the 11/06/20 map package contours.


_workmap - ArcMap
File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help
RAS Geometry RAS Mapping
Labeling Fast Snapping
Table Of Contents
Layers
11_2020_Contours_MHFD
FROM_MPKG_11_06_2020
MajorContour_10_ft
MinorContour_2_ft
Standalone_SHP_11_06_2020
08_30_2021_Contours_ICON
1ft_contour
MJR_10ft_contour
MNR_2ft_contour
11_18_2019_Contours_ICON
08_2021_Deliverables_ICON
Cross_Section
Contours
BRANNON_AND_OVERLOT
RE_PROJECT_TEST_09_2021
Reference
Basemap
6611


File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help
RAS Geometry
RAS Mapping
Labeling
Fast
Snapping
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Standalone_SHP_11_06_2020
08_30_2021_Contours_ICON
1ft_contour
MJR_10ft_contour
MNR_2ft_contour
11_18_2019_Contours_ICON
08_2021_Deliverables_ICON
Cross_Section
Contours
BRANNON_AND_OVERLOT
11_2020_DEM_2_contour_09072021
BRANNON_UPDATE.tif
OVERLOT_UPDATE.tif
OVERLOT_prj.tif
DEM_UPDATE_MOSAIC.tif
15066ccf_EBM.tif
RE_PROJECT_TEST_09_2021
Reference
Basemap

Hopefully that clears things up, and we are on the same page with contours moving forward. Let us know if there are any issues on your end.

Thanks,

John

From: Dan Hill <dhill@mhfd.org>
Sent: Friday, September 3, 2021 12:47 PM
To: John Klier <jklier@iconeng.com>; Hung-Teng Ho <hho@mhfd.org>
Cc: Justen Hamann <jhamann@iconeng.com>; Troy Carmann <tcarmann@iconeng.com>; Darren Harder <dharder@iconeng.com>
Subject: RE: Clear Creek FHAD Contours

John,

Sure thing. Original submittal is on project Dropbox at: https://www.dropbox.com/sh/d2dbhtdntqmic36/AABO0wGonZzNr5Zc_IiRwVNUa?dl=0. They were in a map package, and we exported them.

I've also zipped and am currently posting the November contours separately there ("MJR_10ft_contour.zip" and "MNR_2ft_contour.zip").

Thanks,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

---

From: John Klier <jklier@iconeng.com>
Sent: Friday, September 3, 2021 12:42
To: Dan Hill <dhill@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Cc: Justen Hamann <jhamann@iconeng.com>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Darren Harder <dharder@iconeng.com>
Subject: RE: Clear Creek FHAD Contours

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Hi Dan,

Would it be possible for you to send the Nov 2020 version of the contours you are working with? The version that I have on our server isn't replicating the shift seen in your original screen shot (only when I re-project as seen in my previous

email). I want to be absolutely sure where we stand with the Nov 2020 versioning before advising an override to the Wednesday morning meeting decision.

Many thanks,

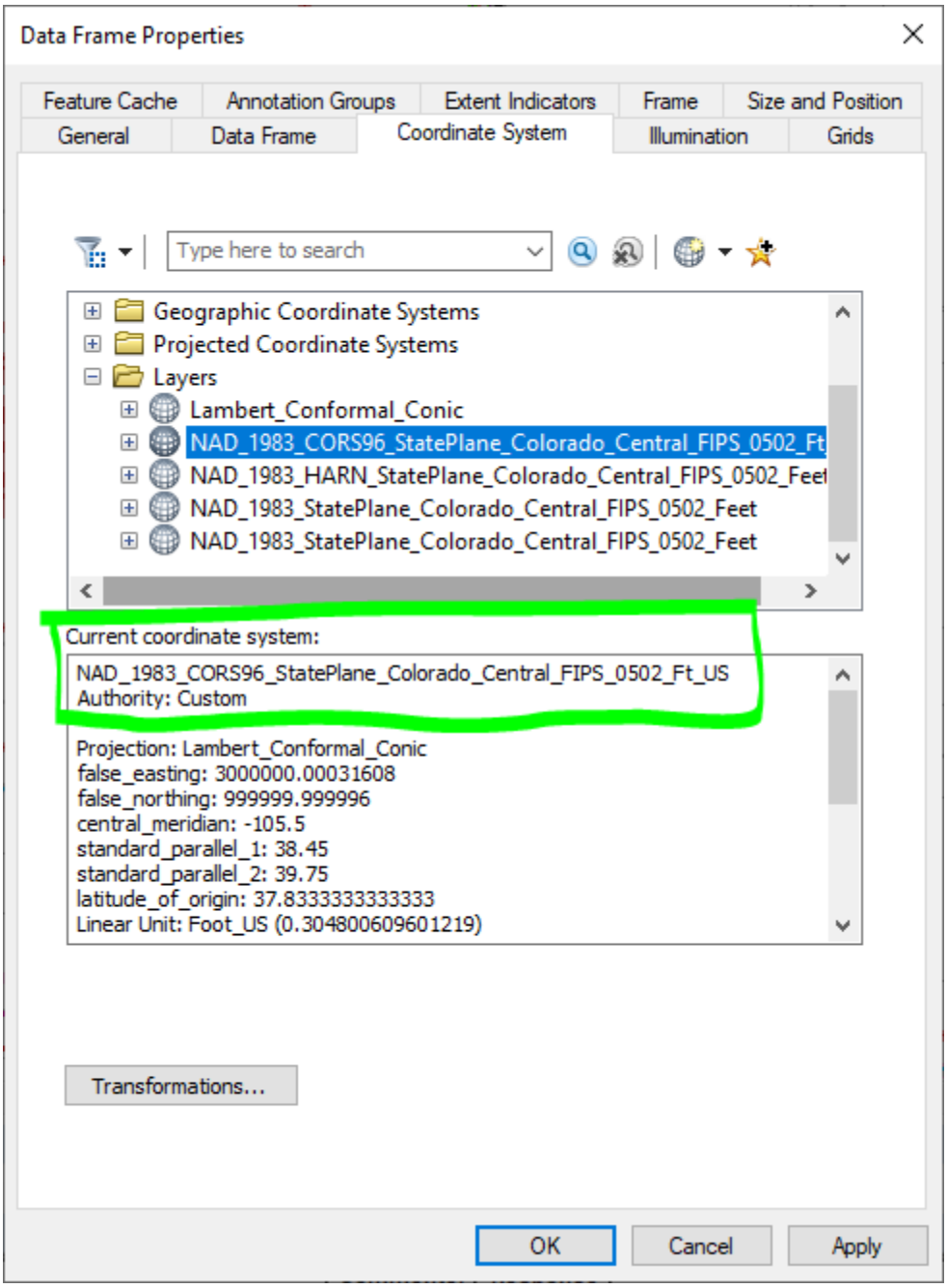
John

From: Dan Hill <dhill@mhfd.org>
Sent: Friday, September 3, 2021 12:04 PM
To: John Klier <jklier@iconeng.com>; Hung-Teng Ho <hho@mhfd.org>
Cc: Justen Hamann <jhamann@iconeng.com>; Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD Contours

John,

Thanks for the description. Our decision in Wednesday morning's call was for Hung-Teng and I to continue to use the November 2020 contours for review of mapping and not the August 2021 contours, given the shift we're seeing in our ArcMap files. I'm having difficulty understanding all these shifts, so I'll ask a potentially oversimplified question: should we revise that decision from Wednesday?

Part of the reason that decision is important is that we're not seeing a similar shift in the mapping/floodplains/delineations, even though the EPSG changed there too from Nov/Dec2020>Aug2021, but between different projections (from a non-EPSG projection, screenshot below, to EPSG 2232):



So when it comes to some of my mapping comments related to excessive contour crossing, the revised August 2021 mapping doesn't cross August 2021 contours excessively in the same areas, but it does cross the November 2020 contours a lot in the same areas:

Thanks,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

From: John Klier jklier@iconeng.com
Sent: Thursday, September 2, 2021 15:56
To: Dan Hill <dhill@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Cc: Justen Hamann <jhamann@iconeng.com>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD Contours

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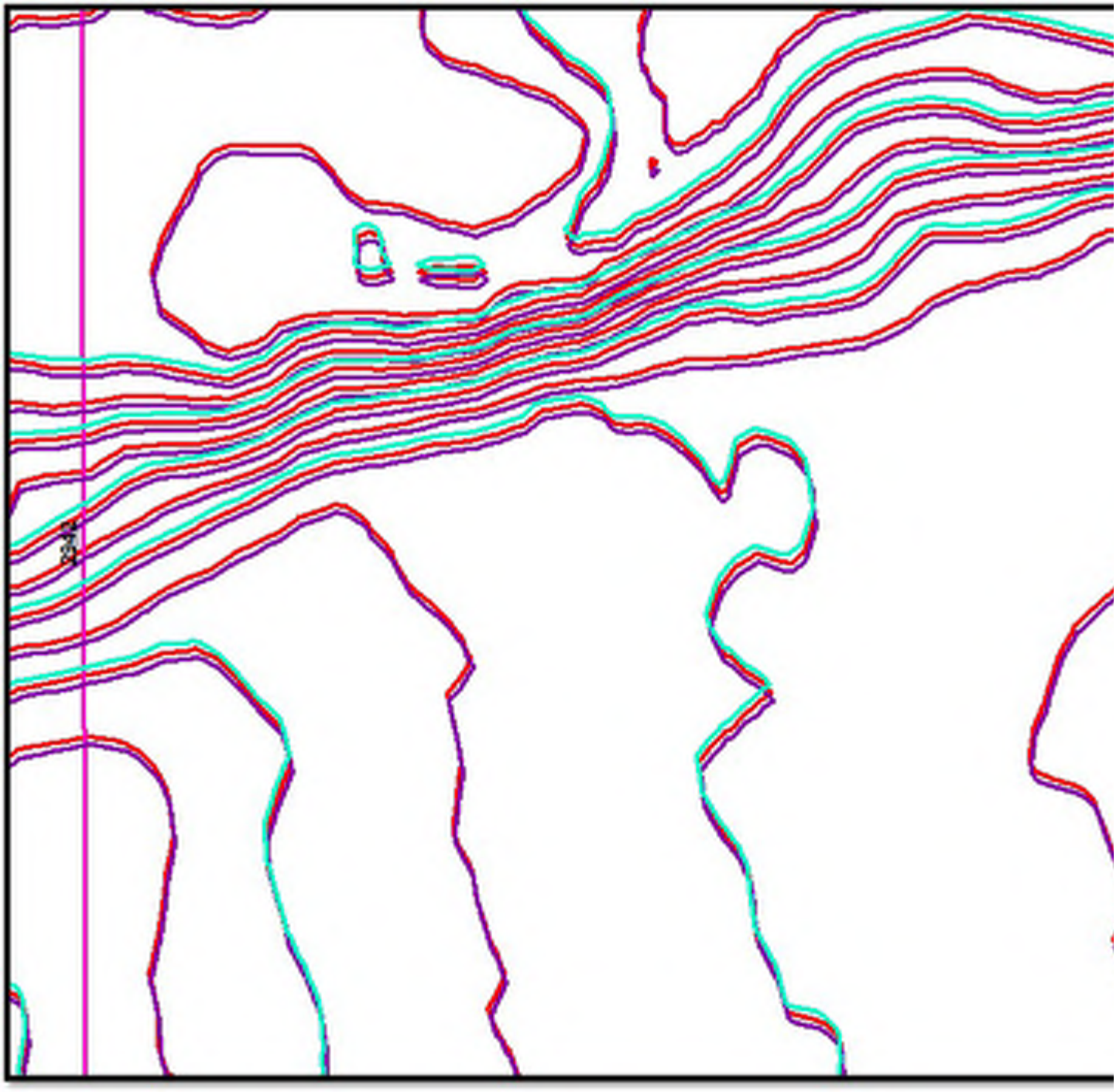
Hi Dan,

Sorry for the delay in getting back to you, I had to dive a bit deeper to replicate the shift, but I am confident I know what the issue is now. From what I've gathered running a re-project on the November 2020 contours (EPSG 2877) to EPSG 2232 creates the shift due to the geographic transformation being applied. The August 2021 data set which started in EPSG 2877 was loaded via feature class to feature class into the MHFD formatted geodatabase set to EPSG 2232 thereby retaining EPSG 2232 on the feature class but applying no transformation (this is why I wasn't seeing the shift between the November 2020 standalone shapefile vs the August 2021 feature class).

The following screen shot shows the August 2021 contours in red (EPSG 2232), the November 2020 contours re-projected from 2877 to EPSG 2232 in purple, and the August 2021 contours re-projected from 2232 to EPSG 2877 in green (this looks like the shift from Nov '20 to August '21 / yellow to dark gray in your screen shot). Both purple and green shift from the red baseline contours when re-projected.



Due to the contours being originally generated in EPSG 2877 (September 2016), the November 2020 surface (accounting for Overlot + Brennan) retained this. Loading the contours into the formatted geodatabase feature class represents most accurately the contours used for delineation on the ICON end. Hopefully this helps clear up why we see the shift when files are re-projected vs loaded into a feature class with a different projection.

I am happy to jump on a call to discuss further.

Many thanks,

John

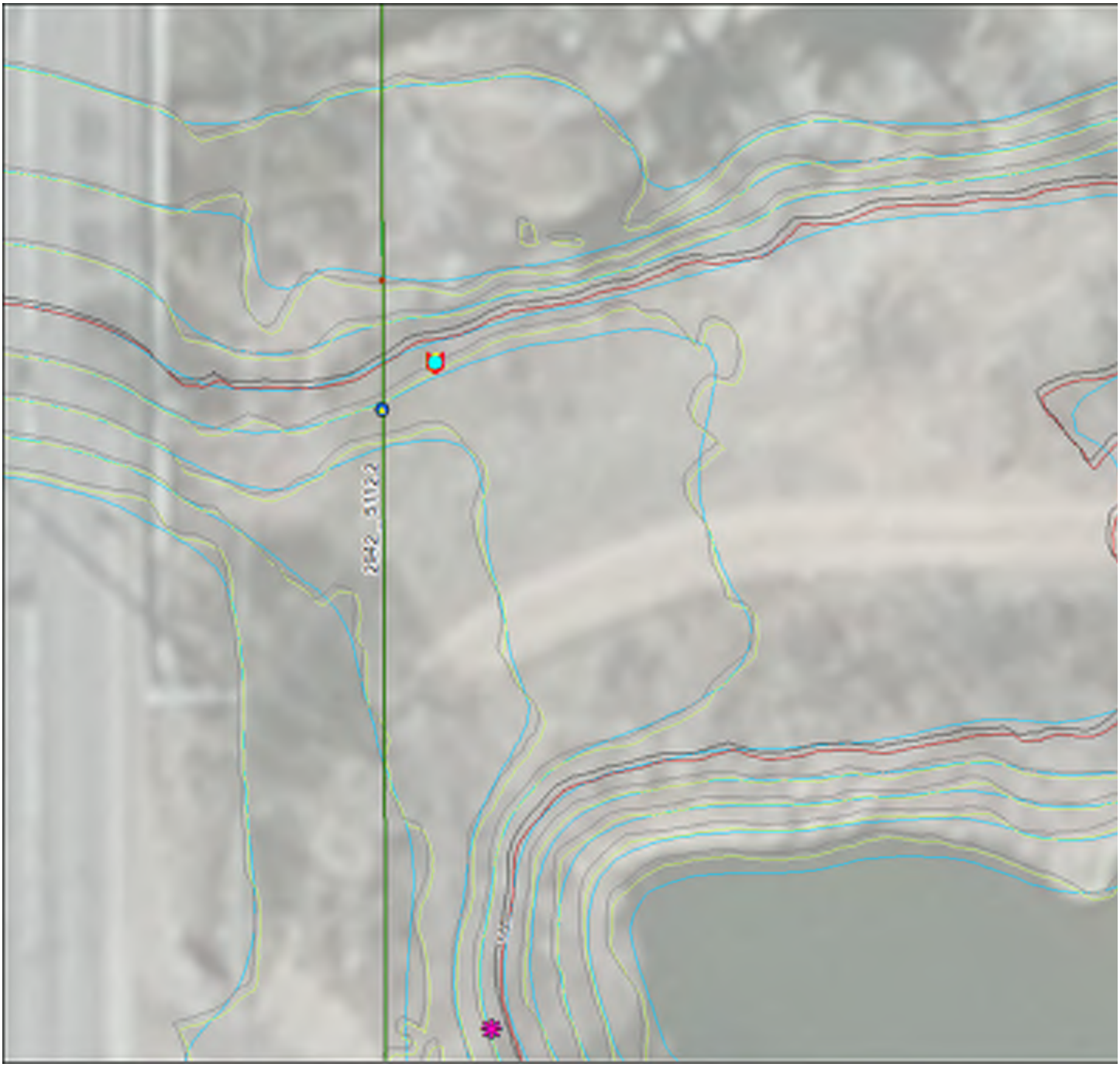
From: Dan Hill <dhill@mhfd.org>
Sent: Thursday, September 2, 2021 10:03 AM
To: John Klier <jklier@iconeng.com>; Hung-Teng Ho <hho@mhfd.org>
Cc: Justen Hamann <jhamann@iconeng.com>; Troy Carmann <tcarmann@iconeng.com>
Subject: RE: Clear Creek FHAD Contours

Hi John,

Thanks for the clarification.

We're seeing a larger shift in ArcMap (10.6.1) than what you're observing, on the order of +1' in the X and -1' in the Y in the August 2021 (EPSG 2232) contours when compared to the November 2020 (EPSG 2877) contours. The September 2016 (also EPSG 2877) were groomed/smoothed by ICON from the LAS point files and those more closely correspond to the November 2020 contours. Screenshot from ArcMap below from Hung-Teng (blue = Sep '16 smoothed, yellow/red = Nov '20, gray/dark gray = Aug '21).

No issue with having everything in EPSG 2232, that makes sense, but is re-projecting (in ArcMap?) something worth trying to avoid this shift?



Thanks,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

Protecting People, Property, and our Environment

MHFD
MILE HIGH FLOOD DISTRICT

From: John Klier <jklier@iconeng.com>
Sent: Wednesday, September 1, 2021 16:36
To: Dan Hill <dhill@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Cc: Justen Hamann <jhamann@iconeng.com>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: Clear Creek FHAD Contours

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Good afternoon,

My apologies for the confusion regarding the most recent contour file submittal on the Clear Creek FHAD. The contours submitted 11/2020 were from a prior workmap and were projected in EPSG 2877 CO State Plane Central (HARN). Since then, we have migrated to Arcgis Pro and ingested all files into a geodatabase set to EPSG 2232 CO State Plane Central projection. I haven't been able to replicate a 2' shift between the data sets, but see a consistent 0.0001' shift in ArcMap, and 0.4' shift in QGIS due to how it handles 'on the fly' projections.

We can deliver the file in any preferred projection, but as it stands all deliverable files and depictions in the workmaps have been standardized on EPSG 2232 CO State Plane Central. Please let me know if you would prefer and I will update accordingly.

Many thanks,

John Klier
GIS Specialist
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
Office: (303) 221-0802 x 220 | jklier@iconeng.com

Troy Carmann

From: Dan Hill <dhill@mhfd.org>
Sent: Tuesday, September 21, 2021 4:49 PM
To: Troy Carmann; Justen Hamann
Cc: Hung-Teng Ho; Charlie Pajares
Subject: Clear Creek FHAD draft report - comments
Attachments: Clear Creek FHAD Report 2021_dh - Report Only.pdf

Troy and Justen,

I've attached my PDF with comments on the main body of the report. Ongoing review for the appendices right now.

I think we can omit any references to the 1979 FHAD as that may be legacy language from the 2007 FHAD where the 1979 FHAD had been the previously effective study.

The Appendices should be reworked, I feel they can be simplified if the various modeling tech memos are all combined into the Hydraulic Analysis Support Documents Appendix (C) following the August 2017 FHAD Guidelines.

We can discuss in our check-in meeting tomorrow morning.

Thanks,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

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MILE HIGH FLOOD DISTRICT

Troy Carmann

From: Dan Hill <dhill@mhfd.org>
Sent: Wednesday, September 22, 2021 9:47 AM
To: Justen Hamann; Hung-Teng Ho
Cc: Troy Carmann; Charlie Pajares
Subject: RE: Clear Creek Workmaps
Attachments: MHFD_Comments_20210908.zip; 2021.09.08_Clear Creek FHAD _MHFD Review Comments.xlsx

Justen, mapping comments attached both in spreadsheet and shapefile. These should incorporate the comments already sent 9/8 by Hung-Teng.

Please let us know if you'd like to discuss as you review or get into addressing them.

Thanks,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

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MILE HIGH FLOOD DISTRICT

From: Dan Hill
Sent: Wednesday, September 8, 2021 17:06
To: Justen Hamann <jhamann@iconeng.com>; Hung-Teng Ho <hho@mhfd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek Workmaps

Justen,

Please see attached for follow-up comments from Hung-Teng.

General comments we discussed this morning:

1. The 100- and 500-year floodplain delineations include quite a few small islands and isolated small ponding areas. Do we want further clean up or call it good?
2. There are a few locations where the floodway is beyond the 100-year floodplain boundary and the 100-year floodplain boundary is beyond the 500-year floodplain.

Thanks,

From: Dan Hill
Sent: Monday, August 30, 2021 17:25
To: Justen Hamann <jhamann@iconeng.com>; Hung-Teng Ho <hho@mhfd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: RE: Clear Creek Workmaps

Thanks Justen, files received. We will begin review based on our previous comments.

I still need some clarity internally about report timeline. I will work on that tomorrow ahead of our weekly Wednesday morning check-in.

Let's keep rolling!

From: Justen Hamann <jhamann@iconeng.com>
Sent: Monday, August 30, 2021 12:09
To: Dan Hill <dhill@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: Clear Creek Workmaps

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Hi Dan and Hung-Teng,

An updated workmap submittal for the Clear Creek FHAD is ready for your review using the OneDrive link below. The submittal contains the GIS data (both shapefiles and Geodatabase) as well as updated PDF versions of the workmaps. The previous Comment Response shapefile we provided in the August 19th model submittal should have our relevant responses to the latest workmap comments.

20210830_Workmaps

We are also working on updated agreement tables to go along with the workmaps and should have those ready for your review by mid-week sometime.

Please let me know if you have any problems downloading the data or you need anything more for this review.

Thanks,
Justen

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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Troy Carmann

From: Charlie Pajares <cpajares@mhfd.org>
Sent: Tuesday, October 19, 2021 5:04 PM
To: Justen Hamann
Cc: Troy Carmann; Hung-Teng Ho; Brooke Seymour; Dan Hill
Subject: RE: Clear Creek updated mapping and tables
Attachments: Clear Creek Profiles_All Channels_MHFD_noted.pdf

Justen and Troy –

Please see attached for our comments on the FHAD profiles from your previous submittal. This should be the last piece of the puzzle. Please let me know if you have any questions.

Thanks for all your work on this one.

Charlie Pajares, P.E., CFM
Project Engineer
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave. Suite 156-B | Denver, CO 80211
Office: 303-455-6277 | **Direct:** 303-253-7972 | www.mhfd.org

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MILE HIGH FLOOD DISTRICT

From: Charlie Pajares
Sent: Monday, October 18, 2021 11:59 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Hung-Teng Ho <hho@mhfd.org>; Brooke Seymour <bseymour@mhfd.org>; Dan Hill <dhill@mhfd.org>
Subject: RE: Clear Creek updated mapping and tables

Justen – Please see attached for the Tabor Lake split table review comments.

Thanks

From: Dan Hill <dhill@mhfd.org>
Sent: Monday, October 18, 2021 9:56 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Charlie Pajares <cpajares@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>; Brooke Seymour <bseymour@mhfd.org>
Subject: Re: Clear Creek updated mapping and tables

Justen,

Attached are a comment shapefile on the mapping and comments on the ATs/FPFWDTs received 10/5-6 (save for Tabor Lake, which we are finishing now). We are also finishing review of the profiles. I've also added these items to the project Dropbox under: Review/20211005_Model_Map_Tables.

Comment shapefile
The comment shapefile has added columns with follow-ups on old comments (in regular state plane, not HARN). We also have new comments on the mapping. As we've mentioned in our check-in calls, we are reviewing against the November 2020 HARN contours which do not feature a shift. We are still seeing excessive contour crossings in your delineations against those contours, and floodplain "islands" that need evaluation.

ATs/FPFWDTs
Please see our comments in the columns to the right of each spreadsheet. We are finishing review of the Tabor Lake split today.

Schedule
As we've discussed in our check-in meetings, we are planning on your closing these comments and submitting final versions of the PDF report (with appendices), model, work maps, and shapefiles by COB 10/27. The remainder of the technical appendices can be submitted afterwards. We need these final documents to ensure we have everything ahead of our resolution for the Board meeting in November. Our internal schedule requires those resolutions on Monday 11/1.

Please feel free to give me a call if you need clarification on any of these items or comments or need to discuss schedule.

Thanks,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Wednesday, October 6, 2021 09:03
To: Dan Hill <dhill@mhfd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Charlie Pajares <cpajares@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Subject: RE: Clear Creek updated mapping and tables

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Hi Dan,

The Excel tables have been added to the OneDrive folder. I'll also include a direct link to download just those files below.

Excel Tables

Thanks,
Justen

From: Dan Hill <dhill@mhfd.org>
Sent: Tuesday, October 5, 2021 3:48 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Charlie Pajares <cpajares@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Subject: RE: Clear Creek updated mapping and tables

Thanks Justen, could you also sent the ATs and FPFWDTs in Excel? Will help expedite our review.

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Tuesday, October 5, 2021 14:13
To: Dan Hill <dhill@mhfd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Charlie Pajares <cpajares@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Subject: RE: Clear Creek updated mapping and tables

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Dan,

The updated mapping and tables are available for your review. We included our comment responses (in PDF form but originally based in Excel) and the updated HEC-RAS modeling too. Let me know if I forgot anything or you have any issues downloading the files.

20211005_Workmaps

Thanks,
Justen

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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From: Justen Hamann
Sent: Tuesday, October 5, 2021 12:55 PM
To: Dan Hill <dhill@mhfd.org>
Cc: Troy Carmann <tcarmann@iconeng.com>; Charlie Pajares <cpajares@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Subject: RE: Clear Creek updated mapping and tables

We found some topology errors with our revised delineations that we are currently cleaning up. We should be ready in the next hour or so.

Justen

From: Dan Hill <dhill@mhfd.org>
Sent: Tuesday, October 5, 2021 12:49 PM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Charlie Pajares <cpajares@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Subject: RE: Clear Creek updated mapping and tables

Justen, how are we looking?

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

---

From: Justen Hamann <jhamann@iconeng.com>
Sent: Monday, October 4, 2021 16:54
To: Dan Hill <dhill@mhfd.org>
Cc: Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Charlie Pajares <cpajares@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Subject: RE: Clear Creek updated mapping and tables

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Dan,

Just a quick update. We're down to the final GIS cleanup but won't be able to have that completed tonight. As soon as it's done tomorrow morning, I'll be in touch with the download link.

Thanks,
Justen

From: Justen Hamann
Sent: Monday, October 4, 2021 12:04 PM
To: Dan Hill <dhill@mhfd.org>
Cc: Troy Carmann <tcarmann@iconeng.com>; Charlie Pajares <cpajares@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Subject: RE: Clear Creek updated mapping and tables

Hi Dan,

Yes, we we're working towards making a submittal by COB today. We decided to allocate a bit more time for QC on Friday which pushed us back to today. I'll let you know if our plan changes, but you should see a submittal later today.

Thanks,
Justen

Justen Hamann, P.E.
Project Manager
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 | www.iconeng.com | jhamann@iconeng.com

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From: Dan Hill <dhill@mhfd.org>
Sent: Monday, October 4, 2021 10:50 AM
To: Justen Hamann <jhamann@iconeng.com>
Cc: Troy Carmann <tcarmann@iconeng.com>; Charlie Pajares <cpajares@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Subject: Clear Creek updated mapping and tables

Justen, should we anticipate updated mapping and tables today? It'd be best for us to review this week to put us all in a good position to wrap everything by COB 10/29.

Thanks,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

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Troy Carmann

From: Dan Hill <dhill@mhfd.org>
Sent: Thursday, October 21, 2021 4:19 PM
To: Troy Carmann; Justen Hamann
Cc: Brooke Seymour; Charlie Pajares; Hung-Teng Ho
Subject: Clear Creek - something to help for Appendix A
Attachments: Clear Creek Submittals etc.xlsx

Troy,

As we discussed yesterday, attached is my spreadsheet tracking submittals, memos, meetings, etc. Please make sure to include emails surrounding the meetings and decisions for Appendix A of the FHAD Report. I haven't updated this since the end of August, so it's missing our weekly check-ins and the 9/10 and 10/5-6 submittals.

Thanks,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

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Troy Carmann

From: Dan Hill <dhill@mhfd.org>
Sent: Thursday, October 21, 2021 4:20 PM
To: John Klier
Cc: Justen Hamann; Troy Carmann; Charlie Pajares; Hung-Teng Ho
Subject: Re: Clear Creek Contour Update 10/14/2021

Thanks John!

Charlie and I are out tomorrow but we will look on Monday and make sure we don't have any questions. Thanks for following this one all the way to the end.

Thanks,

Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager
MILE HIGH FLOOD DISTRICT
Office: 303-455-6277 | **Direct:** 303-749-5427 | www.mhfd.org

---

From: John Klier <jklier@iconeng.com>
Sent: Thursday, October 21, 2021 14:40
To: Dan Hill <dhill@mhfd.org>
Cc: Justen Hamann <jhamann@iconeng.com>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>; Charlie Pajares <cpajares@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Subject: RE: Clear Creek Contour Update 10/14/2021

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Good afternoon Dan,

Happy to help where I can to get this issue resolved. There is certainly a silver lining to the pitfalls experienced with the elevation data on this project – and totally agree that despite the rocky road to get there, the lessons learned will be invaluable down the line for process improvement.

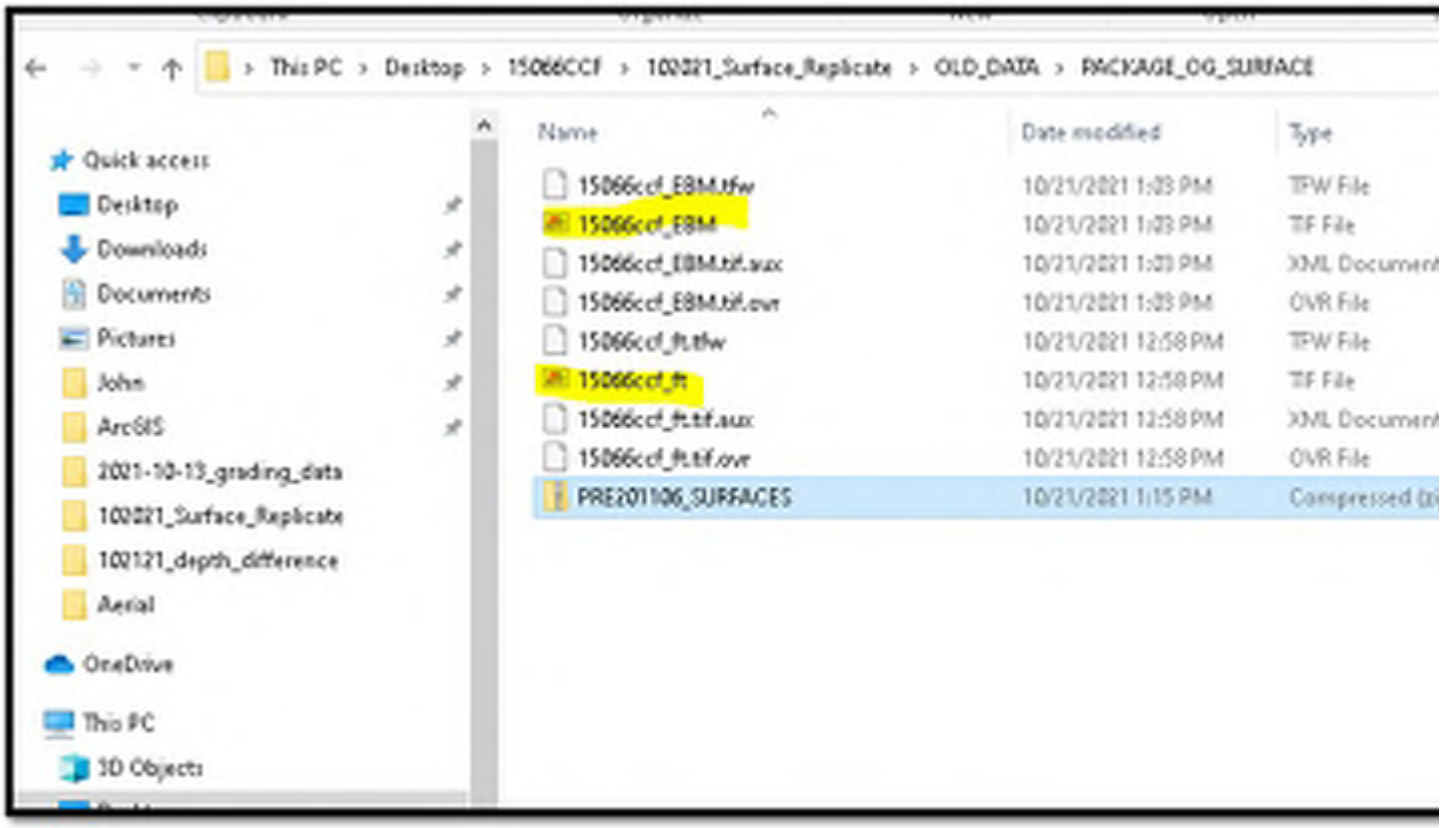
That being said – I am confident this round should put the discrepancies to bed. My updated contour file 1) matches the 11/06/2020 .mpkg delivered contours within ~ 0.005' threshold where I checked (outside the three update areas) and 2) reflects updates in the Brannan / Overlot / and Golden areas. Please follow this link to access base + update files:

CCF_Surface_Compare_102121

*PRE201106_SURFACES contains two DEMs

*15066ccf_ft.tif is the absolute base surface – no updates stitched in, or processes run against it that would produce 'smooth' contours. This file is the original mosaic of FEMA tiles (and is not clipped down to the extent of the original contours)

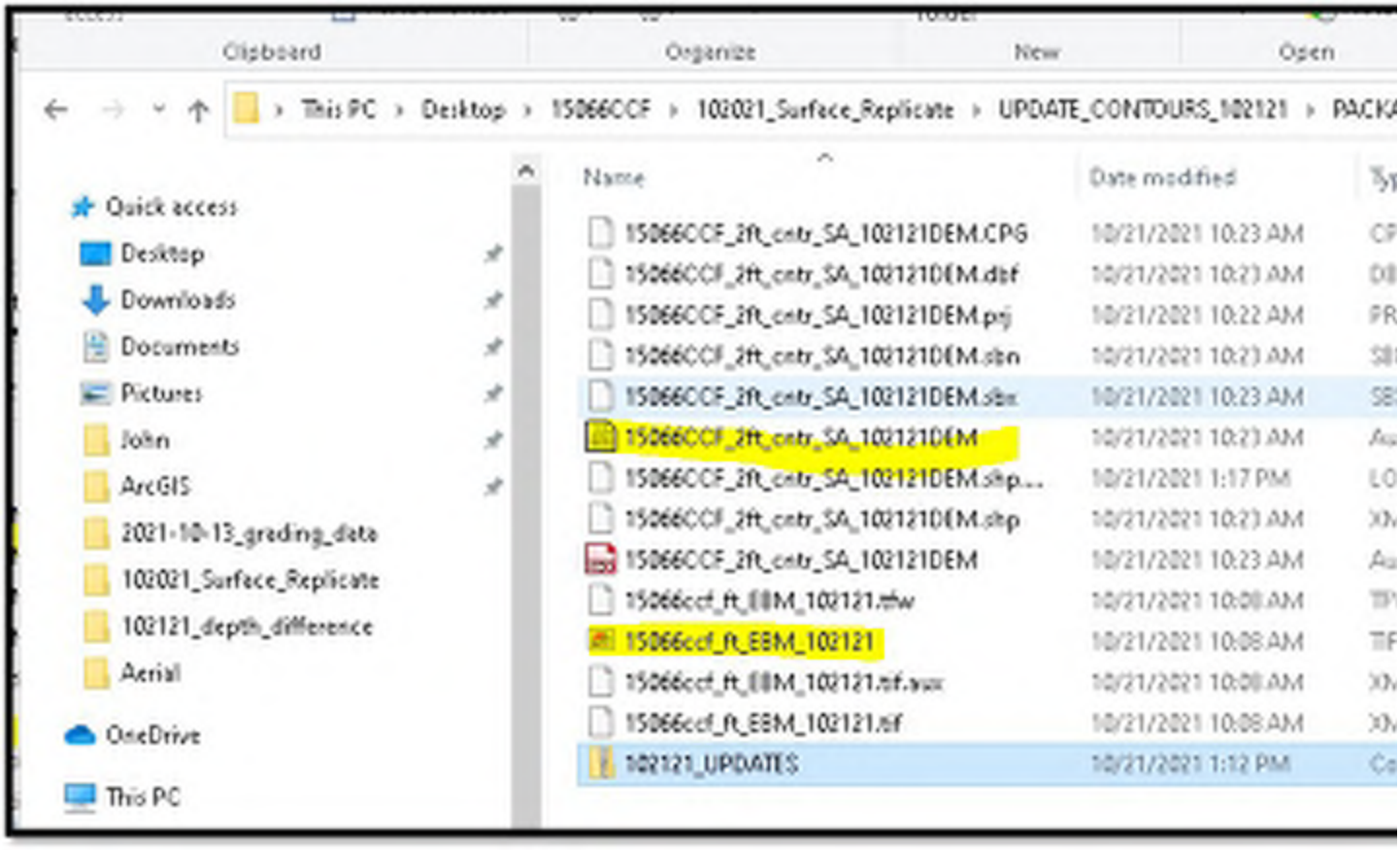
*15066ccf_EBM.tif is the base surface clipped down to the extent of the 11/06/2020 contour data extent.



*102121_UPDATES contains a DEM and an updated contour shapefile:

*15066ccf_ft_EBM_102121 is a DEM with the 3 update area surfaces stitched in. This was the base surface for the updated contour file.

*15066CCF_2ft_cntr_SA_102121DEM.shp is the updated contour shapefile, matching the 11/06/2020 .mpkg contours but with updates to the 3 desired areas.



I will save the flurry of screen shots showing comparisons of the updated sets vs prior deliverables, but am happy to setup a call to screen share and discuss.

Let me know how things look on your end once you have a chance to review and we can go from there.

All the best,

John

From: Dan Hill <dhill@mhfd.org>
Sent: Friday, October 15, 2021 8:02 AM
To: John Klier <jklier@iconeng.com>
Cc: Justen Hamann <jhamann@iconeng.com>; Troy Carmann <tcarmann@iconeng.com>; Charlie Pajares <cpajares@mhfd.org>; Hung-Teng Ho <hho@mhfd.org>
Subject: Re: Clear Creek Contour Update 10/14/2021

Hi John,

Thanks for the clarification, I appreciate it as I didn't realize you had revised elevation data for the Brannan area as well.

Also appreciate you continuing to work with us through this, it will definitely help us all out in the long run when going through the PMR process with FEMA.

Thanks,
Dan Hill, P.E., CFM (He, Him, His)
Watershed Manager

MILE HIGH FLOOD DISTRICT
2480 W. 26th Ave Suite 156-B | Denver, Colorado 80211
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Protecting People, Property, and our Environment

MILE HIGH FLOOD DISTRICT

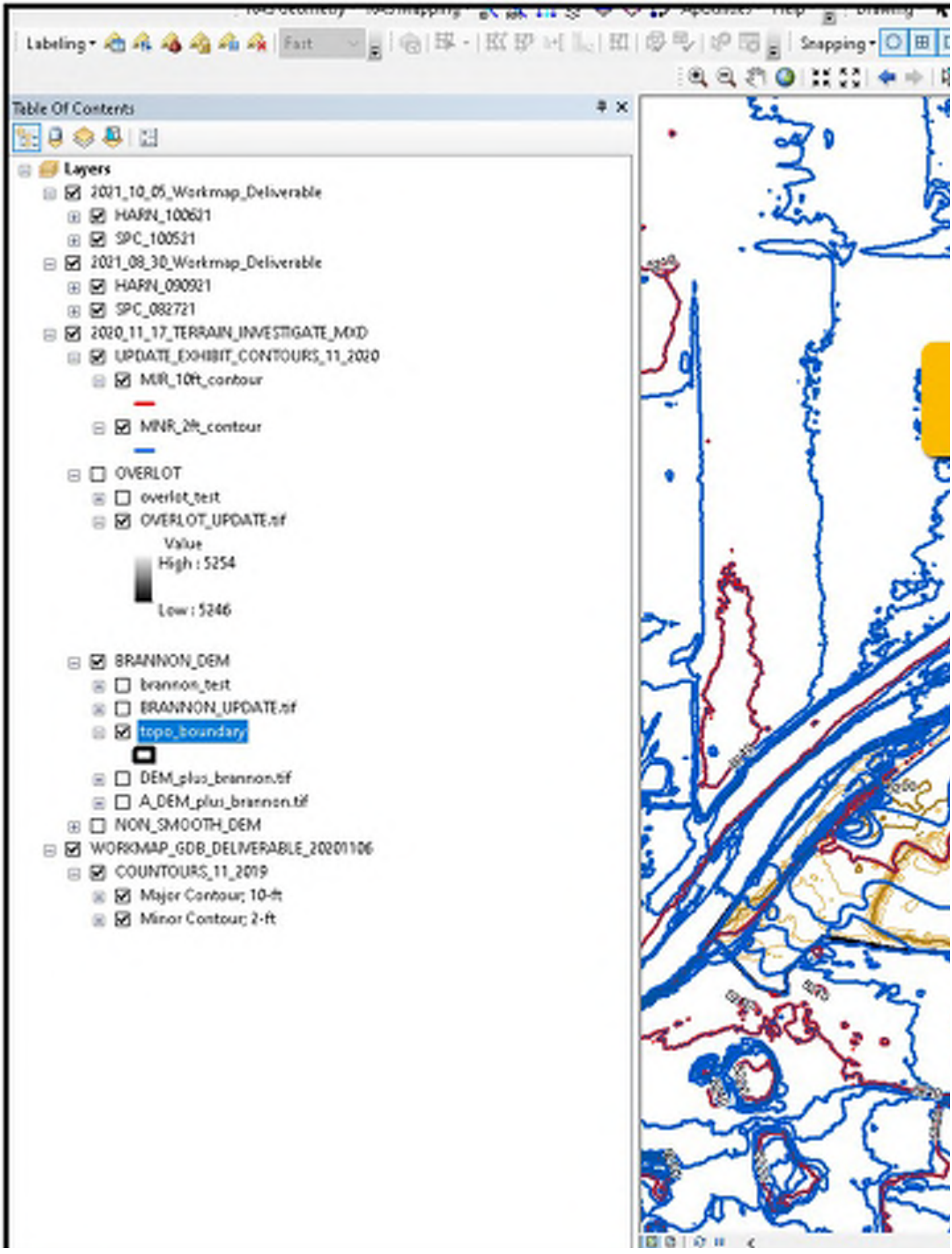
From: John Klier <jklier@iconeng.com>
Sent: Thursday, October 14, 2021 15:44
To: Dan Hill <dhill@mhfd.org>
Cc: Justen Hamann <jhamann@iconeng.com>; Troy W. Carmann, P.E. <tcarmann@iconeng.com>
Subject: Clear Creek Contour Update 10/14/2021

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Good afternoon Dan,

Hope all is well on your end. Following up per the discussion with Justen regarding the plan forward for contours on the Clear Creek FHAD as it pertains to guiding remaining comments.

Utilizing the 11/06/2020 map package delivered contours which I understand is the preferred contour set on your end – please be aware that this version does not include any updates for the three 'pocket areas' (Overlot + Brannan, and more recently the Golden survey). Please see the screenshots below for reference and be cognizant of the fact these updates are not reflected in that version.


Labeling
Fast
Snapping
Table Of Contents
Layers
2021_10_05_Workmap_Deliverable
HARN_100621
SPC_100521
2021_08_30_Workmap_Deliverable
HARN_090921
SPC_082721
2020_11_17_TERRAIN_INVESTIGATE_MXD
UPDATE_EXHIBIT_CONTOURS_11_2020
MJR_10ft_contour
MNR_2ft_contour
OVERLOT
overlot_test
OVERLOT_UPDATE.tif
Value
High : 5254
Low : 5246
BRANNON_DEM
brannon_test
BRANNON_UPDATE.tif
topo_boundary
DEM_plus_brannon.tif
A_DEM_plus_brannon.tif
NON_SMOOTH_DEM
WORKMAP_GDB_DELIVERABLE_20201106
COUNTOURS_11_2019
Major Contour; 10-ft
Minor Contour; 2-ft

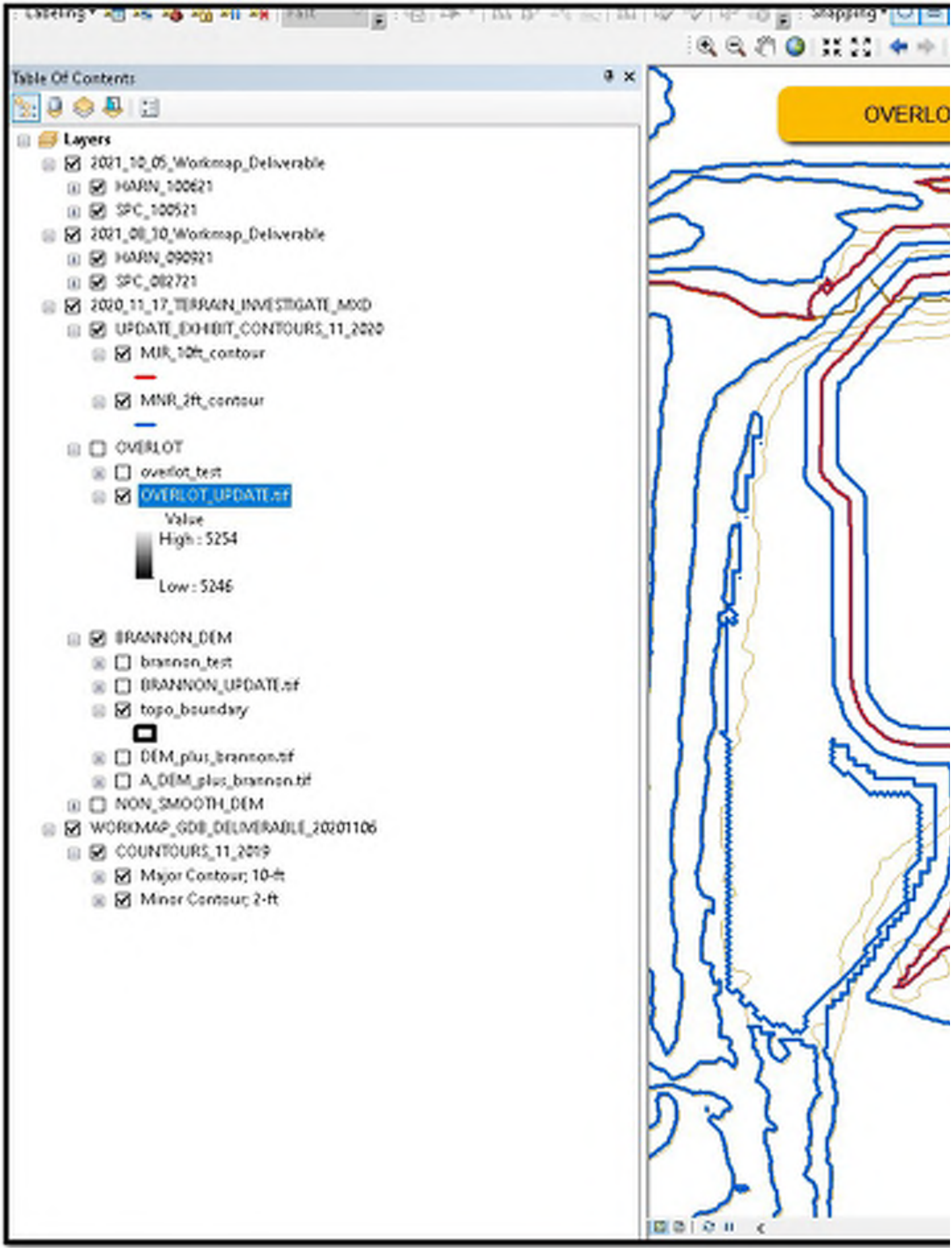


Table Of Contents
Layers
2021_10_05_Workmap_Deliverable
HARN_100621
SPC_100521
2021_08_30_Workmap_Deliverable
HARN_090921
SPC_082721
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NON_SMOOTH_DEM
WORKMAP_GDB_DELIVERABLE_20201106
COUNTOURS_11_2019
Major Contour; 10-ft
Minor Contour; 2-ft
OVERLO

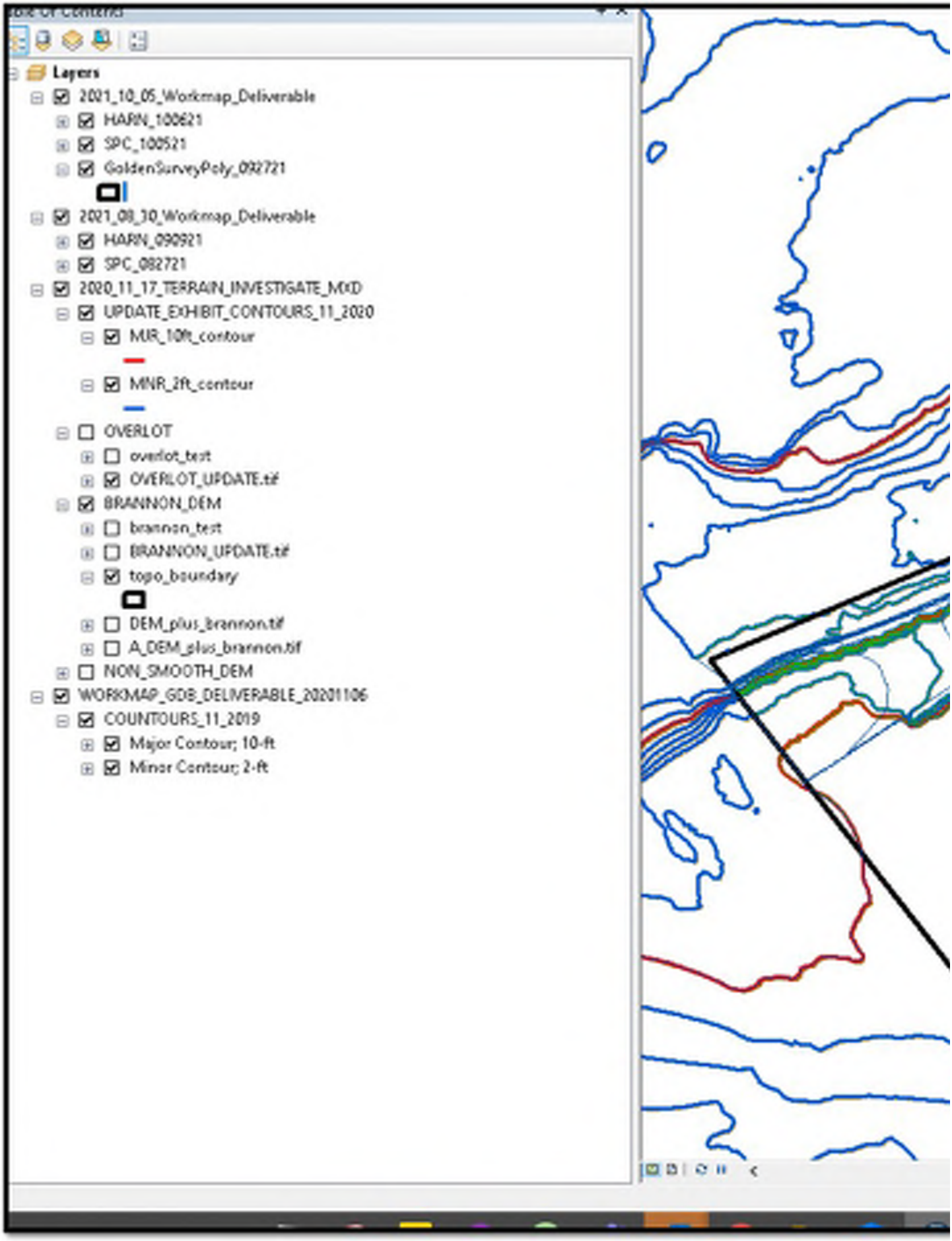
Table Of Contents
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SPC_100521
GoldenSurveyPoly_092721
2021_08_30_Workmap_Deliverable
HARN_090921
SPC_082721
2020_11_17_TERRAIN_INVESTIGATE_MXD
UPDATE_EXHIBIT_CONTOURS_11_2020
MJR_10ft_contour
MNR_2ft_contour
OVERLOT
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OVERLOT_UPDATE.tif
BRANNON_DEM
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BRANNON_UPDATE.tif
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A_DEM_plus_brannon.tif
NON_SMOOTH_DEM
WORKMAP_GDB_DELIVERABLE_20201106
COUNTOURS_11_2019
Major Contour; 10-ft
Minor Contour; 2-ft

I am working on generating a new surface starting with the base DEM used to generate the 11/06/2020 map package contours and will mosaic the three pocket area DEMs back into that and then generate a new contour data set from there for comparison. More to follow once I get through that.

Cheers,

John

From: John Klier
Sent: Wednesday, October 6, 2021 3:39 PM
To: Dan Hill <dhill@mhfd.org>
Cc: Justen Hamann <jhamann@iconeng.com>; Troy Carmann <tcarmann@iconeng.com>
Subject: Clear Creek Deliverable HARN Update 10/06/2021

Good afternoon Dan,

My apologies for the confusion with the projection on the deliverable data set yesterday. I forgot the executive decision from a few weeks back was to roll with HARN and defaulted to what the 8/30/21 deliverable database was set to.

That being said, we should be in better shape at the following link:

CCF_Deliverables_10062021

There shouldn't be any sort of shift present between this set and what was delivered 10/05/2021. Let me know if there are any issues on your end with access or the data itself.

Cheers,

John Klier
GIS Specialist
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
Office: (303) 221-0802 x 220 | jklier@iconeng.com

Appendix B: Hydrologic Analysis Support Documents

Wright Water Engineers, Inc.
2490 West 26th Ave., Suite 100A
Denver, Colorado 80211
(303) 480-1700 TEL
(303) 480-1020 FAX
www.wrightwater.com
e-mail:aearles@wrightwater.com

November 7, 2016

Paul Anderson, P.E., CFM
CDM Smith, a member of Compass PTS JV
FEMA Risk Map Team
Denver, Colorado

Re: Updated Information for Conditional Letter of Map Revision (CLOMR) Request
Case No.: 16-08-0917R
Communities: Adams County, City of Arvada, City and County of Denver, City of Golden, Jefferson County, and City of Wheat Ridge
Community Nos.: 080001, 085072, 080046, 080087, and 085079

Dear Mr. Anderson:

The purpose of this letter is to provide you with updated information related to the Conditional Letter of Map Revision (CLOMR) request related to peak discharge hydrology of Clear Creek from U.S. Highway 6 to the South Platte River (Case Number 16-08-0917R). In working with UDFCD consultants on preliminary hydraulic modeling, Wright Water Engineers, Inc. (WWE) discovered that the peak discharge profile submitted May 23, 2016 did not account for the flow split between Sheridan Boulevard and the Rio Grande Railroad. The split flow from Clear Creek is called the North Overflow. The Clear Creek (Adams County) FHAD prepared by Ayres Associates in 2005 evaluated this flow split. Subsequently, the January 2016 Adams County FIS accounted for the North Overflow in the 100-year peak discharge of Clear Creek (at the I-76 crossing).

After discussions with UDFCD, it has been determined that the Clear Creek hydrology CLOMR request should account for the North Overflow split flow. Therefore, we have included excerpts of pages from the CLOMR Request for Clear Creek, U.S. Highway 6 to South Platte River report (Case No. 16-08-0917R) that have been updated to reflect the North Overflow. The highlighted portions of the text identify areas that have been revised since the CLOMR request dated May 23, 2016.

Thank you for the opportunity to update the previous submittal. If you have any questions, please contact me directly at (303) 480-1700 or via email (aearles@wrightwater.com). Thank you very much for your time and detailed review of the request for a CLOMR.

Sincerely,

WRIGHT WATER ENGINEERS, INC.

By _____
Andrew Earles, Ph.D., P.E., D.WRE
Vice President of Water Resources

Attachments: Revised excerpts from CLOMR request

cc: Ken MacKenzie, Urban Drainage and Flood Control District
David Mallory, Urban Drainage and Flood Control District

Z:\Project Files\15\151-090\151-090.000\Engineering\FEMA AD Letter\North Overflow Resubmittal Information\Clear Creek CLOMR FEMA North Overflow Letter_11.7.16.docx

flows), the estimated 100-year flow is much lower than the lower 68% confidence interval. Additionally, this allowed for a better fit of the tributary steps in the profile.

- Profile steps for gauged tributaries (Lena Gulch and Little Dry Creek) used the 100-year Bulletin 17B estimate using the greater of the station skew or setting the skew to zero.

- Profile steps for ungauged tributaries (Arapahoe Gulch, Tucker Gulch and Ralston Creek) were calculated based on the average ratio of the Bulletin 17B estimate for the gauged tributaries versus the 100-year profile step published in the 2005 and 2007 FHADs multiplied by the ungauged tributary 100-year profile step published in the 2005 and 2007 FHADs. Then a ratio was applied equally to these profile steps so that the 100-year flow at Derby was set to the upper 68% confidence interval value.

- Downstream of Ralston Creek, approximately 370 feet upstream of Sheridan Boulevard, Clear Creek flows in two separate flow paths that rejoin just before the Rio Grande Railroad. The two paths are called the Clear Creek Main Channel and the North Overflow. The Clear Creek Main Channel profiles account for the North Overflow.

To determine the discharge profiles for the recurrence intervals other than the 100-year discharge profile, a dimensionless relationship for the 100-year event was developed and then applied to the other profiles based on the difference from the PeakFQ value in Golden to the upper confidence limit PeakFQ value at Derby. The profile steps are scaled in the same relative way as the 100-year.

Table ES-1 provides the recommended 100-year profile as well as others.

Table ES-1. 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year Peak Discharge Profiles, Clear Creek, U.S. Highway 6 to South Platte River

Clear Creek Station	2-yr (cfs)	5-yr (cfs)	10-yr (cfs)	25-yr (cfs)	50-yr (cfs)	100-yr (cfs)	200-yr (cfs)	500-yr (cfs)
U.S. Highway 6	1,300	2,300	3,300	5,100	6,900	8,600	12,600	18,300
DS Arapahoe Gulch	1,300	2,300	3,300	5,200	7,000	8,800	12,800	18,600
Washington Street	1,300	2,300	3,300	5,200	7,000	8,800	12,800	18,600
Ford Street	1,300	2,300	3,300	5,200	7,000	8,800	12,800	18,600
US Tucker Gulch	1,300	2,300	3,300	5,200	7,100	8,800	12,800	18,700
DS Tucker Gulch	1,400	2,400	3,500	5,500	7,500	9,500	13,600	19,800
Coors Railroad	1,400	2,400	3,500	5,500	7,500	9,500	13,600	19,800
McIntyre Street	1,400	2,400	3,500	5,500	7,500	9,500	13,600	19,800
Coors Railroad	1,400	2,400	3,500	5,500	7,500	9,500	13,600	19,800
I-70	1,400	2,400	3,500	5,500	7,500	9,500	13,600	19,800
US Lena Gulch/Kipling Street	1,400	2,400	3,500	5,500	7,500	9,500	13,600	19,800
DS Lena Gulch	1,400	2,600	3,700	5,800	8,000	10,200	14,400	21,100
44th Avenue	1,400	2,600	3,700	5,800	8,000	10,200	14,400	21,100
Wadsworth Boulevard	1,400	2,600	3,700	5,800	8,000	10,200	14,400	21,100
Marshall Street	1,400	2,600	3,700	5,800	8,000	10,200	14,400	21,100
US Ralston Creek/I-76	1,400	2,600	3,700	5,800	8,000	10,200	14,400	21,100
DS Ralston Creek	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,500
Sheridan Boulevard	1,800	3,100	4,500	7,000	9,600	12,600[1]	14,800[1]	19,200[1]
Tennyson Street	1,800	3,100	4,500	6,500[1]	7,900[1]	9,200[1]	10,000[1]	11,500[1]
Lowell Boulevard	1,800	3,100	4,500	6,500[1]	7,900[1]	9,100[1]	9,900[1]	11,400[1]
Fischer Ditch Diversion	1,800	3,100	4,500	6,500[1]	7,900[1]	9,000[1]	9,800[1]	11,300[1]
Rio Grande Railroad	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,500
Federal Boulevard	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,500
US Little Dry Creek/C&S Railroad Bridge	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,400
DS Little Dry Creek/Pecos Street	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
Lower Clear Creek Diversion Dam	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
Broadway	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
I-25	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
I-25 Ramp	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
Washington Street	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
I-270	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
York Street	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
Clear Creek at South Platte River	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700

[1] Reflects flow spills to Clear Creek North Overflow

Table ES-2. 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year Peak Discharge Profiles, Clear Creek North Overflow

North Overflow Station	2-yr (cfs)	5-yr (cfs)	10-yr (cfs)	25-yr (cfs)	50-yr (cfs)	100-yr (cfs)	200-yr (cfs)	500-yr (cfs)
Sheridan Boulevard	--	--	--	--	--	205	2,600	6,230
Tennyson Street	--	--	5	465	1,630	3,590	7,390	13,940
Irrigation Diversion Dam	--	--	5	465	1,710	3,690	7,500	14,100
Lowell Boulevard	--	--	5	475	1,710	3,690	7,500	14,100
Fischer Ditch Diversion	--	--	5	475	1,720	3,740	7,560	14,160

Table ES-3 provides a comparison of proposed peak discharges and effective peak discharges from FISs and FHADs.

Table ES-3. Comparison of Proposed Peak Discharges with FIS and FHAD Peak Discharges

Location	Peak Discharge (cfs)							
	10% Annual Chance		2% Annual Chance		1% Annual Chance		0.2% Annual Chance	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Above confluence with Tucker Gulch	3,470	3,300	8,010	7,100	12,420	8,800	27,430	18,700
Below confluence with Tucker Gulch	3,470	3,500	8,480	7,500	13,070	9,500	28,900	19,800
At Kipling Boulevard	3,280	3,500	9,000	7,500	13,470	9,500	29,850	19,800
Above confluence with Ralston Creek	3,710	3,700	9,750	8,000	14,520	10,200	31,000	21,100
At Sheridan Boulevard Bridge	8,430[1,2]	4,500	NA[1]	9,600[3]	14,990[2,3,4]	12,600[3]	NA[1]	19,200[3]
At Interstate 76	7,360[1,2]	4,500	NA[1]	7,900[3]	10,079[3]	9,200[3]	NA[1]	11,500[3]
At South Platte Confluence	10,100[1,2]	4,900	NA[1]	10,400	23,100	14,100	NA[1]	27,700

[1] Data not available in Adams County, FIS, 2016 (Pending)
[2] Obtained from the *Flood Hazard Area Delineation for Clear Creek* through Adams County, prepared by Ayres Associates, December 2005.
[3] Reflects flow spills to Clear Creek North Overflow
[4] Value in Adams County FIS, 2016 (20,590 cfs) does not reflect flow spills to the North Overflow although the North Overflow begins approximately 370 feet upstream of Sheridan Boulevard.
NA – Peak discharge value not given in 2005 FHAD Floodplain and Floodway Data Table (flows from Flow Discharge Profile were not estimated)

decision to proceed with a CLOMR was carefully considered. This decision was based on factors including:

- UDFCD, CWCB, United States Geological Survey (USGS) and others have invested significant time and public money in collecting stream gauge data along Clear Creek over many years. It is clear in CWCB and FEMA policy that gauge data should be used when there is a sufficient period of record and the data are of suitable quality. This update to hydrology uses the best currently available data/information.

- While having higher peak discharges typically provides greater protection from flooding, realistic peak flow projections are needed to balance the level of protection provided and the costs of infrastructure. The costs to design and construct bridges, drop structures, levees, and other flood protection infrastructure are closely related to the design peak discharges. If design improvements are implemented for a reach based on an artificially high peak discharge, there will be a higher level of protection in that area (e.g. 500-year versus 100-year); however, the cost of the additional protection is money that could be spent elsewhere to provide a 100-year level of protection in an underserved area.

This report documents the methodology and calculations used to update the previous peak flow discharge profiles for Clear Creek within the project area. Previous studies provided peak discharge profiles for the 10-, 50-, 100-, and 500-year events. This study reevaluated these profiles and added profiles for the 2-, 5-, 25-, and 200-year events. A project location vicinity map showing the stream network is provided as Attachment B.

In preparation of this CLOMR request, many entities have assisted with data, advice, and review. CWCB and FEMA regional office have participated in meetings on feasibility of a hydrology CLOMR, PeakFQ analysis, and development of peak discharge profiles. Dr. Robert Jarrett, P.E. (USGS retired) provided peer review on statistical analysis and skew coefficients. See Attachment E for responses to Dr. Robert Jarrett's comments. All of the affected communities were provided with a draft for review, and following revisions, all have signed Community Acknowledgement Forms provided in Attachment A.

2 PREVIOUS HYDROLOGIC STUDIES

Clear Creek hydrology has been studied numerous times in the past. The majority of the study reach falls within the UDFCD boundary, which extends from U.S. Highway 6 to the confluence with the South Platte River. This reach includes four major tributaries as well as a flow split between Ralston Creek (approximately 370 feet upstream of Sheridan Boulevard) and the Rio Grande Railroad called the Clear Creek North Overflow. Previous studies, primarily based on modeling rather than gauge analysis, defined the hydrologic response of the basin, and when merged, result in discharge profiles for the 100-year runoff event (and 10-, 50-, and 500- year

Table 1. Summary of Clear Creek Peak Discharges from Flood Hazard Area Delineation and Flood Insurance Studies

Location	Peak Discharge (cfs)				Study
	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Above confluence with Tucker Gulch	3,470	8,010	12,420	27,430	Jefferson County FIS, 2014
Below confluence with Tucker Gulch	3,470	8,480	13,070	28,900	
At Kipling Boulevard	3,280	9,000	13,470	29,850	
Above confluence with Ralston Creek	3,710	9,750	14,520	31,000	
At West 52nd Avenue	3,710	9,750	14,520	31,000	City and County of Denver FIS, 2013
At Sheridan Boulevard Bridge	8,430[1,2]	NA	14,990[2,3,4]	NA	Adams County FHAD, 2005
At Interstate 76	7,360[1,2]	NA	10,079[3]	NA	
At South Platte Confluence	10,100[1,2]	NA	23,100	NA	

[1] Data not available in Adams County, FIS, 2016 (Pending)
[2] Obtained from the *Flood Hazard Area Delineation for Clear Creek* through Adams County, prepared by Ayres Associates, December 2005.
[3] Reflects flow spills to Clear Creek North Overflow
[4] Value in Adams County FIS, 2016 (20,590 cfs) does not reflect flow spills to the North Overflow although the North Overflow begins approximately 370 feet upstream of Sheridan Boulevard.
NA – Peak discharge value not given in 2005 FHAD Floodplain and Floodway Data Table (flows from Flow Discharge Profile were not estimated)

5 RESULTS

Because the determination of the profiles between locations on Clear Creek with gauge data is related to tributary inflows, some with gauge data but some without, multiple factors were considered in developing the 100-year peak discharge profile. These included published flows in FISs and FHADs, tributary drainage area, timing of peaks and other factors included in the master spreadsheet on the Flash Drive – Attachment F.

5.1 100-Year Discharge Profile

Based on evaluation of gauge data, meetings and discussions with UDFCD Program Managers who know the hydrology of Clear Creek through their work and data collection over many years, review by engineering staff of participating communities, and peer review by others, Figure 6 illustrates the 100-year peak discharge profile in comparison with the profile from the 2005 and 2007 FHADs. Table 4 provides the recommended 100-year profile as well as others. Key observations of the 100-year profile include:

- The 100-year flow at U.S. Highway 6 was set at the Clear Creek at Golden gauge lower 68% confidence interval. This was a reasonable approach because when analyzing the full period of record from the Clear Creek at Golden gauge (not just rainfall influenced peak flows), the estimated 100-year flow is much lower than the lower 68% confidence interval. Additionally, this allowed for a better fit of the tributary steps in the profile.

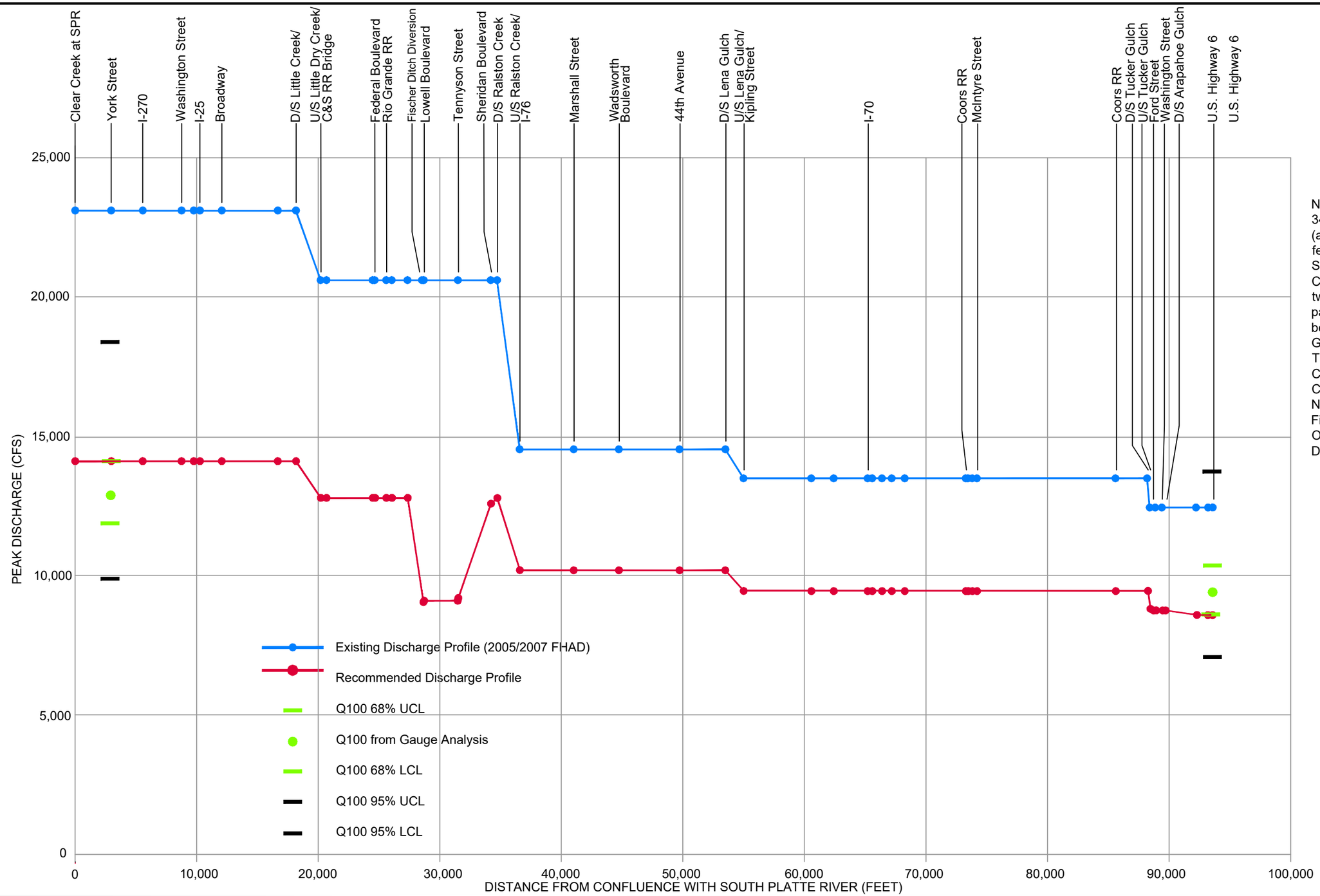
- Profile steps for gauged tributaries (Lena Gulch and Little Dry Creek) used the 100-year Bulletin 17B estimate using the greater of the station skew or setting the skew to zero.

- Profile steps for ungauged tributaries (Arapahoe Gulch, Tucker Gulch and Ralston Creek) were calculated based on the average ratio of the Bulletin 17B estimate for the gauged tributaries versus the 100-year profile step published in the 2005 and 2007 FHADs multiplied by the ungauged tributary 100-year profile step published in the 2005 and 2007 FHADs. Then a ratio was applied equally to these profile steps so that the 100-year flow at Derby was set to the upper 68% confidence interval value.

- Downstream of Ralston Creek, approximately 370 feet upstream of Sheridan Boulevard, Clear Creek flows in two separate flow paths that rejoin just before the Rio Grande Railroad. The two paths are called the Clear Creek Main Channel and the North Overflow. The peak discharges for the North Overflow are provided in Table 5. The Clear Creek Main Channel profiles account for the North Overflow.

5.2 2-, 5-, 10-, 25-, 50-, 200-, and 500-year Peak Discharge Profiles

Profiles for 2-, 5-, 10-, 25- 50-, 200-, and 500-year peak discharges were developed using PeakFQ results for Clear Creek gauge stations and shown in Figure 7. To determine the discharge profiles for the recurrence intervals other than the 100-year discharge profile, a dimensionless relationship for the 100-year event was developed and then applied to the other profiles based on the difference from the PeakFQ value in Golden to the upper confidence limit PeakFQ value at Derby. The profile steps are scaled in the same relative way as the 100-year. Table 6 provides a comparison of proposed peak discharges and effective peak discharges from FISs. Figure 8 provides the peak discharge profiles for the North Overflow.



NOTE: At Station 347+48 (approximately 370 feet upstream of Sheridan Boulevard) Clear Creek flows in two separate flow paths that rejoin just before the Rio Grande Railroad. The two paths are Clear Creek Main Channel and the North Overflow (See Figure 8 for North Overflow Peak Discharge Profiles).

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DENVER, CO 80211
(303)480-1700

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CLEAR CREEK HYDROLOGY CLOMR

Comparison of 2005/2007 FHAD and Recommended 100-year Discharge Profiles for Clear Creek Main Channel

PROJECT NO. 151-090.000

FIGURE 6

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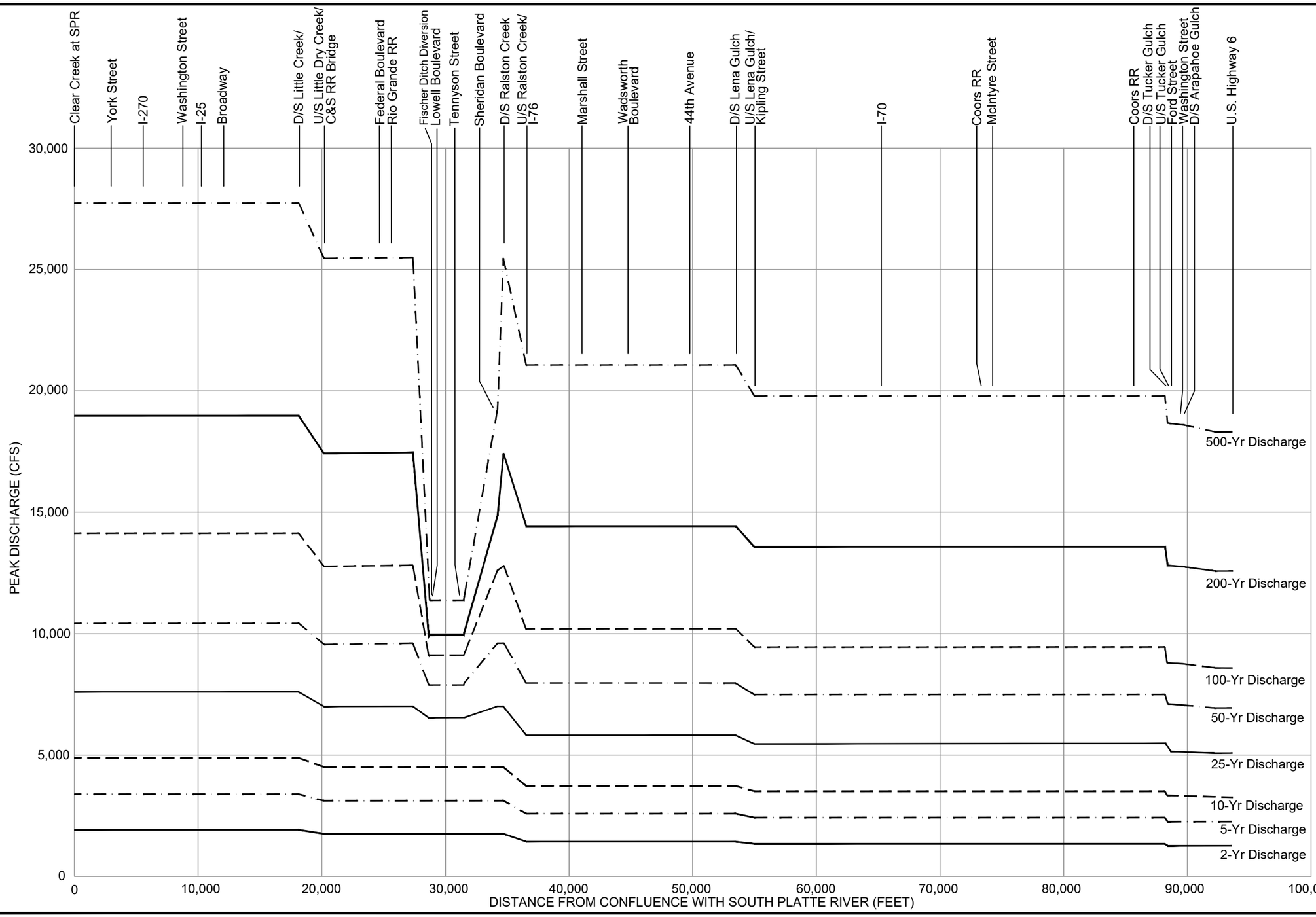

NOTE: At Station 347+48 (approximately 370 feet upstream of Sheridan Boulevard) Clear Creek flows in two separate flow paths that rejoin just before the Rio Grande Railroad. The two paths are Clear Creek Main Channel and the North Overflow (See Figure 8 for North Overflow Peak Discharge Profiles).

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CLEAR CREEK HYDROLOGY CLOMR

2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year Peak Discharge Profiles for Clear Creek Main Channel from U.S. Highway 6 to South Platte River

PROJECT NO.	FIGURE
151-090.000	7

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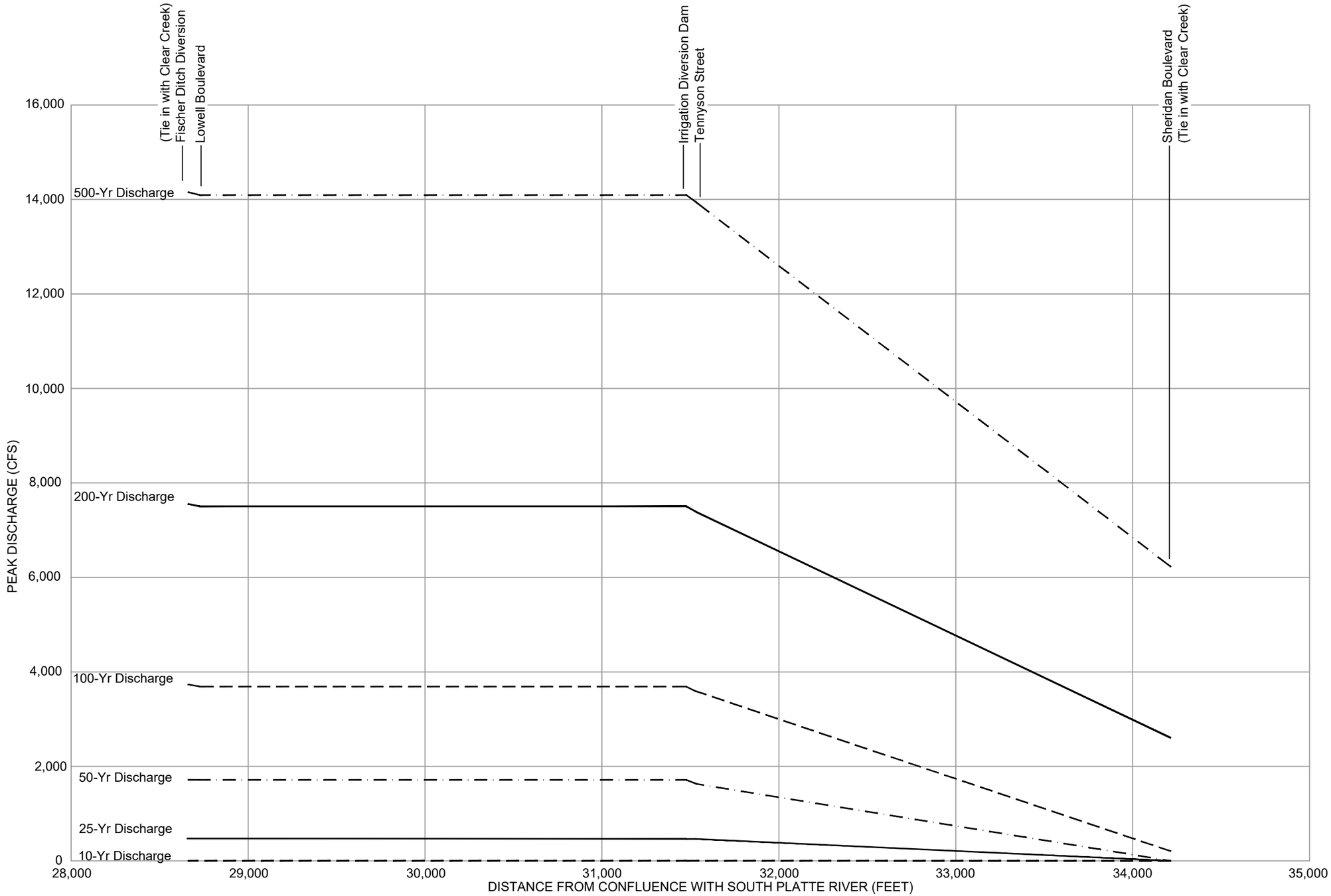

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CLEAR CREEK HYDROLOGY CLOMR

10-, 25-, 50-, 100-, 200-, and 500-year Peak Discharge Profiles for the North Overflow of Clear Creek

PROJECT NO.	FIGURE
151-090.000	8

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Table 4. 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year Peak Discharge Profiles, Clear Creek, U.S. Highway 6 to South Platte River

Clear Creek Station	2-yr (cfs)	5-yr (cfs)	10-yr (cfs)	25-yr (cfs)	50-yr (cfs)	100-yr (cfs)	200-yr (cfs)	500-yr (cfs)
U.S. Highway 6	1,300	2,300	3,300	5,100	6,900	8,600	12,600	18,300
DS Arapahoe Gulch	1,300	2,300	3,300	5,200	7,000	8,800	12,800	18,600
Washington Street	1,300	2,300	3,300	5,200	7,000	8,800	12,800	18,600
Ford Street	1,300	2,300	3,300	5,200	7,000	8,800	12,800	18,600
US Tucker Gulch	1,300	2,300	3,300	5,200	7,100	8,800	12,800	18,700
DS Tucker Gulch	1,400	2,400	3,500	5,500	7,500	9,500	13,600	19,800
Coors Railroad	1,400	2,400	3,500	5,500	7,500	9,500	13,600	19,800
McIntyre Street	1,400	2,400	3,500	5,500	7,500	9,500	13,600	19,800
Coors Railroad	1,400	2,400	3,500	5,500	7,500	9,500	13,600	19,800
I-70	1,400	2,400	3,500	5,500	7,500	9,500	13,600	19,800
US Lena Gulch/Kipling Street	1,400	2,400	3,500	5,500	7,500	9,500	13,600	19,800
DS Lena Gulch	1,400	2,600	3,700	5,800	8,000	10,200	14,400	21,100
44th Avenue	1,400	2,600	3,700	5,800	8,000	10,200	14,400	21,100
Wadsworth Boulevard	1,400	2,600	3,700	5,800	8,000	10,200	14,400	21,100
Marshall Street	1,400	2,600	3,700	5,800	8,000	10,200	14,400	21,100
US Ralston Creek/I-76	1,400	2,600	3,700	5,800	8,000	10,200	14,400	21,100
DS Ralston Creek	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,500
Sheridan Boulevard	1,800	3,100	4,500	7,000	9,600	12,600[1]	14,800[1]	19,200[1]
Tennyson Street	1,800	3,100	4,500	6,500[1]	7,900[1]	9,200[1]	10,000[1]	11,500[1]
Lowell Boulevard	1,800	3,100	4,500	6,500[1]	7,900[1]	9,100[1]	9,900[1]	11,400[1]
Fischer Ditch Diversion	1,800	3,100	4,500	6,500[1]	7,900[1]	9,000[1]	9,800[1]	11,300[1]
Rio Grande Railroad	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,500
Federal Boulevard	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,500
US Little Dry Creek/C&S Railroad Bridge	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,400
DS Little Dry Creek/Pecos Street	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
Lower Clear Creek Diversion Dam	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
Broadway	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
I-25	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
I-25 Ramp	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
Washington Street	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
I-270	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
York Street	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
Clear Creek at South Platte River	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700

[1] Reflects flow spills to Clear Creek North Overflow

Table 5. 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year Peak Discharge Profiles, Clear Creek North Overflow

North Overflow Station	2-yr (cfs)	5-yr (cfs)	10-yr (cfs)	25-yr (cfs)	50-yr (cfs)	100-yr (cfs)	200-yr (cfs)	500-yr (cfs)
Sheridan Boulevard	--	--	--	--	--	205	2,600	6,230
Tennyson Street	--	--	5	465	1,630	3,590	7,390	13,940
Irrigation Diversion Dam	--	--	5	465	1,710	3,690	7,500	14,100
Lowell Boulevard	--	--	5	475	1,710	3,690	7,500	14,100
Fischer Ditch Diversion	--	--	5	475	1,720	3,740	7,560	14,160

Table 6. Comparison of Proposed Peak Discharges with FIS and FHAD Peak Discharges

Location	Peak Discharge (cfs)							
	10% Annual Chance		2% Annual Chance		1% Annual Chance		0.2% Annual Chance	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Above confluence with Tucker Gulch	3,470	3,300	8,010	7,100	12,420	8,800	27,430	18,700
Below confluence with Tucker Gulch	3,470	3,500	8,480	7,500	13,070	9,500	28,900	19,800
At Kipling Boulevard	3,280	3,500	9,000	7,500	13,470	9,500	29,850	19,800
Above confluence with Ralston Creek	3,710	3,700	9,750	8,000	14,520	10,200	31,000	21,100
At Sheridan Boulevard Bridge	8,430[1,2]	4,500	NA[1]	9,600[3]	14,990[2,3,4]	12,600[3]	NA[1]	19,200[3]
At Interstate 76	7,360[1,2]	4,500	NA[1]	7,900[3]	10,079[3]	9,200[3]	NA[1]	11,500[3]
At South Platte Confluence	10,100[1,2]	4,900	NA[1]	10,400	23,100	14,100	NA[1]	27,700

[1] Data not available in Adams County, FIS, 2016 (Pending)
[2] Obtained from the *Flood Hazard Area Delineation for Clear Creek* through Adams County, prepared by Ayres Associates, December 2005.
[3] Reflects flow spills to Clear Creek North Overflow
[4] Value in FIS (20,590 cfs) does not reflect flow spills to the Clear Creek North Overflow although the North Overflow begins approximately 370 feet upstream of Sheridan Boulevard.
NA – Peak discharge value not given in 2005 FHAD Floodplain and Floodway Data Table (flows from Flow Discharge Profile were not estimated)

DRAFT

CLOMR Request for Clear Creek, U.S. Highway 6 to South Platte River

Prepared on behalf of:
Urban Drainage and Flood Control District

Prepared by:
Wright Water Engineers, Inc.
Denver, Colorado

Wright Water Engineers, Inc.

February 2016

151-090.000

TABLE OF CONTENTS

Page

1 INTRODUCTION 1

2 PREVIOUS HYDROLOGIC STUDIES 2

3 REGIONAL RESERVOIRS 7
3.1 Ralston Reservoir 7
3.2 Arvada/Blunn Reservoir 7
3.3 Maple Grove Reservoir 7
3.4 Leyden Lake 7

4 APPROACH 7
4.1 Gauge Analysis 8
4.1.1 Gauge Verification 11
4.1.2 Stream Gauge Trend Analysis 14
4.1.3 Statistical Analysis 18
4.2 Geographic Data 22
4.3 Flood Hazard Area Delineation (FHAD) Information 22
4.4 Flood Insurance Studies 22

5 RESULTS 23
5.1 100-Year Discharge Profile 23
5.2 2-, 5-, 10-, 25-, 50-, 200-, and 500-year Peak Discharge Profiles 23

6 REFERENCES 29

TABLES

Table 1. Summary of Clear Creek Peak Discharges from Flood Insurance Studies 6

Table 2. Clear Creek at Derby USGS/DWR Peak Flow Compared to Adjusted Peak Flow 17

Table 3. Clear Creek PeakFQ Results for 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year Peak Discharges 20

Table 4. 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year Peak Discharge Profiles, Clear Creek, U.S. Highway 6 to South Platte River 27

Table 5. Comparison of Proposed Peak Discharges with FIS Peak Discharges 28

FIGURES

Figure 1. Current Peak Discharge Profiles from 2007 FHAD 5

Figure 2. Map of Clear Creek and Tributary Stream Gauges Used in Analysis 10

Figure 3. Example of Gauge and HEC-RAS Rating Curve Comparison for Clear Creek at Derby (CLEDERCO/06720000 CC at Derby), others provided in Attachment C 13

Figure 4. 10-Year Median Peak Flow vs. Time 16

Figure 5. PeakFQ Probability Plot for Clear Creek near Golden combined with Clear Creek at Golden (06719500/06719505), others provided in Attachment D 21

Figure 6. Comparison of 2005/2007 FHAD and Recommended 100-year Discharge Profiles 25

Figure 7. 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year Peak Discharge Profiles for Clear Creek From U.S. Highway 6 to South Platte River 26

ATTACHMENTS

A MT-2 Forms
B Map of Clear Creek and Tributaries
C Stream Gauge Information, Data, and Quality Assurance
D PeakFQ Input & Output
E Peer Review Comments and Responses
F Spreadsheets, Input Files, Output Files, and Other Documentation (Flash Drive)

Conditional Letter of Map Revision Request, Clear Creek Peak Discharge Rates from U.S. Highway 6 to South Platte River Confluence

1 INTRODUCTION

This report has been prepared on behalf of the Urban Drainage and Flood Control District (UDFCD) to request a Conditional Letter of Map Revision (CLOMR) based on updated hydrology for Clear Creek from U.S. Highway 6 to the South Platte River confluence. This CLOMR does not seek to modify the hydraulic analysis for this reach of Clear Creek, and no changes are proposed to Base Flood Elevations (BFEs) or delineations of the Special Flood Hazard Area (SFHA) on Flood Insurance Rate Maps (FIRMs). This CLOMR will provide the basis for future updates to hydraulic models along this reach and may lead to CLOMRs/LOMRs that modify the SFHA in the future; however, this effort is focused only on hydrology.

This CLOMR request has been reviewed by affected communities including Jefferson County, the City and County of Denver, and Adams County as well as the City of Golden, City of Wheat Ridge, and the City of Arvada. Community Acknowledgement Forms are provided in Attachment A, along with MT-2 Forms.

Studies of the hydrology of Clear Creek by the U.S. Army Corps of Engineers (USACE) date back to the late 1970's. This USACE hydrology is the source of hydrology in subsequent Flood Hazard Delineations (FHADs) and master planning studies, as well as the Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) for incorporated and unincorporated Jefferson County. However, the FIS for incorporated and unincorporated Adams County uses revised hydrology from the Clear Creek (Adams County) FHAD prepared by Ayres Associates in December 2005 for UDFCD.

While the hydrology calculated by the USACE in the late 1970's was a reasonable approach using the best available information at that time, in 2016, we have the benefit of over 25 years of additional peak discharge data at the stream gauges along Clear Creek as well as gauge information for some of the major tributaries. Based on initial comparisons between 100-year published peak discharges and results from PeakFQ analysis, it was evident that the peak discharge profile overestimated peak flows compared to gauge data.

Wright Water Engineers, Inc. (WWE) and UDFCD have completed a similar hydrology CLOMR for the South Platte River from Chatfield Dam to Fort Lupton, Colorado. Prior to undertaking these CLOMRs, WWE and UDFCD conferred with staff from the Colorado Water Conservation Board (CWCB) and FEMA on the potential revision. WWE also consulted with Will Thomas, P.E. of Michael Baker, Jr. Inc. (formerly of FEMA) who was one of the leaders in developing the underlying statistical analysis tools. One of the points of discussion was precedent for a CLOMR

that reduces peak discharges. A number of examples were found through research and FEMA contact, often based on availability of a longer period of peak discharge gauge data to supersede peak discharges based on modeling. Because public health, safety, and welfare is paramount, a decision to proceed with a CLOMR was carefully considered. This decision was based on factors including:

- UDFCD, CWCB, United States Geological Survey (USGS) and others have invested significant time and public money in collecting stream gauge data along Clear Creek over many years. It is clear in CWCB and FEMA policy that gauge data should be used when there is a sufficient period of record and the data are of suitable quality. This update to hydrology uses the best currently available data/information.

- While having higher peak discharges typically provides greater protection from flooding, realistic peak flow projections are needed to balance the level of protection provided and the costs of infrastructure. The costs to design and construct bridges, drop structures, levees, and other flood protection infrastructure are closely related to the design peak discharges. If design improvements are implemented for a reach based on an artificially high peak discharge, there will be a higher level of protection in that area (e.g. 500-year versus 100-year); however, the cost of the additional protection is money that could be spent elsewhere to provide a 100-year level of protection in an underserved area.

This report documents the methodology and calculations used to update the previous peak flow discharge profiles for Clear Creek within the project area. Previous studies provided peak discharge profiles for the 10-, 50-, 100-, and 500-year events. This study reevaluated these profiles and added profiles for the 2-, 5-, 25-, and 200-year events. A project location vicinity map showing the stream network is provided as Attachment B.

In preparation of this CLOMR request, many entities have assisted with data, advice, and review. CWCB and FEMA regional office have participated in meetings on feasibility of a hydrology CLOMR, PeakFQ analysis, and development of peak discharge profiles. Dr. Robert Jarrett, P.E. (USGS retired) provided peer review on statistical analysis and skew coefficients. See Attachment E for responses to Dr. Robert Jarrett's comments. All of the affected communities were provided with a draft for review, and following revisions, all have signed Community Acknowledgement Forms provided in Attachment A.

2 PREVIOUS HYDROLOGIC STUDIES

Clear Creek hydrology has been studied numerous times in the past. The majority of the study reach falls within the UDFCD boundary, which extends from U.S. Highway 6 to the confluence with the South Platte River. Previous studies, primarily based on modeling rather than gauge analysis, defined the hydrologic response of the basin, and when merged, result in discharge

profiles for the 100-year runoff event (and 10-, 50-, and 500- year events) from U.S Highway 6 to the South Platte River as shown in Figure 1. These studies included the following:

1. U.S. Army Corps of Engineers (USACE) studies of Clear Creek and its tributaries through metropolitan Denver completed in 1978. These reports presented hydrologic results and discussion of various factors influencing flood flows.

2. In 1979, UDFCD published the Flood Hazard Area Delineation (FHAD) for Clear Creek within Jefferson County and Adams County.

3. In 1980 and 1981, a Phase A and Phase B report for lower Clear Creek and Clear Creek through Golden was prepared by Wright McLaughlin Engineers, Inc.

4. A Phase B report for Clear Creek Youngfield through Golden was prepared by Wright McLaughlin Engineers.

5. A Phase B report for lower Clear Creek was prepared by Love and Associates, Inc. in 1988.

6. In 2005, a Flood Hazard Area Delineation for Clear Creek through Adams County was prepared by Ayres and Associates, Inc. This study used hydrology prepared by the USACE.

7. A hydrologic study of Clear Creek between U.S. Highway 6 in Golden and the South Platte River was completed in 2006 by ICON Engineering, Inc. (ICON).

8. Flood Hazard Area Delineation for Clear Creek within Denver and Jefferson County prepared in 2007 by ICON Engineering, Inc.

9. In August 2007, ICON prepared a Phase A report for Clear Creek from U.S. Highway 6 in Golden to the South Platte River. This Phase A report consolidated the hydrologic information from the above reports and presented a discharge profile from U.S. Highway 6 in Golden to the South Platte River.

10. ICON also prepared a Clear Creek Hydrology Report in 2012 for the CWCB as a part of the Clear Creek Watershed Flood Mapping Study. This study provided hydrologic analysis along Clear Creek from just downstream of Georgetown Lake to the Interstate 70 (I-70) Twin Tunnels east of the City of Idaho Springs, Colorado. The report provided a good summary of previous hydrologic studies upstream of Golden and included analysis for upper watershed and Golden gauges.

11. Flood Insurance Studies (FISs) were most recently updated by Jefferson County in 2014, the City and County of Denver in 2013, and Adams County in 2016 (pending).

Table 1 summarizes peak discharges for Clear Creek from the most recent FISs. Despite some variations as FHADs and FISs have been updated over the years, Clear Creek peak discharge profiles have largely remained the same since the UDFCD Phase B report was published in 1981.

In addition to these studies of Clear Creek, UDFCD has prepared FHADs and master planning studies for the major tributaries to Clear Creek within UDFCD's boundaries. Data including watershed areas, peak flow rates, hydrographs, time to peak and other information from these reports were factored into the analysis. UDFCD studies conducted by UDFCD referenced in this report are available at: http://udfcd.gisworkshop.com/.

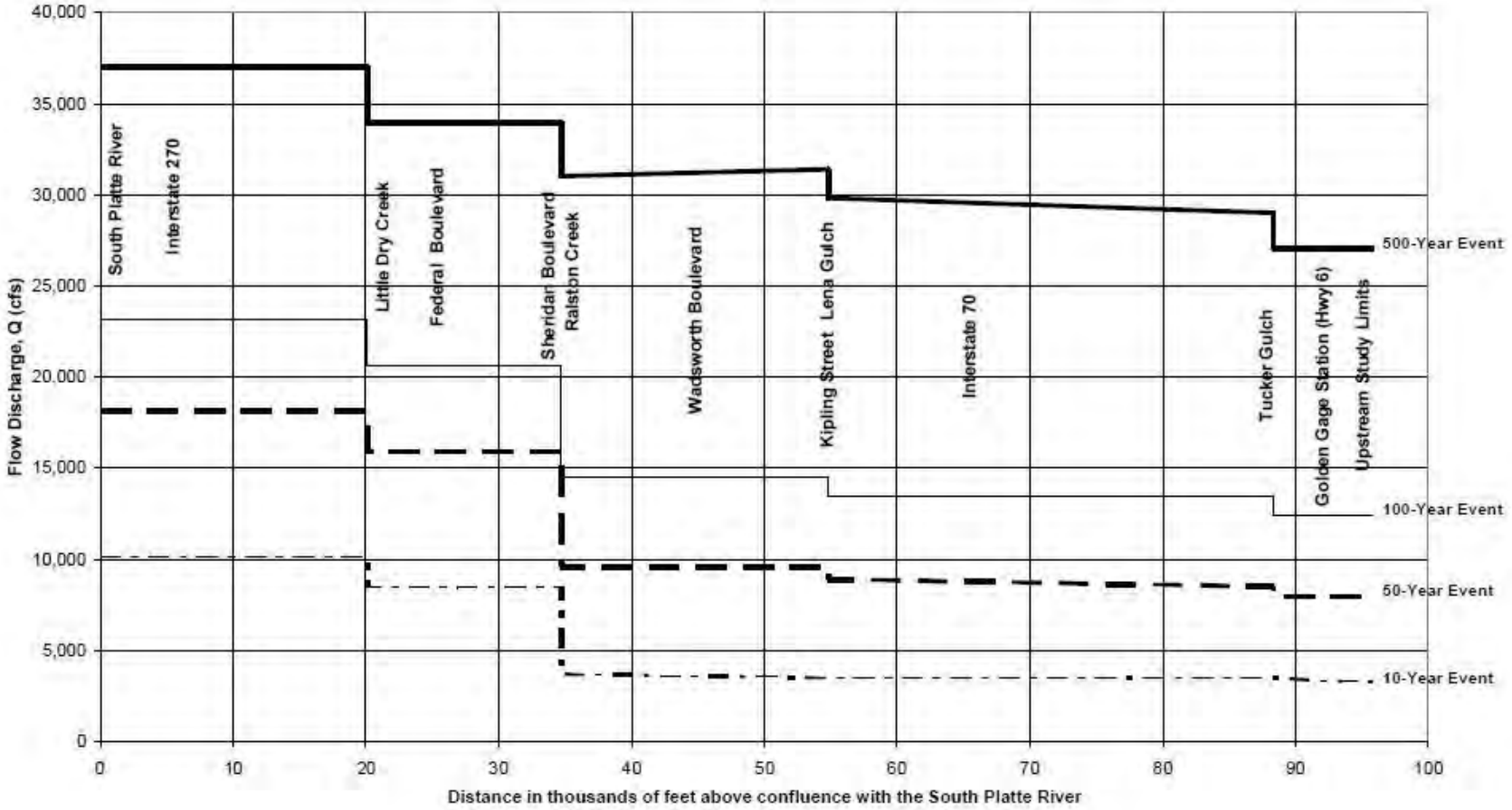


Figure 1. Current Peak Discharge Profiles from 2007 FHAD

Table 1. Summary of Clear Creek Peak Discharges from Flood Insurance Studies

Location	Peak Discharge (cfs)				Study
	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Above confluence with Tucker Gulch	3,470	8,010	12,420	27,430	Jefferson County FIS, 2014
Below confluence with Tucker Gulch	3,470	8,480	13,070	28,900	
At Kipling Boulevard	3,280	9,000	13,470	29,850	
Above confluence with Ralston Creek	3,710	9,750	14,520	31,000	
At West 52nd Avenue	3,710	9,750	14,520	31,000	City and County of Denver FIS, 2013
At Sheridan Boulevard Bridge	8,600[1,2]	15,800[1,2]	20,590	34,000[1,2]	Adams County FIS, 2016 (Pending)
At Interstate 76	8,600[1,2]	15,800[1,2]	10,079[3]	34,000[1,2]	
At South Platte Confluence	10,100[1,2]	18,100[1,2]	23,100	37,010[1,2]	

[1] Data not available in Adams County, FIS, 2016 (Pending)
[2] Obtained from the *Flood Hazard Area Delineation for Clear Creek* through Jefferson County & City and County of Denver, prepared by ICON Engineering, April 2007.
[3] Reflects flow spills to Clear Creek North Overflow

3 REGIONAL RESERVOIRS

There are 11 major reservoirs in the lower Clear Creek watershed. Four of these are on-stream reservoirs which provide some residual flood control downstream from each site as a result of their operation. These reservoirs include Ralston Reservoir, Arvada/Blunn Reservoir, Maple Grove Reservoir, and Leyden Lake. The amount of storage in the Clear Creek watershed is relatively small given the size of the watershed, and effects of stream regulation under high flow conditions would be expected to have minor effects on peak discharges on the mainstem of Clear Creek. The exception is Ralston Creek, which is influenced by storage facilities including Ralston Reservoir and Arvada/Blunn Reservoir. For purposes of determining peak discharges due to Ralston Creek, a gauge with long-term annual peak discharge data was not available downstream of the reservoirs, so values from the FHAD were used in the analysis.

3.1 Ralston Reservoir

Ralston Reservoir was constructed in 1938 by the City of Denver. It receives water from Ralston and South Boulder Creeks and is used for municipal water supply. The outlet works deliver water to the Moffat Treatment Plant and have the capability of forcing the natural inflow back into Ralston Creek. Although Ralston Reservoir is not operated for flood control purposes, there is approximately 2,400 acre-feet of storage available between the primary spillway and the top of the dam which provides incidental flood control.

3.2 Arvada/Blunn Reservoir

The Arvada/Blunn Reservoir is a water storage facility with flood attenuation benefits. This reservoir receives water directly from Ralston Reservoir and discharges into Ralston Creek.

3.3 Maple Grove Reservoir

Maple Grove Reservoir is located on Lena Gulch and is owned by Consolidated Mutual Water Company. This reservoir is used for municipal water supply storage and provides some attenuation of flood peaks. Approximately 452 acre-feet of storage are available in Maple Grove Reservoir.

3.4 Leyden Lake

Leyden Lake was originally an irrigation water storage reservoir, but was upgraded to a flood control facility on Leyden Creek. There are approximately 550 acre-feet of uncontrolled storage between the spillway crest and the crest of the dam.

4 APPROACH

The approach for revising peak discharge profiles for Clear Creek is based on analysis of long-term annual peak flow data for two stations along Clear Creek and two major tributaries. PeakFQ

(Veilleux et al. 2014) analysis was conducted to determine expected 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year peak discharge rates and associated 68% confidence limits. PeakFQ is a standard model for performing statistical analysis of annual peak flow time series following the methodology established in FEMA's Bulletin 17B. These "data points" from the PeakFQ analysis were used to set the bounds for the proposed profile. As described below, multiple factors were considered in developing discharge profiles, including information from studies listed above, analysis of tributary gauge data (when available), and spreadsheet analysis to estimate peak flows at intermediate locations. The technical analysis focused on the 100-year peak discharge profile due to its regulatory nature. Profiles for the 2-, 5-, 10-, 25-, 50-, 200-, and 500- year events were developed using peak flow data from PeakFQ analysis of Clear Creek and major tributaries stations and scaling relative to the 100-year profile. Intermediate locations were similarly scaled for the same general profile shape for all recurrence intervals.

4.1 Gauge Analysis

This update to Clear Creek hydrology is based on statistical analysis of available stream gauge data. The following stream gauges along Clear Creek have been included as part of the statistical analysis:

- USGS Gauge 06719500 – Historic Clear Creek Gauge near Golden, CO
- USGS Gauge 06719505 – Current Clear Creek Gauge at Golden, CO
- DWR Gauge CLEDERCO/USGS Gauge 06720000 – Clear Creek Gauge at Derby, CO

The following adjustments were made to the streamflow gauges:

- Clear Creek at Golden – The current stream gauge record begins in 1975 and excludes several larger flows that occurred prior to 1975 based on the historic Clear Creek gauge that was located approximately 0.7 miles upstream of U.S. Highway 6 in Golden, Colorado. The current stream gauge was extended to include the period of 1911-1974 using the historic stream gauge record. The extension allowed for approximation of several larger peak flows known to occur on Clear Creek that were not represented by the more limited period of record at the current Clear Creek stream gauge. The 1956 event was omitted because it was caused by a non-hydrologic failure of White Reservoir near Lawson, Colorado. The August 1, 1888 peak estimate of 8,700 cubic feet per second (cfs) at a site located 5.5 miles upstream from the Golden gauge was included as a historic peak and the analysis was historically adjusted.

- Clear Creek at Derby - The 1956 event was omitted because it was caused by a non-hydrologic failure of White Reservoir near Lawson, Colorado. The August 1, 1888 peak estimate of 8,700 cfs at a site located 5.5 miles upstream from the Golden gauge was included as a historic peak and the analysis was historically adjusted. However, since this peak flow measurement was taken upstream of the Golden gauge, a ratio of the peak flows

from the Golden gauge and the Derby gauge were applied to the 8,700 cfs peak flow to estimate the peak flow at the Derby gauge, resulting in a historic peak flow of 7,489 cfs at the Derby gauge.

Additionally, the major tributaries to Clear Creek were analyzed, including:

- USGS Gauge 06719560 – Lena Gulch at Lakewood, CO
- USGS Gauge 06719840 – Little Dry Creek at Westminster, CO

Figure 2 shows stream gauge locations, and Attachment C provides additional background on each of the gauges.

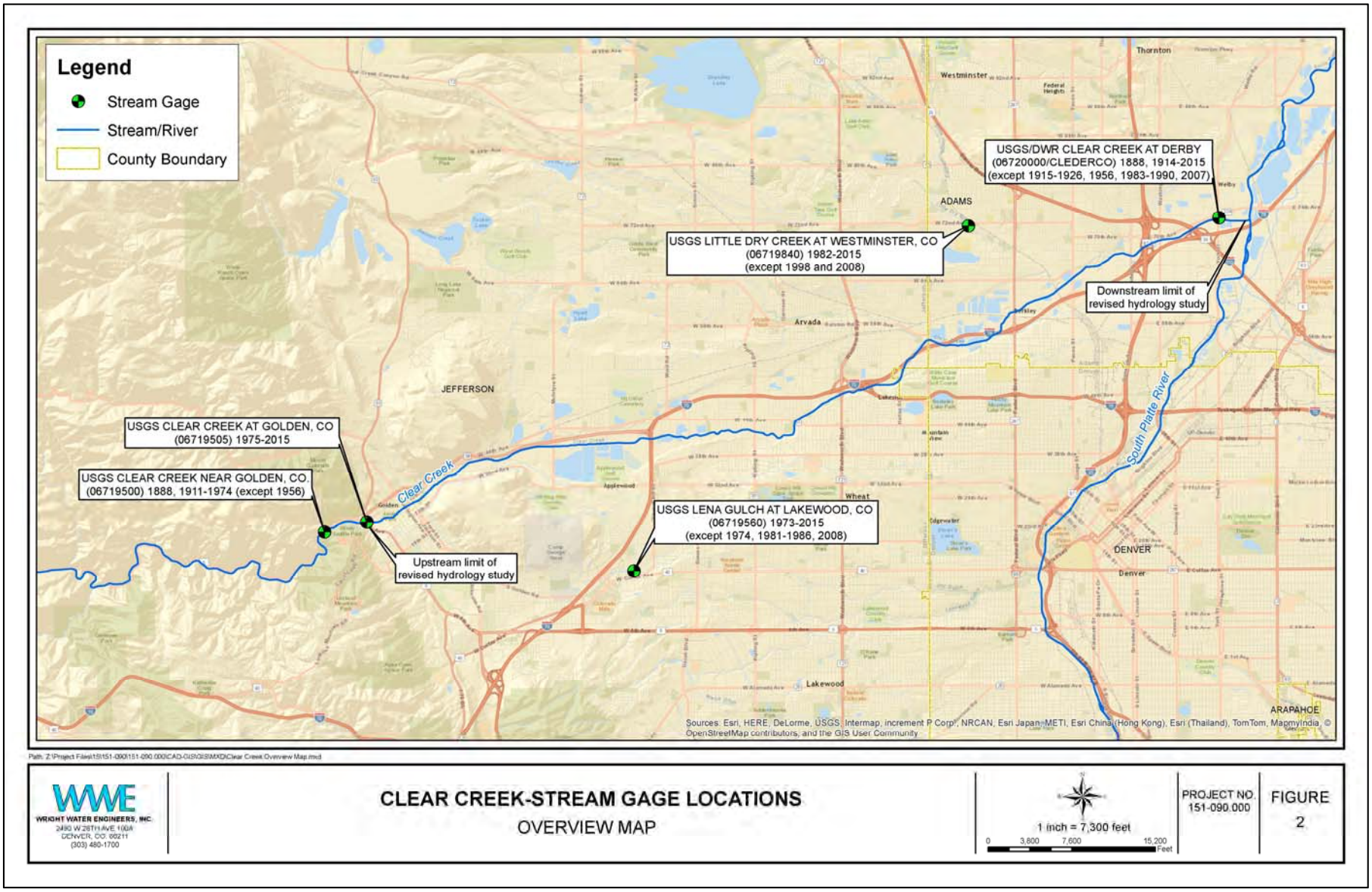


Figure 2. Map of Clear Creek and Tributary Stream Gauges Used in Analysis

4.1.1 Gauge Verification

An important step in evaluating gauge data was determining the validity of the peak flow data at gauge sites along Clear Creek. Peak flow data for the historic gauge near Golden (USGS 06719500) were analyzed using a HEC-RAS model based on topography from Light Detection and Ranging (LiDAR) data received from Denver Regional Council of Governments (DRCOG) in October 2013. To evaluate the peak flow data from the current stream gauge at Golden (USGS 06719505), the HEC-RAS model from the 2007 FHAD for Clear Creek in Jefferson County and City and County of Denver was run to generate rating curves at cross-sections in proximity to the gauging station. Peak flow data for the streamflow gauge at Derby (USGS 06720000) were analyzed similarly to the current stream gauge at Golden (USGS 06719505) using the HEC-RAS model from the 2005 FHAD for Clear Creek in Adams County.

Comparisons were difficult due to differences in model datum and gauge datum and zero flow levels. The elevations were adjusted to NAVD 1988 for comparison; however, further adjustments to USGS gauge 06719500 and USGS gauge 06719505 were required to make meaningful comparisons between the model and gauge data due to the following:

- While the datum for the gauge height is the same over time, the point of zero flow (e.g. where the rating curve begins to indicate flow may change over time due to aggradation or degradation) varies. The rating curve is periodically adjusted by USGS to account for this. An accurate “point in time” comparison of gauge elevation with HEC-RAS elevation (at time of survey) is not feasible based on available data.

- The zero flow level in the HEC-RAS model is determined by the topography on days when the reaches in the model were surveyed. The true channel invert level may be lower than surveyed due to factors including flow in the channel at the time of the survey, resolution of aerial topography, or degradation.

- For the current stream gauge (USGS 06719505), the model cross-section and gauge measurement location are not in exactly the same place. Cross-sections were interpolated; however, some differences would be expected between the cross-section and gauge elevations.

- Model and gauge velocities differ. Manning’s n values assigned in the hydraulic model affect the velocity. In reality, channel roughness is complex, varying with depth, vegetation, and other factors. The Manning’s n values used in the model are a reasonable approximation; however, some variations between model and gauge velocities exist.

- Data for comparison are limited. The rating curves for USGS gauge 06719500 and USGS 06719505 go up to only low-to-moderate flows for comparison to the HEC-RAS model.

To address these challenges, adjustments were developed for each gauge, based on comparison of locations, evaluation of low flow depths, and information available for the gauge. Because many of the gauges are intended to measure a lesser flow regime than the 100-year event, when large flows have occurred historically, the gauge rating curve is extrapolated to estimate flood flows. As a result, the primary intent of the comparison was to determine if the gauge rating curve data follow the same trend as the HEC-RAS model rating curve and, if extrapolated, how they would compare with projected gauge peak flows.

Elevation adjustment were developed for each gauge, based on comparison of locations, evaluation of low flow depths, and information available for the gauge. Because these gauges are intended to measure a lower flow regime than the 100-year event, when large flows have occurred historically, the gauge rating curve is extrapolated to estimate flood flows. As a result, the primary intent of the comparison was to determine if the gauge rating curve data follow the same trend as the HEC-RAS model rating curve and, if extrapolated, how they would compare with projected gauge peak flows (and confidence limits) from statistical analysis. Figure 3 is an example showing comparison of gauge and model rating curves for Clear Creek at Derby. Attachment C includes tables and graphs comparing gauge and model rating curves, with similar figures for other locations.

According to the hydraulic models and including datum adjustments, the gauge depths correlate reasonably with the rating curves developed for each gauge analyzed in this gauge verification study The general relationship between flow and depth at each of the three gauges follow expected trends and gauge data represents flows in Clear Creek reasonably well. It is reasonable to rely on the peak flow data from Clear Creek gauges for establishing a peak discharge profile that falls within the confidence limits of the data.

For tributary gauges, the intent of the analysis was to use peak discharges and confidence limits from PeakFQ as guidance for determining increases in the discharge profiles, along with other information. This CLOMR is not intended to revise peak discharges for tributaries. Therefore, detailed comparisons between HEC-RAS models and gauge rating curves were not developed for tributaries.

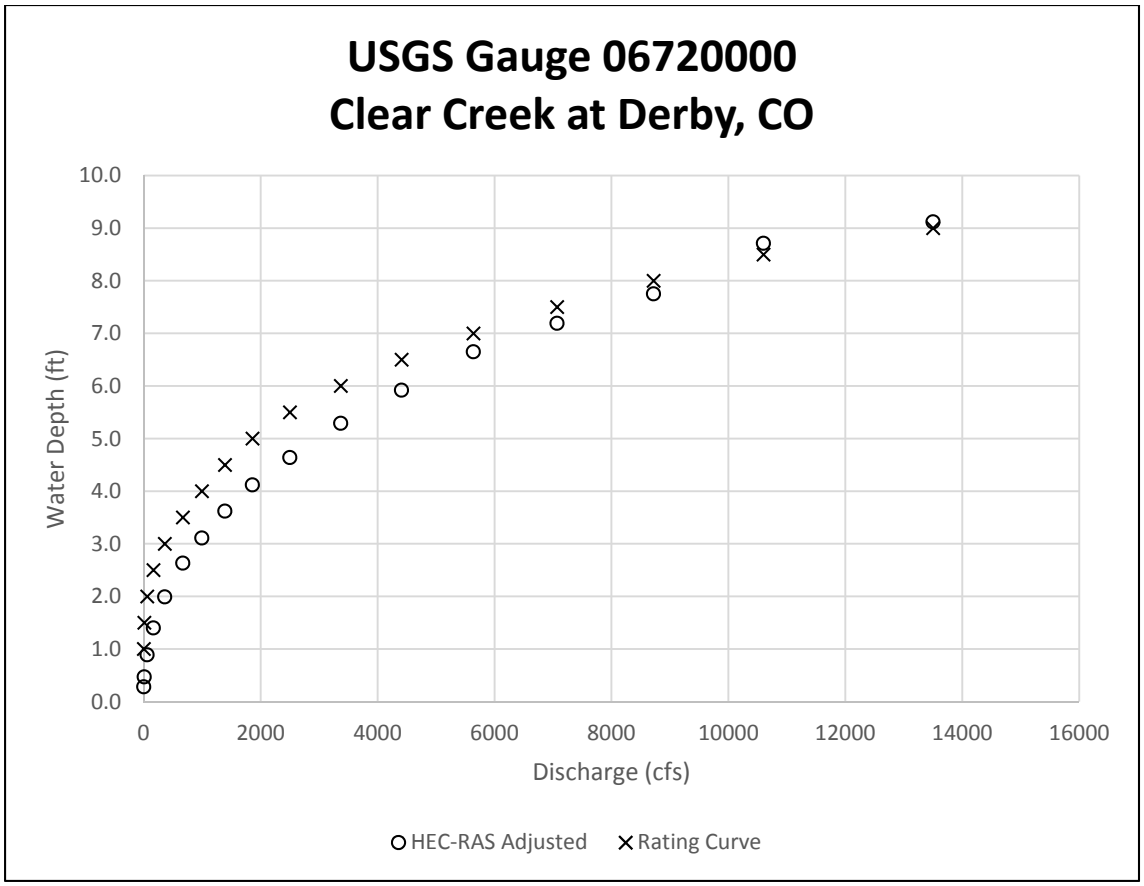


Figure 3. Example of Gauge and HEC-RAS Rating Curve Comparison for Clear Creek at Derby (CLEDERCO/06720000 CC at Derby), others provided in Attachment C

4.1.2 Stream Gauge Trend Analysis

The stream gauge record for the Golden gauge dates back to 1911, a time when imperviousness in the lower Clear Creek watershed was considerably lower than it is now. Therefore, an extensive trend analysis was conducted for both the Clear Creek at Golden and the Clear Creek at Derby streamflow gauges to account for potential increases in peak flows over time due to increased watershed imperviousness. The following summarizes the various trend analyses that were conducted:

- **Population** – Population of counties using the decennial census from 1900 to 1990 by the United States Census Bureau was obtained. The 10-year average peak flow data was then divided by the population. Using 2010 as the baseline, peak flows prior to 2010 were scaled based on the ratio of the 10-year peak flow data versus the population. This resulted in significant overestimation to the point that scaled flows were not realistic.

- **Imperviousness** – Research was conducted to find historical aerial photographs of the Clear Creek watershed to estimate the increase in imperviousness over time, but very limited aerials were found. Aerial photography was insufficient for any meaningful assessment of historic lower watershed imperviousness.

- **Annual Precipitation** – Annual precipitation from the Idaho Springs and Lakewood rain gauge divided by the peak annual streamflow was plotted over time. This did not result in a meaningful trend over time.

- **Monthly Precipitation** – Total precipitation from three months prior to the peak streamflow date from the Idaho Springs and Lakewood rain gauge divided by the annual peak streamflow was plotted over time. Although this resulted in an increasing trend over time, the data did not fit the trend line very well.

- **Rainfall and Snowmelt Influenced Peak Flows** – Peak flows that occurred in July, August or September were omitted from the Clear Creek at Golden streamflow dataset since it was assumed that these peak flows were associated with just rainfall, as opposed to rainfall and snowmelt. Using rainfall information from the Idaho Springs, Cabin Creek, Berthoud Pass, Jones Pass and Georgetown rain gauges, the rainfall and snowmelt peak flow datasets were further truncated based on if there was $\geq$ 1.0 inch, $\geq$ 0.5 inch, and $\geq$ 0.25 inch of rainfall on the day of or within the four preceding days of the peak. This resulted in omitting too many years of peak flow data to be able to run a statistical analysis with confidence.

- **Rainfall Influenced Peak Flows** – The final trend analysis that was conducted analyzed peak flows that were influenced by rainfall regardless of the time of year of the peak

(including both rainfall and snowmelt peak flows). Using rainfall information from the Idaho Springs, Cabin Creek, Berthoud Pass, Jones Pass and Georgetown rain gauges, the Clear Creek at Golden peak flow dataset was truncated based on if there was $\geq$ 0.25 inch of rainfall on the day of or within the four preceding days of the peak. This resulted in a total of 58 years of peak flow data for the Clear Creek at Golden stream gauge that was influenced by rainfall.

The years in which rainfall influenced the peak flows from the Clear Creek at Golden stream gauge were transposed to the years of peak flows for the Clear Creek at Derby stream gauge. For the Clear Creek at Derby stream gauge, precipitation from the Lakewood and Edgewater rain gauges were also analyzed to determine if any additional annual peak flows were influenced by rainfall of $\geq$ 0.25 inch of rainfall on the day of or within the two preceding days of the peak (two preceding days was used to reflect the shorter response time of the watershed tributary to the Clear Creek at Derby stream gauge). This resulted in a total of 62 years of peak flow data for the Clear Creek at Derby stream gauge that was influenced by rainfall. However, to account for changes in the watershed between the Clear Creek at Golden and the Clear Creek at Derby stream gauges, the 62 years of rainfall influenced peak flows at the Derby stream gauge were scaled relative to the peak flow from 2015. The scaling of the peak flows was conducted by the following:

- **10-Year Median Peak Flow of Derby Gauge** – The 10-year running median peak flow of the Derby gauge was plotted over time. This resulted in an increasing trendline with a reasonable fit of the data. The equation of the trendline was used to scale flows from the Derby Gauge relative to the peak flow during 2015. Figure 4 illustrates this plot. Table 2 shows the Clear Creek at Derby peak flow data obtained from the USGS/DWR compared to the adjusted peak flow data used in the statistical analysis. Note: 10-year average trends for the mean and median were calculated for Golden and Derby. The Golden data exhibited a slight decreasing trend and were not adjusted; however, Derby exhibited an increasing trend for both the mean and median. The median trend analysis was selected for adjusting flows because annual peak flows follow a non-parametric distribution.

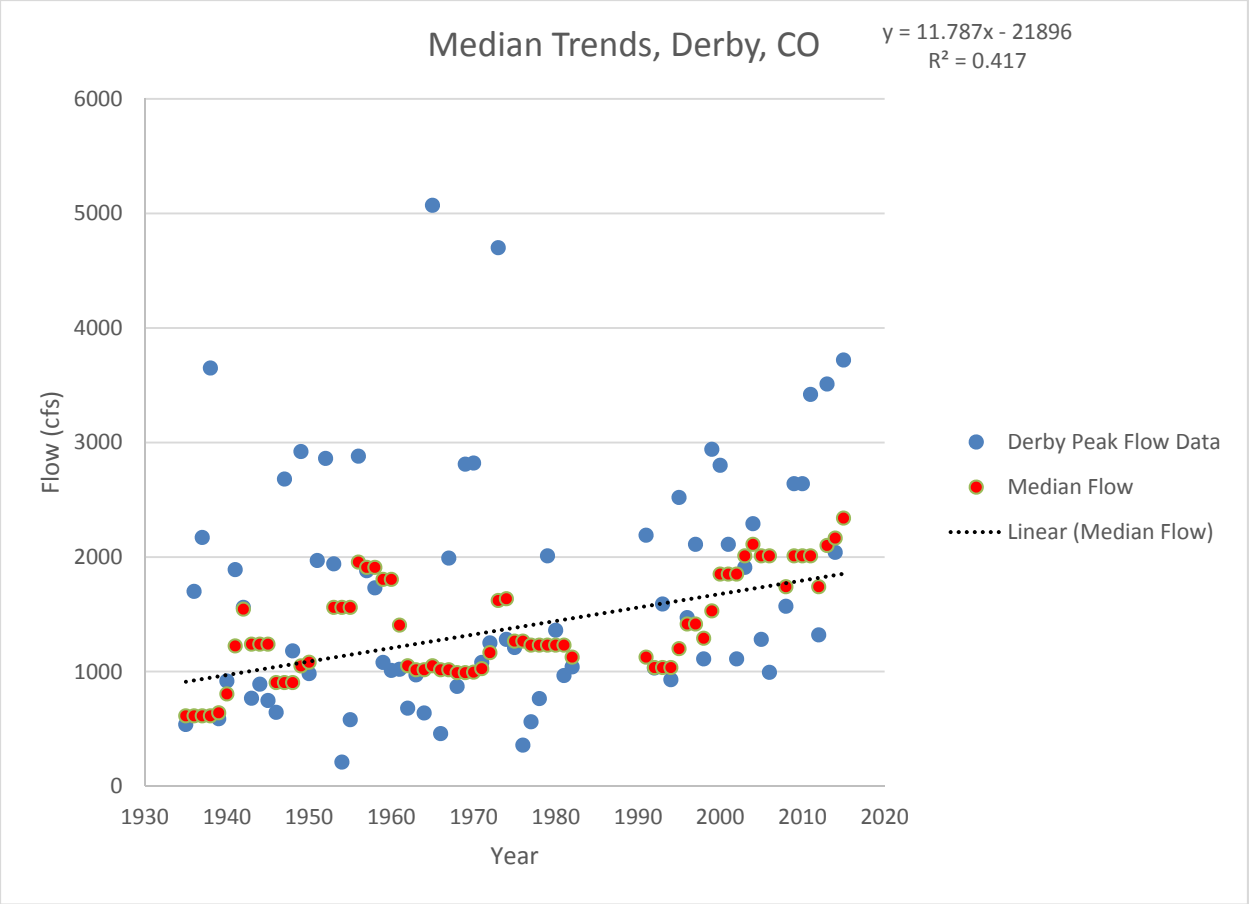


Figure 4. 10-Year Median Peak Flow vs. Time

Table 2. Clear Creek at Derby USGS/DWR Peak Flow Compared to Adjusted Peak Flow

Year	Clear Creek at Derby USGS/DWR Peak Flow (cfs)	Clear Creek at Derby Adjusted Peak Flow (cfs)
1888	8,700	7,489
1914	1,260	3,518
1927	1,000	2,269
1929	482	1,063
1932	345	730
1933	1,530	3,195
1934	690	1,422
1935	537	1,092
1936	1,700	3,414
1937	2,170	4,303
1938	3,650	7,147
1940	918	1,754
1941	1,890	3,568
1942	1,560	2,910
1943	766	1,412
1944	889	1,620
1945	747	1,346
1946	644	1,147
1947	2,680	4,719
1949	2,920	5,029
1950	982	1,673
1951	1,970	3,320
1955	579	936
1958	1,730	2,713
1959	1,080	1,677
1961	1,020	1,553
1963	970	1,449
1964	638	944
1965	5,070	7,431
1966	458	665
1967	1,990	2,863
1969	2,810	3,971
1970	2,820	3,949
1972	1,250	1,720
1973	4,700	6,411
1974	1,280	1,731
1975	1,210	1,622
1976	357	475
1977	561	740
1979	2,010	2,606
1981	965	1,231
1982	1,040	1,316
1992	1,030	1,206
1993	1,590	1,848
1994	929	1,072
1995	2,520	2,887
1996	1,470	1,672
1997	2,110	2,383

1998	1,110	1,244
1999	2,940	3,273
2000	2,800	3,095
2001	2,110	2,316
2002	1,110	1,210
2004	2,290	2,462
2005	1,280	1,367
2008	1,570	1,643
2009	2,640	2,745
2010	2,640	2,727
2011	3,420	3,509
2012	1,320	1,346
2013	3,510	3,555
2015	3,720	3,720

4.1.3 Statistical Analysis

Statistical analysis was performed using PeakFQ Version 7.1. This version was chosen for its ability to implement FEMA Bulletin 17B methods. PeakFQ is widely used for this type of analysis. The 1888 peak discharge of 8,700 cfs for the Golden gauge (7,489 cfs for the Derby gauge) was analyzed as a historical peak, in which the systematic record was supplemented with a historic peak that was known to be the highest in a historical period longer than the systematic record.

Table 3 summarizes results of gauge analysis for the 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year recurrence intervals with upper and lower 68% confidence limits. 68% confidence limits were used to provide upper and lower ranges around the peak flows from PeakFQ to allow peak discharge profiles to be "fit" to data[1].

Figure 5 provides a probability plot of PeakFQ results for Clear Creek at Derby. Attachment D provides PeakFQ results and plots for all gauges analyzed. Attachment F (Flash Drive) contains all input and output files for statistical analysis as well as comparison of different methods and skew coefficients. Based on this analysis the following was determined:

- For the gauged tributaries (Lena Gulch and Little Dry Creek), the most reasonable results were generally achieved using the station skew, if positive, or a zero skew. WWE analyzed scenarios using general, station, and setting the skew equal to zero and consulted with Dr. Robert Jarrett (USGS retired) to determine appropriate skew values.

- For the Clear Creek at Golden and the Clear Creek at Derby gauges, a skew of +1 was utilized. This is consistent with the 1978 USACE Clear Creek Hydrologic Analysis Report.

[1] The 95% confidence limits were originally used to determine if there was a significant difference between the modeled hydrology from FHADs and the gauge analysis. The modeled hydrology from FHADs was greater than the 95% upper confidence limit for both Clear Creek at Golden and Derby, especially if the full gauge data sets were analyzed.

This report states that for the Golden gauge, a generalized skew coefficient of +1 obtained from a regional study of similar streams in Colorado was used to help shape the distribution. The generalized skew of +1 used in the Golden gauge analysis was also used in the statistical analysis of the Derby station flow data.

- As a reasonableness check, using the regional equations developed specifically for foothill streams by Jarrett and Costa (1988), the 100-year flood is 9,550 cfs at Golden.

Table 3. Clear Creek PeakFQ Results for 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year Peak Discharges

Gauge ID	Period of Record	2-year (cfs)			5-year (cfs)			10-year (cfs)			25-year (cfs)			50-year (cfs)			100-year (cfs)			200-year (cfs)			500-year (cfs)		
		Q2	Q2 68% LCL	Q2 68% UCL	Q5	Q5 68% LCL	Q5 68% UCL	Q10	Q10 68% LCL	Q10 68% UCL	Q25	Q25 68% LCL	Q25 68% UCL	Q50	Q50 68% LCL	Q50 68% UCL	Q100	Q100 68% LCL	Q100 68% UCL	Q200	Q200 68% LCL	Q200 68% UCL	Q500	Q500 68% LCL	Q500 68% UCL
USGS Clear Creek near and at Golden, CO (combined) (06719500/06719505)	Rainfall Influenced (58 years) Skew = 1	1,272	1,223	1,323	2,268	2,172	2,373	3,269	3,103	3,456	5,079	4,754	5,454	6,948	6,430	7,554	9,392	8,594	10,340	12,580	11,380	14,030	18,320	16,340	20,760
DWR/USGS Clear Creek at Derby (CLEDERCO/06720000)	Rainfall Influenced (62 years) Skew = 1	1,859	1,792	1,928	3,256	3,126	3,396	4,640	4,419	4,887	7,111	6,683	7,601	9,634	8,959	10,420	12,900	11,870	14,120	17,130	15,590	18,960	24,660	22,140	27,710
USGS Lena Gulch at Lakewood, CO (06719560)	1974 - 2015, missing years from 1981-1986, 2008 (35 years) Skew = 0	235	224	247	391	371	414	510	479	546	677	629	733	813	750	889	958	877	1,056	1,114	1,012	1,238	1,337	1,205	1,500
USGS Little Dry Creek at Westminster, CO (06719840)	1982-2015, missing 1998, 2008 (32 years) Skew = 0	512	491	535	793	755	835	996	942	1,058	1,270	1,189	1,365	1,486	1,382	1,611	1,712	1,581	1,870	1,949	1,789	2,143	2,280	2,076	2,529

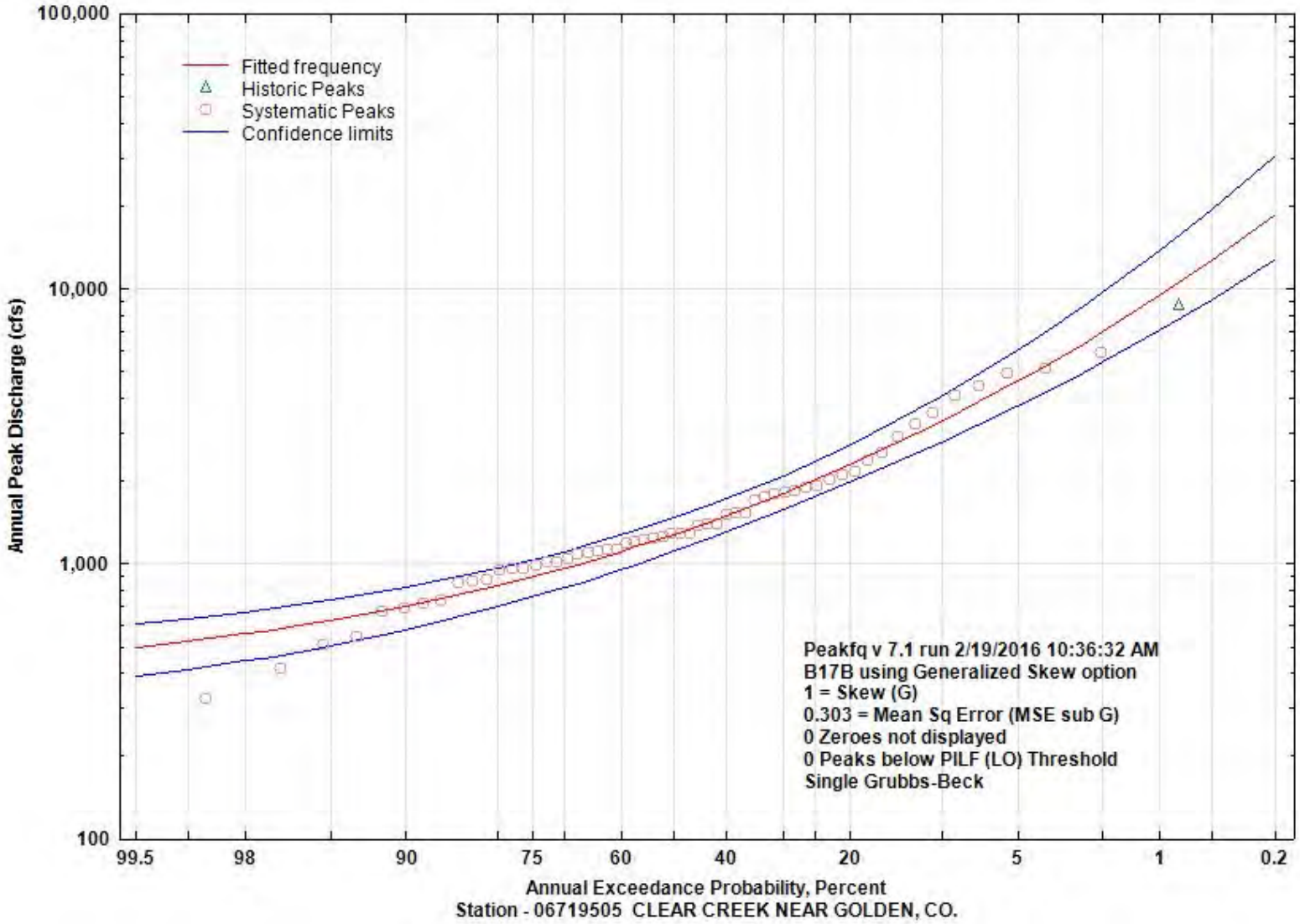


Figure 5. PeakFQ Probability Plot for Clear Creek near Golden combined with Clear Creek at Golden (06719500/06719505), others provided in Attachment D

4.2 Geographic Data

To support development of the 100-year discharge profile between gauge locations, geographic data were collected and compiled in a spreadsheet, including the following:

- Tributary drainage area along Clear Creek and for major tributaries – determined from USGS StreamStats, FIS tables, FHADs, and previous master planning studies.
- Distance along channel centerline, increasing from U.S. Highway 6 in Golden downstream – determined in AutoCAD and checked in GIS.

4.3 Flood Hazard Area Delineation (FHAD) Information

Information including published peak flow rates, hydrograph times to peak and area information was extracted from FHADs and entered into a spreadsheet (provided on Flash Drive – Attachment F) that was used to develop the alternative profile to "fit" Clear Creek gauge data based on this and other information. FHADs are available at http://udfcd.gisworkshop.com/. Peak flow rates from FHADs typically represent future, developed flows.

The analysis in support of this CLOMR did not explicitly evaluate changes in impervious area over time because there is insufficient documentation to estimate imperviousness over the historic period evaluated. Instead, a trend in the median of the 10-year moving average of peak discharges was determined to be the best available surrogate and was applied to adjust the Derby gauge for development over time. FHAD peak discharges, which were factored in to calculation of some of the steps in the profile represent fully developed conditions.

4.4 Flood Insurance Studies

As a part of the profile analysis, peak discharge data from FISs for major tributary inflows were compiled in the master analysis spreadsheet. Peak discharges for Clear Creek are included in County FISs.

5 RESULTS

Because the determination of the profiles between locations on Clear Creek with gauge data is related to tributary inflows, some with gauge data but some without, multiple factors were considered in developing the 100-year peak discharge profile. These included published flows in FISs and FHADs, tributary drainage area, timing of peaks and other factors included in the master spreadsheet on the Flash Drive – Attachment F.

5.1 100-Year Discharge Profile

Based on evaluation of gauge data, meetings and discussions with UDFCD Program Managers who know the hydrology of Clear Creek through their work and data collection over many years, review by engineering staff of participating communities, and peer review by others, Figure 6 illustrates the 100-year peak discharge profile in comparison with the profile from the 2005 and 2007 FHADs. Table 4 provides the recommended 100-year profile as well as others. Key observations of the 100-year profile include:

- The 100-year flow at U.S. Highway 6 was set at the Clear Creek at Golden gauge lower 68% confidence interval. This was a reasonable approach because when analyzing the full period of record from the Clear Creek at Golden gauge (not just rainfall influenced peak flows), the estimated 100-year flow is much lower than the lower 68% confidence interval. Additionally, this allowed for a better fit of the tributary steps in the profile.

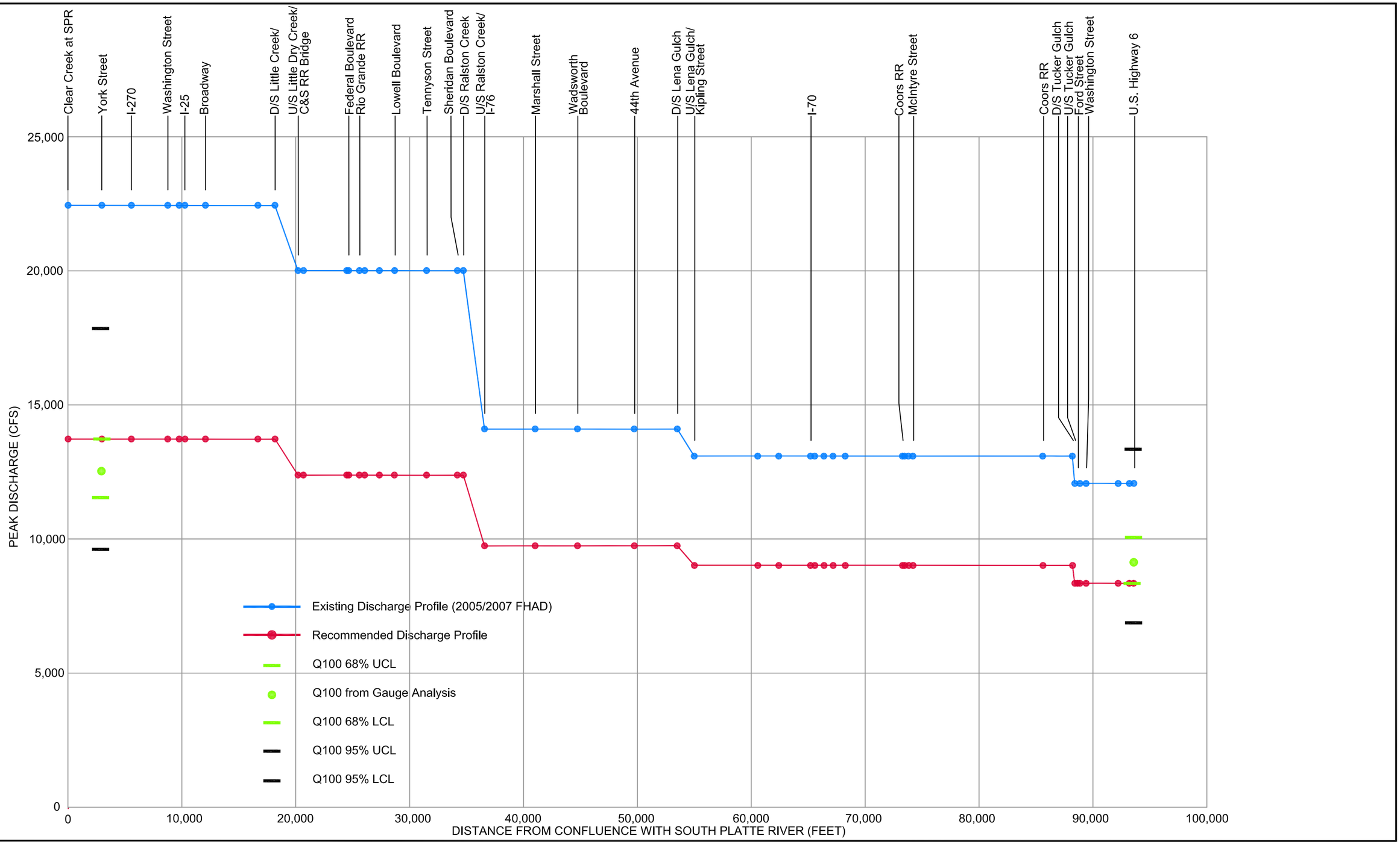
- Profile steps for gauged tributaries (Lena Gulch and Little Dry Creek) used the 100-year Bulletin 17B estimate using the greater of the station skew or setting the skew to zero.

- Profile steps for ungauged tributaries (Tucker Gulch and Ralston Creek) were calculated based on the average ratio of the Bulletin 17B estimate for the gauged tributaries versus the 100-year profile step published in the 2005 and 2007 FHADs multiplied by the ungauged tributary 100-year profile step published in the 2007 and 2007 FHADs. Then a ratio was applied equally to these profile steps so that the 100-year flow at Derby was set to the upper 68% confidence interval value.

5.2 2-, 5-, 10-, 25-, 50-, 200-, and 500-year Peak Discharge Profiles

Profiles for 2-, 5-, 10-, 25- 50-, 200-, and 500-year peak discharges were developed using PeakFQ results for Clear Creek gauge stations and shown in Figure 7. To determine the discharge profiles for the recurrence intervals other than the 100-year discharge profile, a dimensionless relationship for the 100-year event was developed and then applied to the other profiles based on the difference from the PeakFQ value in Golden to the upper confidence limit PeakFQ value at Derby. The

profile steps are scaled in the same relative way as the 100-year. Table 5 provides a comparison of proposed peak discharges and effective peak discharges from FISs.



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CLEAR CREEK HYDROLOGY CLOMR

Comparison of 2005/2007 FHAD and Recommended 100-year Discharge Profiles

PROJECT NO.	FIGURE
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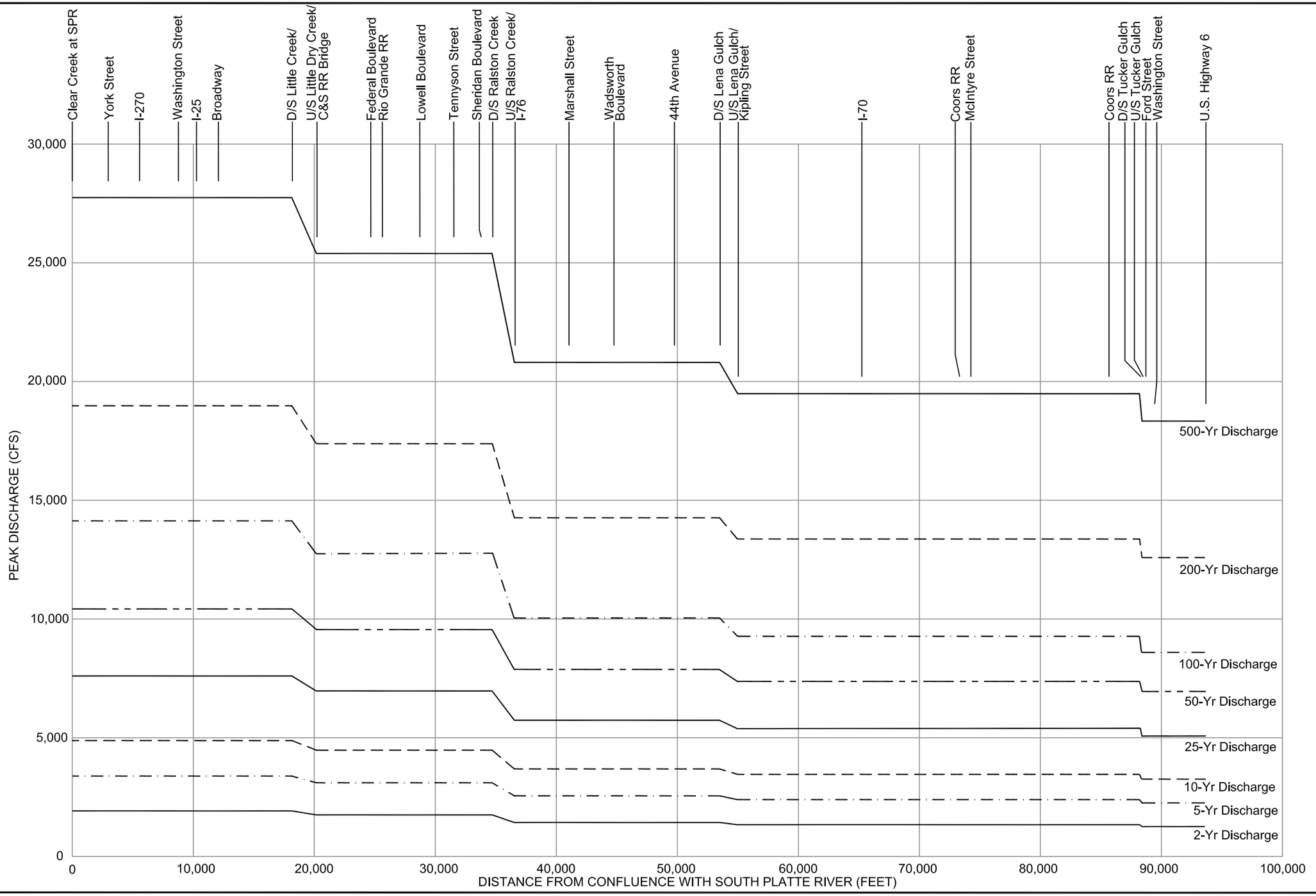

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CLEAR CREEK HYDROLOGY CLOMR

2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year Peak Discharge Profiles for Clear Creek from U.S. Highway 6 to South Platte River

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Table 4. 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year Peak Discharge Profiles, Clear Creek, U.S. Highway 6 to South Platte River

Clear Creek Station	2-yr (cfs)	5-yr (cfs)	10-yr (cfs)	25-yr (cfs)	50-yr (cfs)	100-yr (cfs)	200-yr (cfs)	500-yr (cfs)
U.S. Highway 6	1,300	2,300	3,300	5,100	6,900	8,600	12,600	18,300
Washington Street	1,300	2,300	3,300	5,100	6,900	8,600	12,600	18,300
Ford Street	1,300	2,300	3,300	5,100	6,900	8,600	12,600	18,300
US Tucker Gulch	1,300	2,300	3,300	5,100	6,900	8,600	12,600	18,300
DS Tucker Gulch	1,400	2,400	3,500	5,400	7,400	9,300	13,400	19,500
Coors Railroad	1,400	2,400	3,500	5,400	7,400	9,300	13,400	19,500
McIntyre Street	1,400	2,400	3,500	5,400	7,400	9,300	13,400	19,500
Coors Railroad	1,400	2,400	3,500	5,400	7,400	9,300	13,400	19,500
I-70	1,400	2,400	3,500	5,400	7,400	9,300	13,400	19,500
US Lena Gulch/Kipling Street	1,400	2,400	3,500	5,400	7,400	9,300	13,400	19,500
DS Lena Gulch	1,400	2,600	3,700	5,700	7,900	10,000	14,300	20,800
44th Avenue	1,400	2,600	3,700	5,700	7,900	10,000	14,300	20,800
Wadsworth Boulevard	1,400	2,600	3,700	5,700	7,900	10,000	14,300	20,800
Marshall Street	1,400	2,600	3,700	5,700	7,900	10,000	14,300	20,800
US Ralston Creek/I-76	1,400	2,600	3,700	5,700	7,900	10,000	14,300	20,800
DS Ralston Creek	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,400
Sheridan Boulevard	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,400
Tennyson Street	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,400
Lowell Boulevard	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,400
Fischer Ditch Diversion	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,400
Rio Grande Railroad	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,400
Federal Boulevard	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,400
US Little Dry Creek/C&S Railroad Bridge	1,800	3,100	4,500	7,000	9,600	12,800	17,400	25,400
DS Little Dry Creek/Pecos Street	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
Lower Clear Creek Diversion Dam	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
Broadway	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
I-25	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
I-25 Ramp	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
Washington Street	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
I-270	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
York Street	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700
Clear Creek at South Platte River	1,900	3,400	4,900	7,600	10,400	14,100	19,000	27,700

Table 5. Comparison of Proposed Peak Discharges with FIS Peak Discharges

Location	Peak Discharge (cfs)							
	10% Annual Chance		2% Annual Chance		1% Annual Chance		0.2% Annual Chance	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Above confluence with Tucker Gulch	3,470	3,300	8,010	6,900	12,420	8,600	27,430	18,300
Below confluence with Tucker Gulch	3,470	3,500	8,480	7,400	13,070	9,300	28,900	19,500
At Kipling Boulevard	3,280	3,500	9,000	7,400	13,470	9,300	29,850	19,500
Above confluence with Ralston Creek	3,710	3,700	9,750	7,900	14,520	10,000	31,000	20,800
At Sheridan Boulevard Bridge	8,600[1,2]	4,500	15,800[1,2]	9,600	20,590	12,800	34,000[1,2]	25,400
At Interstate 76	8,600[1,2]	4,500	15,800[1,2]	9,600	10,079[3]	12,800	34,000[1,2]	25,400
At South Platte Confluence	10,100[1,2]	4,900	18,100[1,2]	10,400	23,100	14,100	37,010-[1,2]	27,700

[1] Data not available in Adams County, FIS, 2016 (Pending)
[2] Obtained from the *Flood Hazard Area Delineation for Clear Creek* through Jefferson County & City and County of Denver, prepared by ICON Engineering, April 2007.
[3] Reflects flow spills to Clear Creek North Overflow

6 REFERENCES

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UDFCD 2004. Flood Hazard Area Delineation for Ralston Creek and Leyden Creek through City of Arvada and Jefferson County, prepared by Boyle Engineering Corporation.

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UDFCD 2007. Flood Hazard Area Delineation for Lena Gulch (Lower), prepared by George K. Cotton Consulting, Inc.

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UDFCD 2008. Phase B Report for Clear Creek through Adams, Jefferson, and Denver Counties, prepared by ICON Engineering, Inc.

Veilleux, A.G., Cohn, T.A., Flynn, K.M., Mason, R.R., Jr., and Hummel, P.R., 2014, Estimating magnitude and frequency of floods using the PeakFQ 7.0 program: U.S. Geological Survey Fact Sheet 2013-3108, 2 p., http://pubs.usgs.gov/fs/2013/3108/.

Documents relied upon also include many master planning and flood studies conducted for Clear Creek and tributaries by UDFCD. An exhaustive list of references is not provided for these studies because they are numerous and all can be found on UDFCD's website (www.udfcd.org). Key pages related to hydrology for many of these studies are included on the attached flash drive. Flood Insurance Studies (FISs) cited at the county level provide information on hydrology for the entire county, including incorporated communities.

Appendix C: Hydraulic Analysis Support Documents

MULTI-PROFILE HYDRAULIC MODEL RESULTS

HEC-RAS Plan: CC-MultiProf

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_6	95972	500-YR	18300.00	5713.33	5728.00	5724.02	5729.15	0.00	11.11	2564.38	263.24	0.53
Reach_6	95972	100-YR	8600.00	5713.33	5721.34	5721.34	5723.32	0.01	13.51	960.22	214.99	0.89
Reach_6	95972	50-YR	6900.00	5713.33	5720.74	5720.74	5722.49	0.01	12.52	830.56	213.31	0.86
Reach_6	95972	10-YR	3300.00	5713.33	5719.16	5719.16	5720.35	0.01	9.60	497.94	208.80	0.76
Reach_6	95719	500-YR	18300.00	5708.28	5727.85		5728.55	0.00	8.73	3493.30	349.61	0.35
Reach_6	95719	100-YR	8600.00	5708.28	5720.06		5721.02	0.00	9.27	1327.67	187.47	0.49
Reach_6	95719	50-YR	6900.00	5708.28	5718.49		5719.53	0.00	9.46	1037.25	180.53	0.54
Reach_6	95719	10-YR	3300.00	5708.28	5714.46	5714.21	5715.91	0.01	10.14	401.57	126.28	0.76
Reach_6	95641	500-YR	18300.00	5705.45	5726.48	5720.43	5728.08	0.00	11.94	2166.54	230.16	0.50
Reach_6	95641	100-YR	8600.00	5705.45	5719.24	5716.25	5720.66	0.00	10.16	965.74	120.46	0.55
Reach_6	95641	50-YR	6900.00	5705.45	5717.88	5715.31	5719.15	0.00	9.54	823.19	108.92	0.55
Reach_6	95641	10-YR	3300.00	5705.45	5714.17	5712.93	5715.16	0.01	8.25	441.69	98.83	0.62
Reach_6	95633 Footbridge		Bridge									
Reach_6	95613	500-YR	18300.00	5701.70	5721.92	5721.92	5726.17	0.01	18.09	1316.40	175.56	0.85
Reach_6	95613	100-YR	8600.00	5701.70	5716.42	5716.42	5719.88	0.01	15.67	631.49	97.60	0.94
Reach_6	95613	50-YR	6900.00	5701.70	5715.36	5715.36	5718.42	0.01	14.64	533.32	89.69	0.94
Reach_6	95613	10-YR	3300.00	5701.70	5713.01	5712.68	5714.73	0.01	10.74	333.85	80.67	0.83
Reach_6	95504	500-YR	18300.00	5704.20	5718.50	5718.50	5722.58	0.01	18.65	1330.06	173.24	0.95
Reach_6	95504	100-YR	8600.00	5704.20	5714.71	5714.66	5717.44	0.01	14.60	751.16	138.41	0.90
Reach_6	95504	50-YR	6900.00	5704.20	5714.11	5713.80	5716.32	0.01	12.99	669.84	133.64	0.83
Reach_6	95504	10-YR	3300.00	5704.20	5712.27		5713.42	0.01	9.07	437.07	119.58	0.66
Reach_6	95215	500-YR	18300.00	5701.50	5714.81	5714.81	5717.81	0.01	16.45	1626.09	259.34	0.91
Reach_6	95215	100-YR	8600.00	5701.50	5712.15	5712.15	5714.14	0.01	12.58	963.70	239.33	0.81
Reach_6	95215	50-YR	6900.00	5701.50	5711.45	5711.05	5713.30	0.01	11.84	798.68	231.38	0.80
Reach_6	95215	10-YR	3300.00	5701.50	5709.19	5708.81	5710.71	0.01	9.99	363.54	153.23	0.83
Reach_6	94827	500-YR	18300.00	5697.72	5710.83	5710.83	5713.38	0.01	14.67	1739.16	336.83	0.84
Reach_6	94827	100-YR	8600.00	5697.72	5707.87	5707.87	5709.90	0.01	12.21	876.08	242.80	0.84
Reach_6	94827	50-YR	6900.00	5697.72	5707.07	5707.07	5709.04	0.01	11.75	696.86	206.36	0.86
Reach_6	94827	10-YR	3300.00	5697.72	5705.63	5704.54	5706.62	0.01	8.08	440.77	153.54	0.68
Reach_6	94416	500-YR	18300.00	5693.82	5710.53	5705.32	5711.11	0.00	7.63	3446.16	392.75	0.36
Reach_6	94416	100-YR	8600.00	5693.82	5704.35	5703.21	5705.21	0.00	8.78	1420.90	308.57	0.56
Reach_6	94416	50-YR	6900.00	5693.82	5702.97	5702.71	5704.17	0.01	9.94	998.53	302.96	0.71
Reach_6	94416	10-YR	3300.00	5693.82	5700.99	5700.52	5702.34	0.01	9.37	366.61	249.68	0.81
Reach_6	94176	500-YR	18300.00	5691.78	5710.09	5704.18	5710.82	0.00	9.06	3441.36	377.30	0.40
Reach_6	94176	100-YR	8600.00	5691.78	5703.84	5701.59	5704.57	0.00	8.59	1733.60	339.01	0.48
Reach_6	94176	50-YR	6900.00	5691.78	5702.31	5700.99	5703.17	0.00	9.02	1321.65	328.72	0.55
Reach_6	94176	10-YR	3300.00	5691.78	5698.48	5698.48	5700.13	0.01	10.87	389.22	127.68	0.90
Reach_6	93990	500-YR	18300.00	5689.87	5708.43	5703.75	5710.48	0.00	11.87	1694.31	125.26	0.53
Reach_6	93990	100-YR	8600.00	5689.87	5703.02	5699.32	5704.24	0.00	8.99	1022.11	123.35	0.50
Reach_6	93990	50-YR	6900.00	5689.87	5701.73	5698.26	5702.81	0.00	8.41	862.56	122.89	0.50
Reach_6	93990	10-YR	3300.00	5689.87	5698.11	5695.48	5698.83	0.00	6.81	484.88	82.96	0.50
Reach_6	93988 U.S. Highway 6		Bridge									
Reach_6	93893	500-YR	18300.00	5689.70	5704.53	5704.53	5709.42	0.01	18.19	1096.90	114.71	0.94
Reach_6	93893	100-YR	8600.00	5689.70	5700.01	5700.01	5703.38	0.01	14.74	592.67	96.19	0.97
Reach_6	93893	50-YR	6900.00	5689.70	5698.87	5698.87	5701.96	0.01	14.11	490.27	83.65	1.01
Reach_6	93893	10-YR	3300.00	5689.70	5695.94	5695.94	5698.11	0.01	11.82	279.17	63.35	0.99
Reach_6	93892		Lat Struct									
Reach_6	93795	500-YR	18300.00	5685.91	5705.85	5700.54	5706.99	0.00	9.64	2377.22	395.11	0.43
Reach_6	93795	100-YR	8600.00	5685.91	5699.17	5697.15	5700.35	0.00	9.42	1118.15	374.67	0.55
Reach_6	93795	50-YR	6900.00	5685.91	5698.04	5696.39	5699.17	0.00	9.07	910.43	353.54	0.56
Reach_6	93795	10-YR	3300.00	5685.91	5693.74	5693.74	5695.61	0.01	10.98	300.58	79.50	1.00
Reach_6	93753	500-YR	18300.00	5684.27	5705.84	5700.10	5706.94	0.00	9.98	2571.32	371.89	0.41
Reach_6	93753	100-YR	8600.00	5684.27	5699.21	5696.57	5700.24	0.00	9.14	1311.08	351.22	0.47
Reach_6	93753	50-YR	6900.00	5684.27	5698.09	5695.02	5699.05	0.00	8.62	1098.36	343.86	0.47
Reach_6	93753	10-YR	3300.00	5684.27	5693.59	5692.11	5694.78	0.00	8.84	399.07	103.20	0.64
Reach_6	93745 Footbridge		Bridge									
Reach_6	93727	500-YR	18300.00	5684.33	5699.98	5699.98	5703.43	0.00	16.55	1525.57	364.70	0.85
Reach_6	93727	100-YR	8600.00	5684.33	5696.54	5696.54	5699.01	0.00	13.08	814.22	319.69	0.80
Reach_6	93727	50-YR	6900.00	5684.33	5695.07	5695.00	5697.86	0.01	13.51	544.67	208.69	0.91
Reach_6	93727	10-YR	3300.00	5684.33	5693.50	5692.19	5694.63	0.00	8.53	390.63	83.57	0.66
Reach_6	93493	500-YR	18300.00	5685.10	5697.15	5697.15	5699.67	0.01	14.35	1660.08	381.40	0.87
Reach_6	93493	100-YR	8600.00	5685.10	5694.81	5694.81	5696.50	0.01	11.14	977.97	338.53	0.79
Reach_6	93493	50-YR	6900.00	5685.10	5694.28	5694.25	5695.79	0.01	10.30	827.01	313.95	0.77

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_6	93493	10-YR	3300.00	5685.10	5692.07	5691.71	5693.34	0.01	9.03	365.66	108.93	0.86
Reach_6	93090	500-YR	18300.00	5681.30	5694.82		5696.79	0.01	13.25	2130.26	386.38	0.72
Reach_6	93090	100-YR	8600.00	5681.30	5691.56	5691.56	5693.52	0.01	11.92	960.29	311.84	0.78
Reach_6	93090	50-YR	6900.00	5681.30	5690.42	5690.42	5692.60	0.01	12.18	660.25	199.08	0.87
Reach_6	93090	10-YR	3300.00	5681.30	5688.62	5687.78	5689.81	0.01	8.77	381.09	105.73	0.75
Reach_6	92649	500-YR	18300.00	5678.10	5693.35		5694.97	0.00	11.50	2155.86	243.76	0.56
Reach_6	92649	100-YR	8600.00	5678.10	5688.71	5687.22	5690.05	0.00	9.89	1101.63	197.11	0.60
Reach_6	92649	50-YR	6900.00	5678.10	5687.31	5686.42	5688.78	0.01	10.10	832.11	190.43	0.68
Reach_6	92649	10-YR	3300.00	5678.10	5684.01	5683.77	5685.56	0.01	9.99	330.64	89.26	0.91
Reach_6	92509	500-YR	18300.00	5676.68	5690.64	5690.64	5694.29	0.00	16.20	1398.18	220.77	0.84
Reach_6	92509	100-YR	8600.00	5676.68	5685.91	5685.91	5689.16	0.01	14.48	604.50	103.28	0.97
Reach_6	92509	50-YR	6900.00	5676.68	5684.90	5684.90	5687.78	0.01	13.62	509.05	89.64	0.98
Reach_6	92509	10-YR	3300.00	5676.68	5683.18	5682.47	5684.48	0.01	9.16	360.17	83.19	0.78
Reach_5	92326	500-YR	18300.00	5675.94	5688.22	5688.22	5691.29	0.00	16.19	1578.20	597.90	0.87
Reach_5	92326	100-YR	8600.00	5675.94	5684.76	5684.76	5687.55	0.01	14.15	713.67	362.94	0.93
Reach_5	92326	50-YR	6900.00	5675.94	5683.94	5683.94	5686.38	0.01	13.14	607.39	193.07	0.92
Reach_5	92326	10-YR	3300.00	5675.94	5681.67	5681.67	5683.37	0.01	10.59	336.30	111.81	0.92
Reach_5	92295	500-YR	18300.00	5674.15	5686.34	5686.34	5688.09	0.00	13.19	2491.37	688.62	0.73
Reach_5	92295	100-YR	8600.00	5674.15	5683.14	5683.14	5685.74	0.01	13.59	737.22	257.59	0.91
Reach_5	92295	50-YR	6900.00	5674.15	5682.36	5682.36	5684.65	0.01	12.63	625.47	140.27	0.89
Reach_5	92295	10-YR	3300.00	5674.15	5680.02	5680.02	5681.73	0.01	10.55	323.47	110.85	0.95
Reach_5	92150	500-YR	18300.00	5672.95	5683.75	5683.75	5686.06	0.00	14.30	1932.93	489.14	0.84
Reach_5	92150	100-YR	8600.00	5672.95	5680.28	5680.28	5682.47	0.01	13.04	816.02	183.71	0.98
Reach_5	92150	50-YR	6900.00	5672.95	5679.63	5679.63	5681.56	0.01	12.14	697.95	179.37	0.97
Reach_5	92150	10-YR	3300.00	5672.95	5679.10	5678.01	5679.69	0.00	6.67	603.95	175.83	0.57
Reach_5	91890	500-YR	18300.00	5671.18	5682.16	5680.85	5683.01	0.00	9.28	2943.17	636.85	0.55
Reach_5	91890	100-YR	8600.00	5671.18	5679.80	5678.21	5680.50	0.00	7.79	1449.79	523.72	0.55
Reach_5	91890	50-YR	6900.00	5671.18	5679.20	5678.21	5679.81	0.00	7.22	1224.52	381.04	0.53
Reach_5	91890	10-YR	3300.00	5671.18	5676.61	5676.61	5678.32	0.01	10.48	314.77	216.09	0.99
Reach_5	91865	500-YR	18300.00	5670.77	5682.14	5680.68	5682.92	0.00	9.11	3141.08	650.92	0.53
Reach_5	91865	100-YR	8600.00	5670.77	5679.69	5678.31	5680.41	0.00	8.04	1487.98	596.43	0.55
Reach_5	91865	50-YR	6900.00	5670.77	5679.09	5678.31	5679.72	0.00	7.41	1257.87	437.21	0.53
Reach_5	91865	10-YR	3300.00	5670.77	5676.35	5676.20	5677.93	0.01	10.07	327.79	212.18	0.93
Reach_5	91748	500-YR	18300.00	5669.35	5680.63	5680.63	5682.43	0.00	13.49	2386.57	664.78	0.80
Reach_5	91748	100-YR	8600.00	5669.35	5678.40	5678.40	5679.92	0.00	11.15	1203.35	435.07	0.76
Reach_5	91748	50-YR	6900.00	5669.35	5677.74	5677.74	5679.22	0.00	10.68	933.63	374.29	0.77
Reach_5	91748	10-YR	3300.00	5669.35	5675.41	5675.41	5676.90	0.01	9.90	360.03	140.02	0.91
Reach_5	91713	500-YR	18300.00	5668.32	5680.01	5680.01	5681.78	0.00	12.82	2521.26	652.08	0.73
Reach_5	91713	100-YR	8600.00	5668.32	5677.29	5677.29	5678.96	0.00	11.05	1101.71	411.66	0.74
Reach_5	91713	50-YR	6900.00	5668.32	5676.43	5676.43	5678.19	0.00	10.96	778.01	333.44	0.79
Reach_5	91713	10-YR	3300.00	5668.32	5674.50	5673.69	5675.54	0.00	8.17	409.02	120.15	0.71
Reach_5	91576	500-YR	18300.00	5667.28	5678.06	5678.06	5680.08	0.00	14.09	2019.58	715.30	0.84
Reach_5	91576	100-YR	8600.00	5667.28	5676.20	5676.20	5677.56	0.00	10.73	1238.50	571.71	0.72
Reach_5	91576	50-YR	6900.00	5667.28	5675.61	5675.61	5676.98	0.00	10.39	993.34	561.85	0.73
Reach_5	91576	10-YR	3300.00	5667.28	5673.03	5673.03	5674.71	0.01	10.44	324.27	101.41	0.96
Reach_5	91424	500-YR	18300.00	5666.09	5676.84	5676.84	5678.69	0.00	13.47	2112.82	606.05	0.80
Reach_5	91424	100-YR	8600.00	5666.09	5675.09	5675.09	5676.36	0.00	10.27	1282.30	478.01	0.69
Reach_5	91424	50-YR	6900.00	5666.09	5674.64	5674.64	5675.81	0.00	9.56	1073.14	461.63	0.66
Reach_5	91424	10-YR	3300.00	5666.09	5671.64	5671.64	5673.32	0.01	10.41	319.11	96.36	0.98
Reach_5	91383	500-YR	18300.00	5664.62	5676.57	5676.57	5678.46	0.00	13.77	2201.54	567.28	0.78
Reach_5	91383	100-YR	8600.00	5664.62	5674.68	5674.68	5676.04	0.00	10.59	1304.81	465.43	0.67
Reach_5	91383	50-YR	6900.00	5664.62	5674.20	5674.20	5675.46	0.00	9.84	1083.79	461.17	0.64
Reach_5	91383	10-YR	3300.00	5664.62	5670.65	5670.54	5672.51	0.01	10.93	302.68	76.08	0.95
Reach_5	91225	500-YR	18300.00	5664.06	5674.78	5674.78	5676.59	0.00	13.35	2205.78	535.98	0.80
Reach_5	91225	100-YR	8600.00	5664.06	5673.04	5673.04	5674.31	0.00	10.21	1320.73	498.33	0.68
Reach_5	91225	50-YR	6900.00	5664.06	5672.59	5672.59	5673.77	0.00	9.51	1097.49	493.39	0.66
Reach_5	91225	10-YR	3300.00	5664.06	5669.42	5669.42	5671.18	0.01	10.65	309.75	86.94	1.00
Reach_5	91012	500-YR	18300.00	5662.19	5674.29	5673.19	5675.35	0.00	10.46	2795.15	816.19	0.58
Reach_5	91012	100-YR	8600.00	5662.19	5671.79	5671.36	5672.74	0.00	8.98	1511.71	511.69	0.57
Reach_5	91012	50-YR	6900.00	5662.19	5670.92	5670.87	5672.10	0.00	9.39	1085.55	482.57	0.63
Reach_5	91012	10-YR	3300.00	5662.19	5667.89	5667.52	5669.23	0.01	9.35	360.50	101.55	0.84
Reach_5	90879	500-YR	18300.00	5661.70	5673.42	5673.01	5674.97	0.00	12.37	2343.29	779.41	0.67
Reach_5	90879	100-YR	8600.00	5661.70	5671.55	5670.76	5672.45	0.00	8.77	1532.42	524.47	0.53
Reach_5	90879	50-YR	6900.00	5661.70	5670.74	5670.21	5671.71	0.00	8.73	1194.13	448.09	0.55
Reach_5	90879	10-YR	3300.00	5661.70	5667.24	5666.29	5668.52	0.00	9.07	364.65	77.61	0.73

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_5	90870 Footbridge		Bridge									
Reach_5	90839	500-YR	18300.00	5660.68	5673.19	5672.48	5674.53	0.00	11.63	2499.92	819.62	0.63
Reach_5	90839	100-YR	8600.00	5660.68	5671.48	5670.38	5672.31	0.00	8.40	1541.71	720.94	0.50
Reach_5	90839	50-YR	6900.00	5660.68	5670.63	5669.78	5671.49	0.00	8.28	1224.14	613.35	0.52
Reach_5	90839	10-YR	3300.00	5660.68	5666.91	5665.99	5668.20	0.00	9.12	362.01	76.16	0.74
Reach_5	90759	500-YR	18300.00	5660.68	5673.11	5672.02	5674.24	0.00	10.56	2719.36	778.37	0.57
Reach_5	90759	100-YR	8600.00	5660.68	5670.02	5670.02	5671.82	0.00	11.24	989.83	480.98	0.72
Reach_5	90759	50-YR	6900.00	5660.68	5669.07	5668.13	5670.96	0.00	11.13	680.16	391.49	0.77
Reach_5	90759	10-YR	3300.00	5660.68	5666.59	5665.82	5667.77	0.01	8.71	378.77	92.15	0.76
Reach_5	90603	500-YR	18300.00	5659.70	5672.23	5671.30	5673.82	0.00	12.16	2258.43	510.27	0.66
Reach_5	90603	100-YR	8600.00	5659.70	5668.92	5668.92	5671.13	0.00	12.34	839.42	348.40	0.80
Reach_5	90603	50-YR	6900.00	5659.70	5667.79	5667.79	5670.13	0.01	12.39	607.44	287.71	0.88
Reach_5	90603	10-YR	3300.00	5659.70	5665.45	5664.96	5666.89	0.01	9.62	342.91	82.64	0.83
Reach_5	90380	500-YR	18300.00	5659.08	5672.40	5669.47	5673.15	0.00	8.29	3046.36	561.02	0.43
Reach_5	90380	100-YR	8600.00	5659.08	5667.43	5666.55	5669.43	0.01	11.43	779.24	431.47	0.78
Reach_5	90380	50-YR	6900.00	5659.08	5666.46	5665.74	5668.25	0.01	10.80	653.26	328.11	0.80
Reach_5	90380	10-YR	3300.00	5659.08	5664.38	5663.76	5665.42	0.01	8.18	404.15	112.42	0.75
Reach_5	90305	500-YR	18300.00	5658.07	5671.93	5669.39	5673.00	0.00	9.65	2496.89	521.05	0.49
Reach_5	90305	100-YR	8600.00	5658.07	5667.06	5666.10	5669.03	0.01	11.46	805.49	277.07	0.76
Reach_5	90305	50-YR	6900.00	5658.07	5665.76	5665.31	5667.75	0.01	11.46	628.79	211.33	0.84
Reach_5	90305	10-YR	3300.00	5658.07	5663.16	5663.16	5664.76	0.01	10.14	325.85	102.16	0.99
Reach_5	90252	500-YR	18300.00	5656.38	5671.87	5669.30	5672.92	0.00	10.38	2849.84	443.77	0.48
Reach_5	90252	100-YR	8600.00	5656.38	5667.40	5664.87	5668.66	0.00	10.00	1106.10	311.25	0.56
Reach_5	90252	50-YR	6900.00	5656.38	5666.15	5663.77	5667.32	0.00	9.48	915.94	231.34	0.56
Reach_5	90252	10-YR	3300.00	5656.38	5663.31	5661.37	5664.03	0.00	7.24	535.08	116.03	0.52
Reach_5	90168	500-YR	18300.00	5656.63	5671.75	5667.51	5672.80	0.00	9.15	2558.36	378.58	0.45
Reach_5	90168	100-YR	8600.00	5656.63	5667.44	5664.33	5668.41	0.00	8.07	1143.99	270.07	0.48
Reach_5	90168	50-YR	6900.00	5656.63	5666.15	5663.55	5667.06	0.00	7.74	941.51	219.48	0.50
Reach_5	90168	10-YR	3300.00	5656.63	5663.18	5661.54	5663.80	0.00	6.33	524.19	123.16	0.52
Reach_5	90060	500-YR	18300.00	5655.97	5670.19	5670.19	5672.46	0.00	14.69	2124.85	541.25	0.71
Reach_5	90060	100-YR	8600.00	5655.97	5666.03	5664.97	5668.03	0.00	12.50	881.35	141.95	0.73
Reach_5	90060	50-YR	6900.00	5655.97	5664.05	5663.65	5666.53	0.01	13.61	617.85	119.59	0.90
Reach_5	90060	10-YR	3300.00	5655.97	5662.11	5661.28	5663.36	0.00	9.47	404.88	101.86	0.73
Reach_5	90006	500-YR	18300.00	5655.51	5670.60	5669.65	5672.04	0.00	10.88	2388.17	503.33	0.55
Reach_5	90006	100-YR	8600.00	5655.51	5665.97	5664.44	5667.74	0.00	10.77	829.23	134.13	0.69
Reach_5	90006	50-YR	6900.00	5655.51	5663.53	5663.53	5666.12	0.01	12.90	534.83	101.81	0.99
Reach_5	90006	10-YR	3300.00	5655.51	5661.24	5661.24	5662.96	0.01	10.50	314.22	90.15	0.99
Reach_5	89976	500-YR	18300.00	5653.54	5670.59	5669.18	5671.95	0.00	10.44	2496.00	458.72	0.51
Reach_5	89976	100-YR	8600.00	5653.54	5666.19	5663.41	5667.51	0.00	9.28	975.55	142.05	0.55
Reach_5	89976	50-YR	6900.00	5653.54	5663.76	5662.53	5665.47	0.01	10.49	663.03	115.19	0.73
Reach_5	89976	10-YR	3300.00	5653.54	5660.58	5660.03	5661.96	0.01	9.41	350.82	85.72	0.82
Reach_5	89862	500-YR	18600.00	5653.61	5670.40		5671.76	0.00	10.17	2539.56	426.71	0.48
Reach_5	89862	100-YR	8800.00	5653.61	5666.17		5667.20	0.00	8.21	1132.51	156.02	0.47
Reach_5	89862	50-YR	7000.00	5653.61	5663.71		5664.93	0.00	8.90	803.03	121.75	0.59
Reach_5	89862	10-YR	3300.00	5653.61	5660.10		5661.27	0.00	8.67	380.98	111.77	0.82
Reach_5	89790	500-YR	18600.00	5651.90	5670.43	5663.29	5671.63	0.00	9.22	2666.18	515.90	0.40
Reach_5	89790	100-YR	8800.00	5651.90	5666.43	5659.50	5667.00	0.00	6.17	1475.11	124.30	0.30
Reach_5	89790	50-YR	7000.00	5651.90	5664.09	5658.67	5664.65	0.00	6.03	1195.43	121.03	0.33
Reach_5	89790	10-YR	3300.00	5651.90	5660.64	5656.64	5660.92	0.00	4.27	787.34	116.18	0.28
Reach_5	89784 Washington St		Bridge									
Reach_5	89687	500-YR	18600.00	5651.21	5668.90	5662.13	5670.16	0.00	9.41	2573.72	463.78	0.41
Reach_5	89687	100-YR	8800.00	5651.21	5664.19	5658.40	5664.88	0.00	6.70	1354.49	123.71	0.35
Reach_5	89687	50-YR	7000.00	5651.21	5662.87	5657.58	5663.43	0.00	6.03	1194.18	122.07	0.33
Reach_5	89687	10-YR	3300.00	5651.21	5659.52	5655.58	5659.80	0.00	4.24	793.06	117.88	0.28
Reach_5	89610	500-YR	18600.00	5651.08	5667.70	5665.89	5669.80	0.00	12.33	1999.86	379.18	0.59
Reach_5	89610	100-YR	8800.00	5651.08	5662.88	5660.15	5664.50	0.00	10.21	864.17	98.47	0.60
Reach_5	89610	50-YR	7000.00	5651.08	5661.76	5659.37	5663.10	0.00	9.28	754.97	97.25	0.58
Reach_5	89610	10-YR	3300.00	5651.08	5658.83	5656.60	5659.58	0.00	6.94	475.72	91.39	0.54
Reach_5	89421	500-YR	18600.00	5649.84	5664.92	5664.92	5668.93	0.01	16.97	1279.78	362.15	0.86
Reach_5	89421	100-YR	8800.00	5649.84	5660.25	5660.25	5663.47	0.01	14.62	633.40	123.49	0.95
Reach_5	89421	50-YR	7000.00	5649.84	5659.27	5659.27	5662.08	0.01	13.60	536.88	115.58	0.95
Reach_5	89421	10-YR	3300.00	5649.84	5656.65	5656.65	5658.58	0.01	11.16	295.79	74.79	0.99
Reach_5	89163	500-YR	18600.00	5648.86	5660.41	5660.41	5665.03	0.01	17.30	1095.65	180.67	0.98

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_5	89163	100-YR	8800.00	5648.86	5658.24	5656.61	5659.99	0.00	10.62	836.03	118.14	0.69
Reach_5	89163	50-YR	7000.00	5648.86	5657.46	5655.61	5658.85	0.00	9.46	743.20	117.02	0.65
Reach_5	89163	10-YR	3300.00	5648.86	5655.23	5653.52	5655.91	0.00	6.61	498.91	103.45	0.53
Reach_5	89024	500-YR	18600.00	5647.95	5662.29	5659.33	5663.46	0.00	9.98	3057.81	754.14	0.48
Reach_5	89024	100-YR	8800.00	5647.95	5658.24	5655.09	5659.51	0.00	9.09	1012.99	283.23	0.53
Reach_5	89024	50-YR	7000.00	5647.95	5657.44	5654.20	5658.42	0.00	7.98	903.82	202.52	0.48
Reach_5	89024	10-YR	3300.00	5647.95	5655.22	5652.08	5655.62	0.00	5.13	645.65	104.68	0.36
Reach_5	89018 Ford St		Bridge									
Reach_5	88939	500-YR	18600.00	5647.13	5660.81	5658.30	5661.59	0.00	8.68	3699.26	860.23	0.44
Reach_5	88939	100-YR	8800.00	5647.13	5657.84	5654.38	5658.98	0.00	8.61	1040.77	507.19	0.50
Reach_5	88939	50-YR	7000.00	5647.13	5657.21	5653.49	5658.05	0.00	7.36	965.20	443.69	0.44
Reach_5	88939	10-YR	3300.00	5647.13	5655.14	5651.43	5655.46	0.00	4.57	727.64	142.31	0.31
Reach_5	88854	500-YR	18600.00	5646.54	5660.81	5658.34	5661.39	0.00	7.31	3840.15	811.23	0.40
Reach_5	88854	100-YR	8800.00	5646.54	5657.84	5655.12	5658.66	0.00	7.37	1273.31	532.20	0.48
Reach_5	88854	50-YR	7000.00	5646.54	5657.16	5654.34	5657.82	0.00	6.54	1118.74	481.47	0.45
Reach_5	88854	10-YR	3300.00	5646.54	5655.04	5652.49	5655.37	0.00	4.60	717.64	208.03	0.38
Reach_5	88815	500-YR	18600.00	5645.40	5660.44	5658.38	5661.31	0.00	9.29	3529.89	762.03	0.48
Reach_5	88815	100-YR	8800.00	5645.40	5657.69	5655.13	5658.58	0.00	8.13	1341.53	500.32	0.48
Reach_5	88815	50-YR	7000.00	5645.40	5657.05	5653.83	5657.75	0.00	7.14	1198.00	463.35	0.43
Reach_5	88815	10-YR	3300.00	5645.40	5654.97	5651.22	5655.32	0.00	4.89	754.28	233.77	0.34
Reach_5	88808 Footbridge		Bridge									
Reach_5	88791	500-YR	18600.00	5645.40	5659.00	5659.00	5660.90	0.00	13.14	2435.28	616.35	0.69
Reach_5	88791	100-YR	8800.00	5645.40	5657.04	5654.93	5658.39	0.00	9.83	1103.23	441.09	0.57
Reach_5	88791	50-YR	7000.00	5645.40	5656.67	5653.79	5657.63	0.00	8.27	1026.15	386.06	0.49
Reach_5	88791	10-YR	3300.00	5645.40	5654.89	5651.21	5655.29	0.00	5.17	703.68	174.76	0.34
Reach_5	88764	500-YR	18600.00	5645.30	5658.76	5658.76	5660.35	0.00	12.58	2361.72	643.83	0.74
Reach_5	88764	100-YR	8800.00	5645.30	5656.34	5656.34	5658.16	0.01	11.84	942.96	385.53	0.81
Reach_5	88764	50-YR	7000.00	5645.30	5655.72	5655.72	5657.36	0.01	11.03	787.77	332.65	0.79
Reach_5	88764	10-YR	3300.00	5645.30	5653.60	5653.14	5654.95	0.01	9.40	369.39	161.92	0.81
Reach_5	88696	500-YR	18700.00	5644.90	5657.65	5657.65	5659.49	0.01	13.52	2127.04	732.77	0.84
Reach_5	88696	100-YR	8800.00	5644.90	5655.41	5655.41	5656.91	0.01	11.45	1091.16	463.57	0.83
Reach_5	88696	50-YR	7100.00	5644.90	5654.95	5654.95	5656.31	0.01	10.69	934.31	439.63	0.81
Reach_5	88696	10-YR	3300.00	5644.90	5653.16	5653.16	5654.46	0.01	9.48	415.77	248.79	0.86
Reach_5	88626	500-YR	18700.00	5648.81	5656.08	5656.08	5658.11	0.01	12.87	1771.70	467.71	0.96
Reach_5	88626	100-YR	8800.00	5648.81	5653.92	5653.92	5655.42	0.01	10.75	945.38	360.53	1.02
Reach_5	88626	50-YR	7100.00	5648.81	5653.50	5653.50	5654.81	0.01	10.01	815.21	346.12	1.01
Reach_5	88626	10-YR	3300.00	5648.81	5652.29	5652.29	5653.16	0.01	8.07	476.21	299.82	0.96
Reach_5	88616	500-YR	18700.00	5644.00	5655.90	5654.98	5657.51	0.00	11.23	1989.85	414.16	0.74
Reach_5	88616	100-YR	8800.00	5644.00	5652.67	5652.67	5654.32	0.01	10.98	918.46	307.45	0.94
Reach_5	88616	50-YR	7100.00	5644.00	5652.14	5652.14	5653.64	0.01	10.40	779.50	295.07	0.94
Reach_5	88616	10-YR	3300.00	5644.00	5649.45	5649.45	5651.50	0.01	11.49	287.08	68.43	0.99
Reach_5	88487	500-YR	19800.00	5643.30	5654.22	5654.22	5656.90	0.00	13.71	1801.75	508.23	0.77
Reach_5	88487	100-YR	9500.00	5643.30	5652.06		5653.27	0.00	8.96	1096.75	155.16	0.57
Reach_5	88487	50-YR	7500.00	5643.30	5651.12		5652.11	0.00	8.09	953.82	150.84	0.55
Reach_5	88487	10-YR	3500.00	5643.30	5649.21		5649.64	0.00	5.30	672.74	144.23	0.42
Reach_5	88394	500-YR	19800.00	5644.83	5653.85	5653.83	5655.55	0.00	12.44	2404.00	740.52	0.75
Reach_5	88394	100-YR	9500.00	5644.83	5651.02	5650.36	5652.91	0.01	11.46	910.29	254.08	0.84
Reach_5	88394	50-YR	7500.00	5644.83	5650.00	5649.71	5651.73	0.01	10.88	721.29	201.28	0.88
Reach_5	88394	10-YR	3500.00	5644.83	5648.08	5648.08	5649.31	0.01	9.05	405.96	197.21	0.95
Reach_5	88370	500-YR	19800.00	5644.86	5653.84	5653.84	5655.44	0.00	12.03	2669.89	767.88	0.71
Reach_5	88370	100-YR	9500.00	5644.86	5650.17	5650.17	5652.59	0.01	12.78	789.10	221.90	0.99
Reach_5	88370	50-YR	7500.00	5644.86	5649.50	5649.50	5651.53	0.01	11.69	679.24	219.06	0.97
Reach_5	88370	10-YR	3500.00	5644.86	5647.82	5647.82	5649.06	0.01	9.02	405.53	213.67	0.95
Reach_5	88313	500-YR	19800.00	5635.29	5646.97	5646.97	5651.43	0.01	17.36	1297.14	180.31	0.92
Reach_5	88313	100-YR	9500.00	5635.29	5643.09	5642.51	5645.82	0.01	13.34	732.36	107.74	0.88
Reach_5	88313	50-YR	7500.00	5635.29	5642.01	5641.56	5644.39	0.01	12.43	617.38	106.00	0.89
Reach_5	88313	10-YR	3500.00	5635.29	5639.67	5639.32	5641.06	0.01	9.49	373.26	102.40	0.87
Reach_5	88062	500-YR	19800.00	5631.89	5646.70	5646.70	5650.09	0.00	15.48	1657.63	397.30	0.76
Reach_5	88062	100-YR	9500.00	5631.89	5642.26	5640.80	5644.60	0.00	12.32	795.86	106.00	0.74
Reach_5	88062	50-YR	7500.00	5631.89	5641.24	5639.69	5643.13	0.00	11.06	692.41	97.74	0.71
Reach_5	88062	10-YR	3500.00	5631.89	5637.27	5637.27	5639.11	0.01	10.88	321.81	88.90	1.01
Reach_5	87897	500-YR	19800.00	5631.17	5648.10	5643.62	5648.57	0.00	6.88	4815.27	859.46	0.31
Reach_5	87897	100-YR	9500.00	5631.17	5643.13	5638.94	5643.82	0.00	7.23	1802.64	532.51	0.39
Reach_5	87897	50-YR	7500.00	5631.17	5641.61	5637.95	5642.48	0.00	7.65	1075.96	394.29	0.44

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_5	87897	10-YR	3500.00	5631.17	5635.55	5635.55	5637.27	0.01	10.54	332.04	94.48	0.99
Reach_5	87844	500-YR	19800.00	5629.94	5648.03	5643.67	5648.54	0.00	7.00	4905.04	866.38	0.30
Reach_5	87844	100-YR	9500.00	5629.94	5642.98	5637.78	5643.76	0.00	7.29	1670.22	587.93	0.38
Reach_5	87844	50-YR	7500.00	5629.94	5641.65	5636.83	5642.38	0.00	6.88	1131.15	448.15	0.38
Reach_5	87844	10-YR	3500.00	5629.94	5635.51	5634.66	5636.55	0.00	8.16	430.81	107.71	0.72
Reach_5	87837 Coors N Service		Bridge									
Reach_5	87789	500-YR	19800.00	5629.90	5647.92		5648.41	0.00	6.90	5148.56	861.14	0.30
Reach_5	87789	100-YR	9500.00	5629.90	5642.11		5643.06	0.00	7.94	1371.47	485.21	0.42
Reach_5	87789	50-YR	7500.00	5629.90	5639.51		5640.60	0.00	8.40	905.11	155.38	0.51
Reach_5	87789	10-YR	3500.00	5629.90	5635.24		5636.23	0.00	7.96	440.82	106.78	0.69
Reach_5	87666	500-YR	19800.00	5628.31	5648.01	5642.06	5648.24	0.00	4.86	6679.72	929.22	0.21
Reach_5	87666	100-YR	9500.00	5628.31	5642.21	5637.01	5642.74	0.00	6.20	2055.20	653.74	0.34
Reach_5	87666	50-YR	7500.00	5628.31	5639.38	5636.08	5640.30	0.00	7.73	975.60	220.75	0.49
Reach_5	87666	10-YR	3500.00	5628.31	5634.36	5633.88	5635.58	0.01	8.86	395.17	105.94	0.81
Reach_5	87616	500-YR	19800.00	5627.98	5648.03	5641.63	5648.21	0.00	4.57	7506.43	985.56	0.19
Reach_5	87616	100-YR	9500.00	5627.98	5642.22	5636.50	5642.68	0.00	6.05	2374.36	688.49	0.31
Reach_5	87616	50-YR	7500.00	5627.98	5639.29	5635.53	5640.22	0.00	7.76	1044.90	303.47	0.46
Reach_5	87616	10-YR	3500.00	5627.98	5634.30	5633.22	5635.28	0.00	7.91	442.41	99.23	0.66
Reach_5	87486	500-YR	19800.00	5627.19	5647.75	5641.09	5648.15	0.00	6.36	5113.77	1003.36	0.26
Reach_5	87486	100-YR	9500.00	5627.19	5641.93	5636.10	5642.58	0.00	6.90	1707.83	758.67	0.34
Reach_5	87486	50-YR	7500.00	5627.19	5639.13	5635.11	5640.04	0.00	7.78	1078.37	446.95	0.44
Reach_5	87486	10-YR	3500.00	5627.19	5633.67	5632.72	5634.77	0.00	8.39	418.90	95.64	0.70
Reach_5	87458	500-YR	19800.00	5627.20	5647.69	5640.57	5648.14	0.00	6.58	4773.25	868.45	0.26
Reach_5	87458	100-YR	9500.00	5627.20	5641.85	5635.09	5642.55	0.00	6.99	1653.94	771.94	0.34
Reach_5	87458	50-YR	7500.00	5627.20	5639.14	5634.19	5639.99	0.00	7.44	1074.83	472.24	0.40
Reach_5	87458	10-YR	3500.00	5627.20	5633.85	5631.79	5634.58	0.00	6.84	512.06	90.50	0.51
Reach_5	87452 Footbridge		Bridge									
Reach_5	87438	500-YR	19800.00	5627.20	5647.33	5640.49	5647.98	0.00	7.59	3841.33	716.35	0.31
Reach_5	87438	100-YR	9500.00	5627.20	5641.20	5635.22	5642.03	0.00	7.54	1451.05	463.45	0.37
Reach_5	87438	50-YR	7500.00	5627.20	5639.10	5634.17	5639.96	0.00	7.47	1076.32	352.93	0.40
Reach_5	87438	10-YR	3500.00	5627.20	5633.80	5631.74	5634.53	0.00	6.89	507.87	89.53	0.51
Reach_5	87379	500-YR	19800.00	5627.56	5647.17	5641.74	5647.91	0.00	8.03	3452.81	723.40	0.33
Reach_5	87379	100-YR	9500.00	5627.56	5641.04	5635.68	5641.94	0.00	7.87	1440.38	654.43	0.40
Reach_5	87379	50-YR	7500.00	5627.56	5638.83	5634.64	5639.83	0.00	8.08	981.87	357.20	0.45
Reach_5	87379	10-YR	3500.00	5627.56	5632.99	5632.15	5634.21	0.00	8.84	395.78	87.13	0.73
Reach_5	87326	500-YR	19800.00	5627.21	5647.00	5641.36	5647.87	0.00	8.51	3291.65	769.97	0.35
Reach_5	87326	100-YR	9500.00	5627.21	5641.03	5635.09	5641.86	0.00	7.65	1526.51	703.48	0.38
Reach_5	87326	50-YR	7500.00	5627.21	5638.78	5634.02	5639.74	0.00	7.90	991.80	352.01	0.43
Reach_5	87326	10-YR	3500.00	5627.21	5632.96	5631.48	5633.94	0.00	7.93	441.31	84.04	0.61
Reach_5	87322 Coors Vehicle		Bridge									
Reach_5	87281	500-YR	19800.00	5627.16	5644.06	5640.88	5646.01	0.00	11.94	2072.95	643.58	0.53
Reach_5	87281	100-YR	9500.00	5627.16	5639.17	5635.15	5640.56	0.00	9.50	1055.77	391.53	0.51
Reach_5	87281	50-YR	7500.00	5627.16	5636.10	5634.08	5637.83	0.00	10.55	711.02	108.14	0.65
Reach_5	87281	10-YR	3500.00	5627.16	5632.59	5631.54	5633.73	0.00	8.58	408.02	85.06	0.69
Reach_5	87185	500-YR	19800.00	5626.75	5643.51	5640.53	5645.73	0.00	12.82	1861.45	361.59	0.56
Reach_5	87185	100-YR	9500.00	5626.75	5638.92	5634.87	5640.35	0.00	9.81	1088.58	352.54	0.51
Reach_5	87185	50-YR	7500.00	5626.75	5634.86	5633.71	5637.24	0.01	12.38	605.78	78.29	0.78
Reach_5	87185	10-YR	3500.00	5626.75	5631.86	5631.02	5633.23	0.01	9.38	373.05	76.79	0.75
Reach_5	87132	500-YR	19800.00	5626.45	5643.68	5639.65	5645.48	0.00	11.50	2019.86	360.96	0.50
Reach_5	87132	100-YR	9500.00	5626.45	5639.05	5634.42	5640.15	0.00	8.64	1238.78	351.91	0.45
Reach_5	87132	50-YR	7500.00	5626.45	5634.88	5633.30	5636.85	0.01	11.27	665.75	86.72	0.72
Reach_5	87132	10-YR	3500.00	5626.45	5631.70	5630.68	5632.90	0.01	8.78	398.52	81.86	0.70
Reach_5	87101	500-YR	19800.00	5625.80	5643.13	5639.61	5645.37	0.00	12.75	1900.08	355.85	0.55
Reach_5	87101	100-YR	9500.00	5625.80	5638.88	5634.02	5640.09	0.00	9.01	1201.89	346.61	0.45
Reach_5	87101	50-YR	7500.00	5625.80	5634.78	5632.91	5636.70	0.00	11.12	677.75	83.94	0.68
Reach_5	87101	10-YR	3500.00	5625.80	5631.66	5630.29	5632.73	0.00	8.31	421.37	80.71	0.64
Reach_5	87099 Footbridge		Bridge									
Reach_5	87090	500-YR	19800.00	5625.80	5640.18	5639.69	5643.91	0.00	16.31	1485.35	363.12	0.78
Reach_5	87090	100-YR	9500.00	5625.80	5635.17	5634.25	5638.13	0.01	13.84	695.63	84.63	0.83
Reach_5	87090	50-YR	7500.00	5625.80	5634.07	5633.12	5636.51	0.01	12.55	603.05	83.07	0.81
Reach_5	87090	10-YR	3500.00	5625.80	5630.58	5630.48	5632.44	0.01	10.94	320.32	79.50	0.96
Reach_5	87037	500-YR	19800.00	5625.10	5640.59	5638.93	5643.12	0.00	13.60	1745.50	412.14	0.64

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_5	87037	100-YR	9500.00	5625.10	5635.19	5633.49	5637.57	0.00	12.39	775.44	133.24	0.74
Reach_5	87037	50-YR	7500.00	5625.10	5634.05	5632.37	5636.01	0.00	11.24	667.38	84.72	0.71
Reach_5	87037	10-YR	3500.00	5625.10	5630.44	5629.71	5631.84	0.01	9.47	369.39	80.51	0.78
Reach_5	87000	500-YR	19800.00	5624.70	5640.52	5638.13	5642.97	0.00	13.15	1732.90	351.90	0.62
Reach_5	87000	100-YR	9500.00	5624.70	5635.36	5633.05	5637.27	0.00	11.11	880.47	133.51	0.65
Reach_5	87000	50-YR	7500.00	5624.70	5634.14	5631.97	5635.76	0.00	10.20	735.32	95.67	0.64
Reach_5	87000	10-YR	3500.00	5624.70	5630.40	5629.36	5631.57	0.00	8.67	403.59	84.86	0.70
Reach_5	86989	500-YR	19800.00	5624.48	5640.06	5638.30	5642.89	0.00	14.16	1613.50	271.03	0.67
Reach_5	86989	100-YR	9500.00	5624.48	5634.90	5633.22	5637.19	0.00	12.17	802.64	122.47	0.73
Reach_5	86989	50-YR	7500.00	5624.48	5633.76	5632.08	5635.68	0.00	11.13	674.02	88.07	0.71
Reach_5	86989	10-YR	3500.00	5624.48	5630.05	5629.35	5631.48	0.01	9.62	363.98	79.89	0.79
Reach_5	86917	500-YR	19800.00	5624.25	5640.21	5637.98	5642.53	0.00	13.11	1900.02	302.64	0.60
Reach_5	86917	100-YR	9500.00	5624.25	5634.87	5632.67	5636.82	0.00	11.33	888.54	114.48	0.65
Reach_5	86917	50-YR	7500.00	5624.25	5633.68	5631.51	5635.33	0.00	10.36	752.86	114.18	0.63
Reach_5	86917	10-YR	3500.00	5624.25	5629.76	5628.93	5631.04	0.01	9.09	385.48	82.93	0.74
Reach_5	86719	500-YR	19800.00	5622.00	5639.31	5635.58	5642.03	0.00	13.75	1660.39	245.29	0.61
Reach_5	86719	100-YR	9500.00	5622.00	5634.78	5630.96	5636.20	0.00	9.72	1047.09	150.62	0.51
Reach_5	86719	50-YR	7500.00	5622.00	5633.61	5629.76	5634.74	0.00	8.66	919.07	150.34	0.48
Reach_5	86719	10-YR	3500.00	5622.00	5629.55	5627.14	5630.28	0.00	6.88	509.80	82.46	0.49
Reach_5	86580	500-YR	19800.00	5621.55	5639.96	5636.11	5641.41	0.00	10.79	2418.55	508.49	0.47
Reach_5	86580	100-YR	9500.00	5621.55	5634.66	5631.01	5635.91	0.00	9.34	1208.34	340.01	0.49
Reach_5	86580	50-YR	7500.00	5621.55	5633.40	5629.69	5634.50	0.00	8.62	984.97	316.31	0.48
Reach_5	86580	10-YR	3500.00	5621.55	5629.13	5626.95	5629.98	0.00	7.37	474.84	78.16	0.53
Reach_5	86550	500-YR	19800.00	5620.96	5639.85	5635.92	5641.36	0.00	10.93	2405.70	485.89	0.47
Reach_5	86550	100-YR	9500.00	5620.96	5634.63	5630.51	5635.86	0.00	9.16	1224.95	323.64	0.48
Reach_5	86550	50-YR	7500.00	5620.96	5633.39	5629.29	5634.44	0.00	8.37	1006.40	303.77	0.46
Reach_5	86550	10-YR	3500.00	5620.96	5629.15	5626.55	5629.88	0.00	6.88	509.02	80.12	0.48
Reach_5	86548 Coors Pipe		Bridge									
Reach_5	86546	500-YR	19800.00	5620.96	5639.42	5636.03	5641.10	0.00	11.52	2284.21	484.32	0.50
Reach_5	86546	100-YR	9500.00	5620.96	5634.13	5630.63	5635.56	0.00	9.87	1113.26	310.01	0.52
Reach_5	86546	50-YR	7500.00	5620.96	5632.41	5629.42	5633.84	0.00	9.65	825.44	283.02	0.55
Reach_5	86546	10-YR	3500.00	5620.96	5627.26	5626.68	5628.79	0.01	9.94	351.97	76.80	0.82
Reach_5	86503	500-YR	19800.00	5620.91	5639.37	5635.86	5641.02	0.00	11.34	2270.65	683.50	0.49
Reach_5	86503	100-YR	9500.00	5620.91	5634.06	5630.32	5635.48	0.00	9.76	1079.31	522.91	0.52
Reach_5	86503	50-YR	7500.00	5620.91	5632.36	5629.12	5633.71	0.00	9.37	828.60	463.93	0.54
Reach_5	86503	10-YR	3500.00	5620.91	5627.05	5626.39	5628.52	0.01	9.75	359.13	77.04	0.80
Reach_5	86333	500-YR	19800.00	5619.89	5640.15	5633.68	5640.53	0.00	6.19	4956.68	645.84	0.26
Reach_5	86333	100-YR	9500.00	5619.89	5634.62	5629.23	5635.03	0.00	5.87	2347.23	432.41	0.30
Reach_5	86333	50-YR	7500.00	5619.89	5632.73	5628.01	5633.26	0.00	6.40	1634.73	409.04	0.35
Reach_5	86333	10-YR	3500.00	5619.89	5626.16	5625.62	5627.57	0.01	9.54	367.03	85.93	0.81
Reach_5	86299	500-YR	19800.00	5619.60	5640.06	5633.87	5640.50	0.00	6.77	4416.97	577.77	0.27
Reach_5	86299	100-YR	9500.00	5619.60	5634.50	5628.27	5635.00	0.00	6.46	2083.92	373.22	0.30
Reach_5	86299	50-YR	7500.00	5619.60	5632.59	5627.08	5633.22	0.00	6.86	1478.17	316.07	0.35
Reach_5	86299	10-YR	3500.00	5619.60	5626.38	5624.34	5627.29	0.00	7.66	456.92	76.09	0.55
Reach_5	86295 Footbridge		Bridge									
Reach_5	86277	500-YR	19800.00	5619.80	5639.95	5634.11	5640.42	0.00	6.90	4243.95	598.56	0.28
Reach_5	86277	100-YR	9500.00	5619.80	5634.20	5628.48	5634.81	0.00	6.99	1898.99	395.05	0.33
Reach_5	86277	50-YR	7500.00	5619.80	5631.67	5627.26	5632.64	0.00	8.22	1131.24	306.96	0.43
Reach_5	86277	10-YR	3500.00	5619.80	5626.14	5624.49	5627.19	0.00	8.24	424.77	73.90	0.61
Reach_5	86138	500-YR	19800.00	5618.14	5639.90		5640.35	0.00	6.77	4502.45	514.50	0.27
Reach_5	86138	100-YR	9500.00	5618.14	5634.17		5634.66	0.00	6.45	2144.96	376.34	0.31
Reach_5	86138	50-YR	7500.00	5618.14	5631.54		5632.41	0.00	7.87	1210.50	287.99	0.41
Reach_5	86138	10-YR	3500.00	5618.14	5625.22		5626.57	0.00	9.32	375.66	75.72	0.74
Reach_5	86081	500-YR	19800.00	5618.04	5639.46	5634.20	5640.28	0.00	8.57	3700.65	447.54	0.35
Reach_5	86081	100-YR	9500.00	5618.04	5633.74	5627.98	5634.58	0.00	7.81	1747.64	327.53	0.38
Reach_5	86081	50-YR	7500.00	5618.04	5631.24	5626.84	5632.31	0.00	8.41	1044.03	213.43	0.45
Reach_5	86081	10-YR	3500.00	5618.04	5624.49	5624.22	5626.20	0.01	10.48	333.95	78.58	0.90
Reach_5	86010	500-YR	19800.00	5616.90	5639.19	5630.63	5640.21	0.00	9.08	3023.54	435.43	0.36
Reach_5	86010	100-YR	9500.00	5616.90	5633.76	5626.39	5634.49	0.00	7.01	1395.85	343.87	0.32
Reach_5	86010	50-YR	7500.00	5616.90	5631.46	5625.42	5632.12	0.00	6.64	1166.51	139.91	0.33
Reach_5	86010	10-YR	3500.00	5616.90	5624.93	5622.97	5625.66	0.00	7.00	518.04	107.89	0.51
Reach_5	85963 Coors Railroad		Bridge									
Reach_5	85891	500-YR	19800.00	5616.90	5634.00	5632.10	5638.02	0.00	16.75	1371.02	197.12	0.75

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_5	85891	100-YR	9500.00	5616.90	5627.78	5626.94	5630.98	0.00	14.49	679.93	82.61	0.84
Reach_5	85891	50-YR	7500.00	5616.90	5626.46	5625.69	5629.23	0.00	13.43	573.24	79.36	0.84
Reach_5	85891	10-YR	3500.00	5616.90	5623.36	5622.81	5625.03	0.01	10.37	339.15	71.71	0.83
Reach_5	85799	500-YR	19800.00	5616.52	5633.76	5631.22	5637.71	0.00	16.60	1397.35	172.36	0.74
Reach_5	85799	100-YR	9500.00	5616.52	5627.44	5626.38	5630.51	0.00	14.20	695.24	83.28	0.81
Reach_5	85799	50-YR	7500.00	5616.52	5626.09	5625.18	5628.75	0.00	13.19	584.88	79.76	0.82
Reach_5	85799	10-YR	3500.00	5616.52	5622.74	5622.26	5624.49	0.01	10.61	331.31	71.87	0.86
Reach_5	85484	500-YR	19800.00	5613.67	5630.14	5630.14	5636.29	0.01	20.21	1034.82	88.30	0.94
Reach_5	85484	100-YR	9500.00	5613.67	5624.54	5624.54	5628.74	0.01	16.49	583.23	72.99	0.99
Reach_5	85484	50-YR	7500.00	5613.67	5623.27	5623.27	5626.90	0.01	15.30	492.64	69.67	0.99
Reach_5	85484	10-YR	3500.00	5613.67	5620.45	5620.13	5622.48	0.01	11.43	306.12	62.66	0.91
Reach_5	85036	500-YR	19800.00	5611.81	5628.17	5626.44	5632.55	0.00	17.00	1220.25	99.41	0.79
Reach_5	85036	100-YR	9500.00	5611.81	5623.16		5625.70	0.00	12.84	752.37	87.51	0.74
Reach_5	85036	50-YR	7500.00	5611.81	5621.96		5624.07	0.00	11.67	649.34	84.75	0.72
Reach_5	85036	10-YR	3500.00	5611.81	5619.03		5620.16	0.00	8.52	411.04	77.31	0.65
Reach_5	84717	500-YR	19800.00	5611.28	5625.24	5625.24	5631.03	0.01	19.66	1099.17	146.93	0.97
Reach_5	84717	100-YR	9500.00	5611.28	5620.35	5620.35	5624.09	0.01	15.61	633.97	88.50	0.98
Reach_5	84717	50-YR	7500.00	5611.28	5619.21	5619.21	5622.43	0.01	14.48	534.16	85.70	0.98
Reach_5	84717	10-YR	3500.00	5611.28	5616.47	5616.47	5618.49	0.01	11.39	309.07	78.89	0.99
Reach_5	84651	500-YR	19800.00	5611.27	5623.43	5623.43	5628.62	0.01	18.55	1135.87	214.70	0.98
Reach_5	84651	100-YR	9500.00	5611.27	5620.36	5619.18	5622.72	0.00	12.42	797.11	122.62	0.77
Reach_5	84651	50-YR	7500.00	5611.27	5618.88	5618.19	5621.12	0.01	12.08	639.75	104.25	0.83
Reach_5	84651	10-YR	3500.00	5611.27	5615.83	5615.83	5617.56	0.01	10.55	333.39	96.05	0.98
Reach_5	84628	500-YR	19800.00	5608.14	5623.43	5620.96	5626.91	0.00	15.34	1424.65	217.75	0.72
Reach_5	84628	100-YR	9500.00	5608.14	5620.41	5616.58	5621.76	0.00	9.51	1076.95	111.00	0.50
Reach_5	84628	50-YR	7500.00	5608.14	5618.92	5615.56	5620.07	0.00	8.74	914.70	107.68	0.50
Reach_5	84628	10-YR	3500.00	5608.14	5615.39	5613.10	5616.06	0.00	6.60	548.39	99.44	0.47
Reach_5	84495	500-YR	19800.00	5607.83	5624.68	5621.39	5626.00	0.00	10.91	3144.73	348.26	0.49
Reach_5	84495	100-YR	9500.00	5607.83	5619.59	5616.77	5621.45	0.00	11.06	906.56	310.96	0.60
Reach_5	84495	50-YR	7500.00	5607.83	5618.20	5615.66	5619.77	0.00	10.14	770.10	235.13	0.59
Reach_5	84495	10-YR	3500.00	5607.83	5614.89	5613.02	5615.77	0.00	7.54	469.78	129.23	0.55
Reach_5	84358	500-YR	19800.00	5607.71	5620.22	5620.22	5625.26	0.01	19.57	1398.39	399.69	1.02
Reach_5	84358	100-YR	9500.00	5607.71	5616.93	5616.93	5620.71	0.01	15.70	630.29	382.52	0.97
Reach_5	84358	50-YR	7500.00	5607.71	5615.77	5615.77	5619.03	0.01	14.57	528.84	348.27	0.98
Reach_5	84358	10-YR	3500.00	5607.71	5613.00	5613.00	5615.04	0.01	11.46	306.48	217.80	1.00
Reach_5	84320	500-YR	19800.00	5608.18	5619.62	5619.62	5623.26	0.01	16.90	1693.80	422.26	0.90
Reach_5	84320	100-YR	9500.00	5608.18	5615.90	5615.90	5619.34	0.01	14.99	659.01	381.78	0.98
Reach_5	84320	50-YR	7500.00	5608.18	5614.84	5614.84	5617.81	0.01	13.90	555.96	357.98	0.98
Reach_5	84320	10-YR	3500.00	5608.18	5612.33	5612.33	5614.17	0.01	10.89	324.26	143.45	0.99
Reach_5	84232	500-YR	19800.00	5602.48	5618.71	5614.72	5620.29	0.00	11.02	2648.64	392.73	0.51
Reach_5	84232	100-YR	9500.00	5602.48	5613.08	5610.65	5614.71	0.00	10.31	950.30	318.19	0.61
Reach_5	84232	50-YR	7500.00	5602.48	5611.70	5609.70	5613.14	0.00	9.66	792.81	144.78	0.62
Reach_5	84232	10-YR	3500.00	5602.48	5608.58	5607.45	5609.51	0.00	7.72	454.74	104.58	0.65
Reach_5	84131	500-YR	19800.00	5601.83	5618.88	5615.55	5620.01	0.00	9.91	3349.79	399.77	0.45
Reach_5	84131	100-YR	9500.00	5601.83	5612.42	5610.48	5614.38	0.00	11.28	866.23	262.01	0.67
Reach_5	84131	50-YR	7500.00	5601.83	5611.03	5609.47	5612.78	0.00	10.62	719.59	103.84	0.69
Reach_5	84131	10-YR	3500.00	5601.83	5607.80	5607.08	5609.01	0.01	8.82	397.02	95.61	0.76
Reach_5	83964	500-YR	19800.00	5600.48	5618.70	5615.08	5619.82	0.00	10.25	3803.37	456.01	0.44
Reach_5	83964	100-YR	9500.00	5600.48	5610.59	5609.81	5613.60	0.00	14.06	711.01	210.42	0.84
Reach_5	83964	50-YR	7500.00	5600.48	5609.42	5608.67	5611.97	0.00	12.91	604.39	89.64	0.83
Reach_5	83964	10-YR	3500.00	5600.48	5606.73	5605.98	5608.13	0.00	9.51	372.91	82.11	0.77
Reach_5	83649	500-YR	19800.00	5598.90	5618.38	5612.71	5619.48	0.00	9.63	3034.70	480.80	0.40
Reach_5	83649	100-YR	9500.00	5598.90	5609.61	5608.06	5612.00	0.00	12.47	785.68	111.14	0.73
Reach_5	83649	50-YR	7500.00	5598.90	5608.22	5606.98	5610.34	0.00	11.70	653.54	100.37	0.75
Reach_5	83649	10-YR	3500.00	5598.90	5605.22	5604.35	5606.50	0.01	9.07	386.23	83.91	0.74
Reach_5	83587	500-YR	19800.00	5599.05	5618.50	5614.60	5619.36	0.00	8.86	3926.60	731.98	0.36
Reach_5	83587	100-YR	9500.00	5599.05	5609.18	5607.75	5611.73	0.00	12.85	746.74	96.31	0.75
Reach_5	83587	50-YR	7500.00	5599.05	5607.87	5606.64	5610.06	0.00	11.90	635.93	91.46	0.76
Reach_5	83587	10-YR	3500.00	5599.05	5604.91	5603.96	5606.19	0.00	9.06	386.36	81.50	0.73
Reach_5	83574 E Coors Plant		Bridge									
Reach_5	83521	500-YR	19800.00	5598.62	5618.16	5612.74	5619.00	0.00	8.88	4214.91	806.54	0.36
Reach_5	83521	100-YR	9500.00	5598.62	5607.37	5607.08	5610.76	0.01	14.90	662.29	90.31	0.92
Reach_5	83521	50-YR	7500.00	5598.62	5606.25	5605.91	5609.14	0.01	13.70	563.15	87.32	0.91
Reach_5	83521	10-YR	3500.00	5598.62	5603.36	5603.21	5605.21	0.01	10.92	322.09	79.33	0.94

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_5	83423	500-YR	19800.00	5595.68	5610.39	5610.39	5617.08	0.01	21.23	1021.39	150.67	1.07
Reach_5	83423	100-YR	9500.00	5595.68	5606.81	5606.40	5610.16	0.01	14.84	673.24	91.53	0.89
Reach_5	83423	50-YR	7500.00	5595.68	5605.50	5605.17	5608.48	0.01	13.94	556.59	86.44	0.91
Reach_5	83423	10-YR	3500.00	5595.68	5602.52	5602.31	5604.43	0.01	11.10	317.37	73.25	0.93
Reach_5	83322	500-YR	19800.00	5594.59	5612.92	5612.92	5615.22	0.00	13.80	2463.60	672.95	0.61
Reach_5	83322	100-YR	9500.00	5594.59	5606.44	5605.50	5609.50	0.01	14.22	709.09	87.66	0.82
Reach_5	83322	50-YR	7500.00	5594.59	5605.13	5604.28	5607.77	0.01	13.16	596.45	84.06	0.81
Reach_5	83322	10-YR	3500.00	5594.59	5602.08	5601.36	5603.63	0.01	10.00	353.73	74.43	0.78
Reach_5	82909	500-YR	19800.00	5593.32	5611.68	5608.95	5613.63	0.00	12.47	2210.32	533.21	0.54
Reach_5	82909	100-YR	9500.00	5593.32	5605.27	5603.00	5607.53	0.00	12.19	816.92	109.65	0.67
Reach_5	82909	50-YR	7500.00	5593.32	5603.78	5601.82	5605.75	0.00	11.32	685.39	101.03	0.67
Reach_5	82909	10-YR	3500.00	5593.32	5600.26	5598.95	5601.48	0.00	8.85	398.17	75.74	0.67
Reach_5	82737	500-YR	19800.00	5592.05	5611.04	5607.89	5613.26	0.00	12.88	1920.63	383.73	0.54
Reach_5	82737	100-YR	9500.00	5592.05	5605.01	5601.75	5606.87	0.00	11.04	906.87	96.34	0.58
Reach_5	82737	50-YR	7500.00	5592.05	5603.50	5600.54	5605.07	0.00	10.13	767.59	88.87	0.57
Reach_5	82737	10-YR	3500.00	5592.05	5599.89	5597.64	5600.77	0.00	7.55	465.78	78.18	0.53
Reach_5	82682	500-YR	19800.00	5592.05	5608.59	5608.59	5612.88	0.01	17.69	1399.35	230.24	0.80
Reach_5	82682	100-YR	9500.00	5592.05	5602.47	5602.47	5606.41	0.01	16.09	623.96	86.20	0.94
Reach_5	82682	50-YR	7500.00	5592.05	5601.17	5601.01	5604.62	0.01	14.99	517.76	77.54	0.95
Reach_5	82682	10-YR	3500.00	5592.05	5598.96	5598.02	5600.48	0.01	9.91	356.39	68.99	0.74
Reach_5	82530	500-YR	19800.00	5591.58	5606.40	5606.40	5611.40	0.01	18.46	1206.29	136.14	0.90
Reach_5	82530	100-YR	9500.00	5591.58	5601.09	5601.09	5604.87	0.01	15.67	622.81	87.39	0.98
Reach_5	82530	50-YR	7500.00	5591.58	5599.95	5599.95	5603.21	0.01	14.53	525.04	83.89	0.99
Reach_5	82530	10-YR	3500.00	5591.58	5597.26	5597.20	5599.26	0.01	11.35	309.02	76.18	0.98
Reach_5	82371	500-YR	19800.00	5590.53	5604.10	5604.06	5608.92	0.01	18.11	1215.53	129.35	0.91
Reach_5	82371	100-YR	9500.00	5590.53	5601.04	5599.30	5603.28	0.00	12.11	833.67	120.61	0.70
Reach_5	82371	50-YR	7500.00	5590.53	5599.82	5598.21	5601.74	0.00	11.17	686.75	108.73	0.70
Reach_5	82371	10-YR	3500.00	5590.53	5596.91	5595.67	5597.97	0.00	8.27	424.63	86.67	0.65
Reach_5	82208	500-YR	19800.00	5590.02	5603.15	5603.15	5607.84	0.01	18.61	1285.48	145.17	0.94
Reach_5	82208	100-YR	9500.00	5590.02	5598.76	5598.76	5602.25	0.01	15.43	669.94	122.45	0.98
Reach_5	82208	50-YR	7500.00	5590.02	5597.68	5597.68	5600.70	0.01	14.29	565.49	99.72	0.98
Reach_5	82208	10-YR	3500.00	5590.02	5595.51	5595.14	5597.06	0.01	10.15	363.89	90.11	0.84
Reach_5	82141	500-YR	19800.00	5589.90	5602.75	5602.75	5606.78	0.01	17.05	1391.50	175.23	0.87
Reach_5	82141	100-YR	9500.00	5589.90	5598.17	5598.17	5601.54	0.01	14.89	664.52	128.98	0.98
Reach_5	82141	50-YR	7500.00	5589.90	5597.13	5597.13	5600.05	0.01	13.81	561.11	114.30	0.98
Reach_5	82141	10-YR	3500.00	5589.90	5594.68	5594.68	5596.48	0.01	10.80	327.62	92.03	0.98
Reach_5	82107	500-YR	19800.00	5584.44	5598.28	5598.28	5603.97	0.01	19.52	1097.47	134.14	0.96
Reach_5	82107	100-YR	9500.00	5584.44	5593.49	5593.49	5597.15	0.01	15.45	637.19	90.17	0.97
Reach_5	82107	50-YR	7500.00	5584.44	5592.25	5592.25	5595.52	0.01	14.56	527.29	86.94	0.99
Reach_5	82107	10-YR	3500.00	5584.44	5589.60	5589.60	5591.59	0.01	11.32	309.54	77.19	0.99
Reach_5	82011	500-YR	19800.00	5583.19	5595.95	5595.95	5601.20	0.01	18.55	1110.94	157.23	0.97
Reach_5	82011	100-YR	9500.00	5583.19	5592.57	5591.61	5595.12	0.01	12.86	753.30	102.11	0.81
Reach_5	82011	50-YR	7500.00	5583.19	5591.48	5590.57	5593.64	0.01	11.80	644.12	99.69	0.80
Reach_5	82011	10-YR	3500.00	5583.19	5588.88	5588.21	5590.12	0.01	8.93	392.45	93.92	0.76
Reach_5	81821	500-YR	19800.00	5581.34	5595.84	5594.63	5598.64	0.00	14.38	1673.80	215.95	0.72
Reach_5	81821	100-YR	9500.00	5581.34	5591.67	5590.17	5593.94	0.00	12.14	802.48	164.75	0.74
Reach_5	81821	50-YR	7500.00	5581.34	5590.54	5589.20	5592.45	0.00	11.11	687.52	156.90	0.73
Reach_5	81821	10-YR	3500.00	5581.34	5587.74	5586.86	5588.86	0.01	8.49	413.58	94.79	0.71
Reach_5	81456	500-YR	19800.00	5579.29	5595.71	5591.92	5597.25	0.00	10.78	2232.17	220.82	0.50
Reach_5	81456	100-YR	9500.00	5579.29	5591.05	5587.89	5592.39	0.00	9.34	1040.98	189.61	0.53
Reach_5	81456	50-YR	7500.00	5579.29	5589.83	5586.95	5590.94	0.00	8.48	898.88	182.04	0.52
Reach_5	81456	10-YR	3500.00	5579.29	5586.71	5584.76	5587.34	0.00	6.38	550.38	108.45	0.49
Reach_5	81047	500-YR	19800.00	5577.76	5591.53	5591.53	5595.55	0.01	16.59	1333.49	169.87	0.86
Reach_5	81047	100-YR	9500.00	5577.76	5589.27	5586.75	5591.01	0.00	10.60	913.03	152.90	0.61
Reach_5	81047	50-YR	7500.00	5577.76	5588.25	5585.74	5589.63	0.00	9.42	803.76	134.08	0.58
Reach_5	81047	10-YR	3500.00	5577.76	5585.39	5583.27	5586.09	0.00	6.72	520.88	94.79	0.50
Reach_5	80633	500-YR	19800.00	5577.66	5590.44	5590.44	5592.63	0.00	12.99	2149.35	522.49	0.68
Reach_5	80633	100-YR	9500.00	5577.66	5585.29	5585.29	5588.23	0.01	13.81	701.24	120.62	0.98
Reach_5	80633	50-YR	7500.00	5577.66	5584.38	5584.38	5586.92	0.01	12.82	592.78	117.72	0.98
Reach_5	80633	10-YR	3500.00	5577.66	5582.71	5582.26	5583.90	0.01	8.76	400.64	112.40	0.81
Reach_5	80380	500-YR	19800.00	5577.60	5584.68	5584.68	5587.75	0.01	14.12	1431.52	240.22	1.00
Reach_5	80380	100-YR	9500.00	5577.60	5582.27	5582.27	5584.18	0.01	11.11	863.57	231.40	1.00
Reach_5	80380	50-YR	7500.00	5577.60	5581.70	5581.70	5583.35	0.01	10.29	733.87	229.34	1.00
Reach_5	80380	10-YR	3500.00	5577.60	5580.40	5580.40	5581.40	0.01	8.01	437.65	224.57	1.01
Reach_5	80244	500-YR	19800.00	5571.78	5580.59	5580.59	5583.23	0.01	13.73	1699.82	338.96	0.87

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_5	80244	100-YR	9500.00	5571.78	5577.53	5577.53	5579.77	0.01	12.08	809.74	288.57	0.98
Reach_5	80244	50-YR	7500.00	5571.78	5576.86	5576.86	5578.80	0.01	11.21	683.07	276.00	0.98
Reach_5	80244	10-YR	3500.00	5571.78	5575.25	5575.25	5576.46	0.01	8.84	396.78	250.15	1.00
Reach_5	80202	500-YR	19800.00	5568.00	5581.95		5582.44	0.00	5.79	3883.55	394.88	0.28
Reach_5	80202	100-YR	9500.00	5568.00	5577.14		5577.47	0.00	4.66	2118.37	348.41	0.29
Reach_5	80202	50-YR	7500.00	5568.00	5575.71		5576.02	0.00	4.49	1720.02	339.44	0.30
Reach_5	80202	10-YR	3500.00	5568.00	5572.54		5572.79	0.00	3.95	894.63	304.67	0.36
Reach_5	80018	500-YR	19800.00	5565.58	5578.63	5577.19	5581.97	0.00	14.83	1402.95	704.59	0.79
Reach_5	80018	100-YR	9500.00	5565.58	5575.68	5573.51	5577.16	0.00	9.82	997.50	176.32	0.61
Reach_5	80018	50-YR	7500.00	5565.58	5574.34	5572.62	5575.69	0.00	9.34	821.57	169.19	0.63
Reach_5	80018	10-YR	3500.00	5565.58	5571.42	5570.61	5572.35	0.00	7.73	454.60	152.19	0.69
Reach_5	79610	500-YR	19800.00	5562.71	5579.22	5576.12	5580.23	0.00	9.58	2993.05	598.03	0.44
Reach_5	79610	100-YR	9500.00	5562.71	5573.63	5571.62	5575.64	0.00	11.47	862.68	181.67	0.67
Reach_5	79610	50-YR	7500.00	5562.71	5572.20	5570.54	5574.00	0.00	10.81	712.98	142.40	0.68
Reach_5	79610	10-YR	3500.00	5562.71	5568.92	5568.12	5570.13	0.01	8.85	396.87	123.48	0.74
Reach_5	79217	500-YR	19800.00	5560.16	5579.31	5574.19	5579.67	0.00	6.08	4984.54	895.35	0.26
Reach_5	79217	100-YR	9500.00	5560.16	5572.89	5568.95	5574.15	0.00	9.00	1070.40	363.15	0.49
Reach_5	79217	50-YR	7500.00	5560.16	5571.29	5567.93	5572.39	0.00	8.43	891.68	182.35	0.50
Reach_5	79217	10-YR	3500.00	5560.16	5567.51	5565.40	5568.23	0.00	6.81	514.08	142.59	0.51
Reach_5	79141	500-YR	19800.00	5559.82	5575.98	5575.98	5579.28	0.00	15.73	1617.24	384.70	0.73
Reach_5	79141	100-YR	9500.00	5559.82	5569.61	5569.61	5573.54	0.01	15.93	604.62	94.58	0.98
Reach_5	79141	50-YR	7500.00	5559.82	5568.40	5568.40	5571.79	0.01	14.79	511.20	91.07	0.99
Reach_5	79141	10-YR	3500.00	5559.82	5565.59	5565.59	5567.67	0.01	11.56	302.77	82.41	0.99
Reach_5	79129	500-YR	19800.00	5557.20	5575.12	5575.12	5578.86	0.00	16.32	1507.79	281.78	0.74
Reach_5	79129	100-YR	9500.00	5557.20	5570.22	5568.35	5572.82	0.00	12.98	745.32	96.87	0.72
Reach_5	79129	50-YR	7500.00	5557.20	5568.85	5567.15	5571.04	0.01	11.89	637.71	92.68	0.71
Reach_5	79129	10-YR	3500.00	5557.20	5565.50	5564.30	5566.78	0.01	9.06	386.44	83.55	0.69
Reach_5	78946	500-YR	19800.00	5557.68	5574.31	5572.47	5575.02	0.00	8.37	3739.46	739.32	0.39
Reach_5	78946	100-YR	9500.00	5557.68	5570.43	5566.86	5571.79	0.00	9.41	1070.88	511.48	0.52
Reach_5	78946	50-YR	7500.00	5557.68	5568.77	5565.76	5570.04	0.00	9.04	831.80	129.33	0.55
Reach_5	78946	10-YR	3500.00	5557.68	5564.98	5563.14	5565.83	0.00	7.40	473.08	102.98	0.56
Reach_5	78846	500-YR	19800.00	5557.64	5572.20	5572.20	5574.60	0.00	14.41	2039.55	398.33	0.70
Reach_5	78846	100-YR	9500.00	5557.64	5567.07	5567.07	5571.05	0.01	16.01	597.49	87.01	0.99
Reach_5	78846	50-YR	7500.00	5557.64	5565.86	5565.86	5569.29	0.01	14.86	506.87	83.55	0.99
Reach_5	78846	10-YR	3500.00	5557.64	5562.97	5562.97	5565.10	0.01	11.70	299.13	69.76	1.00
Reach_5	78803	500-YR	19800.00	5555.83	5571.48	5571.48	5573.98	0.00	14.47	2095.32	409.13	0.67
Reach_5	78803	100-YR	9500.00	5555.83	5565.29	5565.29	5569.42	0.01	16.32	588.06	82.45	0.99
Reach_5	78803	50-YR	7500.00	5555.83	5564.07	5564.07	5567.60	0.01	15.09	500.00	71.32	0.99
Reach_5	78803	10-YR	3500.00	5555.83	5561.09	5561.09	5563.28	0.01	11.88	294.76	66.34	0.99
Reach_5	78728	500-YR	19800.00	5554.16	5570.24	5570.24	5572.46	0.00	13.45	2361.63	517.85	0.61
Reach_5	78728	100-YR	9500.00	5554.16	5563.12	5563.12	5566.96	0.01	15.74	608.80	81.05	0.99
Reach_5	78728	50-YR	7500.00	5554.16	5561.93	5561.93	5565.25	0.01	14.64	513.97	78.28	0.99
Reach_5	78728	10-YR	3500.00	5554.16	5559.14	5559.14	5561.20	0.01	11.51	304.08	72.56	0.99
Reach_5	78717	500-YR	19800.00	5550.42	5565.75	5565.75	5571.87	0.01	19.90	1016.40	87.57	0.98
Reach_5	78717	100-YR	9500.00	5550.42	5560.94	5560.69	5564.59	0.01	15.33	620.24	77.36	0.95
Reach_5	78717	50-YR	7500.00	5550.42	5560.02	5559.47	5562.91	0.01	13.65	549.38	75.56	0.89
Reach_5	78717	10-YR	3500.00	5550.42	5557.27	5556.48	5558.82	0.01	10.00	349.99	69.40	0.79
Reach_5	78228	500-YR	19800.00	5547.18	5562.21	5562.21	5567.72	0.01	19.12	1116.70	125.12	0.96
Reach_5	78228	100-YR	9500.00	5547.18	5557.45	5557.45	5561.05	0.01	15.27	638.68	92.26	0.97
Reach_5	78228	50-YR	7500.00	5547.18	5556.31	5556.31	5559.44	0.01	14.22	535.83	88.70	0.98
Reach_5	78228	10-YR	3500.00	5547.18	5553.67	5553.67	5555.62	0.01	11.21	312.50	79.06	0.99
Reach_5	77804	500-YR	19800.00	5543.74	5560.35	5558.01	5564.28	0.00	16.13	1317.01	961.14	0.74
Reach_5	77804	100-YR	9500.00	5543.74	5555.42	5553.24	5557.59	0.00	11.88	821.74	92.97	0.67
Reach_5	77804	50-YR	7500.00	5543.74	5554.18	5552.09	5555.98	0.00	10.78	708.64	90.05	0.65
Reach_5	77804	10-YR	3500.00	5543.74	5551.12	5549.49	5552.08	0.00	7.86	445.93	82.77	0.59
Reach_5	77427	500-YR	19800.00	5542.05	5556.68	5556.68	5562.23	0.01	19.55	1143.84	982.40	0.96
Reach_5	77427	100-YR	9500.00	5542.05	5551.83	5551.83	5555.49	0.01	15.58	650.38	492.34	0.96
Reach_5	77427	50-YR	7500.00	5542.05	5550.68	5550.68	5553.86	0.01	14.46	545.80	200.25	0.96
Reach_5	77427	10-YR	3500.00	5542.05	5547.98	5547.94	5549.93	0.01	11.23	317.23	80.39	0.95
Reach_5	77010	500-YR	19800.00	5539.06	5552.87	5552.87	5558.32	0.01	19.09	1137.15	1614.97	0.97
Reach_5	77010	100-YR	9500.00	5539.06	5548.37	5548.37	5551.85	0.01	15.07	656.53	491.40	0.97
Reach_5	77010	50-YR	7500.00	5539.06	5547.28	5547.28	5550.30	0.01	14.00	551.79	272.69	0.98
Reach_5	77010	10-YR	3500.00	5539.06	5545.00	5544.75	5546.63	0.01	10.28	343.36	87.43	0.90
Reach_5	76522	500-YR	19800.00	5535.18	5549.15	5549.15	5554.76	0.01	19.42	1120.27	1664.84	0.99
Reach_5	76522	100-YR	9500.00	5535.18	5544.74	5544.74	5548.25	0.01	15.15	654.24	613.51	0.97

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_5	76522	50-YR	7500.00	5535.18	5543.62	5543.62	5546.68	0.01	14.10	548.27	375.16	0.97
Reach_5	76522	10-YR	3500.00	5535.18	5541.00	5541.00	5542.91	0.01	11.08	317.16	110.28	0.99
Reach_5	76173	500-YR	19800.00	5532.69	5546.17	5546.17	5551.54	0.01	19.08	1155.69	1565.71	0.96
Reach_5	76173	100-YR	9500.00	5532.69	5541.54	5541.54	5545.03	0.01	15.18	662.42	574.66	0.97
Reach_5	76173	50-YR	7500.00	5532.69	5540.45	5540.45	5543.48	0.01	14.08	556.95	482.76	0.97
Reach_5	76173	10-YR	3500.00	5532.69	5538.19	5537.85	5539.79	0.01	10.18	350.47	230.63	0.87
Reach_5	75747	500-YR	19800.00	5529.15	5542.99	5542.99	5548.44	0.01	19.19	1146.66	1570.30	0.97
Reach_5	75747	100-YR	9500.00	5529.15	5538.42	5538.42	5541.92	0.01	15.16	657.94	843.30	0.97
Reach_5	75747	50-YR	7500.00	5529.15	5537.33	5537.33	5540.36	0.01	14.07	552.86	704.23	0.97
Reach_5	75747	10-YR	3500.00	5529.15	5534.71	5534.71	5536.62	0.01	11.09	317.39	84.24	0.98
Reach_5	75333	500-YR	19800.00	5525.36	5539.65	5539.65	5544.75	0.00	18.62	1216.08	1324.57	0.92
Reach_5	75333	100-YR	9500.00	5525.36	5534.82	5534.68	5538.22	0.01	14.97	670.59	386.30	0.94
Reach_5	75333	50-YR	7500.00	5525.36	5533.73	5533.56	5536.65	0.01	13.82	565.85	340.70	0.94
Reach_5	75333	10-YR	3500.00	5525.36	5531.22	5530.96	5532.90	0.01	10.41	340.47	167.92	0.89
Reach_5	74940	500-YR	19800.00	5522.66	5539.24	5537.75	5540.42	0.00	10.69	2986.13	1760.22	0.48
Reach_5	74940	100-YR	9500.00	5522.66	5533.00	5531.83	5535.68	0.01	13.45	762.53	617.82	0.78
Reach_5	74940	50-YR	7500.00	5522.66	5531.60	5530.68	5534.01	0.01	12.67	629.98	455.38	0.79
Reach_5	74940	10-YR	3500.00	5522.66	5528.48	5527.95	5530.03	0.01	10.07	357.15	206.77	0.81
Reach_5	74916	500-YR	19800.00	5523.03	5538.93	5537.57	5540.35	0.00	11.56	2948.11	1770.98	0.52
Reach_5	74916	100-YR	9500.00	5523.03	5531.71	5531.71	5535.43	0.01	15.67	645.97	480.34	0.97
Reach_5	74916	50-YR	7500.00	5523.03	5530.53	5530.53	5533.77	0.01	14.57	540.92	438.32	0.97
Reach_5	74916	10-YR	3500.00	5523.03	5527.76	5527.76	5529.79	0.01	11.46	310.87	156.58	0.98
Reach_5	74891	500-YR	19800.00	5520.04	5534.39	5534.10	5539.88	0.01	19.13	1119.22	913.05	0.94
Reach_5	74891	100-YR	9500.00	5520.04	5531.21	5529.35	5533.54	0.00	12.37	808.10	468.62	0.70
Reach_5	74891	50-YR	7500.00	5520.04	5530.05	5528.15	5531.95	0.00	11.16	700.87	427.99	0.67
Reach_5	74891	10-YR	3500.00	5520.04	5527.23	5525.55	5528.19	0.00	7.87	452.96	162.78	0.58
Reach_5	74808	500-YR	19800.00	5520.58	5536.73	5535.60	5538.50	0.00	12.09	2505.16	1705.49	0.56
Reach_5	74808	100-YR	9500.00	5520.58	5530.20	5529.47	5533.11	0.01	13.74	707.90	435.18	0.85
Reach_5	74808	50-YR	7500.00	5520.58	5528.66	5528.38	5531.46	0.01	13.45	563.61	297.54	0.92
Reach_5	74808	10-YR	3500.00	5520.58	5525.76	5525.76	5527.69	0.01	11.13	314.51	127.56	0.99
Reach_5	74619	500-YR	19800.00	5518.56	5535.40	5533.57	5538.00	0.00	14.64	1900.62	215.78	0.65
Reach_5	74619	100-YR	9500.00	5518.56	5530.16	5527.70	5532.12	0.00	11.99	939.41	106.03	0.65
Reach_5	74619	50-YR	7500.00	5518.56	5528.56	5526.61	5530.33	0.00	11.30	774.55	100.93	0.66
Reach_5	74619	10-YR	3500.00	5518.56	5525.02	5523.96	5526.21	0.00	9.10	432.64	92.51	0.68
Reach_5	74583	500-YR	19800.00	5518.16	5535.42	5532.49	5537.87	0.00	13.15	1817.65	191.23	0.59
Reach_5	74583	100-YR	9500.00	5518.16	5530.27	5527.08	5531.94	0.00	10.41	937.25	104.80	0.57
Reach_5	74583	50-YR	7500.00	5518.16	5528.65	5526.00	5530.13	0.00	9.78	776.73	95.77	0.58
Reach_5	74583	10-YR	3500.00	5518.16	5525.07	5523.38	5526.01	0.00	7.74	452.13	85.94	0.59
Reach_5	74574 McIntyre St		Bridge									
Reach_5	74484	500-YR	19800.00	5517.90	5532.88	5532.88	5537.27	0.00	17.41	1369.10	177.16	0.83
Reach_5	74484	100-YR	9500.00	5517.90	5527.53	5527.09	5530.91	0.01	14.79	657.34	89.19	0.91
Reach_5	74484	50-YR	7500.00	5517.90	5526.73	5525.96	5529.33	0.01	12.98	587.22	85.83	0.84
Reach_5	74484	10-YR	3500.00	5517.90	5523.49	5523.30	5525.31	0.01	10.82	323.62	76.67	0.93
Reach_5	74344	500-YR	19800.00	5516.56	5531.34	5531.34	5535.38	0.01	16.47	1338.79	3236.02	0.80
Reach_5	74344	100-YR	9500.00	5516.56	5527.26	5525.47	5529.49	0.01	12.00	800.18	3041.73	0.71
Reach_5	74344	50-YR	7500.00	5516.56	5526.45	5524.40	5528.14	0.01	10.43	723.43	3032.59	0.64
Reach_5	74344	10-YR	3500.00	5516.56	5522.74	5521.69	5523.95	0.01	8.85	395.29	2919.80	0.72
Reach_5	74098	500-YR	19800.00	5513.83	5529.61	5529.61	5532.50	0.01	14.41	1710.20	3369.45	0.70
Reach_5	74098	100-YR	9500.00	5513.83	5526.58	5523.50	5528.17	0.00	10.14	950.98	3082.24	0.57
Reach_5	74098	50-YR	7500.00	5513.83	5525.91	5522.47	5527.05	0.00	8.60	881.99	3033.06	0.50
Reach_5	74098	10-YR	3500.00	5513.83	5521.26	5519.95	5522.26	0.01	8.01	436.75	2992.64	0.64
Reach_5	73810	500-YR	19800.00	5513.02	5527.20	5526.61	5529.00	0.00	12.10	2136.46	3483.09	0.62
Reach_5	73810	100-YR	9500.00	5513.02	5525.96	5521.74	5527.17	0.00	8.85	1089.06	3436.69	0.48
Reach_5	73810	50-YR	7500.00	5513.02	5525.45	5520.69	5526.29	0.00	7.34	1028.63	3352.90	0.41
Reach_5	73810	10-YR	3500.00	5513.02	5519.80	5518.20	5520.67	0.00	7.49	467.53	3008.83	0.59
Reach_5	73749	500-YR	19800.00	5512.44	5527.35	5525.71	5528.64	0.00	10.69	2634.42	3515.36	0.52
Reach_5	73749	100-YR	9500.00	5512.44	5525.87	5521.06	5527.00	0.00	8.60	1156.20	3490.67	0.44
Reach_5	73749	50-YR	7500.00	5512.44	5525.39	5520.02	5526.16	0.00	7.10	1092.06	3456.19	0.37
Reach_5	73749	10-YR	3500.00	5512.44	5519.64	5517.57	5520.37	0.00	6.85	511.38	3017.64	0.51
Reach_5	73703 Railroad		Bridge									
Reach_5	73557	500-YR	19800.00	5511.73	5524.55	5524.55	5526.79	0.01	13.98	1998.16	3480.17	0.72
Reach_5	73557	100-YR	9500.00	5511.73	5520.46	5520.46	5524.06	0.01	15.26	630.89	3116.90	0.98
Reach_5	73557	50-YR	7500.00	5511.73	5519.39	5519.39	5522.48	0.01	14.13	535.22	3088.00	0.98
Reach_5	73557	10-YR	3500.00	5511.73	5517.50	5516.79	5518.87	0.01	9.36	374.40	3045.73	0.77

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_5	73513	500-YR	19800.00	5512.16	5523.93	5523.93	5526.39	0.01	14.14	1934.71	3508.07	0.76
Reach_5	73513	100-YR	9500.00	5512.16	5519.81	5519.81	5523.07	0.01	14.50	659.57	3126.47	0.99
Reach_5	73513	50-YR	7500.00	5512.16	5518.87	5518.83	5521.63	0.01	13.32	564.97	3111.57	0.98
Reach_5	73513	10-YR	3500.00	5512.16	5517.20	5516.49	5518.39	0.01	8.73	400.93	3074.26	0.75
Reach_5	73169	500-YR	19800.00	5509.40	5518.40	5518.40	5520.98	0.01	13.58	1686.54	3405.27	0.87
Reach_5	73169	100-YR	9500.00	5509.40	5515.46	5515.46	5517.70	0.01	12.05	794.63	3248.27	0.98
Reach_5	73169	50-YR	7500.00	5509.40	5514.78	5514.78	5516.71	0.01	11.15	675.92	3236.21	0.98
Reach_5	73169	10-YR	3500.00	5509.40	5513.14	5513.14	5514.34	0.02	8.78	398.57	3158.18	0.99
Reach_5	73150	500-YR	19800.00	5508.07	5518.30	5518.30	5520.57	0.01	12.71	1861.74	3517.66	0.79
Reach_5	73150	100-YR	9500.00	5508.07	5514.77	5514.77	5517.06	0.01	12.15	784.49	3258.44	1.01
Reach_5	73150	50-YR	7500.00	5508.07	5514.16	5514.16	5516.07	0.01	11.08	678.17	3242.10	0.99
Reach_5	73150	10-YR	3500.00	5508.07	5512.55	5512.55	5513.73	0.02	8.69	402.76	3117.82	0.99
Reach_5	73020	500-YR	19800.00	5506.16	5515.79	5515.79	5518.99	0.01	14.43	1424.76	3421.62	0.96
Reach_5	73020	100-YR	9500.00	5506.16	5514.45	5512.93	5515.61	0.01	8.66	1097.93	3295.44	0.64
Reach_5	73020	50-YR	7500.00	5506.16	5513.66	5512.24	5514.63	0.01	7.92	946.61	3251.34	0.63
Reach_5	73020	10-YR	3500.00	5506.16	5511.71	5510.68	5512.27	0.01	5.97	586.27	3023.01	0.58
Reach_5	72854	500-YR	19800.00	5505.68	5514.86	5514.82	5516.95	0.01	12.61	2118.90	3633.46	0.82
Reach_5	72854	100-YR	9500.00	5505.68	5513.30	5512.01	5514.63	0.01	9.26	1032.10	3486.00	0.68
Reach_5	72854	50-YR	7500.00	5505.68	5512.56	5511.36	5513.65	0.01	8.40	895.41	3410.22	0.66
Reach_5	72854	10-YR	3500.00	5505.68	5510.74	5509.76	5511.33	0.01	6.14	569.96	3097.72	0.60
Reach_5	72772	500-YR	19800.00	5505.26	5514.35	5514.35	5516.23	0.01	12.21	2314.65	3717.57	0.80
Reach_5	72772	100-YR	9500.00	5505.26	5511.61	5511.61	5513.81	0.01	11.92	798.40	3419.00	0.99
Reach_5	72772	50-YR	7500.00	5505.26	5510.95	5510.95	5512.84	0.01	11.03	680.15	3264.74	0.99
Reach_5	72772	10-YR	3500.00	5505.26	5509.35	5509.35	5510.52	0.02	8.69	402.95	2978.57	0.99
Reach_5	72733	500-YR	19800.00	5503.14	5514.20	5512.80	5515.86	0.01	11.13	2453.14	3708.90	0.67
Reach_5	72733	100-YR	9500.00	5503.14	5511.57	5510.00	5512.83	0.01	8.98	1059.50	3448.72	0.64
Reach_5	72733	50-YR	7500.00	5503.14	5510.80	5509.31	5511.83	0.01	8.12	923.19	3285.10	0.62
Reach_5	72733	10-YR	3500.00	5503.14	5508.79	5507.64	5509.36	0.00	6.01	582.28	2963.62	0.56
Reach_5	72656	500-YR	19800.00	5502.11	5513.97	5513.00	5515.43	0.00	10.56	2659.34	3760.59	0.63
Reach_5	72656	100-YR	9500.00	5502.11	5511.11	5509.69	5512.40	0.01	9.10	1046.61	3386.24	0.66
Reach_5	72656	50-YR	7500.00	5502.11	5510.35	5508.98	5511.41	0.01	8.25	909.46	3308.70	0.64
Reach_5	72656	10-YR	3500.00	5502.11	5508.37	5507.30	5508.96	0.01	6.14	569.84	3014.14	0.58
Reach_5	72411	500-YR	19800.00	5501.89	5513.42	5511.38	5514.40	0.00	8.98	3544.04	3983.64	0.51
Reach_5	72411	100-YR	9500.00	5501.89	5509.23	5508.29	5510.77	0.01	9.93	959.12	3219.71	0.75
Reach_5	72411	50-YR	7500.00	5501.89	5508.47	5507.60	5509.76	0.01	9.12	822.52	3189.91	0.74
Reach_5	72411	10-YR	3500.00	5501.89	5506.66	5505.96	5507.39	0.01	6.83	512.14	3105.91	0.69
Reach_5	72377	500-YR	19800.00	5501.68	5511.40	5511.40	5514.07	0.01	13.57	1748.30	3362.63	0.85
Reach_5	72377	100-YR	9500.00	5501.68	5508.05	5508.05	5510.34	0.01	12.13	783.83	3122.41	1.00
Reach_5	72377	50-YR	7500.00	5501.68	5507.40	5507.40	5509.34	0.01	11.15	672.60	3104.39	0.99
Reach_5	72377	10-YR	3500.00	5501.68	5505.76	5505.76	5506.96	0.02	8.79	398.41	3061.12	0.99
Reach_5	72339	500-YR	19800.00	5499.44	5511.03	5509.60	5513.06	0.01	11.92	1893.29	3293.03	0.71
Reach_5	72339	100-YR	9500.00	5499.44	5508.45	5506.75	5509.68	0.01	8.91	1068.22	3128.83	0.63
Reach_5	72339	50-YR	7500.00	5499.44	5507.68	5506.08	5508.68	0.00	8.03	933.65	3102.35	0.61
Reach_5	72339	10-YR	3500.00	5499.44	5505.69	5504.42	5506.22	0.00	5.83	600.18	3063.24	0.54
Reach_5	72282	500-YR	19800.00	5499.75	5510.77	5509.39	5512.71	0.01	11.66	1954.90	3404.43	0.70
Reach_5	72282	100-YR	9500.00	5499.75	5508.16	5506.59	5509.39	0.01	8.89	1072.42	3191.79	0.64
Reach_5	72282	50-YR	7500.00	5499.75	5507.38	5505.90	5508.39	0.01	8.05	931.84	3167.43	0.62
Reach_5	72282	10-YR	3500.00	5499.75	5505.40	5504.24	5505.95	0.00	5.95	588.70	3116.02	0.56
Reach_5	72004	500-YR	19800.00	5497.74	5508.25	5508.25	5510.77	0.01	13.21	1690.31	3595.85	0.83
Reach_5	72004	100-YR	9500.00	5497.74	5505.18	5504.96	5507.19	0.01	11.37	836.56	3380.64	0.92
Reach_5	72004	50-YR	7500.00	5497.74	5504.54	5504.28	5506.21	0.01	10.38	722.76	3362.27	0.90
Reach_5	72004	10-YR	3500.00	5497.74	5502.96	5502.68	5503.90	0.01	7.76	451.22	3312.83	0.84
Reach_5	71962	500-YR	19800.00	5497.21	5507.80	5507.80	5510.39	0.01	13.29	1665.90	3603.76	0.83
Reach_5	71962	100-YR	9500.00	5497.21	5504.34	5504.34	5506.60	0.01	12.08	787.06	3377.64	1.00
Reach_5	71962	50-YR	7500.00	5497.21	5503.71	5503.71	5505.62	0.01	11.08	677.16	3359.82	0.99
Reach_5	71962	10-YR	3500.00	5497.21	5502.09	5502.09	5503.27	0.02	8.72	401.20	3298.55	0.99
Reach_5	71930	500-YR	19800.00	5493.56	5505.63	5505.63	5509.11	0.01	15.02	1352.04	3440.54	0.94
Reach_5	71930	100-YR	9500.00	5493.56	5503.09	5502.45	5504.88	0.01	10.74	886.32	3333.35	0.82
Reach_5	71930	50-YR	7500.00	5493.56	5502.37	5501.76	5503.87	0.01	9.81	764.46	3321.53	0.81
Reach_5	71930	10-YR	3500.00	5493.56	5500.57	5500.11	5501.44	0.01	7.47	468.30	3298.86	0.77
Reach_5	71865	500-YR	19800.00	5494.40	5505.47	5504.87	5508.28	0.01	13.66	1561.99	3179.88	0.83
Reach_5	71865	100-YR	9500.00	5494.40	5502.66	5501.73	5504.27	0.01	10.19	936.69	2944.47	0.76
Reach_5	71865	50-YR	7500.00	5494.40	5501.92	5501.06	5503.26	0.01	9.29	810.25	1831.03	0.74
Reach_5	71865	10-YR	3500.00	5494.40	5500.07	5499.37	5500.82	0.01	6.94	504.59	243.73	0.69

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_5	71596	500-YR	19800.00	5492.94	5503.60	5502.87	5506.13	0.01	13.02	1659.90	3654.98	0.79
Reach_5	71596	100-YR	9500.00	5492.94	5500.57	5499.68	5502.16	0.01	10.11	940.30	3461.37	0.76
Reach_5	71596	50-YR	7500.00	5492.94	5499.80	5498.97	5501.14	0.01	9.28	808.18	3450.53	0.75
Reach_5	71596	10-YR	3500.00	5492.94	5497.97	5497.30	5498.72	0.01	6.95	503.54	3435.45	0.70
Reach_5	71570	500-YR	19800.00	5493.42	5502.73	5502.73	5505.86	0.01	14.44	1463.38	3557.11	0.91
Reach_5	71570	100-YR	9500.00	5493.42	5499.53	5499.53	5501.82	0.01	12.15	782.46	3452.78	0.99
Reach_5	71570	50-YR	7500.00	5493.42	5498.83	5498.83	5500.80	0.01	11.26	666.15	3446.04	0.99
Reach_5	71570	10-YR	3500.00	5493.42	5497.17	5497.17	5498.39	0.02	8.87	394.73	3432.06	0.99
Reach_5	71505	500-YR	19800.00	5490.07	5502.66	5500.73	5504.69	0.00	11.59	1844.11	3648.34	0.66
Reach_5	71505	100-YR	9500.00	5490.07	5499.43	5497.50	5500.60	0.00	8.69	1094.61	3474.13	0.61
Reach_5	71505	50-YR	7500.00	5490.07	5498.59	5496.87	5499.56	0.00	7.90	949.92	3452.19	0.59
Reach_5	71505	10-YR	3500.00	5490.07	5496.49	5495.20	5497.02	0.00	5.84	599.22	3433.93	0.54
Reach_5	71462	500-YR	19800.00	5489.29	5502.40	5500.61	5504.47	0.01	11.71	1825.54	3678.50	0.68
Reach_5	71462	100-YR	9500.00	5489.29	5499.11	5497.48	5500.37	0.01	9.00	1055.83	3483.39	0.65
Reach_5	71462	50-YR	7500.00	5489.29	5498.28	5496.81	5499.33	0.01	8.23	911.67	3461.96	0.63
Reach_5	71462	10-YR	3500.00	5489.29	5496.22	5495.11	5496.81	0.01	6.17	566.97	3438.10	0.58
Reach_5	71155	500-YR	19800.00	5488.90	5498.78	5498.78	5502.10	0.01	14.81	1394.55	3511.44	0.96
Reach_5	71155	100-YR	9500.00	5488.90	5496.78	5495.85	5498.34	0.01	10.04	946.79	3471.42	0.76
Reach_5	71155	50-YR	7500.00	5488.90	5496.03	5495.13	5497.34	0.01	9.17	817.89	3459.80	0.74
Reach_5	71155	10-YR	3500.00	5488.90	5494.24	5493.47	5494.95	0.01	6.73	520.13	3426.87	0.66
Reach_5	71111	500-YR	19800.00	5488.39	5499.33	5499.33	5501.21	0.01	11.80	2147.79	3901.32	0.72
Reach_5	71111	100-YR	9500.00	5488.39	5495.80	5495.57	5497.87	0.01	11.55	824.78	3474.36	0.92
Reach_5	71111	50-YR	7500.00	5488.39	5495.14	5494.88	5496.87	0.01	10.56	710.39	3456.51	0.91
Reach_5	71111	10-YR	3500.00	5488.39	5493.47	5493.27	5494.50	0.01	8.11	431.54	162.79	0.88
Reach_5	70721	500-YR	19800.00	5484.92	5495.81	5494.69	5496.71	0.00	8.80	3037.72	763.12	0.54
Reach_5	70721	100-YR	9500.00	5484.92	5493.37	5491.90	5494.59	0.01	8.87	1076.21	474.48	0.64
Reach_5	70721	50-YR	7500.00	5484.92	5492.59	5491.24	5493.60	0.01	8.07	930.82	415.24	0.63
Reach_5	70721	10-YR	3500.00	5484.92	5490.67	5489.67	5491.23	0.01	6.00	583.44	185.87	0.58
Reach_5	70392	500-YR	19800.00	5483.44	5493.70	5493.32	5495.28	0.01	11.02	2307.66	3255.64	0.68
Reach_5	70392	100-YR	9500.00	5483.44	5490.74	5489.99	5492.36	0.01	10.24	934.63	2214.27	0.78
Reach_5	70392	50-YR	7500.00	5483.44	5490.06	5489.31	5491.40	0.01	9.28	811.19	1940.12	0.76
Reach_5	70392	10-YR	3500.00	5483.44	5488.37	5487.70	5489.09	0.01	6.81	513.97	1425.90	0.69
Reach_5	70345	500-YR	19800.00	5483.63	5492.98	5492.98	5494.96	0.01	12.08	2027.56	3069.70	0.76
Reach_5	70345	100-YR	9500.00	5483.63	5489.63	5489.63	5491.81	0.01	11.87	803.57	2067.48	0.98
Reach_5	70345	50-YR	7500.00	5483.63	5488.93	5488.93	5490.84	0.01	11.07	678.25	1912.14	1.00
Reach_5	70345	10-YR	3500.00	5483.63	5487.36	5487.36	5488.52	0.02	8.66	404.14	1179.93	0.99
Reach_5	70310	500-YR	19800.00	5481.42	5491.88	5491.56	5494.23	0.01	12.70	1804.79	2930.49	0.77
Reach_5	70310	100-YR	9500.00	5481.42	5488.62	5488.06	5490.40	0.01	10.71	890.84	2000.36	0.83
Reach_5	70310	50-YR	7500.00	5481.42	5487.91	5487.34	5489.40	0.01	9.82	764.97	1382.67	0.82
Reach_5	70310	10-YR	3500.00	5481.42	5486.10	5485.56	5487.01	0.01	7.61	459.69	1156.08	0.80
Reach_5	70238	500-YR	19800.00	5479.28	5490.40	5490.40	5493.55	0.01	14.45	1465.26	2629.46	0.91
Reach_5	70238	100-YR	9500.00	5479.28	5488.16	5487.27	5489.73	0.01	10.07	948.81	1858.43	0.76
Reach_5	70238	50-YR	7500.00	5479.28	5487.41	5486.57	5488.73	0.01	9.21	816.49	1502.89	0.74
Reach_5	70238	10-YR	3500.00	5479.28	5485.52	5484.89	5486.30	0.01	7.05	496.80	1156.09	0.71
Reach_5	69912	500-YR	19800.00	5478.73	5489.41	5487.30	5490.38	0.00	8.82	2763.08	2973.34	0.52
Reach_5	69912	100-YR	9500.00	5478.73	5486.32	5484.81	5487.56	0.01	8.93	1066.78	2258.99	0.64
Reach_5	69912	50-YR	7500.00	5478.73	5485.55	5484.13	5486.57	0.01	8.10	926.20	2019.41	0.63
Reach_5	69912	10-YR	3500.00	5478.73	5483.58	5482.50	5484.15	0.01	6.01	582.40	1327.31	0.57
Reach_5	69192	500-YR	19800.00	5473.91	5482.68	5482.50	5486.29	0.01	15.35	1329.31	2628.88	0.99
Reach_5	69192	100-YR	9500.00	5473.91	5480.14	5479.80	5482.10	0.01	11.28	849.86	2247.72	0.90
Reach_5	69192	50-YR	7500.00	5473.91	5479.47	5479.16	5481.12	0.01	10.31	731.39	2161.98	0.88
Reach_5	69192	10-YR	3500.00	5473.91	5477.90	5477.52	5478.81	0.01	7.66	456.89	1843.50	0.82
Reach_5	69098	500-YR	19800.00	5472.53	5481.61	5481.61	5485.21	0.01	15.29	1319.58	2434.76	0.97
Reach_5	69098	100-YR	9500.00	5472.53	5478.62	5478.62	5480.91	0.01	12.15	783.85	2149.22	0.99
Reach_5	69098	50-YR	7500.00	5472.53	5477.94	5477.94	5479.89	0.01	11.23	668.13	2063.55	0.99
Reach_5	69098	10-YR	3500.00	5472.53	5476.25	5476.25	5477.48	0.02	8.88	394.09	1645.91	0.99
Reach_5	69089	500-YR	19800.00	5470.90	5481.17	5481.17	5484.78	0.01	15.33	1318.00	2262.78	0.97
Reach_5	69089	100-YR	9500.00	5470.90	5478.18	5478.18	5480.46	0.01	12.13	786.62	2096.23	0.98
Reach_5	69089	50-YR	7500.00	5470.90	5477.46	5477.46	5479.44	0.01	11.31	664.40	1989.99	0.99
Reach_5	69089	10-YR	3500.00	5470.90	5475.80	5475.80	5477.03	0.02	8.90	393.08	1614.04	1.00
Reach_5	68947	500-YR	19800.00	5468.38	5478.94	5478.86	5482.49	0.01	15.15	1318.82	2165.31	0.97
Reach_5	68947	100-YR	9500.00	5468.38	5477.36	5475.93	5478.68	0.01	9.19	1036.02	2118.46	0.66
Reach_5	68947	50-YR	7500.00	5468.38	5476.90	5475.23	5477.86	0.00	7.86	955.40	2088.10	0.59
Reach_5	68947	10-YR	3500.00	5468.38	5474.35	5473.52	5475.04	0.01	6.68	523.95	1620.36	0.66
Reach_5	68669	500-YR	19800.00	5467.32	5477.79	5477.79	5479.85	0.01	11.85	1756.25	2409.34	0.71

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_5	68669	100-YR	9500.00	5467.32	5476.68	5473.61	5477.50	0.00	7.26	1345.86	2189.02	0.46
Reach_5	68669	50-YR	7500.00	5467.32	5476.43	5472.92	5476.97	0.00	5.95	1279.43	2120.21	0.39
Reach_5	68669	10-YR	3500.00	5467.32	5473.79	5471.17	5474.08	0.00	4.33	809.87	1909.94	0.35
Reach_5	68668		Lat Struct									
Reach_5	68566	500-YR	19800.00	5465.22	5477.31	5477.31	5479.24	0.01	10.54	1880.00	2505.53	0.66
Reach_5	68566	100-YR	9500.00	5465.22	5476.08	5476.08	5477.12	0.00	8.84	1239.39	2265.32	0.60
Reach_5	68566	50-YR	7500.00	5465.22	5475.81	5475.81	5476.67	0.00	8.05	1100.25	2196.54	0.56
Reach_5	68566	10-YR	3500.00	5465.22	5471.00	5471.00	5473.47	0.02	12.61	277.54	1430.91	1.03
Reach_5	68535	500-YR	19800.00	5465.15	5477.13	5475.01	5477.83	0.00	2.51	3619.02	2472.63	0.15
Reach_5	68535	100-YR	9500.00	5465.15	5474.80	5473.04	5475.79	0.00	4.48	1475.26	2077.53	0.31
Reach_5	68535	50-YR	7500.00	5465.15	5473.58	5472.79	5474.65	0.00	5.94	1027.77	1836.48	0.46
Reach_5	68535	10-YR	3500.00	5465.15	5471.71	5470.47	5472.52	0.01	7.20	485.83	1594.10	0.63
Reach_5	68522 Footbridge		Bridge									
Reach_5	68494	500-YR	19800.00	5464.63	5473.43	5473.43	5475.80	0.00	8.00	2072.36	2102.47	0.57
Reach_5	68494	100-YR	9500.00	5464.63	5471.89	5471.71	5472.96	0.01	7.94	1207.34	1908.90	0.65
Reach_5	68494	50-YR	7500.00	5464.63	5471.43	5471.43	5472.41	0.01	8.17	974.53	1782.57	0.70
Reach_5	68494	10-YR	3500.00	5464.63	5469.66	5469.20	5470.48	0.01	7.27	481.52	1567.19	0.79
Reach_5	68327	500-YR	19800.00	5464.51	5471.63	5471.63	5473.97	0.01	12.80	1690.76	1951.64	0.91
Reach_5	68327	100-YR	9500.00	5464.51	5469.39	5469.39	5471.27	0.01	11.00	867.87	1660.94	0.99
Reach_5	68327	50-YR	7500.00	5464.51	5468.83	5468.83	5470.44	0.01	10.18	737.57	1626.88	0.99
Reach_5	68327	10-YR	3500.00	5464.51	5467.45	5467.45	5468.46	0.02	8.07	433.85	1587.24	0.99
Reach_5	68216	500-YR	19800.00	5456.74	5467.75	5467.75	5471.52	0.01	15.78	1304.09	1582.58	0.95
Reach_5	68216	100-YR	9500.00	5456.74	5464.42	5464.42	5466.95	0.01	12.78	748.37	1495.40	0.99
Reach_5	68216	50-YR	7500.00	5456.74	5463.66	5463.66	5465.83	0.01	11.82	635.28	1485.33	0.99
Reach_5	68216	10-YR	3500.00	5456.74	5461.64	5461.64	5463.08	0.02	9.63	363.33	123.63	0.99
Reach_5	68136	500-YR	19800.00	5451.56	5461.51	5461.51	5465.55	0.01	16.32	1258.54	158.84	0.96
Reach_5	68136	100-YR	9500.00	5451.56	5457.97	5457.97	5460.66	0.01	13.18	729.02	141.08	0.99
Reach_5	68136	50-YR	7500.00	5451.56	5457.21	5457.21	5459.48	0.01	12.11	623.19	137.08	0.98
Reach_5	68136	10-YR	3500.00	5451.56	5455.28	5455.28	5456.68	0.02	9.52	367.53	127.27	0.99
Reach_5	68123	500-YR	19800.00	5449.22	5460.82	5460.82	5464.90	0.01	16.34	1248.96	156.58	0.96
Reach_5	68123	100-YR	9500.00	5449.22	5457.37	5457.37	5460.00	0.01	13.05	733.83	141.27	0.98
Reach_5	68123	50-YR	7500.00	5449.22	5456.57	5456.57	5458.83	0.01	12.07	623.28	137.05	0.98
Reach_5	68123	10-YR	3500.00	5449.22	5454.57	5454.57	5456.03	0.02	9.66	362.24	123.66	1.00
Reach_5	67953	500-YR	19800.00	5442.00	5455.12	5455.12	5460.13	0.01	18.04	1119.36	116.94	0.98
Reach_5	67953	100-YR	9500.00	5442.00	5451.01	5451.01	5454.21	0.01	14.36	662.71	105.61	1.00
Reach_5	67953	50-YR	7500.00	5442.00	5450.06	5450.06	5452.81	0.01	13.29	564.34	103.08	1.00
Reach_5	67953	10-YR	3500.00	5442.00	5448.57	5447.70	5449.68	0.01	8.46	413.63	98.36	0.73
Reach_5	67460	500-YR	19800.00	5436.91	5447.90	5447.90	5453.09	0.02	21.17	1161.61	519.60	1.17
Reach_5	67460	100-YR	9500.00	5436.91	5445.94	5445.94	5447.73	0.01	12.22	929.56	500.88	0.75
Reach_5	67460	50-YR	7500.00	5436.91	5445.94	5445.94	5447.06	0.00	9.65	929.56	500.88	0.59
Reach_5	67460	10-YR	3500.00	5436.91	5443.86	5443.03	5445.70	0.01	10.97	329.21	479.90	0.78
Reach_5	67024	500-YR	19800.00	5433.19	5446.23	5441.67	5447.56	0.00	11.18	2248.82	919.69	0.59
Reach_5	67024	100-YR	9500.00	5433.19	5441.98	5441.67	5442.73	0.00	8.08	1396.69	663.47	0.54
Reach_5	67024	50-YR	7500.00	5433.19	5441.67	5441.67	5442.18	0.00	6.64	1341.56	612.30	0.45
Reach_5	67024	10-YR	3500.00	5433.19	5441.02	5439.41	5442.49	0.01	9.73	359.53	498.26	0.69
Reach_5	66656	500-YR	19800.00	5431.87	5441.13	5441.13	5444.93	0.01	19.86	1589.49	247.36	1.23
Reach_5	66656	100-YR	9500.00	5431.87	5439.01	5438.66	5440.70	0.01	13.05	1111.18	210.86	0.94
Reach_5	66656	50-YR	7500.00	5431.87	5438.66	5438.66	5439.86	0.01	10.98	1036.68	207.12	0.81
Reach_5	66656	10-YR	3500.00	5431.87	5437.51	5437.51	5439.72	0.01	11.93	297.78	195.72	0.99
Reach_5	66246	500-YR	19800.00	5428.75	5440.41	5437.95	5441.60	0.00	11.42	3098.82	702.88	0.63
Reach_5	66246	100-YR	9500.00	5428.75	5435.77	5435.77	5437.42	0.01	12.55	1355.87	636.49	0.93
Reach_5	66246	50-YR	7500.00	5428.75	5435.23	5435.23	5436.68	0.01	11.52	1166.56	631.08	0.90
Reach_5	66246	10-YR	3500.00	5428.75	5433.61	5433.61	5434.95	0.01	10.00	532.47	609.84	0.94
Reach_5	65852	500-YR	19800.00	5423.55	5440.20	5434.38	5440.73	0.00	6.91	4278.38	591.86	0.32
Reach_5	65852	100-YR	9500.00	5423.55	5434.35	5431.34	5434.96	0.00	7.06	2034.95	546.13	0.43
Reach_5	65852	50-YR	7500.00	5423.55	5432.92	5430.72	5433.58	0.00	7.14	1525.18	448.01	0.48
Reach_5	65852	10-YR	3500.00	5423.55	5429.46	5429.14	5430.34	0.01	7.79	580.95	409.50	0.74
Reach_5	65528	500-YR	19800.00	5414.67	5437.67	5433.82	5439.78	0.00	12.25	1857.71	166.71	0.55
Reach_5	65528	100-YR	9500.00	5414.67	5432.58	5429.20	5433.97	0.00	9.61	1067.33	142.56	0.53
Reach_5	65528	50-YR	7500.00	5414.67	5431.37	5428.08	5432.55	0.00	8.78	899.90	133.97	0.51
Reach_5	65528	10-YR	3500.00	5414.67	5428.32	5425.35	5428.93	0.00	6.28	557.34	90.11	0.45
Reach_5	65518 I-70 WB		Bridge									
Reach_5	65437	500-YR	19800.00	5417.69	5436.83	5433.26	5439.22	0.00	12.53	1650.07	140.88	0.60

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_5	65437	100-YR	9500.00	5417.69	5432.03	5429.40	5433.44	0.00	9.53	1008.65	126.01	0.57
Reach_5	65437	50-YR	7500.00	5417.69	5430.85	5428.45	5432.04	0.00	8.75	861.89	121.38	0.56
Reach_5	65437	10-YR	3500.00	5417.69	5427.80	5425.63	5428.53	0.00	6.86	510.26	108.96	0.56
Reach_5	65402	500-YR	19800.00	5418.40	5436.26	5433.28	5438.99	0.00	13.60	1566.90	139.27	0.65
Reach_5	65402	100-YR	9500.00	5418.40	5431.66	5429.24	5433.25	0.00	10.25	964.20	122.57	0.60
Reach_5	65402	50-YR	7500.00	5418.40	5430.52	5428.26	5431.86	0.00	9.34	827.88	118.01	0.59
Reach_5	65402	10-YR	3500.00	5418.40	5427.59	5425.58	5428.37	0.00	7.09	499.08	106.22	0.57
Reach_5	65393 I-70 EB		Bridge									
Reach_5	65330	500-YR	19800.00	5418.40	5434.08	5433.41	5438.21	0.01	16.77	1299.57	136.02	0.87
Reach_5	65330	100-YR	9500.00	5418.40	5429.38	5429.27	5432.40	0.01	14.10	703.97	116.35	0.95
Reach_5	65330	50-YR	7500.00	5418.40	5428.29	5428.27	5431.01	0.01	13.32	580.55	110.24	0.97
Reach_5	65330	10-YR	3500.00	5418.40	5425.48	5425.48	5427.50	0.01	11.41	309.48	76.61	0.98
Reach_5	65282	500-YR	19800.00	5418.00	5434.45	5432.10	5437.46	0.00	14.10	1502.47	144.55	0.70
Reach_5	65282	100-YR	9500.00	5418.00	5429.69	5428.06	5431.63	0.00	11.18	864.22	123.37	0.70
Reach_5	65282	50-YR	7500.00	5418.00	5428.58	5427.11	5430.23	0.00	10.32	730.92	115.53	0.70
Reach_5	65282	10-YR	3500.00	5418.00	5425.20	5423.75	5426.45	0.00	8.99	389.23	72.97	0.69
Reach_5	65275 Youngfield St		Bridge									
Reach_5	65211	500-YR	19800.00	5418.00	5431.80	5431.80	5436.48	0.01	17.46	1180.01	133.21	0.97
Reach_5	65211	100-YR	9500.00	5418.00	5428.07	5427.89	5430.89	0.01	13.48	710.44	118.74	0.95
Reach_5	65211	50-YR	7500.00	5418.00	5427.33	5427.00	5429.59	0.01	12.08	623.26	115.88	0.90
Reach_5	65211	10-YR	3500.00	5418.00	5424.37	5424.49	5426.30	0.01	11.14	314.18	88.24	1.04
Reach_5	64938	500-YR	19800.00	5416.57	5429.53	5429.53	5433.54	0.01	17.13	1470.43	190.85	0.92
Reach_5	64938	100-YR	9500.00	5416.57	5425.80	5425.80	5428.64	0.01	13.84	791.63	164.62	0.92
Reach_5	64938	50-YR	7500.00	5416.57	5424.95	5424.82	5427.37	0.01	12.68	656.50	152.76	0.90
Reach_5	64938	10-YR	3500.00	5416.57	5423.04		5424.23	0.01	8.80	404.00	105.31	0.75
Reach_5	64534	500-YR	19800.00	5414.18	5426.23	5426.23	5428.81	0.00	4.32	2434.16	1155.66	0.25
Reach_5	64534	100-YR	9500.00	5414.18	5424.14	5422.52	5425.35	0.01	9.13	1137.63	1033.30	0.62
Reach_5	64534	50-YR	7500.00	5414.18	5423.14	5421.80	5424.23	0.01	8.58	944.57	986.80	0.63
Reach_5	64534	10-YR	3500.00	5414.18	5420.73	5419.83	5421.51	0.01	7.11	510.56	891.29	0.66
Reach_5	64095	500-YR	19800.00	5411.04	5422.81	5422.81	5423.54	0.00	1.92	3628.48	1126.67	0.11
Reach_5	64095	100-YR	9500.00	5411.04	5421.43	5419.34	5422.79	0.01	9.37	1024.13	1075.04	0.60
Reach_5	64095	50-YR	7500.00	5411.04	5420.47	5418.51	5421.60	0.01	8.50	886.55	1062.44	0.59
Reach_5	64095	10-YR	3500.00	5411.04	5418.27	5416.56	5418.82	0.00	5.99	584.37	1037.95	0.50
Reach_5	63718	500-YR	19800.00	5408.26	5421.89	5421.51	5423.16	0.00	4.39	2521.20	1108.60	0.24
Reach_5	63718	100-YR	9500.00	5408.26	5420.37	5417.99	5421.92	0.00	6.44	1131.95	1025.20	0.37
Reach_5	63718	50-YR	7500.00	5408.26	5418.90	5417.50	5420.39	0.00	7.27	862.50	975.03	0.46
Reach_5	63718	10-YR	3500.00	5408.26	5416.70	5414.86	5417.50	0.00	7.27	494.72	922.24	0.53
Reach_5	63717		Lat Struct									
Reach_5	63333	500-YR	19800.00	5406.52	5422.40	5421.01	5422.84	0.00	1.96	4338.03	910.34	0.10
Reach_5	63333	100-YR	9500.00	5406.52	5420.37	5416.67	5421.48	0.00	4.21	1455.23	857.37	0.23
Reach_5	63333	50-YR	7500.00	5406.52	5418.56	5416.35	5419.75	0.00	5.12	1039.86	760.95	0.30
Reach_5	63333	10-YR	3500.00	5406.52	5415.02	5412.80	5416.17	0.00	8.61	406.43	62.77	0.60
Reach_5	63330		Lat Struct									
Reach_5	63271	500-YR	19800.00	5406.35	5422.18	5420.61	5422.82	0.00	3.27	3531.68	714.62	0.16
Reach_5	63271	100-YR	9500.00	5406.35	5420.46	5418.00	5421.41	0.00	5.71	1419.33	697.46	0.30
Reach_5	63271	50-YR	7500.00	5406.35	5418.59	5417.31	5419.66	0.00	7.27	977.69	646.71	0.42
Reach_5	63271	10-YR	3500.00	5406.35	5414.14	5413.08	5415.82	0.01	10.40	336.52	59.74	0.77
Reach_5	63262 Footbridge		Bridge									
Reach_5	63243	500-YR	19800.00	5406.30	5421.79	5420.01	5422.52	0.00	3.76	3364.44	723.98	0.19
Reach_5	63243	100-YR	9500.00	5406.30	5418.02	5418.02	5420.18	0.00	11.28	875.36	636.38	0.67
Reach_5	63243	50-YR	7500.00	5406.30	5417.21	5417.21	5419.16	0.00	11.34	698.83	536.78	0.70
Reach_5	63243	10-YR	3500.00	5406.30	5413.44	5412.80	5415.36	0.01	11.10	315.27	58.18	0.84
Reach_5	63054	500-YR	19800.00	5405.48	5420.07	5418.89	5422.01	0.00	12.10	2094.45	323.63	0.66
Reach_5	63054	100-YR	9500.00	5405.48	5417.73	5415.19	5418.74	0.00	8.36	1368.85	295.56	0.52
Reach_5	63054	50-YR	7500.00	5405.48	5416.53	5414.35	5417.61	0.00	8.36	919.73	277.44	0.56
Reach_5	63054	10-YR	3500.00	5405.48	5413.28	5411.63	5414.10	0.00	7.25	482.77	108.02	0.60
Reach_5	63050		Lat Struct									
Reach_5	62718	500-YR	19800.00	5403.96	5419.38	5416.90	5420.70	0.00	8.29	2268.50	931.13	0.42
Reach_5	62718	100-YR	9500.00	5403.96	5416.79	5412.94	5417.76	0.00	7.99	1241.51	838.24	0.46
Reach_5	62718	50-YR	7500.00	5403.96	5415.72	5412.02	5416.52	0.00	7.19	1070.91	801.45	0.44
Reach_5	62718	10-YR	3500.00	5403.96	5412.56	5409.83	5413.00	0.00	5.38	650.76	117.03	0.40

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_5	62715		Lat Struct									
Reach_5	62640	500-YR	19800.00	5403.51	5419.51	5417.79	5420.44	0.00	5.82	2837.01	898.23	0.28
Reach_5	62640	100-YR	9500.00	5403.51	5415.96	5413.62	5417.37	0.01	9.86	1111.78	781.98	0.56
Reach_5	62640	50-YR	7500.00	5403.51	5414.91	5412.28	5416.13	0.01	9.04	922.33	175.43	0.55
Reach_5	62640	10-YR	3500.00	5403.51	5411.95	5409.47	5412.66	0.00	6.74	519.51	93.18	0.50
Reach_5	62484	500-YR	19800.00	5403.38	5418.10	5418.10	5419.99	0.01	13.14	2631.50	875.74	0.65
Reach_5	62484	100-YR	9500.00	5403.38	5413.34	5413.34	5416.05	0.01	13.76	809.13	163.46	0.87
Reach_5	62484	50-YR	7500.00	5403.38	5412.46	5412.46	5414.85	0.01	12.70	670.46	155.06	0.85
Reach_5	62484	10-YR	3500.00	5403.38	5409.85	5409.14	5411.41	0.01	10.03	348.91	75.95	0.82
Reach_5	62206	500-YR	19800.00	5401.00	5413.16	5413.16	5415.90	0.01	16.11	2080.77	388.60	0.88
Reach_5	62206	100-YR	9500.00	5401.00	5410.52	5410.52	5412.49	0.01	12.63	1205.06	316.57	0.79
Reach_5	62206	50-YR	7500.00	5401.00	5409.80	5409.80	5411.59	0.01	11.70	982.88	303.41	0.77
Reach_5	62206	10-YR	3500.00	5401.00	5406.86	5406.86	5408.72	0.01	11.02	336.60	102.78	0.95
Reach_5	62067	500-YR	19800.00	5398.81	5412.13	5412.13	5414.91	0.01	16.02	2062.46	403.51	0.83
Reach_5	62067	100-YR	9500.00	5398.81	5409.20	5409.20	5411.38	0.01	12.92	1104.75	316.64	0.77
Reach_5	62067	50-YR	7500.00	5398.81	5408.26	5407.84	5410.31	0.01	12.16	840.93	240.44	0.77
Reach_5	62067	10-YR	3500.00	5398.81	5406.74	5404.72	5407.63	0.00	7.70	514.35	165.44	0.54
Reach_5	61678	500-YR	19800.00	5396.21	5410.79	5409.49	5412.00	0.00	12.14	3322.93	662.59	0.60
Reach_5	61678	100-YR	9500.00	5396.21	5407.62	5406.82	5408.94	0.00	11.07	1393.83	471.30	0.63
Reach_5	61678	50-YR	7500.00	5396.21	5406.32	5405.71	5407.87	0.01	11.43	1032.98	273.31	0.71
Reach_5	61678	10-YR	3500.00	5396.21	5402.85	5402.78	5405.31	0.01	12.59	277.95	102.93	0.98
Reach_5	61187	500-YR	19800.00	5391.66	5407.88	5407.88	5409.83	0.01	13.40	2691.33	613.92	0.64
Reach_5	61187	100-YR	9500.00	5391.66	5404.71	5402.93	5406.51	0.01	11.26	1001.72	275.16	0.62
Reach_5	61187	50-YR	7500.00	5391.66	5403.96	5401.65	5405.35	0.00	9.81	890.53	164.84	0.56
Reach_5	61187	10-YR	3500.00	5391.66	5400.88	5397.99	5401.71	0.00	7.29	489.12	111.58	0.50
Reach_4	60806	500-YR	19800.00	5390.76	5404.53	5402.88	5404.91	0.00	3.13	4803.92	1411.78	0.17
Reach_4	60806	100-YR	9500.00	5390.76	5402.51	5401.43	5404.30	0.01	11.30	1203.06	1183.79	0.68
Reach_4	60806	50-YR	7500.00	5390.76	5401.97	5399.92	5403.47	0.01	10.05	939.06	1097.46	0.62
Reach_4	60806	10-YR	3500.00	5390.76	5399.32	5397.12	5400.13	0.00	7.24	484.34	86.62	0.53
Reach_4	60460	500-YR	19800.00	5389.13	5404.55	5401.67	5404.75	0.00	2.82	6952.44	1603.32	0.14
Reach_4	60460	100-YR	9500.00	5389.13	5401.56	5400.66	5402.37	0.00	8.60	1888.60	1428.42	0.49
Reach_4	60460	50-YR	7500.00	5389.13	5401.36	5399.87	5401.93	0.00	7.15	1776.28	1387.74	0.42
Reach_4	60460	10-YR	3500.00	5389.13	5396.95	5395.32	5398.23	0.01	9.06	386.30	68.82	0.67
Reach_4	60416	500-YR	19800.00	5388.98	5404.55	5402.63	5404.73	0.00	2.88	7159.66	2132.34	0.15
Reach_4	60416	100-YR	9500.00	5388.98	5401.30	5400.51	5402.21	0.00	8.83	1821.62	1459.52	0.53
Reach_4	60416	50-YR	7500.00	5388.98	5401.24	5399.68	5401.82	0.00	7.10	1782.92	1442.31	0.42
Reach_4	60416	10-YR	3500.00	5388.98	5396.80	5394.98	5397.97	0.00	8.68	403.21	68.83	0.63
Reach_4	60411 Footbridge		Bridge									
Reach_4	60391	500-YR	19800.00	5388.77	5402.72	5402.72	5404.27	0.00	13.19	3253.61	1563.28	0.68
Reach_4	60391	100-YR	9500.00	5388.77	5400.68	5400.68	5402.17	0.00	11.07	1522.11	685.78	0.63
Reach_4	60391	50-YR	7500.00	5388.77	5399.74	5399.74	5401.38	0.00	10.99	1045.25	435.79	0.66
Reach_4	60391	10-YR	3500.00	5388.77	5396.27	5395.03	5397.75	0.01	9.74	359.34	65.34	0.73
Reach_4	60301	500-YR	19800.00	5388.09	5401.59	5401.59	5403.09	0.01	12.87	3073.94	1559.88	0.69
Reach_4	60301	100-YR	9500.00	5388.09	5399.46	5399.46	5401.05	0.01	11.34	1426.49	676.40	0.68
Reach_4	60301	50-YR	7500.00	5388.09	5398.87	5398.87	5400.33	0.01	10.44	1103.76	480.68	0.65
Reach_4	60301	10-YR	3500.00	5388.09	5395.00	5394.55	5396.88	0.01	10.99	318.60	65.89	0.88
Reach_4	60157	500-YR	19800.00	5387.07	5400.15	5400.15	5401.89	0.00	12.92	2985.91	798.67	0.73
Reach_4	60157	100-YR	9500.00	5387.07	5397.57	5397.57	5399.28	0.00	11.27	1289.57	468.16	0.74
Reach_4	60157	50-YR	7500.00	5387.07	5396.35	5396.06	5398.40	0.01	11.82	790.76	301.04	0.86
Reach_4	60157	10-YR	3500.00	5387.07	5394.96		5395.82	0.00	7.51	511.34	174.01	0.62
Reach_4	59850	500-YR	19800.00	5386.52	5397.32	5397.32	5398.68	0.01	12.53	3382.49	1068.30	0.80
Reach_4	59850	100-YR	9500.00	5386.52	5395.68	5395.68	5396.81	0.00	10.18	1837.43	787.80	0.73
Reach_4	59850	50-YR	7500.00	5386.52	5394.90	5394.90	5396.39	0.01	10.86	1103.93	635.32	0.83
Reach_4	59850	10-YR	3500.00	5386.52	5393.60	5392.40	5394.70	0.00	8.39	419.94	363.06	0.74
Reach_4	59484	500-YR	19800.00	5386.14	5394.69	5393.83	5395.19	0.01	8.07	4250.08	1266.64	0.55
Reach_4	59484	100-YR	9500.00	5386.14	5393.12	5392.88	5393.76	0.01	8.11	1992.74	1206.18	0.64
Reach_4	59484	50-YR	7500.00	5386.14	5392.81	5392.52	5393.37	0.01	7.36	1715.63	1172.00	0.60
Reach_4	59484	10-YR	3500.00	5386.14	5391.52	5390.98	5392.29	0.01	7.25	549.52	562.33	0.69
Reach_4	59441	500-YR	19800.00	5385.94	5394.53	5393.54	5394.98	0.00	7.57	4498.64	1273.61	0.51
Reach_4	59441	100-YR	9500.00	5385.94	5392.83	5392.18	5393.47	0.01	8.00	2017.41	1231.96	0.62
Reach_4	59441	50-YR	7500.00	5385.94	5392.12	5392.12	5393.00	0.01	8.75	1366.45	1142.50	0.73
Reach_4	59441	10-YR	3500.00	5385.94	5390.52	5390.52	5391.67	0.02	8.71	437.12	314.22	0.89
Reach_4	59399	500-YR	19800.00	5383.97	5393.53	5393.53	5394.70	0.01	11.30	3694.66	1242.06	0.74
Reach_4	59399	100-YR	9500.00	5383.97	5392.01	5392.01	5393.16	0.00	9.69	1718.61	1124.68	0.71

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_4	59399	50-YR	7500.00	5383.97	5391.66	5391.42	5392.65	0.00	8.68	1425.55	999.56	0.65
Reach_4	59399	10-YR	3500.00	5383.97	5390.09	5388.91	5390.80	0.00	6.79	543.40	284.04	0.61
Reach_4	59302	500-YR	19800.00	5383.52	5393.01	5392.74	5394.06	0.01	11.22	3294.53	1110.00	0.70
Reach_4	59302	100-YR	9500.00	5383.52	5391.32	5391.32	5392.41	0.01	10.01	1731.24	881.82	0.71
Reach_4	59302	50-YR	7500.00	5383.52	5391.05	5391.05	5392.11	0.01	9.34	1284.55	822.11	0.68
Reach_4	59302	10-YR	3500.00	5383.52	5389.33	5388.37	5390.29	0.01	7.90	486.53	226.89	0.68
Reach_4	59010	500-YR	19800.00	5379.64	5391.02	5390.62	5392.14	0.01	11.55	3158.12	1068.27	0.68
Reach_4	59010	100-YR	9500.00	5379.64	5389.07	5388.83	5390.20	0.01	10.26	1617.98	702.26	0.69
Reach_4	59010	50-YR	7500.00	5379.64	5388.74	5388.30	5389.82	0.01	9.56	1171.83	623.39	0.66
Reach_4	59010	10-YR	3500.00	5379.64	5386.57	5385.79	5387.79	0.01	8.97	421.12	256.75	0.74
Reach_4	58630	500-YR	19800.00	5377.96	5388.48	5386.91	5389.64	0.01	12.17	3187.74	885.09	0.71
Reach_4	58630	100-YR	9500.00	5377.96	5386.53	5386.08	5387.58	0.01	10.30	1614.54	695.48	0.68
Reach_4	58630	50-YR	7500.00	5377.96	5385.96	5385.31	5387.19	0.01	10.26	1033.29	566.78	0.71
Reach_4	58630	10-YR	3500.00	5377.96	5384.55	5383.33	5385.17	0.00	6.96	637.12	297.09	0.54
Reach_4	58172	500-YR	19800.00	5374.43	5385.67	5385.67	5386.92	0.01	13.81	3575.47	1266.84	0.79
Reach_4	58172	100-YR	9500.00	5374.43	5384.16	5384.16	5385.18	0.00	11.00	2154.57	854.58	0.69
Reach_4	58172	50-YR	7500.00	5374.43	5383.76	5383.76	5384.72	0.00	10.21	1813.46	818.98	0.65
Reach_4	58172	10-YR	3500.00	5374.43	5381.26	5381.26	5382.58	0.01	10.13	514.43	200.45	0.79
Reach_4	57791	500-YR	19800.00	5371.93	5382.51	5382.51	5383.83	0.00	13.65	3857.95	1319.29	0.81
Reach_4	57791	100-YR	9500.00	5371.93	5381.10	5381.10	5382.13	0.00	10.66	2334.01	1012.62	0.69
Reach_4	57791	50-YR	7500.00	5371.93	5380.60	5380.60	5381.62	0.00	10.05	1843.84	958.19	0.68
Reach_4	57791	10-YR	3500.00	5371.93	5378.43	5378.43	5379.74	0.01	9.70	526.04	265.30	0.79
Reach_4	57496	500-YR	19800.00	5370.48	5379.63	5379.63	5381.03	0.01	13.72	3100.61	1029.56	0.94
Reach_4	57496	100-YR	9500.00	5370.48	5378.29	5378.29	5379.29	0.01	10.65	1937.82	850.27	0.81
Reach_4	57496	50-YR	7500.00	5370.48	5377.95	5377.95	5378.84	0.00	9.72	1673.95	763.30	0.77
Reach_4	57496	10-YR	3500.00	5370.48	5376.61	5376.61	5377.59	0.01	8.78	642.37	582.90	0.80
Reach_4	57442	500-YR	19800.00	5370.36	5379.65	5378.86	5380.41	0.01	10.56	3417.69	1248.61	0.67
Reach_4	57442	100-YR	9500.00	5370.36	5377.83	5377.33	5378.49	0.01	9.27	1871.61	866.15	0.67
Reach_4	57442	50-YR	7500.00	5370.36	5377.19	5376.94	5377.93	0.01	9.48	1415.11	622.66	0.73
Reach_4	57442	10-YR	3500.00	5370.36	5376.22	5375.58	5376.64	0.01	6.64	830.62	498.73	0.55
Reach_4	57428 Footbridge		Bridge									
Reach_4	57402	500-YR	19800.00	5370.13	5379.61	5378.68	5380.25	0.01	9.77	3883.68	1497.04	0.61
Reach_4	57402	100-YR	9500.00	5370.13	5377.75	5377.05	5378.40	0.01	9.10	1969.20	981.86	0.65
Reach_4	57402	50-YR	7500.00	5370.13	5377.20	5376.55	5377.85	0.01	8.76	1564.52	835.97	0.65
Reach_4	57402	10-YR	3500.00	5370.13	5375.74	5375.17	5376.21	0.01	6.83	799.34	377.12	0.58
Reach_4	57293	500-YR	19800.00	5369.04	5378.88	5377.86	5379.62	0.01	10.28	3377.96	1213.47	0.64
Reach_4	57293	100-YR	9500.00	5369.04	5376.92	5375.81	5377.64	0.01	9.42	1761.62	767.06	0.68
Reach_4	57293	50-YR	7500.00	5369.04	5376.05	5375.51	5376.91	0.01	9.85	1244.76	522.17	0.77
Reach_4	57293	10-YR	3500.00	5369.04	5374.50	5374.50	5375.25	0.01	8.58	649.26	355.86	0.80
Reach_4	56972	500-YR	19800.00	5366.98	5376.35	5376.35	5377.80	0.00	12.80	2940.80	1030.32	0.81
Reach_4	56972	100-YR	9500.00	5366.98	5374.12	5373.48	5375.48	0.01	11.09	1291.21	478.09	0.83
Reach_4	56972	50-YR	7500.00	5366.98	5373.50	5372.78	5374.61	0.01	9.91	1095.11	300.43	0.79
Reach_4	56972	10-YR	3500.00	5366.98	5372.01	5371.20	5372.64	0.00	7.28	645.47	259.55	0.70
Reach_4	56520	500-YR	19800.00	5362.86	5372.74	5372.74	5374.44	0.01	12.87	2126.70	794.84	0.87
Reach_4	56520	100-YR	9500.00	5362.86	5371.41	5370.83	5372.39	0.01	9.38	1396.10	576.87	0.71
Reach_4	56520	50-YR	7500.00	5362.86	5370.84	5370.37	5371.71	0.01	8.63	1133.10	439.90	0.69
Reach_4	56520	10-YR	3500.00	5362.86	5369.40	5369.11	5370.04	0.01	7.07	633.82	302.24	0.66
Reach_4	56096	500-YR	19800.00	5360.31	5369.77	5369.49	5370.73	0.00	11.99	3805.03	1390.80	0.77
Reach_4	56096	100-YR	9500.00	5360.31	5368.27	5368.27	5369.49	0.01	11.37	1706.16	1202.94	0.82
Reach_4	56096	50-YR	7500.00	5360.31	5367.79	5367.79	5368.91	0.01	10.55	1370.24	1051.59	0.79
Reach_4	56096	10-YR	3500.00	5360.31	5366.16	5366.11	5367.13	0.01	8.84	631.64	330.80	0.79
Reach_4	55687	500-YR	19800.00	5357.16	5369.03	5366.96	5369.39	0.00	6.13	4632.80	1940.14	0.39
Reach_4	55687	100-YR	9500.00	5357.16	5367.17	5365.58	5367.42	0.00	4.92	2884.53	1379.30	0.36
Reach_4	55687	50-YR	7500.00	5357.16	5366.25	5365.22	5366.58	0.00	5.42	2085.94	1212.93	0.43
Reach_4	55687	10-YR	3500.00	5357.16	5363.62	5363.28	5364.59	0.01	7.92	445.29	262.31	0.84
Reach_4	55415	500-YR	19800.00	5355.58	5368.73	5365.58	5368.99	0.00	5.21	5536.58	2369.65	0.30
Reach_4	55415	100-YR	9500.00	5355.58	5367.01	5363.85	5367.13	0.00	3.53	4011.76	1416.04	0.23
Reach_4	55415	50-YR	7500.00	5355.58	5366.08	5363.06	5366.21	0.00	3.52	3208.15	942.98	0.24
Reach_4	55415	10-YR	3500.00	5355.58	5362.00	5361.28	5362.79	0.01	7.12	491.64	157.72	0.70
Reach_4	55335	500-YR	19800.00	5352.20	5367.69	5366.65	5368.79	0.00	10.12	3386.34	1686.98	0.55
Reach_4	55335	100-YR	9500.00	5352.20	5366.60	5362.95	5367.04	0.00	6.12	2561.07	962.97	0.35
Reach_4	55335	50-YR	7500.00	5352.20	5365.64	5362.03	5366.11	0.00	6.00	1944.86	803.42	0.36
Reach_4	55335	10-YR	3500.00	5352.20	5361.90	5359.97	5362.46	0.00	6.02	582.59	122.54	0.48
Reach_4	55328 Kipling St		Bridge									

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_4	55239	500-YR	19800.00	5351.70	5367.34	5366.79	5368.65	0.00	10.66	2978.32	1529.72	0.58
Reach_4	55239	100-YR	9500.00	5351.70	5365.41	5362.50	5366.29	0.00	7.97	1644.36	711.40	0.48
Reach_4	55239	50-YR	7500.00	5351.70	5363.83	5361.66	5364.97	0.00	8.58	893.18	237.32	0.57
Reach_4	55239	10-YR	3500.00	5351.70	5361.37	5359.57	5361.96	0.00	6.17	567.89	124.57	0.51
Reach_4	55224	500-YR	19800.00	5351.85	5367.40	5366.54	5368.51	0.00	10.03	2978.18	1567.04	0.56
Reach_4	55224	100-YR	9500.00	5351.85	5365.40	5362.98	5366.24	0.00	7.92	1647.22	682.33	0.49
Reach_4	55224	50-YR	7500.00	5351.85	5363.16	5362.12	5364.77	0.01	10.21	737.99	131.30	0.74
Reach_4	55224	10-YR	3500.00	5351.85	5360.85	5360.11	5361.80	0.01	7.83	446.86	120.99	0.72
Reach_4	55212 Footbridge		Bridge									
Reach_4	55193	500-YR	19800.00	5352.02	5366.33	5366.33	5367.70	0.00	11.12	2899.84	1214.57	0.64
Reach_4	55193	100-YR	9500.00	5352.02	5362.76	5362.45	5365.27	0.01	12.69	749.36	127.93	0.92
Reach_4	55193	50-YR	7500.00	5352.02	5362.24	5361.61	5364.11	0.01	10.99	682.79	125.96	0.83
Reach_4	55193	10-YR	3500.00	5352.02	5360.53	5359.54	5361.38	0.00	7.42	471.64	120.52	0.66
Reach_4	55123	500-YR	19800.00	5353.50	5364.41	5364.41	5366.12	0.01	12.06	2276.42	822.25	0.77
Reach_4	55123	100-YR	9500.00	5353.50	5362.43	5362.13	5364.07	0.01	10.55	1014.44	357.20	0.78
Reach_4	55123	50-YR	7500.00	5353.50	5361.81	5361.32	5363.21	0.01	9.64	845.20	247.78	0.76
Reach_4	55123	10-YR	3500.00	5353.50	5360.14	5359.23	5360.88	0.01	6.91	506.64	149.14	0.65
Reach_4	54961	500-YR	21100.00	5352.42	5362.23	5362.23	5363.31	0.01	11.95	3374.54	1026.77	0.78
Reach_4	54961	100-YR	10200.00	5352.42	5361.54	5360.92	5362.78	0.00	10.65	1525.59	935.80	0.74
Reach_4	54961	50-YR	8000.00	5352.42	5360.97	5360.36	5362.00	0.00	9.60	1320.79	893.38	0.69
Reach_4	54961	10-YR	3700.00	5352.42	5359.27	5358.33	5359.95	0.00	7.31	723.67	583.99	0.63
Reach_4	54621	500-YR	21100.00	5351.12	5360.01	5360.01	5360.52	0.00	7.68	4109.15	1296.92	0.55
Reach_4	54621	100-YR	10200.00	5351.12	5359.28	5359.12	5360.79	0.01	10.53	1197.63	1221.06	0.80
Reach_4	54621	50-YR	8000.00	5351.12	5358.53	5358.53	5360.01	0.01	10.20	948.64	1115.34	0.83
Reach_4	54621	10-YR	3700.00	5351.12	5356.52	5356.52	5357.83	0.01	9.20	403.16	491.18	0.99
Reach_4	54353	500-YR	21100.00	5348.45	5358.88	5358.01	5359.42	0.00	7.65	4387.04	1457.51	0.49
Reach_4	54353	100-YR	10200.00	5348.45	5356.73	5356.73	5358.62	0.01	11.49	1029.15	884.84	0.88
Reach_4	54353	50-YR	8000.00	5348.45	5356.01	5355.90	5357.69	0.01	10.72	831.86	577.95	0.88
Reach_4	54353	10-YR	3700.00	5348.45	5354.89	5354.02	5355.59	0.00	6.79	578.42	415.37	0.63
Reach_4	54064	500-YR	21100.00	5346.52	5358.59	5356.16	5358.82	0.00	5.63	6537.16	1729.92	0.33
Reach_4	54064	100-YR	10200.00	5346.52	5356.63	5354.69	5356.92	0.00	5.64	2794.99	1179.21	0.38
Reach_4	54064	50-YR	8000.00	5346.52	5356.10	5354.30	5356.34	0.00	5.13	2440.69	1121.93	0.36
Reach_4	54064	10-YR	3700.00	5346.52	5354.57	5353.28	5354.74	0.00	4.05	1425.34	855.60	0.33
Reach_4	54021	500-YR	21100.00	5347.51	5358.46	5356.38	5358.76	0.00	7.34	6556.77	1886.23	0.44
Reach_4	54021	100-YR	10200.00	5347.51	5356.49	5354.86	5356.84	0.00	6.89	2851.46	1152.71	0.47
Reach_4	54021	50-YR	8000.00	5347.51	5355.97	5354.50	5356.27	0.00	6.28	2483.63	1093.93	0.44
Reach_4	54021	10-YR	3700.00	5347.51	5354.45	5353.39	5354.68	0.00	5.05	1458.51	836.28	0.39
Reach_4	54013 Footbridge		Bridge									
Reach_4	54004	500-YR	21100.00	5347.45	5358.18	5356.59	5358.62	0.00	8.61	5294.64	1479.01	0.53
Reach_4	54004	100-YR	10200.00	5347.45	5355.46	5355.08	5356.34	0.00	10.40	2026.19	952.43	0.75
Reach_4	54004	50-YR	8000.00	5347.45	5354.78	5354.60	5355.73	0.00	10.34	1596.20	845.31	0.78
Reach_4	54004	10-YR	3700.00	5347.45	5353.49	5353.49	5354.28	0.00	8.36	878.36	644.45	0.69
Reach_4	53915	500-YR	21100.00	5346.38	5358.09	5355.69	5358.43	0.00	7.00	5744.91	1896.16	0.41
Reach_4	53915	100-YR	10200.00	5346.38	5355.44	5354.32	5355.85	0.00	6.96	2845.90	1049.30	0.48
Reach_4	53915	50-YR	8000.00	5346.38	5354.76	5353.89	5355.19	0.00	6.85	2283.39	956.40	0.50
Reach_4	53915	10-YR	3700.00	5346.38	5353.11	5351.76	5353.57	0.00	6.13	1038.60	676.50	0.52
Reach_4	53751	500-YR	21100.00	5346.17	5357.12	5355.21	5358.09	0.00	7.05	3296.88	1617.07	0.43
Reach_4	53751	100-YR	10200.00	5346.17	5354.91	5353.74	5355.48	0.00	6.15	1991.74	969.78	0.43
Reach_4	53751	50-YR	8000.00	5346.17	5354.30	5353.33	5354.80	0.00	5.99	1663.97	881.14	0.44
Reach_4	53751	10-YR	3700.00	5346.17	5352.59	5351.44	5353.08	0.00	5.99	794.15	809.21	0.53
Reach_4	53431	500-YR	21100.00	5343.42	5354.74	5354.70	5356.83	0.01	15.02	2273.16	1534.08	0.91
Reach_4	53431	100-YR	10200.00	5343.42	5352.69	5352.69	5354.20	0.01	11.98	1359.28	615.46	0.83
Reach_4	53431	50-YR	8000.00	5343.42	5352.13	5352.13	5353.49	0.01	11.06	1123.38	497.48	0.80
Reach_4	53431	10-YR	3700.00	5343.42	5350.34	5350.02	5351.40	0.01	9.04	522.41	198.98	0.78
Reach_4	53268	500-YR	21100.00	5343.11	5354.04	5352.76	5355.32	0.01	11.08	2578.19	1698.72	0.66
Reach_4	53268	100-YR	10200.00	5343.11	5352.27	5350.91	5352.91	0.00	7.69	1830.39	1052.47	0.51
Reach_4	53268	50-YR	8000.00	5343.11	5351.55	5350.40	5352.13	0.00	7.27	1527.20	912.25	0.51
Reach_4	53268	10-YR	3700.00	5343.11	5349.40	5348.55	5350.02	0.01	6.84	677.45	553.61	0.60
Reach_4	53103	500-YR	21100.00	5341.19	5352.59	5352.59	5354.26	0.01	12.69	2701.13	1657.80	0.79
Reach_4	53103	100-YR	10200.00	5341.19	5350.28	5350.28	5351.95	0.01	11.41	1214.16	994.09	0.84
Reach_4	53103	50-YR	8000.00	5341.19	5349.62	5349.62	5351.16	0.01	10.71	981.74	607.56	0.83
Reach_4	53103	10-YR	3700.00	5341.19	5347.74	5347.60	5348.87	0.01	8.75	485.74	197.54	0.85
Reach_4	52630	500-YR	21100.00	5339.20	5350.08	5349.16	5351.44	0.00	10.98	2928.38	1492.18	0.70

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_4	52630	100-YR	10200.00	5339.20	5348.16	5346.97	5349.02	0.00	8.22	1717.58	537.19	0.61
Reach_4	52630	50-YR	8000.00	5339.20	5347.35	5346.53	5348.20	0.00	8.00	1367.06	515.02	0.64
Reach_4	52630	10-YR	3700.00	5339.20	5345.40	5345.01	5346.12	0.00	6.99	631.77	311.57	0.72
Reach_4	52143	500-YR	21100.00	5335.90	5348.61	5347.51	5349.46	0.00	9.64	3952.26	1509.87	0.57
Reach_4	52143	100-YR	10200.00	5335.90	5346.65	5345.16	5347.43	0.00	8.20	1786.38	975.17	0.55
Reach_4	52143	50-YR	8000.00	5335.90	5345.72	5344.50	5346.48	0.00	7.87	1449.98	554.41	0.56
Reach_4	52143	10-YR	3700.00	5335.90	5343.41	5342.72	5344.11	0.00	7.02	675.92	277.84	0.64
Reach_4	51703	500-YR	21100.00	5334.34	5347.17	5346.75	5348.09	0.00	10.39	3794.10	1410.68	0.59
Reach_4	51703	100-YR	10200.00	5334.34	5344.02	5343.42	5345.63	0.01	11.59	1230.42	288.96	0.80
Reach_4	51703	50-YR	8000.00	5334.34	5343.21	5342.72	5344.64	0.01	10.80	1030.43	274.53	0.79
Reach_4	51703	10-YR	3700.00	5334.34	5341.31	5340.96	5342.27	0.00	8.42	593.95	219.98	0.75
Reach_4	51250	500-YR	21100.00	5333.05	5345.62	5344.17	5346.81	0.00	11.63	3897.11	1573.19	0.63
Reach_4	51250	100-YR	10200.00	5333.05	5341.92	5341.18	5343.37	0.00	11.33	1418.88	289.64	0.75
Reach_4	51250	50-YR	8000.00	5333.05	5341.09	5340.52	5342.39	0.00	10.56	1181.23	283.97	0.75
Reach_4	51250	10-YR	3700.00	5333.05	5338.82	5338.60	5339.96	0.01	9.17	568.22	244.88	0.81
Reach_4	50912	500-YR	21100.00	5330.49	5343.95	5342.20	5345.71	0.00	13.19	3008.47	1367.10	0.69
Reach_4	50912	100-YR	10200.00	5330.49	5340.81	5339.26	5342.00	0.00	10.08	1450.67	268.23	0.63
Reach_4	50912	50-YR	8000.00	5330.49	5340.15	5338.51	5341.08	0.00	8.85	1277.28	251.76	0.57
Reach_4	50912	10-YR	3700.00	5330.49	5338.09	5336.54	5338.60	0.00	6.31	794.77	222.50	0.48
Reach_4	50437	500-YR	21100.00	5329.41	5343.56	5340.43	5344.19	0.00	8.07	3954.29	1117.26	0.42
Reach_4	50437	100-YR	10200.00	5329.41	5339.56	5337.99	5340.36	0.00	8.33	1664.10	373.79	0.53
Reach_4	50437	50-YR	8000.00	5329.41	5339.13	5337.46	5339.73	0.00	7.14	1512.44	349.14	0.47
Reach_4	50437	10-YR	3700.00	5329.41	5337.10	5335.85	5337.50	0.00	5.59	867.98	303.55	0.43
Reach_4	50170	500-YR	21100.00	5329.14	5343.02	5339.52	5343.77	0.00	9.07	3322.74	867.27	0.46
Reach_4	50170	100-YR	10200.00	5329.14	5338.93	5337.63	5339.65	0.00	8.70	1803.41	543.61	0.54
Reach_4	50170	50-YR	8000.00	5329.14	5338.69	5337.10	5339.18	0.00	7.23	1710.90	528.78	0.45
Reach_4	50170	10-YR	3700.00	5329.14	5335.47	5334.93	5336.58	0.01	9.29	564.60	279.09	0.75
Reach_4	50078	500-YR	21100.00	5328.01	5342.30	5338.66	5343.56	0.00	9.55	3050.77	990.93	0.49
Reach_4	50078	100-YR	10200.00	5328.01	5338.48	5335.51	5339.41	0.00	7.74	1342.63	193.67	0.49
Reach_4	50078	50-YR	8000.00	5328.01	5338.45	5334.66	5339.03	0.00	6.09	1337.81	193.42	0.38
Reach_4	50078	10-YR	3700.00	5328.01	5335.84	5332.69	5336.12	0.00	4.27	870.43	169.76	0.33
Reach_4	50073 44th Ave		Bridge									
Reach_4	49993	500-YR	21100.00	5326.80	5338.80	5338.15	5342.04	0.01	14.46	1472.16	204.85	0.87
Reach_4	49993	100-YR	10200.00	5326.80	5337.44	5335.02	5338.52	0.00	8.34	1231.80	183.28	0.55
Reach_4	49993	50-YR	8000.00	5326.80	5337.18	5334.20	5337.90	0.00	6.78	1187.20	181.49	0.45
Reach_4	49993	10-YR	3700.00	5326.80	5335.20	5332.30	5335.50	0.00	4.39	844.12	166.19	0.34
Reach_4	49812	500-YR	21100.00	5327.34	5338.09	5338.09	5340.18	0.01	13.66	2266.34	978.02	0.86
Reach_4	49812	100-YR	10200.00	5327.34	5336.21	5336.21	5337.65	0.01	10.60	1350.78	705.92	0.76
Reach_4	49812	50-YR	8000.00	5327.34	5335.36	5335.36	5336.96	0.01	10.73	947.63	455.85	0.83
Reach_4	49812	10-YR	3700.00	5327.34	5334.23	5333.16	5334.96	0.00	6.96	589.49	290.87	0.61
Reach_4	49640	500-YR	21100.00	5326.96	5336.84	5336.84	5338.82	0.01	15.05	2491.54	946.80	0.92
Reach_4	49640	100-YR	10200.00	5326.96	5335.00	5335.00	5336.39	0.00	11.74	1527.22	704.82	0.82
Reach_4	49640	50-YR	8000.00	5326.96	5334.52	5334.52	5335.75	0.00	10.75	1288.88	663.84	0.78
Reach_4	49640	10-YR	3700.00	5326.96	5332.68	5332.08	5334.06	0.01	9.93	477.15	302.68	0.86
Reach_4	49591	500-YR	21100.00	5327.20	5335.99	5335.99	5338.14	0.01	15.38	2418.30	1023.43	1.02
Reach_4	49591	100-YR	10200.00	5327.20	5334.54	5334.54	5335.89	0.01	11.36	1474.94	634.68	0.85
Reach_4	49591	50-YR	8000.00	5327.20	5334.04	5334.04	5335.26	0.01	10.53	1235.21	549.60	0.82
Reach_4	49591	10-YR	3700.00	5327.20	5332.74	5332.74	5333.66	0.00	8.32	634.80	438.91	0.75
Reach_4	49530	500-YR	21100.00	5320.03	5334.81	5334.81	5337.05	0.00	13.80	2514.72	590.30	0.72
Reach_4	49530	100-YR	10200.00	5320.03	5332.16	5330.72	5333.99	0.00	11.17	1128.08	422.53	0.67
Reach_4	49530	50-YR	8000.00	5320.03	5331.43	5329.34	5332.89	0.00	9.84	910.64	238.42	0.61
Reach_4	49530	10-YR	3700.00	5320.03	5329.20	5326.51	5329.85	0.00	6.51	569.61	106.54	0.48
Reach_4	49418	500-YR	21100.00	5320.13	5334.13	5334.13	5336.01	0.00	13.67	2745.04	831.66	0.72
Reach_4	49418	100-YR	10200.00	5320.13	5331.65	5331.65	5333.56	0.00	11.97	1224.30	486.02	0.71
Reach_4	49418	50-YR	8000.00	5320.13	5330.49	5330.10	5332.42	0.01	11.65	835.65	203.41	0.75
Reach_4	49418	10-YR	3700.00	5320.13	5328.64	5326.83	5329.55	0.00	7.71	513.92	140.65	0.57
Reach_4	49071	500-YR	21100.00	5317.94	5332.78	5332.78	5334.45	0.00	13.91	3140.70	972.00	0.71
Reach_4	49071	100-YR	10200.00	5317.94	5329.70	5329.70	5331.84	0.00	13.33	1169.70	417.77	0.79
Reach_4	49071	50-YR	8000.00	5317.94	5328.76	5328.76	5330.77	0.00	12.54	907.60	227.17	0.78
Reach_4	49071	10-YR	3700.00	5317.94	5325.17	5325.17	5327.70	0.01	12.76	290.04	56.44	0.99
Reach_4	48477	500-YR	21100.00	5316.29	5331.60	5328.05	5331.89	0.00	5.77	5953.93	1457.17	0.29
Reach_4	48477	100-YR	10200.00	5316.29	5329.83	5325.12	5329.98	0.00	3.90	4302.60	1229.37	0.21
Reach_4	48477	50-YR	8000.00	5316.29	5328.50	5324.49	5328.68	0.00	4.17	3077.22	917.69	0.25
Reach_4	48477	10-YR	3700.00	5316.29	5324.50	5322.16	5324.85	0.00	5.05	866.74	261.02	0.40

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_4	48066	500-YR	21100.00	5314.01	5331.16	5328.42	5331.55	0.00	7.15	5899.64	1125.37	0.33
Reach_4	48066	100-YR	10200.00	5314.01	5329.50	5324.35	5329.77	0.00	5.28	3487.45	1119.86	0.26
Reach_4	48066	50-YR	8000.00	5314.01	5327.99	5323.59	5328.38	0.00	5.87	2040.91	946.79	0.31
Reach_4	48066	10-YR	3700.00	5314.01	5323.81	5321.45	5324.20	0.00	5.50	847.80	194.22	0.37
Reach_4	48004	500-YR	21100.00	5314.16	5330.58	5329.67	5331.43	0.00	10.25	4874.49	1116.81	0.48
Reach_4	48004	100-YR	10200.00	5314.16	5329.09	5325.32	5329.69	0.00	7.55	2781.41	1112.27	0.37
Reach_4	48004	50-YR	8000.00	5314.16	5325.63	5323.94	5328.08	0.00	12.58	642.27	158.79	0.73
Reach_4	48004	10-YR	3700.00	5314.16	5323.00	5320.58	5324.03	0.00	8.14	454.59	112.02	0.55
Reach_4	47996 Footbridge		Bridge									
Reach_4	47979	500-YR	21100.00	5314.16	5329.48	5329.48	5330.84	0.00	12.22	3750.30	1125.15	0.61
Reach_4	47979	100-YR	10200.00	5314.16	5326.38	5325.30	5328.69	0.00	12.83	962.05	261.43	0.74
Reach_4	47979	50-YR	8000.00	5314.16	5325.91	5324.09	5327.55	0.00	10.76	867.90	156.85	0.64
Reach_4	47979	10-YR	3700.00	5314.16	5322.87	5320.49	5323.95	0.00	8.35	442.92	103.75	0.57
Reach_4	47862	500-YR	21100.00	5313.16	5328.67	5328.12	5329.68	0.00	11.05	4230.57	1128.10	0.54
Reach_4	47862	100-YR	10200.00	5313.16	5326.23	5324.31	5327.39	0.00	9.99	1695.92	739.67	0.54
Reach_4	47862	50-YR	8000.00	5313.16	5325.76	5323.32	5326.67	0.00	8.67	1421.10	654.56	0.48
Reach_4	47862	10-YR	3700.00	5313.16	5322.67	5320.16	5323.35	0.00	6.93	651.94	160.74	0.45
Reach_4	47719	500-YR	21100.00	5312.85	5327.54	5327.54	5329.24	0.00	13.91	3195.61	1032.58	0.70
Reach_4	47719	100-YR	10200.00	5312.85	5325.64	5325.64	5327.01	0.00	10.95	1768.16	911.26	0.59
Reach_4	47719	50-YR	8000.00	5312.85	5324.41	5322.88	5326.22	0.00	11.58	958.28	450.45	0.67
Reach_4	47719	10-YR	3700.00	5312.85	5322.22	5320.07	5323.04	0.00	7.54	566.06	112.84	0.50
Reach_4	47490	500-YR	21100.00	5312.19	5327.00	5326.01	5327.71	0.00	9.43	3985.14	945.09	0.49
Reach_4	47490	100-YR	10200.00	5312.19	5325.10	5324.58	5325.96	0.00	8.89	1898.47	935.01	0.50
Reach_4	47490	50-YR	8000.00	5312.19	5324.34	5324.03	5325.28	0.00	8.77	1460.42	897.37	0.52
Reach_4	47490	10-YR	3700.00	5312.19	5321.52	5319.35	5322.44	0.00	7.67	487.13	93.56	0.55
Reach_4	46985	500-YR	21100.00	5310.89	5324.29	5324.29	5325.85	0.01	12.25	2604.48	673.02	0.69
Reach_4	46985	100-YR	10200.00	5310.89	5322.26	5322.26	5323.93	0.01	11.01	1200.45	545.30	0.69
Reach_4	46985	50-YR	8000.00	5310.89	5320.81	5320.58	5322.84	0.01	11.66	769.85	192.71	0.81
Reach_4	46985	10-YR	3700.00	5310.89	5318.72	5317.82	5319.81	0.01	8.40	441.94	113.10	0.72
Reach_4	46532	500-YR	21100.00	5308.92	5322.39	5321.25	5323.34	0.00	9.29	3420.76	830.69	0.54
Reach_4	46532	100-YR	10200.00	5308.92	5319.91	5319.18	5320.87	0.00	8.39	1690.63	651.99	0.58
Reach_4	46532	50-YR	8000.00	5308.92	5318.96	5317.63	5320.05	0.00	8.54	1112.88	550.44	0.63
Reach_4	46532	10-YR	3700.00	5308.92	5316.50	5315.51	5317.30	0.00	7.19	514.33	171.38	0.67
Reach_4	46171	500-YR	21100.00	5307.87	5320.84	5320.23	5322.29	0.00	12.21	2905.76	681.86	0.66
Reach_4	46171	100-YR	10200.00	5307.87	5317.91	5317.63	5319.54	0.00	11.45	1315.82	424.96	0.73
Reach_4	46171	50-YR	8000.00	5307.87	5317.17	5316.54	5318.63	0.00	10.58	1040.29	313.30	0.71
Reach_4	46171	10-YR	3700.00	5307.87	5315.30	5314.10	5316.10	0.00	7.48	606.45	178.28	0.58
Reach_4	45604	500-YR	21100.00	5306.68	5320.41	5317.47	5320.93	0.00	7.38	4626.47	771.65	0.41
Reach_4	45604	100-YR	10200.00	5306.68	5316.67	5315.30	5317.48	0.00	8.06	1802.61	604.74	0.56
Reach_4	45604	50-YR	8000.00	5306.68	5315.75	5314.70	5316.54	0.00	7.80	1439.56	458.76	0.58
Reach_4	45604	10-YR	3700.00	5306.68	5313.83	5312.52	5314.42	0.00	6.37	727.16	345.89	0.58
Reach_4	45311	500-YR	21100.00	5307.12	5319.59	5316.07	5320.46	0.00	9.08	3082.23	762.84	0.48
Reach_4	45311	100-YR	10200.00	5307.12	5316.08	5314.10	5316.74	0.00	7.73	1737.10	653.03	0.50
Reach_4	45311	50-YR	8000.00	5307.12	5315.12	5313.57	5315.72	0.00	7.35	1436.66	583.43	0.51
Reach_4	45311	10-YR	3700.00	5307.12	5312.24	5312.24	5313.19	0.01	8.55	570.73	374.64	0.80
Reach_4	45243	500-YR	21100.00	5306.09	5318.19	5317.08	5320.16	0.00	12.52	2124.71	689.10	0.68
Reach_4	45243	100-YR	10200.00	5306.09	5314.16	5314.16	5316.32	0.01	12.22	971.21	474.71	0.85
Reach_4	45243	50-YR	8000.00	5306.09	5313.21	5313.21	5315.28	0.01	11.73	751.35	303.05	0.89
Reach_4	45243	10-YR	3700.00	5306.09	5310.84	5310.84	5312.39	0.01	9.96	371.31	119.77	1.00
Reach_4	45140	500-YR	21100.00	5300.00	5318.18	5312.73	5319.81	0.00	10.47	2188.14	481.86	0.48
Reach_4	45140	100-YR	10200.00	5300.00	5311.28	5309.08	5312.75	0.00	9.78	1067.89	144.57	0.61
Reach_4	45140	50-YR	8000.00	5300.00	5310.23	5308.19	5311.44	0.00	8.84	918.95	140.19	0.59
Reach_4	45140	10-YR	3700.00	5300.00	5307.95	5305.67	5308.52	0.00	6.09	608.99	128.66	0.49
Reach_4	45093 Wadsworth Blvd		Bridge									
Reach_4	45000	500-YR	21100.00	5299.16	5315.99		5318.02	0.00	12.11	2056.13	154.29	0.53
Reach_4	45000	100-YR	10200.00	5299.16	5309.19		5311.00	0.00	11.06	1028.08	145.54	0.64
Reach_4	45000	50-YR	8000.00	5299.16	5307.42		5309.27	0.00	11.06	779.35	136.31	0.72
Reach_4	45000	10-YR	3700.00	5299.16	5304.00		5305.48	0.01	9.79	379.43	99.90	0.87
Reach_4	44988	500-YR	21100.00	5297.00	5314.65	5311.29	5317.70	0.00	14.89	1723.48	128.07	0.65
Reach_4	44988	100-YR	10200.00	5297.00	5308.67	5306.81	5310.85	0.00	12.24	959.99	127.26	0.67
Reach_4	44988	50-YR	8000.00	5297.00	5307.34	5305.51	5309.21	0.00	11.25	792.22	118.58	0.66
Reach_4	44988	10-YR	3700.00	5297.00	5304.15	5302.61	5305.23	0.00	8.40	457.59	92.52	0.61
Reach_4	44948 I-70 Access Ramp		Bridge									

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_4	44913	500-YR	21100.00	5296.96	5313.37	5310.66	5316.33	0.00	14.93	1745.66	154.95	0.67
Reach_4	44913	100-YR	10200.00	5296.96	5306.34	5306.15	5309.64	0.01	14.99	762.98	121.37	0.91
Reach_4	44913	50-YR	8000.00	5296.96	5305.02	5305.02	5308.04	0.01	14.21	614.87	107.51	0.94
Reach_4	44913	10-YR	3700.00	5296.96	5302.15	5302.15	5304.16	0.01	11.41	329.87	86.63	0.97
Reach_4	44826	500-YR	21100.00	5296.00	5313.60		5315.71	0.00	13.89	2413.02	185.92	0.59
Reach_4	44826	100-YR	10200.00	5296.00	5306.65		5308.61	0.00	12.72	1198.43	163.58	0.70
Reach_4	44826	50-YR	8000.00	5296.00	5304.91		5306.94	0.00	12.66	918.66	157.35	0.76
Reach_4	44826	10-YR	3700.00	5296.00	5301.31	5301.26	5303.09	0.01	11.31	422.18	125.00	0.89
Reach_4	44692	500-YR	21100.00	5292.21	5313.80		5315.27	0.00	11.53	2568.71	195.39	0.47
Reach_4	44692	100-YR	10200.00	5292.21	5306.66		5308.02	0.00	10.58	1299.41	161.11	0.55
Reach_4	44692	50-YR	8000.00	5292.21	5304.83		5306.23	0.00	10.53	1009.32	155.40	0.60
Reach_4	44692	10-YR	3700.00	5292.21	5300.87	5300.20	5302.07	0.01	9.33	485.72	124.54	0.70
Reach_4	44466	500-YR	21100.00	5290.63	5308.19	5308.19	5314.11	0.01	20.89	1321.21	122.93	0.94
Reach_4	44466	100-YR	10200.00	5290.63	5302.55	5302.55	5306.72	0.01	17.03	708.52	91.05	0.96
Reach_4	44466	50-YR	8000.00	5290.63	5301.24	5301.24	5304.84	0.01	15.69	591.62	88.49	0.95
Reach_4	44466	10-YR	3700.00	5290.63	5298.03	5298.03	5300.38	0.01	12.38	317.66	81.50	0.95
Reach_4	44185	500-YR	21100.00	5288.67	5306.37		5309.42	0.00	15.54	1837.94	186.66	0.70
Reach_4	44185	100-YR	10200.00	5288.67	5300.43	5299.47	5303.31	0.01	14.24	869.94	142.32	0.82
Reach_4	44185	50-YR	8000.00	5288.67	5299.15	5298.47	5301.57	0.01	12.98	712.96	113.36	0.80
Reach_4	44185	10-YR	3700.00	5288.67	5295.74	5295.36	5297.66	0.01	11.14	344.99	102.53	0.88
Reach_4	43824	500-YR	21100.00	5286.16	5306.10		5308.14	0.00	12.44	2324.57	255.13	0.53
Reach_4	43824	100-YR	10200.00	5286.16	5299.63		5301.52	0.00	11.26	1018.21	131.68	0.61
Reach_4	43824	50-YR	8000.00	5286.16	5298.16		5299.82	0.00	10.46	831.77	121.57	0.62
Reach_4	43824	10-YR	3700.00	5286.16	5294.67		5295.67	0.00	8.04	473.27	96.06	0.61
Reach_4	43444	500-YR	21100.00	5284.40	5306.09		5307.23	0.00	9.53	3023.53	306.46	0.40
Reach_4	43444	100-YR	10200.00	5284.40	5298.78		5300.26	0.00	9.84	1106.71	152.08	0.54
Reach_4	43444	50-YR	8000.00	5284.40	5297.21		5298.51	0.00	9.18	898.67	123.98	0.54
Reach_4	43444	10-YR	3700.00	5284.40	5293.44		5294.30	0.00	7.44	497.07	93.99	0.57
Reach_4	43235	500-YR	21100.00	5283.62	5306.37	5298.17	5306.82	0.00	7.44	5155.68	505.31	0.29
Reach_4	43235	100-YR	10200.00	5283.62	5298.36	5295.17	5299.61	0.00	10.23	1337.81	350.51	0.50
Reach_4	43235	50-YR	8000.00	5283.62	5296.59	5293.57	5297.84	0.00	10.01	1038.81	158.87	0.53
Reach_4	43235	10-YR	3700.00	5283.62	5292.44	5290.96	5293.42	0.00	8.53	515.59	102.79	0.57
Reach_4	43134	500-YR	21100.00	5281.80	5305.21	5298.63	5306.64	0.00	11.25	2685.46	477.62	0.43
Reach_4	43134	100-YR	10200.00	5281.80	5298.27	5293.77	5299.44	0.00	9.58	1454.32	228.80	0.45
Reach_4	43134	50-YR	8000.00	5281.80	5296.55	5292.35	5297.63	0.00	9.03	1168.20	159.26	0.45
Reach_4	43134	10-YR	3700.00	5281.80	5292.47	5289.22	5293.15	0.00	6.89	618.82	99.94	0.42
Reach_4	43051 I-70 EB Access		Bridge									
Reach_4	43039	500-YR	21100.00	5281.80	5304.84	5296.01	5305.77	0.00	7.99	2943.56	210.18	0.33
Reach_4	43039	100-YR	10200.00	5281.80	5297.26	5292.38	5298.02	0.00	7.07	1528.16	179.86	0.38
Reach_4	43039	50-YR	8000.00	5281.80	5295.64	5291.47	5296.31	0.00	6.61	1250.89	160.96	0.39
Reach_4	43039	10-YR	3700.00	5281.80	5291.84	5288.80	5292.28	0.00	5.35	697.28	137.23	0.41
Reach_4	43009	500-YR	21100.00	5281.80	5304.85	5297.46	5305.71	0.00	8.99	3239.69	265.68	0.35
Reach_4	43009	100-YR	10200.00	5281.80	5296.71	5293.00	5297.87	0.00	9.60	1397.37	184.77	0.48
Reach_4	43009	50-YR	8000.00	5281.80	5295.18	5292.06	5296.18	0.00	8.81	1144.78	153.11	0.47
Reach_4	43009	10-YR	3700.00	5281.80	5291.44	5289.05	5292.15	0.00	7.11	616.14	130.27	0.46
Reach_4	42988	500-YR	21100.00	5283.30	5304.83	5295.92	5305.70	0.00	7.72	3021.85	314.01	0.32
Reach_4	42988	100-YR	10200.00	5283.30	5296.86	5292.35	5297.66	0.00	7.25	1468.02	174.03	0.41
Reach_4	42988	50-YR	8000.00	5283.30	5295.29	5291.46	5296.01	0.00	6.80	1205.79	161.82	0.41
Reach_4	42988	10-YR	3700.00	5283.30	5291.51	5288.80	5292.02	0.00	5.73	645.55	134.27	0.46
Reach_4	42940 I-70 EB		Bridge									
Reach_4	42877	500-YR	21100.00	5283.27	5303.43	5295.81	5304.65	0.00	9.22	2582.33	206.82	0.39
Reach_4	42877	100-YR	10200.00	5283.27	5296.07	5291.84	5297.07	0.00	8.12	1312.68	148.20	0.45
Reach_4	42877	50-YR	8000.00	5283.27	5294.43	5290.71	5295.33	0.00	7.66	1078.06	139.14	0.46
Reach_4	42877	10-YR	3700.00	5283.27	5290.61	5288.17	5291.23	0.00	6.27	589.83	106.99	0.47
Reach_4	42676	500-YR	21100.00	5281.70	5303.26	5296.16	5304.37	0.00	9.22	2884.46	646.79	0.38
Reach_4	42676	100-YR	10200.00	5281.70	5295.22	5291.78	5296.54	0.00	9.40	1171.01	143.63	0.51
Reach_4	42676	50-YR	8000.00	5281.70	5293.51	5290.59	5294.74	0.00	8.99	937.15	131.97	0.53
Reach_4	42676	10-YR	3700.00	5281.70	5289.59	5288.13	5290.49	0.00	7.63	486.47	99.06	0.60
Reach_4	42499	500-YR	21100.00	5280.30	5303.04	5294.46	5304.17	0.00	9.15	2741.55	266.22	0.36
Reach_4	42499	100-YR	10200.00	5280.30	5295.02	5290.12	5296.02	0.00	8.27	1360.95	146.16	0.42
Reach_4	42499	50-YR	8000.00	5280.30	5293.28	5288.90	5294.17	0.00	7.75	1115.00	136.93	0.42
Reach_4	42499	10-YR	3700.00	5280.30	5289.22	5286.18	5289.81	0.00	6.13	607.18	101.58	0.43
Reach_4	42456 I-70 WB		Bridge									

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_4	42415	500-YR	21100.00	5280.30	5300.67	5294.14	5302.28	0.00	10.81	2282.65	184.85	0.45
Reach_4	42415	100-YR	10200.00	5280.30	5294.43	5289.92	5295.49	0.00	8.53	1322.11	139.32	0.43
Reach_4	42415	50-YR	8000.00	5280.30	5292.71	5288.80	5293.65	0.00	8.01	1087.28	132.91	0.44
Reach_4	42415	10-YR	3700.00	5280.30	5288.77	5285.98	5289.39	0.00	6.34	599.55	113.79	0.44
Reach_4	42287	500-YR	21100.00	5279.59	5300.91	5292.79	5301.73	0.00	7.77	3118.55	444.92	0.33
Reach_4	42287	100-YR	10200.00	5279.59	5294.42	5289.57	5295.11	0.00	6.86	1646.82	259.00	0.37
Reach_4	42287	50-YR	8000.00	5279.59	5292.63	5288.65	5293.28	0.00	6.60	1286.82	173.89	0.39
Reach_4	42287	10-YR	3700.00	5279.59	5288.48	5286.29	5289.02	0.00	5.91	628.52	133.97	0.47
Reach_4	42165	500-YR	21100.00	5278.80	5300.28	5292.79	5301.49	0.00	9.59	2629.16	354.86	0.39
Reach_4	42165	100-YR	10200.00	5278.80	5294.14	5288.78	5294.92	0.00	7.56	1561.95	169.52	0.37
Reach_4	42165	50-YR	8000.00	5278.80	5292.37	5287.81	5293.08	0.00	7.14	1276.57	155.08	0.38
Reach_4	42165	10-YR	3700.00	5278.80	5288.25	5285.17	5288.73	0.00	5.73	700.91	127.54	0.39
Reach_4	42126 I-70 Exit Ramp		Bridge									
Reach_4	42105	500-YR	21100.00	5278.80	5297.40	5292.92	5299.16	0.00	11.64	2154.83	192.72	0.51
Reach_4	42105	100-YR	10200.00	5278.80	5293.68	5288.70	5294.52	0.00	7.88	1531.34	168.20	0.39
Reach_4	42105	50-YR	8000.00	5278.80	5291.93	5287.71	5292.69	0.00	7.46	1249.67	155.44	0.40
Reach_4	42105	10-YR	3700.00	5278.80	5287.82	5285.09	5288.36	0.00	6.08	670.47	128.70	0.41
Reach_4	41978	500-YR	21100.00	5278.86	5297.45	5292.28	5298.61	0.00	9.61	2750.71	1020.88	0.44
Reach_4	41978	100-YR	10200.00	5278.86	5293.54	5289.04	5294.28	0.00	7.34	1605.49	772.51	0.39
Reach_4	41978	50-YR	8000.00	5278.86	5291.76	5287.61	5292.44	0.00	6.96	1270.46	566.26	0.41
Reach_4	41978	10-YR	3700.00	5278.86	5287.28	5285.77	5287.97	0.00	6.82	569.53	128.89	0.55
Reach_4	41773	500-YR	21100.00	5278.31	5297.50	5291.08	5298.21	0.00	8.31	3767.24	809.45	0.36
Reach_4	41773	100-YR	10200.00	5278.31	5293.33	5287.47	5293.99	0.00	7.29	1808.85	734.72	0.36
Reach_4	41773	50-YR	8000.00	5278.31	5291.57	5286.57	5292.12	0.00	6.52	1449.46	463.76	0.35
Reach_4	41773	10-YR	3700.00	5278.31	5286.95	5284.51	5287.39	0.00	5.71	737.24	137.98	0.41
Reach_4	41417	500-YR	21100.00	5276.82	5297.25	5289.66	5297.87	0.00	7.19	3955.33	613.69	0.31
Reach_4	41417	100-YR	10200.00	5276.82	5293.22	5286.19	5293.61	0.00	5.38	2300.28	422.49	0.26
Reach_4	41417	50-YR	8000.00	5276.82	5291.35	5285.35	5291.76	0.00	5.30	1699.93	277.06	0.28
Reach_4	41417	10-YR	3700.00	5276.82	5286.54	5283.18	5286.85	0.00	4.55	853.43	153.68	0.32
Reach_4	41357	500-YR	21100.00	5275.84	5296.72	5288.78	5297.78	0.00	8.30	2783.07	445.53	0.36
Reach_4	41357	100-YR	10200.00	5275.84	5293.16	5285.33	5293.59	0.00	5.17	1986.34	205.14	0.25
Reach_4	41357	50-YR	8000.00	5275.84	5291.36	5284.49	5291.71	0.00	4.73	1702.47	181.74	0.25
Reach_4	41357	10-YR	3700.00	5275.84	5286.54	5282.49	5286.78	0.00	3.89	951.10	150.03	0.27
Reach_4	41314 Marshall St		Bridge									
Reach_4	41282	500-YR	21100.00	5274.85	5293.07		5294.83	0.00	10.69	1999.04	411.50	0.53
Reach_4	41282	100-YR	10200.00	5274.85	5292.21		5292.69	0.00	5.55	1859.82	264.95	0.28
Reach_4	41282	50-YR	8000.00	5274.85	5290.86		5291.24	0.00	4.93	1641.34	209.36	0.27
Reach_4	41282	10-YR	3700.00	5274.85	5286.34		5286.59	0.00	4.04	914.92	153.39	0.29
Reach_4	41139	500-YR	21100.00	5276.16	5293.27	5292.01	5294.11	0.00	9.69	3649.17	735.87	0.45
Reach_4	41139	100-YR	10200.00	5276.16	5290.72	5288.56	5292.22	0.00	10.53	1261.29	556.11	0.54
Reach_4	41139	50-YR	8000.00	5276.16	5289.47	5286.31	5290.80	0.00	9.73	1002.65	430.47	0.52
Reach_4	41139	10-YR	3700.00	5276.16	5285.05	5283.15	5286.15	0.00	8.45	443.65	74.85	0.59
Reach_4	41025	500-YR	21100.00	5276.10	5292.09	5292.09	5293.80	0.00	13.90	3238.98	782.30	0.65
Reach_4	41025	100-YR	10200.00	5276.10	5289.30	5289.30	5291.81	0.00	13.63	1057.47	509.71	0.71
Reach_4	41025	50-YR	8000.00	5276.10	5286.44	5286.44	5290.16	0.01	15.80	560.93	85.46	0.95
Reach_4	41025	10-YR	3700.00	5276.10	5283.07	5283.07	5285.46	0.01	12.47	308.21	67.44	0.97
Reach_4	40947	500-YR	21100.00	5273.35	5290.12	5290.12	5292.57	0.01	14.94	2496.06	730.72	0.72
Reach_4	40947	100-YR	10200.00	5273.35	5286.78	5285.45	5289.73	0.01	13.94	838.01	255.10	0.78
Reach_4	40947	50-YR	8000.00	5273.35	5285.81	5284.07	5288.17	0.01	12.35	659.28	86.99	0.72
Reach_4	40947	10-YR	3700.00	5273.35	5282.95	5280.70	5284.03	0.00	8.33	444.22	68.50	0.58
Reach_4	40883	500-YR	21100.00	5273.48	5289.29	5289.29	5291.19	0.00	15.11	2850.78	755.23	0.70
Reach_4	40883	100-YR	10200.00	5273.48	5286.71	5286.71	5288.47	0.00	12.76	1436.13	424.79	0.66
Reach_4	40883	50-YR	8000.00	5273.48	5285.57	5285.57	5287.53	0.00	12.69	996.63	335.65	0.69
Reach_4	40883	10-YR	3700.00	5273.48	5280.83	5280.83	5283.24	0.01	12.88	327.41	74.27	0.94
Reach_4	40434	500-YR	21100.00	5271.12	5286.56	5284.64	5287.35	0.00	10.08	3939.45	828.94	0.49
Reach_4	40434	100-YR	10200.00	5271.12	5283.48	5282.24	5284.32	0.00	9.24	2022.48	517.78	0.51
Reach_4	40434	50-YR	8000.00	5271.12	5282.42	5281.35	5283.36	0.00	9.31	1497.09	461.62	0.55
Reach_4	40434	10-YR	3700.00	5271.12	5279.77	5278.32	5280.64	0.00	7.98	603.14	211.22	0.56
Reach_4	40002	500-YR	21100.00	5270.50	5285.96	5283.17	5286.71	0.00	9.56	3946.28	825.27	0.47
Reach_4	40002	100-YR	10200.00	5270.50	5282.92	5280.93	5283.57	0.00	8.08	1974.12	414.27	0.45
Reach_4	40002	50-YR	8000.00	5270.50	5281.81	5279.90	5282.48	0.00	7.92	1588.46	370.08	0.47
Reach_4	40002	10-YR	3700.00	5270.50	5278.38	5277.61	5279.37	0.00	8.48	537.66	202.78	0.65
Reach_4	39601	500-YR	21100.00	5267.74	5283.91	5283.91	5285.79	0.00	13.41	2902.67	756.20	0.65
Reach_4	39601	100-YR	10200.00	5267.74	5279.77	5279.77	5282.36	0.00	13.51	942.56	205.58	0.80

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_4	39601	50-YR	8000.00	5267.74	5278.37	5278.37	5281.09	0.01	13.43	665.20	172.58	0.86
Reach_4	39601	10-YR	3700.00	5267.74	5274.83	5274.83	5277.04	0.01	11.91	310.57	69.40	0.99
Reach_4	39183	500-YR	21100.00	5261.27	5282.33	5282.33	5284.30	0.00	13.49	2984.13	704.34	0.56
Reach_4	39183	100-YR	10200.00	5261.27	5275.43	5273.99	5279.17	0.01	15.55	666.81	66.30	0.81
Reach_4	39183	50-YR	8000.00	5261.27	5274.11		5277.08	0.01	13.82	582.90	61.79	0.77
Reach_4	39183	10-YR	3700.00	5261.27	5270.40		5271.97	0.01	10.06	367.87	54.28	0.68
Reach_4	38688	500-YR	21100.00	5259.49	5278.91	5278.91	5280.93	0.00	13.34	2945.68	800.27	0.58
Reach_4	38688	100-YR	10200.00	5259.49	5272.70	5271.42	5275.96	0.01	14.52	715.39	80.65	0.80
Reach_4	38688	50-YR	8000.00	5259.49	5271.38	5270.02	5274.06	0.01	13.13	613.32	74.29	0.78
Reach_4	38688	10-YR	3700.00	5259.49	5267.94	5266.61	5269.43	0.01	9.79	378.00	63.45	0.71
Reach_4	38441	500-YR	21100.00	5258.31	5275.46	5272.41	5275.64	0.00	5.93	9490.19	2044.21	0.27
Reach_4	38441	100-YR	10200.00	5258.31	5270.11	5270.11	5274.33	0.01	16.98	673.18	849.92	0.95
Reach_4	38441	50-YR	8000.00	5258.31	5268.74	5268.74	5272.41	0.01	15.71	557.83	423.96	0.95
Reach_4	38441	10-YR	3700.00	5258.31	5265.38	5265.38	5267.76	0.01	12.45	307.51	67.50	0.97
Reach_4	38345	500-YR	21100.00	5257.00	5274.32	5274.32	5275.46	0.00	9.95	4955.98	2308.34	0.46
Reach_4	38345	100-YR	10200.00	5257.00	5271.25	5266.02	5272.31	0.00	8.28	1238.66	1103.23	0.43
Reach_4	38345	50-YR	8000.00	5257.00	5269.02	5264.85	5270.03	0.00	8.04	997.82	781.19	0.46
Reach_4	38345	10-YR	3700.00	5257.00	5266.10	5261.68	5266.55	0.00	5.36	690.64	101.95	0.36
Reach_4	38290 W 52nd Ave		Bridge									
Reach_4	38267	500-YR	21100.00	5257.00	5271.94	5269.77	5272.58	0.00	8.33	4982.71	1662.51	0.41
Reach_4	38267	100-YR	10200.00	5257.00	5270.23	5265.47	5271.36	0.00	8.55	1199.27	955.51	0.45
Reach_4	38267	50-YR	8000.00	5257.00	5268.83	5264.30	5269.74	0.00	7.66	1048.20	837.28	0.43
Reach_4	38267	10-YR	3700.00	5257.00	5265.48	5261.33	5265.92	0.00	5.33	693.83	101.32	0.36
Reach_4	38186	500-YR	21100.00	5256.08	5271.85	5271.45	5272.47	0.00	8.82	5196.67	1422.57	0.44
Reach_4	38186	100-YR	10200.00	5256.08	5267.83	5267.03	5270.61	0.01	13.47	784.83	582.71	0.83
Reach_4	38186	50-YR	8000.00	5256.08	5266.90	5265.91	5269.11	0.01	11.98	684.07	391.45	0.78
Reach_4	38186	10-YR	3700.00	5256.08	5264.42	5263.30	5265.53	0.01	8.47	437.95	93.67	0.68
Reach_4	37772	500-YR	21100.00	5254.56	5271.47		5271.92	0.00	7.21	5955.81	1458.24	0.35
Reach_4	37772	100-YR	10200.00	5254.56	5265.75	5264.55	5267.87	0.01	11.75	900.87	137.74	0.75
Reach_4	37772	50-YR	8000.00	5254.56	5264.66		5266.48	0.01	10.85	753.17	132.95	0.74
Reach_4	37772	10-YR	3700.00	5254.56	5262.10		5263.14	0.01	8.19	451.66	106.93	0.70
Reach_4	37300	500-YR	21100.00	5252.06	5270.72		5271.42	0.00	7.73	4714.42	1640.10	0.36
Reach_4	37300	100-YR	10200.00	5252.06	5264.72		5265.90	0.00	8.72	1182.08	521.53	0.53
Reach_4	37300	50-YR	8000.00	5252.06	5263.45		5264.46	0.00	8.06	996.64	144.08	0.53
Reach_4	37300	10-YR	3700.00	5252.06	5260.43		5261.06	0.00	6.39	579.05	131.47	0.54
Reach_4	37204	500-YR	21100.00	5252.14	5270.79	5265.21	5271.27	0.00	6.80	5105.90	1999.00	0.31
Reach_4	37204	100-YR	10200.00	5252.14	5264.45	5261.38	5265.67	0.00	8.91	1177.86	1070.78	0.53
Reach_4	37204	50-YR	8000.00	5252.14	5263.17	5260.40	5264.22	0.00	8.21	987.44	647.34	0.52
Reach_4	37204	10-YR	3700.00	5252.14	5260.20	5258.23	5260.79	0.00	6.18	598.69	120.69	0.49
Reach_4	37007	500-YR	21100.00	5249.68	5269.37	5264.50	5270.94	0.00	11.69	2304.89	193.13	0.50
Reach_4	37007	100-YR	10200.00	5249.68	5264.12	5261.14	5265.19	0.00	9.41	1357.96	166.27	0.48
Reach_4	37007	50-YR	8000.00	5249.68	5262.78	5260.24	5263.74	0.00	8.79	1139.00	162.10	0.48
Reach_4	37007	10-YR	3700.00	5249.68	5259.67	5257.41	5260.32	0.00	6.94	651.57	150.78	0.45
Reach_4	36929 I-76 EB		Bridge									
Reach_4	36901	500-YR	21100.00	5249.68	5268.91		5270.44	0.00	11.51	2401.87	205.50	0.51
Reach_4	36901	100-YR	10200.00	5249.68	5263.83		5264.83	0.00	9.07	1423.87	178.60	0.49
Reach_4	36901	50-YR	8000.00	5249.68	5262.48		5263.37	0.00	8.46	1188.13	172.42	0.49
Reach_4	36901	10-YR	3700.00	5249.68	5259.28		5259.91	0.00	6.85	659.80	158.50	0.50
Reach_4	36879	500-YR	21100.00	5249.68	5268.34		5270.28	0.00	12.72	2212.27	198.64	0.58
Reach_4	36879	100-YR	10200.00	5249.68	5263.51		5264.72	0.00	9.78	1328.41	170.36	0.54
Reach_4	36879	50-YR	8000.00	5249.68	5262.21		5263.27	0.00	9.09	1109.27	165.18	0.54
Reach_4	36879	10-YR	3700.00	5249.68	5259.10		5259.83	0.00	7.24	615.42	151.02	0.53
Reach_4	36856	500-YR	21100.00	5249.00	5268.69	5263.20	5269.84	0.00	9.86	2728.39	241.22	0.44
Reach_4	36856	100-YR	10200.00	5249.00	5263.69	5260.13	5264.46	0.00	7.82	1612.41	208.27	0.43
Reach_4	36856	50-YR	8000.00	5249.00	5262.35	5259.35	5263.03	0.00	7.31	1340.01	199.23	0.43
Reach_4	36856	10-YR	3700.00	5249.00	5259.16	5257.18	5259.66	0.00	6.01	730.76	181.86	0.44
Reach_4	36763 I-76 WB		Bridge									
Reach_4	36727	500-YR	21100.00	5249.00	5268.51		5269.59	0.00	9.33	2938.28	244.52	0.41
Reach_4	36727	100-YR	10200.00	5249.00	5263.57		5264.17	0.00	6.79	1848.08	205.32	0.35
Reach_4	36727	50-YR	8000.00	5249.00	5262.23		5262.74	0.00	6.16	1579.04	198.82	0.34
Reach_4	36727	10-YR	3700.00	5249.00	5259.07		5259.34	0.00	4.41	977.05	180.39	0.29
Reach_4	36563	500-YR	21100.00	5250.00	5266.70	5263.72	5268.96	0.00	14.96	2283.55	532.81	0.68
Reach_4	36563	100-YR	10200.00	5250.00	5261.96	5260.01	5263.60	0.00	11.85	1131.95	147.51	0.65

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_4	36563	50-YR	8000.00	5250.00	5260.84	5259.03	5262.22	0.00	10.81	968.16	143.40	0.63
Reach_4	36563	10-YR	3700.00	5250.00	5258.21	5256.60	5258.98	0.00	7.82	603.48	133.44	0.54
Reach_4	36262	500-YR	21100.00	5249.74	5264.05	5262.34	5267.60	0.01	17.23	1619.97	203.42	0.88
Reach_4	36262	100-YR	10200.00	5249.74	5260.71	5259.22	5262.49	0.00	11.85	1038.15	147.54	0.71
Reach_4	36262	50-YR	8000.00	5249.74	5259.51	5258.32	5261.09	0.00	11.09	863.96	142.96	0.72
Reach_4	36262	10-YR	3700.00	5249.74	5256.90	5256.20	5257.91	0.01	8.72	502.21	133.79	0.70
Reach_4	35958	500-YR	21100.00	5248.46	5261.94	5261.94	5265.79	0.01	17.60	1571.26	222.85	0.93
Reach_4	35958	100-YR	10200.00	5248.46	5259.68	5257.84	5261.33	0.00	11.29	1116.26	176.21	0.67
Reach_4	35958	50-YR	8000.00	5248.46	5258.30	5256.90	5259.85	0.00	10.81	888.82	154.48	0.70
Reach_4	35958	10-YR	3700.00	5248.46	5255.87	5254.75	5256.71	0.00	7.85	554.55	131.96	0.62
Reach_4	35468	500-YR	21100.00	5247.54	5263.37	5258.24	5263.84	0.00	7.64	4645.22	774.34	0.36
Reach_4	35468	100-YR	10200.00	5247.54	5259.79	5255.60	5260.17	0.00	6.44	2291.02	393.32	0.35
Reach_4	35468	50-YR	8000.00	5247.54	5258.14	5254.98	5258.54	0.00	6.56	1765.27	309.45	0.39
Reach_4	35468	10-YR	3700.00	5247.54	5255.24	5253.44	5255.55	0.00	5.54	959.65	243.37	0.40
Reach_4	35401	500-YR	21100.00	5248.50	5263.34	5257.50	5263.78	0.00	7.17	5004.14	803.98	0.34
Reach_4	35401	100-YR	10200.00	5248.50	5259.78	5255.05	5260.09	0.00	5.76	2573.01	433.31	0.31
Reach_4	35401	50-YR	8000.00	5248.50	5258.13	5254.23	5258.45	0.00	5.72	2017.01	321.32	0.34
Reach_4	35401	10-YR	3700.00	5248.50	5255.21	5252.50	5255.44	0.00	4.65	1128.49	284.37	0.34
Reach_4	35382 Footbridge		Bridge									
Reach_4	35343	500-YR	21100.00	5248.09	5263.18	5257.20	5263.59	0.00	6.65	5127.57	851.04	0.31
Reach_4	35343	100-YR	10200.00	5248.09	5259.65	5254.90	5259.94	0.00	5.33	2647.77	477.70	0.29
Reach_4	35343	50-YR	8000.00	5248.09	5258.01	5254.31	5258.30	0.00	5.29	2096.03	328.47	0.31
Reach_4	35343	10-YR	3700.00	5248.09	5255.06	5252.17	5255.28	0.00	4.39	1172.03	295.02	0.32
Reach_4	35231	500-YR	21100.00	5246.91	5263.28	5256.69	5263.40	0.00	4.23	8243.62	999.23	0.19
Reach_4	35231	100-YR	10200.00	5246.91	5259.62	5254.25	5259.84	0.00	4.86	3031.29	827.72	0.26
Reach_4	35231	50-YR	8000.00	5246.91	5257.96	5253.58	5258.20	0.00	4.95	2354.46	748.64	0.28
Reach_4	35231	10-YR	3700.00	5246.91	5255.01	5251.94	5255.17	0.00	3.90	1306.83	530.52	0.27
Reach_4	35018	500-YR	25500.00	5245.25	5262.98	5257.44	5263.30	0.00	5.99	6338.96	986.14	0.27
Reach_4	35018	100-YR	12800.00	5245.25	5259.45	5254.76	5259.72	0.00	5.18	3497.22	692.14	0.27
Reach_4	35018	50-YR	9600.00	5245.25	5257.76	5253.71	5258.04	0.00	5.17	2599.24	621.71	0.29
Reach_4	35018	10-YR	4500.00	5245.25	5254.74	5251.78	5254.99	0.00	4.51	1265.94	326.72	0.30
Reach_4	34757	500-YR	25500.00	5244.84	5258.79	5258.79	5262.58	0.01	17.23	1848.90	648.69	0.87
Reach_4	34757	100-YR	12800.00	5244.84	5258.26	5254.70	5259.36	0.00	9.23	1723.50	632.19	0.48
Reach_4	34757	50-YR	9600.00	5244.84	5256.68	5253.55	5257.66	0.00	8.53	1352.27	348.32	0.48
Reach_4	34757	10-YR	4500.00	5244.84	5254.24	5251.02	5254.68	0.00	5.62	919.29	159.03	0.36
Reach_4	34653	500-YR	14298.00	5245.74	5260.53	5254.60	5261.34	0.00	8.11	2073.25	755.02	0.39
Reach_4	34653	100-YR	12005.00	5245.74	5258.25	5253.87	5259.13	0.00	8.43	1685.43	379.07	0.44
Reach_4	34653	50-YR	9600.00	5245.74	5256.61	5253.07	5257.43	0.00	8.12	1406.79	201.49	0.46
Reach_4	34653	10-YR	4500.00	5245.74	5254.18	5251.04	5254.54	0.00	5.41	994.51	166.39	0.36
Reach_4	34574 Sheridan Blvd		Bridge									
Reach_4	34496	500-YR	14298.00	5244.97	5257.23	5253.36	5258.40	0.00	9.54	1714.92	188.45	0.52
Reach_4	34496	100-YR	12005.00	5244.97	5256.22	5252.63	5257.24	0.00	8.94	1538.24	180.06	0.51
Reach_4	34496	50-YR	9600.00	5244.97	5255.57	5251.84	5256.33	0.00	7.73	1424.70	176.42	0.46
Reach_4	34496	10-YR	4500.00	5244.97	5252.79	5249.82	5253.17	0.00	5.36	950.89	166.26	0.38
Reach_4	34478	500-YR	14298.00	5243.72	5256.70	5254.05	5258.23	0.00	11.04	1520.15	309.79	0.62
Reach_4	34478	100-YR	12005.00	5243.72	5255.67	5253.33	5257.07	0.00	10.49	1325.57	270.55	0.62
Reach_4	34478	50-YR	9600.00	5243.72	5255.20	5252.51	5256.21	0.00	8.93	1241.52	253.22	0.54
Reach_4	34478	10-YR	4500.00	5243.72	5252.56	5250.51	5253.08	0.00	6.40	805.41	190.79	0.47
Reach_4	34142	500-YR	13181.00	5244.57	5255.57	5253.69	5257.05	0.00	11.43	1558.62	266.76	0.63
Reach_4	34142	100-YR	10317.00	5244.57	5254.15	5252.68	5255.73	0.00	11.38	1142.80	241.55	0.68
Reach_4	34142	50-YR	9024.00	5244.57	5253.51	5252.08	5255.00	0.00	10.95	1028.33	215.64	0.68
Reach_4	34142	10-YR	4500.00	5244.57	5250.78	5249.82	5251.86	0.01	9.09	578.09	131.08	0.70
Reach_4	33862	500-YR	13181.00	5241.72	5254.65		5256.07	0.00	11.15	1455.77	190.71	0.60
Reach_4	33862	100-YR	10317.00	5241.72	5253.31		5254.57	0.00	10.31	1206.21	183.82	0.59
Reach_4	33862	50-YR	9024.00	5241.72	5252.67		5253.82	0.00	9.81	1102.50	149.38	0.58
Reach_4	33862	10-YR	4500.00	5241.72	5249.87		5250.57	0.00	7.68	700.51	135.41	0.55
Reach_4	33496	500-YR	13181.00	5239.97	5253.47		5254.88	0.00	11.23	1505.19	183.80	0.57
Reach_4	33496	100-YR	10317.00	5239.97	5252.14		5253.37	0.00	10.37	1264.89	177.18	0.56
Reach_4	33496	50-YR	9024.00	5239.97	5251.50		5252.63	0.00	9.89	1153.87	169.56	0.55
Reach_4	33496	10-YR	4500.00	5239.97	5248.81		5249.47	0.00	7.43	750.44	134.32	0.48
Reach_4	33166	500-YR	13181.00	5240.80	5253.03	5249.15	5254.25	0.00	9.17	1598.51	423.43	0.48
Reach_4	33166	100-YR	10317.00	5240.80	5251.76	5248.13	5252.75	0.00	8.18	1387.39	398.04	0.46
Reach_4	33166	50-YR	9024.00	5240.80	5251.16	5247.62	5252.02	0.00	7.67	1288.31	385.21	0.44
Reach_4	33166	10-YR	4500.00	5240.80	5248.51	5245.39	5248.96	0.00	5.51	870.32	153.42	0.38

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_4	33030 I-76 W X-ing		Bridge									
Reach_4	32787	500-YR	13181.00	5238.80	5248.92	5247.70	5251.61	0.00	13.70	1088.99	134.99	0.78
Reach_4	32787	100-YR	10317.00	5238.80	5248.10	5246.55	5250.12	0.00	11.83	979.57	131.89	0.70
Reach_4	32787	50-YR	9024.00	5238.80	5247.70	5245.91	5249.41	0.00	10.90	926.59	130.55	0.66
Reach_4	32787	10-YR	4500.00	5238.80	5245.58	5243.60	5246.40	0.00	7.47	658.06	122.55	0.53
Reach_4	32573	500-YR	13181.00	5236.93	5248.16	5246.86	5250.58	0.01	13.07	1121.92	315.42	0.76
Reach_4	32573	100-YR	10317.00	5236.93	5247.49	5245.78	5249.25	0.00	11.13	1026.51	257.44	0.67
Reach_4	32573	50-YR	9024.00	5236.93	5247.15	5245.25	5248.63	0.00	10.17	979.74	246.65	0.62
Reach_4	32573	10-YR	4500.00	5236.93	5245.20	5243.04	5245.89	0.00	6.86	712.39	133.55	0.48
Reach_4	32467	500-YR	13181.00	5236.47	5248.49	5246.00	5249.91	0.00	10.07	1507.49	463.63	0.58
Reach_4	32467	100-YR	10317.00	5236.47	5247.66	5245.07	5248.74	0.00	8.76	1344.16	404.35	0.53
Reach_4	32467	50-YR	9024.00	5236.47	5247.27	5244.68	5248.19	0.00	8.08	1269.80	354.00	0.50
Reach_4	32467	10-YR	4500.00	5236.47	5245.17	5242.79	5245.63	0.00	5.66	883.69	203.36	0.41
Reach_4	32160	500-YR	13181.00	5236.66	5247.84	5245.19	5248.94	0.00	8.97	1645.09	1046.09	0.54
Reach_4	32160	100-YR	10317.00	5236.66	5247.10	5244.35	5247.92	0.00	7.71	1479.38	652.34	0.49
Reach_4	32160	50-YR	9024.00	5236.66	5246.77	5243.90	5247.46	0.00	7.08	1406.08	607.36	0.46
Reach_4	32160	10-YR	4500.00	5236.66	5244.76	5242.33	5245.11	0.00	5.00	979.03	375.18	0.38
Reach_4	31859	500-YR	13181.00	5238.12	5247.70	5245.38	5248.10	0.00	5.99	2875.48	1459.70	0.37
Reach_4	31859	100-YR	10317.00	5238.12	5246.81	5244.51	5247.19	0.00	5.68	2392.30	1300.82	0.37
Reach_4	31859	50-YR	9024.00	5238.12	5246.44	5244.08	5246.79	0.00	5.44	2191.28	1263.85	0.36
Reach_4	31859	10-YR	4500.00	5238.12	5243.44	5242.23	5244.21	0.00	7.06	637.40	664.43	0.61
Reach_4	31809 Tennyson St		Bridge									
Reach_4	31778	500-YR	12114.00	5236.98	5244.53	5244.53	5246.31	0.00	11.01	1335.31	804.53	0.77
Reach_4	31778	100-YR	10100.00	5236.98	5243.15	5243.15	5245.58	0.01	12.50	810.69	185.88	0.98
Reach_4	31778	50-YR	8981.00	5236.98	5242.73	5242.73	5245.02	0.01	12.12	741.47	164.44	1.00
Reach_4	31778	10-YR	4500.00	5236.98	5241.02	5241.02	5242.47	0.01	9.64	466.83	157.05	0.99
Reach_4	31579	500-YR	12114.00	5227.96	5238.65	5237.65	5240.27	0.00	10.20	1193.51	630.94	0.74
Reach_4	31579	100-YR	10100.00	5227.96	5238.02	5237.06	5239.44	0.00	9.54	1061.95	604.52	0.74
Reach_4	31579	50-YR	8981.00	5227.96	5237.61	5236.77	5238.93	0.00	9.22	976.19	593.80	0.74
Reach_4	31579	10-YR	4500.00	5227.96	5235.98	5235.28	5236.74	0.00	7.00	643.12	210.61	0.69
Reach_4	31387	500-YR	12114.00	5227.61	5236.64	5236.64	5238.96	0.01	12.64	1059.71	679.61	0.98
Reach_4	31387	100-YR	10100.00	5227.61	5236.04	5236.04	5238.15	0.01	12.03	925.00	671.54	1.00
Reach_4	31387	50-YR	8981.00	5227.61	5235.76	5235.76	5237.68	0.01	11.45	862.01	227.30	0.98
Reach_4	31387	10-YR	4500.00	5227.61	5235.60	5234.26	5236.13	0.00	5.97	827.67	226.01	0.52
Reach_4	30793	500-YR	12114.00	5227.25	5234.78	5234.05	5235.50	0.00	2.19	2478.79	732.32	0.19
Reach_4	30793	100-YR	10100.00	5227.25	5233.76	5233.76	5234.85	0.00	2.48	1763.56	676.98	0.24
Reach_4	30793	50-YR	8981.00	5227.25	5233.36	5233.36	5234.95	0.00	2.56	1420.43	664.67	0.27
Reach_4	30793	10-YR	4500.00	5227.25	5232.83	5232.52	5233.54	0.01	6.77	665.41	444.24	0.79
Reach_4	30256	500-YR	12114.00	5227.32	5235.03	5232.27	5235.25	0.00	1.02	4708.65	1234.19	0.07
Reach_4	30256	100-YR	10100.00	5227.32	5234.00	5231.92	5234.25	0.00	1.05	3769.02	906.34	0.08
Reach_4	30256	50-YR	8981.00	5227.32	5233.49	5231.73	5233.75	0.00	1.04	3313.26	862.12	0.09
Reach_4	30256	10-YR	4500.00	5227.32	5232.68	5230.44	5232.84	0.00	3.25	1390.27	766.95	0.31
Reach_4	29856	500-YR	12114.00	5227.27	5235.01	5231.82	5235.21	0.00	1.07	4932.70	1149.01	0.08
Reach_4	29856	100-YR	10100.00	5227.27	5233.98	5231.50	5234.20	0.00	1.08	3999.76	1112.85	0.08
Reach_4	29856	50-YR	8981.00	5227.27	5233.47	5231.28	5233.69	0.00	1.07	3573.59	1043.08	0.09
Reach_4	29856	10-YR	4500.00	5227.27	5232.58	5230.36	5232.70	0.00	2.88	1569.19	1024.97	0.26
Reach_4	29554	500-YR	12114.00	5226.98	5235.03	5231.41	5235.16	0.00	1.53	5103.17	1062.88	0.10
Reach_4	29554	100-YR	10100.00	5226.98	5233.94	5231.10	5234.14	0.00	1.89	3539.09	1038.99	0.14
Reach_4	29554	50-YR	8981.00	5226.98	5233.41	5230.87	5233.63	0.00	1.90	3097.24	997.32	0.15
Reach_4	29554	10-YR	4500.00	5226.98	5232.22	5229.87	5232.36	0.00	3.04	1488.28	863.90	0.27
Reach_4	29230	500-YR	12114.00	5227.17	5234.78	5231.97	5235.09	0.00	1.78	3527.94	626.99	0.12
Reach_4	29230	100-YR	10100.00	5227.17	5233.71	5231.76	5234.05	0.00	1.85	2862.91	620.68	0.14
Reach_4	29230	50-YR	8981.00	5227.17	5233.18	5231.48	5233.52	0.00	1.87	2533.85	616.97	0.15
Reach_4	29230	10-YR	4500.00	5227.17	5231.21	5230.20	5231.69	0.00	5.58	806.50	544.97	0.56
Reach_4	29044	500-YR	12114.00	5226.00	5234.13	5232.02	5234.96	0.00	7.71	1837.90	566.72	0.50
Reach_4	29044	100-YR	10100.00	5226.00	5232.92	5231.25	5233.88	0.00	8.09	1427.49	460.63	0.57
Reach_4	29044	50-YR	8981.00	5226.00	5232.37	5230.87	5233.34	0.00	8.08	1242.05	425.31	0.59
Reach_4	29044	10-YR	4500.00	5226.00	5230.21	5229.22	5230.93	0.00	6.81	663.67	214.25	0.64
Reach_4	29001 Lowell Blvd		Bridge									
Reach_4	28974	500-YR	12414.00	5225.00	5232.72	5231.34	5234.35	0.00	10.29	1228.60	326.99	0.70
Reach_4	28974	100-YR	9372.00	5225.00	5231.70	5230.43	5233.00	0.00	9.17	1035.46	200.84	0.67
Reach_4	28974	50-YR	8336.00	5225.00	5231.30	5230.07	5232.49	0.00	8.78	959.90	197.96	0.67
Reach_4	28974	10-YR	4500.00	5225.00	5229.69	5228.62	5230.41	0.00	6.80	663.00	184.91	0.62

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_4	28927	500-YR	12414.00	5225.54	5231.25	5231.25	5233.82	0.01	12.93	981.10	239.83	0.99
Reach_4	28927	100-YR	9372.00	5225.54	5230.36	5230.36	5232.50	0.01	11.77	804.74	212.91	0.99
Reach_4	28927	50-YR	8336.00	5225.54	5230.06	5230.06	5232.02	0.01	11.26	746.27	207.92	0.98
Reach_4	28927	10-YR	4500.00	5225.54	5228.65	5228.65	5229.99	0.01	9.28	486.19	191.40	0.99
Reach_4	28893	500-YR	12414.00	5217.15	5231.48	5223.98	5232.07	0.00	6.27	2167.53	210.19	0.30
Reach_4	28893	100-YR	9372.00	5217.15	5229.22	5222.85	5229.75	0.00	5.86	1604.58	184.71	0.31
Reach_4	28893	50-YR	8336.00	5217.15	5228.40	5222.44	5228.89	0.00	5.62	1487.02	174.37	0.30
Reach_4	28893	10-YR	4500.00	5217.15	5224.90	5220.71	5225.22	0.00	4.52	995.75	152.49	0.30
Reach_4	28754	500-YR	12414.00	5213.87	5227.00	5227.00	5231.43	0.01	17.01	756.40	113.49	0.98
Reach_4	28754	100-YR	9372.00	5213.87	5225.45	5225.45	5229.15	0.01	15.50	617.77	100.95	0.97
Reach_4	28754	50-YR	8336.00	5213.87	5224.84	5224.84	5228.31	0.01	14.98	565.57	95.57	0.98
Reach_4	28754	10-YR	4500.00	5213.87	5222.32	5222.32	5224.72	0.02	12.41	362.51	74.33	0.99
Reach_4	28381	500-YR	12414.00	5211.47	5228.80	5221.73	5229.28	0.00	5.97	2778.17	594.73	0.28
Reach_4	28381	100-YR	9372.00	5211.47	5220.61	5220.61	5223.17	0.01	12.89	744.04	149.25	0.97
Reach_4	28381	50-YR	8336.00	5211.47	5220.18	5220.18	5222.58	0.01	12.47	680.39	146.33	0.98
Reach_4	28381	10-YR	4500.00	5211.47	5218.46	5218.46	5220.09	0.01	10.26	438.95	134.08	0.99
Reach_4	28088	500-YR	12414.00	5207.31	5228.77	5217.90	5229.12	0.00	4.99	2861.10	323.65	0.21
Reach_4	28088	100-YR	9372.00	5207.31	5220.68	5216.72	5221.60	0.00	7.75	1240.69	145.76	0.44
Reach_4	28088	50-YR	8336.00	5207.31	5218.73	5216.25	5219.91	0.00	8.71	966.48	136.04	0.56
Reach_4	28088	10-YR	4500.00	5207.31	5216.28	5214.28	5217.03	0.00	6.95	647.69	123.63	0.53
Reach_4	27970 I-76 E X-ing		Bridge									
Reach_4	27695	500-YR	12414.00	5203.30	5228.68	5213.60	5228.92	0.00	4.17	3682.00	260.04	0.16
Reach_4	27695	100-YR	9372.00	5203.30	5220.21	5212.34	5220.70	0.00	5.69	1812.19	175.76	0.27
Reach_4	27695	50-YR	8336.00	5203.30	5217.70	5211.91	5218.30	0.00	6.28	1409.01	148.87	0.33
Reach_4	27695	10-YR	4500.00	5203.30	5213.67	5209.99	5214.12	0.00	5.37	851.70	127.60	0.35
Reach_4	27564	500-YR	12414.00	5201.65	5228.71	5213.43	5228.83	0.00	3.22	5184.16	489.56	0.12
Reach_4	27564	100-YR	9372.00	5201.65	5220.00	5212.11	5220.56	0.00	6.13	1629.90	136.75	0.29
Reach_4	27564	50-YR	8336.00	5201.65	5217.40	5211.63	5218.10	0.00	6.76	1288.34	126.77	0.35
Reach_4	27564	10-YR	4500.00	5201.65	5213.40	5209.59	5213.89	0.00	5.64	810.68	112.85	0.36
Reach_4	27559 Footbridge		Bridge									
Reach_4	27548	500-YR	12414.00	5202.47	5228.68	5213.48	5228.81	0.00	3.39	5224.19	513.47	0.12
Reach_4	27548	100-YR	9372.00	5202.47	5219.93	5212.16	5220.51	0.00	6.21	1620.10	137.31	0.29
Reach_4	27548	50-YR	8336.00	5202.47	5217.35	5211.66	5218.06	0.00	6.84	1278.53	128.12	0.35
Reach_4	27548	10-YR	4500.00	5202.47	5213.35	5209.56	5213.85	0.00	5.72	798.86	112.15	0.36
Reach_4	27468	500-YR	12414.00	5202.48	5228.70	5212.79	5228.76	0.00	2.30	7048.11	567.92	0.08
Reach_4	27468	100-YR	9372.00	5202.48	5220.06	5211.09	5220.27	0.00	4.06	2810.47	329.32	0.19
Reach_4	27468	50-YR	8336.00	5202.48	5217.46	5210.65	5217.77	0.00	4.75	2075.94	254.86	0.24
Reach_4	27468	10-YR	4500.00	5202.48	5213.32	5208.75	5213.63	0.00	4.47	1094.12	227.09	0.28
Reach_4	27091	500-YR	12414.00	5201.27	5228.69	5212.67	5228.73	0.00	1.81	9291.69	1130.14	0.07
Reach_4	27091	100-YR	9372.00	5201.27	5219.89	5211.81	5220.05	0.00	3.40	3026.91	335.33	0.17
Reach_4	27091	50-YR	8336.00	5201.27	5217.11	5211.50	5217.36	0.00	4.17	2154.88	296.48	0.24
Reach_4	27091	10-YR	4500.00	5201.27	5212.46	5209.82	5212.79	0.00	4.68	972.30	214.56	0.38
Reach_3	26669	500-YR	25500.00	5200.58	5228.64	5214.23	5228.70	0.00	1.59	14467.43	1717.32	0.06
Reach_3	26669	100-YR	12800.00	5200.58	5219.71	5211.02	5219.84	0.00	3.24	4894.02	1001.79	0.15
Reach_3	26669	50-YR	9600.00	5200.58	5216.79	5210.07	5216.96	0.00	3.56	3247.19	448.74	0.19
Reach_3	26669	10-YR	4500.00	5200.58	5211.17	5207.72	5211.45	0.00	4.24	1082.37	244.06	0.33
Reach_3	26340	500-YR	25500.00	5200.24	5228.58	5213.37	5228.67	0.00	2.85	11639.33	1581.24	0.10
Reach_3	26340	100-YR	12800.00	5200.24	5219.47	5209.93	5219.71	0.00	4.11	3880.38	991.35	0.19
Reach_3	26340	50-YR	9600.00	5200.24	5216.53	5208.97	5216.77	0.00	4.11	2756.87	417.34	0.21
Reach_3	26340	10-YR	4500.00	5200.24	5210.76	5207.00	5211.01	0.00	3.98	1147.15	209.68	0.28
Reach_3	26179	500-YR	25500.00	5198.27	5228.52	5212.92	5228.65	0.00	3.83	10729.81	1359.22	0.13
Reach_3	26179	100-YR	12800.00	5198.27	5219.34	5209.18	5219.64	0.00	5.03	3962.99	1032.26	0.21
Reach_3	26179	50-YR	9600.00	5198.27	5216.35	5208.02	5216.68	0.00	5.07	2560.51	336.10	0.23
Reach_3	26179	10-YR	4500.00	5198.27	5210.65	5204.98	5210.89	0.00	4.17	1288.32	188.79	0.24
Reach_2	25937	500-YR	25500.00	5199.66	5227.38	5217.14	5228.49	0.00	9.23	3276.25	525.74	0.33
Reach_2	25937	100-YR	12800.00	5199.66	5218.41	5211.39	5219.42	0.00	8.42	1767.84	194.43	0.37
Reach_2	25937	50-YR	9600.00	5199.66	5215.40	5209.74	5216.43	0.00	8.29	1268.13	154.27	0.41
Reach_2	25937	10-YR	4500.00	5199.66	5209.78	5206.34	5210.57	0.00	7.14	632.43	92.60	0.46
Reach_2	25895 BNSF RR		Bridge									
Reach_2	25850	500-YR	25500.00	5199.74	5219.44	5218.92	5225.10	0.00	19.85	1531.08	137.28	0.83
Reach_2	25850	100-YR	12800.00	5199.74	5214.03	5212.24	5217.60	0.00	15.28	880.77	85.43	0.76
Reach_2	25850	50-YR	9600.00	5199.74	5212.05	5210.30	5214.96	0.00	13.75	718.01	78.47	0.74
Reach_2	25850	10-YR	4500.00	5199.74	5208.06	5206.59	5209.74	0.00	10.41	432.36	65.01	0.71

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_2	25833	500-YR	25500.00	5199.70	5220.02	5218.12	5224.39	0.00	17.48	1721.59	141.30	0.72
Reach_2	25833	100-YR	12800.00	5199.70	5214.26	5211.80	5217.23	0.00	13.91	961.96	99.62	0.70
Reach_2	25833	50-YR	9600.00	5199.70	5212.21	5210.03	5214.67	0.00	12.61	775.94	85.26	0.69
Reach_2	25833	10-YR	4500.00	5199.70	5208.07	5206.51	5209.59	0.00	9.87	455.73	70.97	0.69
Reach_2	25822 LRT Gold Line		Bridge									
Reach_2	25780	500-YR	25500.00	5199.60	5216.37	5216.12	5220.40	0.00	17.17	1815.50	833.34	0.79
Reach_2	25780	100-YR	12800.00	5199.60	5210.65	5210.65	5214.77	0.01	16.34	802.31	109.44	0.96
Reach_2	25780	50-YR	9600.00	5199.60	5209.96	5208.96	5212.71	0.01	13.31	729.85	101.94	0.81
Reach_2	25780	10-YR	4500.00	5199.60	5206.45	5205.70	5208.22	0.01	10.67	421.63	79.24	0.82
Reach_2	25690	500-YR	25500.00	5197.69	5217.71	5214.43	5218.69	0.00	9.31	4093.98	574.31	0.41
Reach_2	25690	100-YR	12800.00	5197.69	5210.80	5209.28	5212.96	0.00	11.95	1147.76	168.34	0.71
Reach_2	25690	50-YR	9600.00	5197.69	5210.30	5207.99	5211.69	0.00	9.57	1065.16	160.64	0.59
Reach_2	25690	10-YR	4500.00	5197.69	5206.23	5205.53	5207.49	0.00	8.99	501.64	121.22	0.77
Reach_2	25392	500-YR	25500.00	5196.25	5217.79		5218.27	0.00	6.27	4988.62	489.38	0.27
Reach_2	25392	100-YR	12800.00	5196.25	5211.62		5211.97	0.00	4.91	2713.57	278.17	0.26
Reach_2	25392	50-YR	9600.00	5196.25	5210.79		5211.02	0.00	4.02	2482.53	275.25	0.23
Reach_2	25392	10-YR	4500.00	5196.25	5206.47		5206.65	0.00	3.48	1321.61	255.43	0.26
Reach_2	25104	500-YR	25500.00	5196.90	5216.70	5209.23	5217.95	0.00	9.09	3111.39	1904.28	0.39
Reach_2	25104	100-YR	12800.00	5196.90	5210.87	5205.82	5211.67	0.00	7.19	1814.87	184.05	0.39
Reach_2	25104	50-YR	9600.00	5196.90	5210.31	5204.65	5210.81	0.00	5.70	1713.07	181.29	0.31
Reach_2	25104	10-YR	4500.00	5196.90	5206.05	5202.48	5206.37	0.00	4.60	979.00	163.35	0.33
Reach_2	25035 Federal Blvd		Bridge									
Reach_2	24920	500-YR	25500.00	5195.59	5213.60	5208.92	5215.84	0.00	12.08	2202.80	851.58	0.55
Reach_2	24920	100-YR	12800.00	5195.59	5209.42	5205.01	5210.55	0.00	8.54	1510.65	150.23	0.46
Reach_2	24920	50-YR	9600.00	5195.59	5208.01	5203.79	5208.85	0.00	7.39	1302.17	145.07	0.43
Reach_2	24920	10-YR	4500.00	5195.59	5204.78	5201.36	5205.22	0.00	5.27	853.21	133.54	0.37
Reach_1	24755	500-YR	25500.00	5195.13	5212.82	5209.81	5215.34	0.00	13.12	2151.39	884.52	0.64
Reach_1	24755	100-YR	12800.00	5195.13	5208.65	5206.26	5210.12	0.00	9.93	1377.84	176.68	0.59
Reach_1	24755	50-YR	9600.00	5195.13	5207.22	5205.15	5208.44	0.00	8.99	1130.05	171.10	0.58
Reach_1	24755	10-YR	4500.00	5195.13	5203.66	5201.96	5204.74	0.00	8.38	549.97	151.13	0.76
Reach_1	24720	500-YR	25500.00	5194.98	5212.59	5209.45	5215.23	0.00	13.29	2086.85	1233.55	0.64
Reach_1	24720	100-YR	12800.00	5194.98	5208.61	5205.79	5210.02	0.00	9.65	1396.12	166.46	0.56
Reach_1	24720	50-YR	9600.00	5194.98	5207.21	5204.66	5208.33	0.00	8.58	1166.85	162.00	0.54
Reach_1	24720	10-YR	4500.00	5194.98	5203.76	5201.52	5204.57	0.00	7.28	630.77	147.28	0.61
Reach_1	24582	500-YR	25500.00	5194.84	5210.13	5210.13	5214.50	0.01	18.02	1691.47	710.87	0.91
Reach_1	24582	100-YR	12800.00	5194.84	5206.36	5206.36	5209.39	0.01	14.51	1017.63	172.10	0.88
Reach_1	24582	50-YR	9600.00	5194.84	5204.96	5204.96	5207.72	0.01	13.60	781.74	163.28	0.90
Reach_1	24582	10-YR	4500.00	5194.84	5202.08	5202.04	5204.02	0.01	11.19	407.41	102.94	0.97
Reach_1	24222	500-YR	25500.00	5194.27	5206.72	5206.72	5209.98	0.01	16.11	2087.27	557.41	0.89
Reach_1	24222	100-YR	12800.00	5194.27	5204.63	5203.79	5206.29	0.00	11.15	1473.56	331.15	0.69
Reach_1	24222	50-YR	9600.00	5194.27	5203.61	5202.84	5205.03	0.00	10.09	1192.19	312.04	0.67
Reach_1	24222	10-YR	4500.00	5194.27	5201.28	5199.86	5202.24	0.00	7.91	607.59	198.35	0.63
Reach_1	23845	500-YR	25500.00	5192.71	5206.56	5204.45	5207.73	0.00	10.62	3530.38	577.16	0.53
Reach_1	23845	100-YR	12800.00	5192.71	5204.63	5201.64	5205.21	0.00	7.20	2602.80	474.73	0.39
Reach_1	23845	50-YR	9600.00	5192.71	5203.50	5200.73	5204.02	0.00	6.62	2073.06	450.80	0.38
Reach_1	23845	10-YR	4500.00	5192.71	5201.05	5197.81	5201.40	0.00	5.03	1159.29	317.98	0.34
Reach_1	23255	500-YR	25500.00	5191.56	5205.11	5204.72	5206.21	0.00	10.40	4034.62	1471.23	0.59
Reach_1	23255	100-YR	12800.00	5191.56	5202.93	5201.39	5204.05	0.00	9.25	1797.07	601.37	0.59
Reach_1	23255	50-YR	9600.00	5191.56	5202.23	5200.57	5203.02	0.00	7.68	1517.74	422.07	0.51
Reach_1	23255	10-YR	4500.00	5191.56	5200.02	5197.48	5200.55	0.00	6.03	853.40	277.85	0.49
Reach_1	22876	500-YR	25500.00	5190.34	5205.16	5202.70	5205.39	0.00	5.47	8199.95	2429.07	0.29
Reach_1	22876	100-YR	12800.00	5190.34	5201.64	5201.07	5202.66	0.00	9.28	1909.80	830.14	0.60
Reach_1	22876	50-YR	9600.00	5190.34	5200.61	5200.27	5201.73	0.01	9.28	1349.68	566.92	0.65
Reach_1	22876	10-YR	4500.00	5190.34	5198.49	5196.58	5199.44	0.00	7.90	604.03	192.99	0.61
Reach_1	22613	500-YR	25500.00	5189.86	5204.20	5201.70	5205.01	0.00	8.81	4357.73	1543.34	0.48
Reach_1	22613	100-YR	12800.00	5189.86	5201.15	5199.60	5201.87	0.00	7.73	2321.82	720.67	0.50
Reach_1	22613	50-YR	9600.00	5189.86	5200.22	5198.73	5200.85	0.00	7.08	1845.45	623.97	0.49
Reach_1	22613	10-YR	4500.00	5189.86	5198.17	5195.89	5198.67	0.00	5.83	941.34	403.51	0.49
Reach_1	22088	500-YR	25500.00	5189.59	5202.19	5200.78	5203.77	0.00	13.13	2946.70	1149.90	0.70
Reach_1	22088	100-YR	12800.00	5189.59	5199.41	5198.77	5200.59	0.00	11.01	1824.82	775.19	0.68
Reach_1	22088	50-YR	9600.00	5189.59	5198.54	5198.08	5199.62	0.00	10.24	1484.83	636.31	0.67
Reach_1	22088	10-YR	4500.00	5189.59	5196.85	5196.39	5197.62	0.00	8.01	841.10	346.48	0.60
Reach_1	21914	500-YR	25500.00	5189.50	5200.06	5200.06	5202.85	0.01	16.86	2076.87	610.34	1.03

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_1	21914	100-YR	12800.00	5189.50	5197.95	5197.95	5199.73	0.01	13.40	1356.18	579.63	0.94
Reach_1	21914	50-YR	9600.00	5189.50	5197.27	5197.27	5198.78	0.01	12.23	1127.16	572.09	0.91
Reach_1	21914	10-YR	4500.00	5189.50	5195.97	5195.97	5196.95	0.01	9.45	706.23	460.37	0.77
Reach_1	21866	500-YR	25500.00	5185.36	5200.07	5198.76	5201.78	0.00	8.91	2664.96	661.67	0.50
Reach_1	21866	100-YR	12800.00	5185.36	5197.73	5196.48	5198.75	0.00	6.75	1724.15	610.26	0.44
Reach_1	21866	50-YR	9600.00	5185.36	5195.83	5195.76	5197.42	0.00	8.41	974.72	508.15	0.60
Reach_1	21866	10-YR	4500.00	5185.36	5194.29	5194.29	5195.38	0.00	6.67	568.89	389.15	0.50
Reach_1	21849	500-YR	25500.00	5187.66	5200.03	5198.69	5201.75	0.00	8.84	2705.22	650.57	0.49
Reach_1	21849	100-YR	12800.00	5187.66	5197.72	5196.56	5198.72	0.00	6.49	1771.18	605.80	0.41
Reach_1	21849	50-YR	9600.00	5187.66	5195.78	5195.78	5197.36	0.00	7.51	1015.55	514.68	0.55
Reach_1	21849	10-YR	4500.00	5187.66	5194.22	5193.92	5195.28	0.00	5.67	603.61	352.64	0.46
Reach_1	21842	500-YR	25500.00	5186.05	5200.14	5198.44	5201.69	0.00	8.88	2823.64	651.56	0.47
Reach_1	21842	100-YR	12800.00	5186.05	5197.80	5196.01	5198.67	0.00	6.47	1878.34	604.06	0.38
Reach_1	21842	50-YR	9600.00	5186.05	5195.33	5195.33	5196.95	0.00	8.42	972.19	437.95	0.58
Reach_1	21842	10-YR	4500.00	5186.05	5194.55	5192.70	5195.13	0.00	4.89	776.60	370.25	0.35
Reach_1	21733	500-YR	25500.00	5184.02	5200.46	5197.29	5201.45	0.00	4.57	4346.45	874.13	0.23
Reach_1	21733	100-YR	12800.00	5184.02	5197.99	5194.49	5198.52	0.00	3.37	2871.45	849.03	0.19
Reach_1	21733	50-YR	9600.00	5184.02	5195.78	5193.54	5196.45	0.00	3.99	1715.71	628.62	0.25
Reach_1	21733	10-YR	4500.00	5184.02	5194.74	5192.10	5194.98	0.00	2.47	1309.90	536.68	0.17
Reach_1	21726 Footbridge		Bridge									
Reach_1	21700	500-YR	25500.00	5184.02	5199.74	5196.86	5200.70	0.00	4.54	4440.41	937.88	0.23
Reach_1	21700	100-YR	12800.00	5184.02	5197.82	5194.55	5198.26	0.00	3.13	3134.45	896.08	0.18
Reach_1	21700	50-YR	9600.00	5184.02	5195.60	5194.55	5196.20	0.00	3.78	1822.31	671.57	0.24
Reach_1	21700	10-YR	4500.00	5184.02	5193.22	5191.99	5194.57	0.00	9.33	482.27	455.51	0.71
Reach_1	21401	500-YR	25500.00	5185.08	5199.96	5195.70	5200.34	0.00	3.07	7319.43	1663.11	0.16
Reach_1	21401	100-YR	12800.00	5185.08	5197.90	5193.36	5198.09	0.00	2.18	5247.41	1641.08	0.13
Reach_1	21401	50-YR	9600.00	5185.08	5195.67	5192.79	5195.94	0.00	2.79	3010.97	1328.94	0.18
Reach_1	21401	10-YR	4500.00	5185.08	5193.57	5191.86	5193.76	0.00	2.69	1358.18	582.67	0.21
Reach_1	20985	500-YR	27700.00	5184.88	5199.80	5195.87	5200.25	0.00	3.03	5663.88	1760.55	0.16
Reach_1	20985	100-YR	14100.00	5184.88	5197.83	5194.34	5198.04	0.00	2.01	4299.24	1709.42	0.12
Reach_1	20985	50-YR	10400.00	5184.88	5195.53	5193.41	5195.85	0.00	2.25	2721.71	1483.22	0.15
Reach_1	20985	10-YR	4900.00	5184.88	5192.58	5191.27	5193.36	0.00	7.09	691.30	1124.29	0.60
Reach_1	20638	500-YR	27700.00	5184.89	5199.98	5194.94	5200.06	0.00	2.91	13001.31	1801.80	0.15
Reach_1	20638	100-YR	14100.00	5184.89	5197.61	5192.61	5197.93	0.00	4.69	3168.07	1726.93	0.27
Reach_1	20638	50-YR	10400.00	5184.89	5195.35	5191.79	5195.69	0.00	4.74	2305.40	1396.96	0.32
Reach_1	20638	10-YR	4900.00	5184.89	5191.59	5190.32	5192.01	0.00	5.22	938.94	753.14	0.52
Reach_1	20593 LRT NWES Line		Bridge									
Reach_1	20568	500-YR	27700.00	5186.82	5199.18	5195.15	5199.53	0.00	5.89	7826.32	1545.54	0.31
Reach_1	20568	100-YR	14100.00	5186.82	5197.19	5192.45	5197.75	0.00	6.08	2393.80	1321.88	0.35
Reach_1	20568	50-YR	10400.00	5186.82	5194.97	5191.56	5195.50	0.00	5.88	1818.13	670.23	0.38
Reach_1	20568	10-YR	4900.00	5186.82	5191.09	5190.00	5191.64	0.00	5.96	829.99	312.99	0.56
Reach_1	20561	500-YR	27700.00	5186.85	5198.76	5195.11	5199.43	0.00	7.52	5904.41	1447.38	0.40
Reach_1	20561	100-YR	14100.00	5186.85	5197.18	5192.42	5197.75	0.00	6.08	2358.71	1262.72	0.35
Reach_1	20561	50-YR	10400.00	5186.85	5194.96	5191.53	5195.49	0.00	5.88	1792.70	437.21	0.38
Reach_1	20561	10-YR	4900.00	5186.85	5191.06	5190.00	5191.61	0.00	5.95	824.23	253.77	0.57
Reach_1	20560 Railroad		Bridge									
Reach_1	20524	500-YR	27700.00	5186.16	5193.85	5193.85	5197.34	0.01	15.18	1879.39	682.70	0.97
Reach_1	20524	100-YR	14100.00	5186.16	5191.12	5191.12	5193.45	0.01	12.32	1167.99	303.61	0.99
Reach_1	20524	50-YR	10400.00	5186.16	5190.11	5190.11	5192.17	0.01	11.56	912.59	288.75	1.04
Reach_1	20524	10-YR	4900.00	5186.16	5188.70	5188.70	5189.87	0.01	8.69	566.82	254.10	0.98
Reach_1	20502	500-YR	27700.00	5177.86	5195.03	5186.37	5195.26	0.00	4.58	8767.13	1463.24	0.21
Reach_1	20502	100-YR	14100.00	5177.86	5191.45	5184.06	5191.69	0.00	4.16	3810.75	1125.03	0.21
Reach_1	20502	50-YR	10400.00	5177.86	5190.20	5183.33	5190.37	0.00	3.42	3317.05	913.59	0.19
Reach_1	20502	10-YR	4900.00	5177.86	5187.51	5181.99	5187.58	0.00	2.20	2396.34	328.38	0.14
Reach_1	20331	500-YR	27700.00	5174.86	5191.50	5191.50	5194.82	0.01	15.59	2193.25	629.43	0.80
Reach_1	20331	100-YR	14100.00	5174.86	5190.04	5186.91	5191.45	0.00	9.83	1670.20	554.27	0.54
Reach_1	20331	50-YR	10400.00	5174.86	5189.16	5185.44	5190.18	0.00	8.24	1415.74	482.35	0.48
Reach_1	20331	10-YR	4900.00	5174.86	5187.06	5182.19	5187.48	0.00	5.19	943.54	135.33	0.34
Reach_1	20100	500-YR	27700.00	5175.21	5192.29	5189.71	5193.14	0.00	9.52	4675.02	702.14	0.45
Reach_1	20100	100-YR	14100.00	5175.21	5190.19	5187.08	5190.84	0.00	7.60	2667.44	624.29	0.39
Reach_1	20100	50-YR	10400.00	5175.21	5189.23	5185.90	5189.72	0.00	6.47	2288.95	584.71	0.35
Reach_1	20100	10-YR	4900.00	5175.21	5186.98	5182.50	5187.25	0.00	4.55	1454.96	455.19	0.28
Reach_1	19952	500-YR	27700.00	5175.05	5192.34	5189.43	5192.87	0.00	7.77	6018.04	1115.55	0.38

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_1	19952	100-YR	14100.00	5175.05	5190.07	5187.02	5190.66	0.00	7.29	2756.86	886.45	0.39
Reach_1	19952	50-YR	10400.00	5175.05	5189.14	5185.48	5189.57	0.00	6.20	2351.70	621.25	0.35
Reach_1	19952	10-YR	4900.00	5175.05	5186.55	5182.46	5187.11	0.00	6.01	815.63	463.50	0.38
Reach_1	19866	500-YR	27700.00	5175.12	5192.20	5189.25	5192.77	0.00	8.82	6079.20	1438.21	0.42
Reach_1	19866	100-YR	14100.00	5175.12	5190.12	5187.61	5190.51	0.00	6.90	3375.09	803.16	0.36
Reach_1	19866	50-YR	10400.00	5175.12	5189.15	5187.61	5189.46	0.00	6.13	2844.11	675.82	0.33
Reach_1	19866	10-YR	4900.00	5175.12	5185.15	5183.21	5186.84	0.00	10.45	471.67	439.77	0.66
Reach_1	19861	500-YR	27700.00	5175.01	5192.20	5189.19	5192.76	0.00	8.85	6114.62	1414.16	0.42
Reach_1	19861	100-YR	14100.00	5175.01	5190.11	5187.32	5190.51	0.00	6.97	3374.92	802.18	0.36
Reach_1	19861	50-YR	10400.00	5175.01	5189.14	5186.63	5189.46	0.00	6.19	2843.63	677.06	0.33
Reach_1	19861	10-YR	4900.00	5175.01	5184.98	5183.29	5186.81	0.00	10.88	453.37	440.92	0.69
Reach_1	19746	500-YR	27700.00	5174.89	5192.20	5188.10	5192.64	0.00	6.96	5988.80	1427.00	0.34
Reach_1	19746	100-YR	14100.00	5174.89	5190.19	5186.32	5190.40	0.00	4.78	4549.24	1079.57	0.25
Reach_1	19746	50-YR	10400.00	5174.89	5189.20	5185.65	5189.37	0.00	4.21	3854.16	1011.88	0.23
Reach_1	19746	10-YR	4900.00	5174.89	5185.98	5182.31	5186.20	0.00	4.30	1756.51	622.22	0.28
Reach_1	19666	500-YR	27700.00	5174.89	5192.18	5187.85	5192.57	0.00	6.40	6250.52	1292.82	0.31
Reach_1	19666	100-YR	14100.00	5174.89	5190.18	5186.18	5190.36	0.00	4.38	4708.48	1037.73	0.23
Reach_1	19666	50-YR	10400.00	5174.89	5189.19	5184.85	5189.33	0.00	3.85	3982.01	957.29	0.21
Reach_1	19666	10-YR	4900.00	5174.89	5185.95	5182.20	5186.15	0.00	4.03	1809.33	641.25	0.27
Reach_1	19578	500-YR	27700.00	5174.77	5192.28	5187.47	5192.48	0.00	4.65	8822.68	1461.83	0.24
Reach_1	19578	100-YR	14100.00	5174.77	5190.21	5185.70	5190.32	0.00	3.32	6512.17	1382.86	0.19
Reach_1	19578	50-YR	10400.00	5174.77	5189.21	5183.96	5189.30	0.00	2.99	5400.08	1263.40	0.18
Reach_1	19578	10-YR	4900.00	5174.77	5185.96	5181.16	5186.10	0.00	3.24	2197.60	787.37	0.24
Reach_1	19327	500-YR	27700.00	5174.76	5191.18	5189.69	5192.23	0.00	10.76	4329.39	1204.49	0.54
Reach_1	19327	100-YR	14100.00	5174.76	5189.63	5187.80	5190.17	0.00	7.37	3218.12	1011.23	0.39
Reach_1	19327	50-YR	10400.00	5174.76	5188.67	5186.92	5189.16	0.00	6.78	2556.20	900.48	0.38
Reach_1	19327	10-YR	4900.00	5174.76	5184.89	5182.01	5185.84	0.00	7.83	656.82	229.49	0.53
Reach_1	18997	500-YR	27700.00	5174.72	5190.96	5189.79	5191.57	0.00	8.59	6320.05	1620.67	0.46
Reach_1	18997	100-YR	14100.00	5174.72	5187.65	5187.65	5189.44	0.00	11.64	1740.68	806.64	0.75
Reach_1	18997	50-YR	10400.00	5174.72	5186.11	5186.11	5188.35	0.00	12.24	975.24	456.15	0.86
Reach_1	18997	10-YR	4900.00	5174.72	5181.92	5181.90	5184.40	0.01	12.63	388.05	77.29	0.99
Reach_1	18905	500-YR	27700.00	5174.70	5191.06	5188.60	5191.40	0.00	6.68	8334.08	1758.82	0.34
Reach_1	18905	100-YR	14100.00	5174.70	5186.61	5186.61	5188.73	0.00	12.32	1487.39	799.41	0.80
Reach_1	18905	50-YR	10400.00	5174.70	5184.69	5184.69	5187.40	0.01	13.37	830.91	358.19	0.95
Reach_1	18905	10-YR	4900.00	5174.70	5181.82	5181.22	5183.57	0.01	10.60	463.12	97.97	0.84
Reach_1	18733	500-YR	27700.00	5173.93	5191.05	5186.56	5191.26	0.00	4.83	9274.86	1764.82	0.23
Reach_1	18733	100-YR	14100.00	5173.93	5186.49	5183.03	5187.21	0.00	7.18	2332.22	893.44	0.42
Reach_1	18733	50-YR	10400.00	5173.93	5185.17	5181.75	5185.81	0.00	6.58	1777.69	469.92	0.41
Reach_1	18733	10-YR	4900.00	5173.93	5182.14	5179.67	5182.57	0.00	5.32	936.15	221.89	0.42
Reach_1	18648	500-YR	27700.00	5173.30	5190.66	5184.78	5191.17	0.00	7.12	6259.31	1279.56	0.34
Reach_1	18648	100-YR	14100.00	5173.30	5186.44	5182.11	5187.04	0.00	6.65	2384.24	696.20	0.37
Reach_1	18648	50-YR	10400.00	5173.30	5185.18	5181.12	5185.63	0.00	5.73	2051.18	560.11	0.35
Reach_1	18648	10-YR	4900.00	5173.30	5182.11	5179.49	5182.39	0.00	4.51	1237.99	306.85	0.34
Reach_1	18574 Pecos St		Bridge									
Reach_1	18466	500-YR	27700.00	5173.30	5187.61	5186.03	5188.75	0.00	11.72	4605.90	1494.51	0.58
Reach_1	18466	100-YR	14100.00	5173.30	5185.02	5182.00	5186.10	0.00	9.82	1924.05	1141.85	0.54
Reach_1	18466	50-YR	10400.00	5173.30	5183.71	5180.97	5184.54	0.00	8.56	1625.22	940.94	0.50
Reach_1	18466	10-YR	4900.00	5173.30	5181.15	5179.08	5181.60	0.00	6.18	1058.09	295.32	0.43
Reach_1	18273	500-YR	27700.00	5174.15	5187.73	5185.44	5188.15	0.00	6.44	6956.18	2206.65	0.34
Reach_1	18273	100-YR	14100.00	5174.15	5184.75	5181.58	5185.67	0.00	7.78	1946.08	1864.96	0.48
Reach_1	18273	50-YR	10400.00	5174.15	5183.41	5180.52	5184.17	0.00	7.03	1499.39	1394.21	0.48
Reach_1	18273	10-YR	4900.00	5174.15	5180.89	5178.65	5181.31	0.00	5.18	946.05	831.39	0.42
Reach_1	18090	500-YR	27700.00	5173.95	5185.00	5185.00	5187.59	0.01	14.14	2661.23	1863.37	0.81
Reach_1	18090	100-YR	14100.00	5173.95	5183.38	5181.62	5185.11	0.00	10.60	1419.33	1652.57	0.67
Reach_1	18090	50-YR	10400.00	5173.95	5182.41	5180.45	5183.68	0.00	9.03	1156.18	1269.44	0.61
Reach_1	18090	10-YR	4900.00	5173.95	5180.42	5178.32	5180.97	0.00	5.99	818.09	759.52	0.47
Reach_1	17743	500-YR	27700.00	5172.69	5182.87	5182.87	5185.03	0.01	15.92	2999.58	1752.16	0.94
Reach_1	17743	100-YR	14100.00	5172.69	5181.17	5181.17	5183.43	0.01	14.38	1463.84	1693.36	0.94
Reach_1	17743	50-YR	10400.00	5172.69	5180.35	5180.35	5182.19	0.01	12.75	1215.87	1659.94	0.89
Reach_1	17743	10-YR	4900.00	5172.69	5178.63	5178.63	5179.89	0.00	9.89	707.55	952.52	0.78
Reach_1	17393	500-YR	27700.00	5171.32	5180.28	5180.02	5182.12	0.01	15.42	3105.38	1402.54	1.01
Reach_1	17393	100-YR	14100.00	5171.32	5178.57	5178.46	5179.81	0.01	12.28	2043.99	1127.87	0.92
Reach_1	17393	50-YR	10400.00	5171.32	5177.94	5177.62	5179.04	0.01	11.26	1670.66	945.20	0.88
Reach_1	17393	10-YR	4900.00	5171.32	5176.64	5176.51	5177.50	0.01	9.21	941.34	525.22	0.82

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_1	17022	500-YR	27700.00	5170.31	5178.26	5178.26	5180.09	0.01	13.19	3121.58	1218.83	1.00
Reach_1	17022	100-YR	14100.00	5170.31	5177.13	5176.83	5178.10	0.01	9.34	2242.45	863.35	0.79
Reach_1	17022	50-YR	10400.00	5170.31	5176.71	5176.06	5177.44	0.00	8.03	1917.97	809.94	0.72
Reach_1	17022	10-YR	4900.00	5170.31	5175.94	5174.99	5176.25	0.00	5.09	1354.18	681.00	0.51
Reach_1	17020		Inl Struct									
Reach_1	17011	500-YR	27700.00	5165.92	5178.31	5178.31	5179.86	0.01	12.24	3765.49	1207.15	0.84
Reach_1	17011	100-YR	14100.00	5165.92	5176.40	5176.40	5177.77	0.01	10.64	1981.18	804.73	0.87
Reach_1	17011	50-YR	10400.00	5165.92	5175.76	5175.76	5176.97	0.01	9.74	1519.58	726.26	0.85
Reach_1	17011	10-YR	4900.00	5165.92	5174.26	5174.26	5175.27	0.01	8.37	702.56	452.83	0.92
Reach_1	16987	500-YR	27700.00	5158.97	5175.45	5170.06	5176.35	0.00	8.06	4343.26	685.98	0.39
Reach_1	16987	100-YR	14100.00	5158.97	5169.61	5167.07	5170.59	0.00	8.05	1869.31	313.65	0.52
Reach_1	16987	50-YR	10400.00	5158.97	5167.62	5166.18	5168.68	0.00	8.27	1273.02	243.39	0.62
Reach_1	16987	10-YR	4900.00	5158.97	5164.08	5164.08	5165.65	0.01	10.06	487.08	167.05	0.99
Reach_1	16825	500-YR	27700.00	5155.19	5170.33	5170.33	5175.55	0.01	18.95	1662.15	172.98	0.95
Reach_1	16825	100-YR	14100.00	5155.19	5166.14	5166.14	5169.75	0.01	15.40	974.46	152.59	0.94
Reach_1	16825	50-YR	10400.00	5155.19	5164.46	5164.46	5167.69	0.01	14.46	733.66	125.93	0.99
Reach_1	16825	10-YR	4900.00	5155.19	5161.82	5161.82	5163.85	0.01	11.42	429.20	107.28	1.01
Reach_1	16803	500-YR	27700.00	5154.91	5169.91	5169.91	5174.77	0.01	18.47	1757.51	193.63	0.93
Reach_1	16803	100-YR	14100.00	5154.91	5165.86	5165.86	5169.31	0.01	15.08	1011.12	166.76	0.92
Reach_1	16803	50-YR	10400.00	5154.91	5164.27	5164.27	5167.34	0.01	14.08	759.29	149.45	0.96
Reach_1	16803	10-YR	4900.00	5154.91	5161.18	5161.18	5163.40	0.01	11.93	410.67	94.18	1.01
Reach_1	16787	500-YR	27700.00	5151.22	5169.12	5169.12	5173.78	0.01	18.37	1840.02	207.79	0.89
Reach_1	16787	100-YR	14100.00	5151.22	5164.90	5164.90	5168.46	0.01	15.36	1007.75	169.99	0.91
Reach_1	16787	50-YR	10400.00	5151.22	5163.05	5163.05	5166.42	0.01	14.73	713.05	130.94	0.98
Reach_1	16787	10-YR	4900.00	5151.22	5159.50	5159.50	5162.00	0.01	12.69	386.25	78.79	1.01
Reach_1	16726	500-YR	27700.00	5151.43	5167.25	5167.25	5171.40	0.01	17.94	1990.71	236.10	0.86
Reach_1	16726	100-YR	14100.00	5151.43	5163.41	5163.41	5166.54	0.01	14.75	1140.21	204.48	0.83
Reach_1	16726	50-YR	10400.00	5151.43	5161.81	5161.81	5164.74	0.01	13.88	819.25	191.48	0.86
Reach_1	16726	10-YR	4900.00	5151.43	5157.85	5157.81	5160.28	0.01	12.49	392.24	79.91	0.99
Reach_1	16597	500-YR	27700.00	5149.95	5164.66	5164.66	5169.35	0.01	18.32	1786.03	203.65	0.93
Reach_1	16597	100-YR	14100.00	5149.95	5160.83	5160.83	5164.11	0.01	14.83	1055.75	178.82	0.91
Reach_1	16597	50-YR	10400.00	5149.95	5159.40	5159.40	5162.26	0.01	13.67	807.32	168.75	0.93
Reach_1	16597	10-YR	4900.00	5149.95	5157.95	5156.51	5159.02	0.00	8.32	591.33	121.13	0.64
Reach_1	16232	500-YR	27700.00	5147.60	5161.77	5157.14	5162.35	0.00	7.53	4832.63	971.00	0.40
Reach_1	16232	100-YR	14100.00	5147.60	5157.18	5155.80	5157.77	0.00	7.65	2477.80	498.33	0.52
Reach_1	16232	50-YR	10400.00	5147.60	5155.82	5155.80	5156.47	0.00	7.95	1741.72	487.84	0.61
Reach_1	16232	10-YR	4900.00	5147.60	5154.16	5154.16	5156.39	0.01	11.97	409.49	382.29	0.99
Reach_1	15860	500-YR	27700.00	5144.91	5161.50	5155.70	5161.92	0.00	6.81	6628.13	1030.61	0.32
Reach_1	15860	100-YR	14100.00	5144.91	5156.58	5153.60	5157.05	0.00	6.71	3065.08	498.35	0.39
Reach_1	15860	50-YR	10400.00	5144.91	5155.12	5152.81	5155.57	0.00	6.43	2376.51	466.10	0.41
Reach_1	15860	10-YR	4900.00	5144.91	5151.97	5151.13	5152.58	0.00	6.85	975.51	381.20	0.56
Reach_1	15697	500-YR	27700.00	5144.32	5161.51	5154.84	5161.77	0.00	5.29	7363.42	1039.98	0.24
Reach_1	15697	100-YR	14100.00	5144.32	5156.57	5152.67	5156.83	0.00	5.12	3965.33	641.59	0.29
Reach_1	15697	50-YR	10400.00	5144.32	5155.01	5151.90	5155.34	0.00	5.47	2556.52	567.14	0.34
Reach_1	15697	10-YR	4900.00	5144.32	5151.78	5150.35	5152.15	0.00	5.47	1188.75	455.72	0.44
Reach_1	15383	500-YR	27700.00	5143.17	5161.41		5161.61	0.00	5.05	8176.34	634.23	0.22
Reach_1	15383	100-YR	14100.00	5143.17	5156.47		5156.61	0.00	4.22	5121.73	602.90	0.22
Reach_1	15383	50-YR	10400.00	5143.17	5154.95		5155.07	0.00	3.84	4212.17	593.88	0.21
Reach_1	15383	10-YR	4900.00	5143.17	5151.66		5151.76	0.00	3.52	2297.65	569.99	0.24
Reach_1	14865	500-YR	27700.00	5141.77	5161.33		5161.48	0.00	4.28	10645.29	781.20	0.18
Reach_1	14865	100-YR	14100.00	5141.77	5156.38		5156.48	0.00	3.42	6848.36	750.68	0.17
Reach_1	14865	50-YR	10400.00	5141.77	5154.86		5154.94	0.00	3.04	5713.54	741.71	0.17
Reach_1	14865	10-YR	4900.00	5141.77	5151.54		5151.59	0.00	2.53	3289.48	713.67	0.17
Reach_1	14482	500-YR	27700.00	5141.80	5161.29		5161.41	0.00	3.48	10934.11	769.16	0.15
Reach_1	14482	100-YR	14100.00	5141.80	5156.34		5156.41	0.00	2.71	7214.82	734.15	0.14
Reach_1	14482	50-YR	10400.00	5141.80	5154.82		5154.87	0.00	2.39	6106.93	724.30	0.13
Reach_1	14482	10-YR	4900.00	5141.80	5151.49		5151.52	0.00	1.88	3742.30	693.18	0.12
Reach_1	14079	500-YR	27700.00	5141.18	5160.99		5161.28	0.00	5.54	7099.13	554.03	0.23
Reach_1	14079	100-YR	14100.00	5141.18	5156.08		5156.28	0.00	4.62	4462.95	520.62	0.23
Reach_1	14079	50-YR	10400.00	5141.18	5154.59		5154.76	0.00	4.18	3692.47	512.30	0.22
Reach_1	14079	10-YR	4900.00	5141.18	5151.26		5151.40	0.00	3.70	2025.07	483.07	0.23
Reach_1	13859	500-YR	27700.00	5141.19	5160.77		5161.15	0.00	6.69	6353.08	519.68	0.28
Reach_1	13859	100-YR	14100.00	5141.19	5155.85		5156.15	0.00	5.76	3875.16	488.19	0.28
Reach_1	13859	50-YR	10400.00	5141.19	5154.37		5154.62	0.00	5.29	3157.16	478.91	0.28
Reach_1	13859	10-YR	4900.00	5141.19	5151.00		5151.23	0.00	4.72	1632.02	405.05	0.29

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_1	13400	500-YR	27700.00	5140.93	5160.32	5154.04	5160.81	0.00	7.63	5742.46	681.42	0.32
Reach_1	13400	100-YR	14100.00	5140.93	5155.24	5149.90	5155.71	0.00	7.13	3141.86	479.98	0.36
Reach_1	13400	50-YR	10400.00	5140.93	5153.78	5149.93	5154.20	0.00	6.50	2486.45	421.39	0.35
Reach_1	13400	10-YR	4900.00	5140.93	5150.10	5148.08	5150.61	0.00	6.50	1076.18	335.35	0.43
Reach_1	12944	500-YR	27700.00	5139.45	5160.35	5152.61	5160.55	0.00	3.86	7966.17	1169.06	0.16
Reach_1	12944	100-YR	14100.00	5139.45	5154.78	5150.13	5155.21	0.00	6.44	3029.06	352.53	0.32
Reach_1	12944	50-YR	10400.00	5139.45	5153.37	5149.29	5153.71	0.00	5.68	2542.44	339.39	0.30
Reach_1	12944	10-YR	4900.00	5139.45	5149.44	5146.20	5149.80	0.00	5.40	1263.75	312.16	0.35
Reach_1	12864	500-YR	27700.00	5139.38	5159.96	5154.06	5160.48	0.00	7.78	6268.21	1047.13	0.34
Reach_1	12864	100-YR	14100.00	5139.38	5154.25	5151.29	5155.08	0.00	8.52	2321.66	309.53	0.45
Reach_1	12864	50-YR	10400.00	5139.38	5152.91	5149.54	5153.59	0.00	7.61	1913.86	299.66	0.43
Reach_1	12864	10-YR	4900.00	5139.38	5148.60	5147.51	5149.58	0.00	8.29	732.12	223.41	0.63
Reach_1	12560	500-YR	27700.00	5138.55	5160.05	5150.41	5160.26	0.00	4.76	9382.92	1295.14	0.20
Reach_1	12560	100-YR	14100.00	5138.55	5154.49	5148.39	5154.70	0.00	4.40	4517.25	479.45	0.22
Reach_1	12560	50-YR	10400.00	5138.55	5153.11	5147.66	5153.26	0.00	3.83	3858.20	471.09	0.21
Reach_1	12560	10-YR	4900.00	5138.55	5148.87	5146.01	5149.03	0.00	3.72	1910.73	447.16	0.26
Reach_1	12297	500-YR	27700.00	5138.45	5159.63	5151.36	5160.13	0.00	6.72	5534.16	838.10	0.28
Reach_1	12297	100-YR	14100.00	5138.45	5154.14	5148.65	5154.54	0.00	5.84	2947.30	603.65	0.30
Reach_1	12297	50-YR	10400.00	5138.45	5152.83	5147.83	5153.13	0.00	5.03	2539.37	557.77	0.27
Reach_1	12297	10-YR	4900.00	5138.45	5148.52	5146.09	5148.81	0.00	4.85	1241.84	440.52	0.34
Reach_1	12221	500-YR	27700.00	5139.46	5159.04	5152.28	5160.00	0.00	8.21	4293.29	1198.37	0.37
Reach_1	12221	100-YR	14100.00	5139.46	5153.65	5148.81	5154.41	0.00	7.00	2053.03	591.89	0.39
Reach_1	12221	50-YR	10400.00	5139.46	5152.49	5147.58	5153.03	0.00	5.88	1793.77	551.48	0.35
Reach_1	12221	10-YR	4900.00	5139.46	5148.26	5145.02	5148.69	0.00	5.23	937.68	383.92	0.39
Reach_1	12140 Broadway		Bridge									
Reach_1	12081	500-YR	27700.00	5138.00	5154.10	5151.24	5156.56	0.00	12.86	2278.87	1003.46	0.63
Reach_1	12081	100-YR	14100.00	5138.00	5150.40	5147.69	5151.77	0.00	9.52	1541.90	766.38	0.56
Reach_1	12081	50-YR	10400.00	5138.00	5149.06	5146.30	5150.12	0.00	8.32	1288.39	663.95	0.53
Reach_1	12081	10-YR	4900.00	5138.00	5146.62	5143.47	5147.14	0.00	5.79	846.08	277.91	0.43
Reach_1	11882	500-YR	27700.00	5137.60	5155.12	5148.35	5155.25	0.00	3.46	9665.44	1346.87	0.17
Reach_1	11882	100-YR	14100.00	5137.60	5150.52	5146.19	5150.92	0.00	5.29	2814.73	942.16	0.32
Reach_1	11882	50-YR	10400.00	5137.60	5149.06	5145.29	5149.38	0.00	4.77	2304.51	934.16	0.32
Reach_1	11882	10-YR	4900.00	5137.60	5146.43	5143.88	5146.63	0.00	3.74	1397.25	520.92	0.31
Reach_1	11760	500-YR	27700.00	5137.48	5154.75	5149.44	5155.16	0.00	6.07	5973.58	1142.67	0.29
Reach_1	11760	100-YR	14100.00	5137.48	5150.26	5146.92	5150.73	0.00	6.15	2891.22	560.89	0.36
Reach_1	11760	50-YR	10400.00	5137.48	5148.72	5145.92	5149.17	0.00	5.87	2142.65	437.19	0.38
Reach_1	11760	10-YR	4900.00	5137.48	5145.80	5144.10	5146.32	0.00	5.79	852.58	334.36	0.48
Reach_1	11405	500-YR	27700.00	5136.75	5154.41	5147.91	5154.87	0.00	6.23	5624.01	948.96	0.29
Reach_1	11405	100-YR	14100.00	5136.75	5149.93	5145.70	5150.29	0.00	5.37	3293.65	499.13	0.31
Reach_1	11405	50-YR	10400.00	5136.75	5148.34	5144.91	5148.68	0.00	5.08	2520.77	461.88	0.32
Reach_1	11405	10-YR	4900.00	5136.75	5145.25	5143.33	5145.54	0.00	4.54	1274.81	372.60	0.37
Reach_1	11109	500-YR	27700.00	5135.59	5152.33	5149.32	5154.34	0.00	11.70	2607.38	302.18	0.59
Reach_1	11109	100-YR	14100.00	5135.59	5148.57	5145.78	5149.80	0.00	9.00	1647.47	234.82	0.54
Reach_1	11109	50-YR	10400.00	5135.59	5147.21	5144.74	5148.19	0.00	7.97	1341.72	219.03	0.52
Reach_1	11109	10-YR	4900.00	5135.59	5144.43	5142.69	5145.02	0.00	6.16	797.39	179.99	0.51
Reach_1	11024	500-YR	27700.00	5135.42	5151.73	5149.33	5154.06	0.00	12.55	2400.78	592.40	0.64
Reach_1	11024	100-YR	14100.00	5135.42	5148.16	5145.77	5149.56	0.00	9.57	1524.90	471.45	0.59
Reach_1	11024	50-YR	10400.00	5135.42	5146.90	5144.68	5147.98	0.00	8.37	1266.22	398.49	0.56
Reach_1	11024	10-YR	4900.00	5135.42	5144.16	5142.75	5144.82	0.00	6.51	754.43	278.76	0.55
Reach_1	11020		Inl Struct									
Reach_1	10961	500-YR	27700.00	5134.34	5151.42	5148.23	5153.38	0.00	11.63	2653.40	836.02	0.57
Reach_1	10961	100-YR	14100.00	5134.34	5146.57	5144.45	5148.19	0.00	10.24	1411.32	336.91	0.63
Reach_1	10961	50-YR	10400.00	5134.34	5145.33	5143.40	5146.57	0.00	8.97	1170.92	280.38	0.60
Reach_1	10961	10-YR	4900.00	5134.34	5142.84	5141.26	5143.52	0.00	6.62	740.76	166.96	0.55
Reach_1	10815	500-YR	27700.00	5134.26	5150.50		5152.75	0.00	12.57	2429.89	251.33	0.61
Reach_1	10815	100-YR	14100.00	5134.26	5145.08		5147.24	0.01	11.94	1236.85	194.15	0.76
Reach_1	10815	50-YR	10400.00	5134.26	5143.34	5142.80	5145.46	0.01	11.73	907.30	181.57	0.85
Reach_1	10815	10-YR	4900.00	5134.26	5140.64	5140.64	5142.28	0.01	10.27	477.12	145.74	1.00
Reach_1	10741	500-YR	27700.00	5132.72	5150.84	5144.59	5152.10	0.00	9.28	3400.50	758.08	0.42
Reach_1	10741	100-YR	14100.00	5132.72	5145.53	5141.25	5146.42	0.00	7.60	1935.24	302.13	0.42
Reach_1	10741	50-YR	10400.00	5132.72	5143.85	5140.12	5144.56	0.00	6.80	1559.74	205.67	0.41
Reach_1	10741	10-YR	4900.00	5132.72	5140.95	5137.34	5141.32	0.00	4.93	994.63	185.70	0.37
Reach_1	10692		Inl Struct									

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_1	10680	500-YR	27700.00	5131.45	5149.73	5145.87	5151.84	0.00	11.99	2637.52	457.79	0.57
Reach_1	10680	100-YR	14100.00	5131.45	5144.61	5142.28	5146.17	0.00	10.14	1478.74	348.33	0.61
Reach_1	10680	50-YR	10400.00	5131.45	5142.99	5141.18	5144.32	0.00	9.30	1161.21	240.05	0.62
Reach_1	10680	10-YR	4900.00	5131.45	5139.88	5139.08	5140.87	0.00	7.97	616.80	161.48	0.71
Reach_1	10644	500-YR	27700.00	5130.71	5149.90	5144.31	5151.55	0.00	10.50	2849.65	268.75	0.47
Reach_1	10644	100-YR	14100.00	5130.71	5144.79	5140.71	5145.85	0.00	8.30	1754.56	201.32	0.46
Reach_1	10644	50-YR	10400.00	5130.71	5143.16	5139.53	5144.00	0.00	7.36	1434.42	191.32	0.45
Reach_1	10644	10-YR	4900.00	5130.71	5140.06	5137.02	5140.52	0.00	5.47	895.65	163.02	0.41
Reach_1	10584 I-25		Bridge									
Reach_1	10304	500-YR	27700.00	5129.72	5147.64	5143.17	5149.49	0.00	11.13	2683.56	229.09	0.53
Reach_1	10304	100-YR	14100.00	5129.72	5142.70	5139.74	5143.95	0.00	9.02	1619.67	203.62	0.53
Reach_1	10304	50-YR	10400.00	5129.72	5141.20	5138.60	5142.21	0.00	8.05	1319.74	196.93	0.52
Reach_1	10304	10-YR	4900.00	5129.72	5138.34	5136.52	5138.94	0.00	6.21	789.29	171.87	0.51
Reach_1	10269	500-YR	27700.00	5129.35	5147.62		5149.38	0.00	11.32	2708.18	248.94	0.52
Reach_1	10269	100-YR	14100.00	5129.35	5142.31		5143.80	0.00	10.21	1499.45	210.06	0.59
Reach_1	10269	50-YR	10400.00	5129.35	5140.69		5142.02	0.00	9.55	1167.77	199.56	0.61
Reach_1	10269	10-YR	4900.00	5129.35	5137.78		5138.73	0.00	7.89	635.31	155.56	0.65
Reach_1	10229	500-YR	27700.00	5129.28	5146.44		5149.02	0.00	13.37	2289.62	217.13	0.65
Reach_1	10229	100-YR	14100.00	5129.28	5141.49		5143.50	0.00	11.56	1293.11	187.07	0.71
Reach_1	10229	50-YR	10400.00	5129.28	5140.16		5141.79	0.00	10.33	1049.28	179.15	0.69
Reach_1	10229	10-YR	4900.00	5129.28	5137.61		5138.57	0.00	7.88	623.14	149.45	0.67
Reach_1	10191	500-YR	27700.00	5128.85	5146.55	5142.97	5148.70	0.00	12.13	2516.05	311.82	0.58
Reach_1	10191	100-YR	14100.00	5128.85	5141.58	5139.39	5143.16	0.00	10.23	1455.88	197.88	0.61
Reach_1	10191	50-YR	10400.00	5128.85	5140.23	5138.12	5141.48	0.00	9.04	1194.72	188.93	0.59
Reach_1	10191	10-YR	4900.00	5128.85	5137.64	5135.92	5138.33	0.00	6.66	736.59	158.70	0.54
Reach_1	10161		Inl Struct									
Reach_1	10127	500-YR	27700.00	5127.88	5145.93	5141.93	5148.30	0.00	12.91	2458.39	203.52	0.58
Reach_1	10127	100-YR	14100.00	5127.88	5139.14	5137.85	5141.53	0.00	12.57	1187.95	170.10	0.74
Reach_1	10127	50-YR	10400.00	5127.88	5137.50	5136.44	5139.55	0.00	11.55	924.94	148.13	0.76
Reach_1	10127	10-YR	4900.00	5127.88	5134.34	5133.90	5135.83	0.01	9.80	499.83	120.79	0.85
Reach_1	10030	500-YR	27700.00	5127.90	5146.13	5140.07	5147.81	0.00	10.68	2834.32	238.60	0.46
Reach_1	10030	100-YR	14100.00	5127.90	5139.37	5136.22	5140.78	0.00	9.61	1533.45	184.29	0.54
Reach_1	10030	50-YR	10400.00	5127.90	5137.68	5134.98	5138.84	0.00	8.67	1225.62	178.42	0.54
Reach_1	10030	10-YR	4900.00	5127.90	5134.37	5132.76	5135.12	0.00	6.94	705.99	148.21	0.56
Reach_1	9931	500-YR	27700.00	5126.90	5146.38	5138.68	5147.55	0.00	8.93	3433.34	748.12	0.38
Reach_1	9931	100-YR	14100.00	5126.90	5139.54	5135.09	5140.50	0.00	7.91	1854.42	494.41	0.43
Reach_1	9931	50-YR	10400.00	5126.90	5137.80	5133.92	5138.57	0.00	7.05	1504.55	444.13	0.42
Reach_1	9931	10-YR	4900.00	5126.90	5134.41	5131.57	5134.87	0.00	5.43	902.79	259.23	0.41
Reach_1	9877	500-YR	27700.00	5126.92	5146.36	5138.63	5147.51	0.00	8.88	3367.67	747.03	0.37
Reach_1	9877	100-YR	14100.00	5126.92	5139.50	5134.92	5140.43	0.00	7.85	1887.71	210.89	0.42
Reach_1	9877	50-YR	10400.00	5126.92	5137.75	5133.73	5138.51	0.00	7.03	1529.59	201.15	0.41
Reach_1	9877	10-YR	4900.00	5126.92	5134.35	5131.54	5134.80	0.00	5.40	909.54	163.17	0.40
Reach_1	9816 I-25 E Ramp		Bridge									
Reach_1	9780	500-YR	27700.00	5126.56	5144.22	5138.32	5145.65	0.00	9.82	3017.92	1047.71	0.45
Reach_1	9780	100-YR	14100.00	5126.56	5139.07	5134.92	5140.02	0.00	7.88	1859.15	303.33	0.44
Reach_1	9780	50-YR	10400.00	5126.56	5137.38	5133.78	5138.15	0.00	7.09	1501.64	205.91	0.44
Reach_1	9780	10-YR	4900.00	5126.56	5134.05	5131.62	5134.54	0.00	5.59	875.96	169.52	0.43
Reach_1	9644	500-YR	27700.00	5125.10	5144.39	5137.45	5145.14	0.00	6.75	4321.76	1029.80	0.29
Reach_1	9644	100-YR	14100.00	5125.10	5139.03	5133.99	5139.60	0.00	6.29	2500.90	815.96	0.33
Reach_1	9644	50-YR	10400.00	5125.10	5137.25	5132.86	5137.77	0.00	6.01	1929.80	738.39	0.35
Reach_1	9644	10-YR	4900.00	5125.10	5133.82	5130.75	5134.19	0.00	4.88	1013.24	257.54	0.36
Reach_1	9467	500-YR	27700.00	5123.95	5144.57	5136.76	5144.95	0.00	3.46	6780.46	1029.51	0.15
Reach_1	9467	100-YR	14100.00	5123.95	5139.09	5133.75	5139.36	0.00	4.17	3689.39	989.35	0.21
Reach_1	9467	50-YR	10400.00	5123.95	5137.13	5132.68	5137.48	0.00	5.26	2458.88	878.06	0.29
Reach_1	9467	10-YR	4900.00	5123.95	5133.55	5130.24	5133.85	0.00	4.59	1228.12	279.38	0.32
Reach_1	9164	500-YR	27700.00	5123.45	5144.09	5136.03	5144.76	0.00	7.16	4708.70	990.22	0.30
Reach_1	9164	100-YR	14100.00	5123.45	5138.23	5132.61	5138.97	0.00	6.96	2067.88	493.21	0.36
Reach_1	9164	50-YR	10400.00	5123.45	5136.35	5131.45	5136.94	0.00	6.16	1702.36	448.30	0.35
Reach_1	9164	10-YR	4900.00	5123.45	5132.95	5129.40	5133.27	0.00	4.51	1087.35	174.27	0.32
Reach_1	9016	500-YR	27700.00	5122.52	5143.60	5135.75	5144.50	0.00	8.05	3968.69	886.43	0.34
Reach_1	9016	100-YR	14100.00	5122.52	5137.86	5132.18	5138.62	0.00	7.01	2068.71	482.01	0.37
Reach_1	9016	50-YR	10400.00	5122.52	5135.99	5130.88	5136.59	0.00	6.22	1686.31	189.89	0.35
Reach_1	9016	10-YR	4900.00	5122.52	5132.63	5128.73	5132.95	0.00	4.50	1088.61	168.60	0.31

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_1	8918	500-YR	27700.00	5123.00	5141.44	5137.70	5144.06	0.00	13.30	2247.15	460.37	0.60
Reach_1	8918	100-YR	14100.00	5123.00	5136.51	5133.25	5138.20	0.00	10.46	1397.28	167.61	0.57
Reach_1	8918	50-YR	10400.00	5123.00	5134.86	5131.63	5136.19	0.00	9.26	1134.93	147.35	0.55
Reach_1	8918	10-YR	4900.00	5123.00	5132.03	5128.64	5132.67	0.00	6.38	768.04	116.98	0.44
Reach_1	8856 Washington St		Bridge									
Reach_1	8791	500-YR	27700.00	5122.50	5138.22	5135.51	5141.04	0.01	13.88	2151.03	374.02	0.66
Reach_1	8791	100-YR	14100.00	5122.50	5133.80	5131.62	5135.60	0.01	10.91	1368.62	189.01	0.63
Reach_1	8791	50-YR	10400.00	5122.50	5132.38	5130.31	5133.81	0.01	9.67	1118.18	176.75	0.61
Reach_1	8791	10-YR	4900.00	5122.50	5130.35	5127.92	5130.95	0.00	6.23	797.87	146.82	0.46
Reach_1	8757 Pipe X-ing		Bridge									
Reach_1	8754	500-YR	27700.00	5121.72	5135.16	5134.35	5138.32	0.01	16.04	2159.14	354.68	0.85
Reach_1	8754	100-YR	14100.00	5121.72	5132.80	5131.42	5134.35	0.01	11.09	1605.37	318.75	0.66
Reach_1	8754	50-YR	10400.00	5121.72	5131.82	5130.44	5133.00	0.00	9.58	1374.73	303.86	0.61
Reach_1	8754	10-YR	4900.00	5121.72	5130.16	5128.39	5130.69	0.00	6.26	984.83	274.99	0.45
Reach_1	8648	500-YR	27700.00	5123.00	5134.93	5133.71	5137.13	0.01	13.94	2775.88	645.64	0.76
Reach_1	8648	100-YR	14100.00	5123.00	5132.47	5131.22	5133.72	0.00	10.23	1938.00	591.98	0.63
Reach_1	8648	50-YR	10400.00	5123.00	5131.47	5130.34	5132.50	0.00	9.10	1598.33	578.81	0.60
Reach_1	8648	10-YR	4900.00	5123.00	5129.94	5128.35	5130.43	0.00	6.10	1076.30	508.96	0.46
Reach_1	8370	500-YR	27700.00	5122.64	5134.41	5131.98	5135.64	0.00	11.42	3605.70	538.93	0.60
Reach_1	8370	100-YR	14100.00	5122.64	5131.97	5129.54	5132.66	0.00	8.36	2508.70	467.32	0.49
Reach_1	8370	50-YR	10400.00	5122.64	5130.92	5128.71	5131.52	0.00	7.64	1986.45	412.49	0.48
Reach_1	8370	10-YR	4900.00	5122.64	5129.70	5126.57	5129.92	0.00	4.59	1545.65	361.48	0.32
Reach_1	7946	500-YR	27700.00	5122.64	5132.95	5131.13	5134.16	0.00	10.28	3428.14	515.11	0.59
Reach_1	7946	100-YR	14100.00	5122.64	5130.35	5129.04	5131.33	0.00	8.80	1954.51	484.66	0.60
Reach_1	7946	50-YR	10400.00	5122.64	5129.20	5128.90	5130.12	0.00	8.38	1502.20	472.49	0.63
Reach_1	7946	10-YR	4900.00	5122.64	5128.86	5126.69	5129.29	0.00	5.38	1024.10	468.29	0.42
Reach_1	7756	500-YR	27700.00	5122.53	5132.22	5130.37	5133.46	0.00	11.49	3810.77	573.34	0.68
Reach_1	7756	100-YR	14100.00	5122.53	5129.13	5127.91	5130.41	0.01	10.73	1767.80	510.74	0.78
Reach_1	7756	50-YR	10400.00	5122.53	5128.00	5127.67	5129.11	0.01	9.93	1394.92	471.64	0.80
Reach_1	7756	10-YR	4900.00	5122.53	5127.51	5126.74	5128.66	0.01	8.64	575.22	455.75	0.74
Reach_1	7697	500-YR	27700.00	5121.05	5132.14	5129.72	5133.14	0.00	10.09	3952.72	590.12	0.59
Reach_1	7697	100-YR	14100.00	5121.05	5128.96	5127.66	5129.95	0.01	9.27	1912.30	533.48	0.67
Reach_1	7697	50-YR	10400.00	5121.05	5127.72	5127.66	5128.61	0.01	8.76	1464.07	460.29	0.71
Reach_1	7697	10-YR	4900.00	5121.05	5126.76	5126.42	5128.15	0.01	9.46	518.27	371.12	0.86
Reach_1	7651	500-YR	27700.00	5118.39	5132.04	5128.87	5132.95	0.00	9.63	4365.13	610.16	0.50
Reach_1	7651	100-YR	14100.00	5118.39	5128.91	5127.47	5129.67	0.00	8.18	2291.79	541.77	0.50
Reach_1	7651	50-YR	10400.00	5118.39	5127.66	5126.41	5128.31	0.00	7.45	1845.41	482.28	0.49
Reach_1	7651	10-YR	4900.00	5118.39	5127.17	5123.81	5127.68	0.00	5.74	856.60	446.06	0.39
Reach_1	7516	500-YR	27700.00	5119.55	5131.83	5127.83	5132.54	0.00	8.86	4930.31	642.89	0.46
Reach_1	7516	100-YR	14100.00	5119.55	5128.72	5127.16	5129.24	0.00	7.23	2805.04	569.98	0.43
Reach_1	7516	50-YR	10400.00	5119.55	5127.43	5126.43	5127.88	0.00	6.60	2272.65	523.24	0.43
Reach_1	7516	10-YR	4900.00	5119.55	5126.75	5123.90	5127.36	0.00	6.31	792.96	461.74	0.43
Reach_1	7382	500-YR	27700.00	5119.49	5131.65	5127.14	5132.22	0.00	7.60	5078.88	634.21	0.40
Reach_1	7382	100-YR	14100.00	5119.49	5128.53	5126.32	5128.92	0.00	6.10	3029.72	570.88	0.38
Reach_1	7382	50-YR	10400.00	5119.49	5127.21	5126.32	5127.55	0.00	5.69	2430.46	543.88	0.39
Reach_1	7382	10-YR	4900.00	5119.49	5126.30	5123.97	5126.96	0.00	6.55	750.57	441.64	0.48
Reach_1	7228	500-YR	27700.00	5119.42	5131.35	5126.72	5131.87	0.00	7.41	5264.11	729.72	0.39
Reach_1	7228	100-YR	14100.00	5119.42	5128.22	5125.36	5128.57	0.00	5.97	3200.89	595.76	0.38
Reach_1	7228	50-YR	10400.00	5119.42	5126.85	5125.36	5127.17	0.00	5.66	2515.89	549.44	0.39
Reach_1	7228	10-YR	4900.00	5119.42	5124.15	5123.97	5125.82	0.02	10.39	471.69	472.44	0.93
Reach_1	7182	500-YR	27700.00	5118.63	5131.26	5126.88	5131.80	0.00	7.58	5327.18	785.25	0.39
Reach_1	7182	100-YR	14100.00	5118.63	5128.13	5125.15	5128.50	0.00	6.09	3215.64	601.41	0.37
Reach_1	7182	50-YR	10400.00	5118.63	5126.74	5124.85	5127.08	0.00	5.85	2498.64	562.95	0.39
Reach_1	7182	10-YR	4900.00	5118.63	5123.76	5123.37	5125.27	0.01	9.84	498.09	458.10	0.86
Reach_1	7127	500-YR	27700.00	5113.45	5131.04	5126.75	5131.72	0.00	8.30	5113.10	763.74	0.39
Reach_1	7127	100-YR	14100.00	5113.45	5128.01	5124.55	5128.44	0.00	6.31	3212.83	540.43	0.34
Reach_1	7127	50-YR	10400.00	5113.45	5126.64	5123.13	5127.02	0.00	5.79	2584.13	456.62	0.33
Reach_1	7127	10-YR	4900.00	5113.45	5124.38	5120.60	5124.83	0.00	5.41	918.11	433.81	0.35
Reach_1	7017	500-YR	27700.00	5114.58	5130.93	5126.35	5131.51	0.00	7.47	5143.21	805.91	0.36
Reach_1	7017	100-YR	14100.00	5114.58	5127.92	5124.71	5128.28	0.00	5.69	3252.62	537.54	0.31
Reach_1	7017	50-YR	10400.00	5114.58	5126.55	5123.43	5126.86	0.00	5.29	2607.74	506.66	0.31
Reach_1	7017	10-YR	4900.00	5114.58	5124.22	5121.16	5124.69	0.00	5.52	898.21	444.91	0.38
Reach_1	6827	500-YR	27700.00	5115.04	5130.74	5126.61	5131.28	0.00	7.44	5368.36	883.74	0.36

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_1	6827	100-YR	14100.00	5115.04	5127.69	5124.74	5128.08	0.00	6.04	3214.89	594.39	0.34
Reach_1	6827	50-YR	10400.00	5115.04	5126.27	5123.59	5126.65	0.00	5.84	2482.66	554.90	0.35
Reach_1	6827	10-YR	4900.00	5115.04	5123.64	5121.13	5124.27	0.00	6.36	771.65	463.66	0.46
Reach_1	6461	500-YR	27700.00	5114.70	5130.24	5126.29	5130.83	0.00	7.61	5327.66	881.29	0.38
Reach_1	6461	100-YR	14100.00	5114.70	5127.09	5124.22	5127.62	0.00	6.68	2762.87	638.66	0.39
Reach_1	6461	50-YR	10400.00	5114.70	5125.63	5122.79	5126.13	0.00	6.35	2139.38	535.17	0.40
Reach_1	6461	10-YR	4900.00	5114.70	5122.82	5120.52	5123.41	0.00	6.16	796.09	467.57	0.46
Reach_1	6024	500-YR	27700.00	5114.70	5129.59	5126.01	5130.30	0.00	8.19	4907.98	779.90	0.41
Reach_1	6024	100-YR	14100.00	5114.70	5126.57	5123.85	5127.09	0.00	6.63	2940.14	553.58	0.38
Reach_1	6024	50-YR	10400.00	5114.70	5124.96	5121.96	5125.51	0.00	6.56	2154.18	521.17	0.41
Reach_1	6024	10-YR	4900.00	5114.70	5121.90	5119.69	5122.50	0.00	6.21	788.75	149.22	0.48
Reach_1	5990	500-YR	27700.00	5107.32	5129.58	5125.01	5130.25	0.00	7.68	5084.46	768.64	0.35
Reach_1	5990	100-YR	14100.00	5107.32	5126.59	5120.37	5127.03	0.00	5.83	3181.41	548.51	0.29
Reach_1	5990	50-YR	10400.00	5107.32	5125.04	5118.94	5125.43	0.00	5.33	2467.41	484.69	0.29
Reach_1	5990	10-YR	4900.00	5107.32	5122.11	5116.24	5122.36	0.00	3.98	1229.98	353.99	0.25
Reach_1	5822	500-YR	27700.00	5107.00	5129.48	5124.67	5130.06	0.00	7.77	5534.86	763.40	0.33
Reach_1	5822	100-YR	14100.00	5107.00	5126.49	5120.22	5126.90	0.00	6.08	3347.67	610.27	0.28
Reach_1	5822	50-YR	10400.00	5107.00	5124.89	5118.85	5125.29	0.00	5.78	2411.38	529.95	0.29
Reach_1	5822	10-YR	4900.00	5107.00	5122.02	5115.50	5122.25	0.00	4.10	1436.83	324.59	0.23
Reach_1	5777	500-YR	27700.00	5110.01	5128.40	5126.87	5129.76	0.00	11.81	4046.25	684.75	0.52
Reach_1	5777	100-YR	14100.00	5110.01	5125.14	5122.40	5126.54	0.00	10.56	2005.44	525.98	0.52
Reach_1	5777	50-YR	10400.00	5110.01	5123.31	5120.44	5124.88	0.00	10.48	1214.50	287.59	0.55
Reach_1	5777	10-YR	4900.00	5110.01	5121.56	5117.01	5122.11	0.00	6.09	887.25	163.36	0.35
Reach_1	5690	500-YR	27700.00	5109.97	5128.27	5125.92	5129.47	0.00	11.42	4096.12	592.77	0.49
Reach_1	5690	100-YR	14100.00	5109.97	5125.06	5121.33	5126.05	0.00	9.43	2411.31	461.30	0.45
Reach_1	5690	50-YR	10400.00	5109.97	5123.22	5119.66	5124.27	0.00	9.20	1580.10	345.97	0.47
Reach_1	5690	10-YR	4900.00	5109.97	5121.52	5116.70	5121.89	0.00	5.34	1154.87	213.15	0.29
Reach_1	5555 I-270		Bridge									
Reach_1	5470	500-YR	27700.00	5107.00	5124.45	5122.37	5126.22	0.00	12.89	3252.31	431.05	0.57
Reach_1	5470	100-YR	14100.00	5107.00	5121.53	5118.52	5122.59	0.00	9.46	2123.59	345.77	0.46
Reach_1	5470	50-YR	10400.00	5107.00	5119.81	5116.54	5121.08	0.00	9.66	1281.81	299.69	0.51
Reach_1	5470	10-YR	4900.00	5107.00	5118.55	5113.51	5118.95	0.00	5.34	1074.00	239.79	0.30
Reach_1	5370	500-YR	27700.00	5107.68	5123.91	5122.54	5125.84	0.00	12.66	2912.91	442.89	0.63
Reach_1	5370	100-YR	14100.00	5107.68	5120.76	5118.93	5122.22	0.00	10.34	1708.02	357.32	0.60
Reach_1	5370	50-YR	10400.00	5107.68	5119.50	5117.41	5120.79	0.00	9.46	1297.81	294.34	0.59
Reach_1	5370	10-YR	4900.00	5107.68	5118.30	5114.66	5118.81	0.00	5.72	859.46	205.16	0.38
Reach_1	5207	500-YR	27700.00	5106.69	5123.41	5121.97	5125.20	0.00	12.59	3029.91	567.47	0.61
Reach_1	5207	100-YR	14100.00	5106.69	5119.84	5118.98	5121.53	0.00	11.33	1653.50	466.90	0.65
Reach_1	5207	50-YR	10400.00	5106.69	5118.16	5117.00	5119.98	0.01	11.26	1116.12	365.57	0.71
Reach_1	5207	10-YR	4900.00	5106.69	5118.03	5114.31	5118.55	0.00	5.79	868.53	360.86	0.37
Reach_1	4871	500-YR	27700.00	5105.80	5123.05	5120.34	5124.88	0.00	4.59	3016.86	417.55	0.21
Reach_1	4871	100-YR	14100.00	5105.80	5119.63	5117.23	5120.75	0.00	3.80	1954.78	293.96	0.20
Reach_1	4871	50-YR	10400.00	5105.80	5117.85	5116.78	5118.96	0.00	4.01	1456.04	264.75	0.23
Reach_1	4871	10-YR	4900.00	5105.80	5115.93	5114.07	5117.58	0.01	10.31	475.48	243.53	0.68
Reach_1	4589	500-YR	27700.00	5105.49	5122.97	5120.05	5124.69	0.00	6.63	2932.37	448.30	0.31
Reach_1	4589	100-YR	14100.00	5105.49	5119.51	5116.96	5120.57	0.00	5.39	1894.13	282.25	0.29
Reach_1	4589	50-YR	10400.00	5105.49	5117.66	5115.45	5118.72	0.00	5.65	1394.03	263.52	0.34
Reach_1	4589	10-YR	4900.00	5105.49	5114.83	5112.99	5116.15	0.00	9.22	533.18	204.91	0.64
Reach_1	4363	500-YR	27700.00	5105.06	5122.70	5119.96	5124.37	0.00	12.26	3149.40	698.76	0.58
Reach_1	4363	100-YR	14100.00	5105.06	5119.08	5117.12	5120.27	0.00	9.82	1868.15	368.41	0.54
Reach_1	4363	50-YR	10400.00	5105.06	5116.37	5116.10	5118.18	0.01	11.53	1139.86	262.72	0.73
Reach_1	4363	10-YR	4900.00	5105.06	5113.52	5112.58	5115.03	0.01	9.86	496.75	110.04	0.76
Reach_1	4201	500-YR	27700.00	5104.25	5123.02	5118.31	5123.83	0.00	8.13	4620.61	715.04	0.39
Reach_1	4201	100-YR	14100.00	5104.25	5119.07	5115.20	5119.84	0.00	7.22	2126.00	385.13	0.41
Reach_1	4201	50-YR	10400.00	5104.25	5116.51	5114.12	5117.37	0.00	7.54	1461.39	243.06	0.50
Reach_1	4201	10-YR	4900.00	5104.25	5113.54	5112.16	5114.18	0.00	6.40	766.01	187.61	0.56
Reach_1	3798	500-YR	27700.00	5103.23	5121.58	5117.90	5123.14	0.00	10.64	3361.30	618.42	0.51
Reach_1	3798	100-YR	14100.00	5103.23	5118.22	5114.13	5119.21	0.00	8.06	1855.36	303.98	0.45
Reach_1	3798	50-YR	10400.00	5103.23	5115.20	5112.95	5116.36	0.00	8.66	1211.59	180.11	0.58
Reach_1	3798	10-YR	4900.00	5103.23	5112.59	5110.80	5113.23	0.00	6.41	764.12	163.05	0.52
Reach_1	3388	500-YR	27700.00	5102.60	5121.35	5115.31	5122.27	0.00	8.06	4072.70	820.07	0.38
Reach_1	3388	100-YR	14100.00	5102.60	5117.99	5112.42	5118.54	0.00	5.96	2411.77	337.83	0.32
Reach_1	3388	50-YR	10400.00	5102.60	5114.52	5111.48	5115.20	0.00	6.59	1587.28	229.22	0.44
Reach_1	3388	10-YR	4900.00	5102.60	5111.82	5109.79	5112.21	0.00	5.00	982.55	219.06	0.41

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_1	3069	500-YR	27700.00	5101.30	5117.43	5115.58	5121.26	0.00	15.69	1765.32	355.75	0.78
Reach_1	3069	100-YR	14100.00	5101.30	5117.07	5111.73	5118.12	0.00	8.23	1713.34	331.75	0.42
Reach_1	3069	50-YR	10400.00	5101.30	5113.16	5110.30	5114.41	0.00	8.95	1162.19	200.61	0.55
Reach_1	3069	10-YR	4900.00	5101.30	5111.20	5108.26	5111.68	0.00	5.54	884.96	166.64	0.39
Reach_1	3030 York St		Bridge									
Reach_1	2942	500-YR	27700.00	5101.30	5118.71	5118.71	5120.59	0.00	12.48	3894.68	1629.86	0.61
Reach_1	2942	100-YR	14100.00	5101.30	5112.22	5111.69	5115.50	0.01	14.70	998.47	152.29	0.90
Reach_1	2942	50-YR	10400.00	5101.30	5111.44	5110.37	5113.64	0.00	12.03	895.77	147.74	0.78
Reach_1	2942	10-YR	4900.00	5101.30	5110.88	5107.89	5111.45	0.00	6.14	823.15	144.00	0.41
Reach_1	2830	500-YR	27700.00	5102.60	5115.57	5114.11	5116.20	0.00	8.65	5182.91	1231.96	0.47
Reach_1	2830	100-YR	14100.00	5102.60	5112.87	5110.93	5113.86	0.00	9.13	1888.25	883.63	0.57
Reach_1	2830	50-YR	10400.00	5102.60	5111.68	5110.50	5112.51	0.00	8.32	1538.47	493.20	0.56
Reach_1	2830	10-YR	4900.00	5102.60	5110.03	5108.10	5111.07	0.00	8.18	598.71	305.64	0.62
Reach_1	2459	500-YR	27700.00	5101.76	5115.75	5111.30	5115.92	0.00	2.60	8957.94	1391.59	0.13
Reach_1	2459	100-YR	14100.00	5101.76	5112.31	5108.94	5112.87	0.00	6.96	2547.06	1230.01	0.42
Reach_1	2459	50-YR	10400.00	5101.76	5111.12	5108.75	5111.56	0.00	6.09	2105.23	1148.48	0.39
Reach_1	2459	10-YR	4900.00	5101.76	5108.32	5107.11	5109.29	0.01	7.89	632.95	427.29	0.64
Reach_1	2316	500-YR	27700.00	5101.78	5115.51	5111.79	5115.86	0.00	6.33	6787.50	1135.59	0.32
Reach_1	2316	100-YR	14100.00	5101.78	5111.94	5109.02	5112.61	0.00	7.50	2400.82	1000.86	0.46
Reach_1	2316	50-YR	10400.00	5101.78	5110.72	5108.27	5111.30	0.00	6.84	1879.19	874.48	0.45
Reach_1	2316	10-YR	4900.00	5101.78	5108.38	5106.76	5108.74	0.00	5.30	1143.83	297.50	0.43
Reach_1	2036	500-YR	27700.00	5101.79	5111.74	5111.74	5115.06	0.01	14.94	1974.58	894.41	0.95
Reach_1	2036	100-YR	14100.00	5101.79	5110.70	5109.07	5111.90	0.00	8.92	1669.10	879.44	0.61
Reach_1	2036	50-YR	10400.00	5101.79	5109.65	5108.07	5110.61	0.00	7.94	1366.47	803.61	0.59
Reach_1	2036	10-YR	4900.00	5101.79	5107.49	5106.40	5108.08	0.00	6.19	794.60	686.96	0.58
Reach_1	1981	500-YR	27700.00	5100.78	5111.01	5111.01	5111.79	0.00	3.94	4348.14	884.10	0.25
Reach_1	1981	100-YR	14100.00	5100.78	5109.28	5109.28	5111.52	0.01	12.58	1293.14	829.91	0.89
Reach_1	1981	50-YR	10400.00	5100.78	5108.33	5108.33	5110.24	0.01	11.45	1027.16	793.35	0.88
Reach_1	1981	10-YR	4900.00	5100.78	5106.06	5106.06	5107.68	0.01	10.20	480.18	566.73	0.99
Reach_1	1948	500-YR	27700.00	5099.14	5111.01	5111.01	5111.68	0.00	4.07	4673.76	888.27	0.22
Reach_1	1948	100-YR	14100.00	5099.14	5107.11	5107.11	5110.22	0.01	14.16	1006.32	686.83	0.97
Reach_1	1948	50-YR	10400.00	5099.14	5105.81	5105.81	5108.45	0.01	13.03	798.39	149.83	0.99
Reach_1	1948	10-YR	4900.00	5099.14	5103.57	5103.57	5105.24	0.01	10.36	473.01	140.14	0.99
Reach_1	1899	500-YR	27700.00	5093.80	5109.50		5110.37	0.00	6.54	3911.59	842.99	0.31
Reach_1	1899	100-YR	14100.00	5093.80	5104.93		5107.09	0.00	11.82	1206.14	141.32	0.68
Reach_1	1899	50-YR	10400.00	5093.80	5103.65		5105.24	0.00	10.12	1030.73	133.09	0.63
Reach_1	1899	10-YR	4900.00	5093.80	5101.14		5101.88	0.00	6.88	712.30	122.04	0.50
Reach_1	1791	500-YR	27700.00	5092.28	5109.47		5110.27	0.00	6.33	4142.68	800.45	0.30
Reach_1	1791	100-YR	14100.00	5092.28	5104.06		5106.54	0.00	12.69	1137.92	155.35	0.79
Reach_1	1791	50-YR	10400.00	5092.28	5102.82		5104.73	0.00	11.12	949.03	149.37	0.75
Reach_1	1791	10-YR	4900.00	5092.28	5100.53		5101.51	0.00	7.91	620.48	138.37	0.65
Reach_1	1719	500-YR	27700.00	5092.21	5109.21	5105.99	5110.18	0.00	9.03	4468.10	876.36	0.45
Reach_1	1719	100-YR	14100.00	5092.21	5104.37	5102.25	5105.93	0.00	10.07	1430.97	227.50	0.63
Reach_1	1719	50-YR	10400.00	5092.21	5102.94	5101.10	5104.22	0.00	9.06	1154.62	180.21	0.62
Reach_1	1719	10-YR	4900.00	5092.21	5100.43	5098.99	5101.15	0.00	6.83	717.25	167.78	0.58
Reach_1	1668	500-YR	27700.00	5092.19	5109.40	5107.37	5110.02	0.00	5.63	4635.49	892.24	0.27
Reach_1	1668	100-YR	14100.00	5092.19	5104.15	5101.90	5105.73	0.00	10.10	1432.10	226.50	0.61
Reach_1	1668	50-YR	10400.00	5092.19	5102.75	5100.74	5104.00	0.00	8.97	1167.60	174.58	0.60
Reach_1	1668	10-YR	4900.00	5092.19	5100.27	5098.57	5100.93	0.00	6.56	747.02	164.18	0.54
Reach_1	1402	500-YR	27700.00	5091.72	5108.14	5104.77	5109.64	0.00	10.50	3619.66	847.62	0.52
Reach_1	1402	100-YR	14100.00	5091.72	5102.98	5101.18	5104.65	0.00	10.39	1373.54	211.88	0.67
Reach_1	1402	50-YR	10400.00	5091.72	5101.34	5100.05	5102.83	0.00	9.79	1069.24	179.76	0.70
Reach_1	1402	10-YR	4900.00	5091.72	5098.61	5098.03	5099.67	0.01	8.25	594.26	167.22	0.77
Reach_1	966	500-YR	27700.00	5086.50	5107.83	5101.58	5108.78	0.00	8.59	4604.40	858.18	0.38
Reach_1	966	100-YR	14100.00	5086.50	5102.23	5097.82	5103.27	0.00	8.24	1768.02	221.98	0.45
Reach_1	966	50-YR	10400.00	5086.50	5100.57	5096.53	5101.39	0.00	7.27	1440.96	172.28	0.43
Reach_1	966	10-YR	4900.00	5086.50	5098.15	5093.95	5098.49	0.00	4.72	1039.67	157.70	0.32
Reach_1	534	500-YR	27700.00	5083.00	5106.77	5100.54	5108.13	0.00	9.73	3188.32	1379.33	0.42
Reach_1	534	100-YR	14100.00	5083.00	5101.52	5096.40	5102.44	0.00	7.79	1912.67	227.48	0.41
Reach_1	534	50-YR	10400.00	5083.00	5099.87	5094.28	5100.59	0.00	6.83	1551.46	193.31	0.39
Reach_1	534	10-YR	4900.00	5083.00	5097.79	5090.53	5098.05	0.00	4.11	1193.44	161.06	0.26
Reach_1	398	500-YR	27700.00	5082.65	5105.54	5101.16	5107.75	0.00	12.12	2488.60	1248.99	0.56
Reach_1	398	100-YR	14100.00	5082.65	5100.67	5097.23	5102.08	0.00	9.52	1492.68	178.12	0.53
Reach_1	398	50-YR	10400.00	5082.65	5099.20	5095.75	5100.26	0.00	8.28	1258.91	154.90	0.50
Reach_1	398	10-YR	4900.00	5082.65	5097.53	5090.74	5097.90	0.00	4.86	1007.83	145.47	0.33

HEC-RAS Plan: CC-MultiProf (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach_1	391 Footbridge		Bridge									
Reach_1	368	500-YR	27700.00	5082.60	5102.53	5101.93	5106.97	0.00	17.11	1746.63	291.34	0.87
Reach_1	368	100-YR	14100.00	5082.60	5099.76	5097.65	5101.79	0.00	11.47	1266.79	166.04	0.66
Reach_1	368	50-YR	10400.00	5082.60	5098.59	5096.29	5100.06	0.00	9.73	1089.86	149.21	0.60
Reach_1	368	10-YR	4900.00	5082.60	5097.39	5090.67	5097.84	0.00	5.39	917.11	140.19	0.36
Reach_1	317	500-YR	27700.00	5082.65	5102.22	5102.22	5106.64	0.01	17.27	1763.25	427.69	0.90
Reach_1	317	100-YR	14100.00	5082.65	5099.09	5097.90	5101.48	0.01	12.50	1167.10	158.35	0.76
Reach_1	317	50-YR	10400.00	5082.65	5098.16	5096.55	5099.83	0.01	10.44	1021.50	152.91	0.67
Reach_1	317	10-YR	4900.00	5082.65	5097.30	5091.76	5097.78	0.00	5.59	892.31	147.92	0.38
Reach_1	258	500-YR	27700.00	5082.65	5102.61	5102.61	5105.81	0.01	14.82	2187.26	477.33	0.78
Reach_1	258	100-YR	14100.00	5082.65	5098.53	5097.81	5101.03	0.01	12.70	1121.84	175.30	0.84
Reach_1	258	50-YR	10400.00	5082.65	5097.75	5096.62	5099.47	0.01	10.54	992.94	162.66	0.74
Reach_1	258	10-YR	4900.00	5082.65	5097.20	5091.52	5097.66	0.00	5.44	904.51	160.47	0.40
Reach_1	232	500-YR	27700.00	5083.00	5099.29	5099.29	5103.94	0.01	17.46	1669.80	239.93	0.94
Reach_1	232	100-YR	14100.00	5083.00	5098.65	5095.25	5100.03	0.00	9.51	1548.43	221.16	0.53
Reach_1	232	50-YR	10400.00	5083.00	5097.83	5093.79	5098.74	0.00	7.68	1397.06	191.75	0.45
Reach_1	232	10-YR	4900.00	5083.00	5097.22	5091.17	5097.46	0.00	3.89	1288.34	173.13	0.23
Reach_1	157	500-YR	27700.00	5086.46	5100.40	5100.40	5102.59	0.00	14.36	3347.07	924.89	0.74
Reach_1	157	100-YR	14100.00	5086.46	5097.20	5096.63	5099.69	0.00	13.51	1261.70	381.93	0.81
Reach_1	157	50-YR	10400.00	5086.46	5097.19	5095.39	5098.55	0.00	9.98	1259.64	381.16	0.60
Reach_1	157	10-YR	4900.00	5086.46	5097.10	5092.77	5097.41	0.00	4.76	1241.62	374.36	0.29

HEC-RAS Plan: CC-MultiProf River: NorthOverflow Reach: Reach 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	7991	500-YR	11202.00	5258.85	5262.10	5262.10	5263.20	0.00	9.32	1375.07	615.33	0.97
Reach 1	7991	100-YR	795.00	5258.85	5259.87	5259.87	5260.15	0.00	4.47	193.48	360.00	0.98
Reach 1	7991	50-YR	1.00	5258.85	5258.94	5258.94	5258.96	0.01	1.33	0.75	16.61	1.10
Reach 1	7991	10-YR	1.00	5258.85	5258.94	5258.94	5258.96	0.01	1.33	0.75	16.61	1.10
Reach 1	7879	500-YR	11202.00	5257.66	5260.13	5260.13	5261.10	0.00	8.45	1442.85	772.24	0.99
Reach 1	7879	100-YR	795.00	5257.66	5258.28	5258.28	5258.49	0.00	3.18	225.13	541.93	0.89
Reach 1	7879	50-YR	1.00	5257.66	5257.56	5257.56	5257.56	0.00		1.78	63.00	0.00
Reach 1	7879	10-YR	1.00	5257.66	5257.56	5257.56	5257.56	0.00		1.78	63.00	0.00
Reach 1	7650	500-YR	11202.00	5252.98	5258.13		5258.60	0.00	6.48	2224.15	937.91	0.57
Reach 1	7650	100-YR	795.00	5252.98	5255.52		5255.56	0.00	1.62	478.55	336.08	0.24
Reach 1	7650	50-YR	1.00	5252.98	5254.29		5254.29	0.00	0.01	132.97	228.59	0.00
Reach 1	7650	10-YR	1.00	5252.98	5253.19		5253.20	0.01	0.75	1.32	10.09	0.37
Reach 1	7365	500-YR	12319.00	5249.78	5255.45	5255.45	5256.74	0.01	10.29	1443.56	559.40	0.93
Reach 1	7365	100-YR	2483.00	5249.78	5253.34	5253.34	5253.92	0.02	6.78	427.54	354.68	0.92
Reach 1	7365	50-YR	576.00	5249.78	5252.03	5252.03	5252.46	0.03	5.33	110.23	132.08	1.01
Reach 1	7365	10-YR	1.00	5249.78	5249.95	5249.95	5249.99	0.05	1.66	0.60	6.28	0.95
Reach 1	7126	500-YR	12319.00	5247.01	5252.37		5253.10	0.00	7.27	1968.72	648.03	0.59
Reach 1	7126	100-YR	2483.00	5247.01	5249.89		5250.08	0.00	3.54	701.65	308.32	0.41
Reach 1	7126	50-YR	576.00	5247.01	5248.52		5248.56	0.00	1.73	332.30	239.60	0.26
Reach 1	7126	10-YR	1.00	5247.01	5247.08		5247.08	0.00	0.07	14.58	204.09	0.05
Reach 1	6804	500-YR	12319.00	5246.62	5251.41	5249.97	5251.80	0.00	5.24	2612.14	891.84	0.45
Reach 1	6804	100-YR	2483.00	5246.62	5249.26	5248.12	5249.35	0.00	2.48	1029.06	571.57	0.30
Reach 1	6804	50-YR	576.00	5246.62	5248.09	5247.46	5248.11	0.00	1.33	433.93	455.44	0.24
Reach 1	6804	10-YR	1.00	5246.62	5247.02	5246.77	5247.02	0.00	0.09	10.92	304.17	0.09
Reach 1	6611	500-YR	12319.00	5245.01	5251.43		5251.52	0.00	2.44	5181.81	1216.06	0.19
Reach 1	6611	100-YR	2483.00	5245.01	5249.25		5249.26	0.00	0.90	2812.72	1094.77	0.09
Reach 1	6611	50-YR	576.00	5245.01	5248.08		5248.08	0.00	0.36	1625.61	980.98	0.05
Reach 1	6611	10-YR	1.00	5245.01	5247.02		5247.02	0.00	0.00	679.86	712.25	0.00
Reach 1	6380	500-YR	12319.00	5247.00	5251.21		5251.35	0.00	3.25	4210.23	1643.17	0.28
Reach 1	6380	100-YR	2483.00	5247.00	5249.15		5249.19	0.00	1.75	1583.69	1355.34	0.21
Reach 1	6380	50-YR	576.00	5247.00	5248.04		5248.05	0.00	1.02	597.29	703.94	0.18
Reach 1	6380	10-YR	1.00	5247.00	5247.02	5247.02	5247.02	0.00	0.09	10.66	507.56	0.11
Reach 1	6019	500-YR	12319.00	5245.64	5250.77		5250.94	0.00	3.66	3754.38	2033.20	0.35
Reach 1	6019	100-YR	2483.00	5245.64	5248.76		5248.84	0.00	2.09	1082.12	1204.35	0.31
Reach 1	6019	50-YR	576.00	5245.64	5247.69		5247.72	0.00	1.46	399.52	807.44	0.27
Reach 1	6019	10-YR	1.00	5245.64	5246.10		5246.10	0.00	0.19	5.20	21.43	0.07
Reach 1	5889	500-YR	12319.00	5246.91	5250.54	5248.99	5250.70	0.00	3.65	3789.38	2020.59	0.35
Reach 1	5889	100-YR	2483.00	5246.91	5248.56	5247.59	5248.62	0.00	1.86	1284.57	1352.55	0.27
Reach 1	5889	50-YR	576.00	5246.91	5247.51	5246.82	5247.54	0.00	0.81	460.14	937.85	0.20
Reach 1	5889	10-YR	1.00	5246.91	5246.03	5246.03	5246.03	0.01		2.68	113.39	0.00
Reach 1	5635	500-YR	12319.00	5247.00	5249.62	5249.03	5249.97	0.00	4.62	2607.45	1796.71	0.51
Reach 1	5635	100-YR	2483.00	5247.00	5247.80	5247.47	5248.01	0.00	1.85	732.07	1065.11	0.40
Reach 1	5635	50-YR	576.00	5247.00	5246.92	5246.68	5247.02	0.00		223.71	693.55	0.00
Reach 1	5635	10-YR	1.00	5247.00	5244.83	5244.80	5244.88	0.00		0.59	13.84	0.00
Reach 1	5423	500-YR	12319.00	5242.81	5248.38	5247.89	5248.95	0.01	6.75	2054.97	1230.78	0.64
Reach 1	5423	100-YR	2483.00	5242.81	5246.33	5246.33	5246.74	0.01	5.15	482.83	758.94	0.76
Reach 1	5423	50-YR	576.00	5242.81	5245.53	5245.53	5245.79	0.01	3.67	142.24	422.55	0.74
Reach 1	5423	10-YR	1.00	5242.81	5242.98	5242.98	5243.04	0.04	2.00	0.50	3.84	0.98
Reach 1	5178	500-YR	12319.00	5241.55	5246.06	5246.06	5246.90	0.01	7.05	1673.62	1175.20	0.81
Reach 1	5178	100-YR	2483.00	5241.55	5244.95	5244.42	5245.10	0.00	2.52	803.96	788.38	0.40
Reach 1	5178	50-YR	576.00	5241.55	5244.23	5243.68	5244.27	0.00	1.19	383.80	628.18	0.24
Reach 1	5178	10-YR	1.00	5241.55	5242.11	5241.71	5242.12	0.00	0.36	2.65	8.02	0.10
Reach 1	4897	500-YR	13386.00	5241.66	5244.86	5244.86	5245.49	0.00	7.01	2117.16	1678.70	0.90
Reach 1	4897	100-YR	2700.00	5241.66	5243.89	5243.89	5244.16	0.00	4.67	662.77	1247.28	0.86
Reach 1	4897	50-YR	619.00	5241.66	5243.46	5243.46	5243.62	0.00	3.37	203.49	723.89	0.78
Reach 1	4897	10-YR	1.00	5241.66	5241.77	5241.77	5241.81	0.06	1.56	0.64	8.90	1.02
Reach 1	4295	500-YR	13386.00	5235.00	5239.19		5239.33	0.00	3.02	4640.72	1215.94	0.26
Reach 1	4295	100-YR	2700.00	5235.00	5237.07		5237.10	0.00	1.35	2098.91	1183.49	0.17
Reach 1	4295	50-YR	619.00	5235.00	5236.05		5236.05	0.00	0.65	955.50	953.23	0.11
Reach 1	4295	10-YR	1.00	5235.00	5235.03	5235.03	5235.03	0.00	0.04	23.95	891.89	0.04

HEC-RAS Plan: CC-MultiProf River: NorthOverflow Reach: Reach 1 (Continued)

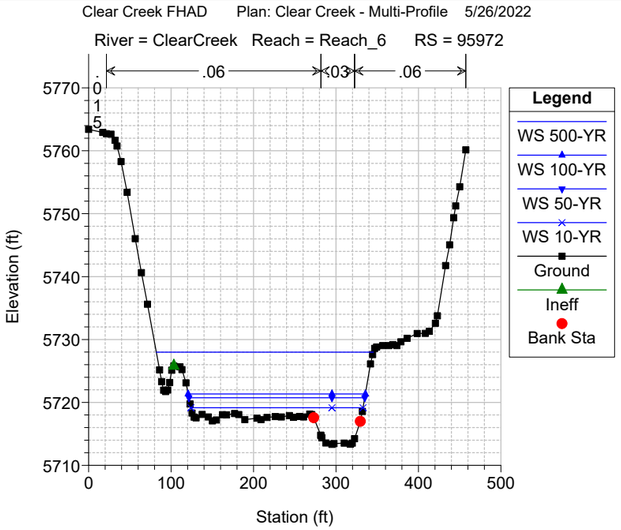
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	3885	500-YR	13386.00	5233.49	5237.34	5237.34	5238.23	0.02	8.11	1829.20	1140.29	0.99
Reach 1	3885	100-YR	2700.00	5233.49	5236.02	5236.02	5236.40	0.02	4.88	555.98	767.06	0.98
Reach 1	3885	50-YR	619.00	5233.49	5235.43	5235.43	5235.61	0.03	3.79	179.55	509.16	1.02
Reach 1	3885	10-YR	1.00	5233.49	5233.76	5233.76	5233.83	0.05	2.17	0.46	3.26	1.02
Reach 1	3638	500-YR	13386.00	5232.00	5236.61		5236.75	0.00	3.23	4704.86	1383.50	0.27
Reach 1	3638	100-YR	2700.00	5232.00	5234.45		5234.49	0.00	1.47	1955.42	1154.06	0.17
Reach 1	3638	50-YR	619.00	5232.00	5233.26		5233.26	0.00	0.68	906.54	732.48	0.11
Reach 1	3638	10-YR	1.00	5232.00	5232.03	5232.03	5232.03	0.00	0.04	24.16	717.08	0.04
Reach 1	3090	500-YR	13386.00	5231.65	5234.71	5234.71	5235.48	0.01	7.33	2006.13	1428.05	0.89
Reach 1	3090	100-YR	2700.00	5231.65	5233.28	5233.28	5233.66	0.02	4.96	548.97	717.34	0.99
Reach 1	3090	50-YR	619.00	5231.65	5232.54	5232.54	5232.77	0.03	3.92	158.10	324.04	0.99
Reach 1	3090	10-YR	1.00	5231.65	5231.80	5231.80	5231.81	0.04	0.85	1.18	30.27	0.76
Reach 1	2852	500-YR	13386.00	5226.00	5233.48		5233.55	0.00	2.52	6785.30	1674.69	0.17
Reach 1	2852	100-YR	2700.00	5226.00	5231.52		5231.53	0.00	0.90	3632.03	1524.89	0.07
Reach 1	2852	50-YR	619.00	5226.00	5230.77		5230.77	0.00	0.26	2592.39	1090.02	0.02
Reach 1	2852	10-YR	1.00	5226.00	5229.56		5229.56	0.00	0.00	1663.24	485.63	0.00
Reach 1	2382	500-YR	13386.00	5226.00	5233.31		5233.39	0.00	2.62	6150.97	1441.33	0.17
Reach 1	2382	100-YR	2700.00	5226.00	5231.49		5231.50	0.00	0.82	3868.52	1122.58	0.06
Reach 1	2382	50-YR	619.00	5226.00	5230.76		5230.76	0.00	0.24	3083.48	995.02	0.02
Reach 1	2382	10-YR	1.00	5226.00	5229.56		5229.56	0.00	0.00	1937.47	888.35	0.00
Reach 1	2135	500-YR	13386.00	5224.17	5233.21		5233.30	0.00	2.50	5978.68	1455.27	0.19
Reach 1	2135	100-YR	2700.00	5224.17	5231.48		5231.48	0.00	0.80	3611.41	1221.23	0.07
Reach 1	2135	50-YR	619.00	5224.17	5230.76		5230.76	0.00	0.23	2794.66	1075.06	0.02
Reach 1	2135	10-YR	1.00	5224.17	5229.56		5229.56	0.00	0.00	1595.74	944.77	0.00
Reach 1	1853	500-YR	13386.00	5222.87	5233.10	5229.25	5233.17	0.00	2.49	6696.31	1743.56	0.18
Reach 1	1853	100-YR	2700.00	5222.87	5231.46	5227.51	5231.47	0.00	0.72	4304.88	1358.45	0.06
Reach 1	1853	50-YR	619.00	5222.87	5230.76	5226.55	5230.76	0.00	0.20	3436.62	1235.22	0.02
Reach 1	1853	10-YR	1.00	5222.87	5229.56	5225.42	5229.56	0.00	0.00	2089.41	1120.60	0.00
Reach 1	1612	500-YR	13086.00	5229.46	5232.15	5232.15	5232.92	0.00	7.43	2024.98	1491.39	0.91
Reach 1	1612	100-YR	3428.00	5229.46	5230.94	5230.94	5231.38	0.00	5.30	661.71	836.69	0.99
Reach 1	1612	50-YR	1264.00	5229.46	5230.46	5230.46	5230.72	0.00	4.14	308.05	583.02	1.00
Reach 1	1612	10-YR	1.00	5229.46	5229.56	5229.56	5229.56	0.00	0.43	2.33	74.46	0.43
Reach 1	1479	500-YR	13086.00	5223.73	5229.01	5229.01	5230.01	0.02	9.12	1646.76	929.27	0.99
Reach 1	1479	100-YR	3428.00	5223.73	5227.76	5227.76	5228.26	0.02	6.55	614.14	711.04	0.98
Reach 1	1479	50-YR	1264.00	5223.73	5226.98	5226.98	5227.40	0.02	5.99	252.84	344.44	0.88
Reach 1	1479	10-YR	1.00	5223.73	5224.16	5224.16	5224.27	0.04	2.61	0.38	12.86	0.99
Reach 1	1322	500-YR	13086.00	5219.00	5228.82	5222.23	5228.93	0.00	2.85	5300.15	951.05	0.16
Reach 1	1322	100-YR	3428.00	5219.00	5222.48	5220.33	5222.57	0.00	2.41	1420.99	422.87	0.23
Reach 1	1322	50-YR	1264.00	5219.00	5221.18	5219.69	5221.21	0.00	1.43	880.88	411.87	0.17
Reach 1	1322	10-YR	1.00	5219.00	5219.08	5219.03	5219.08	0.00	0.03	31.43	397.52	0.02
Reach 1	1010	500-YR	13086.00	5219.00	5228.73	5222.25	5228.83	0.00	2.73	5562.73	798.49	0.15
Reach 1	1010	100-YR	3428.00	5219.00	5222.13	5220.34	5222.25	0.00	2.73	1254.35	417.25	0.27
Reach 1	1010	50-YR	1264.00	5219.00	5220.96	5219.70	5221.01	0.00	1.62	780.40	401.84	0.20
Reach 1	1010	10-YR	1.00	5219.00	5219.07	5219.03	5219.07	0.00	0.04	27.58	392.48	0.02
Reach 1	538	500-YR	13086.00	5219.00	5228.69	5221.74	5228.74	0.00	1.84	7682.33	876.91	0.10
Reach 1	538	100-YR	3428.00	5219.00	5220.14	5220.14	5220.69	0.02	5.91	579.91	597.82	0.98
Reach 1	538	50-YR	1264.00	5219.00	5219.58	5219.58	5219.87	0.03	4.29	294.49	517.64	0.99
Reach 1	538	10-YR	1.00	5219.00	5219.02	5219.02	5219.02	0.00	0.09	10.55	509.03	0.12

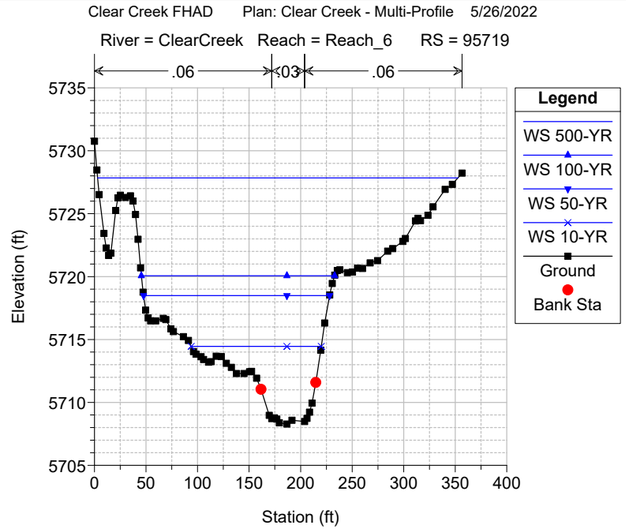
HEC-RAS Plan: CC-MultiProf

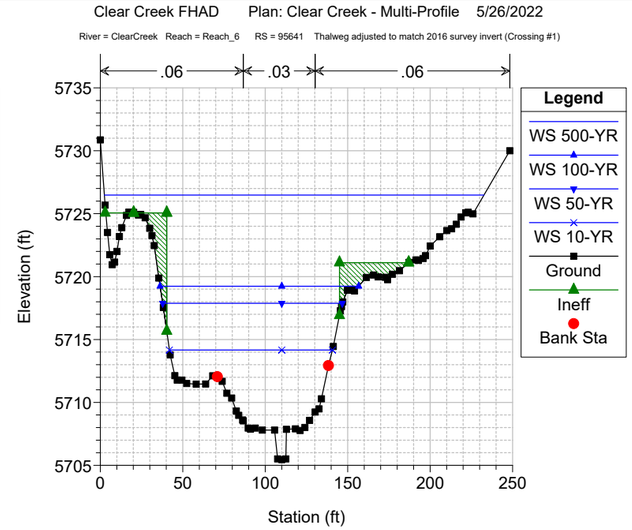
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
6th Ave. Split	1360	500-YR	1711.00	5694.00	5699.70		5699.76	0.00	1.99	932.50	185.90	0.15
6th Ave. Split	1360	100-YR	126.00	5694.00	5696.35		5696.35	0.00	0.37	343.28	152.95	0.04
6th Ave. Split	1360	50-YR	0.01	5694.00	5694.48		5694.48	0.00	0.00	67.75	142.78	0.00
6th Ave. Split	1360	10-YR	0.01	5694.00	5694.48		5694.48	0.00	0.00	67.75	142.78	0.00
6th Ave. Split	1184	500-YR	1711.00	5694.00	5699.43		5699.73	0.00	4.47	454.84	99.68	0.34
6th Ave. Split	1184	100-YR	126.00	5694.00	5696.34		5696.35	0.00	0.80	163.61	83.91	0.09
6th Ave. Split	1184	50-YR	0.01	5694.00	5694.48		5694.48	0.00	0.00	31.06	65.64	0.00
6th Ave. Split	1184	10-YR	0.01	5694.00	5694.48		5694.48	0.00	0.00	31.06	65.64	0.00
6th Ave. Split	1108	500-YR	1711.00	5694.00	5699.49		5699.70	0.00	3.75	529.77	111.09	0.28
6th Ave. Split	1108	100-YR	126.00	5694.00	5696.34		5696.35	0.00	0.66	197.64	94.23	0.08
6th Ave. Split	1108	50-YR	0.01	5694.00	5694.48		5694.48	0.00	0.00	38.10	80.45	0.00
6th Ave. Split	1108	10-YR	0.01	5694.00	5694.48		5694.48	0.00	0.00	38.10	80.45	0.00
6th Ave. Split	706	500-YR	1711.00	5694.24	5698.35	5698.35	5699.53	0.00	11.75	432.71	172.51	1.11
6th Ave. Split	706	100-YR	126.00	5694.24	5696.00	5695.90	5696.31	0.00	4.61	45.41	127.66	0.76
6th Ave. Split	706	50-YR	0.01	5694.24	5694.48		5694.48	0.00	0.01	1.19	7.66	0.00
6th Ave. Split	706	10-YR	0.01	5694.24	5694.48		5694.48	0.00	0.01	1.19	7.66	0.00
6th Ave. Split	409	500-YR	1711.00	5694.45	5696.34	5696.34	5696.59	0.02	6.06	477.19	841.01	0.87
6th Ave. Split	409	100-YR	126.00	5694.45	5695.60	5695.60	5695.71	0.01	3.38	59.44	225.07	0.68
6th Ave. Split	409	50-YR	0.01	5694.45	5694.48	5694.48	5694.48	0.02	0.32	0.03	2.16	0.47
6th Ave. Split	409	10-YR	0.01	5694.45	5694.48	5694.48	5694.48	0.02	0.32	0.03	2.16	0.47
6th Ave. Split	338	500-YR	1711.00	5683.34	5691.92	5686.68	5691.94	0.00	1.15	1757.21	427.01	0.07
6th Ave. Split	338	100-YR	126.00	5683.34	5688.34	5684.51	5688.34	0.00	0.33	465.80	294.60	0.03
6th Ave. Split	338	50-YR	0.01	5683.34	5687.30	5683.37	5687.30	0.00	0.00	257.47	143.02	0.00
6th Ave. Split	338	10-YR	0.01	5683.34	5685.08	5683.37	5685.08	0.00	0.00	68.42	73.39	0.00
6th Ave. Split	260	500-YR	1711.00	5683.30	5691.92	5685.74	5691.93	0.00	0.77	2556.42	510.82	0.05
6th Ave. Split	260	100-YR	126.00	5683.30	5688.34	5684.37	5688.34	0.00	0.13	1132.08	444.52	0.01
6th Ave. Split	260	50-YR	0.01	5683.30	5687.30	5683.32	5687.30	0.00	0.00	781.31	421.11	0.00
6th Ave. Split	260	10-YR	0.01	5683.30	5685.08	5683.32	5685.08	0.00	0.00	152.67	202.61	0.00
Tabor Lake Split	2346	500-YR	8675.00	5412.00	5417.73		5418.19	0.00	5.44	1694.09	317.39	0.40
Tabor Lake Split	2346	100-YR	1311.00	5412.00	5416.12		5416.14	0.00	1.15	1184.38	313.59	0.10
Tabor Lake Split	2346	50-YR	359.00	5412.00	5415.58		5415.58	0.00	0.36	1018.33	299.00	0.03
Tabor Lake Split	2346	10-YR	0.01	5412.00	5414.89		5414.89	0.00	0.00	815.16	292.11	0.00
Tabor Lake Split	1757	500-YR	8675.00	5412.00	5418.02		5418.05	0.00	1.40	6332.98	1080.06	0.10
Tabor Lake Split	1757	100-YR	1311.00	5412.00	5416.13		5416.13	0.00	0.31	4303.37	1058.88	0.03
Tabor Lake Split	1757	50-YR	359.00	5412.00	5415.58		5415.58	0.00	0.10	3720.41	1052.53	0.01
Tabor Lake Split	1757	10-YR	0.01	5412.00	5414.89		5414.89	0.00	0.00	2996.24	1048.25	0.00
Tabor Lake Split	1062	500-YR	8675.00	5414.90	5417.12	5417.12	5417.95	0.01	8.18	1208.67	1055.75	1.02
Tabor Lake Split	1062	100-YR	1311.00	5414.90	5415.82	5415.82	5416.10	0.02	4.79	316.38	659.03	1.00
Tabor Lake Split	1062	50-YR	359.00	5414.90	5415.42	5415.42	5415.56	0.03	3.24	120.89	468.53	1.02
Tabor Lake Split	1062	10-YR	0.01	5414.90	5414.89	5414.89	5414.89	0.02		0.03	2.32	0.00
Tabor Lake Split	958	500-YR	8675.00	5410.82	5415.12	5414.89	5415.63	0.01	5.50	1795.01	1181.61	0.49
Tabor Lake Split	958	100-YR	1311.00	5410.82	5412.70	5412.70	5413.19	0.02	5.03	245.98	271.39	0.73
Tabor Lake Split	958	50-YR	359.00	5410.82	5411.75	5411.75	5412.09	0.02	2.57	81.05	112.72	0.62
Tabor Lake Split	958	10-YR	0.01	5410.82	5410.33	5410.33	5410.34	0.09		0.01	0.62	0.00
Tabor Lake Split	435	500-YR	8675.00	5404.42	5407.90	5407.90	5409.17	0.02	9.86	987.26	550.65	0.95
Tabor Lake Split	435	100-YR	1311.00	5404.42	5406.88	5405.81	5406.96	0.00	2.40	622.25	389.42	0.28
Tabor Lake Split	435	50-YR	359.00	5404.42	5405.96	5405.10	5405.98	0.00	1.32	314.56	323.28	0.20
Tabor Lake Split	435	10-YR	0.01	5404.42	5404.45	5404.45	5404.45	0.00	0.06	0.15	13.53	0.11
Federal Split	1198	500-YR	5692.00	5215.00	5224.13	5218.56	5224.18	0.00	3.05	3702.36	1002.39	0.18
Federal Split	1198	100-YR	414.00	5215.00	5218.71	5215.91	5218.72	0.00	0.79	1100.19	775.99	0.08
Federal Split	1198	50-YR	0.01	5215.00	5216.46	5215.01	5216.46	0.00	0.00	224.24	303.37	0.00
Federal Split	1198	10-YR	0.01	5215.00	5216.46	5215.01	5216.46	0.00	0.00	224.24	303.37	0.00
Federal Split	1075	500-YR	5692.00	5215.40	5224.09	5218.39	5224.16	0.00	3.31	3326.65	1040.75	0.20
Federal Split	1075	100-YR	414.00	5215.40	5218.71	5216.38	5218.71	0.00	0.76	1021.23	874.08	0.08
Federal Split	1075	50-YR	0.01	5215.40	5216.46	5215.43	5216.46	0.00	0.00	153.40	274.61	0.00
Federal Split	1075	10-YR	0.01	5215.40	5216.46	5215.43	5216.46	0.00	0.00	153.40	274.61	0.00
Federal Split	980	500-YR	5692.00	5216.16	5224.05	5218.58	5224.14	0.00	3.52	2748.37	999.61	0.23
Federal Split	980	100-YR	414.00	5216.16	5218.70	5216.72	5218.71	0.00	0.81	815.09	925.67	0.10
Federal Split	980	50-YR	0.01	5216.16	5216.46	5215.65	5216.46	0.00	0.00	56.99	315.22	0.00
Federal Split	980	10-YR	0.01	5216.16	5216.46	5215.65	5216.46	0.00	0.00	56.99	315.22	0.00
Federal Split	923	500-YR	5692.00	5216.67	5224.10	5215.69	5224.11	0.00	1.26	7094.06	1522.30	0.08
Federal Split	923	100-YR	414.00	5216.67	5218.71	5212.96	5218.71	0.00	0.20	2067.28	1297.94	0.03
Federal Split	923	50-YR	0.01	5216.67	5216.46	5211.85	5216.46	0.00		718.57	761.31	0.00
Federal Split	923	10-YR	0.01	5216.67	5216.46	5211.85	5216.46	0.00		718.57	761.31	0.00
Federal Split	773	500-YR	5692.00	5217.00	5223.98	5219.43	5224.09	0.00	3.28	2489.89	1365.48	0.23
Federal Split	773	100-YR	414.00	5217.00	5218.69	5217.63	5218.70	0.00	1.13	511.57	1322.30	0.18
Federal Split	773	50-YR	0.01	5217.00	5216.46	5215.65	5216.46	0.00		6.71	933.91	0.00

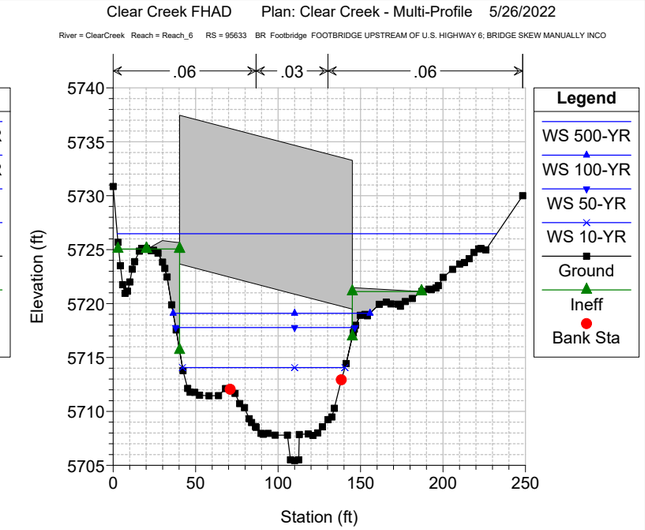
HEC-RAS Plan: CC-MultiProf (Continued)

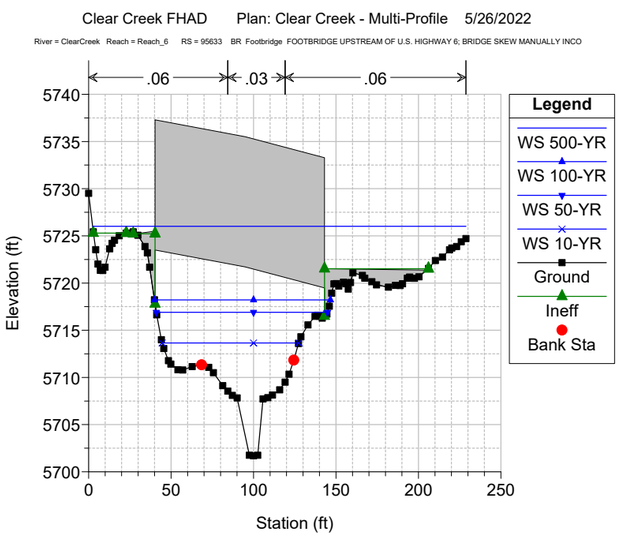
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Federal Split	773	10-YR	0.01	5217.00	5216.46	5215.65	5216.46	0.00		6.71	933.91	0.00
Federal Split	627	500-YR	5692.00	5216.39	5223.08	5220.92	5223.83	0.00	7.62	909.92	164.68	0.54
Federal Split	627	100-YR	414.00	5216.39	5218.56	5217.65	5218.63	0.00	2.21	216.58	141.49	0.30
Federal Split	627	50-YR	0.01	5216.39	5216.46	5216.43	5216.46	0.00	0.06	0.18	4.43	0.05
Federal Split	627	10-YR	0.01	5216.39	5216.46	5216.43	5216.46	0.00	0.06	0.18	4.43	0.05
Federal Split	580 Federal Blvd		Bridge									
Federal Split	458	500-YR	5692.00	5215.31	5219.25	5219.25	5221.11	0.01	11.94	545.56	154.37	1.16
Federal Split	458	100-YR	414.00	5215.31	5216.15	5216.15	5216.62	0.01	3.36	80.38	93.04	0.94
Federal Split	458	50-YR	0.01	5215.31	5213.13	5213.13	5213.13	0.00		0.06	1.77	0.00
Federal Split	458	10-YR	0.01	5215.31	5213.13	5213.13	5213.13	0.00		0.06	1.77	0.00
Federal Split	326	500-YR	5692.00	5212.21	5217.41	5217.41	5219.11	0.02	4.91	881.57	241.86	0.38
Federal Split	326	100-YR	414.00	5212.21	5213.56	5213.56	5213.99	0.02	1.97	137.23	145.15	0.31
Federal Split	326	50-YR	0.01	5212.21	5210.74	5210.74	5210.74	0.00		0.06	1.50	0.00
Federal Split	326	10-YR	0.01	5212.21	5210.74	5210.74	5210.74	0.00		0.06	1.50	0.00

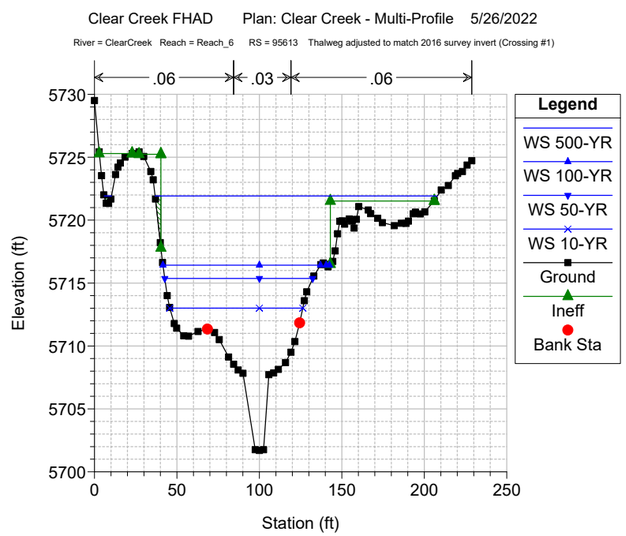

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95972
.06 .03 .06
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

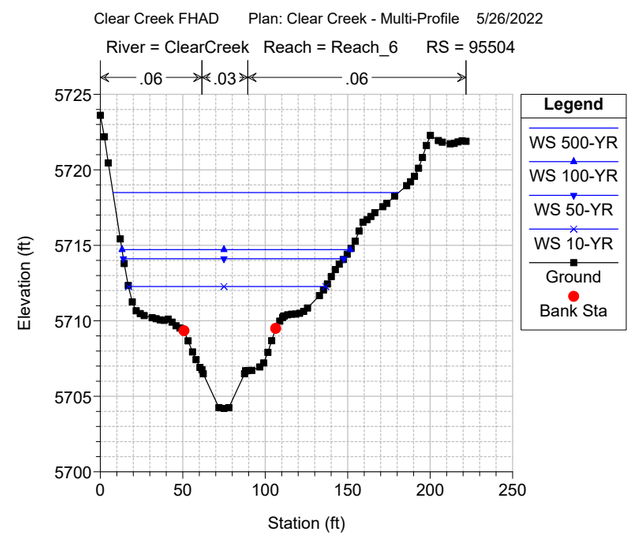

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95719
.06 .03 .06
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

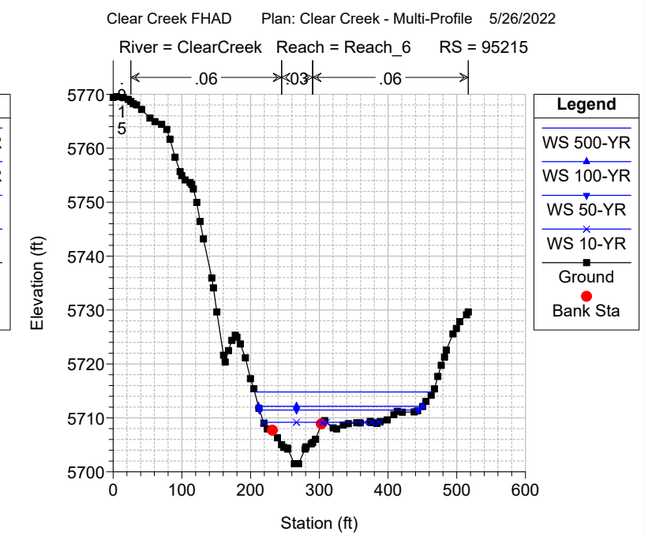

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95641 Thalweg adjusted to match 2016 survey invert (Crossing #1)
.06 .03 .06
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

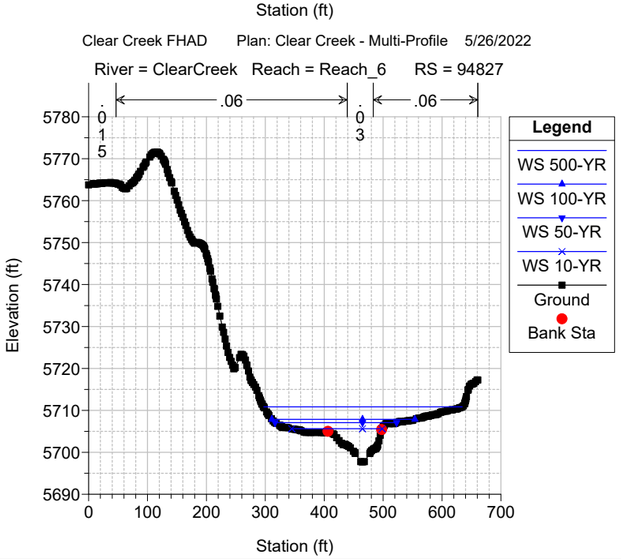

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95633 BR Footbridge FOOTBRIDGE UPSTREAM OF U.S. HIGHWAY 6; BRIDGE SKEW MANUALLY INCO
.06 .03 .06
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

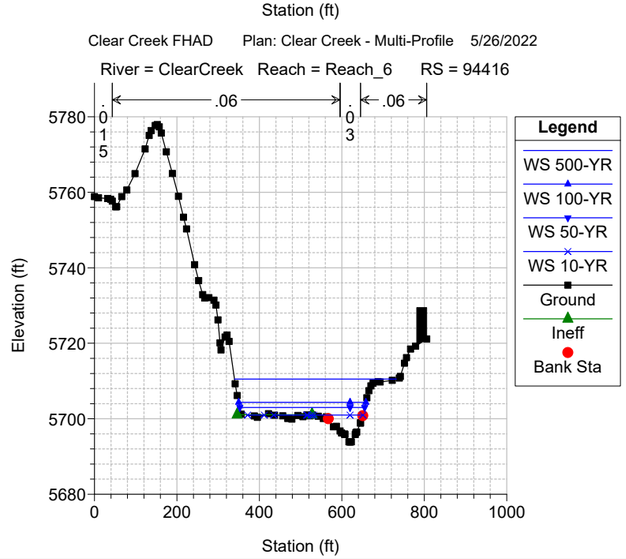

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95633 BR Footbridge FOOTBRIDGE UPSTREAM OF U.S. HIGHWAY 6; BRIDGE SKEW MANUALLY INCO
.06 .03 .06
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

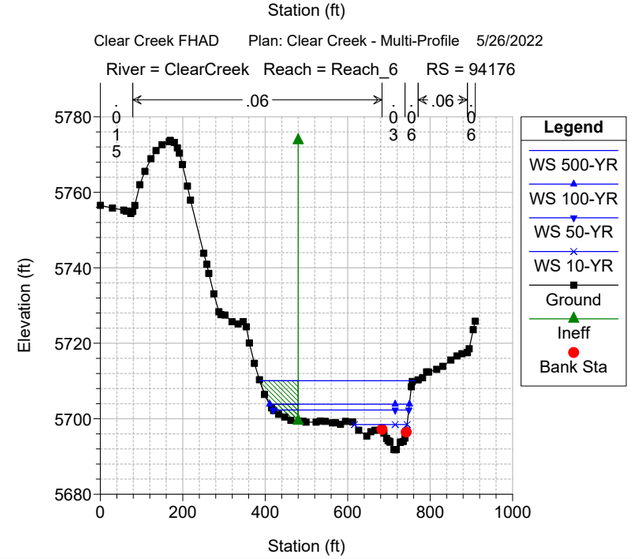

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95613 Thalweg adjusted to match 2016 survey invert (Crossing #1)
.06 .03 .06
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

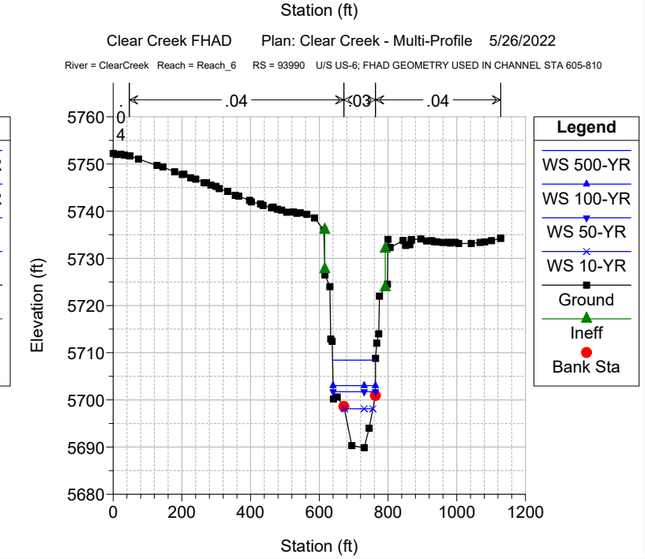

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95504
.06 .03 .06
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95215
.06 .03 .06
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 94827
.06 .06
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

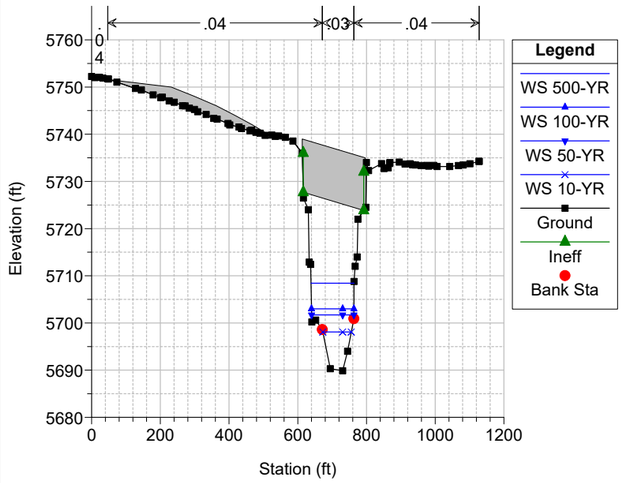

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 94416
.06 .06
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 94176
.06 .06
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 93990 U/S US-6; FHAD GEOMETRY USED IN CHANNEL STA 605-810
.04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

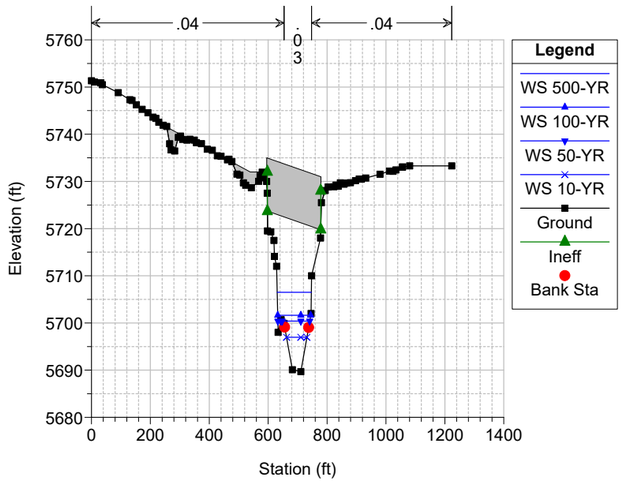
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93988 BR U.S. Highway 6 U.S. HIGHWAY 6



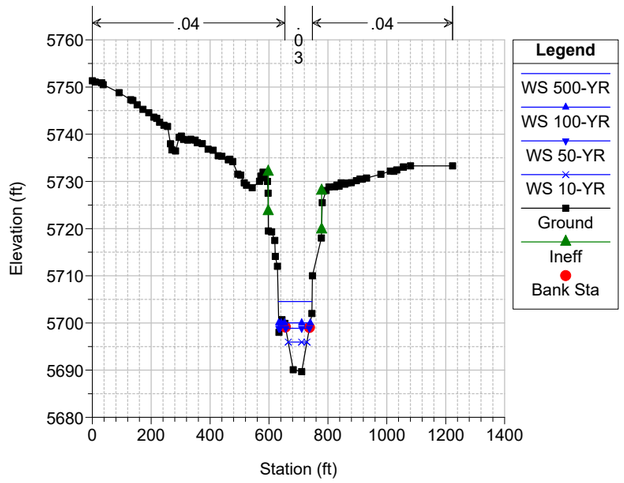
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93988 BR U.S. Highway 6 U.S. HIGHWAY 6



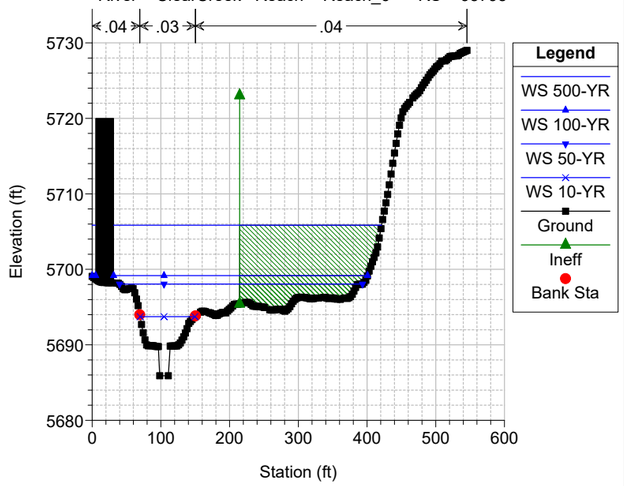
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93893 DS US-6; FHAD GEOMETRY USED IN CHANNEL STA 585 - 790



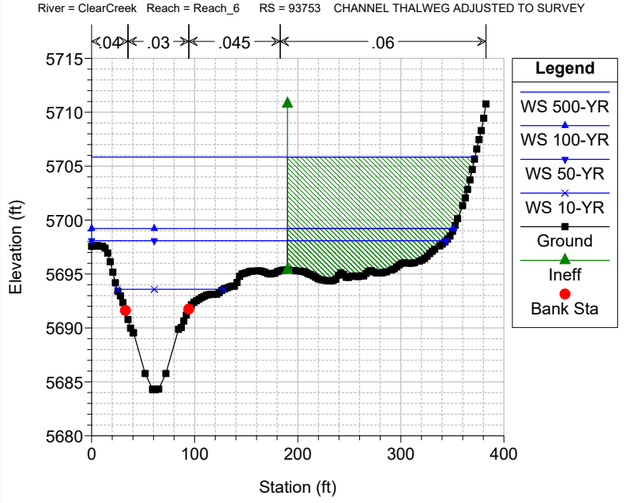
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93795



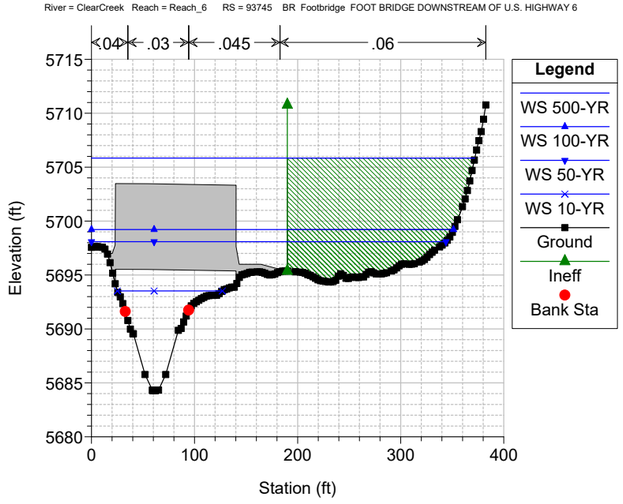
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93753 CHANNEL THALWEG ADJUSTED TO SURVEY



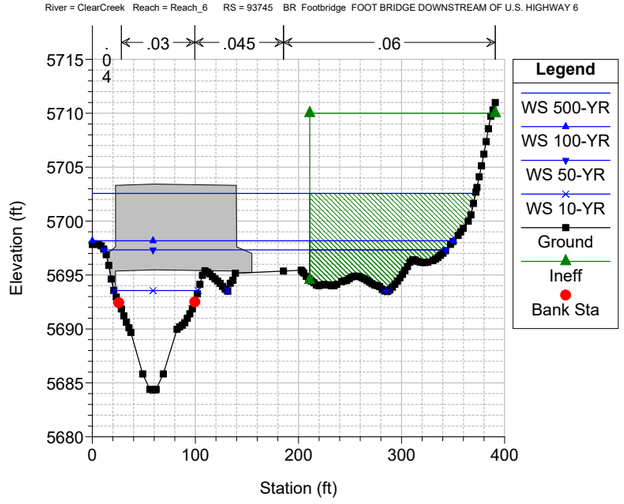
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93745 BR Footbridge FOOT BRIDGE DOWNSTREAM OF U.S. HIGHWAY 6



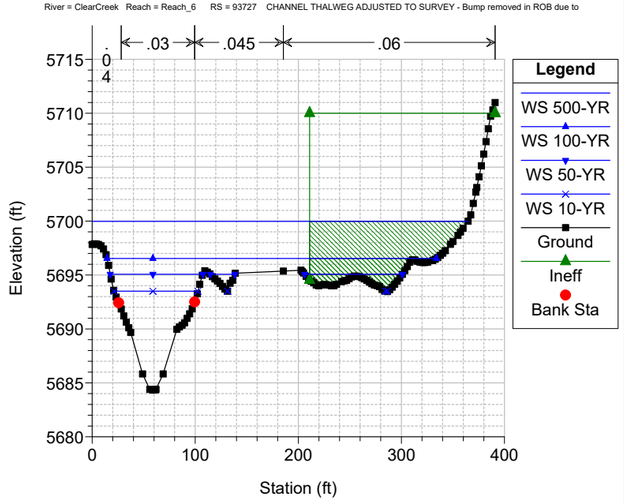
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93745 BR Footbridge FOOT BRIDGE DOWNSTREAM OF U.S. HIGHWAY 6



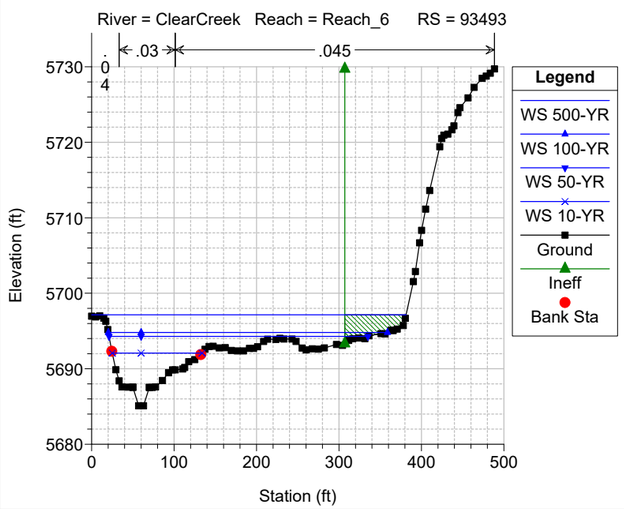
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93727 CHANNEL THALWEG ADJUSTED TO SURVEY - Bump removed in ROB due to



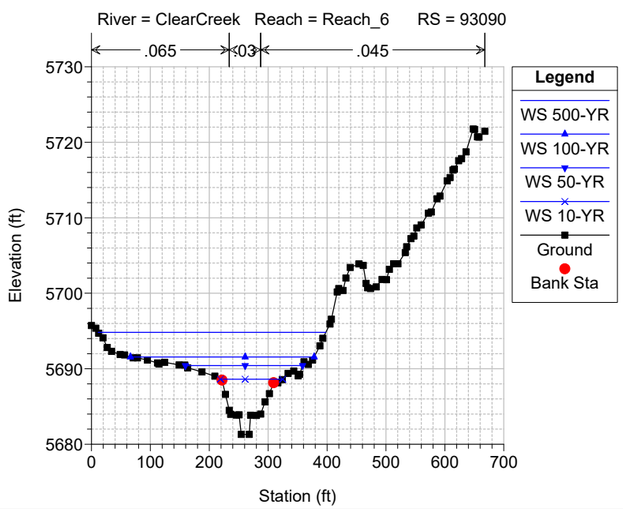
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93493



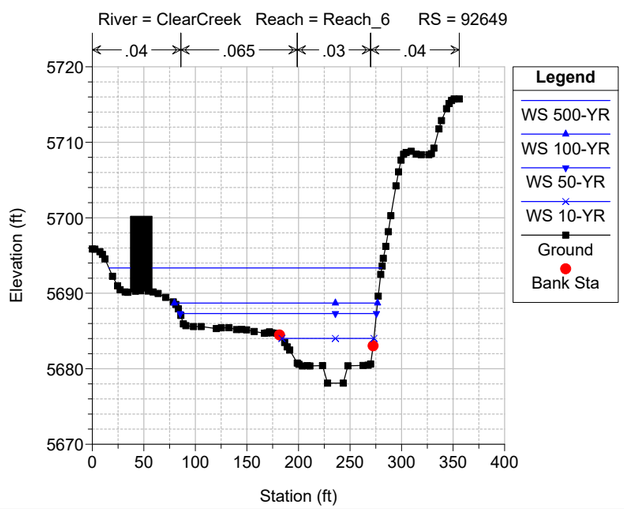
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93090



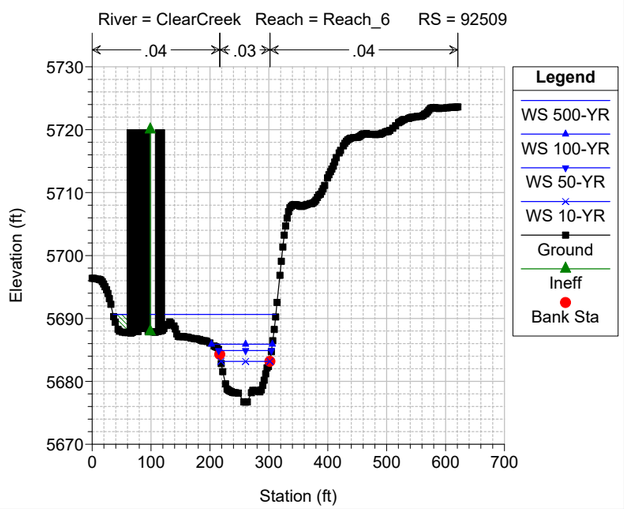
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

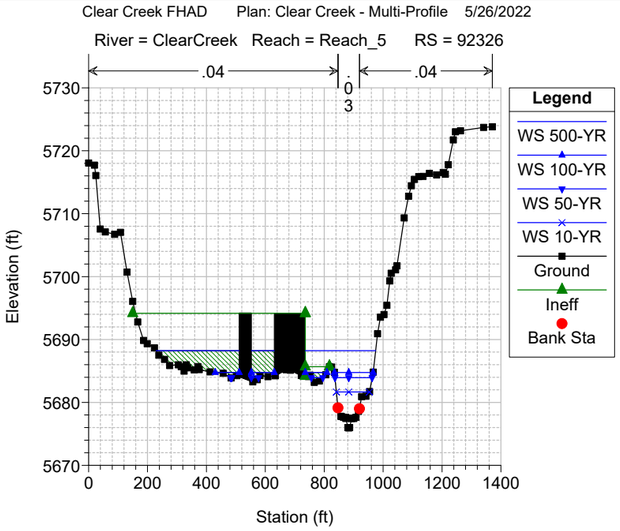
River = ClearCreek Reach = Reach_6 RS = 92649

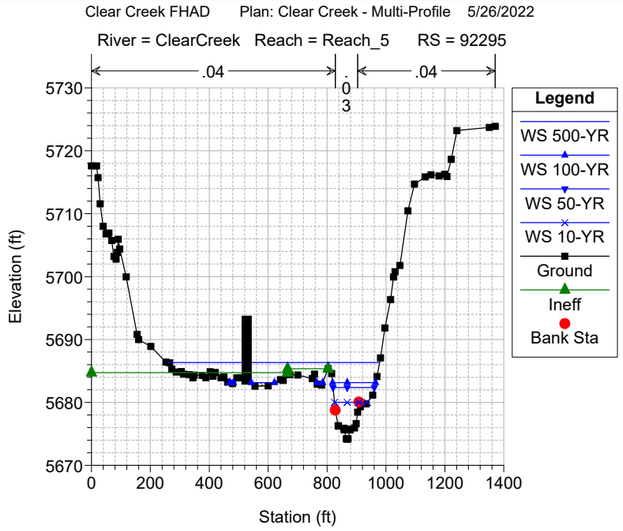


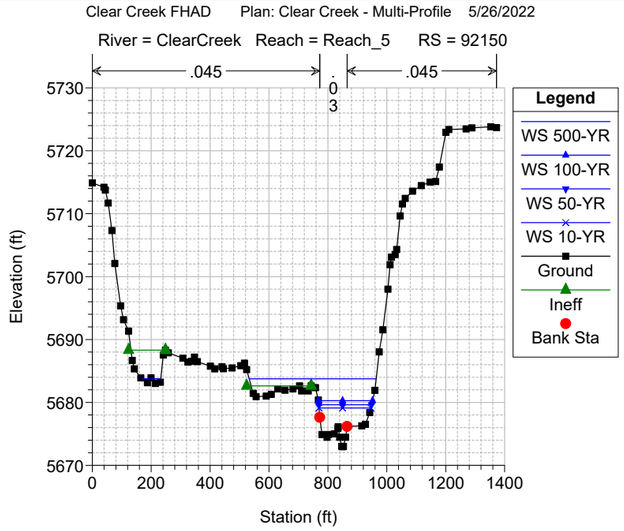
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

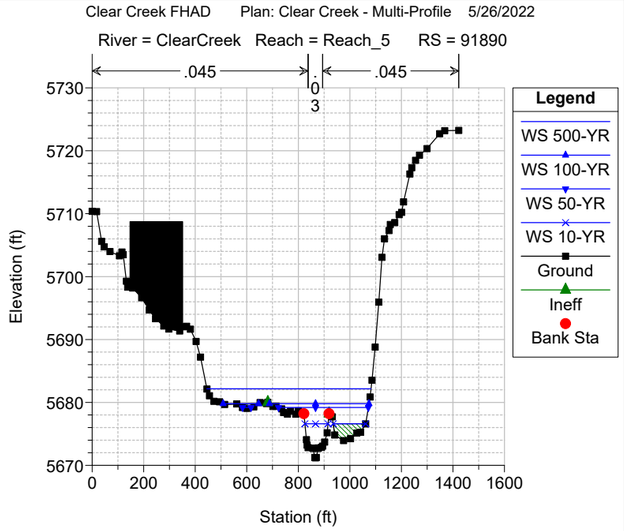
River = ClearCreek Reach = Reach_6 RS = 92509

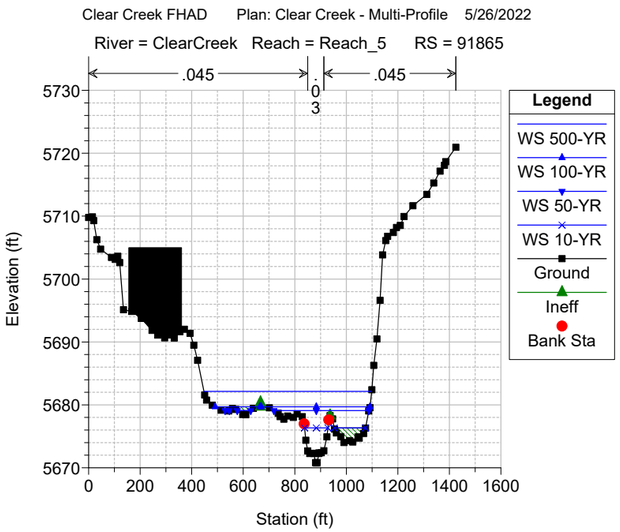


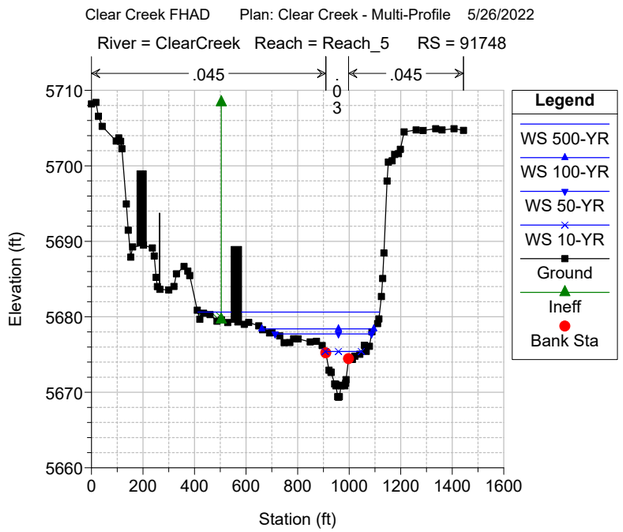

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 92326
.04
.03
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

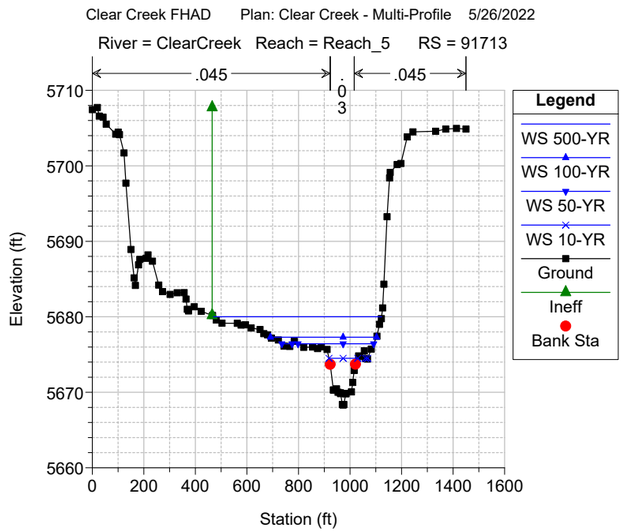

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 92295
.04
.03
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

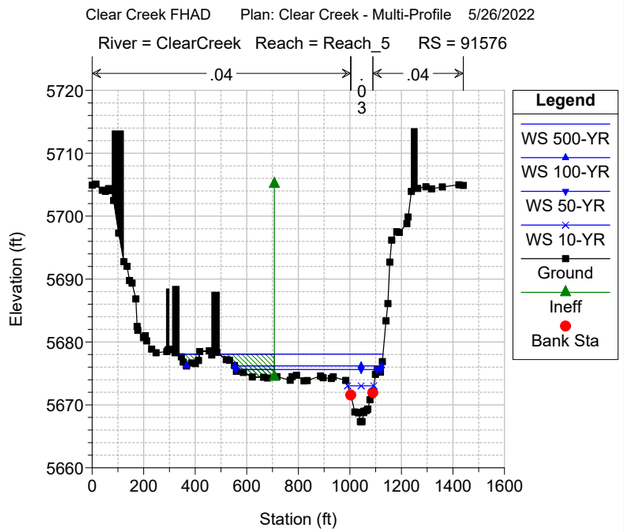

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 92150
.045
.03
.045
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

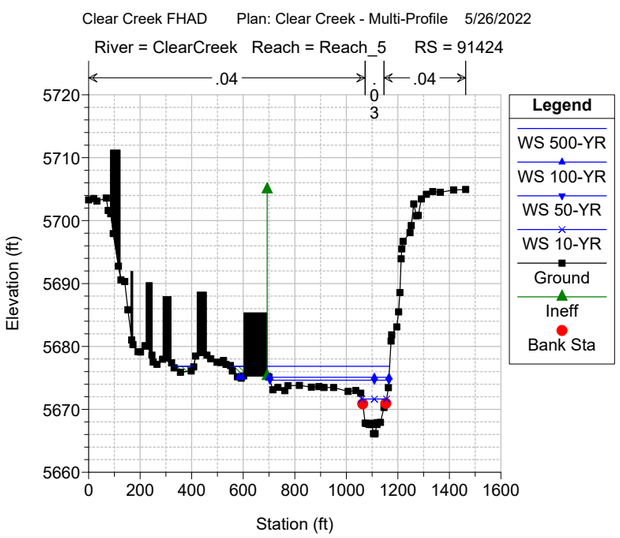

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91890
.045
.03
.045
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

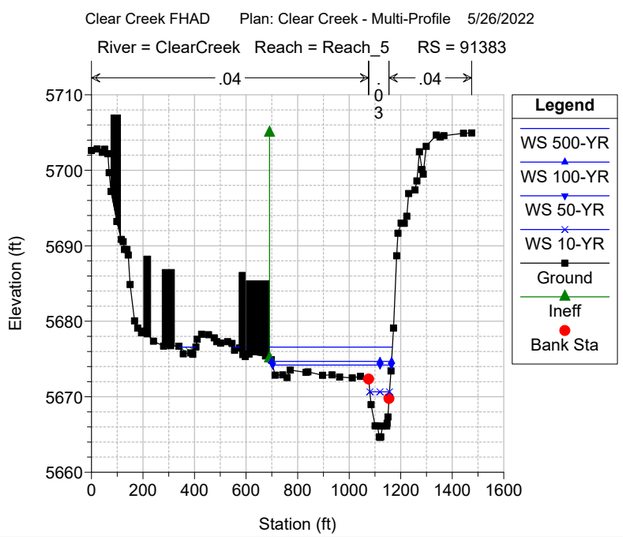

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91865
.045
.03
.045
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

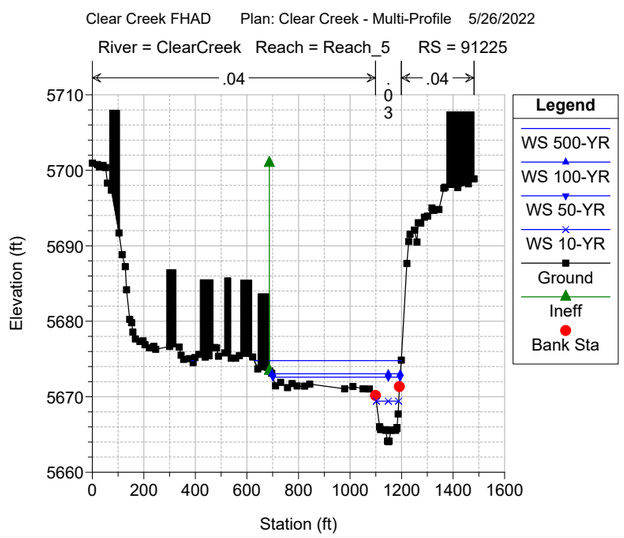

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91748
.045
.03
.045
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

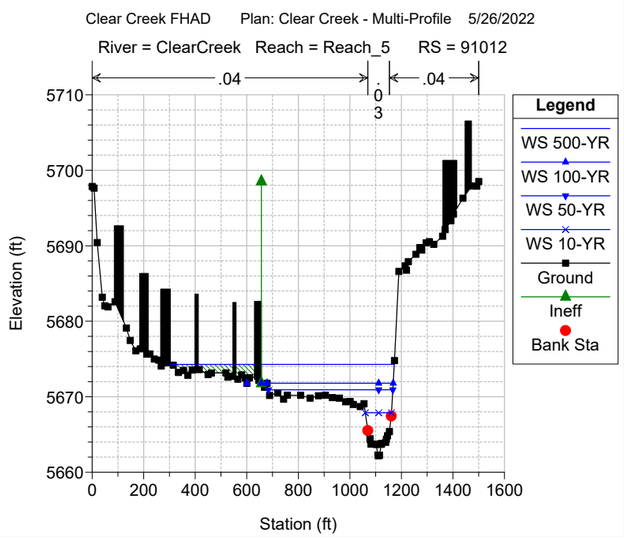

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91713
.045
.03
.045
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91576
.04
.03
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

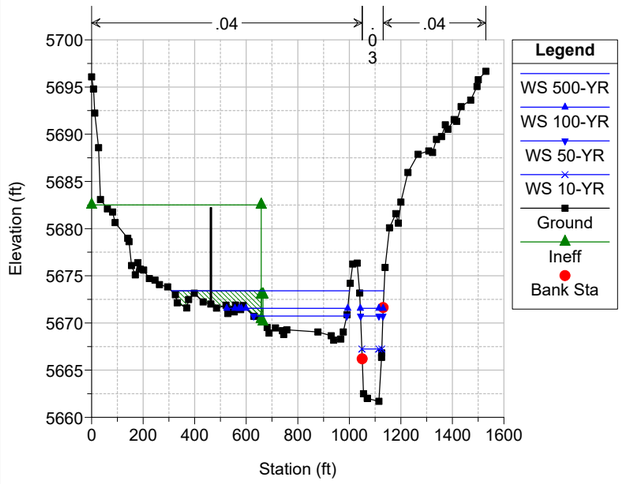

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91424
.04
.03
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91383
.04
.03
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

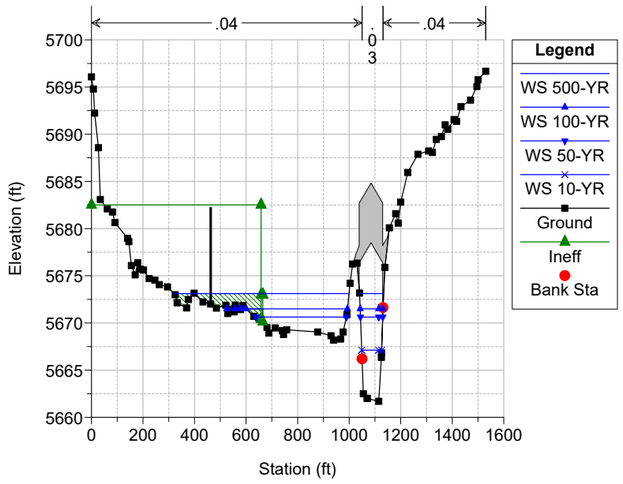

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91225
.04
.03
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91012
.04
.03
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

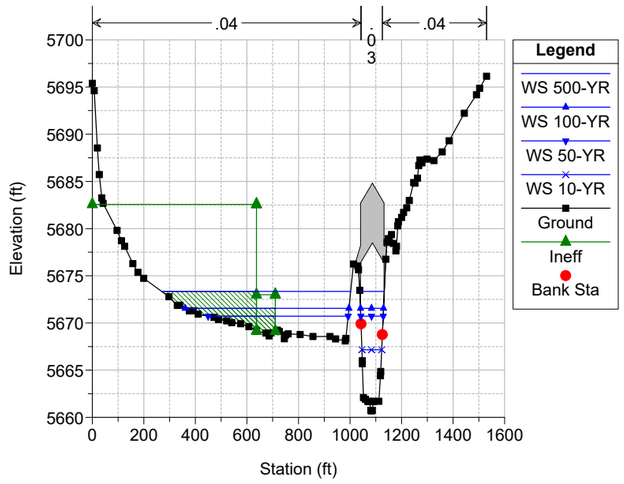
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90879 THALWEG TAKEN FROM FHAD STA 1050-1125



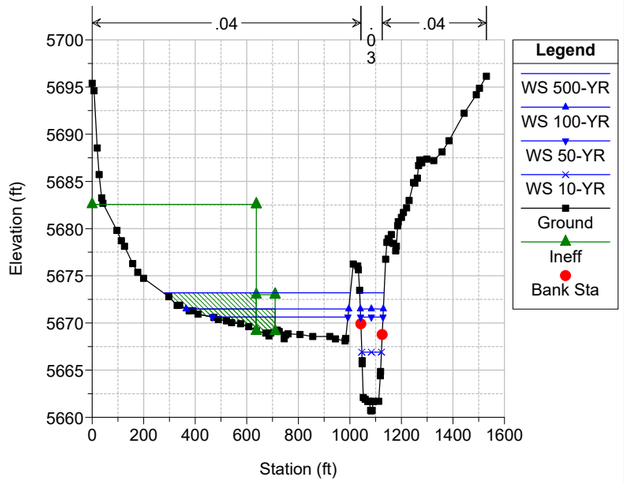
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90870 BR Footbridge FOOTBRIDGE UPSTREAM OF WASHINGTON AVE.



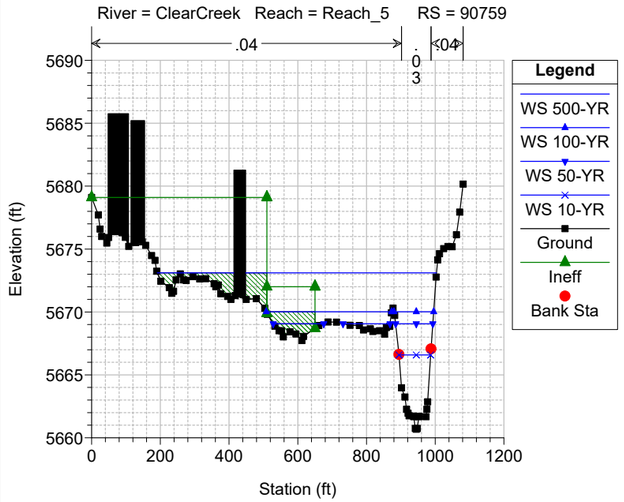
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90870 BR Footbridge FOOTBRIDGE UPSTREAM OF WASHINGTON AVE.



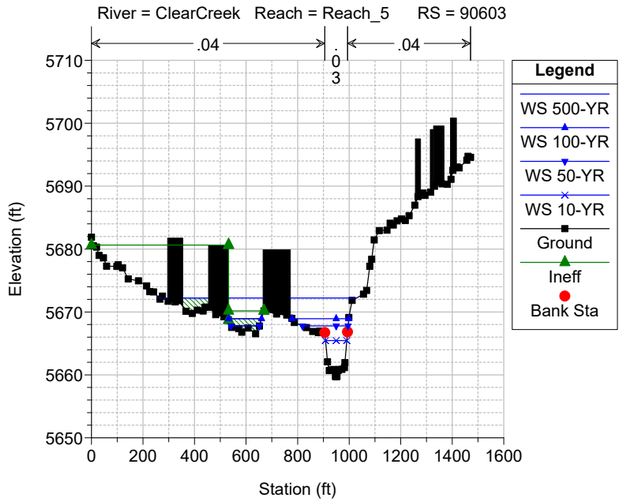
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90839 THALWEG GEOMETRY FROM FHAD STA 1050-1120



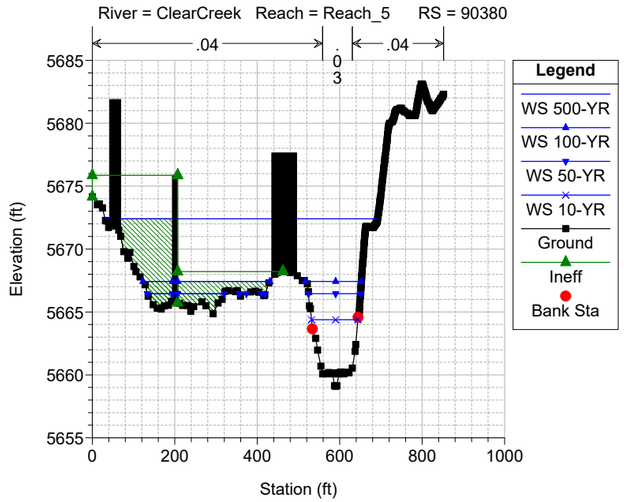
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90759



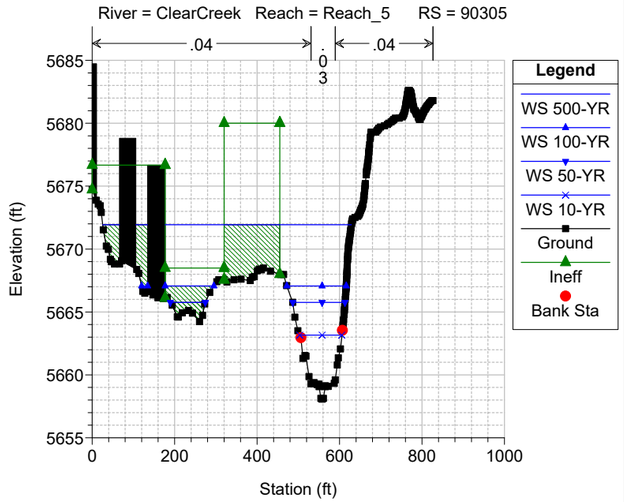
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90603



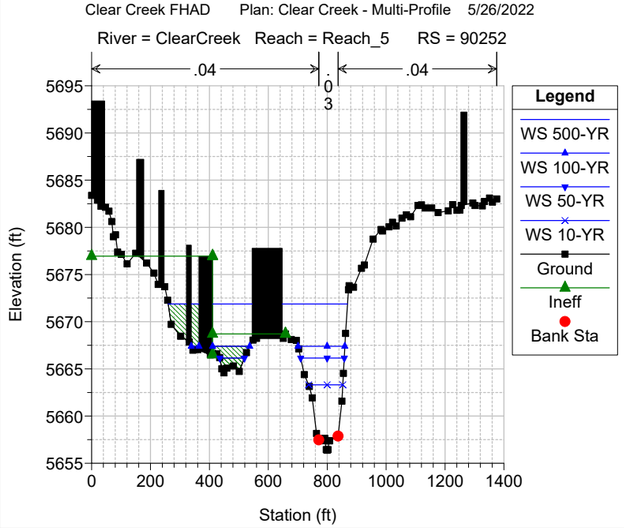
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90380



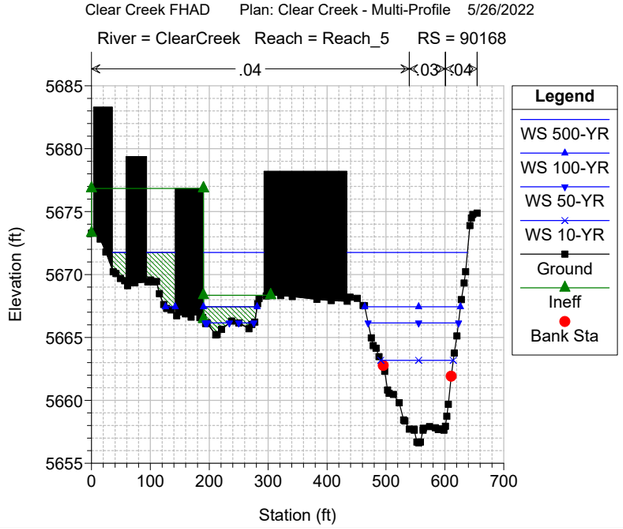
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90305



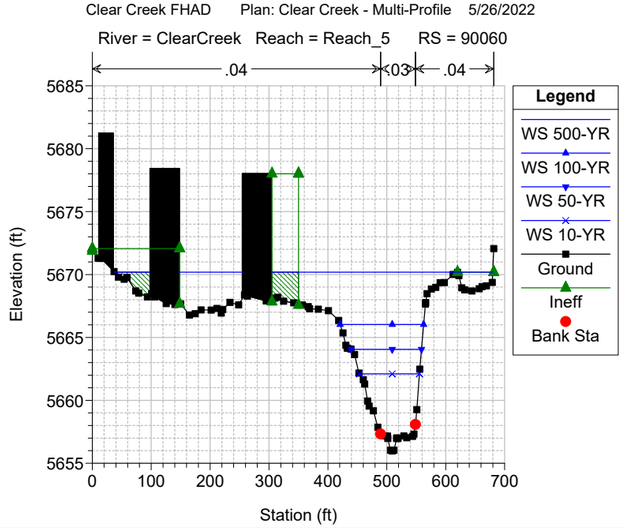
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90252



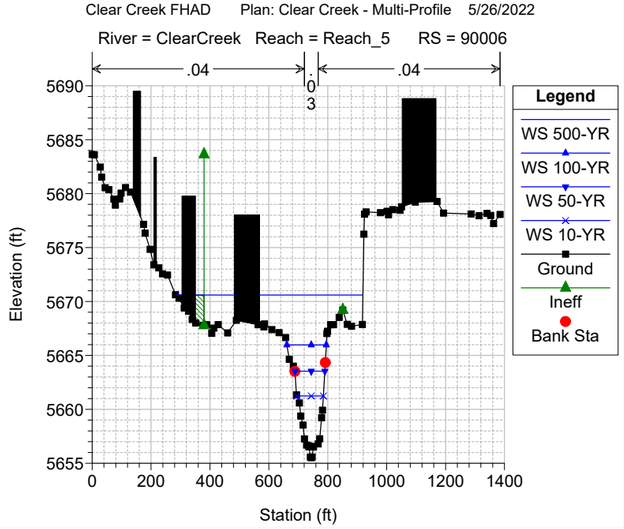
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90168



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90060

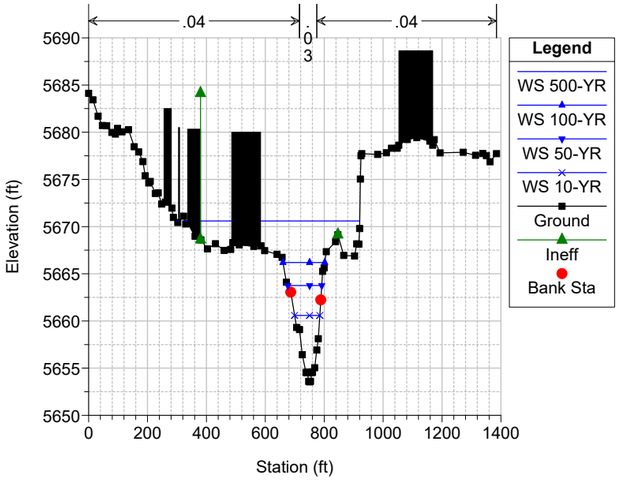


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90006



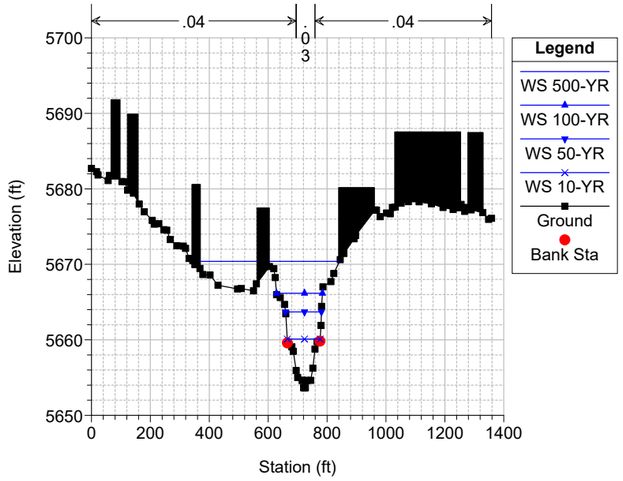
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 89976



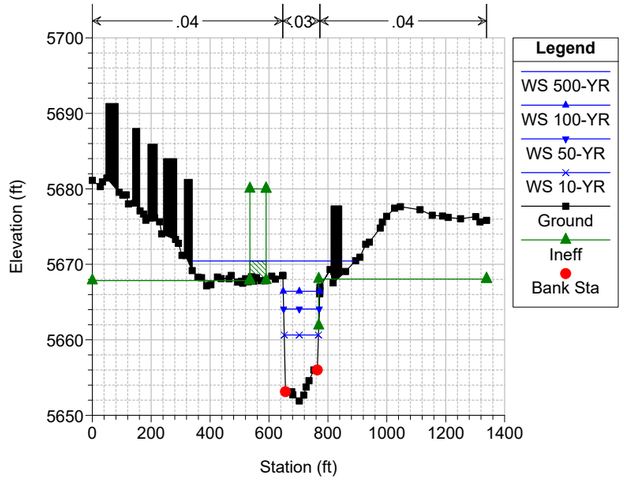
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 89862



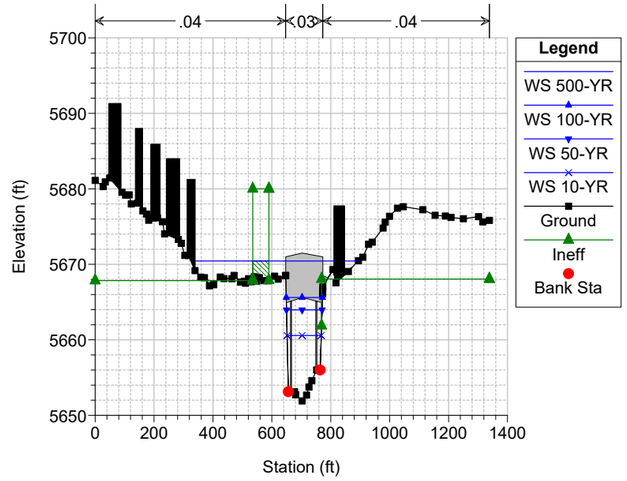
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 89790 US WASHINGTON ST; FHAD GEOMETRY USED STA 645-780



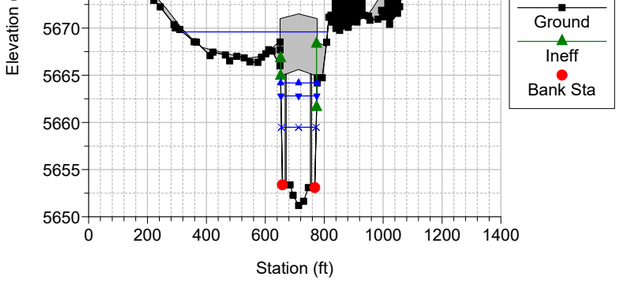
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 89784 BR Washington St WASHINGTON STREET



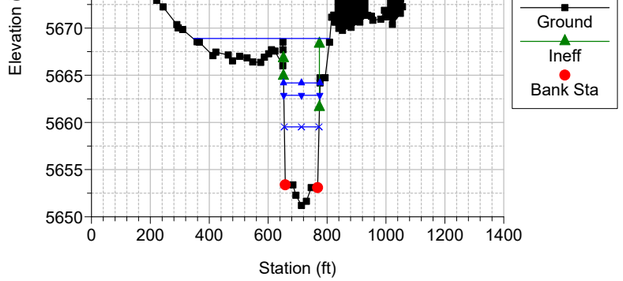
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 89784 BR Washington St WASHINGTON STREET



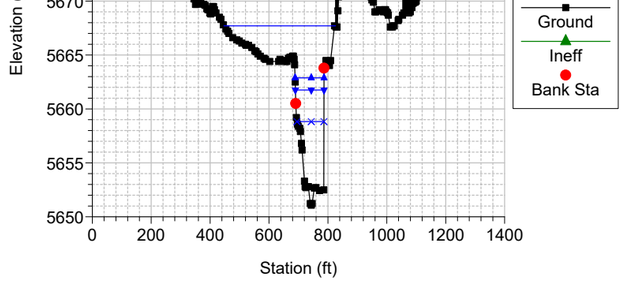
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 89687 DS WASHINGTON; FHAD CHANNEL GEOMETRY USED STA 625-775



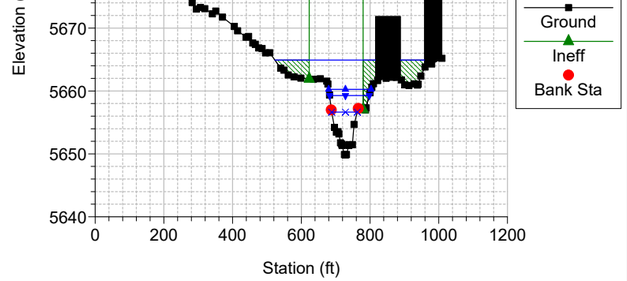
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 89610 Blocked obstruction added to ROB to remove unrealistic shalllow



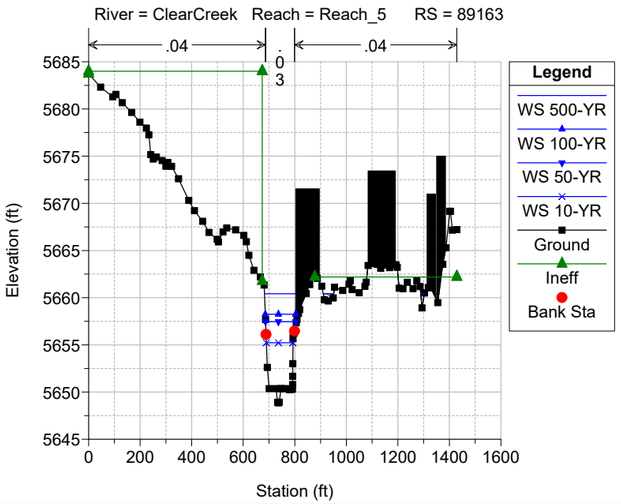
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 89421



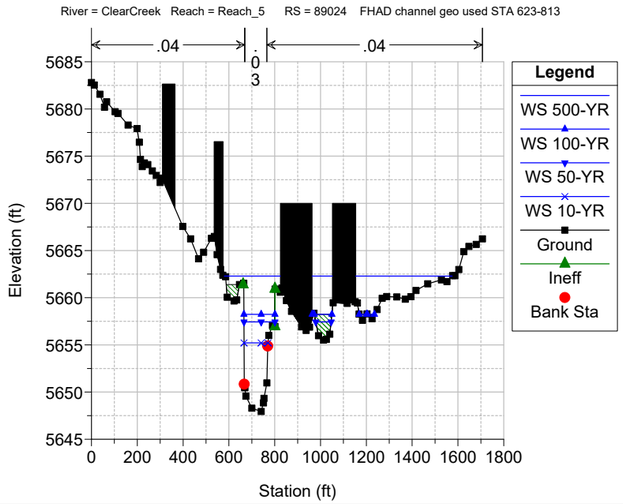
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 89163



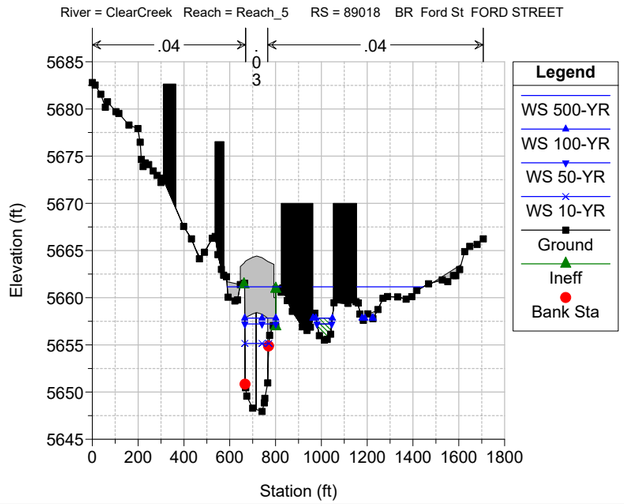
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 89024 FHAD channel geo used STA 623-813



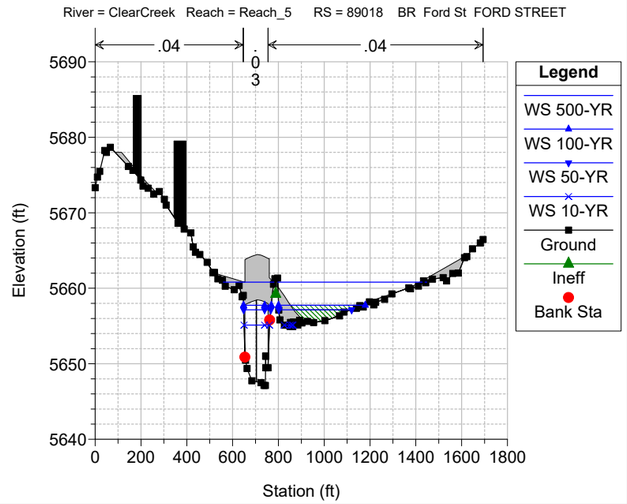
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 89018 BR Ford St FORD STREET



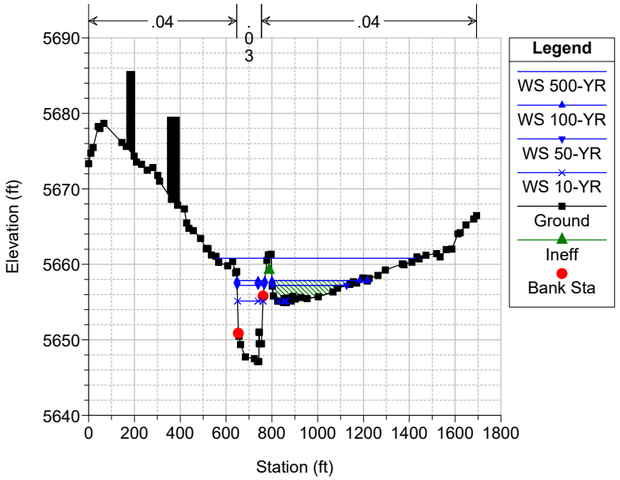
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 89018 BR Ford St FORD STREET



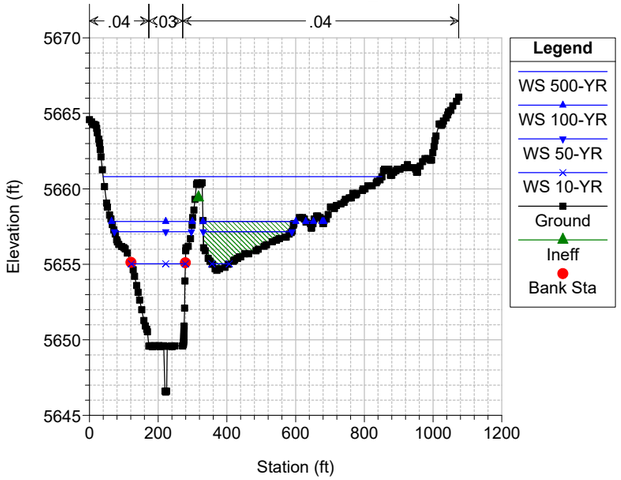
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 88939 DS FORD ST; FHAD CHANNEL GEOMETRY USED 650-760



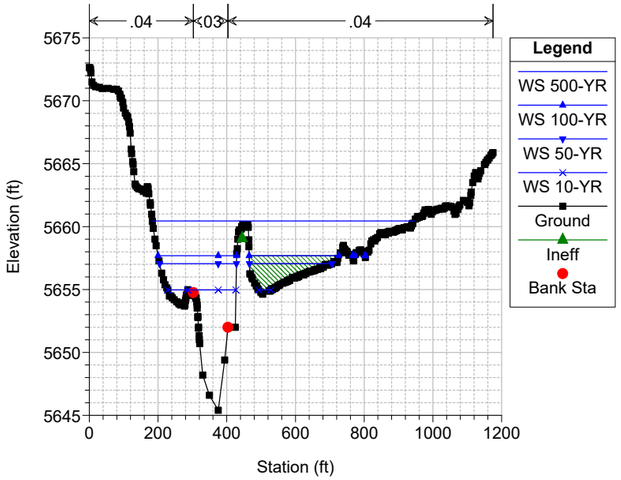
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 88854



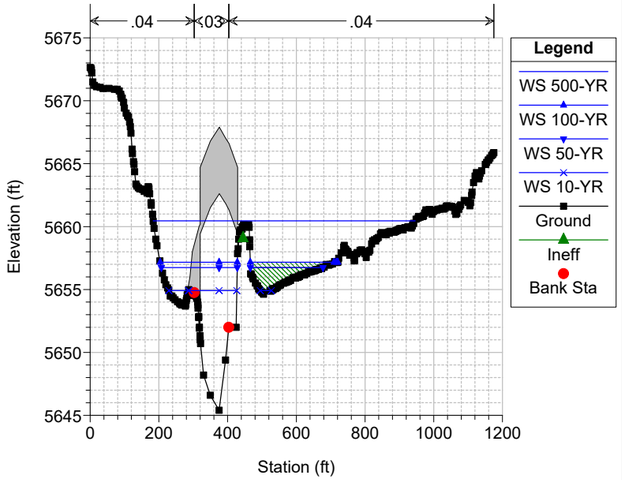
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 88815 US PED BRIDGE; FHAD GEOMETRY USED IN THALWEG



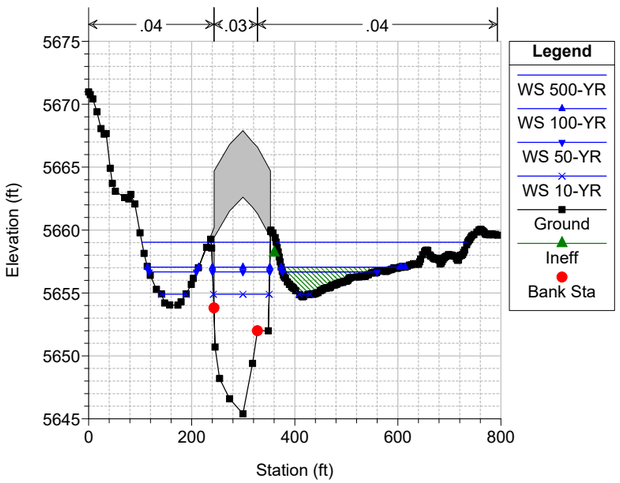
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 88808 BR Footbridge FOOTBRIDGE DOWNSTREAM OF FORD ST.



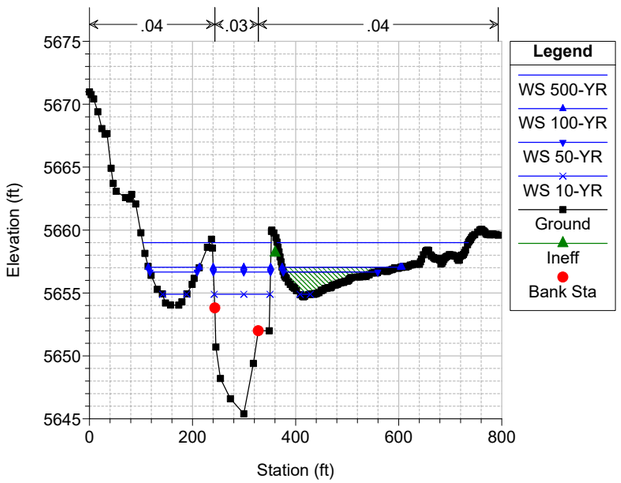
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 88808 BR Footbridge FOOTBRIDGE DOWNSTREAM OF FORD ST.



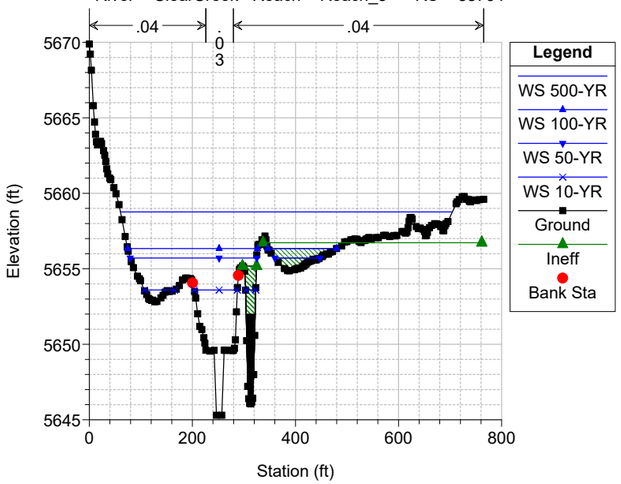
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 88791 DS PED BRIDGE; FHAD GEOMETRY USED STA 586-720



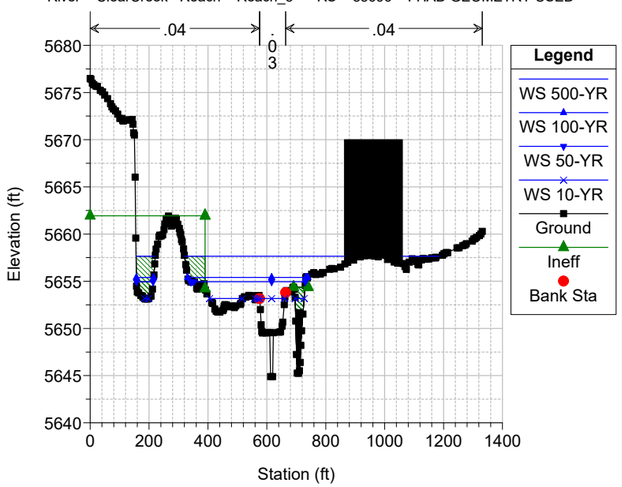
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 88764



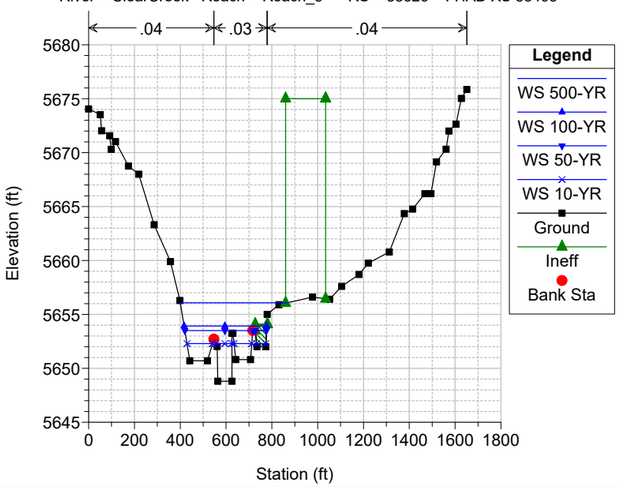
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 88696 FHAD GEOMETRY USED



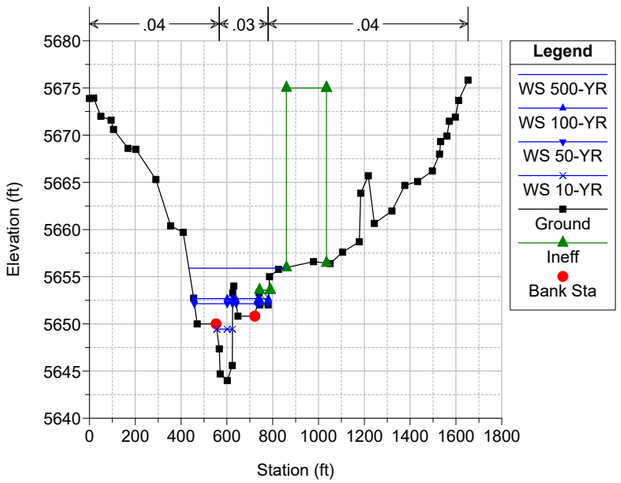
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 88626 FHAD XS 88405



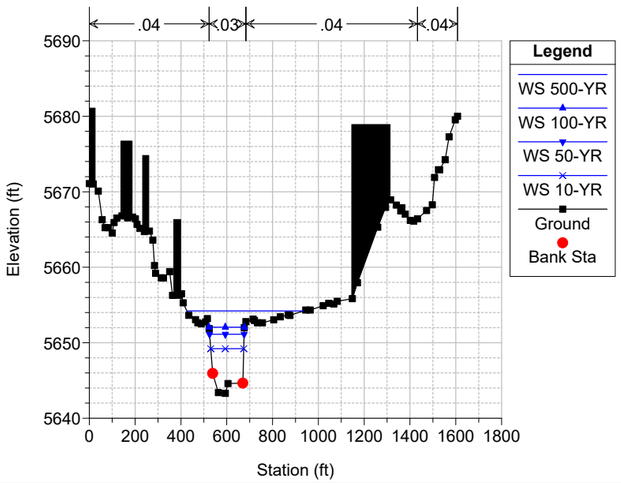
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 88616 FHAD XS 88395 GEOMETRY USED



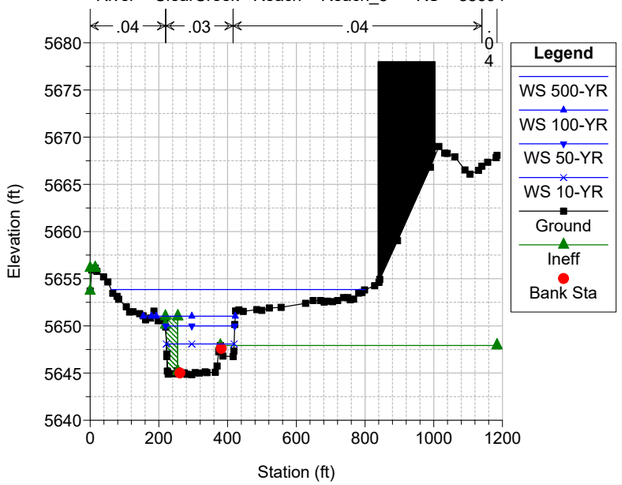
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

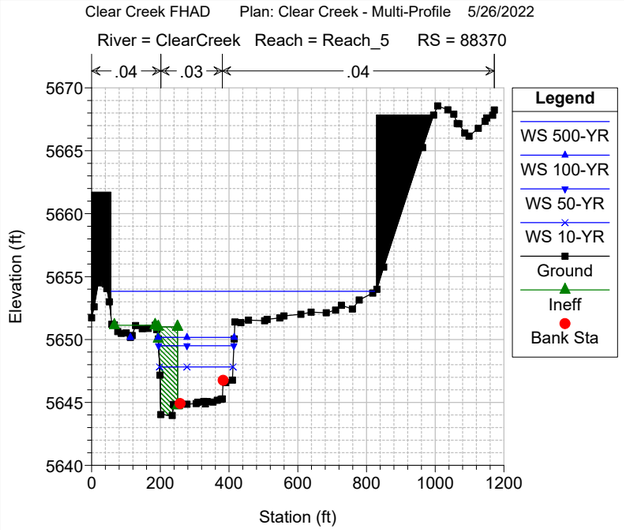
River = ClearCreek Reach = Reach_5 RS = 88487 FHAD XS 88266 USED 520-717

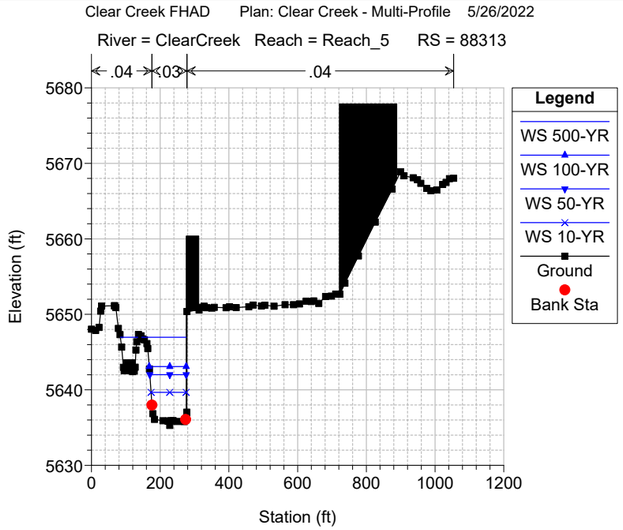


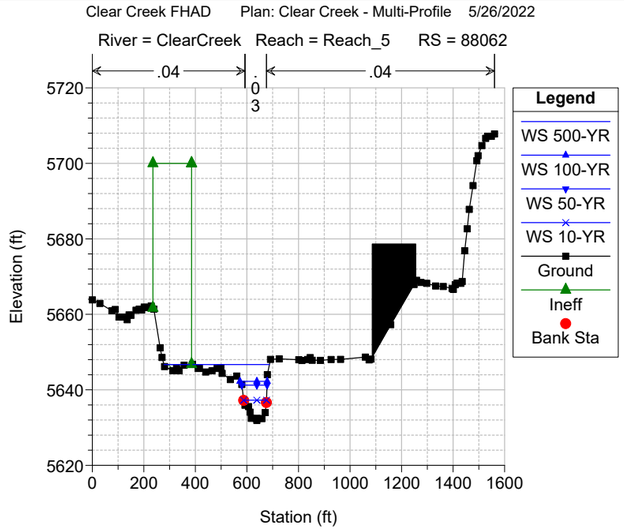
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

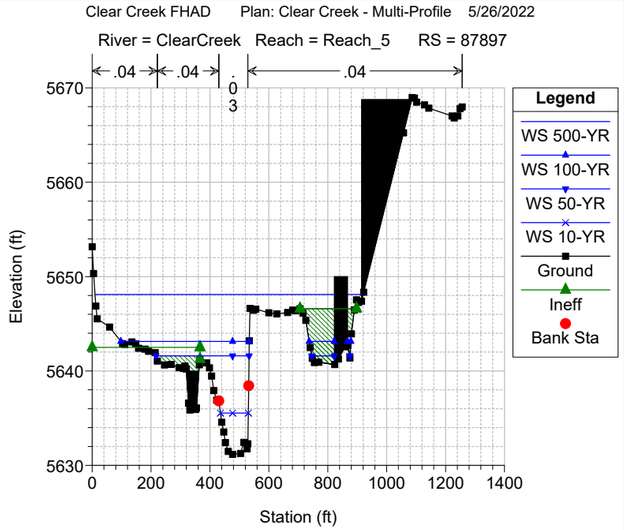
River = ClearCreek Reach = Reach_5 RS = 88394

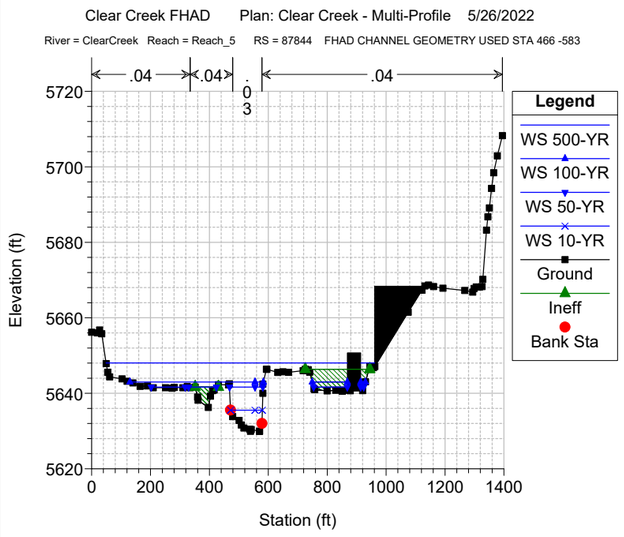


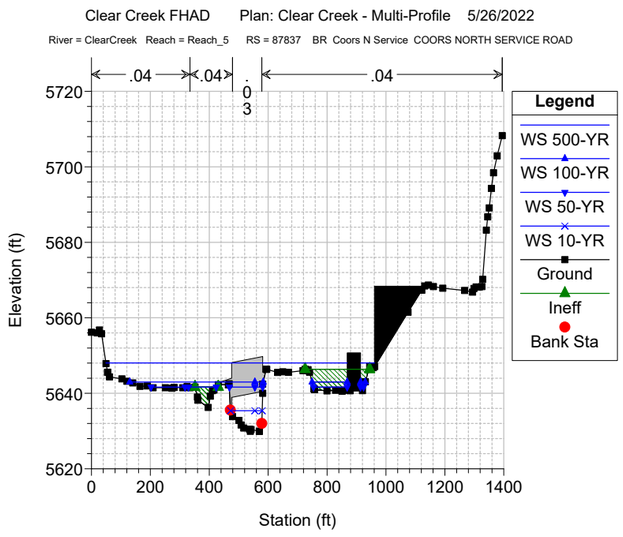

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88370
.04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

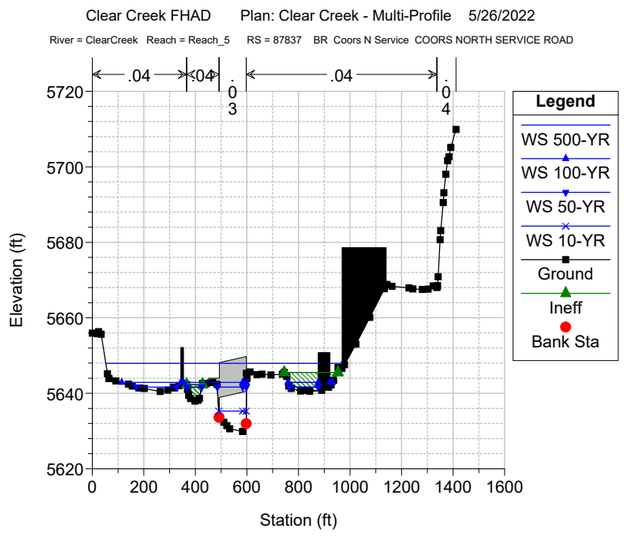

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88313
.04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

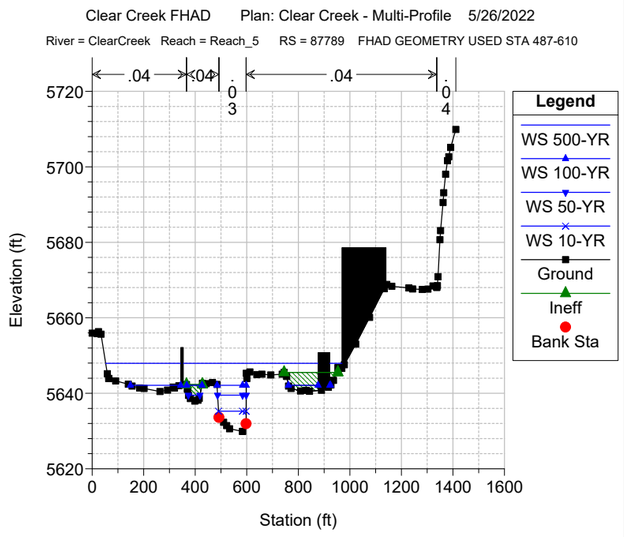

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88062
.04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

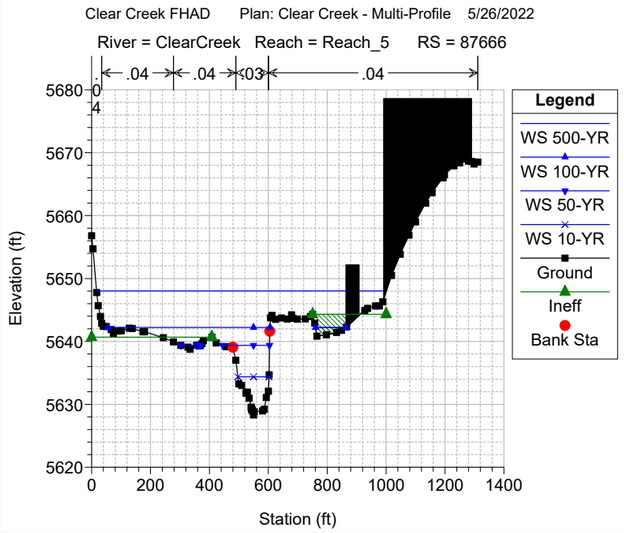

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87897
.04 .04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

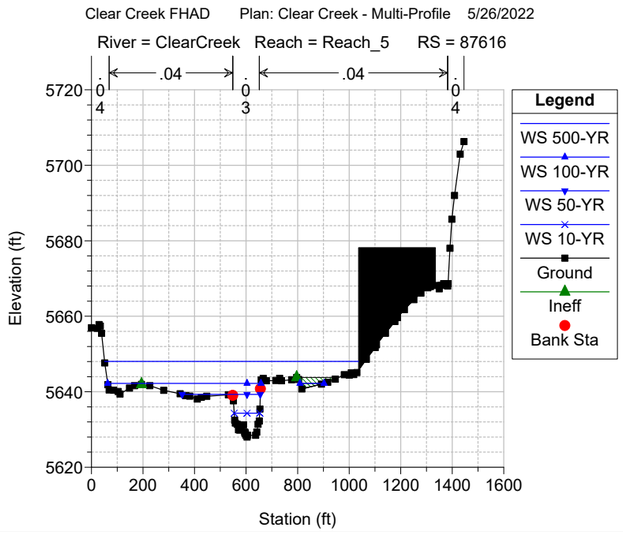

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87844 FHAD CHANNEL GEOMETRY USED STA 466 -583
.04 .04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

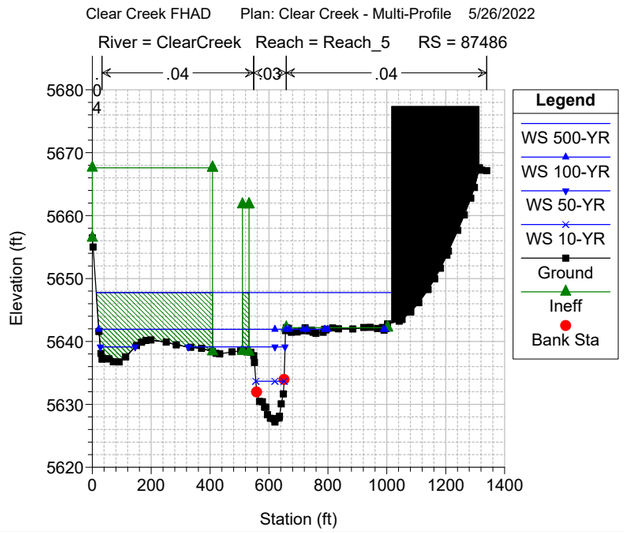

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87837 BR Coors N Service COORS NORTH SERVICE ROAD
.04 .04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

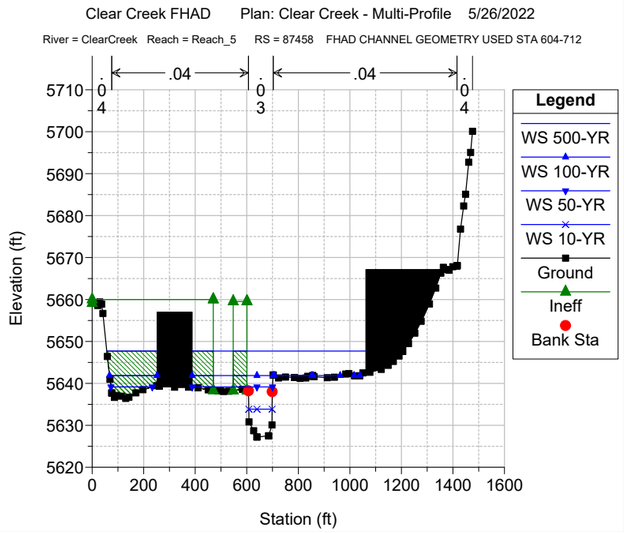

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87837 BR Coors N Service COORS NORTH SERVICE ROAD
.04 .04 .03 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87789 FHAD GEOMETRY USED STA 487-610
.04 .04 .03 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87666
.04 .04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

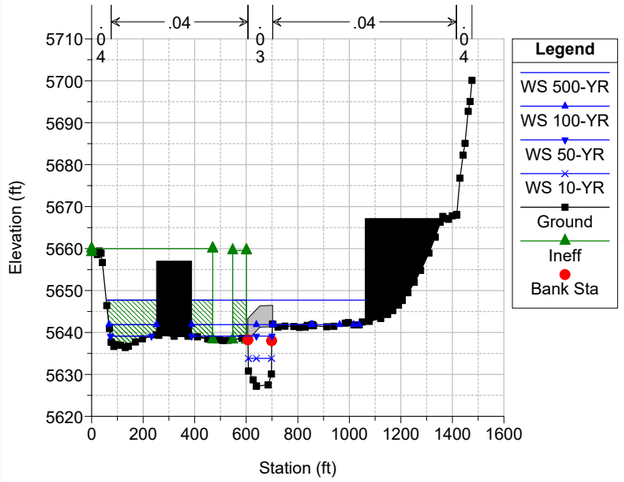

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87616
.04 .04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87486
.04 .04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87458 FHAD CHANNEL GEOMETRY USED STA 604-712
.04 .04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

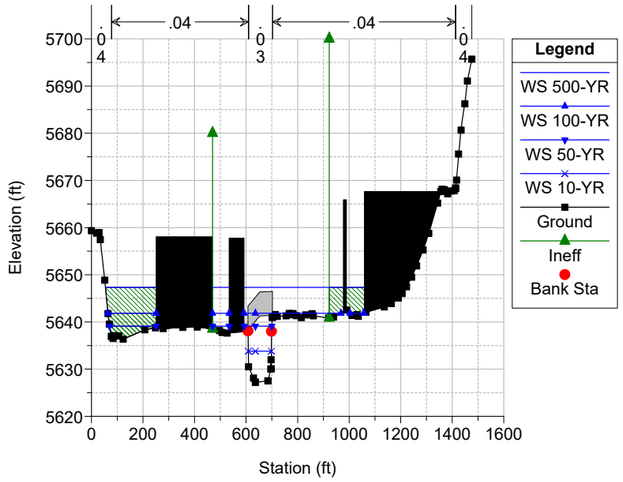
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87452 BR Footbridge FOOTBRIDGE UPSTREAM OF COORS VEHICLE BRIDGE



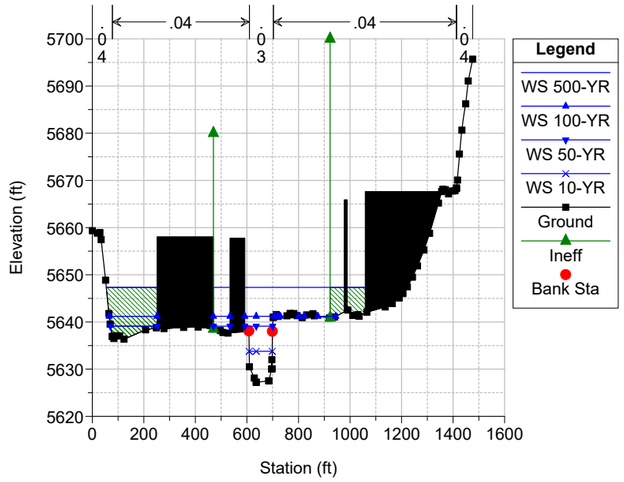
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87452 BR Footbridge FOOTBRIDGE UPSTREAM OF COORS VEHICLE BRIDGE



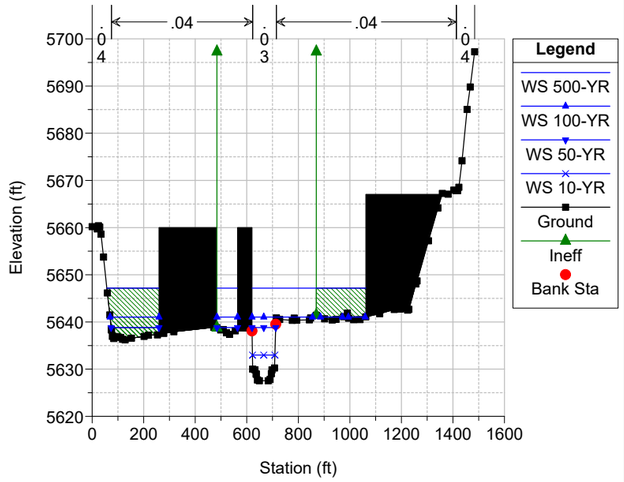
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87438 FHAD CHANNEL GEOMETRY STA 607-704



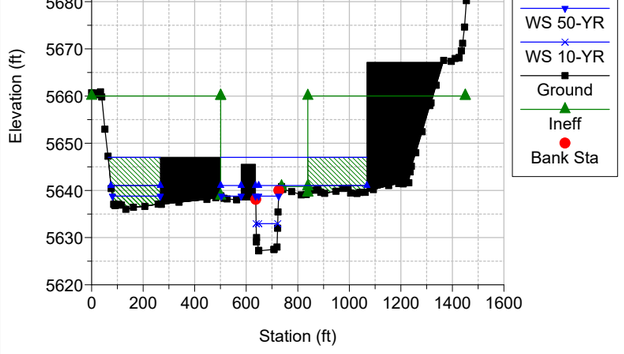
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87379 Left bank adjusted to reflect 2005 FHAD XS 87158



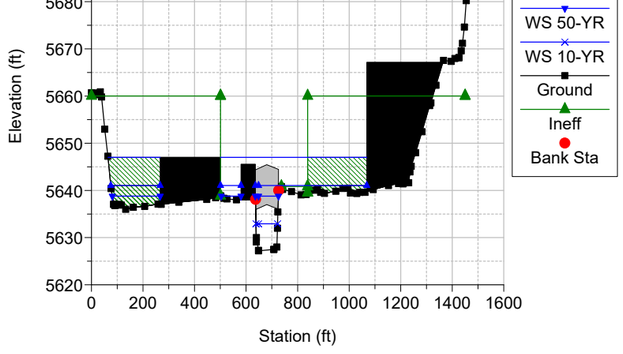
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87326 Left bank adjusted to reflect 2005 FHAD XS 87158



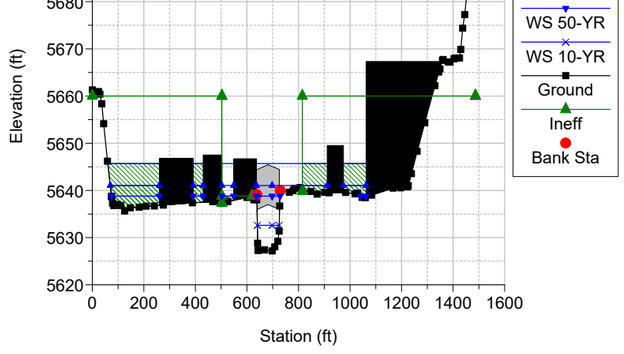
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87322 BR Coors Vehicle COORS VEHICLE BRIDGE



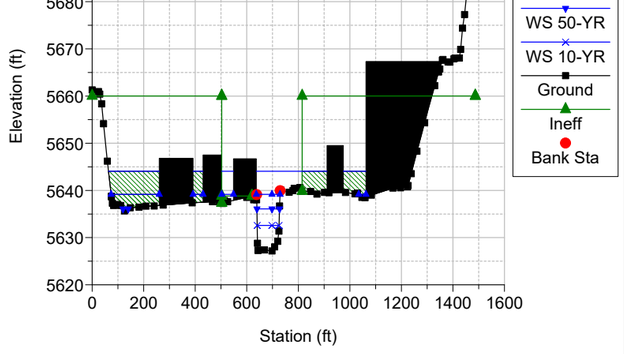
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87322 BR Coors Vehicle COORS VEHICLE BRIDGE



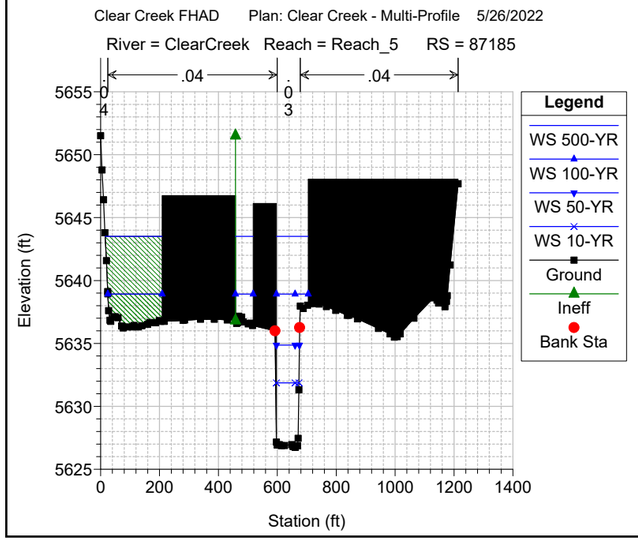
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87281 Topo left bank updated to reflect walls from FHAD XS 87059



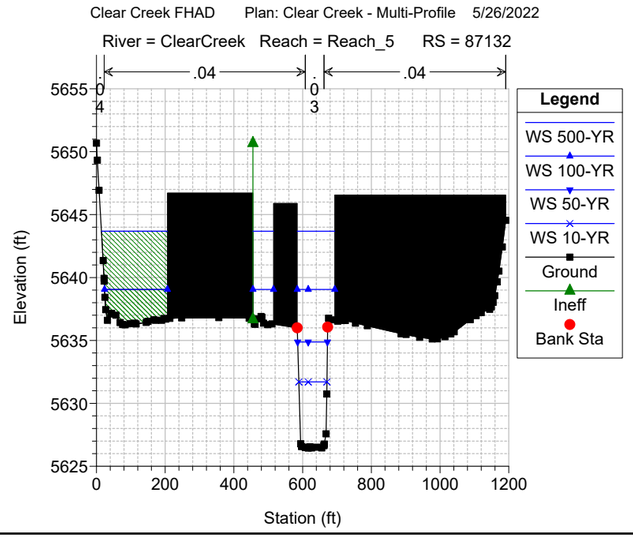
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87185



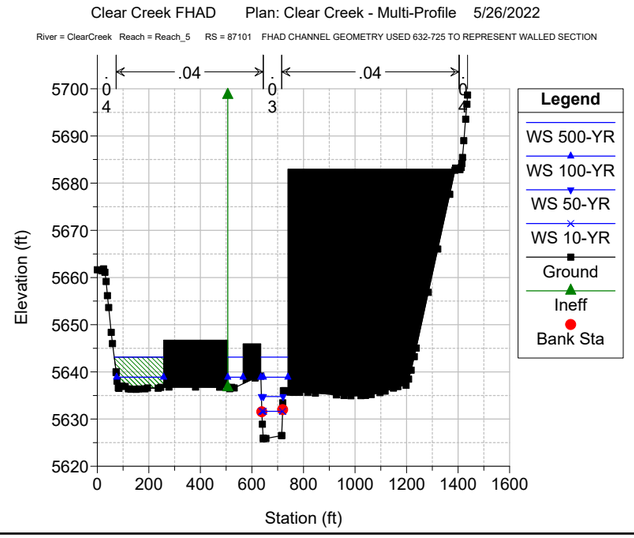
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87132



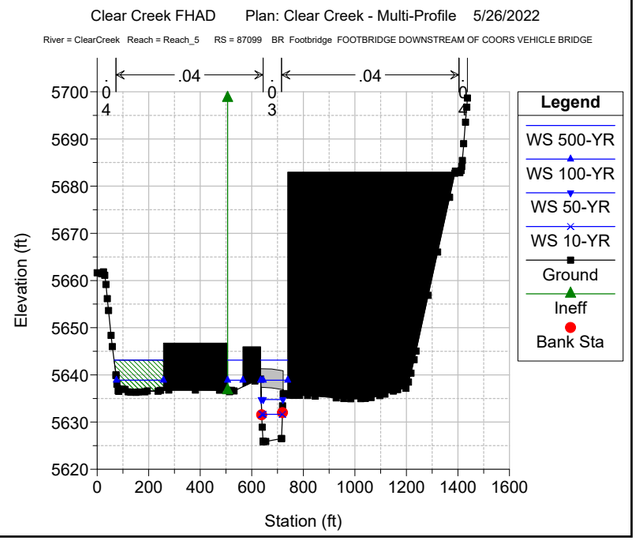
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87101 FHAD CHANNEL GEOMETRY USED 632-725 TO REPRESENT WALLED SECTION



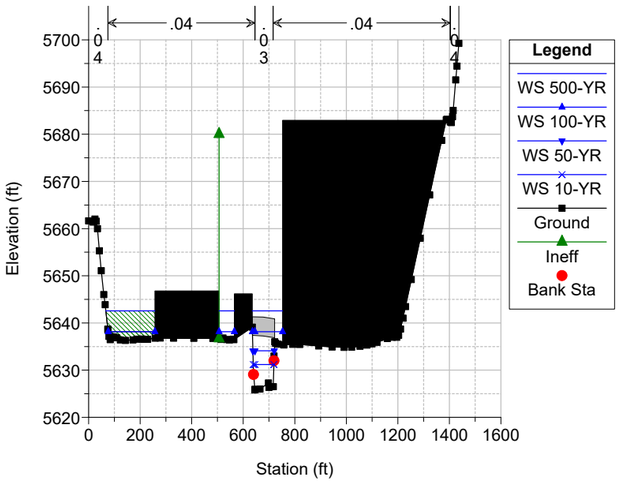
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87099 BR Footbridge FOOTBRIDGE DOWNSTREAM OF COORS VEHICLE BRIDGE



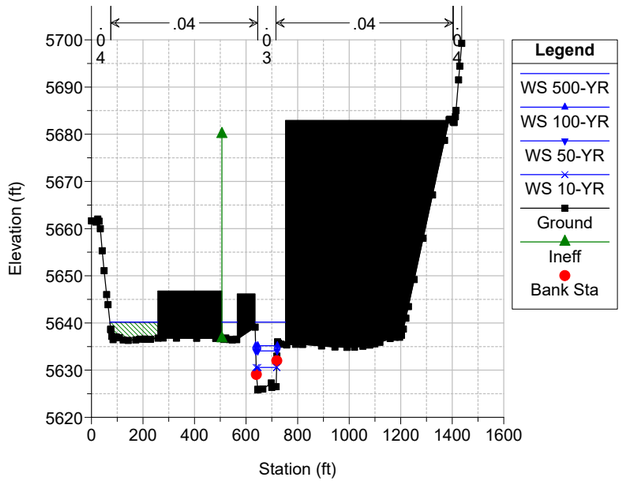
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87099 BR Footbridge FOOTBRIDGE DOWNSTREAM OF COORS VEHICLE BRIDGE



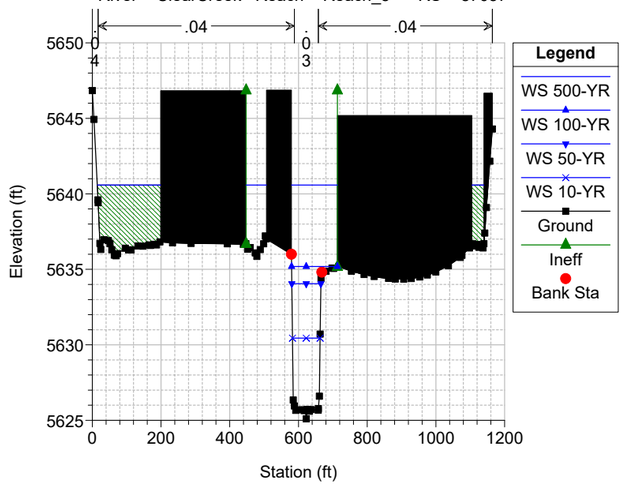
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87090 FHAD CHANNEL GEOMETRY USED 635-725 TO REPRESENT WALLED SECTIONS



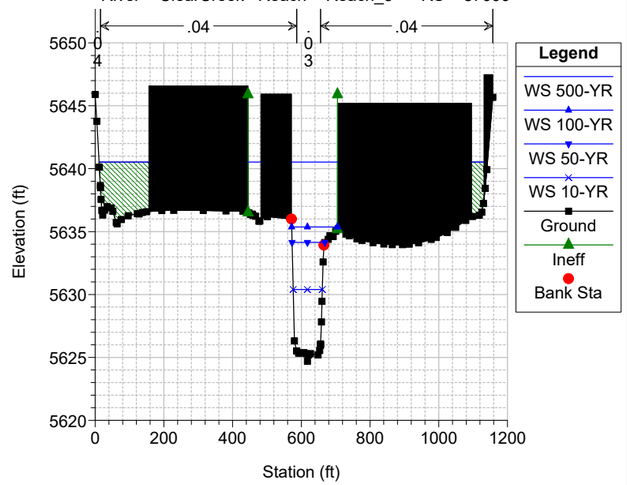
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87037



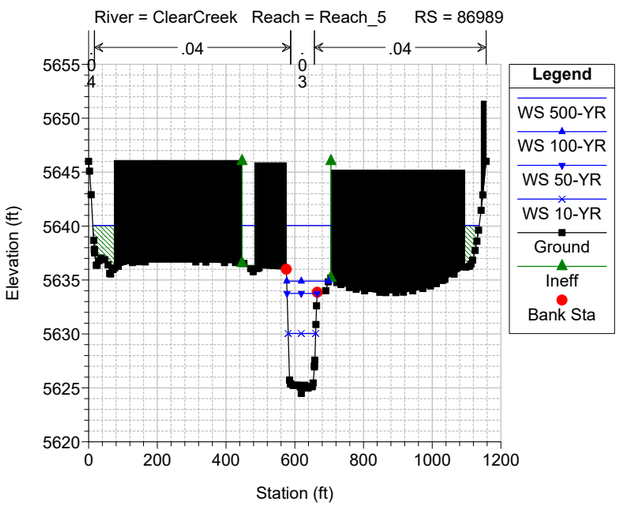
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87000



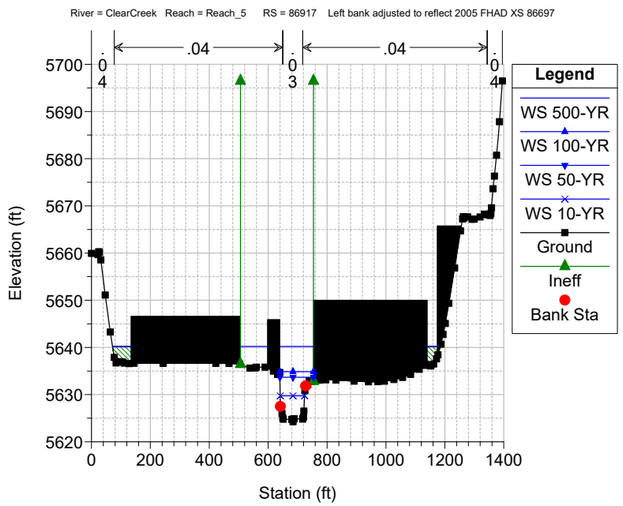
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86989



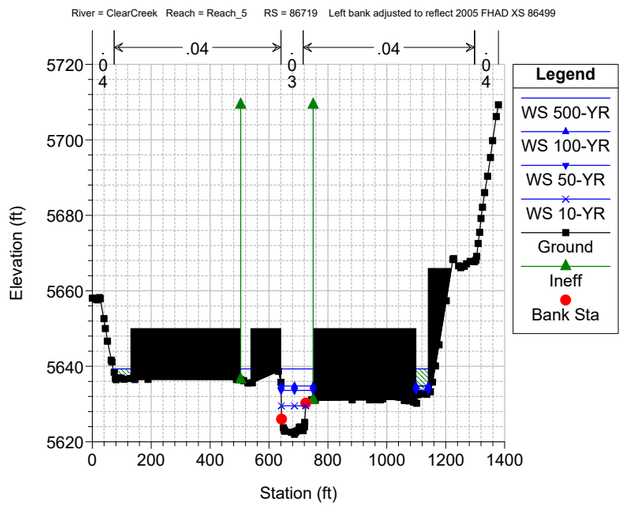
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86917 Left bank adjusted to reflect 2005 FHAD XS 86697



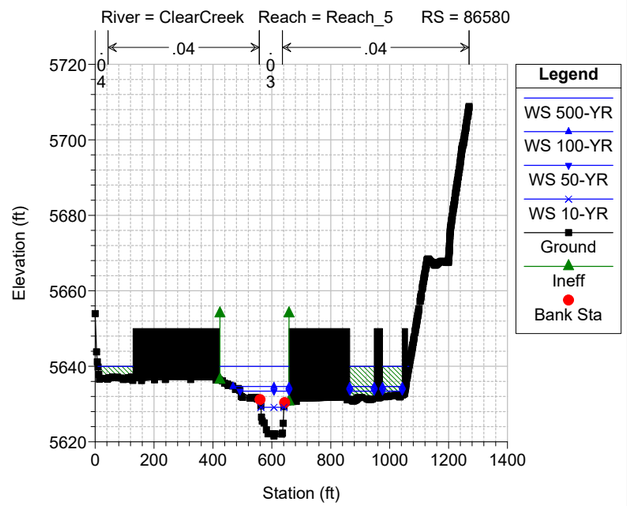
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86719 Left bank adjusted to reflect 2005 FHAD XS 86499



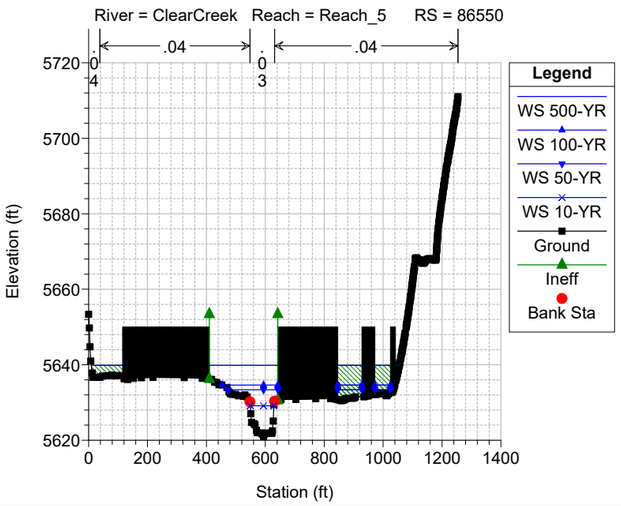
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86580



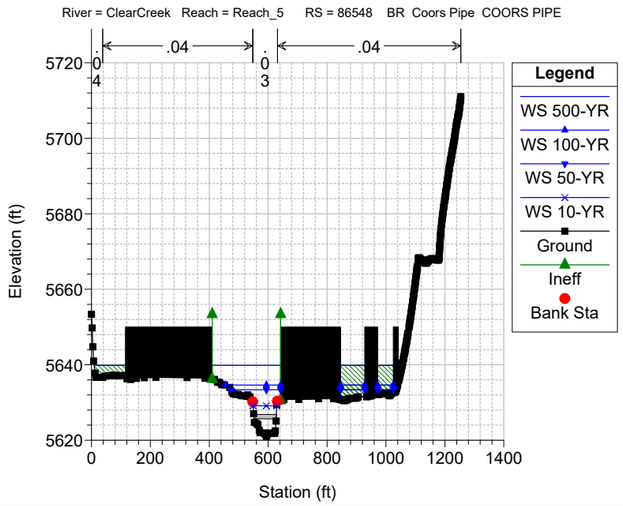
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86550



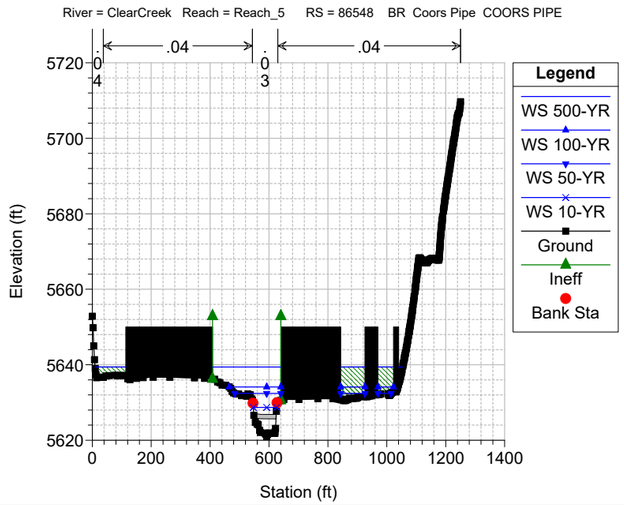
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86548 BR Coors Pipe COORS PIPE



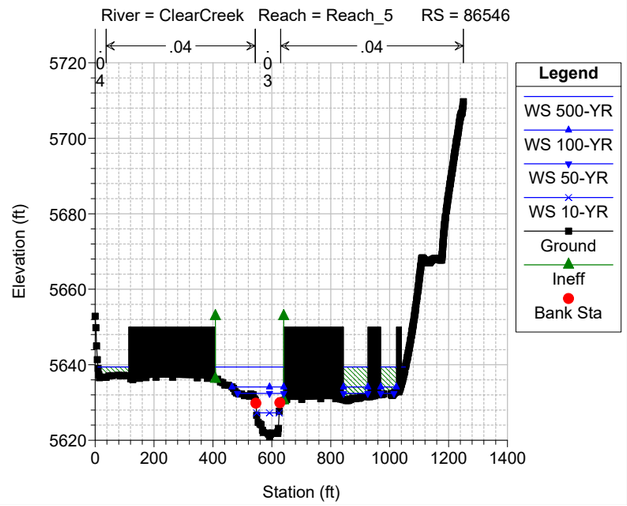
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86548 BR Coors Pipe COORS PIPE



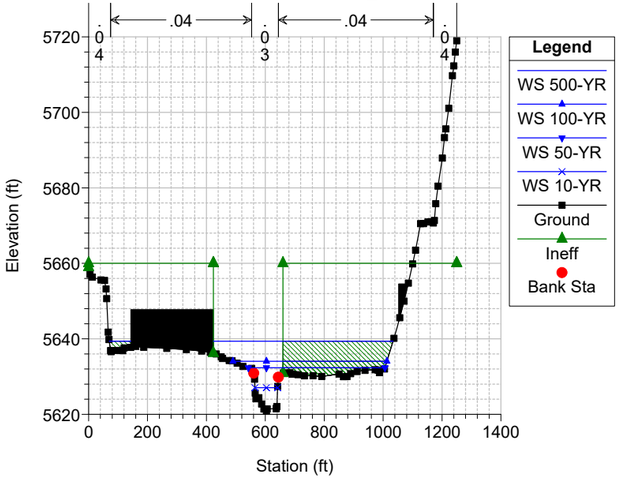
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86546



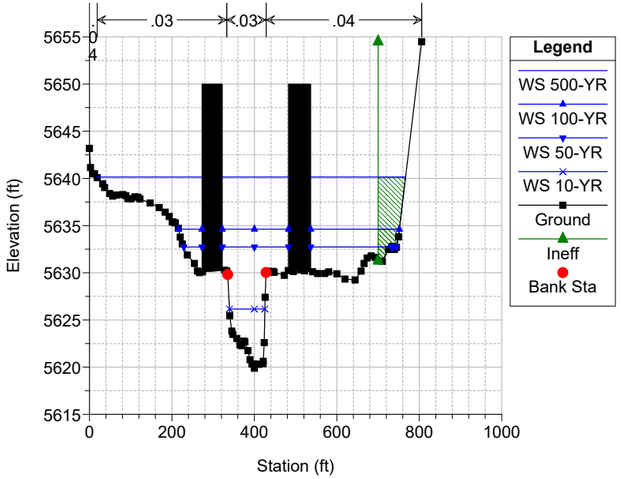
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86503



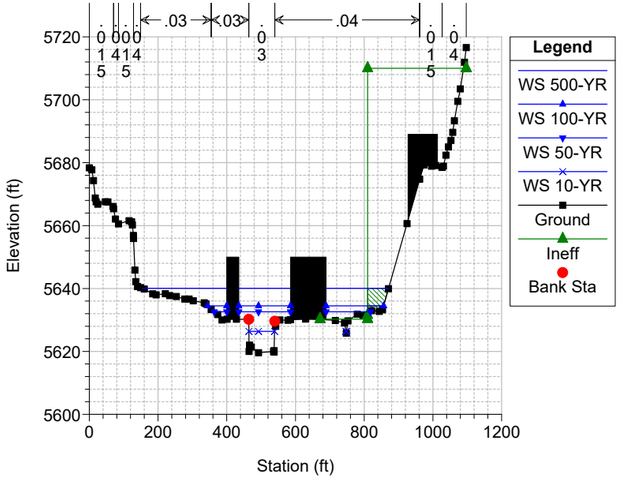
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86333



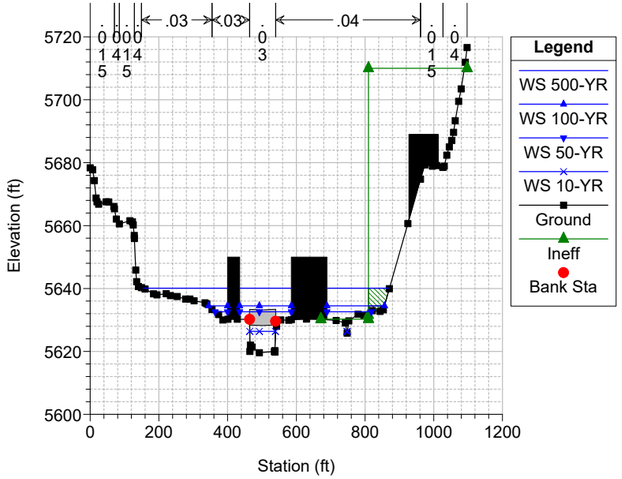
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86299 FHAD CHANNEL GEOMETRY STA 463-558



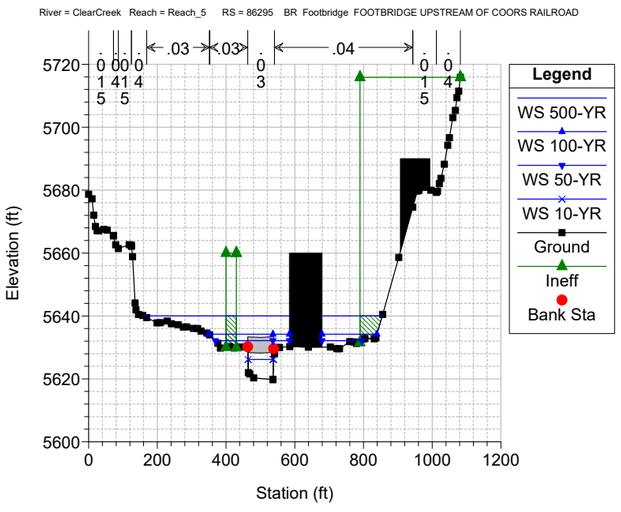
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86295 BR Footbridge FOOTBRIDGE UPSTREAM OF COORS RAILROAD



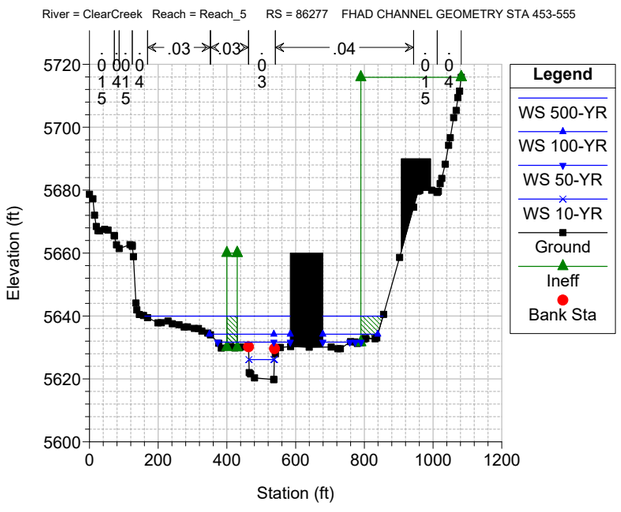
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86295 BR Footbridge FOOTBRIDGE UPSTREAM OF COORS RAILROAD



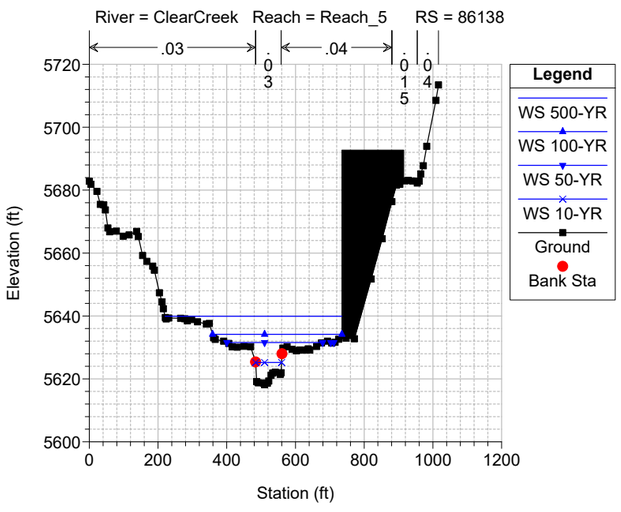
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86277 FHAD CHANNEL GEOMETRY STA 453-555



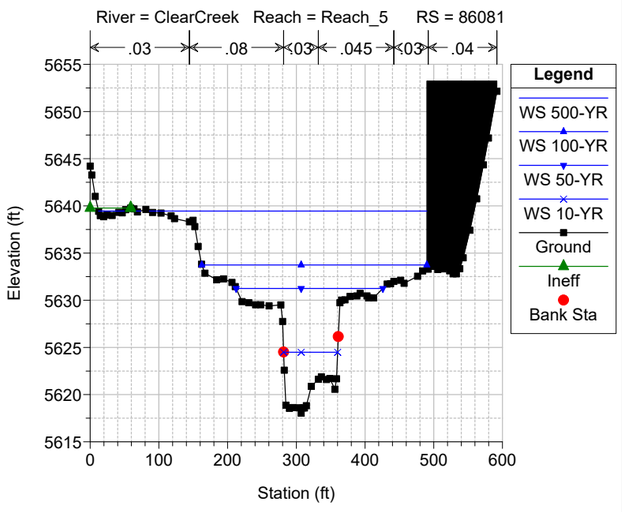
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86138



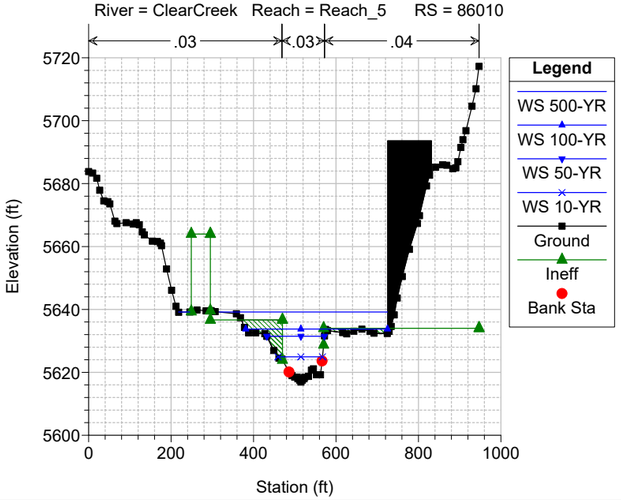
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86081



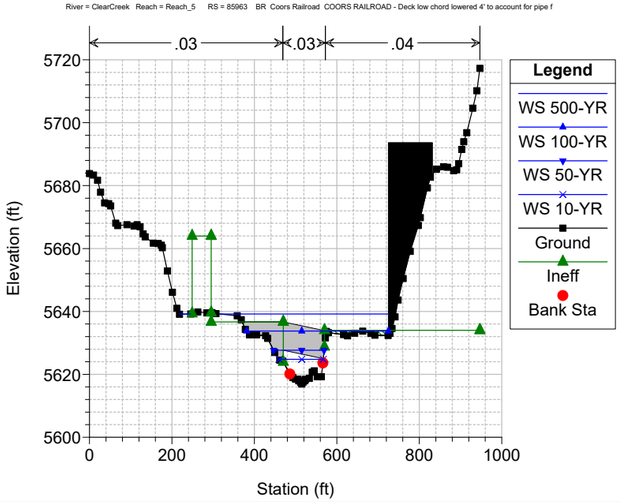
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 86010



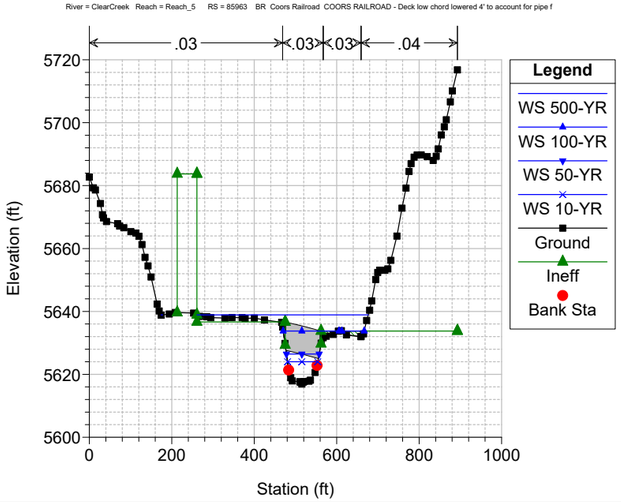
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 85963 BR Coors Railroad COORS RAILROAD - Deck low chord lowered 4' to account for pipe f



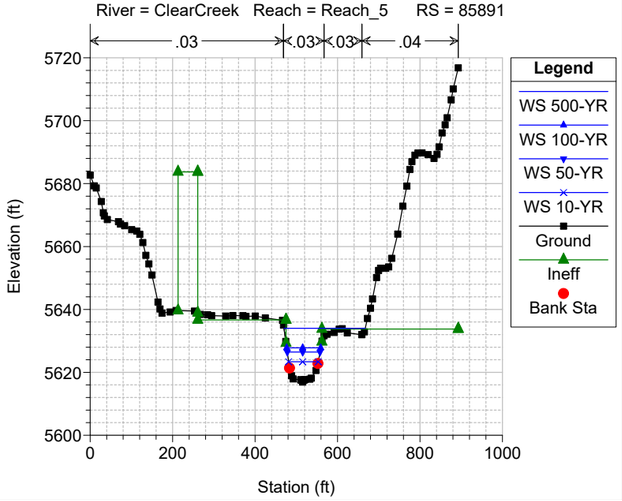
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 85963 BR Coors Railroad COORS RAILROAD - Deck low chord lowered 4' to account for pipe f

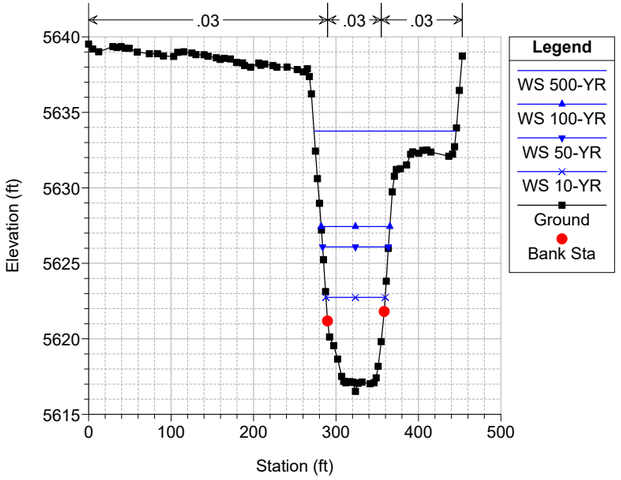


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

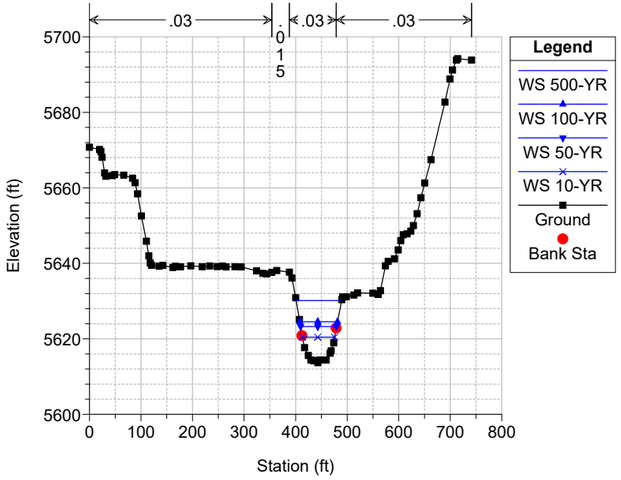
River = ClearCreek Reach = Reach_5 RS = 85891



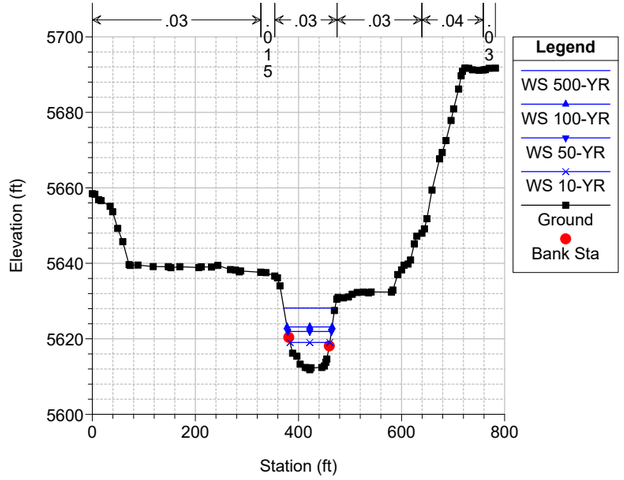
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 85799



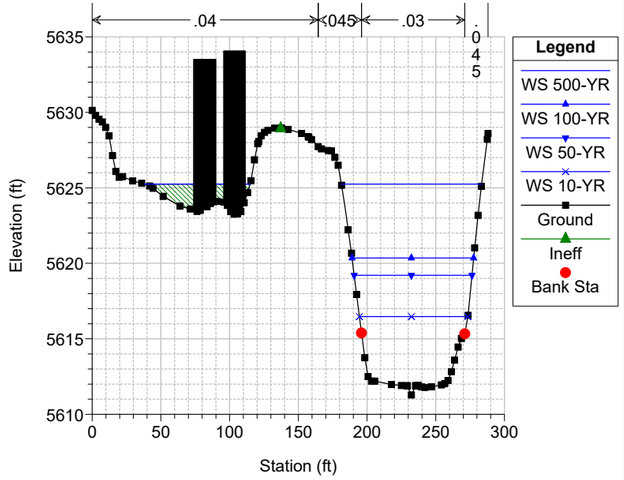
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 85484



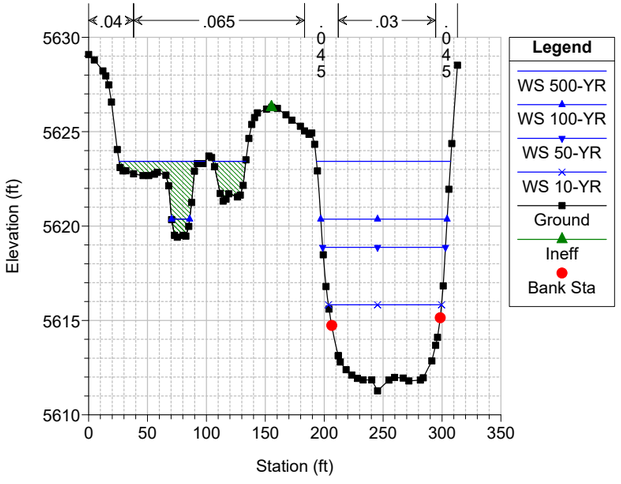
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 85036



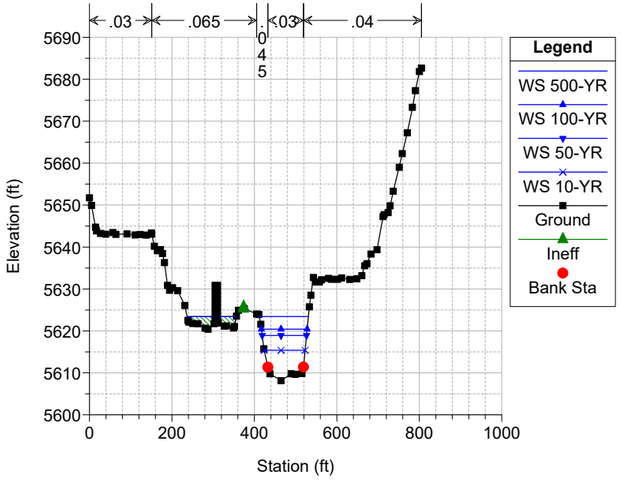
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84717



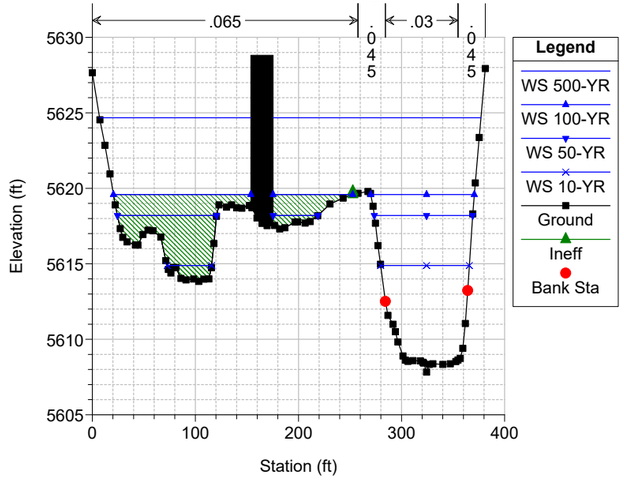
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84651 Increased Cont/Exp Coeffs. to fix drawdown.



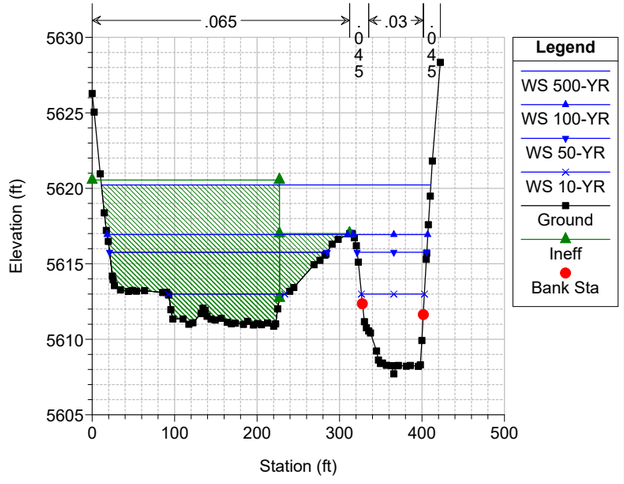
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84628



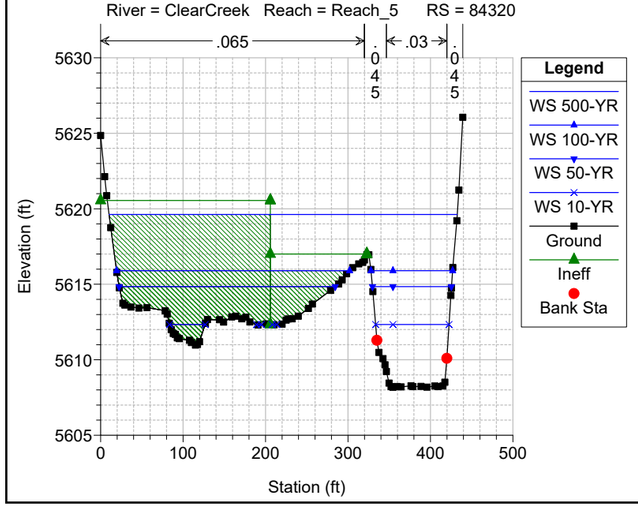
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84495



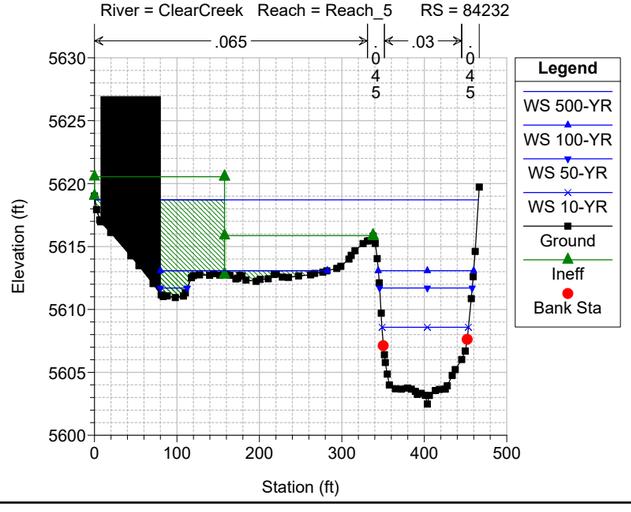
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84358



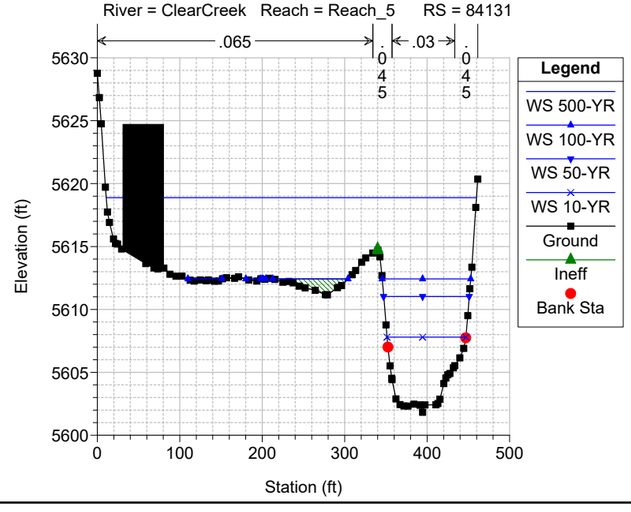
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84320



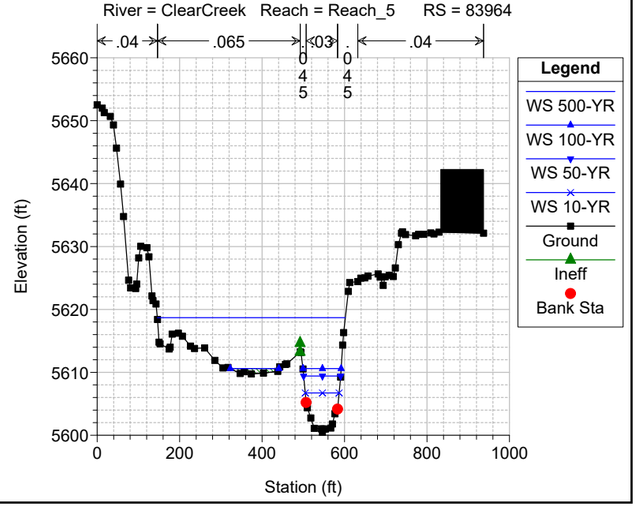
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84232

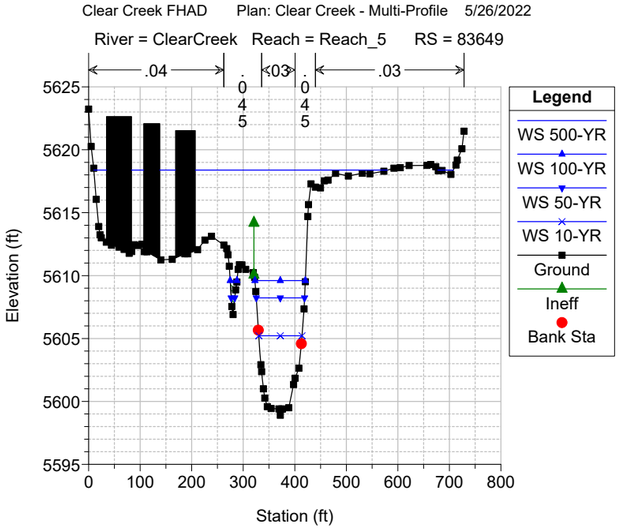


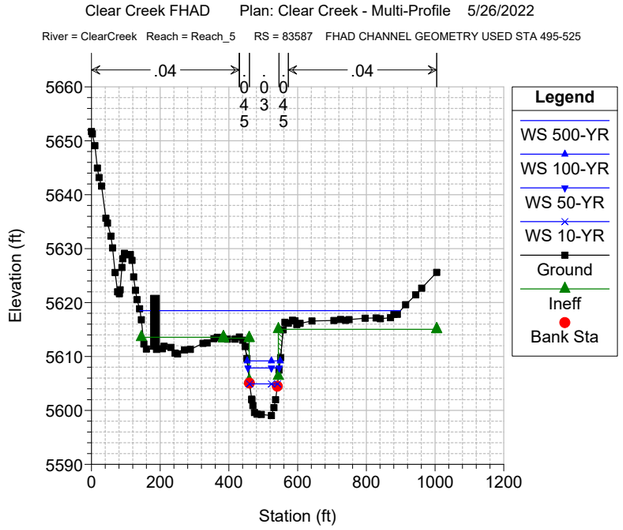
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84131

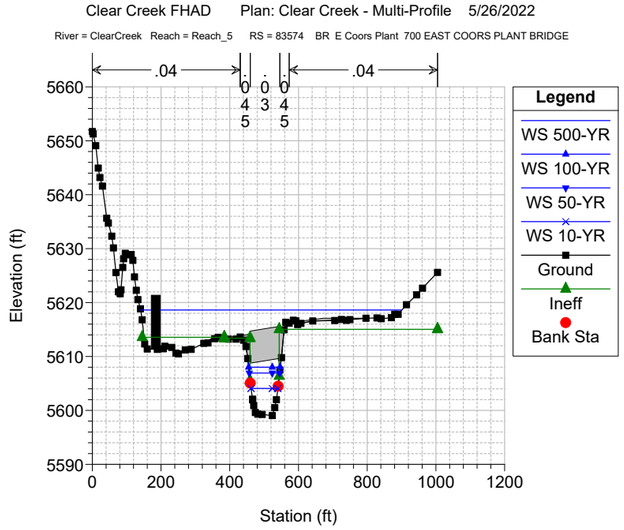


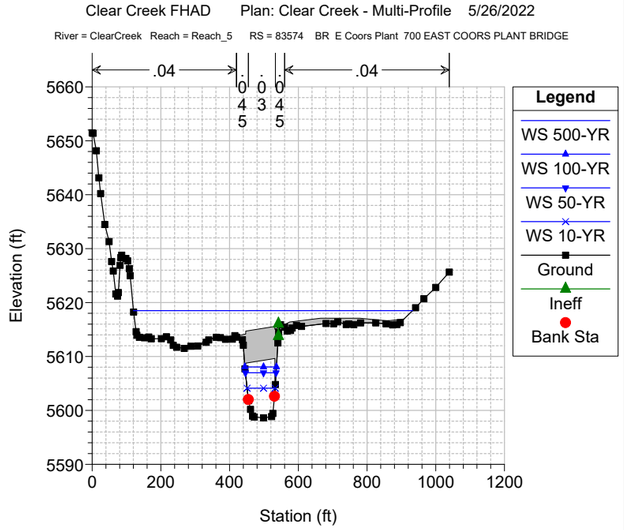
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83964

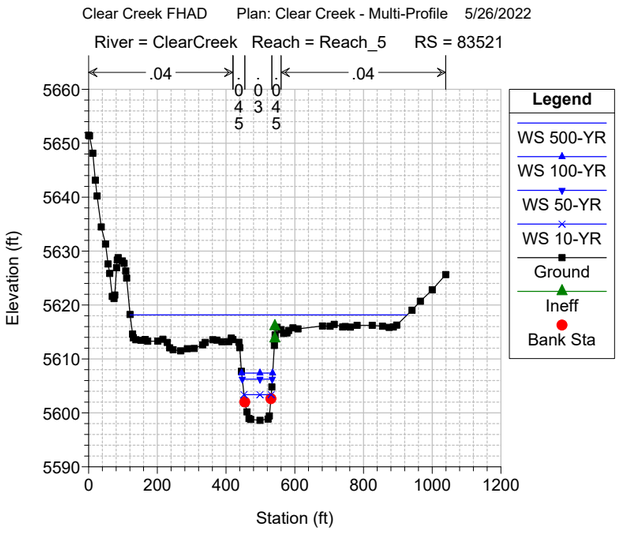


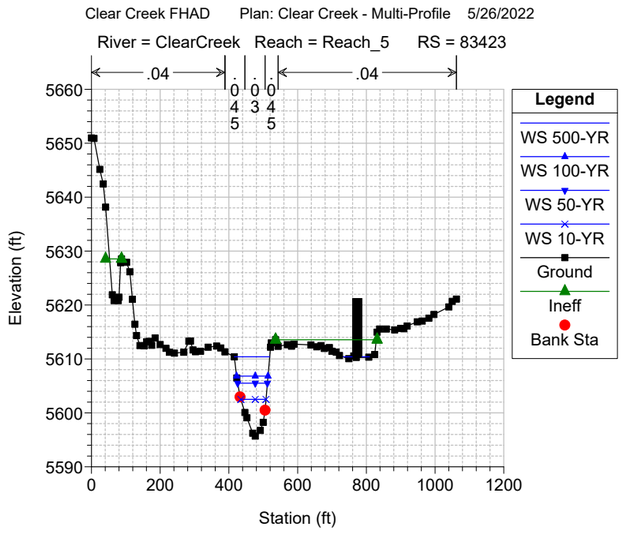

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83649
.04 .03 .03
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

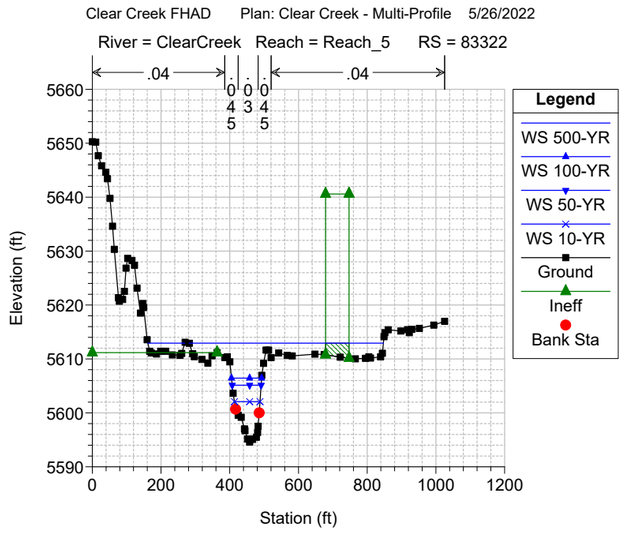

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83587 FHAD CHANNEL GEOMETRY USED STA 495-525
.04 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

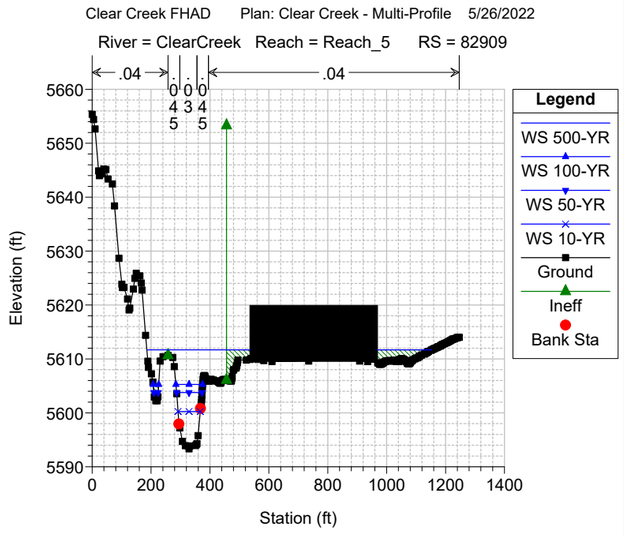

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83574 BR E Coors Plant 700 EAST COORS PLANT BRIDGE
.04 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

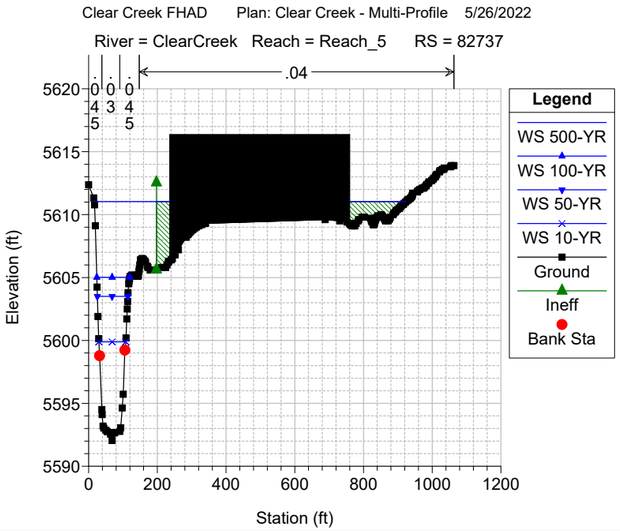

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83574 BR E Coors Plant 700 EAST COORS PLANT BRIDGE
.04 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

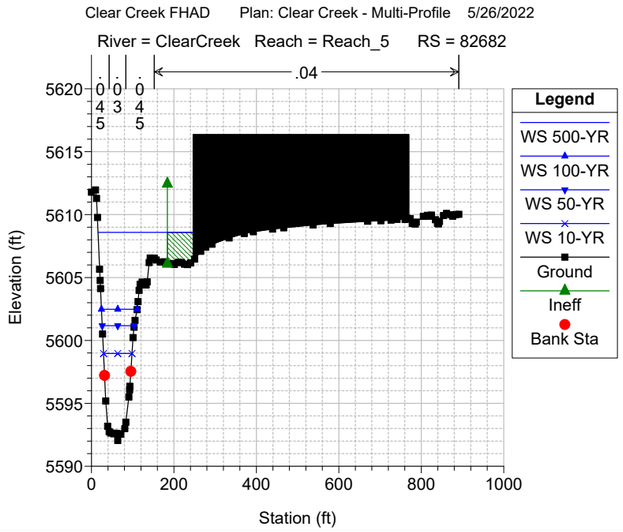

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83521
.04 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

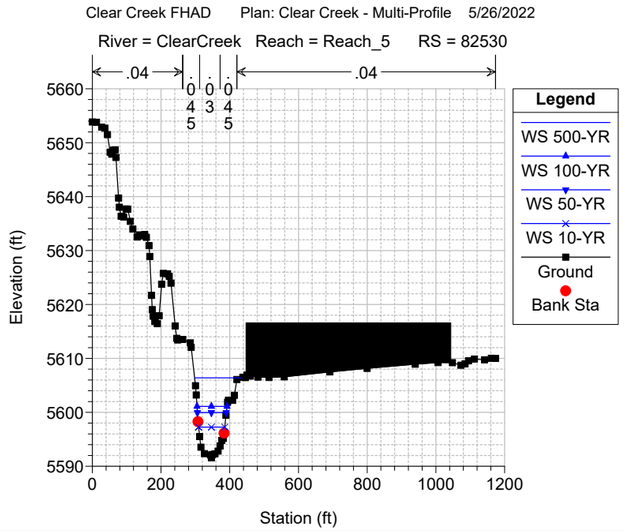

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83423
.04 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

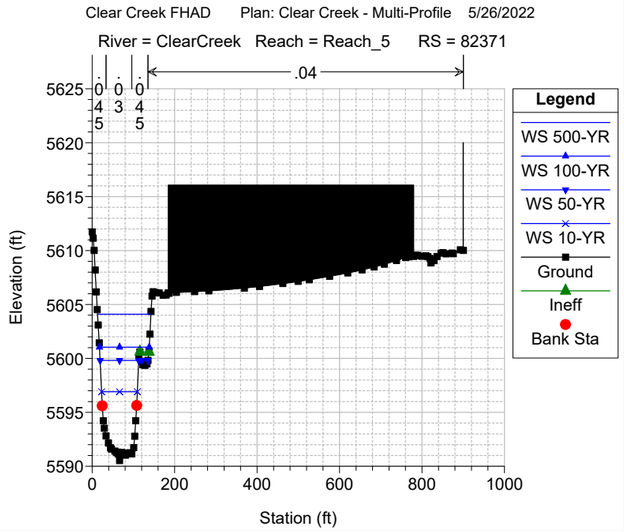

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83322
.04 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

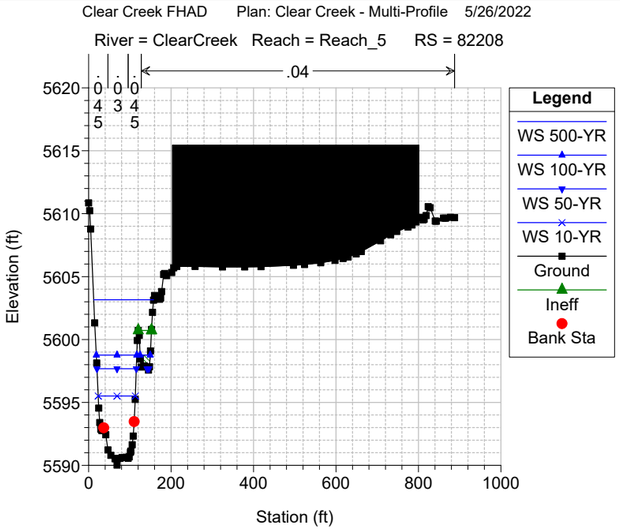

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82909
.04 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

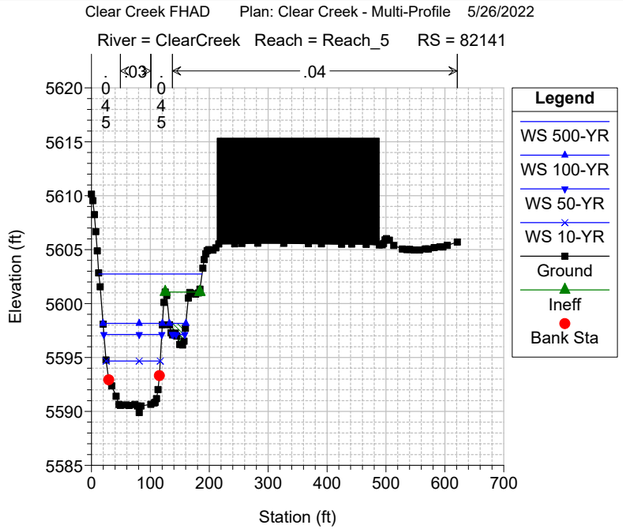

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82737
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

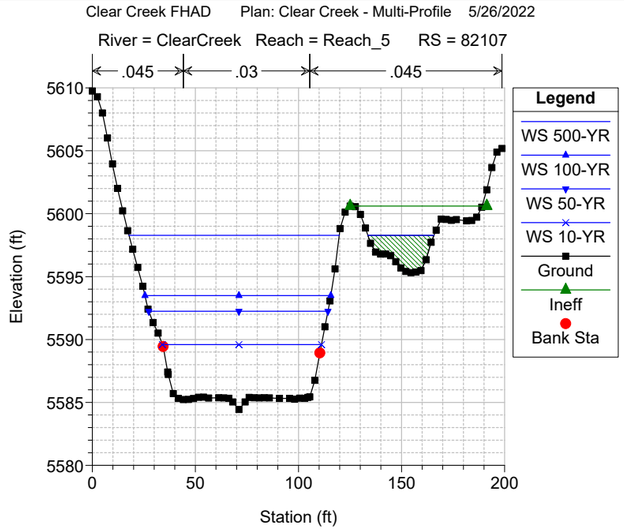

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82682
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

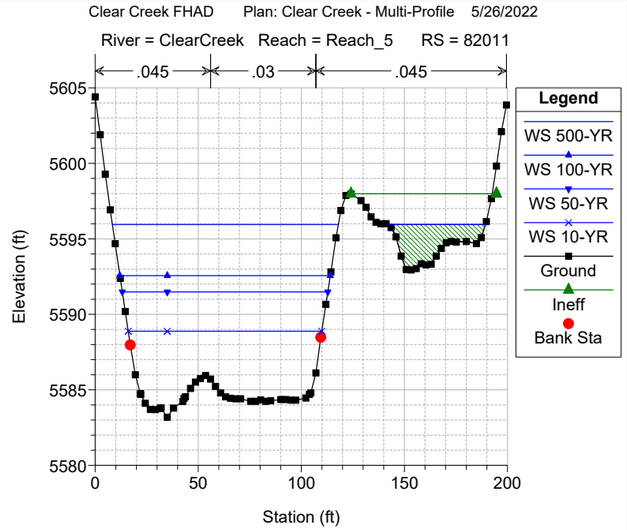

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82530
.04 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

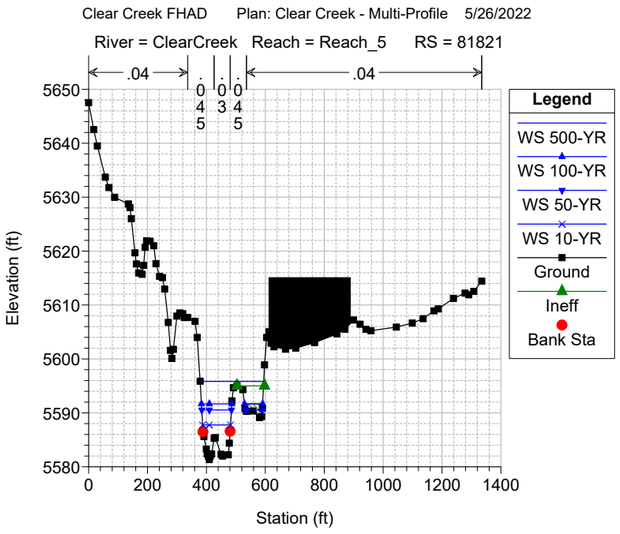

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82371
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

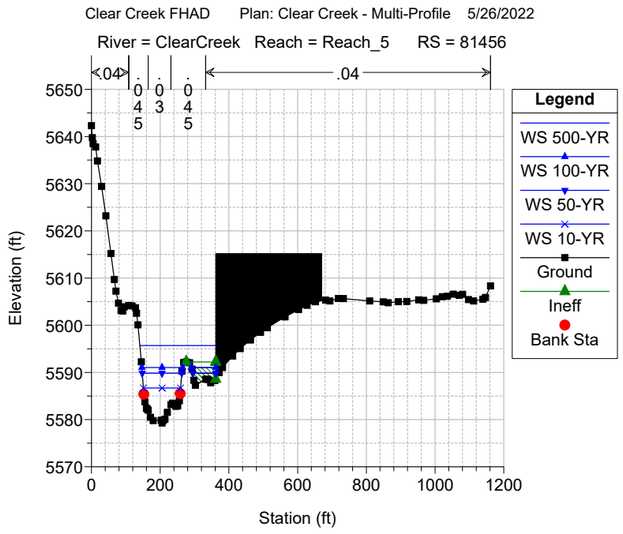

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82208
.045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

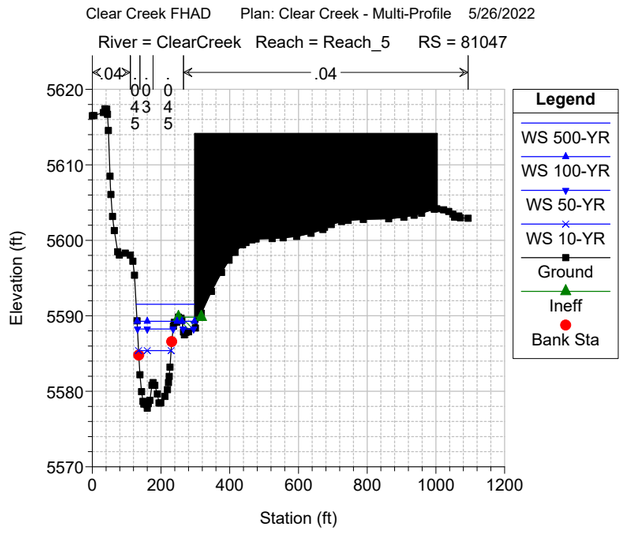

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82141
.045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

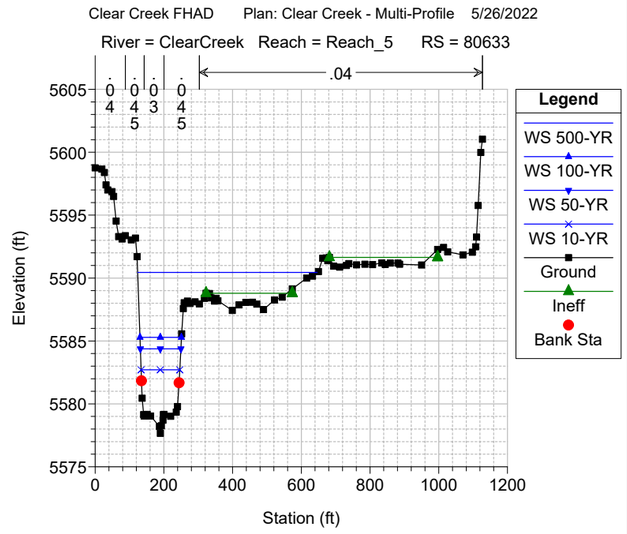

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82107
.045 .03 .045
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

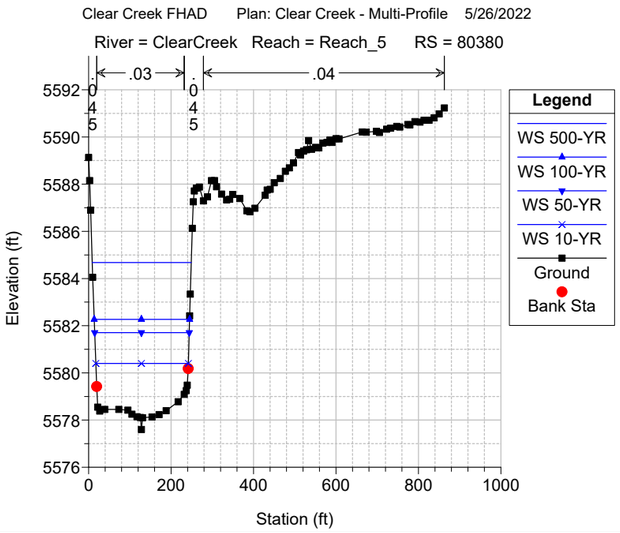

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82011
.045 .03 .045
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

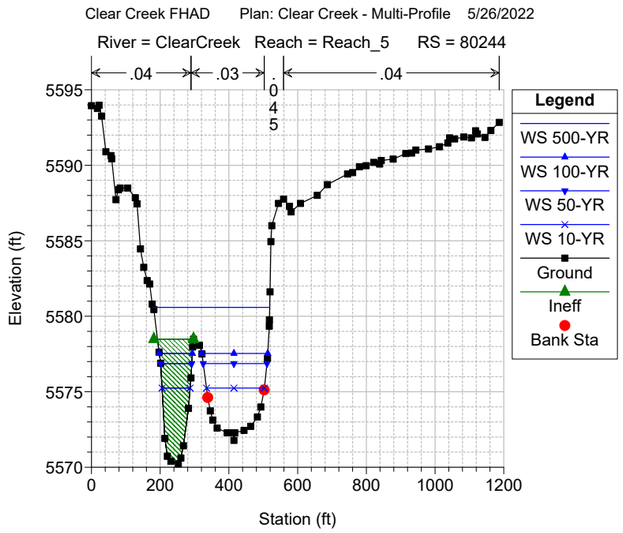

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 81821
.04 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

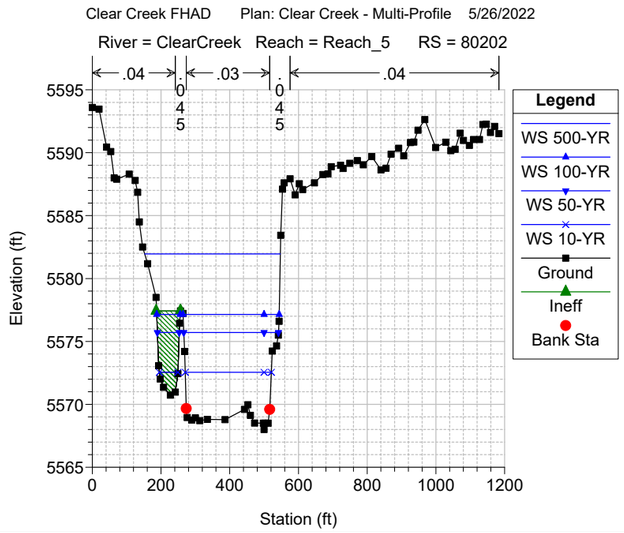

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 81456
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

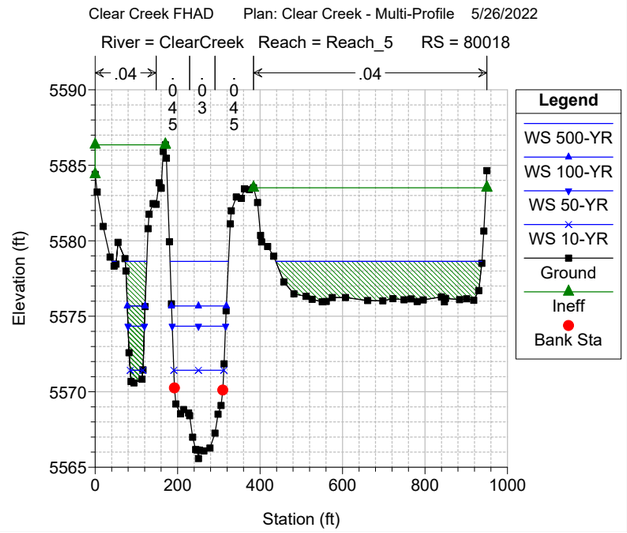

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 81047
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

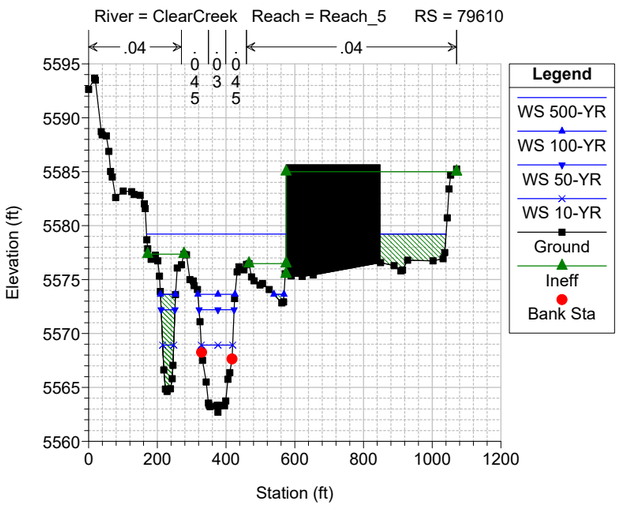

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 80633
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

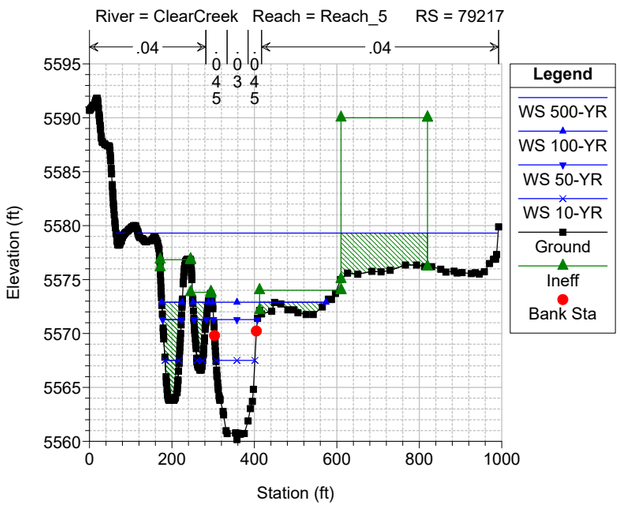

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 80380
.03 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

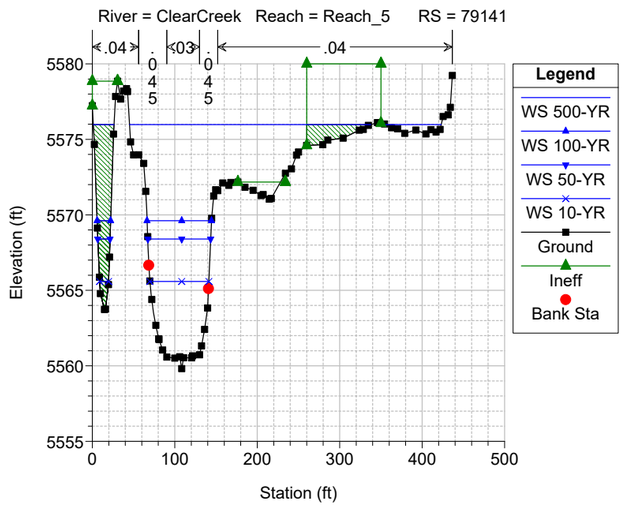

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 80244
.04 .03 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

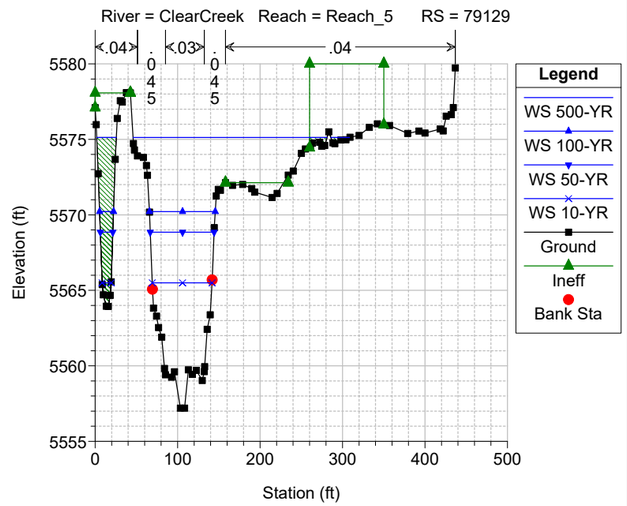

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 80202
.04 .03 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

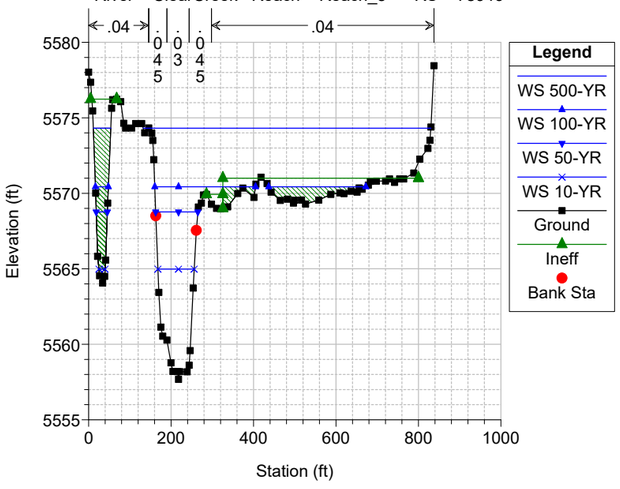

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 80018
.04 .04 .03 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

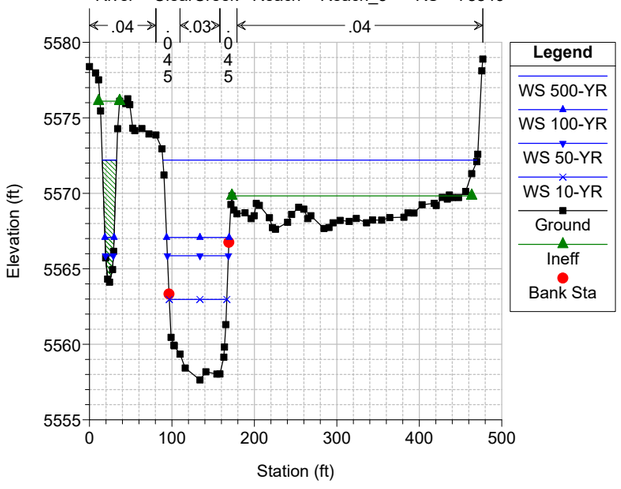
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 79610


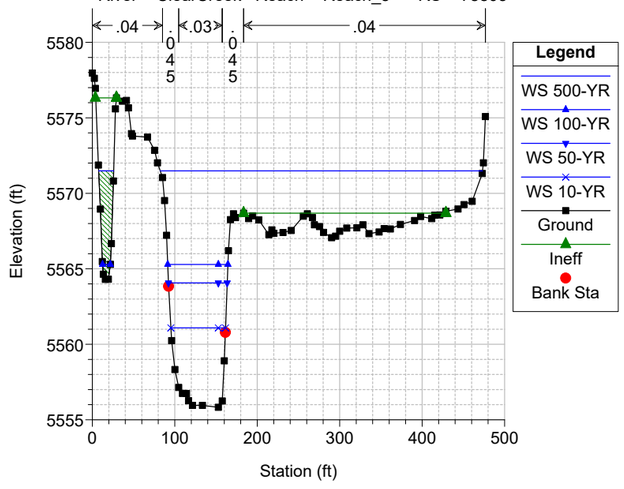
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 79217


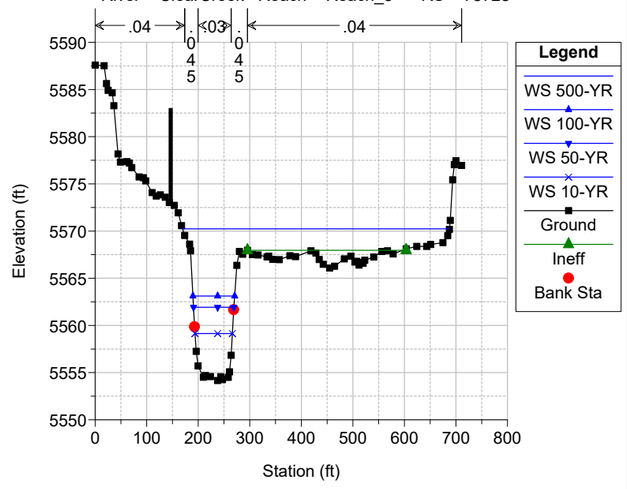
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 79141


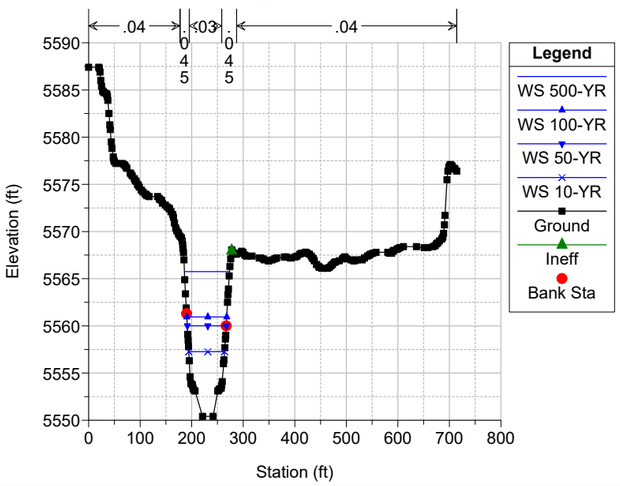
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 79129


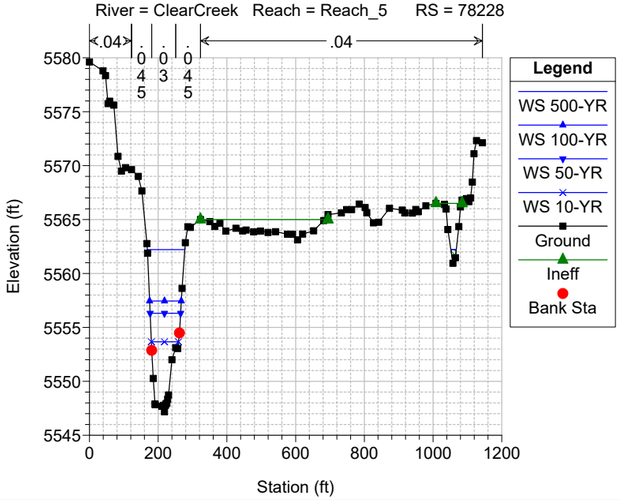
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 78946


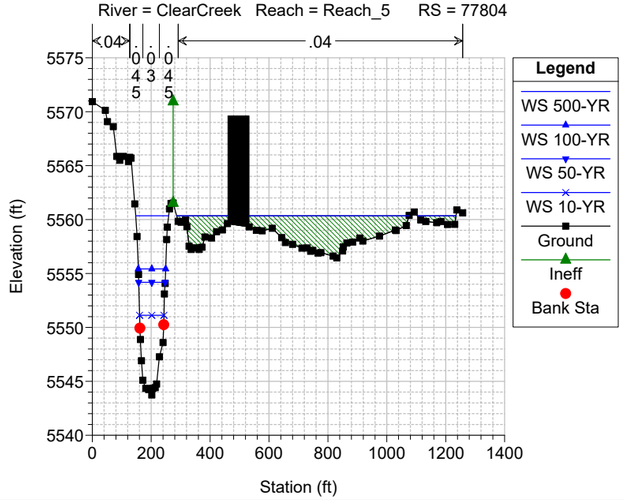
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 78846


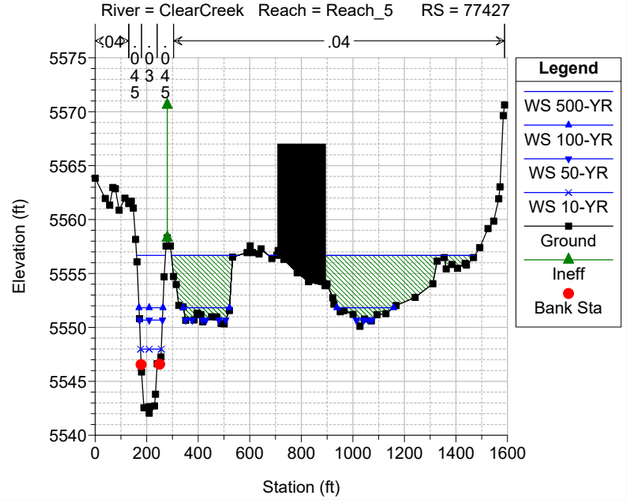
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 78803


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 78728


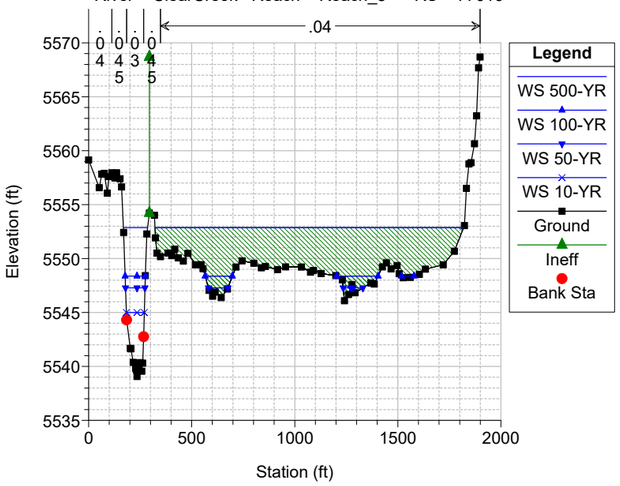
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 78717 Thalweg adjusted per survey point.


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 78228


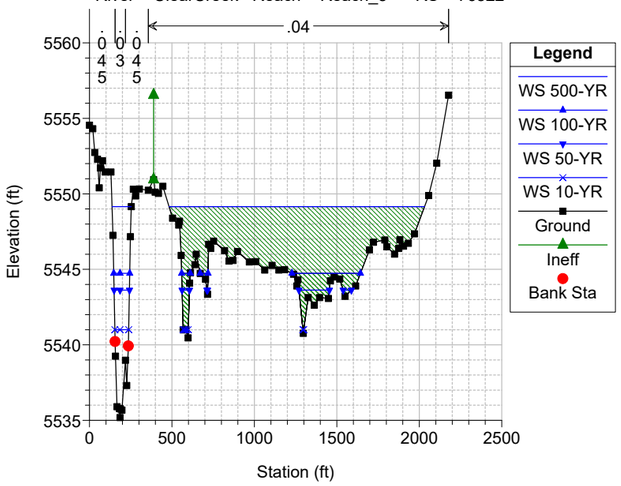
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 77804


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 77427


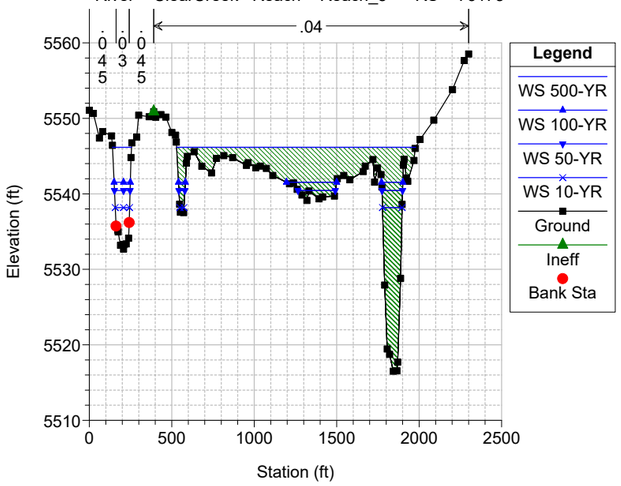
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 77010



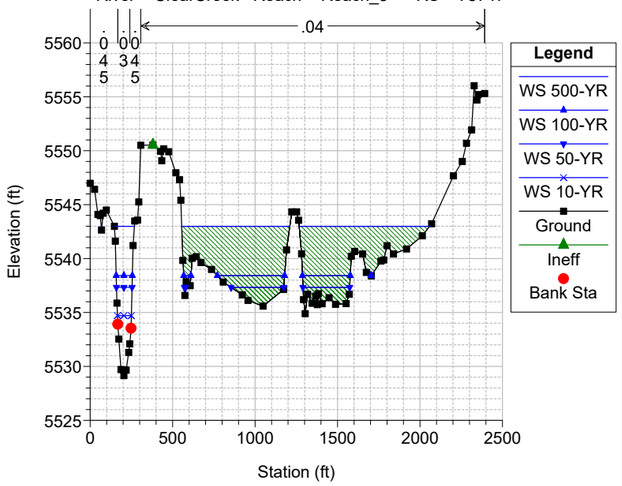
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 76522



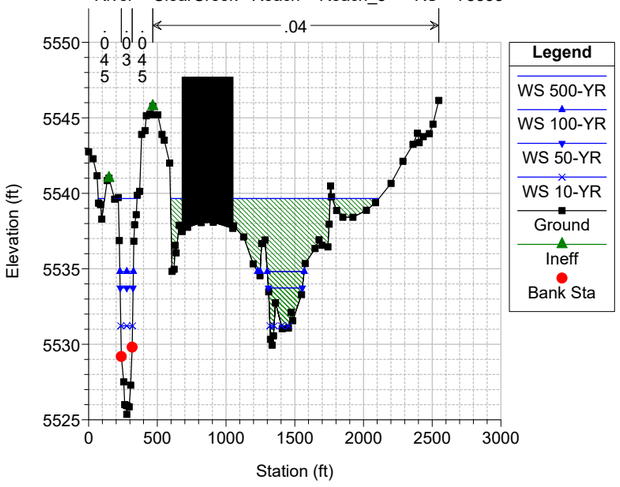
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 76173



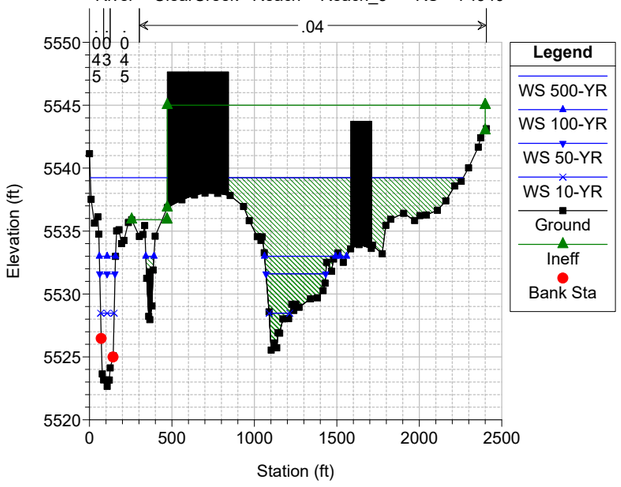
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 75747



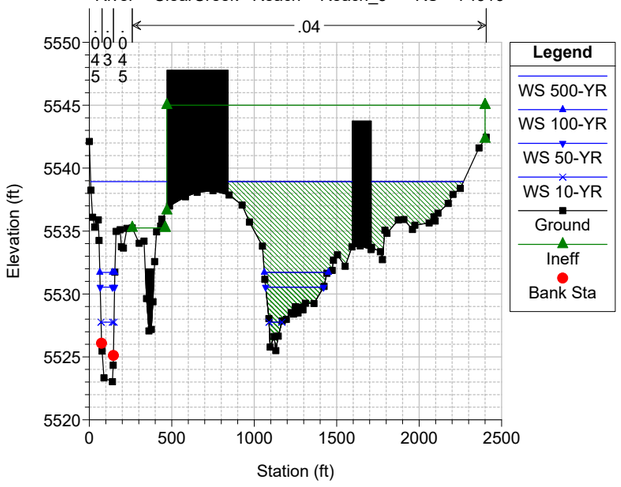
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 75333



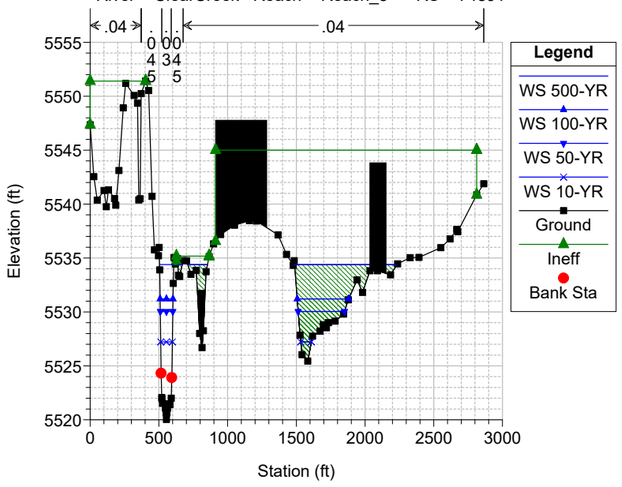
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74940



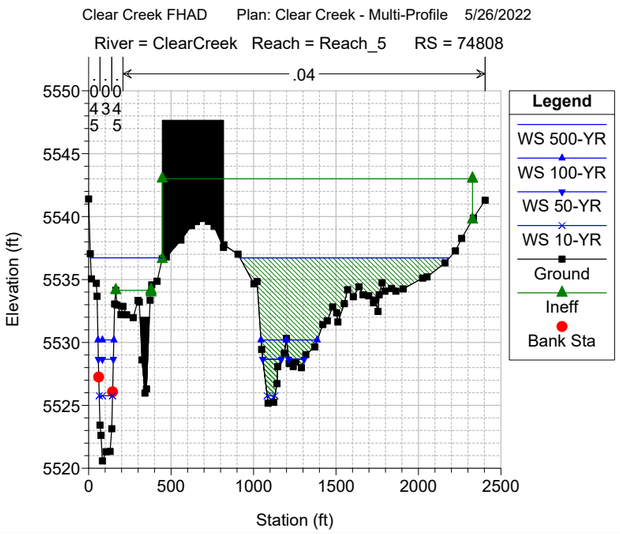
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74916



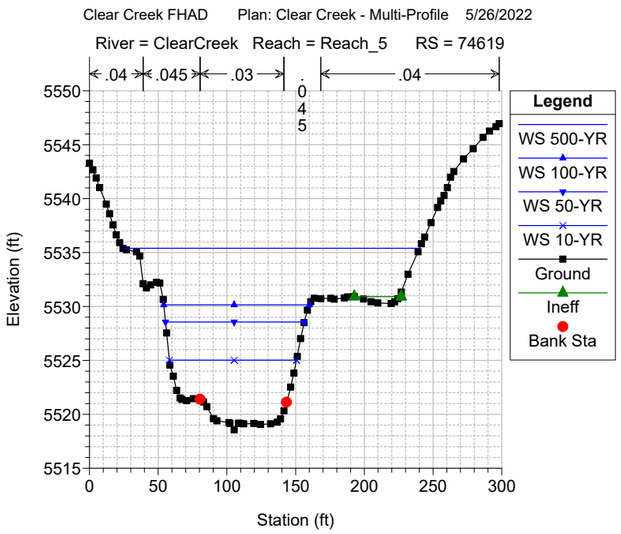
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74891



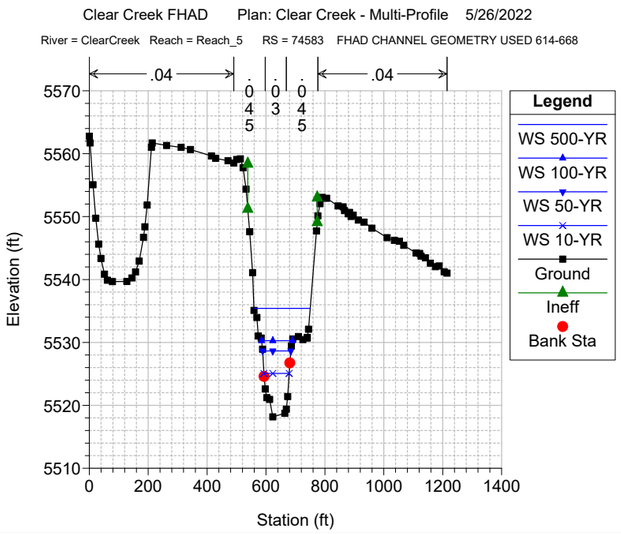
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74808



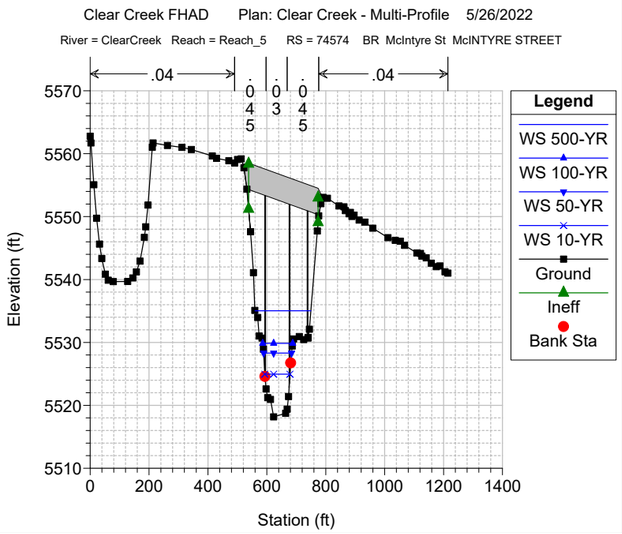
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74619

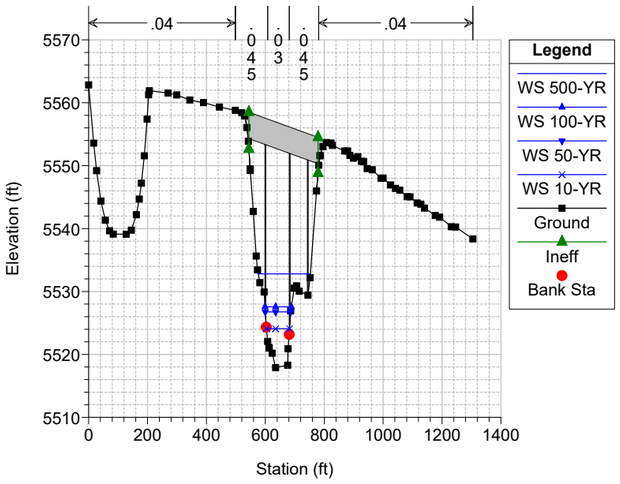


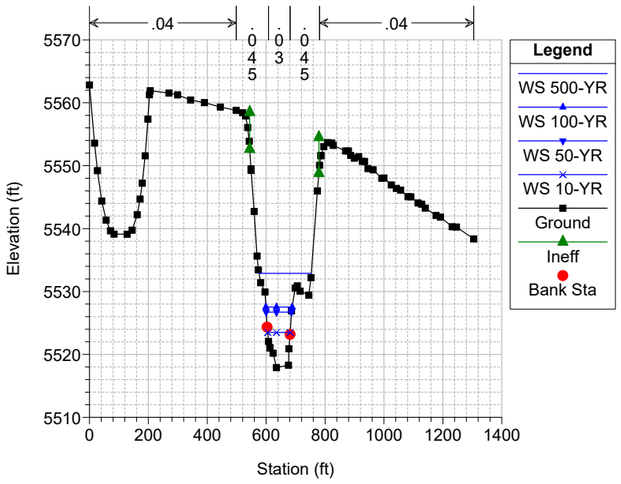
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74583 FHAD CHANNEL GEOMETRY USED 614-668

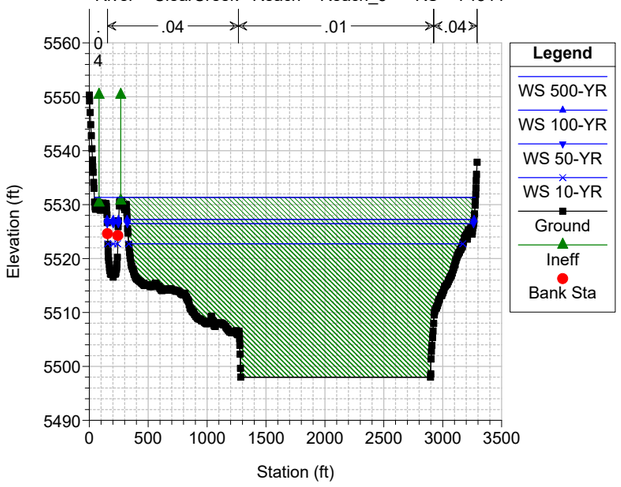


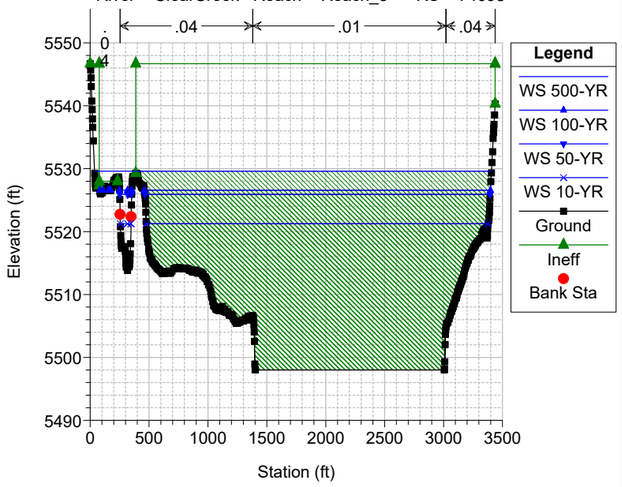
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74574 BR McIntyre St McINTYRE STREET

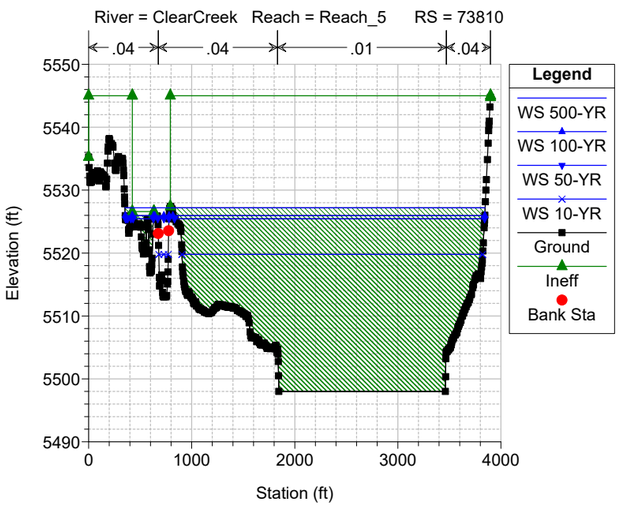


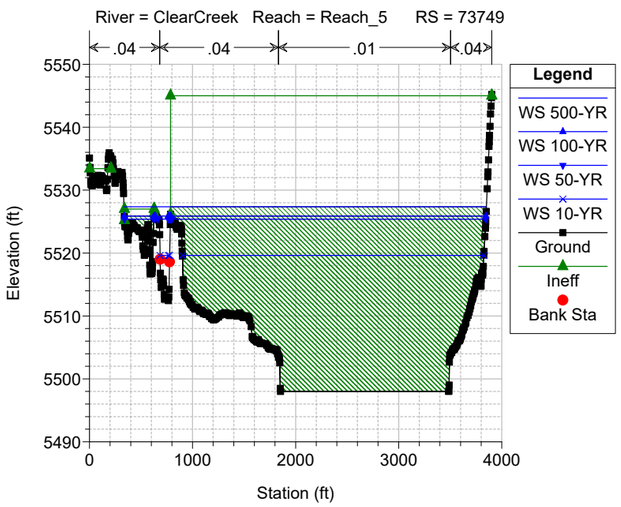
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74574 BR McIntyre St McINTYRE STREET


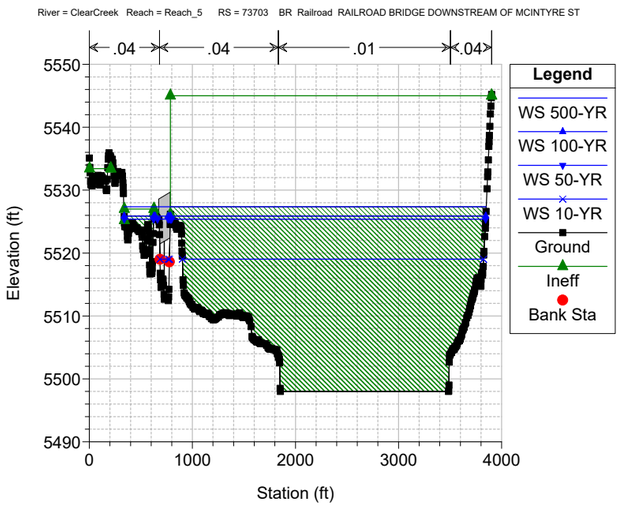
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74484 FHAD CHANNEL GEOMETRY STA 625-676


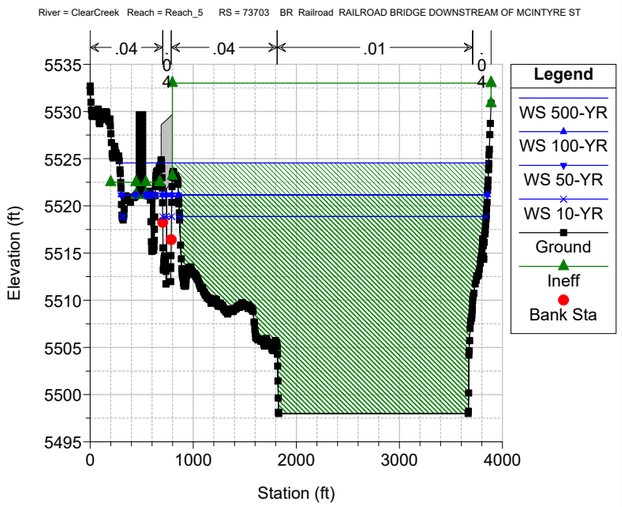
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74344


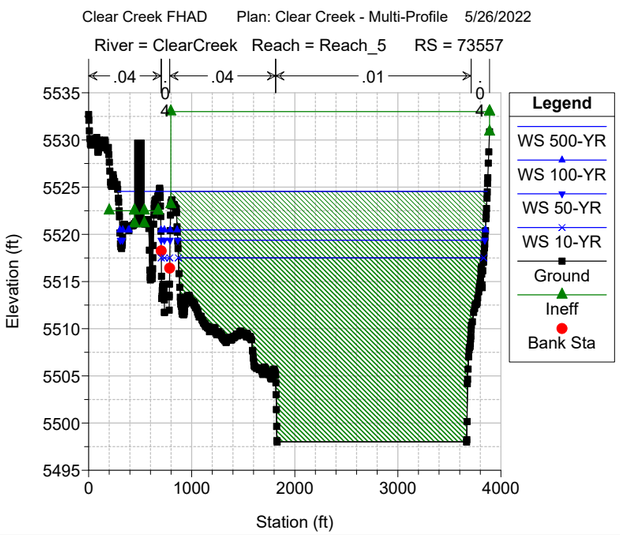
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74098


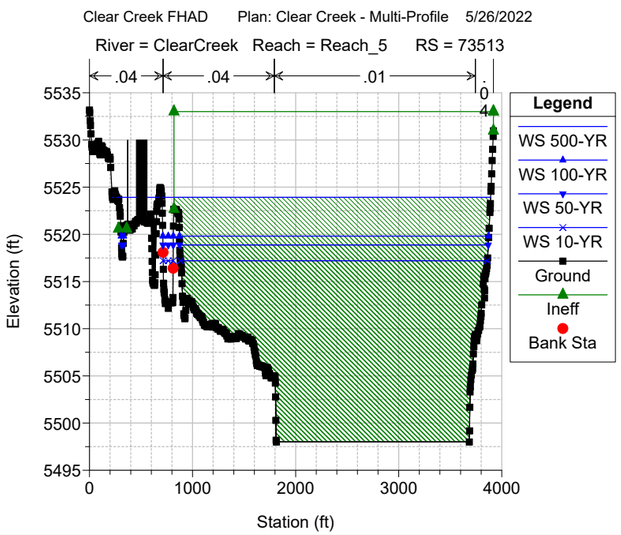
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73810


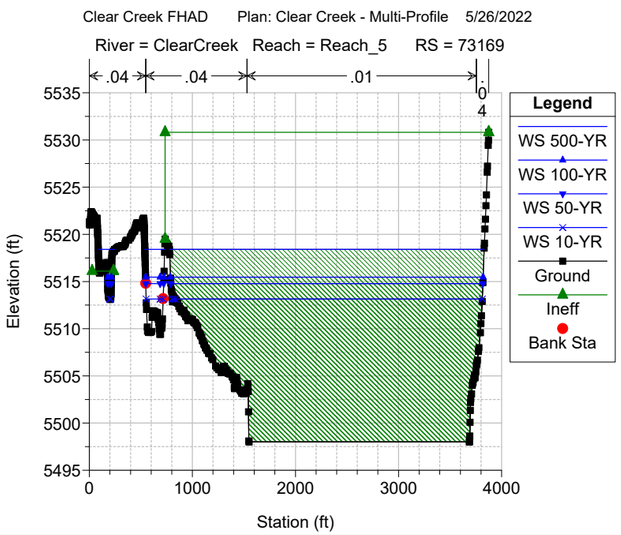
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73749


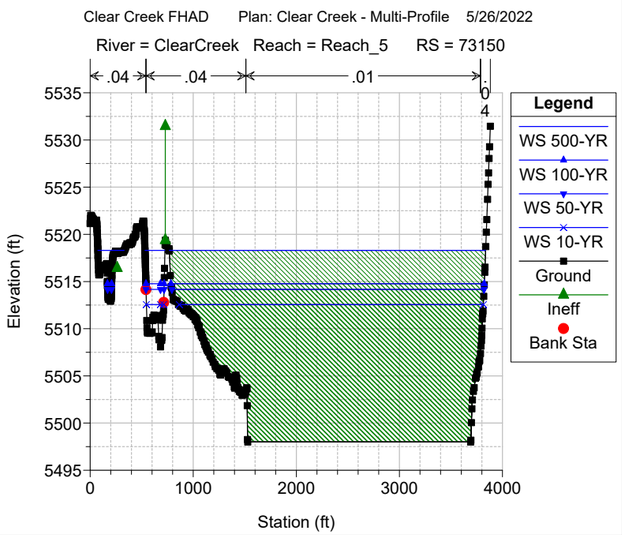
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73703 BR Railroad RAILROAD BRIDGE DOWNSTREAM OF MCINTYRE ST


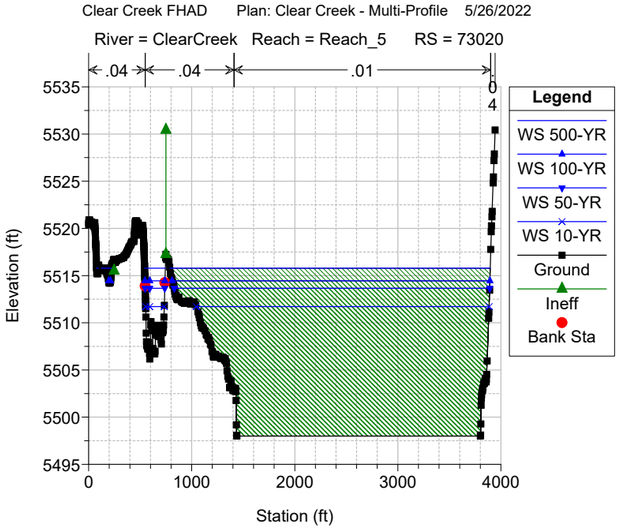
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73703 BR Railroad RAILROAD BRIDGE DOWNSTREAM OF MCINTYRE ST


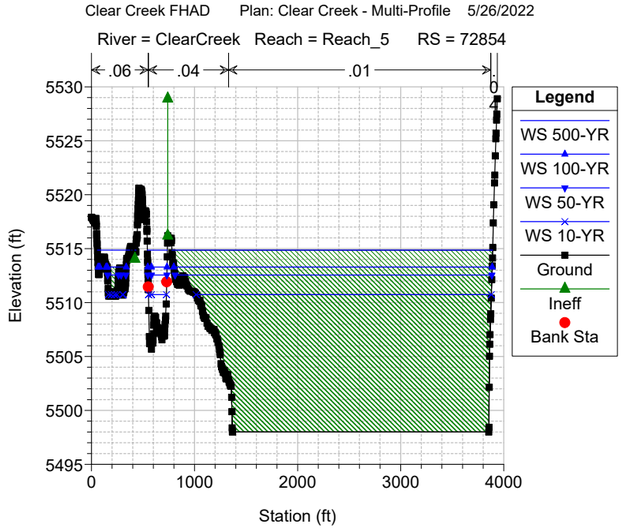
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73557


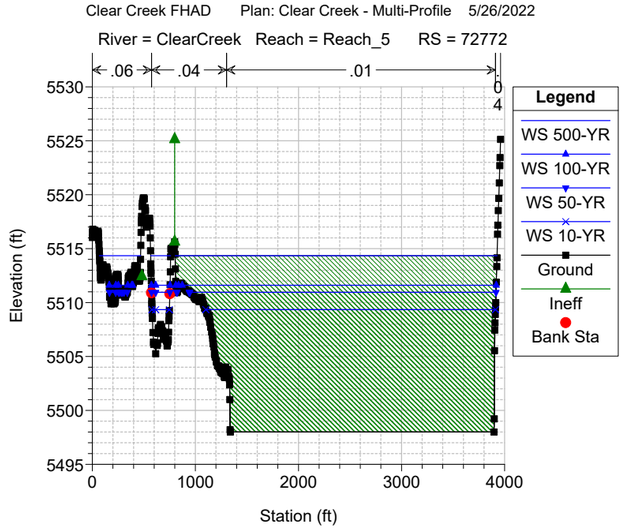
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73513


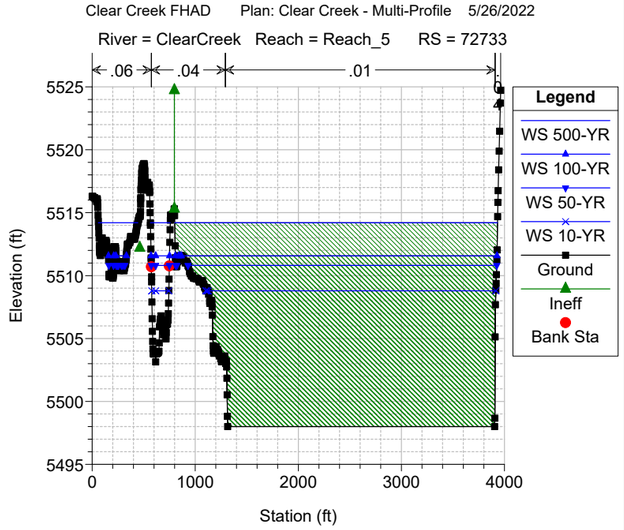
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73169


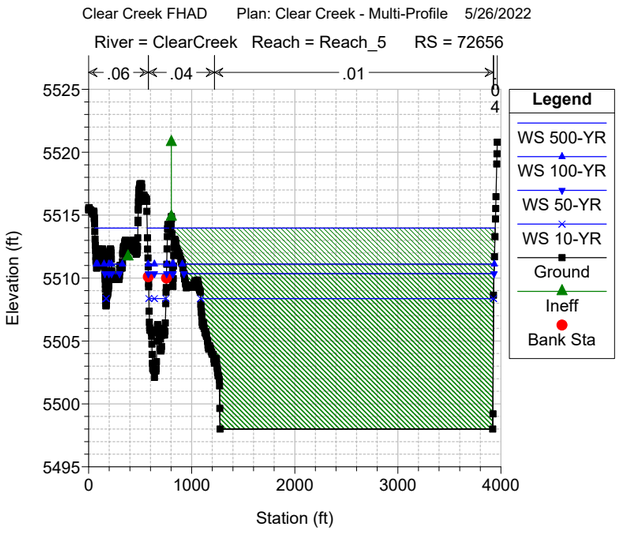
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73150


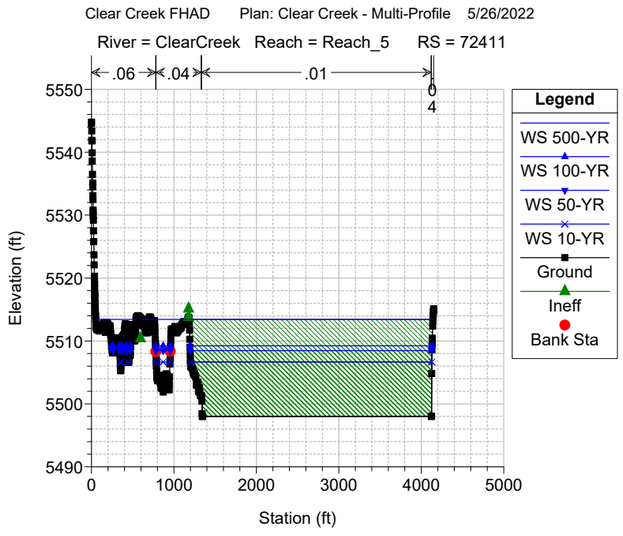

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73020
.04 .04 .01
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

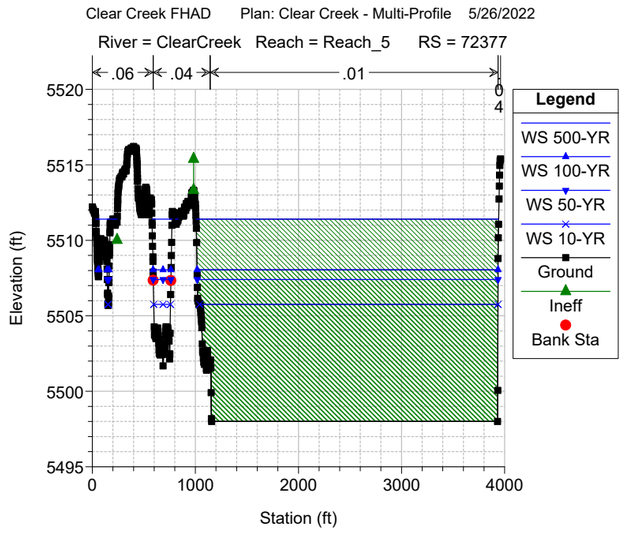

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72854
.06 .04 .01
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

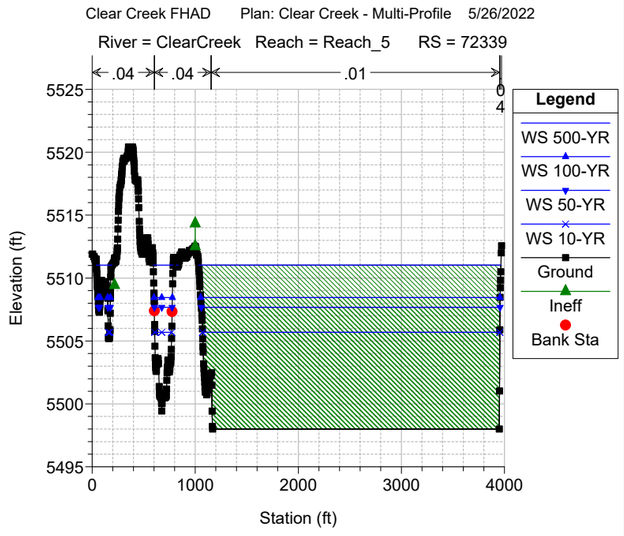

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72772
.06 .04 .01
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

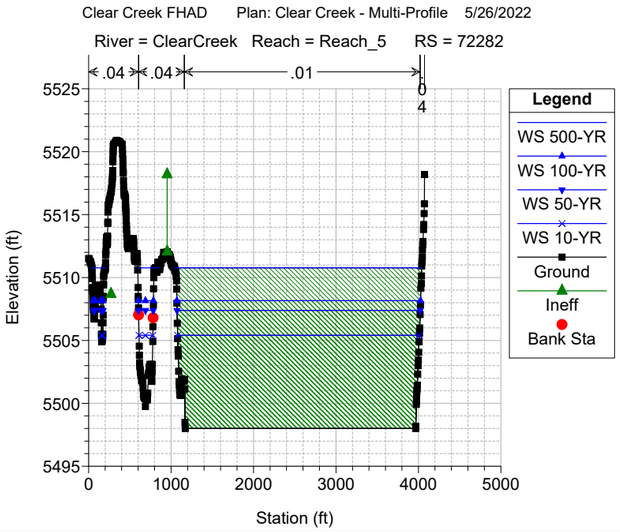

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72733
.06 .04 .01
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

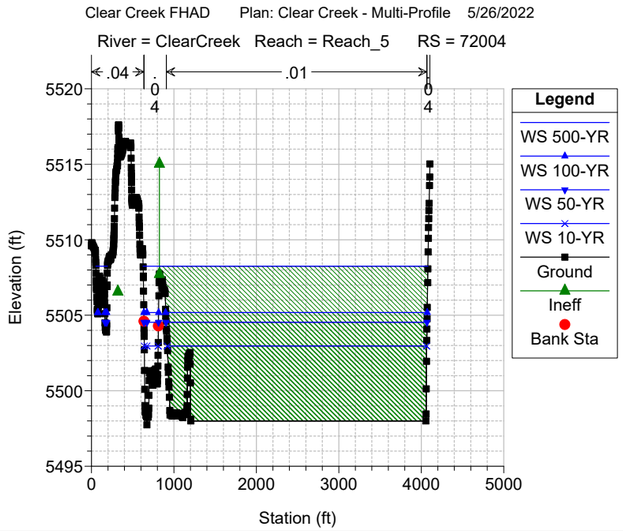

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72656
.06 .04 .01
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

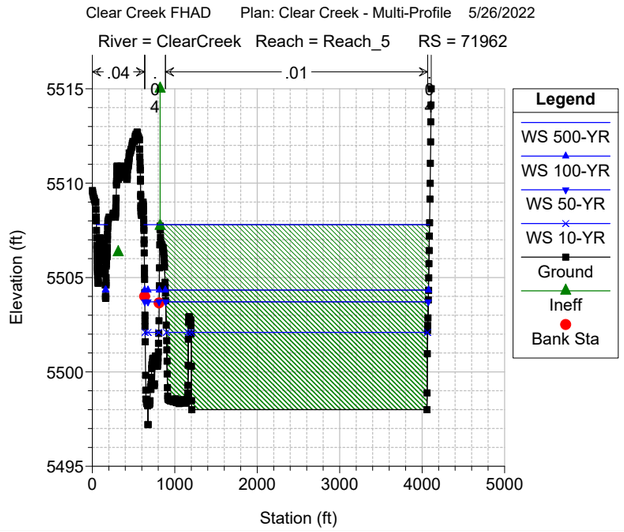

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72411
.06 .04 .01
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

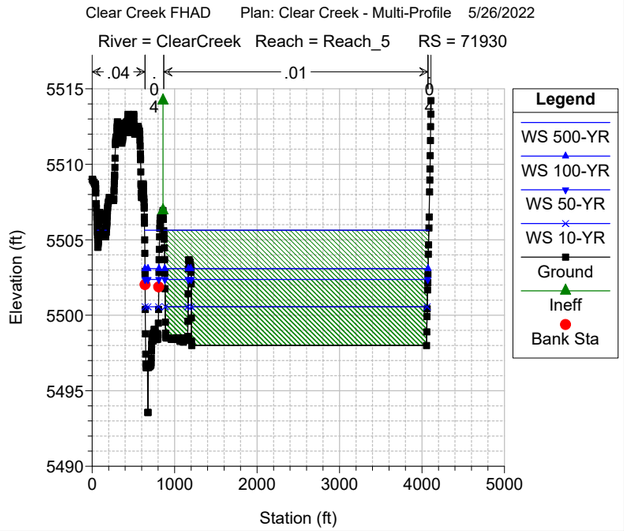

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72377
.06 .04 .01
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72339
.04 .04 .01
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

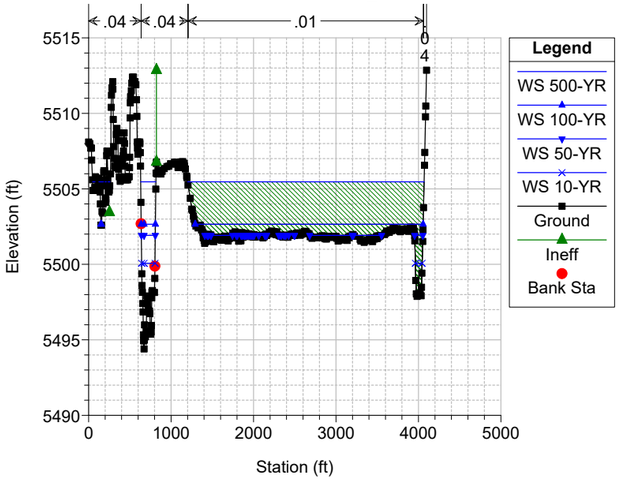

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72282
.04 .04 .01
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72004
.04 .01
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

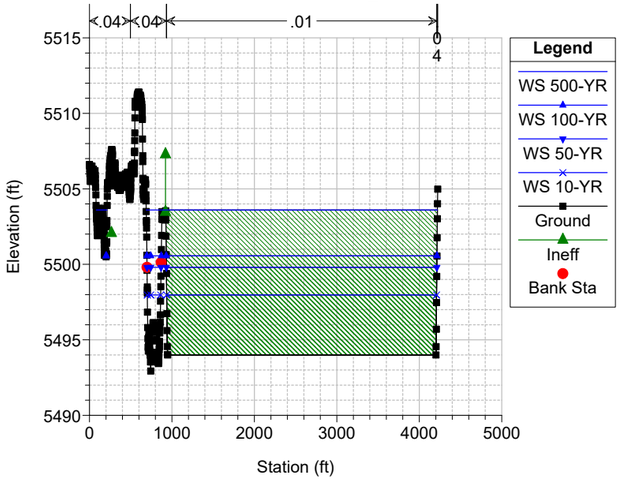

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71962
.04 .01
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71930
.04 .01
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

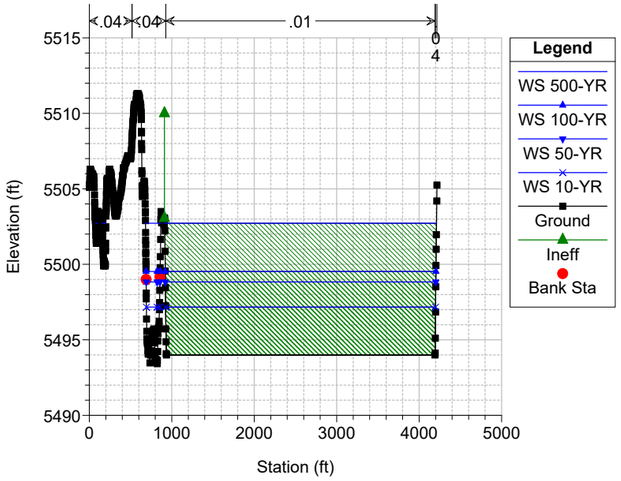
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71865



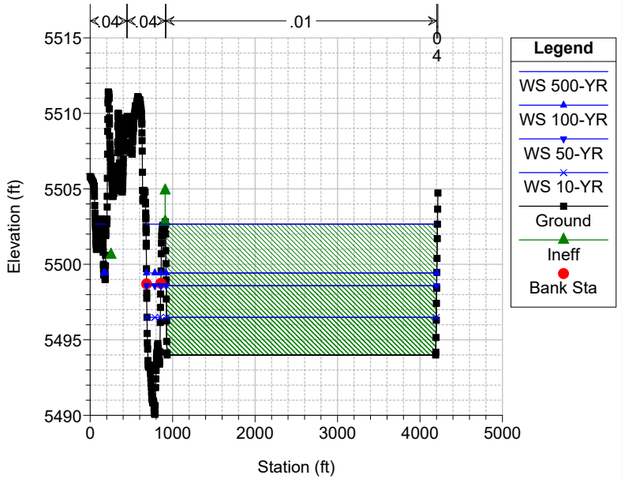
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71596



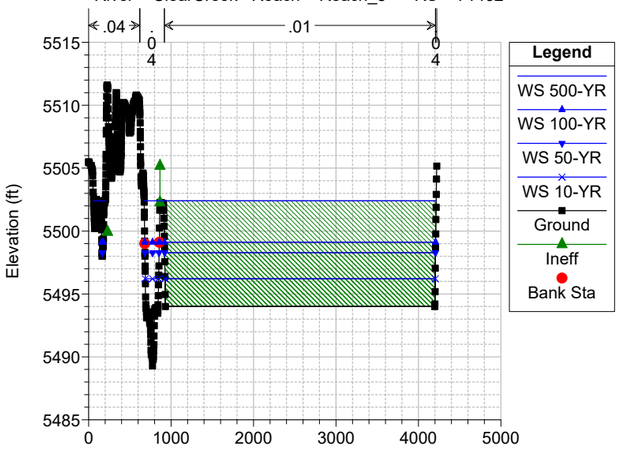
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71570



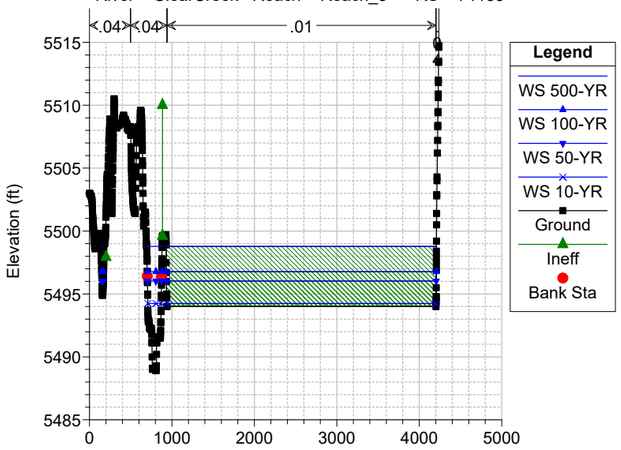
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71505



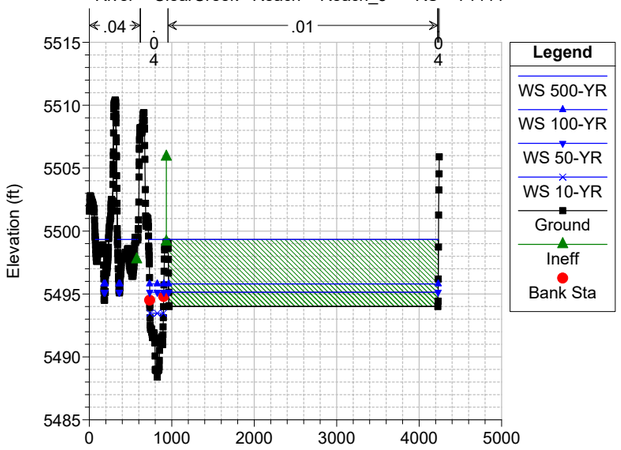
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71462



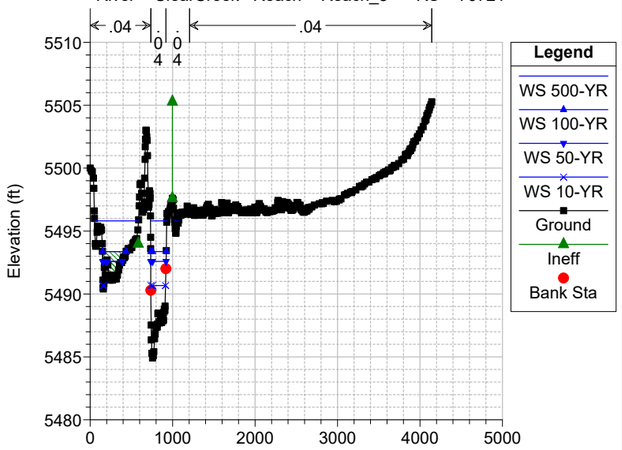
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71155



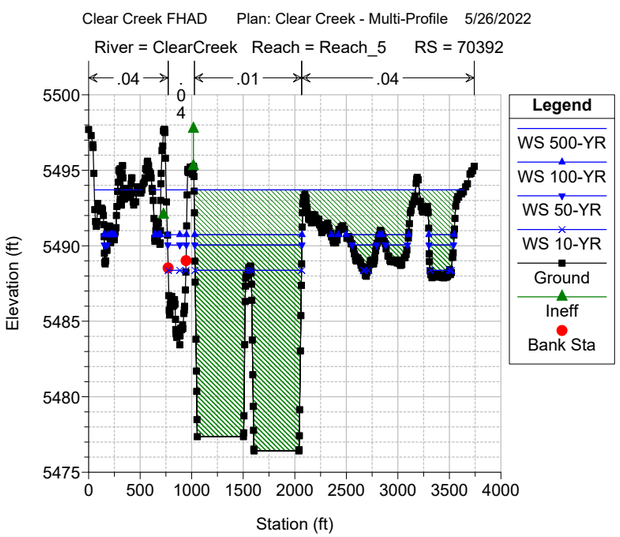
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71111



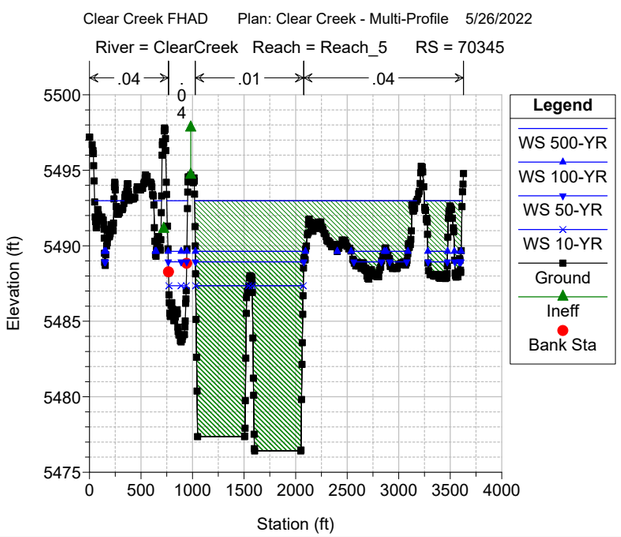
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 70721



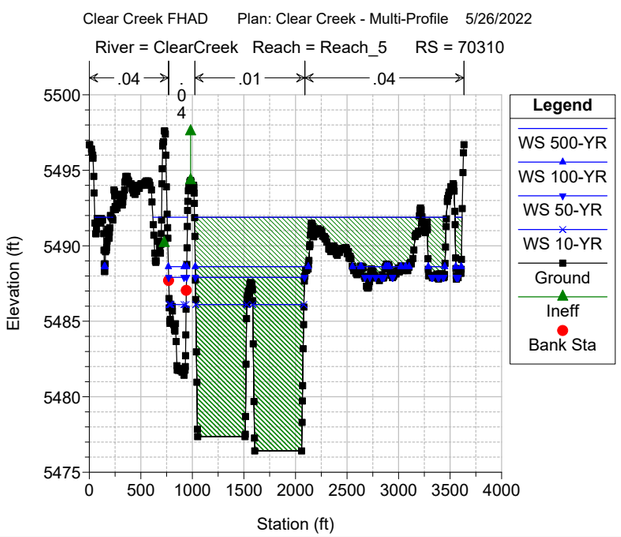
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 70392



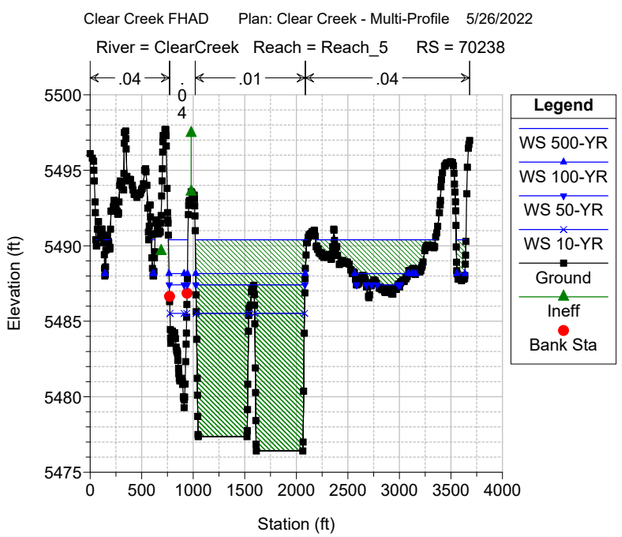
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 70345



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 70310



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 70238



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 69912
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 69192
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 69098
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 69089
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68947
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68669
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68566 Manning's adjusted in LOB to account for large stack of RCPs fou
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68535
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

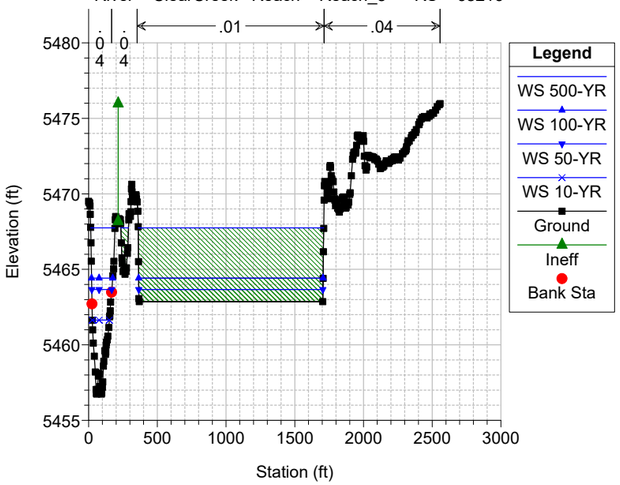
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68522 BR Footbridge FOOTBRIDGE UPSTREAM OF I-70 WESTBOUND
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68522 BR Footbridge FOOTBRIDGE UPSTREAM OF I-70 WESTBOUND
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

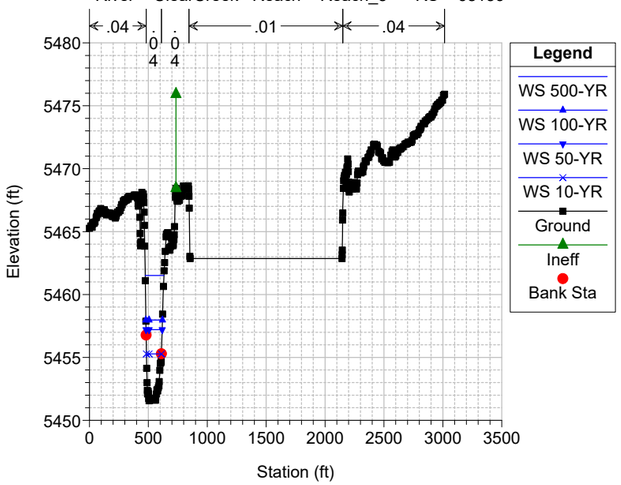
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68494
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68327
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

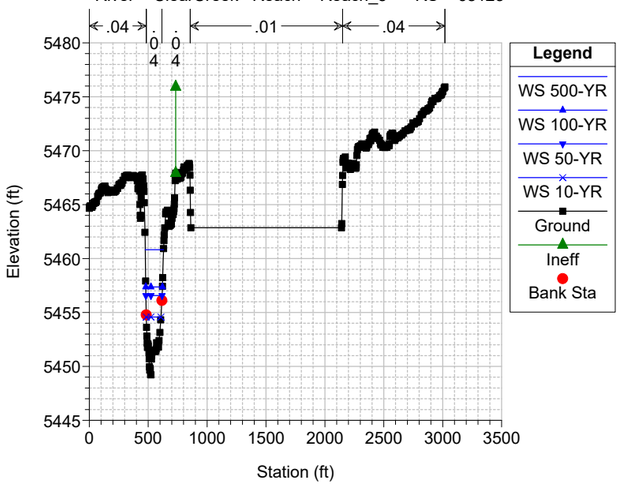
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68216



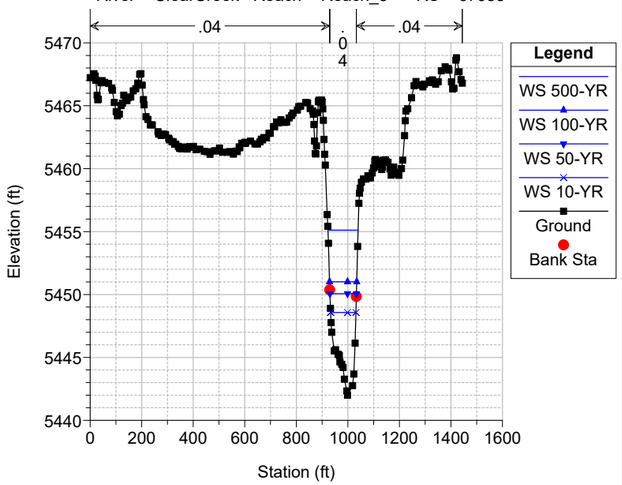
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68136



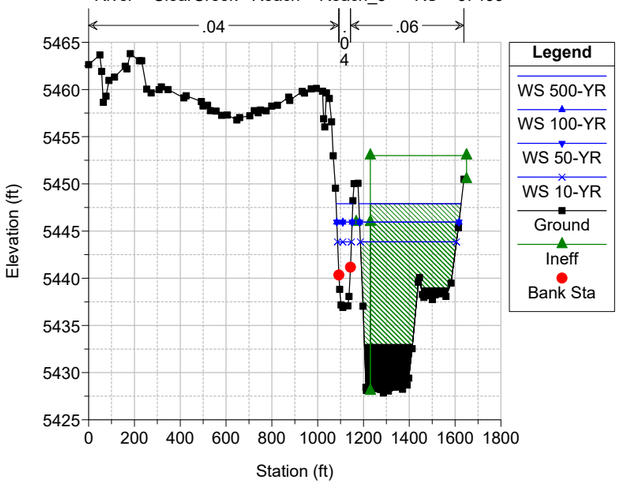
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68123



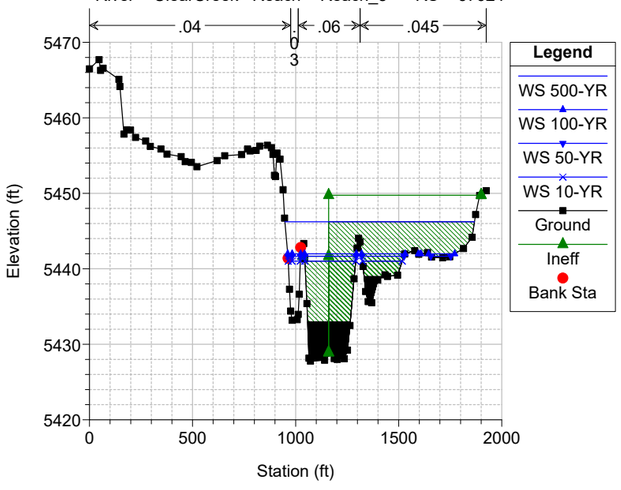
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 67953



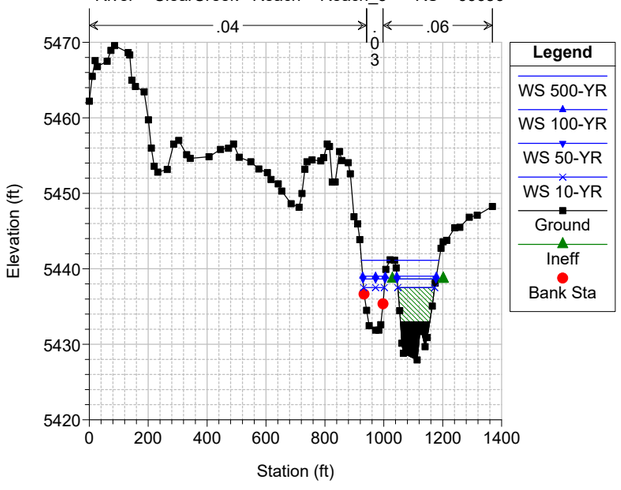
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 67460



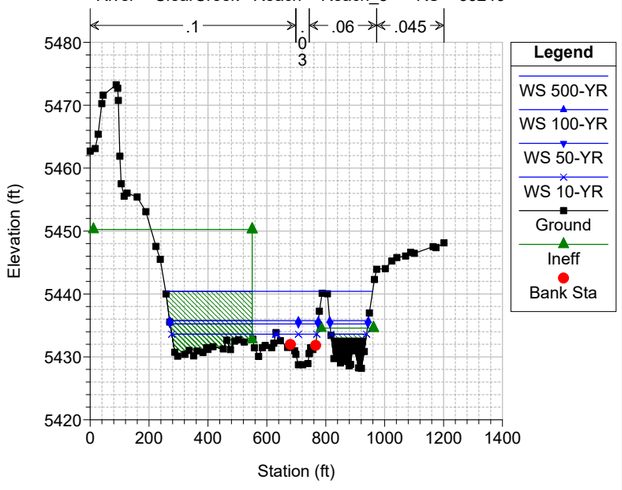
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 67024



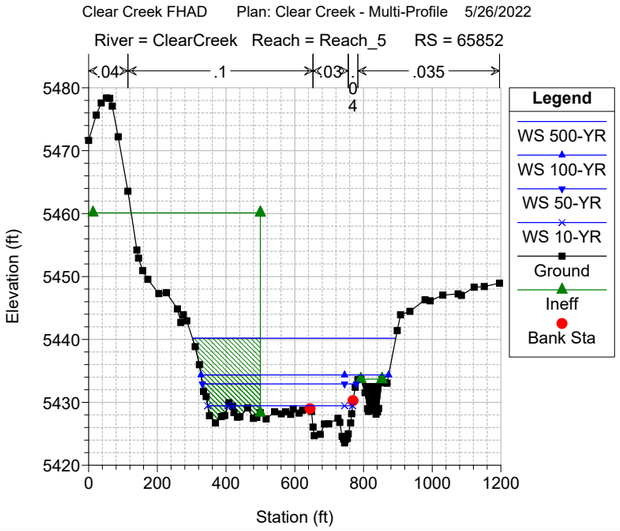
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 66656



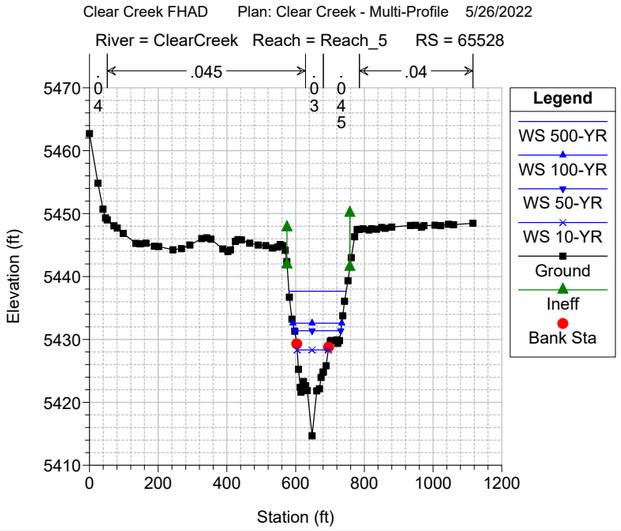
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 66246



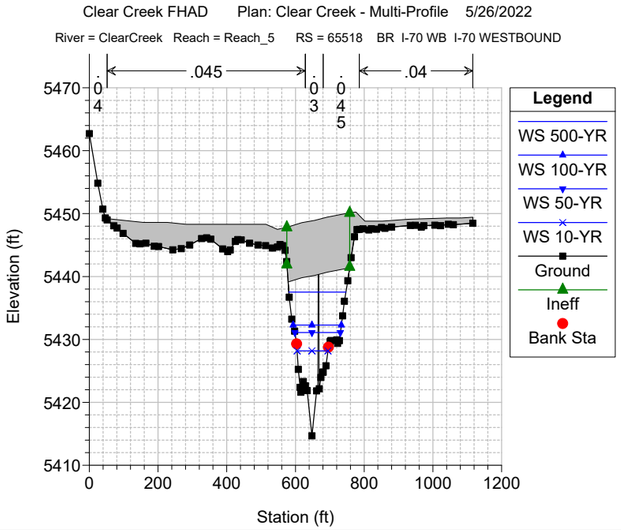
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 65852



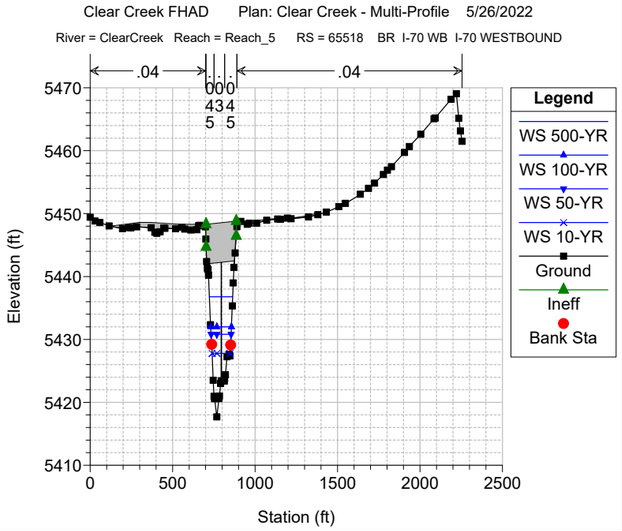
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 65528



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 65518 BR I-70 WB I-70 WESTBOUND

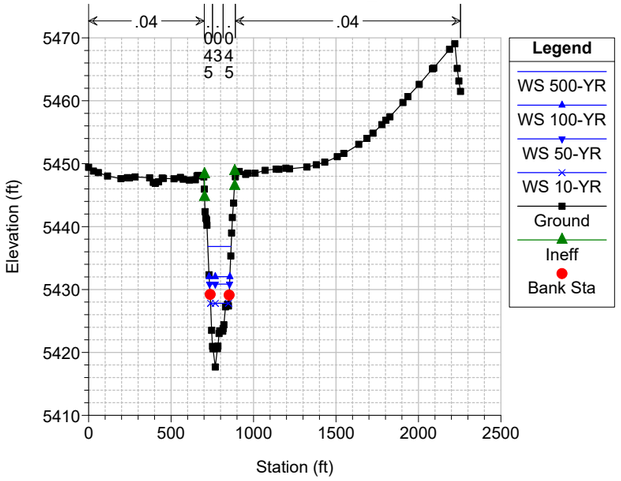


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 65518 BR I-70 WB I-70 WESTBOUND



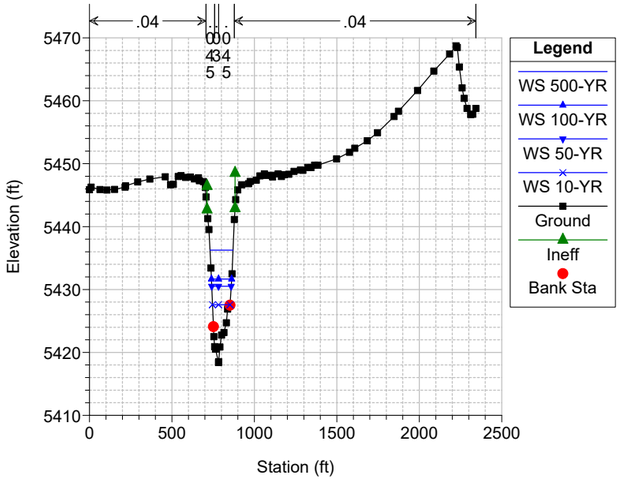
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65437



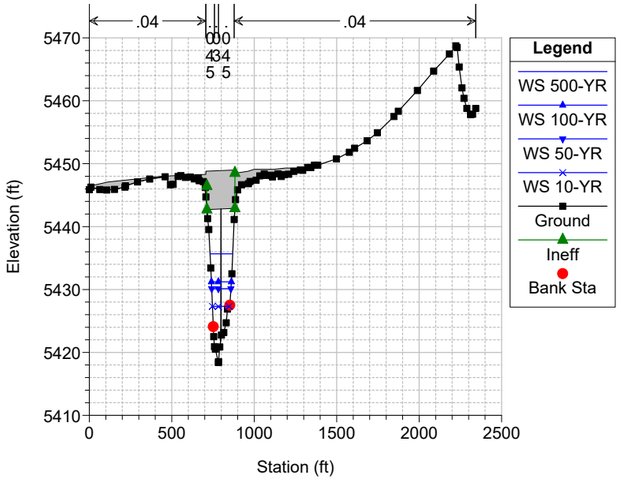
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65402 FHAD CHANNEL GEOMETRY USED STA 764-789



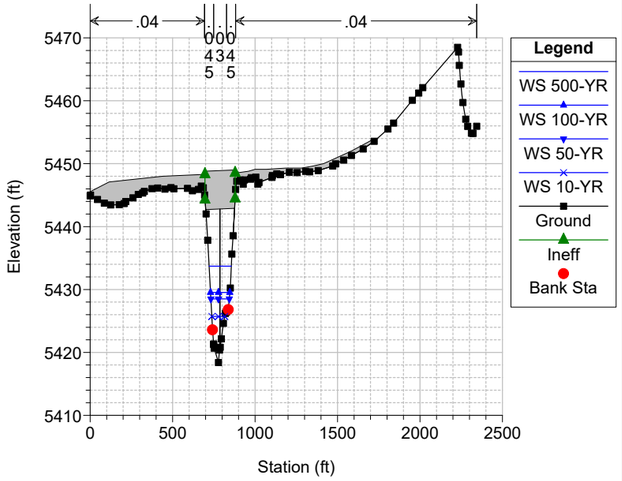
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65393 BR I-70 EB I-70 EASTBOUND



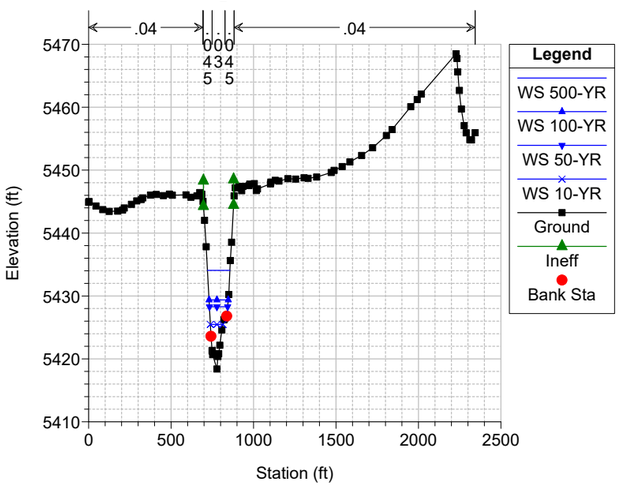
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65393 BR I-70 EB I-70 EASTBOUND



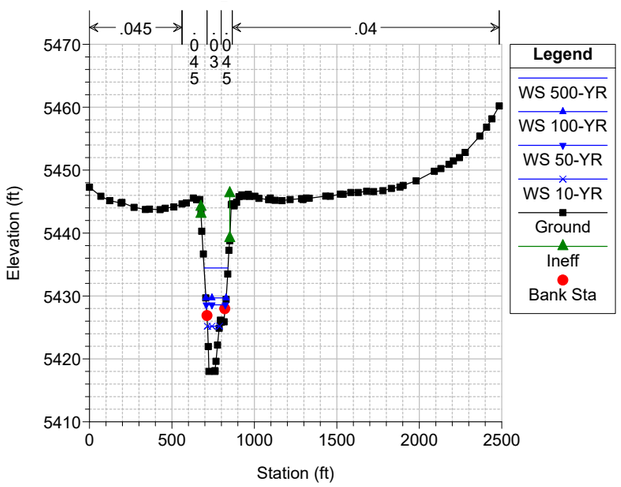
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65330 FHAD CHANNEL GEOMETRY USED STA 753-780



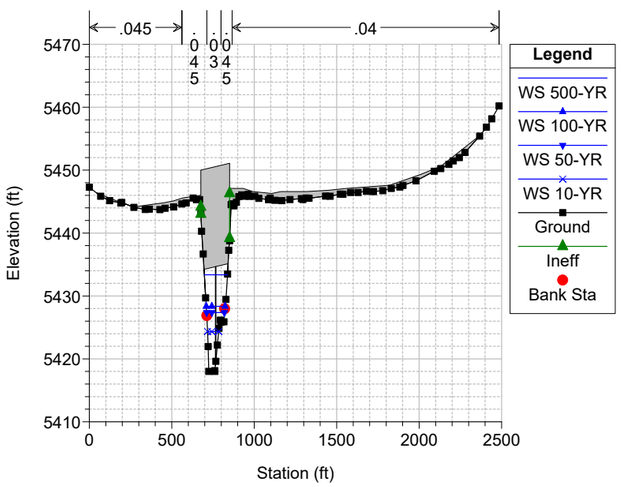
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65282 FHAD CHANNEL GEOMETRY USED STA 720-765



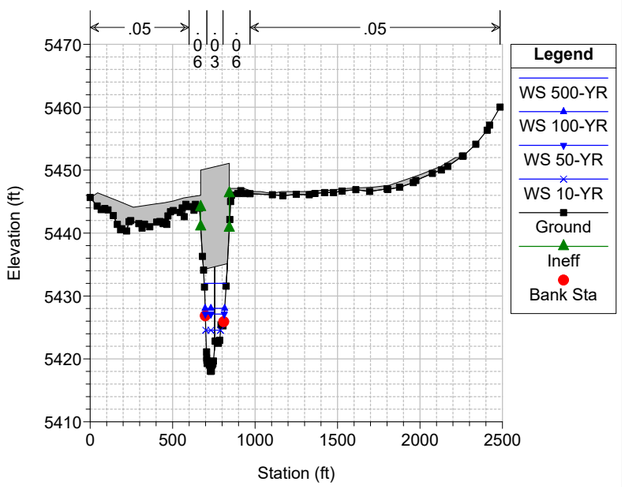
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65275 BR Youngfield St YOUNGFIELD STREET - Deck low chord lowered 6' to account for lo



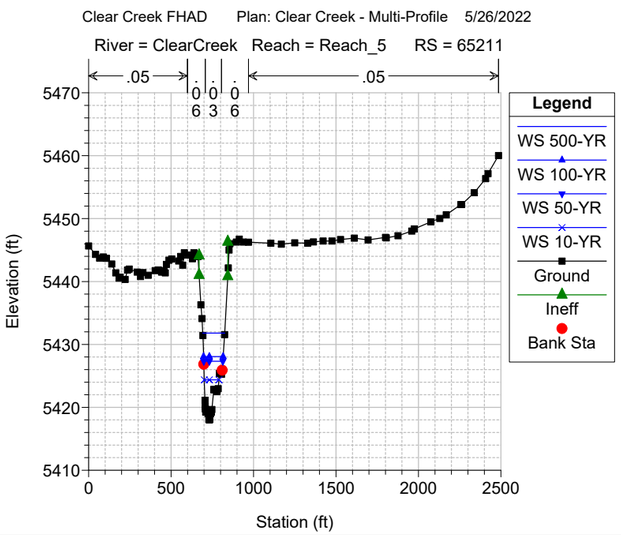
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65275 BR Youngfield St YOUNGFIELD STREET - Deck low chord lowered 6' to account for lo



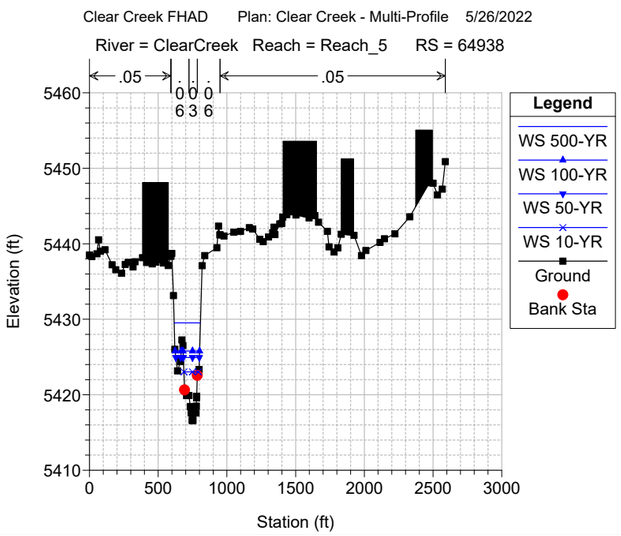
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65211



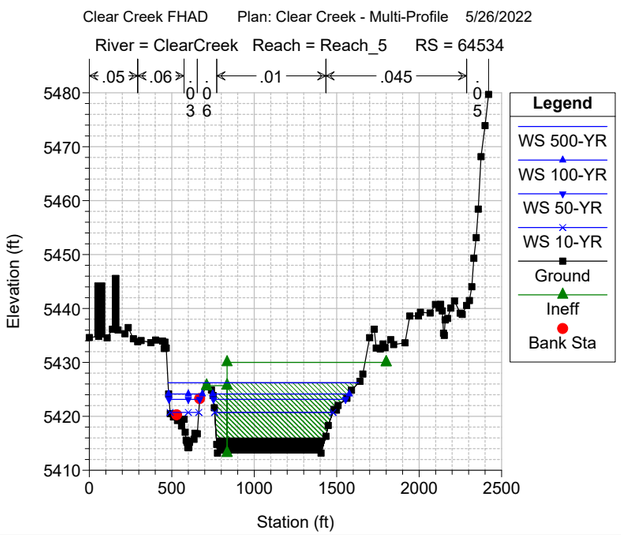
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 64938



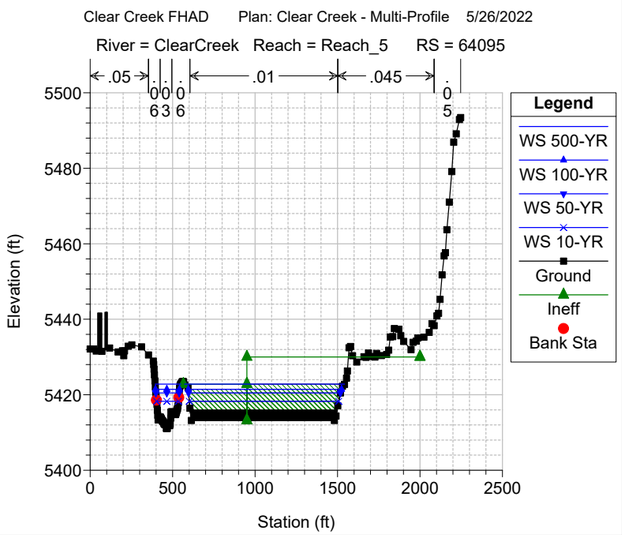
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

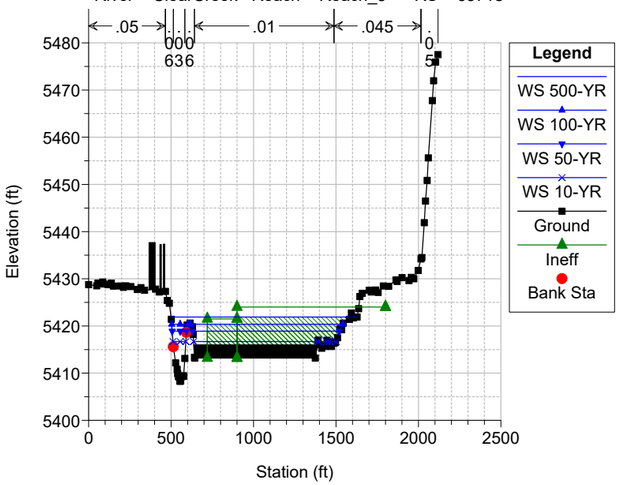
River = ClearCreek Reach = Reach_5 RS = 64534

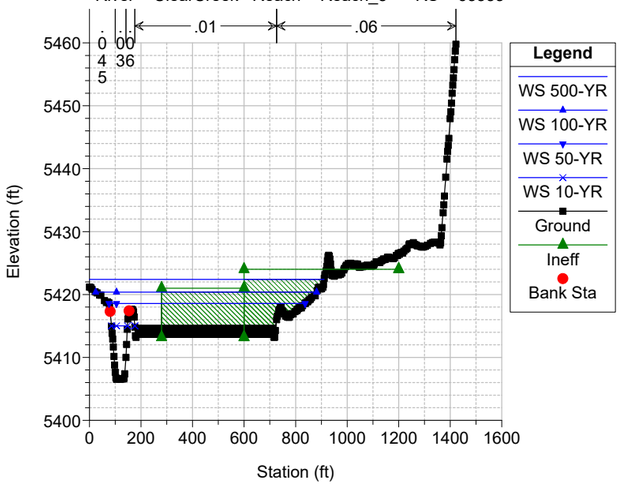


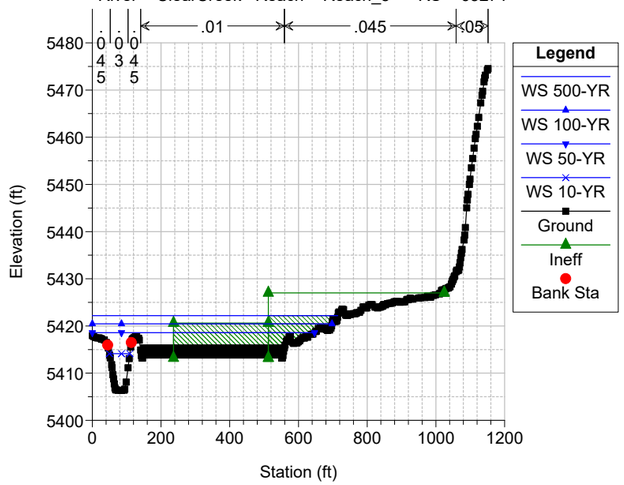
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

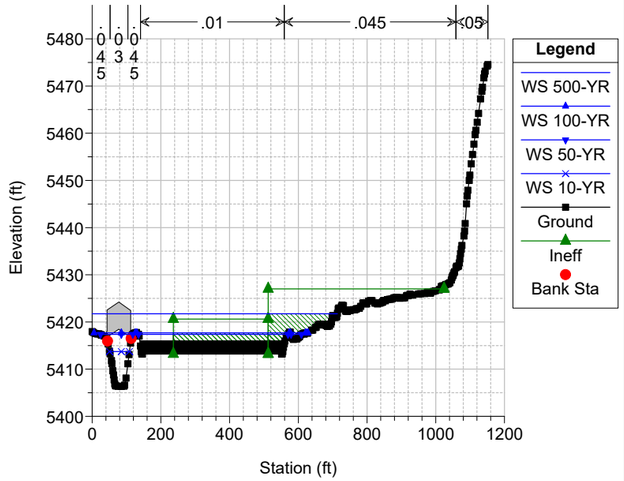
River = ClearCreek Reach = Reach_5 RS = 64095

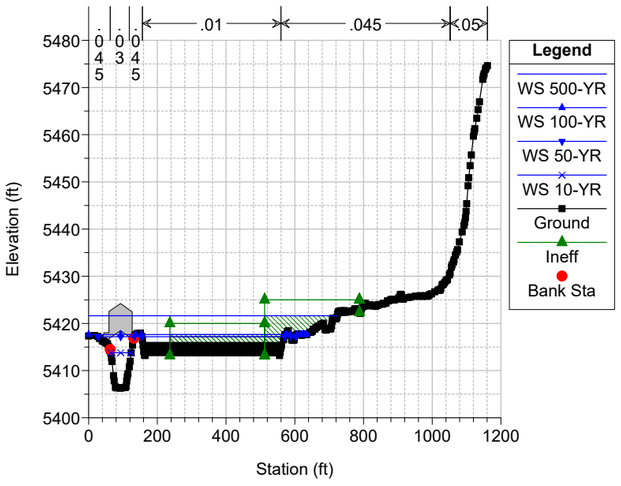


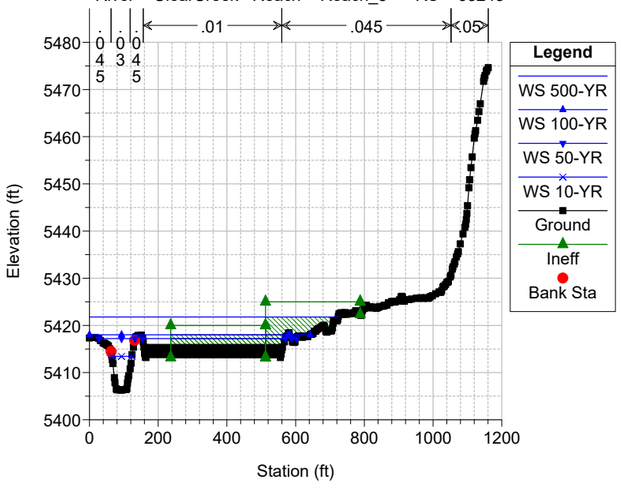
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 63718


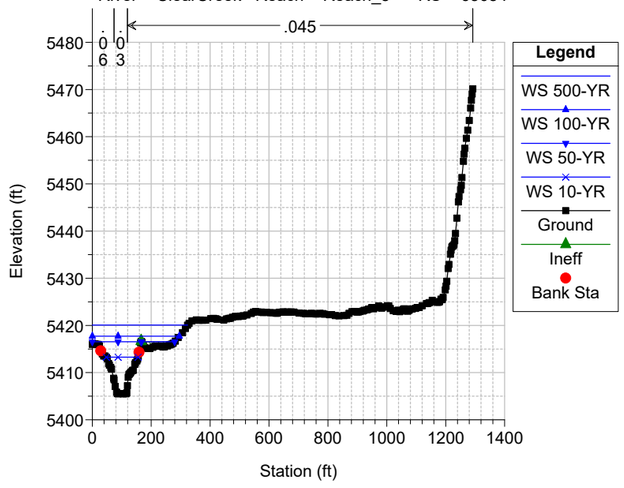
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 63333


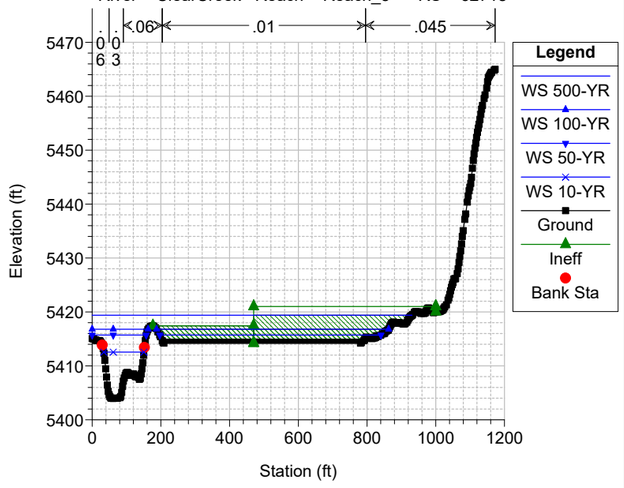
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 63271


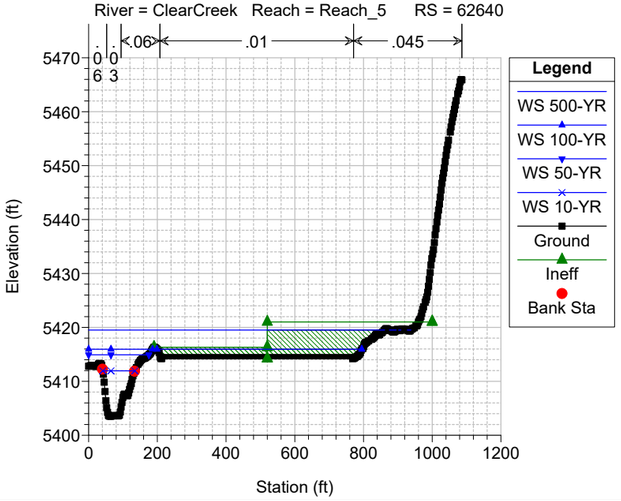
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 63262 BR Footbridge FOOTBRIDGE DOWNSTREAM OF YOUNGFIELD ST.


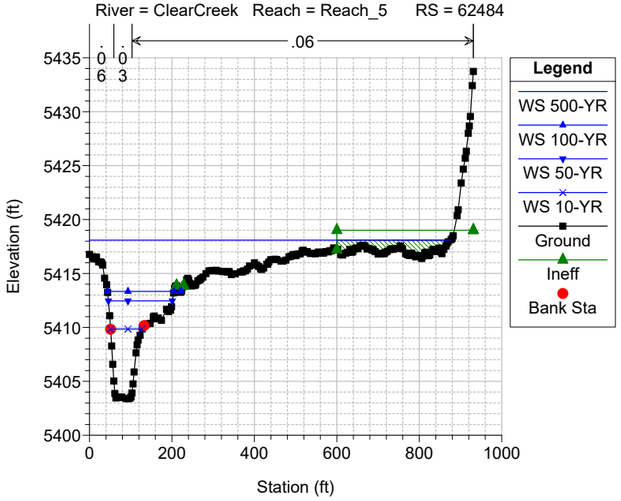
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 63262 BR Footbridge FOOTBRIDGE DOWNSTREAM OF YOUNGFIELD ST.


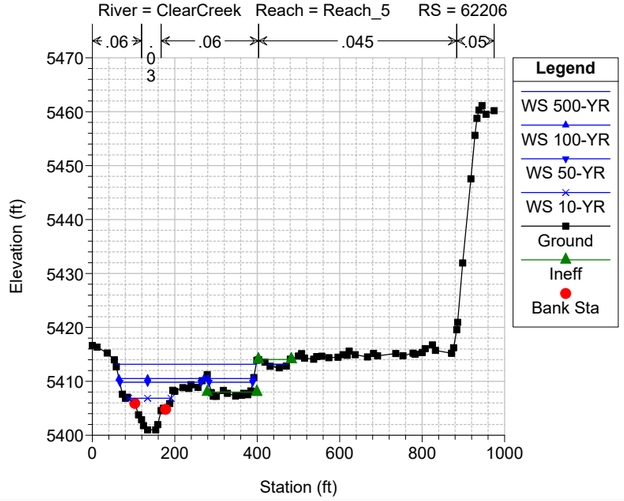
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 63243


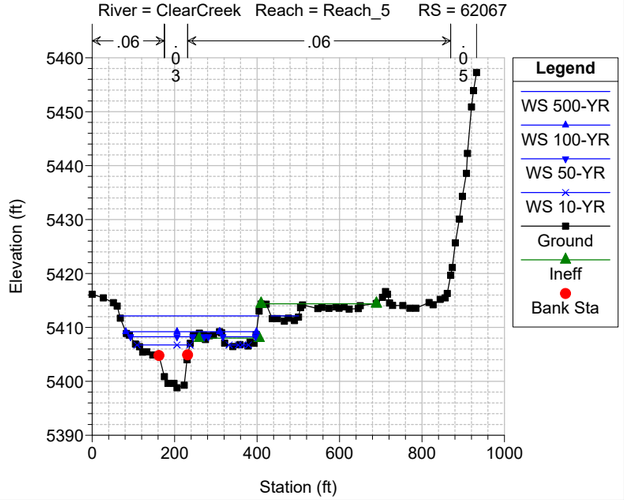
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 63054


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 62718


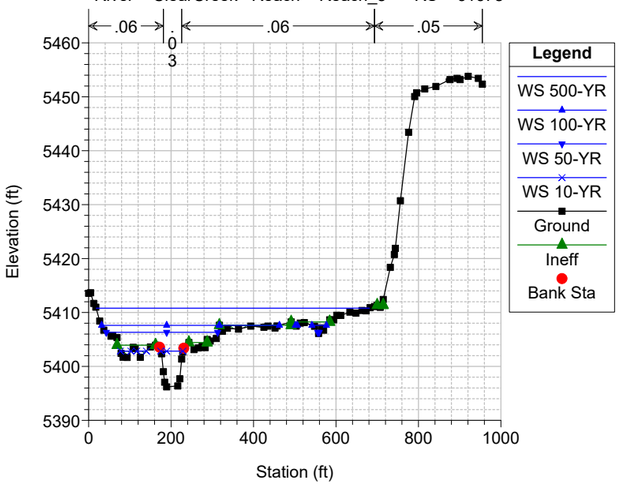
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 62640


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 62484


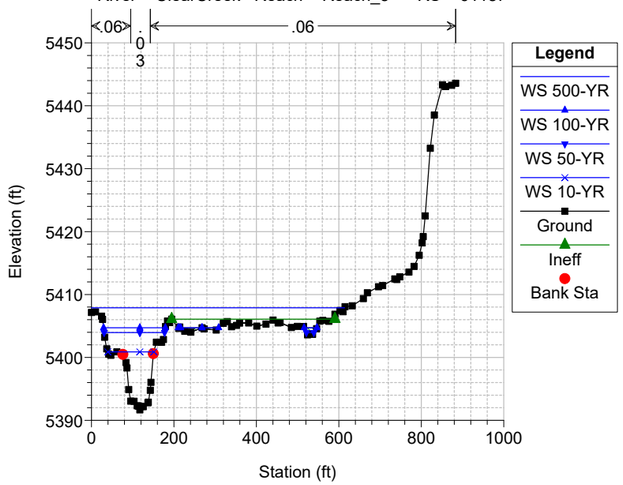
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 62206


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 62067


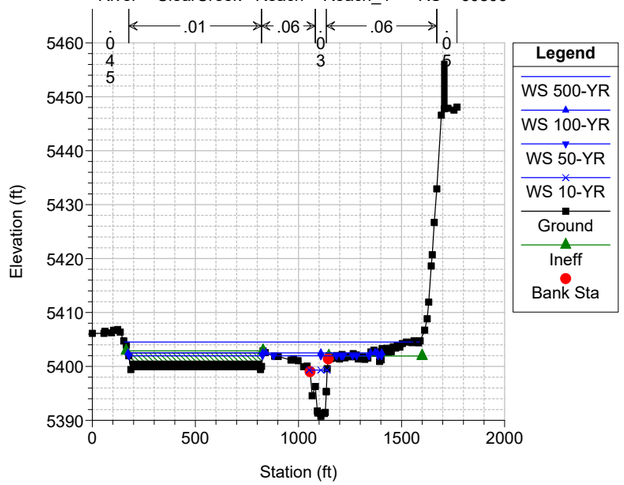
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 61678



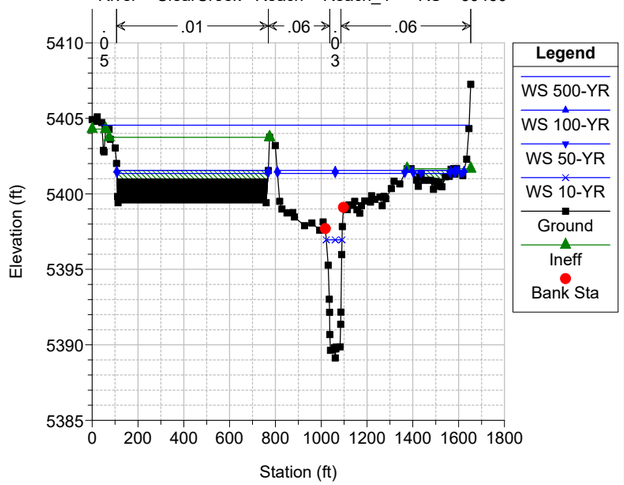
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 61187



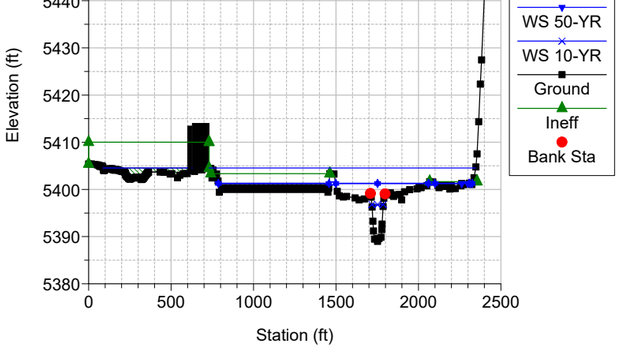
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60806



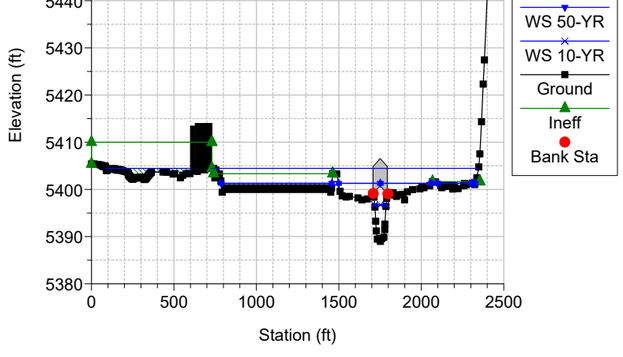
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60460



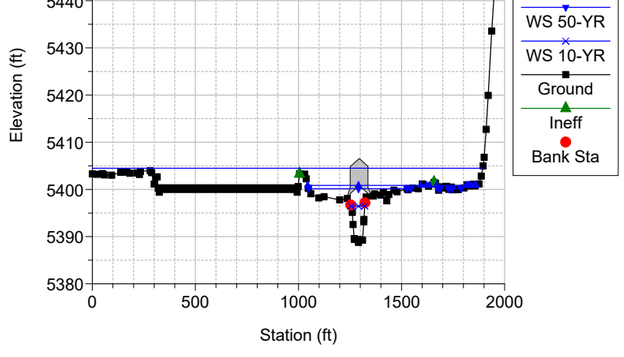
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60416



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60411 BR Footbridge FOOTBRIDGE AT PROSPECT PARK



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60411 BR Footbridge FOOTBRIDGE AT PROSPECT PARK



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
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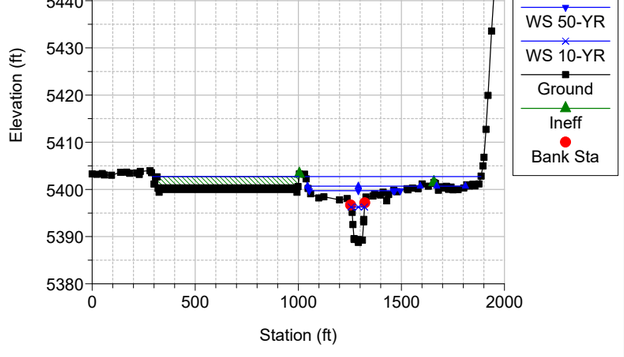
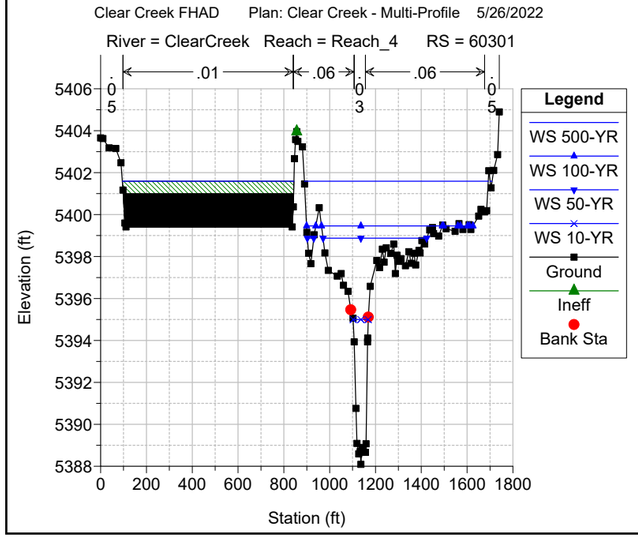
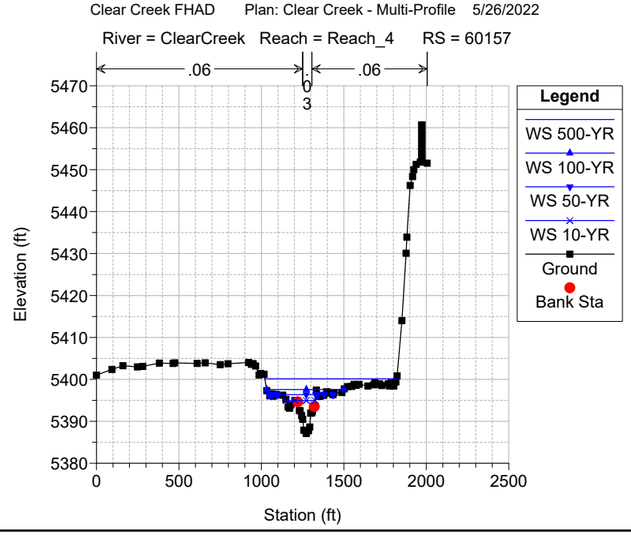


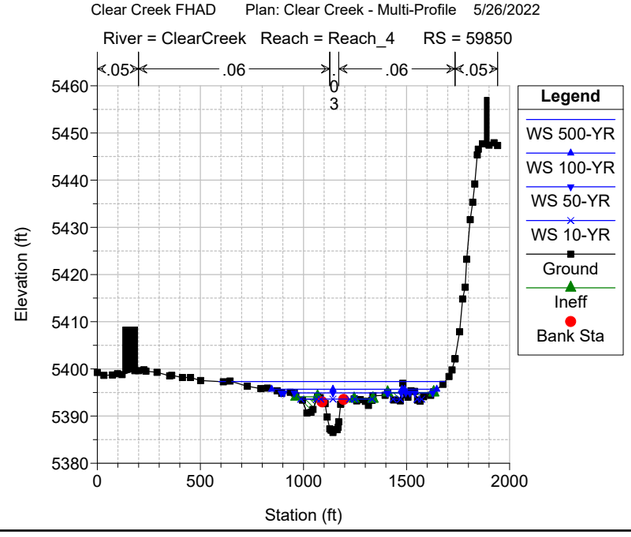
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60301



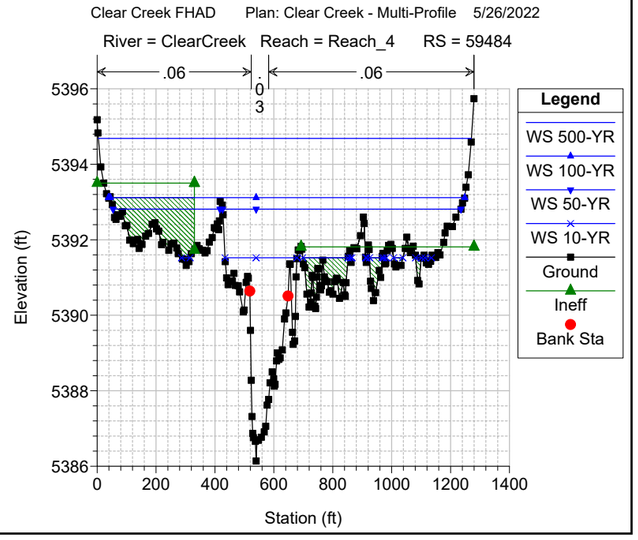
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60157



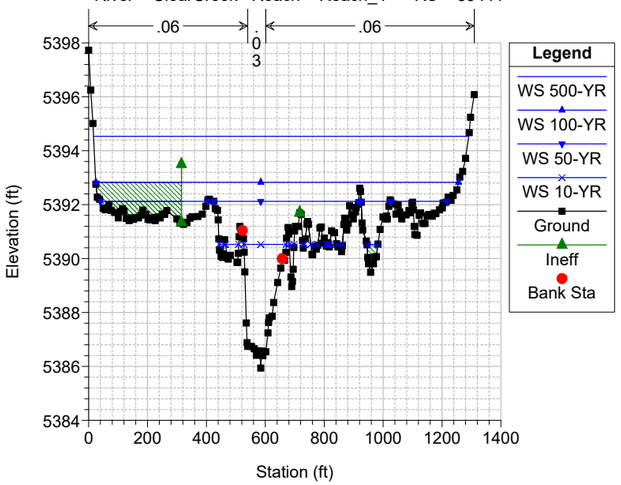
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 59850



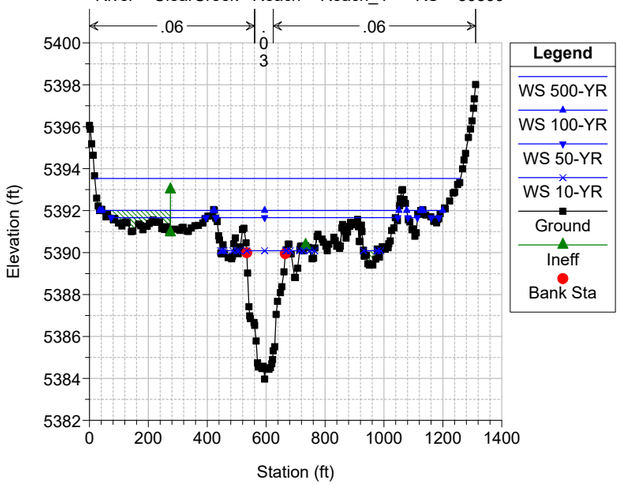
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 59484



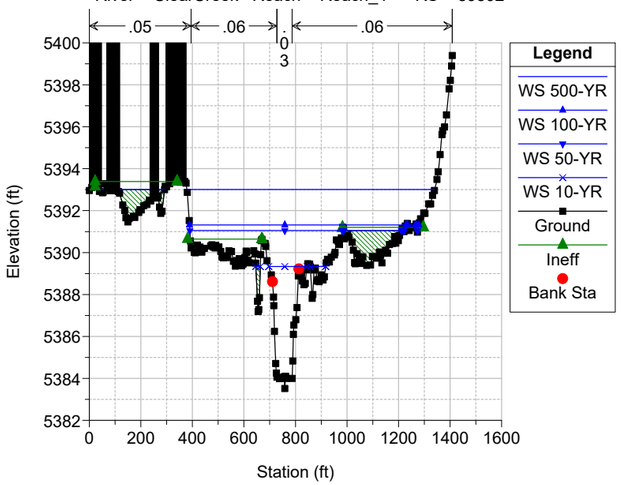
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 59441



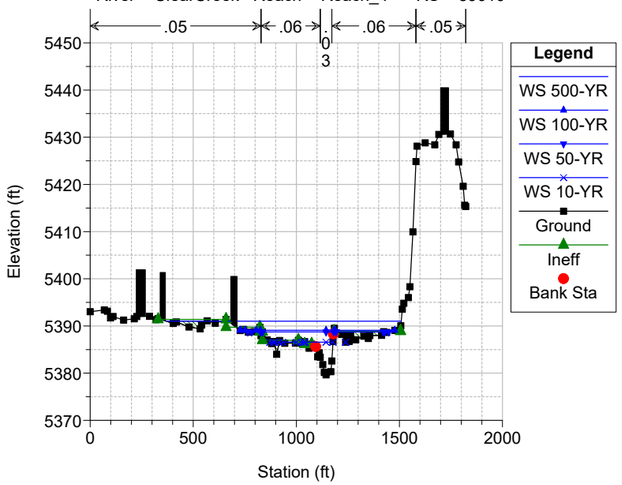
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 59399



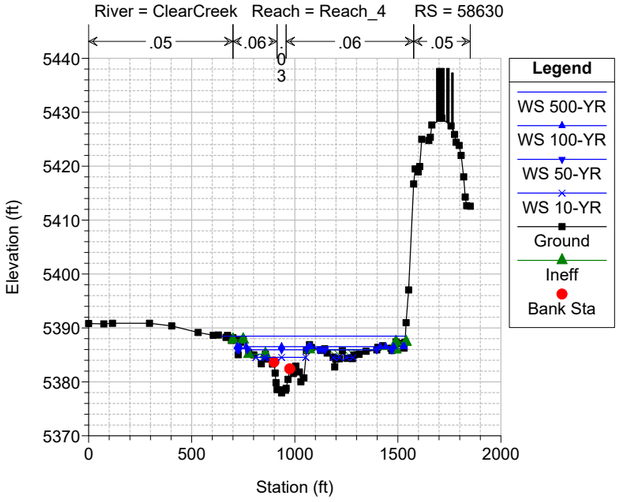
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 59302



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 59010



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 58630



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
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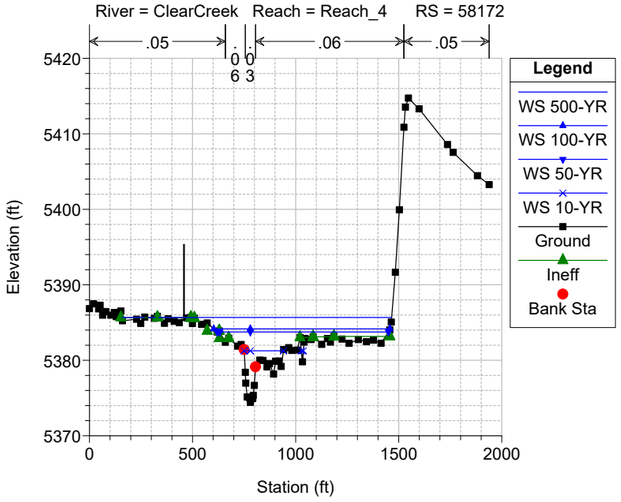
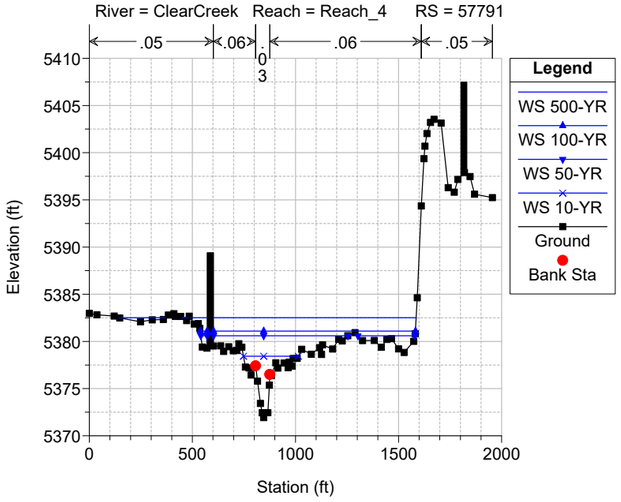
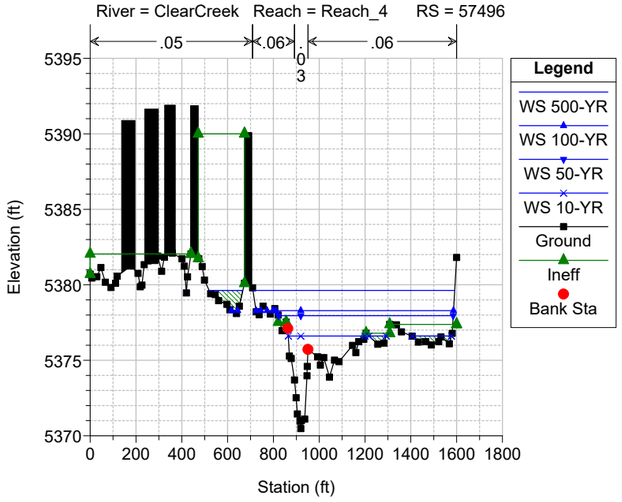


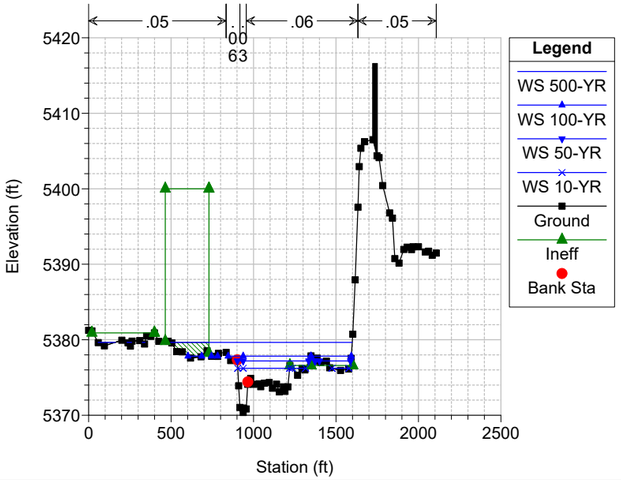
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 57791



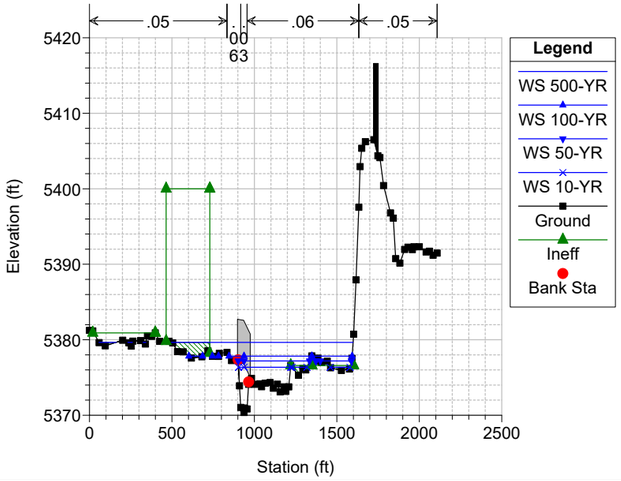
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 57496



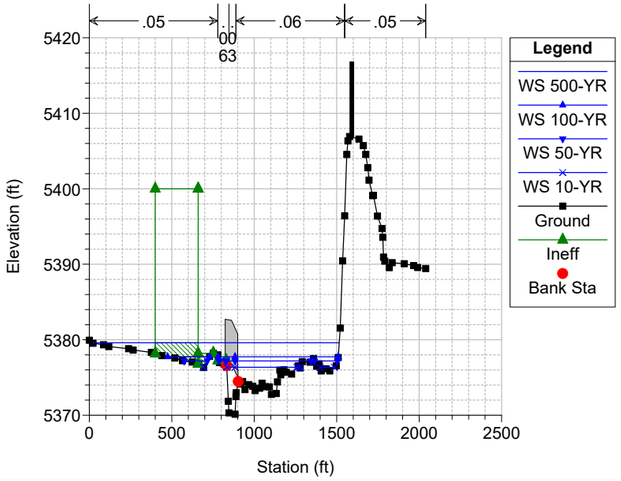
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 57442 FHAD CHANNEL GEOMETRY USED STA 846-891



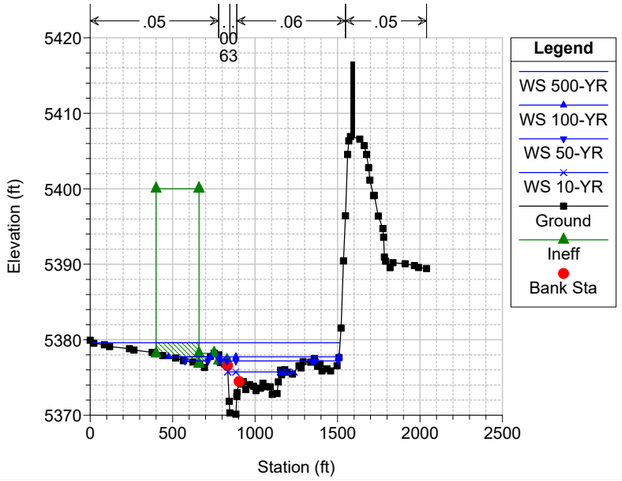
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 57428 BR Footbridge FOOTBRIDGE UPSTREAM OF KIPLING ST.



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 57428 BR Footbridge FOOTBRIDGE UPSTREAM OF KIPLING ST.



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 57402 FHAD CHANNEL GEOMETRY USED STA 845 - 886



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
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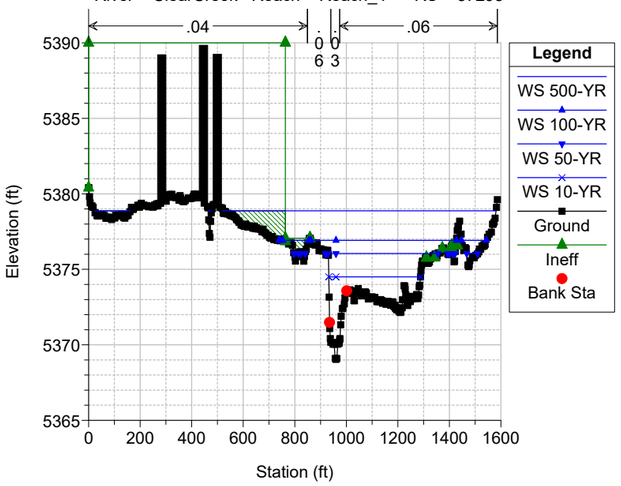
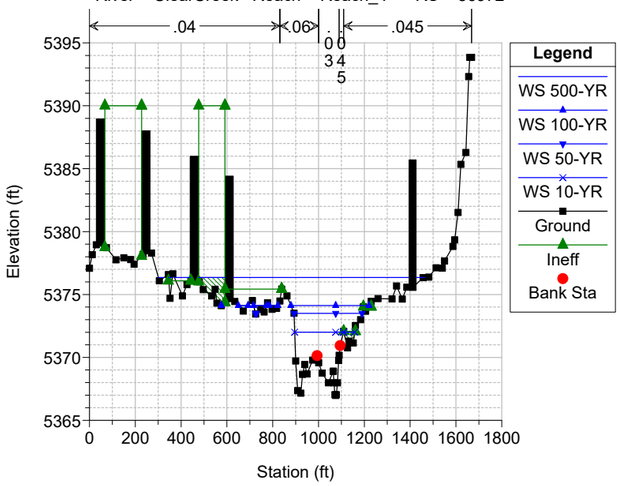


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 56972



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
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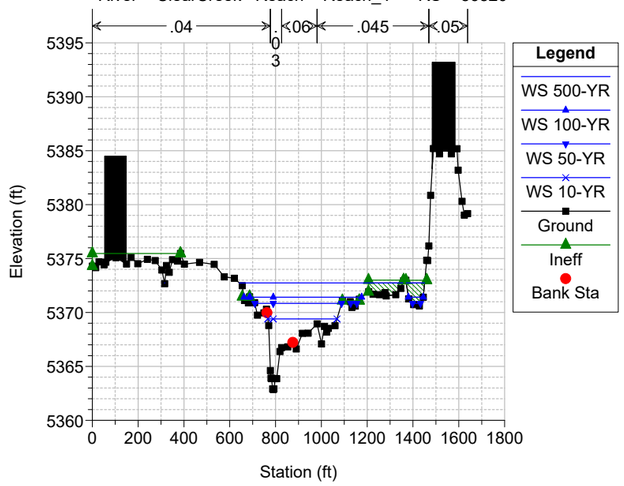
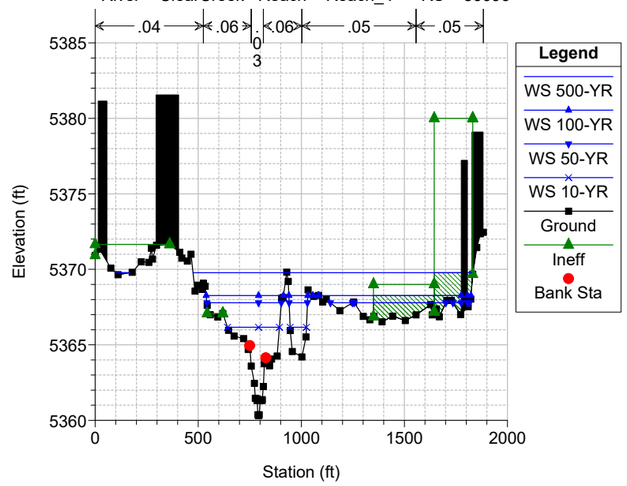
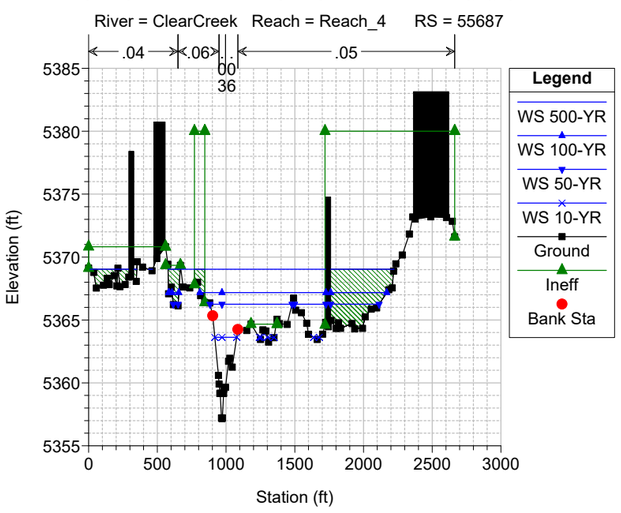


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 56096



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55687



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
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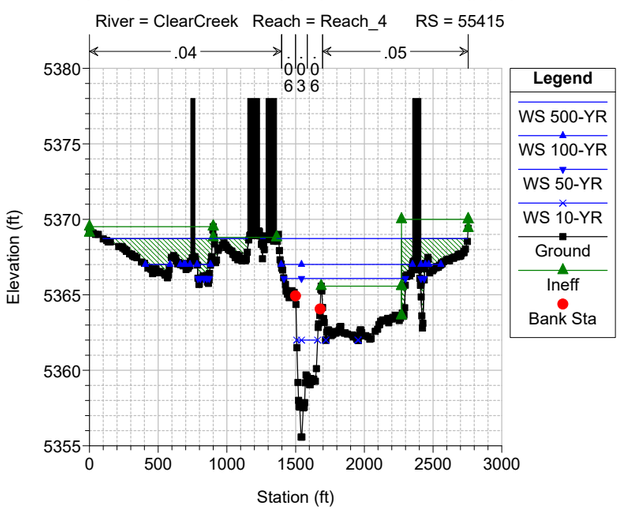
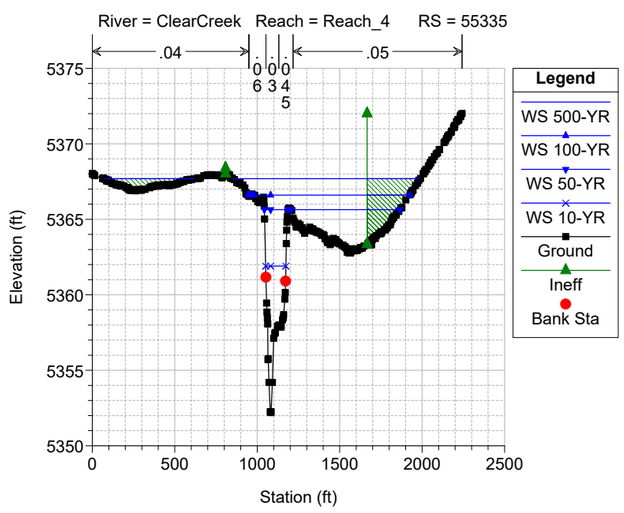
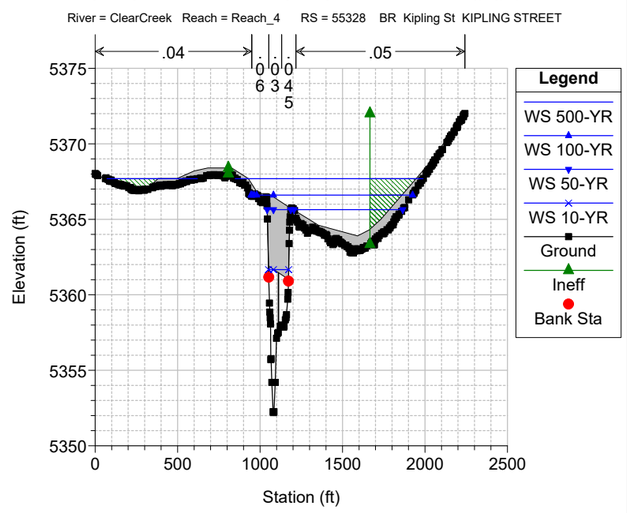


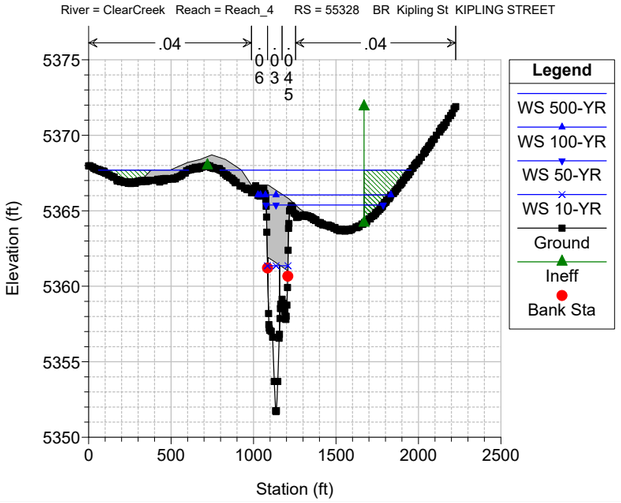
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55335



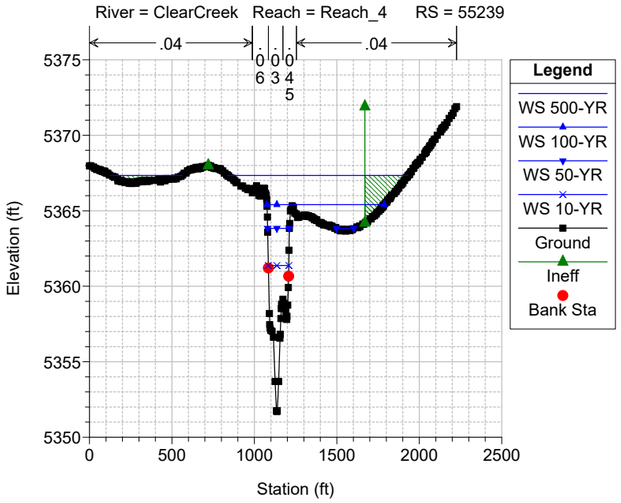
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55328 BR Kipling St KIPLING STREET



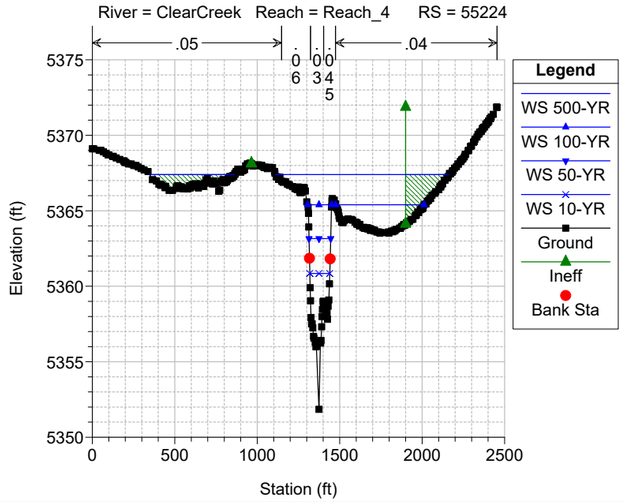
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55328 BR Kipling St KIPLING STREET



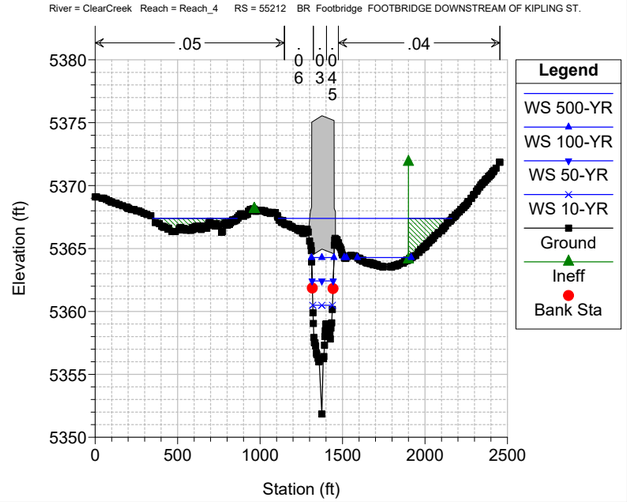
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55239



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55224

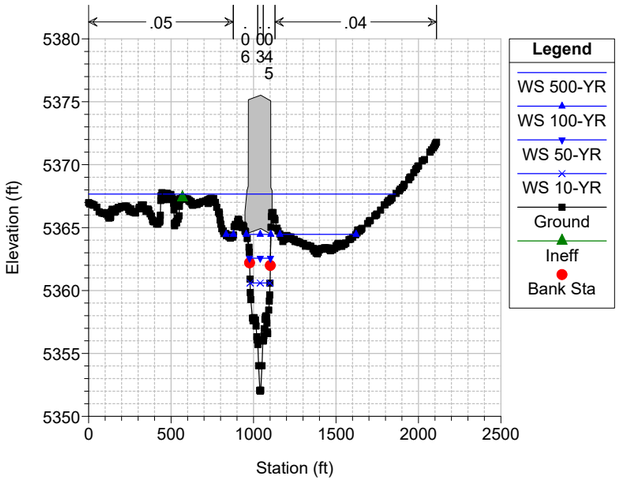


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55212 BR Footbridge FOOTBRIDGE DOWNSTREAM OF KIPLING ST.



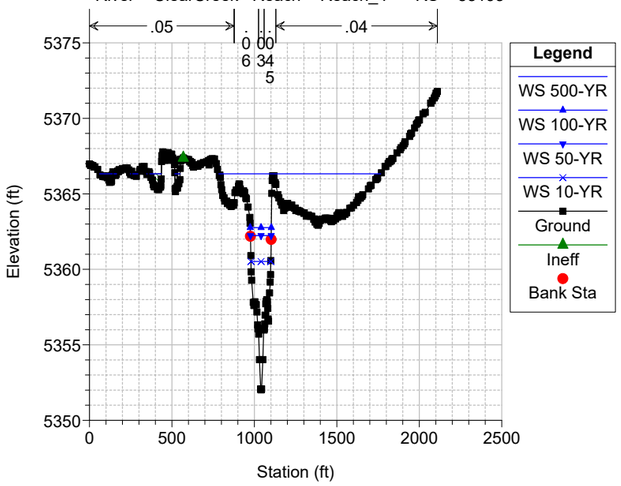
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 55212 BR Footbridge FOOTBRIDGE DOWNSTREAM OF KIPLING ST.



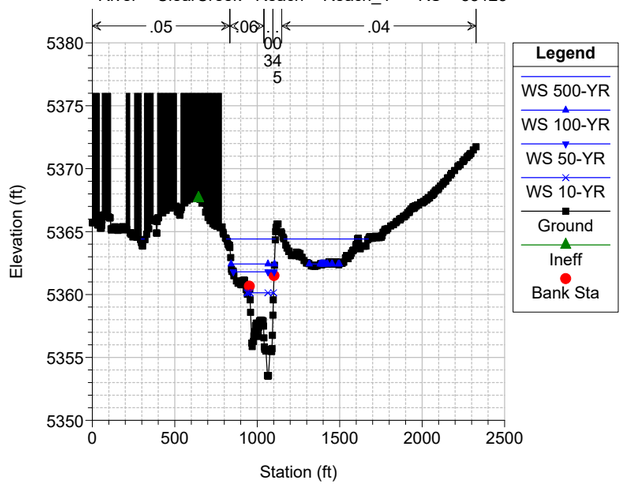
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 55193



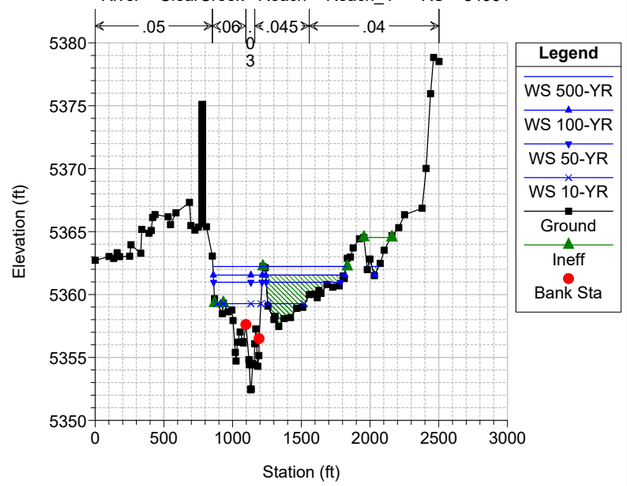
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 55123



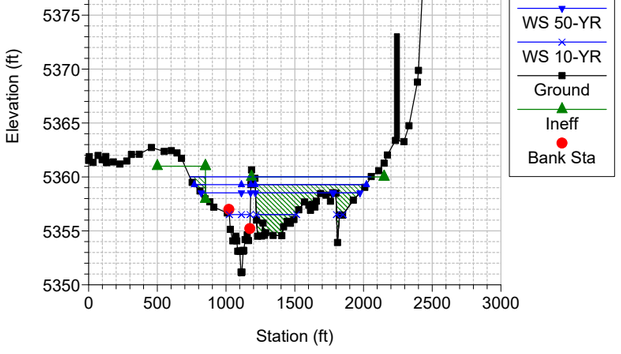
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 54961



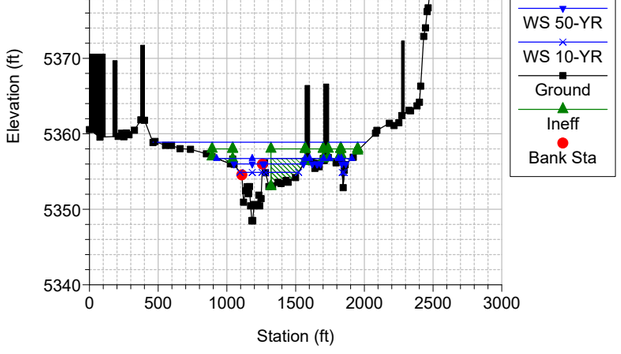
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 54621



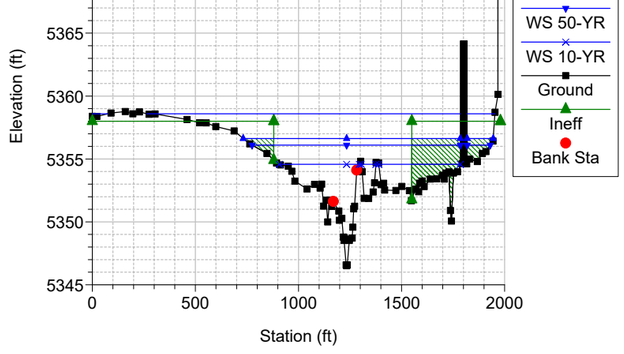
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 54353



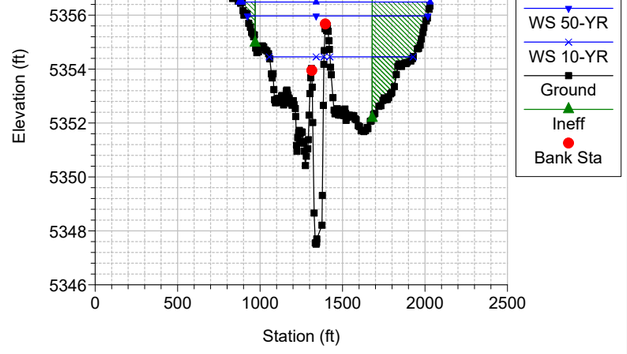
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 54064



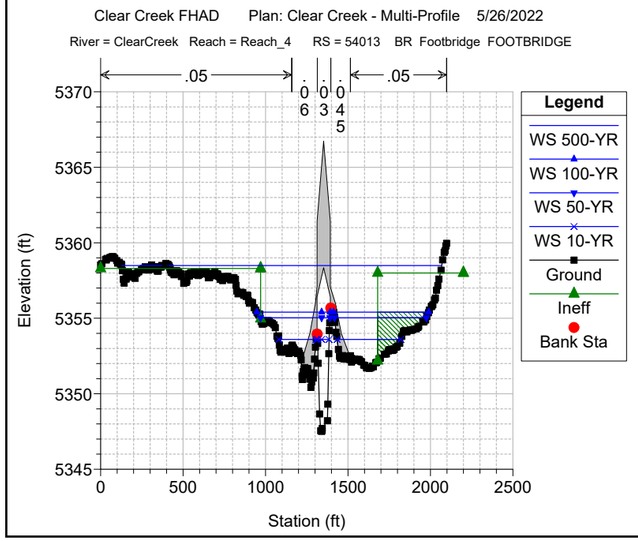
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 54021 FHAD CHANNEL GEOMETRY USED STA 1330-1376



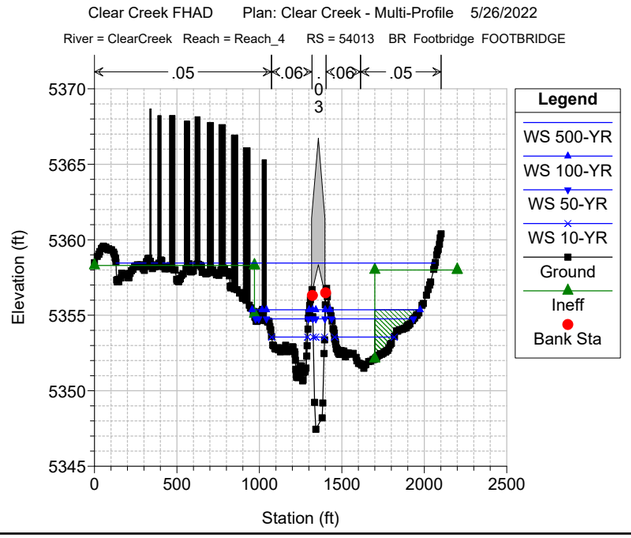
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 54013 BR Footbridge FOOTBRIDGE



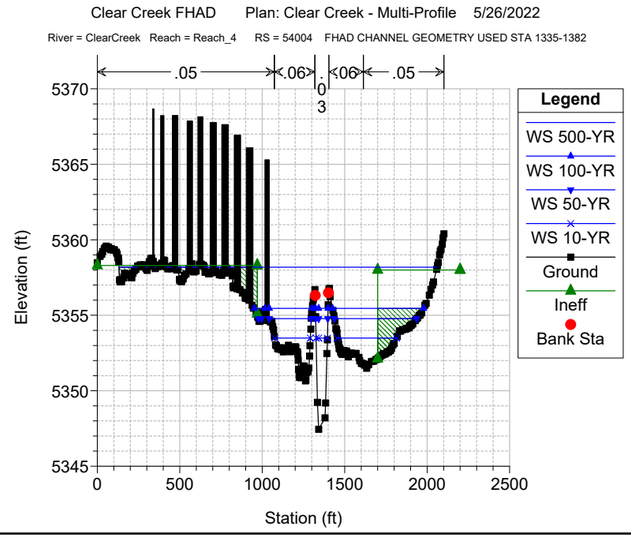
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 54013 BR Footbridge FOOTBRIDGE



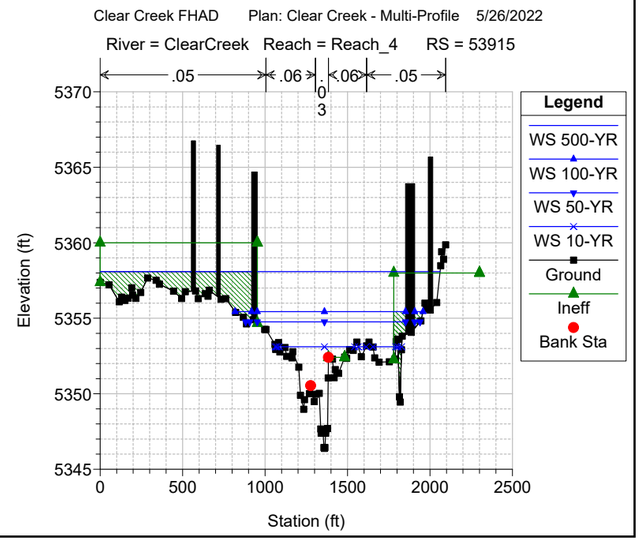
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

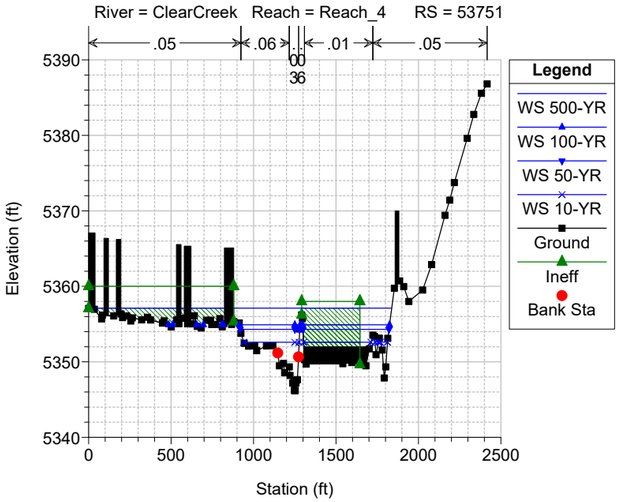
River = ClearCreek Reach = Reach_4 RS = 54004 FHAD CHANNEL GEOMETRY USED STA 1335-1382

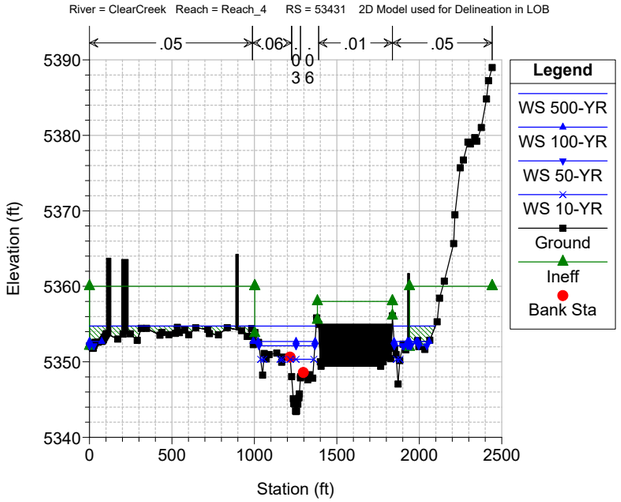


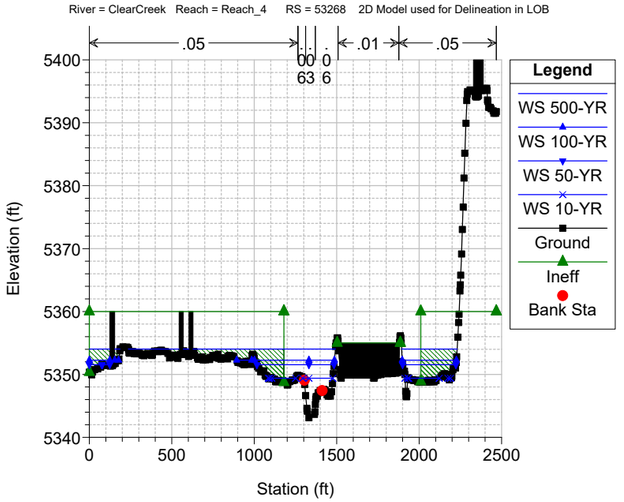
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

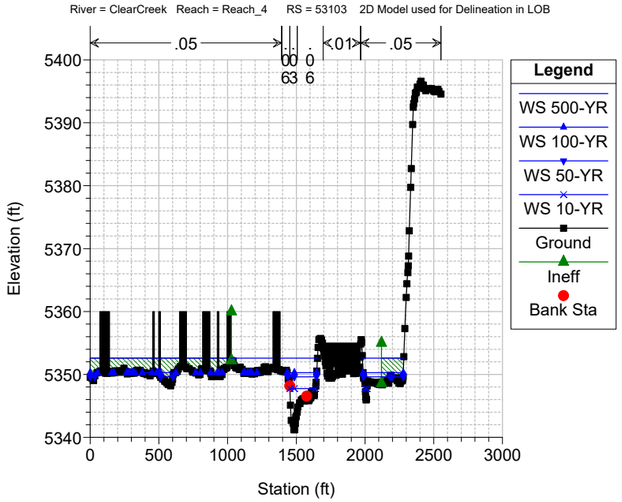
River = ClearCreek Reach = Reach_4 RS = 53915

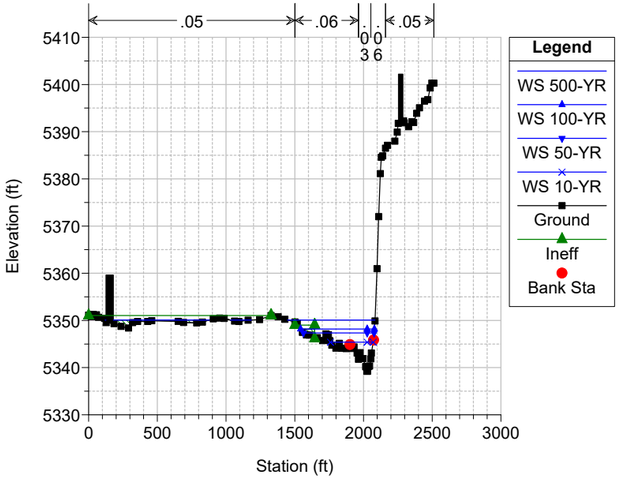


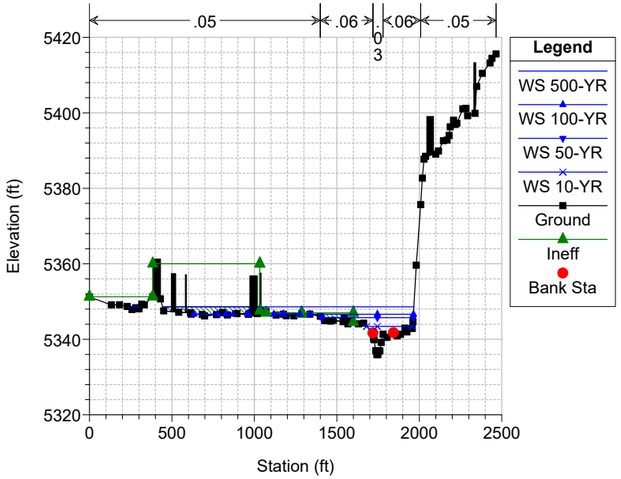
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 53751


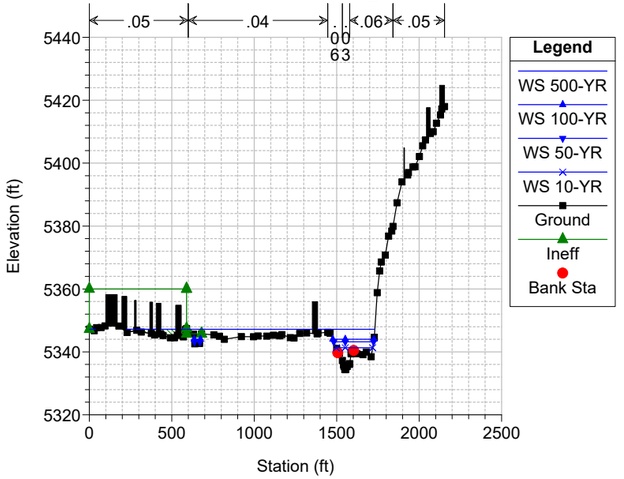
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 53431 2D Model used for Delineation in LOB


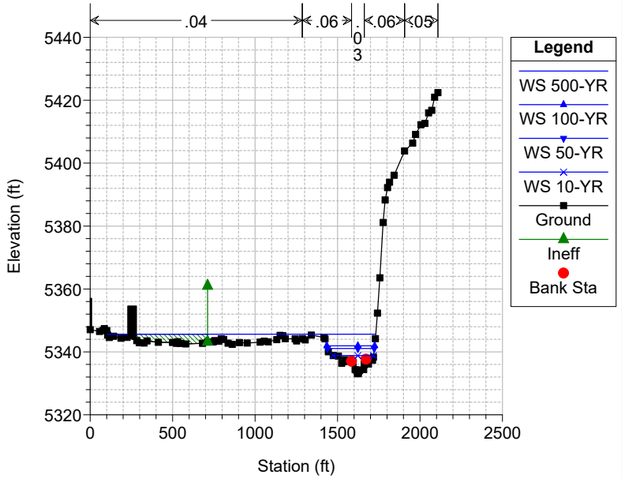
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 53268 2D Model used for Delineation in LOB


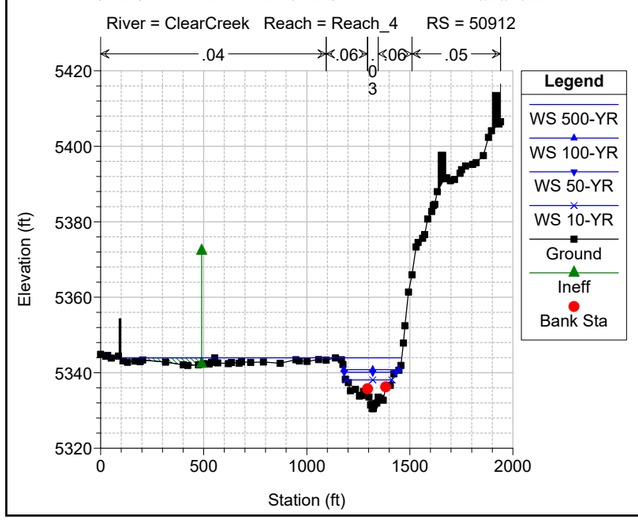
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 53103 2D Model used for Delineation in LOB


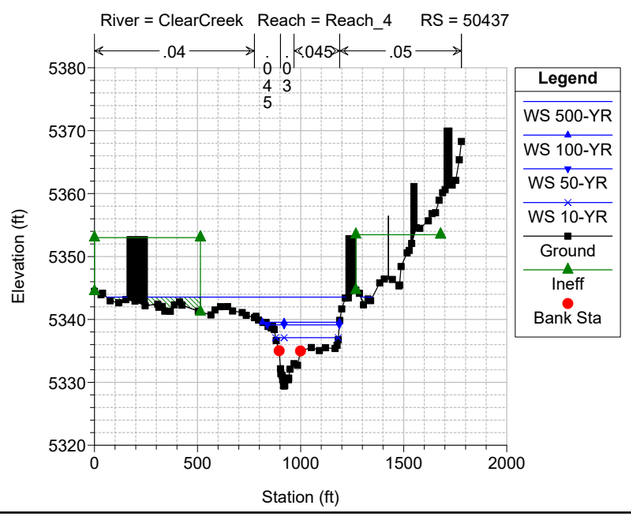
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 52630


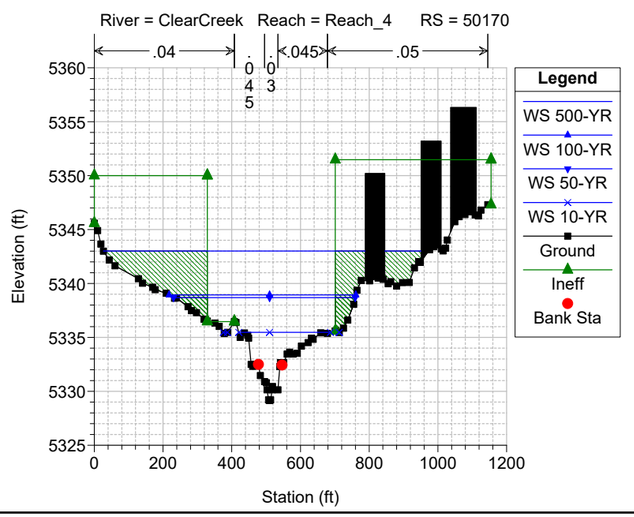
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 52143


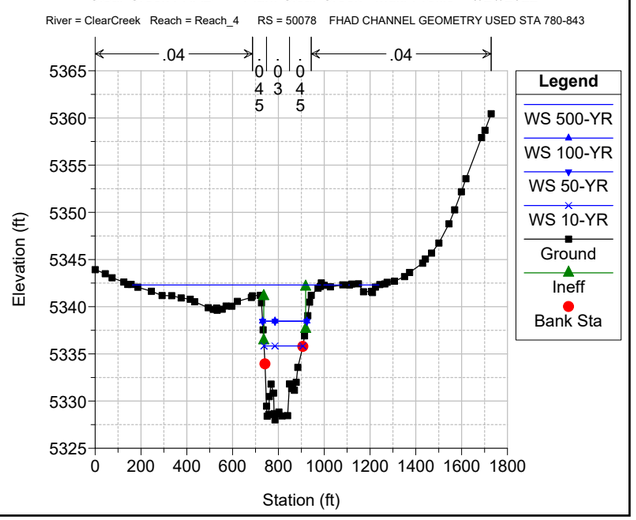
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 51703


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 51250


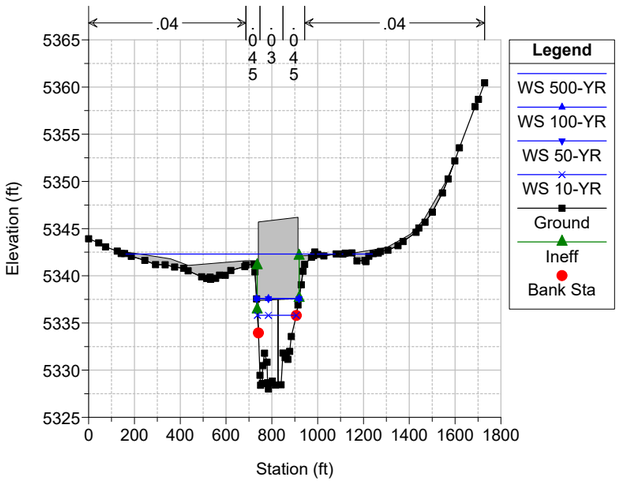
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 50912


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 50437


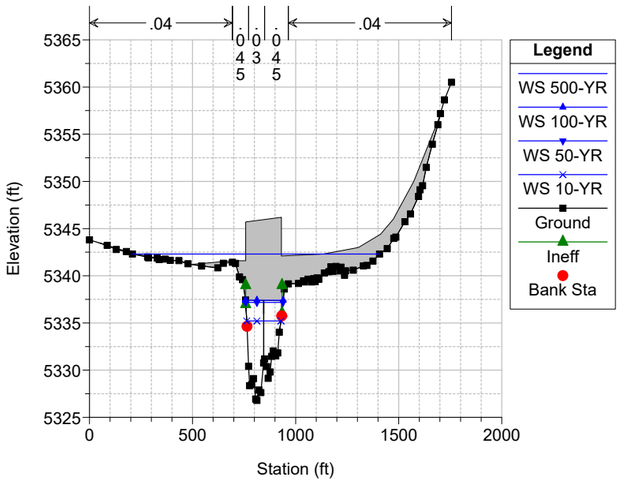
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 50170


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 50078 FHAD CHANNEL GEOMETRY USED STA 780-843


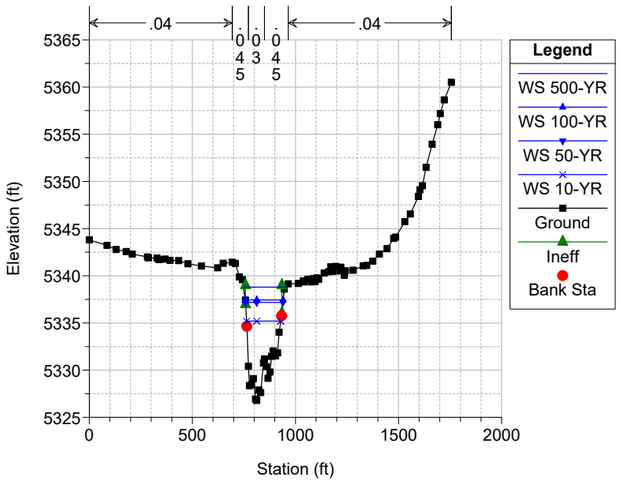
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 50073 BR 44th Ave 44TH AVENUE



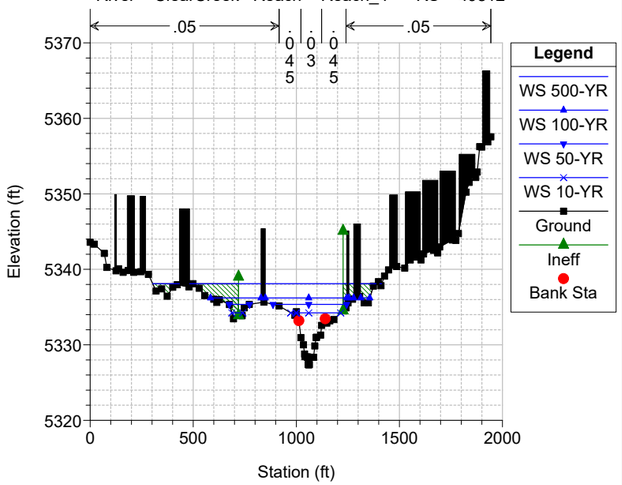
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 50073 BR 44th Ave 44TH AVENUE



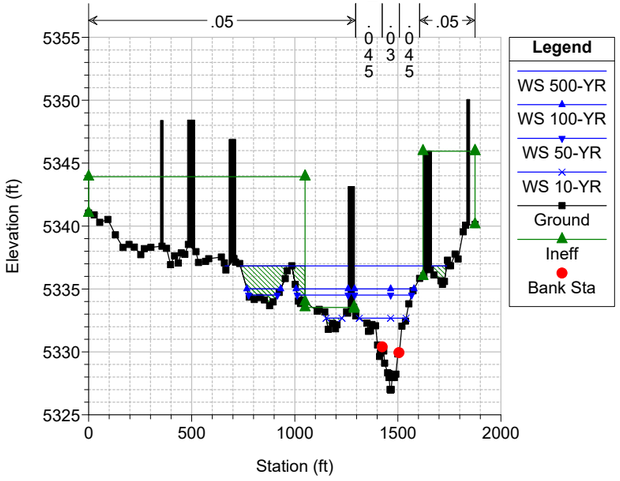
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 49993 FHAD CHANNEL GEOMETRY USED STA 797-842



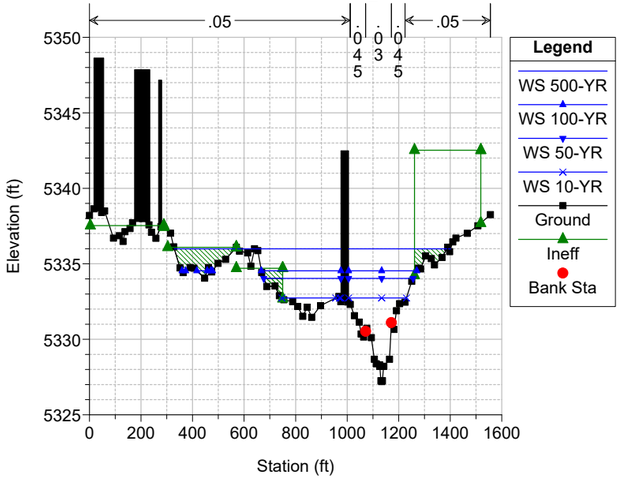
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 49812



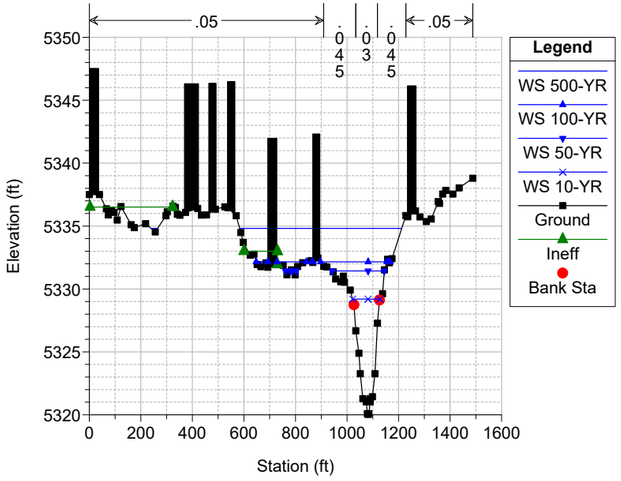
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 49640



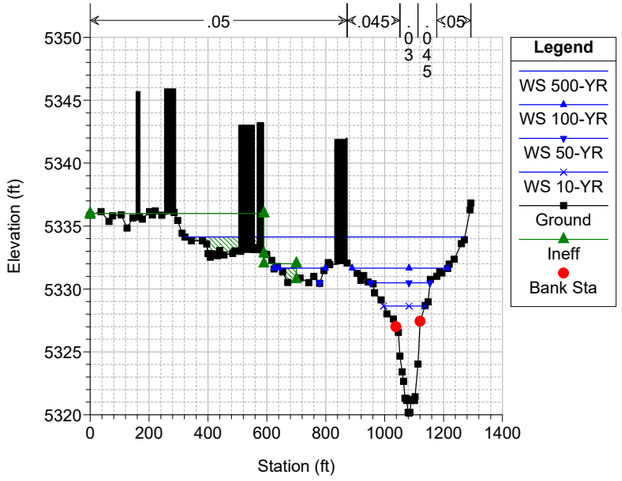
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 49591



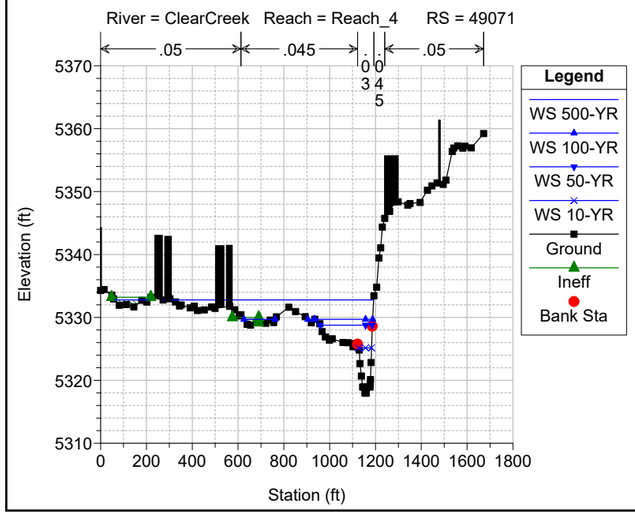
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 49530



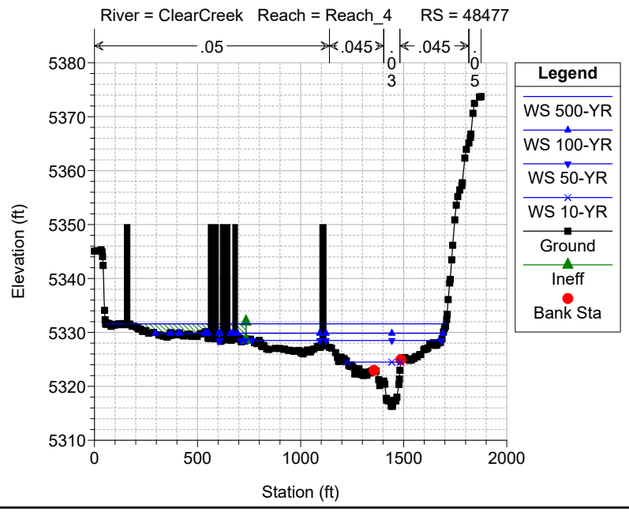
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 49418



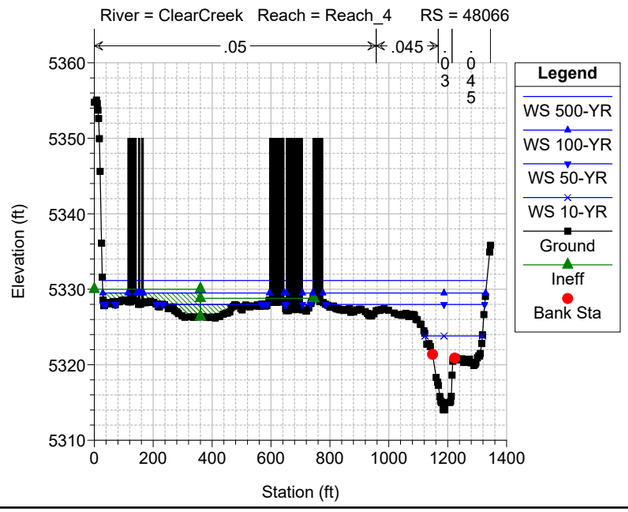
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 49071



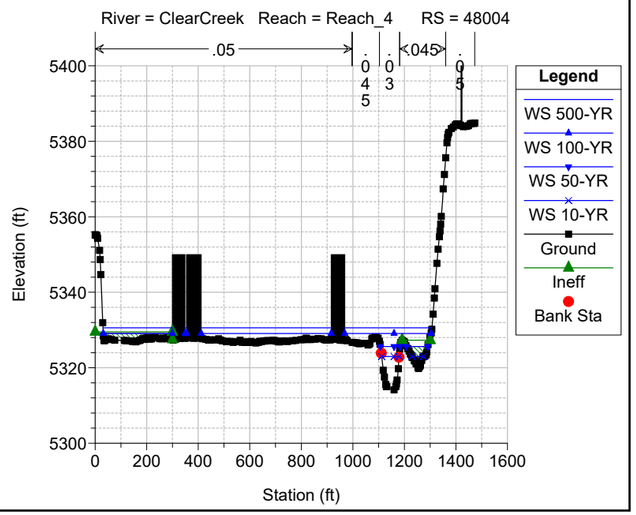
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 48477



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 48066

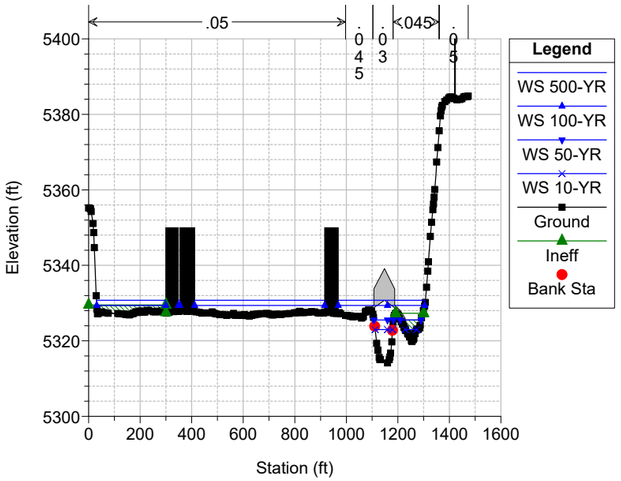


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 48004



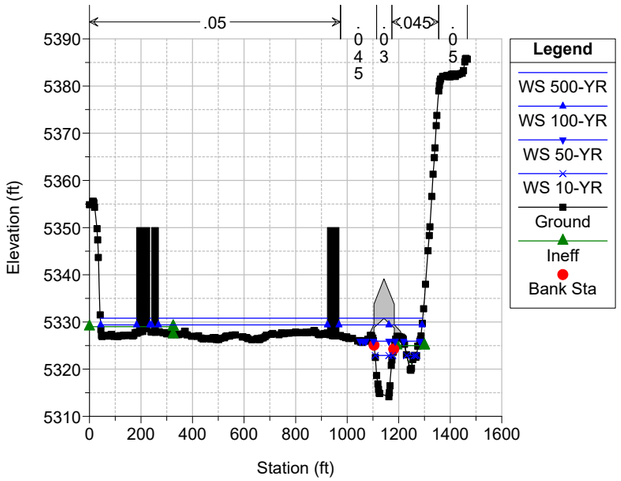
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 47996 BR Footbridge FOOTBRIDGE DOWNSTREAM OF W. 44TH AVE.



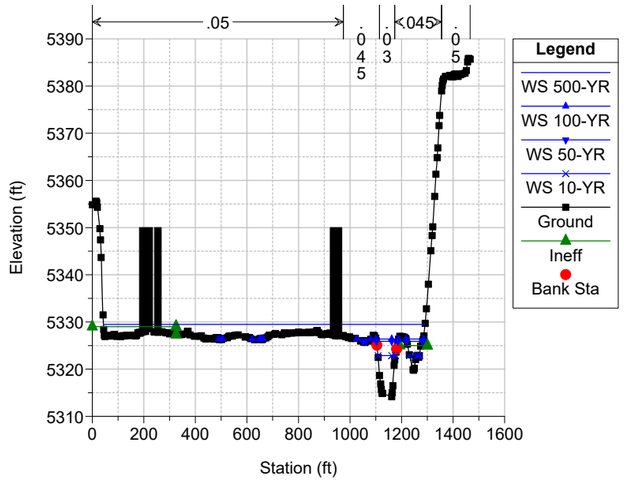
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 47996 BR Footbridge FOOTBRIDGE DOWNSTREAM OF W. 44TH AVE.



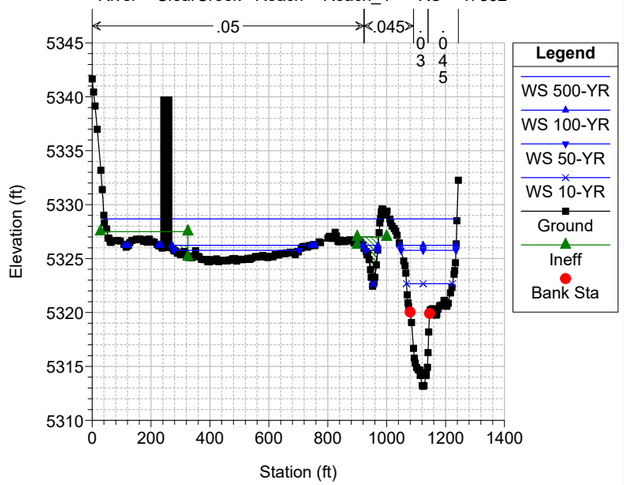
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 47979 0.8 expansion coefficient used to fix crossing profiles



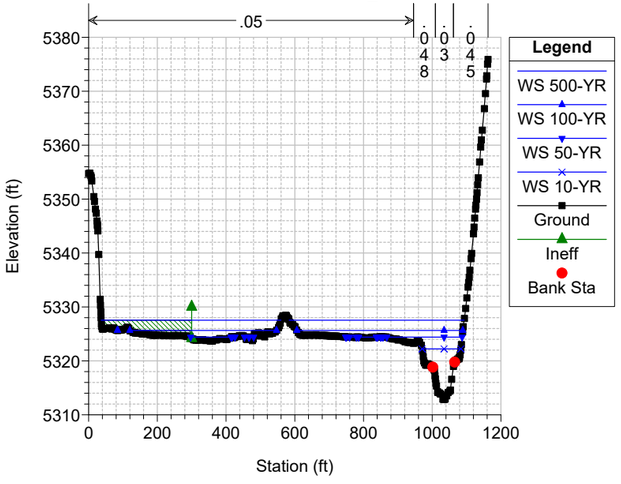
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 47862



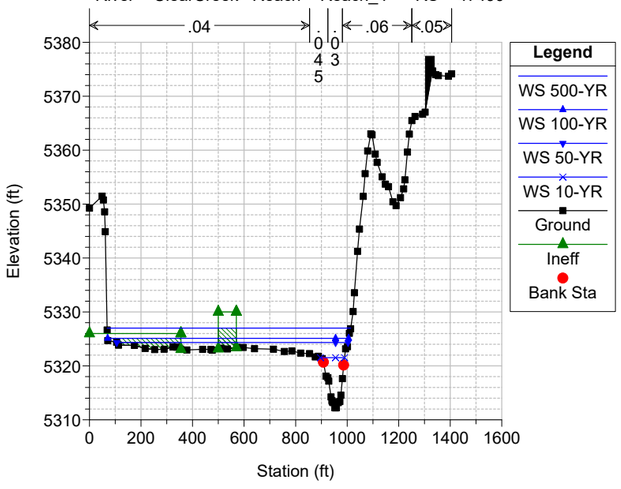
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 47719



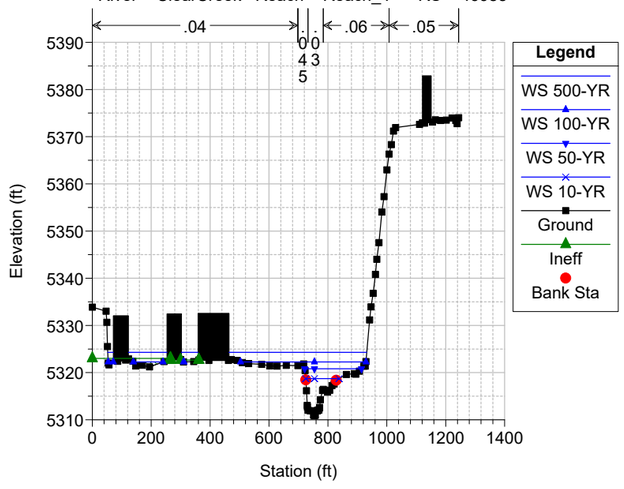
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 47490



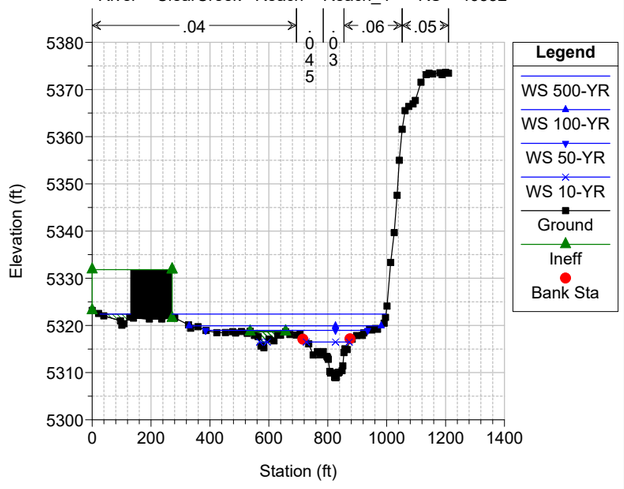
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 46985



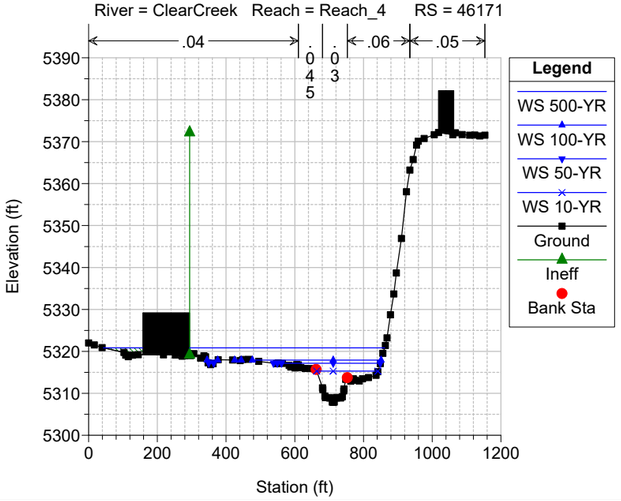
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 46532



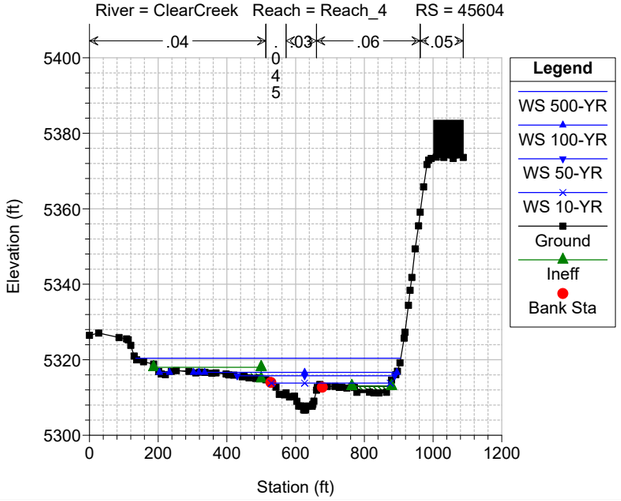
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 46171



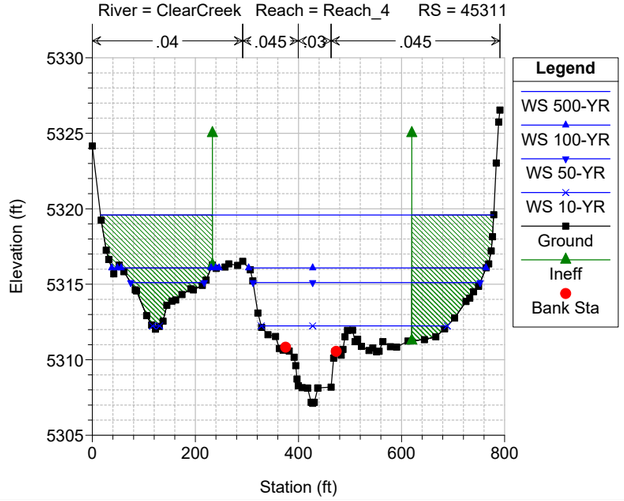
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 45604



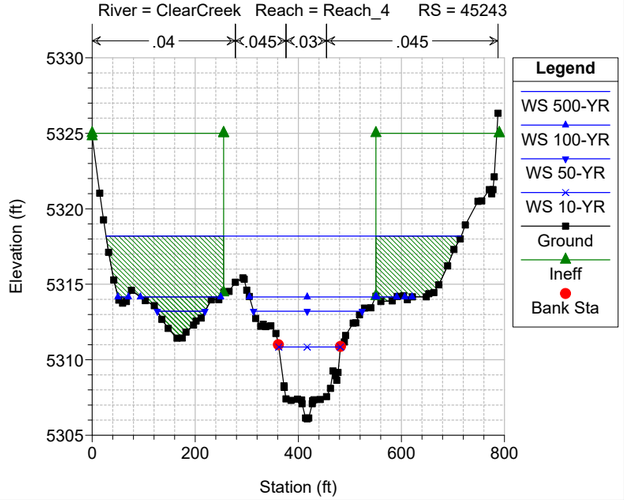
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

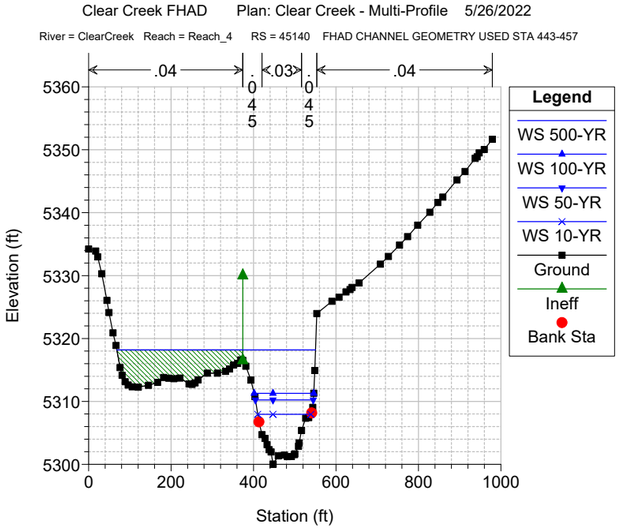
River = ClearCreek Reach = Reach_4 RS = 45311

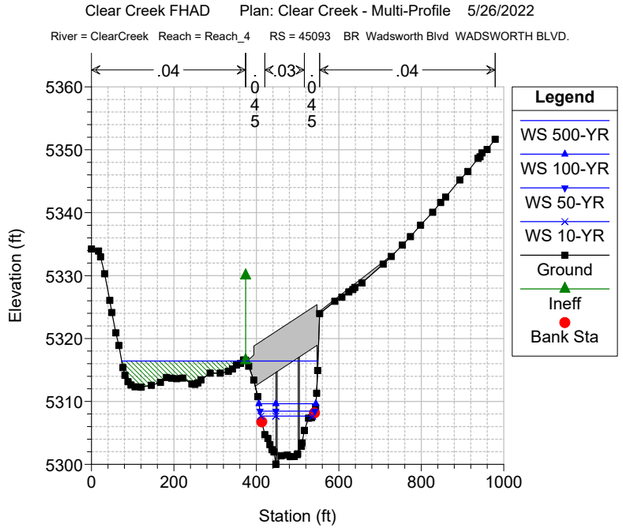


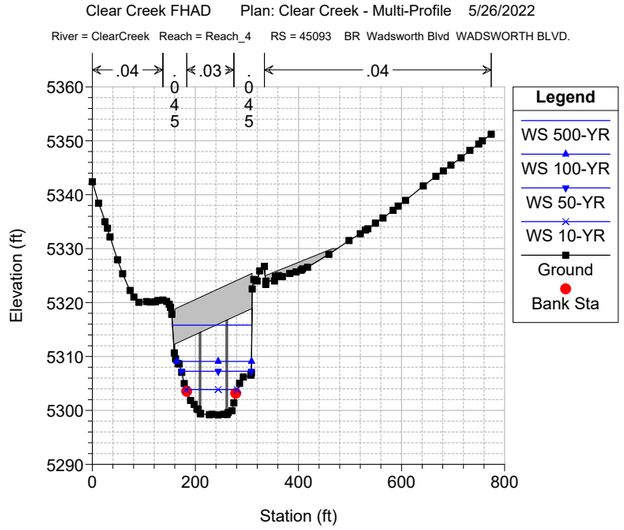
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

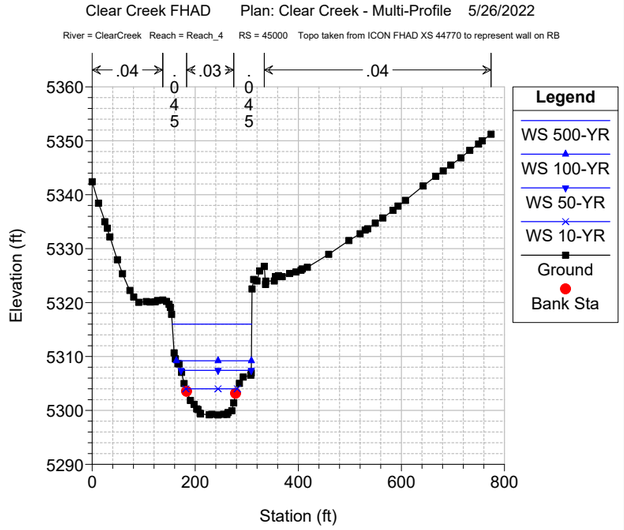
River = ClearCreek Reach = Reach_4 RS = 45243

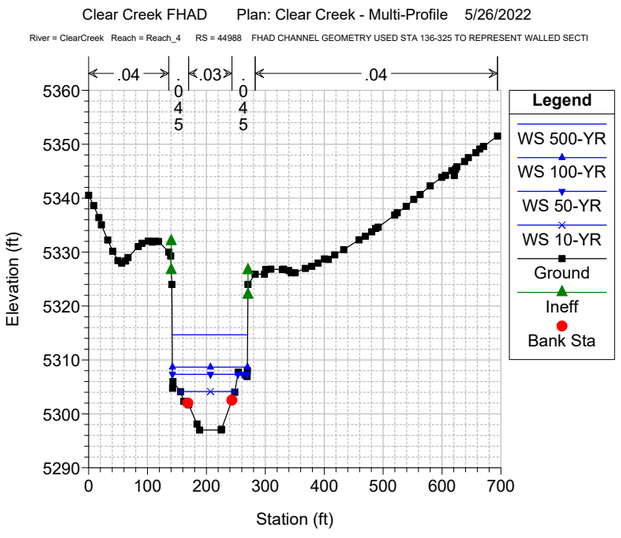


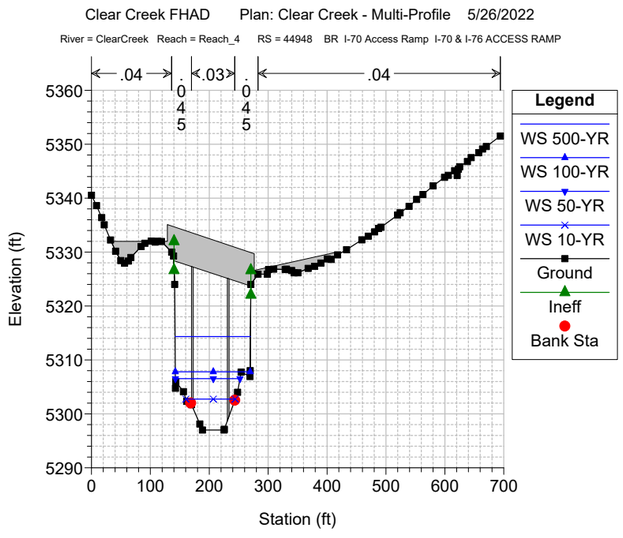

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 45140 FHAD CHANNEL GEOMETRY USED STA 443-457
.04
.045
.03
.045
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

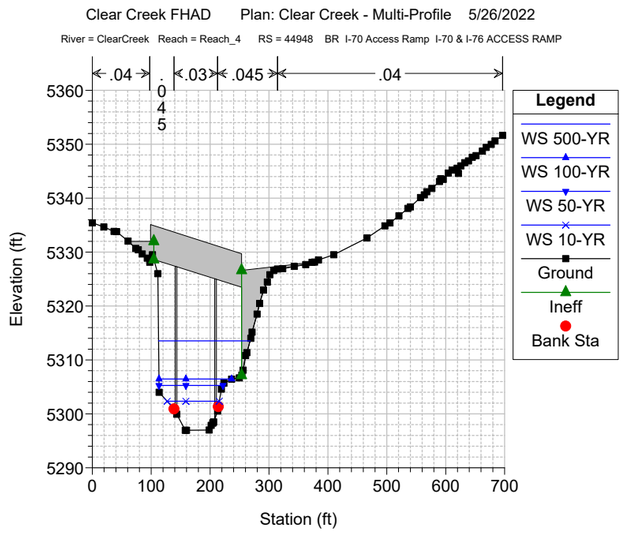

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 45093 BR Wadsworth Blvd WADSWORTH BLVD.
.04
.045
.03
.045
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

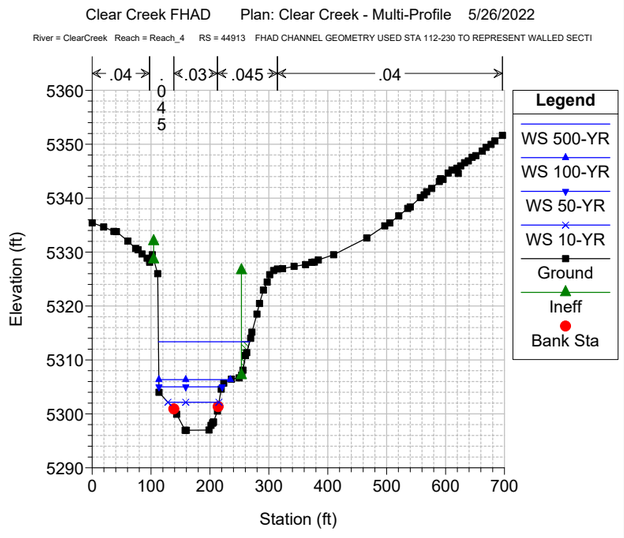

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 45093 BR Wadsworth Blvd WADSWORTH BLVD.
.04
.045
.03
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

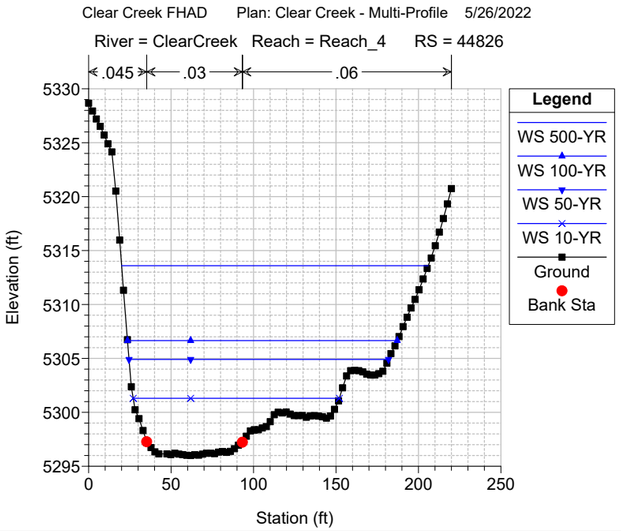

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 45000 Topo taken from ICON FHAD XS 44770 to represent wall on RB
.04
.045
.03
.045
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

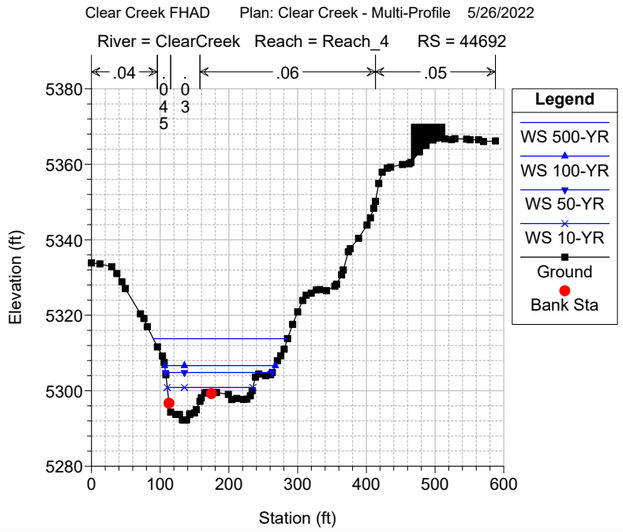

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44988 FHAD CHANNEL GEOMETRY USED STA 136-325 TO REPRESENT WALLED SECTI
.04
.045
.03
.045
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

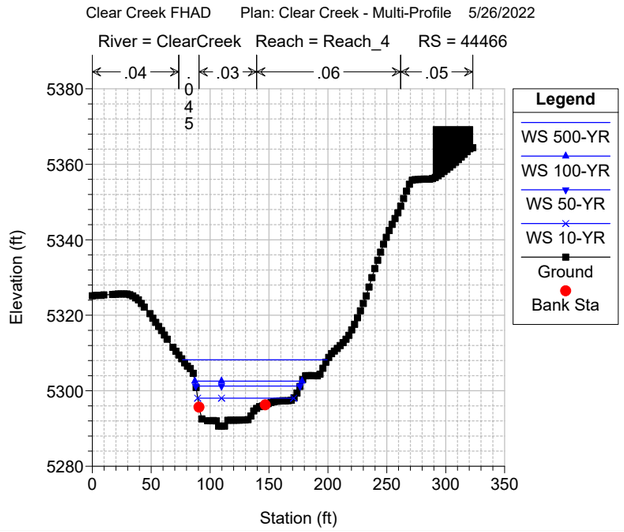

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44948 BR I-70 Access Ramp I-70 & I-76 ACCESS RAMP
.04
.045
.03
.045
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

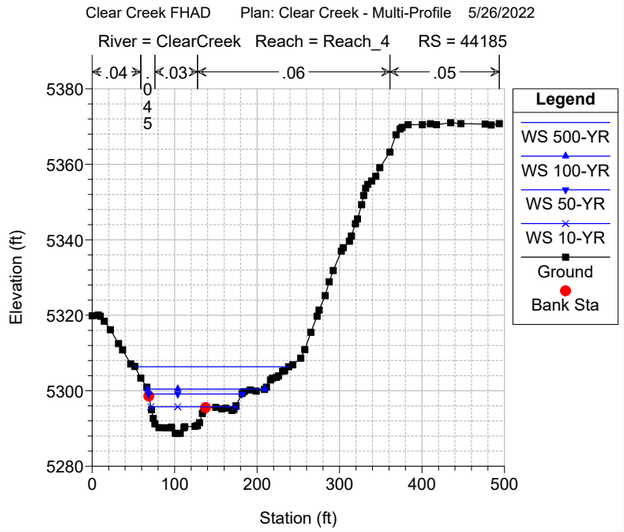

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44948 BR I-70 Access Ramp I-70 & I-76 ACCESS RAMP
.04
.045
.03
.045
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

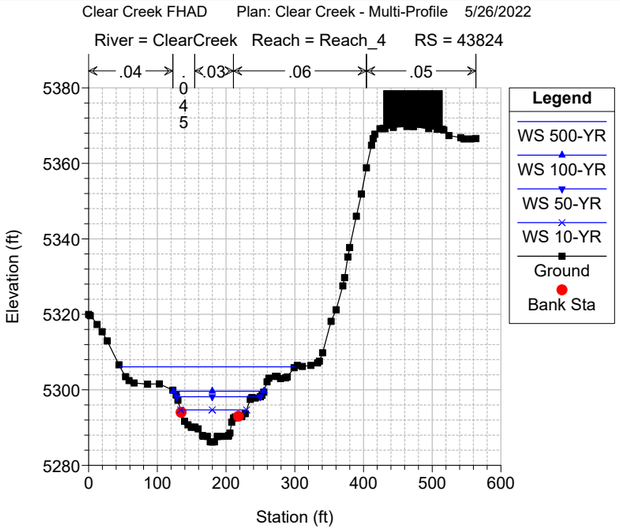

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44913 FHAD CHANNEL GEOMETRY USED STA 112-230 TO REPRESENT WALLED SECTI
.04
.045
.03
.045
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

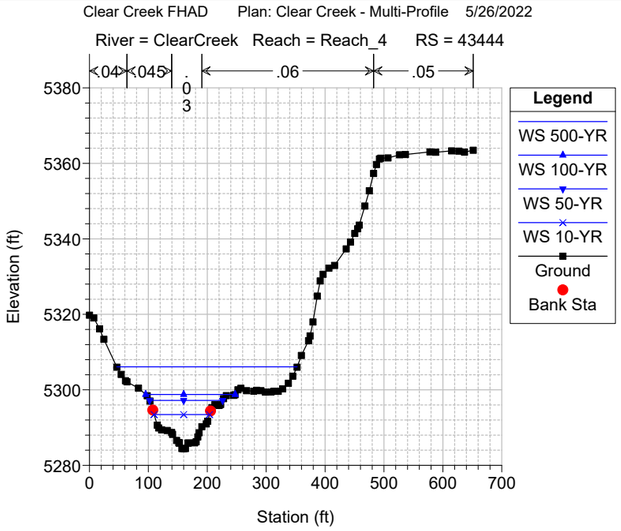

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44826
.045
.03
.06
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

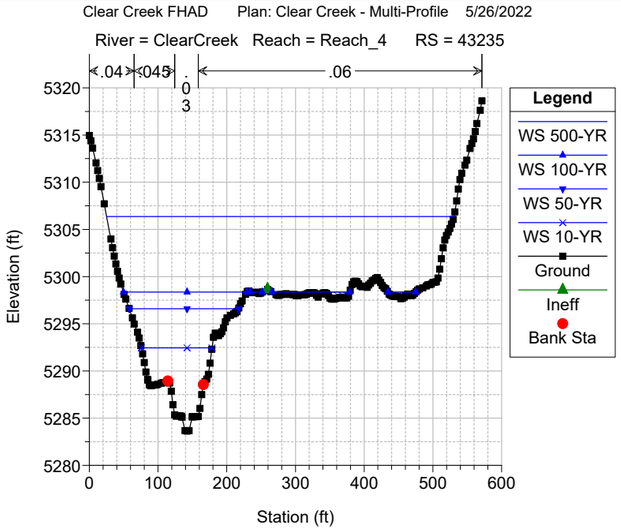

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44692
.04
.045
.03
.06
.05
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

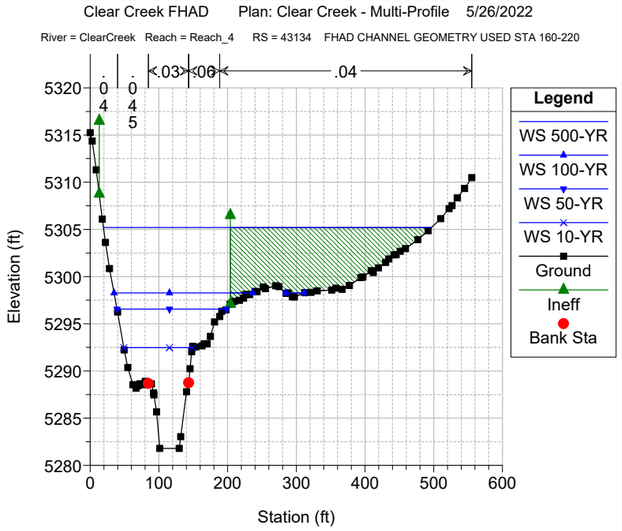

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44466
.04
.045
.03
.06
.05
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

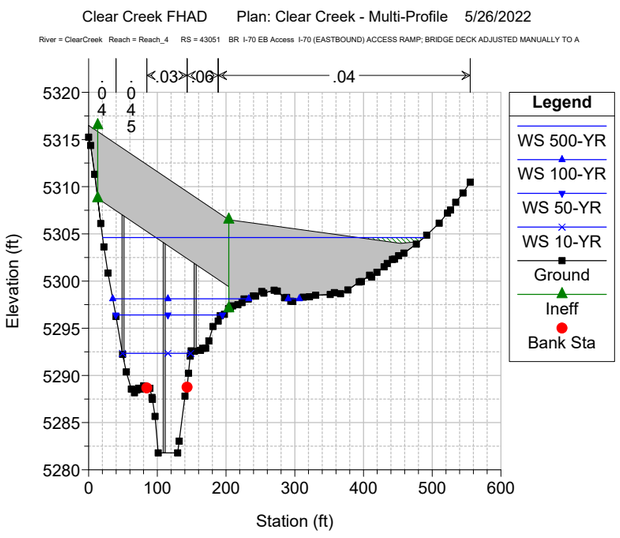

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44185
.04
.045
.03
.06
.05
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

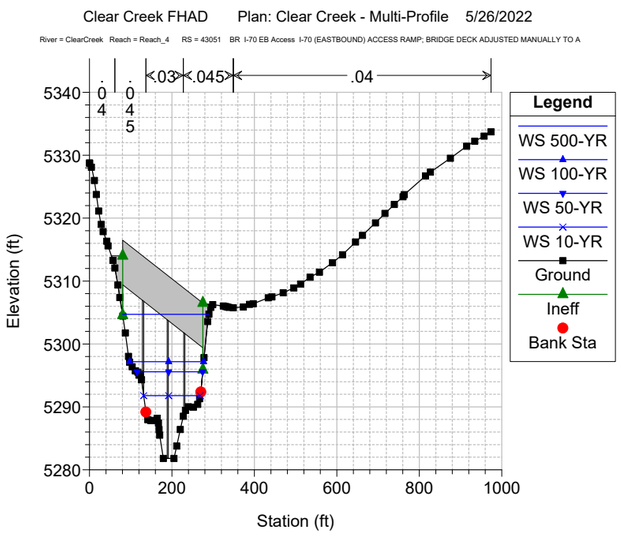

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 43824
.04 .045 .03 .06 .05
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

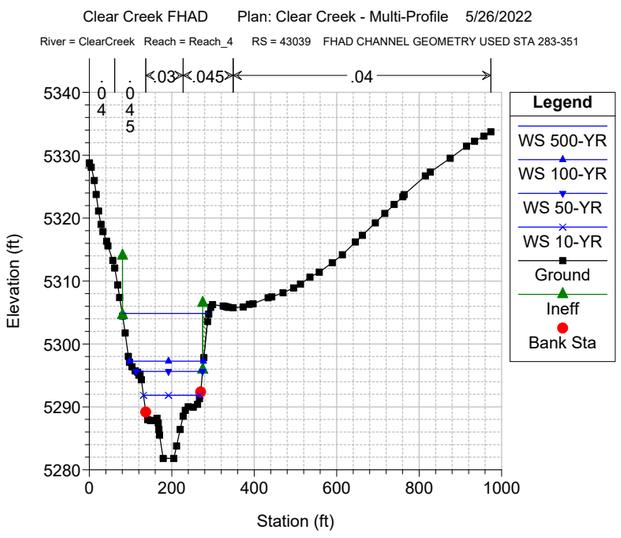

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 43444
.04 .045 .03 .06 .05
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

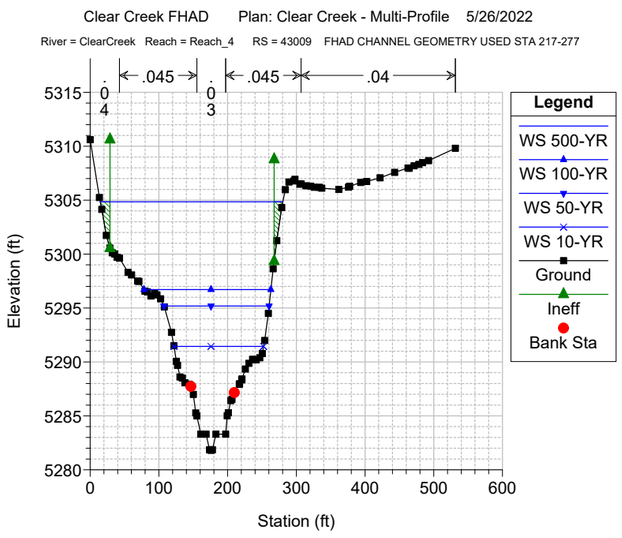

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 43235
.04 .045 .03 .06
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

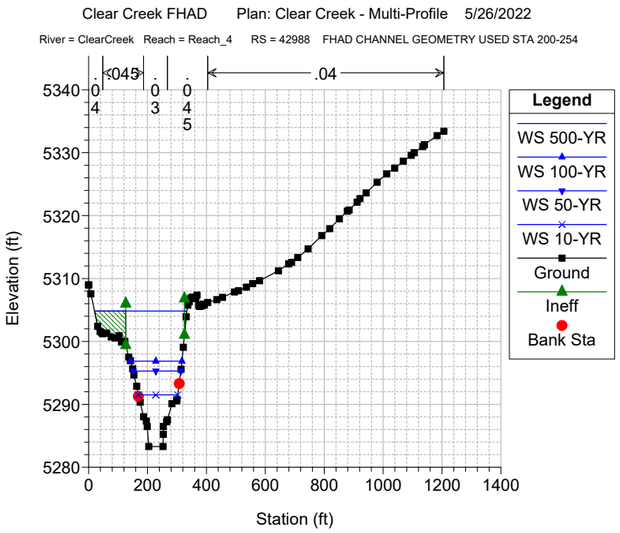

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 43134 FHAD CHANNEL GEOMETRY USED STA 160-220
.04 .045 .03 .06 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

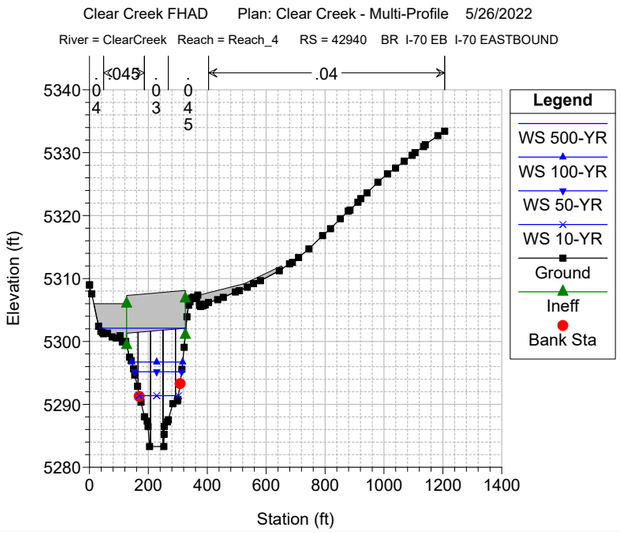

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 43051 BR I-70 EB Access I-70 (EASTBOUND) ACCESS RAMP; BRIDGE DECK ADJUSTED MANUALLY TO A
.04 .045 .03 .06 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

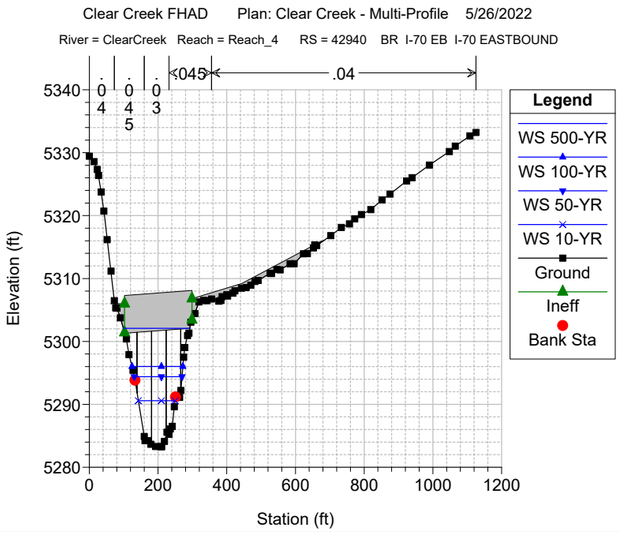

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 43051 BR I-70 EB Access I-70 (EASTBOUND) ACCESS RAMP; BRIDGE DECK ADJUSTED MANUALLY TO A
.04 .045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

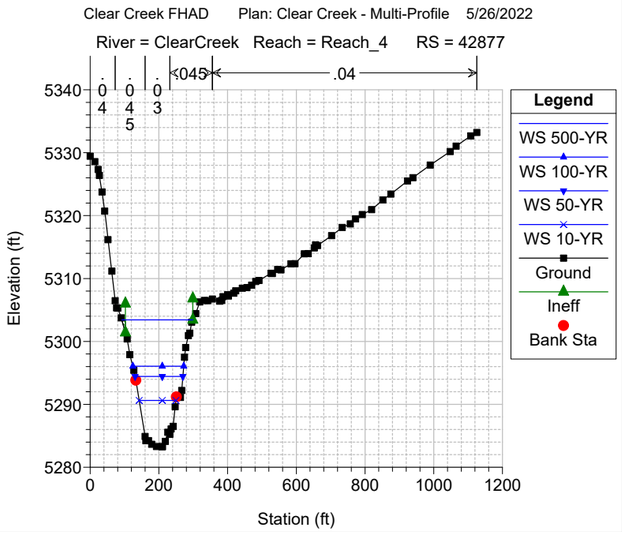

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 43039 FHAD CHANNEL GEOMETRY USED STA 283-351
.04 .045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 43009 FHAD CHANNEL GEOMETRY USED STA 217-277
.04 .045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 42988 FHAD CHANNEL GEOMETRY USED STA 200-254
.04 .045 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

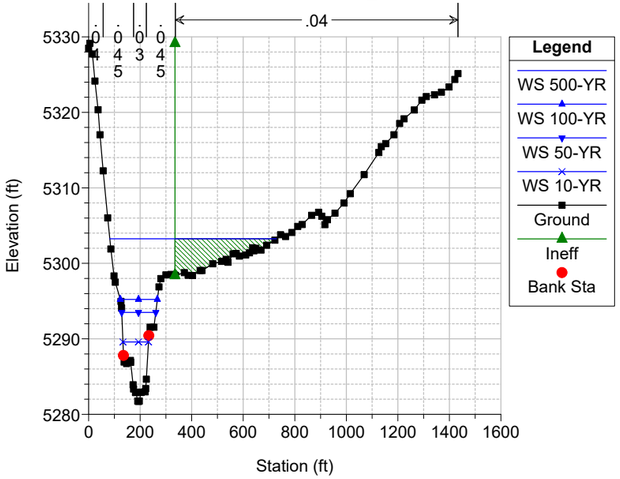

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 42940 BR I-70 EB I-70 EASTBOUND
.04 .045 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 42940 BR I-70 EB I-70 EASTBOUND
.04 .045 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 42877
.04 .045 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

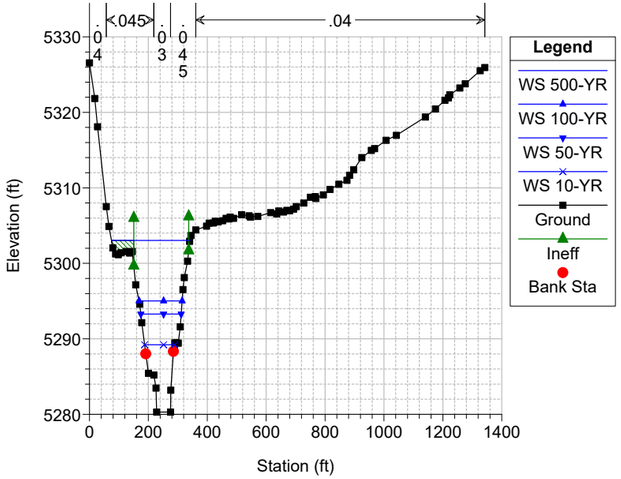
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42676



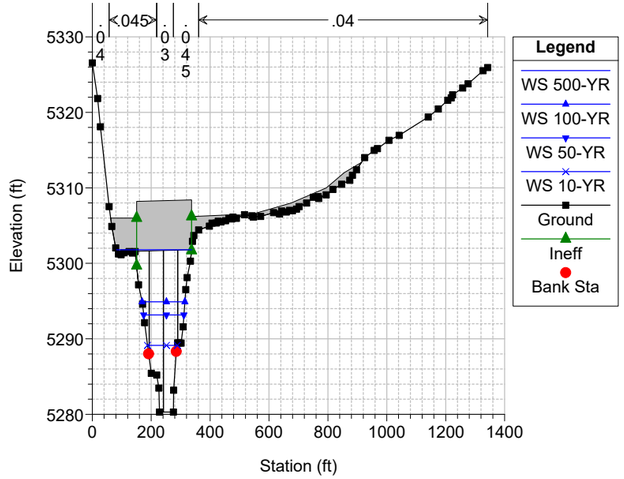
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42499 FHAD CHANNEL GEOMETRY USED STA 225-276



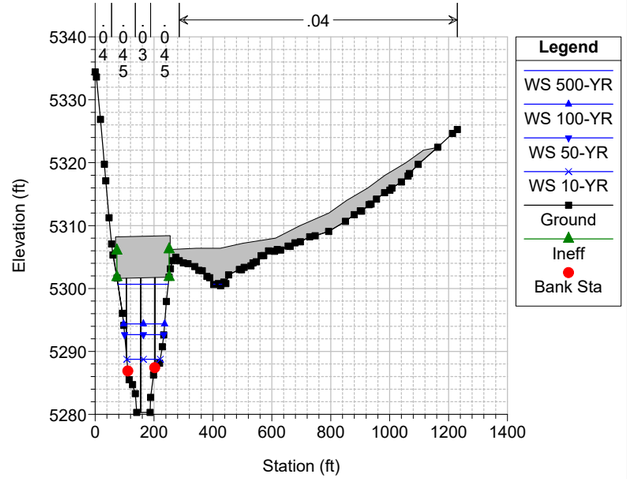
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42456 BR I-70 WB I-70 WESTBOUND



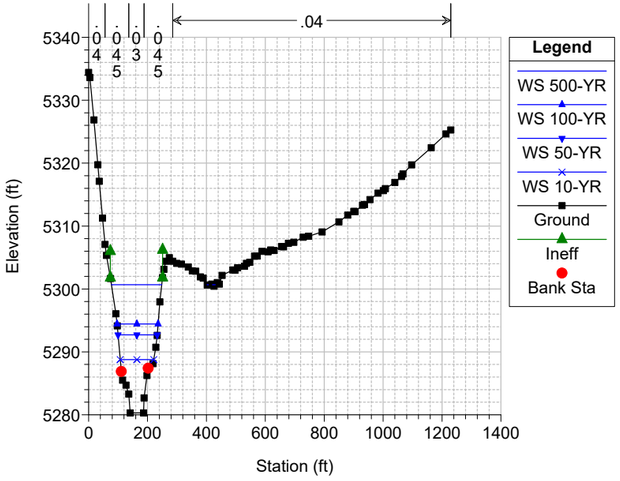
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42456 BR I-70 WB I-70 WESTBOUND



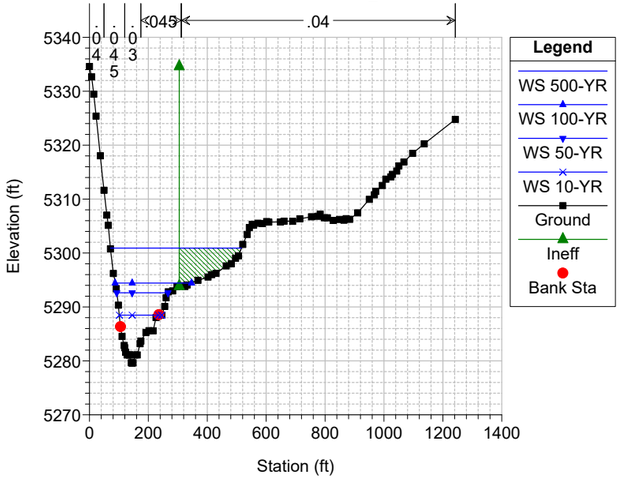
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42415 FHAD CHANNEL GEOMETRY USED STA 136-188



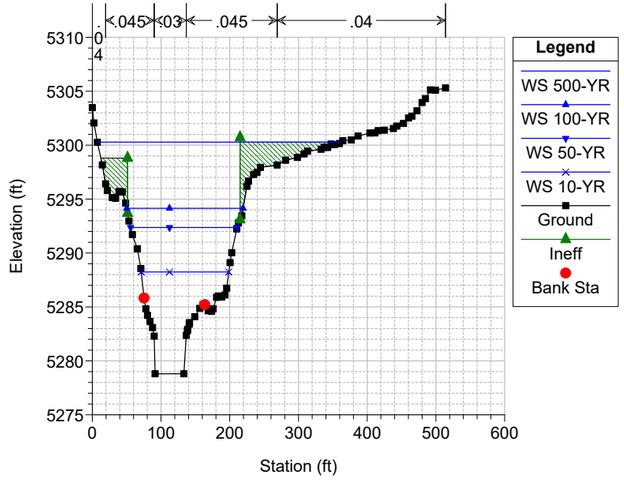
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42287



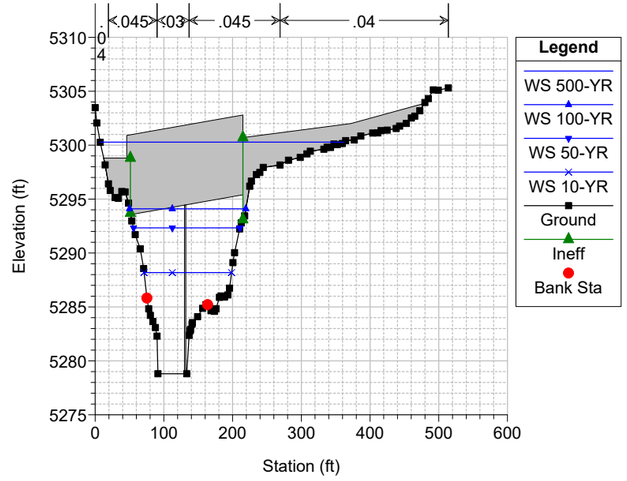
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42165 FHAD CHANNEL GEOMETRY USED STA 90-134



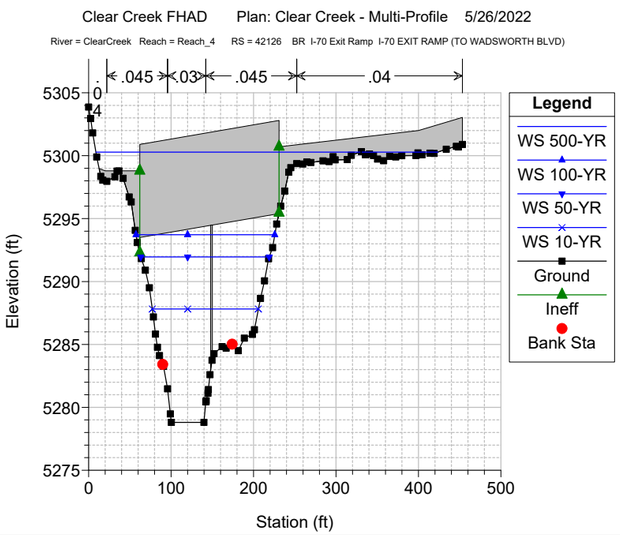
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42126 BR I-70 Exit Ramp I-70 EXIT RAMP (TO WADSWORTH BLVD)



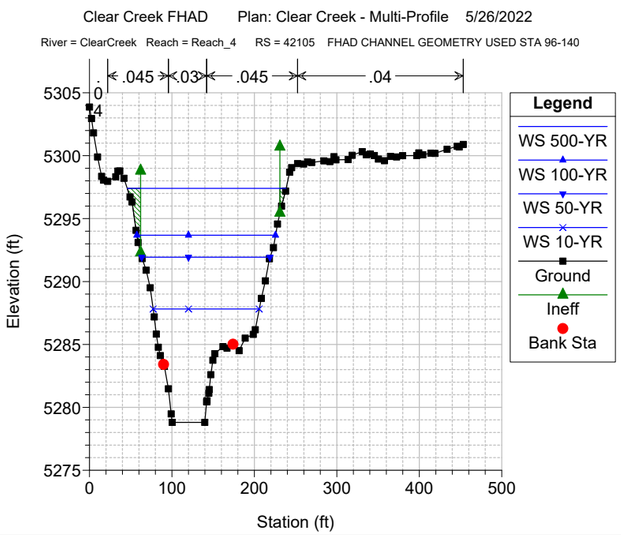
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42126 BR I-70 EXIT RAMP (TO WADSWORTH BLVD)



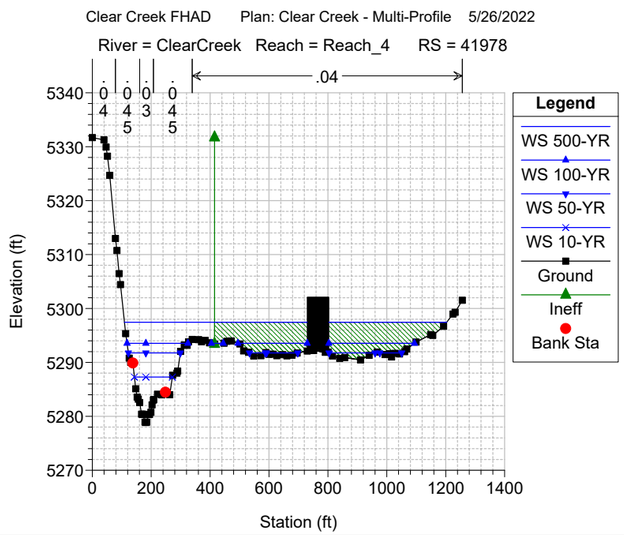
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42105 FHAD CHANNEL GEOMETRY USED STA 96-140



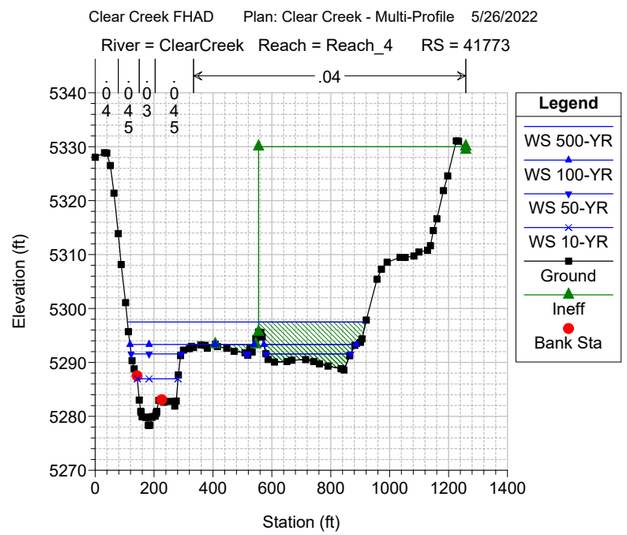
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

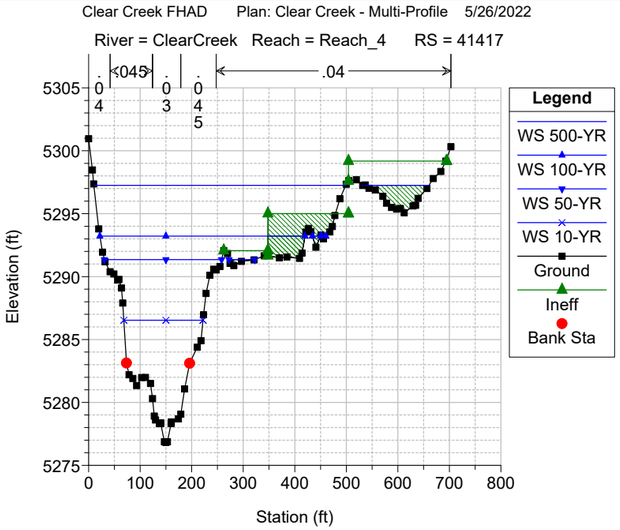
River = ClearCreek Reach = Reach_4 RS = 41978

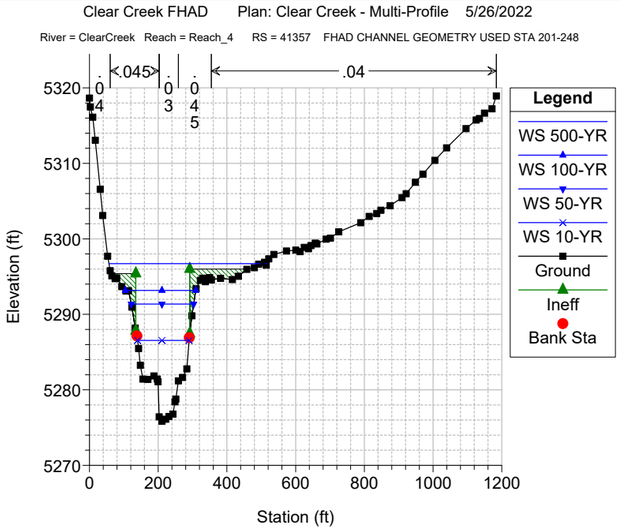


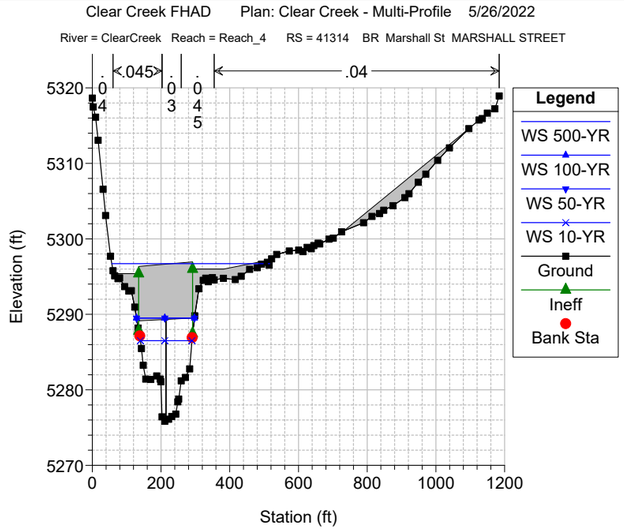
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

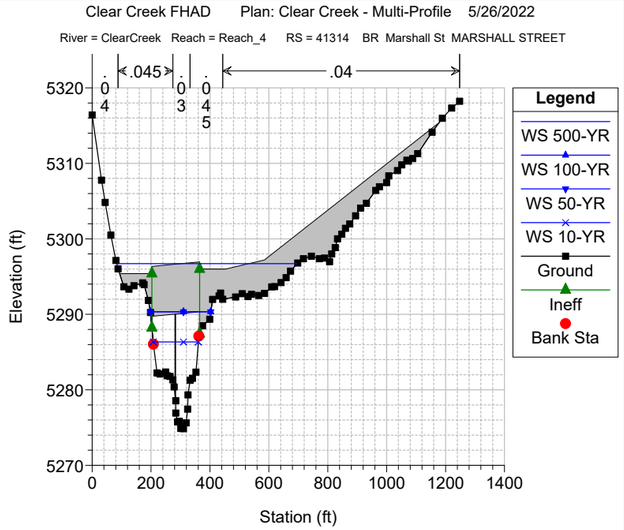
River = ClearCreek Reach = Reach_4 RS = 41773

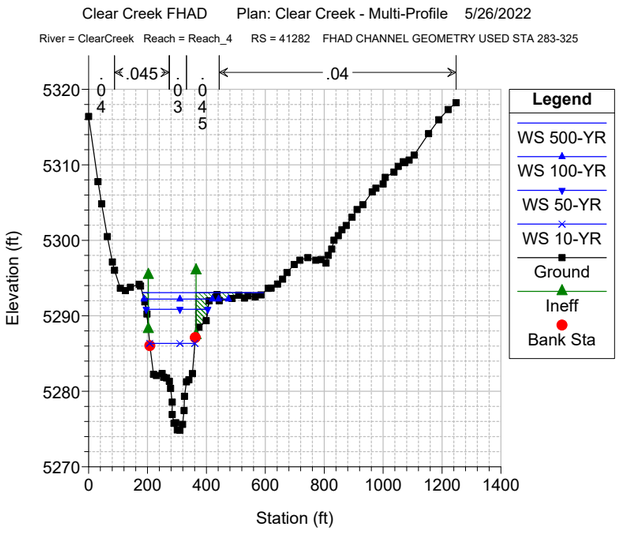


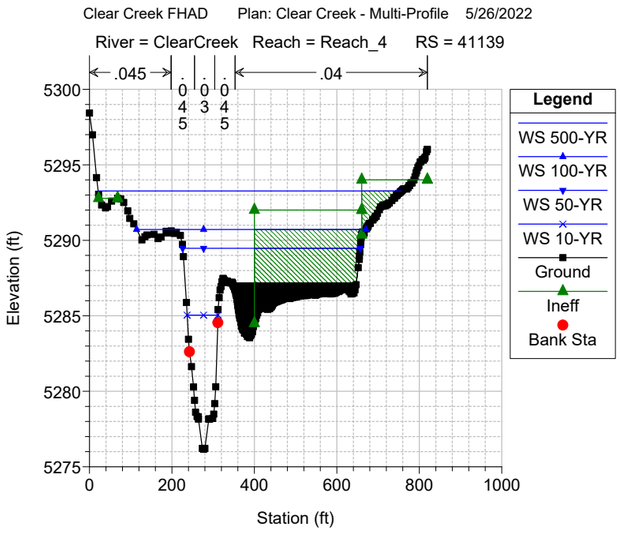

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 41417
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

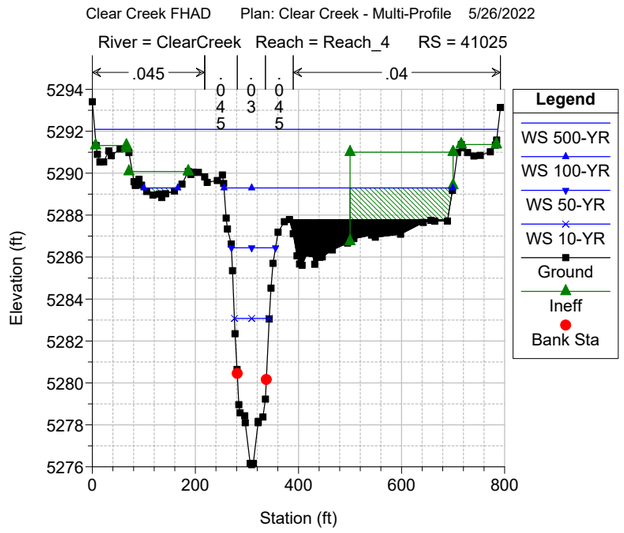

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 41357 FHAD CHANNEL GEOMETRY USED STA 201-248
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

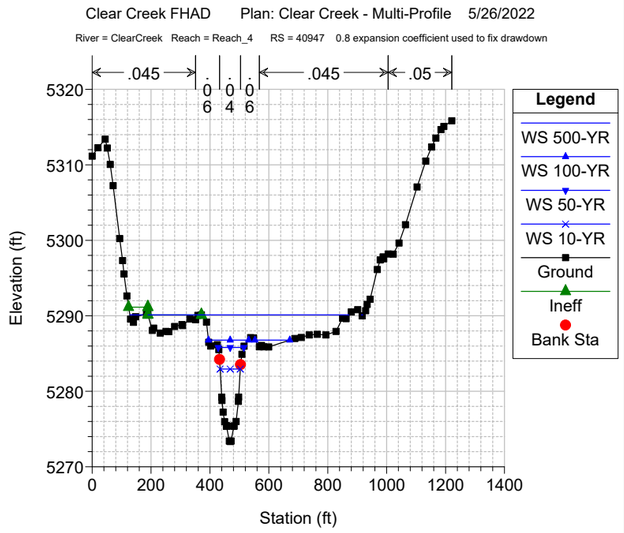

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 41314 BR Marshall St MARSHALL STREET
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

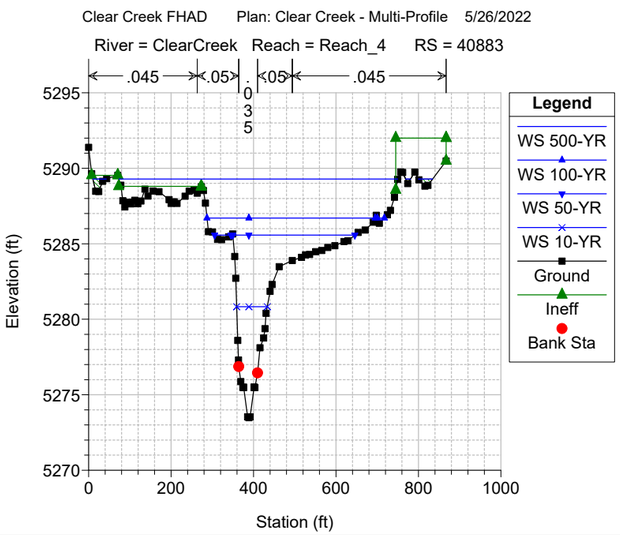

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 41314 BR Marshall St MARSHALL STREET
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

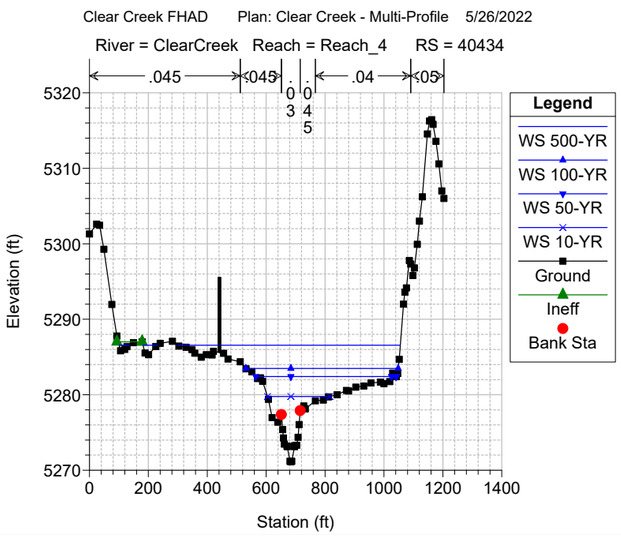

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 41282 FHAD CHANNEL GEOMETRY USED STA 283-325
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

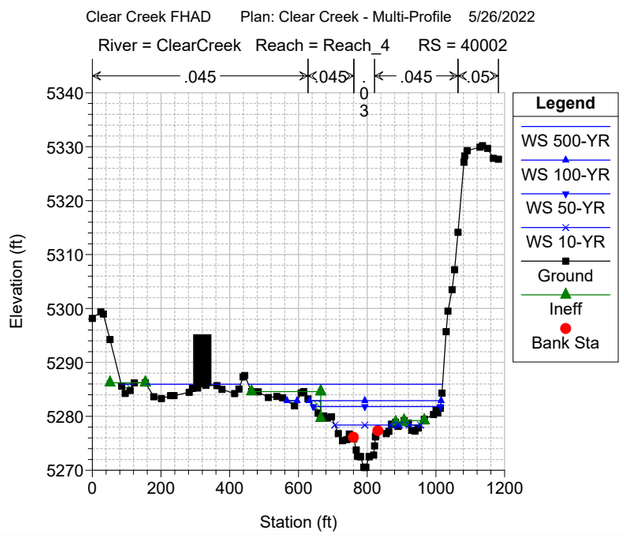

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 41139
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

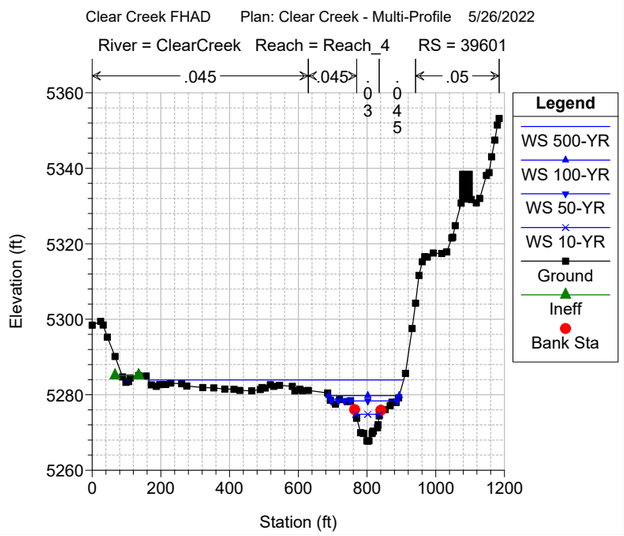

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 41025
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

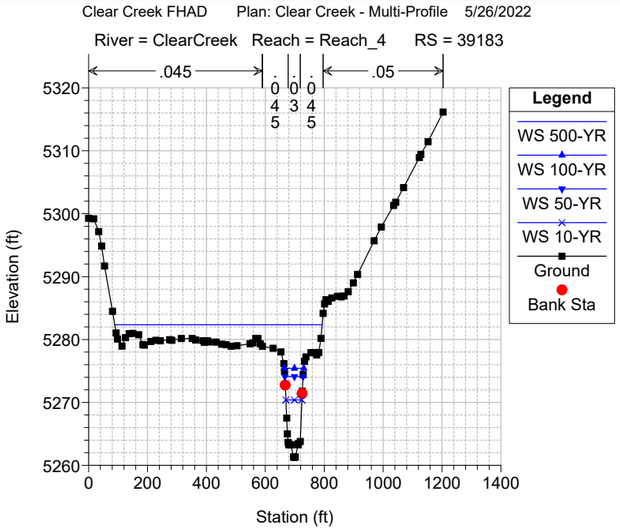

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 40947 0.8 expansion coefficient used to fix drawdown
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

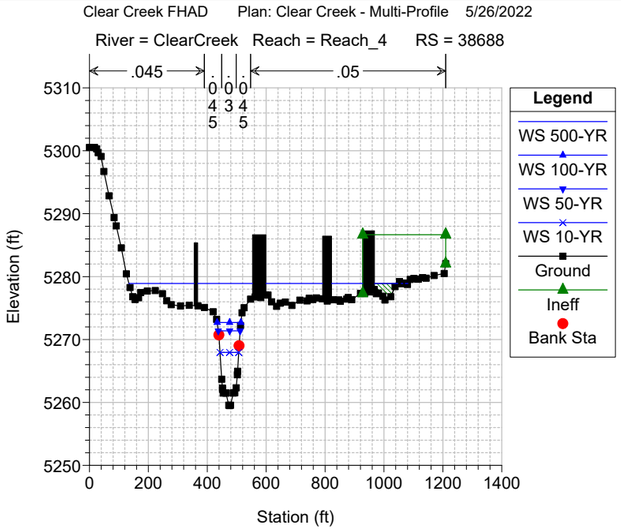

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 40883
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

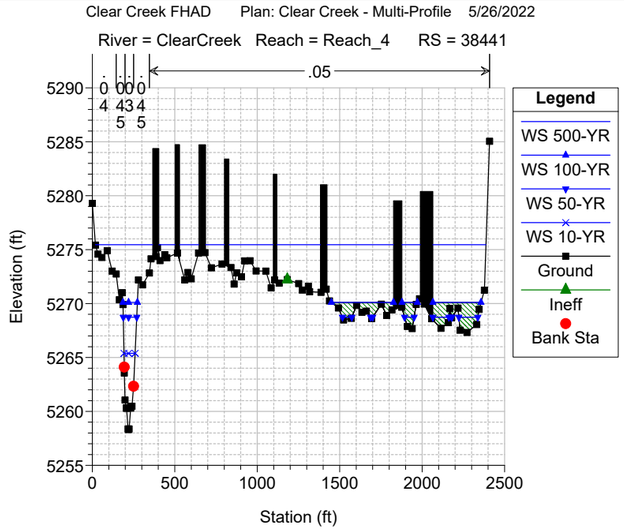

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 40434
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

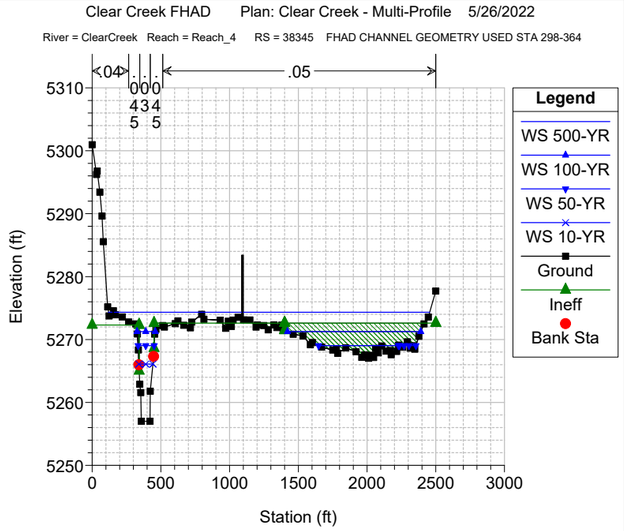

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 40002
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

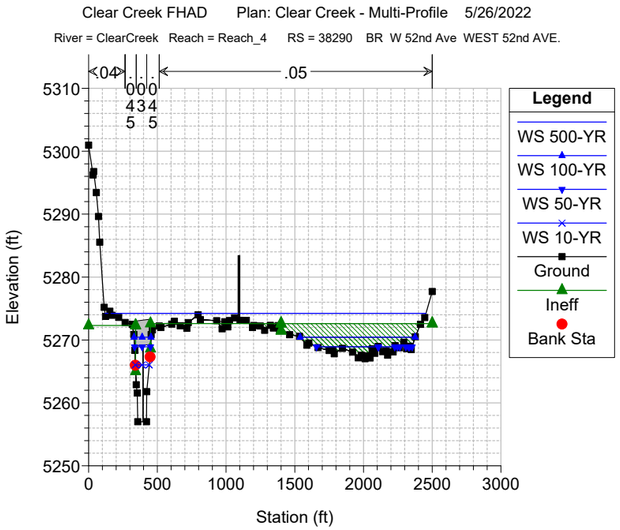

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 39601
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

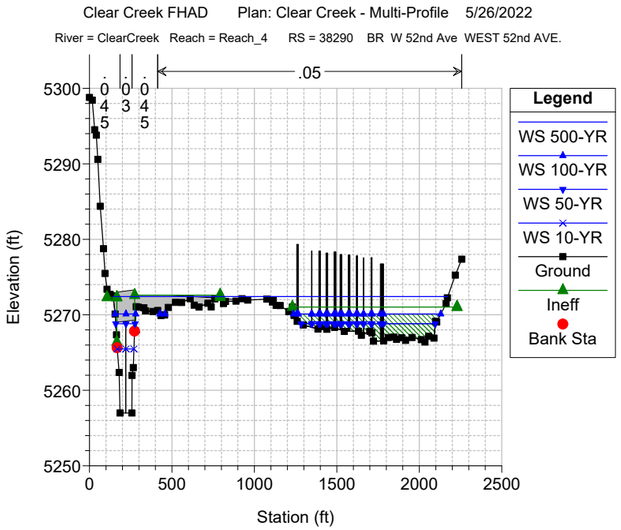

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 39183
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

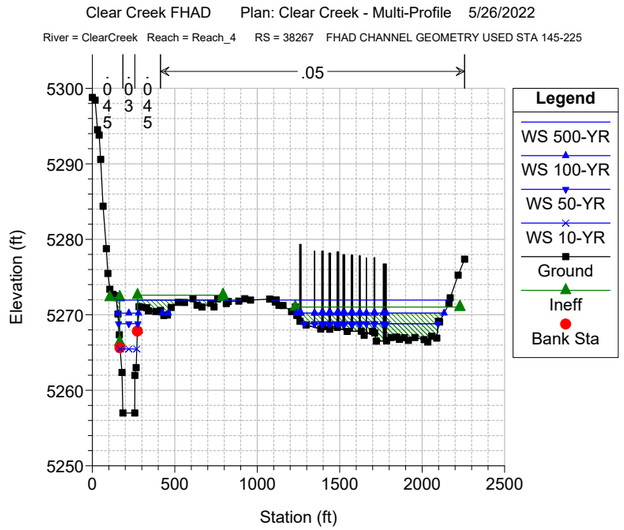

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 38688
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

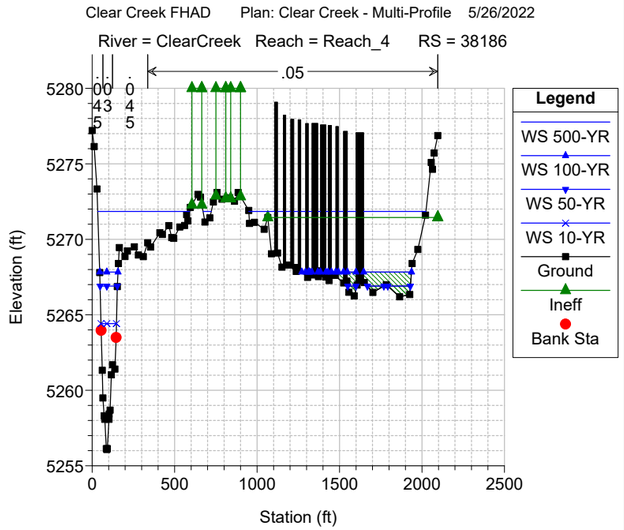

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 38441
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

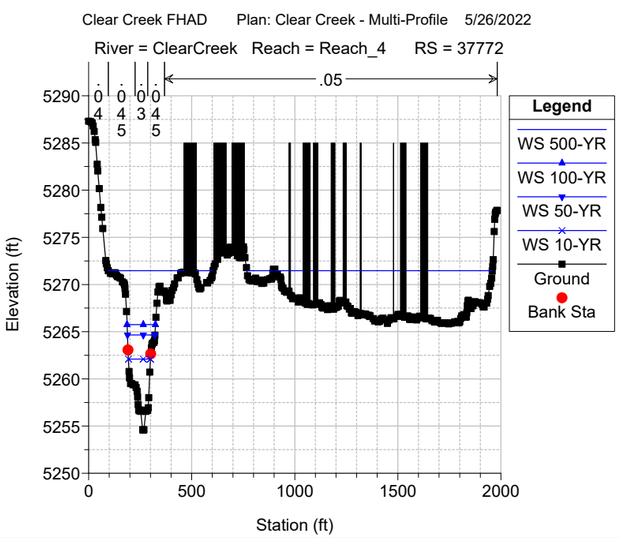

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 38345 FHAD CHANNEL GEOMETRY USED STA 298-364
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

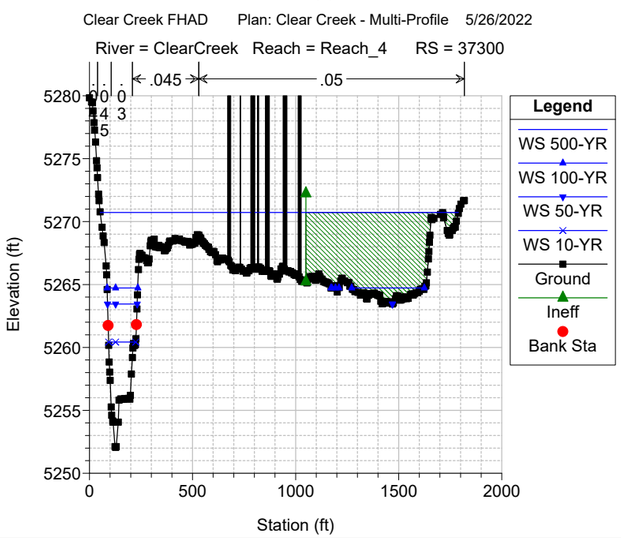

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 38290 BR W 52nd Ave WEST 52nd AVE.
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

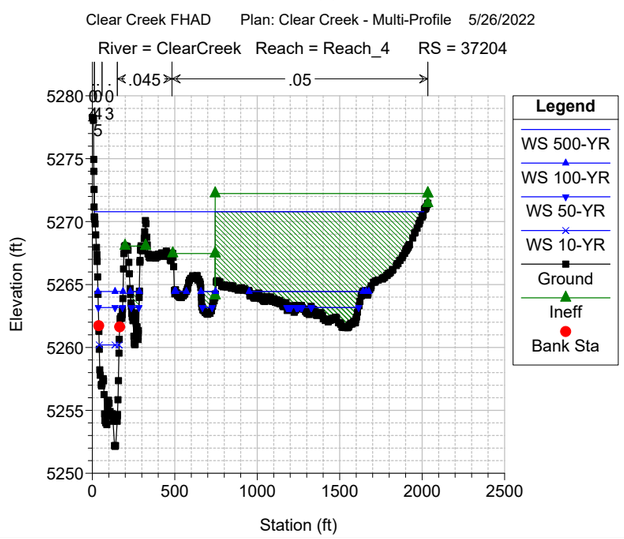

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 38290 BR W 52nd Ave WEST 52nd AVE.
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

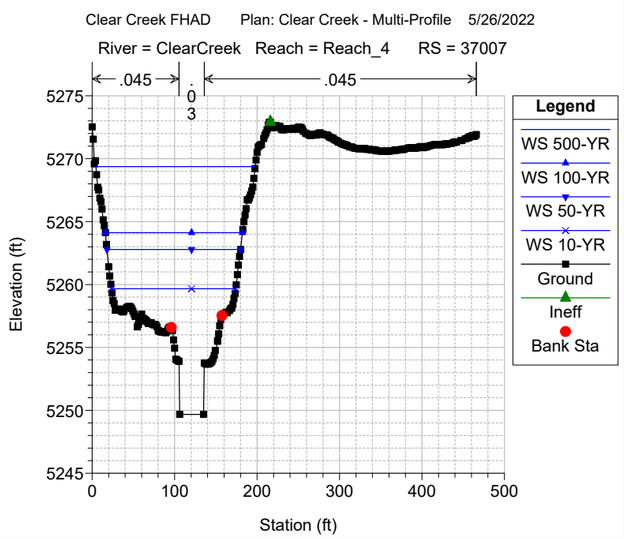

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 38267 FHAD CHANNEL GEOMETRY USED STA 145-225
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 38186
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 37772
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

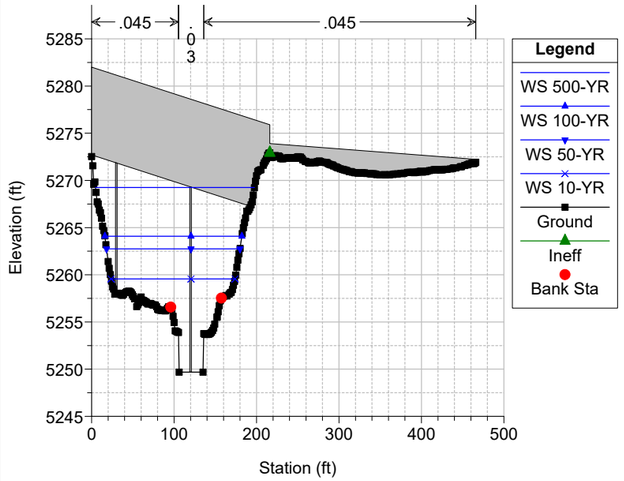

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 37300
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 37204
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 37007
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

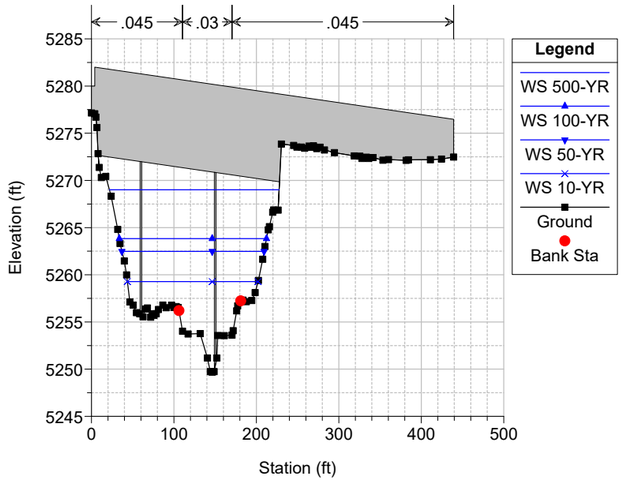
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36929 BR I-76 EB I-76 EASTBOUND; BRIDGE DECK ADJUSTED MANUALLY TO ACCOUNT FOR SKE



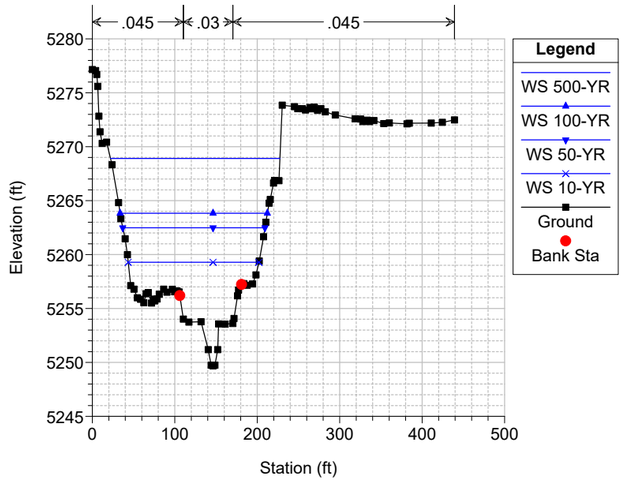
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36929 BR I-76 EB I-76 EASTBOUND; BRIDGE DECK ADJUSTED MANUALLY TO ACCOUNT FOR SKE



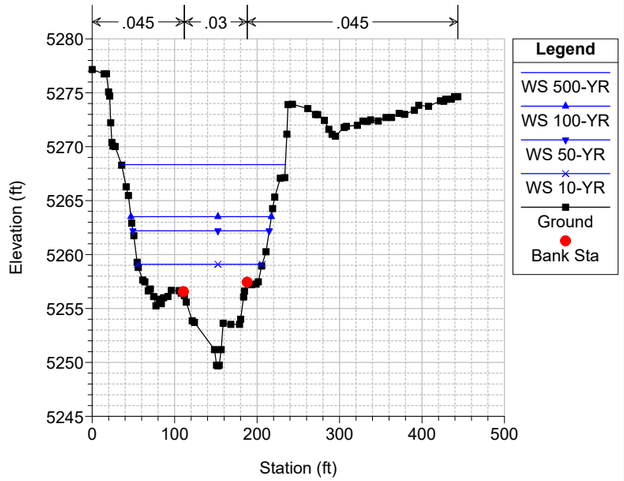
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36901 FHAD CHANNEL GEOMETRY USED STA 207-280



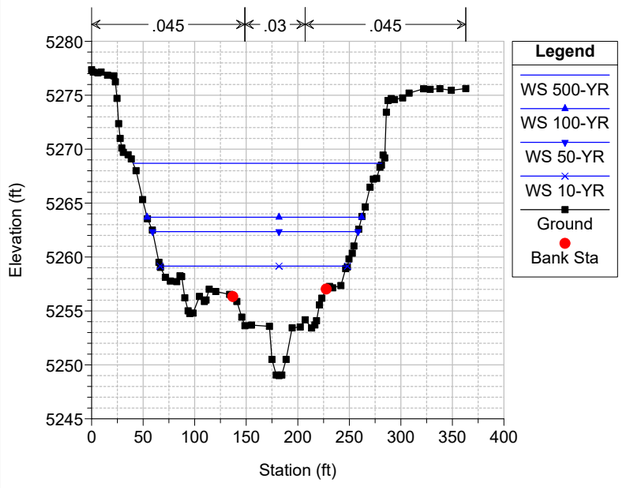
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36879 FHAD CHANNEL GEOMETRY USED STA 263-276



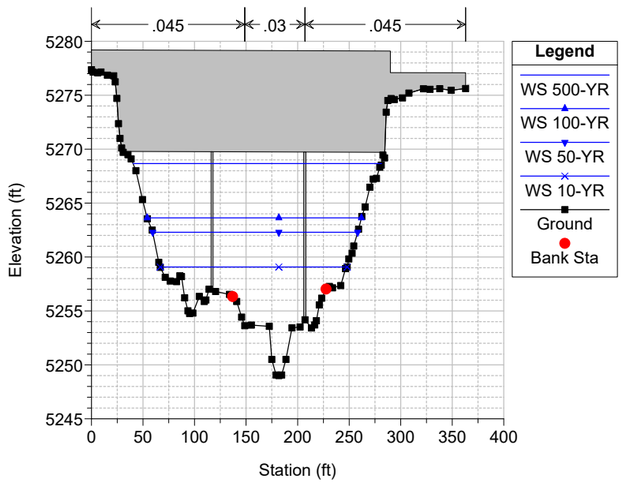
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36856 FHAD CHANNEL GEOMETRY USED STA 240-281



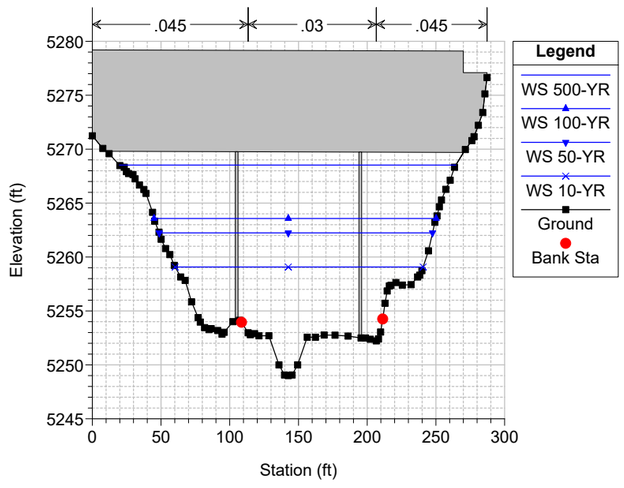
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36763 BR I-76 WB I-76 WESTBOUND; BRIDGE DECK MANUALLY ADJUSTED TO ACCOUNT FOR SKE



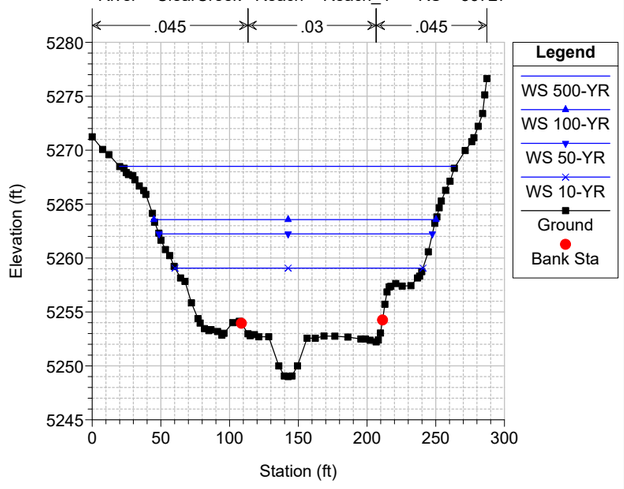
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36763 BR I-76 WB I-76 WESTBOUND; BRIDGE DECK MANUALLY ADJUSTED TO ACCOUNT FOR SKE



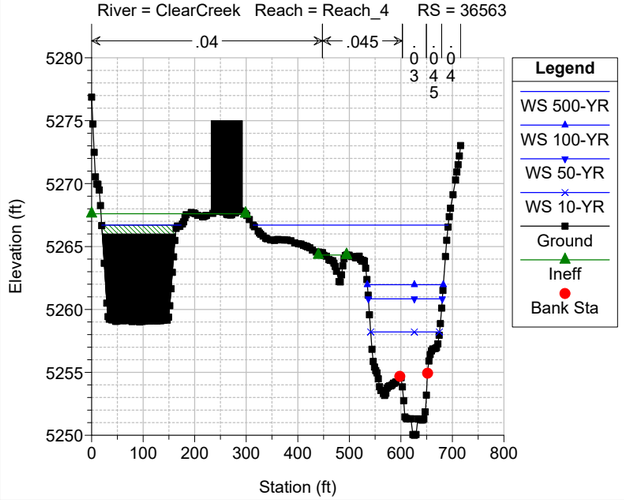
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36727



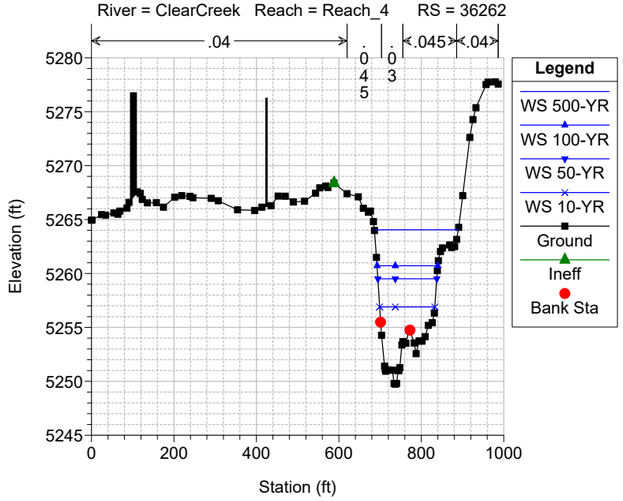
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36563



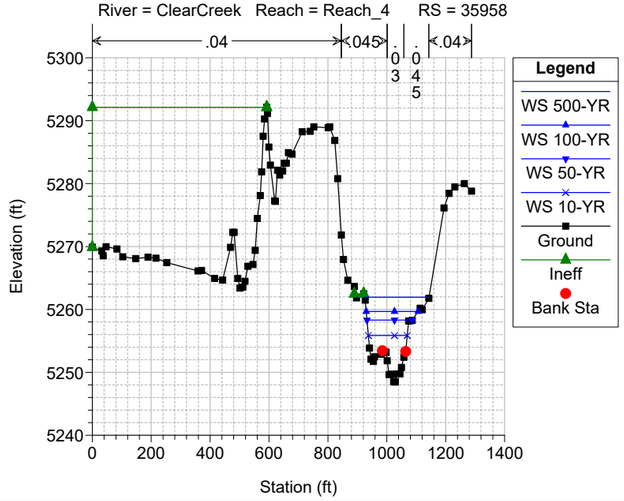
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36262



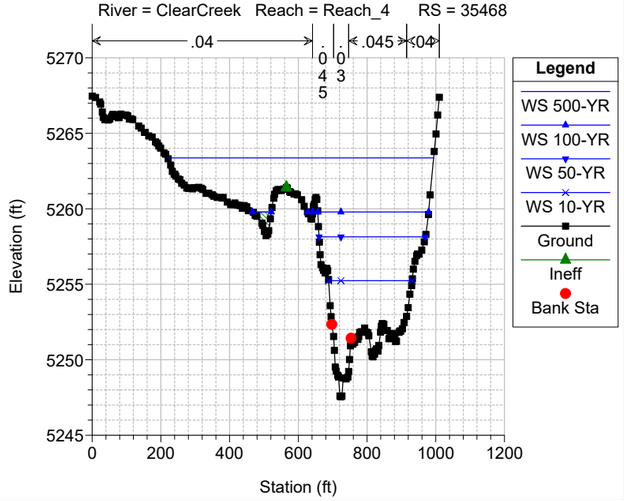
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 35958

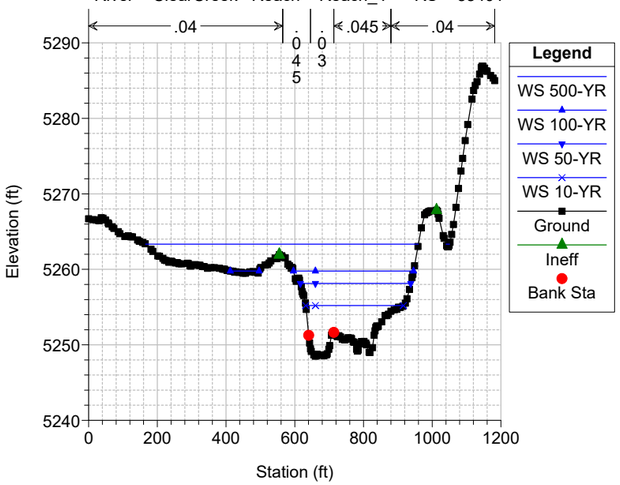


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

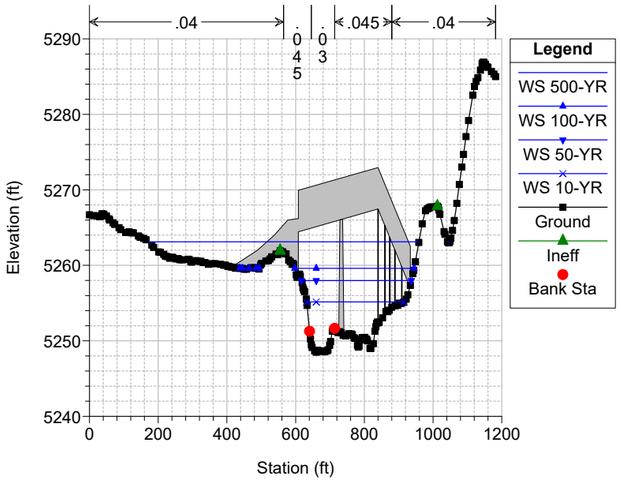
River = ClearCreek Reach = Reach_4 RS = 35468



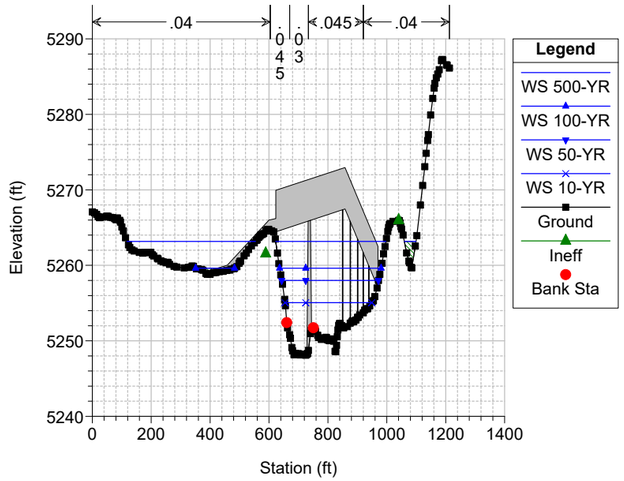
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 35401



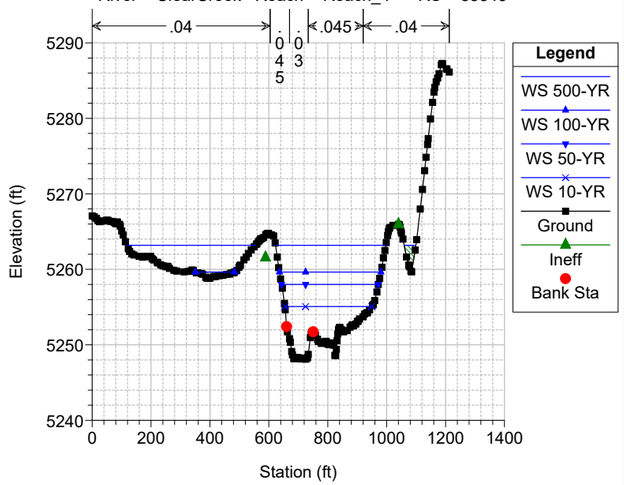
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 35382 BR Footbridge FOOTBRIDGE UPSTREAM OF SHERIDAN



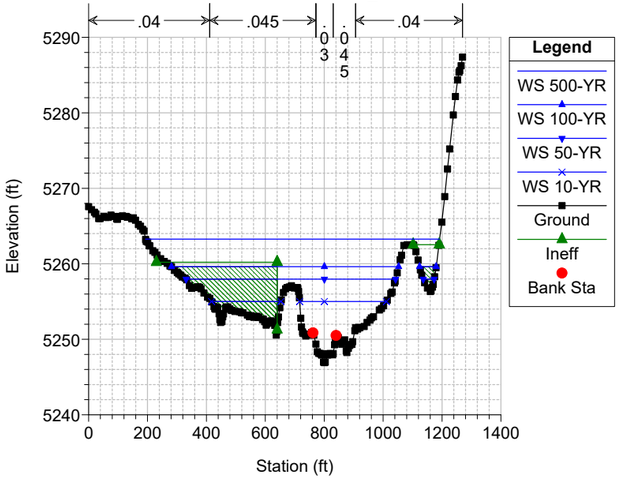
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 35382 BR Footbridge FOOTBRIDGE UPSTREAM OF SHERIDAN



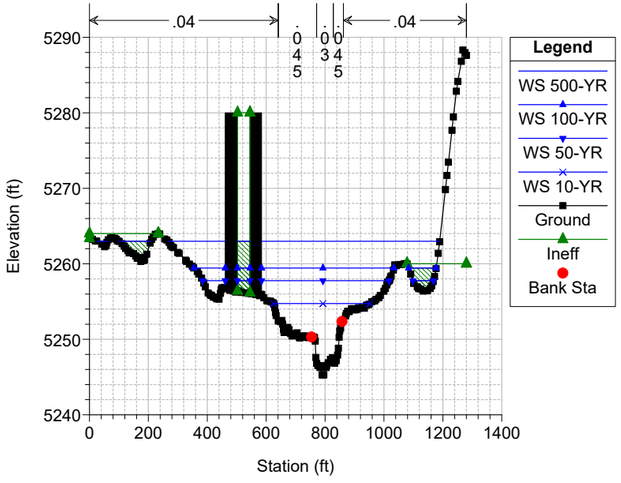
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 35343



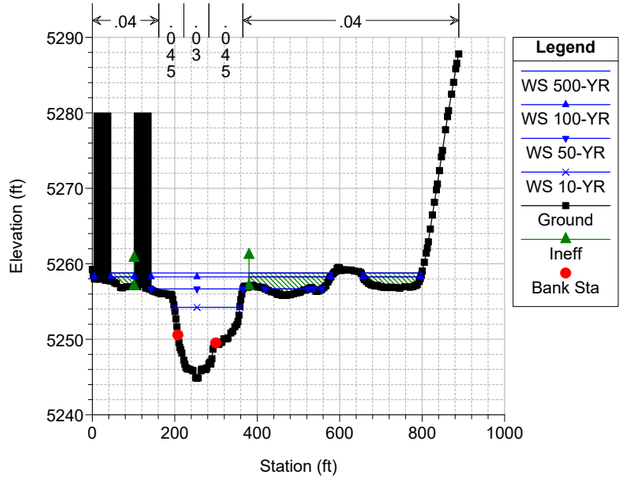
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 35231



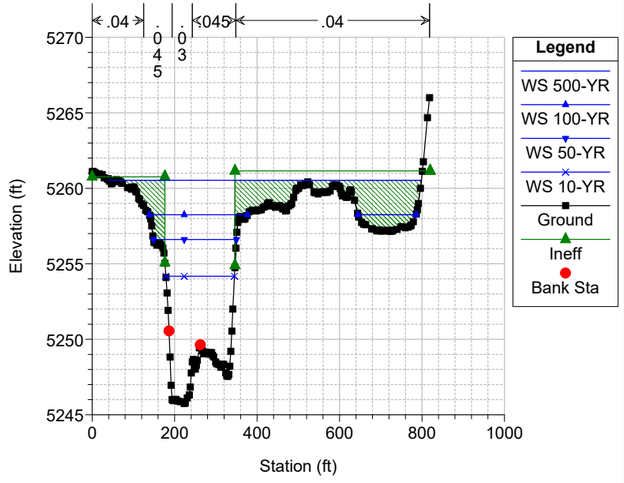
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 35018



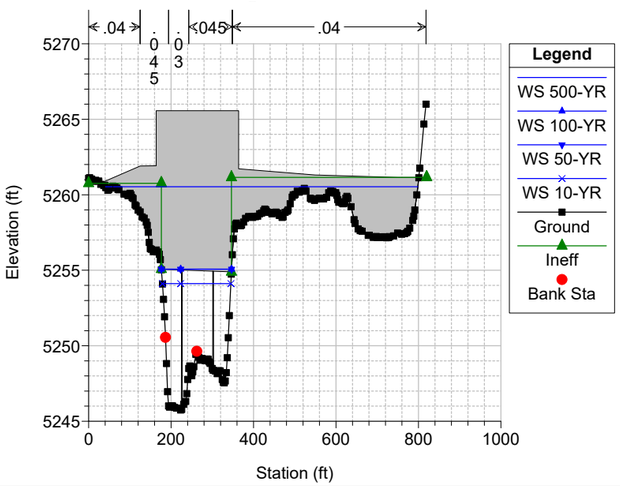
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 34757



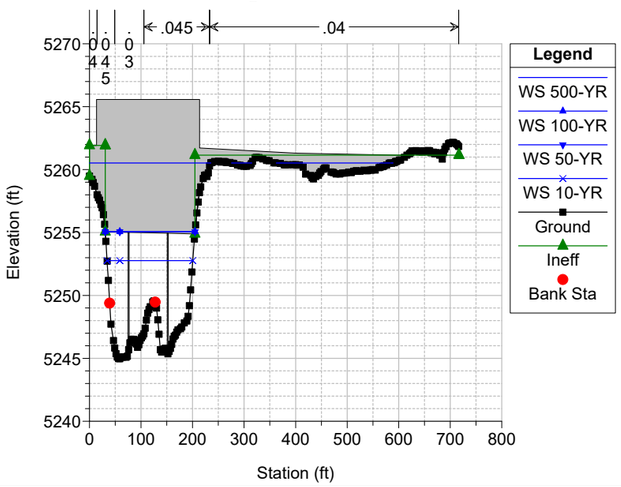
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 34653 U/S Sheridan Blvd.



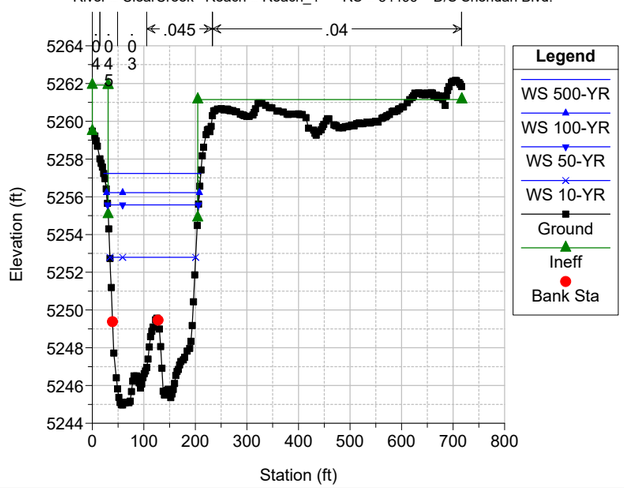
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 34574 BR Sheridan Blvd SHERIDAN BLVD.



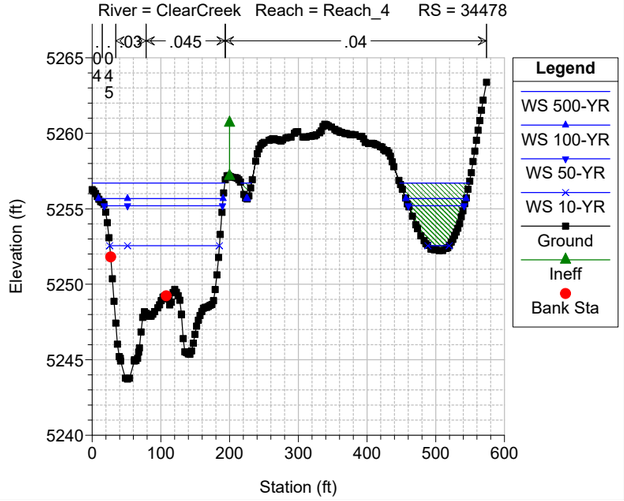
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 34574 BR Sheridan Blvd SHERIDAN BLVD.

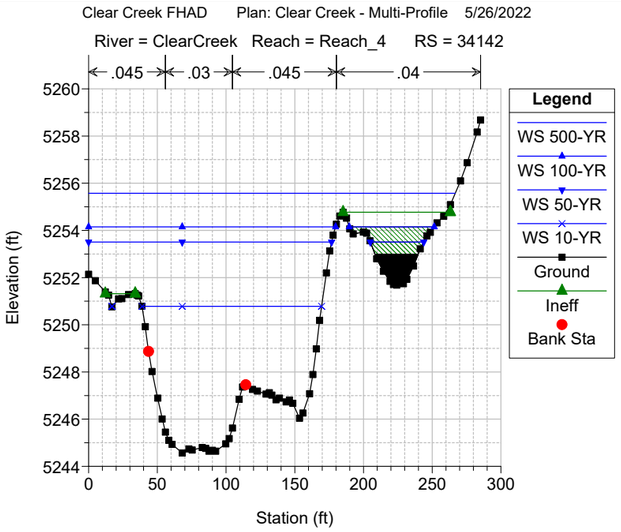


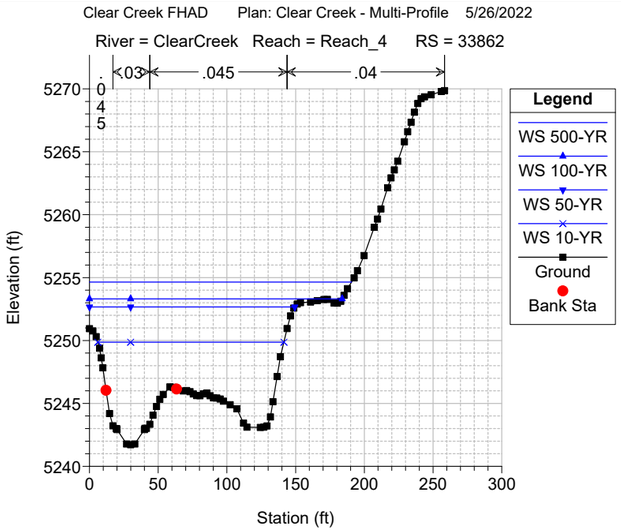
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 34496 D/S Sheridan Blvd.

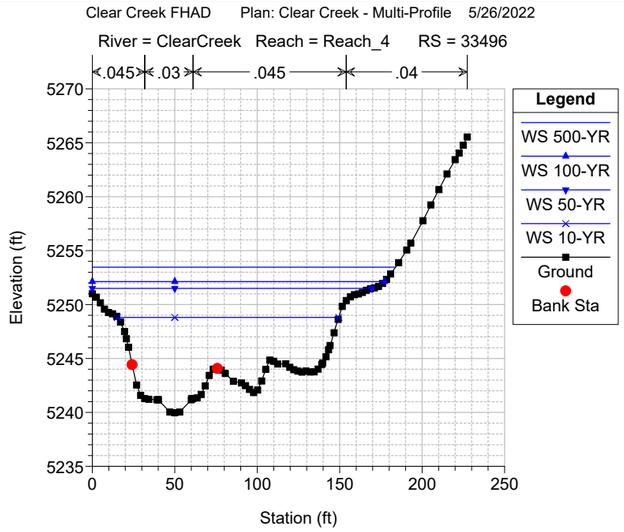


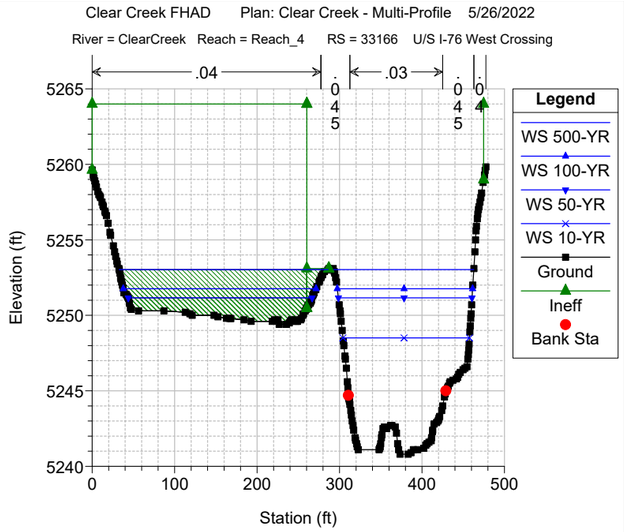
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 34478

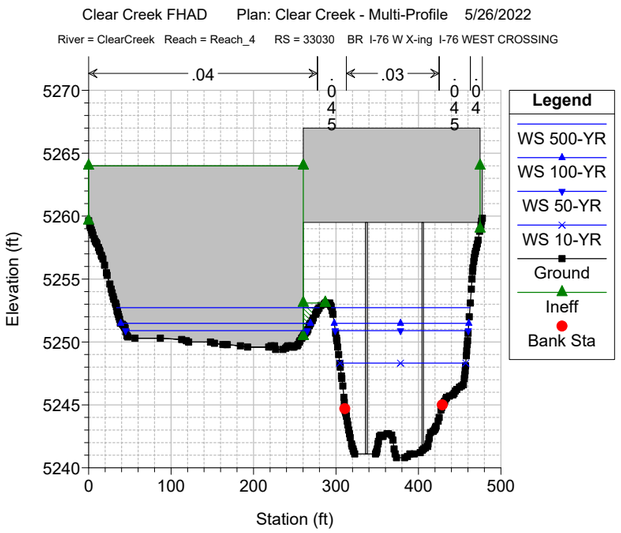


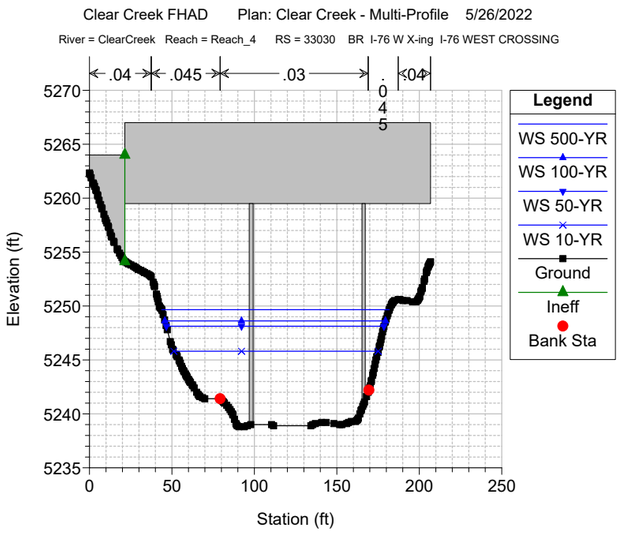

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 34142
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

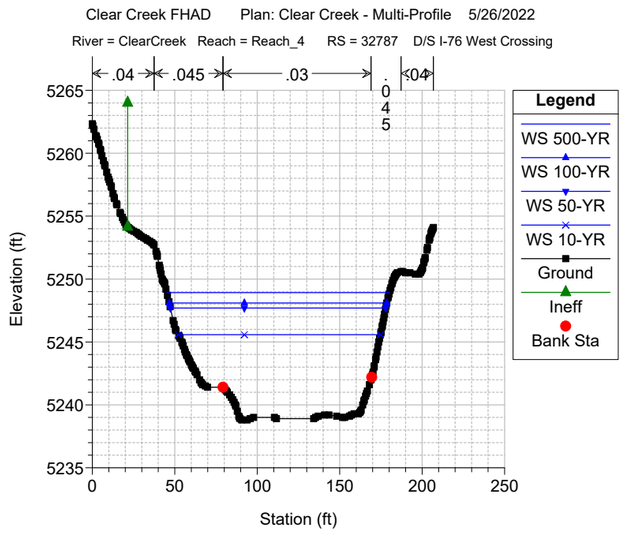

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 33862
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

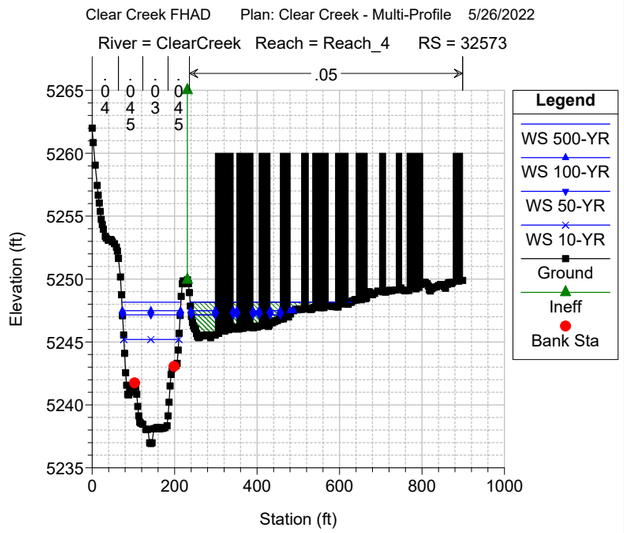

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 33496
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

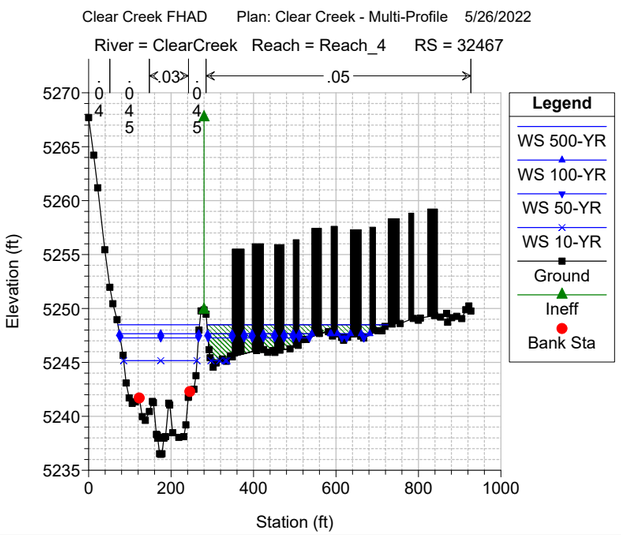

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 33166 U/S I-76 West Crossing
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

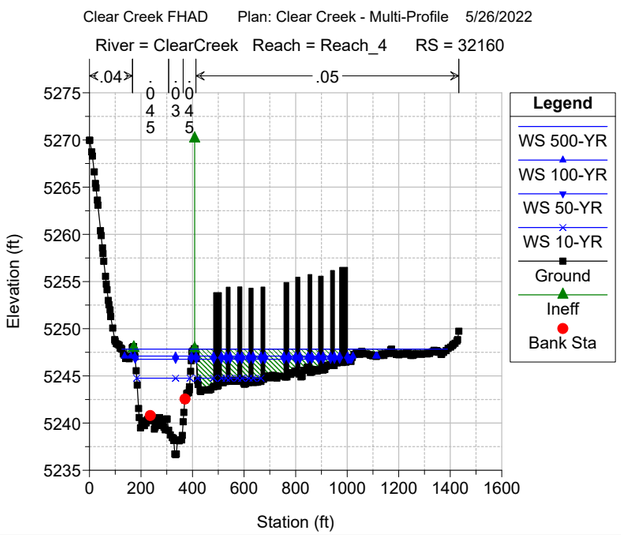

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 33030 BR I-76 W X-ing I-76 WEST CROSSING
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

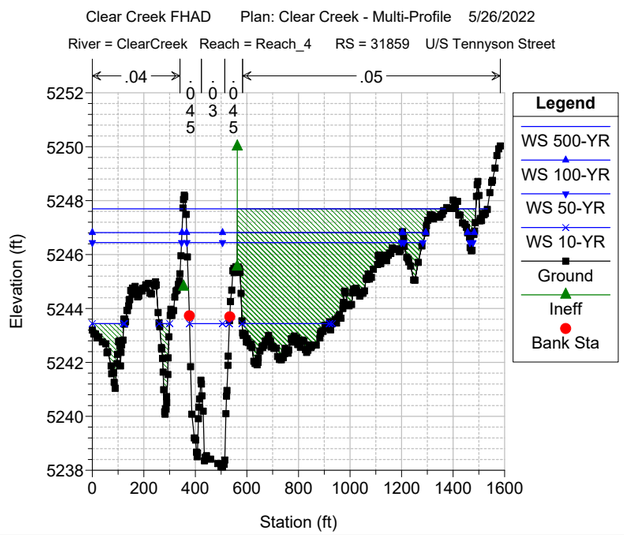

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 33030 BR I-76 W X-ing I-76 WEST CROSSING
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

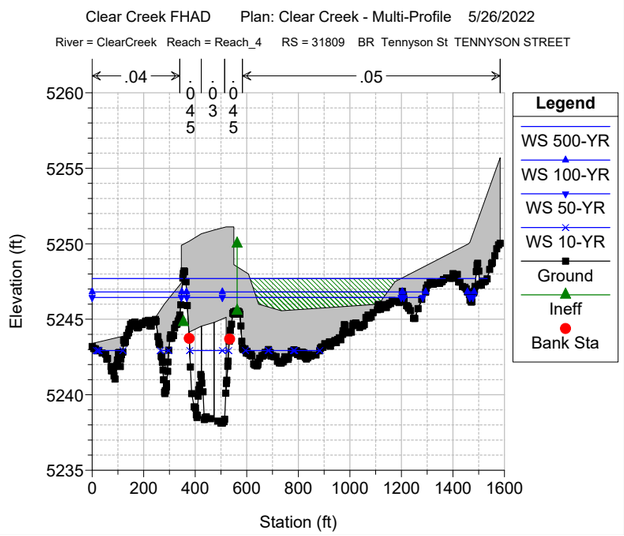

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 32787 D/S I-76 West Crossing
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

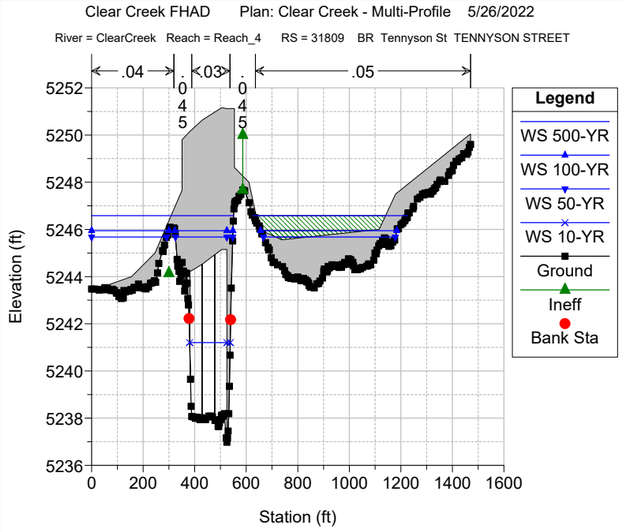

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 32573
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

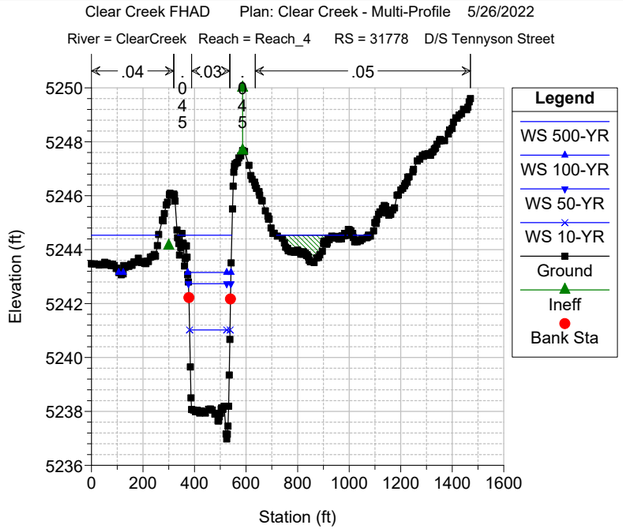

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 32467
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

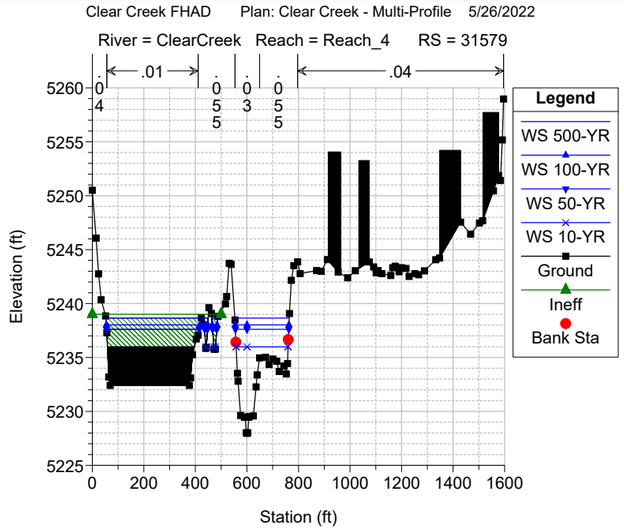

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 32160
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

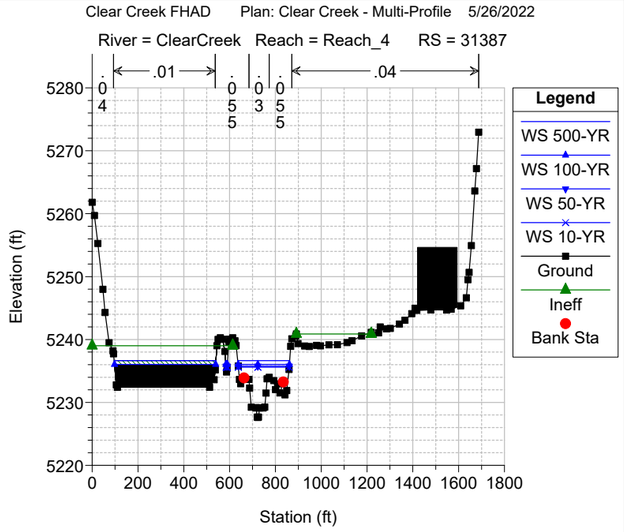

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 31859 U/S Tennyson Street
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

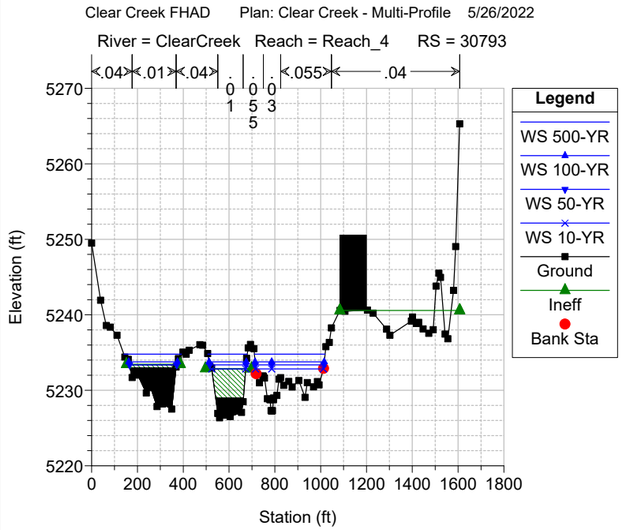

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 31809 BR Tennyson St TENNYSON STREET
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

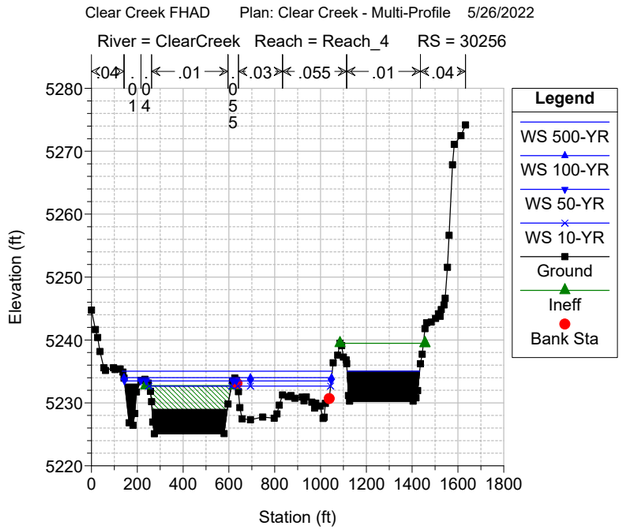

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 31809 BR Tennyson St TENNYSON STREET
.04 .03 .05
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

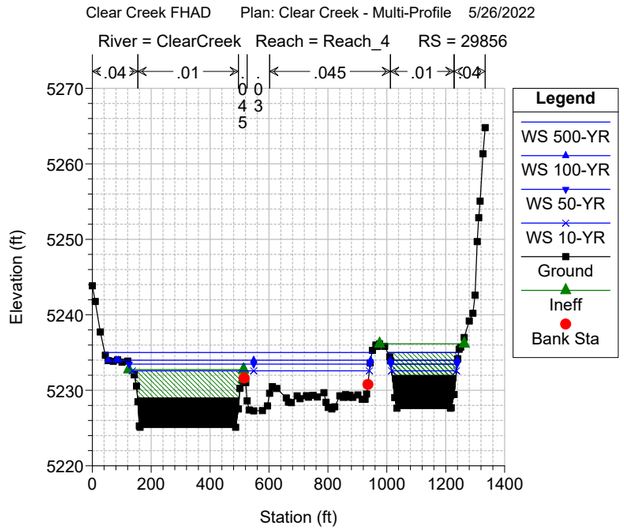

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 31778 D/S Tennyson Street
.04 .03 .05
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

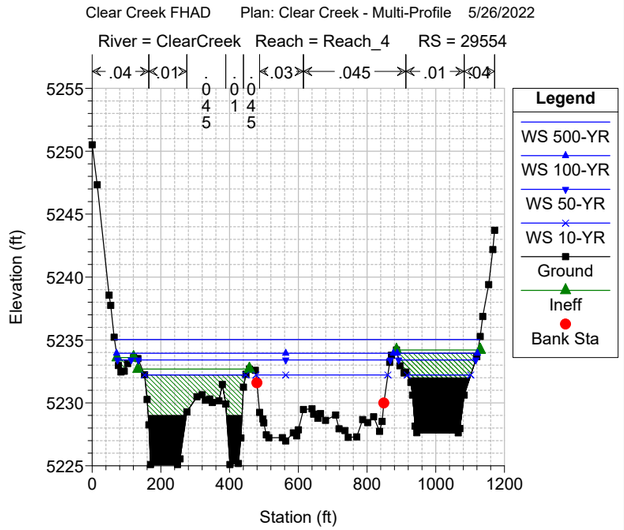

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 31579
.01 .04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

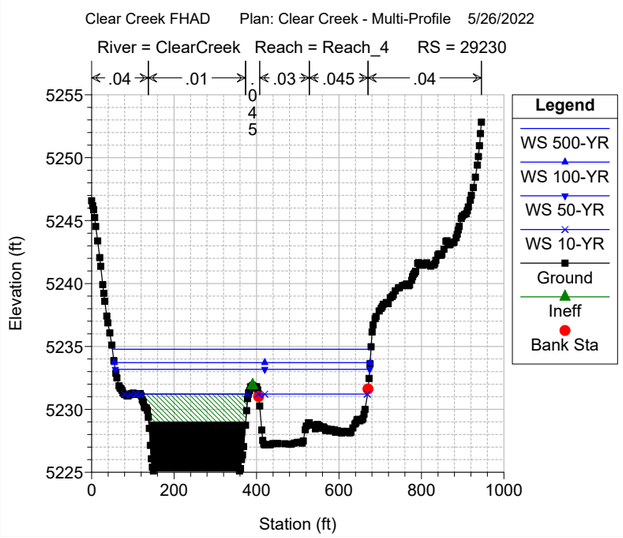

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 31387
.01 .04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

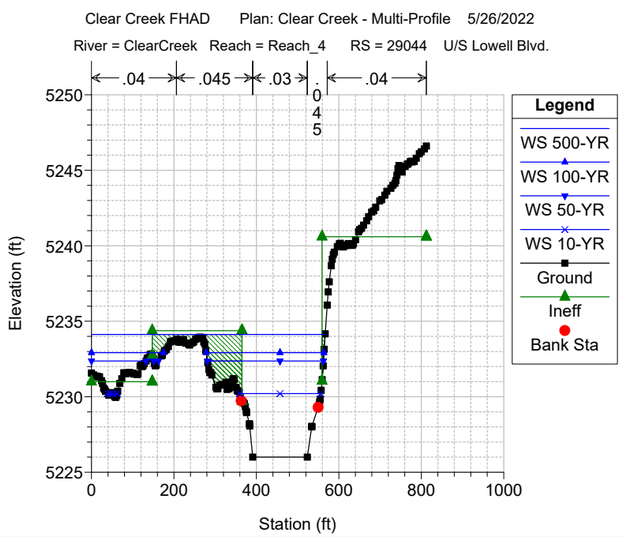

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 30793
.04 .01 .04 .055 .04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

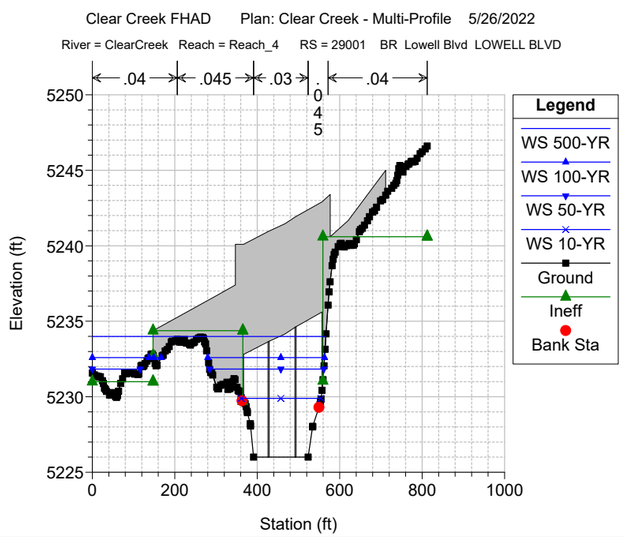

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 30256
.04 .01 .03 .055 .01 .04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

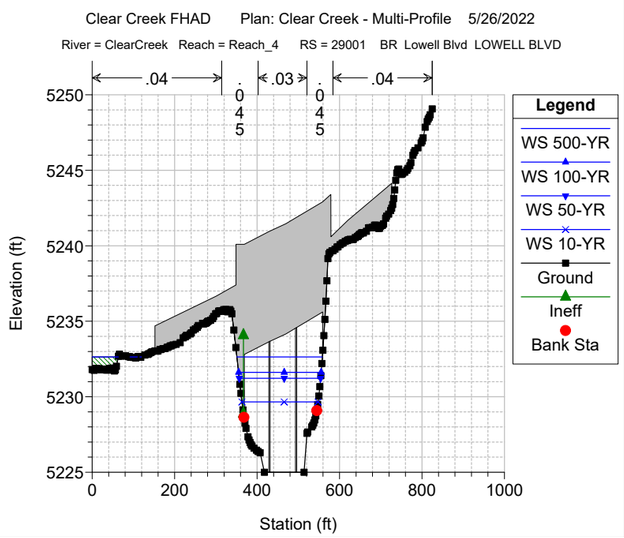

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 29856
.04 .01 .045 .01 .04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 29554
.04 .01 .03 .045 .01 .04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

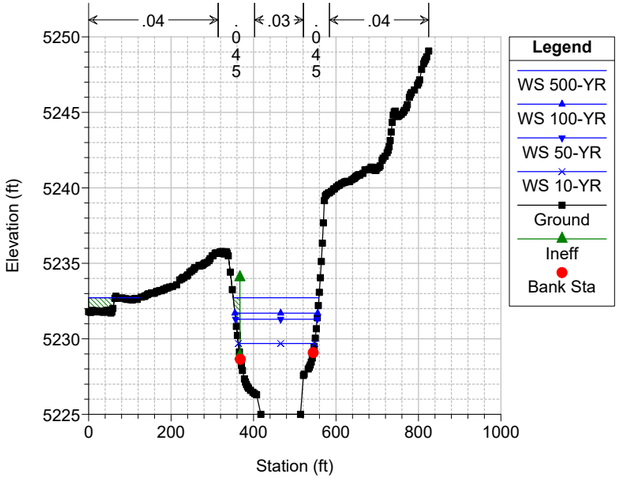

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 29230
.04 .01 .03 .045 .04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 29044 U/S Lowell Blvd.
.04 .045 .03 .04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

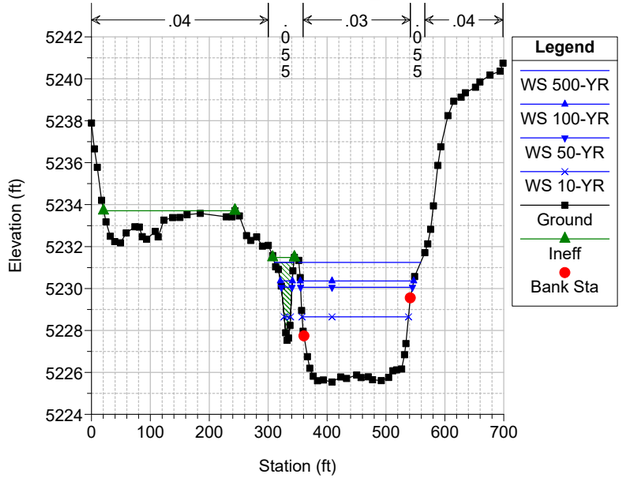

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 29001 BR Lowell Blvd LOWELL BLVD
.04 .045 .03 .04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 29001 BR Lowell Blvd LOWELL BLVD
.04 .03 .04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

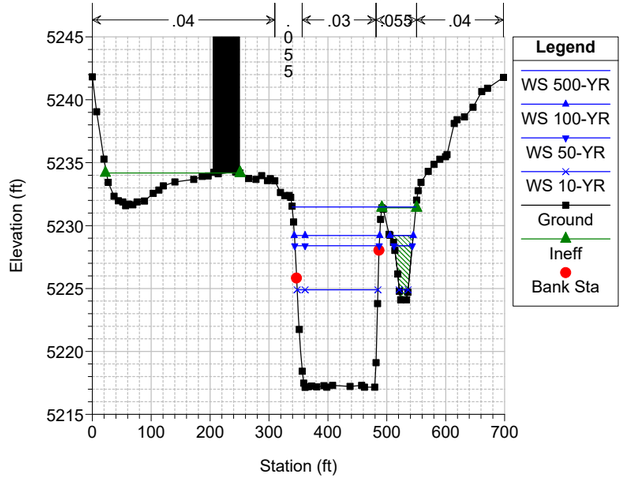
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 28974 D/S Lowell Blvd.



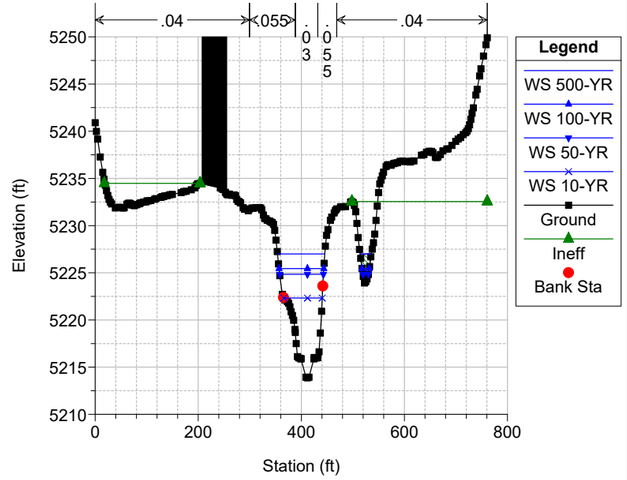
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 28927



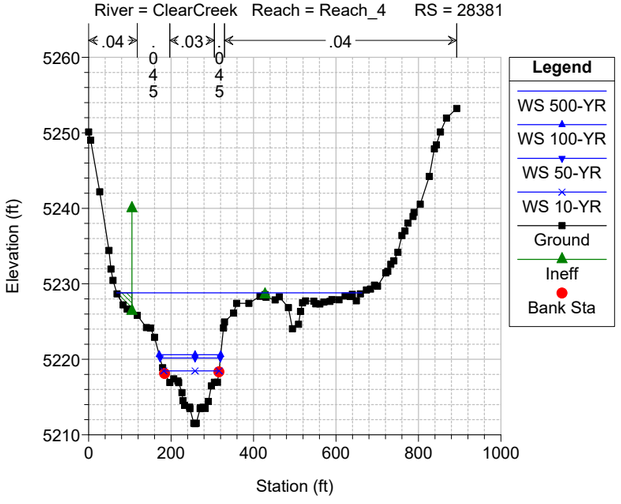
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 28893



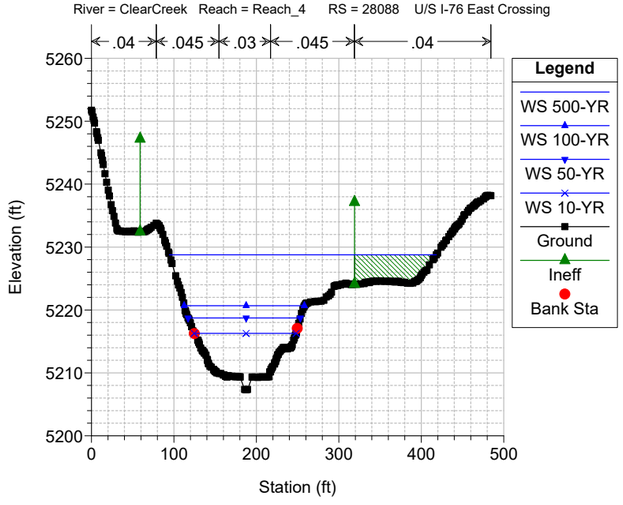
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 28754



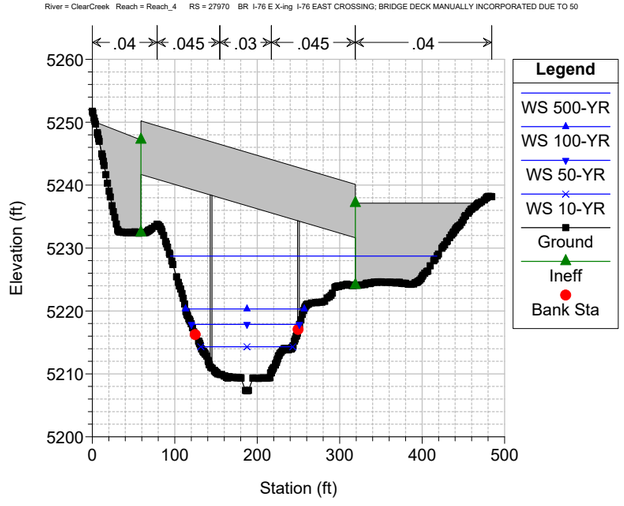
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 28381



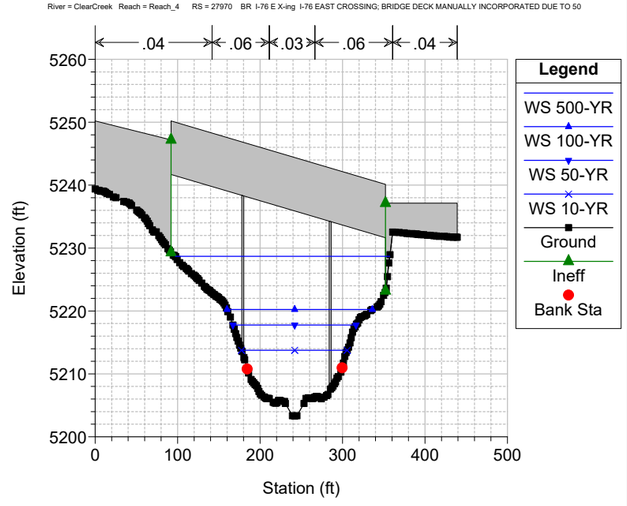
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 28088 U/S I-76 East Crossing



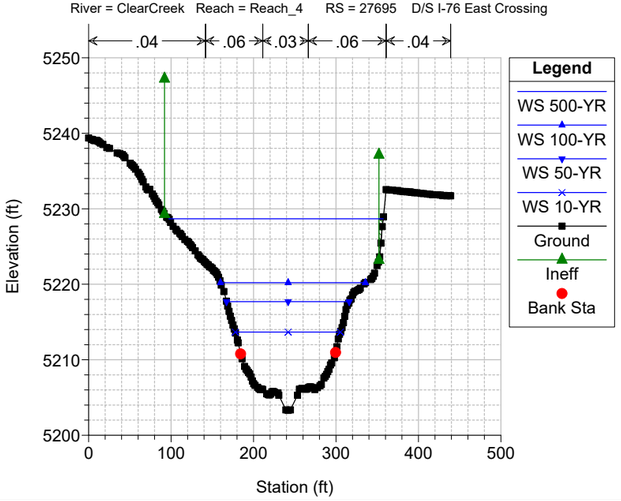
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27970 BR I-76 E X-ing I-76 EAST CROSSING; BRIDGE DECK MANUALLY INCORPORATED DUE TO 50



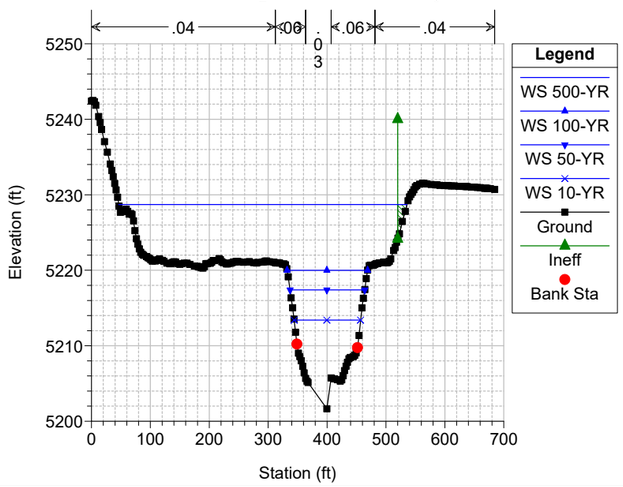
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27970 BR I-76 E X-ing I-76 EAST CROSSING; BRIDGE DECK MANUALLY INCORPORATED DUE TO 50



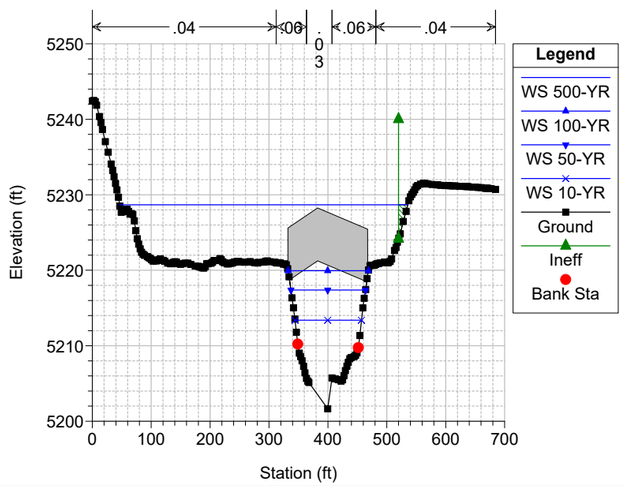
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27695 D/S I-76 East Crossing



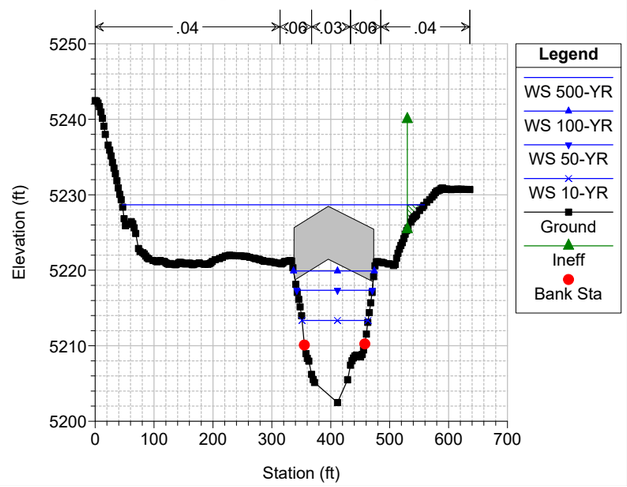
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27564 U/S Footbridge Downstream of I-76



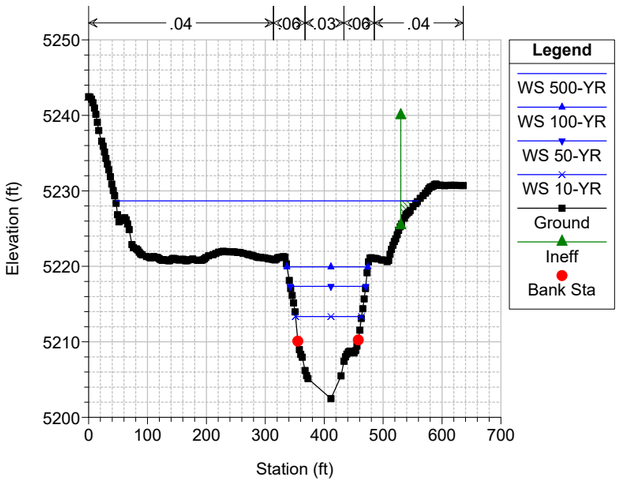
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27559 BR Footbridge FOOTBRIDGE DOWNSTREAM OF I-76



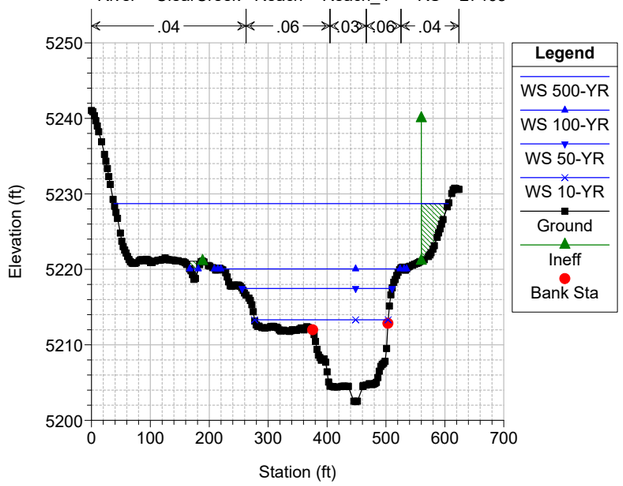
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27559 BR Footbridge FOOTBRIDGE DOWNSTREAM OF I-76



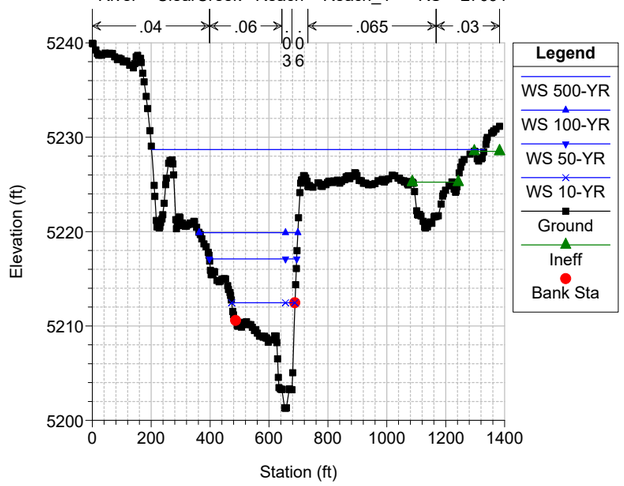
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27548 D/S Footbridge Downstream of I-76



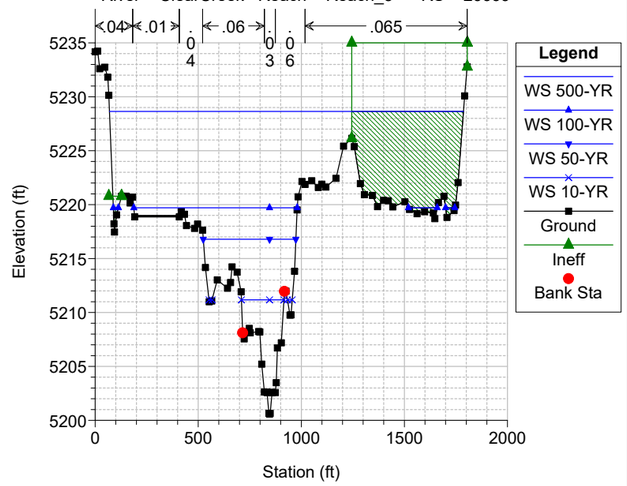
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27468



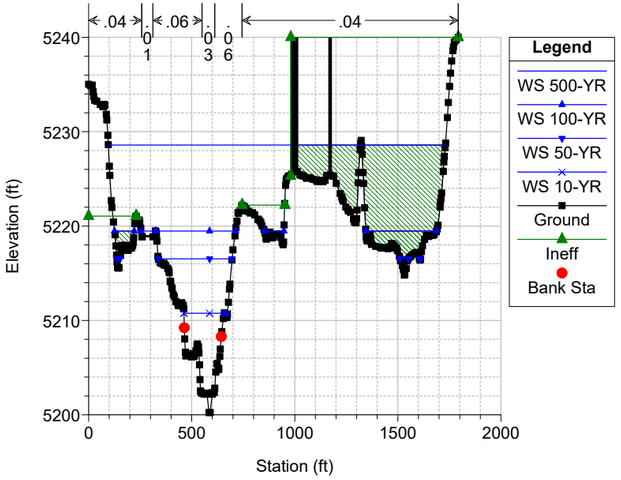
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27091



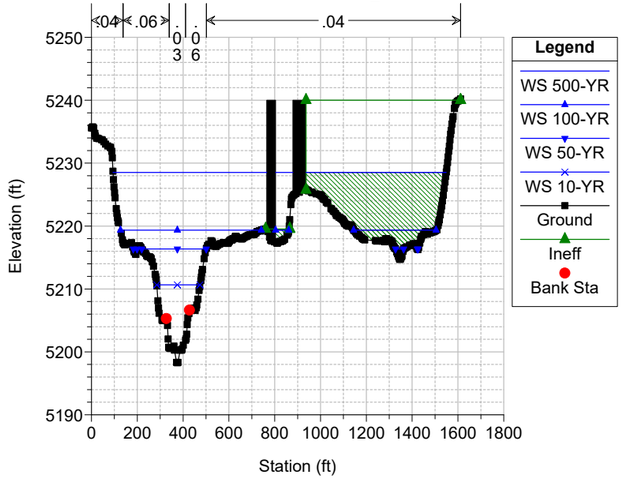
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_3 RS = 26669



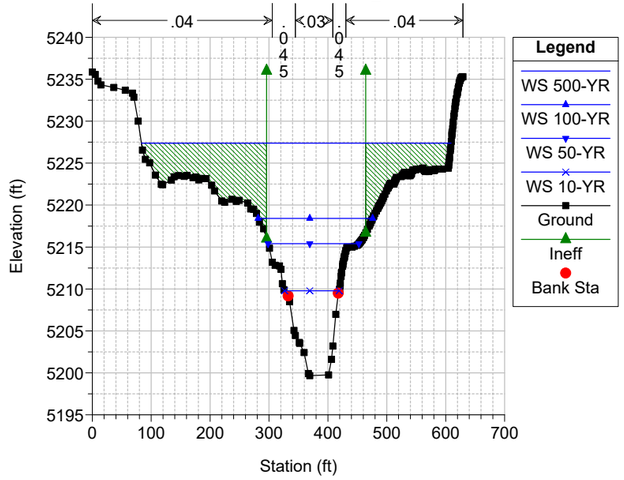
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_3 RS = 26340



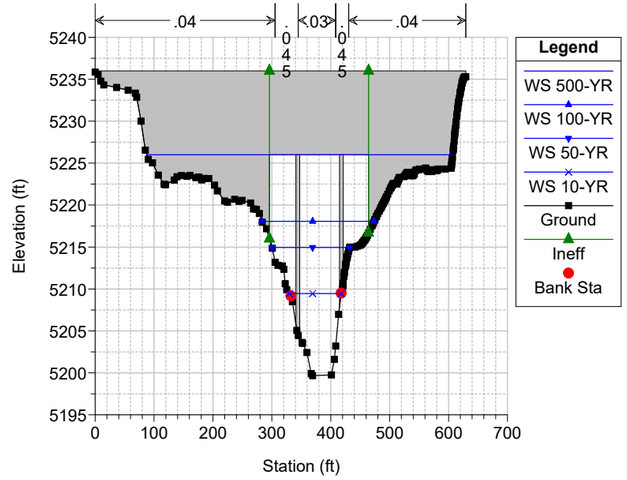
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_3 RS = 26179



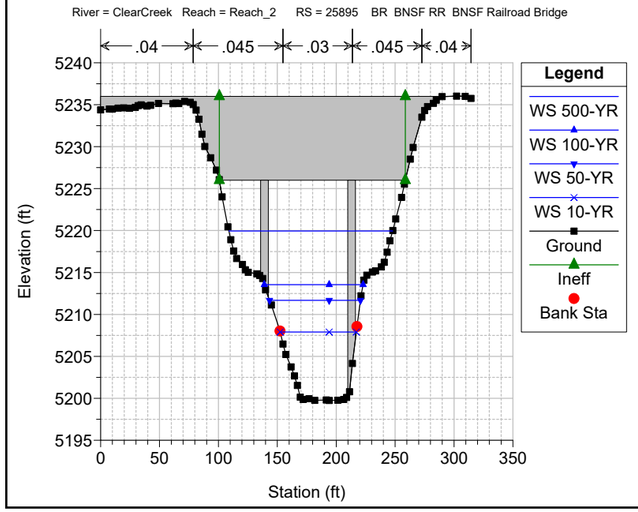
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_2 RS = 25937



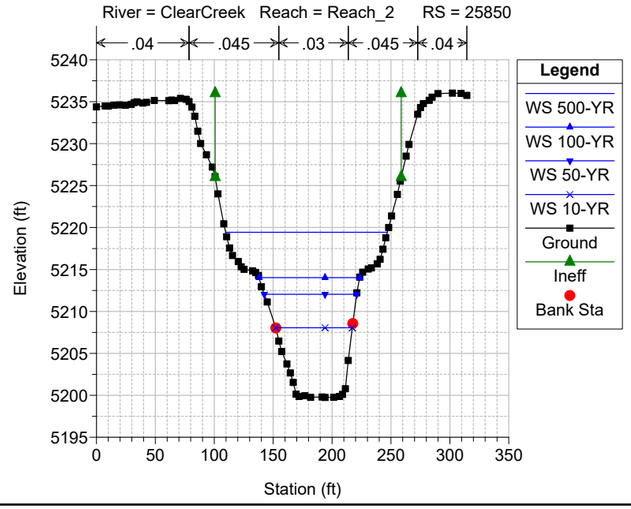
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_2 RS = 25895 BR BNSF RR BNSF Railroad Bridge



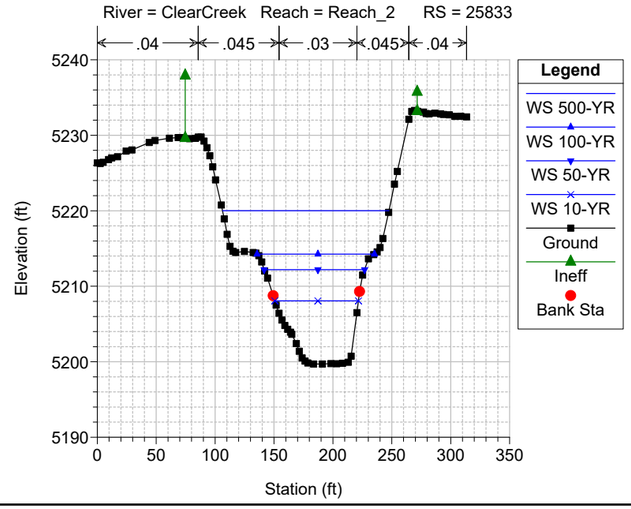
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_2 RS = 25895 BR BNSF RR BNSF Railroad Bridge



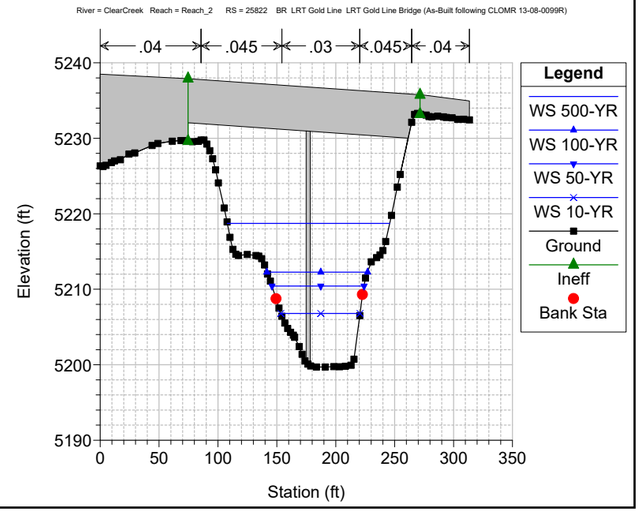
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_2 RS = 25850



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_2 RS = 25833

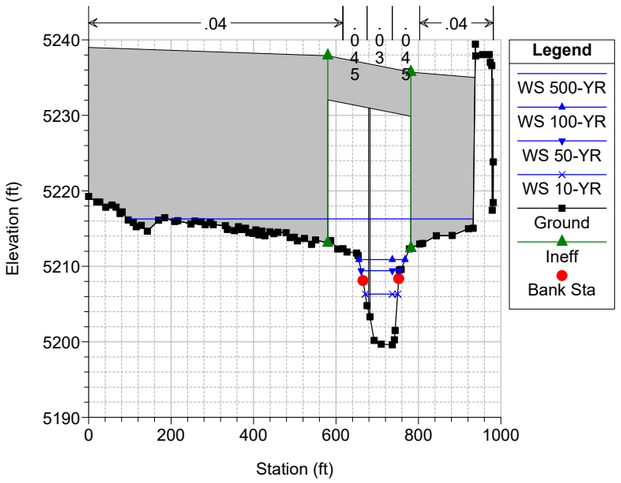


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_2 RS = 25822 BR LRT Gold Line LRT Gold Line Bridge (As-Built following CLOMR 13-08-0099R)



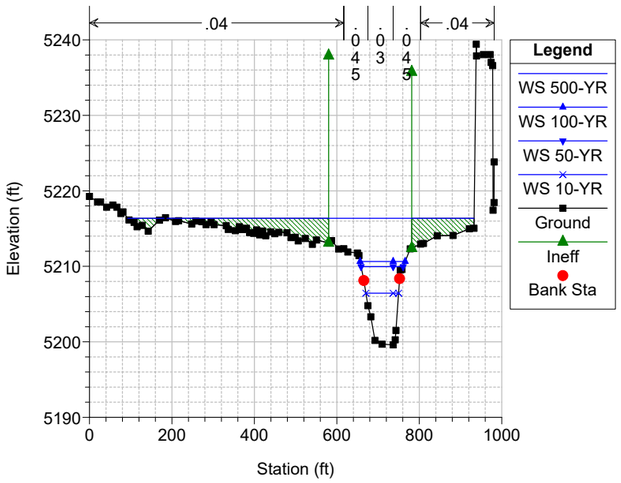
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25822 BR LRT Gold Line LRT Gold Line Bridge (As-Built following CLOMR 13-08-0099R)



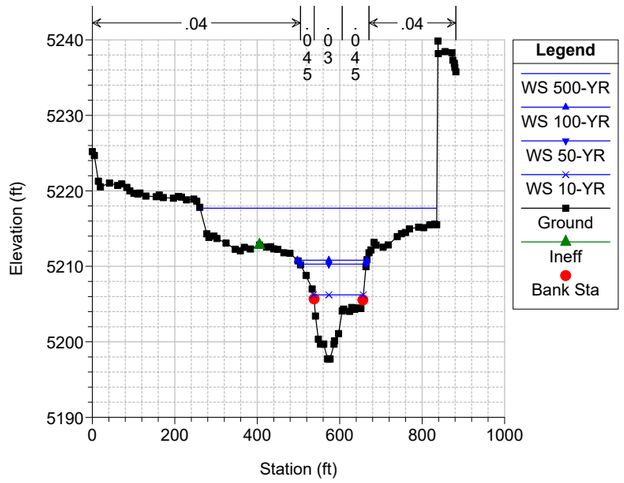
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25780 ROB Geom. data from RTD Gold Line LOMR 16-08-1204P



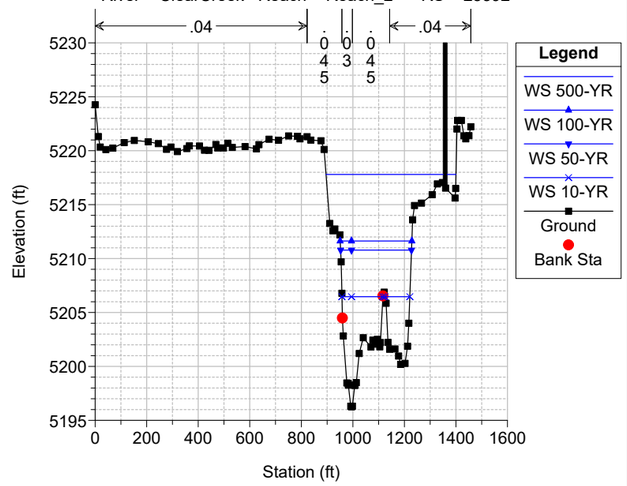
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25690 ROB Geom. data from RTD Gold Line LOMR 16-08-1204P



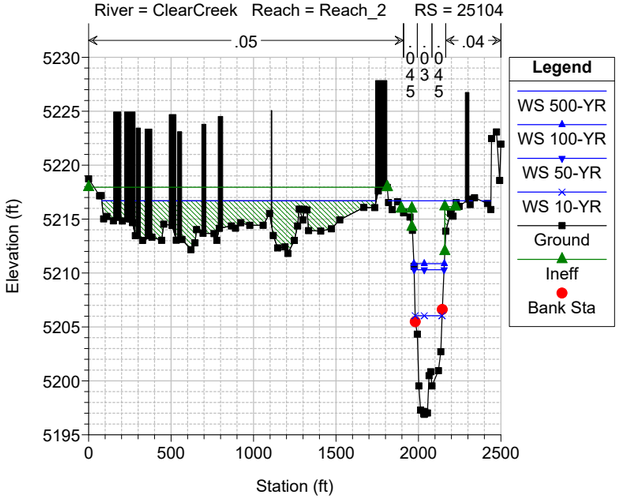
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25392



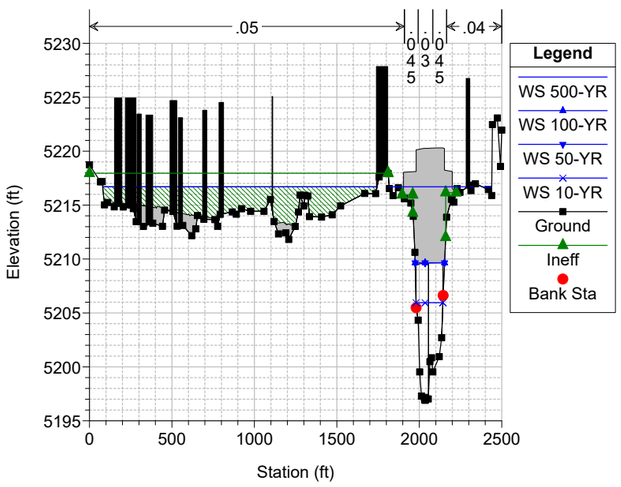
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25104



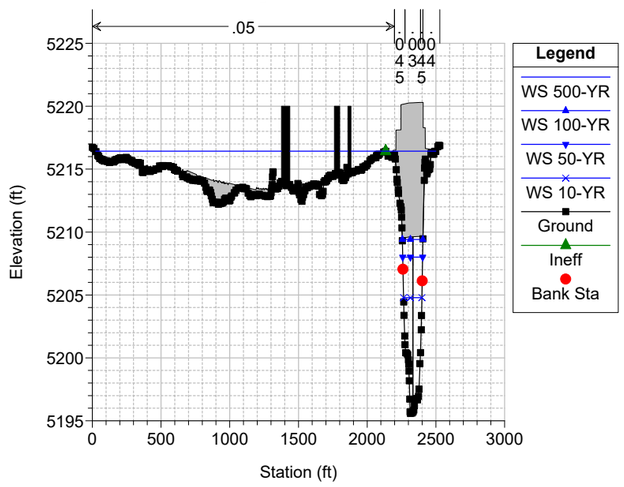
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25035 BR Federal Blvd FEDERAL BLVD



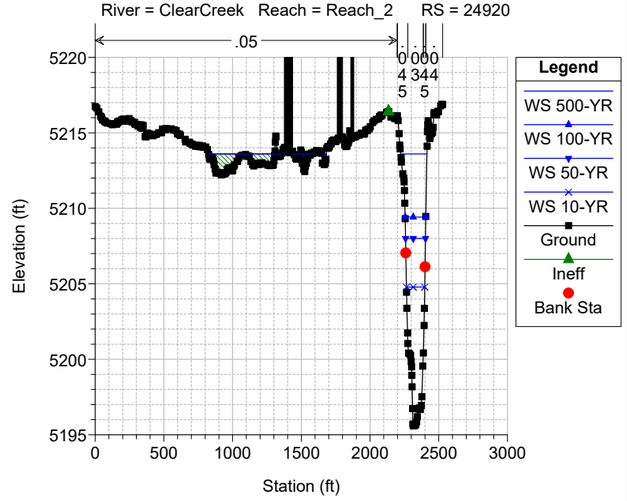
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25035 BR Federal Blvd FEDERAL BLVD



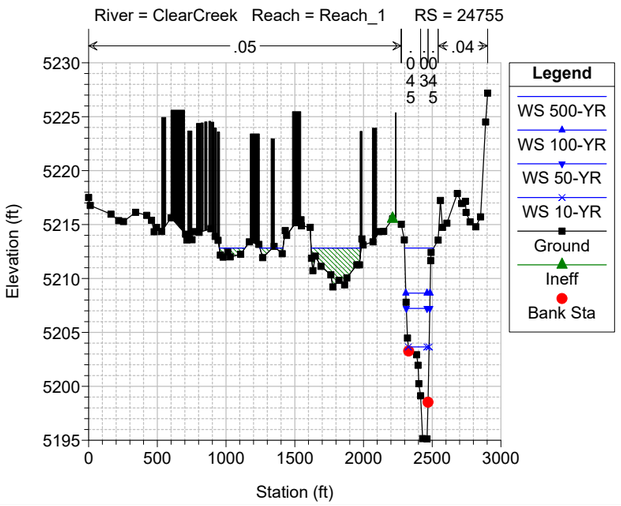
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 24920



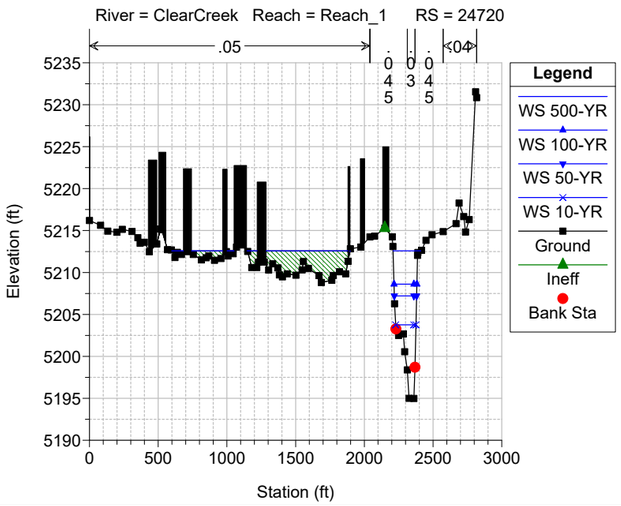
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 24755



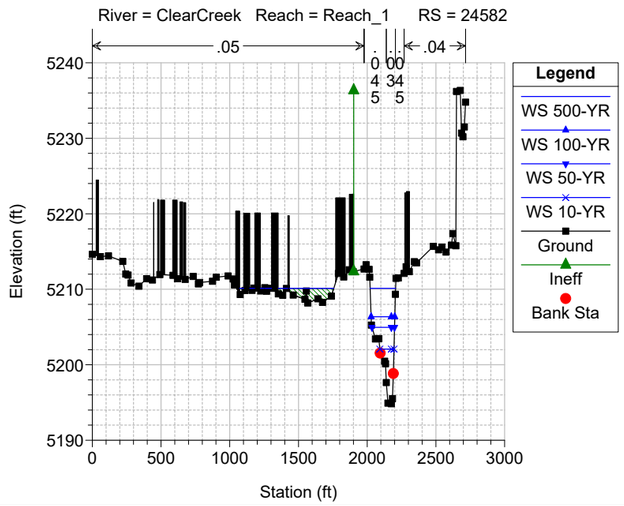
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 24720



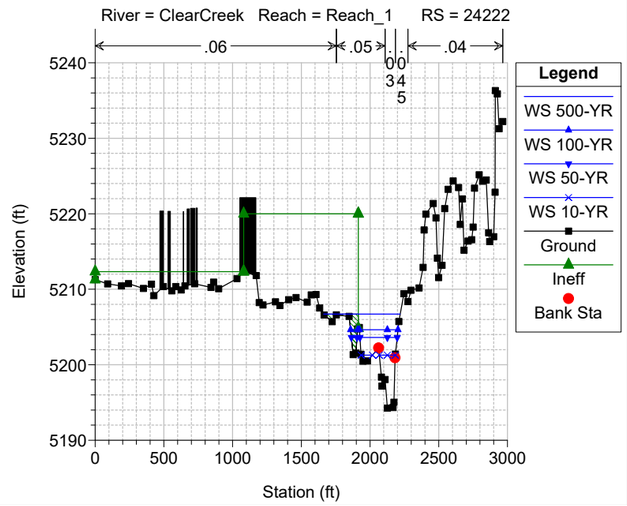
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 24582



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 24222



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 23845
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 23255
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 22876
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 22613 Blocked obstruction added to LOB to remove unrealistic shallow
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 22088
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21914
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21866 Merrick Survey Used for Thalweg
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21849 Merrick Survey Used for Thalweg
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21842 New XS - Merrick Survey Used for Thalweg
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

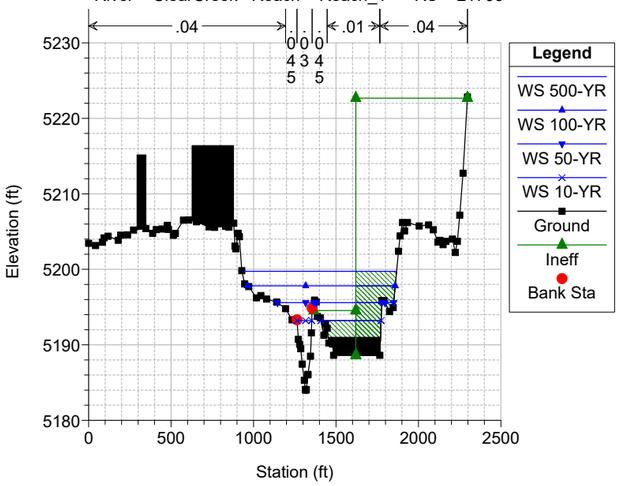
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21733
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21726 BR Footbridge FOOTBRIDGE DOWNSTREAM OF FEDERAL
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21726 BR Footbridge FOOTBRIDGE DOWNSTREAM OF FEDERAL
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

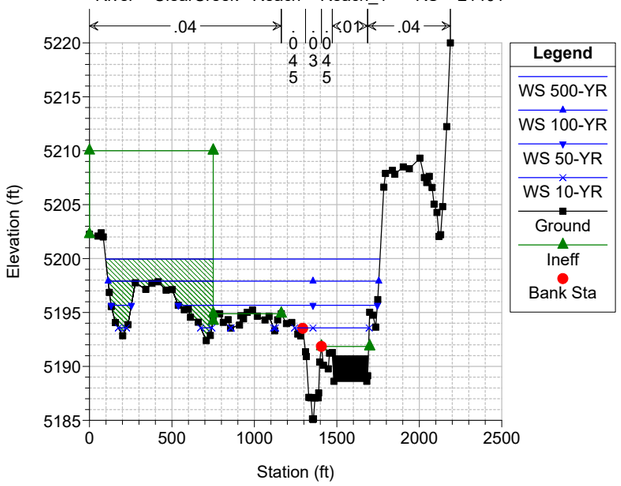
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 21700



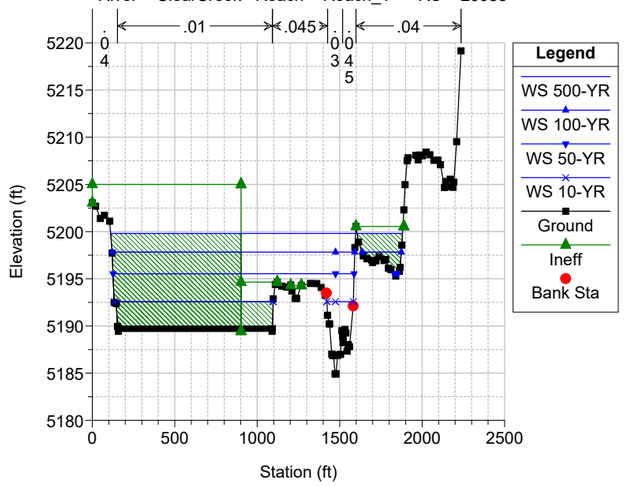
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 21401



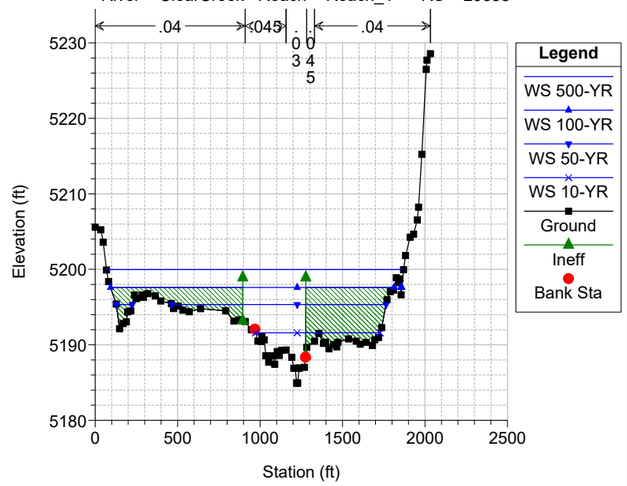
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 20985



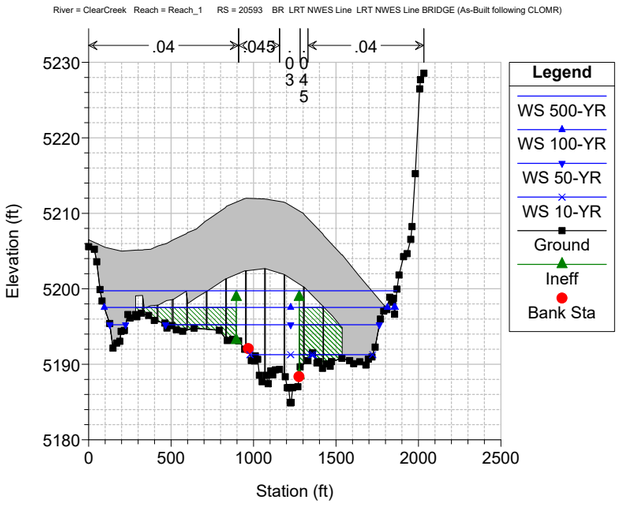
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 20638



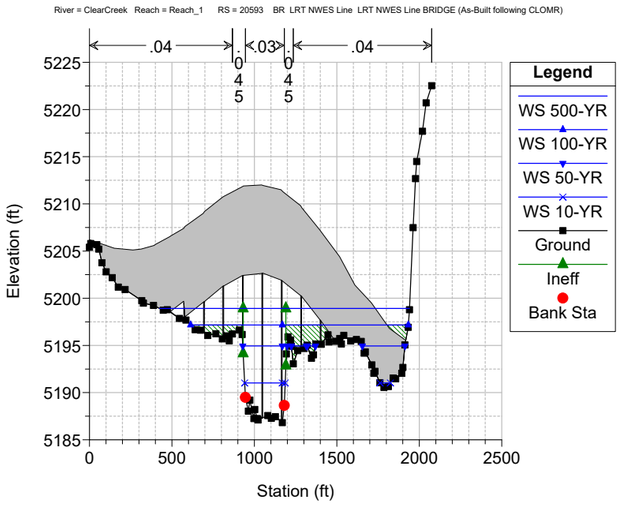
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 20593 BR LRT NWES Line LRT NWES Line BRIDGE (As-Built following CLOMR)



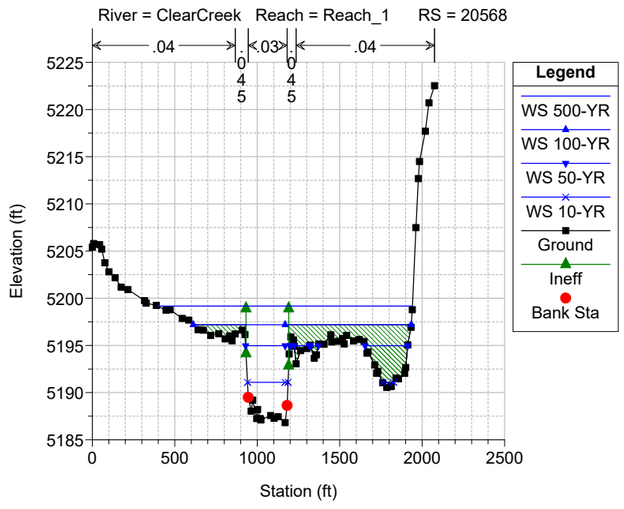
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 20593 BR LRT NWES Line LRT NWES Line BRIDGE (As-Built following CLOMR)



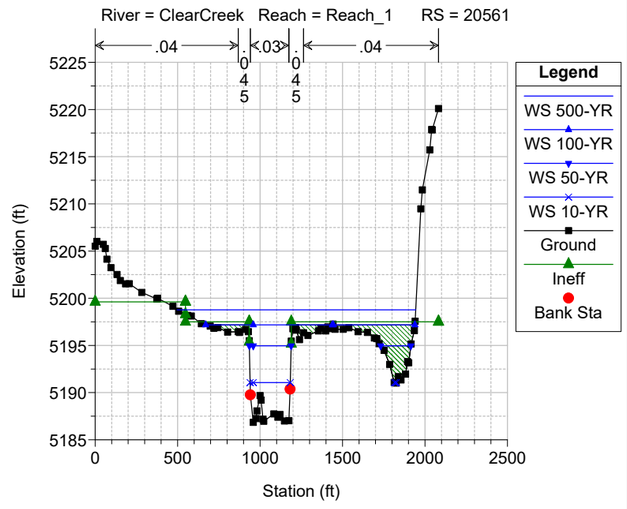
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 20568



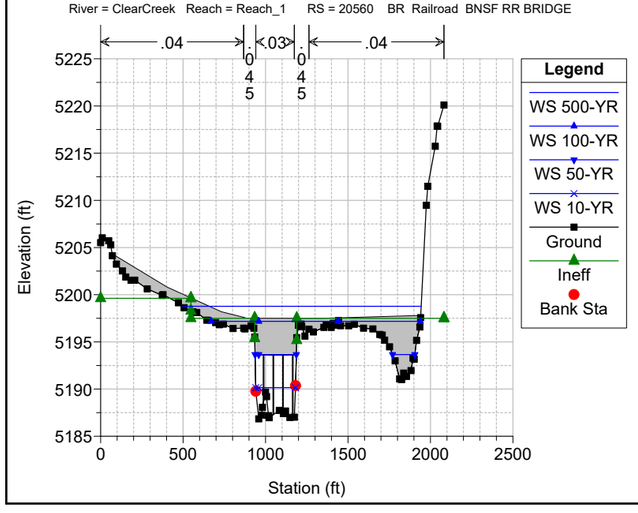
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 20561



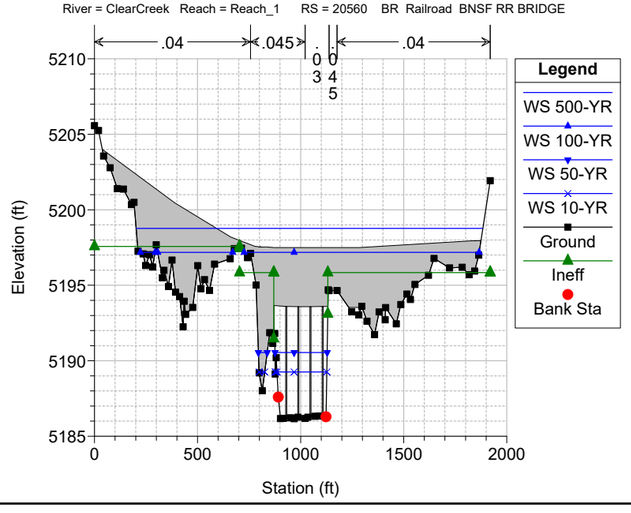
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 20560 BR Railroad BNSF RR BRIDGE



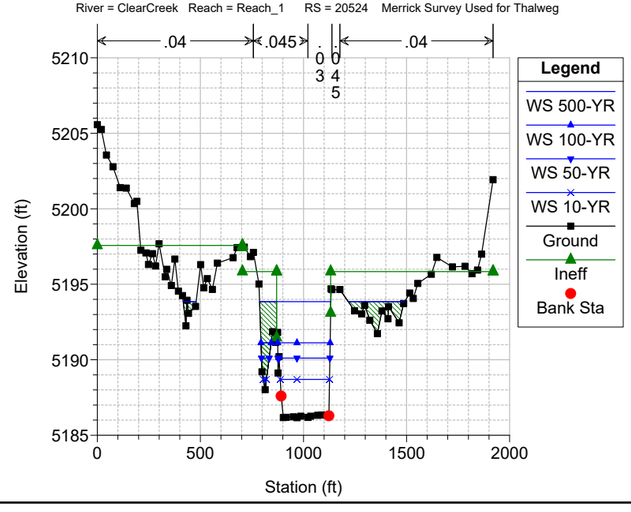
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 20560 BR Railroad BNSF RR BRIDGE



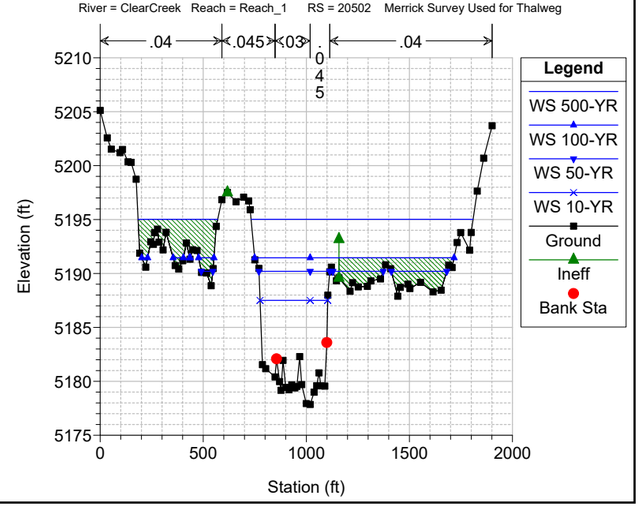
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 20524 Merrick Survey Used for Thalweg



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 20502 Merrick Survey Used for Thalweg



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 20331 New XS - Merrick Survey Used for Thalweg
.04 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 20100
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 19952
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 19866
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 19861
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 19746
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 19666
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 19578
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 19327
.04 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

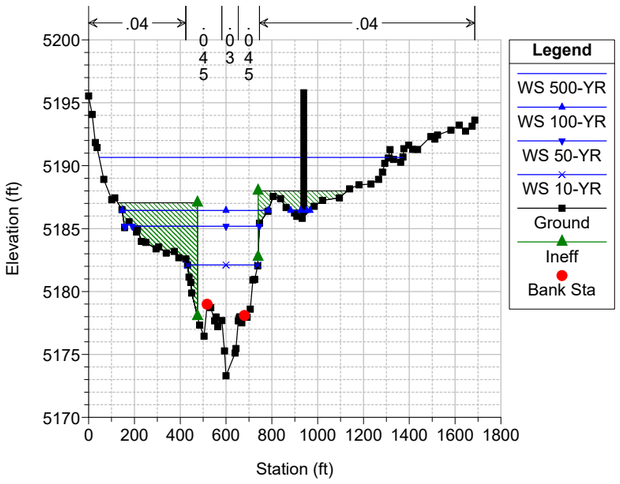
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 18997
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 18905
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 18733
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

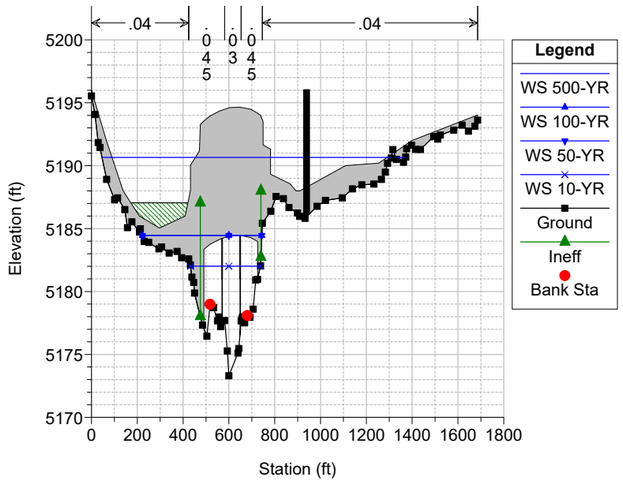
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 18648 FHAD CHANNEL GEOMETRY USED STA 595-638



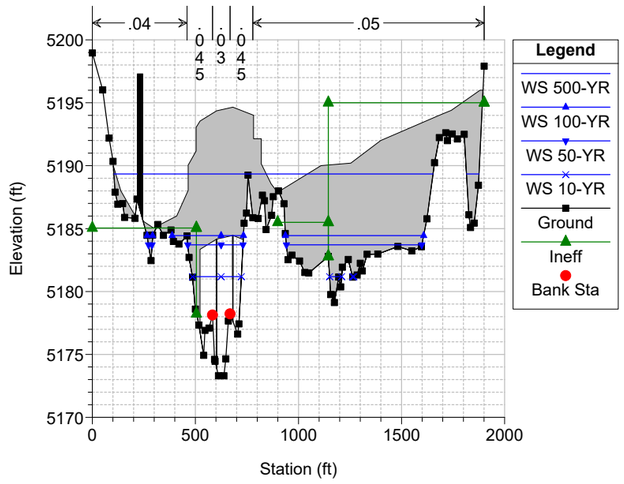
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 18574 BR Pecos St PECOS STREET BRIDGE



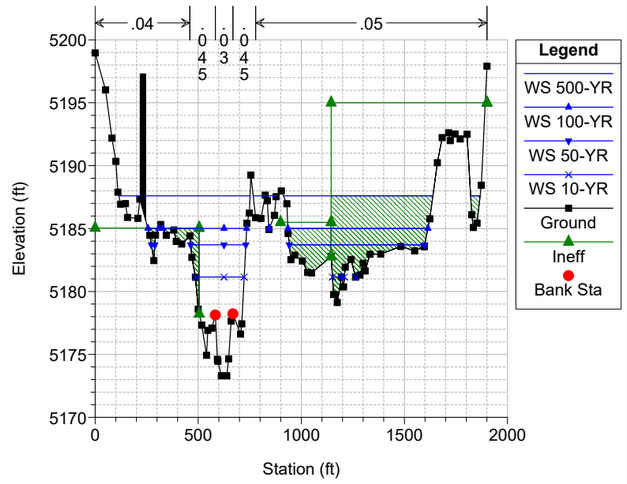
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 18574 BR Pecos St PECOS STREET BRIDGE



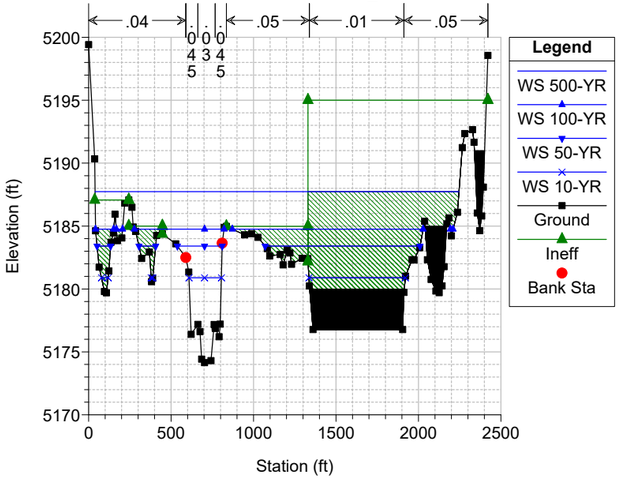
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 18466 FHAD CHANNEL GEOMETRY USED STA 592-648



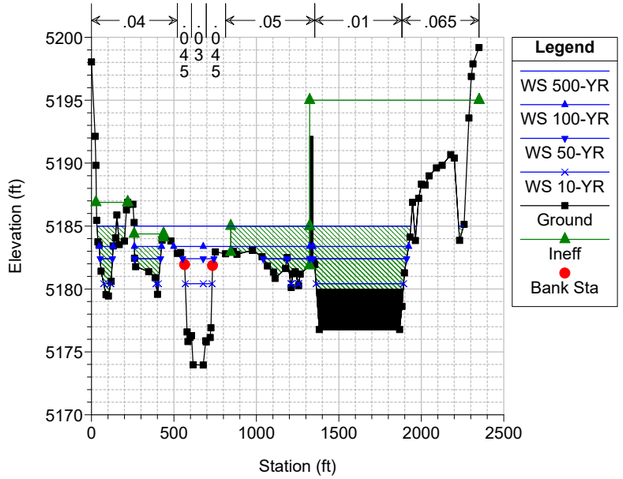
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 18273



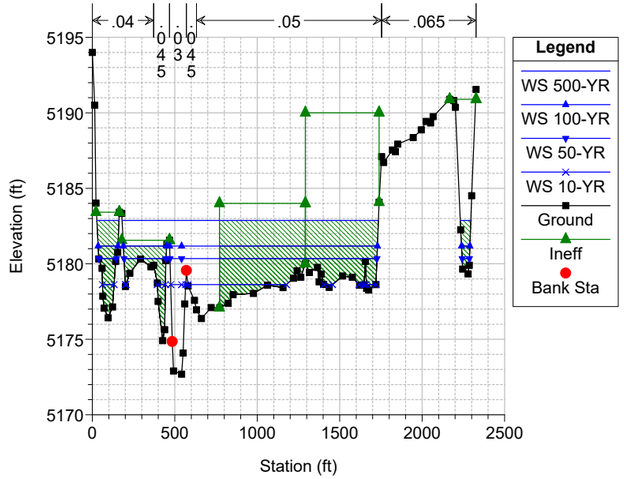
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 18090



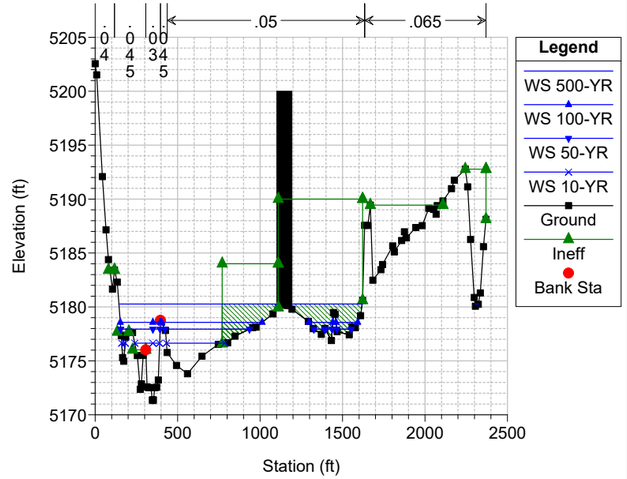
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 17743



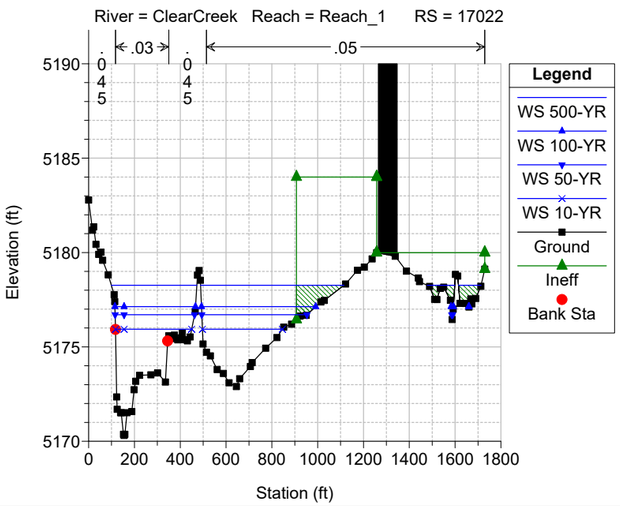
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 17393



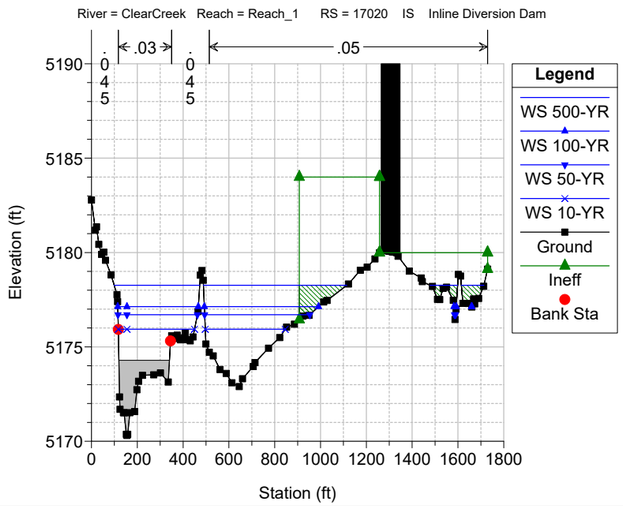
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 17022



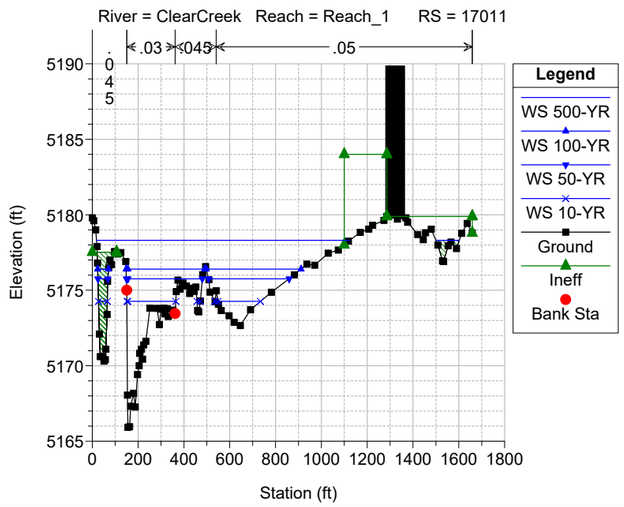
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 17020 IS Inline Diversion Dam



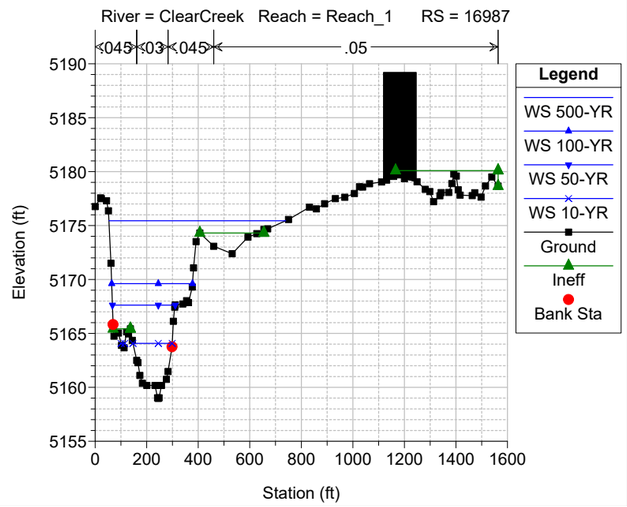
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 17011

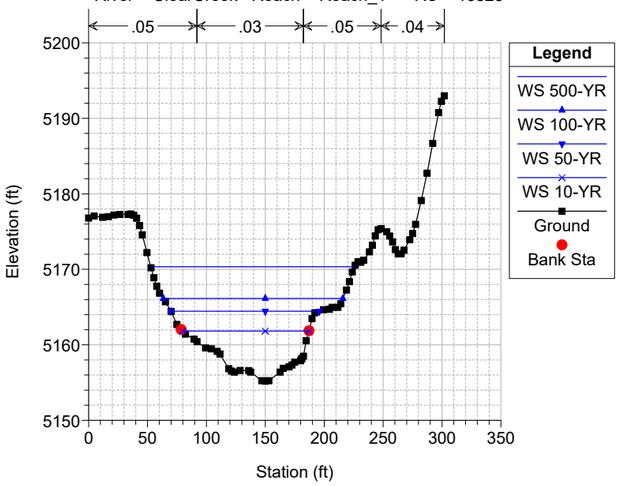


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

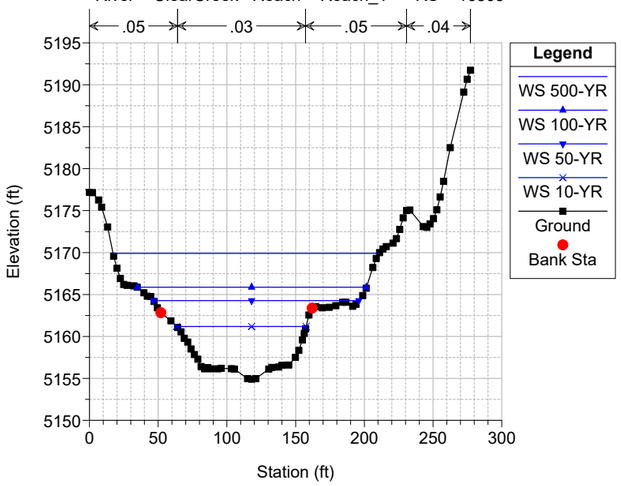
River = ClearCreek Reach = Reach_1 RS = 16987



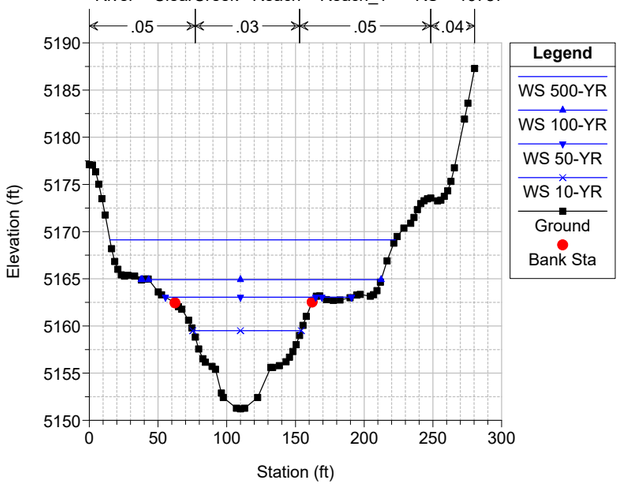
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 16825



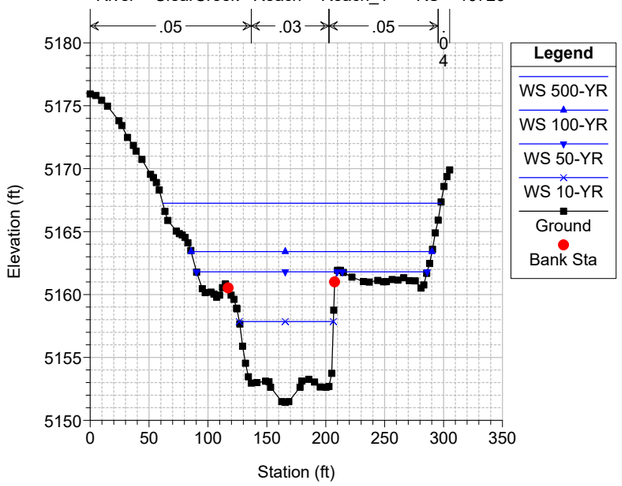
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 16803



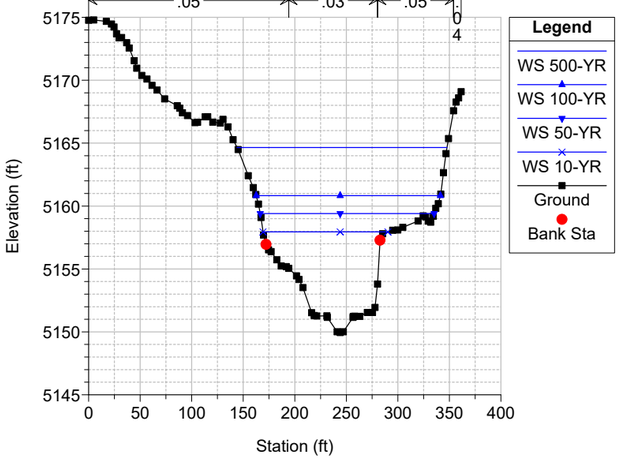
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 16787



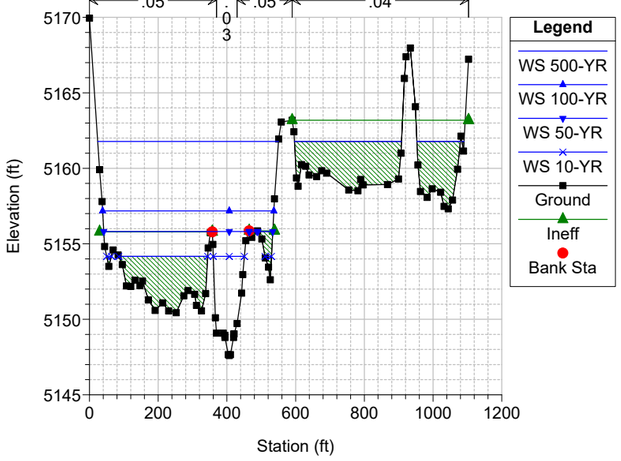
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 16726



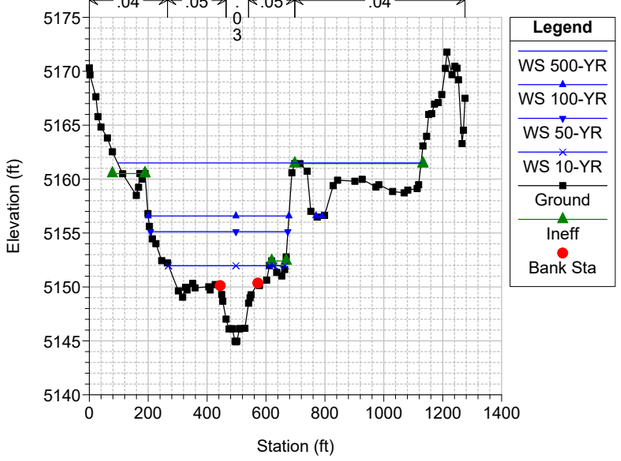
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 16597



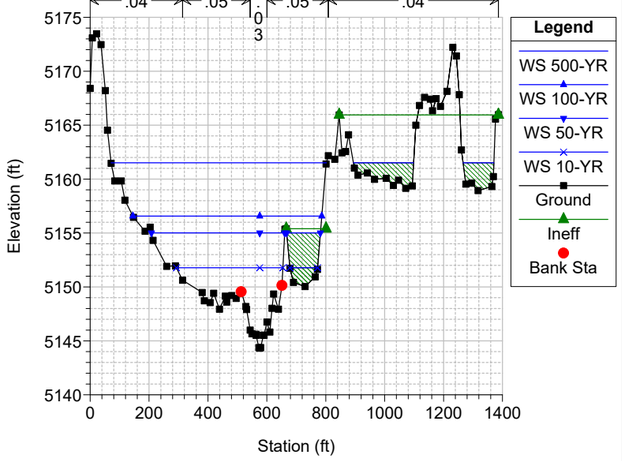
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 16232



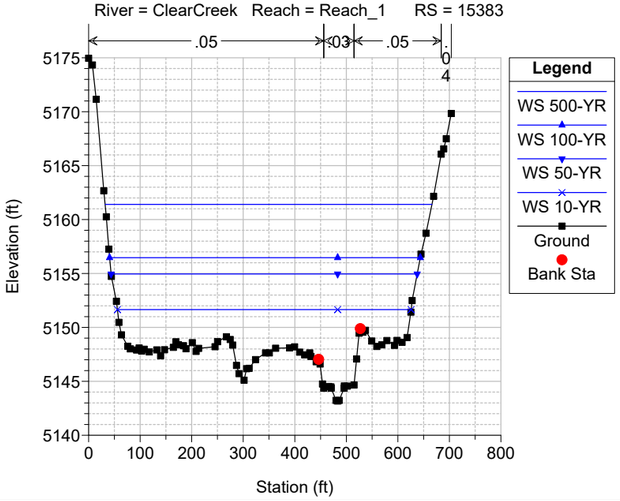
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 15860



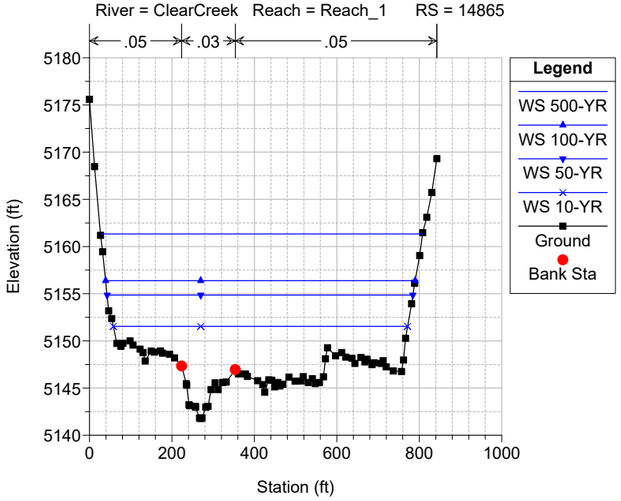
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 15697



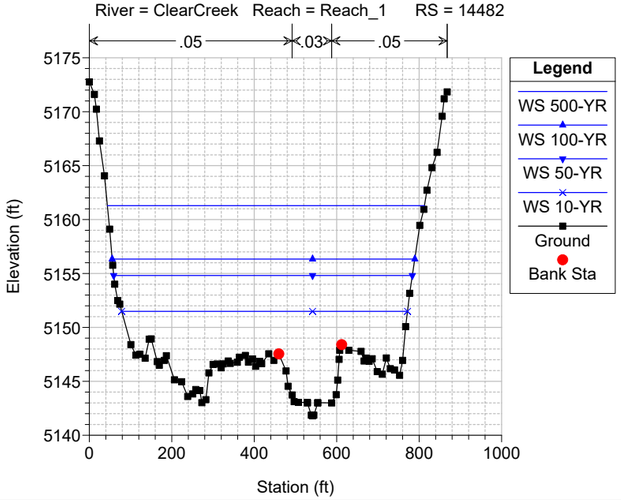
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 15383



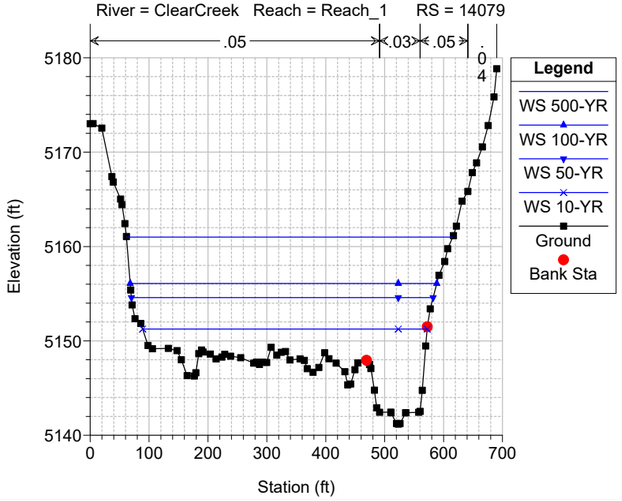
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 14865



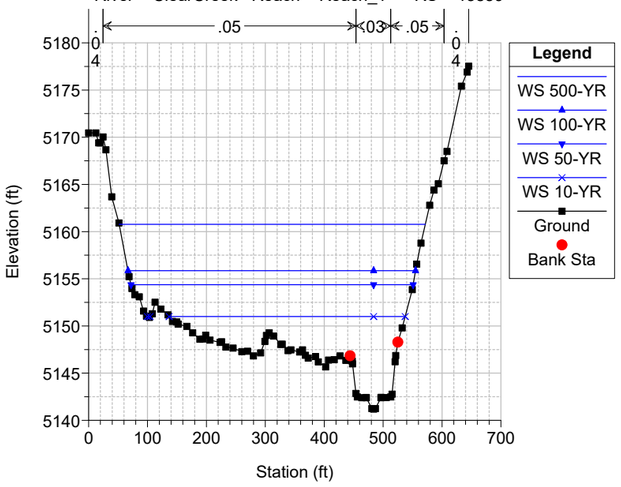
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 14482



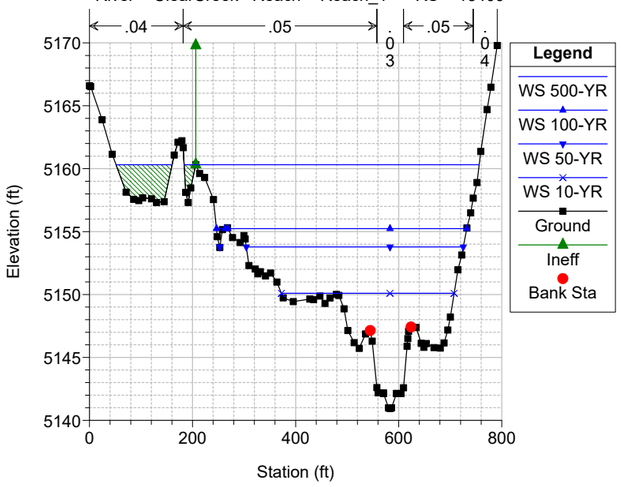
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 14079



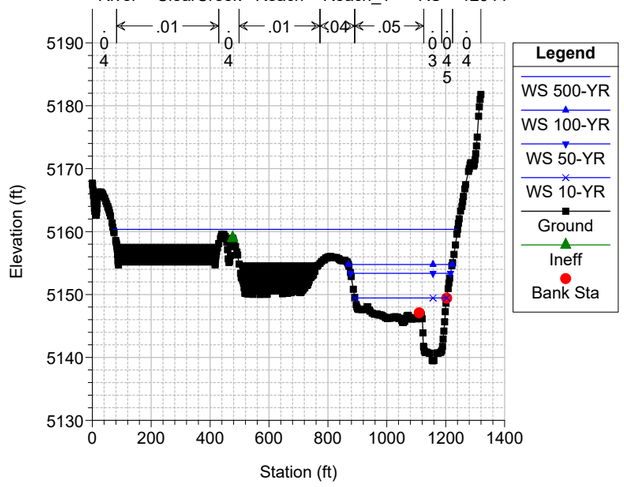
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 13859



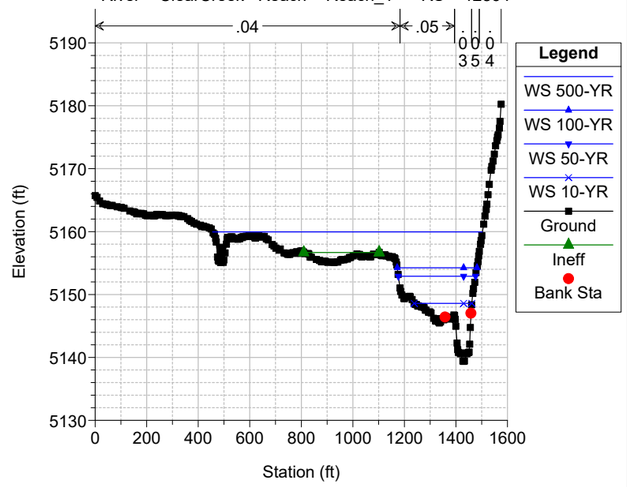
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 13400



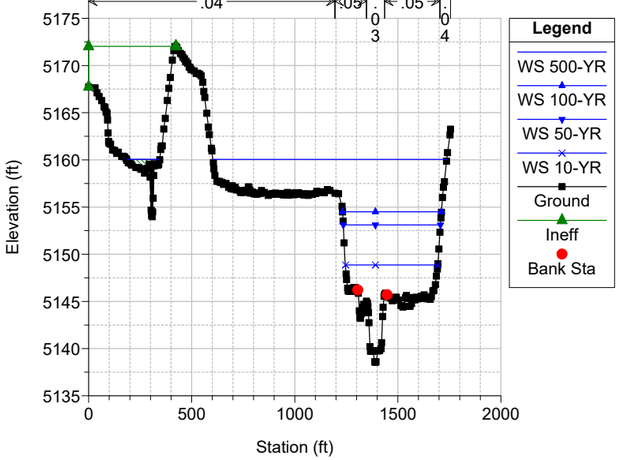
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12944



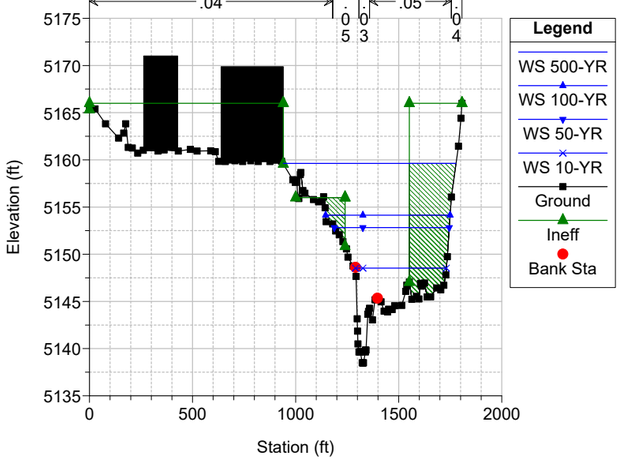
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12864



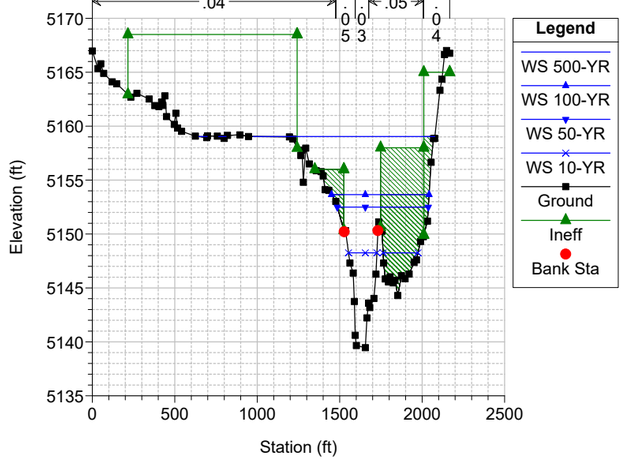
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12560



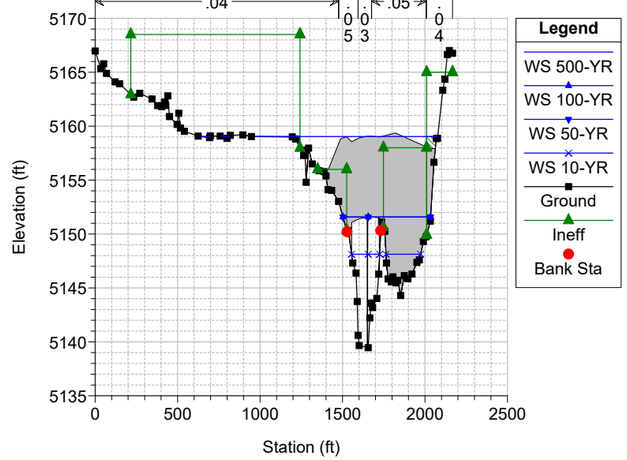
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12297



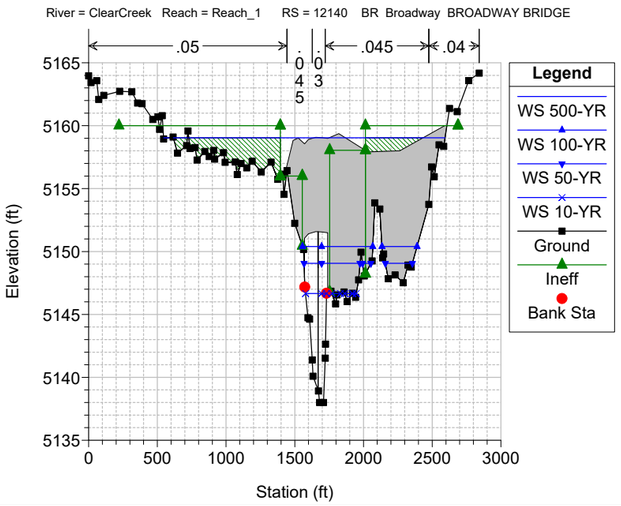
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12221 U/S BROADWAY BRIDGE



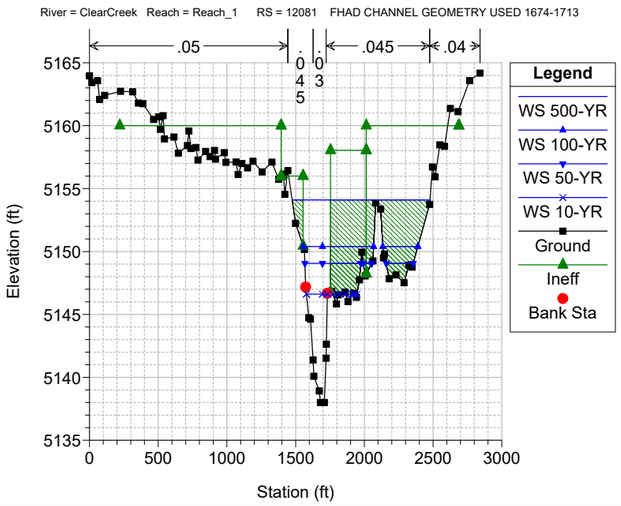
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12140 BR Broadway BROADWAY BRIDGE



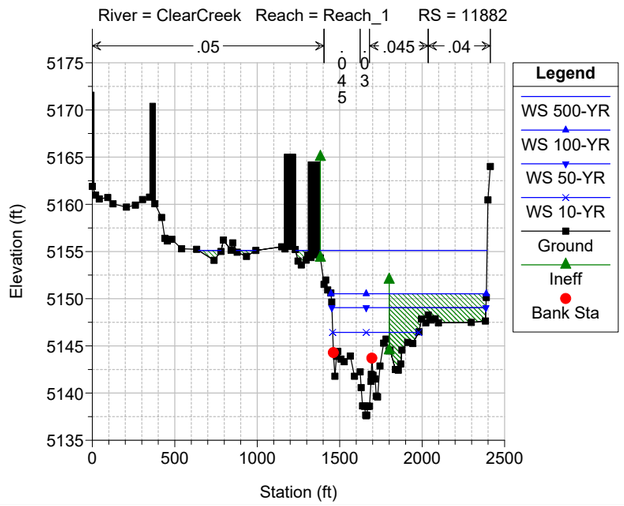
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12140 BR Broadway BROADWAY BRIDGE



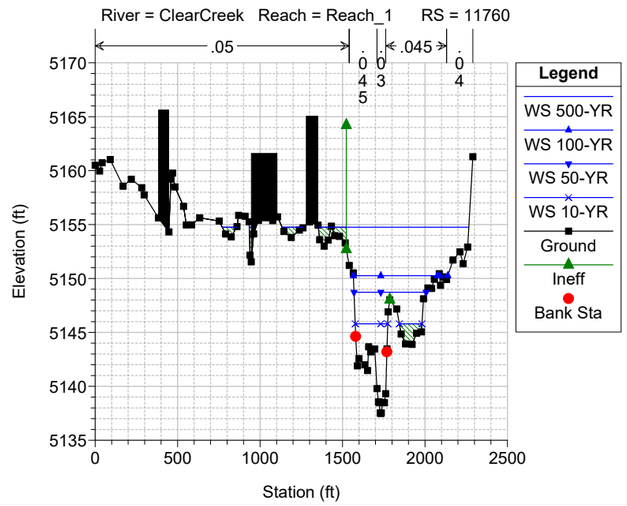
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12081 FHAD CHANNEL GEOMETRY USED 1674-1713



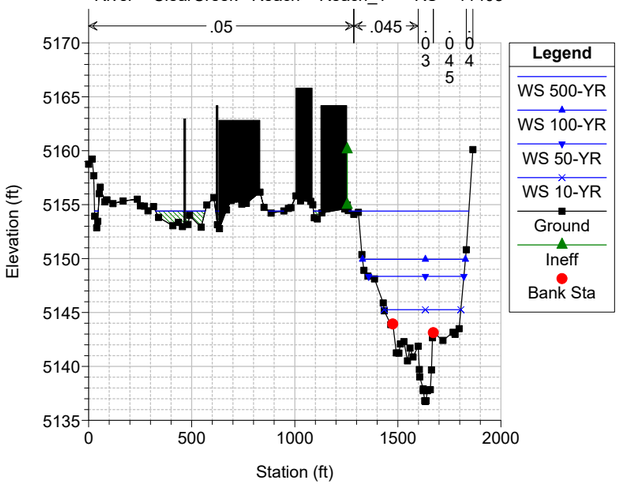
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 11882



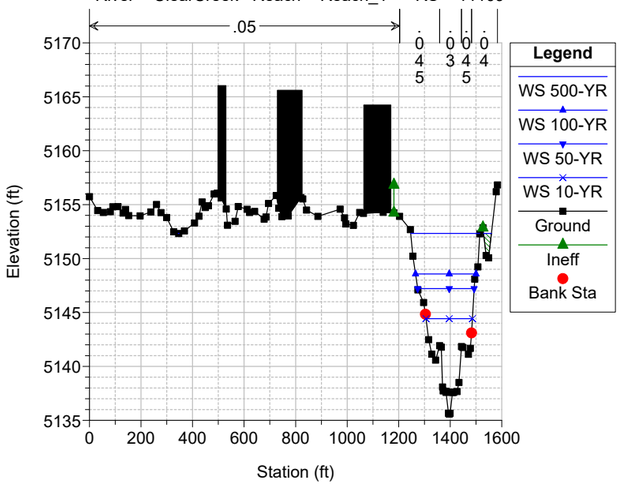
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 11760



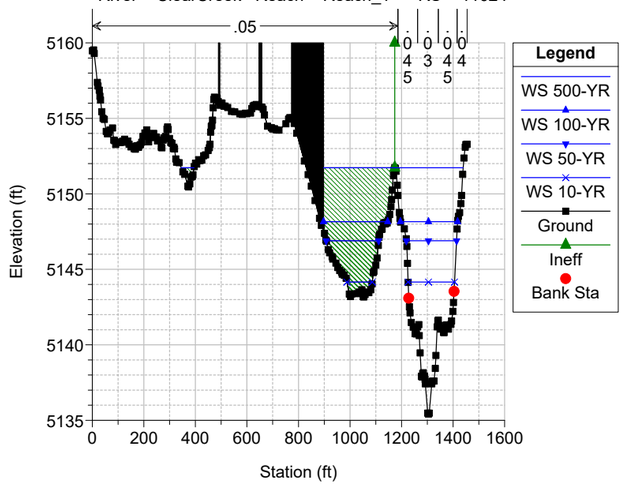
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 11405



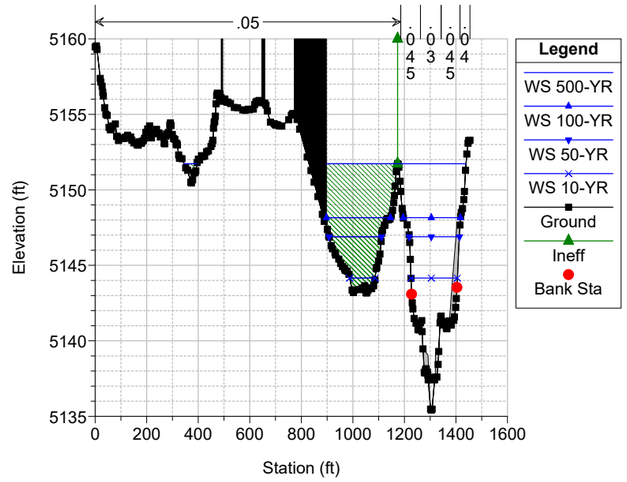
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 11109



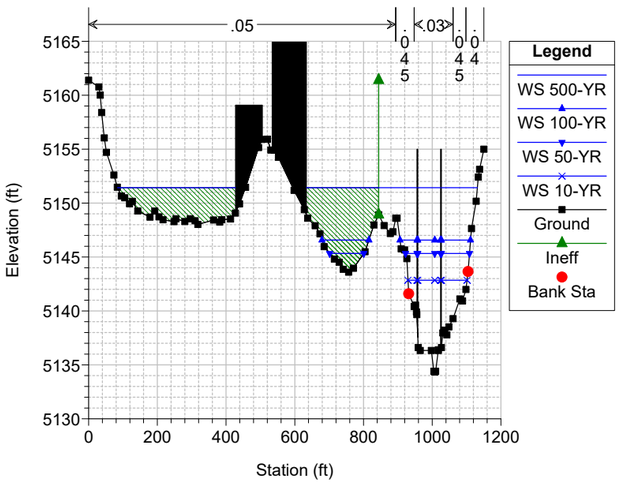
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 11024



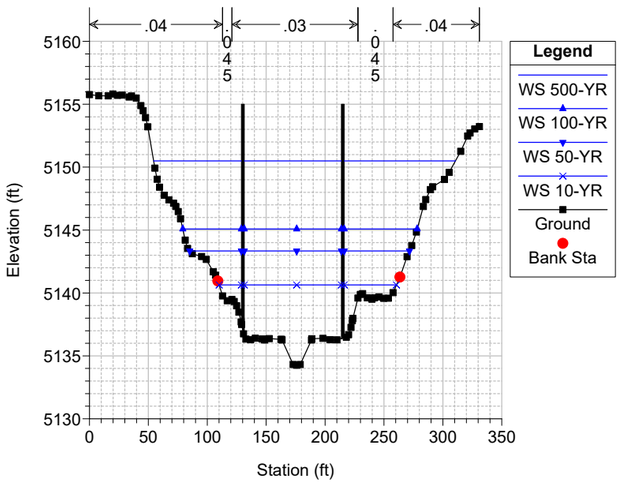
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 11020 IS Grouted Boulder Drop U/S of I-25 Ramp N



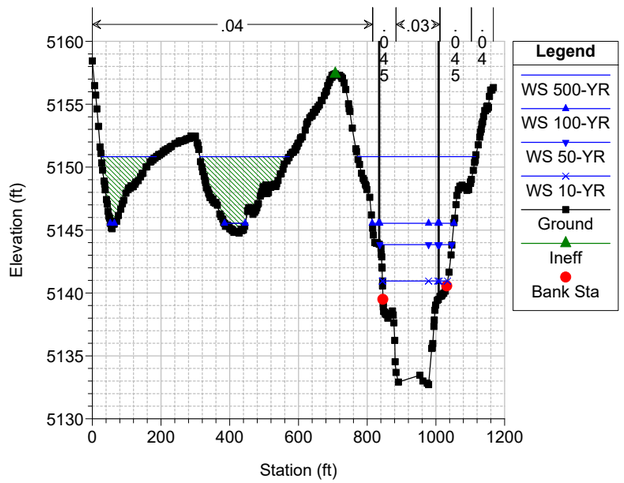
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10961 On-ramp deck piers modeled as blocked obstructions



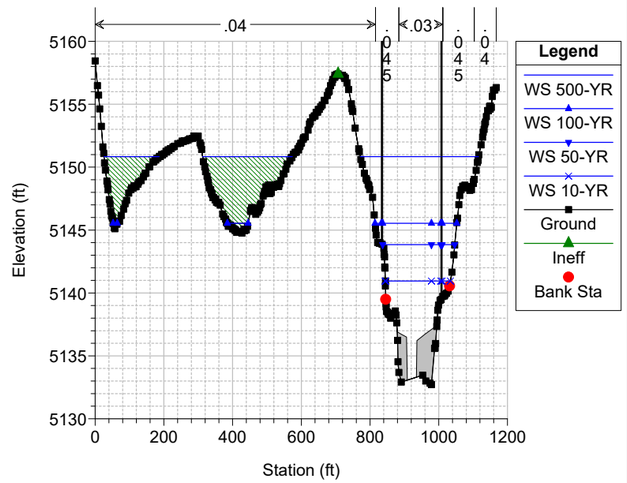
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10815 On-ramp deck piers modeled as blocked obstructions



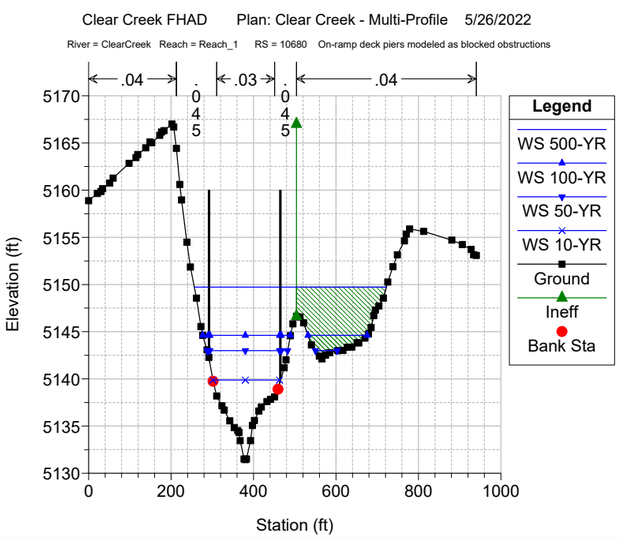
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10741 FHAD XS used for thalweg; On-ramp deck piers modeled as blocked



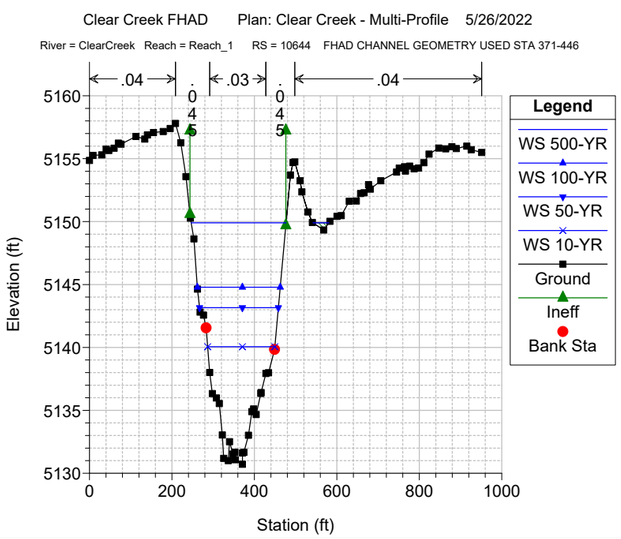
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10692 IS Grouted Boulder Drop Directly beneath I-25 Ramp D



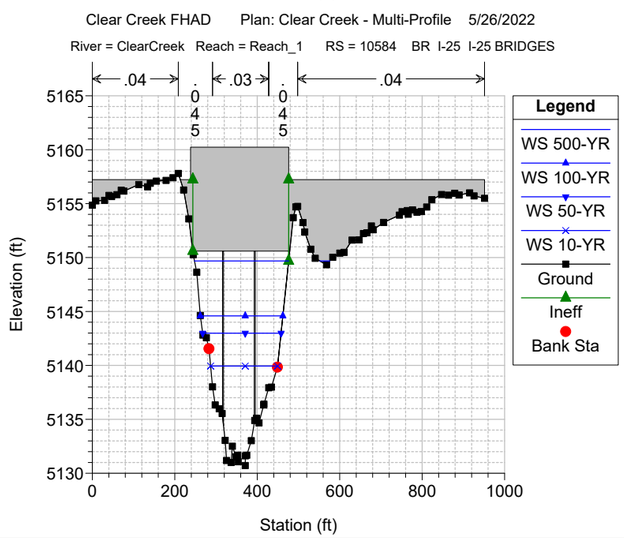
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10680 On-ramp deck piers modeled as blocked obstructions



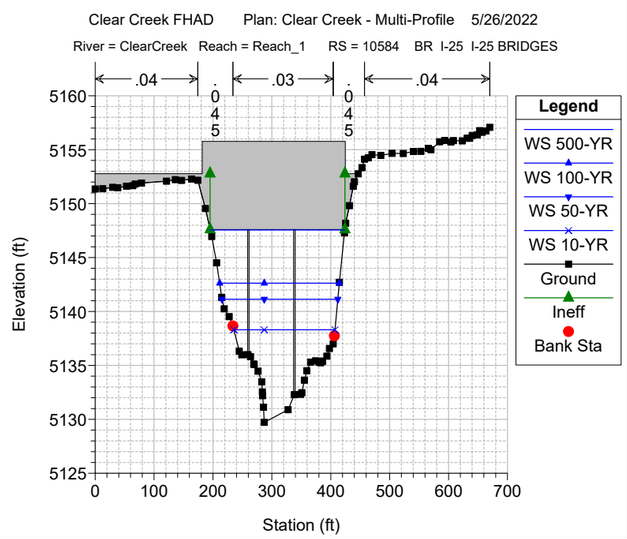
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10644 FHAD CHANNEL GEOMETRY USED STA 371-446

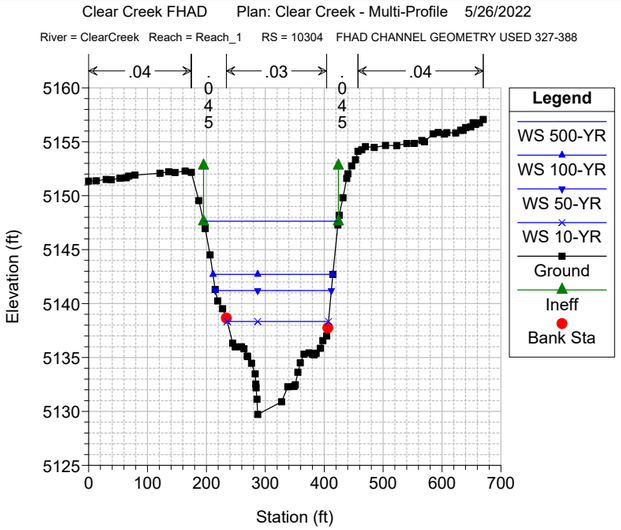


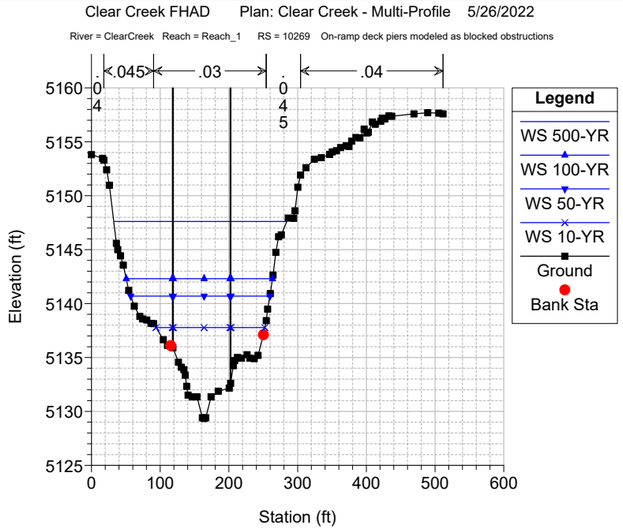
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10584 BR I-25 I-25 BRIDGES

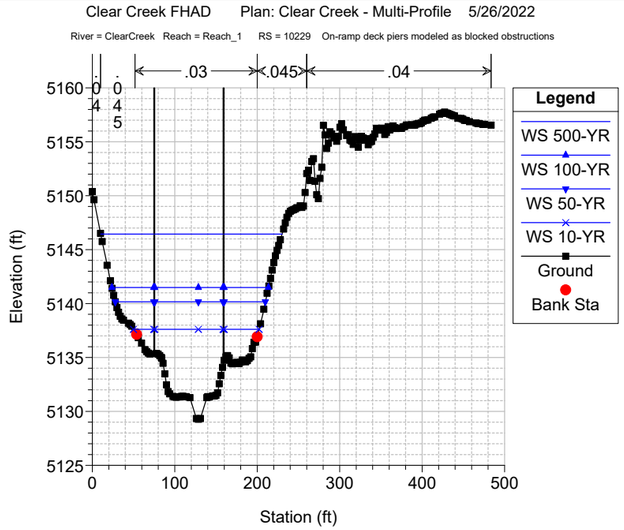


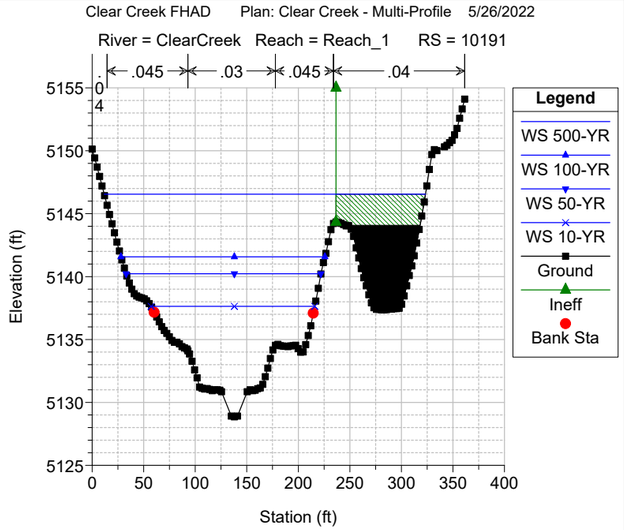
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10584 BR I-25 I-25 BRIDGES

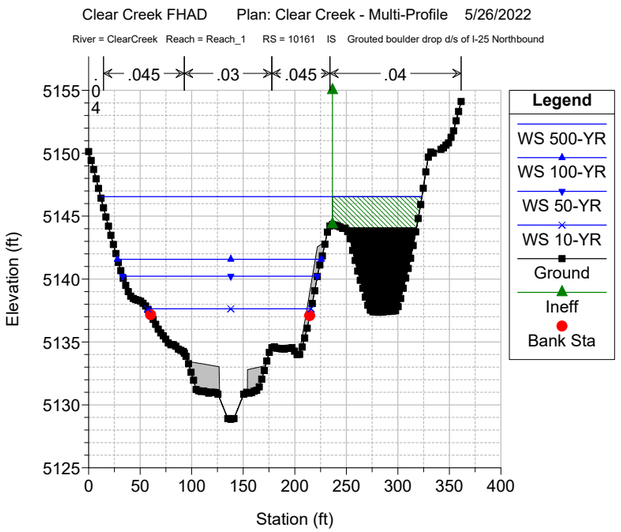


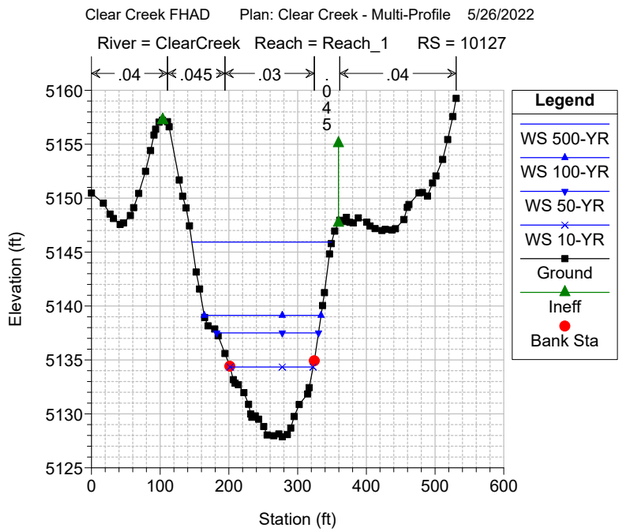

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10304 FHAD CHANNEL GEOMETRY USED 327-388
.04 .045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

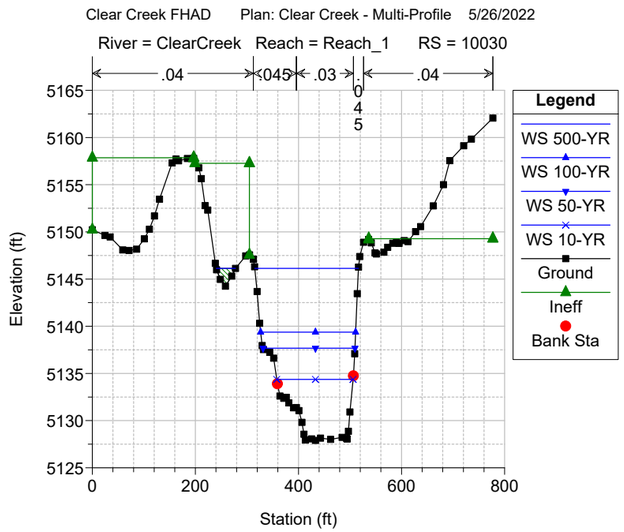

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10269 On-ramp deck piers modeled as blocked obstructions
.04 .045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

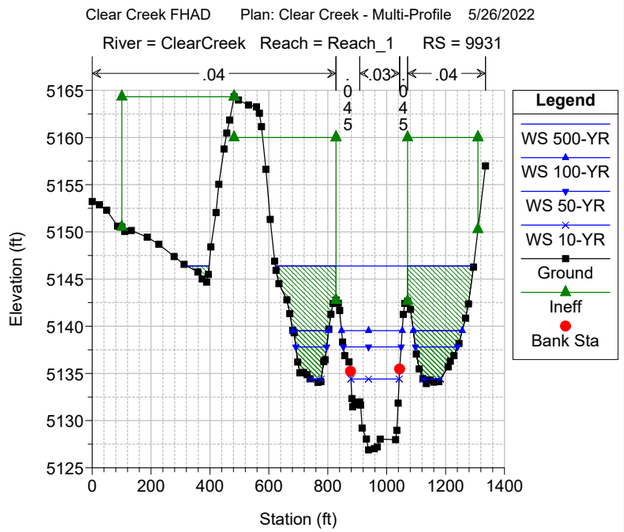

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10229 On-ramp deck piers modeled as blocked obstructions
.04 .045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

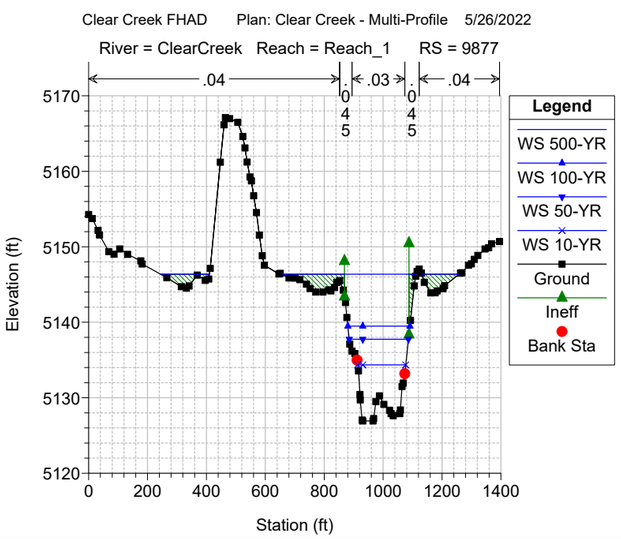

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10191
.04 .045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

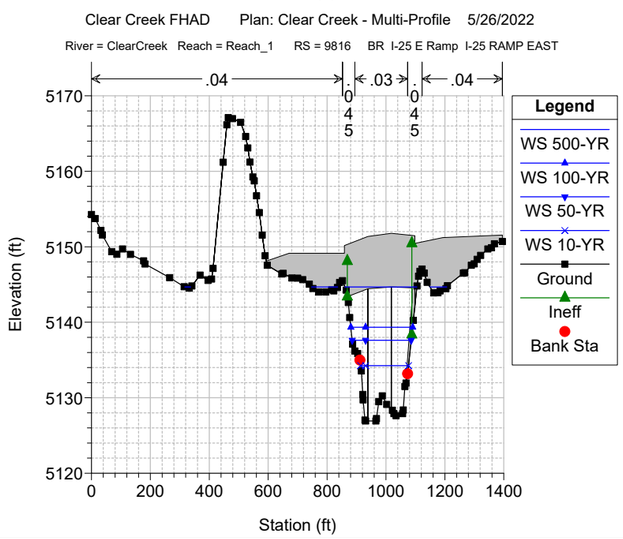

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10161 IS Grouted boulder drop d/s of I-25 Northbound
.04 .045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

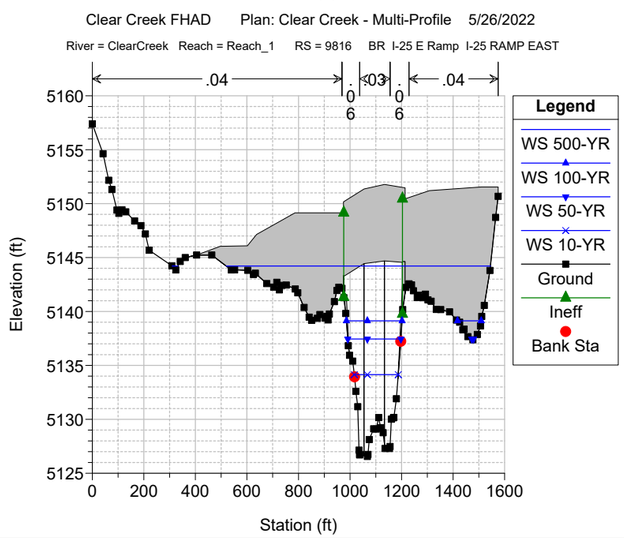

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10127
.04 .045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

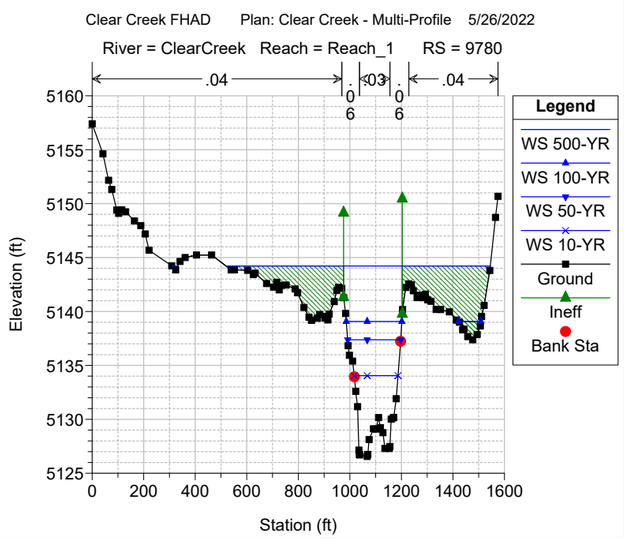

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10030
.04 .045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9931
.04 .045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

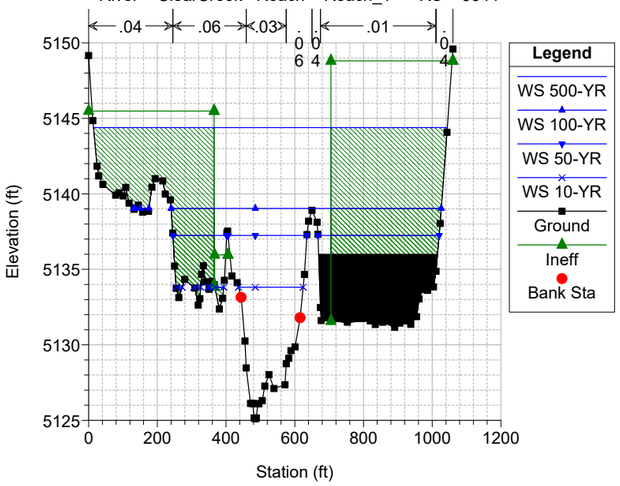

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9877
.04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9816 BR I-25 E Ramp I-25 RAMP EAST
.04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

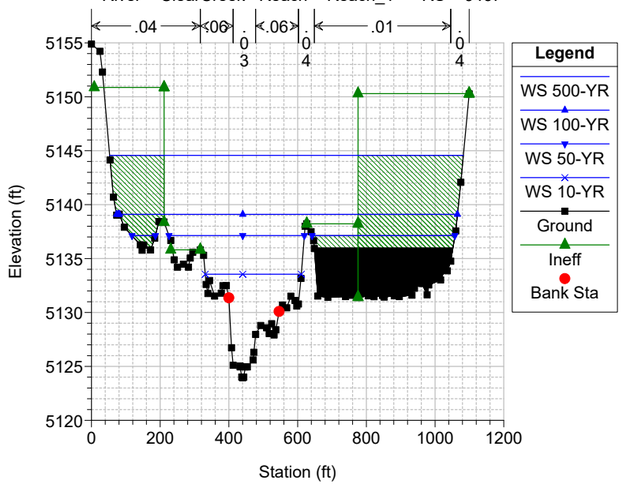

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9816 BR I-25 E Ramp I-25 RAMP EAST
.04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9780
.04 .03 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

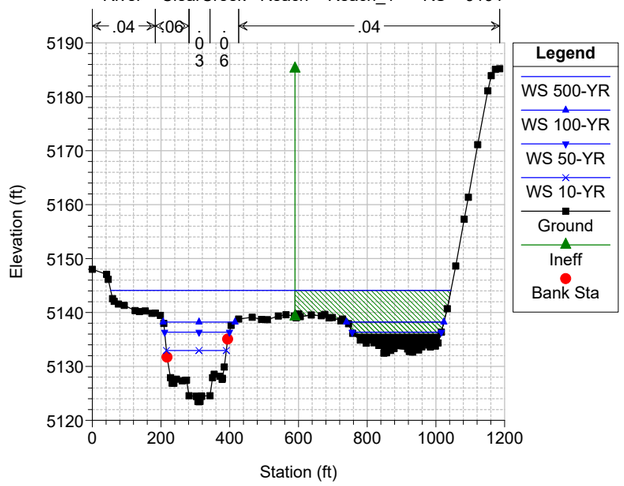
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9644



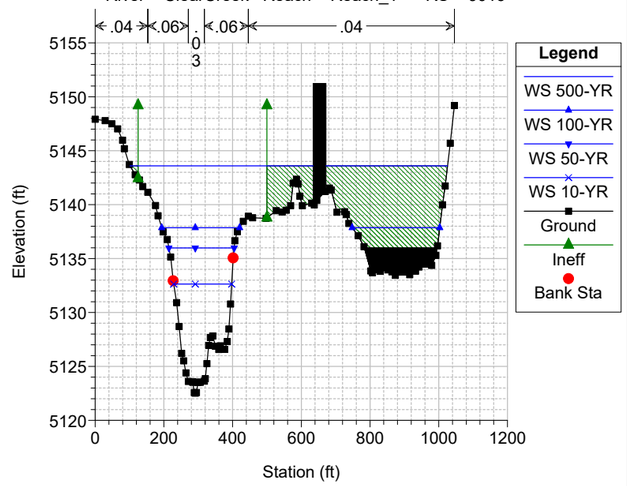
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9467



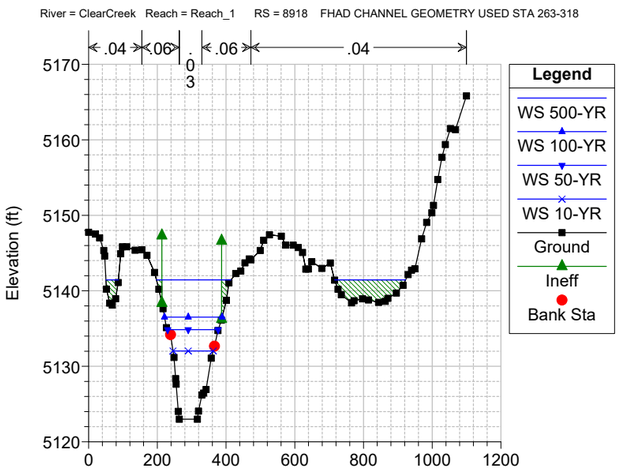
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9164



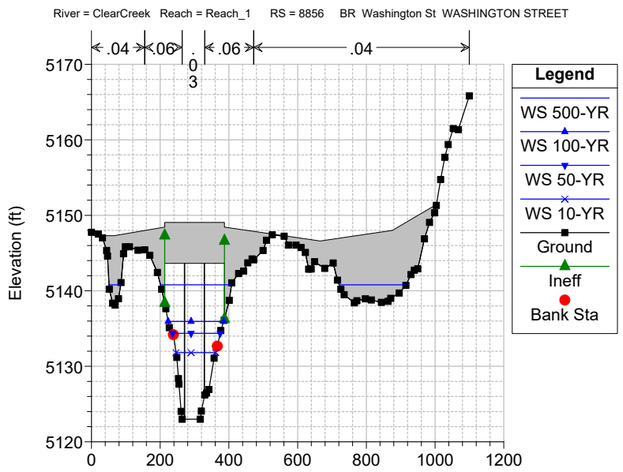
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9016



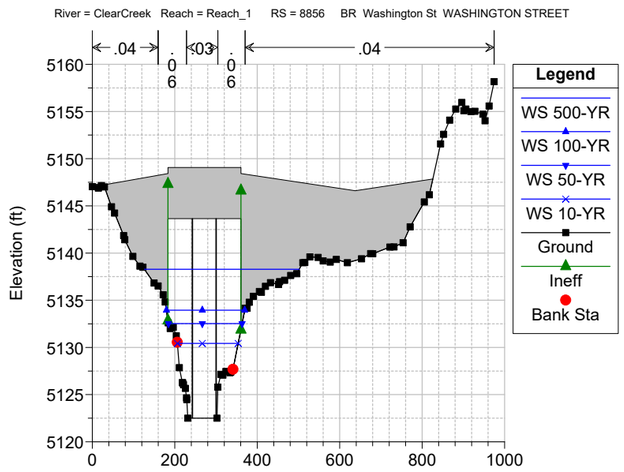
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8918 FHAD CHANNEL GEOMETRY USED STA 263-318



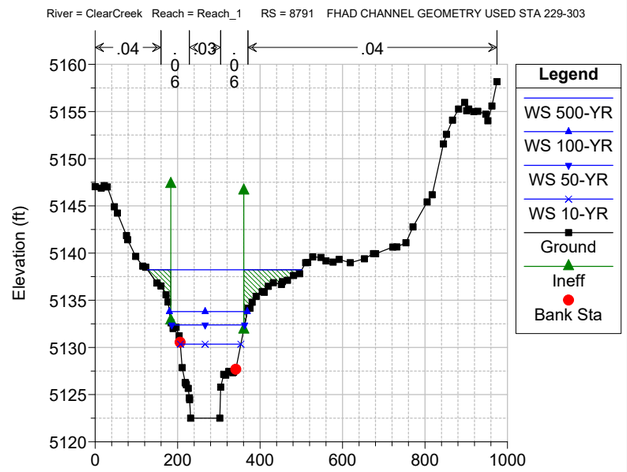
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8856 BR Washington St WASHINGTON STREET



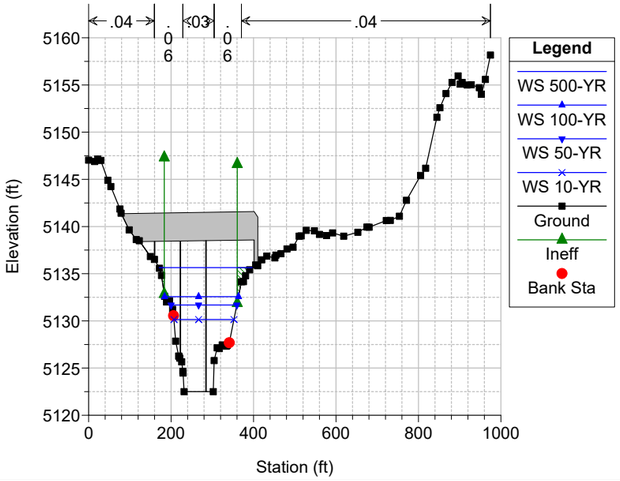
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8856 BR Washington St WASHINGTON STREET



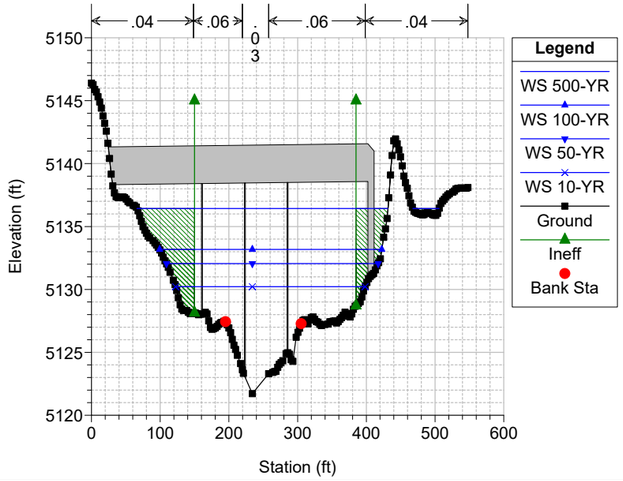
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8791 FHAD CHANNEL GEOMETRY USED STA 229-303



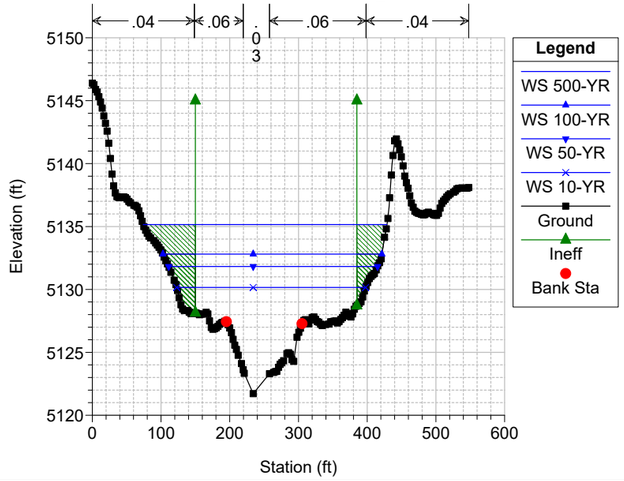
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8757 BR Pipe X-ing WASHINGTON PIPE CROSSING



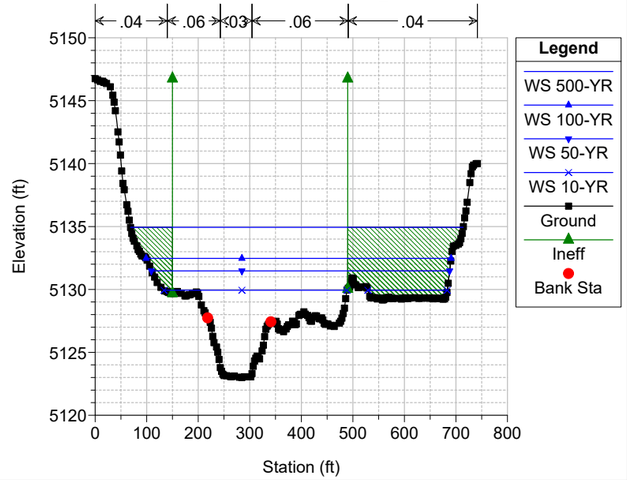
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8757 BR Pipe X-ing WASHINGTON PIPE CROSSING



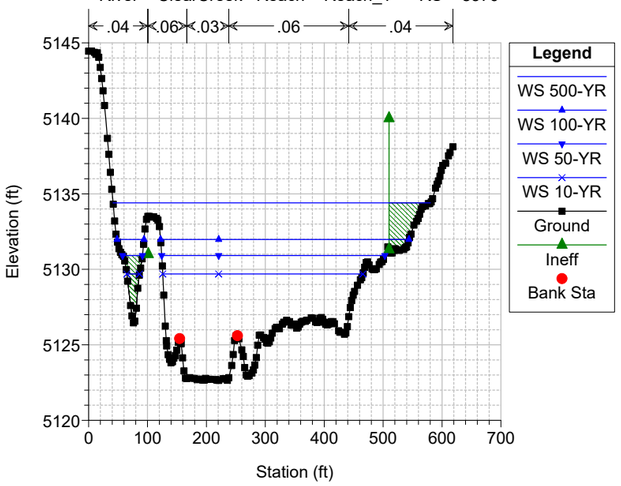
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8754



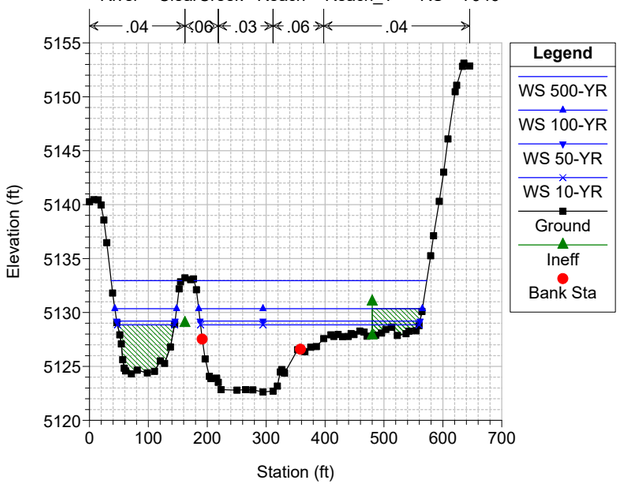
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8648



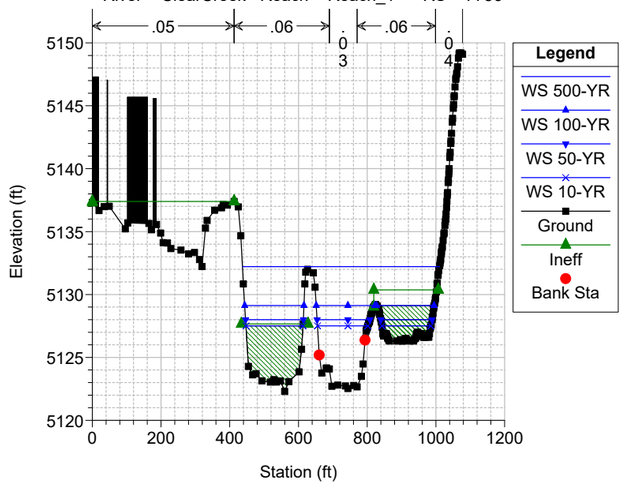
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8370



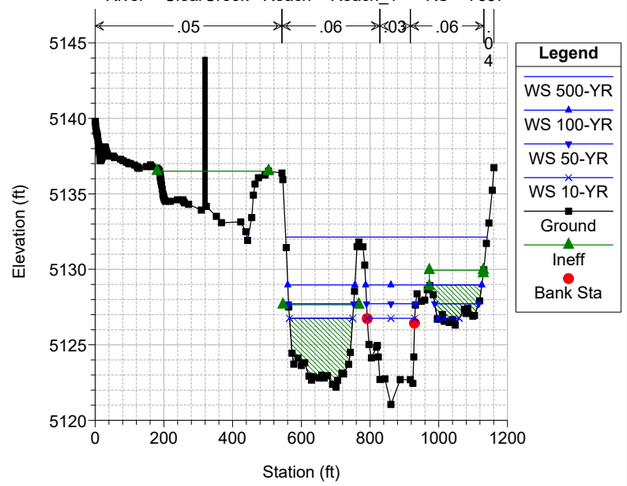
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7946



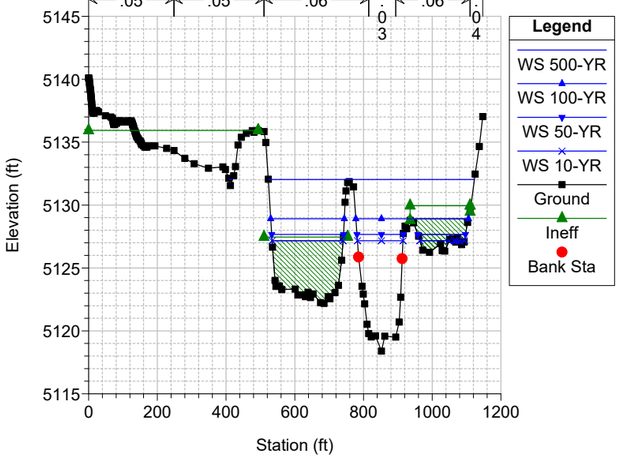
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7756



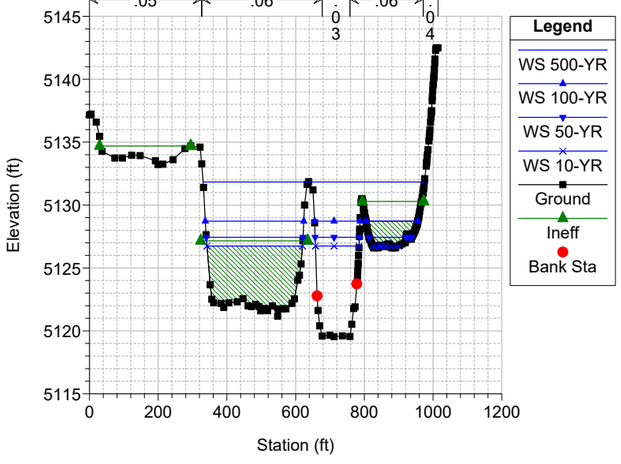
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7697



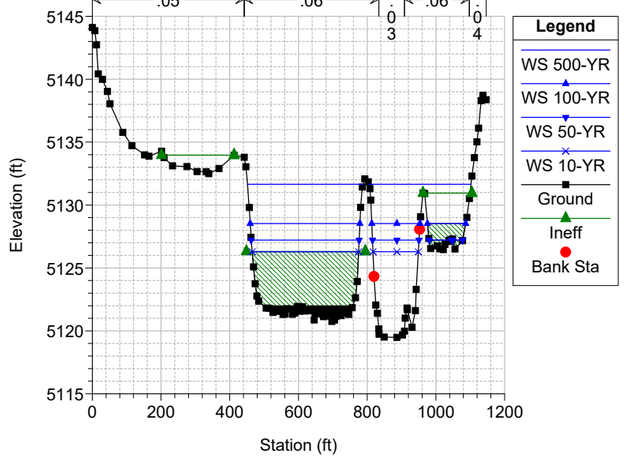
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7651



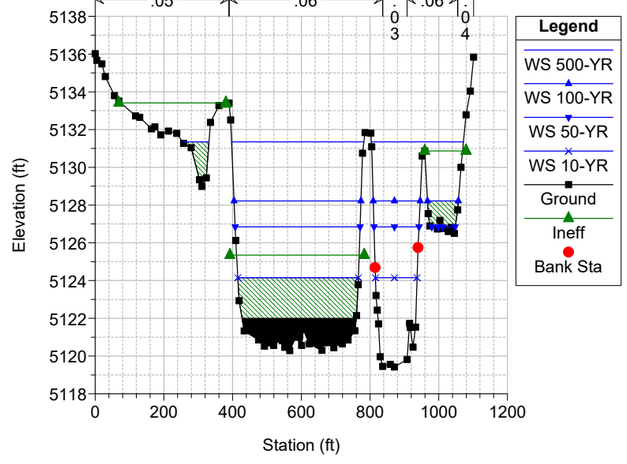
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7516



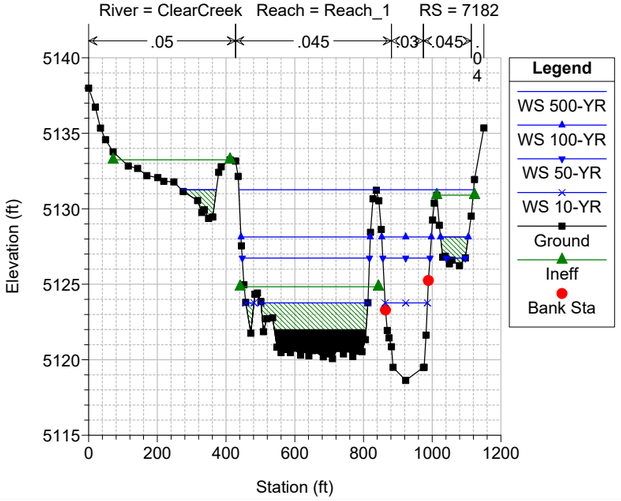
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7382



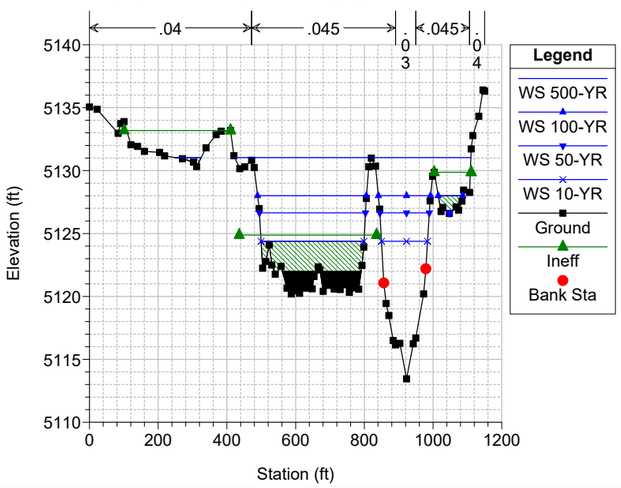
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7228



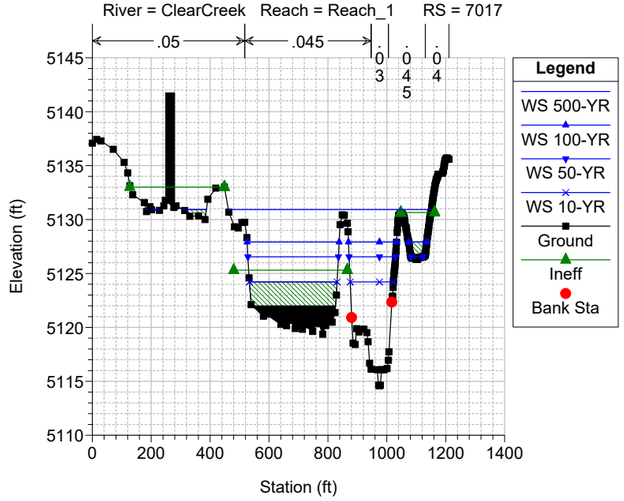
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7182



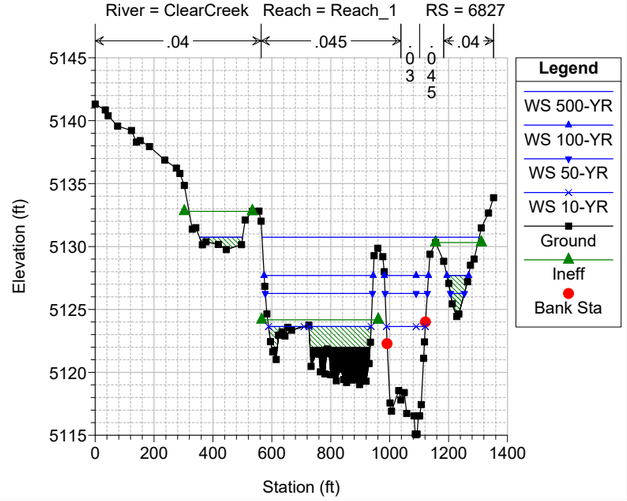
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7127 0.8 expansion coefficient used to fix drawdown



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7017

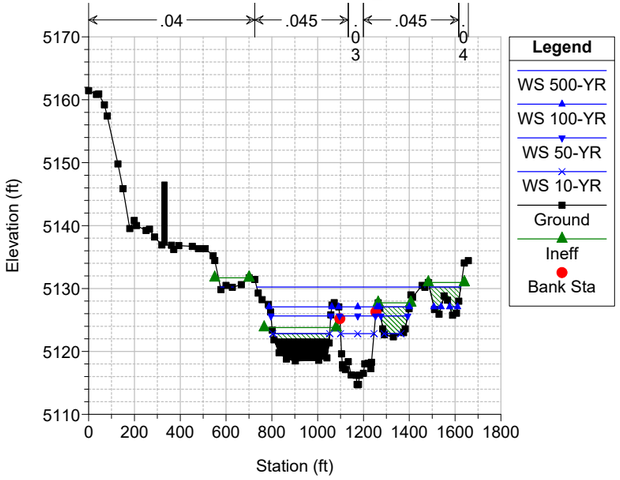


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 6827



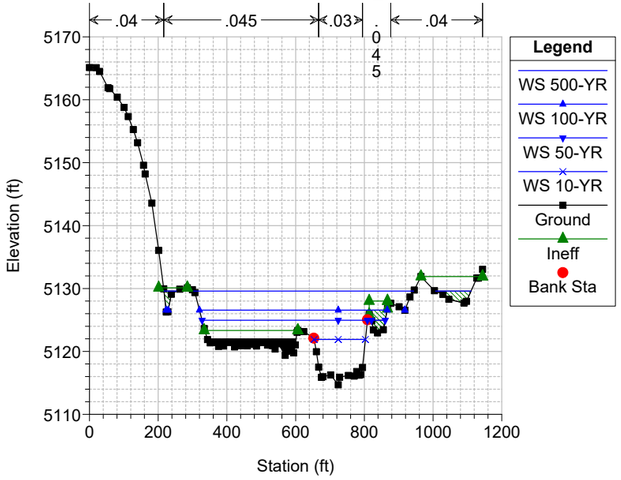
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 6461



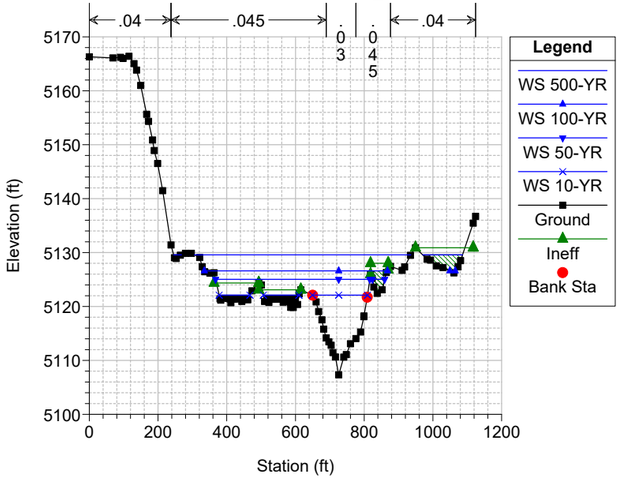
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 6024



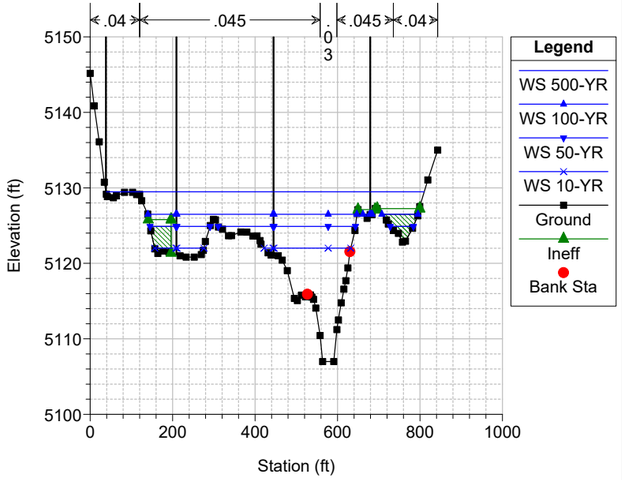
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 5990



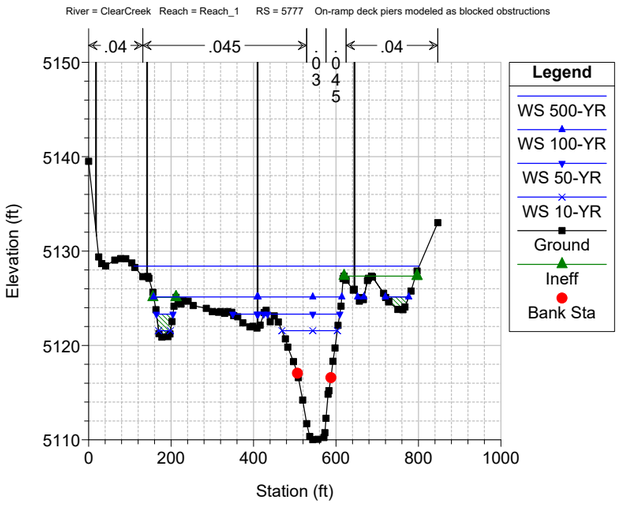
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 5822 FHAD CHANNEL GEOMETRY USED STA 557-598; On-ramp deck piers model



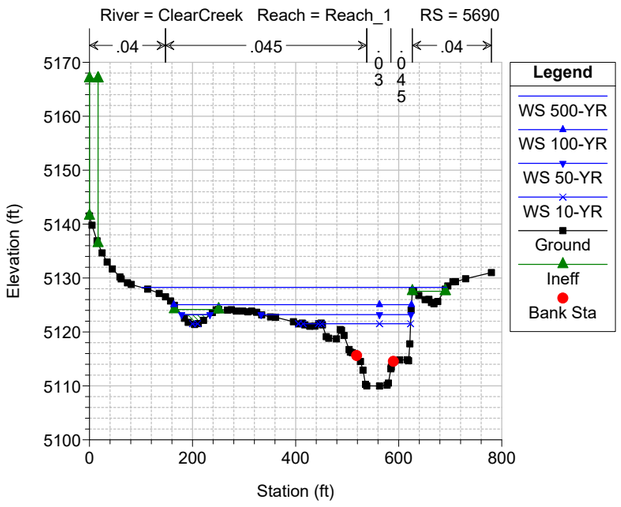
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 5777 On-ramp deck piers modeled as blocked obstructions



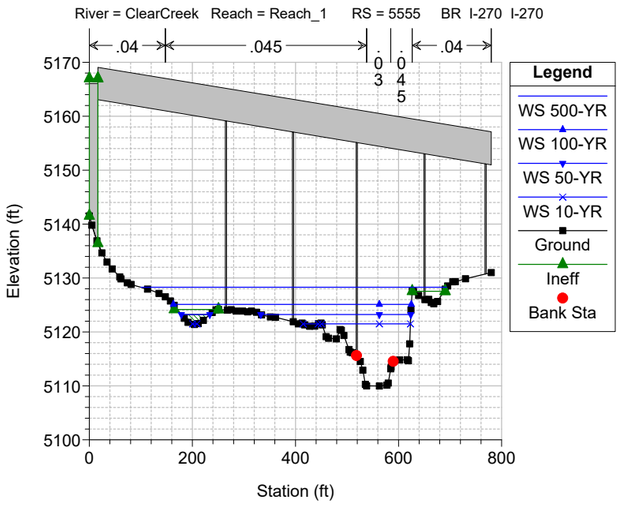
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 5690



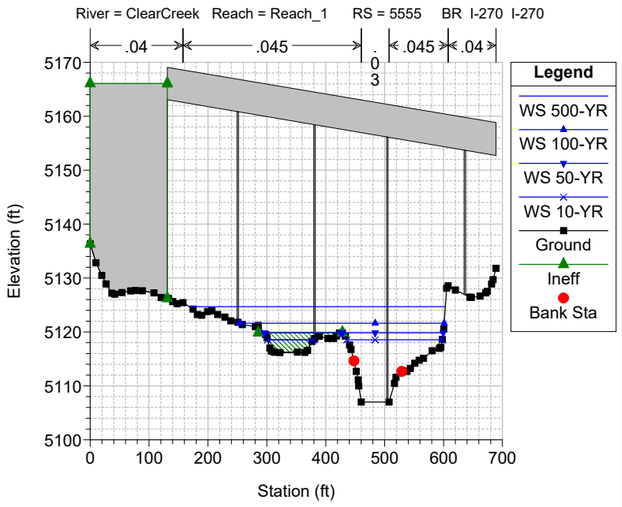
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 5555 BR I-270 I-270



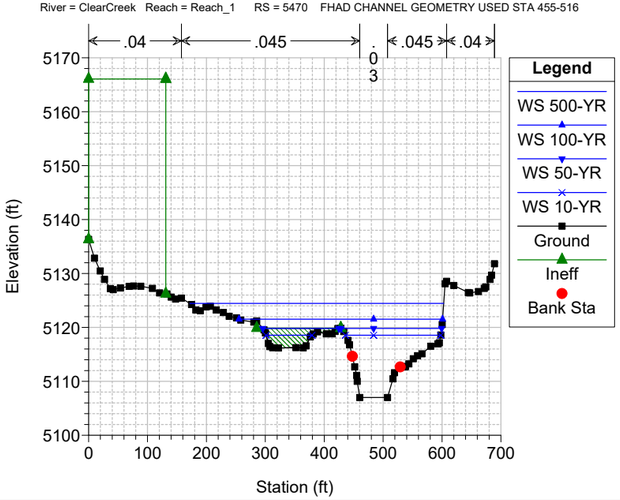
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 5555 BR I-270 I-270



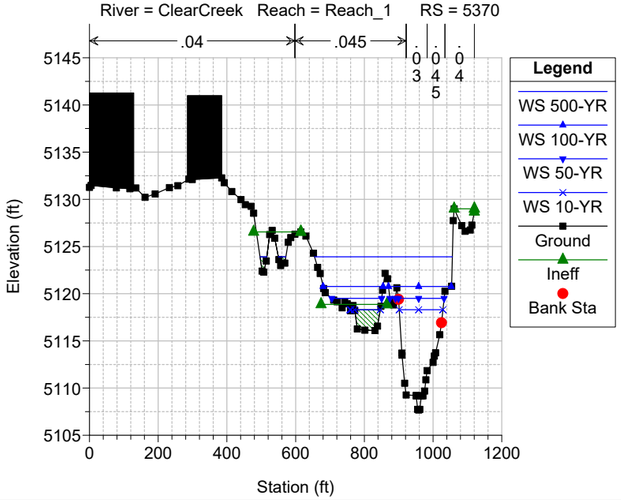
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 5470 FHAD CHANNEL GEOMETRY USED STA 455-516



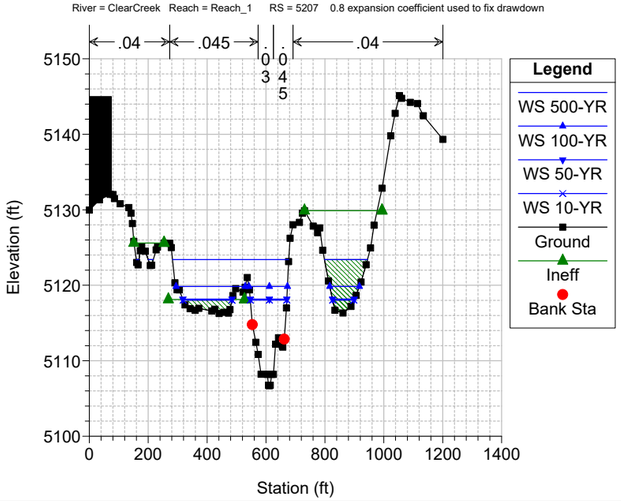
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 5370



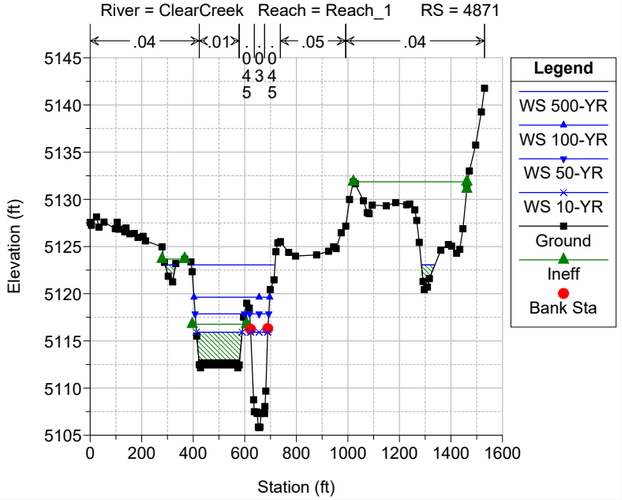
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

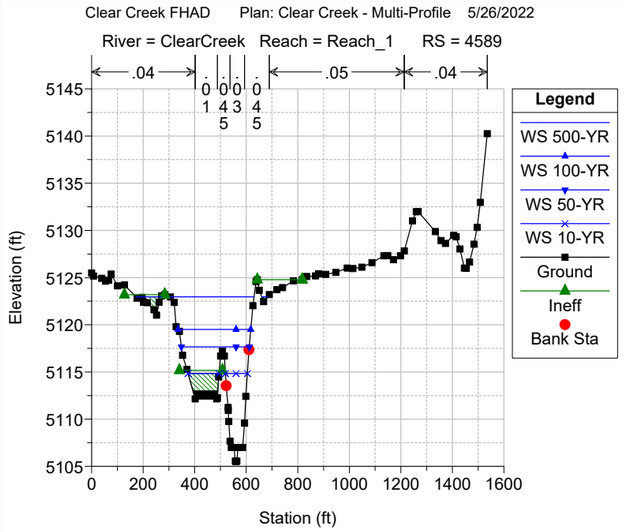
River = ClearCreek Reach = Reach_1 RS = 5207 0.8 expansion coefficient used to fix drawdown

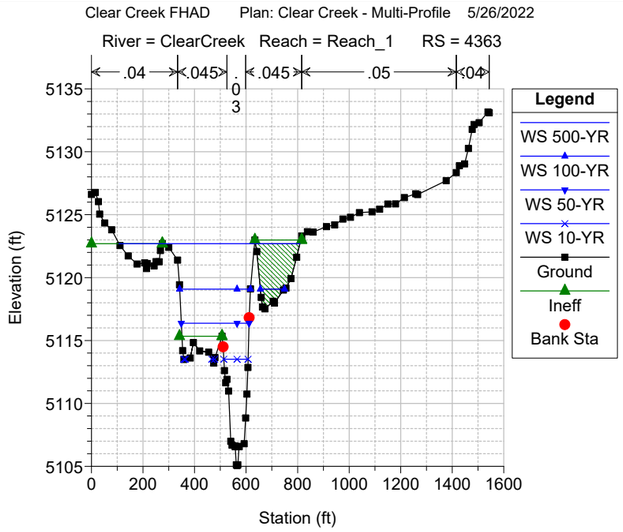


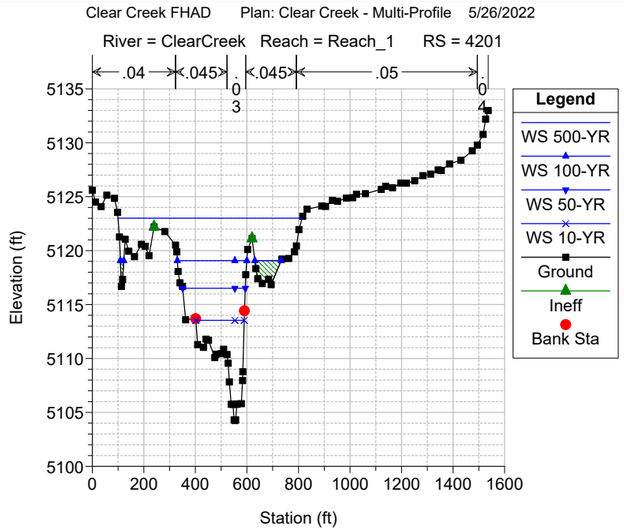
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

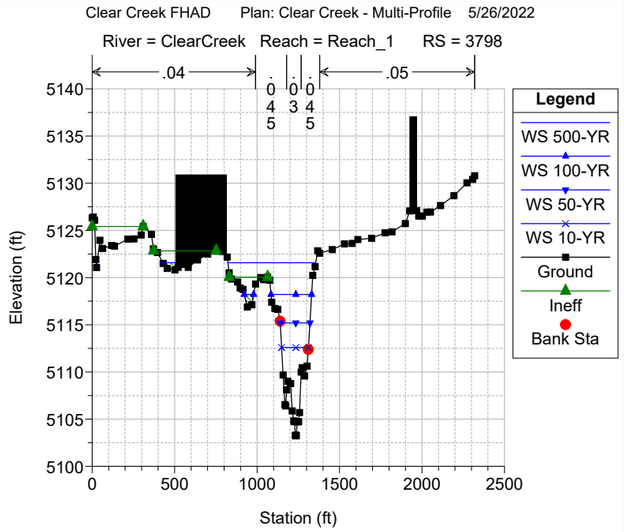
River = ClearCreek Reach = Reach_1 RS = 4871

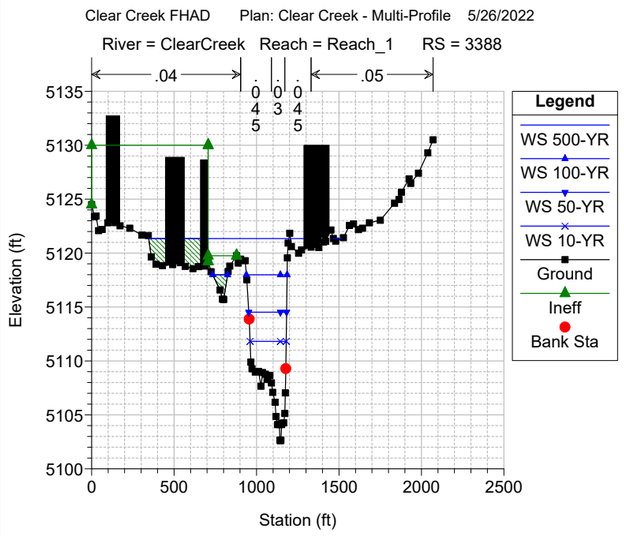


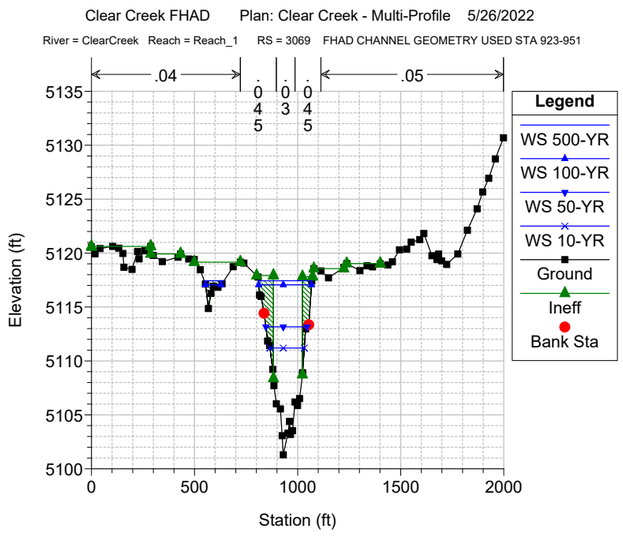

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 4589
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

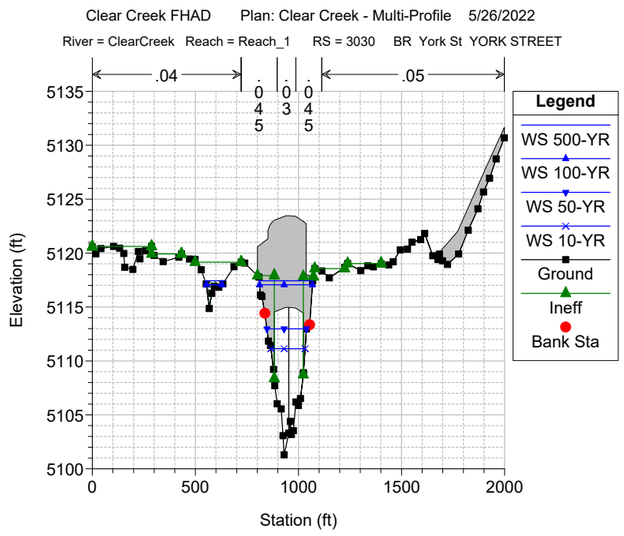

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 4363
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

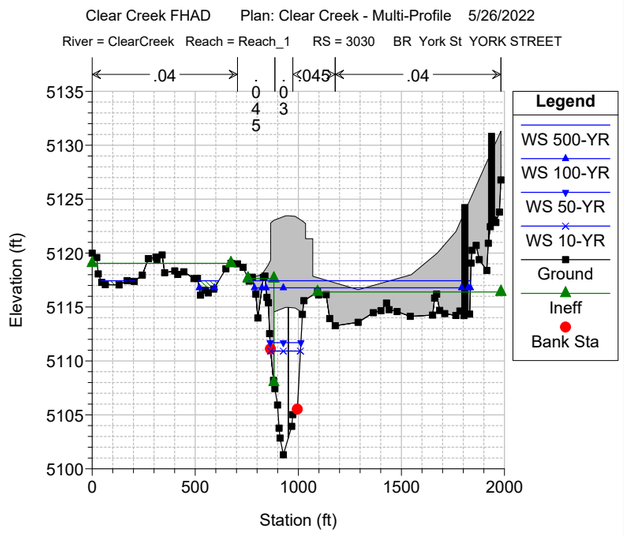

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 4201
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

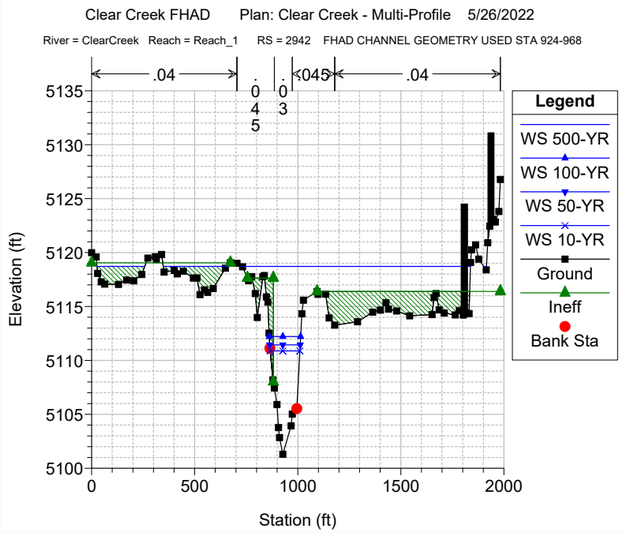

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 3798
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

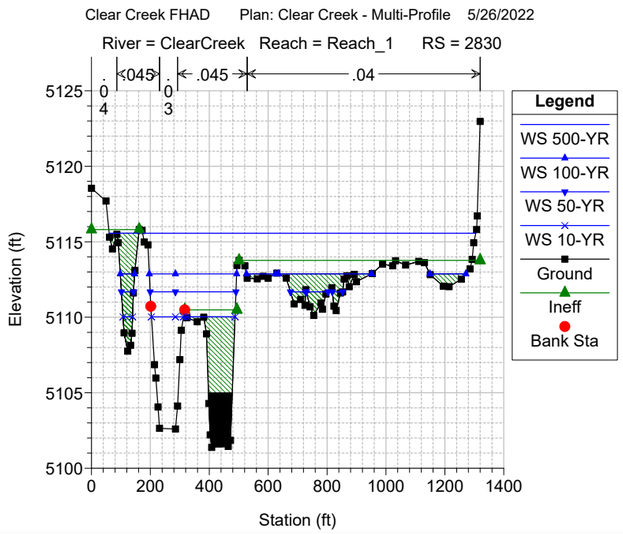

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 3388
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

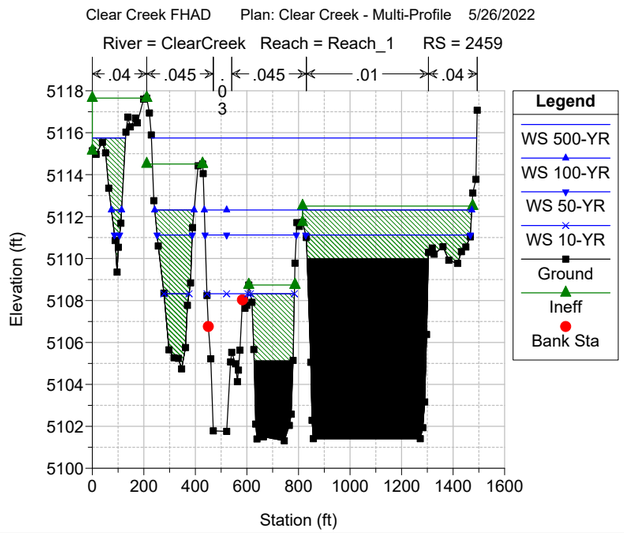

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 3069 FHAD CHANNEL GEOMETRY USED STA 923-951
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

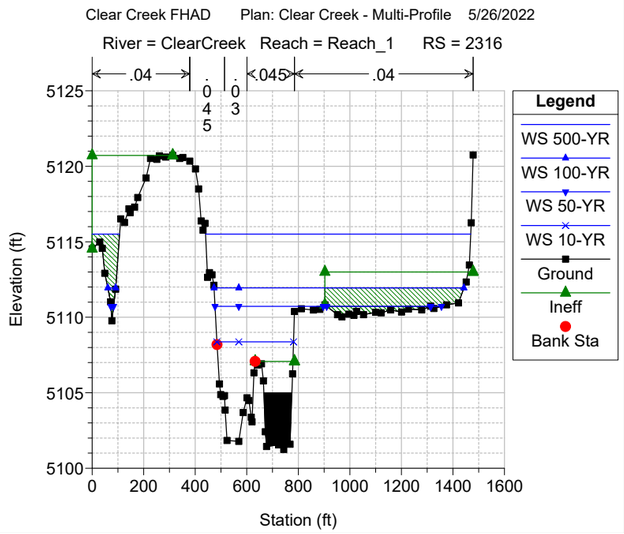

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 3030 BR York St YORK STREET
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 3030 BR York St YORK STREET
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

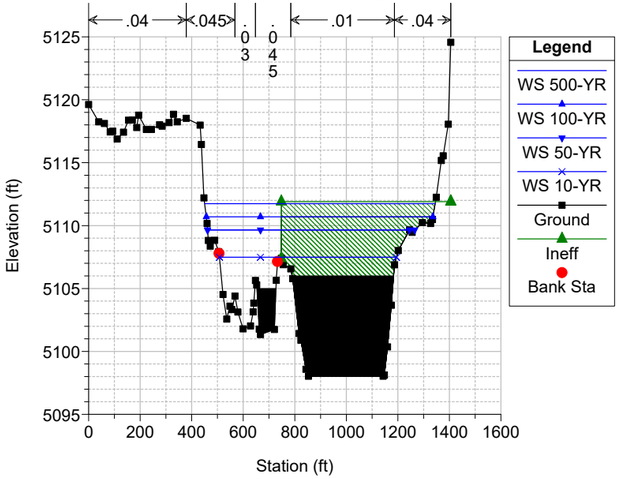

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 2942 FHAD CHANNEL GEOMETRY USED STA 924-968
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 2830
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

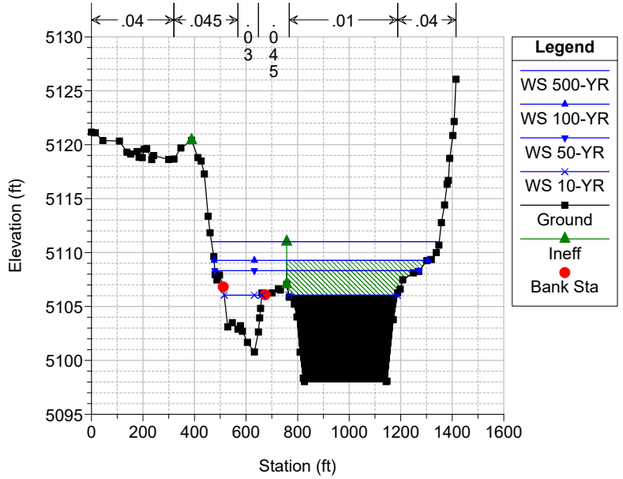

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 2459
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 2316
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

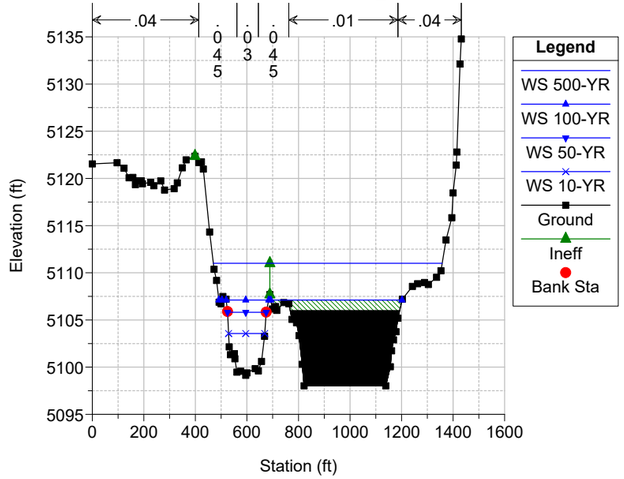
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 2036



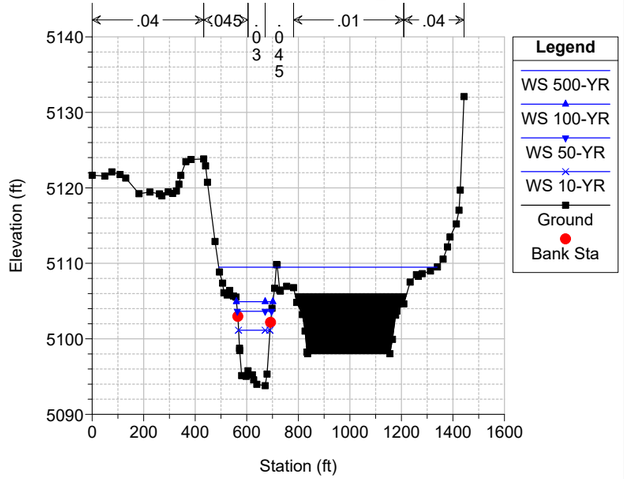
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 1981



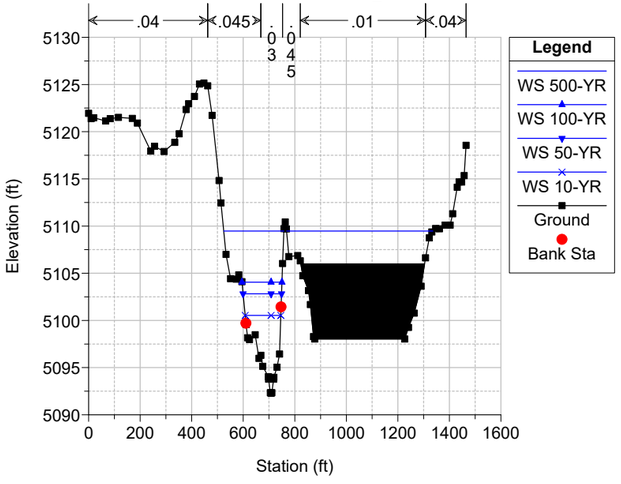
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 1948



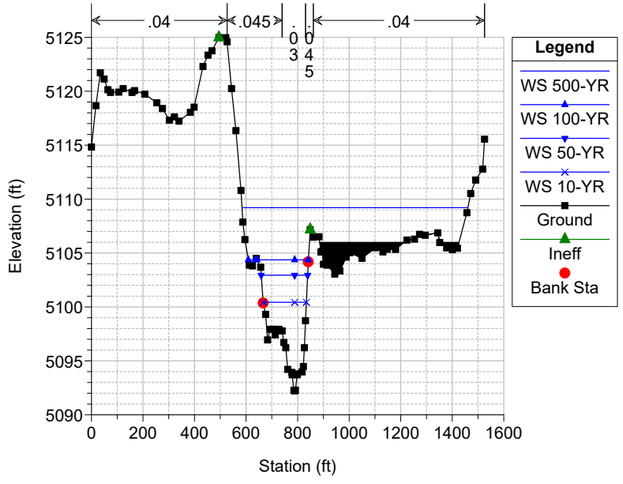
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 1899



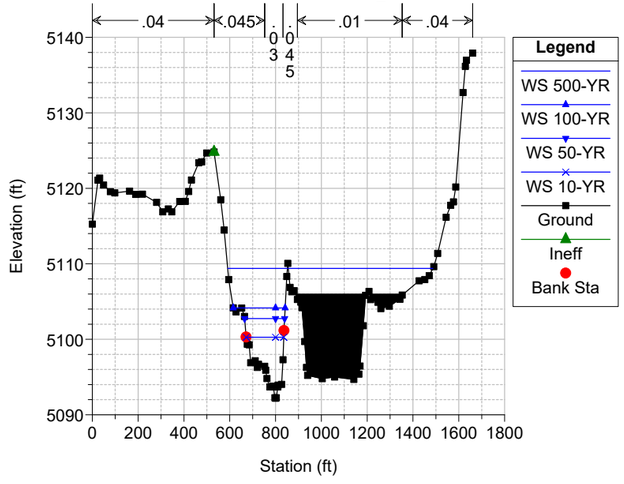
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 1791



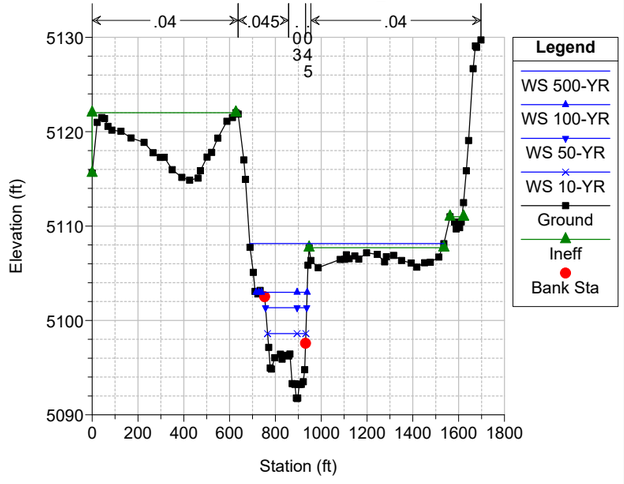
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 1719



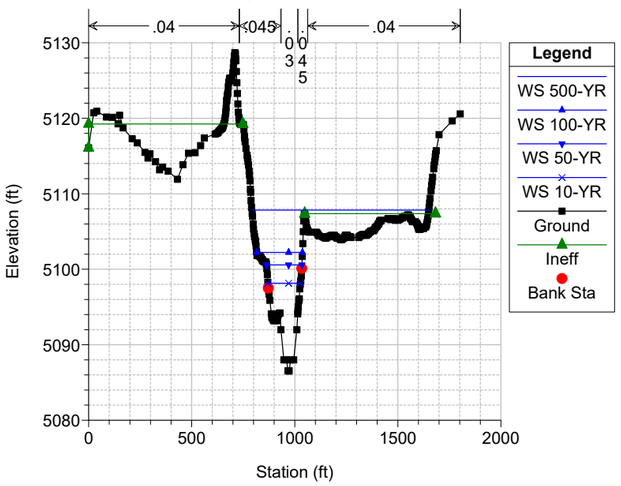
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 1668



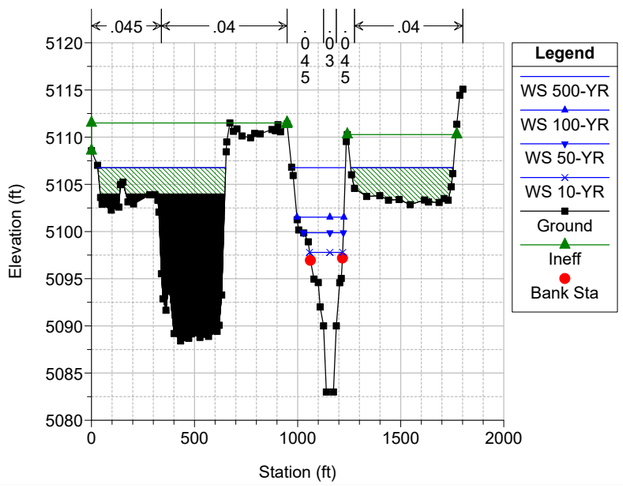
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 1402



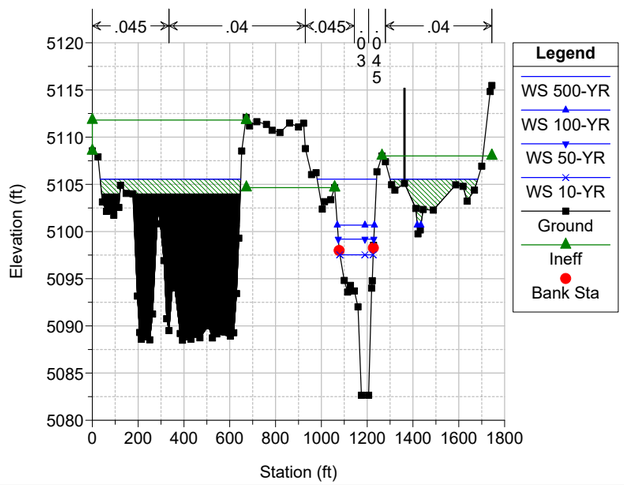
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 966 Channel thalweg taken from previous FHAD



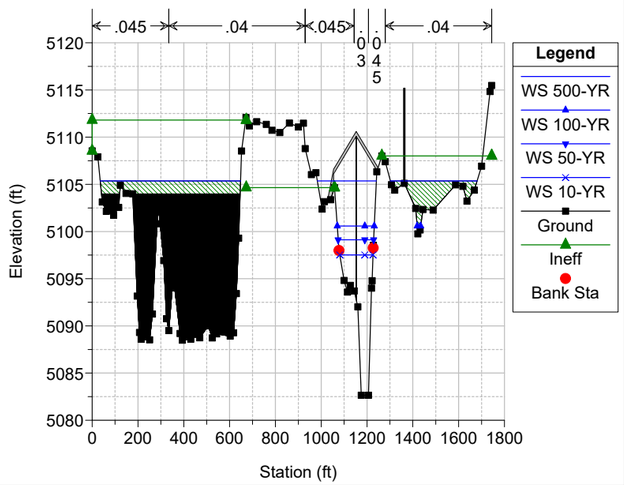
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 534 Channel Thalweg taken from Ayres FHAD XS 3.0 (3 -- thalweg estim



Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 398 Channel Thalweg taken from Ayres FHAD XS 2.6 ()

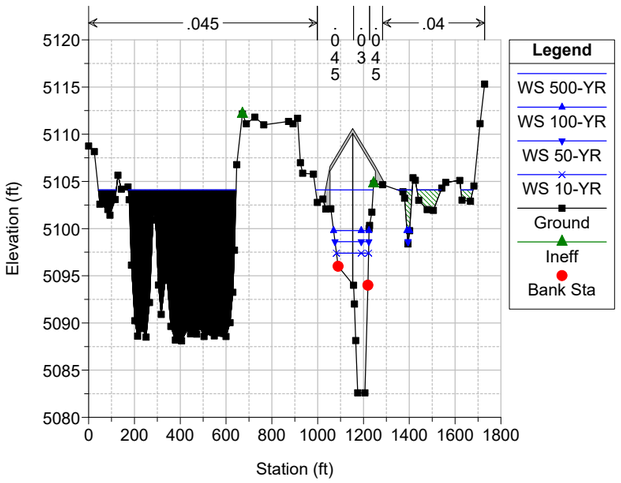


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 391 BR Footbridge FOOTBRIDGE UPSTREAM OF SPR CONFLUENCE



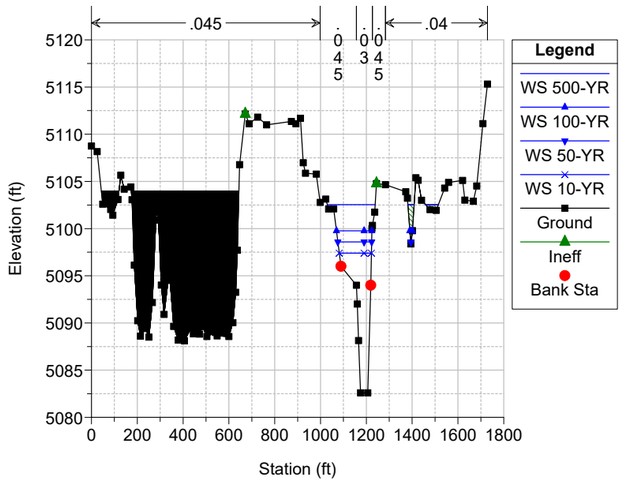
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 391 BR Footbridge FOOTBRIDGE UPSTREAM OF SPR CONFLUENCE



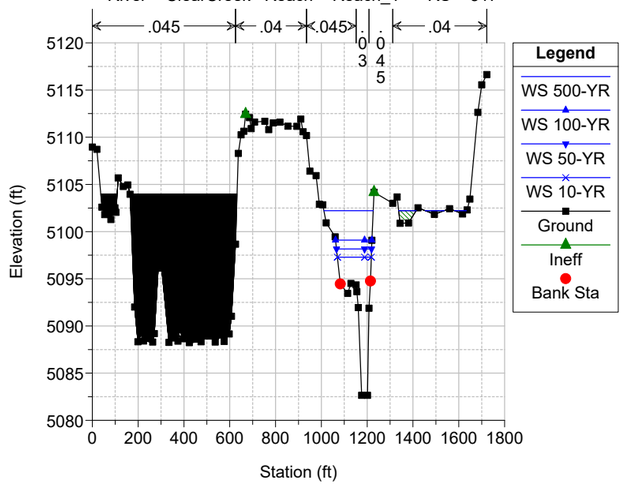
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 368 Channel thalweg taken from Ayres FHAD XS 2.4 (2.4 -- D/S face of



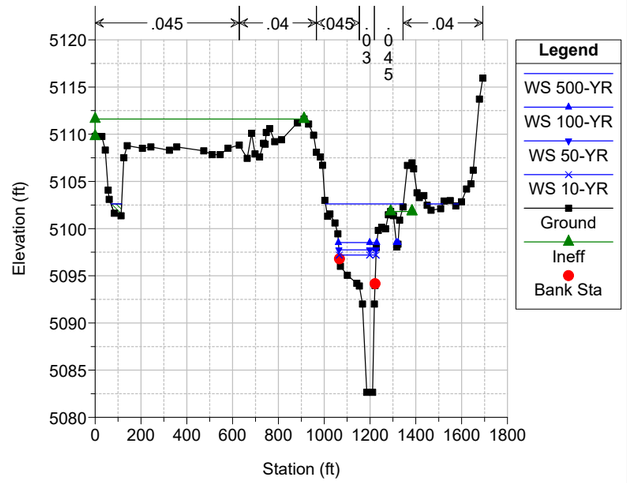
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 317



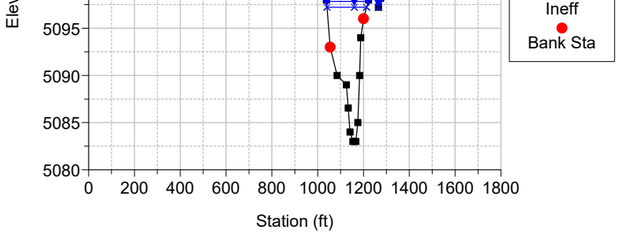
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 258 Channel thalweg taken from Ayres FHAD XS 2 (2 -- gravel pit pond



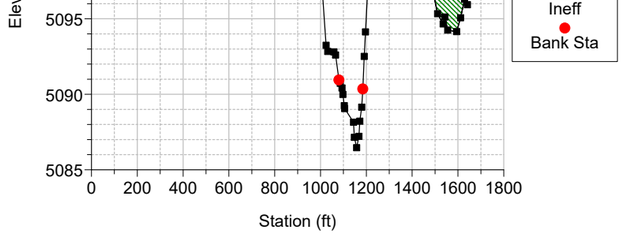
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

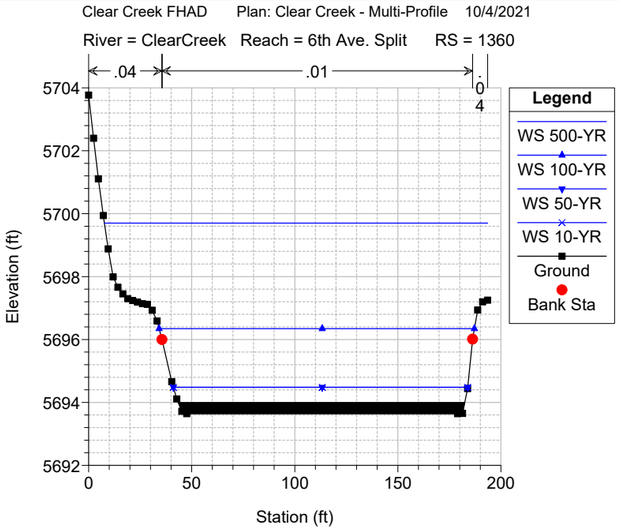
River = ClearCreek Reach = Reach_1 RS = 232 Channel thalweg taken from Ayres FHAD XS 1.2 (1.2 -- XS develope

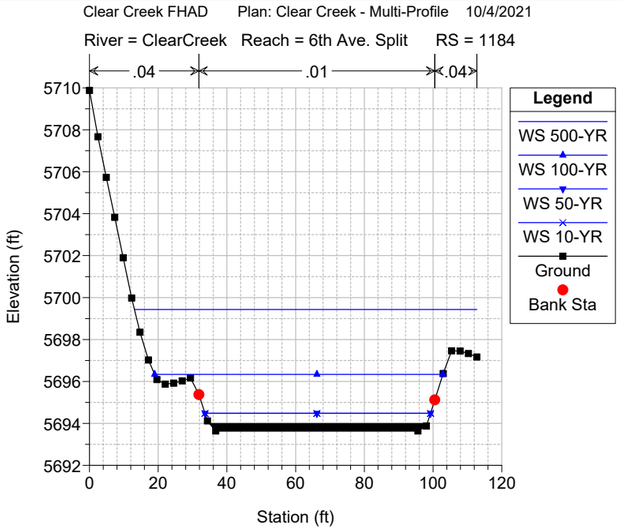


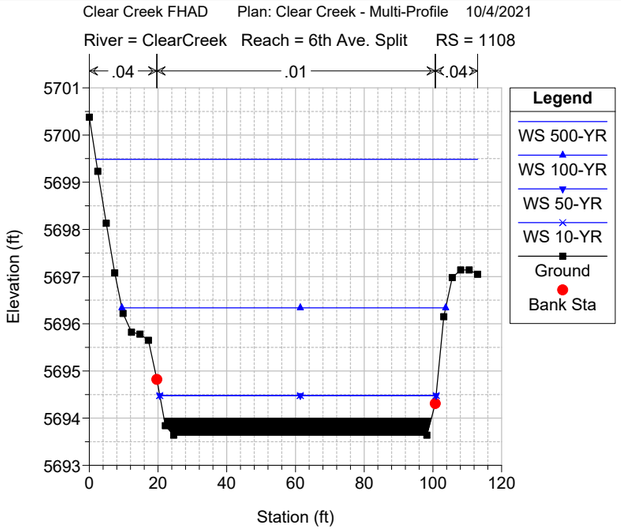
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 5/26/2022

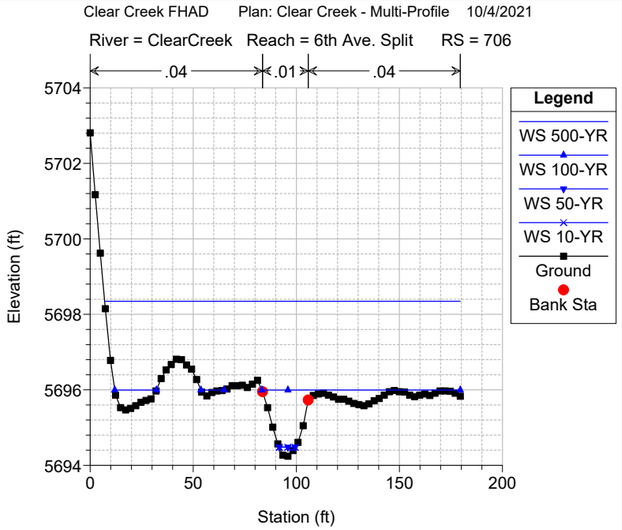
River = ClearCreek Reach = Reach_1 RS = 157 D/S Crest of GBD structure

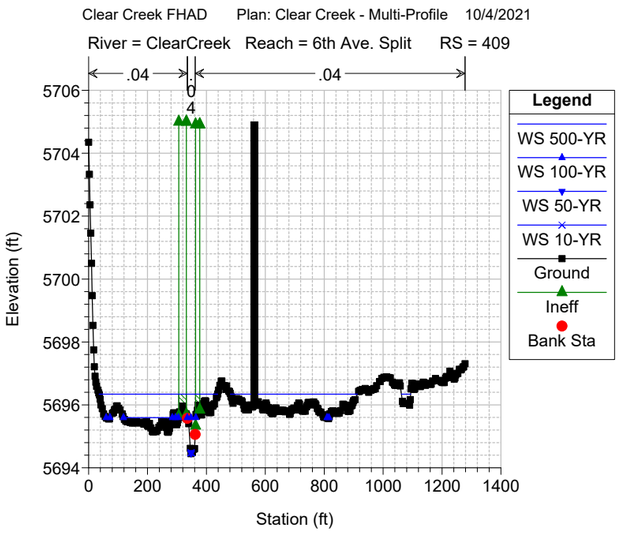


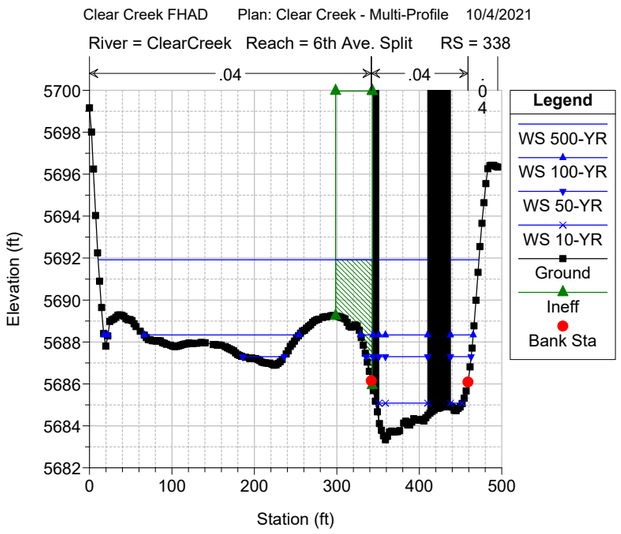

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = 6th Ave. Split RS = 1360
.04 .01 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

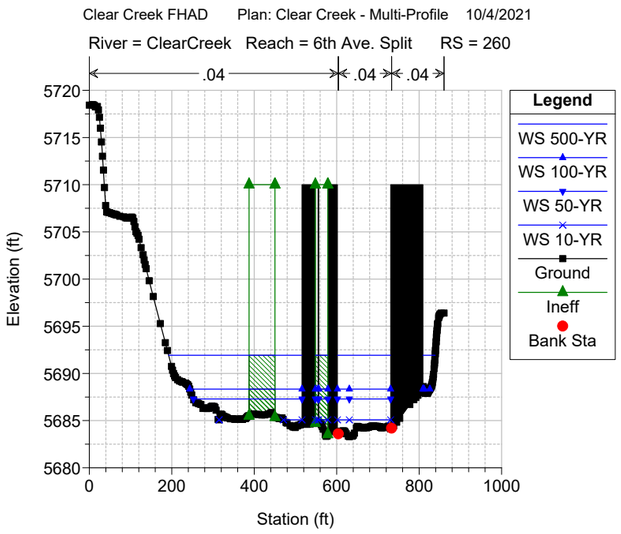

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = 6th Ave. Split RS = 1184
.04 .01 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

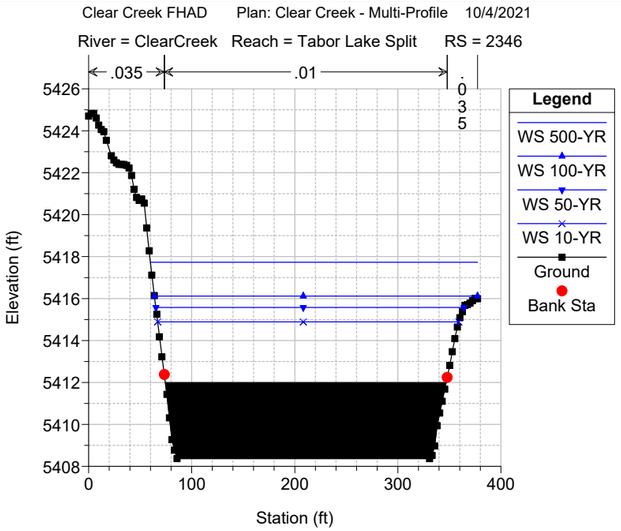

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = 6th Ave. Split RS = 1108
.04 .01 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

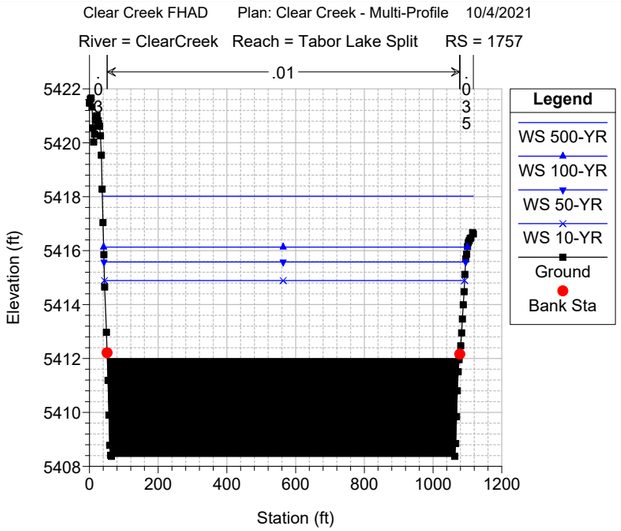

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = 6th Ave. Split RS = 706
.04 .01 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

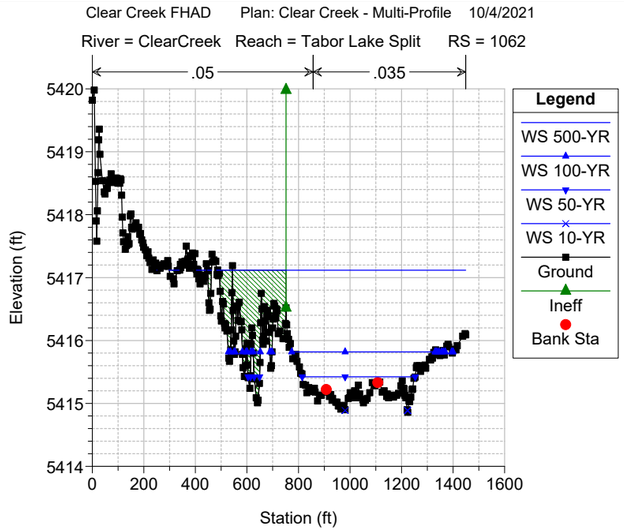

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = 6th Ave. Split RS = 409
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

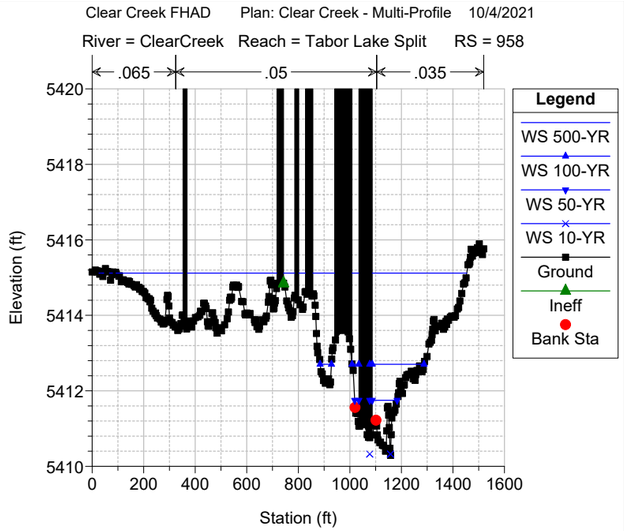

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = 6th Ave. Split RS = 338
.04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

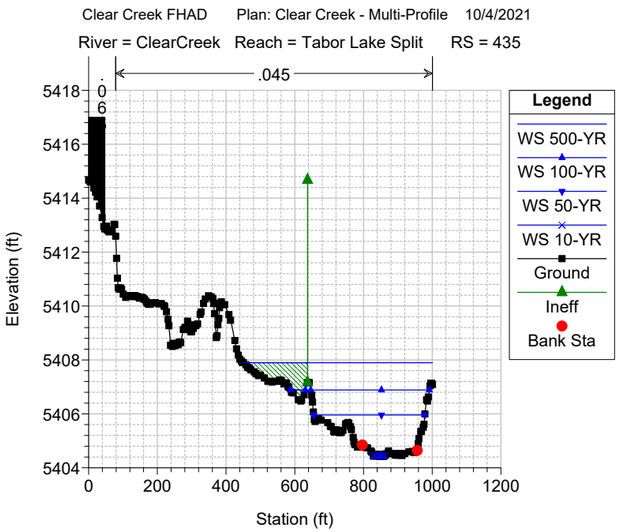

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = 6th Ave. Split RS = 260
.04 .04 .04
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

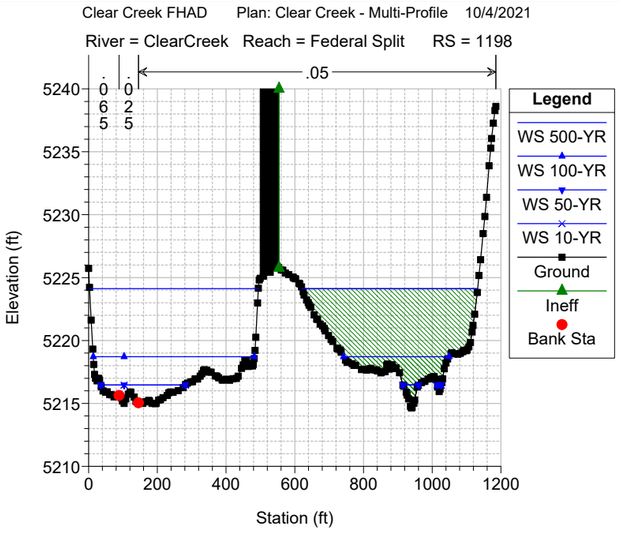

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Tabor Lake Split RS = 2346
.035
.01
.035
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

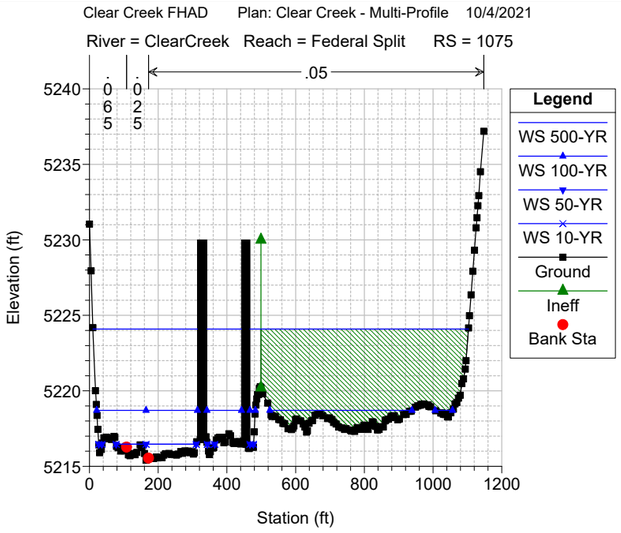

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Tabor Lake Split RS = 1757
.03
.01
.035
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

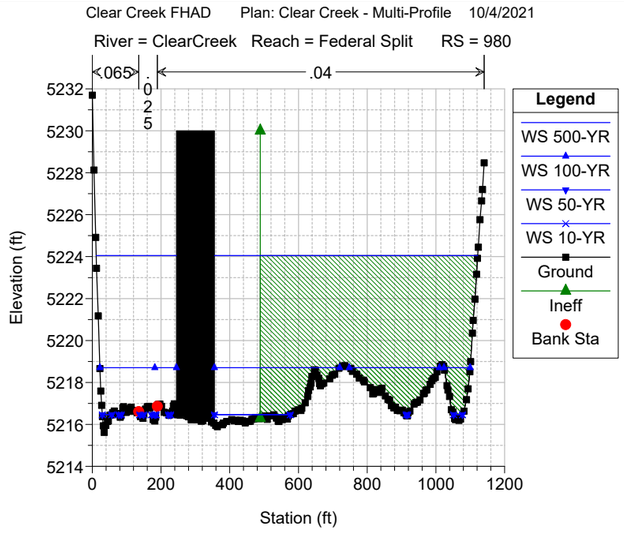

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Tabor Lake Split RS = 1062
.05
.035
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

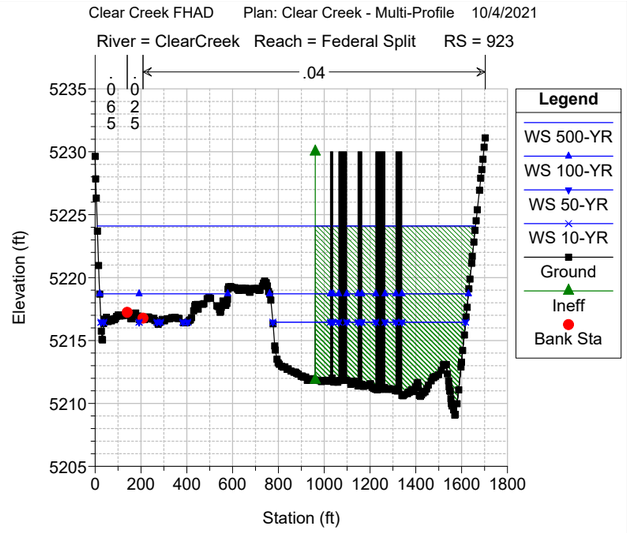

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Tabor Lake Split RS = 958
.065
.05
.035
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

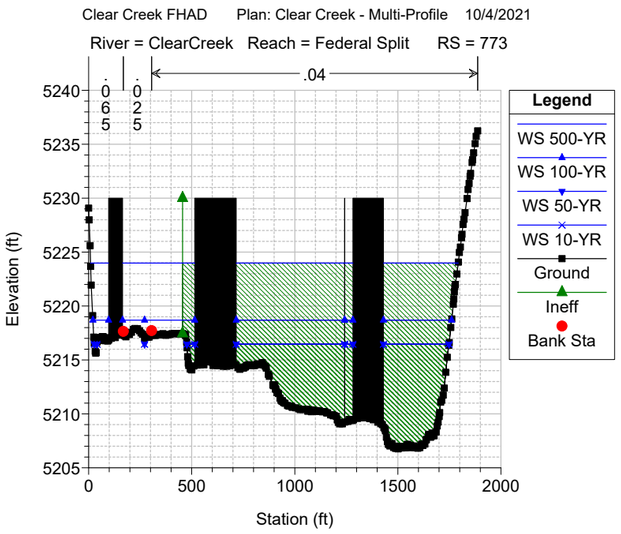

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Tabor Lake Split RS = 435
.06
.045
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

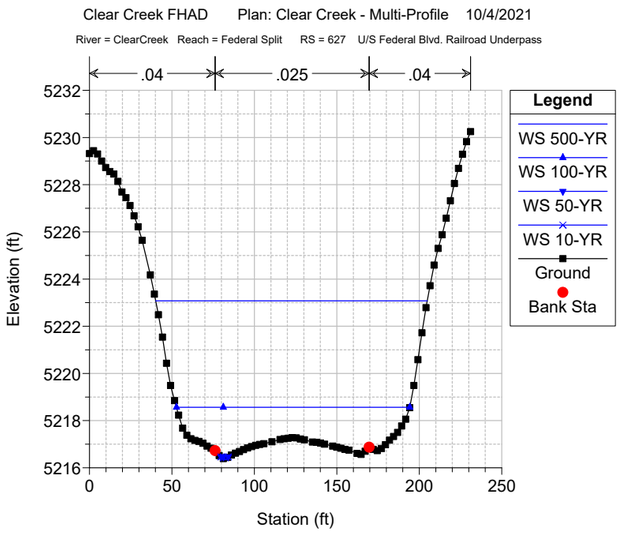

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Federal Split RS = 1198
.05
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

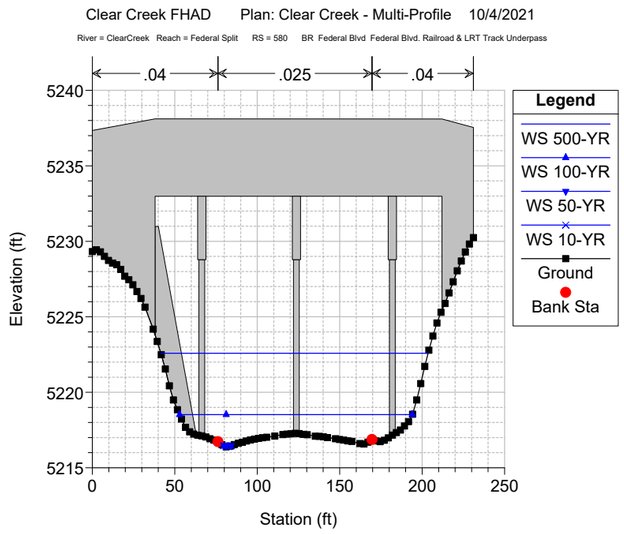

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Federal Split RS = 1075
.05
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

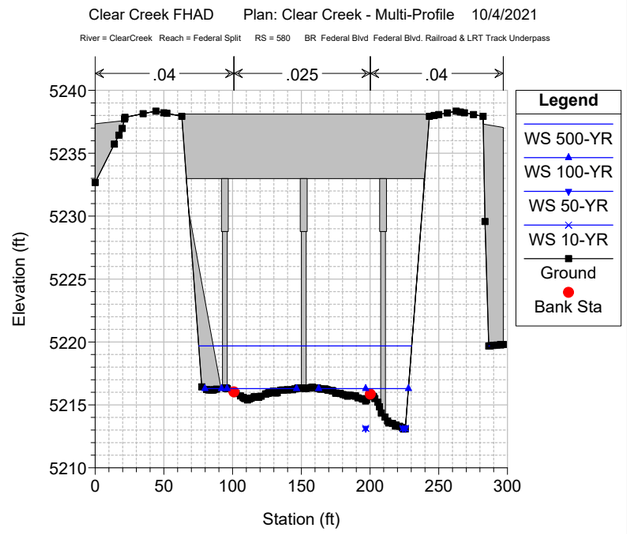

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Federal Split RS = 980
.065
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

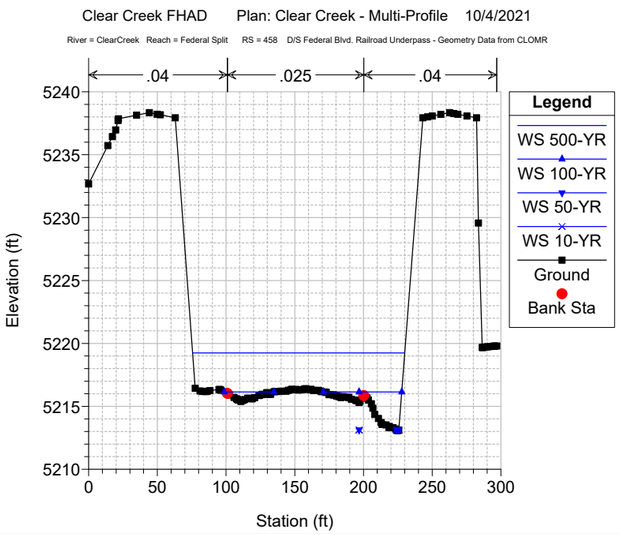

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Federal Split RS = 923
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

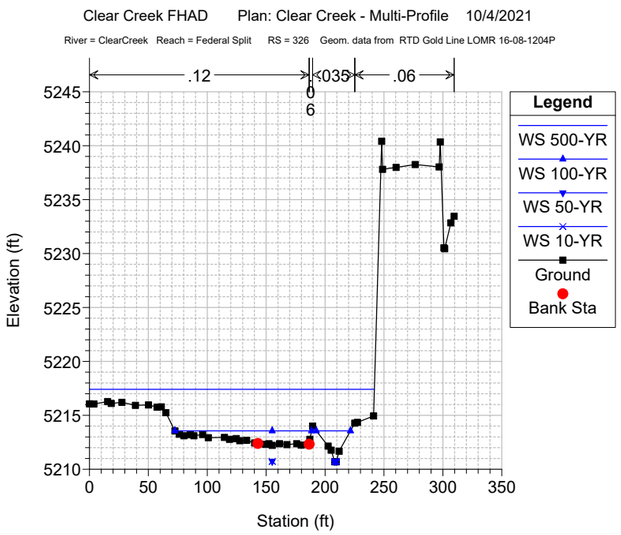

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Federal Split RS = 773
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Federal Split RS = 627 U/S Federal Blvd. Railroad Underpass
.04
.025
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

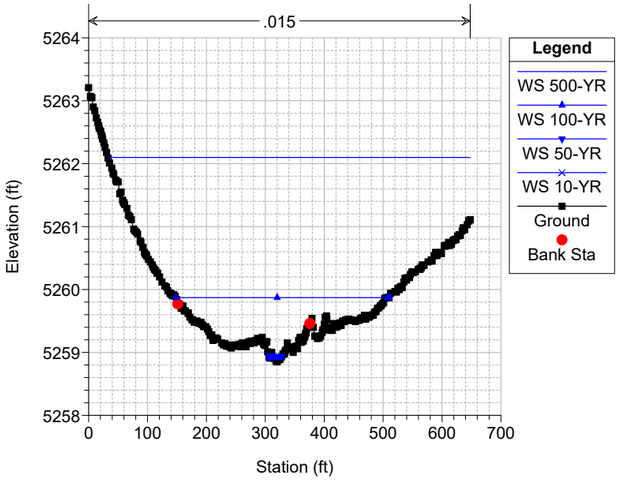

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Federal Split RS = 580 BR Federal Blvd Federal Blvd. Railroad & LRT Track Underpass
.04
.025
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Federal Split RS = 580 BR Federal Blvd Federal Blvd. Railroad & LRT Track Underpass
.04
.025
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

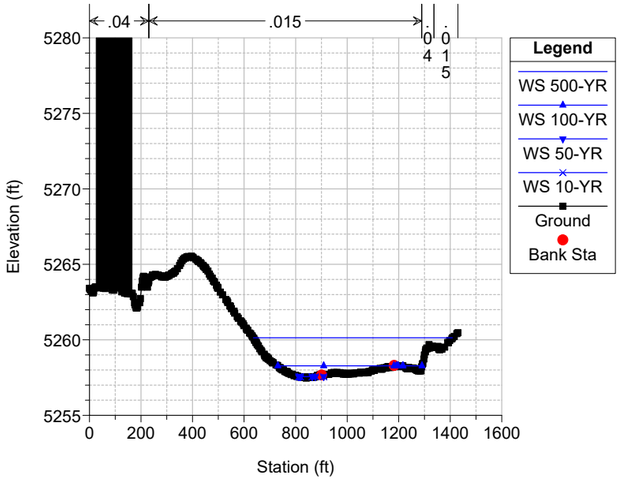

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Federal Split RS = 458 D/S Federal Blvd. Railroad Underpass - Geometry Data from CLOMR
.04
.025
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = ClearCreek Reach = Federal Split RS = 326 Geom. data from RTD Gold Line LOMR 16-08-1204P
.12
.035
.06
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

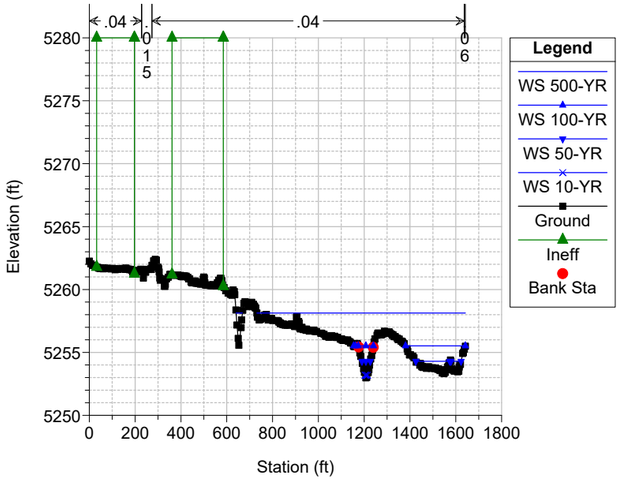
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 7991 SHERIDAN BLVD.



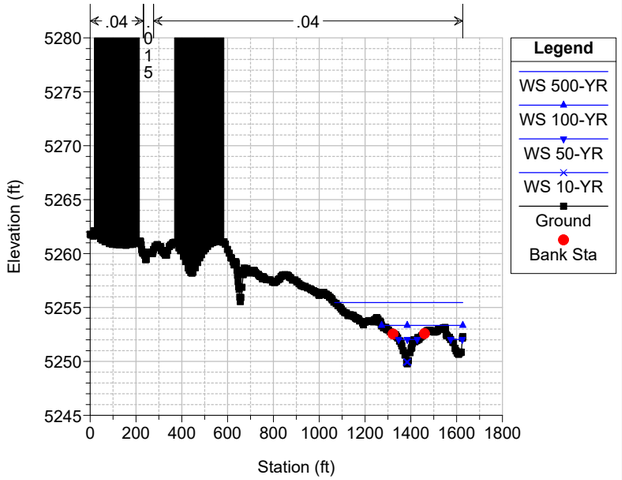
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 7879



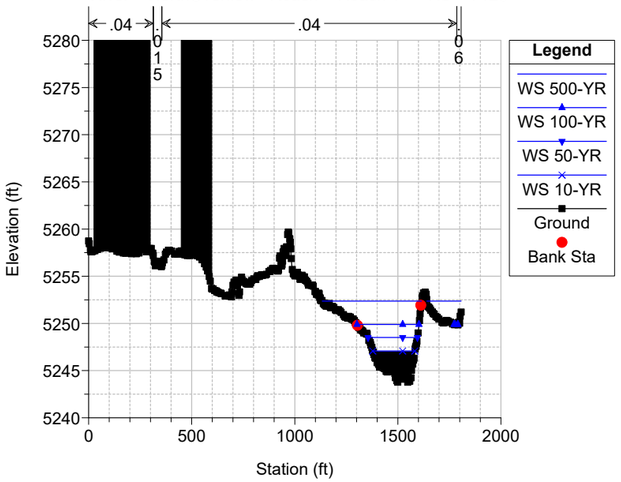
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 7650



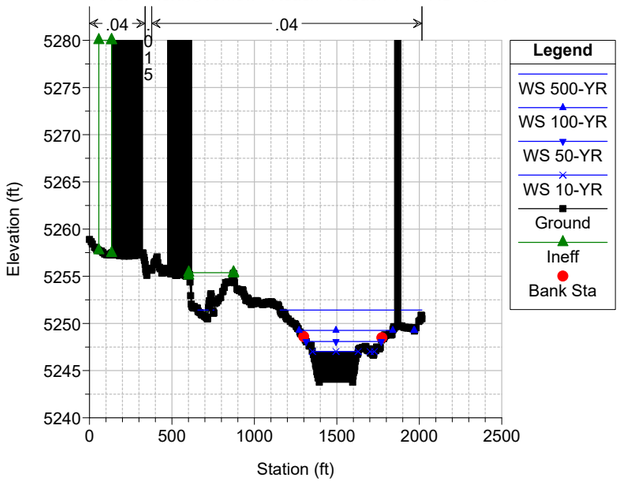
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 7365



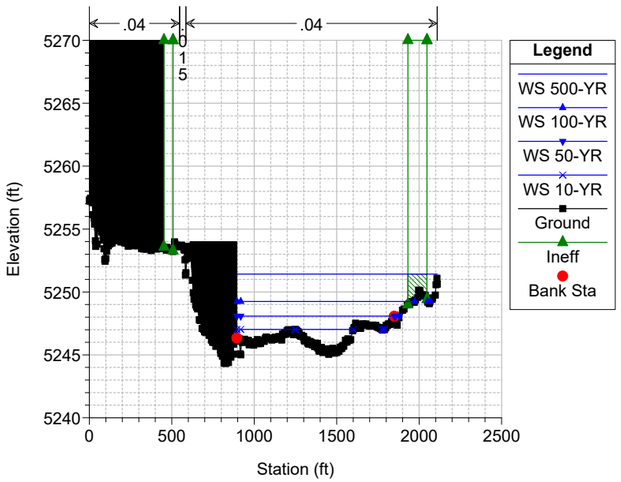
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 7126



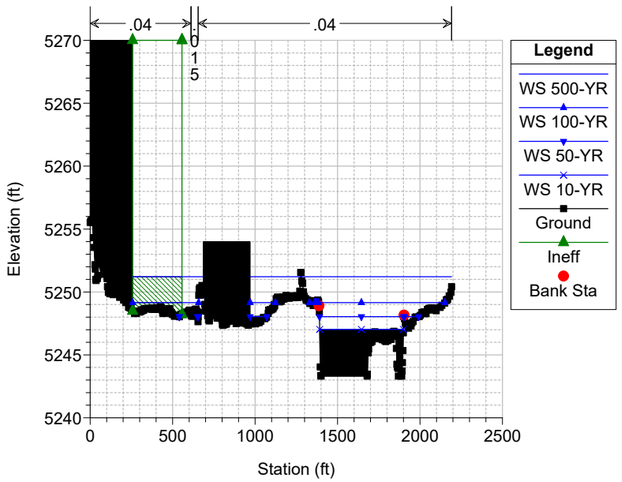
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 6804



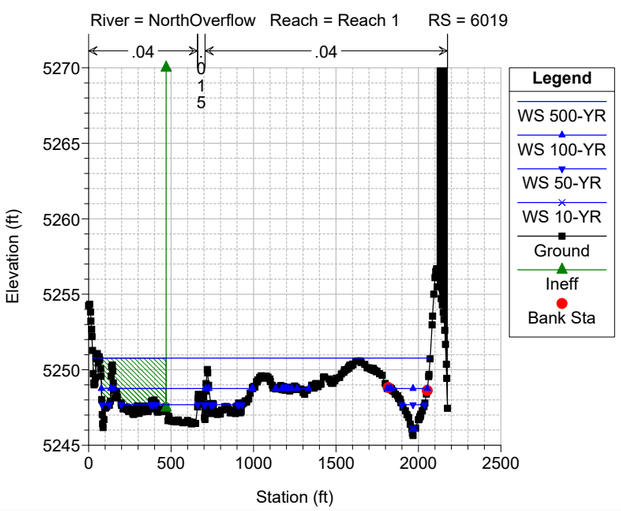
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 6611 Fill @ Elev. 5254 Added to LOB



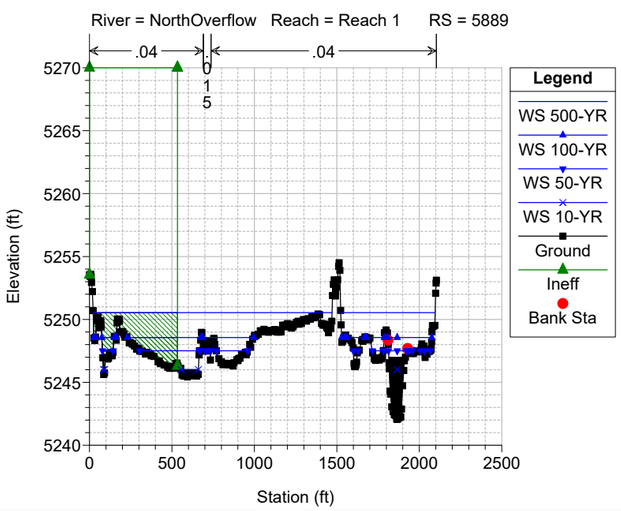
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 6380 Fill @ Elev. 5254 Added to LOB



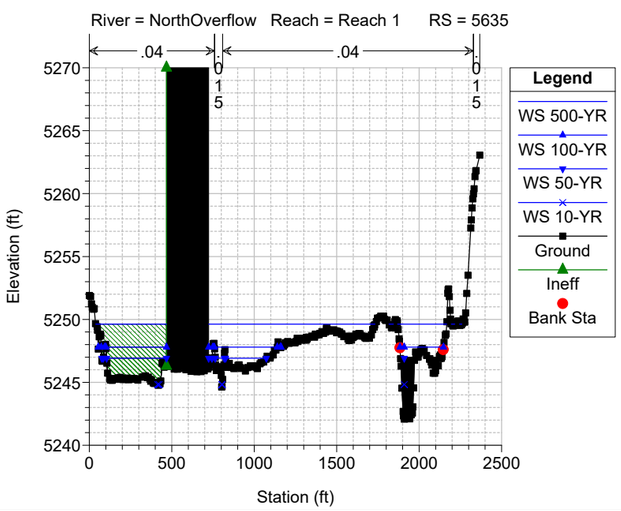
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 6019



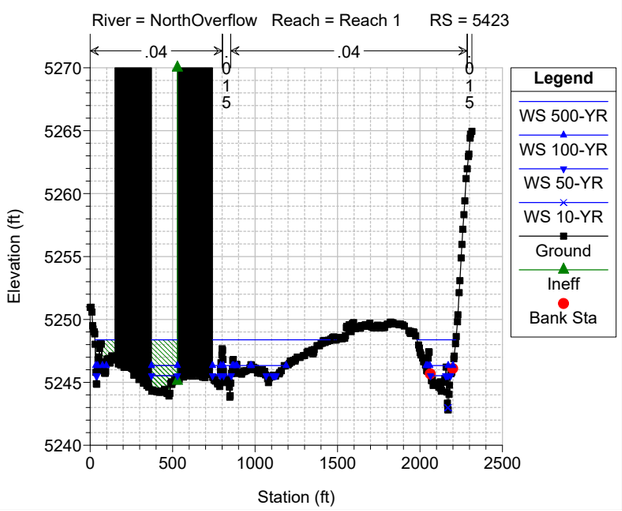
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 5889

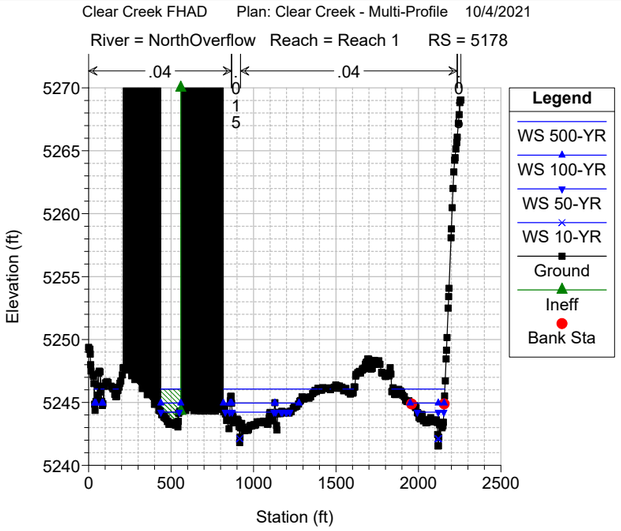


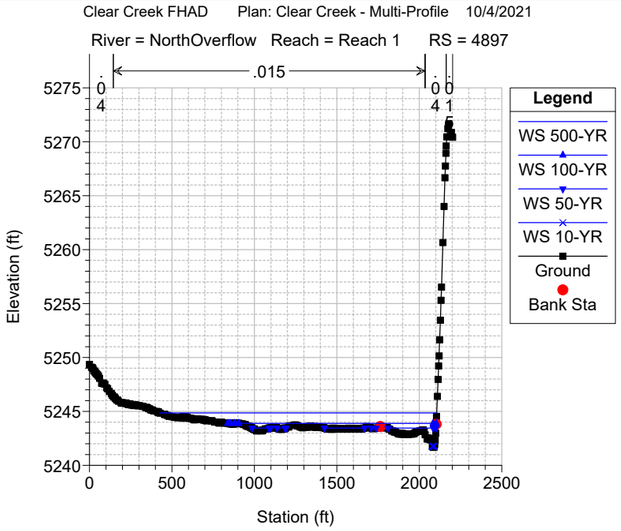
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 5635

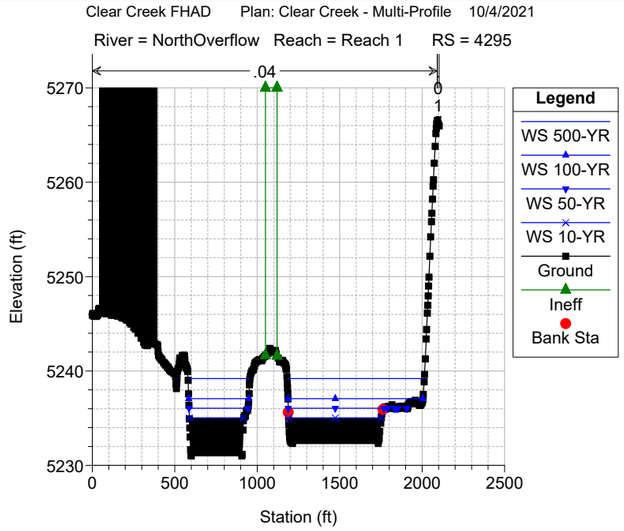


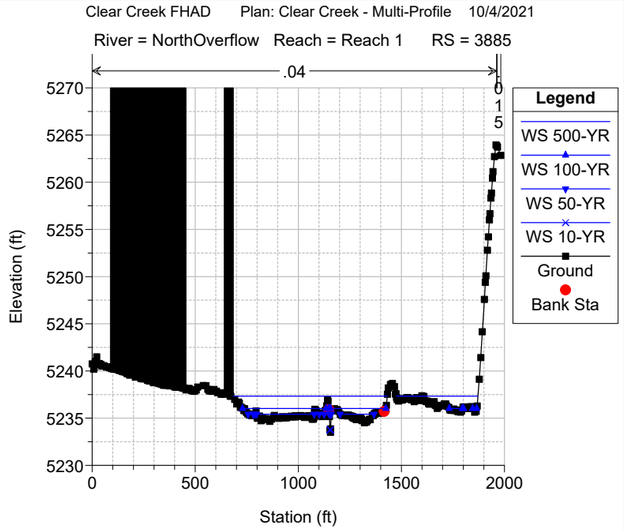
Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 5423

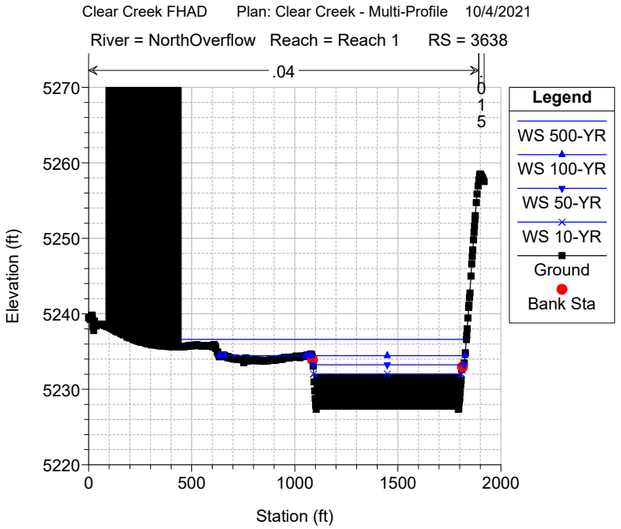


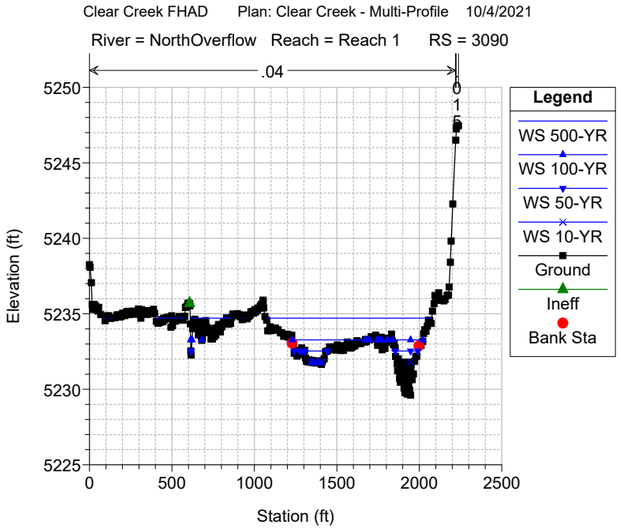

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 5178
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

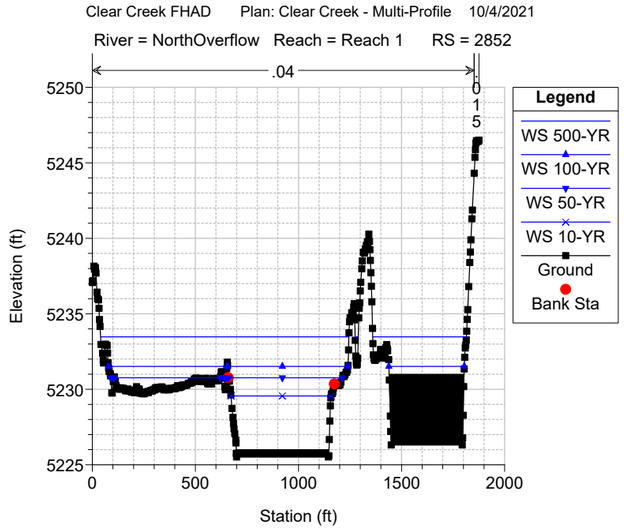

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 4897
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

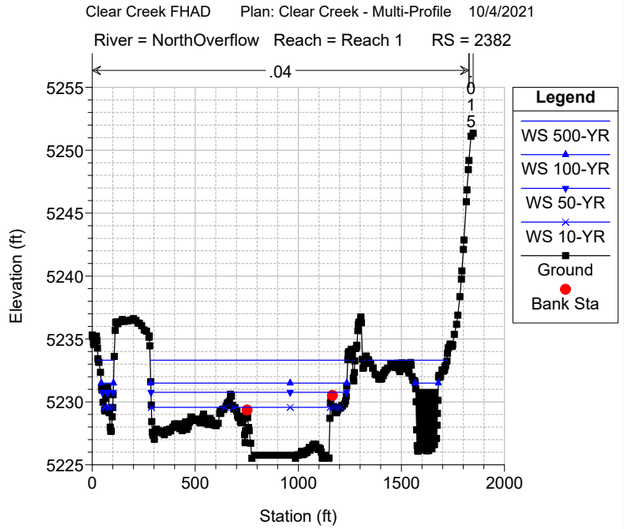

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 4295
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

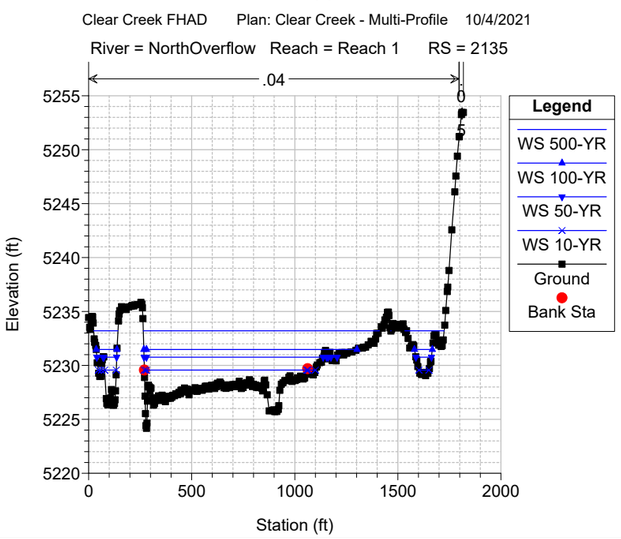

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 3885
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

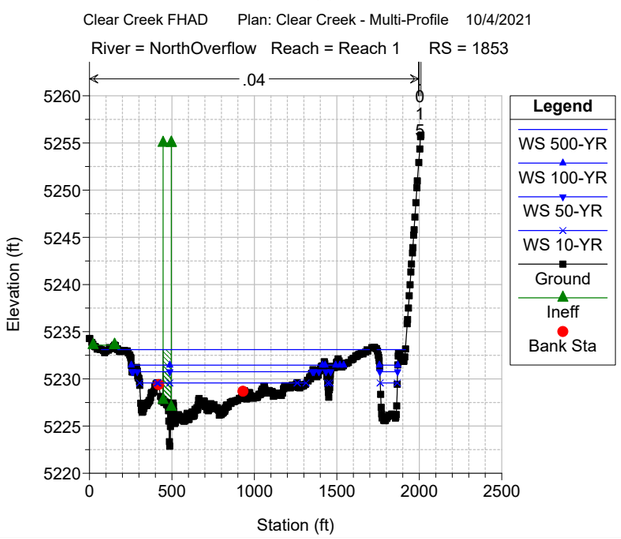

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 3638
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

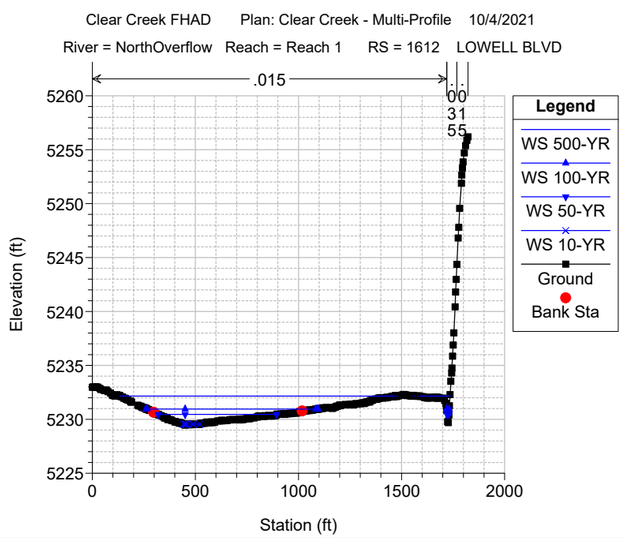

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 3090
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta

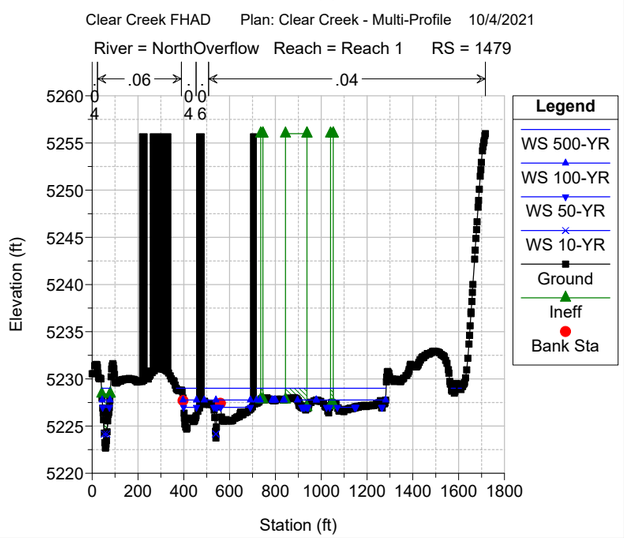

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 2852
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

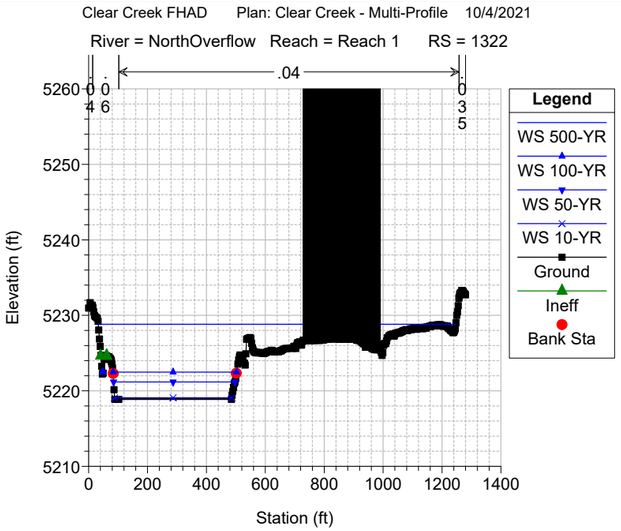

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 2382
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

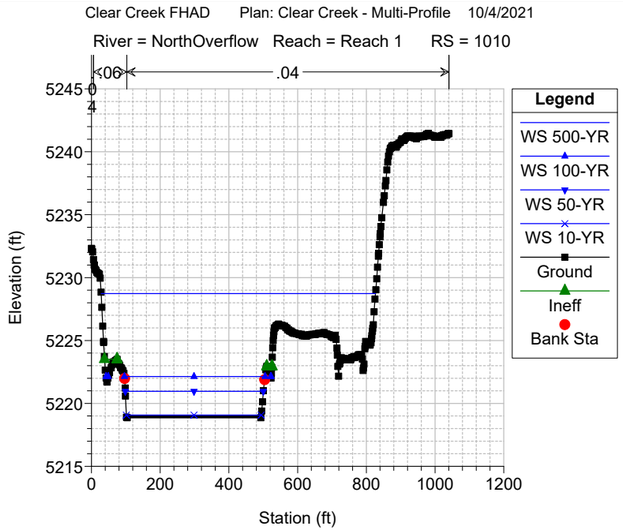

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 2135
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

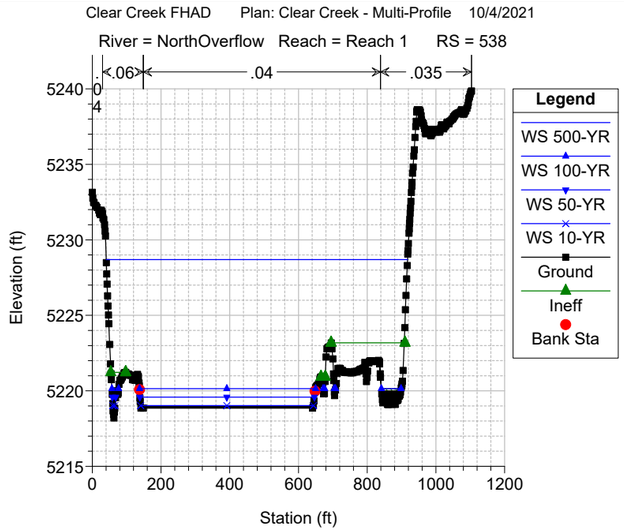

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 1853
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 1612 LOWELL BLVD
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Bank Sta

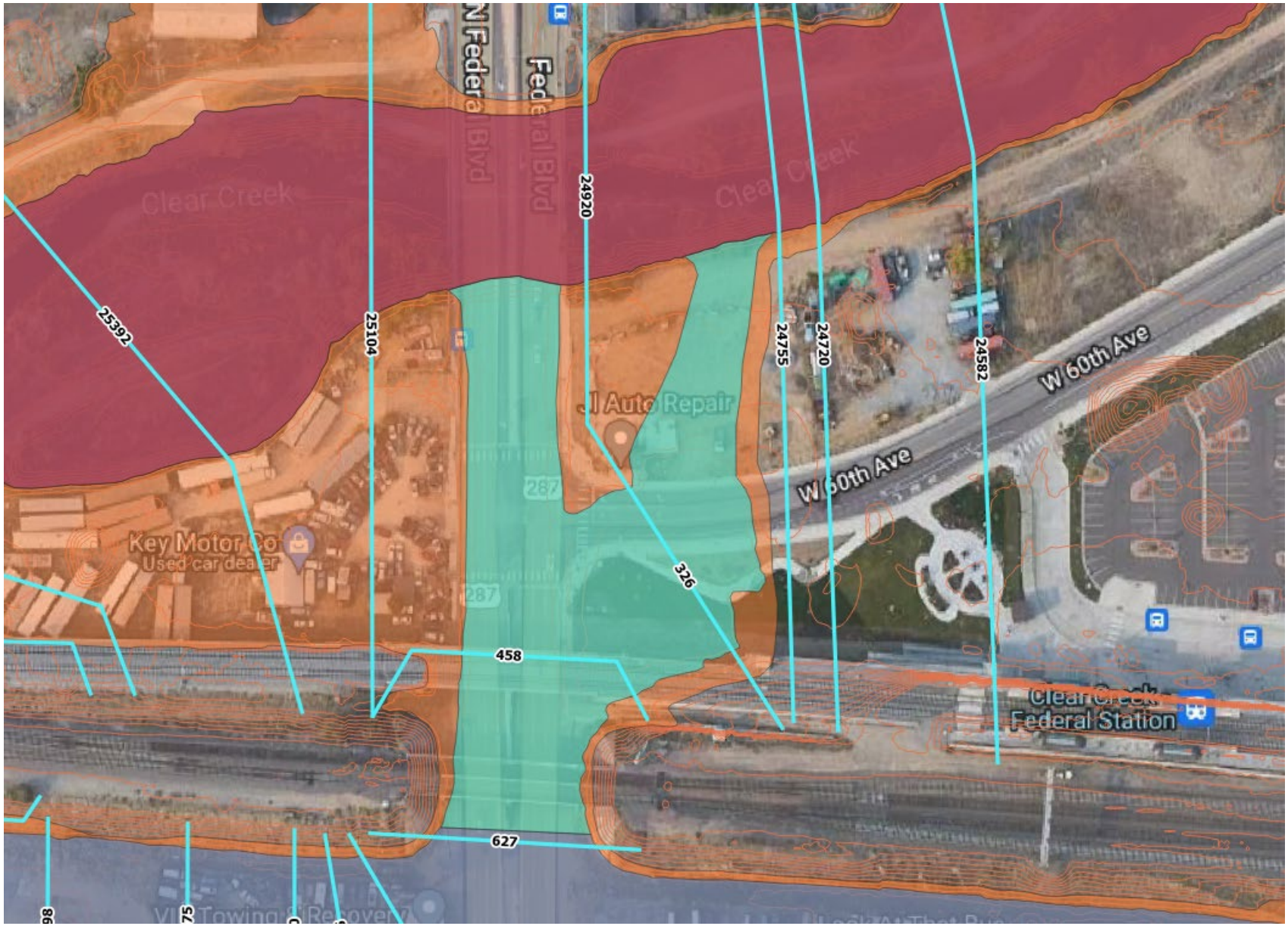

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 1479
Elevation (ft)
Station (ft)
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 1322
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 1010
.06
.04
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

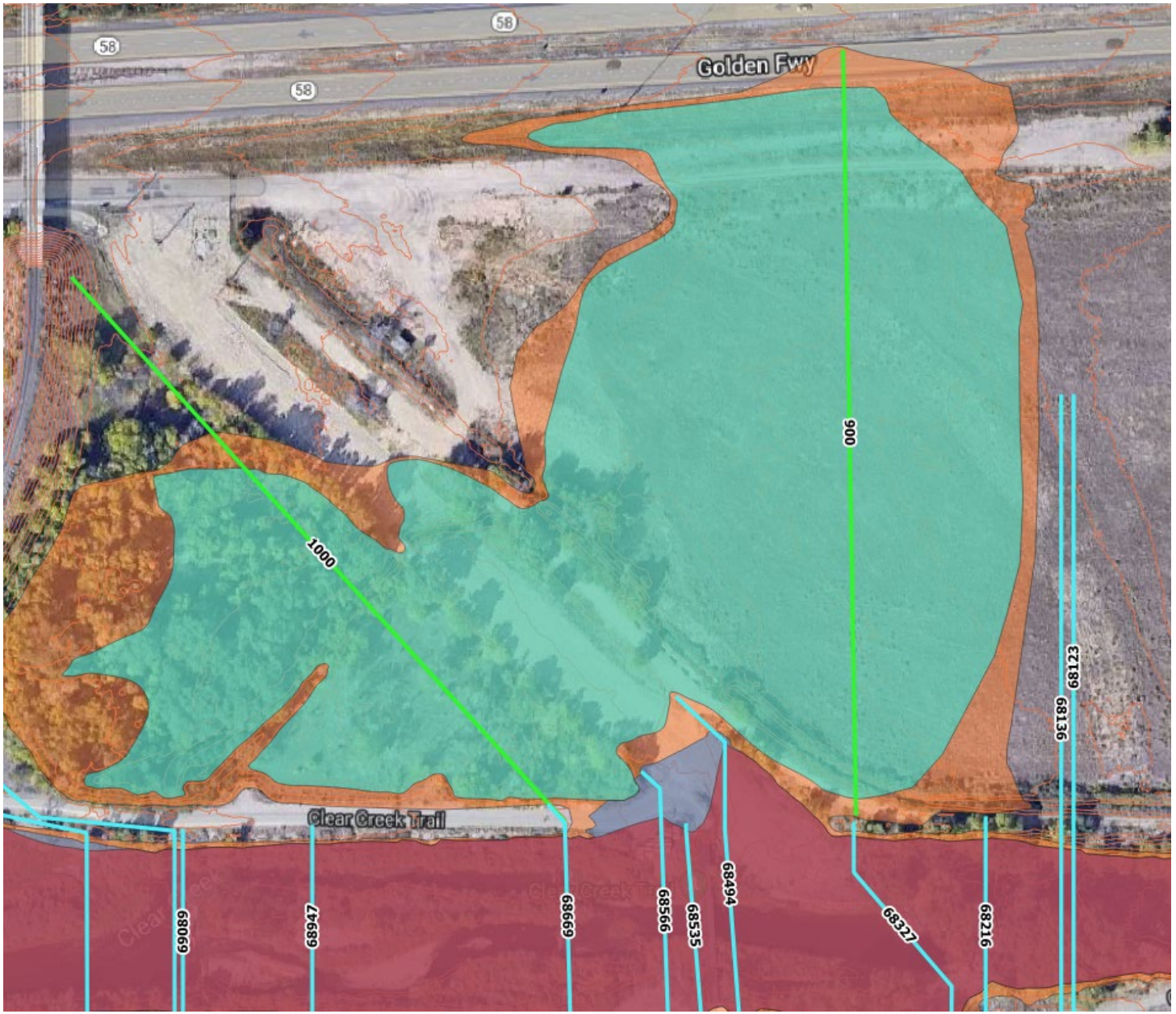

Clear Creek FHAD Plan: Clear Creek - Multi-Profile 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 538
.06
.04
.035
Legend
WS 500-YR
WS 100-YR
WS 50-YR
WS 10-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

AVERAGE DEPTH CALCS



The average depths were analyzed for cross-sections 458 & 326 in the Federal Split as the 100-YR flooding appeared to be shallow. The average depths are less than 1-ft in both sections therefore this area was shown as shallow 100-YR flooding.

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Flow Area (sq ft)	Area (sq ft)	Top Width (ft)	Avg. Flow Depth (ft)	Conclusions
Federal Split	**326**	100-YR	414	5212.21	5213.56	137.23	137.23	145.15	0.95	<----Less than 1.0' = Zone X (shaded)
Federal Split	**458**	100-YR	414	5215.31	5216.15	80.38	80.38	93.04	0.86	
Federal Split	**580 Federal Blvd**		Bridge							
Federal Split	**627**	100-YR	414	5216.39	5218.56	216.58	216.58	141.49	1.53	
Federal Split	**773**	100-YR	414	5217	5218.69	511.57	8071.08	1322.3	6.10	
Federal Split	**923**	100-YR	414	5216.67	5218.71	2067.28	5855.01	1297.94	4.51	
Federal Split	**980**	100-YR	414	5216.16	5218.7	815.09	1608.9	925.67	1.74	
Federal Split	**1075**	100-YR	414	5215.4	5218.71	1021.23	1360.69	874.08	1.56	
Federal Split	**1198**	100-YR	414	5215	5218.71	1100.19	1555.34	775.99	2.00	



HEC-RAS based flow distribution was used to calculate the approx. flow in a low-lying area of the LOB of Clear Creek from XS 68669 to XS 68535. Once the most conservative flow values were determined (3,468-cfs for the 100-YR and 8,285-cfs for the 500-YR), normal depth calculations were used to determine the water-surface elevations and to assist with plotting the floodplains.

Worksheet for Irregular Section - 2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Discharge	3,468.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	5,471.99
0+15	5,471.68
0+37	5,471.55
0+59	5,467.70
0+64	5,467.73
0+71	5,468.79
0+83	5,469.45
1+03	5,468.71
1+09	5,468.77
1+18	5,470.72
1+33	5,470.15
1+39	5,470.93
1+53	5,469.83
1+62	5,469.57
1+85	5,470.22
1+92	5,470.08
2+14	5,470.18
2+36	5,470.48
2+46	5,470.14
3+39	5,469.24
3+64	5,468.70
3+96	5,468.51
4+25	5,468.76
4+36	5,469.01
4+69	5,469.14
4+94	5,468.77
5+06	5,468.84
5+27	5,468.90
5+34	5,469.17
5+56	5,469.40
5+64	5,469.74
5+83	5,469.79
6+01	5,470.25
6+22	5,469.99
6+40	5,470.49
6+72	5,470.13
6+94	5,470.82
6+99	5,470.65

Worksheet for Irregular Section - 2

Section Definitions

Station (ft)	Elevation (ft)
7+11	5,471.18
7+24	5,471.08
7+37	5,471.42
7+43	5,471.06
7+52	5,471.57
7+60	5,470.14
7+67	5,467.24
7+75	5,466.88
7+80	5,469.24
7+85	5,470.57
8+00	5,470.91
8+06	5,471.56

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 5,471.99)	(8+06, 5,471.56)	0.045

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	50.9 in
Elevation Range	5,466.9 to 5,472.0 ft
Flow Area	1,117.6 ft²
Wetted Perimeter	729.5 ft
Hydraulic Radius	18.4 in
Top Width	727.26 ft
Normal Depth	50.9 in
Critical Depth	42.1 in
Critical Slope	0.030 ft/ft
Velocity	3.10 ft/s
Velocity Head	0.15 ft
Specific Energy	4.39 ft
Froude Number	0.441
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft

Worksheet for Irregular Section - 2

GVF Input Data	
Number Of Steps	0

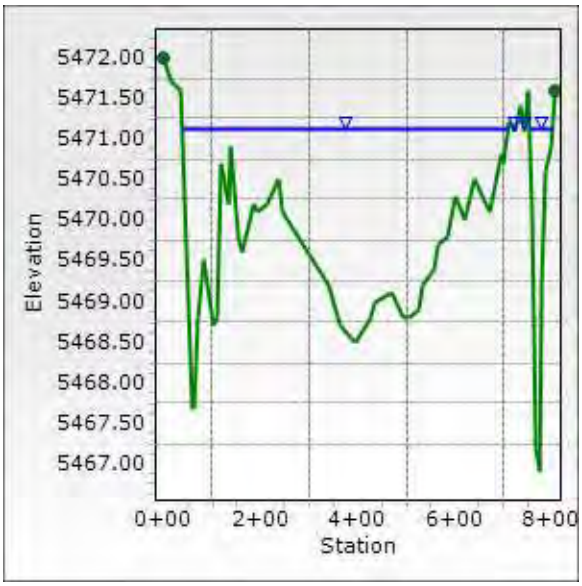
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	50.9 in
Critical Depth	42.1 in
Channel Slope	0.005 ft/ft
Critical Slope	0.030 ft/ft

Messages	
Messages	Flow is divided.

Cross Section for Irregular Section - 2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Normal Depth	50.9 in
Discharge	3,468.00 cfs



Worksheet for Irregular Section - 1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Discharge	3,468.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	5,490.13
0+18	5,484.46
0+28	5,481.82
0+31	5,482.02
0+40	5,479.10
0+51	5,478.59
0+77	5,477.96
0+84	5,478.42
1+12	5,477.77
1+41	5,477.46
1+89	5,477.06
1+97	5,476.59
2+16	5,476.69
2+30	5,476.16
2+55	5,476.06
2+74	5,474.96
2+85	5,473.39
2+99	5,474.61
3+10	5,474.06
3+29	5,474.19
3+39	5,473.77
3+67	5,474.59
3+77	5,473.81
3+99	5,473.67
4+05	5,472.66
4+25	5,472.37
4+34	5,472.54
4+40	5,470.99
4+47	5,471.09
4+59	5,470.01
4+67	5,472.79
4+74	5,473.37
5+11	5,472.72
5+44	5,473.27
5+59	5,473.15
5+75	5,473.92
5+89	5,472.87
5+99	5,472.93

Worksheet for Irregular Section - 1

Section Definitions

Station (ft)	Elevation (ft)
6+11	5,472.49
6+28	5,473.16
6+41	5,473.24
6+47	5,472.79
6+64	5,474.23
6+76	5,474.33
6+92	5,473.32
7+03	5,471.75
7+29	5,471.09
7+35	5,472.20
7+49	5,478.38
7+74	5,478.06

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 5,490.13)	(7+74, 5,478.06)	0.045

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	60.1 in
Elevation Range	5,470.0 to 5,490.1 ft
Flow Area	888.2 ft²
Wetted Perimeter	471.0 ft
Hydraulic Radius	22.6 in
Top Width	468.88 ft
Normal Depth	60.1 in
Critical Depth	51.1 in
Critical Slope	0.027 ft/ft
Velocity	3.90 ft/s
Velocity Head	0.24 ft
Specific Energy	5.25 ft
Froude Number	0.500
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft

Worksheet for Irregular Section - 1

GVF Input Data	
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	60.1 in
Critical Depth	51.1 in
Channel Slope	0.006 ft/ft
Critical Slope	0.027 ft/ft

Worksheet for Irregular Section - 2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Discharge	8,285.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	5,471.99
0+15	5,471.68
0+37	5,471.55
0+59	5,467.70
0+64	5,467.73
0+71	5,468.79
0+83	5,469.45
1+03	5,468.71
1+09	5,468.77
1+18	5,470.72
1+33	5,470.15
1+39	5,470.93
1+53	5,469.83
1+62	5,469.57
1+85	5,470.22
1+92	5,470.08
2+14	5,470.18
2+36	5,470.48
2+46	5,470.14
3+39	5,469.24
3+64	5,468.70
3+96	5,468.51
4+25	5,468.76
4+36	5,469.01
4+69	5,469.14
4+94	5,468.77
5+06	5,468.84
5+27	5,468.90
5+34	5,469.17
5+56	5,469.40
5+64	5,469.74
5+83	5,469.79
6+01	5,470.25
6+22	5,469.99
6+40	5,470.49
6+72	5,470.13
6+94	5,470.82
6+99	5,470.65

Worksheet for Irregular Section - 2

Section Definitions

Station (ft)	Elevation (ft)
7+11	5,471.18
7+24	5,471.08
7+37	5,471.42
7+43	5,471.06
7+52	5,471.57
7+60	5,470.14
7+67	5,467.24
7+75	5,466.88
7+80	5,469.24
7+85	5,470.57
8+00	5,470.91
8+06	5,471.56

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 5,471.99)	(8+06, 5,471.56)	0.045

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	63.9 in
Elevation Range	5,466.9 to 5,472.0 ft
Flow Area	1,964.6 ft²
Wetted Perimeter	809.3 ft
Hydraulic Radius	29.1 in
Top Width	806.06 ft
Normal Depth	63.9 in
Critical Depth	51.7 in
Critical Slope	0.025 ft/ft
Velocity	4.22 ft/s
Velocity Head	0.28 ft
Specific Energy	5.60 ft
Froude Number	0.476
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft

Worksheet for Irregular Section - 2

GVF Input Data	
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	63.9 in
Critical Depth	51.7 in
Channel Slope	0.005 ft/ft
Critical Slope	0.025 ft/ft

Messages	
Messages	Water Surface Elevation exceeds lowest end station by 0.648383008582641ft.

Cross Section for Irregular Section - 2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Normal Depth	63.9 in
Discharge	8,285.00 cfs

Worksheet for Irregular Section - 1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Discharge	8,285.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	5,490.13
0+18	5,484.46
0+28	5,481.82
0+31	5,482.02
0+40	5,479.10
0+51	5,478.59
0+77	5,477.96
0+84	5,478.42
1+12	5,477.77
1+41	5,477.46
1+89	5,477.06
1+97	5,476.59
2+16	5,476.69
2+30	5,476.16
2+55	5,476.06
2+74	5,474.96
2+85	5,473.39
2+99	5,474.61
3+10	5,474.06
3+29	5,474.19
3+39	5,473.77
3+67	5,474.59
3+77	5,473.81
3+99	5,473.67
4+05	5,472.66
4+25	5,472.37
4+34	5,472.54
4+40	5,470.99
4+47	5,471.09
4+59	5,470.01
4+67	5,472.79
4+74	5,473.37
5+11	5,472.72
5+44	5,473.27
5+59	5,473.15
5+75	5,473.92
5+89	5,472.87
5+99	5,472.93

Worksheet for Irregular Section - 1

Section Definitions

Station (ft)	Elevation (ft)
6+11	5,472.49
6+28	5,473.16
6+41	5,473.24
6+47	5,472.79
6+64	5,474.23
6+76	5,474.33
6+92	5,473.32
7+03	5,471.75
7+29	5,471.09
7+35	5,472.20
7+49	5,478.38
7+74	5,478.06

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 5,490.13)	(7+74, 5,478.06)	0.045

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	76.7 in
Elevation Range	5,470.0 to 5,490.1 ft
Flow Area	1,562.2 ft²
Wetted Perimeter	523.1 ft
Hydraulic Radius	35.8 in
Top Width	520.72 ft
Normal Depth	76.7 in
Critical Depth	63.1 in
Critical Slope	0.023 ft/ft
Velocity	5.30 ft/s
Velocity Head	0.44 ft
Specific Energy	6.83 ft
Froude Number	0.540
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft

Worksheet for Irregular Section - 1

GVF Input Data	
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	76.7 in
Critical Depth	63.1 in
Channel Slope	0.006 ft/ft
Critical Slope	0.023 ft/ft

Cross Section for Irregular Section - 1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Normal Depth	76.7 in
Discharge	8,285.00 cfs

0.5 FOOT FLOODWAY HYDRAULIC MODEL RESULTS

HEC-RAS Plan: CC-0.5-FW

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_6	95972	100-YR	214.99	960.22	8.96	5721.34	5721.34		
Reach_6	95972	0.5' FW	214.99	960.23	8.96	5721.34	5721.34	0.00	0.00
Reach_6	95719	100-YR	187.47	1327.67	6.48	5720.06	5720.06		
Reach_6	95719	0.5' FW	187.47	1327.67	6.48	5720.06	5720.06	0.00	0.00
Reach_6	95641	100-YR	104.75	980.21	8.91	5719.24	5719.24		
Reach_6	95641	0.5' FW	104.75	968.59	8.91	5719.24	5719.24	0.00	0.00
Reach_6	95633 Footbridge		Bridge						
Reach_6	95613	100-YR	97.60	631.49	13.62	5716.42	5716.42		
Reach_6	95613	0.5' FW	97.60	631.49	13.62	5716.42	5716.42	0.00	0.00
Reach_6	95504	100-YR	138.41	751.16	11.45	5714.71	5714.71		
Reach_6	95504	0.5' FW	138.41	751.16	11.45	5714.71	5714.71	0.00	0.00
Reach_6	95215	100-YR	239.33	963.70	8.92	5712.15	5712.15		
Reach_6	95215	0.5' FW	239.33	963.70	8.92	5712.15	5712.15	0.00	0.00
Reach_6	94827	100-YR	242.80	876.08	9.82	5707.87	5707.87		
Reach_6	94827	0.5' FW	242.80	876.08	9.82	5707.87	5707.87	0.00	0.00
Reach_6	94416	100-YR	308.57	1420.90	6.05	5704.35	5704.35		
Reach_6	94416	0.5' FW	308.56	1421.05	6.05	5704.35	5704.35	0.00	0.00
Reach_6	94176	100-YR	269.72	1946.60	4.96	5703.84	5703.84		
Reach_6	94176	0.5' FW	269.72	1737.98	4.96	5703.84	5703.84	0.00	0.00
Reach_6	93990	100-YR	123.35	1022.11	8.41	5703.02	5703.02		
Reach_6	93990	0.5' FW	123.35	1022.11	8.41	5703.02	5703.02	0.00	0.00
Reach_6	93988 U.S. Highway 6		Bridge						
Reach_6	93893	100-YR	96.19	592.67	14.51	5700.01	5700.01		
Reach_6	93893	0.5' FW	96.19	592.67	14.51	5700.01	5700.01	0.00	0.00
Reach_6	93892		Lat Struct						
Reach_6	93795	100-YR	188.52	1725.84	7.69	5699.17	5699.17		
Reach_6	93795	0.5' FW	183.41	1117.98	7.70	5699.17	5699.17	0.00	0.00
Reach_6	93753	100-YR	190.00	1891.28	6.56	5699.21	5699.21		
Reach_6	93753	0.5' FW	190.00	1314.74	6.56	5699.21	5699.21	0.00	0.00
Reach_6	93745 Footbridge		Bridge						
Reach_6	93727	100-YR	196.67	1032.26	10.56	5696.54	5696.54		
Reach_6	93727	0.5' FW	196.64	813.93	10.57	5696.54	5696.54	0.00	0.00
Reach_6	93493	100-YR	286.71	1008.63	8.79	5694.81	5694.81		
Reach_6	93493	0.5' FW	239.71	893.56	9.62	5694.84	5694.81	0.03	0.24
Reach_6	93090	100-YR	311.84	960.29	8.96	5691.56	5691.56		
Reach_6	93090	0.5' FW	311.84	960.29	8.96	5691.56	5691.56	0.00	0.00
Reach_6	92649	100-YR	197.11	1101.63	7.81	5688.71	5688.71		
Reach_6	92649	0.5' FW	197.11	1101.63	7.81	5688.71	5688.71	0.00	0.00
Reach_6	92509	100-YR	103.28	604.50	14.23	5685.91	5685.91		
Reach_6	92509	0.5' FW	103.28	604.50	14.23	5685.91	5685.91	0.00	0.00
Reach_5	92326	100-YR	131.38	878.79	12.05	5684.76	5684.76		
Reach_5	92326	0.5' FW	131.38	713.67	12.05	5684.76	5684.76	0.00	0.00
Reach_5	92295	100-YR	145.81	777.71	11.67	5683.14	5683.14		
Reach_5	92295	0.5' FW	145.82	737.37	11.66	5683.14	5683.14	0.00	0.00

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_5	92150	100-YR	183.71	816.02	10.54	5680.28	5680.28		
Reach_5	92150	0.5' FW	183.71	816.02	10.54	5680.28	5680.28	0.00	0.00
Reach_5	91890	100-YR	386.20	1494.35	5.93	5679.80	5679.80		
Reach_5	91890	0.5' FW	386.20	1450.16	5.93	5679.80	5679.80	0.00	0.00
Reach_5	91865	100-YR	422.52	1584.70	5.78	5679.69	5679.69		
Reach_5	91865	0.5' FW	422.52	1487.98	5.78	5679.69	5679.69	0.00	0.00
Reach_5	91748	100-YR	435.07	1203.35	7.15	5678.40	5678.40		
Reach_5	91748	0.5' FW	435.07	1203.35	7.15	5678.40	5678.40	0.00	0.00
Reach_5	91713	100-YR	411.66	1101.71	7.81	5677.29	5677.29		
Reach_5	91713	0.5' FW	411.66	1101.71	7.81	5677.29	5677.29	0.00	0.00
Reach_5	91576	100-YR	415.92	1470.75	6.94	5676.20	5676.20		
Reach_5	91576	0.5' FW	352.92	1138.79	7.55	5676.27	5676.20	0.07	0.22
Reach_5	91424	100-YR	465.54	1283.09	6.71	5675.09	5675.09		
Reach_5	91424	0.5' FW	405.78	1202.45	7.15	5675.13	5675.09	0.04	0.14
Reach_5	91383	100-YR	465.43	1304.81	6.59	5674.68	5674.68		
Reach_5	91383	0.5' FW	391.71	1199.53	7.17	5674.72	5674.68	0.04	0.17
Reach_5	91225	100-YR	498.33	1320.73	6.51	5673.04	5673.04		
Reach_5	91225	0.5' FW	445.19	1257.71	6.84	5673.04	5673.04	0.00	0.07
Reach_5	91012	100-YR	511.31	1511.72	5.69	5671.79	5671.79		
Reach_5	91012	0.5' FW	511.35	1512.46	5.69	5671.79	5671.79	0.00	0.00
Reach_5	90879	100-YR	417.47	1592.76	5.61	5671.55	5671.55		
Reach_5	90879	0.5' FW	417.47	1531.81	5.61	5671.55	5671.55	0.00	0.00
Reach_5	90870 Footbridge		Bridge						
Reach_5	90839	100-YR	374.97	2030.29	5.58	5671.48	5671.48		
Reach_5	90839	0.5' FW	374.95	1540.43	5.58	5671.48	5671.48	0.00	0.00
Reach_5	90759	100-YR	339.14	1204.65	8.69	5670.02	5670.02		
Reach_5	90759	0.5' FW	339.14	989.83	8.69	5670.02	5670.02	0.00	0.00
Reach_5	90603	100-YR	220.09	1043.54	10.25	5668.92	5668.92		
Reach_5	90603	0.5' FW	220.09	854.47	10.06	5668.99	5668.92	0.07	0.00
Reach_5	90380	100-YR	136.44	1205.86	11.04	5667.43	5667.43		
Reach_5	90380	0.5' FW	136.45	779.97	11.03	5667.44	5667.43	0.01	0.00
Reach_5	90305	100-YR	144.23	1019.83	10.68	5667.06	5667.06		
Reach_5	90305	0.5' FW	144.23	805.91	10.67	5667.07	5667.06	0.00	0.00
Reach_5	90252	100-YR	159.02	1334.54	7.78	5667.40	5667.40		
Reach_5	90252	0.5' FW	159.02	1106.18	7.77	5667.40	5667.40	0.00	0.00
Reach_5	90168	100-YR	162.48	1284.52	7.52	5667.44	5667.44		
Reach_5	90168	0.5' FW	162.48	1143.99	7.52	5667.44	5667.44	0.00	0.00
Reach_5	90060	100-YR	141.95	881.35	9.76	5666.03	5666.03		
Reach_5	90060	0.5' FW	141.95	881.35	9.76	5666.03	5666.03	0.00	0.00
Reach_5	90006	100-YR	134.13	829.23	10.37	5665.97	5665.97		
Reach_5	90006	0.5' FW	134.13	829.23	10.37	5665.97	5665.97	0.00	0.00
Reach_5	89976	100-YR	142.05	975.55	8.82	5666.19	5666.19		
Reach_5	89976	0.5' FW	142.05	975.55	8.82	5666.19	5666.19	0.00	0.00
Reach_5	89862	100-YR	156.02	1132.51	7.77	5666.17	5666.17		

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_5	89862	0.5' FW	156.02	1132.51	7.77	5666.17	5666.17	0.00	0.00
Reach_5	89790	100-YR	120.59	1483.56	5.97	5666.43	5666.43		
Reach_5	89790	0.5' FW	120.59	1483.56	5.97	5666.43	5666.43	0.00	0.00
Reach_5	89784 Washington St		Bridge						
Reach_5	89687	100-YR	121.85	1356.89	6.50	5664.19	5664.19		
Reach_5	89687	0.5' FW	121.85	1356.53	6.50	5664.19	5664.19	0.00	0.00
Reach_5	89610	100-YR	98.47	864.17	10.18	5662.88	5662.88		
Reach_5	89610	0.5' FW	98.47	863.78	10.19	5662.88	5662.88	0.00	0.00
Reach_5	89421	100-YR	100.31	680.84	13.89	5660.25	5660.25		
Reach_5	89421	0.5' FW	100.31	637.68	13.87	5660.26	5660.25	0.01	0.00
Reach_5	89163	100-YR	118.14	836.03	10.53	5658.24	5658.24		
Reach_5	89163	0.5' FW	118.15	836.26	10.52	5658.25	5658.24	0.00	0.00
Reach_5	89024	100-YR	135.57	1187.20	8.69	5658.24	5658.24		
Reach_5	89024	0.5' FW	135.57	1013.40	8.68	5658.24	5658.24	0.00	0.00
Reach_5	89018 Ford St		Bridge						
Reach_5	88939	100-YR	121.64	1714.46	8.46	5657.84	5657.84		
Reach_5	88939	0.5' FW	121.64	1041.18	8.45	5657.85	5657.84	0.00	0.00
Reach_5	88854	100-YR	235.02	1808.37	6.91	5657.84	5657.84		
Reach_5	88854	0.5' FW	235.01	1274.23	6.91	5657.84	5657.84	0.00	0.00
Reach_5	88815	100-YR	228.64	1790.10	6.56	5657.69	5657.69		
Reach_5	88815	0.5' FW	228.64	1342.54	6.55	5657.69	5657.69	0.00	0.00
Reach_5	88808 Footbridge		Bridge						
Reach_5	88791	100-YR	210.61	1360.14	7.98	5657.04	5657.04		
Reach_5	88791	0.5' FW	210.64	1103.85	7.97	5657.04	5657.04	0.00	0.00
Reach_5	88764	100-YR	252.03	1117.27	9.33	5656.34	5656.34		
Reach_5	88764	0.5' FW	252.01	1006.96	9.34	5656.34	5656.34	0.00	0.00
Reach_5	88696	100-YR	346.06	1316.89	8.06	5655.41	5655.41		
Reach_5	88696	0.5' FW	295.00	1046.15	8.41	5655.42	5655.41	0.02	0.08
Reach_5	88626	100-YR	310.27	1031.90	9.31	5653.92	5653.92		
Reach_5	88626	0.5' FW	310.25	944.32	9.32	5653.92	5653.92	0.00	0.00
Reach_5	88616	100-YR	268.52	943.96	9.58	5652.67	5652.67		
Reach_5	88616	0.5' FW	267.92	922.81	9.54	5652.69	5652.67	0.02	0.00
Reach_5	88487	100-YR	155.16	1096.75	8.66	5652.06	5652.06		
Reach_5	88487	0.5' FW	155.16	1148.95	8.27	5652.39	5652.06	0.34	0.23
Reach_5	88394	100-YR	254.08	1110.07	10.44	5651.02	5651.02		
Reach_5	88394	0.5' FW	152.00	865.40	10.98	5651.20	5651.02	0.18	0.24
Reach_5	88370	100-YR	165.84	1097.10	12.04	5650.17	5650.17		
Reach_5	88370	0.5' FW	145.00	755.11	12.58	5650.35	5650.17	0.18	0.35
Reach_5	88313	100-YR	107.74	732.36	12.97	5643.09	5643.09		
Reach_5	88313	0.5' FW	107.78	734.67	12.93	5643.11	5643.09	0.02	0.00
Reach_5	88062	100-YR	106.00	795.86	11.94	5642.26	5642.26		
Reach_5	88062	0.5' FW	105.98	800.37	11.87	5642.31	5642.26	0.04	0.02
Reach_5	87897	100-YR	436.04	1993.62	5.27	5643.13	5643.13		
Reach_5	87897	0.5' FW	319.60	1742.35	5.45	5643.15	5643.13	0.02	0.03

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_5	87844	100-YR	453.02	2170.02	5.69	5642.98	5642.98		
Reach_5	87844	0.5' FW	453.02	1907.74	5.62	5643.03	5642.98	0.04	0.03
Reach_5	87837 Coors N Service		Bridge						
Reach_5	87789	100-YR	308.02	1703.51	6.93	5642.11	5642.11		
Reach_5	87789	0.5' FW	308.06	1572.47	6.86	5642.16	5642.11	0.04	0.03
Reach_5	87666	100-YR	550.99	2146.33	4.62	5642.21	5642.21		
Reach_5	87666	0.5' FW	327.87	1868.24	5.08	5642.24	5642.21	0.02	0.05
Reach_5	87616	100-YR	594.73	2445.23	4.00	5642.22	5642.22		
Reach_5	87616	0.5' FW	313.44	1956.16	4.86	5642.21	5642.22	0.00	0.06
Reach_5	87486	100-YR	226.98	3006.88	5.56	5641.93	5641.93		
Reach_5	87486	0.5' FW	225.85	1804.26	5.51	5642.00	5641.93	0.08	0.07
Reach_5	87458	100-YR	452.30	2828.78	5.74	5641.85	5641.85		
Reach_5	87458	0.5' FW	178.89	1753.09	6.06	5641.91	5641.85	0.06	0.07
Reach_5	87452 Footbridge		Bridge						
Reach_5	87438	100-YR	255.69	2121.50	6.55	5641.20	5641.20		
Reach_5	87438	0.5' FW	178.51	1501.60	6.33	5641.54	5641.20	0.35	0.29
Reach_5	87379	100-YR	314.18	2284.93	6.60	5641.04	5641.04		
Reach_5	87379	0.5' FW	174.26	1424.73	6.67	5641.39	5641.04	0.34	0.29
Reach_5	87326	100-YR	282.23	2621.87	6.22	5641.03	5641.03		
Reach_5	87326	0.5' FW	180.39	1437.51	6.61	5641.34	5641.03	0.31	0.31
Reach_5	87322 Coors Vehicle		Bridge						
Reach_5	87281	100-YR	138.04	1620.42	9.00	5639.17	5639.17		
Reach_5	87281	0.5' FW	138.04	1055.57	9.00	5639.17	5639.17	0.00	0.00
Reach_5	87185	100-YR	168.35	1513.64	8.73	5638.92	5638.92		
Reach_5	87185	0.5' FW	168.35	1088.25	8.73	5638.92	5638.92	0.00	0.00
Reach_5	87132	100-YR	168.90	1688.26	7.67	5639.05	5639.05		
Reach_5	87132	0.5' FW	168.90	1238.45	7.67	5639.05	5639.05	0.00	0.00
Reach_5	87101	100-YR	164.21	1619.41	7.90	5638.88	5638.88		
Reach_5	87101	0.5' FW	164.21	1201.57	7.91	5638.88	5638.88	0.00	0.00
Reach_5	87099 Footbridge		Bridge						
Reach_5	87090	100-YR	84.63	695.63	13.66	5635.17	5635.17		
Reach_5	87090	0.5' FW	90.00	715.97	13.27	5635.41	5635.17	0.24	0.08
Reach_5	87037	100-YR	133.24	775.44	12.25	5635.19	5635.19		
Reach_5	87037	0.5' FW	133.28	809.93	11.73	5635.45	5635.19	0.26	0.11
Reach_5	87000	100-YR	133.51	880.47	10.79	5635.36	5635.36		
Reach_5	87000	0.5' FW	133.51	913.78	10.40	5635.61	5635.36	0.25	0.13
Reach_5	86989	100-YR	122.47	802.64	11.84	5634.90	5634.90		
Reach_5	86989	0.5' FW	122.47	843.84	11.26	5635.24	5634.90	0.34	0.14
Reach_5	86917	100-YR	114.48	888.54	10.69	5634.87	5634.87		
Reach_5	86917	0.5' FW	114.48	927.61	10.24	5635.21	5634.87	0.34	0.19
Reach_5	86719	100-YR	109.02	1144.82	9.07	5634.78	5634.78		
Reach_5	86719	0.5' FW	109.02	1085.10	8.75	5635.13	5634.78	0.35	0.25
Reach_5	86580	100-YR	190.10	1653.45	7.86	5634.66	5634.66		

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_5	86580	0.5' FW	190.10	1285.85	7.39	5635.06	5634.66	0.41	0.27
Reach_5	86550	100-YR	188.94	1641.24	7.76	5634.63	5634.63		
Reach_5	86550	0.5' FW	188.94	1301.25	7.30	5635.04	5634.63	0.40	0.28
Reach_5	86548 Coors Pipe		Bridge						
Reach_5	86546	100-YR	175.24	1463.80	8.53	5634.13	5634.13		
Reach_5	86546	0.5' FW	175.24	1197.97	7.93	5634.62	5634.13	0.48	0.31
Reach_5	86503	100-YR	169.96	2225.30	8.80	5634.06	5634.06		
Reach_5	86503	0.5' FW	169.96	1159.06	8.20	5634.53	5634.06	0.47	0.32
Reach_5	86333	100-YR	380.81	2469.47	4.05	5634.62	5634.62		
Reach_5	86333	0.5' FW	233.87	1847.47	5.14	5634.86	5634.62	0.23	0.40
Reach_5	86299	100-YR	326.45	2162.99	4.56	5634.50	5634.50		
Reach_5	86299	0.5' FW	231.21	1894.70	5.01	5634.85	5634.50	0.35	0.41
Reach_5	86295 Footbridge		Bridge						
Reach_5	86277	100-YR	315.82	2095.94	5.00	5634.20	5634.20		
Reach_5	86277	0.5' FW	235.14	1719.58	5.52	5634.35	5634.20	0.14	0.22
Reach_5	86138	100-YR	376.34	2144.96	4.43	5634.17	5634.17		
Reach_5	86138	0.5' FW	210.00	1702.79	5.58	5634.26	5634.17	0.09	0.25
Reach_5	86081	100-YR	327.53	1747.64	5.44	5633.74	5633.74		
Reach_5	86081	0.5' FW	155.00	1388.76	6.84	5633.81	5633.74	0.08	0.24
Reach_5	86010	100-YR	100.00	1859.20	6.81	5633.76	5633.76		
Reach_5	86010	0.5' FW	100.00	1416.09	6.72	5633.94	5633.76	0.18	0.19
Reach_5	85963 Coors Railroad		Bridge						
Reach_5	85891	100-YR	82.61	679.93	13.97	5627.78	5627.78		
Reach_5	85891	0.5' FW	82.61	679.93	13.97	5627.78	5627.78	0.00	0.00
Reach_5	85799	100-YR	83.28	695.24	13.66	5627.44	5627.44		
Reach_5	85799	0.5' FW	83.28	695.24	13.66	5627.44	5627.44	0.00	0.00
Reach_5	85484	100-YR	72.99	583.23	16.29	5624.54	5624.54		
Reach_5	85484	0.5' FW	72.99	583.23	16.29	5624.54	5624.54	0.00	0.00
Reach_5	85036	100-YR	87.51	752.37	12.63	5623.16	5623.16		
Reach_5	85036	0.5' FW	87.50	752.41	12.63	5623.16	5623.16	0.00	0.00
Reach_5	84717	100-YR	88.50	633.97	14.98	5620.35	5620.35		
Reach_5	84717	0.5' FW	88.50	633.93	14.99	5620.35	5620.35	0.00	0.00
Reach_5	84651	100-YR	107.28	808.56	11.92	5620.36	5620.36		
Reach_5	84651	0.5' FW	107.27	796.48	11.93	5620.36	5620.36	-0.01	0.00
Reach_5	84628	100-YR	111.00	1076.95	8.82	5620.41	5620.41		
Reach_5	84628	0.5' FW	110.98	1076.24	8.83	5620.40	5620.41	-0.01	0.00
Reach_5	84495	100-YR	100.53	1427.86	10.48	5619.59	5619.59		
Reach_5	84495	0.5' FW	100.50	905.77	10.49	5619.58	5619.59	-0.01	0.00
Reach_5	84358	100-YR	90.79	1824.29	15.07	5616.93	5616.93		
Reach_5	84358	0.5' FW	90.79	633.22	15.00	5616.96	5616.93	0.03	0.00
Reach_5	84320	100-YR	99.01	1478.89	14.42	5615.90	5615.90		
Reach_5	84320	0.5' FW	99.01	659.59	14.40	5615.91	5615.90	0.01	0.00
Reach_5	84232	100-YR	115.72	1091.91	10.00	5613.08	5613.08		
Reach_5	84232	0.5' FW	115.72	950.25	10.00	5613.08	5613.08	0.00	0.00

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_5	84131	100-YR	107.37	928.38	10.97	5612.42	5612.42		
Reach_5	84131	0.5' FW	107.37	866.18	10.97	5612.42	5612.42	0.00	0.00
Reach_5	83964	100-YR	92.43	781.43	13.36	5610.59	5610.59		
Reach_5	83964	0.5' FW	92.43	711.15	13.36	5610.59	5610.59	0.00	0.00
Reach_5	83649	100-YR	97.86	804.30	12.09	5609.61	5609.61		
Reach_5	83649	0.5' FW	97.86	786.07	12.09	5609.61	5609.61	0.00	0.00
Reach_5	83587	100-YR	85.00	764.67	12.72	5609.18	5609.18		
Reach_5	83587	0.5' FW	85.00	764.95	12.72	5609.18	5609.18	0.00	0.00
Reach_5	83574 E Coors Plant		Bridge						
Reach_5	83521	100-YR	90.31	662.29	14.34	5607.37	5607.37		
Reach_5	83521	0.5' FW	90.31	662.33	14.34	5607.37	5607.37	0.00	0.00
Reach_5	83423	100-YR	91.53	673.24	14.11	5606.81	5606.81		
Reach_5	83423	0.5' FW	91.53	673.28	14.11	5606.81	5606.81	0.00	0.00
Reach_5	83322	100-YR	87.66	709.09	13.40	5606.44	5606.44		
Reach_5	83322	0.5' FW	87.66	709.01	13.40	5606.44	5606.44	0.00	0.00
Reach_5	82909	100-YR	90.74	859.03	11.63	5605.27	5605.27		
Reach_5	82909	0.5' FW	90.73	816.79	11.63	5605.26	5605.27	0.00	0.00
Reach_5	82737	100-YR	96.34	906.87	10.48	5605.01	5605.01		
Reach_5	82737	0.5' FW	96.34	906.87	10.48	5605.01	5605.01	0.00	0.00
Reach_5	82682	100-YR	86.20	623.96	15.23	5602.47	5602.47		
Reach_5	82682	0.5' FW	86.20	623.96	15.23	5602.47	5602.47	0.00	0.00
Reach_5	82530	100-YR	87.39	622.81	15.25	5601.09	5601.09		
Reach_5	82530	0.5' FW	87.39	622.81	15.25	5601.09	5601.09	0.00	0.00
Reach_5	82371	100-YR	120.61	833.67	11.40	5601.04	5601.04		
Reach_5	82371	0.5' FW	120.61	833.67	11.40	5601.04	5601.04	0.00	0.00
Reach_5	82208	100-YR	98.09	691.79	14.18	5598.76	5598.76		
Reach_5	82208	0.5' FW	98.09	669.89	14.18	5598.76	5598.76	0.00	0.00
Reach_5	82141	100-YR	100.94	700.22	14.30	5598.17	5598.17		
Reach_5	82141	0.5' FW	100.94	665.16	14.28	5598.17	5598.17	0.01	0.00
Reach_5	82107	100-YR	90.17	637.19	14.91	5593.49	5593.49		
Reach_5	82107	0.5' FW	90.16	637.06	14.91	5593.49	5593.49	0.00	0.00
Reach_5	82011	100-YR	102.11	753.30	12.61	5592.57	5592.57		
Reach_5	82011	0.5' FW	102.11	753.40	12.61	5592.57	5592.57	0.00	0.00
Reach_5	81821	100-YR	103.16	903.98	11.84	5591.67	5591.67		
Reach_5	81821	0.5' FW	103.16	802.53	11.84	5591.67	5591.67	0.00	0.00
Reach_5	81456	100-YR	118.87	1239.72	9.13	5591.05	5591.05		
Reach_5	81456	0.5' FW	118.87	1041.04	9.13	5591.05	5591.05	0.00	0.00
Reach_5	81047	100-YR	116.39	958.80	10.40	5589.27	5589.27		
Reach_5	81047	0.5' FW	116.39	913.03	10.40	5589.27	5589.27	0.00	0.00
Reach_5	80633	100-YR	120.62	701.24	13.55	5585.29	5585.29		
Reach_5	80633	0.5' FW	120.62	701.24	13.55	5585.29	5585.29	0.00	0.00
Reach_5	80380	100-YR	231.40	863.57	11.00	5582.27	5582.27		
Reach_5	80380	0.5' FW	231.40	863.57	11.00	5582.27	5582.27	0.00	0.00
Reach_5	80244	100-YR	192.18	1317.15	11.73	5577.53	5577.53		

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_5	80244	0.5' FW	192.18	819.69	11.59	5577.59	5577.53	0.05	0.00
Reach_5	80202	100-YR	280.06	2470.67	4.48	5577.14	5577.14		
Reach_5	80202	0.5' FW	280.06	2118.24	4.48	5577.14	5577.14	0.00	0.00
Reach_5	80018	100-YR	133.22	1178.43	9.52	5575.68	5575.68		
Reach_5	80018	0.5' FW	133.22	997.57	9.52	5575.69	5575.68	0.00	0.00
Reach_5	79610	100-YR	108.11	1161.54	11.01	5573.63	5573.63		
Reach_5	79610	0.5' FW	108.11	862.68	11.01	5573.63	5573.63	0.00	0.00
Reach_5	79217	100-YR	114.54	1662.60	8.88	5572.89	5572.89		
Reach_5	79217	0.5' FW	114.53	1070.23	8.88	5572.89	5572.89	0.00	0.00
Reach_5	79141	100-YR	78.15	672.72	15.71	5569.61	5569.61		
Reach_5	79141	0.5' FW	78.07	604.88	15.71	5569.62	5569.61	0.00	0.00
Reach_5	79129	100-YR	79.88	823.44	12.75	5570.22	5570.22		
Reach_5	79129	0.5' FW	79.86	745.16	12.75	5570.22	5570.22	0.00	0.00
Reach_5	78946	100-YR	165.23	1416.72	8.87	5570.43	5570.43		
Reach_5	78946	0.5' FW	165.22	1070.15	8.88	5570.43	5570.43	0.00	0.00
Reach_5	78846	100-YR	75.83	621.47	15.90	5567.07	5567.07		
Reach_5	78846	0.5' FW	75.81	597.23	15.91	5567.07	5567.07	0.00	0.00
Reach_5	78803	100-YR	73.02	595.11	16.15	5565.29	5565.29		
Reach_5	78803	0.5' FW	73.02	587.96	16.16	5565.29	5565.29	0.00	0.00
Reach_5	78728	100-YR	81.05	608.80	15.60	5563.12	5563.12		
Reach_5	78728	0.5' FW	81.05	608.80	15.60	5563.12	5563.12	0.00	0.00
Reach_5	78717	100-YR	77.36	620.24	15.32	5560.94	5560.94		
Reach_5	78717	0.5' FW	77.36	620.24	15.32	5560.94	5560.94	0.00	0.00
Reach_5	78228	100-YR	92.26	638.68	14.87	5557.45	5557.45		
Reach_5	78228	0.5' FW	92.26	638.68	14.87	5557.45	5557.45	0.00	0.00
Reach_5	77804	100-YR	92.97	821.74	11.56	5555.42	5555.42		
Reach_5	77804	0.5' FW	92.97	821.74	11.56	5555.42	5555.42	0.00	0.00
Reach_5	77427	100-YR	92.97	987.92	14.61	5551.83	5551.83		
Reach_5	77427	0.5' FW	92.97	650.38	14.61	5551.83	5551.83	0.00	0.00
Reach_5	77010	100-YR	98.18	1032.32	14.47	5548.37	5548.37		
Reach_5	77010	0.5' FW	98.18	657.05	14.46	5548.38	5548.37	0.01	0.00
Reach_5	76522	100-YR	96.96	1363.74	14.52	5544.74	5544.74		
Reach_5	76522	0.5' FW	96.97	654.67	14.51	5544.74	5544.74	0.00	0.00
Reach_5	76173	100-YR	98.63	3542.50	14.34	5541.54	5541.54		
Reach_5	76173	0.5' FW	98.63	664.49	14.30	5541.56	5541.54	0.02	0.00
Reach_5	75747	100-YR	98.05	2083.21	14.44	5538.42	5538.42		
Reach_5	75747	0.5' FW	98.05	659.95	14.40	5538.44	5538.42	0.02	0.00
Reach_5	75333	100-YR	98.33	1443.22	14.17	5534.82	5534.82		
Reach_5	75333	0.5' FW	98.33	670.55	14.17	5534.82	5534.82	0.00	0.00
Reach_5	74940	100-YR	97.65	2426.48	12.46	5533.00	5533.00		
Reach_5	74940	0.5' FW	97.65	762.44	12.46	5533.00	5533.00	0.00	0.00
Reach_5	74916	100-YR	90.99	1816.43	14.71	5531.71	5531.71		
Reach_5	74916	0.5' FW	90.99	645.97	14.71	5531.71	5531.71	0.00	0.00
Reach_5	74891	100-YR	93.79	1861.57	11.76	5531.21	5531.21		
Reach_5	74891	0.5' FW	93.76	808.01	11.76	5531.21	5531.21	0.00	0.00

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_5	74808	100-YR	96.15	1417.80	13.42	5530.20	5530.20		
Reach_5	74808	0.5' FW	94.35	707.55	13.43	5530.20	5530.20	0.00	0.00
Reach_5	74619	100-YR	106.03	939.41	10.11	5530.16	5530.16		
Reach_5	74619	0.5' FW	106.02	939.36	10.11	5530.15	5530.16	0.00	0.00
Reach_5	74583	100-YR	104.80	937.25	10.14	5530.27	5530.27		
Reach_5	74583	0.5' FW	104.79	937.25	10.14	5530.27	5530.27	0.00	0.00
Reach_5	74574 McIntyre St		Bridge						
Reach_5	74484	100-YR	89.19	657.34	14.45	5527.53	5527.53		
Reach_5	74484	0.5' FW	89.19	657.30	14.45	5527.53	5527.53	0.00	0.00
Reach_5	74344	100-YR	96.69	66414.73	11.87	5527.26	5527.26		
Reach_5	74344	0.5' FW	96.69	800.08	11.87	5527.26	5527.26	0.00	0.00
Reach_5	74098	100-YR	103.97	66195.79	9.99	5526.58	5526.58		
Reach_5	74098	0.5' FW	103.97	950.83	9.99	5526.58	5526.58	0.00	0.00
Reach_5	73810	100-YR	138.91	67888.09	8.72	5525.96	5525.96		
Reach_5	73810	0.5' FW	138.81	1088.72	8.73	5525.95	5525.96	0.00	0.00
Reach_5	73749	100-YR	147.93	69212.75	8.22	5525.87	5525.87		
Reach_5	73749	0.5' FW	147.93	69212.75	8.22	5525.87	5525.87	0.00	0.00
Reach_5	73703 Railroad		Bridge						
Reach_5	73557	100-YR	90.26	54293.57	15.06	5520.46	5520.46		
Reach_5	73557	0.5' FW	90.26	54293.57	15.06	5520.46	5520.46	0.00	0.00
Reach_5	73513	100-YR	102.21	53044.44	14.40	5519.81	5519.81		
Reach_5	73513	0.5' FW	102.03	658.79	14.42	5519.80	5519.81	-0.01	0.00
Reach_5	73169	100-YR	178.34	45159.68	11.96	5515.46	5515.46		
Reach_5	73169	0.5' FW	178.34	794.80	11.95	5515.46	5515.46	0.00	0.00
Reach_5	73150	100-YR	176.80	43313.09	12.11	5514.77	5514.77		
Reach_5	73150	0.5' FW	176.81	794.33	11.96	5514.82	5514.77	0.06	0.00
Reach_5	73020	100-YR	193.52	44344.18	8.65	5514.45	5514.45		
Reach_5	73020	0.5' FW	193.52	1097.93	8.65	5514.45	5514.45	0.00	0.00
Reach_5	72854	100-YR	187.02	42396.41	9.20	5513.30	5513.30		
Reach_5	72854	0.5' FW	187.02	1032.19	9.20	5513.30	5513.30	0.00	0.00
Reach_5	72772	100-YR	181.12	37644.89	11.90	5511.61	5511.61		
Reach_5	72772	0.5' FW	181.11	798.05	11.90	5511.61	5511.61	0.00	0.00
Reach_5	72733	100-YR	179.11	38228.85	8.97	5511.57	5511.57		
Reach_5	72733	0.5' FW	179.11	1059.50	8.97	5511.57	5511.57	0.00	0.00
Reach_5	72656	100-YR	181.88	37539.88	9.08	5511.11	5511.11		
Reach_5	72656	0.5' FW	181.88	1046.61	9.08	5511.11	5511.11	0.00	0.00
Reach_5	72411	100-YR	181.01	33206.61	9.90	5509.23	5509.23		
Reach_5	72411	0.5' FW	180.98	958.59	9.91	5509.23	5509.23	0.00	0.00
Reach_5	72377	100-YR	174.33	29418.60	12.12	5508.05	5508.05		
Reach_5	72377	0.5' FW	174.33	784.77	12.11	5508.05	5508.05	0.01	0.00
Reach_5	72339	100-YR	176.63	30915.45	8.89	5508.45	5508.45		
Reach_5	72339	0.5' FW	176.63	1070.37	8.88	5508.46	5508.45	0.01	0.01
Reach_5	72282	100-YR	182.66	30461.00	8.86	5508.16	5508.16		
Reach_5	72282	0.5' FW	182.66	1075.27	8.83	5508.18	5508.16	0.02	0.01

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_5	72004	100-YR	179.48	23093.86	11.36	5505.18	5505.18		
Reach_5	72004	0.5' FW	179.30	830.08	11.44	5505.14	5505.18	-0.04	0.00
Reach_5	71962	100-YR	177.51	20535.92	12.07	5504.34	5504.34		
Reach_5	71962	0.5' FW	177.51	792.26	11.99	5504.37	5504.34	0.03	0.00
Reach_5	71930	100-YR	169.92	16744.07	10.72	5503.09	5503.09		
Reach_5	71930	0.5' FW	169.92	886.40	10.72	5503.09	5503.09	0.00	0.00
Reach_5	71865	100-YR	172.35	3312.75	10.14	5502.66	5502.66		
Reach_5	71865	0.5' FW	172.34	936.61	10.14	5502.66	5502.66	0.00	0.00
Reach_5	71596	100-YR	175.20	22422.26	10.10	5500.57	5500.57		
Reach_5	71596	0.5' FW	175.20	940.22	10.10	5500.57	5500.57	0.00	0.00
Reach_5	71570	100-YR	170.38	18862.71	12.14	5499.53	5499.53		
Reach_5	71570	0.5' FW	170.38	782.55	12.14	5499.53	5499.53	0.00	0.00
Reach_5	71505	100-YR	175.98	18853.15	8.68	5499.43	5499.43		
Reach_5	71505	0.5' FW	175.99	1094.70	8.68	5499.43	5499.43	0.00	0.00
Reach_5	71462	100-YR	176.77	17809.79	9.00	5499.11	5499.11		
Reach_5	71462	0.5' FW	176.77	1055.83	9.00	5499.11	5499.11	0.00	0.00
Reach_5	71155	100-YR	175.44	10049.25	10.03	5496.78	5496.78		
Reach_5	71155	0.5' FW	175.44	946.79	10.03	5496.78	5496.78	0.00	0.00
Reach_5	71111	100-YR	174.07	6730.04	11.52	5495.80	5495.80		
Reach_5	71111	0.5' FW	174.06	824.78	11.52	5495.80	5495.80	0.00	0.00
Reach_5	70721	100-YR	188.52	1495.67	8.83	5493.37	5493.37		
Reach_5	70721	0.5' FW	188.52	1076.11	8.83	5493.37	5493.37	0.00	0.00
Reach_5	70392	100-YR	183.88	15619.73	10.16	5490.74	5490.74		
Reach_5	70392	0.5' FW	183.61	934.88	10.16	5490.74	5490.74	0.00	0.00
Reach_5	70345	100-YR	182.67	14029.51	11.82	5489.63	5489.63		
Reach_5	70345	0.5' FW	182.65	803.13	11.83	5489.62	5489.63	0.00	0.00
Reach_5	70310	100-YR	178.20	12666.83	10.66	5488.62	5488.62		
Reach_5	70310	0.5' FW	178.20	891.28	10.66	5488.62	5488.62	0.00	0.00
Reach_5	70238	100-YR	179.27	12371.36	10.01	5488.16	5488.16		
Reach_5	70238	0.5' FW	179.27	949.77	10.00	5488.16	5488.16	0.01	0.00
Reach_5	69912	100-YR	182.83	11927.82	8.91	5486.32	5486.32		
Reach_5	69912	0.5' FW	182.84	1078.56	8.81	5486.39	5486.32	0.06	0.04
Reach_5	69192	100-YR	181.32	25995.88	11.18	5480.14	5480.14		
Reach_5	69192	0.5' FW	170.56	835.43	11.37	5480.12	5480.14	-0.02	0.02
Reach_5	69098	100-YR	171.52	23748.92	12.12	5478.62	5478.62		
Reach_5	69098	0.5' FW	171.52	784.36	12.11	5478.62	5478.62	0.00	0.00
Reach_5	69089	100-YR	171.26	22956.73	12.08	5478.18	5478.18		
Reach_5	69089	0.5' FW	171.26	787.04	12.07	5478.18	5478.18	0.00	0.00
Reach_5	68947	100-YR	176.20	22327.86	9.17	5477.36	5477.36		
Reach_5	68947	0.5' FW	175.00	1093.17	8.69	5477.69	5477.36	0.33	0.19
Reach_5	68669	100-YR	367.38	22006.93	7.06	5476.68	5476.68		
Reach_5	68669	0.5' FW	215.54	1440.45	6.60	5477.18	5476.68	0.50	0.39
Reach_5	68668		Lat Struct						
Reach_5	68566	100-YR	520.00	20329.29	7.67	5476.08	5476.08		

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_5	68566	0.5' FW	377.55	2131.85	8.44	5476.24	5476.08	0.16	0.38
Reach_5	68535	100-YR	415.12	8512.71	6.44	5474.80	5474.80		
Reach_5	68535	0.5' FW	376.80	1678.54	6.50	5475.31	5474.80	0.50	0.49
Reach_5	68522 Footbridge		Bridge						
Reach_5	68494	100-YR	511.48	13559.94	7.87	5471.89	5471.89		
Reach_5	68494	0.5' FW	368.44	1828.24	8.78	5471.86	5471.89	-0.03	0.19
Reach_5	68327	100-YR	233.44	9786.32	10.95	5469.39	5469.39		
Reach_5	68327	0.5' FW	229.68	862.58	11.01	5469.38	5469.39	-0.01	0.00
Reach_5	68216	100-YR	153.67	2834.90	12.69	5464.42	5464.42		
Reach_5	68216	0.5' FW	153.67	753.84	12.60	5464.45	5464.42	0.04	0.00
Reach_5	68136	100-YR	141.08	729.02	13.03	5457.97	5457.97		
Reach_5	68136	0.5' FW	140.99	726.54	13.08	5457.95	5457.97	-0.02	0.00
Reach_5	68123	100-YR	141.27	733.83	12.95	5457.37	5457.37		
Reach_5	68123	0.5' FW	141.28	734.66	12.93	5457.37	5457.37	0.01	0.00
Reach_5	67953	100-YR	105.61	662.71	14.34	5451.01	5451.01		
Reach_5	67953	0.5' FW	105.61	667.86	14.22	5451.06	5451.01	0.05	0.00
Reach_5	67460	100-YR	114.01	4651.42	10.22	5445.94	5445.94		
Reach_5	67460	0.5' FW	114.01	929.56	10.22	5445.94	5445.94	0.00	0.15
Reach_5	67024	100-YR	179.17	3064.33	6.80	5441.98	5441.98		
Reach_5	67024	0.5' FW	179.33	1404.40	6.76	5442.02	5441.98	0.04	0.05
Reach_5	66656	100-YR	210.86	1111.18	8.55	5439.01	5439.01		
Reach_5	66656	0.5' FW	210.89	1112.62	8.54	5439.02	5439.01	0.01	0.00
Reach_5	66246	100-YR	355.92	2545.09	7.01	5435.77	5435.77		
Reach_5	66246	0.5' FW	355.96	1359.00	6.99	5435.77	5435.77	0.01	0.01
Reach_5	65852	100-YR	373.14	3044.68	4.67	5434.35	5434.35		
Reach_5	65852	0.5' FW	373.11	2031.67	4.68	5434.34	5434.35	-0.01	0.00
Reach_5	65528	100-YR	142.56	1067.33	8.90	5432.58	5432.58		
Reach_5	65528	0.5' FW	142.53	1066.78	8.91	5432.58	5432.58	0.00	0.00
Reach_5	65518 I-70 WB		Bridge						
Reach_5	65437	100-YR	126.01	1008.65	9.42	5432.03	5432.03		
Reach_5	65437	0.5' FW	125.99	1008.10	9.42	5432.03	5432.03	0.00	0.00
Reach_5	65402	100-YR	122.57	964.20	9.85	5431.66	5431.66		
Reach_5	65402	0.5' FW	122.54	963.48	9.86	5431.65	5431.66	-0.01	0.00
Reach_5	65393 I-70 EB		Bridge						
Reach_5	65330	100-YR	116.35	703.97	13.49	5429.38	5429.38		
Reach_5	65330	0.5' FW	116.35	703.97	13.49	5429.38	5429.38	0.00	0.00
Reach_5	65282	100-YR	123.37	864.22	10.99	5429.69	5429.69		
Reach_5	65282	0.5' FW	123.37	864.22	10.99	5429.69	5429.69	0.00	0.00
Reach_5	65275 Youngfield St		Bridge						
Reach_5	65211	100-YR	118.74	710.44	13.37	5428.07	5428.07		
Reach_5	65211	0.5' FW	118.74	730.90	13.00	5428.24	5428.07	0.17	0.02
Reach_5	64938	100-YR	164.62	791.63	12.00	5425.80	5425.80		
Reach_5	64938	0.5' FW	119.85	761.92	12.47	5426.15	5425.80	0.35	0.23

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_5	64534	100-YR	204.78	7020.63	8.35	5424.14	5424.14		
Reach_5	64534	0.5' FW	139.73	966.32	9.83	5424.21	5424.14	0.07	0.36
Reach_5	64095	100-YR	145.45	5961.39	9.28	5421.43	5421.43		
Reach_5	64095	0.5' FW	145.45	1095.51	8.67	5421.92	5421.43	0.49	0.32
Reach_5	63718	100-YR	202.91	4609.93	8.39	5420.37	5420.37		
Reach_5	63718	0.5' FW	197.30	1146.57	8.29	5420.88	5420.37	0.50	0.36
Reach_5	63717		Lat Struct						
Reach_5	63333	100-YR	255.89	4179.16	6.53	5420.37	5420.37		
Reach_5	63333	0.5' FW	218.00	1403.81	6.77	5420.68	5420.37	0.31	0.38
Reach_5	63330		Lat Struct						
Reach_5	63271	100-YR	236.40	3195.77	6.69	5420.46	5420.46		
Reach_5	63271	0.5' FW	200.00	1335.62	7.11	5420.76	5420.46	0.31	0.37
Reach_5	63262 Footbridge		Bridge						
Reach_5	63243	100-YR	236.40	1587.18	10.85	5418.02	5418.02		
Reach_5	63243	0.5' FW	210.00	852.78	11.14	5418.10	5418.02	0.08	0.17
Reach_5	63054	100-YR	295.56	1368.85	6.94	5417.73	5417.73		
Reach_5	63054	0.5' FW	265.00	1339.04	7.09	5417.74	5417.73	0.01	0.02
Reach_5	63050		Lat Struct						
Reach_5	62718	100-YR	162.76	2392.91	7.65	5416.79	5416.79		
Reach_5	62718	0.5' FW	161.66	1242.54	7.65	5416.80	5416.79	0.02	0.01
Reach_5	62715		Lat Struct						
Reach_5	62640	100-YR	186.07	1672.86	8.54	5415.96	5415.96		
Reach_5	62640	0.5' FW	179.00	1111.49	8.55	5415.98	5415.96	0.03	0.02
Reach_5	62484	100-YR	160.88	809.24	11.74	5413.34	5413.34		
Reach_5	62484	0.5' FW	151.11	798.56	11.90	5413.34	5413.34	0.00	0.02
Reach_5	62206	100-YR	316.57	1205.06	7.88	5410.52	5410.52		
Reach_5	62206	0.5' FW	244.79	1045.94	9.08	5410.70	5410.52	0.18	0.50
Reach_5	62067	100-YR	316.64	1104.75	8.60	5409.20	5409.20		
Reach_5	62067	0.5' FW	258.57	1027.64	9.24	5409.43	5409.20	0.22	0.33
Reach_5	61678	100-YR	285.33	1477.62	6.82	5407.62	5407.62		
Reach_5	61678	0.5' FW	283.42	1393.36	6.82	5407.62	5407.62	0.00	0.00
Reach_5	61187	100-YR	149.81	1056.21	9.48	5404.71	5404.71		
Reach_5	61187	0.5' FW	149.81	1004.65	9.46	5404.73	5404.71	0.02	0.01
Reach_4	60806	100-YR	530.19	2177.86	7.90	5402.51	5402.51		
Reach_4	60806	0.5' FW	430.00	1148.03	8.28	5402.51	5402.51	0.00	0.02
Reach_4	60460	100-YR	563.40	2371.18	5.03	5401.56	5401.56		
Reach_4	60460	0.5' FW	523.41	1864.15	5.10	5401.58	5401.56	0.03	0.02
Reach_4	60416	100-YR	562.92	2143.63	5.22	5401.30	5401.30		
Reach_4	60416	0.5' FW	521.19	1783.76	5.33	5401.32	5401.30	0.01	0.02
Reach_4	60411 Footbridge		Bridge						
Reach_4	60391	100-YR	546.12	1586.13	6.24	5400.68	5400.68		
Reach_4	60391	0.5' FW	546.12	1522.91	6.24	5400.68	5400.68	0.00	0.00
Reach_4	60301	100-YR	676.40	1426.49	6.66	5399.46	5399.46		

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_4	60301	0.5' FW	456.84	1359.79	6.99	5399.49	5399.46	0.03	0.01
Reach_4	60157	100-YR	468.16	1289.57	7.37	5397.57	5397.57		
Reach_4	60157	0.5' FW	455.00	1310.14	7.25	5397.63	5397.57	0.05	0.00
Reach_4	59850	100-YR	787.80	1837.43	5.17	5395.68	5395.68		
Reach_4	59850	0.5' FW	380.00	1291.49	7.36	5395.69	5395.68	0.01	0.47
Reach_4	59484	100-YR	918.05	2297.89	4.77	5393.12	5393.12		
Reach_4	59484	0.5' FW	445.00	1470.01	6.46	5393.36	5393.12	0.24	0.50
Reach_4	59441	100-YR	941.22	2357.94	4.71	5392.83	5392.83		
Reach_4	59441	0.5' FW	445.00	1408.45	6.74	5392.88	5392.83	0.05	0.41
Reach_4	59399	100-YR	892.18	1866.94	5.53	5392.01	5392.01		
Reach_4	59399	0.5' FW	440.00	1362.43	6.97	5392.20	5392.01	0.19	0.39
Reach_4	59302	100-YR	881.82	1731.24	5.49	5391.32	5391.32		
Reach_4	59302	0.5' FW	460.00	1353.90	7.02	5391.55	5391.32	0.23	0.50
Reach_4	59010	100-YR	645.79	1632.34	5.87	5389.07	5389.07		
Reach_4	59010	0.5' FW	378.96	1382.27	6.87	5389.44	5389.07	0.36	0.50
Reach_4	58630	100-YR	676.13	1625.43	5.88	5386.53	5386.53		
Reach_4	58630	0.5' FW	385.96	1335.41	7.11	5386.79	5386.53	0.26	0.48
Reach_4	58172	100-YR	854.58	2154.57	4.41	5384.16	5384.16		
Reach_4	58172	0.5' FW	560.00	1759.98	5.40	5384.16	5384.16	0.00	0.24
Reach_4	57791	100-YR	1012.62	2334.01	4.07	5381.10	5381.10		
Reach_4	57791	0.5' FW	565.00	1762.29	5.39	5381.18	5381.10	0.08	0.39
Reach_4	57496	100-YR	823.28	1940.36	4.90	5378.29	5378.29		
Reach_4	57496	0.5' FW	550.00	1641.69	5.79	5378.48	5378.29	0.19	0.40
Reach_4	57442	100-YR	782.67	1884.83	5.08	5377.83	5377.83		
Reach_4	57442	0.5' FW	602.16	1701.45	5.58	5377.84	5377.83	0.00	0.10
Reach_4	57428 Footbridge		Bridge						
Reach_4	57402	100-YR	728.05	2118.47	4.82	5377.75	5377.75		
Reach_4	57402	0.5' FW	610.00	1837.28	5.17	5377.75	5377.75	0.01	0.06
Reach_4	57293	100-YR	661.86	1820.61	5.39	5376.92	5376.92		
Reach_4	57293	0.5' FW	480.00	1626.51	5.84	5376.89	5376.92	-0.03	0.03
Reach_4	56972	100-YR	340.48	1330.92	7.36	5374.12	5374.12		
Reach_4	56972	0.5' FW	340.48	1292.04	7.35	5374.13	5374.12	0.00	0.00
Reach_4	56520	100-YR	488.21	1439.31	6.80	5371.41	5371.41		
Reach_4	56520	0.5' FW	416.19	1422.09	6.68	5371.66	5371.41	0.25	0.17
Reach_4	56096	100-YR	760.08	2219.90	5.57	5368.27	5368.27		
Reach_4	56096	0.5' FW	594.59	1515.31	6.27	5368.46	5368.27	0.19	0.33
Reach_4	55687	100-YR	875.00	3791.75	3.29	5367.17	5367.17		
Reach_4	55687	0.5' FW	650.00	2592.84	3.66	5367.62	5367.17	0.45	0.49
Reach_4	55415	100-YR	875.48	4404.81	2.37	5367.01	5367.01		
Reach_4	55415	0.5' FW	600.00	3450.11	2.75	5367.46	5367.01	0.45	0.48
Reach_4	55335	100-YR	704.19	3036.03	3.71	5366.60	5366.60		
Reach_4	55335	0.5' FW	498.00	2304.66	4.12	5367.03	5366.60	0.43	0.48
Reach_4	55328 Kipling St		Bridge						
Reach_4	55239	100-YR	594.02	1723.65	5.78	5365.41	5365.41		

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_4	55239	0.5' FW	543.88	1565.76	6.07	5365.39	5365.41	-0.02	0.03
Reach_4	55224	100-YR	570.13	1728.81	5.77	5365.40	5365.40		
Reach_4	55224	0.5' FW	513.58	1551.19	6.12	5365.37	5365.40	-0.03	0.04
Reach_4	55212 Footbridge		Bridge						
Reach_4	55193	100-YR	127.93	749.36	12.68	5362.76	5362.76		
Reach_4	55193	0.5' FW	127.77	751.23	12.65	5362.78	5362.76	0.01	0.00
Reach_4	55123	100-YR	357.20	1014.44	9.36	5362.43	5362.43		
Reach_4	55123	0.5' FW	262.25	1013.24	9.38	5362.46	5362.43	0.03	0.01
Reach_4	54961	100-YR	357.25	2728.57	6.69	5361.54	5361.54		
Reach_4	54961	0.5' FW	358.08	1557.37	6.55	5361.63	5361.54	0.09	0.04
Reach_4	54621	100-YR	330.51	3321.34	8.52	5359.28	5359.28		
Reach_4	54621	0.5' FW	280.22	1172.53	8.70	5359.47	5359.28	0.19	0.16
Reach_4	54353	100-YR	280.32	1899.75	9.91	5356.73	5356.73		
Reach_4	54353	0.5' FW	250.00	1004.48	10.15	5356.94	5356.73	0.20	0.26
Reach_4	54064	100-YR	670.00	3889.86	3.65	5356.63	5356.63		
Reach_4	54064	0.5' FW	505.00	2483.11	4.11	5357.06	5356.63	0.43	0.50
Reach_4	54021	100-YR	710.00	3805.98	3.58	5356.49	5356.49		
Reach_4	54021	0.5' FW	551.00	2619.02	3.89	5356.94	5356.49	0.45	0.50
Reach_4	54013 Footbridge		Bridge						
Reach_4	54004	100-YR	655.35	2525.96	5.03	5355.46	5355.46		
Reach_4	54004	0.5' FW	531.34	1928.36	5.29	5355.86	5355.46	0.41	0.50
Reach_4	53915	100-YR	827.00	3124.50	3.58	5355.44	5355.44		
Reach_4	53915	0.5' FW	600.00	2568.16	3.97	5355.88	5355.44	0.44	0.50
Reach_4	53751	100-YR	547.27	3006.22	5.12	5354.91	5354.91		
Reach_4	53751	0.5' FW	416.94	2869.61	5.81	5355.24	5354.91	0.33	0.50
Reach_4	53431	100-YR	426.47	1445.93	7.50	5352.69	5352.69		
Reach_4	53431	0.5' FW	281.86	1125.30	9.06	5352.81	5352.69	0.11	0.50
Reach_4	53268	100-YR	419.08	3077.71	5.57	5352.27	5352.27		
Reach_4	53268	0.5' FW	329.11	1526.16	6.68	5352.28	5352.27	0.00	0.28
Reach_4	53103	100-YR	414.98	1643.96	8.40	5350.28	5350.28		
Reach_4	53103	0.5' FW	308.91	1131.96	9.01	5350.25	5350.28	-0.03	0.12
Reach_4	52630	100-YR	434.48	1840.77	5.94	5348.16	5348.16		
Reach_4	52630	0.5' FW	349.48	1555.09	6.56	5348.17	5348.16	0.00	0.09
Reach_4	52143	100-YR	364.56	2210.45	5.71	5346.65	5346.65		
Reach_4	52143	0.5' FW	354.56	1764.76	5.78	5346.65	5346.65	0.00	0.01
Reach_4	51703	100-YR	250.59	1277.81	8.29	5344.02	5344.02		
Reach_4	51703	0.5' FW	250.42	1226.75	8.31	5344.00	5344.02	-0.01	0.00
Reach_4	51250	100-YR	289.64	1418.88	7.19	5341.92	5341.92		
Reach_4	51250	0.5' FW	289.64	1471.07	6.93	5342.10	5341.92	0.18	0.07
Reach_4	50912	100-YR	268.23	1450.67	7.03	5340.81	5340.81		
Reach_4	50912	0.5' FW	250.51	1547.67	6.59	5341.23	5340.81	0.42	0.24
Reach_4	50437	100-YR	373.79	1664.10	6.13	5339.56	5339.56		
Reach_4	50437	0.5' FW	255.00	1450.36	7.03	5339.82	5339.56	0.26	0.43
Reach_4	50170	100-YR	372.20	2074.64	5.66	5338.93	5338.93		

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_4	50170	0.5' FW	265.00	1467.29	6.95	5338.94	5338.93	0.01	0.32
Reach_4	50078	100-YR	183.00	1349.96	7.60	5338.48	5338.48		
Reach_4	50078	0.5' FW	183.00	1407.95	7.24	5338.84	5338.48	0.36	0.28
Reach_4	50073 44th Ave		Bridge						
Reach_4	49993	100-YR	176.00	1236.31	8.28	5337.44	5337.44		
Reach_4	49993	0.5' FW	176.00	1280.44	7.97	5337.71	5337.44	0.28	0.20
Reach_4	49812	100-YR	486.02	1538.64	7.55	5336.21	5336.21		
Reach_4	49812	0.5' FW	337.05	1199.68	8.50	5336.23	5336.21	0.01	0.17
Reach_4	49640	100-YR	497.40	1693.32	6.68	5335.00	5335.00		
Reach_4	49640	0.5' FW	337.40	1260.26	8.09	5335.10	5335.00	0.10	0.45
Reach_4	49591	100-YR	481.48	1576.88	6.92	5334.54	5334.54		
Reach_4	49591	0.5' FW	370.00	1298.76	7.85	5334.66	5334.54	0.12	0.36
Reach_4	49530	100-YR	376.20	1139.56	9.04	5332.16	5332.16		
Reach_4	49530	0.5' FW	350.87	1121.34	9.10	5332.16	5332.16	0.00	0.00
Reach_4	49418	100-YR	423.10	1267.92	8.33	5331.65	5331.65		
Reach_4	49418	0.5' FW	423.10	1224.30	8.33	5331.65	5331.65	0.00	0.00
Reach_4	49071	100-YR	353.27	1213.49	8.72	5329.70	5329.70		
Reach_4	49071	0.5' FW	352.68	1167.63	8.74	5329.69	5329.70	-0.01	0.00
Reach_4	48477	100-YR	926.75	4460.23	2.37	5329.83	5329.83		
Reach_4	48477	0.5' FW	539.89	3338.21	3.06	5329.84	5329.83	0.01	0.07
Reach_4	48066	100-YR	828.98	4038.11	2.92	5329.50	5329.50		
Reach_4	48066	0.5' FW	648.91	3021.81	3.38	5329.48	5329.50	-0.02	0.03
Reach_4	48004	100-YR	844.35	3208.77	3.67	5329.09	5329.09		
Reach_4	48004	0.5' FW	755.55	2635.04	3.87	5329.08	5329.09	0.00	0.03
Reach_4	47996 Footbridge		Bridge						
Reach_4	47979	100-YR	261.43	962.05	10.60	5326.38	5326.38		
Reach_4	47979	0.5' FW	305.11	1015.26	10.05	5326.58	5326.38	0.19	0.05
Reach_4	47862	100-YR	612.32	1823.09	6.01	5326.23	5326.23		
Reach_4	47862	0.5' FW	502.68	1717.18	6.30	5326.42	5326.23	0.19	0.19
Reach_4	47719	100-YR	729.81	1916.18	5.77	5325.64	5325.64		
Reach_4	47719	0.5' FW	629.37	1583.67	6.44	5325.63	5325.64	-0.02	0.16
Reach_4	47490	100-YR	580.65	2462.95	5.37	5325.10	5325.10		
Reach_4	47490	0.5' FW	505.58	1857.06	5.90	5325.07	5325.10	-0.02	0.11
Reach_4	46985	100-YR	425.53	1273.88	8.50	5322.26	5322.26		
Reach_4	46985	0.5' FW	414.01	1203.44	8.48	5322.27	5322.26	0.01	0.00
Reach_4	46532	100-YR	651.99	1861.45	6.03	5319.91	5319.91		
Reach_4	46532	0.5' FW	280.00	1292.47	7.90	5319.91	5319.91	0.00	0.25
Reach_4	46171	100-YR	424.96	1315.82	7.75	5317.91	5317.91		
Reach_4	46171	0.5' FW	251.33	1203.49	8.48	5317.92	5317.91	0.00	0.11
Reach_4	45604	100-YR	394.84	2044.42	5.66	5316.67	5316.67		
Reach_4	45604	0.5' FW	365.00	1827.81	5.88	5316.66	5316.67	-0.01	0.02
Reach_4	45311	100-YR	323.45	2555.95	5.87	5316.08	5316.08		
Reach_4	45311	0.5' FW	314.33	1733.21	5.89	5316.07	5316.08	-0.01	0.00
Reach_4	45243	100-YR	244.73	1192.20	10.50	5314.16	5314.16		

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_4	45243	0.5' FW	244.73	980.65	10.40	5314.20	5314.16	0.04	0.00
Reach_4	45140	100-YR	144.57	1067.89	9.55	5311.28	5311.28		
Reach_4	45140	0.5' FW	144.57	1067.89	9.55	5311.28	5311.28	0.00	0.00
Reach_4	45093 Wadsworth Blvd		Bridge						
Reach_4	45000	100-YR	145.54	1028.08	9.92	5309.19	5309.19		
Reach_4	45000	0.5' FW	145.54	1028.08	9.92	5309.19	5309.19	0.00	0.00
Reach_4	44988	100-YR	127.26	959.99	10.63	5308.67	5308.67		
Reach_4	44988	0.5' FW	127.26	959.99	10.63	5308.67	5308.67	0.00	0.00
Reach_4	44948 I-70 Access Ramp		Bridge						
Reach_4	44913	100-YR	121.37	762.98	13.37	5306.34	5306.34		
Reach_4	44913	0.5' FW	121.37	762.98	13.37	5306.34	5306.34	0.00	0.00
Reach_4	44826	100-YR	163.58	1198.43	8.51	5306.65	5306.65		
Reach_4	44826	0.5' FW	163.58	1198.43	8.51	5306.65	5306.65	0.00	0.00
Reach_4	44692	100-YR	161.11	1299.41	7.85	5306.66	5306.66		
Reach_4	44692	0.5' FW	161.11	1299.41	7.85	5306.66	5306.66	0.00	0.00
Reach_4	44466	100-YR	91.05	708.52	14.40	5302.55	5302.55		
Reach_4	44466	0.5' FW	91.05	708.52	14.40	5302.55	5302.55	0.00	0.00
Reach_4	44185	100-YR	142.32	869.94	11.72	5300.43	5300.43		
Reach_4	44185	0.5' FW	142.30	869.38	11.73	5300.42	5300.43	0.00	0.00
Reach_4	43824	100-YR	131.68	1018.21	10.02	5299.63	5299.63		
Reach_4	43824	0.5' FW	131.64	1017.31	10.03	5299.62	5299.63	-0.01	0.00
Reach_4	43444	100-YR	152.08	1106.71	9.22	5298.78	5298.78		
Reach_4	43444	0.5' FW	129.41	1096.11	9.31	5298.78	5298.78	0.00	-0.01
Reach_4	43235	100-YR	196.83	1391.17	7.62	5298.36	5298.36		
Reach_4	43235	0.5' FW	156.00	1313.12	7.77	5298.35	5298.36	0.00	0.00
Reach_4	43134	100-YR	169.31	1478.82	7.01	5298.27	5298.27		
Reach_4	43134	0.5' FW	169.23	1454.07	7.01	5298.27	5298.27	0.00	0.00
Reach_4	43051 I-70 EB Access		Bridge						
Reach_4	43039	100-YR	177.97	1529.45	6.67	5297.26	5297.26		
Reach_4	43039	0.5' FW	177.88	1527.81	6.68	5297.26	5297.26	0.00	0.00
Reach_4	43009	100-YR	184.77	1397.37	7.30	5296.71	5296.71		
Reach_4	43009	0.5' FW	184.76	1397.09	7.30	5296.71	5296.71	0.00	0.00
Reach_4	42988	100-YR	174.03	1468.02	6.95	5296.86	5296.86		
Reach_4	42988	0.5' FW	174.02	1467.85	6.95	5296.86	5296.86	0.00	0.00
Reach_4	42940 I-70 EB		Bridge						
Reach_4	42877	100-YR	148.20	1312.68	7.77	5296.07	5296.07		
Reach_4	42877	0.5' FW	148.19	1312.53	7.77	5296.07	5296.07	0.00	0.00
Reach_4	42676	100-YR	143.63	1171.01	8.71	5295.22	5295.22		
Reach_4	42676	0.5' FW	143.62	1170.80	8.71	5295.21	5295.22	0.00	0.00
Reach_4	42499	100-YR	146.16	1360.95	7.49	5295.02	5295.02		
Reach_4	42499	0.5' FW	146.15	1360.67	7.50	5295.02	5295.02	0.00	0.00
Reach_4	42456 I-70 WB		Bridge						
Reach_4	42415	100-YR	139.32	1322.11	7.71	5294.43	5294.43		

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_4	42415	0.5' FW	139.31	1321.84	7.72	5294.43	5294.43	0.00	0.00
Reach_4	42287	100-YR	217.74	1663.34	6.19	5294.42	5294.42		
Reach_4	42287	0.5' FW	172.72	1586.20	6.43	5294.41	5294.42	-0.01	0.00
Reach_4	42165	100-YR	163.81	1565.11	6.53	5294.14	5294.14		
Reach_4	42165	0.5' FW	163.81	1561.71	6.53	5294.14	5294.14	0.00	0.00
Reach_4	42126 I-70 Exit Ramp		Bridge						
Reach_4	42105	100-YR	163.65	1534.80	6.66	5293.68	5293.68		
Reach_4	42105	0.5' FW	163.64	1531.10	6.66	5293.68	5293.68	0.00	0.00
Reach_4	41978	100-YR	217.36	2671.34	6.35	5293.54	5293.54		
Reach_4	41978	0.5' FW	206.85	1604.69	6.36	5293.54	5293.54	0.00	0.00
Reach_4	41773	100-YR	288.41	2930.39	5.64	5293.33	5293.33		
Reach_4	41773	0.5' FW	224.00	1790.53	5.70	5293.32	5293.33	0.00	0.00
Reach_4	41417	100-YR	326.14	2422.95	4.43	5293.22	5293.22		
Reach_4	41417	0.5' FW	268.05	2187.46	4.66	5293.20	5293.22	-0.02	0.00
Reach_4	41357	100-YR	157.00	2088.96	5.14	5293.16	5293.16		
Reach_4	41357	0.5' FW	157.00	1985.73	5.14	5293.16	5293.16	0.00	0.00
Reach_4	41314 Marshall St		Bridge						
Reach_4	41282	100-YR	162.00	2024.92	5.48	5292.21	5292.21		
Reach_4	41282	0.5' FW	162.00	1859.82	5.48	5292.21	5292.21	0.00	0.00
Reach_4	41139	100-YR	285.66	2161.41	8.09	5290.72	5290.72		
Reach_4	41139	0.5' FW	190.00	1223.09	8.34	5290.70	5290.72	-0.02	0.00
Reach_4	41025	100-YR	244.45	1366.45	9.65	5289.30	5289.30		
Reach_4	41025	0.5' FW	244.45	1062.24	9.60	5289.32	5289.30	0.02	0.00
Reach_4	40947	100-YR	255.10	838.01	12.17	5286.78	5286.78		
Reach_4	40947	0.5' FW	253.88	835.40	12.21	5286.77	5286.78	-0.01	0.00
Reach_4	40883	100-YR	424.79	1436.13	7.10	5286.71	5286.71		
Reach_4	40883	0.5' FW	387.97	1421.95	7.17	5286.70	5286.71	-0.01	-0.01
Reach_4	40434	100-YR	517.78	2022.48	5.04	5283.48	5283.48		
Reach_4	40434	0.5' FW	395.00	1880.63	5.42	5283.49	5283.48	0.00	0.00
Reach_4	40002	100-YR	350.30	2041.62	5.17	5282.92	5282.92		
Reach_4	40002	0.5' FW	350.30	1973.95	5.17	5282.91	5282.92	0.00	0.00
Reach_4	39601	100-YR	205.58	942.56	10.82	5279.77	5279.77		
Reach_4	39601	0.5' FW	205.58	942.56	10.82	5279.77	5279.77	0.00	0.00
Reach_4	39183	100-YR	66.30	666.81	15.30	5275.43	5275.43		
Reach_4	39183	0.5' FW	66.30	666.85	15.30	5275.43	5275.43	0.00	0.00
Reach_4	38688	100-YR	80.65	715.39	14.26	5272.70	5272.70		
Reach_4	38688	0.5' FW	80.83	718.03	14.21	5272.73	5272.70	0.03	0.01
Reach_4	38441	100-YR	87.88	1703.63	15.15	5270.11	5270.11		
Reach_4	38441	0.5' FW	80.00	665.57	15.33	5270.12	5270.11	0.01	0.02
Reach_4	38345	100-YR	108.00	3663.49	8.23	5271.25	5271.25		
Reach_4	38345	0.5' FW	108.00	1238.34	8.24	5271.25	5271.25	0.00	0.00
Reach_4	38290 W 52nd Ave		Bridge						
Reach_4	38267	100-YR	108.00	3301.62	8.51	5270.23	5270.23		
Reach_4	38267	0.5' FW	108.00	1198.60	8.51	5270.22	5270.23	-0.01	0.00

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_4	38186	100-YR	111.08	1246.02	13.00	5267.83	5267.83		
Reach_4	38186	0.5' FW	111.08	784.88	13.00	5267.83	5267.83	0.00	0.00
Reach_4	37772	100-YR	137.74	900.87	11.32	5265.75	5265.75		
Reach_4	37772	0.5' FW	137.74	900.94	11.32	5265.75	5265.75	0.00	0.00
Reach_4	37300	100-YR	148.75	1410.28	8.63	5264.72	5264.72		
Reach_4	37300	0.5' FW	148.75	1182.08	8.63	5264.72	5264.72	0.00	0.00
Reach_4	37204	100-YR	151.88	2382.00	8.66	5264.45	5264.45		
Reach_4	37204	0.5' FW	151.88	1177.86	8.66	5264.45	5264.45	0.00	0.00
Reach_4	37007	100-YR	166.27	1357.96	7.51	5264.12	5264.12		
Reach_4	37007	0.5' FW	166.27	1357.96	7.51	5264.12	5264.12	0.00	0.00
Reach_4	36929 I-76 EB		Bridge						
Reach_4	36901	100-YR	178.60	1423.87	7.16	5263.83	5263.83		
Reach_4	36901	0.5' FW	178.60	1423.87	7.16	5263.83	5263.83	0.00	0.00
Reach_4	36879	100-YR	170.36	1328.41	7.68	5263.51	5263.51		
Reach_4	36879	0.5' FW	170.36	1328.41	7.68	5263.51	5263.51	0.00	0.00
Reach_4	36856	100-YR	208.27	1612.41	6.33	5263.69	5263.69		
Reach_4	36856	0.5' FW	208.27	1612.41	6.33	5263.69	5263.69	0.00	0.00
Reach_4	36763 I-76 WB		Bridge						
Reach_4	36727	100-YR	205.32	1848.08	5.52	5263.57	5263.57		
Reach_4	36727	0.5' FW	205.32	1848.08	5.52	5263.57	5263.57	0.00	0.00
Reach_4	36563	100-YR	147.51	1131.95	9.01	5261.96	5261.96		
Reach_4	36563	0.5' FW	147.51	1131.95	9.01	5261.96	5261.96	0.00	0.00
Reach_4	36262	100-YR	147.54	1038.15	9.83	5260.71	5260.71		
Reach_4	36262	0.5' FW	147.54	1038.08	9.83	5260.71	5260.71	0.00	0.00
Reach_4	35958	100-YR	176.21	1116.26	9.14	5259.68	5259.68		
Reach_4	35958	0.5' FW	176.20	1116.09	9.14	5259.68	5259.68	0.00	0.00
Reach_4	35468	100-YR	337.74	2330.37	4.45	5259.79	5259.79		
Reach_4	35468	0.5' FW	337.71	2290.69	4.45	5259.79	5259.79	0.00	0.00
Reach_4	35401	100-YR	349.44	2585.96	3.96	5259.78	5259.78		
Reach_4	35401	0.5' FW	349.43	2572.67	3.96	5259.77	5259.78	0.00	0.00
Reach_4	35382 Footbridge		Bridge						
Reach_4	35343	100-YR	344.90	2702.74	3.85	5259.65	5259.65		
Reach_4	35343	0.5' FW	344.89	2647.44	3.85	5259.64	5259.65	0.00	0.00
Reach_4	35231	100-YR	412.64	4894.86	3.36	5259.62	5259.62		
Reach_4	35231	0.5' FW	412.63	3030.28	3.37	5259.62	5259.62	0.00	0.00
Reach_4	35018	100-YR	556.64	3837.92	3.66	5259.45	5259.45		
Reach_4	35018	0.5' FW	556.64	3632.92	3.66	5259.45	5259.45	0.00	0.00
Reach_4	34757	100-YR	237.14	2296.71	7.43	5258.26	5258.26		
Reach_4	34757	0.5' FW	237.14	1723.38	7.43	5258.26	5258.26	0.00	0.00
Reach_4	34653	100-YR	170.04	1883.56	7.12	5258.25	5258.25		
Reach_4	34653	0.5' FW	170.04	1688.48	7.12	5258.25	5258.25	0.00	0.00
Reach_4	34574 Sheridan Blvd		Bridge						
Reach_4	34496	100-YR	174.05	1541.66	7.80	5256.22	5256.22		

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_4	34496	0.5' FW	174.05	1539.29	7.80	5256.22	5256.22	0.00	0.00
Reach_4	34478	100-YR	181.36	1531.25	9.06	5255.67	5255.67		
Reach_4	34478	0.5' FW	181.36	1325.66	9.06	5255.67	5255.67	0.00	0.00
Reach_4	34142	100-YR	179.73	1192.12	9.03	5254.15	5254.15		
Reach_4	34142	0.5' FW	179.73	1142.71	9.03	5254.15	5254.15	0.00	0.00
Reach_4	33862	100-YR	183.82	1206.21	8.55	5253.31	5253.31		
Reach_4	33862	0.5' FW	183.81	1205.85	8.56	5253.31	5253.31	0.00	0.00
Reach_4	33496	100-YR	177.18	1264.89	8.16	5252.14	5252.14		
Reach_4	33496	0.5' FW	177.15	1264.19	8.16	5252.13	5252.14	0.00	0.00
Reach_4	33166	100-YR	164.10	1791.26	7.44	5251.76	5251.76		
Reach_4	33166	0.5' FW	164.08	1386.59	7.44	5251.76	5251.76	0.00	0.00
Reach_4	33030 I-76 W X-ing		Bridge						
Reach_4	32787	100-YR	131.89	979.57	10.53	5248.10	5248.10		
Reach_4	32787	0.5' FW	131.89	979.70	10.53	5248.10	5248.10	0.00	0.00
Reach_4	32573	100-YR	141.18	1186.58	10.05	5247.49	5247.49		
Reach_4	32573	0.5' FW	141.18	1026.58	10.05	5247.49	5247.49	0.00	0.00
Reach_4	32467	100-YR	192.54	1626.69	7.68	5247.66	5247.66		
Reach_4	32467	0.5' FW	192.53	1344.16	7.68	5247.66	5247.66	0.00	0.00
Reach_4	32160	100-YR	219.89	2352.11	6.97	5247.10	5247.10		
Reach_4	32160	0.5' FW	219.89	1479.38	6.97	5247.10	5247.10	0.00	0.00
Reach_4	31859	100-YR	544.50	4449.23	4.31	5246.81	5246.81		
Reach_4	31859	0.5' FW	544.50	2392.30	4.31	5246.81	5246.81	0.00	0.00
Reach_4	31809 Tennyson St		Bridge						
Reach_4	31778	100-YR	168.25	811.38	12.46	5243.15	5243.15		
Reach_4	31778	0.5' FW	168.24	811.38	12.46	5243.15	5243.15	0.00	0.00
Reach_4	31579	100-YR	208.57	1815.59	9.51	5238.02	5238.02		
Reach_4	31579	0.5' FW	208.50	1804.67	9.54	5238.01	5238.02	-0.02	-0.01
Reach_4	31387	100-YR	223.53	946.94	10.92	5236.04	5236.04		
Reach_4	31387	0.5' FW	223.64	971.54	10.82	5236.08	5236.04	0.04	0.00
Reach_4	30793	100-YR	676.98	1763.56	5.73	5233.76	5233.76		
Reach_4	30793	0.5' FW	676.98	1763.56	5.73	5233.76	5233.76	0.00	0.00
Reach_4	30256	100-YR	906.34	3769.02	2.68	5234.00	5234.00		
Reach_4	30256	0.5' FW	906.31	3766.37	2.68	5234.00	5234.00	0.00	0.00
Reach_4	29856	100-YR	884.53	4439.83	2.53	5233.98	5233.98		
Reach_4	29856	0.5' FW	824.98	3989.23	2.53	5233.97	5233.98	0.00	0.00
Reach_4	29554	100-YR	805.65	3948.53	2.85	5233.94	5233.94		
Reach_4	29554	0.5' FW	805.51	3536.33	2.86	5233.94	5233.94	0.00	0.00
Reach_4	29230	100-YR	620.68	2862.91	3.53	5233.71	5233.71		
Reach_4	29230	0.5' FW	620.66	2860.49	3.53	5233.71	5233.71	0.00	0.00
Reach_4	29044	100-YR	341.40	1621.62	7.08	5232.92	5232.92		
Reach_4	29044	0.5' FW	341.40	1610.96	7.10	5232.91	5232.92	-0.01	0.00
Reach_4	29001 Lowell Blvd		Bridge						
Reach_4	28974	100-YR	188.65	1053.30	9.05	5231.70	5231.70		
Reach_4	28974	0.5' FW	188.60	1032.79	9.07	5231.69	5231.70	-0.01	0.00

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_4	28927	100-YR	192.63	838.50	11.65	5230.36	5230.36		
Reach_4	28927	0.5' FW	192.61	806.06	11.63	5230.37	5230.36	0.01	0.00
Reach_4	28893	100-YR	145.16	1722.36	5.84	5229.22	5229.22		
Reach_4	28893	0.5' FW	145.15	1604.29	5.84	5229.21	5229.22	0.00	0.00
Reach_4	28754	100-YR	86.84	631.02	15.17	5225.45	5225.45		
Reach_4	28754	0.5' FW	86.83	618.74	15.15	5225.46	5225.45	0.01	0.00
Reach_4	28381	100-YR	149.25	744.04	12.60	5220.61	5220.61		
Reach_4	28381	0.5' FW	149.23	743.67	12.60	5220.61	5220.61	0.00	0.00
Reach_4	28088	100-YR	145.76	1240.69	7.55	5220.68	5220.68		
Reach_4	28088	0.5' FW	145.75	1240.69	7.55	5220.68	5220.68	0.00	0.00
Reach_4	27970 I-76 E X-ing		Bridge						
Reach_4	27695	100-YR	175.76	1812.19	5.17	5220.21	5220.21		
Reach_4	27695	0.5' FW	155.09	1788.50	5.24	5220.22	5220.21	0.00	0.00
Reach_4	27564	100-YR	136.75	1629.90	5.75	5220.00	5220.00		
Reach_4	27564	0.5' FW	136.75	1629.90	5.75	5220.00	5220.00	0.00	0.00
Reach_4	27559 Footbridge		Bridge						
Reach_4	27548	100-YR	137.31	1620.10	5.78	5219.93	5219.93		
Reach_4	27548	0.5' FW	137.31	1620.10	5.78	5219.93	5219.93	0.00	0.00
Reach_4	27468	100-YR	314.61	2821.10	3.33	5220.06	5220.06		
Reach_4	27468	0.5' FW	304.28	2809.67	3.34	5220.06	5220.06	0.00	0.00
Reach_4	27091	100-YR	335.33	3026.91	3.10	5219.89	5219.89		
Reach_4	27091	0.5' FW	335.33	3027.07	3.10	5219.89	5219.89	0.00	0.00
Reach_3	26669	100-YR	792.78	5000.83	2.62	5219.71	5219.71		
Reach_3	26669	0.5' FW	792.78	4894.41	2.62	5219.71	5219.71	0.00	0.00
Reach_3	26340	100-YR	457.83	4747.16	3.30	5219.47	5219.47		
Reach_3	26340	0.5' FW	457.86	3880.60	3.30	5219.47	5219.47	0.00	0.00
Reach_3	26179	100-YR	614.50	4677.39	3.23	5219.34	5219.34		
Reach_3	26179	0.5' FW	440.00	3757.25	3.41	5219.34	5219.34	0.00	0.00
Reach_2	25937	100-YR	168.24	1794.12	7.24	5218.41	5218.41		
Reach_2	25937	0.5' FW	168.24	1794.12	7.24	5218.41	5218.41	0.00	0.00
Reach_2	25895 BNSF RR		Bridge						
Reach_2	25850	100-YR	85.43	880.77	14.53	5214.03	5214.03		
Reach_2	25850	0.5' FW	85.43	880.77	14.53	5214.03	5214.03	0.00	0.00
Reach_2	25833	100-YR	99.62	961.96	13.31	5214.26	5214.26		
Reach_2	25833	0.5' FW	99.62	961.96	13.31	5214.26	5214.26	0.00	0.00
Reach_2	25822 LRT Gold Line		Bridge						
Reach_2	25780	100-YR	109.44	802.31	15.95	5210.65	5210.65		
Reach_2	25780	0.5' FW	109.44	802.31	15.95	5210.65	5210.65	0.00	0.00
Reach_2	25690	100-YR	168.34	1147.76	11.15	5210.80	5210.80		
Reach_2	25690	0.5' FW	168.34	1147.76	11.15	5210.80	5210.80	0.00	0.00
Reach_2	25392	100-YR	278.17	2713.57	4.72	5211.62	5211.62		
Reach_2	25392	0.5' FW	278.17	2713.57	4.72	5211.62	5211.62	0.00	0.00
Reach_2	25104	100-YR	184.05	1814.87	7.05	5210.87	5210.87		

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_2	25104	0.5' FW	184.05	1814.87	7.05	5210.87	5210.87	0.00	0.00
Reach_2	25035 Federal Blvd		Bridge						
Reach_2	24920	100-YR	150.23	1510.65	8.47	5209.42	5209.42		
Reach_2	24920	0.5' FW	150.23	1510.58	8.47	5209.42	5209.42	0.00	0.00
Reach_1	24755	100-YR	176.68	1377.84	9.29	5208.65	5208.65		
Reach_1	24755	0.5' FW	176.67	1377.58	9.29	5208.64	5208.65	0.00	0.00
Reach_1	24720	100-YR	166.46	1396.12	9.17	5208.61	5208.61		
Reach_1	24720	0.5' FW	166.46	1395.87	9.17	5208.61	5208.61	0.00	0.00
Reach_1	24582	100-YR	172.10	1017.63	12.58	5206.36	5206.36		
Reach_1	24582	0.5' FW	172.10	1018.72	12.56	5206.36	5206.36	0.01	0.00
Reach_1	24222	100-YR	280.49	1586.12	8.69	5204.63	5204.63		
Reach_1	24222	0.5' FW	280.49	1473.56	8.69	5204.63	5204.63	0.00	0.00
Reach_1	23845	100-YR	474.73	2602.80	4.92	5204.63	5204.63		
Reach_1	23845	0.5' FW	474.73	2602.57	4.92	5204.63	5204.63	0.00	0.00
Reach_1	23255	100-YR	437.56	1974.30	7.12	5202.93	5202.93		
Reach_1	23255	0.5' FW	437.22	1795.57	7.13	5202.92	5202.93	0.00	0.00
Reach_1	22876	100-YR	581.20	2161.66	6.70	5201.64	5201.64		
Reach_1	22876	0.5' FW	483.54	1832.33	6.99	5201.61	5201.64	-0.03	-0.01
Reach_1	22613	100-YR	553.88	2645.71	5.51	5201.15	5201.15		
Reach_1	22613	0.5' FW	450.86	2234.42	5.73	5201.15	5201.15	0.00	-0.01
Reach_1	22088	100-YR	395.89	2306.54	7.01	5199.41	5199.41		
Reach_1	22088	0.5' FW	395.89	1830.42	6.99	5199.42	5199.41	0.01	0.01
Reach_1	21914	100-YR	338.46	2562.36	9.44	5197.95	5197.95		
Reach_1	21914	0.5' FW	338.48	1359.49	9.42	5197.96	5197.95	0.01	0.01
Reach_1	21866	100-YR	398.25	2827.26	7.42	5197.73	5197.73		
Reach_1	21866	0.5' FW	398.25	1923.86	6.65	5198.23	5197.73	0.50	0.28
Reach_1	21849	100-YR	400.33	2824.77	7.23	5197.72	5197.72		
Reach_1	21849	0.5' FW	401.48	1970.82	6.49	5198.21	5197.72	0.50	0.29
Reach_1	21842	100-YR	394.92	2938.88	6.81	5197.80	5197.80		
Reach_1	21842	0.5' FW	403.26	2063.37	6.20	5198.27	5197.80	0.46	0.30
Reach_1	21733	100-YR	588.48	4228.11	4.46	5197.99	5197.99		
Reach_1	21733	0.5' FW	500.00	2966.81	4.31	5198.40	5197.99	0.41	0.34
Reach_1	21726 Footbridge		Bridge						
Reach_1	21700	100-YR	656.63	4396.67	4.08	5197.82	5197.82		
Reach_1	21700	0.5' FW	520.00	3069.37	4.17	5198.21	5197.82	0.39	0.38
Reach_1	21401	100-YR	1004.08	6731.84	2.44	5197.90	5197.90		
Reach_1	21401	0.5' FW	550.00	3336.59	3.84	5198.15	5197.90	0.25	0.45
Reach_1	20985	100-YR	689.08	10595.51	3.28	5197.83	5197.83		
Reach_1	20985	0.5' FW	515.79	2987.42	4.72	5197.91	5197.83	0.09	0.27
Reach_1	20638	100-YR	382.00	8793.28	4.45	5197.61	5197.61		
Reach_1	20638	0.5' FW	382.00	3190.45	4.42	5197.66	5197.61	0.06	0.06
Reach_1	20593 LRT NWES Line		Bridge						
Reach_1	20568	100-YR	259.00	5008.52	5.89	5197.19	5197.19		
Reach_1	20568	0.5' FW	259.00	2410.62	5.85	5197.26	5197.19	0.06	0.06

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_1	20561	100-YR	255.00	3759.11	5.98	5197.18	5197.18		
Reach_1	20561	0.5' FW	255.00	2377.01	5.93	5197.25	5197.18	0.07	0.06
Reach_1	20560 Railroad		Bridge						
Reach_1	20524	100-YR	254.20	1256.25	12.07	5191.12	5191.12		
Reach_1	20524	0.5' FW	254.21	1177.05	11.98	5191.16	5191.12	0.04	0.00
Reach_1	20502	100-YR	409.16	5246.67	3.70	5191.45	5191.45		
Reach_1	20502	0.5' FW	271.00	3029.53	4.65	5191.63	5191.45	0.18	0.29
Reach_1	20331	100-YR	290.05	2044.72	8.44	5190.04	5190.04		
Reach_1	20331	0.5' FW	290.05	1815.51	7.77	5190.55	5190.04	0.50	0.30
Reach_1	20100	100-YR	401.33	3395.17	5.29	5190.19	5190.19		
Reach_1	20100	0.5' FW	339.51	2614.91	5.39	5190.61	5190.19	0.42	0.40
Reach_1	19952	100-YR	457.42	3688.19	5.11	5190.07	5190.07		
Reach_1	19952	0.5' FW	394.11	2875.93	4.90	5190.58	5190.07	0.50	0.40
Reach_1	19866	100-YR	555.78	3737.85	4.18	5190.12	5190.12		
Reach_1	19866	0.5' FW	441.59	2830.30	4.98	5190.40	5190.12	0.28	0.45
Reach_1	19861	100-YR	555.12	3734.72	4.18	5190.11	5190.11		
Reach_1	19861	0.5' FW	440.59	2819.33	5.00	5190.38	5190.11	0.27	0.45
Reach_1	19746	100-YR	706.48	5449.07	3.10	5190.19	5190.19		
Reach_1	19746	0.5' FW	494.43	3428.99	4.11	5190.44	5190.19	0.26	0.42
Reach_1	19666	100-YR	755.77	5423.92	2.99	5190.18	5190.18		
Reach_1	19666	0.5' FW	489.48	3142.84	4.49	5190.34	5190.18	0.17	0.40
Reach_1	19578	100-YR	1111.82	7041.20	2.17	5190.21	5190.21		
Reach_1	19578	0.5' FW	520.00	3903.84	3.61	5190.41	5190.21	0.20	0.36
Reach_1	19327	100-YR	701.32	3783.60	4.38	5189.63	5189.63		
Reach_1	19327	0.5' FW	453.20	2499.73	5.64	5189.65	5189.63	0.01	0.27
Reach_1	18997	100-YR	565.71	2155.92	8.10	5187.65	5187.65		
Reach_1	18997	0.5' FW	465.25	1592.22	8.86	5187.64	5187.65	0.00	0.15
Reach_1	18905	100-YR	411.31	2165.70	9.48	5186.61	5186.61		
Reach_1	18905	0.5' FW	378.09	1473.43	9.57	5186.63	5186.61	0.02	0.01
Reach_1	18733	100-YR	448.15	2736.89	6.05	5186.49	5186.49		
Reach_1	18733	0.5' FW	447.60	2325.00	6.06	5186.47	5186.49	-0.02	-0.01
Reach_1	18648	100-YR	265.00	3476.02	5.91	5186.44	5186.44		
Reach_1	18648	0.5' FW	265.00	2376.09	5.93	5186.41	5186.44	-0.03	-0.01
Reach_1	18574 Pecos St		Bridge						
Reach_1	18466	100-YR	232.53	3953.95	7.33	5185.02	5185.02		
Reach_1	18466	0.5' FW	229.87	1921.79	7.34	5185.01	5185.02	-0.01	0.02
Reach_1	18273	100-YR	374.03	6277.58	7.25	5184.75	5184.75		
Reach_1	18273	0.5' FW	328.31	1917.21	7.35	5184.75	5184.75	0.00	0.00
Reach_1	18090	100-YR	345.47	4502.59	9.93	5183.38	5183.38		
Reach_1	18090	0.5' FW	345.30	1417.81	9.94	5183.38	5183.38	0.00	0.00
Reach_1	17743	100-YR	302.61	4868.30	9.63	5181.17	5181.17		
Reach_1	17743	0.5' FW	302.61	1486.44	9.49	5181.25	5181.17	0.07	0.02
Reach_1	17393	100-YR	610.60	2509.14	6.90	5178.57	5178.57		
Reach_1	17393	0.5' FW	610.70	2045.78	6.89	5178.57	5178.57	0.00	0.00

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_1	17022	100-YR	766.49	2277.92	6.29	5177.13	5177.13		
Reach_1	17022	0.5' FW	766.44	2238.71	6.30	5177.13	5177.13	0.00	0.00
Reach_1	17020		Inl Struct						
Reach_1	17011	100-YR	757.03	2188.76	7.12	5176.40	5176.40		
Reach_1	17011	0.5' FW	759.89	2035.25	6.93	5176.47	5176.40	0.07	0.00
Reach_1	16987	100-YR	313.65	1869.31	7.54	5169.61	5169.61		
Reach_1	16987	0.5' FW	313.65	1869.31	7.54	5169.61	5169.61	0.00	0.00
Reach_1	16825	100-YR	152.59	974.46	14.47	5166.14	5166.14		
Reach_1	16825	0.5' FW	152.59	974.46	14.47	5166.14	5166.14	0.00	0.00
Reach_1	16803	100-YR	166.76	1011.12	13.94	5165.86	5165.86		
Reach_1	16803	0.5' FW	166.76	1011.12	13.94	5165.86	5165.86	0.00	0.00
Reach_1	16787	100-YR	169.99	1007.75	13.99	5164.90	5164.90		
Reach_1	16787	0.5' FW	169.99	1007.75	13.99	5164.90	5164.90	0.00	0.00
Reach_1	16726	100-YR	204.48	1140.21	12.37	5163.41	5163.41		
Reach_1	16726	0.5' FW	204.48	1140.21	12.37	5163.41	5163.41	0.00	0.00
Reach_1	16597	100-YR	178.82	1055.75	13.36	5160.83	5160.83		
Reach_1	16597	0.5' FW	178.82	1055.75	13.36	5160.83	5160.83	0.00	0.00
Reach_1	16232	100-YR	498.33	2477.80	5.69	5157.18	5157.18		
Reach_1	16232	0.5' FW	498.33	2477.55	5.69	5157.18	5157.18	0.00	0.00
Reach_1	15860	100-YR	477.94	3066.20	4.60	5156.58	5156.58		
Reach_1	15860	0.5' FW	477.92	3064.85	4.60	5156.58	5156.58	0.00	0.00
Reach_1	15697	100-YR	641.59	3965.33	3.56	5156.57	5156.57		
Reach_1	15697	0.5' FW	641.58	3965.02	3.56	5156.57	5156.57	0.00	0.00
Reach_1	15383	100-YR	602.90	5121.73	2.75	5156.47	5156.47		
Reach_1	15383	0.5' FW	602.89	5121.44	2.75	5156.47	5156.47	0.00	0.00
Reach_1	14865	100-YR	750.68	6848.36	2.06	5156.38	5156.38		
Reach_1	14865	0.5' FW	750.67	6848.00	2.06	5156.38	5156.38	0.00	0.00
Reach_1	14482	100-YR	734.15	7214.82	1.95	5156.34	5156.34		
Reach_1	14482	0.5' FW	734.15	7214.46	1.95	5156.34	5156.34	0.00	0.00
Reach_1	14079	100-YR	520.62	4462.95	3.16	5156.08	5156.08		
Reach_1	14079	0.5' FW	520.62	4462.69	3.16	5156.08	5156.08	0.00	0.00
Reach_1	13859	100-YR	488.19	3875.16	3.64	5155.85	5155.85		
Reach_1	13859	0.5' FW	488.18	3874.69	3.64	5155.85	5155.85	0.00	0.00
Reach_1	13400	100-YR	479.98	3141.86	4.49	5155.24	5155.24		
Reach_1	13400	0.5' FW	479.94	3141.63	4.49	5155.24	5155.24	0.00	0.00
Reach_1	12944	100-YR	352.53	3029.06	4.65	5154.78	5154.78		
Reach_1	12944	0.5' FW	352.53	3028.89	4.66	5154.78	5154.78	0.00	0.00
Reach_1	12864	100-YR	309.53	2321.66	6.07	5154.25	5154.25		
Reach_1	12864	0.5' FW	309.52	2321.51	6.07	5154.25	5154.25	0.00	0.00
Reach_1	12560	100-YR	479.45	4517.25	3.12	5154.49	5154.49		
Reach_1	12560	0.5' FW	479.45	4516.78	3.12	5154.49	5154.49	0.00	0.00
Reach_1	12297	100-YR	311.85	4591.43	4.78	5154.14	5154.14		
Reach_1	12297	0.5' FW	311.85	2951.18	4.78	5154.14	5154.14	0.00	0.00
Reach_1	12221	100-YR	223.00	4044.50	6.87	5153.65	5153.65		

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_1	12221	0.5' FW	223.00	2051.83	6.87	5153.65	5153.65	-0.01	0.00
Reach_1	12140 Broadway		Bridge						
Reach_1	12081	100-YR	197.30	2995.00	9.14	5150.40	5150.40		
Reach_1	12081	0.5' FW	197.30	1543.92	9.13	5150.41	5150.40	0.01	0.01
Reach_1	11882	100-YR	352.92	5109.55	5.01	5150.52	5150.52		
Reach_1	11882	0.5' FW	352.92	2817.66	5.00	5150.53	5150.52	0.01	0.01
Reach_1	11760	100-YR	560.89	2891.22	4.88	5150.26	5150.26		
Reach_1	11760	0.5' FW	561.65	2897.80	4.87	5150.27	5150.26	0.01	0.01
Reach_1	11405	100-YR	499.13	3293.65	4.28	5149.93	5149.93		
Reach_1	11405	0.5' FW	499.13	3300.72	4.27	5149.95	5149.93	0.01	0.01
Reach_1	11109	100-YR	234.82	1647.47	8.56	5148.57	5148.57		
Reach_1	11109	0.5' FW	234.82	1653.08	8.53	5148.59	5148.57	0.02	0.02
Reach_1	11024	100-YR	222.17	2302.23	9.25	5148.16	5148.16		
Reach_1	11024	0.5' FW	222.17	1531.84	9.20	5148.19	5148.16	0.03	0.02
Reach_1	11020		Inl Struct						
Reach_1	10961	100-YR	200.37	1655.90	9.99	5146.57	5146.57		
Reach_1	10961	0.5' FW	200.36	1411.22	9.99	5146.57	5146.57	0.00	0.00
Reach_1	10815	100-YR	194.15	1236.85	11.40	5145.08	5145.08		
Reach_1	10815	0.5' FW	194.15	1236.95	11.40	5145.08	5145.08	0.00	0.00
Reach_1	10741	100-YR	229.94	1966.09	7.29	5145.53	5145.53		
Reach_1	10741	0.5' FW	229.94	1935.46	7.29	5145.53	5145.53	0.00	0.00
Reach_1	10692		Inl Struct						
Reach_1	10680	100-YR	204.83	1675.96	9.54	5144.61	5144.61		
Reach_1	10680	0.5' FW	204.83	1478.84	9.53	5144.61	5144.61	0.00	0.00
Reach_1	10644	100-YR	201.32	1754.56	8.04	5144.79	5144.79		
Reach_1	10644	0.5' FW	201.32	1754.56	8.04	5144.79	5144.79	0.00	0.00
Reach_1	10584 I-25		Bridge						
Reach_1	10304	100-YR	203.62	1619.67	8.71	5142.70	5142.70		
Reach_1	10304	0.5' FW	203.62	1619.67	8.71	5142.70	5142.70	0.00	0.00
Reach_1	10269	100-YR	210.06	1499.45	9.40	5142.31	5142.31		
Reach_1	10269	0.5' FW	210.06	1499.45	9.40	5142.31	5142.31	0.00	0.00
Reach_1	10229	100-YR	187.07	1293.11	10.90	5141.49	5141.49		
Reach_1	10229	0.5' FW	187.07	1293.11	10.90	5141.49	5141.49	0.00	0.00
Reach_1	10191	100-YR	197.88	1455.88	9.68	5141.58	5141.58		
Reach_1	10191	0.5' FW	197.88	1455.88	9.68	5141.58	5141.58	0.00	0.00
Reach_1	10161		Inl Struct						
Reach_1	10127	100-YR	170.10	1187.95	11.87	5139.14	5139.14		
Reach_1	10127	0.5' FW	170.79	1220.76	11.55	5139.33	5139.14	0.19	0.08
Reach_1	10030	100-YR	184.29	1533.45	9.19	5139.37	5139.37		
Reach_1	10030	0.5' FW	184.64	1566.24	9.00	5139.55	5139.37	0.18	0.12
Reach_1	9931	100-YR	206.23	2981.77	7.60	5139.54	5139.54		
Reach_1	9931	0.5' FW	206.84	1889.83	7.46	5139.71	5139.54	0.17	0.14
Reach_1	9877	100-YR	207.72	1889.52	7.47	5139.50	5139.50		

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_1	9877	0.5' FW	208.07	1923.86	7.33	5139.67	5139.50	0.17	0.14
Reach_1	9816 I-25 E Ramp		Bridge						
Reach_1	9780	100-YR	215.73	1949.17	7.58	5139.07	5139.07		
Reach_1	9780	0.5' FW	216.52	1900.01	7.42	5139.26	5139.07	0.19	0.15
Reach_1	9644	100-YR	340.00	4072.55	5.64	5139.03	5139.03		
Reach_1	9644	0.5' FW	245.00	2188.46	6.44	5139.10	5139.03	0.06	0.23
Reach_1	9467	100-YR	564.57	4820.33	3.82	5139.09	5139.09		
Reach_1	9467	0.5' FW	360.00	3002.33	4.70	5139.09	5139.09	0.00	0.14
Reach_1	9164	100-YR	209.23	2664.51	6.82	5138.23	5138.23		
Reach_1	9164	0.5' FW	209.18	2067.47	6.82	5138.22	5138.23	0.00	0.00
Reach_1	9016	100-YR	226.76	2499.70	6.82	5137.86	5137.86		
Reach_1	9016	0.5' FW	226.72	2068.38	6.82	5137.86	5137.86	0.00	0.00
Reach_1	8918	100-YR	166.10	1397.48	10.09	5136.51	5136.51		
Reach_1	8918	0.5' FW	166.09	1397.07	10.09	5136.51	5136.51	0.00	0.00
Reach_1	8856 Washington St		Bridge						
Reach_1	8791	100-YR	177.00	1378.67	10.30	5133.80	5133.80		
Reach_1	8791	0.5' FW	177.00	1365.68	10.32	5133.78	5133.80	-0.02	0.00
Reach_1	8757 Pipe X-ing		Bridge						
Reach_1	8754	100-YR	235.00	1826.31	8.78	5132.80	5132.80		
Reach_1	8754	0.5' FW	235.00	1602.96	8.80	5132.79	5132.80	-0.01	0.03
Reach_1	8648	100-YR	340.00	2613.82	7.28	5132.47	5132.47		
Reach_1	8648	0.5' FW	340.00	1936.67	7.28	5132.47	5132.47	0.00	0.01
Reach_1	8370	100-YR	433.51	2530.49	5.62	5131.97	5131.97		
Reach_1	8370	0.5' FW	433.35	2509.97	5.62	5131.98	5131.97	0.00	0.00
Reach_1	7946	100-YR	399.42	2131.02	7.21	5130.35	5130.35		
Reach_1	7946	0.5' FW	399.41	1953.93	7.22	5130.35	5130.35	0.00	0.00
Reach_1	7756	100-YR	340.40	2153.18	7.98	5129.13	5129.13		
Reach_1	7756	0.5' FW	340.39	1767.80	7.98	5129.13	5129.13	0.00	0.00
Reach_1	7697	100-YR	380.61	2190.94	7.37	5128.96	5128.96		
Reach_1	7697	0.5' FW	380.61	1912.30	7.37	5128.96	5128.96	0.00	0.00
Reach_1	7651	100-YR	372.06	2601.01	6.15	5128.91	5128.91		
Reach_1	7651	0.5' FW	372.05	2291.79	6.15	5128.91	5128.91	0.00	0.00
Reach_1	7516	100-YR	419.26	3051.08	5.03	5128.72	5128.72		
Reach_1	7516	0.5' FW	419.25	2805.04	5.03	5128.72	5128.72	0.00	0.00
Reach_1	7382	100-YR	459.63	3207.14	4.65	5128.53	5128.53		
Reach_1	7382	0.5' FW	459.63	3029.72	4.65	5128.53	5128.53	0.00	0.00
Reach_1	7228	100-YR	505.89	3319.22	4.41	5128.22	5128.22		
Reach_1	7228	0.5' FW	505.89	3200.89	4.41	5128.22	5128.22	0.00	0.00
Reach_1	7182	100-YR	520.63	3331.98	4.38	5128.13	5128.13		
Reach_1	7182	0.5' FW	520.63	3215.64	4.38	5128.13	5128.13	0.00	0.00
Reach_1	7127	100-YR	468.96	3284.51	4.39	5128.01	5128.01		
Reach_1	7127	0.5' FW	468.96	3212.83	4.39	5128.01	5128.01	0.00	0.00
Reach_1	7017	100-YR	476.05	3333.08	4.33	5127.92	5127.92		
Reach_1	7017	0.5' FW	476.05	3252.62	4.33	5127.92	5127.92	0.00	0.00

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_1	6827	100-YR	520.52	3351.88	4.39	5127.69	5127.69		
Reach_1	6827	0.5' FW	520.51	3214.13	4.39	5127.69	5127.69	0.00	0.00
Reach_1	6461	100-YR	441.98	3304.77	5.10	5127.09	5127.09		
Reach_1	6461	0.5' FW	441.88	2762.00	5.10	5127.09	5127.09	0.00	0.00
Reach_1	6024	100-YR	494.66	3077.68	4.80	5126.57	5126.57		
Reach_1	6024	0.5' FW	493.93	2938.68	4.80	5126.57	5126.57	0.00	0.00
Reach_1	5990	100-YR	483.53	3313.21	4.43	5126.59	5126.59		
Reach_1	5990	0.5' FW	483.50	3180.23	4.43	5126.59	5126.59	0.00	0.00
Reach_1	5822	100-YR	502.36	3526.82	4.21	5126.49	5126.49		
Reach_1	5822	0.5' FW	502.34	3346.20	4.21	5126.49	5126.49	0.00	0.00
Reach_1	5777	100-YR	453.83	2058.27	7.03	5125.14	5125.14		
Reach_1	5777	0.5' FW	453.77	2001.01	7.05	5125.13	5125.14	-0.01	0.00
Reach_1	5690	100-YR	461.30	2411.31	5.85	5125.06	5125.06		
Reach_1	5690	0.5' FW	461.20	2406.58	5.86	5125.05	5125.06	-0.01	-0.01
Reach_1	5555 I-270		Bridge						
Reach_1	5470	100-YR	345.77	2123.59	6.64	5121.53	5121.53		
Reach_1	5470	0.5' FW	345.55	2119.54	6.65	5121.52	5121.53	-0.01	-0.01
Reach_1	5370	100-YR	357.32	1708.02	8.26	5120.76	5120.76		
Reach_1	5370	0.5' FW	352.43	1698.30	8.30	5120.74	5120.76	-0.03	-0.01
Reach_1	5207	100-YR	366.15	1894.79	8.53	5119.84	5119.84		
Reach_1	5207	0.5' FW	354.32	1651.57	8.54	5119.85	5119.84	0.01	-0.01
Reach_1	4871	100-YR	293.96	1954.78	7.21	5119.63	5119.63		
Reach_1	4871	0.5' FW	293.98	1956.22	7.21	5119.63	5119.63	0.00	0.00
Reach_1	4589	100-YR	282.25	1894.13	7.44	5119.51	5119.51		
Reach_1	4589	0.5' FW	282.25	1895.78	7.44	5119.51	5119.51	0.01	0.00
Reach_1	4363	100-YR	274.52	1954.68	7.55	5119.08	5119.08		
Reach_1	4363	0.5' FW	274.51	1870.42	7.54	5119.09	5119.08	0.01	0.00
Reach_1	4201	100-YR	269.62	2298.37	6.63	5119.07	5119.07		
Reach_1	4201	0.5' FW	269.62	2128.11	6.63	5119.08	5119.07	0.01	0.01
Reach_1	3798	100-YR	246.60	1907.21	7.60	5118.22	5118.22		
Reach_1	3798	0.5' FW	246.60	1858.13	7.59	5118.23	5118.22	0.01	0.01
Reach_1	3388	100-YR	247.04	2514.60	5.85	5117.99	5117.99		
Reach_1	3388	0.5' FW	247.04	2414.90	5.84	5118.00	5117.99	0.01	0.01
Reach_1	3069	100-YR	141.20	2222.59	8.23	5117.07	5117.07		
Reach_1	3069	0.5' FW	141.20	1713.34	8.23	5117.07	5117.07	0.00	0.00
Reach_1	3030 York St		Bridge						
Reach_1	2942	100-YR	132.63	1044.49	14.12	5112.22	5112.22		
Reach_1	2942	0.5' FW	132.63	998.79	14.12	5112.22	5112.22	0.00	0.00
Reach_1	2830	100-YR	296.64	2510.40	7.47	5112.87	5112.87		
Reach_1	2830	0.5' FW	296.63	1888.25	7.47	5112.87	5112.87	0.00	0.00
Reach_1	2459	100-YR	381.32	4781.04	5.54	5112.31	5112.31		
Reach_1	2459	0.5' FW	381.32	2547.07	5.54	5112.31	5112.31	0.00	0.00
Reach_1	2316	100-YR	430.13	3211.36	5.87	5111.94	5111.94		
Reach_1	2316	0.5' FW	430.13	2400.83	5.87	5111.94	5111.94	0.00	0.00

HEC-RAS Plan: CC-0.5-FW (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach_1	2036	100-YR	291.14	3894.63	8.45	5110.70	5110.70		
Reach_1	2036	0.5' FW	291.14	1670.19	8.45	5110.70	5110.70	0.00	0.00
Reach_1	1981	100-YR	281.90	2849.71	10.90	5109.28	5109.28		
Reach_1	1981	0.5' FW	281.90	1293.70	10.90	5109.28	5109.28	0.00	0.00
Reach_1	1948	100-YR	177.17	1530.83	14.01	5107.11	5107.11		
Reach_1	1948	0.5' FW	177.12	1005.98	14.02	5107.11	5107.11	0.00	0.00
Reach_1	1899	100-YR	141.33	1206.28	11.69	5104.93	5104.93		
Reach_1	1899	0.5' FW	141.32	1206.14	11.69	5104.93	5104.93	0.00	0.00
Reach_1	1791	100-YR	155.36	1138.15	12.39	5104.06	5104.06		
Reach_1	1791	0.5' FW	155.35	1137.92	12.39	5104.06	5104.06	0.00	0.00
Reach_1	1719	100-YR	227.52	1431.08	9.85	5104.37	5104.37		
Reach_1	1719	0.5' FW	227.50	1430.97	9.85	5104.37	5104.37	0.00	0.00
Reach_1	1668	100-YR	226.51	1432.22	9.84	5104.16	5104.16		
Reach_1	1668	0.5' FW	226.50	1432.10	9.85	5104.15	5104.16	0.00	0.00
Reach_1	1402	100-YR	211.98	1373.75	10.26	5102.98	5102.98		
Reach_1	1402	0.5' FW	211.88	1373.54	10.27	5102.98	5102.98	0.00	0.00
Reach_1	966	100-YR	221.99	1768.45	7.97	5102.23	5102.23		
Reach_1	966	0.5' FW	221.98	1768.02	7.98	5102.23	5102.23	0.00	0.00
Reach_1	534	100-YR	227.49	1913.11	7.37	5101.52	5101.52		
Reach_1	534	0.5' FW	227.48	1912.67	7.37	5101.52	5101.52	0.00	0.00
Reach_1	398	100-YR	162.06	1502.30	9.44	5100.67	5100.67		
Reach_1	398	0.5' FW	162.05	1492.68	9.45	5100.67	5100.67	0.00	0.00
Reach_1	391 Footbridge		Bridge						
Reach_1	368	100-YR	154.54	1275.17	11.13	5099.77	5099.77		
Reach_1	368	0.5' FW	154.53	1266.79	11.13	5099.76	5099.77	0.00	0.00
Reach_1	317	100-YR	158.34	1166.94	12.08	5099.09	5099.09		
Reach_1	317	0.5' FW	158.35	1167.10	12.08	5099.09	5099.09	0.00	0.00
Reach_1	258	100-YR	167.76	1123.82	12.57	5098.53	5098.53		
Reach_1	258	0.5' FW	167.77	1121.84	12.57	5098.53	5098.53	0.00	0.00
Reach_1	232	100-YR	187.80	1567.04	9.11	5098.65	5098.65		
Reach_1	232	0.5' FW	187.80	1548.52	9.11	5098.65	5098.65	0.00	0.00
Reach_1	157	100-YR	201.10	1596.18	11.18	5097.20	5097.20		
Reach_1	157	0.5' FW	201.10	1261.70	11.18	5097.20	5097.20	0.00	0.00

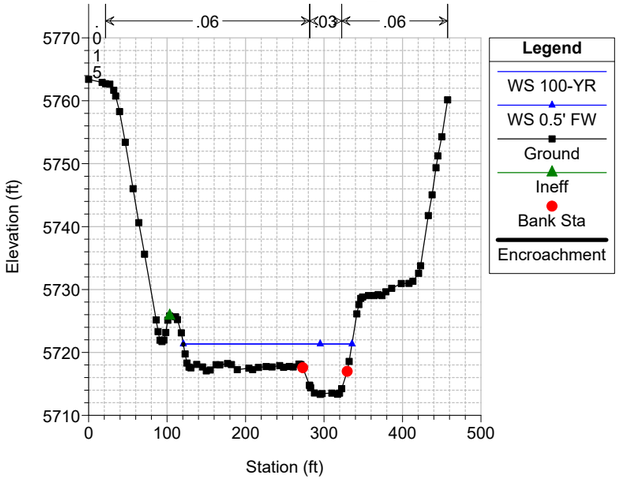
HEC-RAS Plan: CC-0.5-FW River: NorthOverflow Reach: Reach 1

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach 1	7991	100-YR	360.00	193.48	4.11	5259.87	5259.87		
Reach 1	7991	0.5' FW	360.00	193.48	4.11	5259.87	5259.87	0.00	0.00
Reach 1	7879	100-YR	541.93	225.13	3.53	5258.28	5258.28		
Reach 1	7879	0.5' FW	302.55	182.70	4.35	5258.48	5258.28	0.19	0.28
Reach 1	7650	100-YR	336.08	478.55	1.66	5255.52	5255.52		
Reach 1	7650	0.5' FW	336.08	478.55	1.66	5255.52	5255.52	0.00	0.00
Reach 1	7365	100-YR	354.68	427.54	5.81	5253.34	5253.34		
Reach 1	7365	0.5' FW	354.68	427.54	5.81	5253.34	5253.34	0.00	0.00
Reach 1	7126	100-YR	308.32	701.65	3.54	5249.89	5249.89		
Reach 1	7126	0.5' FW	301.30	748.77	3.32	5250.04	5249.89	0.16	0.13
Reach 1	6804	100-YR	571.57	1029.06	2.41	5249.26	5249.26		
Reach 1	6804	0.5' FW	539.50	1243.81	2.00	5249.67	5249.26	0.42	0.39
Reach 1	6611	100-YR	1053.60	2817.37	0.88	5249.25	5249.25		
Reach 1	6611	0.5' FW	954.41	3135.94	0.79	5249.67	5249.25	0.42	0.42
Reach 1	6380	100-YR	1055.34	1788.90	1.57	5249.15	5249.15		
Reach 1	6380	0.5' FW	849.29	1617.51	1.54	5249.59	5249.15	0.44	0.44
Reach 1	6019	100-YR	828.73	1554.90	2.29	5248.76	5248.76		
Reach 1	6019	0.5' FW	878.20	974.67	2.55	5249.19	5248.76	0.43	0.45
Reach 1	5889	100-YR	958.98	1860.73	1.93	5248.56	5248.56		
Reach 1	5889	0.5' FW	812.74	1194.99	2.08	5248.93	5248.56	0.37	0.38
Reach 1	5635	100-YR	676.57	1635.02	3.39	5247.80	5247.80		
Reach 1	5635	0.5' FW	620.83	709.84	3.50	5247.99	5247.80	0.19	0.18
Reach 1	5423	100-YR	566.91	793.16	5.14	5246.33	5246.33		
Reach 1	5423	0.5' FW	587.15	645.95	3.84	5246.78	5246.33	0.45	0.28
Reach 1	5178	100-YR	655.17	971.73	3.09	5244.95	5244.95		
Reach 1	5178	0.5' FW	518.68	672.30	3.69	5245.33	5244.95	0.38	0.44
Reach 1	4897	100-YR	1247.28	662.77	4.07	5243.89	5243.89		
Reach 1	4897	0.5' FW	982.70	616.16	4.38	5243.93	5243.89	0.04	0.08
Reach 1	4295	100-YR	1183.49	2098.91	1.29	5237.07	5237.07		
Reach 1	4295	0.5' FW	818.76	1711.12	1.58	5237.49	5237.07	0.42	0.43
Reach 1	3885	100-YR	767.06	555.98	4.86	5236.02	5236.02		
Reach 1	3885	0.5' FW	618.69	524.25	5.15	5236.35	5236.02	0.33	0.39
Reach 1	3638	100-YR	1154.06	1955.42	1.38	5234.45	5234.45		
Reach 1	3638	0.5' FW	743.14	1981.55	1.36	5234.71	5234.45	0.26	0.25
Reach 1	3090	100-YR	717.34	548.97	4.92	5233.28	5233.28		
Reach 1	3090	0.5' FW	465.43	478.21	5.65	5233.57	5233.28	0.30	0.41
Reach 1	2852	100-YR	1524.89	3632.03	0.74	5231.52	5231.52		
Reach 1	2852	0.5' FW	583.66	2736.41	0.99	5231.56	5231.52	0.04	0.05
Reach 1	2382	100-YR	1122.58	3868.52	0.70	5231.49	5231.49		
Reach 1	2382	0.5' FW	735.79	3069.86	0.88	5231.52	5231.49	0.03	0.04

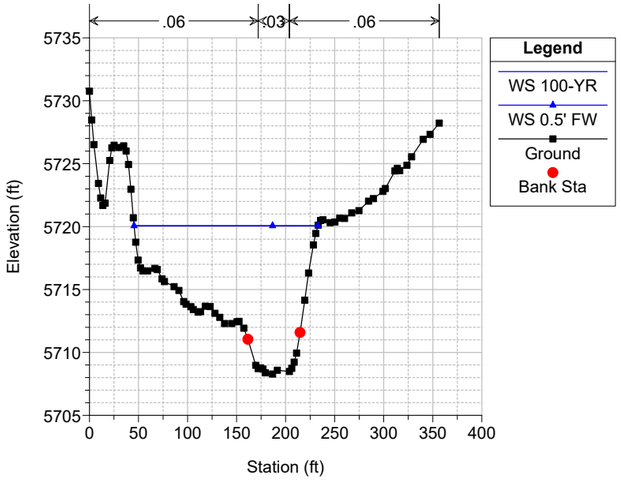
HEC-RAS Plan: CC-0.5-FW River: NorthOverflow Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS	Prof Delta EG
			(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
Reach 1	2135	100-YR	1221.23	3611.41	0.75	5231.48	5231.48		
Reach 1	2135	0.5' FW	1030.96	3180.51	0.85	5231.51	5231.48	0.03	0.03
Reach 1	1853	100-YR	1308.45	4548.75	0.63	5231.46	5231.46		
Reach 1	1853	0.5' FW	1036.22	3592.99	0.81	5231.48	5231.46	0.02	0.02
Reach 1	1612	100-YR	836.69	661.71	5.18	5230.94	5230.94		
Reach 1	1612	0.5' FW	836.69	661.71	5.18	5230.94	5230.94	0.00	0.00
Reach 1	1479	100-YR	624.34	733.24	5.58	5227.76	5227.76		
Reach 1	1479	0.5' FW	625.87	646.90	5.57	5227.76	5227.76	0.00	0.00
Reach 1	1322	100-YR	419.43	1421.57	2.41	5222.48	5222.48		
Reach 1	1322	0.5' FW	419.45	1422.22	2.41	5222.48	5222.48	0.00	0.00
Reach 1	1010	100-YR	409.41	1255.81	2.73	5222.13	5222.13		
Reach 1	1010	0.5' FW	409.45	1255.95	2.73	5222.14	5222.13	0.00	0.00
Reach 1	538	100-YR	512.49	605.40	5.91	5220.14	5220.14		
Reach 1	538	0.5' FW	512.43	579.91	5.91	5220.14	5220.14	0.00	0.00

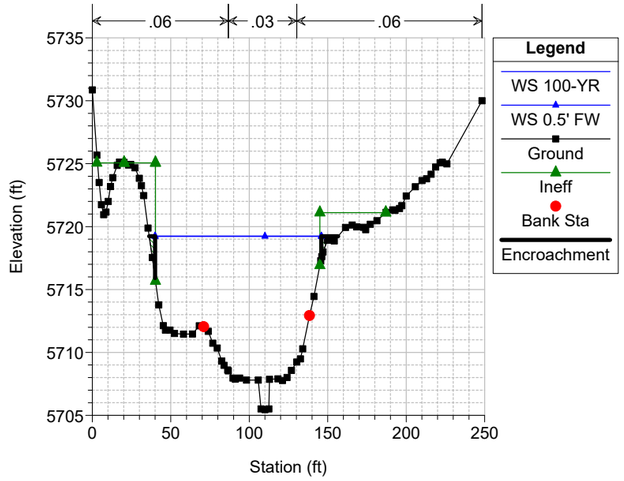
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95972



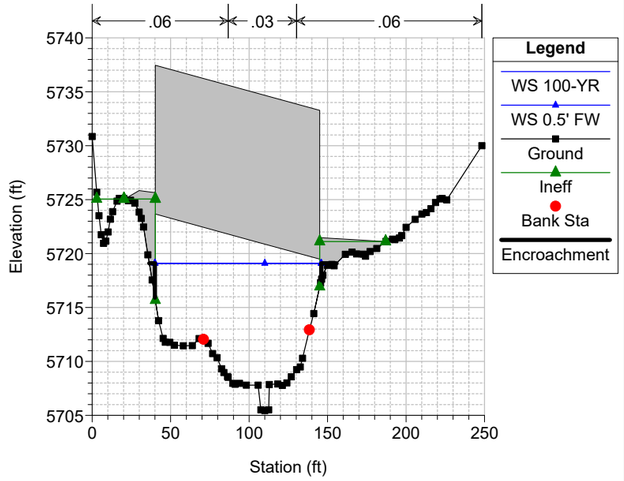
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95719



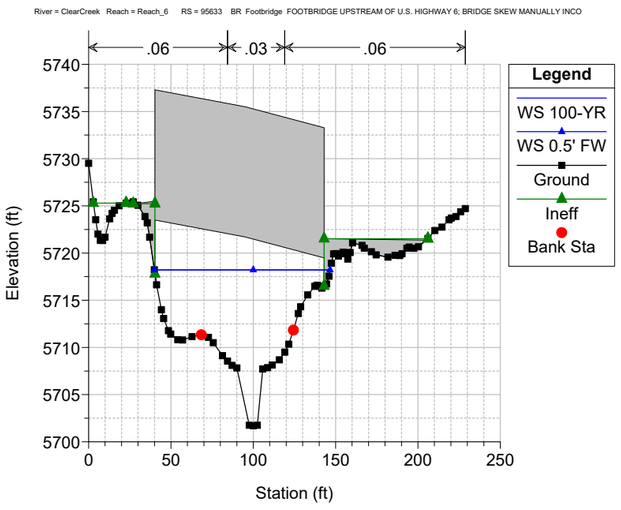
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95641 Thalweg adjusted to match 2016 survey invert (Crossing #1)



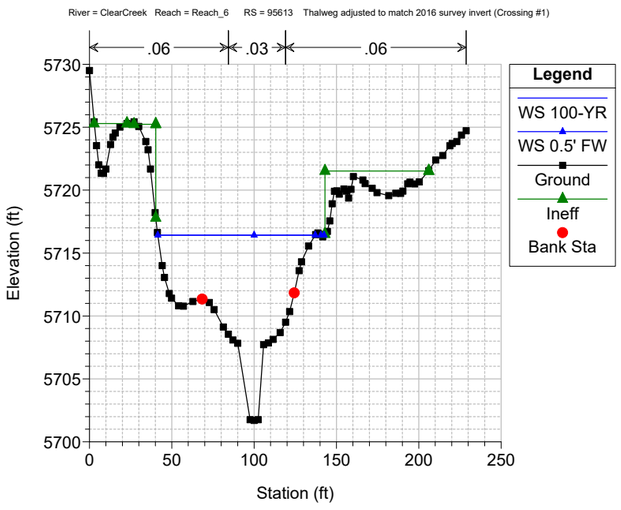
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95633 BR Footbridge FOOTBRIDGE UPSTREAM OF U.S. HIGHWAY 6; BRIDGE SKEW MANUALLY INCO



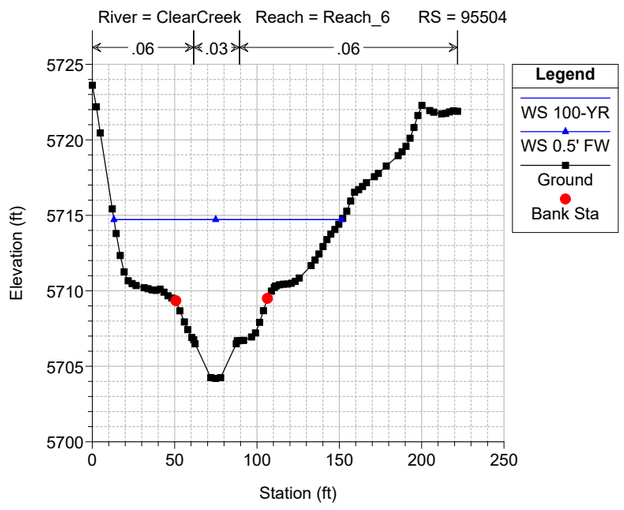
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95633 BR Footbridge FOOTBRIDGE UPSTREAM OF U.S. HIGHWAY 6; BRIDGE SKEW MANUALLY INCO



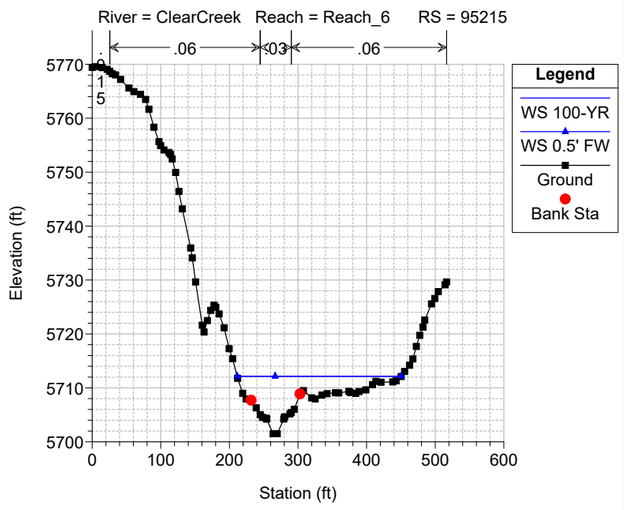
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95613 Thalweg adjusted to match 2016 survey invert (Crossing #1)



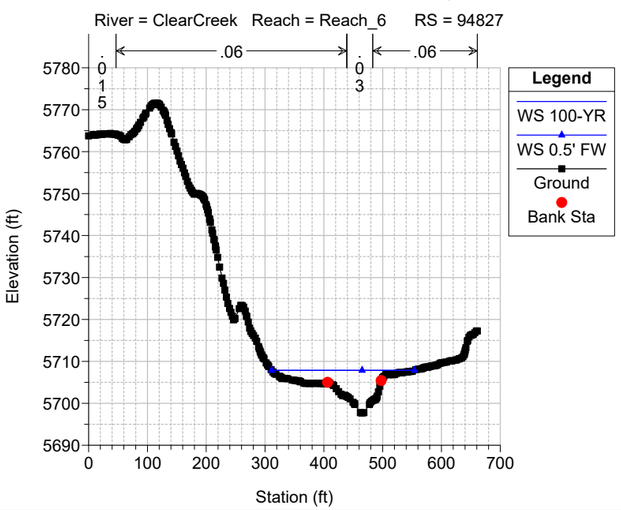
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95504



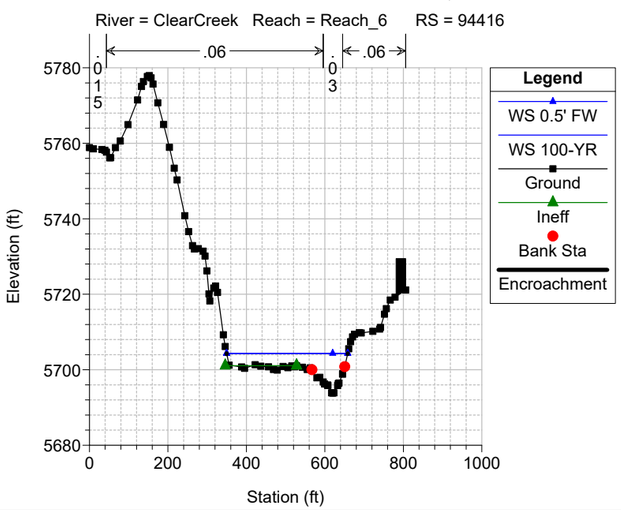
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 95215



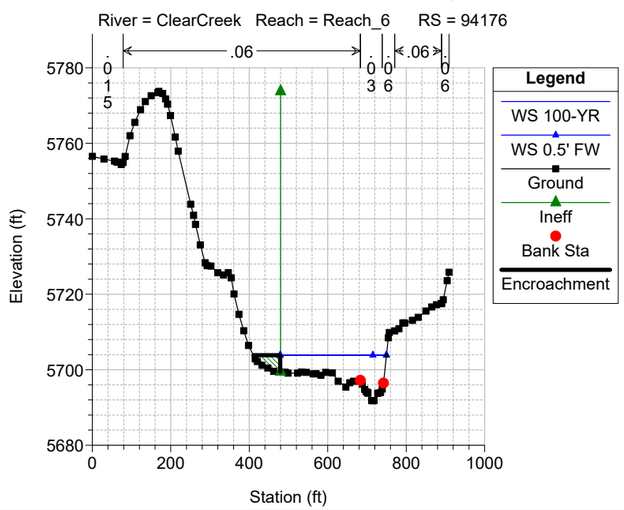
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 94827



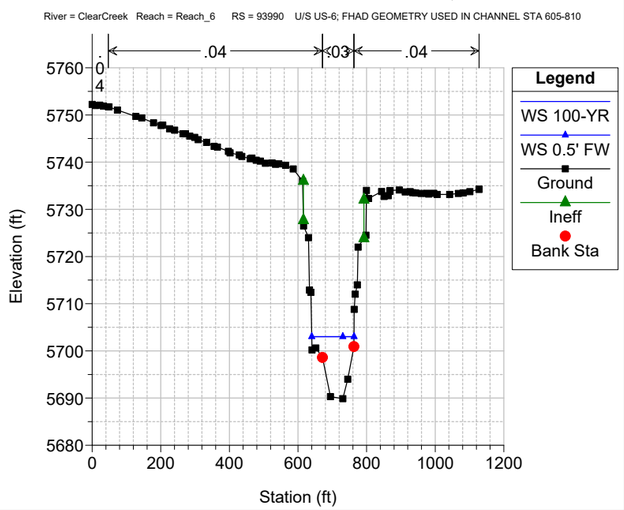
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 94416



Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 94176

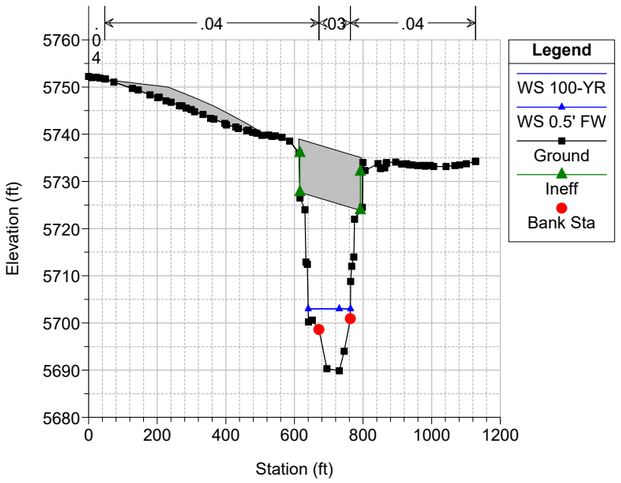


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_6 RS = 93990 U/S US-6; FHAD GEOMETRY USED IN CHANNEL STA 605-810



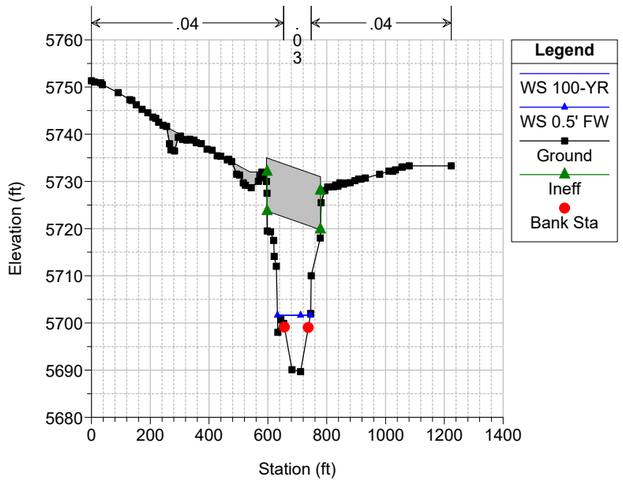
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93988 BR U.S. Highway 6 U.S. HIGHWAY 6



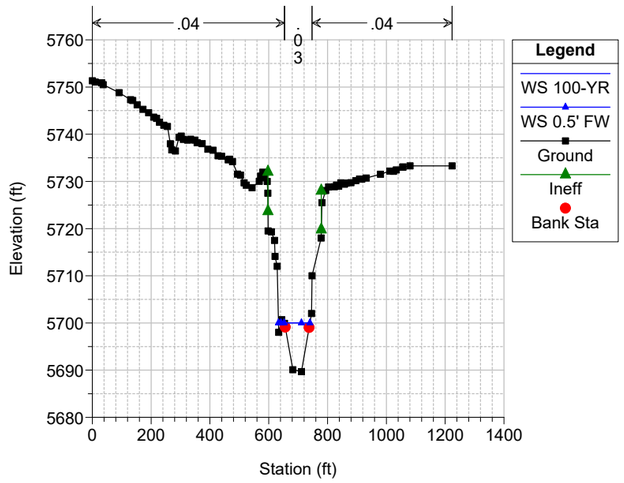
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93988 BR U.S. Highway 6 U.S. HIGHWAY 6



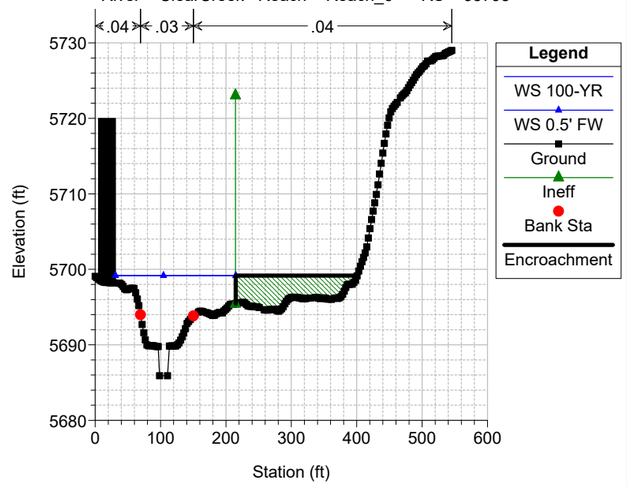
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93893 DS US-6; FHAD GEOMETRY USED IN CHANNEL STA 585 - 790



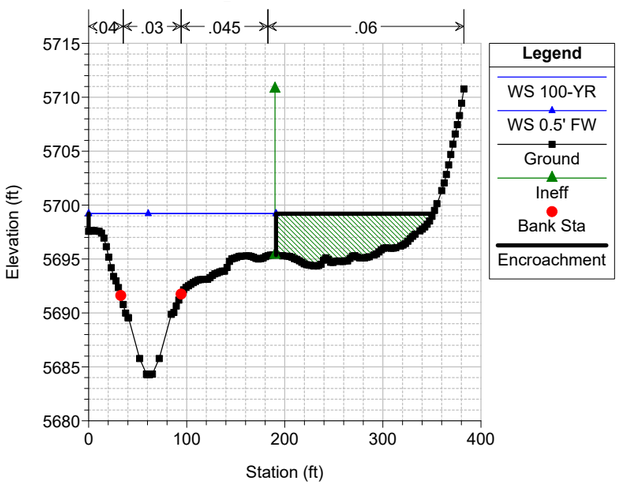
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93795



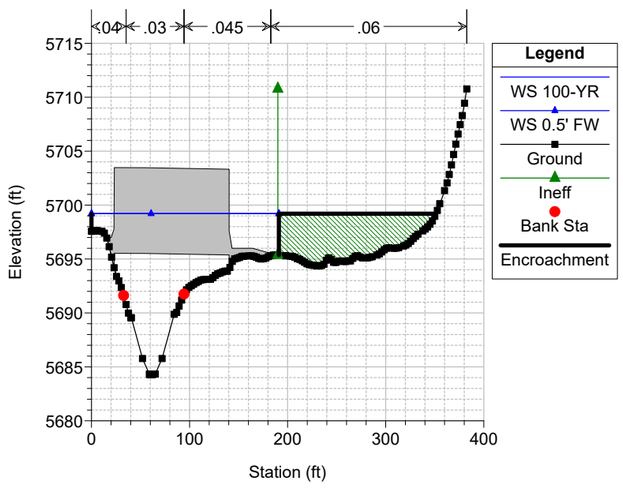
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93753 CHANNEL THALWEG ADJUSTED TO SURVEY



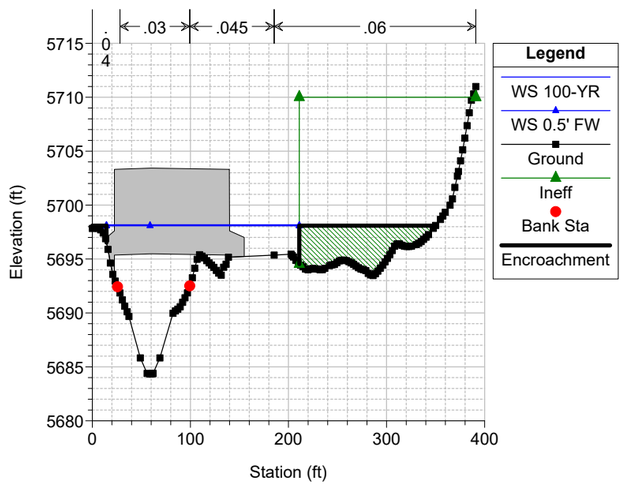
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93745 BR Footbridge FOOT BRIDGE DOWNSTREAM OF U.S. HIGHWAY 6



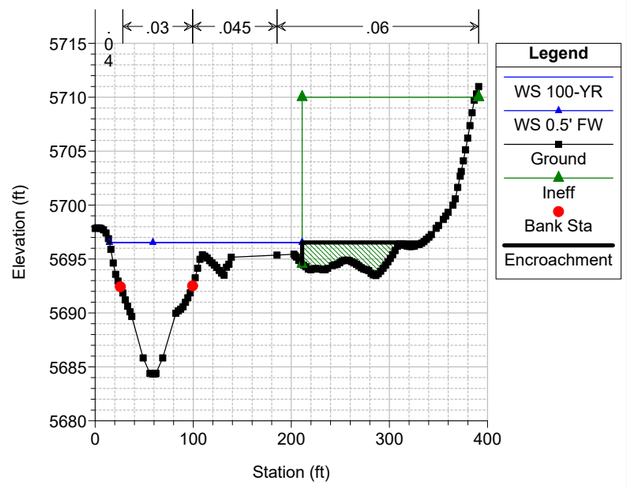
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93745 BR Footbridge FOOT BRIDGE DOWNSTREAM OF U.S. HIGHWAY 6



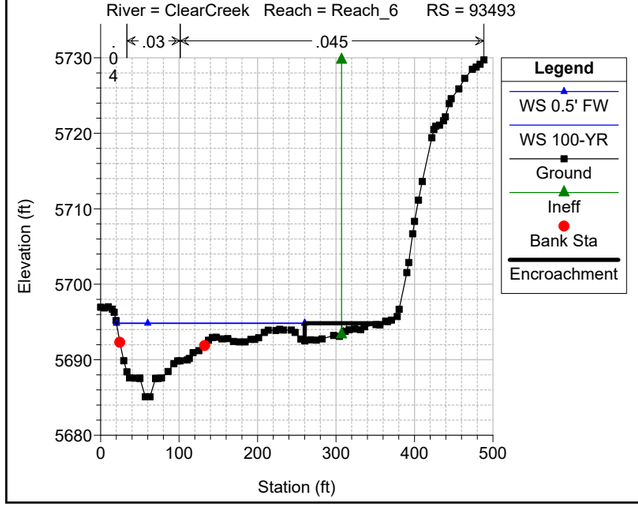
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93727 CHANNEL THALWEG ADJUSTED TO SURVEY - Bump removed in ROB due to



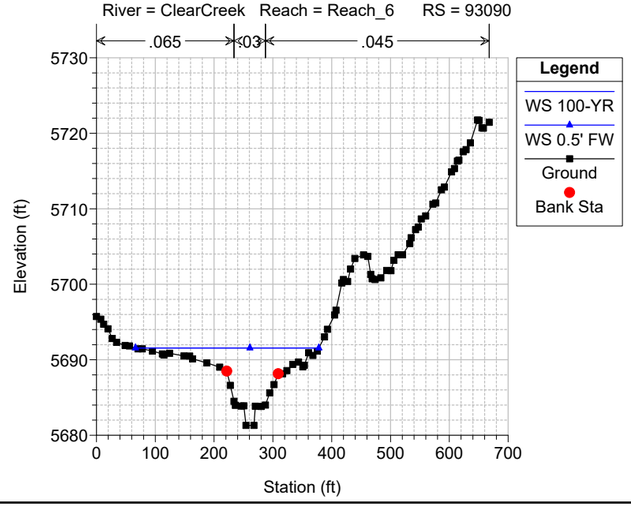
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93493



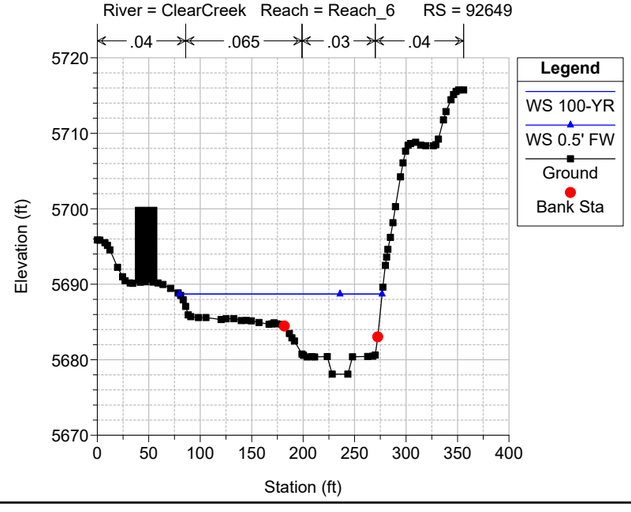
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 93090



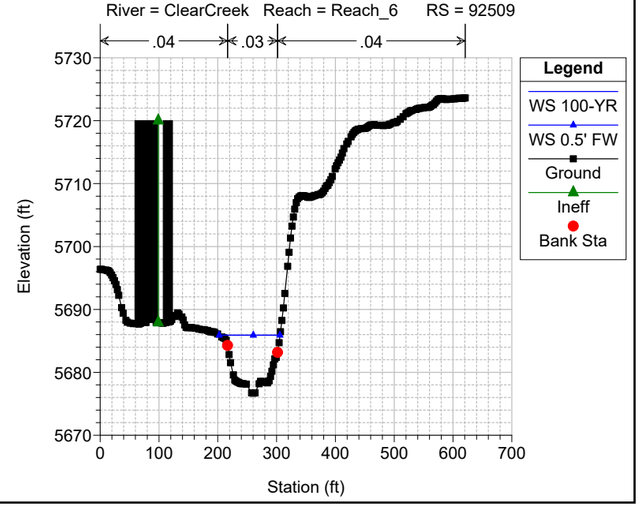
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_6 RS = 92649

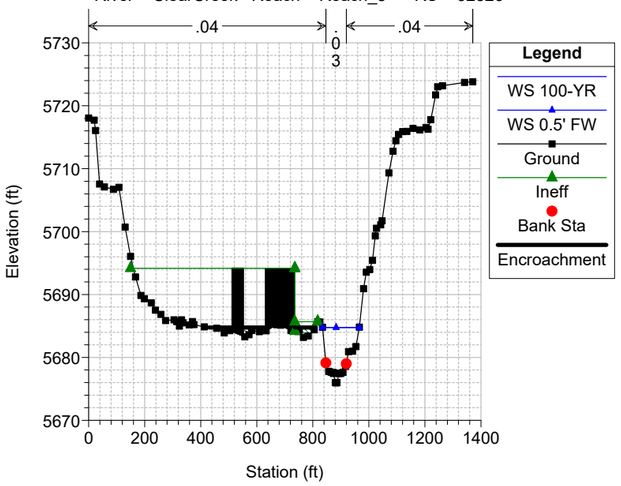


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

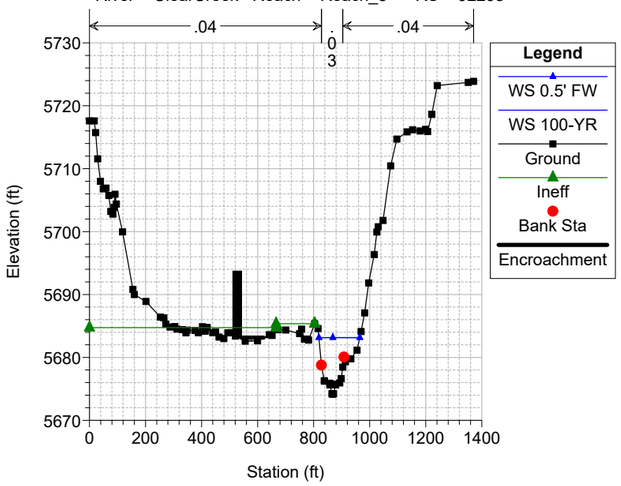
River = ClearCreek Reach = Reach_6 RS = 92509



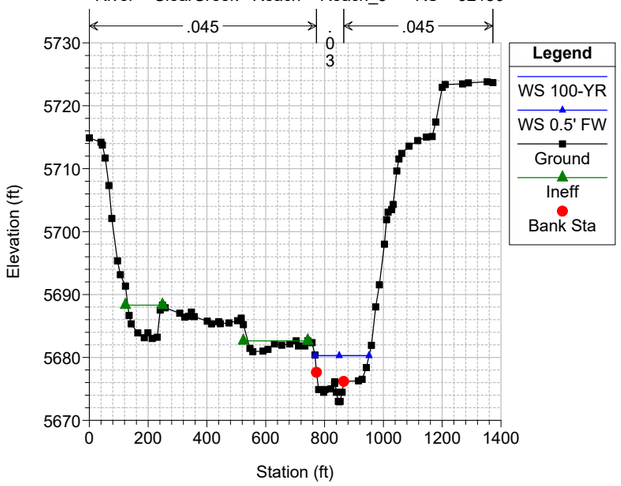
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 92326



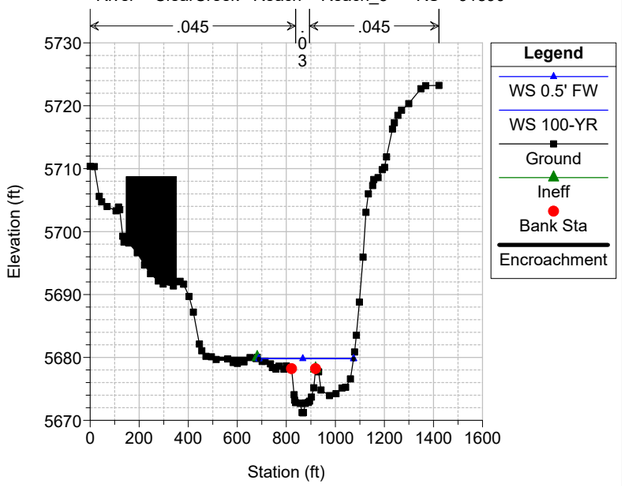
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 92295



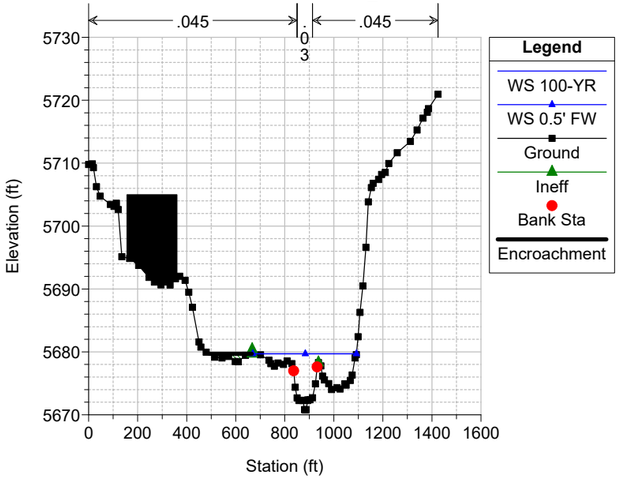
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 92150



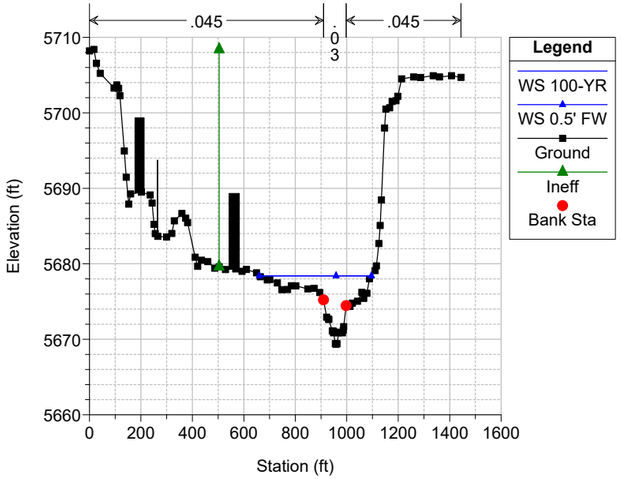
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91890



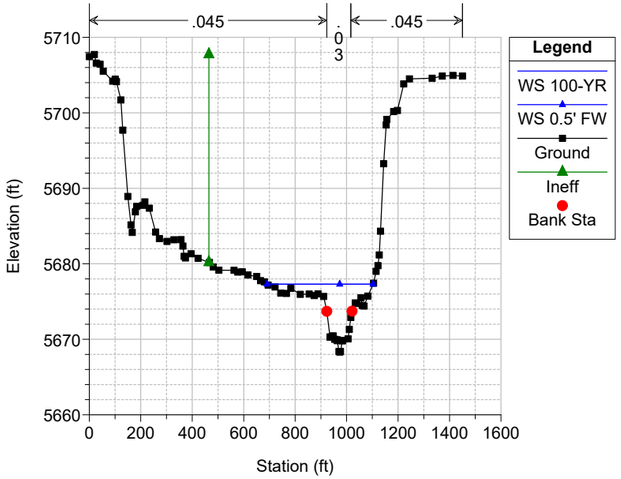
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91865



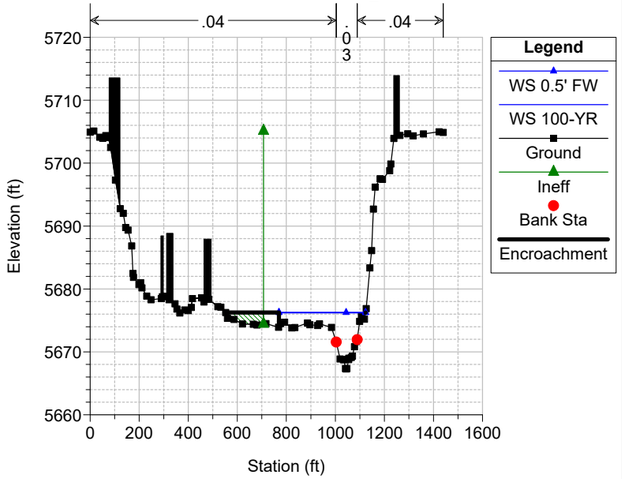
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91748



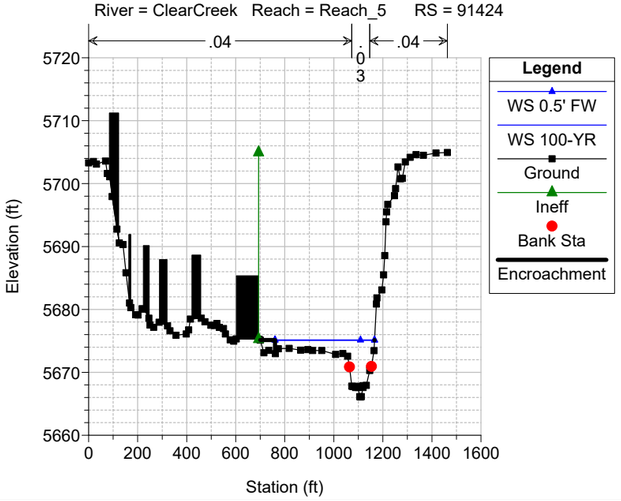
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91713



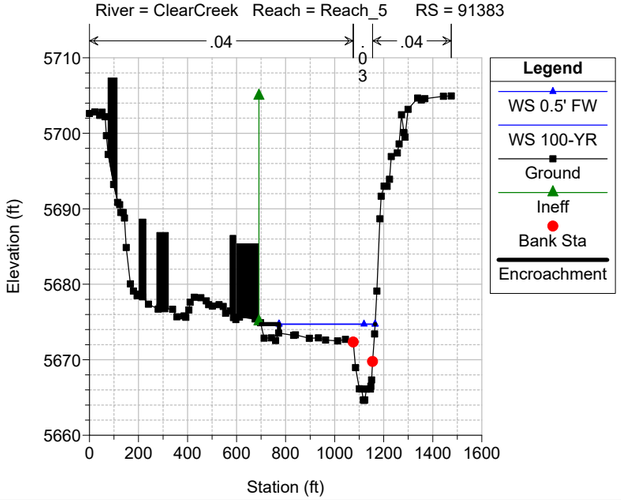
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91576



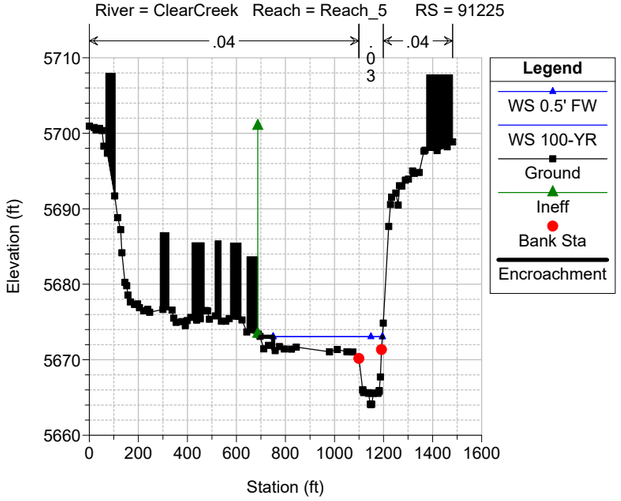
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91424



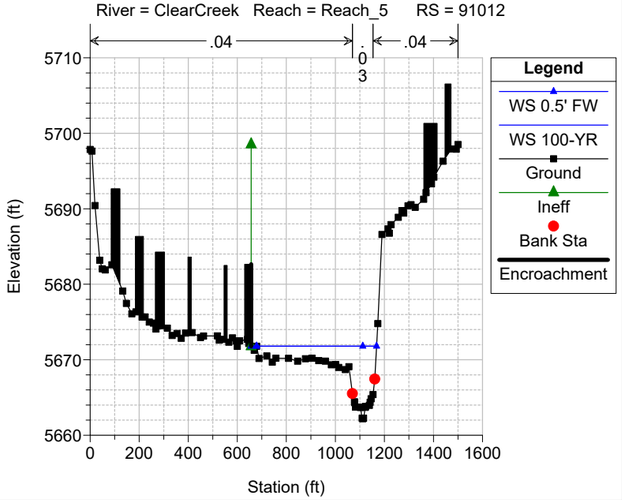
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91383

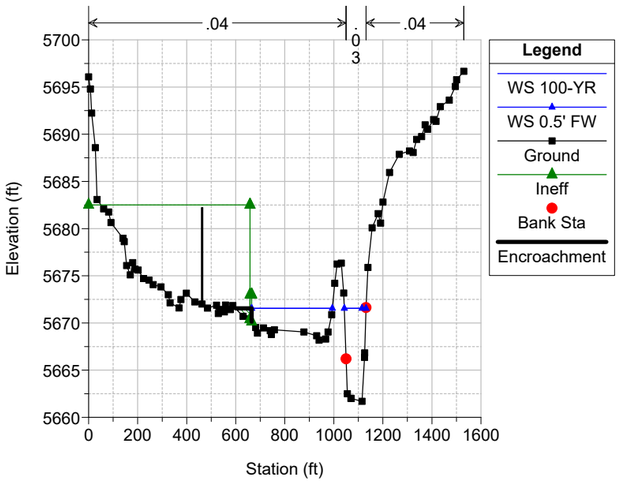


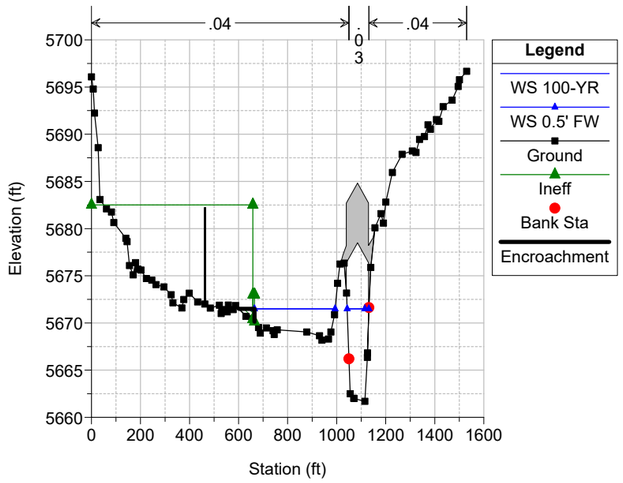
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91225

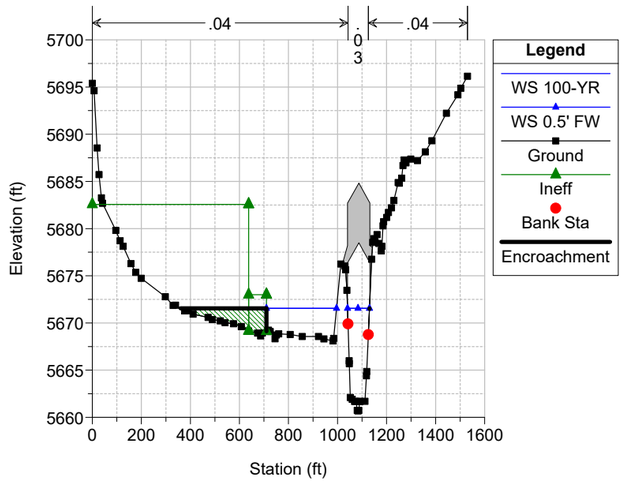


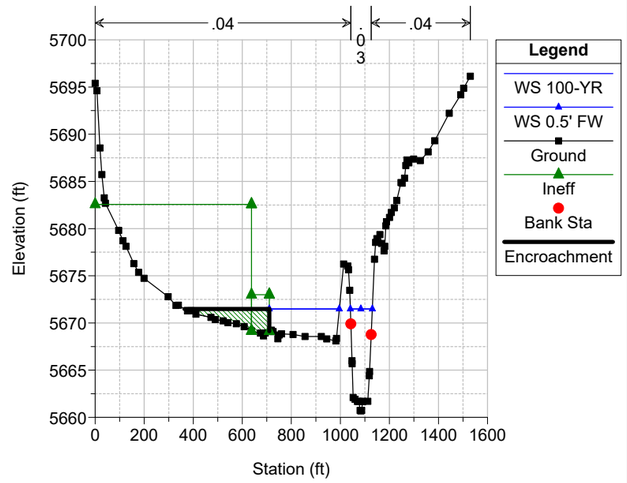
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 91012

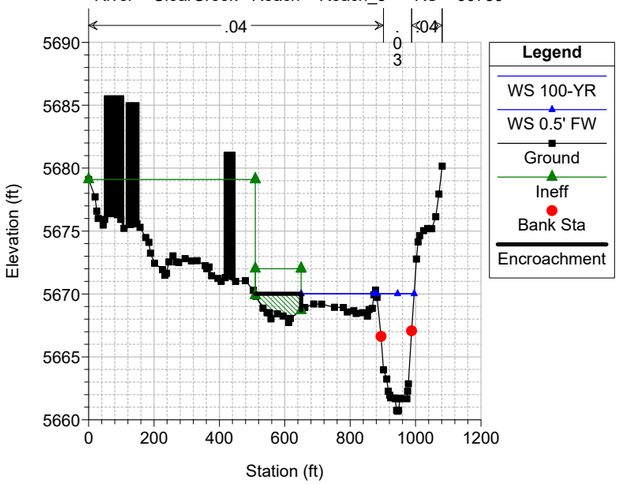


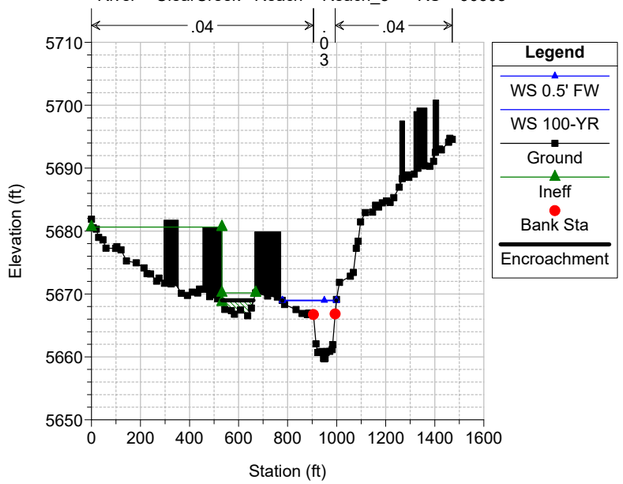
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90879 THALWEG TAKEN FROM FHAD STA 1050-1125


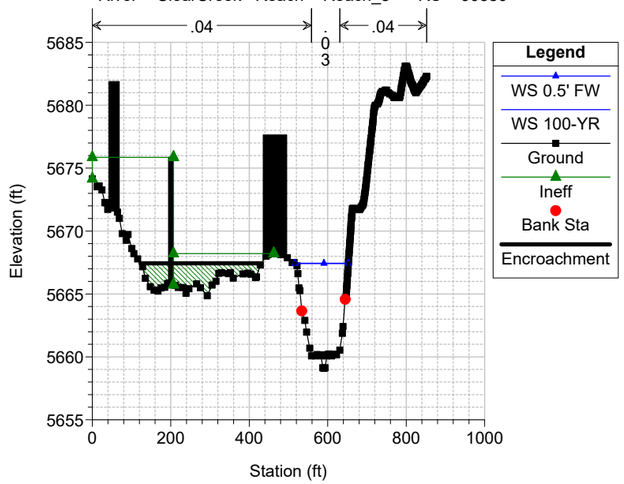
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90870 BR Footbridge FOOTBRIDGE UPSTREAM OF WASHINGTON AVE.


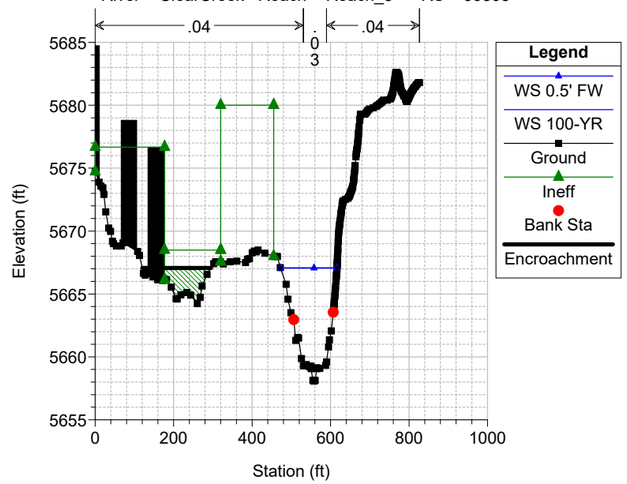
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90870 BR Footbridge FOOTBRIDGE UPSTREAM OF WASHINGTON AVE.


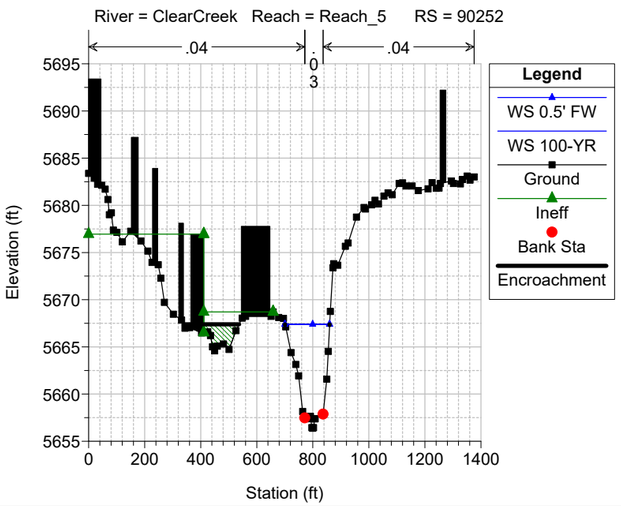
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90839 THALWEG GEOMETRY FROM FHAD STA 1050-1120


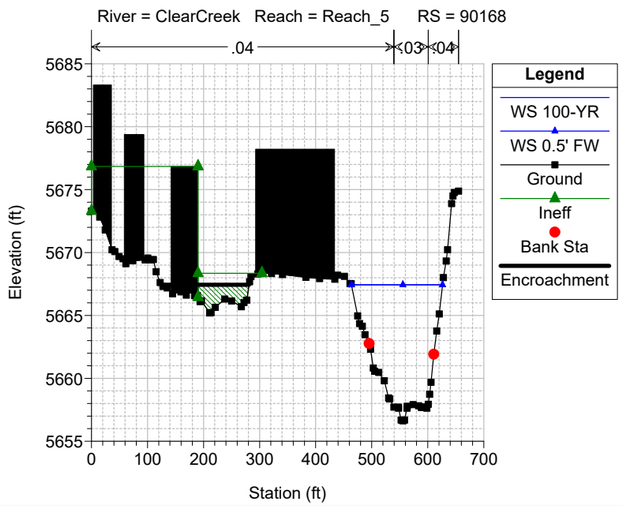
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90759


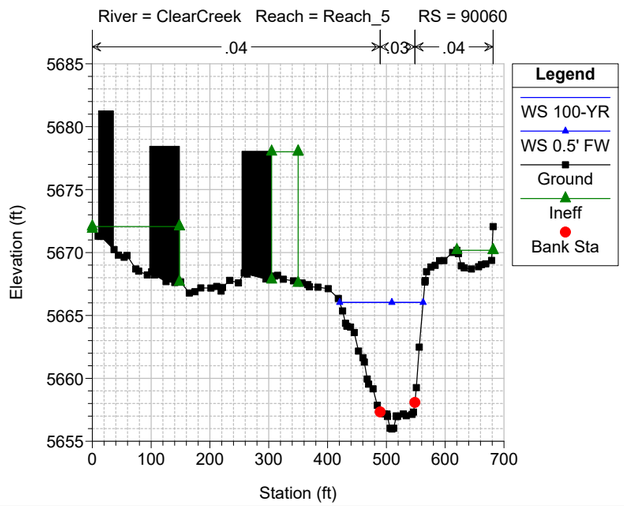
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90603


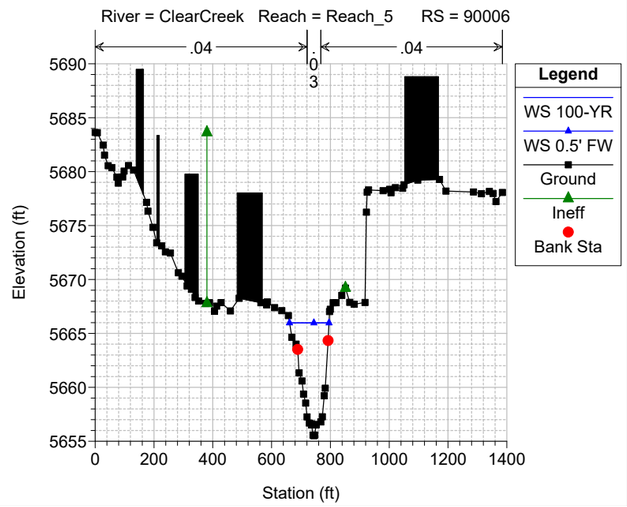
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90380


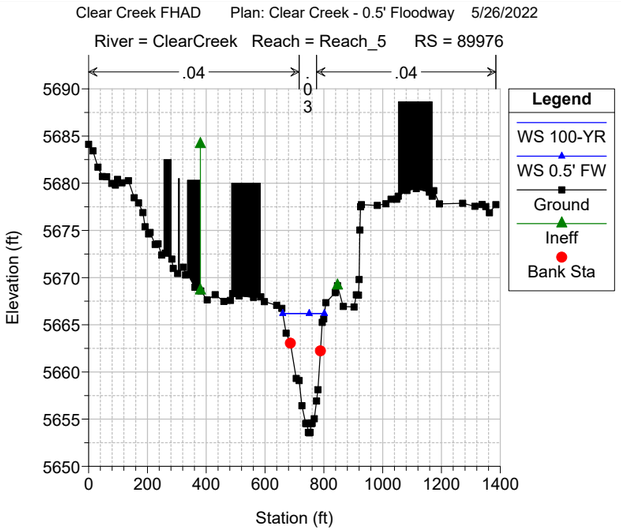
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90305


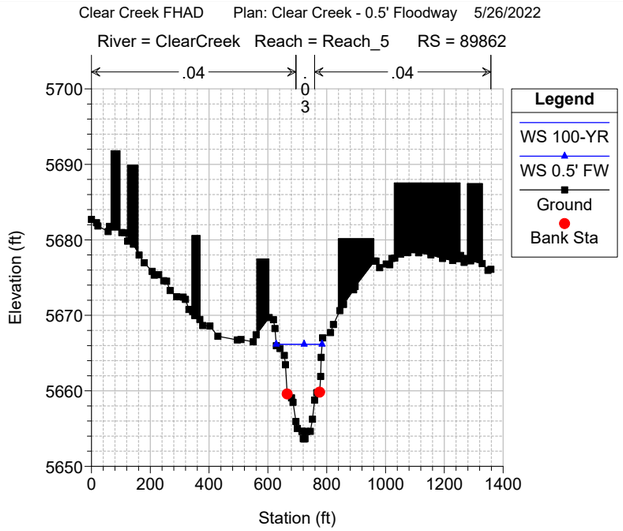
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90252


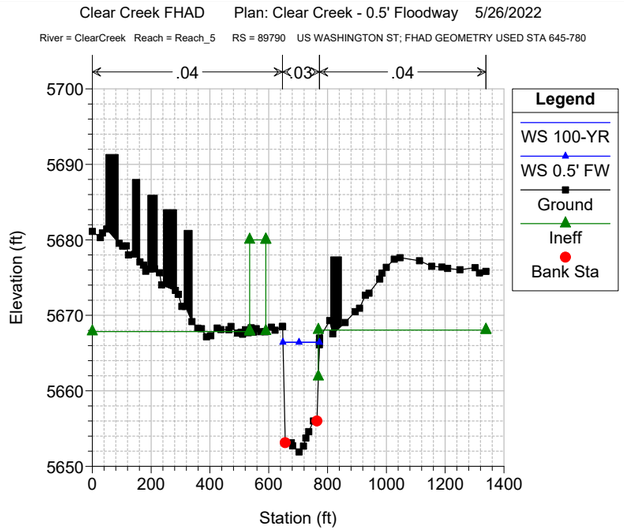
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90168


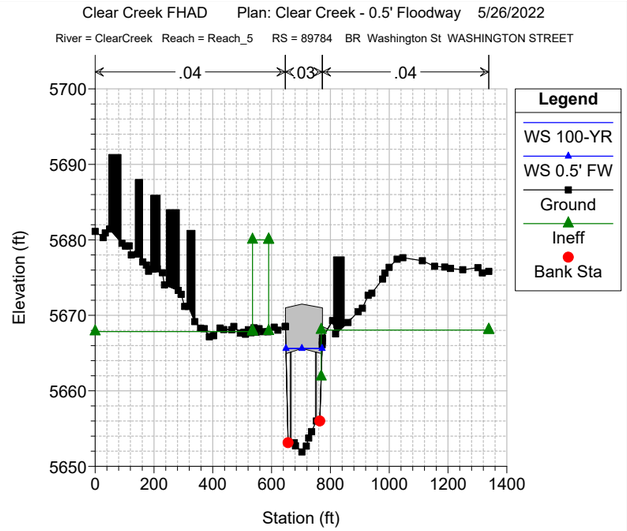
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90060


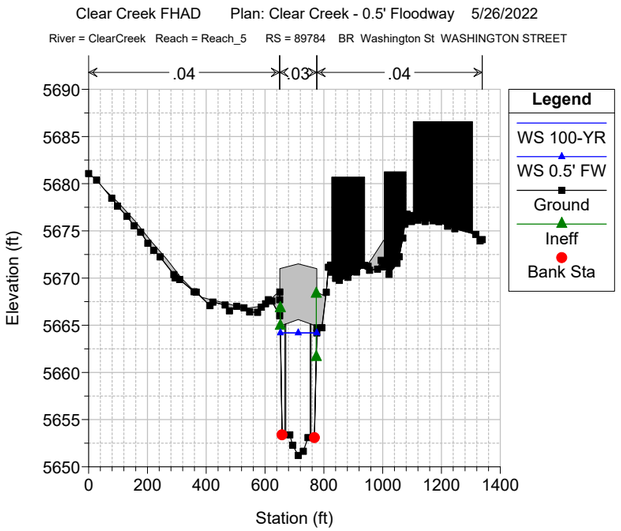
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 90006


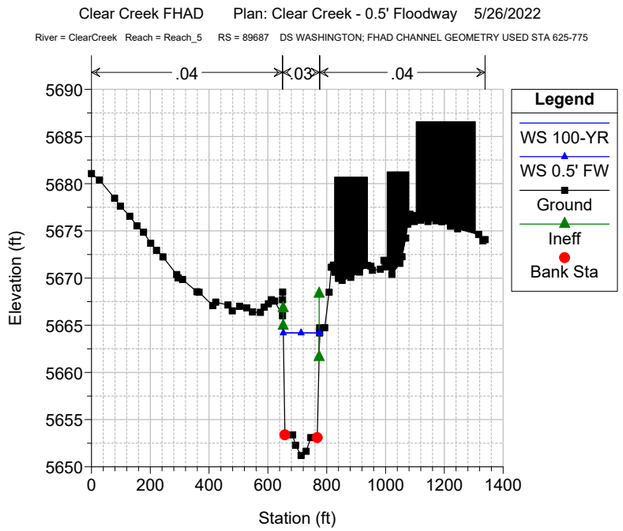

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 89976
.04 .03 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

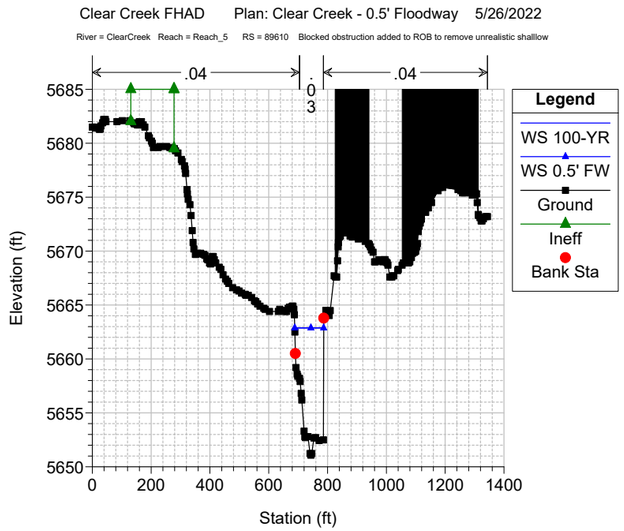

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 89862
.04 .03 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)

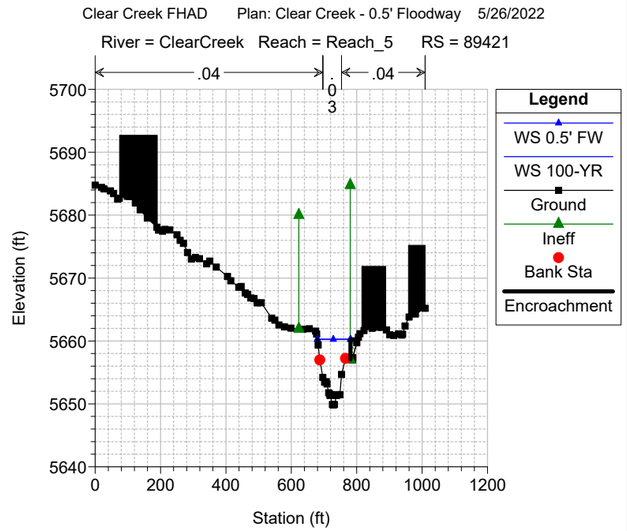

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 89790 US WASHINGTON ST; FHAD GEOMETRY USED STA 645-780
.04 .03 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

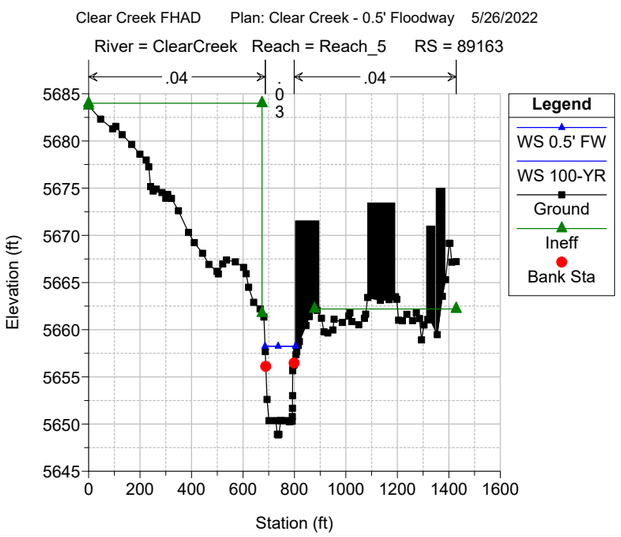

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 89784 BR Washington St WASHINGTON STREET
.04 .03 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

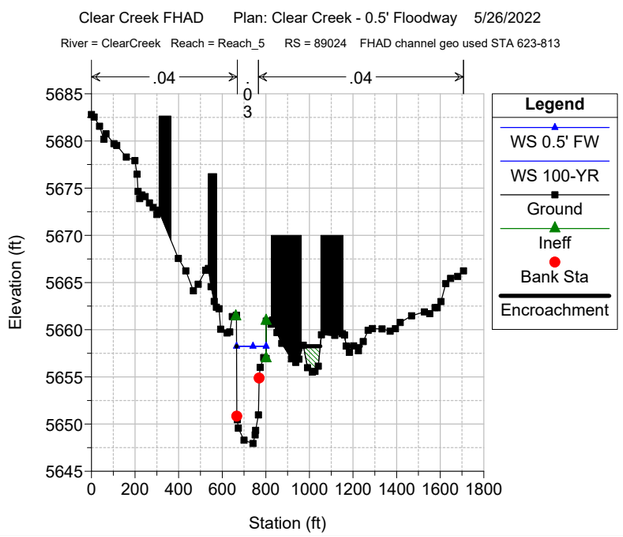

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 89784 BR Washington St WASHINGTON STREET
.04 .03 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

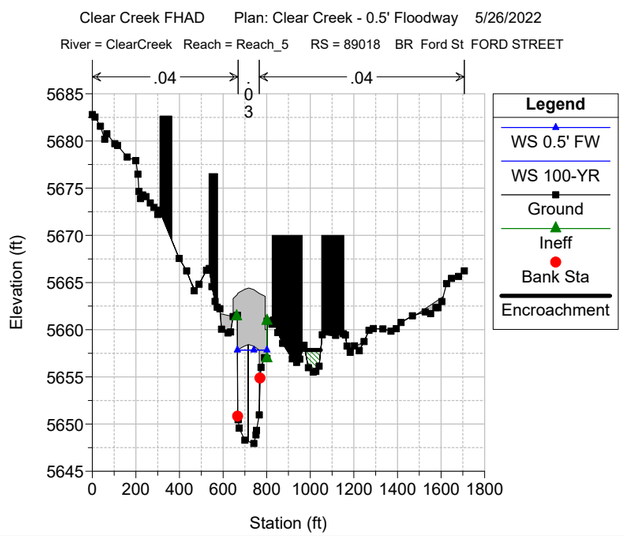

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 89687 DS WASHINGTON; FHAD CHANNEL GEOMETRY USED STA 625-775
.04 .03 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

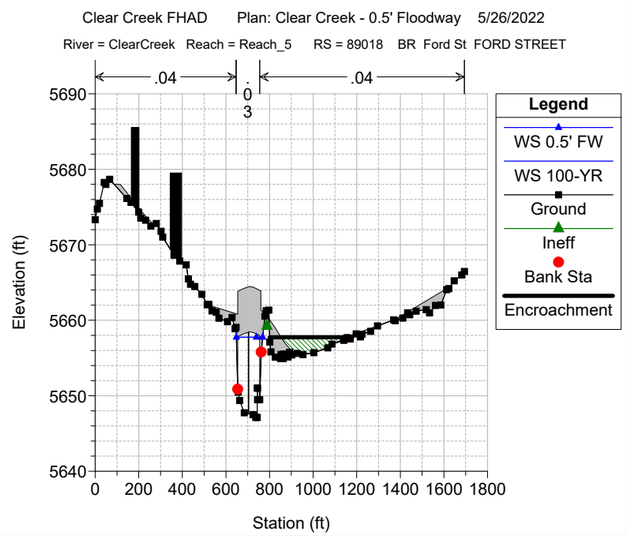

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 89610 Blocked obstruction added to ROB to remove unrealistic shalllow
.04 .03 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 89421
.04 .03 .04
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

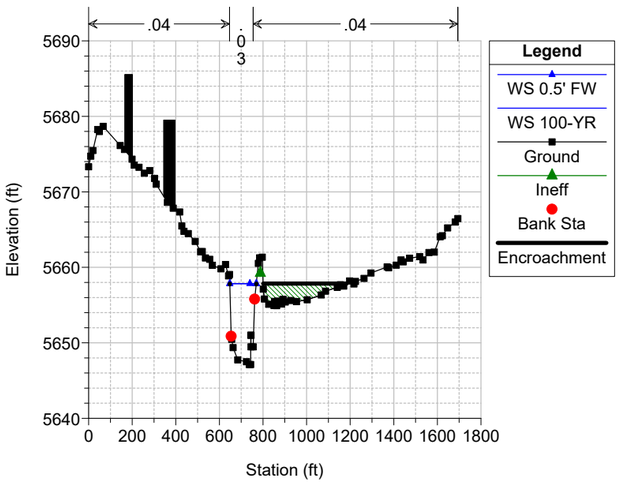

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 89163
.04 .03 .04
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 89024 FHAD channel geo used STA 623-813
.04 .03 .04
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

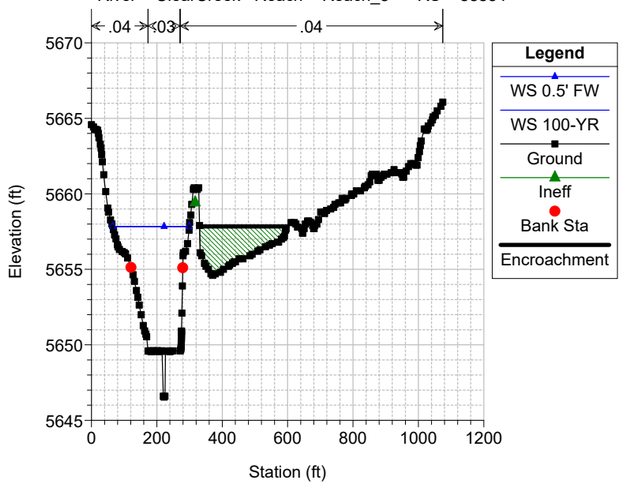

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 89018 BR Ford St FORD STREET
.04 .03 .04
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 89018 BR Ford St FORD STREET
.04 .03 .04
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

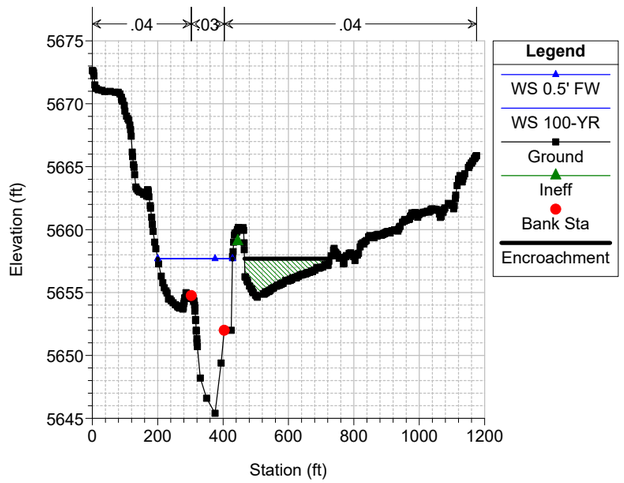
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88939 DS FORD ST; FHAD CHANNEL GEOMETRY USED 650-760



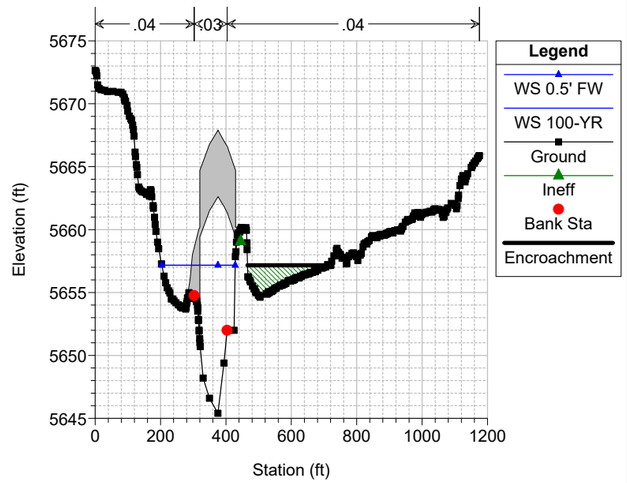
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88854



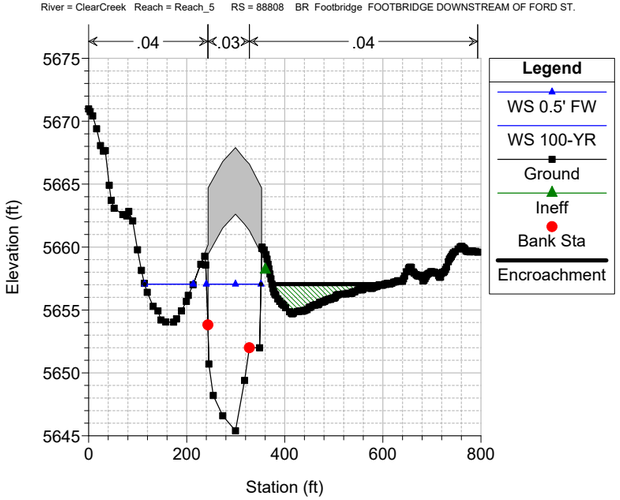
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88815 US PED BRIDGE; FHAD GEOMETRY USED IN THALWEG



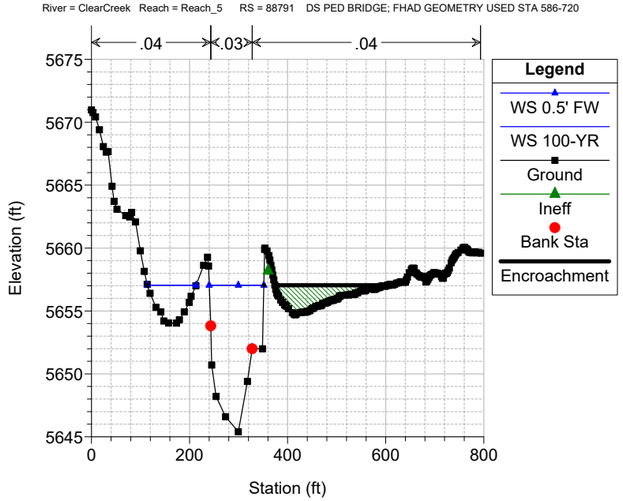
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88808 BR Footbridge FOOTBRIDGE DOWNSTREAM OF FORD ST.



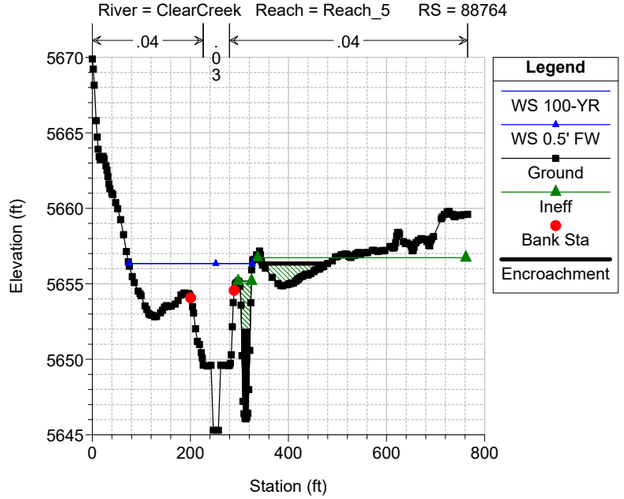
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88808 BR Footbridge FOOTBRIDGE DOWNSTREAM OF FORD ST.



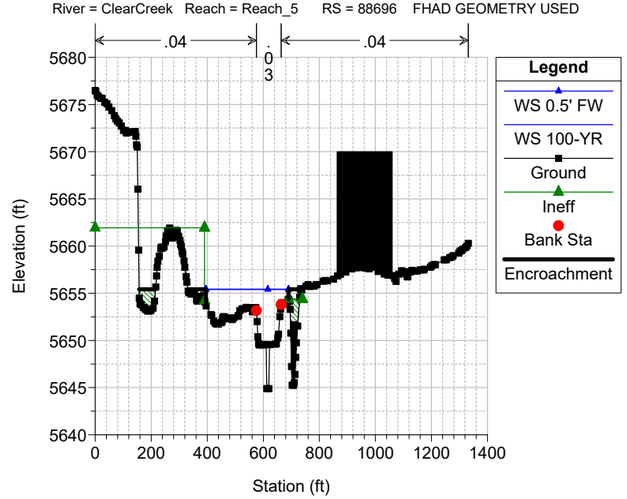
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88791 DS PED BRIDGE; FHAD GEOMETRY USED STA 586-720



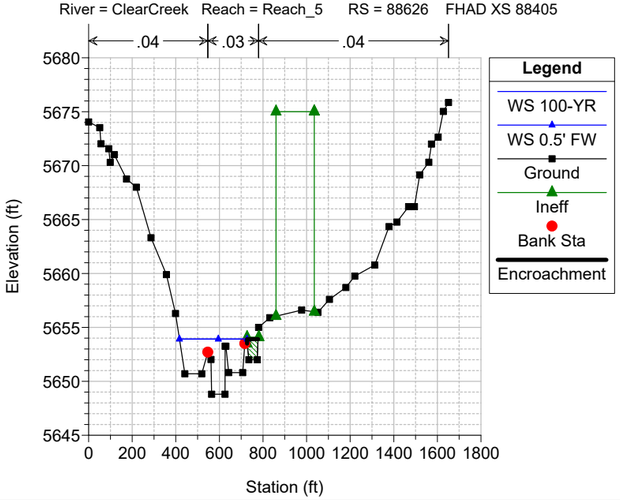
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88764



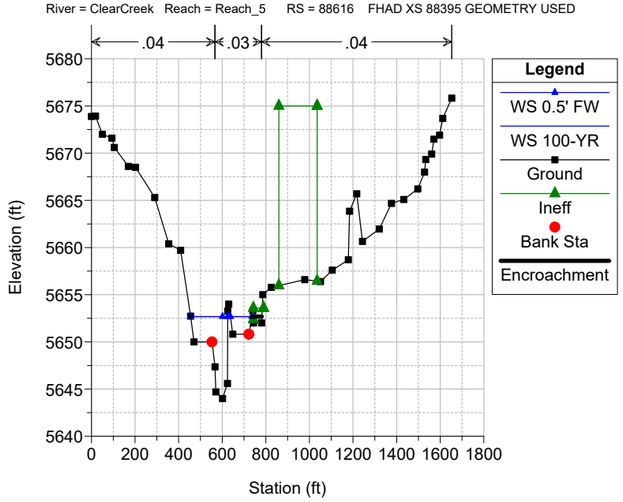
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88696 FHAD GEOMETRY USED



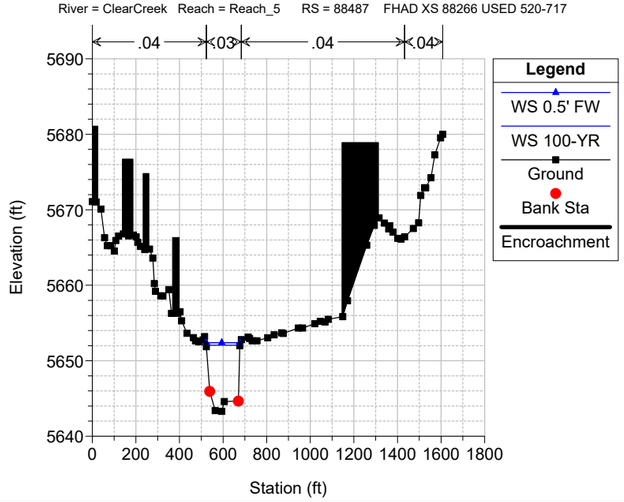
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88626 FHAD XS 88405



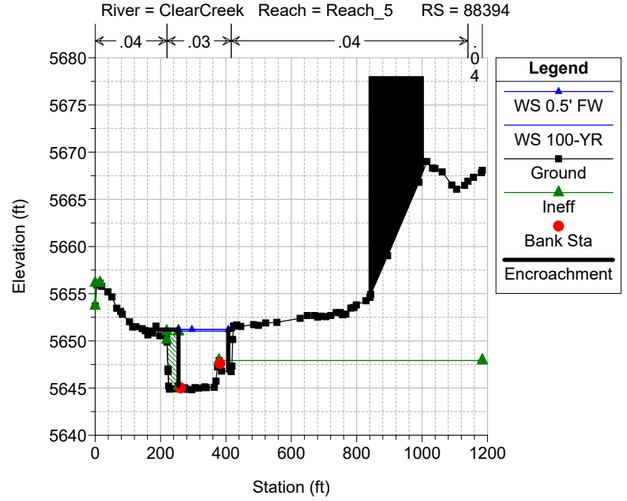
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88616 FHAD XS 88395 GEOMETRY USED

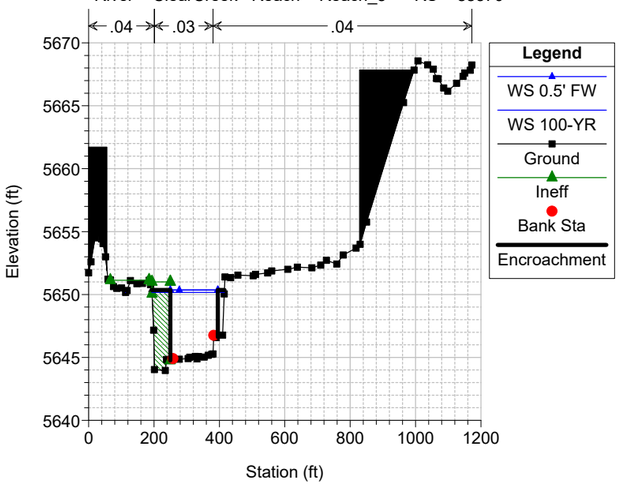


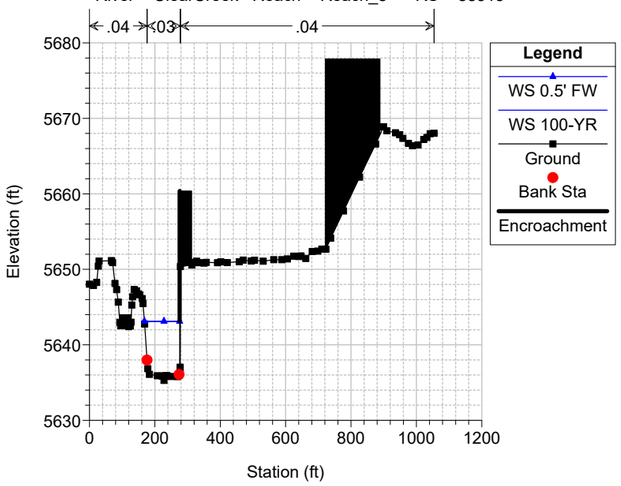
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88487 FHAD XS 88266 USED 520-717

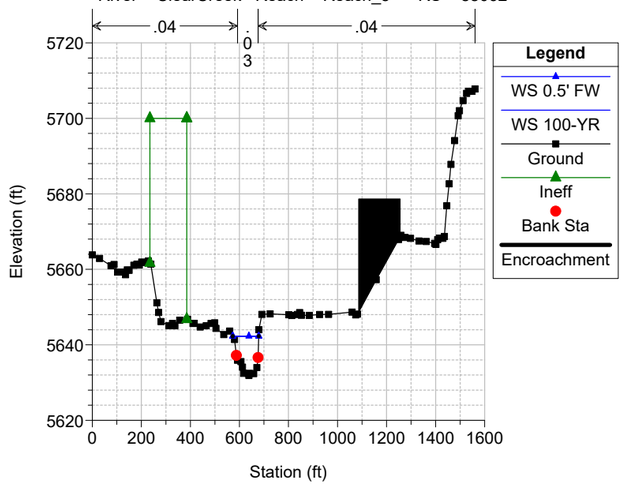


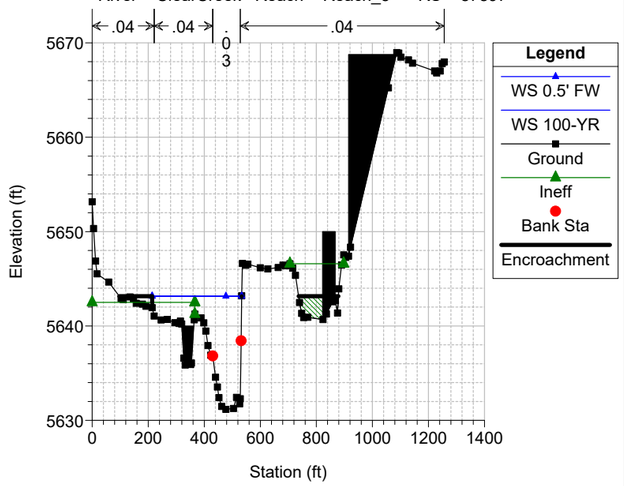
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88394

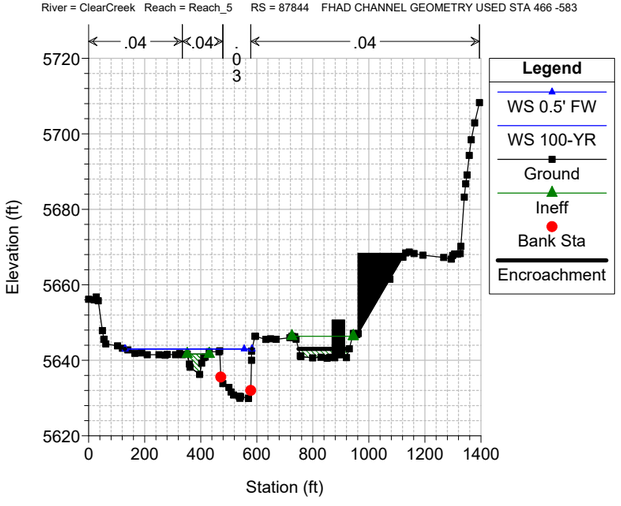


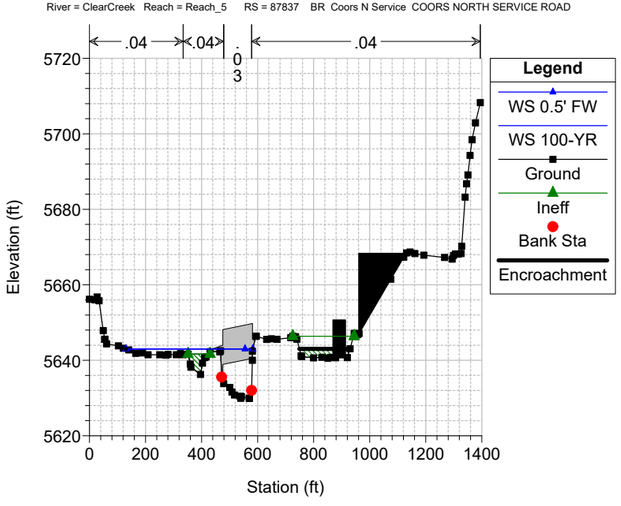
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88370


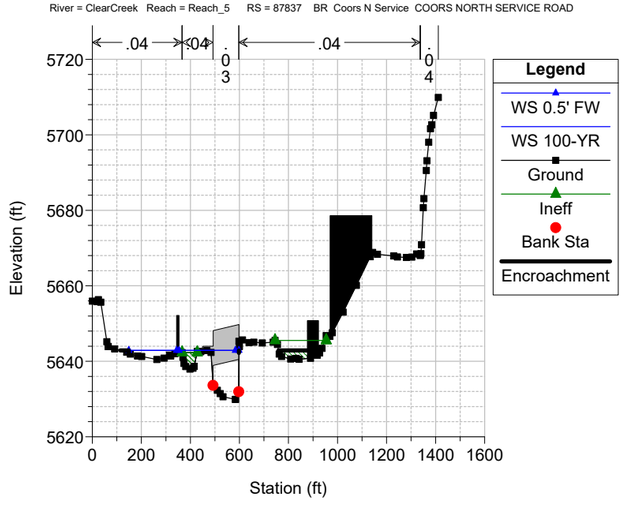
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88313


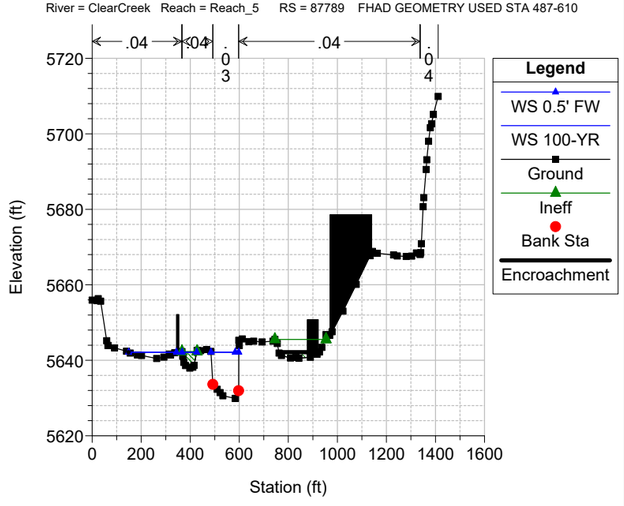
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 88062


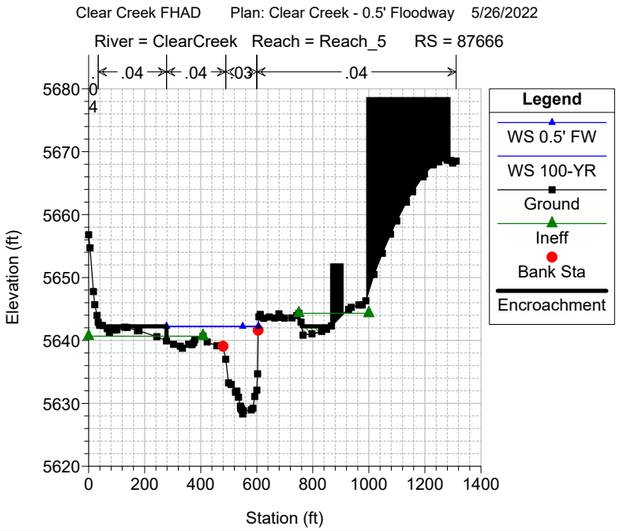
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87897


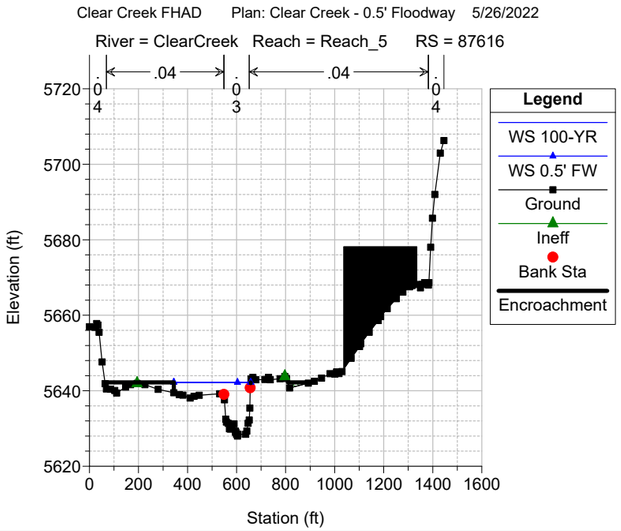
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87844 FHAD CHANNEL GEOMETRY USED STA 466 -583


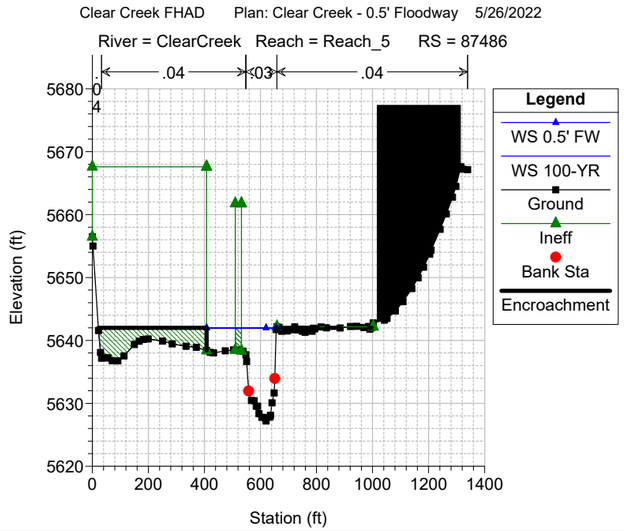
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87837 BR Coors N Service COORS NORTH SERVICE ROAD


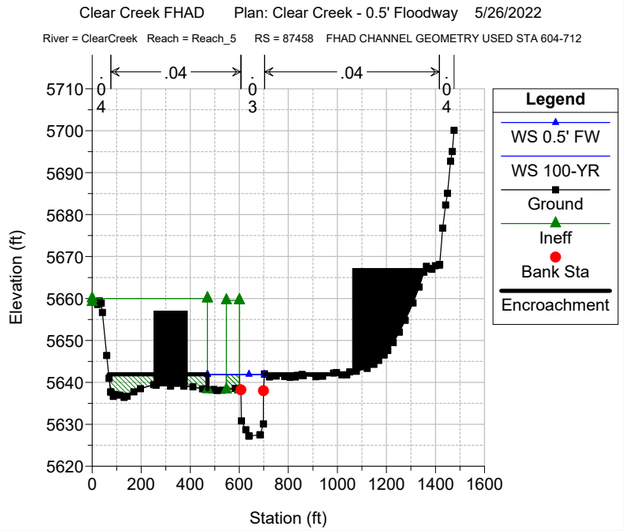
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87837 BR Coors N Service COORS NORTH SERVICE ROAD


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87789 FHAD GEOMETRY USED STA 487-610


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87666


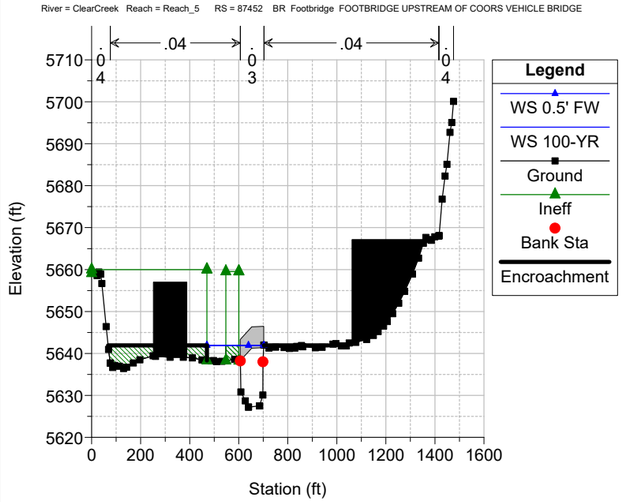
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87616


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87486


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87458 FHAD CHANNEL GEOMETRY USED STA 604-712


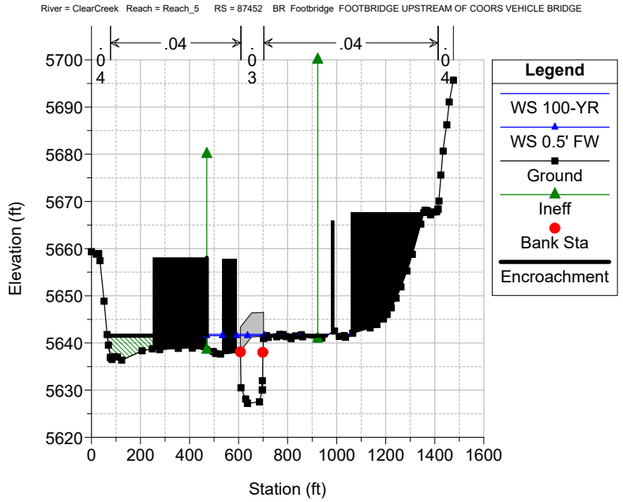
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87452 BR Footbridge FOOTBRIDGE UPSTREAM OF COORS VEHICLE BRIDGE



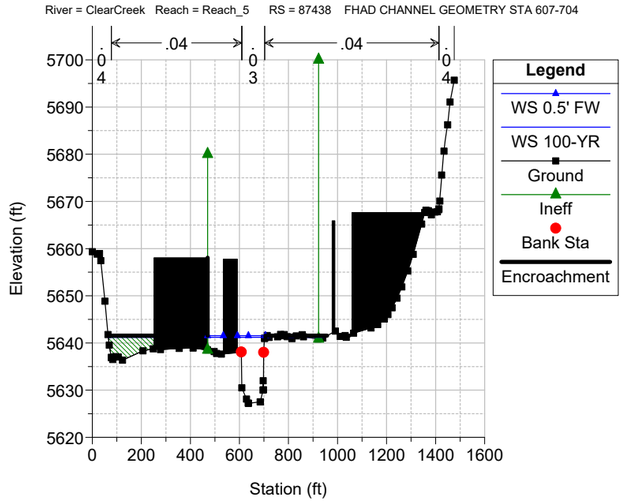
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87452 BR Footbridge FOOTBRIDGE UPSTREAM OF COORS VEHICLE BRIDGE



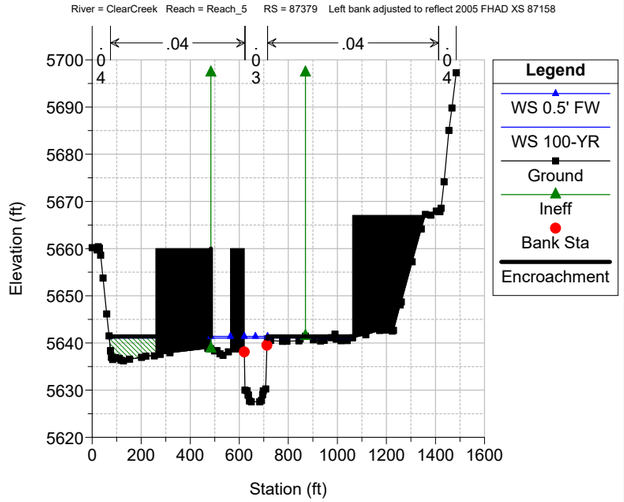
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87438 FHAD CHANNEL GEOMETRY STA 607-704



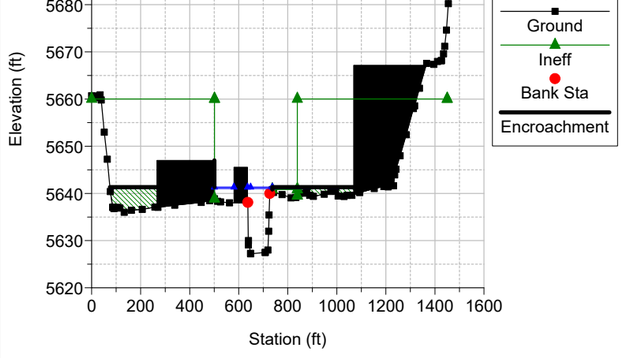
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87379 Left bank adjusted to reflect 2005 FHAD XS 87158



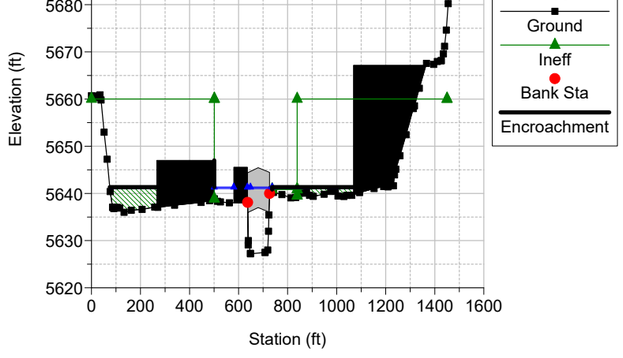
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87326 Left bank adjusted to reflect 2005 FHAD XS 87158



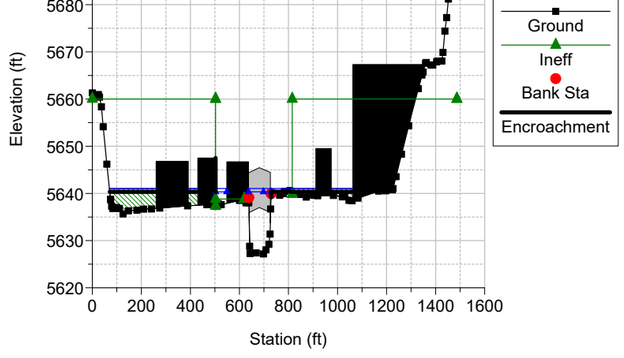
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87322 BR Coors Vehicle COORS VEHICLE BRIDGE



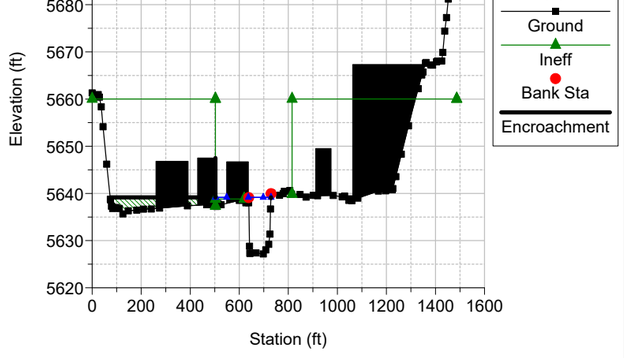
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87322 BR Coors Vehicle COORS VEHICLE BRIDGE



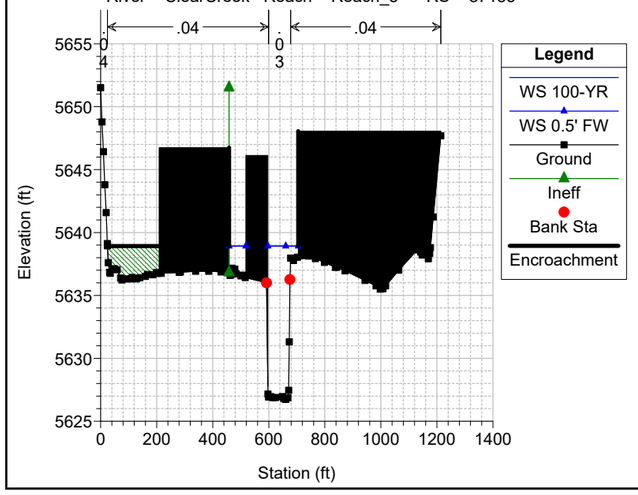
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87281 Topo left bank updated to reflect walls from FHAD XS 87059



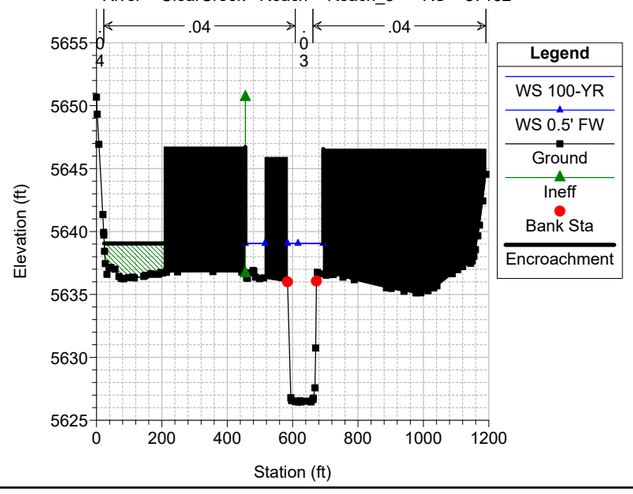
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87185



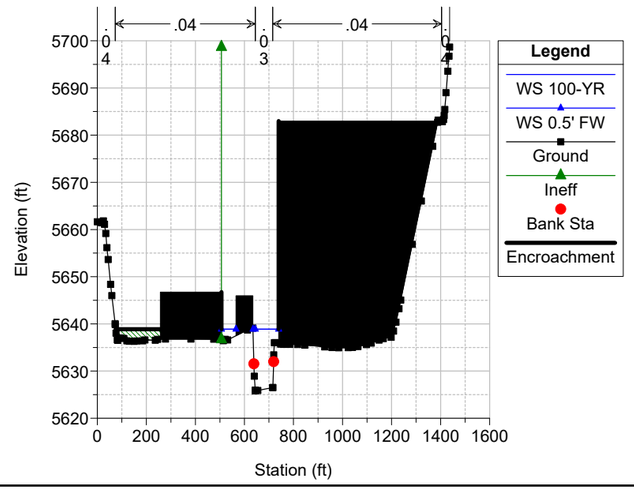
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 87132



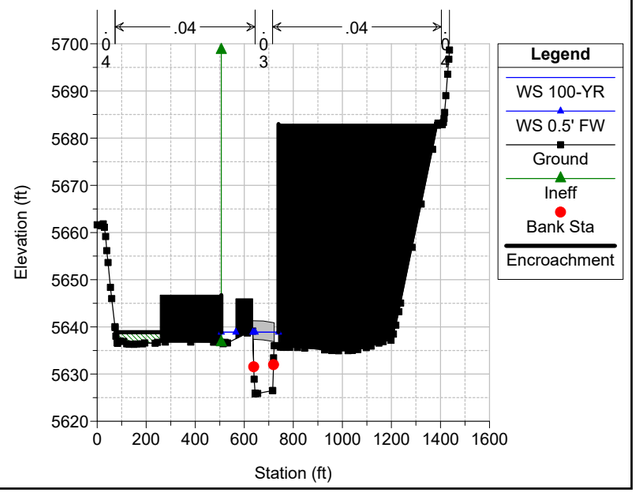
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

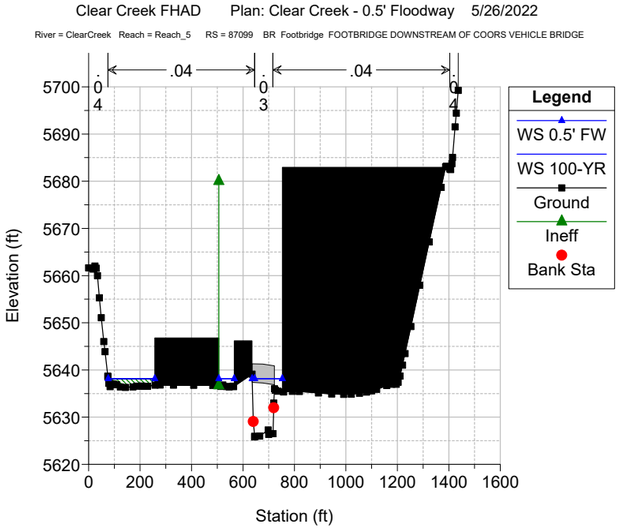
River = ClearCreek Reach = Reach_5 RS = 87101 FHAD CHANNEL GEOMETRY USED 632-725 TO REPRESENT WALLED SECTION

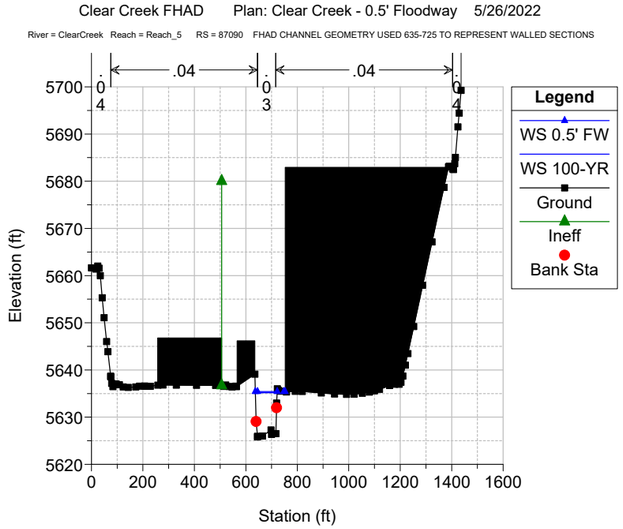


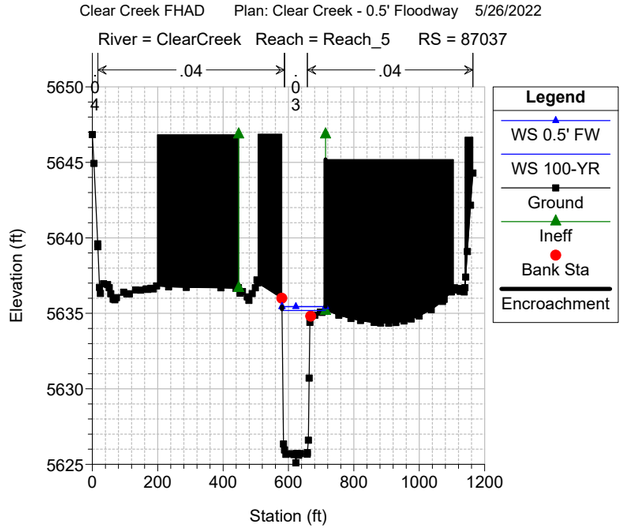
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

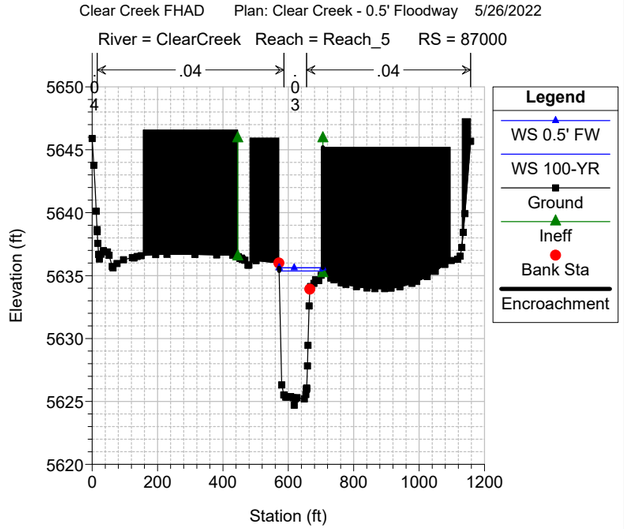
River = ClearCreek Reach = Reach_5 RS = 87099 BR Footbridge FOOTBRIDGE DOWNSTREAM OF COORS VEHICLE BRIDGE

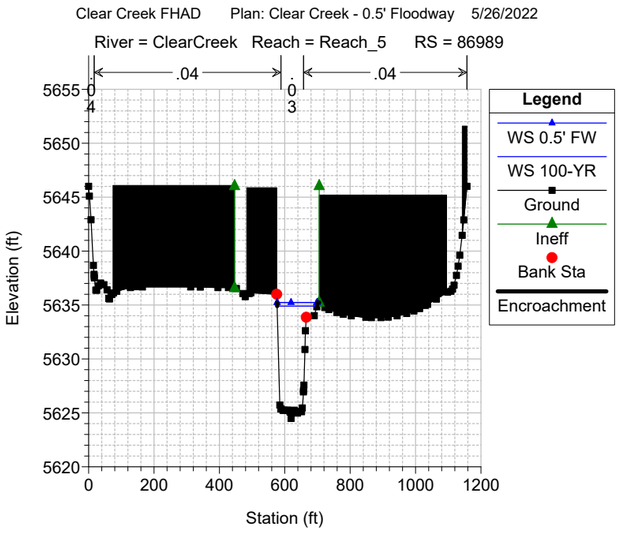


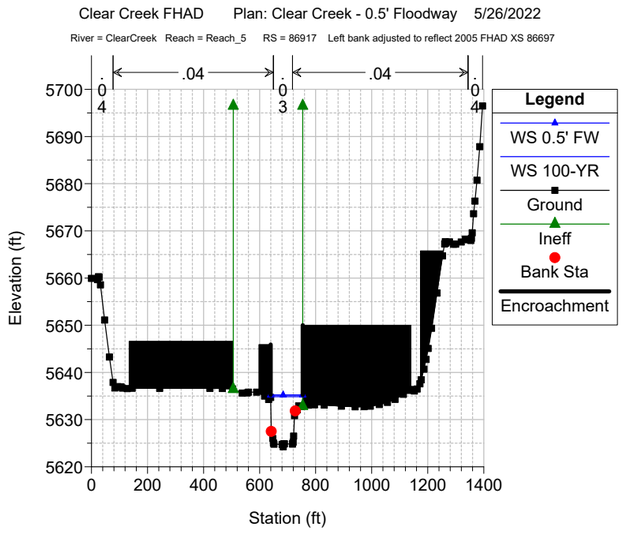

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87099 BR Footbridge FOOTBRIDGE DOWNSTREAM OF COORS VEHICLE BRIDGE
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta

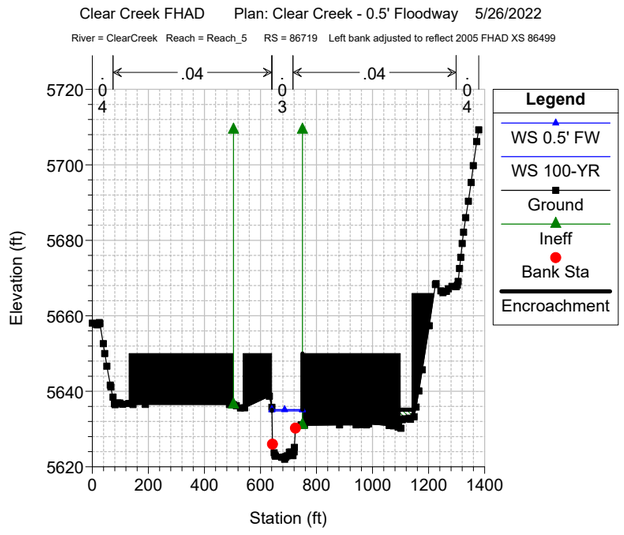

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87090 FHAD CHANNEL GEOMETRY USED 635-725 TO REPRESENT WALLED SECTIONS
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta

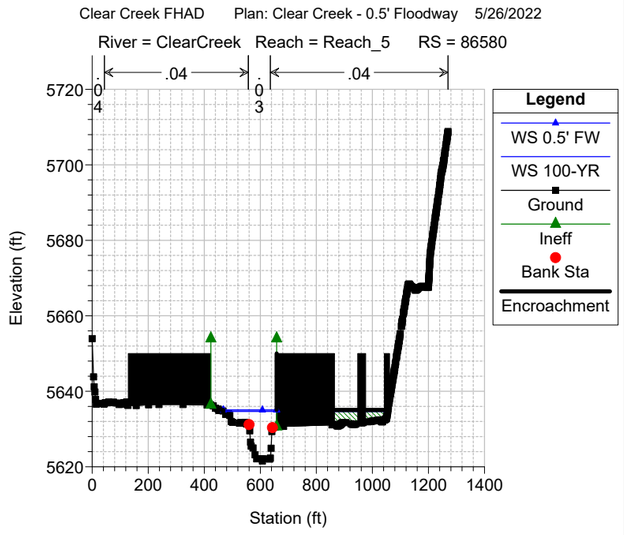

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87037
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

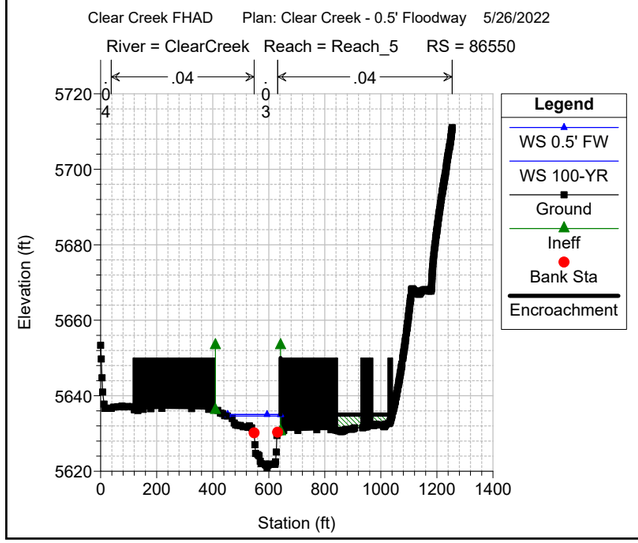

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 87000
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

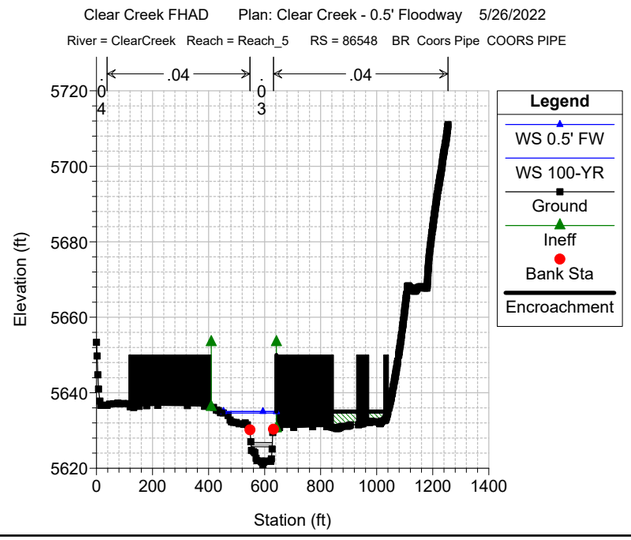

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86989
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

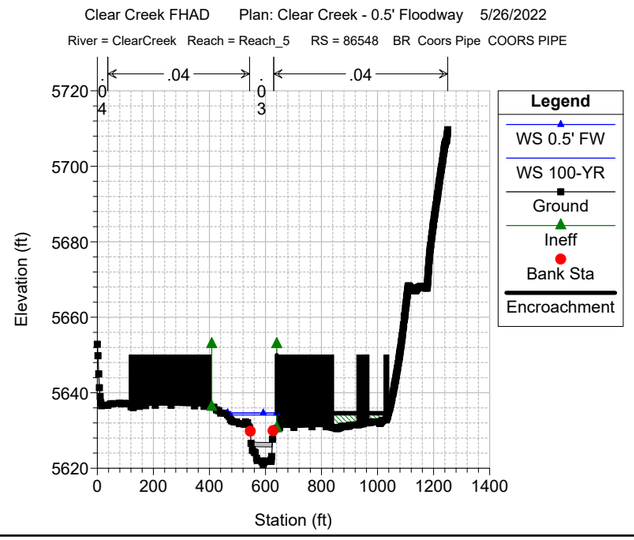

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86917 Left bank adjusted to reflect 2005 FHAD XS 86697
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

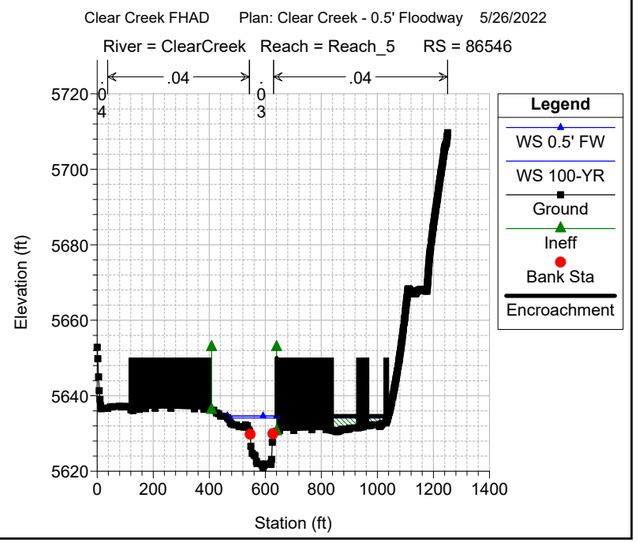

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86719 Left bank adjusted to reflect 2005 FHAD XS 86499
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

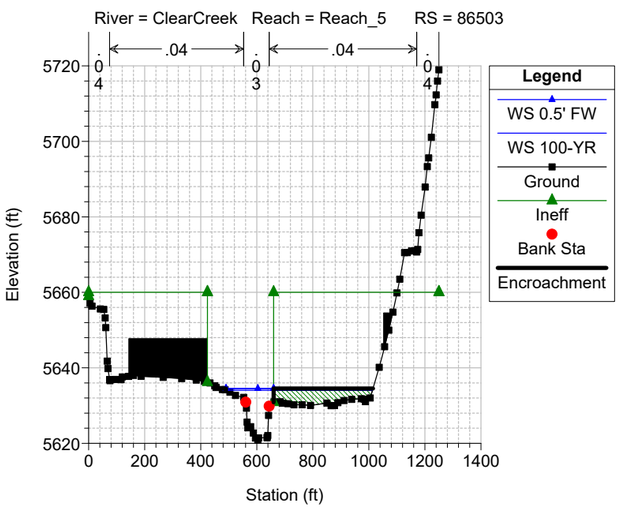

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86580
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

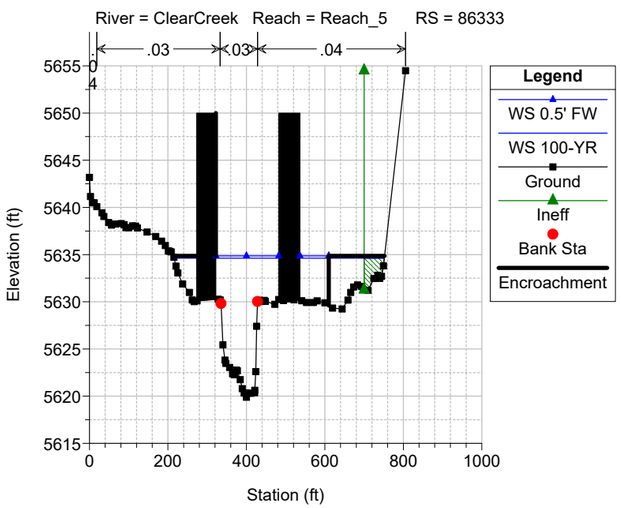

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86550
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

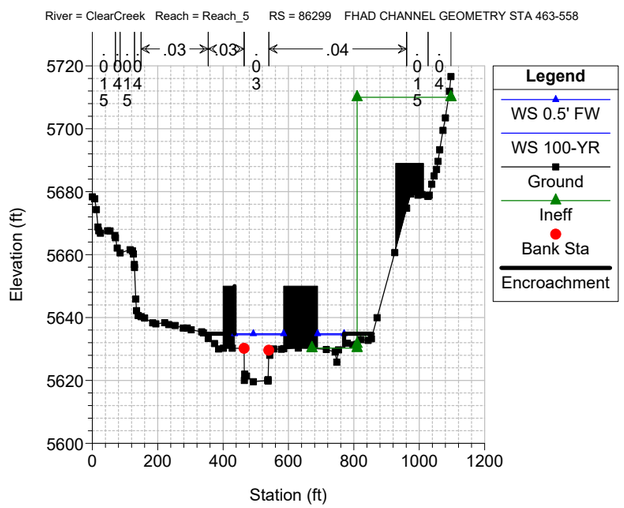

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86548 BR Coors Pipe COORS PIPE
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

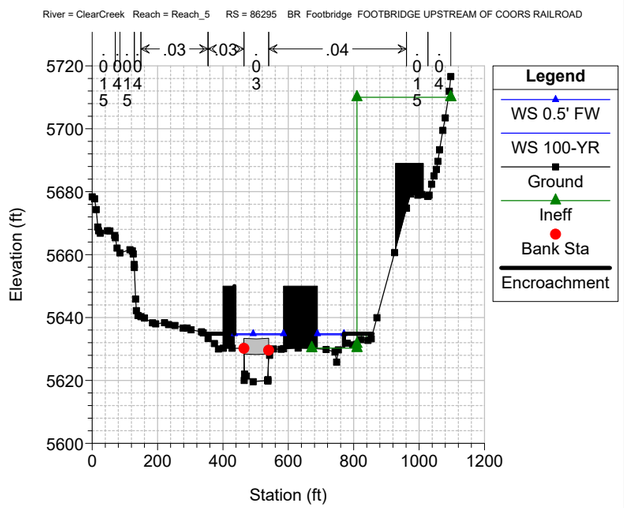

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86548 BR Coors Pipe COORS PIPE
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

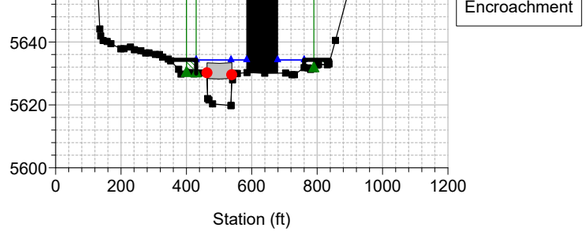

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86546
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

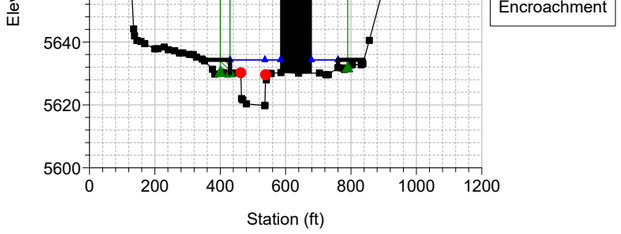
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86503


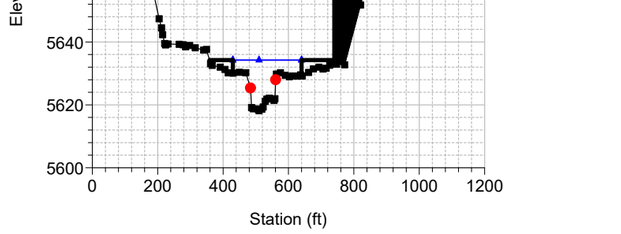
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86333


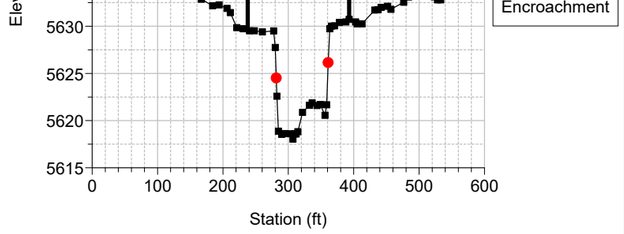
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86299 FHAD CHANNEL GEOMETRY STA 463-558


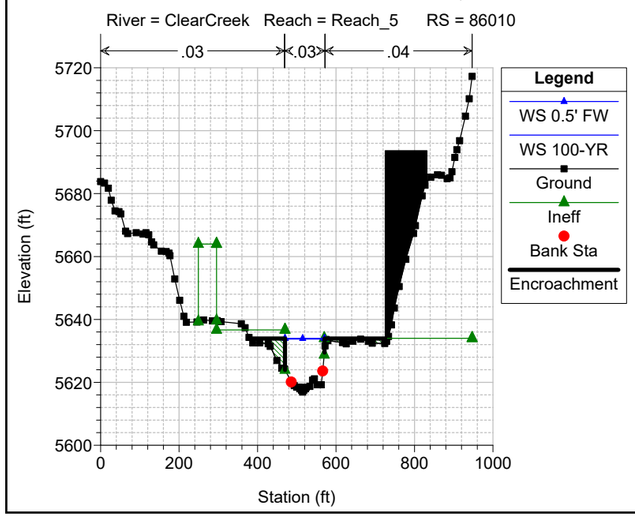
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86295 BR Footbridge FOOTBRIDGE UPSTREAM OF COORS RAILROAD


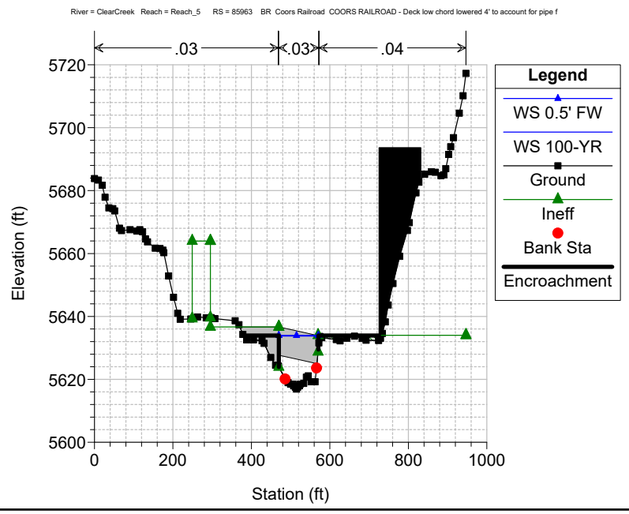
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86295 BR Footbridge FOOTBRIDGE UPSTREAM OF COORS RAILROAD


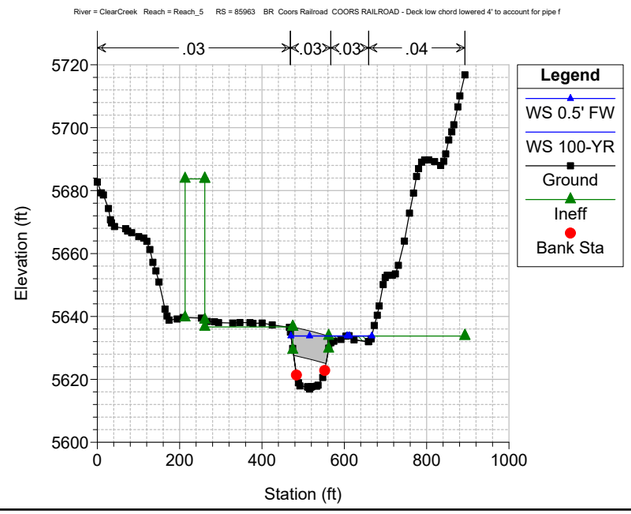
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86277 FHAD CHANNEL GEOMETRY STA 453-555


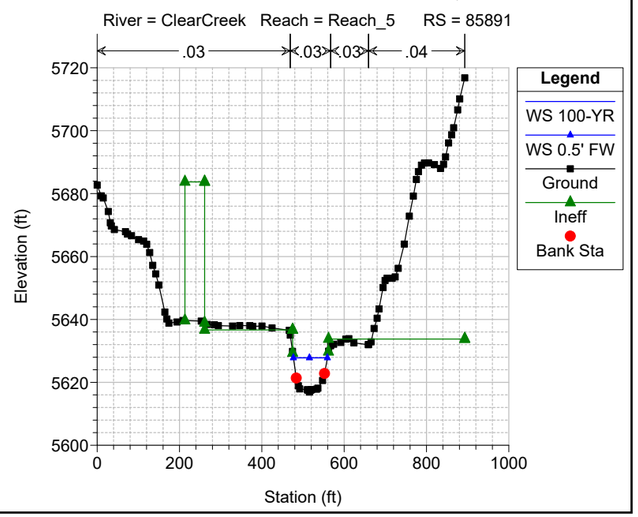
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86138


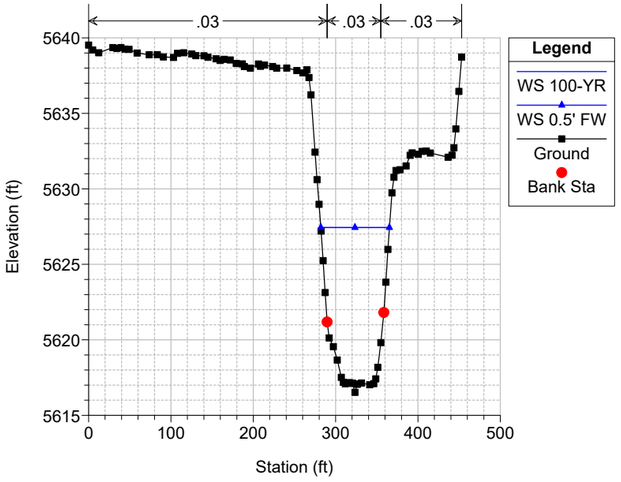
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86081


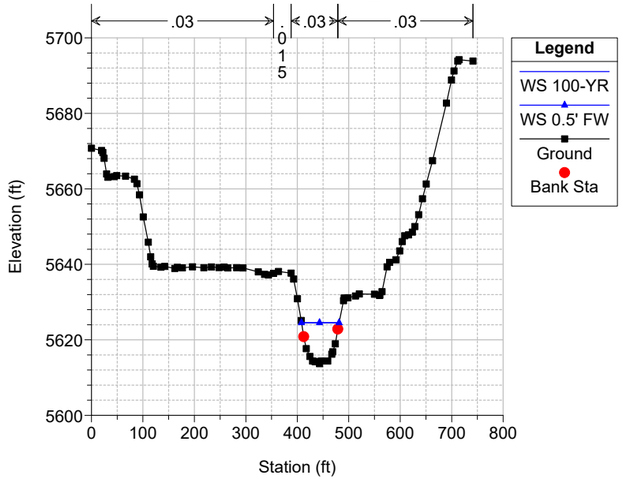
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 86010


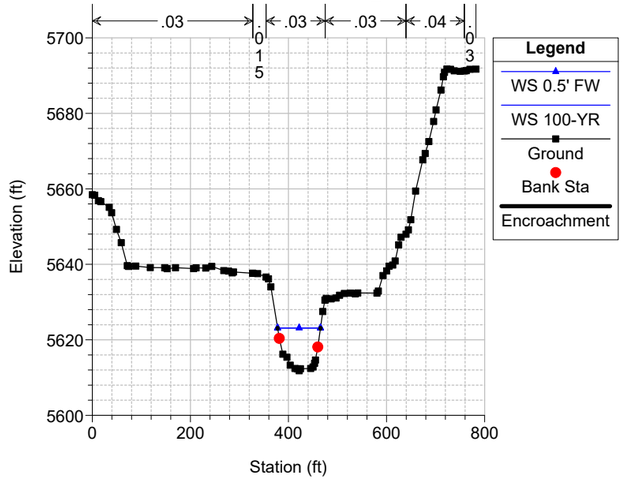
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 85963 BR Coors Railroad COORS RAILROAD - Deck low chord lowered 4' to account for pipe f


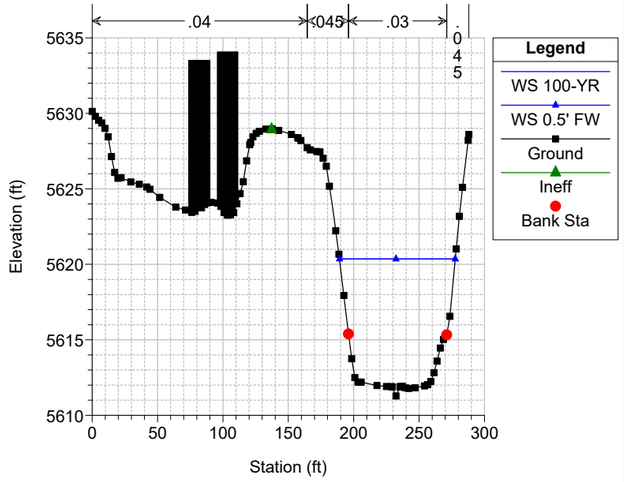
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 85963 BR Coors Railroad COORS RAILROAD - Deck low chord lowered 4' to account for pipe f


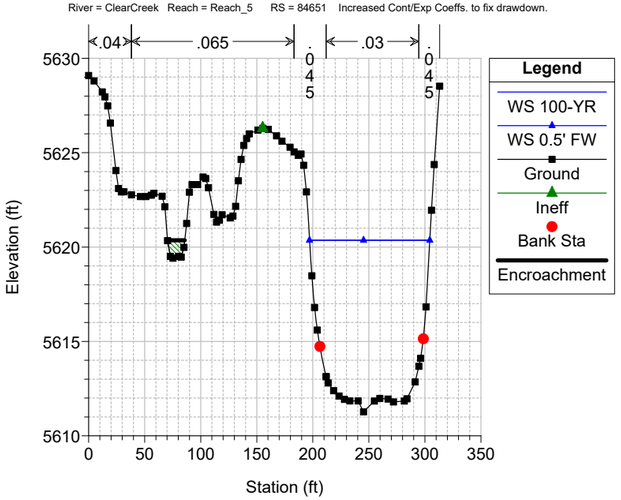
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 85891


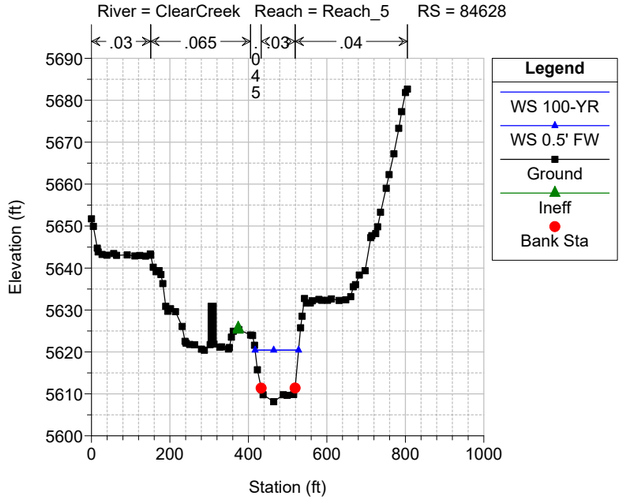
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 85799


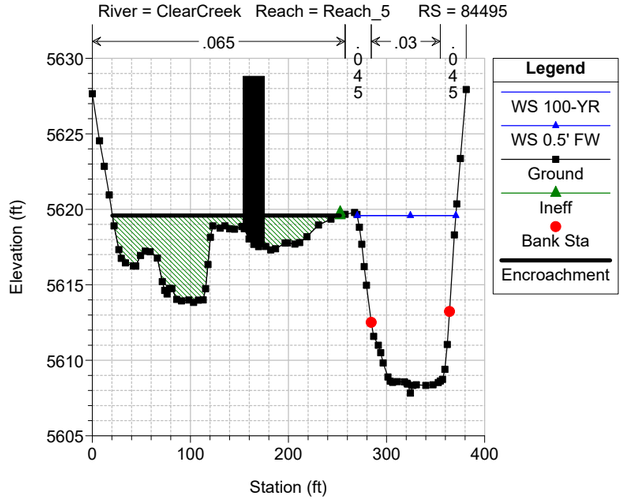
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 85484


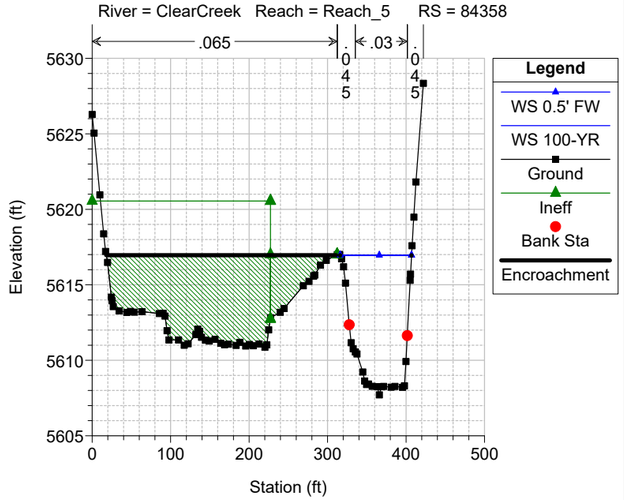
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 85036


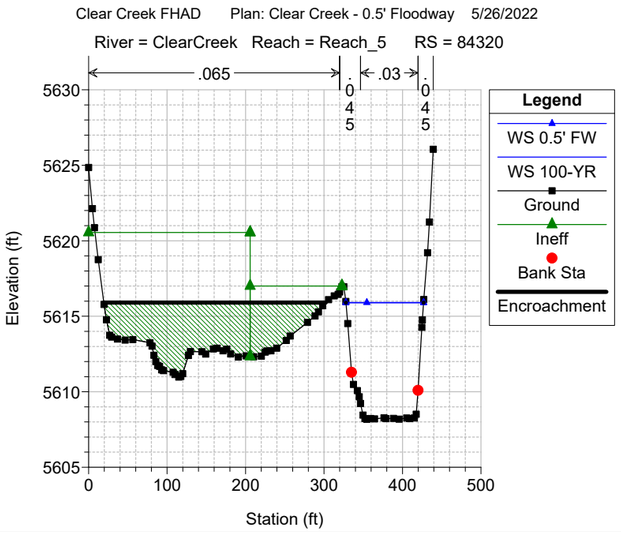
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84717


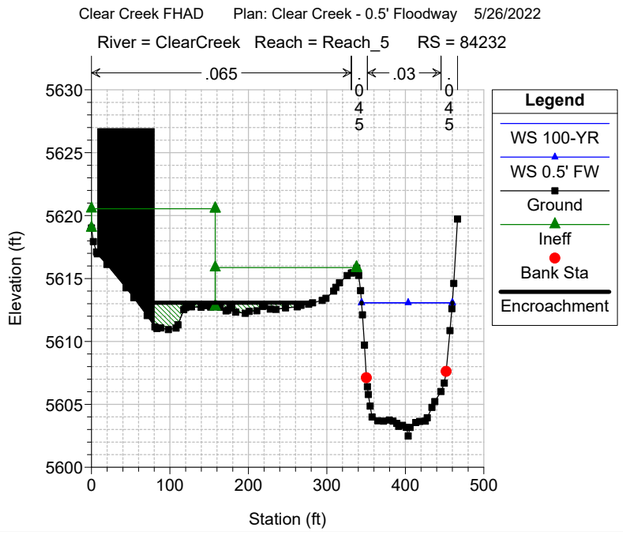
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84651 Increased Cont/Exp Coeffs. to fix drawdown.


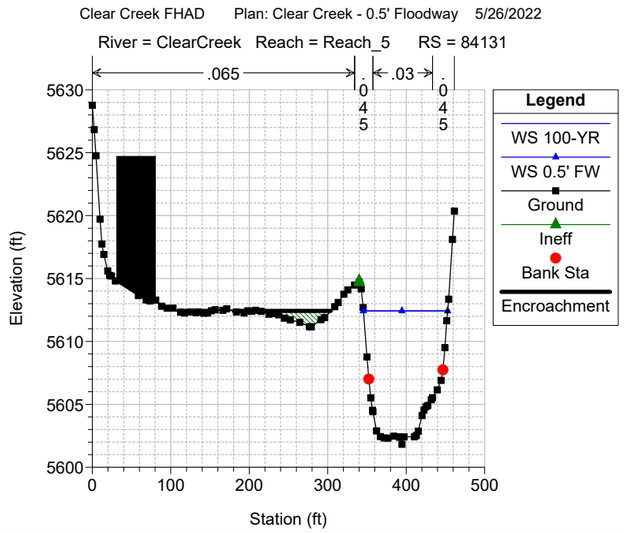
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84628


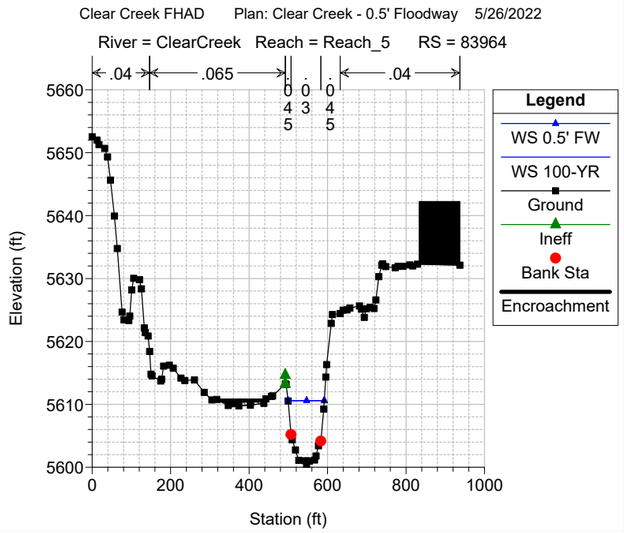
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84495


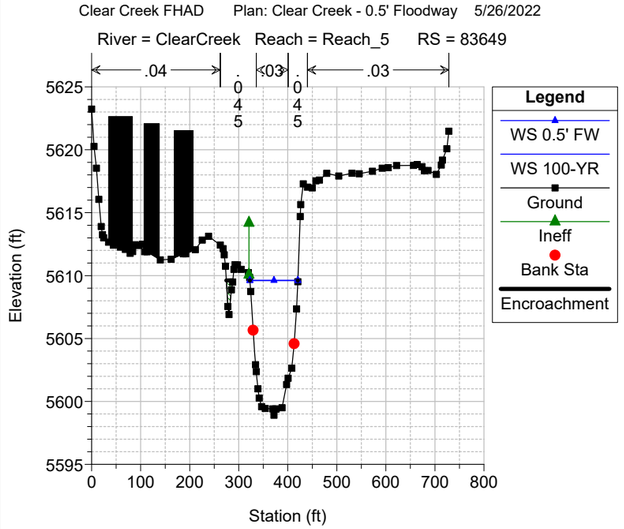
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84358


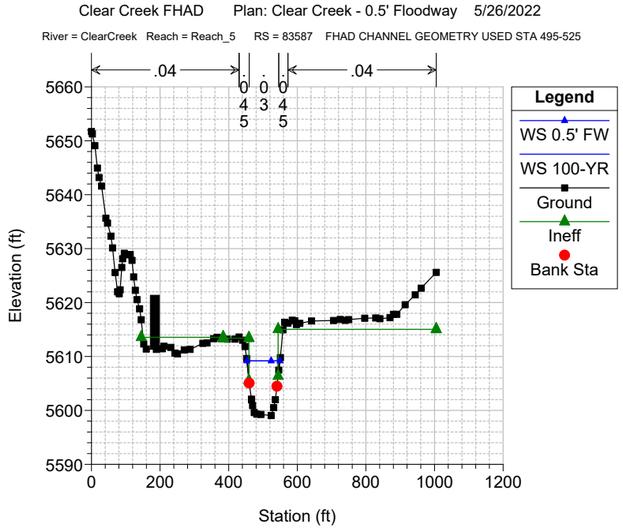
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84320


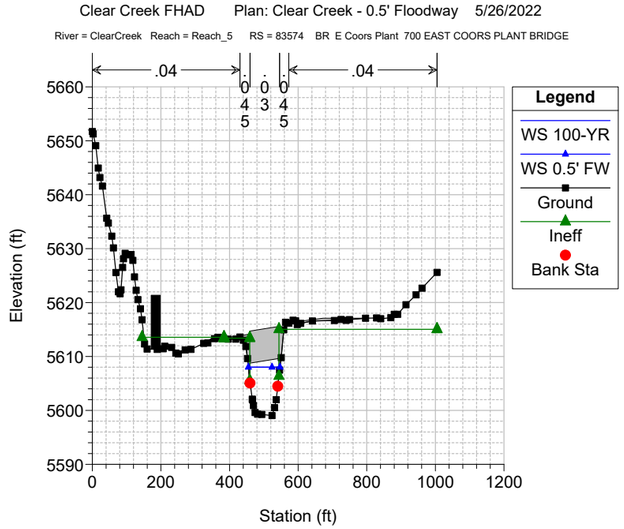
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84232


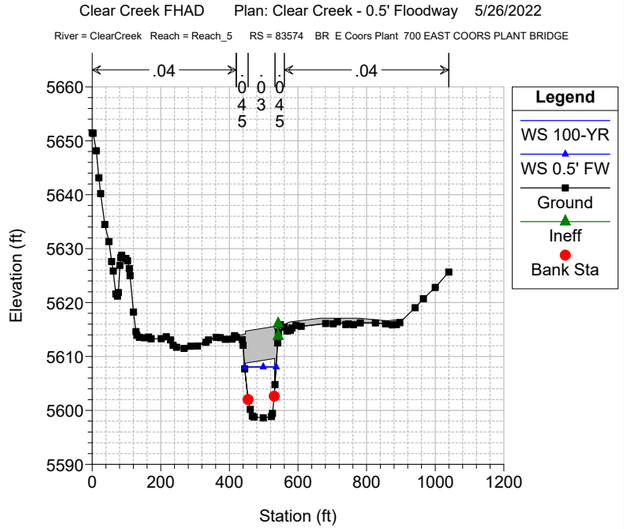
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 84131


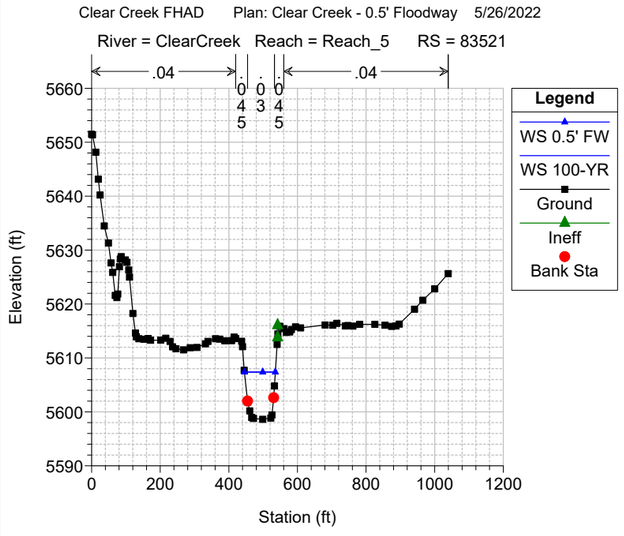
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83964


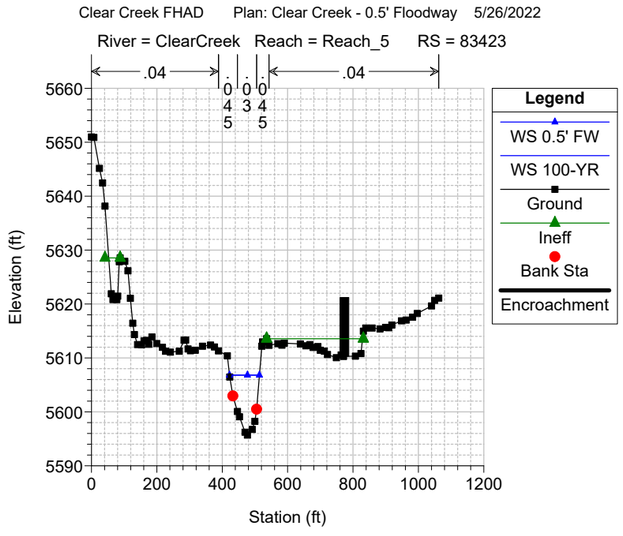

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83649
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

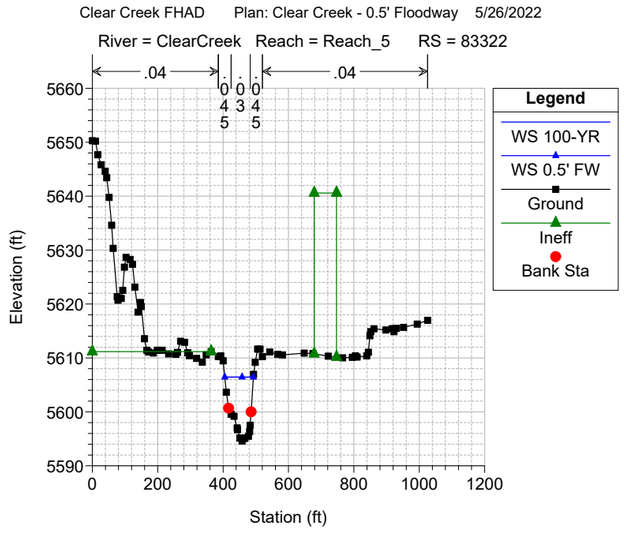

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83587 FHAD CHANNEL GEOMETRY USED STA 495-525
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

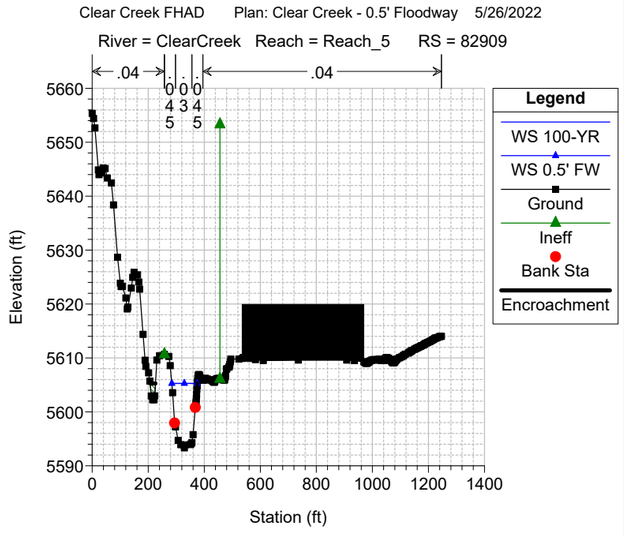

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83574 BR E Coors Plant 700 EAST COORS PLANT BRIDGE
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

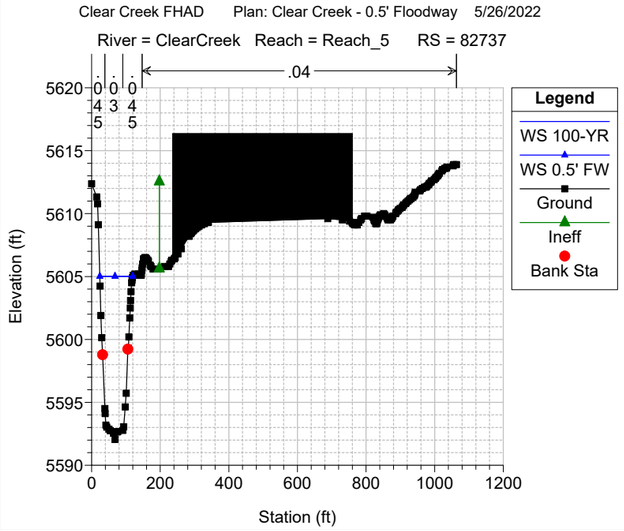

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83574 BR E Coors Plant 700 EAST COORS PLANT BRIDGE
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

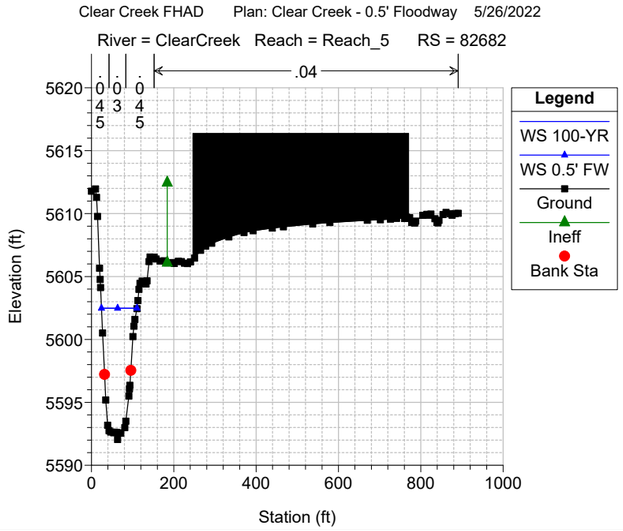

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83521
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

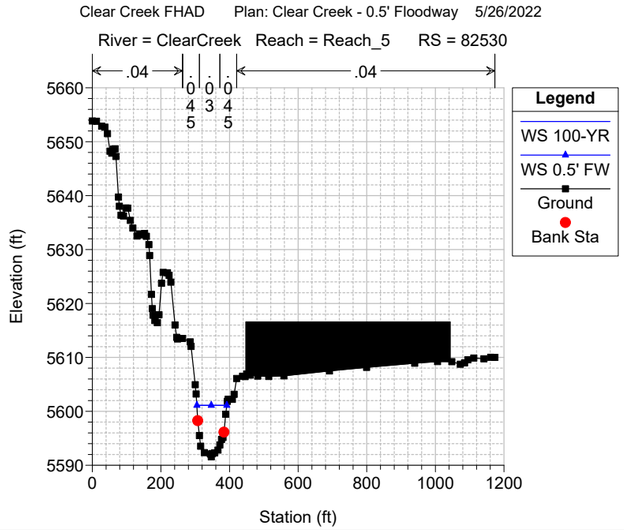

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83423
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

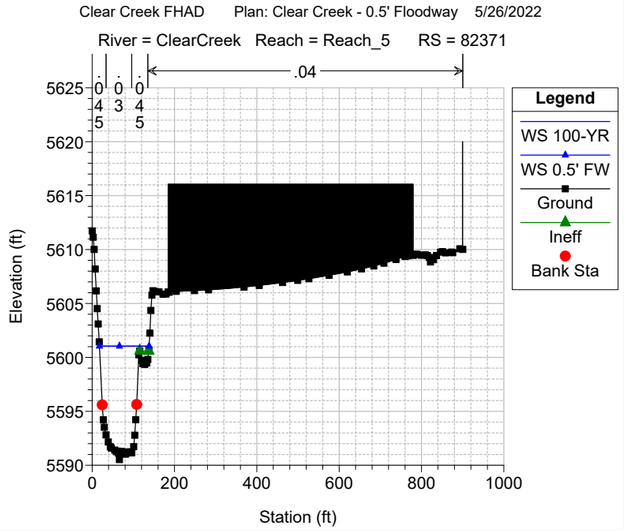

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 83322
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

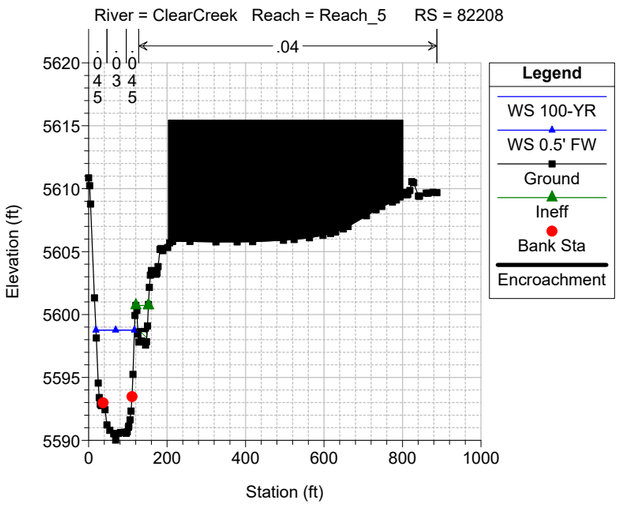

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82909
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

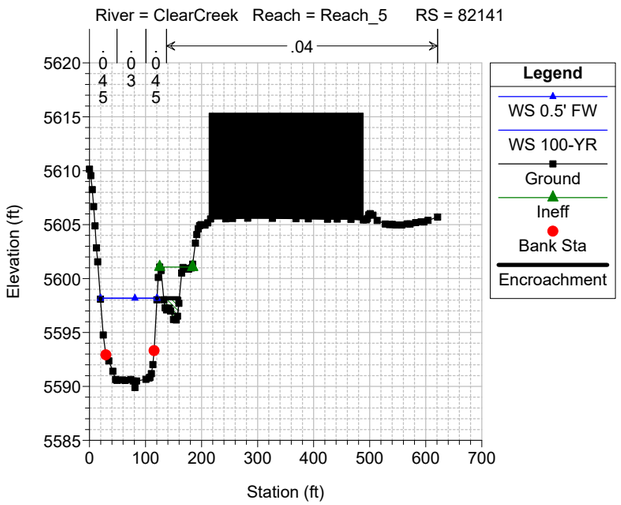

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82737
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

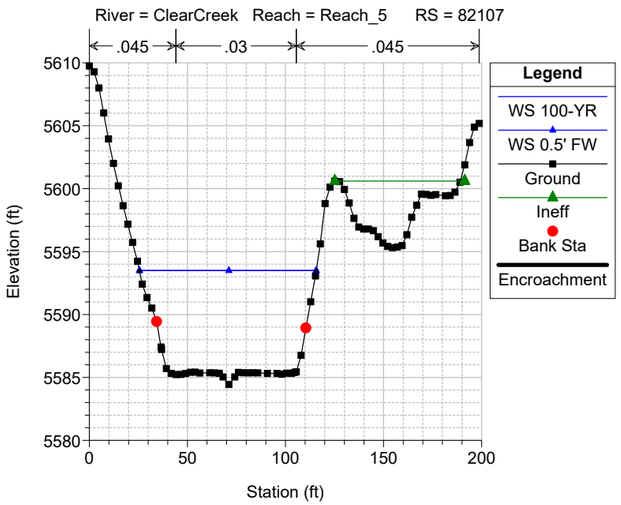

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82682
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

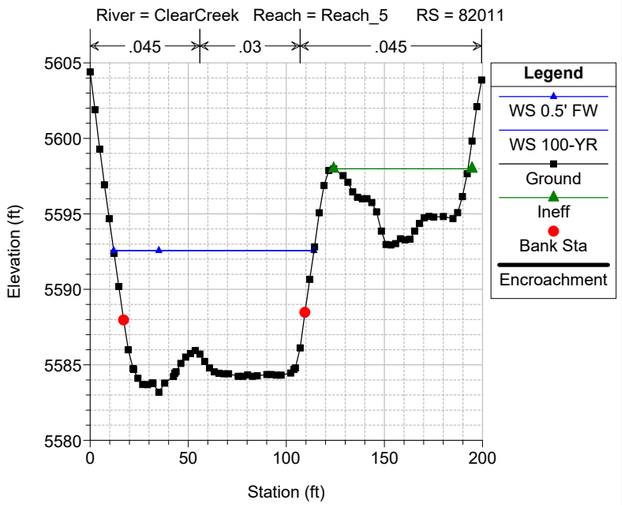

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82530
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)

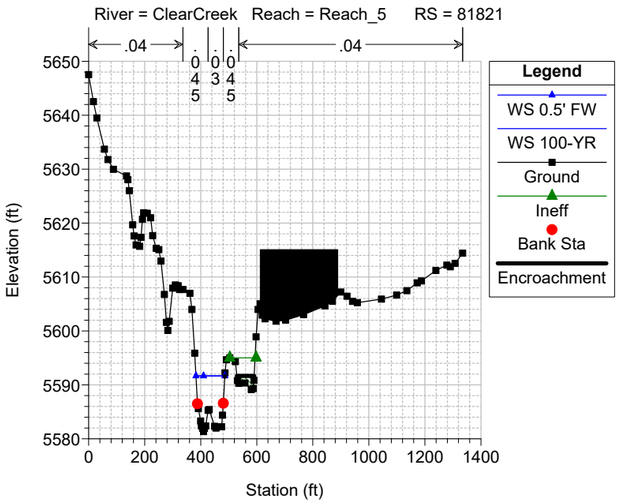

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82371
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

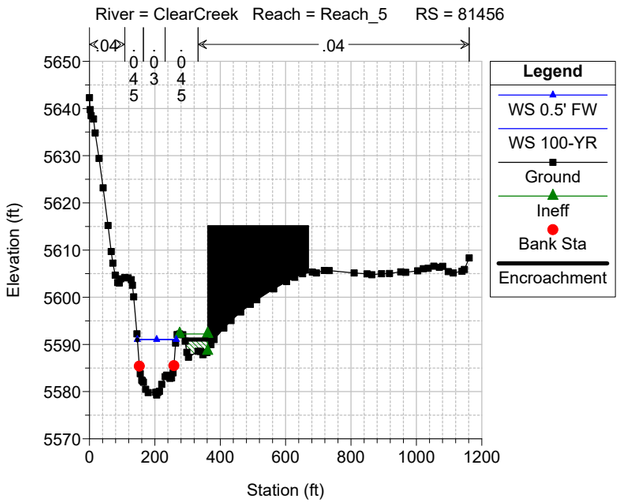
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82208


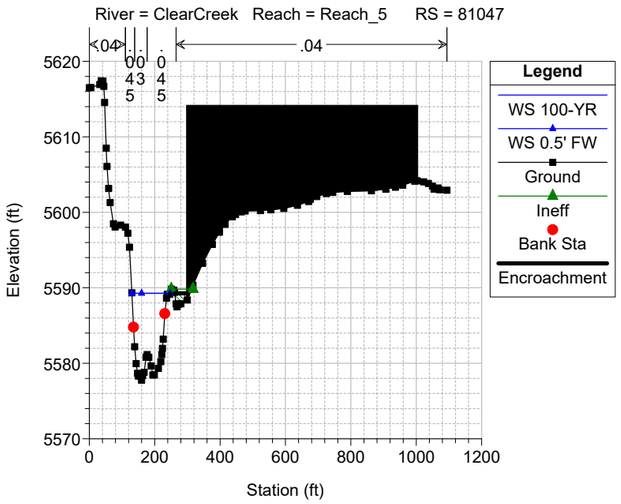
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82141


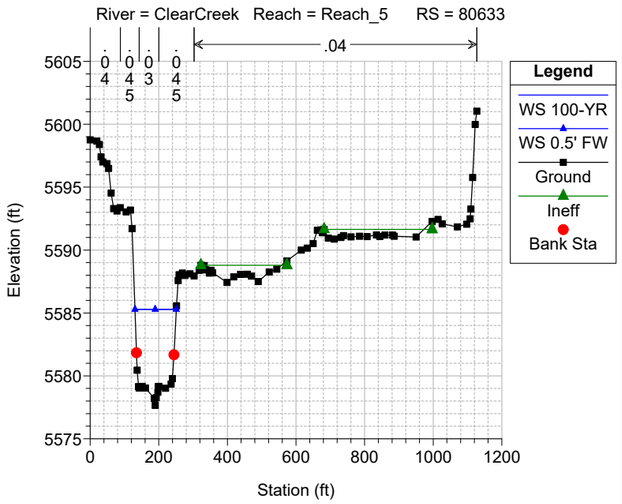
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82107


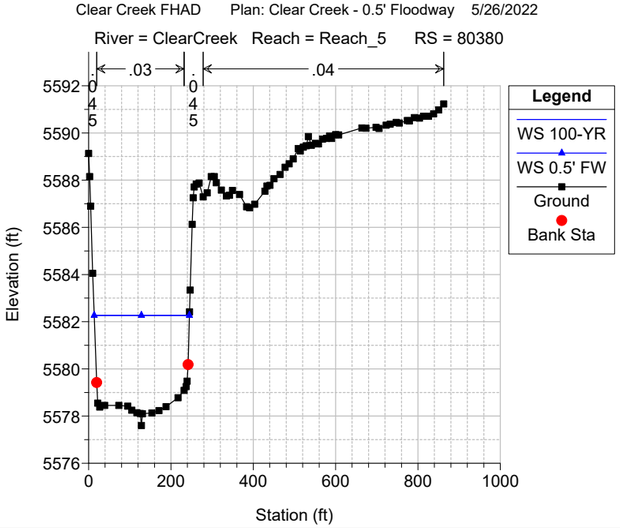
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 82011


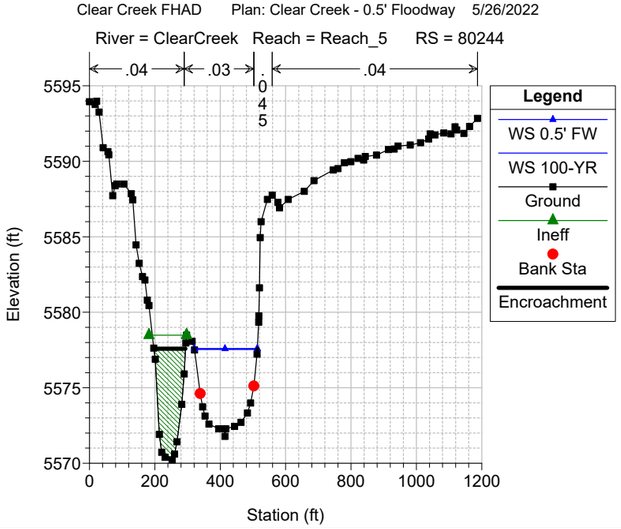
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 81821


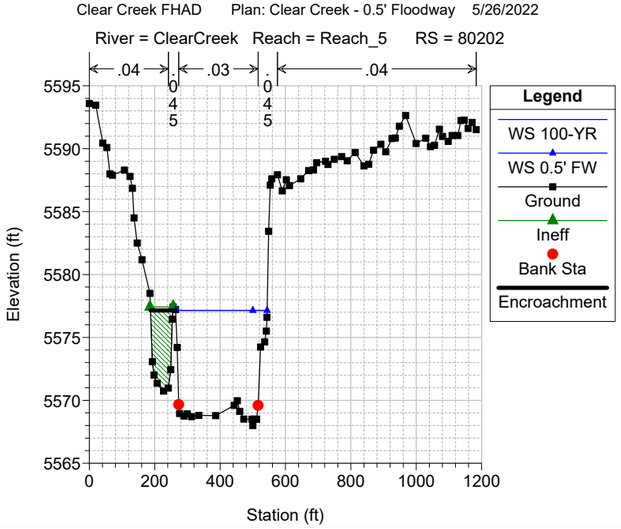
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 81456


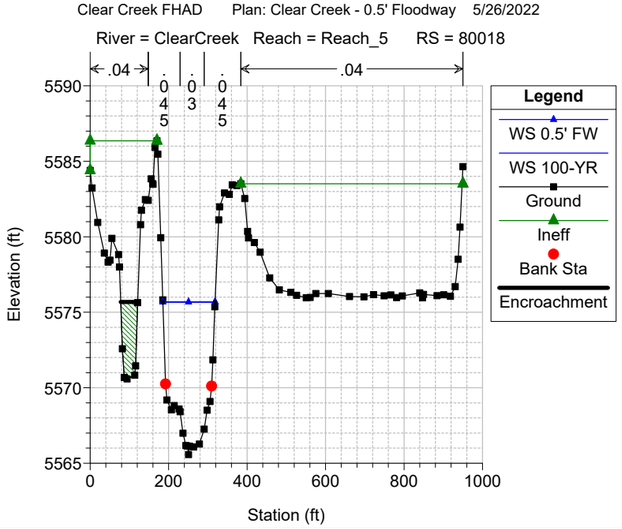
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 81047


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 80633


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 80380


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 80244


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 80202


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 80018


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 79610
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 79217
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 79141
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 79129
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 78946
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 78846
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 78803
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 78728
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta

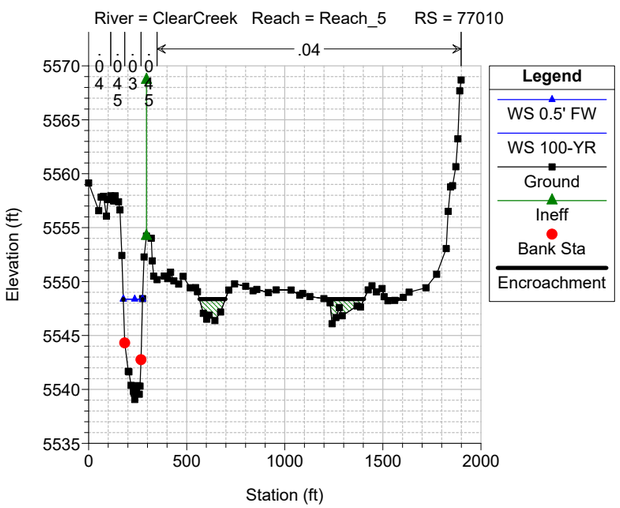
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 78717 Thalweg adjusted per survey point.
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 78228
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta

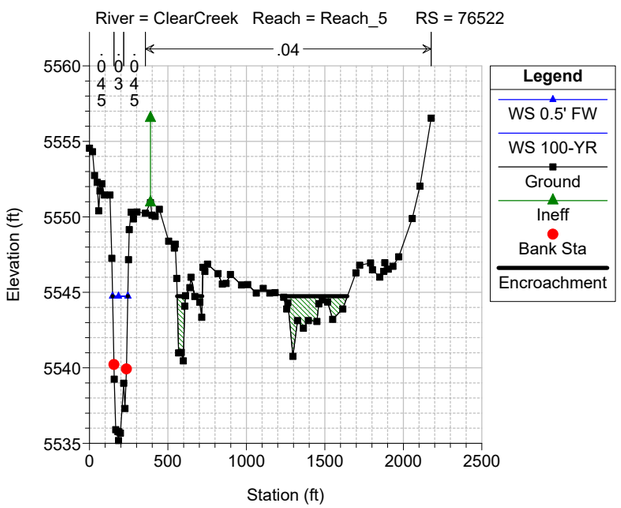
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 77804
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 77427
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

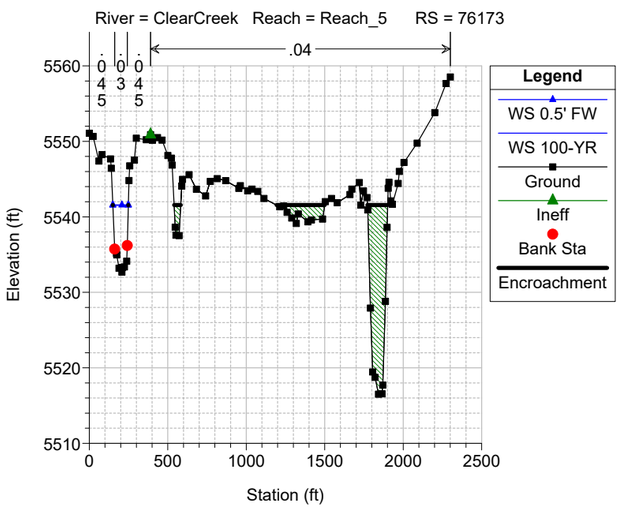
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 77010



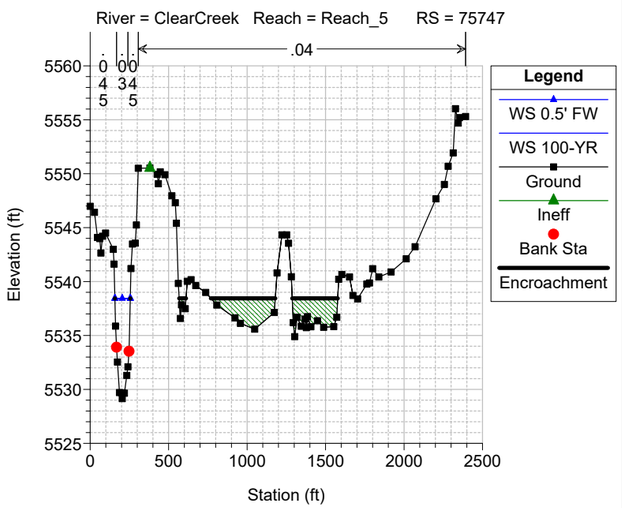
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 76522



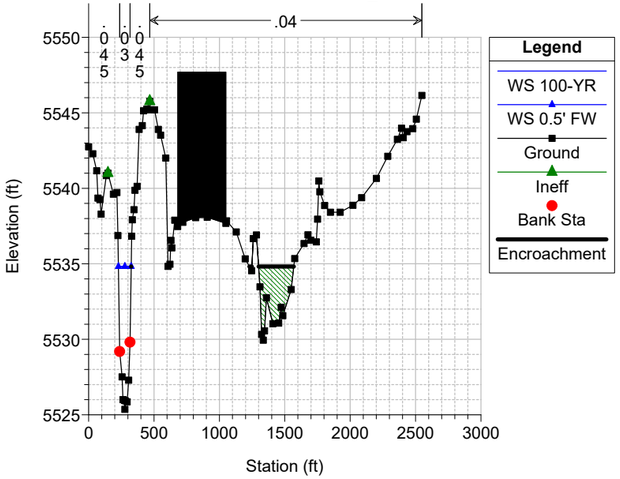
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 76173



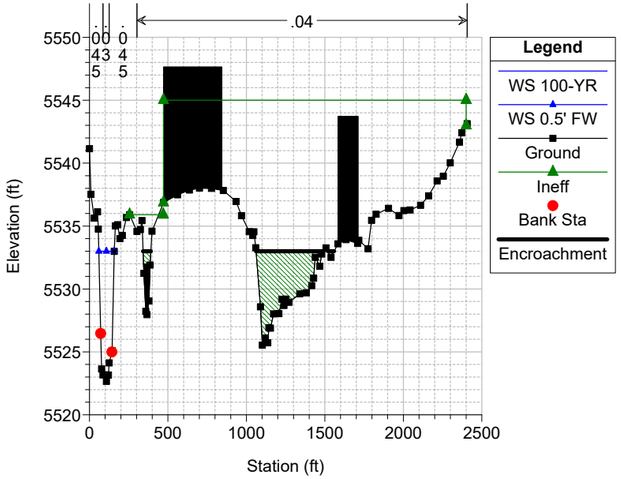
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 75747



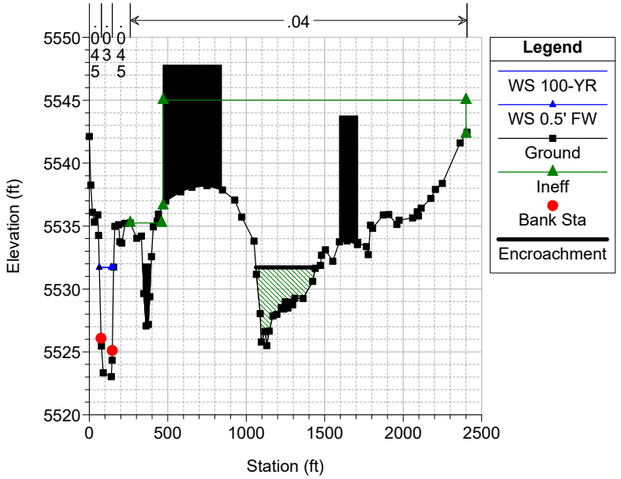
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 75333



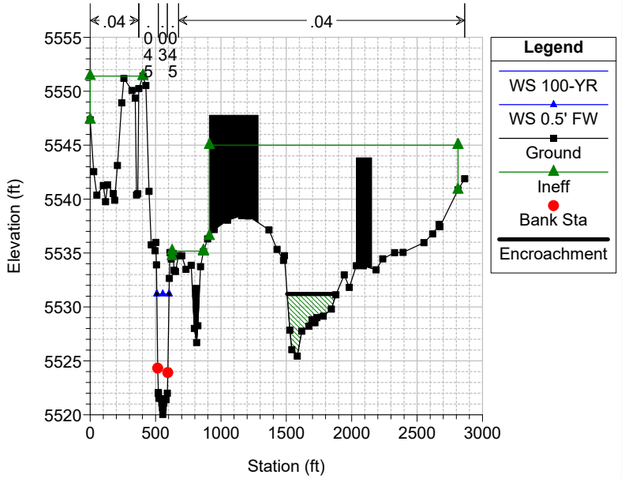
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74940



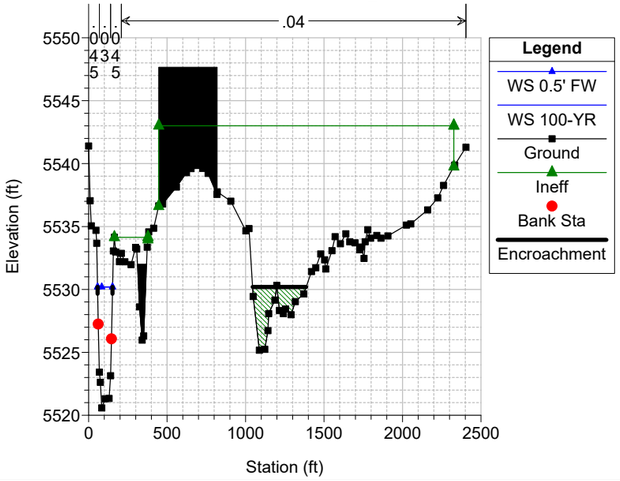
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74916



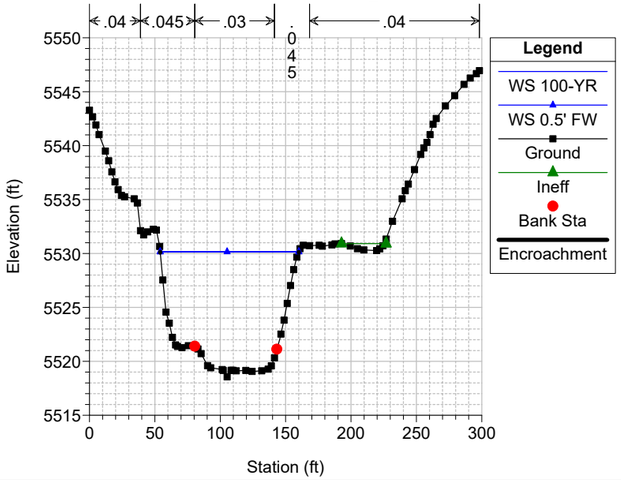
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74891



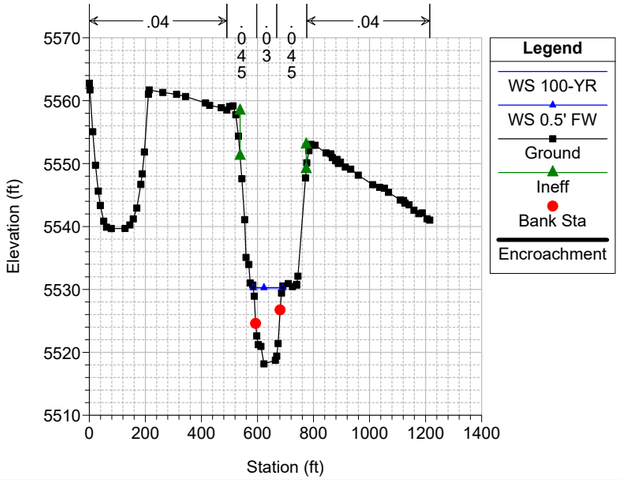
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74808



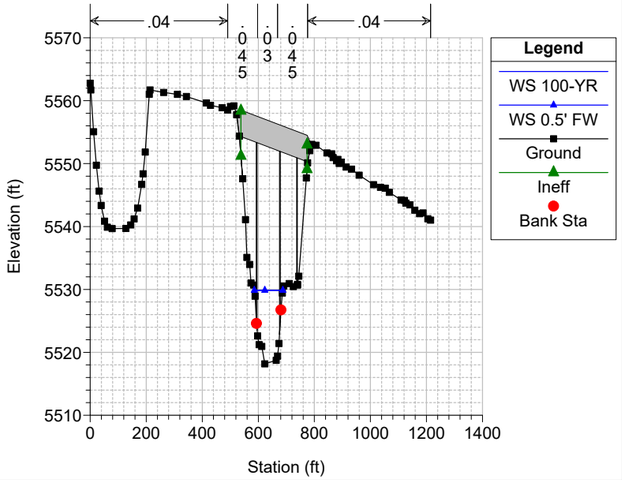
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74619

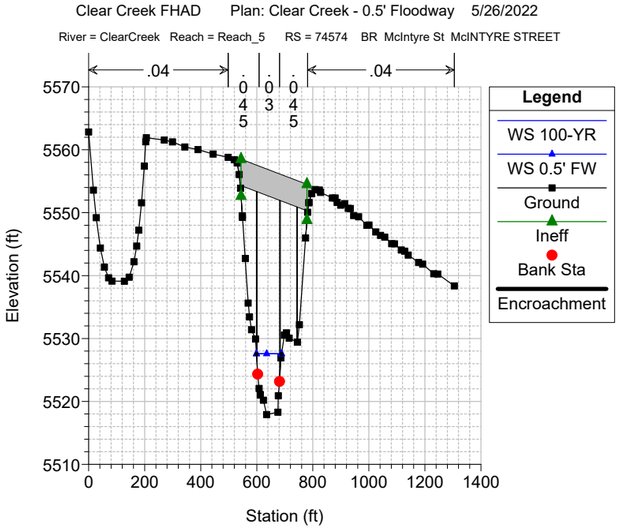


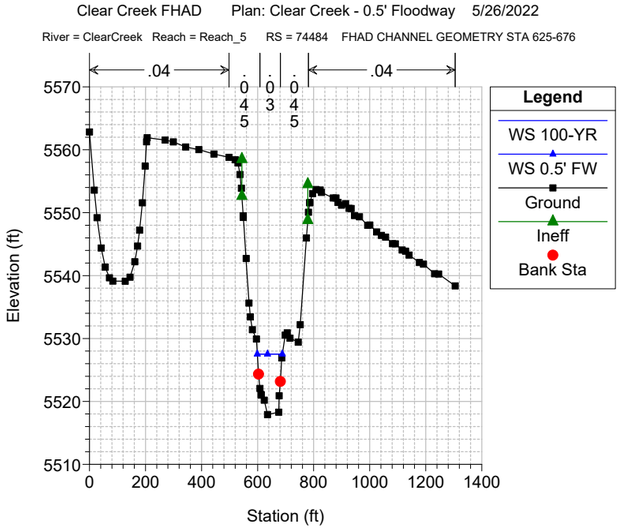
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74583 FHAD CHANNEL GEOMETRY USED 614-668

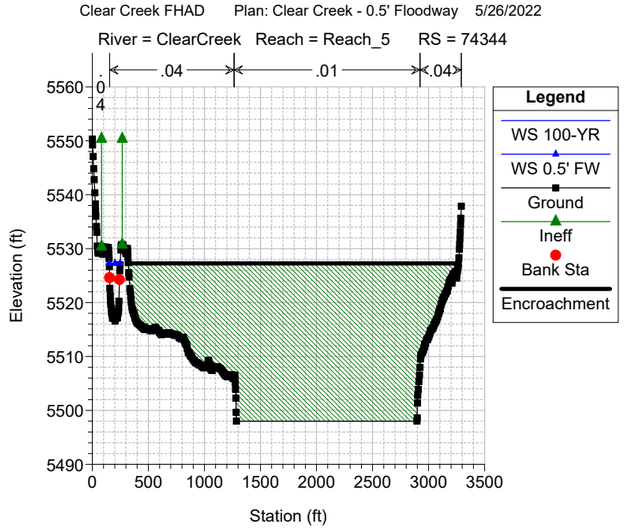


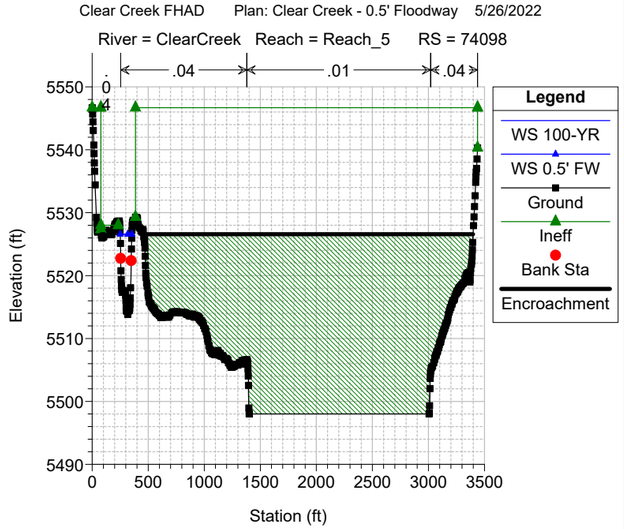
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74574 BR McIntyre St McINTYRE STREET

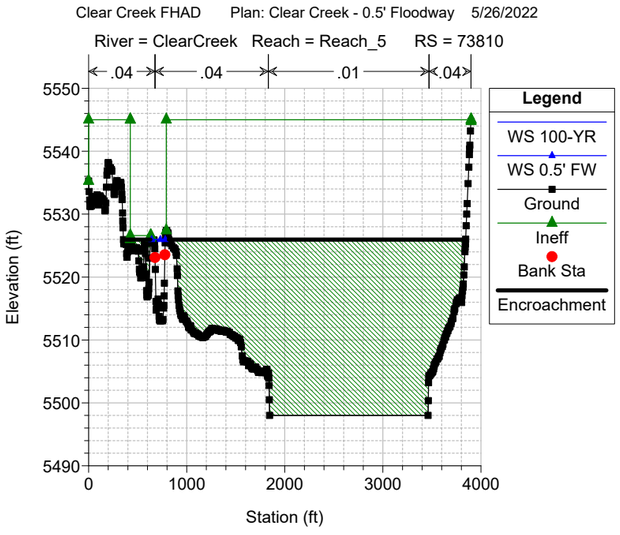


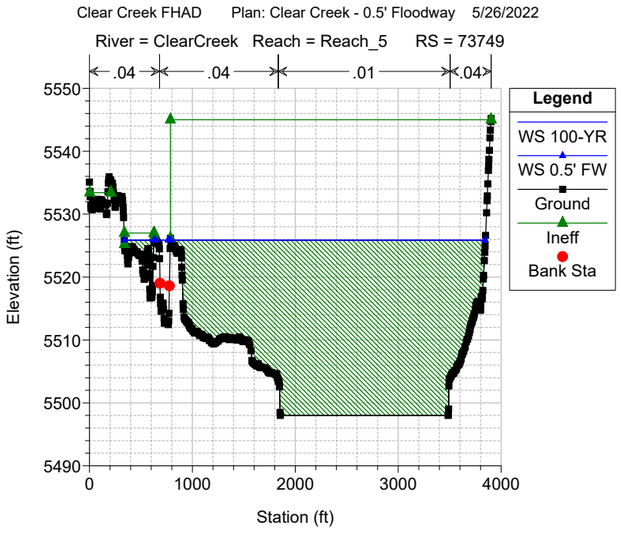

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74574 BR McIntyre St McINTYRE STREET
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

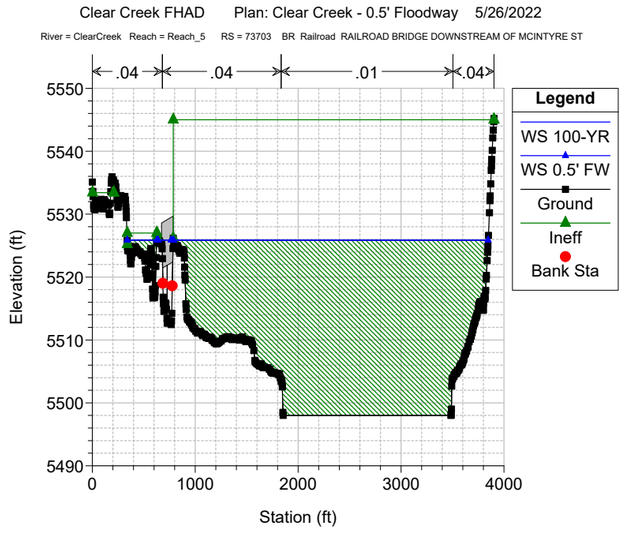

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74484 FHAD CHANNEL GEOMETRY STA 625-676
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta

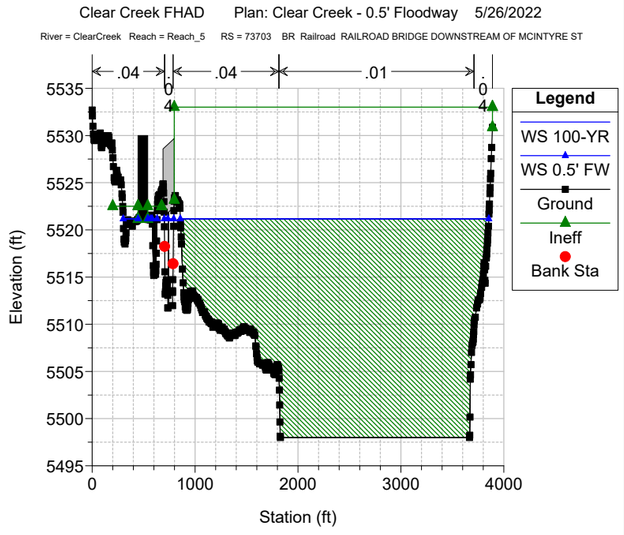

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74344
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

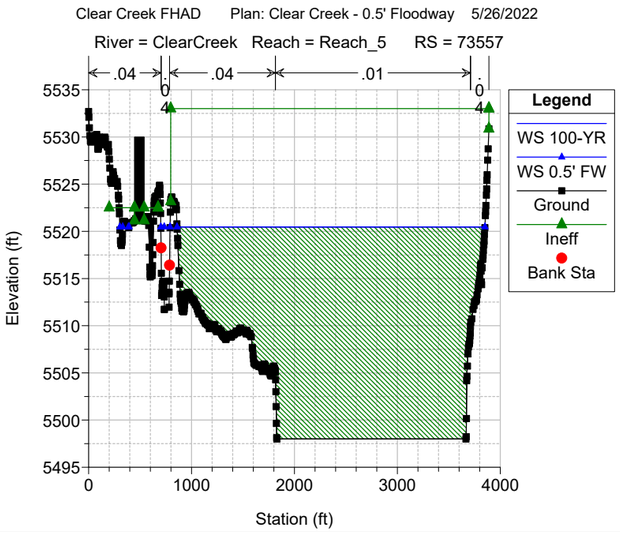

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 74098
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

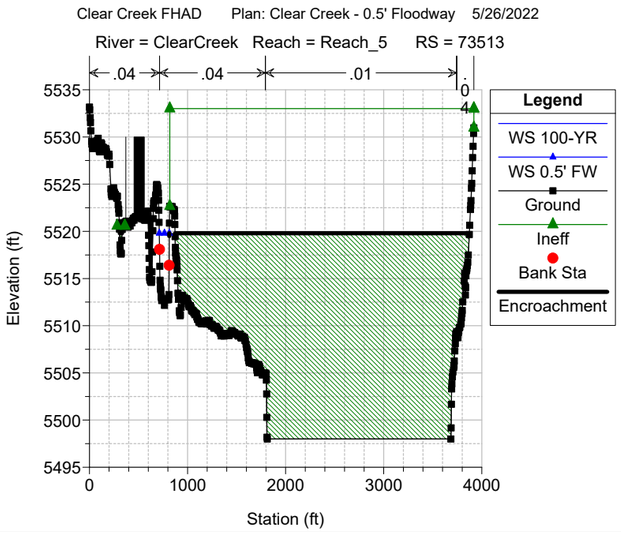

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73810
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

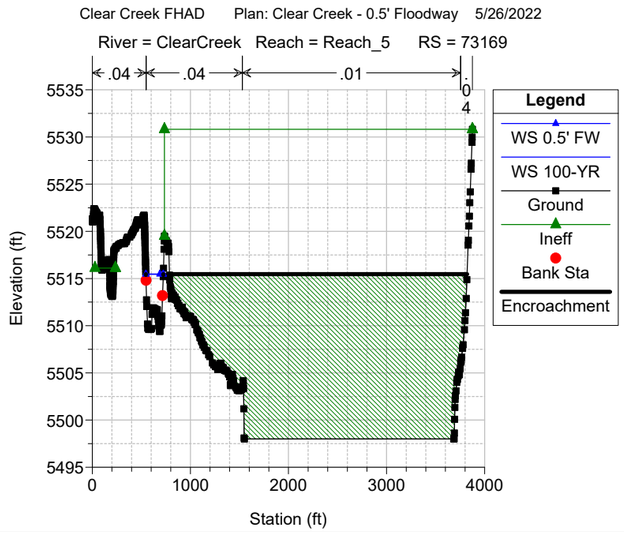

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73749
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

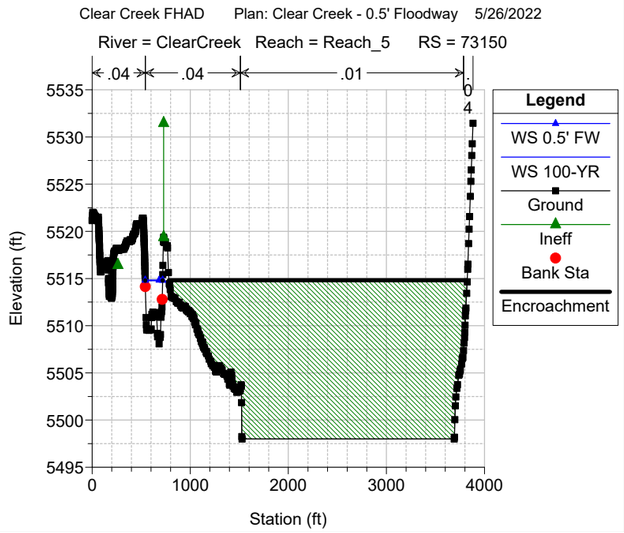

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73703 BR Railroad RAILROAD BRIDGE DOWNSTREAM OF MCINTYRE ST
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

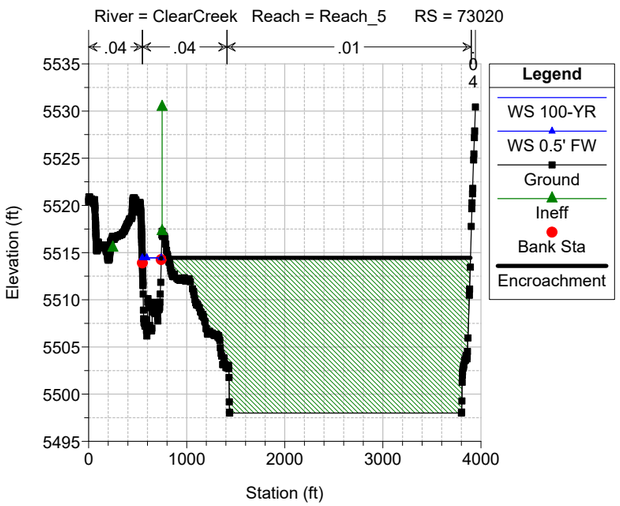

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73703 BR Railroad RAILROAD BRIDGE DOWNSTREAM OF MCINTYRE ST
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

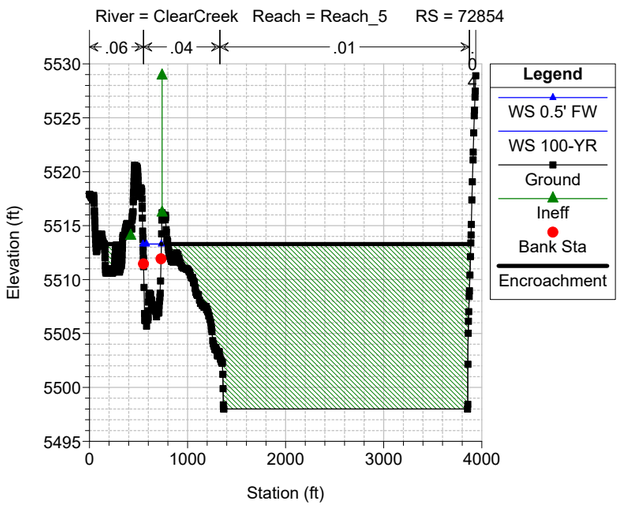

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73557
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

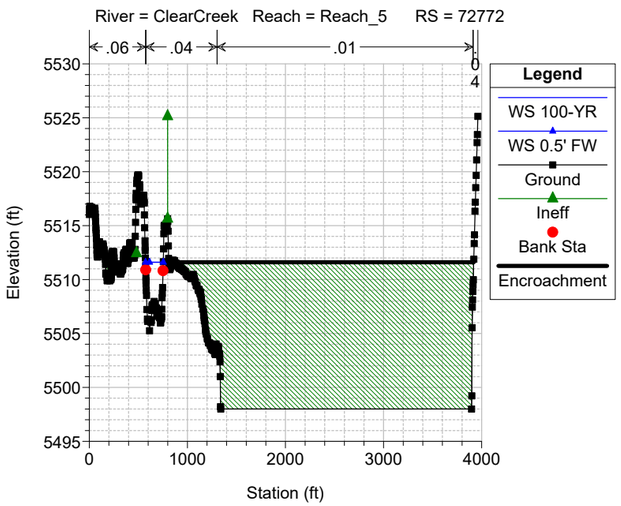

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73513
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

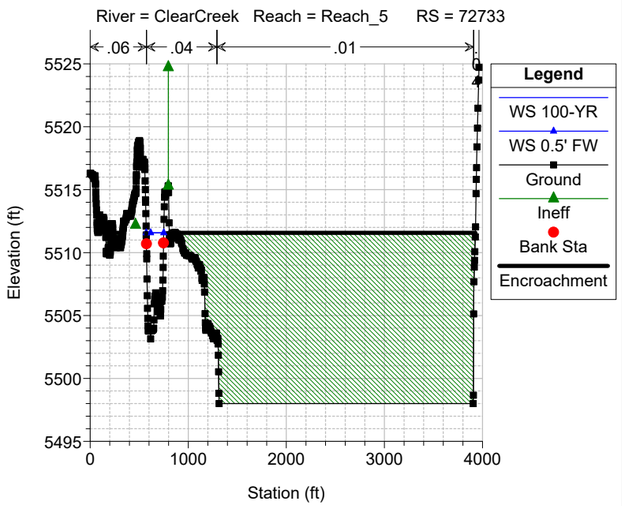

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73169
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

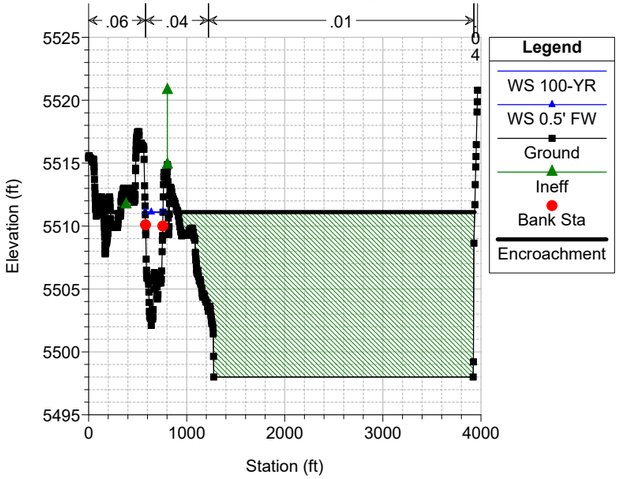

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73150
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

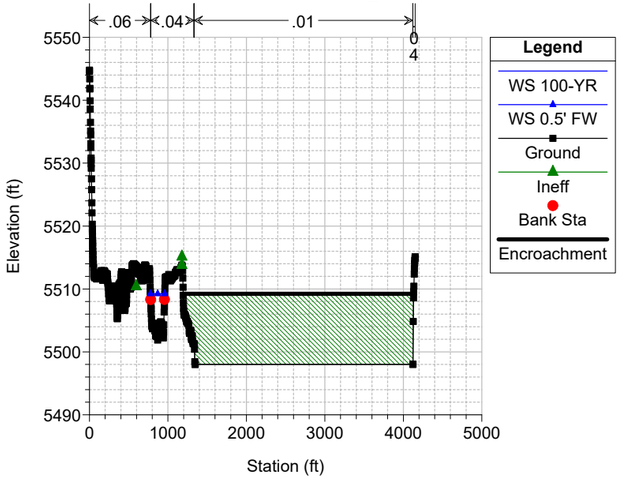
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 73020


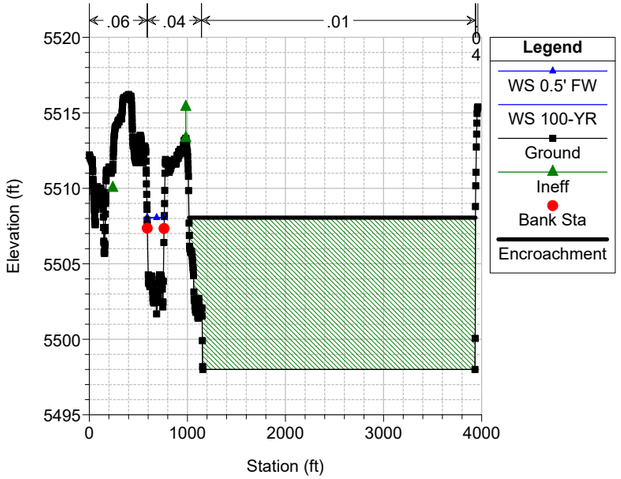
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72854


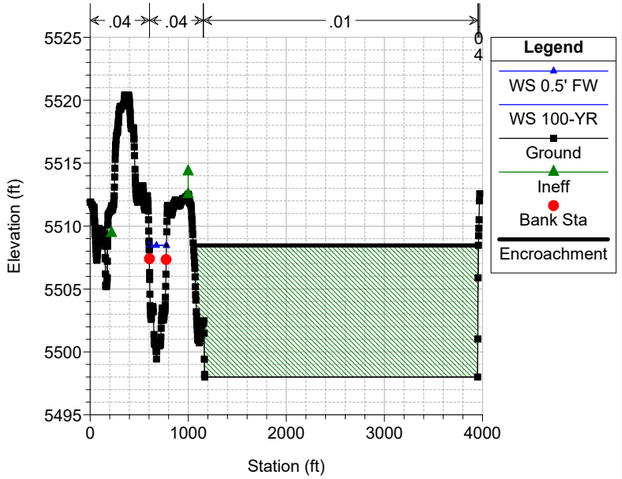
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72772


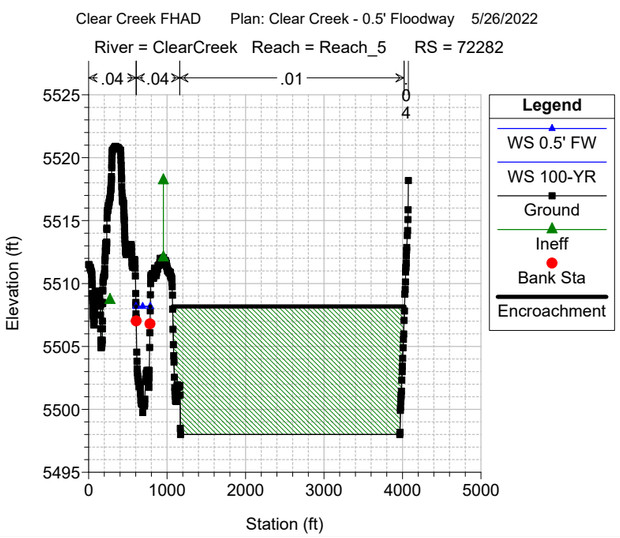
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72733


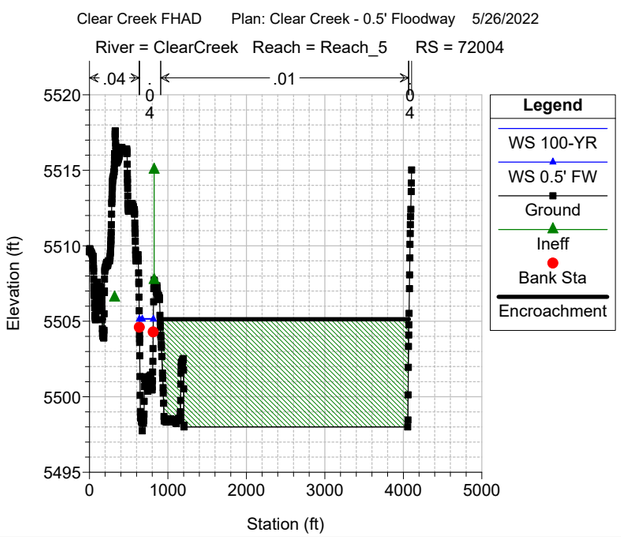
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72656


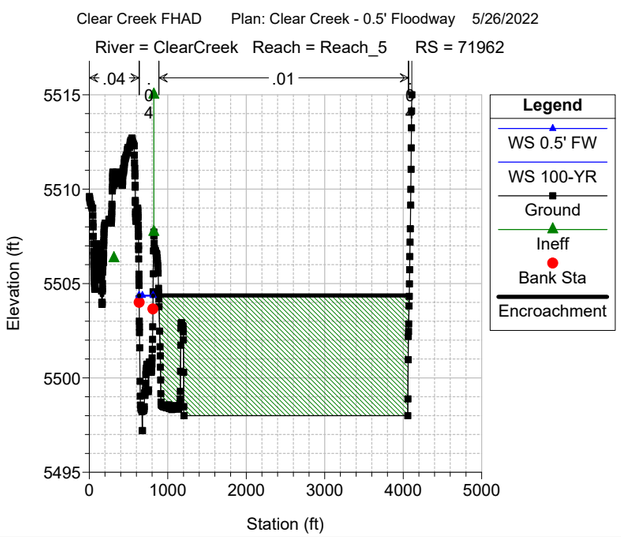
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72411


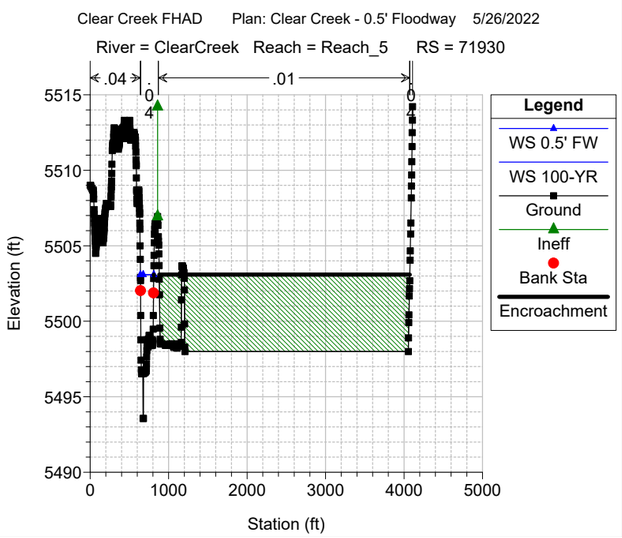
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72377


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72339


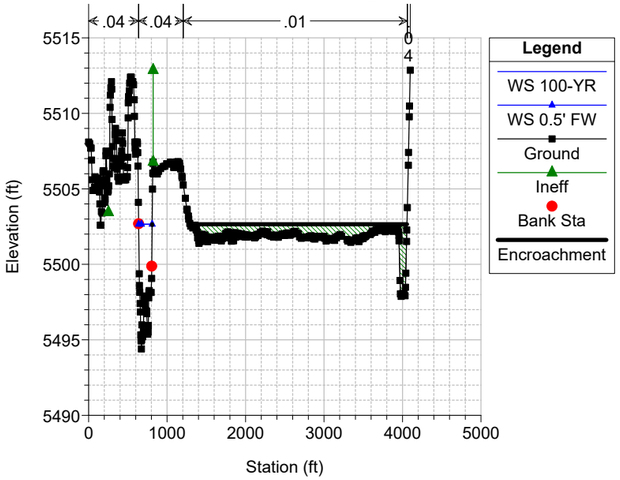
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72282


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 72004


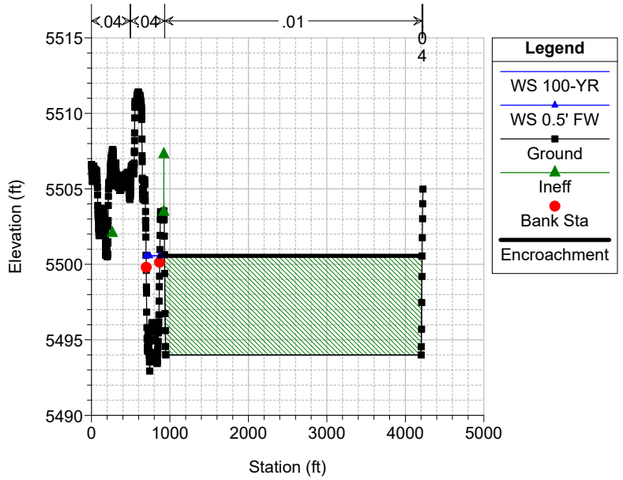
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71962


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71930


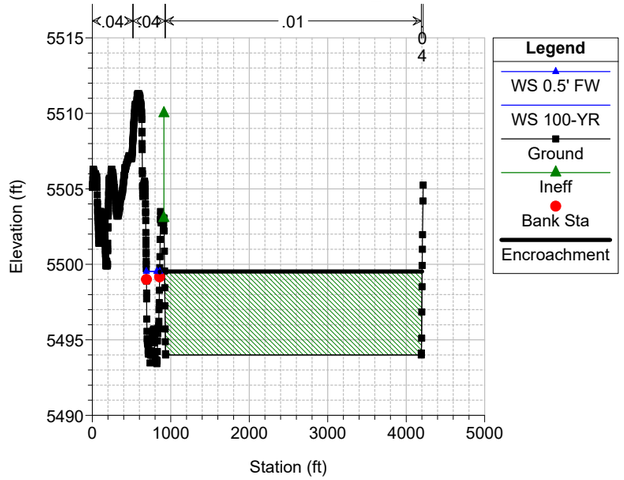
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71865



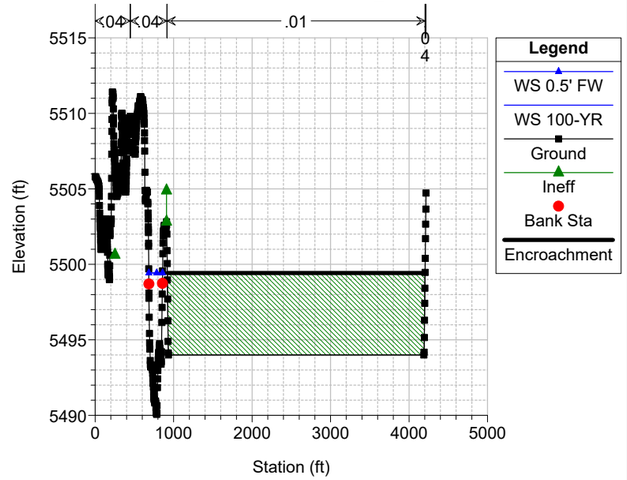
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71596



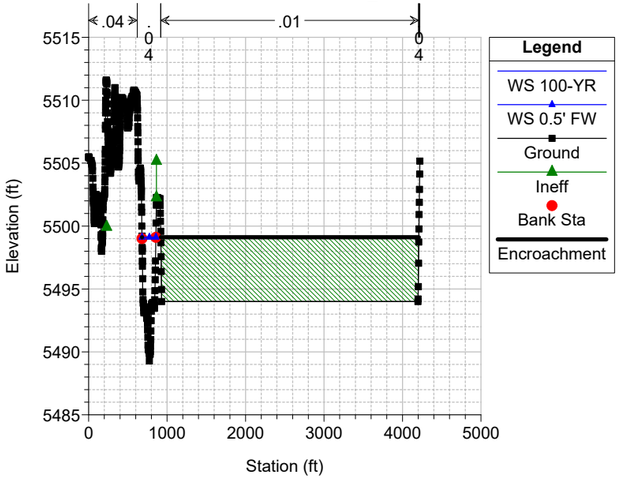
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71570



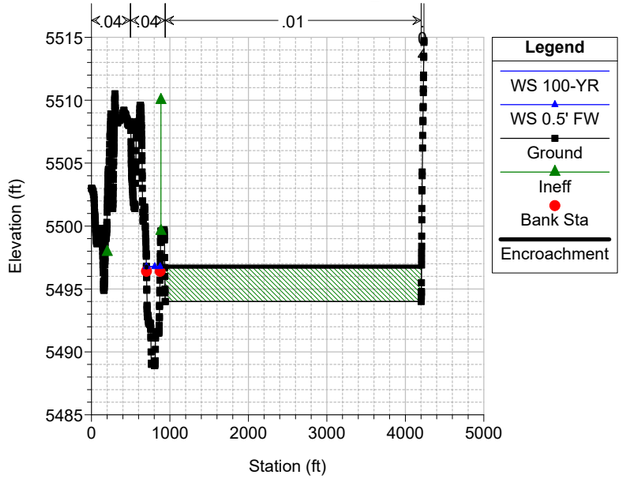
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71505



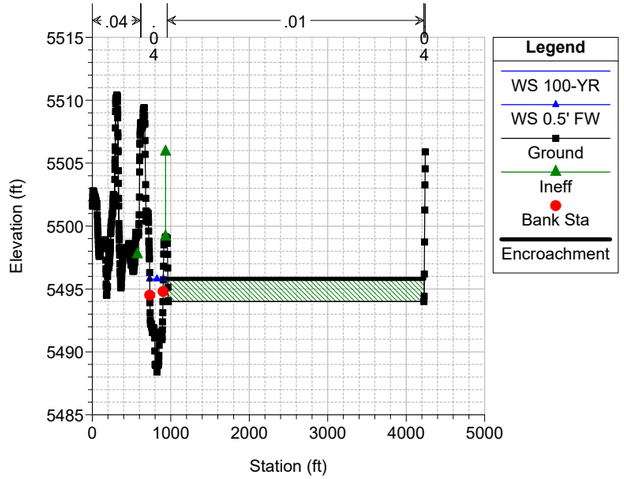
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71462



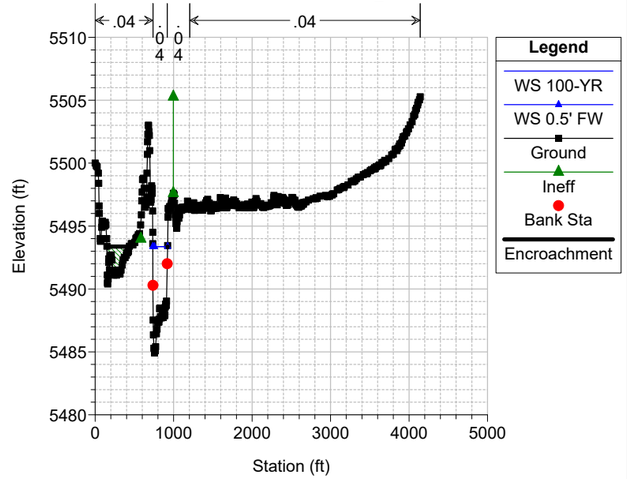
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71155



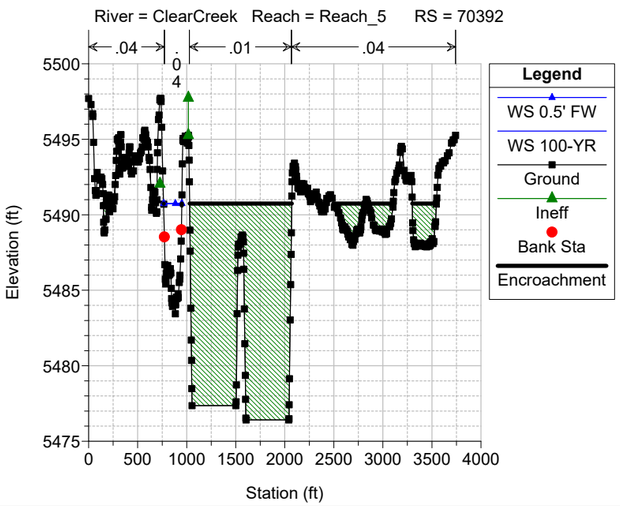
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 71111



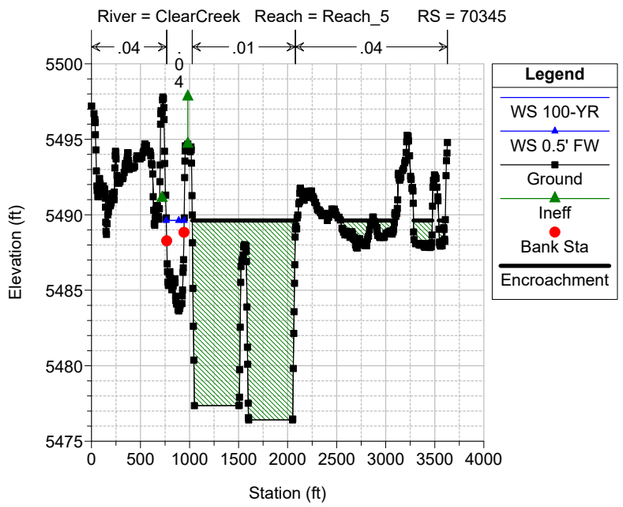
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 70721



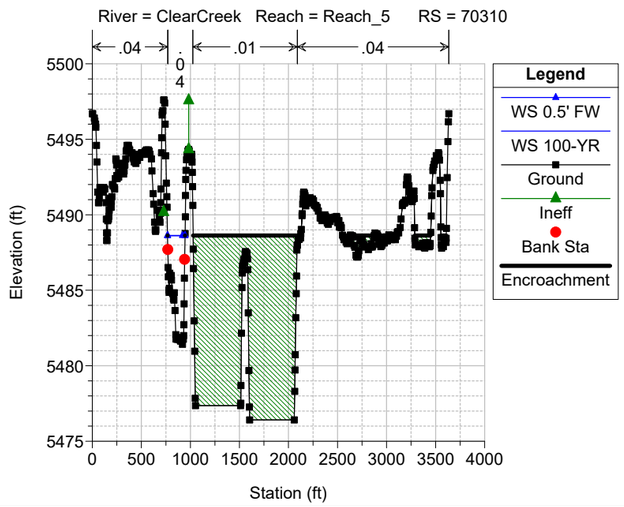
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 70392



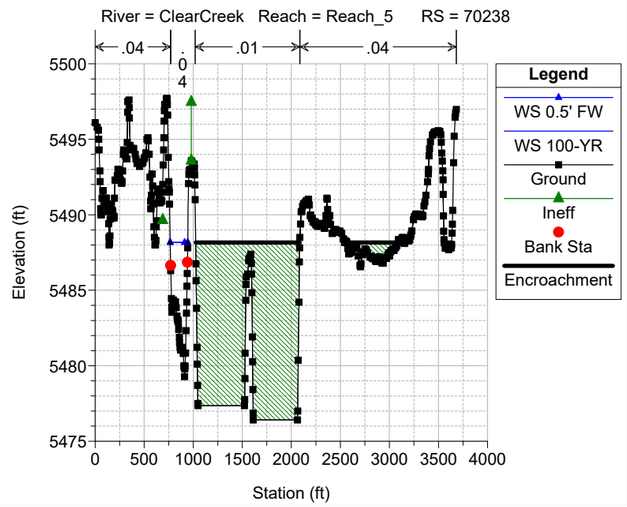
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 70345



Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 70310



Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 70238



Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 69912
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 69192
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 69098
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 69089
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68947
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68669
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68566 Manning's adjusted in LOB to account for large stack of RCPs fou
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

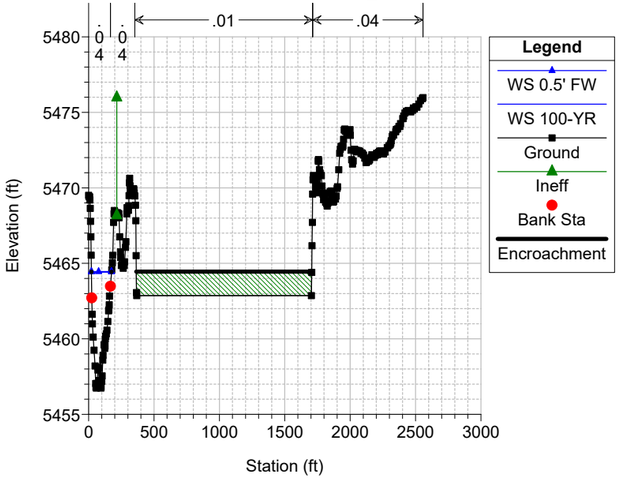
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68535
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

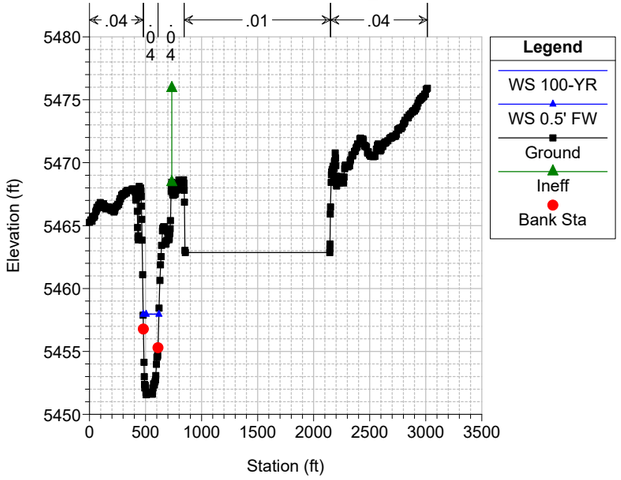
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68522 BR Footbridge FOOTBRIDGE UPSTREAM OF I-70 WESTBOUND
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

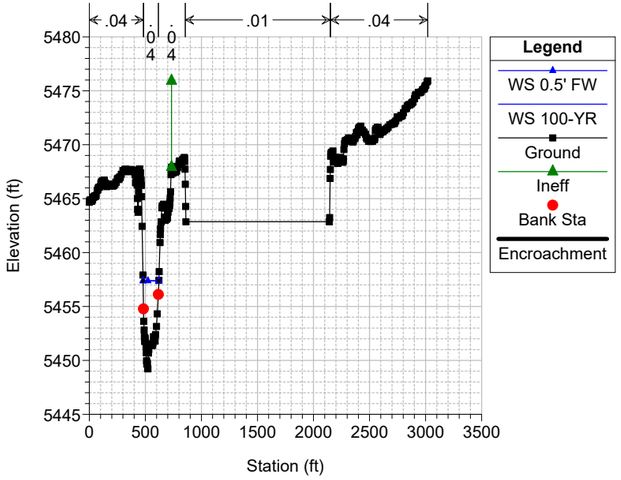
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68522 BR Footbridge FOOTBRIDGE UPSTREAM OF I-70 WESTBOUND
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

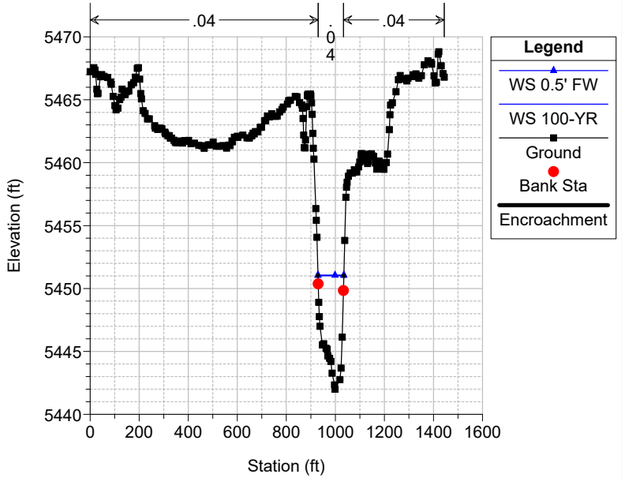
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68494
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

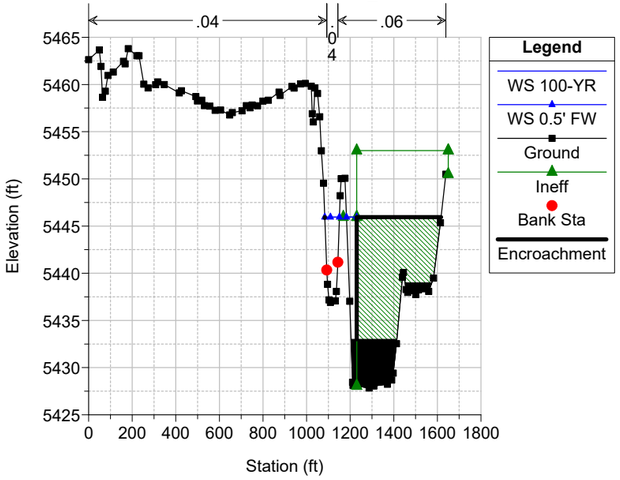
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68327
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

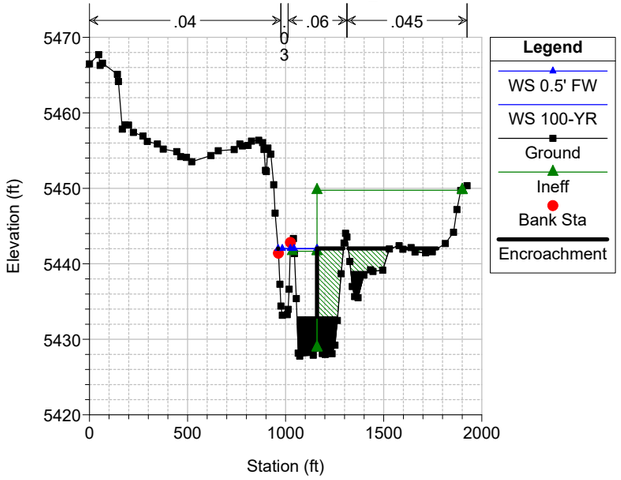
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68216


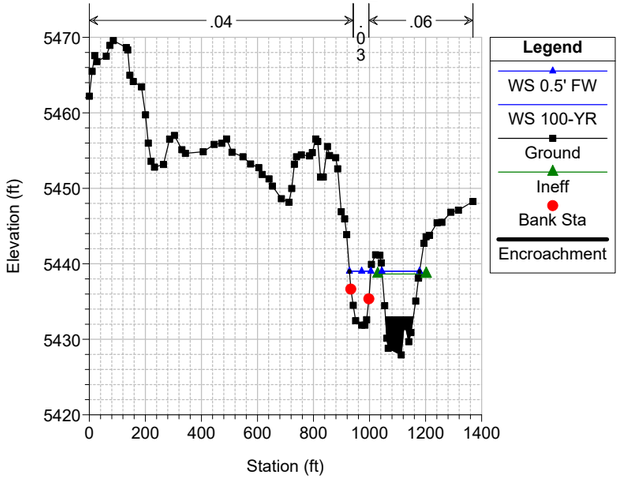
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68136


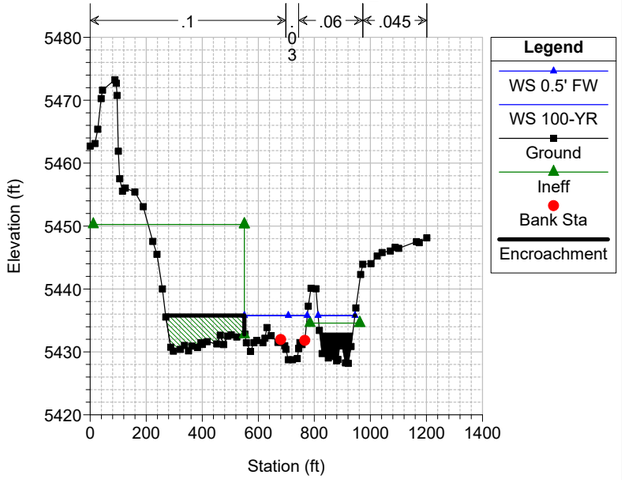
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 68123


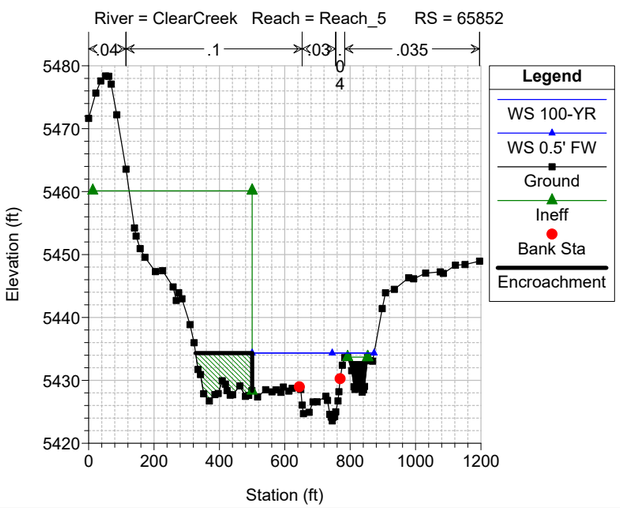
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 67953


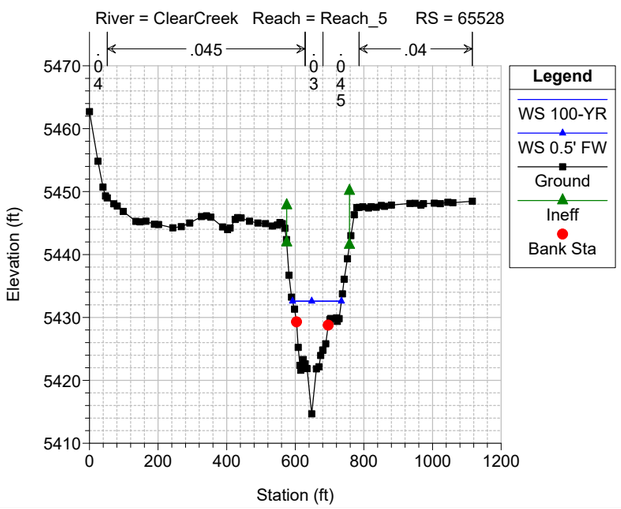
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 67460


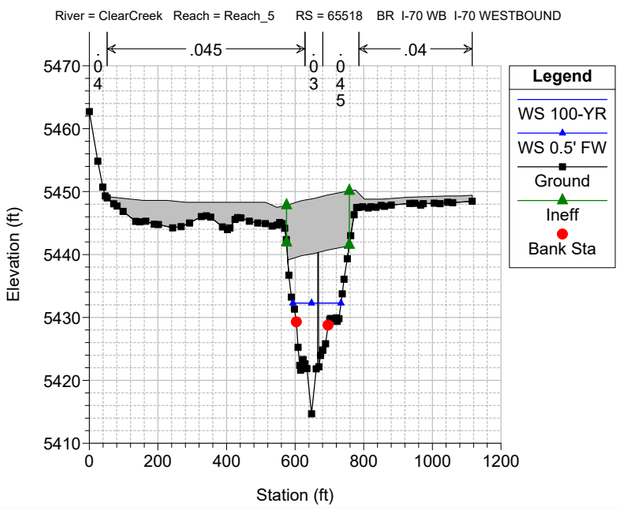
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 67024


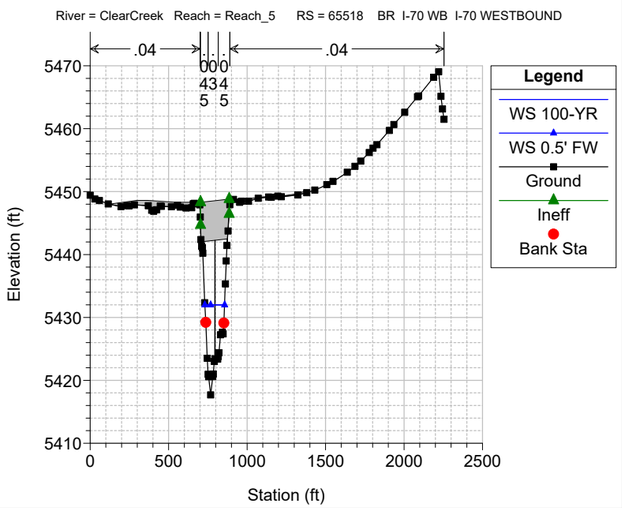
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 66656


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 66246


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 65852


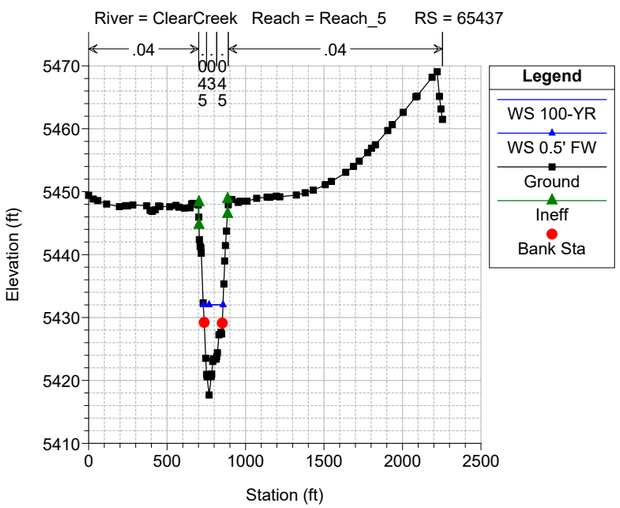
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 65528


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 65518 BR I-70 WB I-70 WESTBOUND


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 65518 BR I-70 WB I-70 WESTBOUND


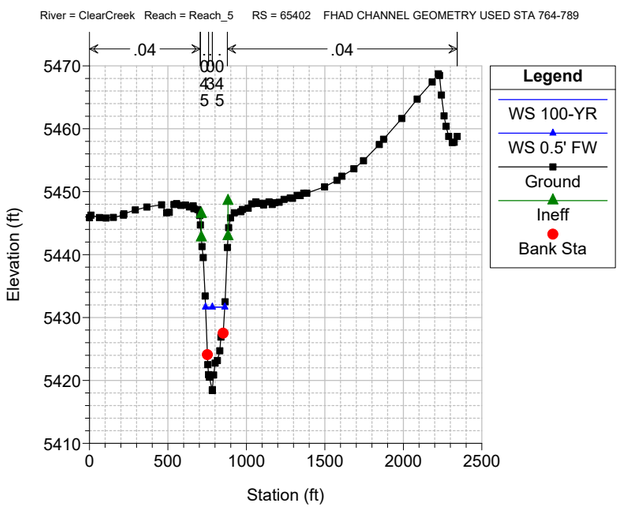
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65437



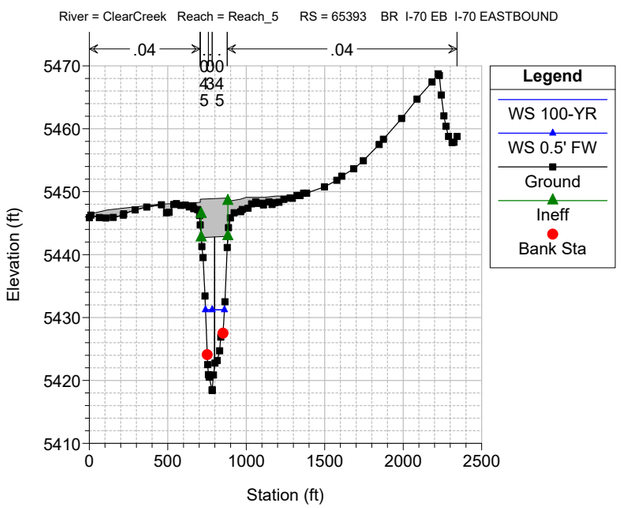
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65402 FHAD CHANNEL GEOMETRY USED STA 764-789



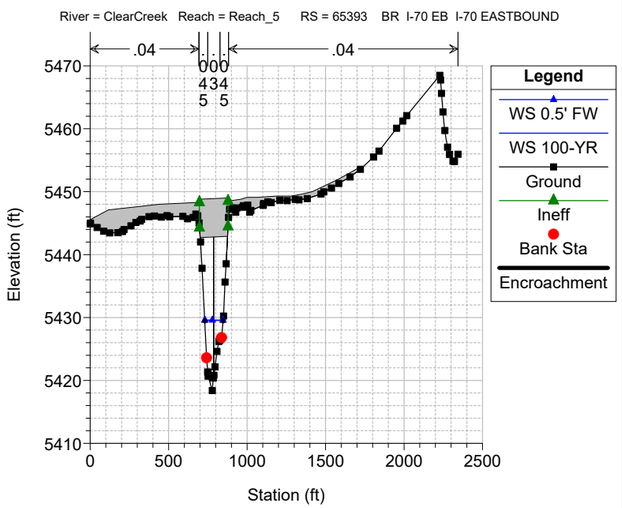
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65393 BR I-70 EB I-70 EASTBOUND



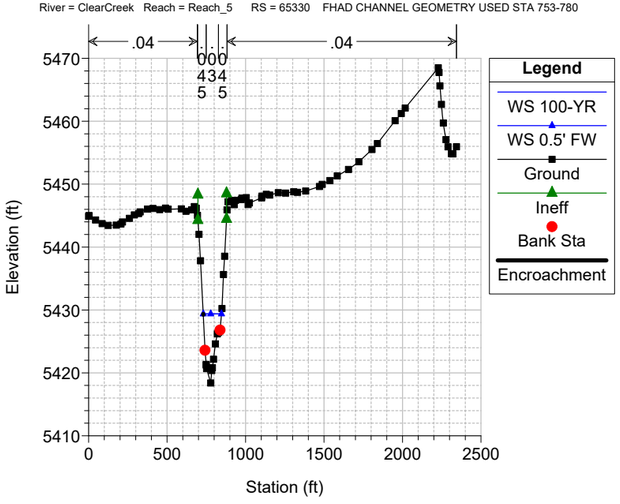
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65393 BR I-70 EB I-70 EASTBOUND



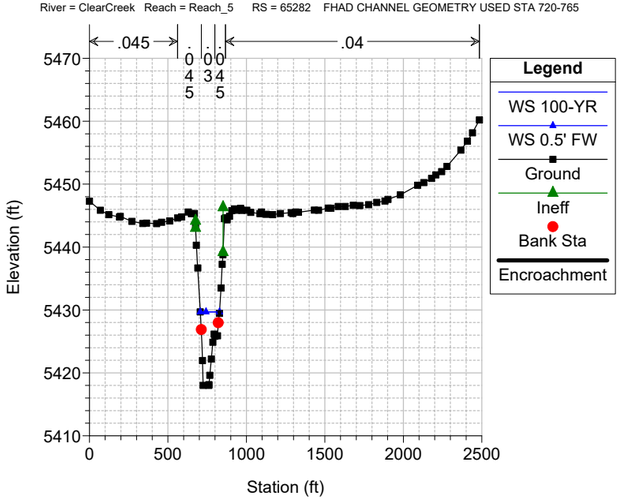
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65330 FHAD CHANNEL GEOMETRY USED STA 753-780



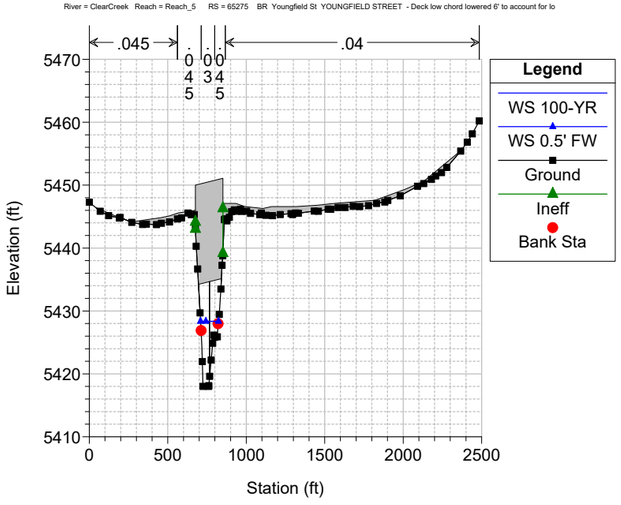
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65282 FHAD CHANNEL GEOMETRY USED STA 720-765



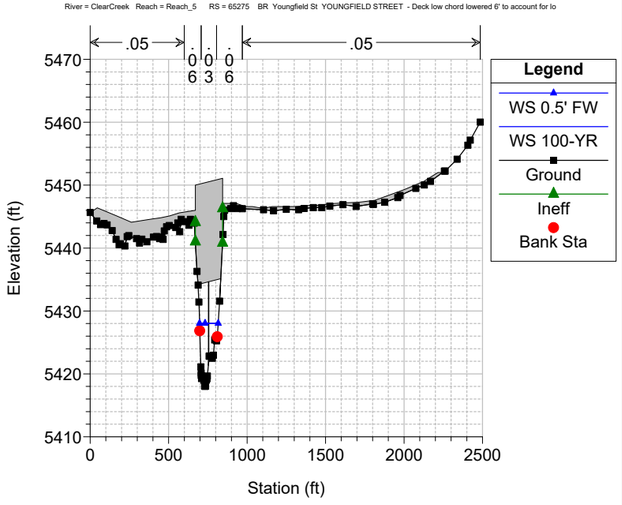
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65275 BR Youngfield St YOUNGFIELD STREET - Deck low chord lowered 6' to account for lo



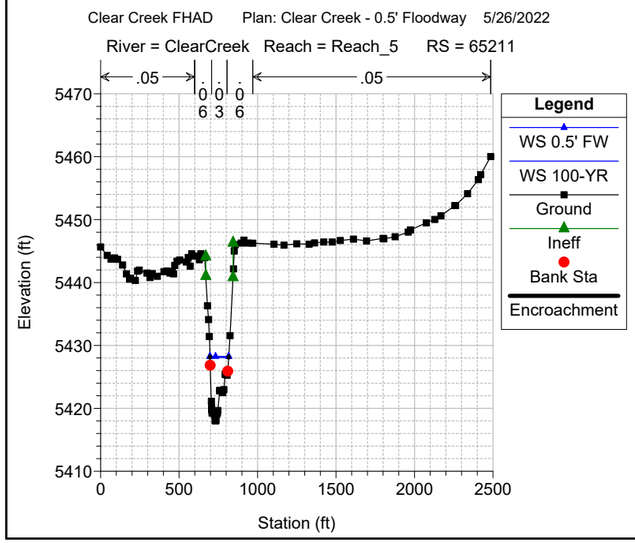
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65275 BR Youngfield St YOUNGFIELD STREET - Deck low chord lowered 6' to account for lo



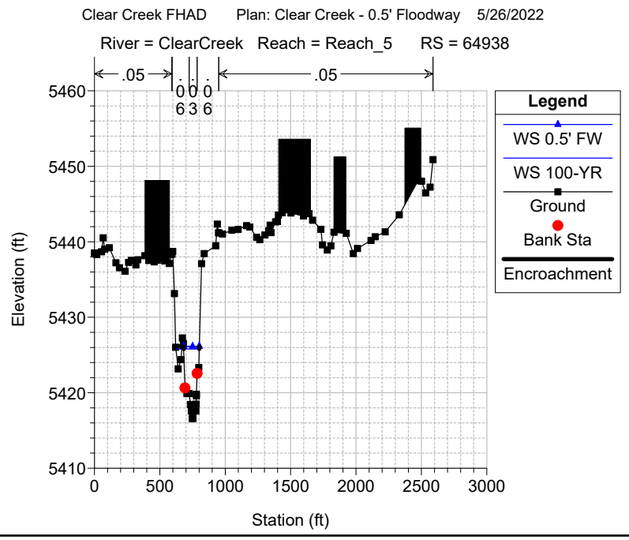
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 65211



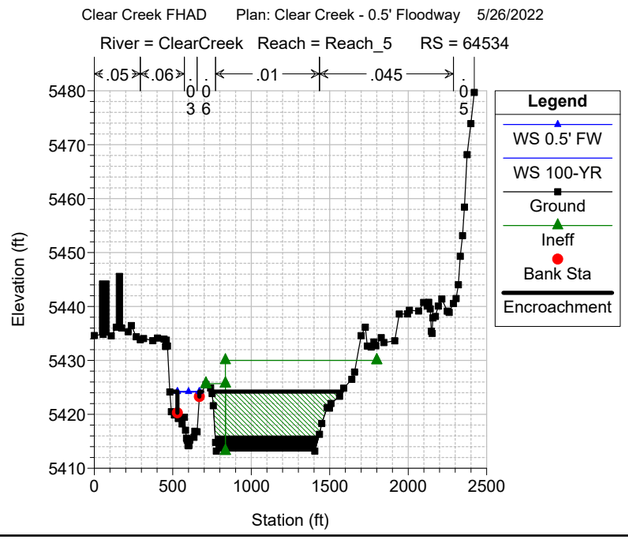
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 64938



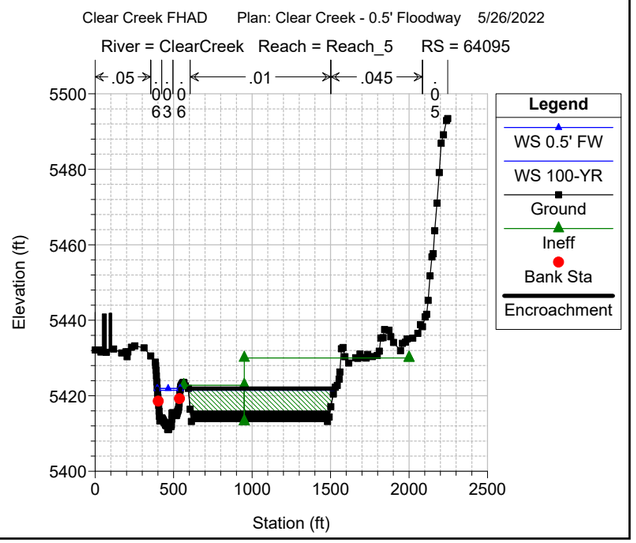
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 64534



Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_5 RS = 64095



Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 63718
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 63333
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 63271
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 63262 BR Footbridge FOOTBRIDGE DOWNSTREAM OF YOUNGFIELD ST.
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 63262 BR Footbridge FOOTBRIDGE DOWNSTREAM OF YOUNGFIELD ST.
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 63243
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 63054
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

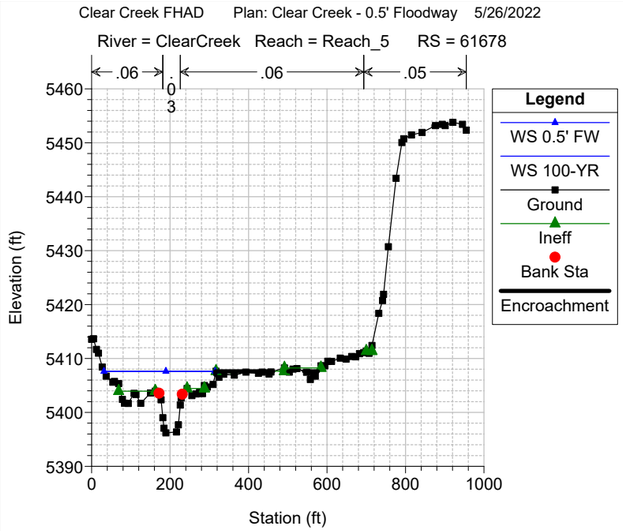
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 62718
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

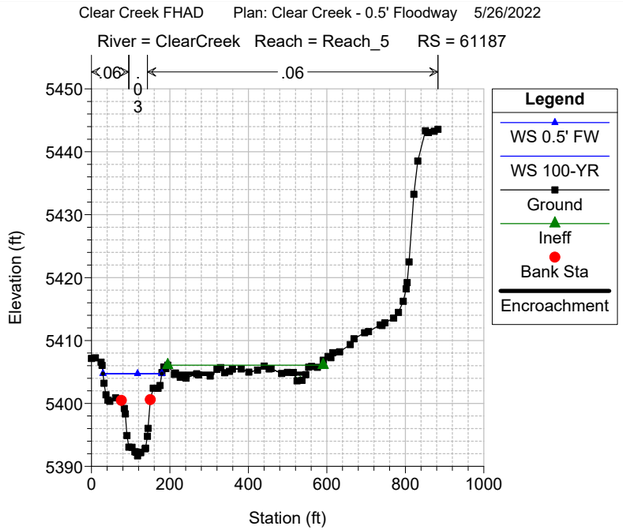
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 62640
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

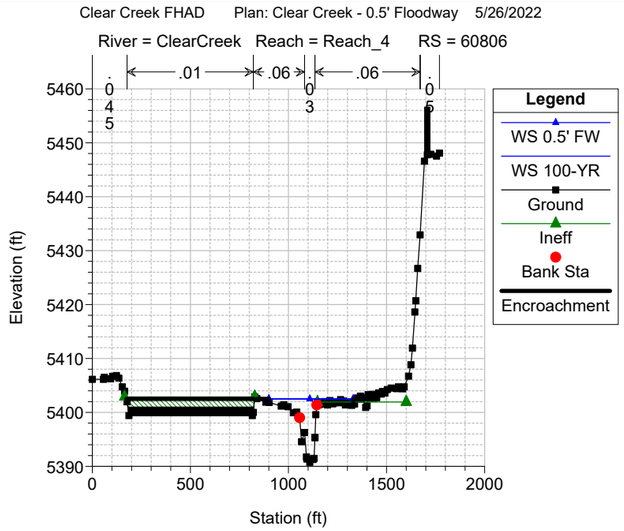
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 62484
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

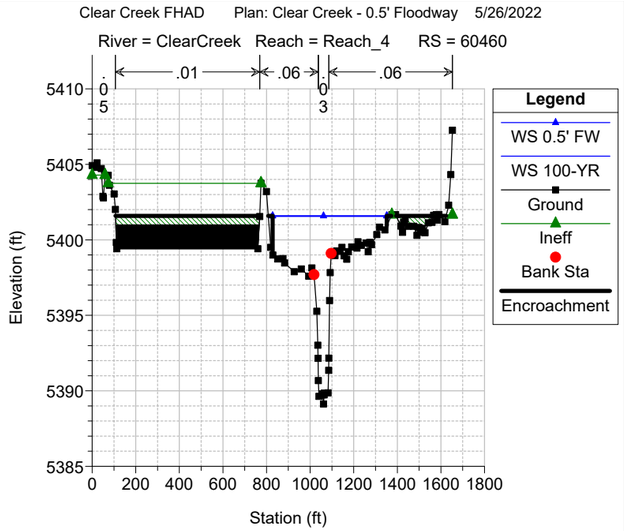
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 62206
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

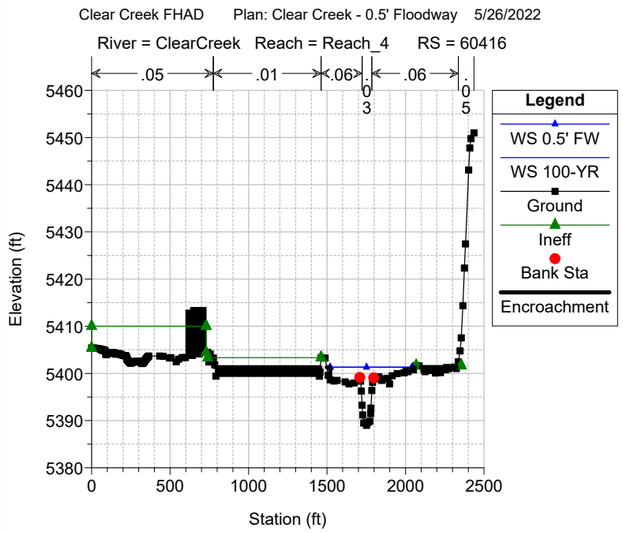
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 62067
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

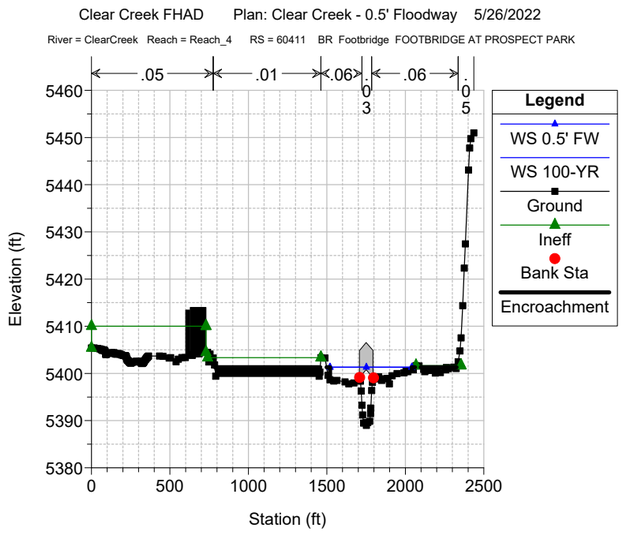

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 61678
.06 .03 .06 .06 .05
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

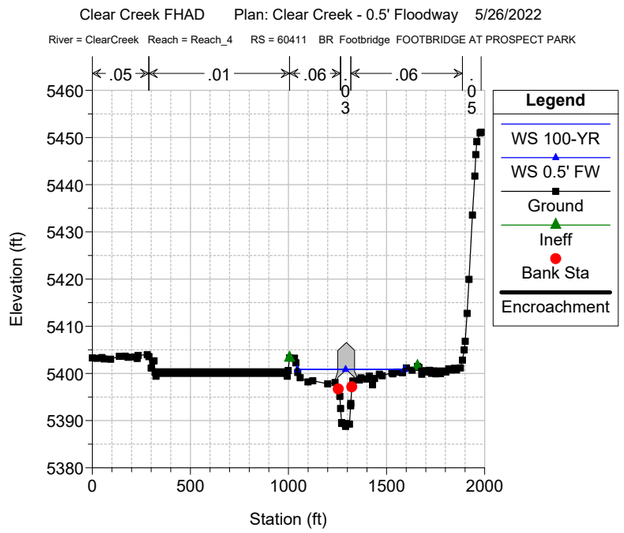

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_5 RS = 61187
.06 .03 .06
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

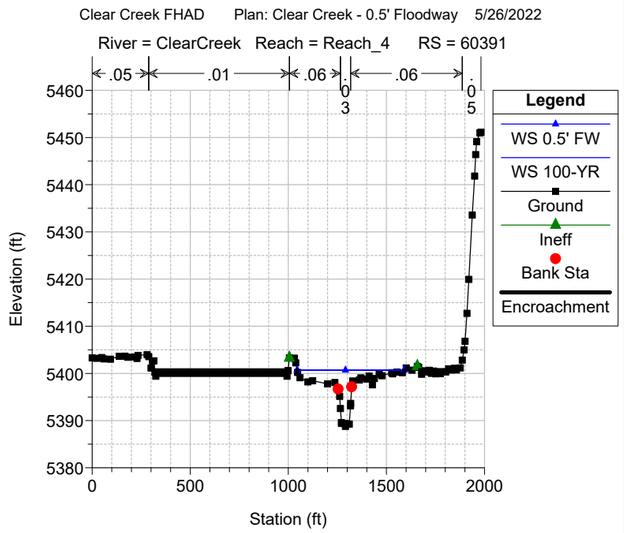

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60806
.045 .01 .06 .03 .06 .05
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

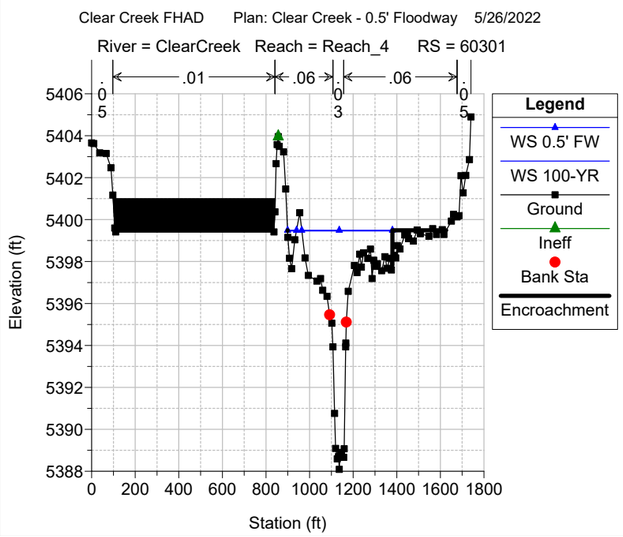

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60460
.05 .01 .06 .03 .06
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

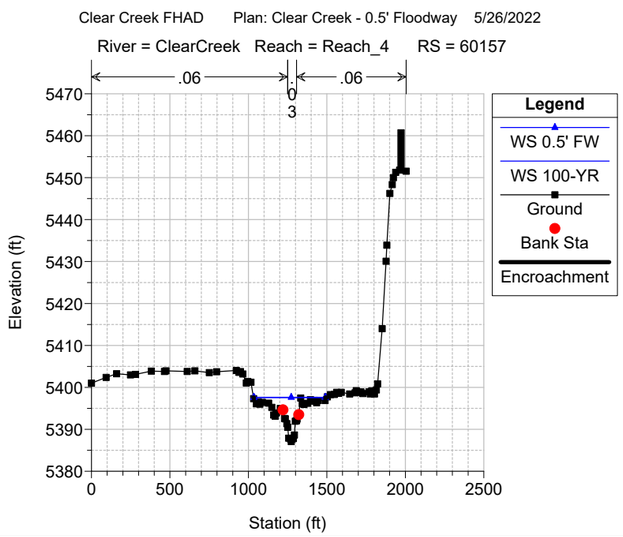

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60416
.05 .01 .06 .03 .06 .05
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

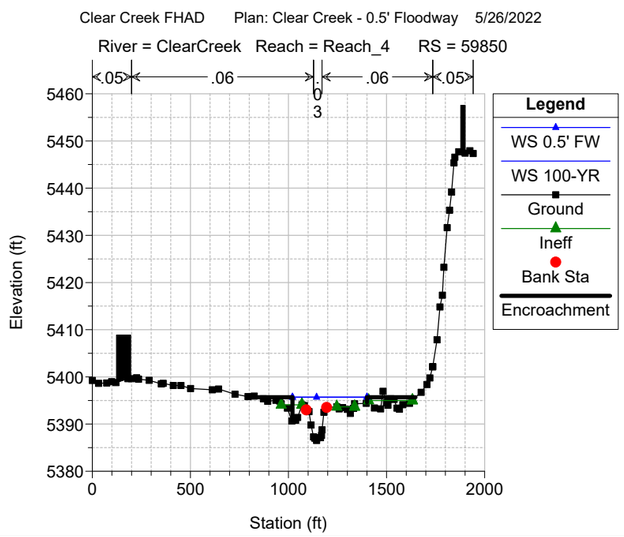

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60411 BR Footbridge FOOTBRIDGE AT PROSPECT PARK
.05 .01 .06 .03 .06 .05
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

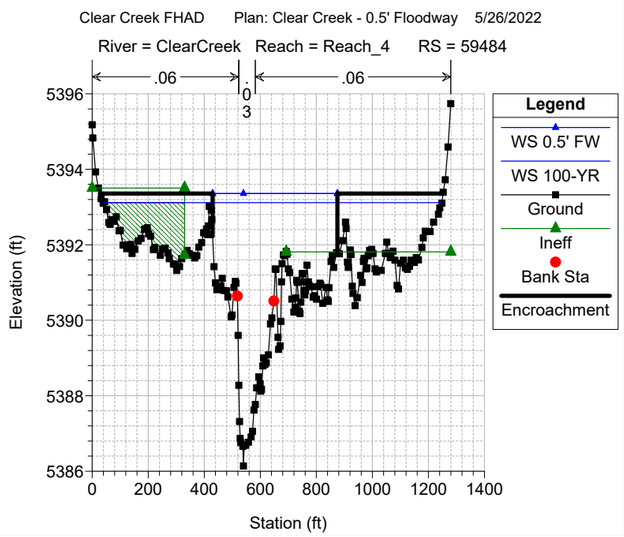

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60411 BR Footbridge FOOTBRIDGE AT PROSPECT PARK
.05 .01 .06 .03 .06 .05
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

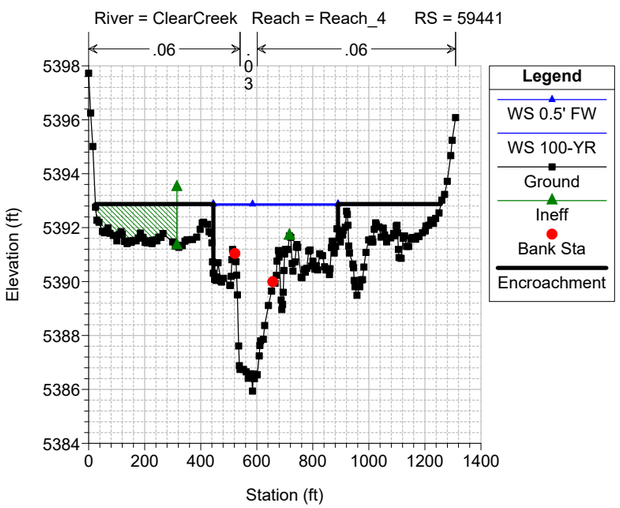

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60391
.05 .01 .06 .03 .06 .05
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

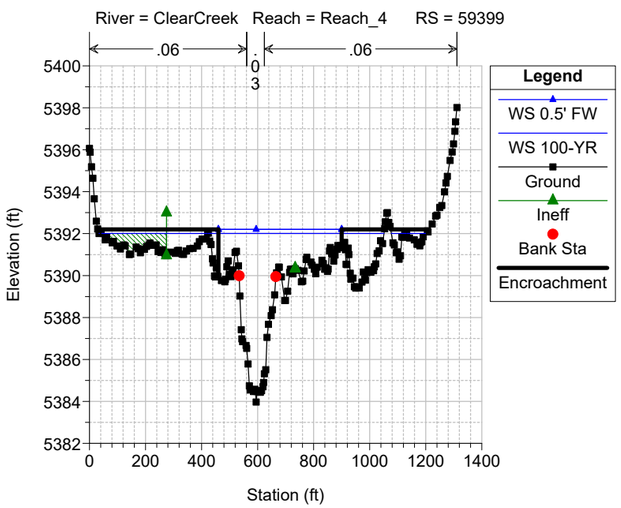

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60301
.05 .01 .06 .03 .06 .05
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

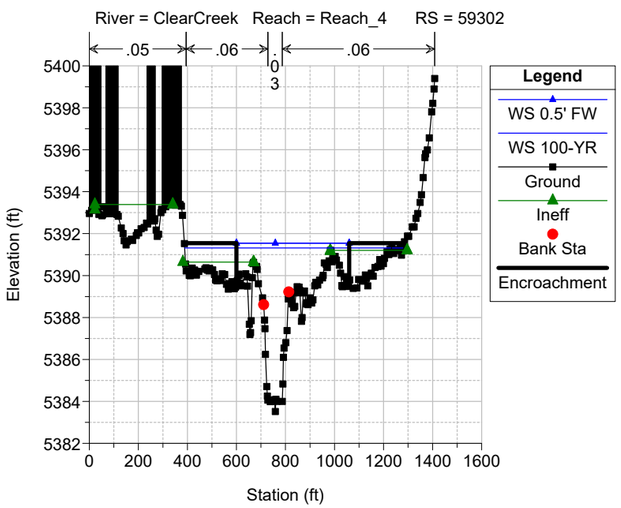

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 60157
.06 .03 .06
Legend
WS 0.5' FW
WS 100-YR
Ground
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

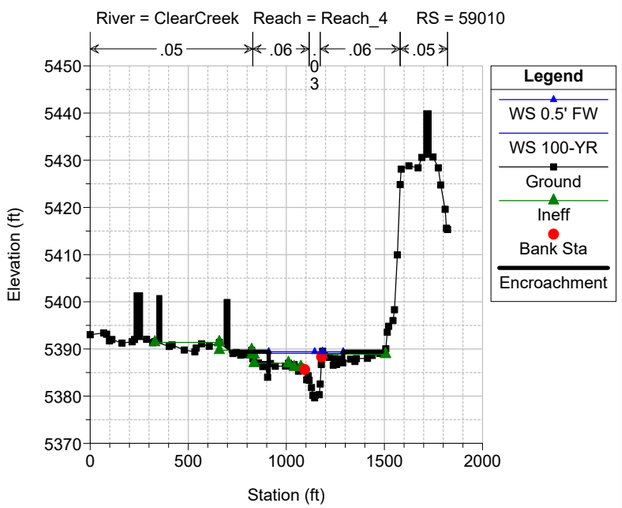

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 59850
.05 .06 .03 .06 .05
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

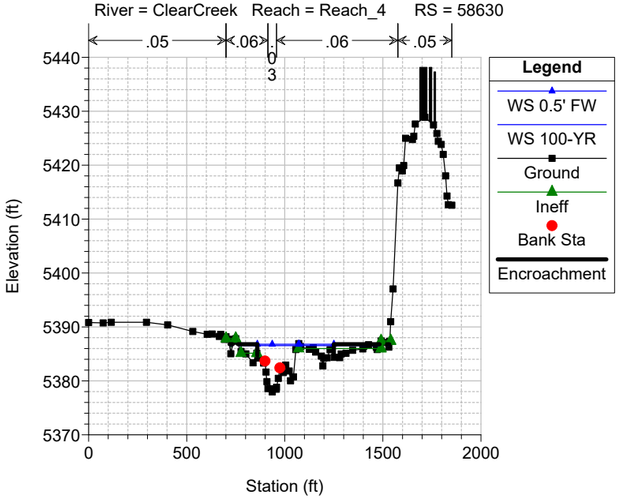

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 59484
.06 .03 .06
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

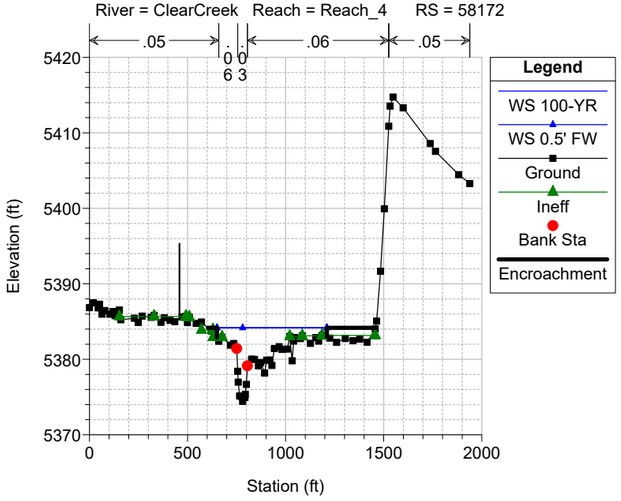
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 59441


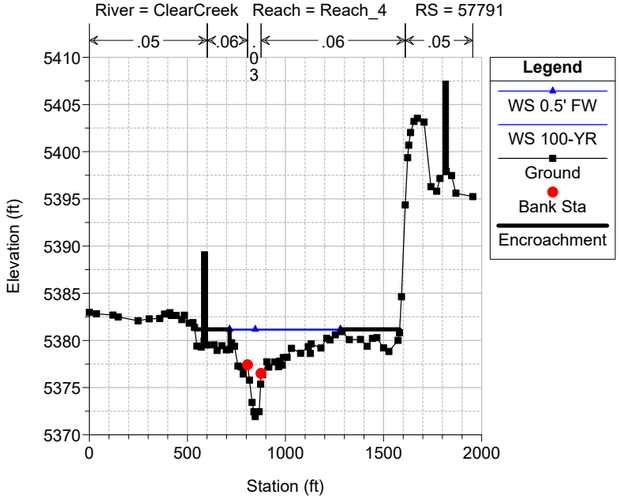
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 59399


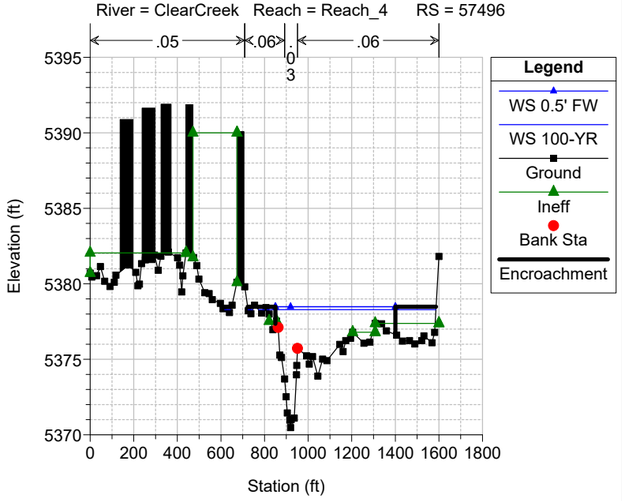
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 59302


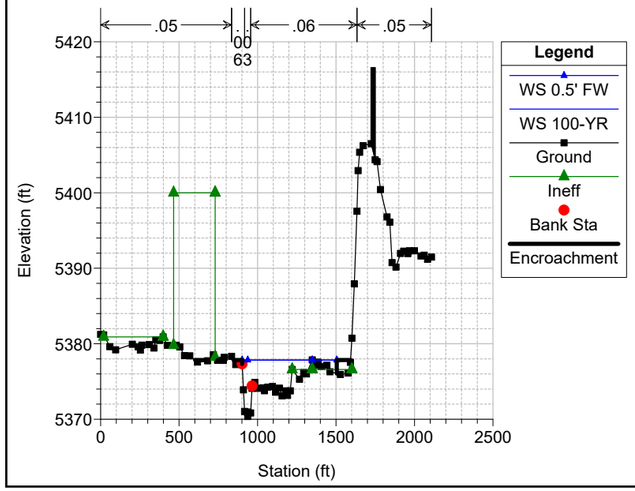
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 59010


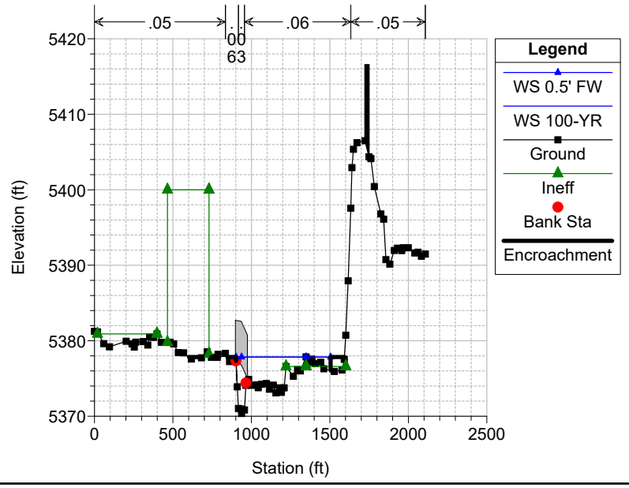
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 58630


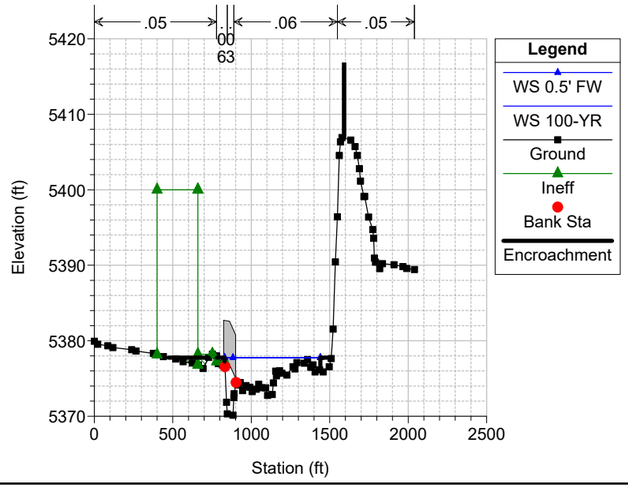
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 58172


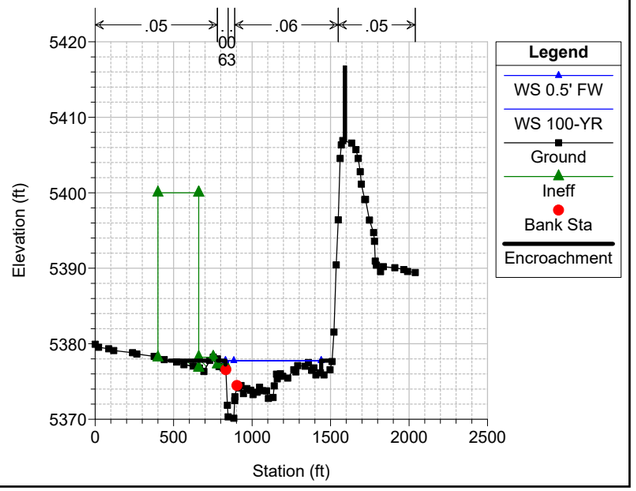
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 57791


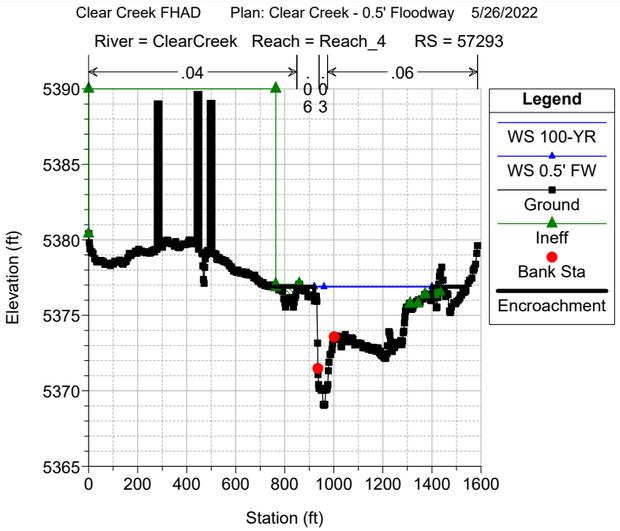
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 57496


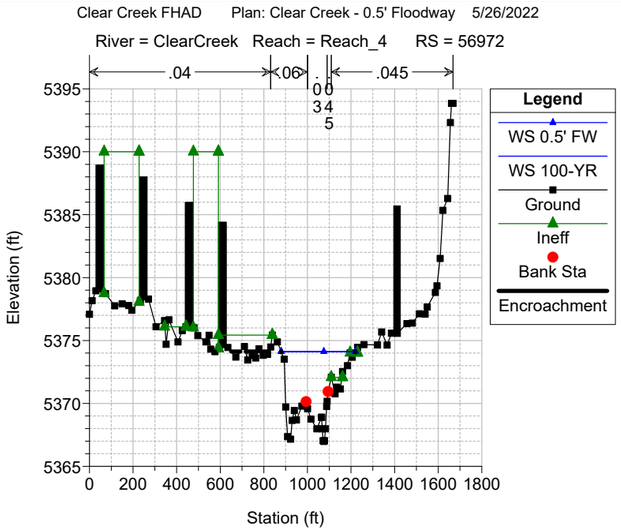
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 57442 FHAD CHANNEL GEOMETRY USED STA 846-891


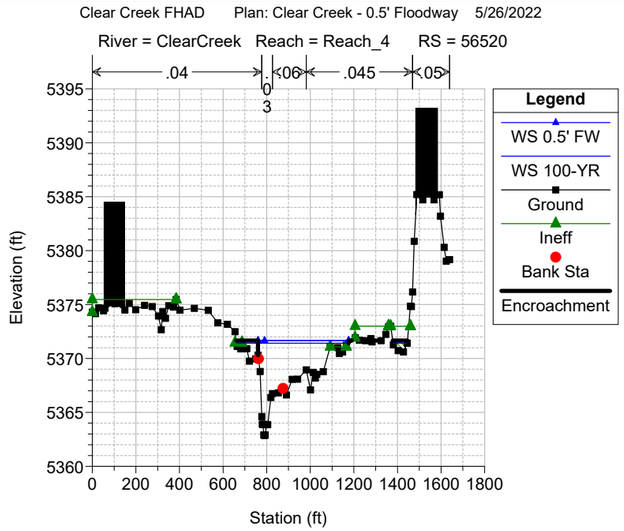
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 57428 BR Footbridge FOOTBRIDGE UPSTREAM OF KIPLING ST.


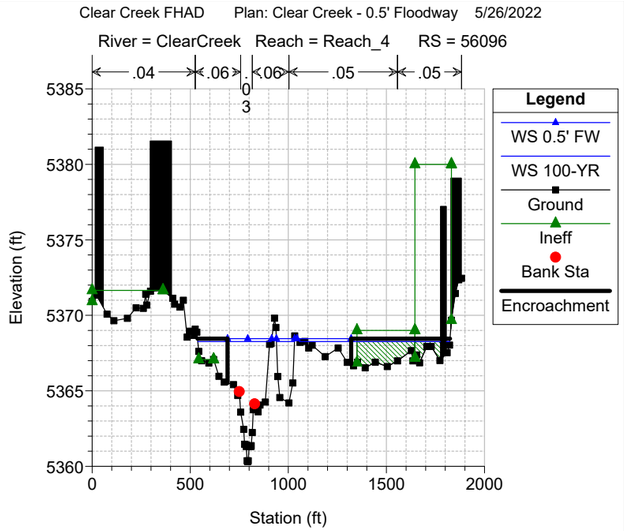
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 57428 BR Footbridge FOOTBRIDGE UPSTREAM OF KIPLING ST.


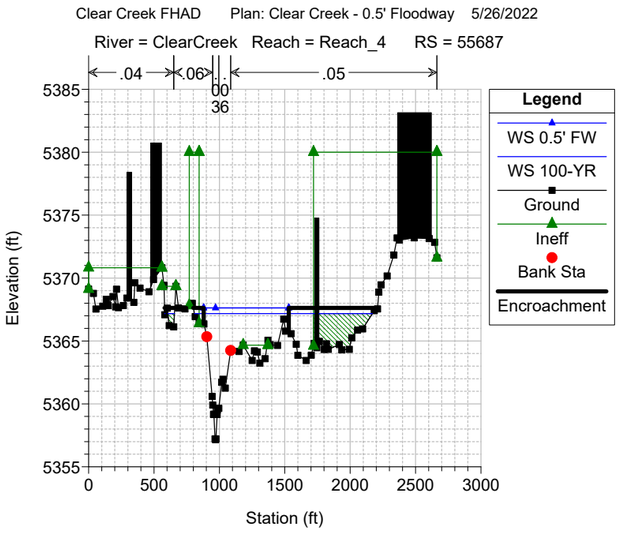
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 57402 FHAD CHANNEL GEOMETRY USED STA 845 - 886


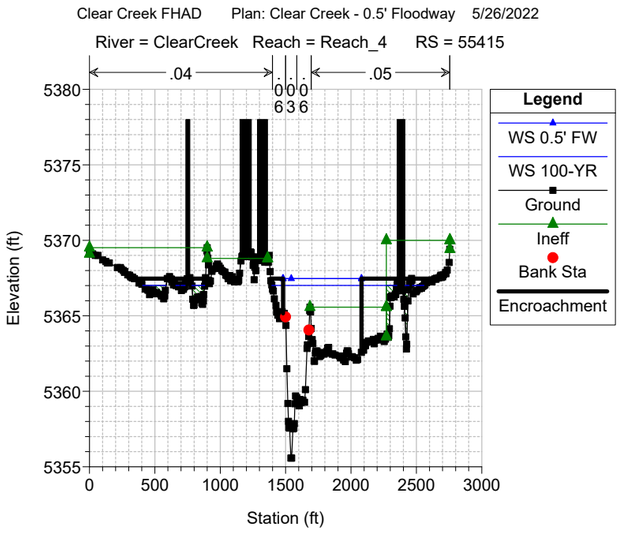

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 57293
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

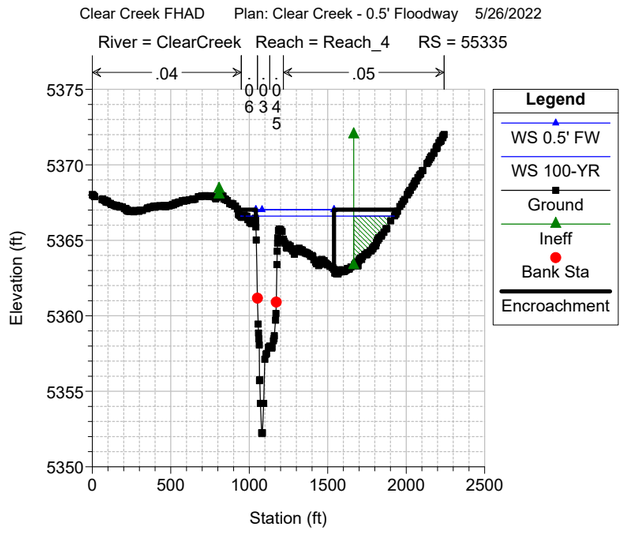

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 56972
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

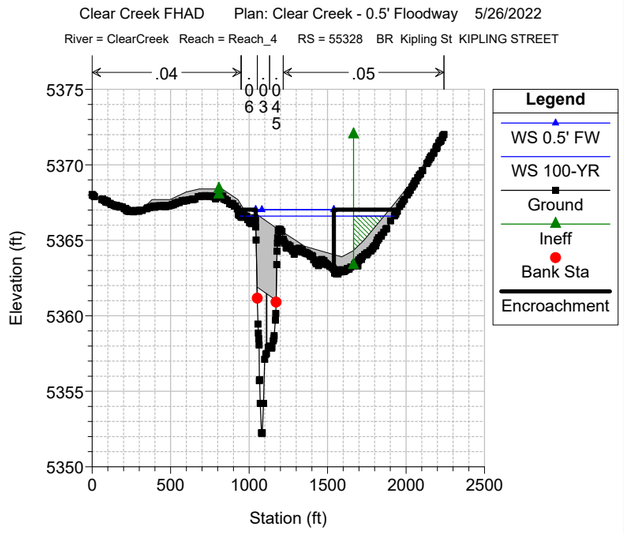

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 56520
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

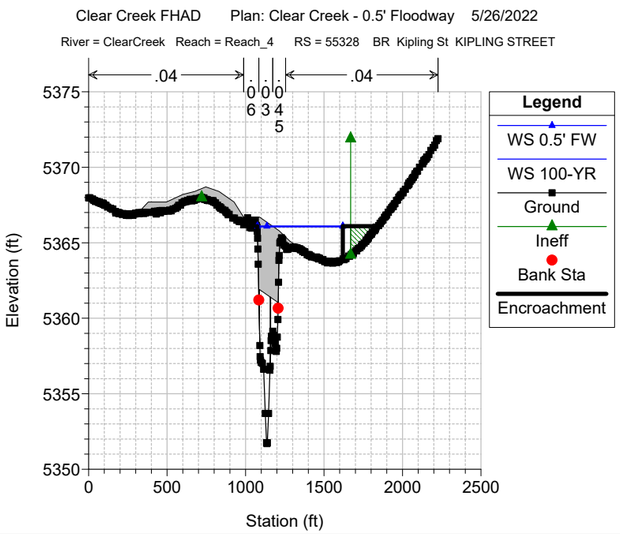

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 56096
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

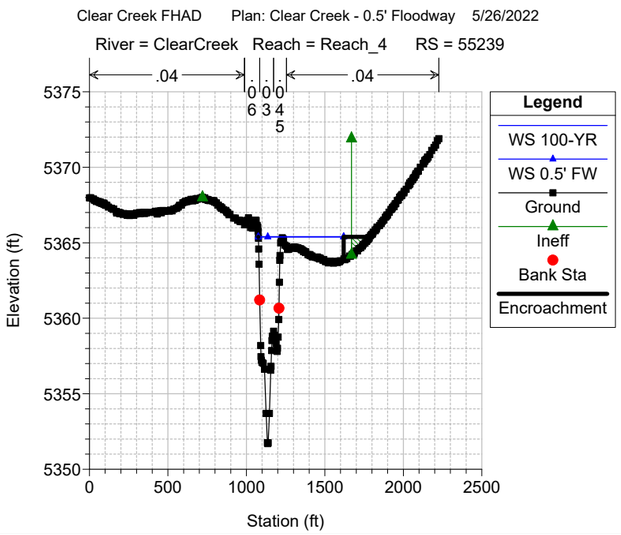

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55687
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

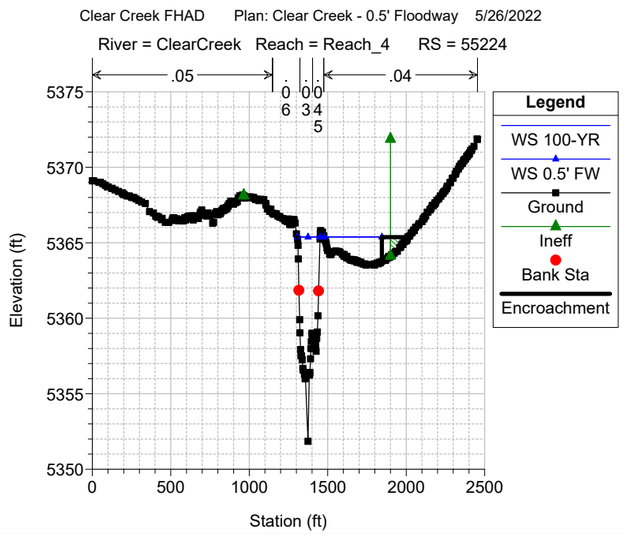

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55415
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

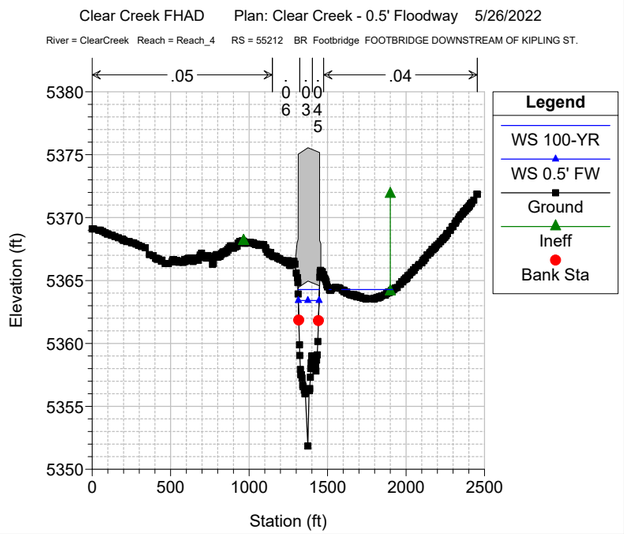

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55335
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

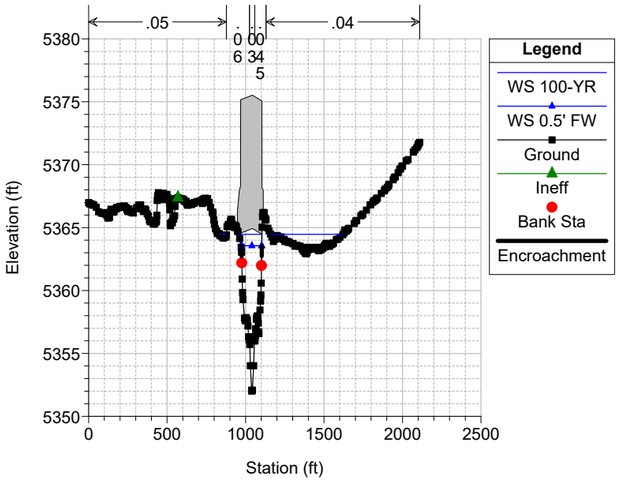

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55328 BR Kipling St KIPLING STREET
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

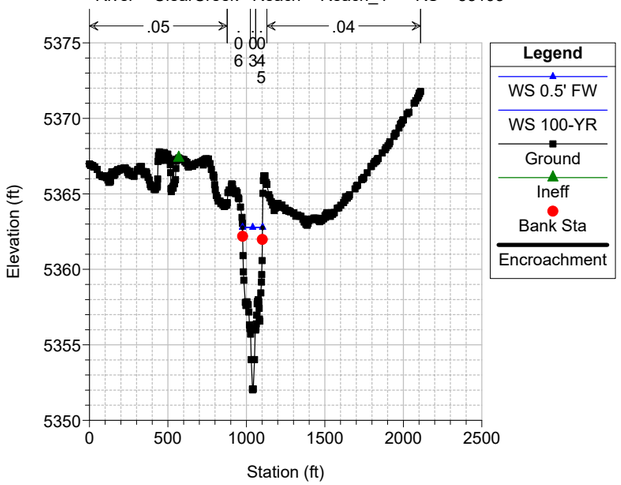

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55328 BR Kipling St KIPLING STREET
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

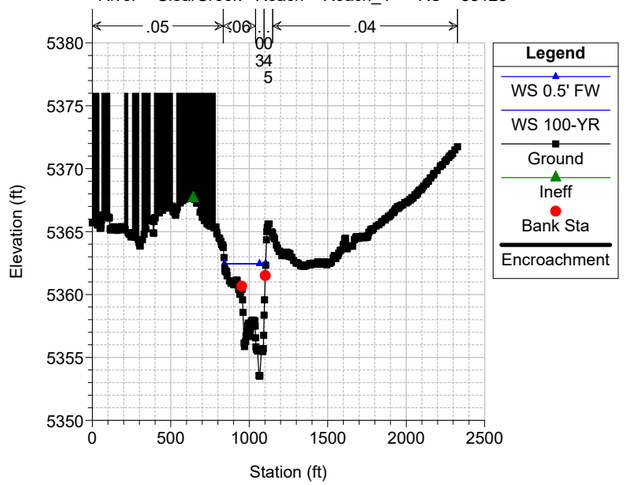

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55239
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

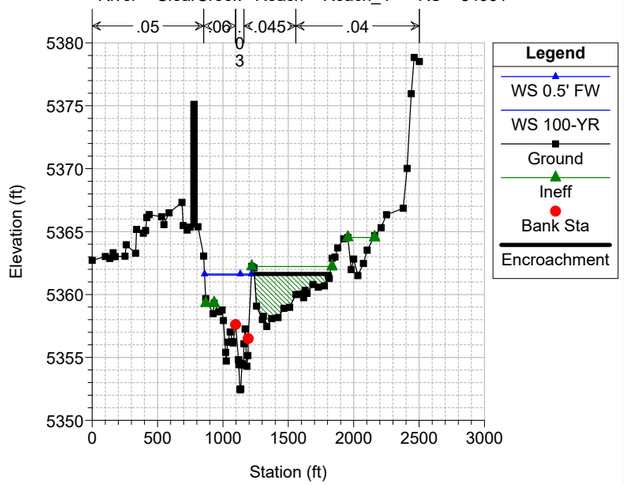

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55224
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

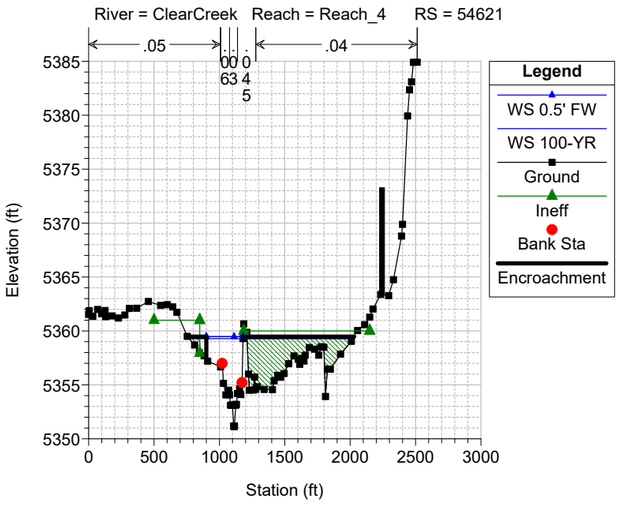

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55212 BR Footbridge FOOTBRIDGE DOWNSTREAM OF KIPLING ST.
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta

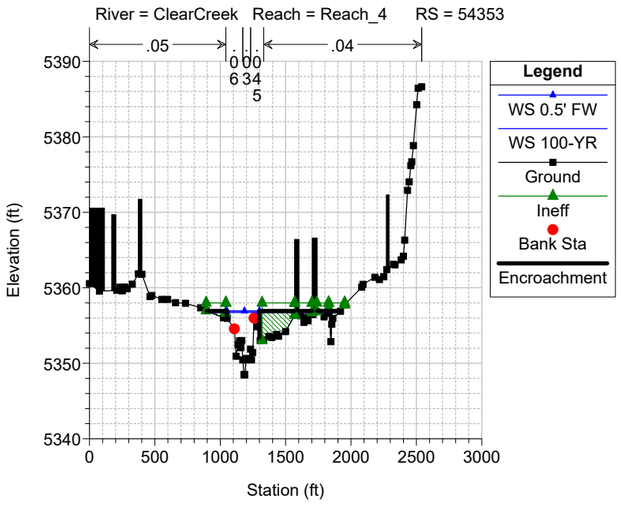
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55212 BR Footbridge FOOTBRIDGE DOWNSTREAM OF KIPLING ST.


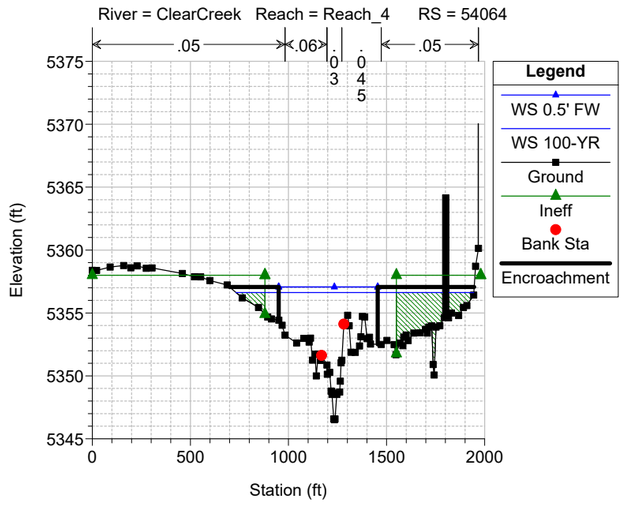
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55193


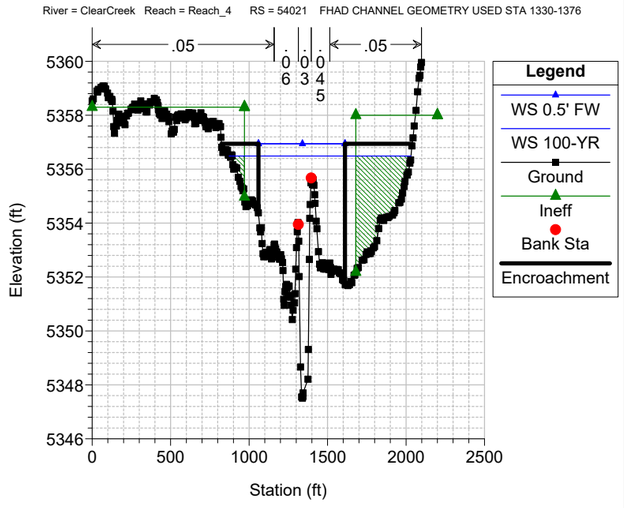
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 55123


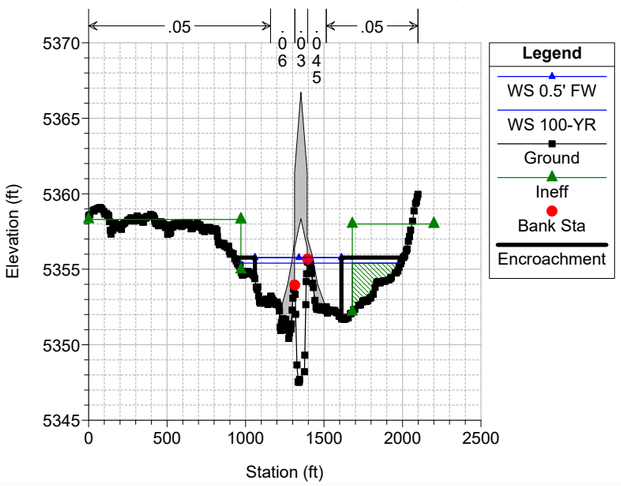
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 54961


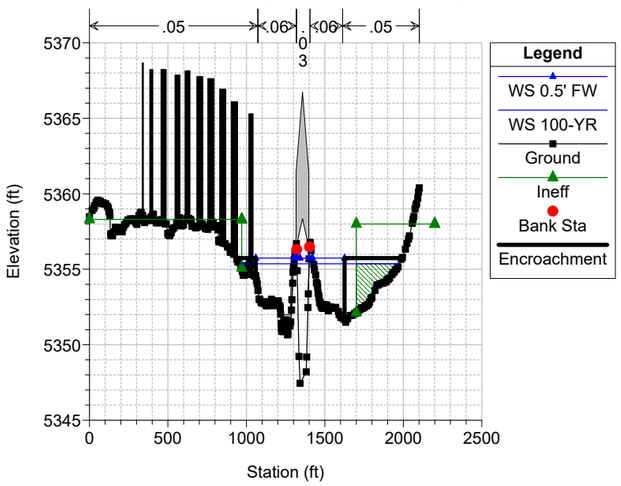
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 54621


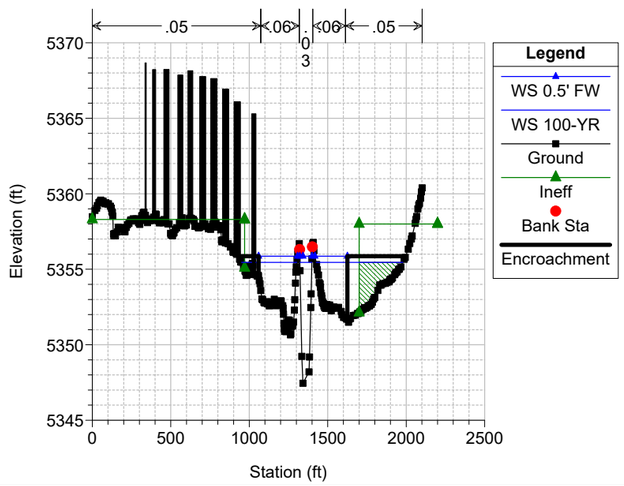
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 54353


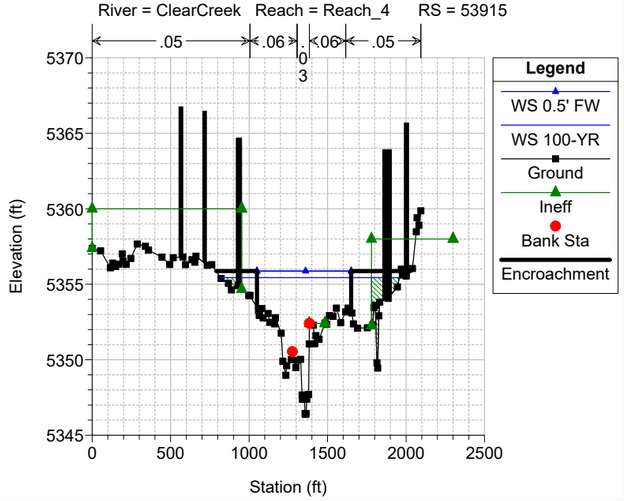
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 54064


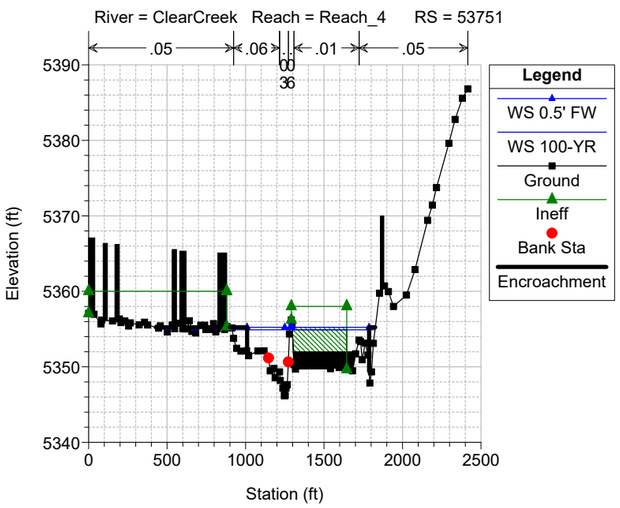
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 54021 FHAD CHANNEL GEOMETRY USED STA 1330-1376


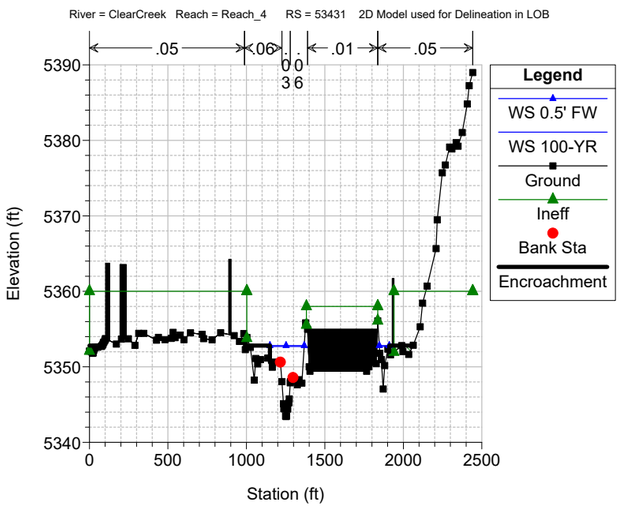
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 54013 BR Footbridge FOOTBRIDGE


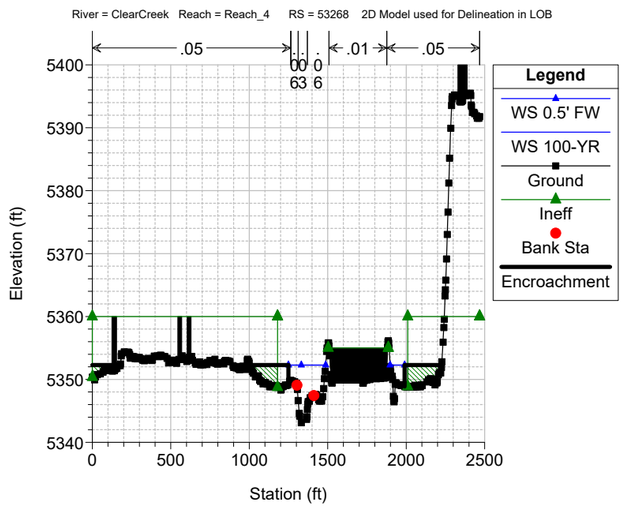
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 54013 BR Footbridge FOOTBRIDGE


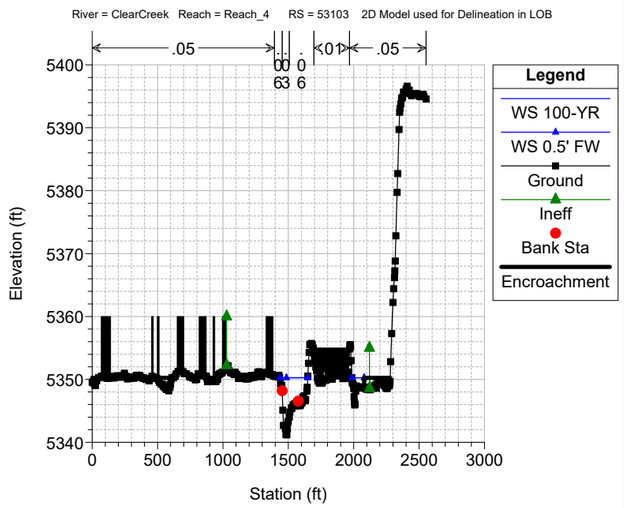
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 54004 FHAD CHANNEL GEOMETRY USED STA 1335-1382


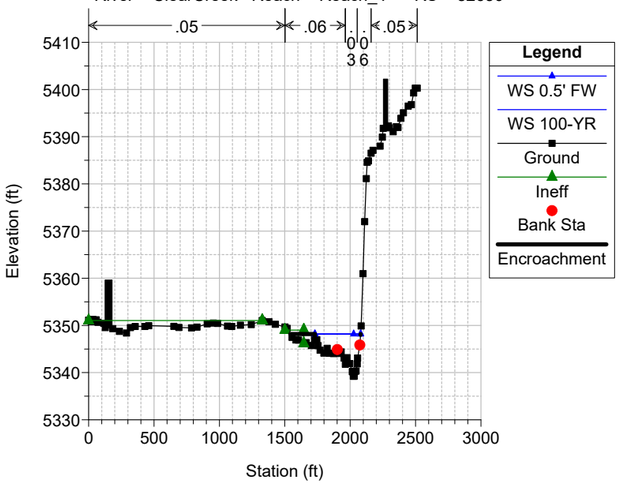
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 53915


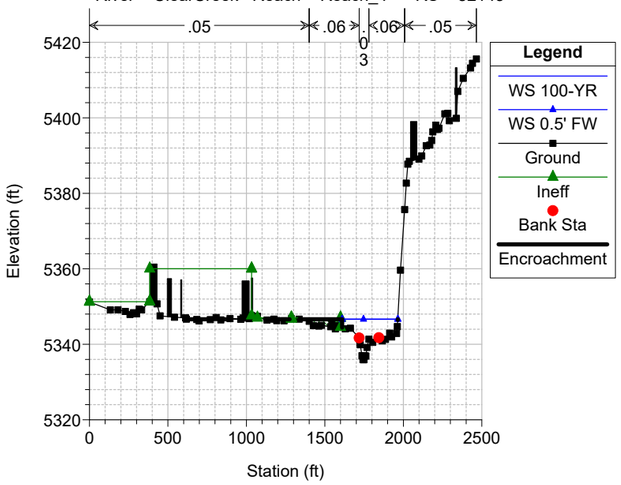
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 53751


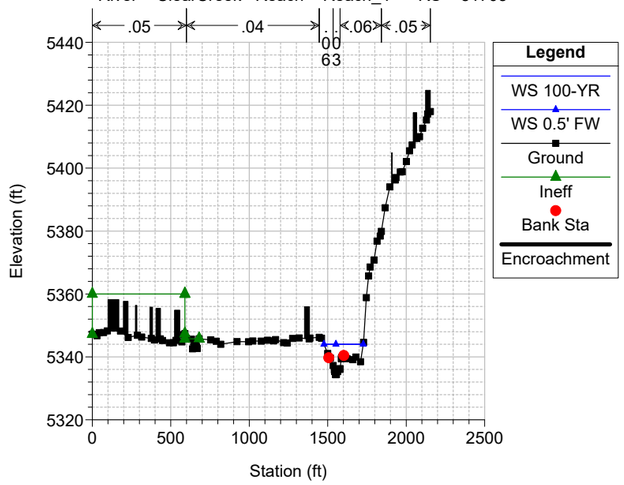
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 53431 2D Model used for Delineation in LOB


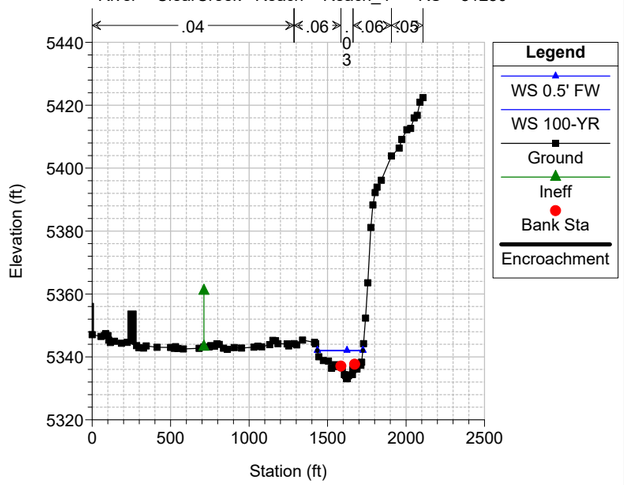
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 53268 2D Model used for Delineation in LOB


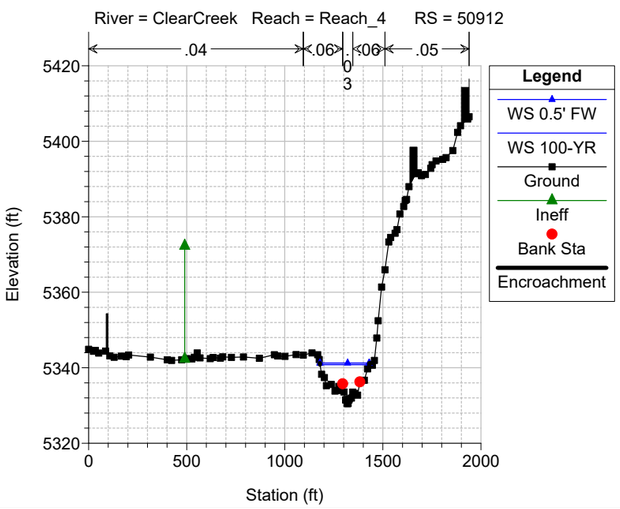
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 53103 2D Model used for Delineation in LOB


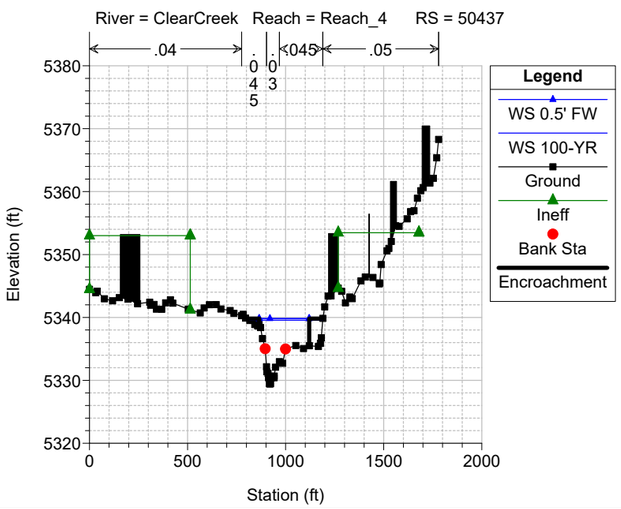
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 52630


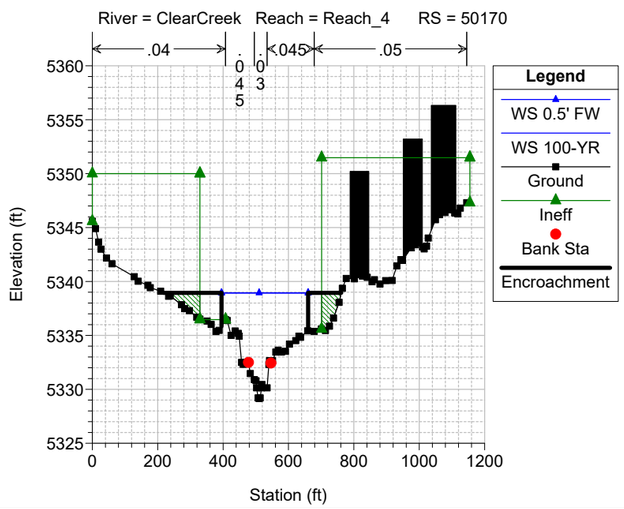
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 52143


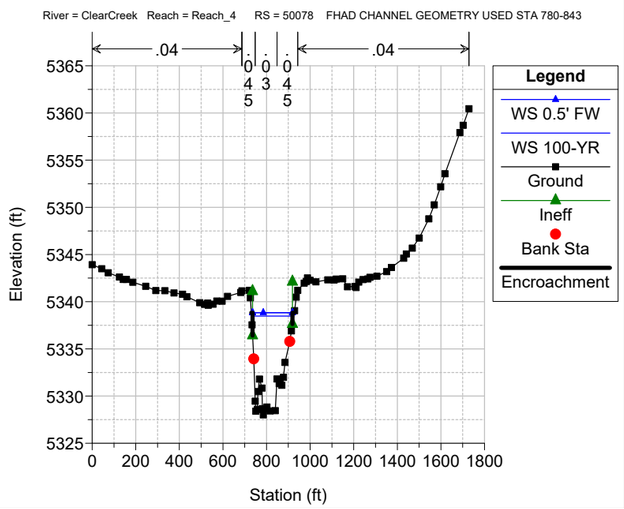
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 51703


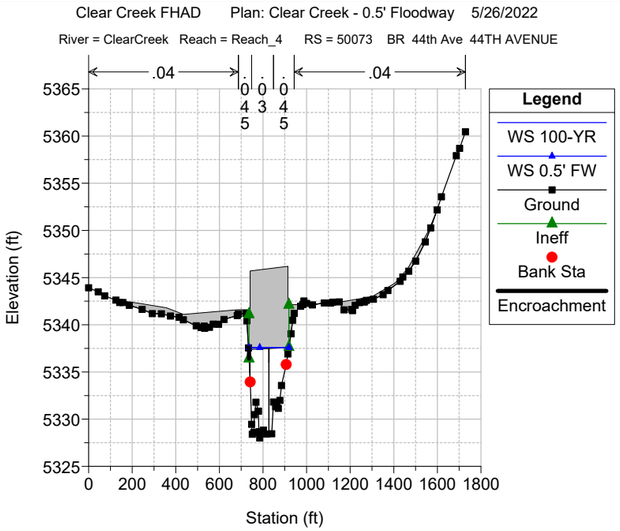
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 51250


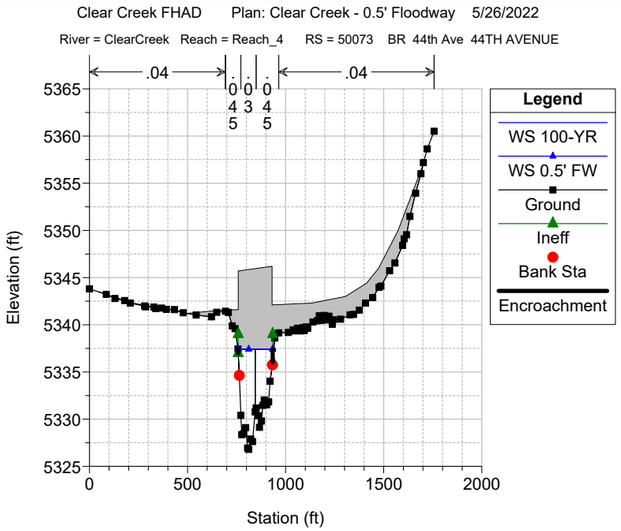
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 50912


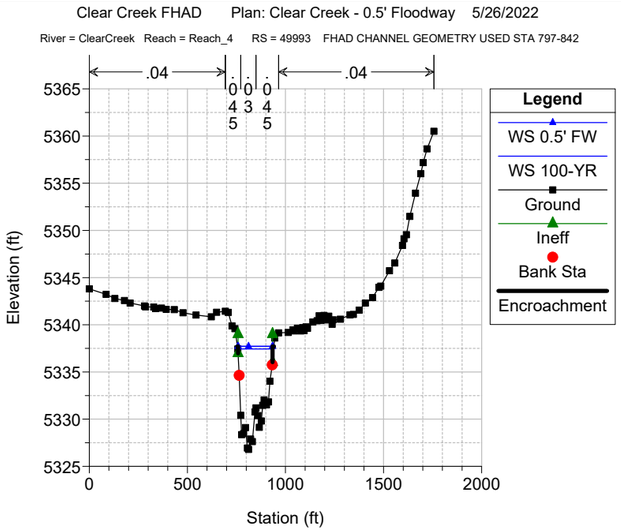
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 50437


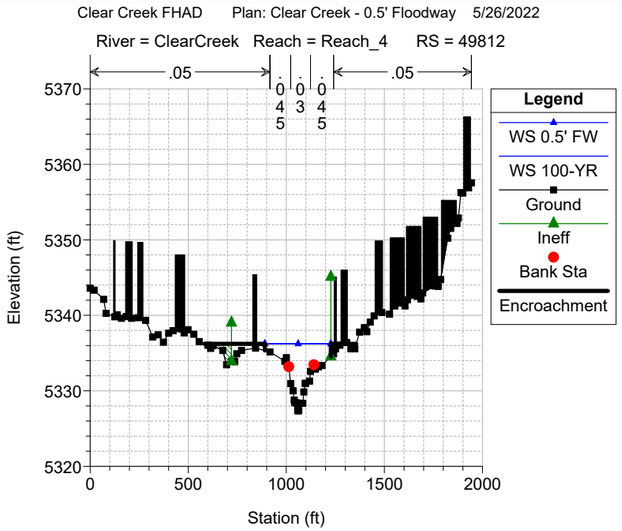
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 50170


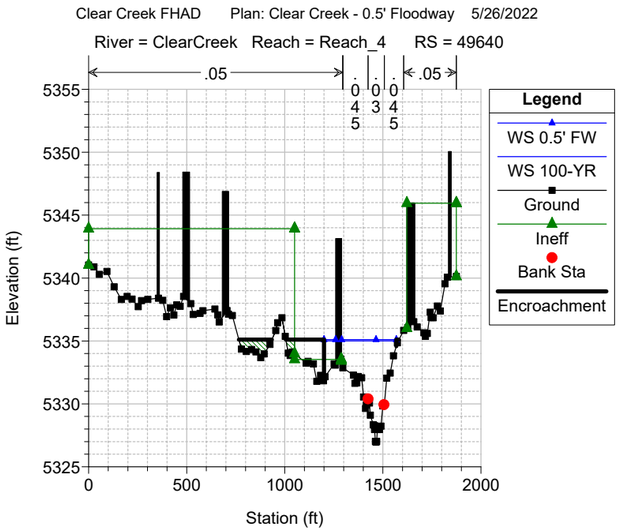
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 50078 FHAD CHANNEL GEOMETRY USED STA 780-843


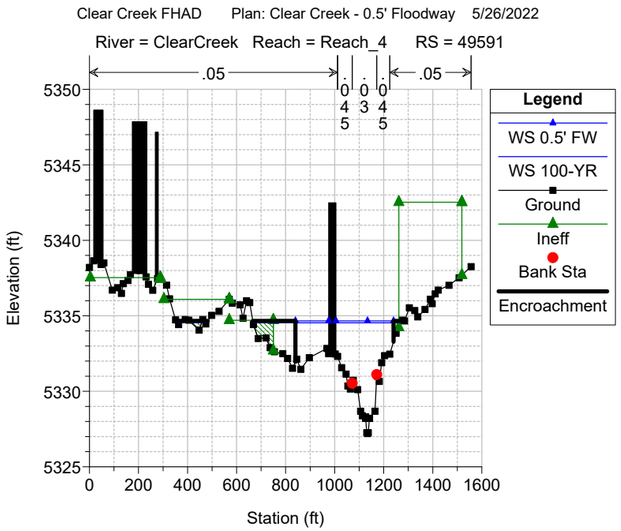

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 50073 BR 44th Ave 44TH AVENUE
.04 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

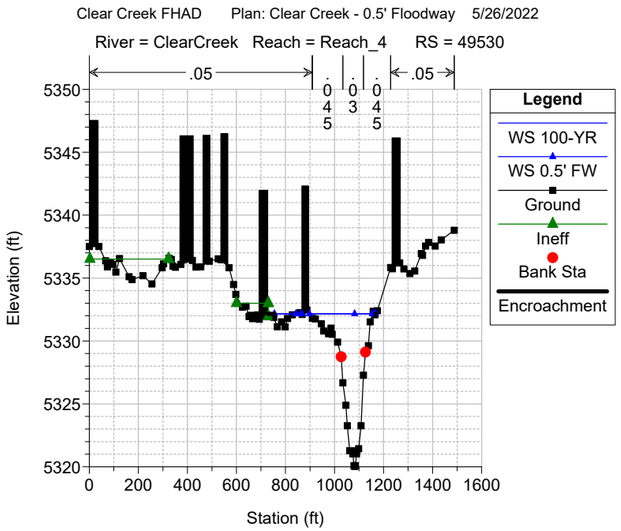

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 50073 BR 44th Ave 44TH AVENUE
.04 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

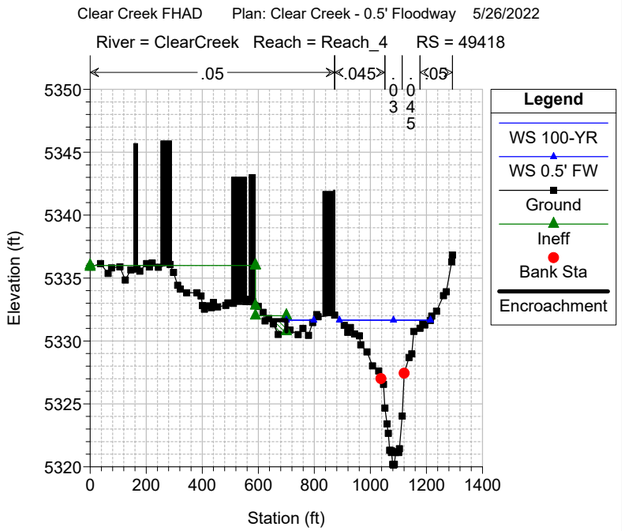

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 49993 FHAD CHANNEL GEOMETRY USED STA 797-842
.04 .04
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

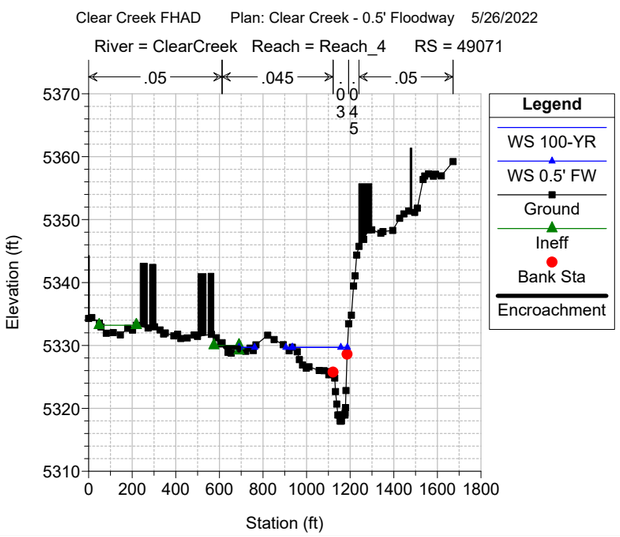

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 49812
.05 .05
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

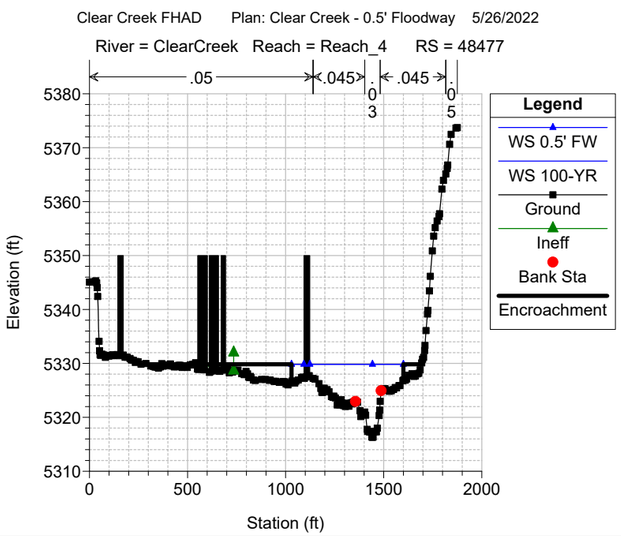

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 49640
.05 .05
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

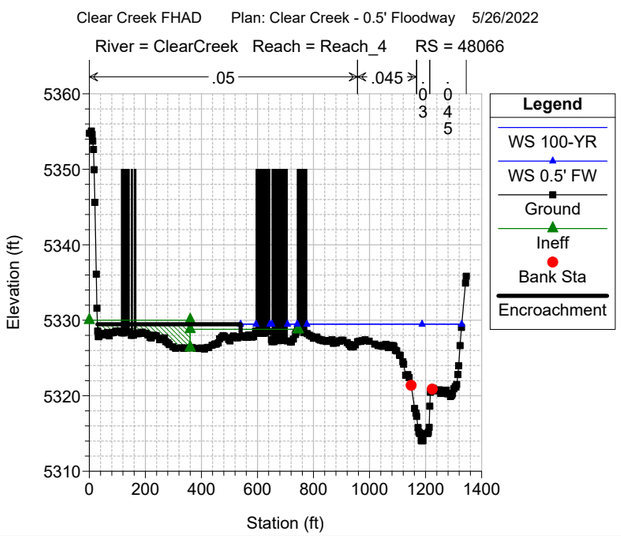

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 49591
.05 .05
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

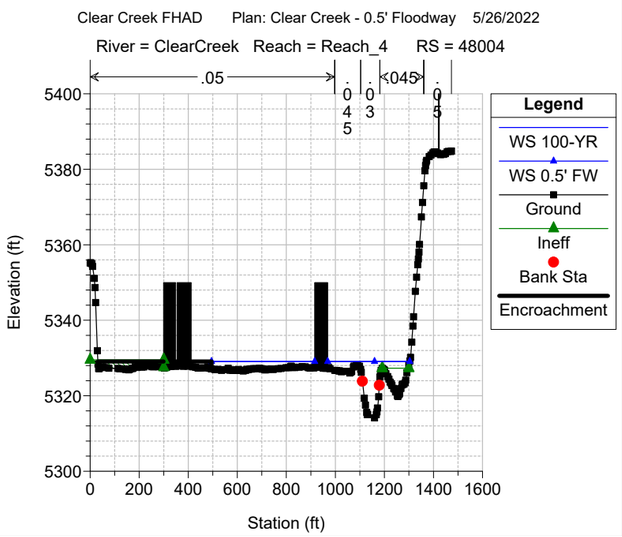

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 49530
.05 .05
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

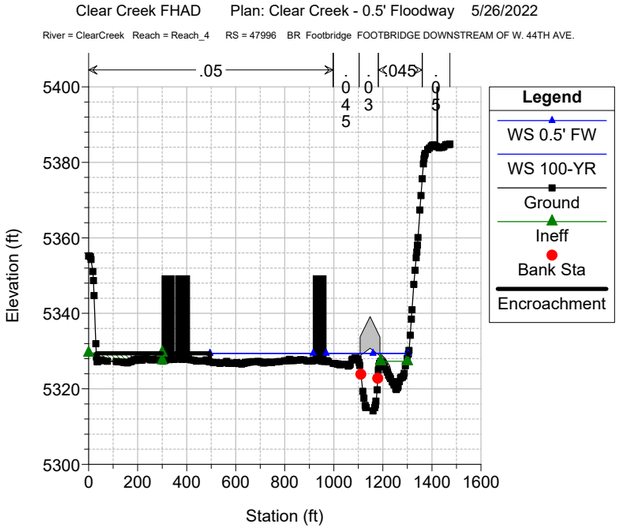

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 49418
.05 .045 .05
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

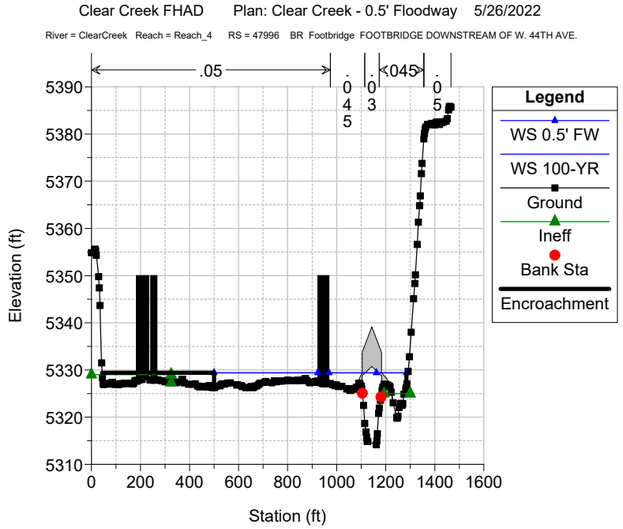

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 49071
.05 .045 .05
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

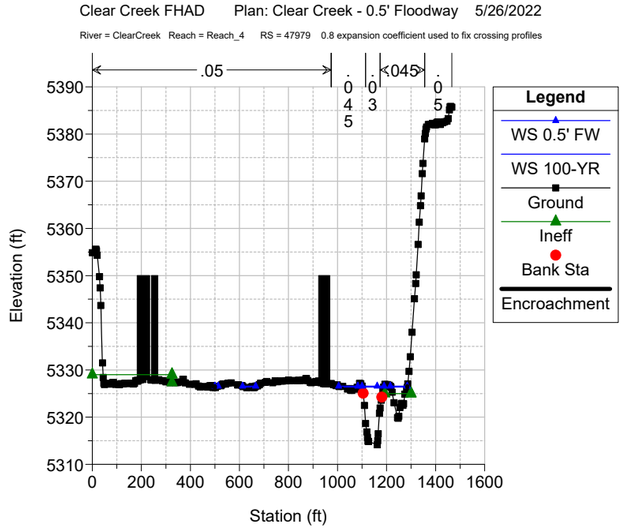

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 48477
.05 .045 .045
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

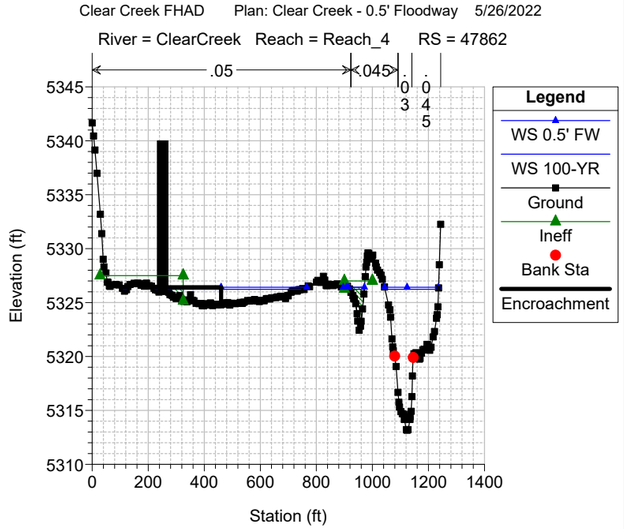

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 48066
.05 .045
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

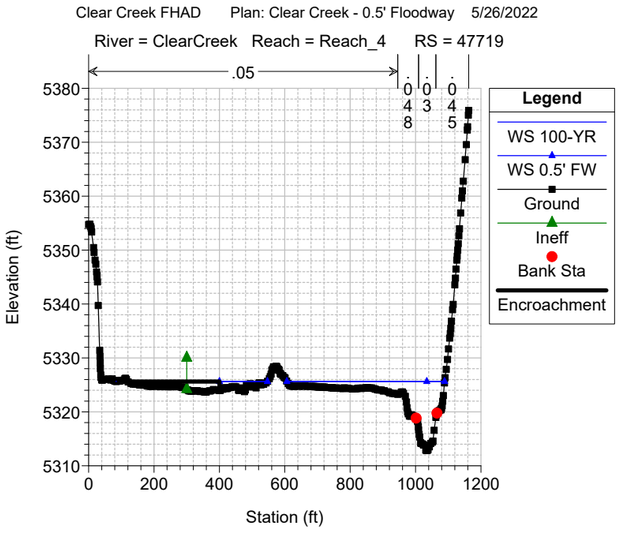

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 48004
.05 .045
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

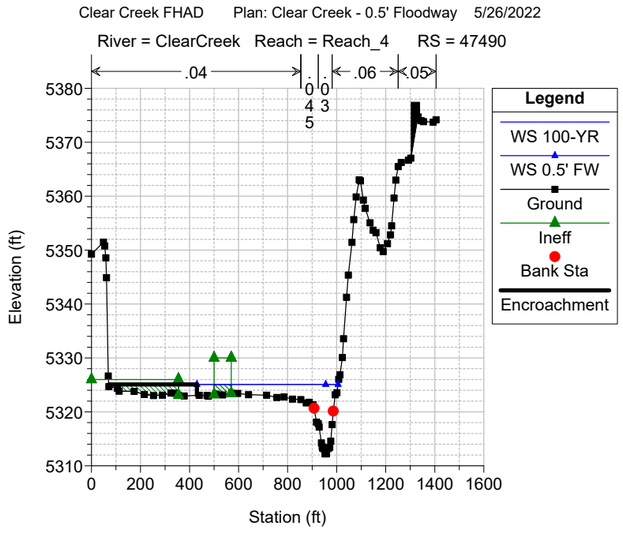

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 47996 BR Footbridge FOOTBRIDGE DOWNSTREAM OF W. 44TH AVE.
.05
.045
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

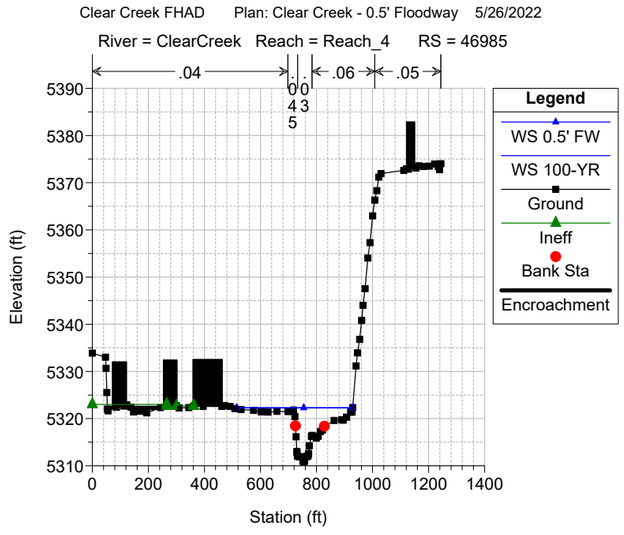

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 47996 BR Footbridge FOOTBRIDGE DOWNSTREAM OF W. 44TH AVE.
.05
.045
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

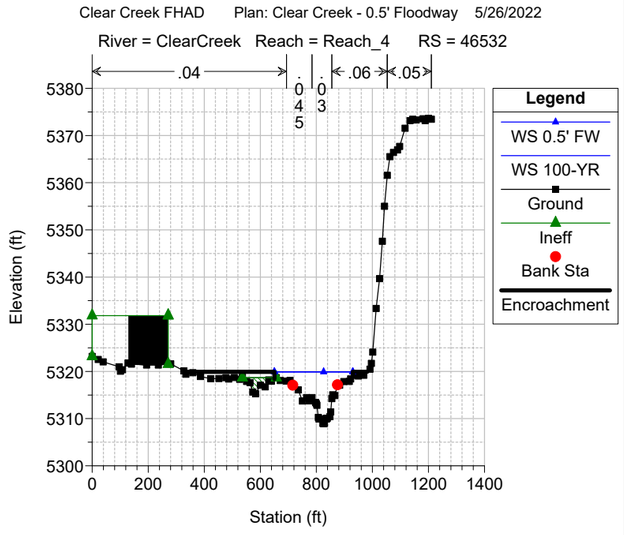

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 47979 0.8 expansion coefficient used to fix crossing profiles
.05
.045
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

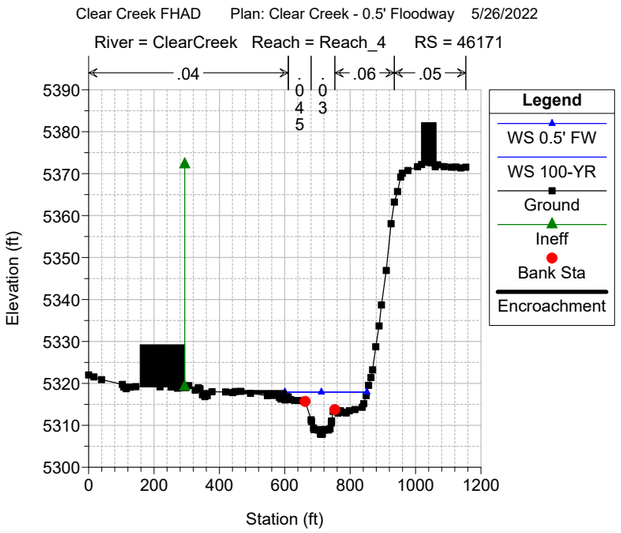

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 47862
.05
.045
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

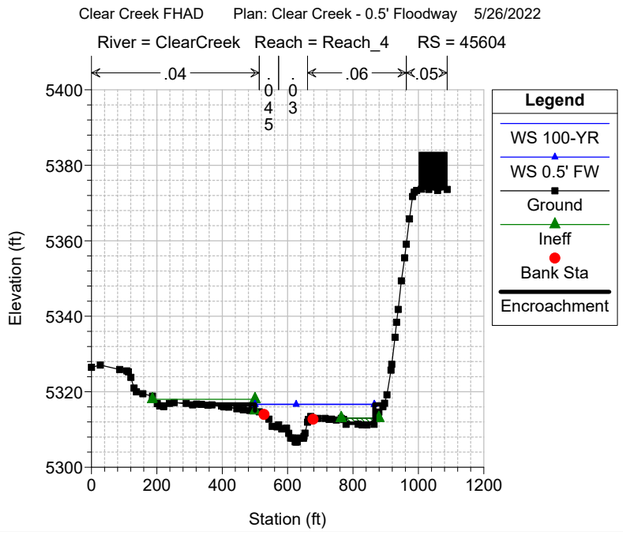

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 47719
.05
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

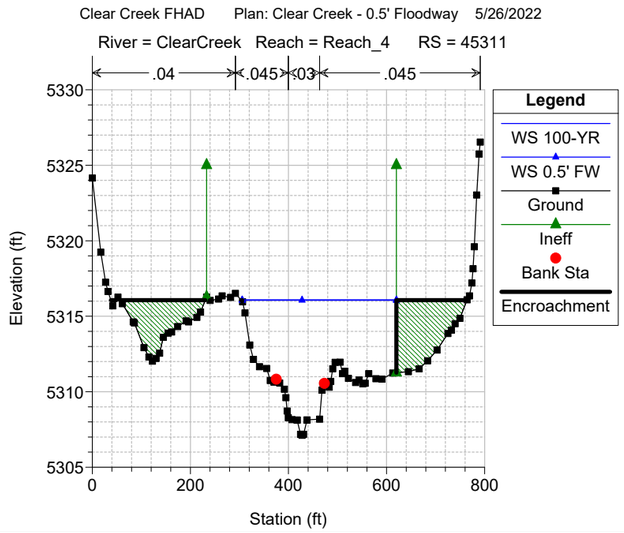

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 47490
.04
.06
.05
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

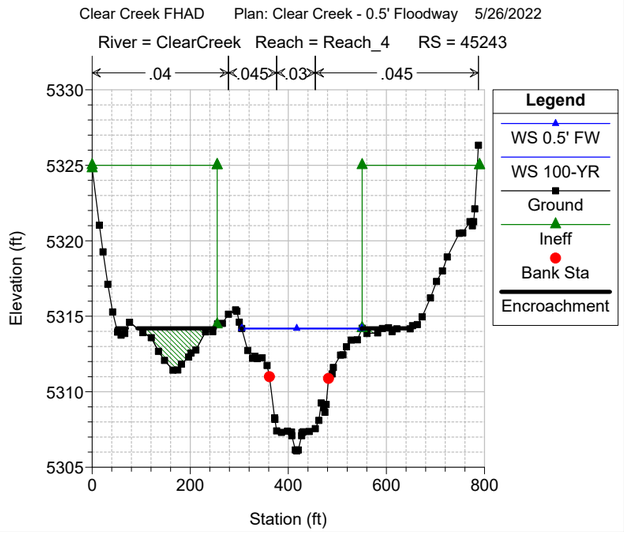

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 46985
.04
.06
.05
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

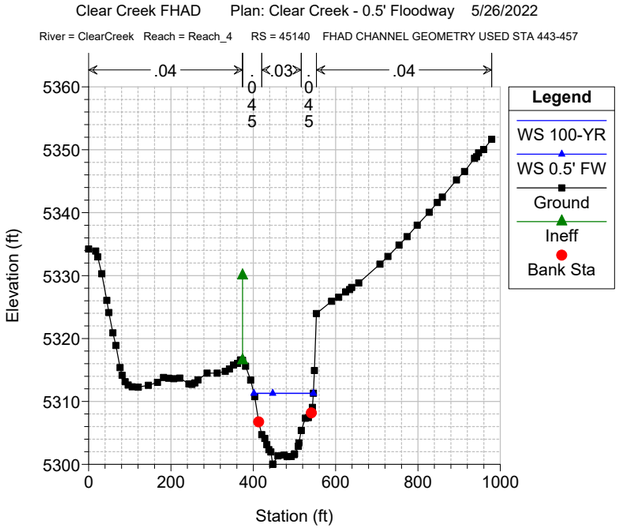

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 46532
.04
.06
.05
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

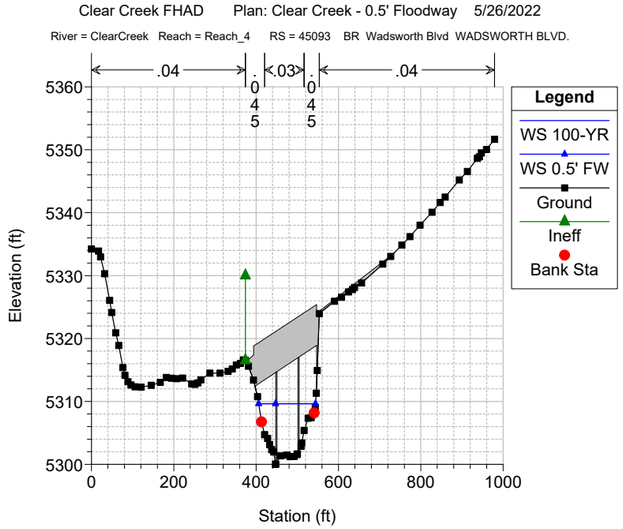

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 46171
.04
.06
.05
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

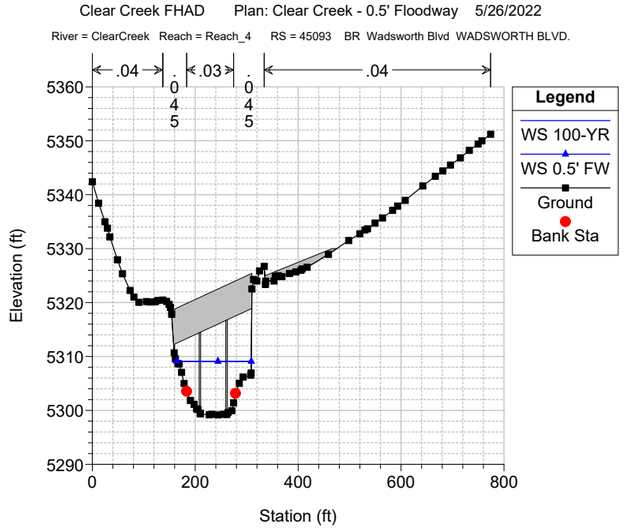

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 45604
.04
.06
.05
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

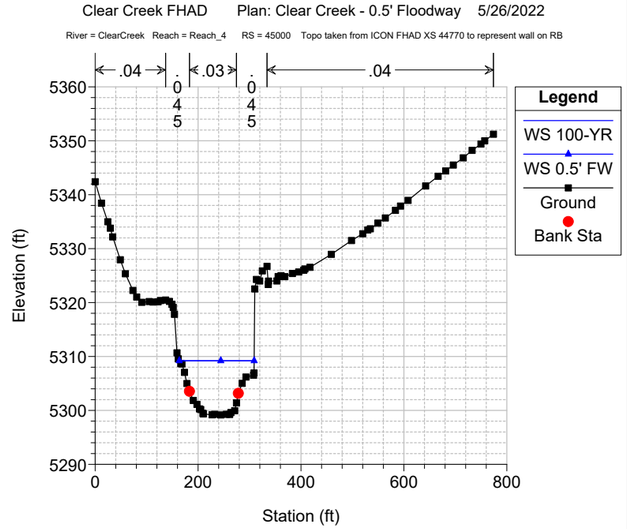

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 45311
.04
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

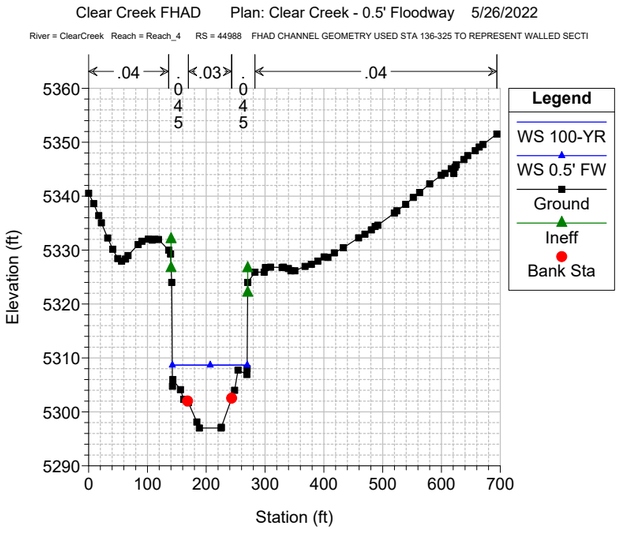

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 45243
.04
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

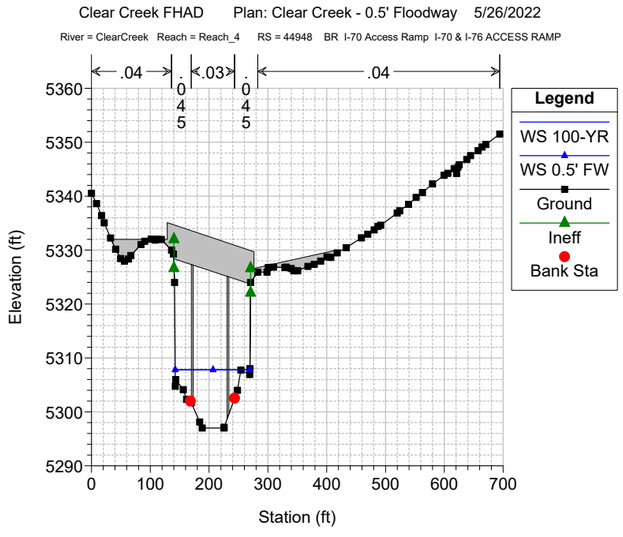

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 45140 FHAD CHANNEL GEOMETRY USED STA 443-457
.04
.045
.03
.045
.04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

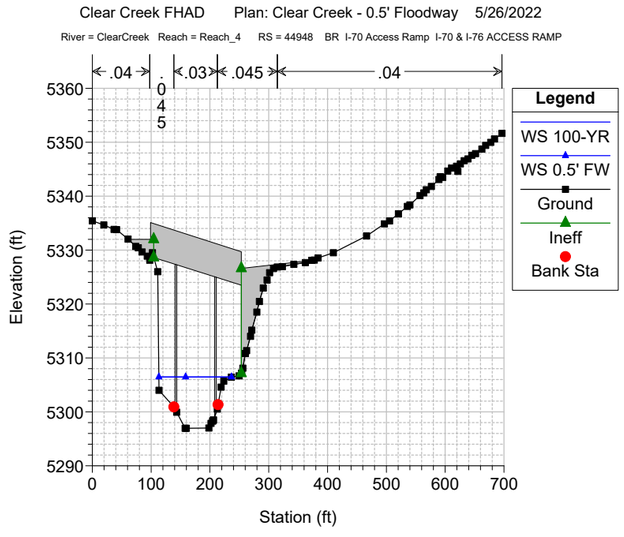

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 45093 BR Wadsworth Blvd WADSWORTH BLVD.
.04
.045
.03
.045
.04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

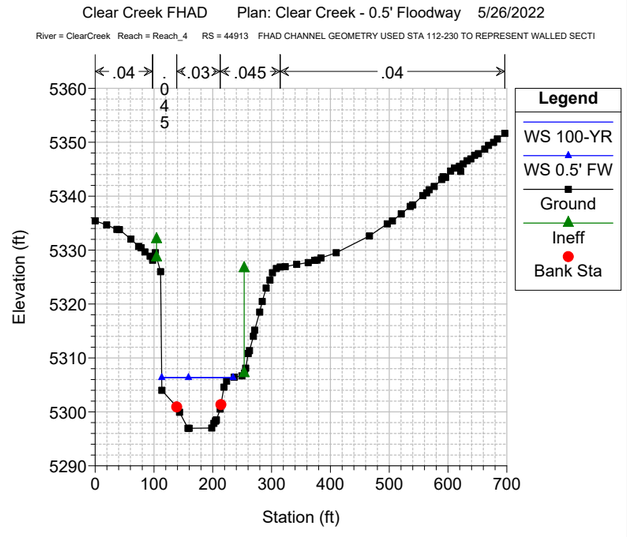

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 45093 BR Wadsworth Blvd WADSWORTH BLVD.
.04
.045
.03
.045
.04
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)

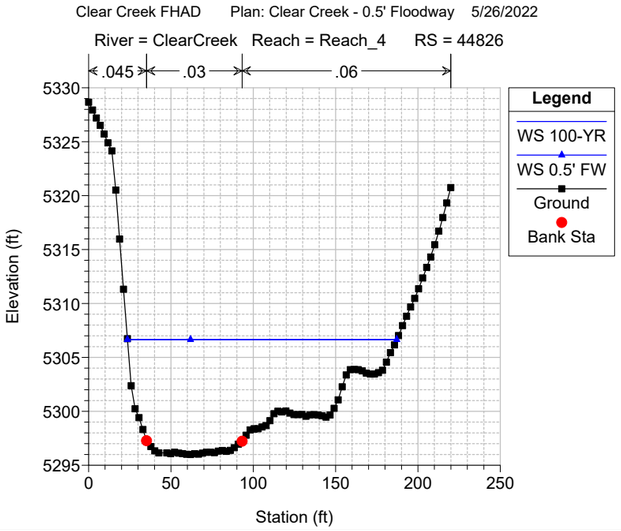

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 45000 Topo taken from ICON FHAD XS 44770 to represent wall on RB
.04
.045
.03
.045
.04
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)

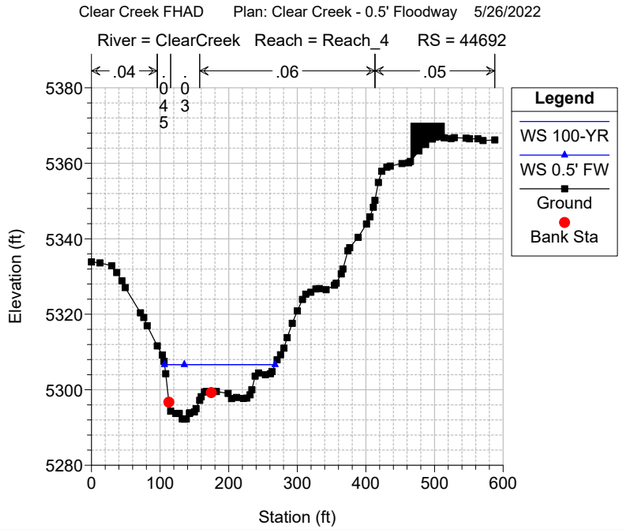

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44988 FHAD CHANNEL GEOMETRY USED STA 136-325 TO REPRESENT WALLED SECTI
.04
.045
.03
.045
.04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

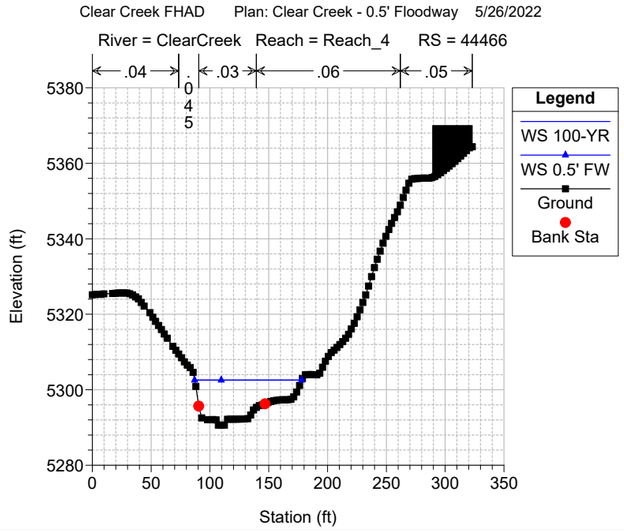

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44948 BR I-70 Access Ramp I-70 & I-76 ACCESS RAMP
.04
.045
.03
.045
.04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

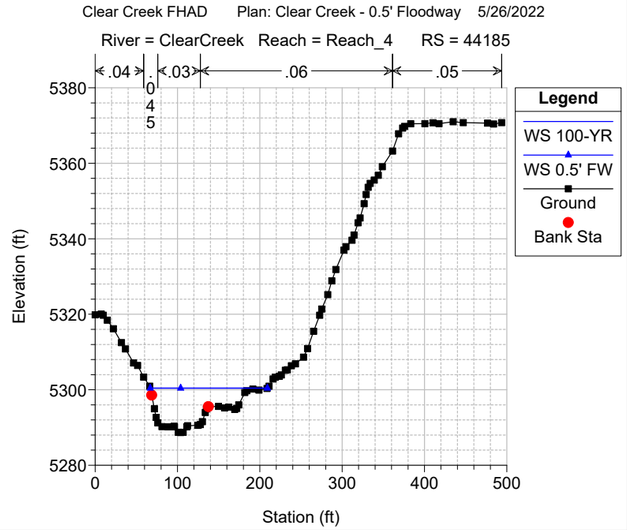

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44948 BR I-70 Access Ramp I-70 & I-76 ACCESS RAMP
.04
.045
.03
.045
.04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44913 FHAD CHANNEL GEOMETRY USED STA 112-230 TO REPRESENT WALLED SECTI
.04
.045
.03
.045
.04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44826
.045
.03
.06
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)

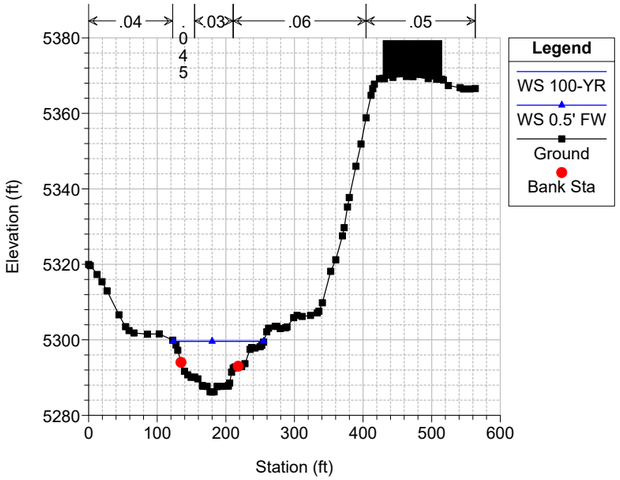

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44692
.04
.045
.03
.06
.05
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44466
.04
.045
.03
.06
.05
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 44185
.04
.045
.03
.06
.05
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)

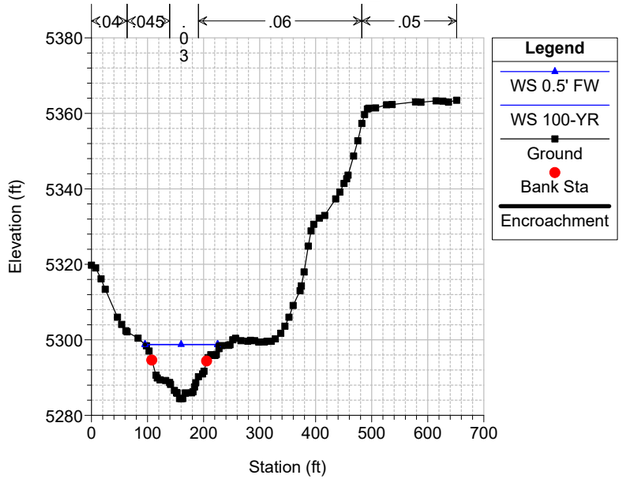
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 43824



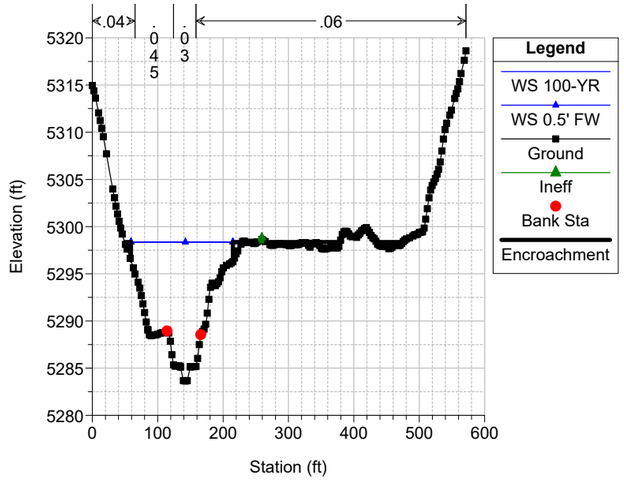
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 43444



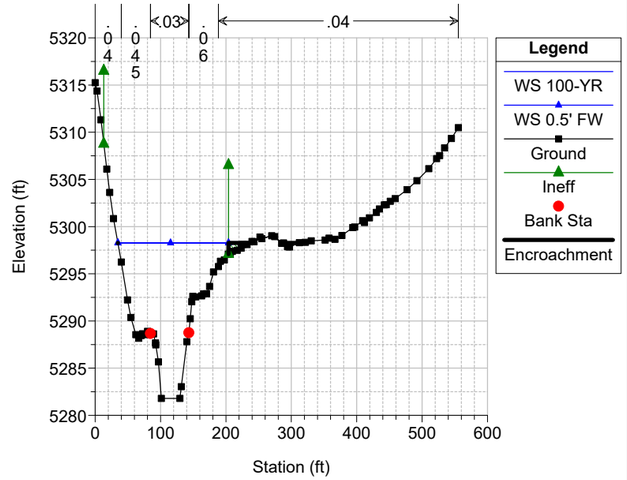
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 43235



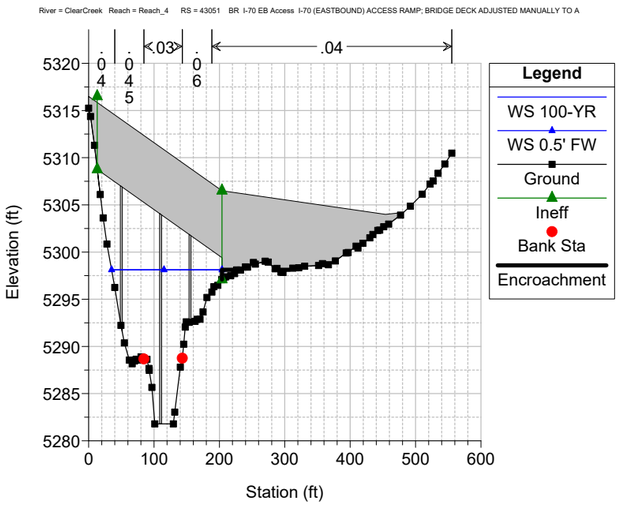
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 43134 FHAD CHANNEL GEOMETRY USED STA 160-220



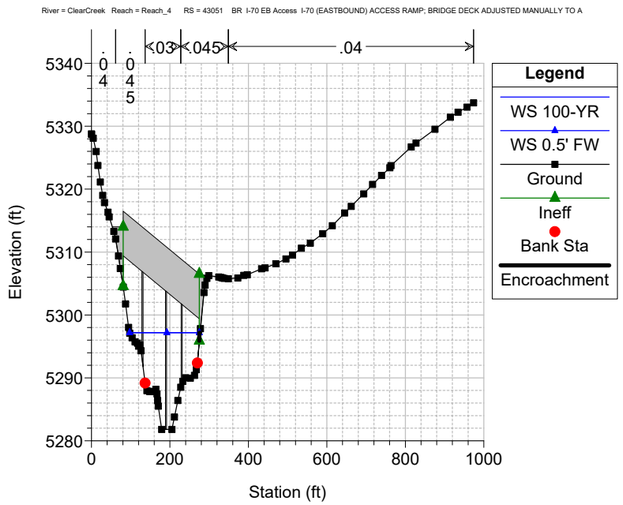
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 43051 BR I-70 EB Access I-70 (EASTBOUND) ACCESS RAMP; BRIDGE DECK ADJUSTED MANUALLY TO A



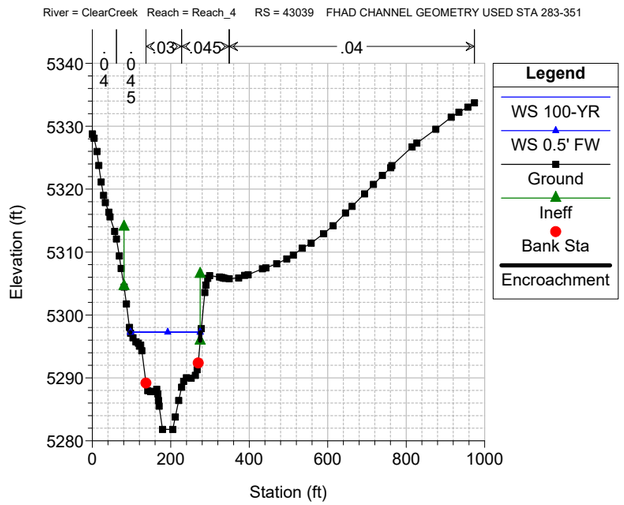
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 43051 BR I-70 EB Access I-70 (EASTBOUND) ACCESS RAMP; BRIDGE DECK ADJUSTED MANUALLY TO A



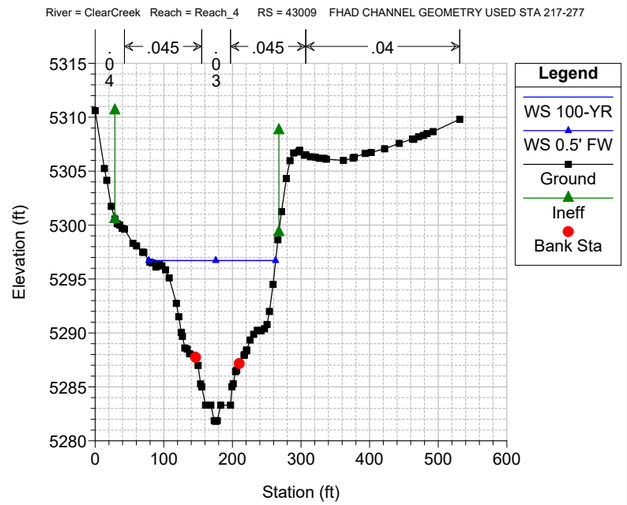
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 43039 FHAD CHANNEL GEOMETRY USED STA 283-351



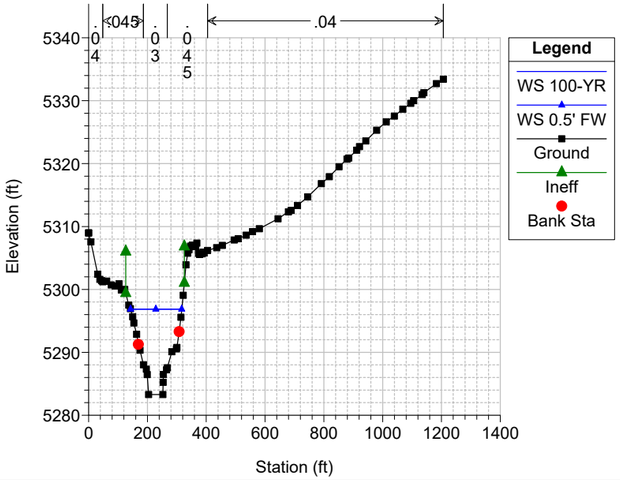
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 43009 FHAD CHANNEL GEOMETRY USED STA 217-277



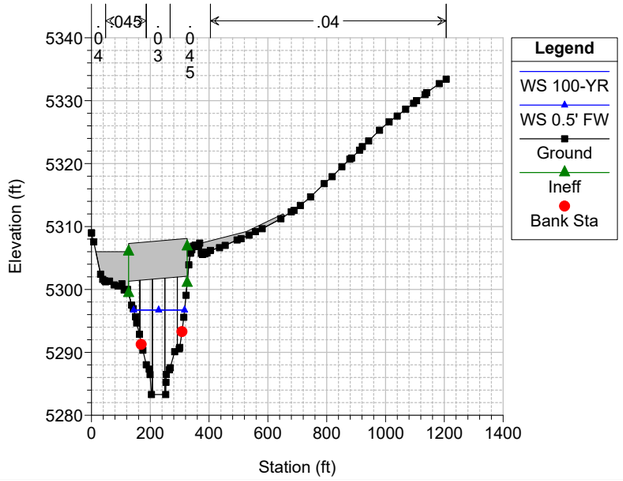
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42988 FHAD CHANNEL GEOMETRY USED STA 200-254



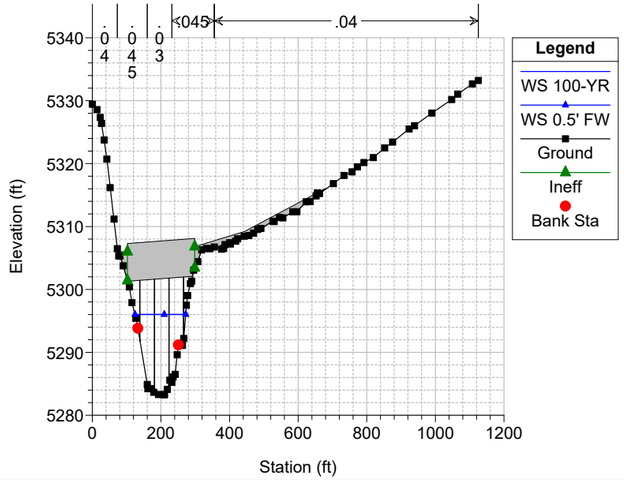
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42940 BR I-70 EB I-70 EASTBOUND



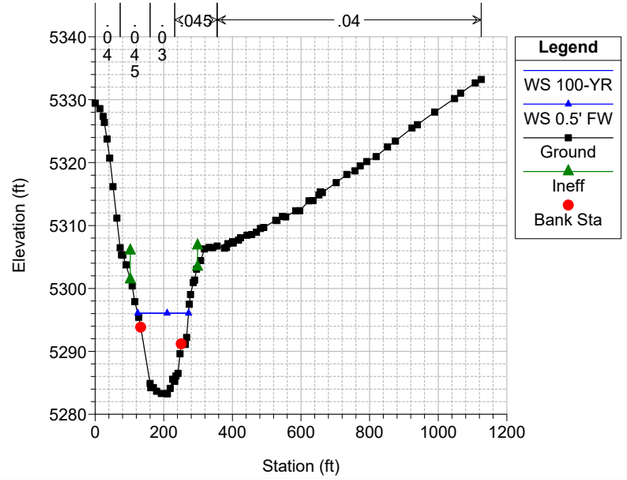
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42940 BR I-70 EB I-70 EASTBOUND



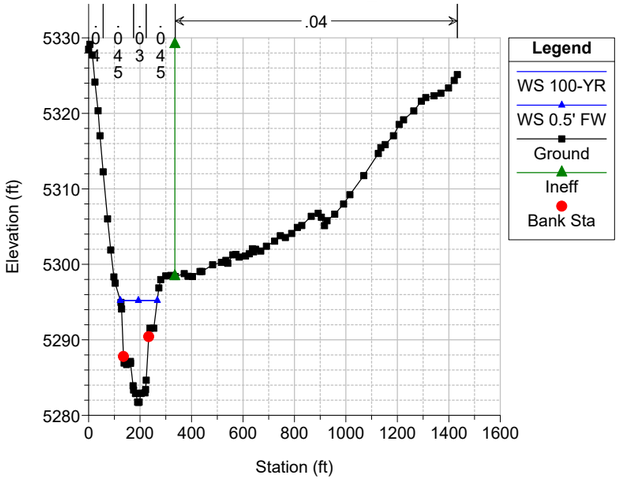
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42877



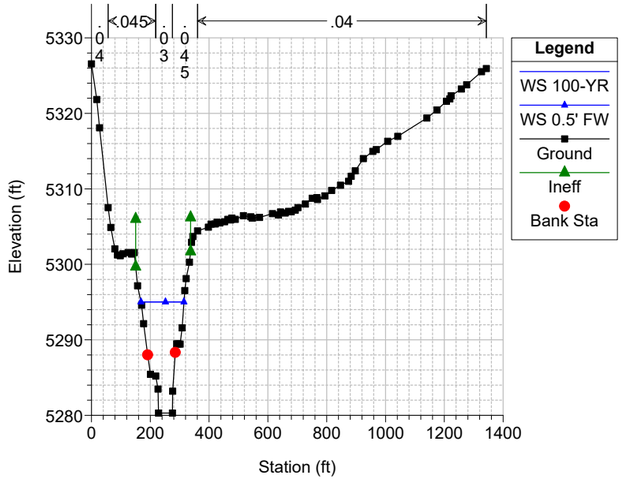
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42676



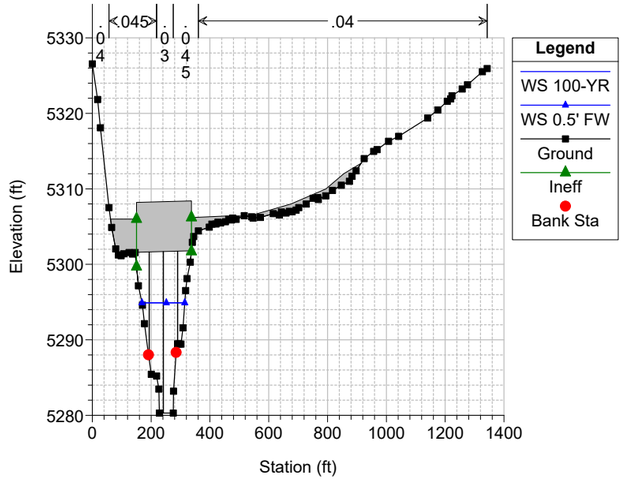
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42499 FHAD CHANNEL GEOMETRY USED STA 225-276



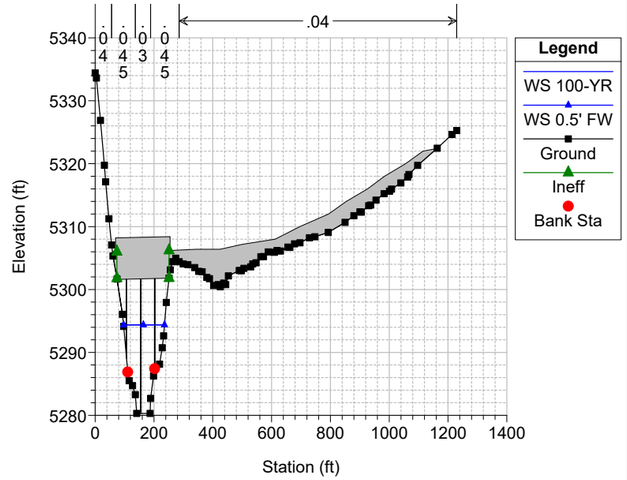
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42456 BR I-70 WB I-70 WESTBOUND



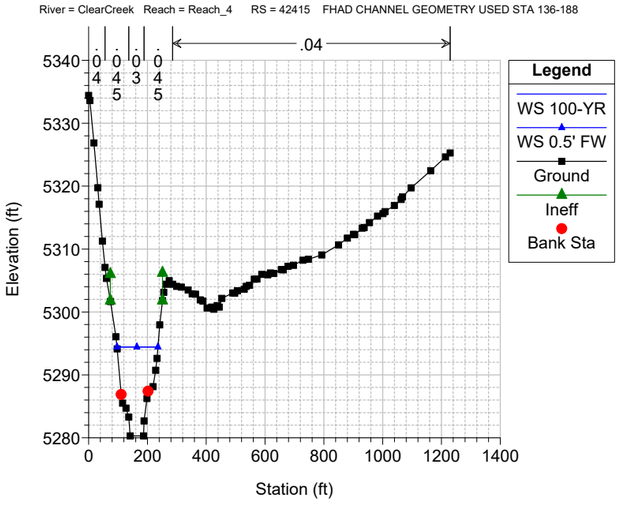
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42456 BR I-70 WB I-70 WESTBOUND



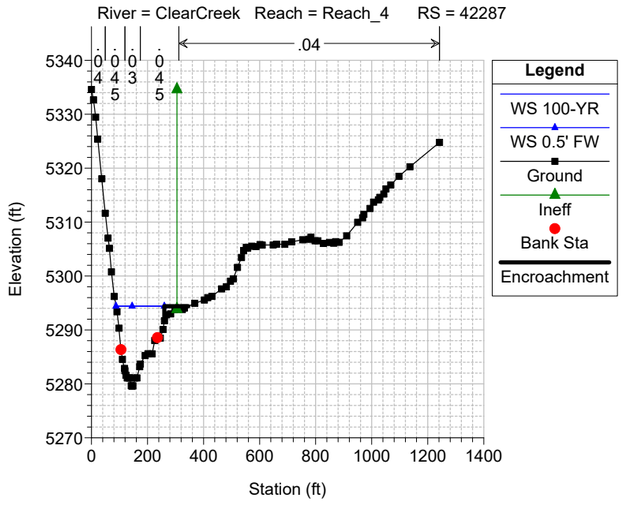
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42415 FHAD CHANNEL GEOMETRY USED STA 136-188



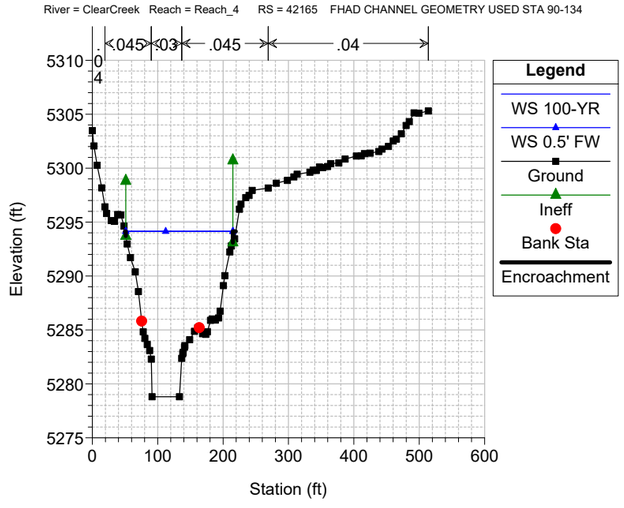
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42287



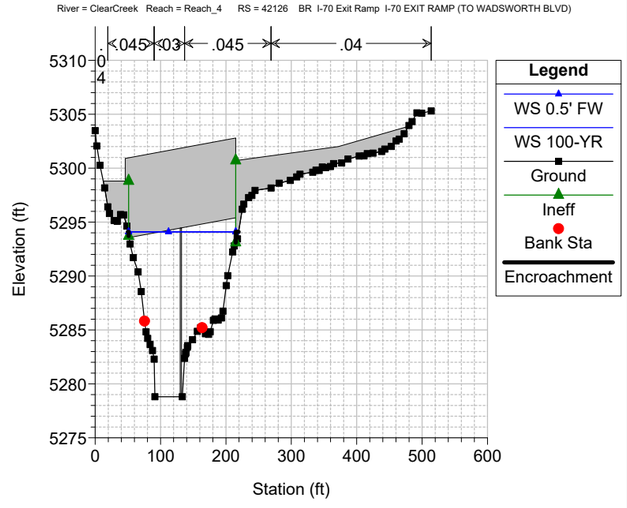
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42165 FHAD CHANNEL GEOMETRY USED STA 90-134



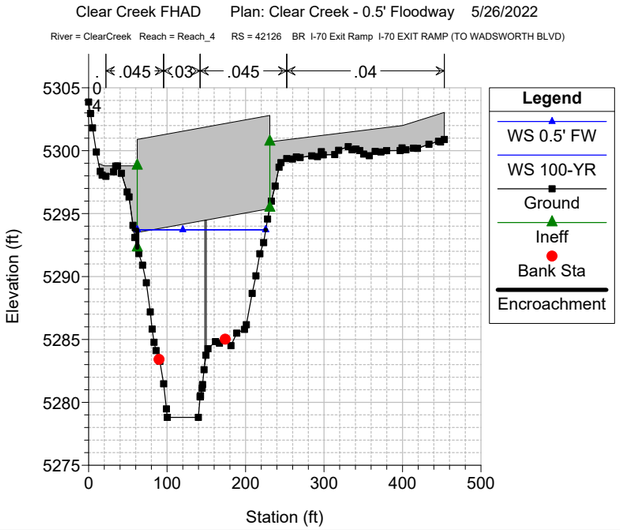
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42126 BR I-70 Exit Ramp I-70 EXIT RAMP (TO WADSWORTH BLVD)



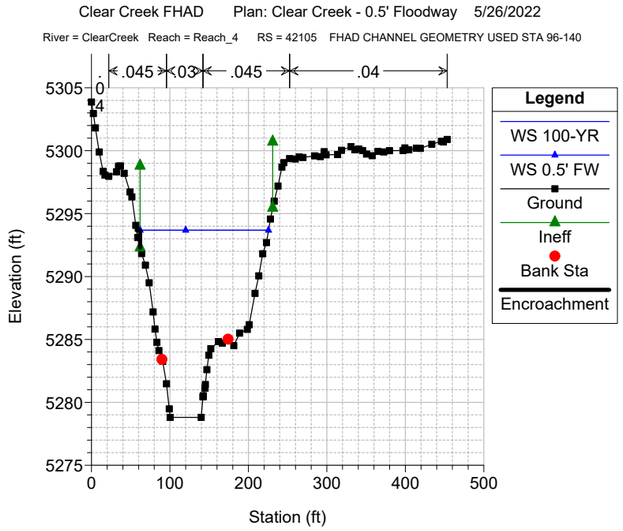
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42126 BR I-70 Exit Ramp I-70 EXIT RAMP (TO WADSWORTH BLVD)



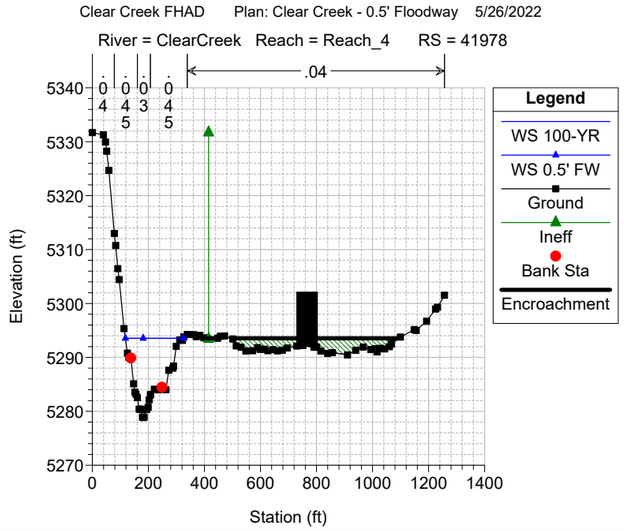
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 42105 FHAD CHANNEL GEOMETRY USED STA 96-140



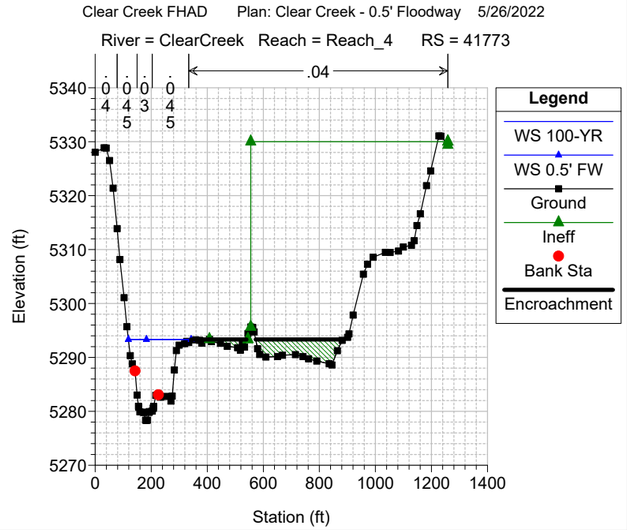
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

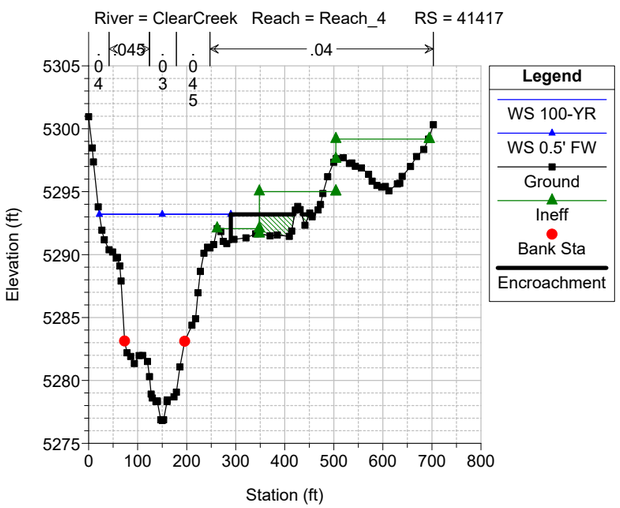
River = ClearCreek Reach = Reach_4 RS = 41978

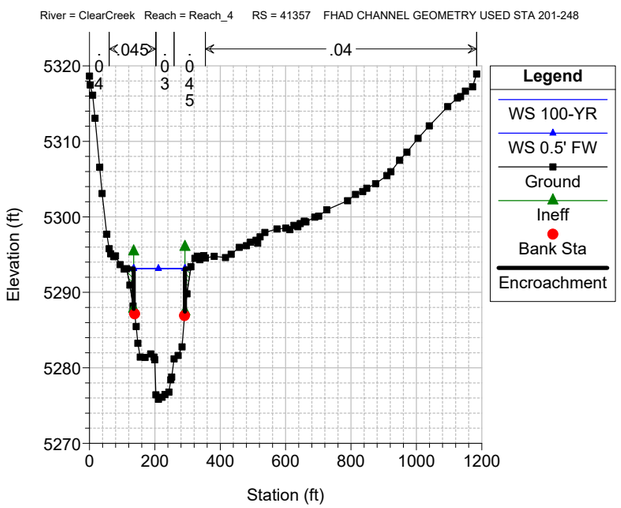


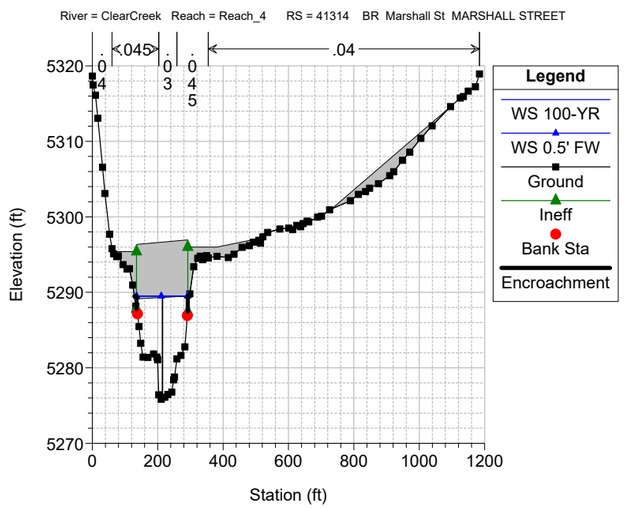
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

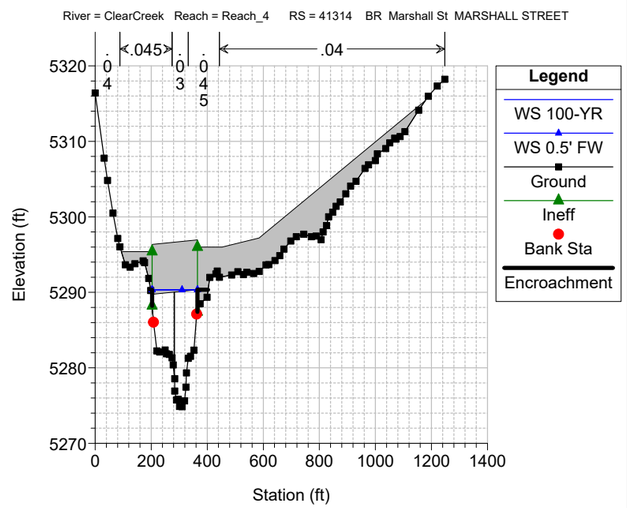
River = ClearCreek Reach = Reach_4 RS = 41773

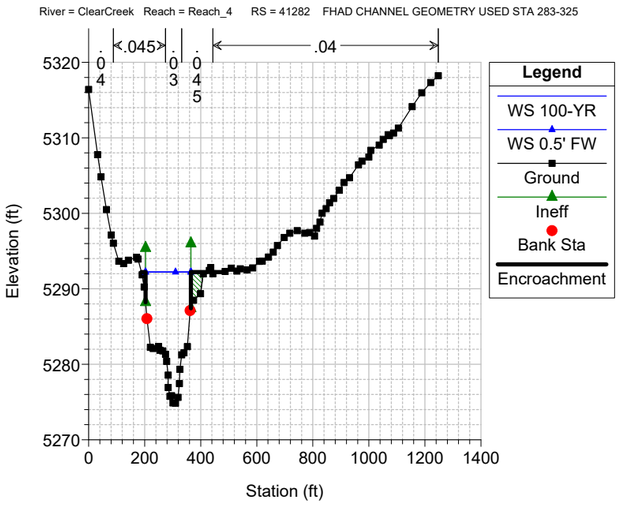


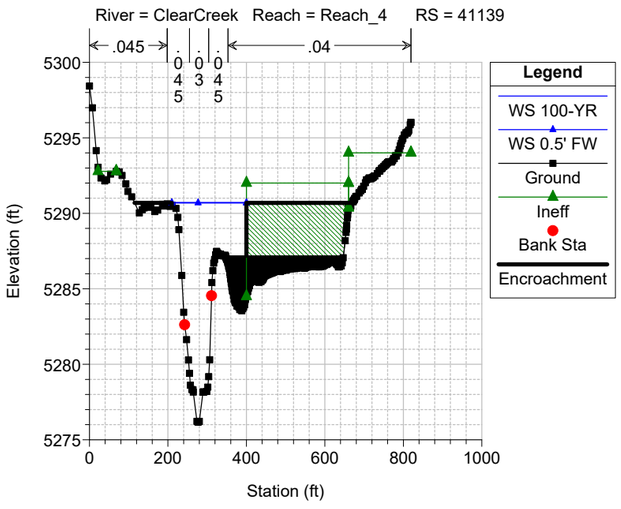
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 41417


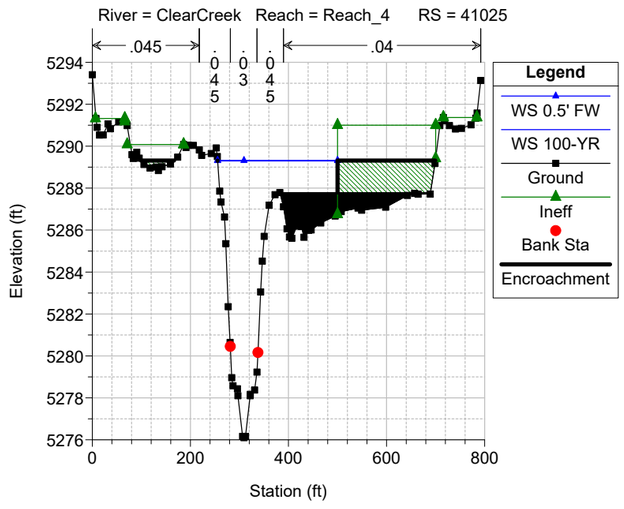
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 41357 FHAD CHANNEL GEOMETRY USED STA 201-248


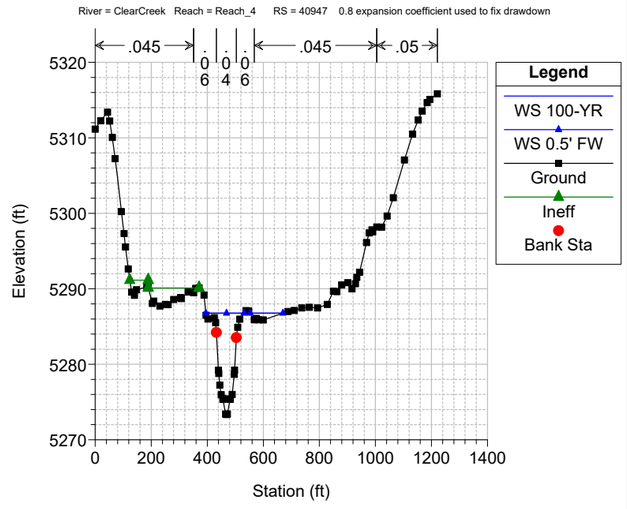
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 41314 BR Marshall St MARSHALL STREET


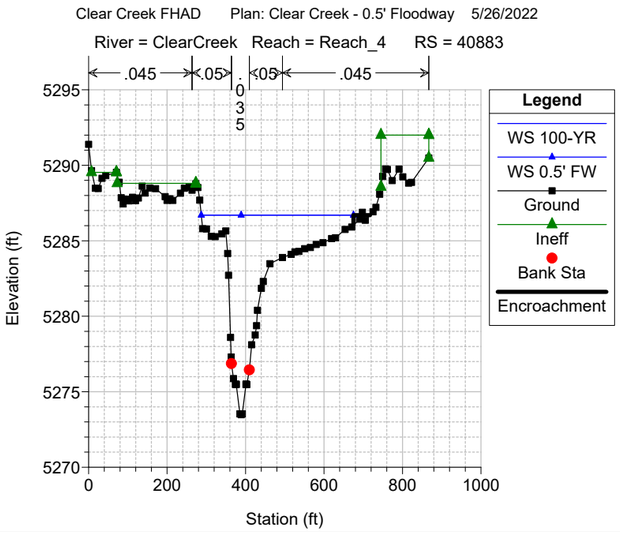
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 41314 BR Marshall St MARSHALL STREET


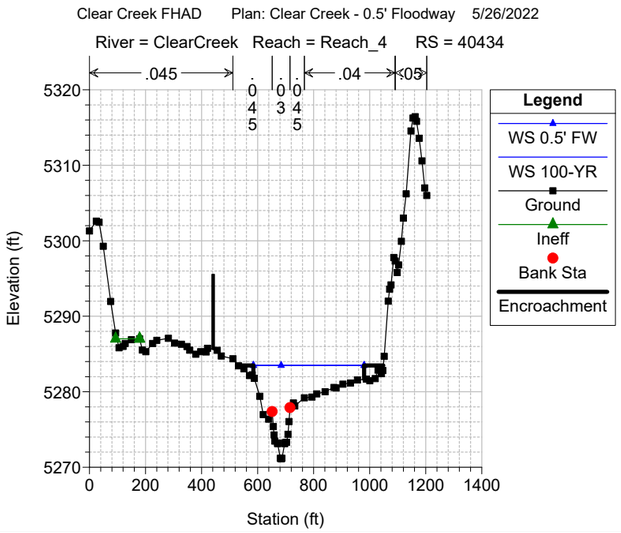
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 41282 FHAD CHANNEL GEOMETRY USED STA 283-325


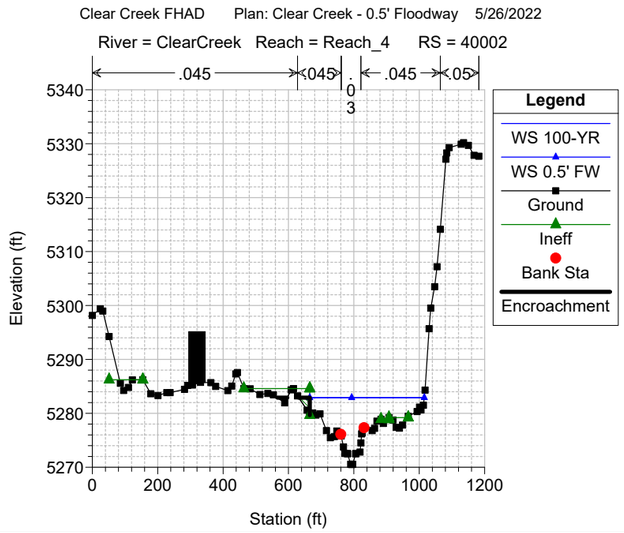
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 41139


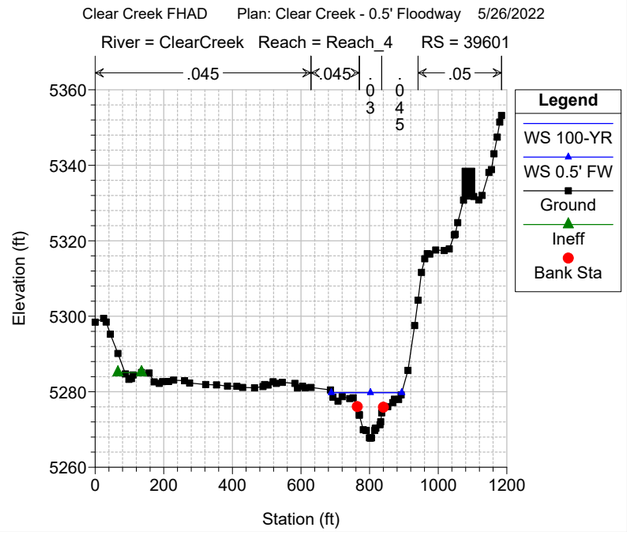
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 41025


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 40947 0.8 expansion coefficient used to fix drawdown


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 40883


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 40434


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 40002


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 39601


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 39183
.045 .05
Legend: WS 0.5' FW, WS 100-YR, Ground, Bank Sta
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 38688
.045 .05
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 38441
.05
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 38345 FHAD CHANNEL GEOMETRY USED STA 298-364
.05
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 38290 BR W 52nd Ave WEST 52nd AVE.
.05
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 38290 BR W 52nd Ave WEST 52nd AVE.
.05
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 38267 FHAD CHANNEL GEOMETRY USED STA 145-225
.05
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 38186
.05
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 37772
.05
Legend: WS 0.5' FW, WS 100-YR, Ground, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

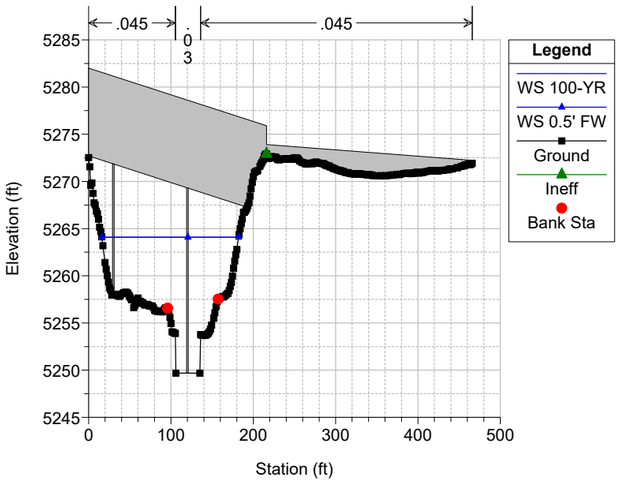
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 37300
.045 .05
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 37204
.045 .05
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 37007
.045 .045
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta
Elevation (ft)
Station (ft)

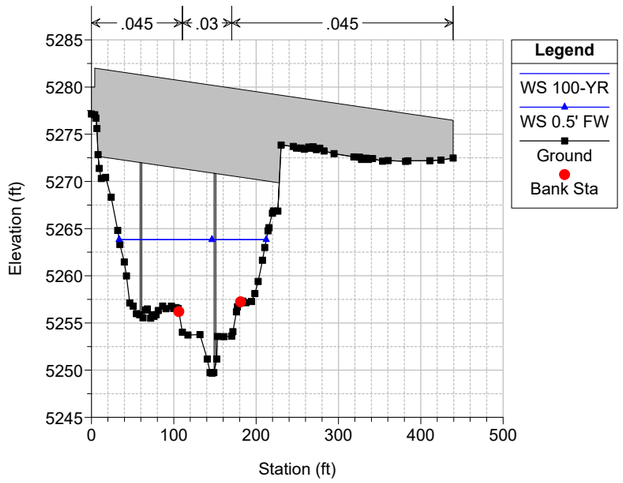
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36929 BR I-76 EB I-76 EASTBOUND; BRIDGE DECK ADJUSTED MANUALLY TO ACCOUNT FOR SKE



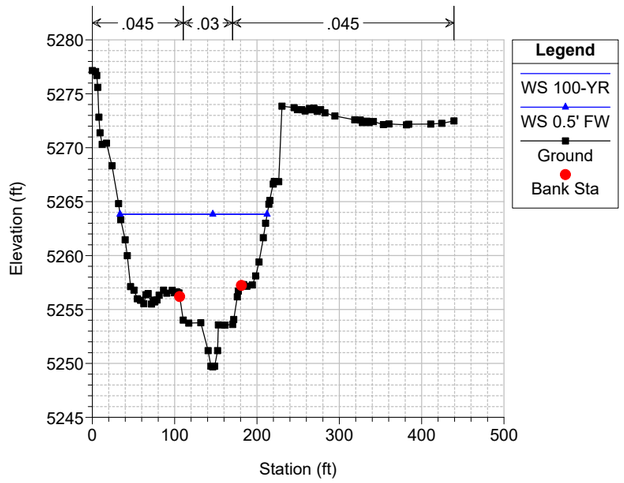
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36929 BR I-76 EB I-76 EASTBOUND; BRIDGE DECK ADJUSTED MANUALLY TO ACCOUNT FOR SKE



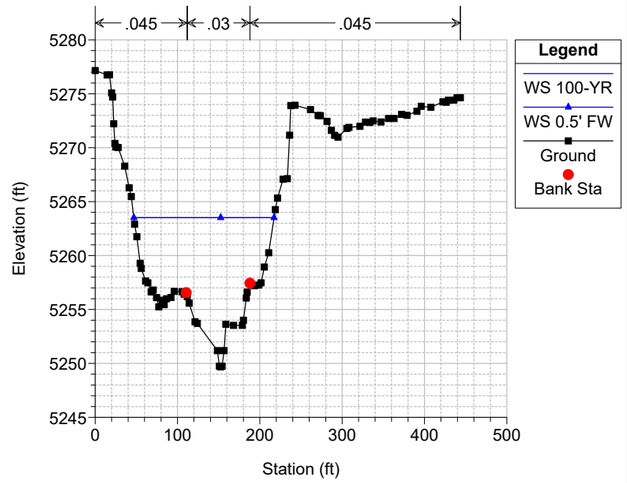
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36901 FHAD CHANNEL GEOMETRY USED STA 207-280



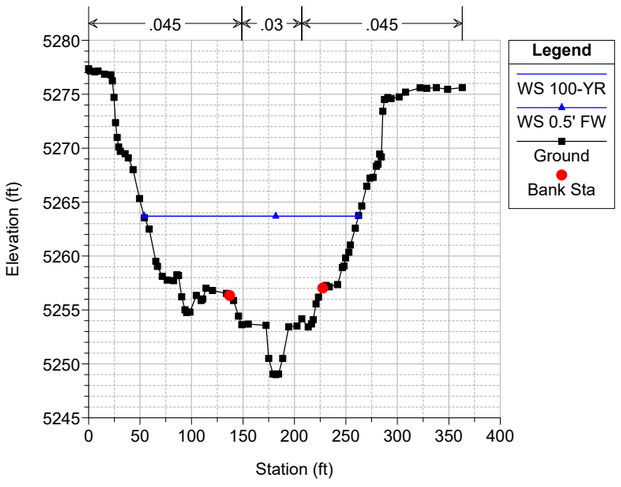
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36879 FHAD CHANNEL GEOMETRY USED STA 263-276



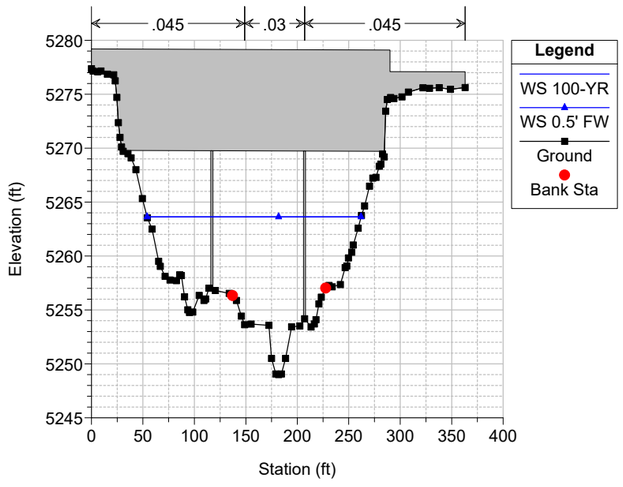
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36856 FHAD CHANNEL GEOMETRY USED STA 240-281



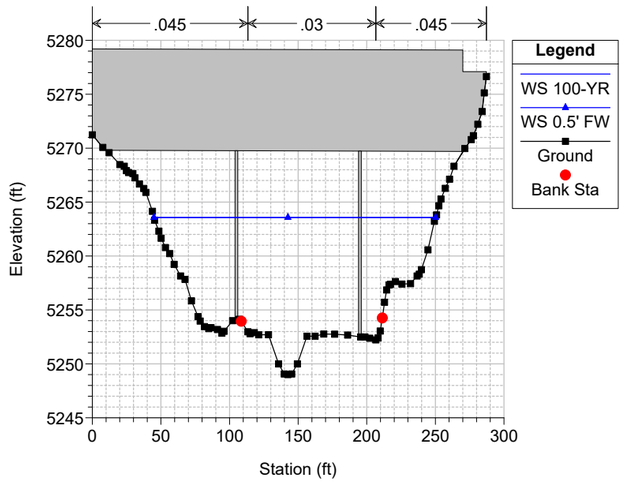
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36763 BR I-76 WB I-76 WESTBOUND; BRIDGE DECK MANUALLY ADJUSTED TO ACCOUNT FOR SKE



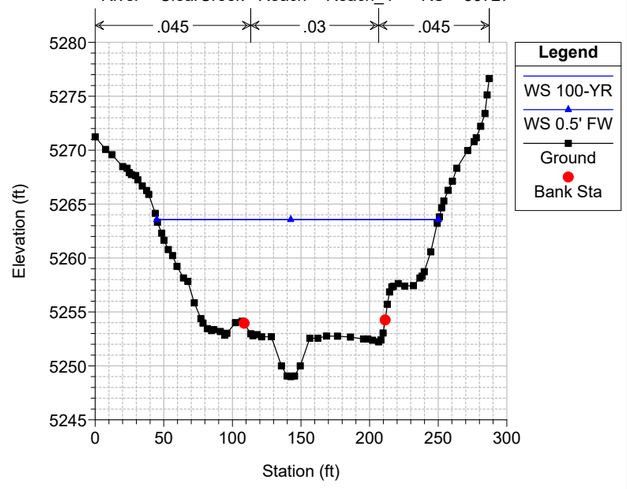
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36763 BR I-76 WB I-76 WESTBOUND; BRIDGE DECK MANUALLY ADJUSTED TO ACCOUNT FOR SKE



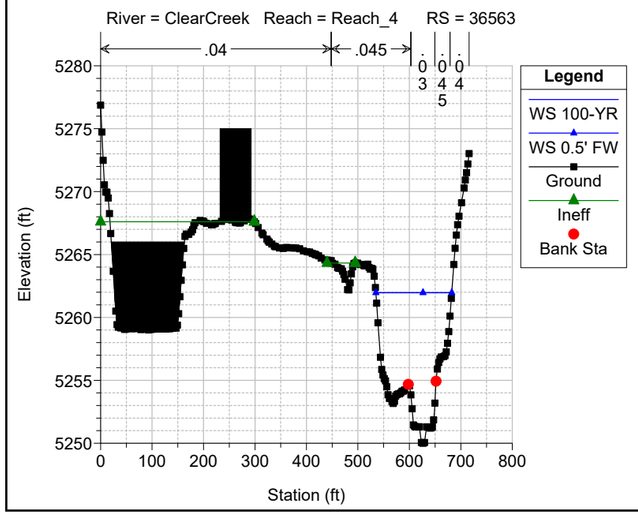
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36727



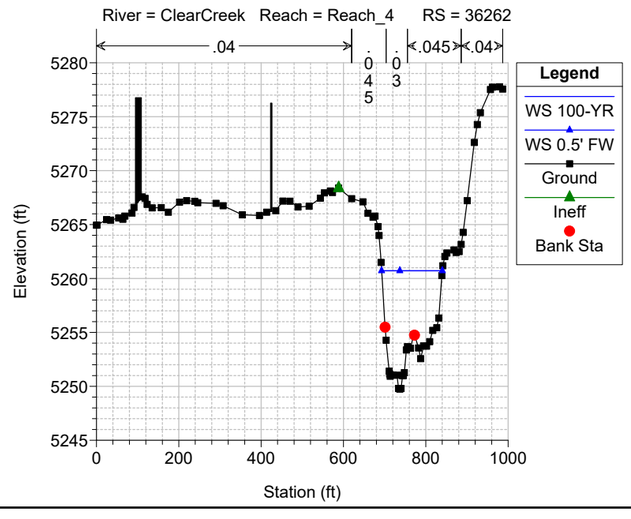
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36563



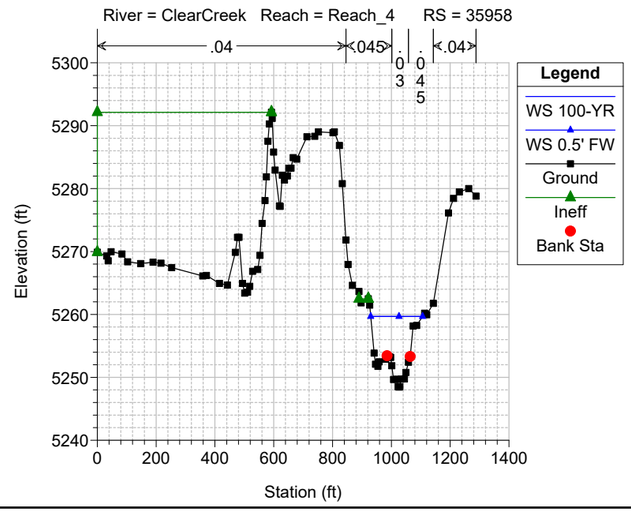
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 36262



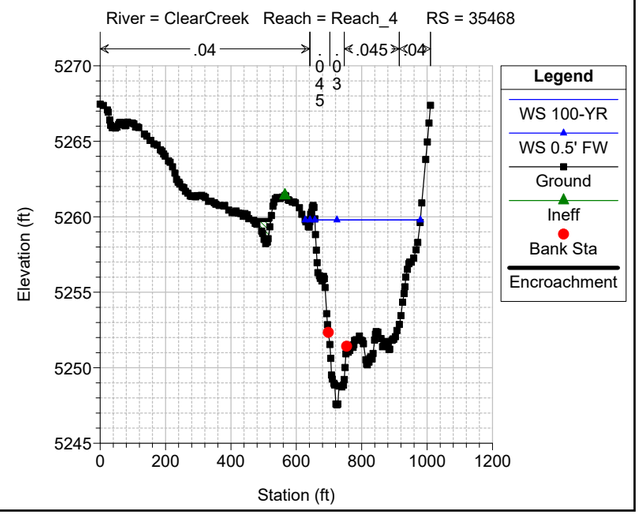
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

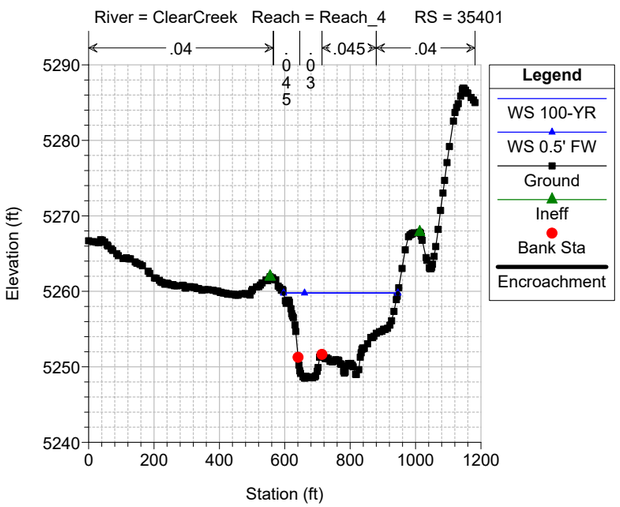
River = ClearCreek Reach = Reach_4 RS = 35958

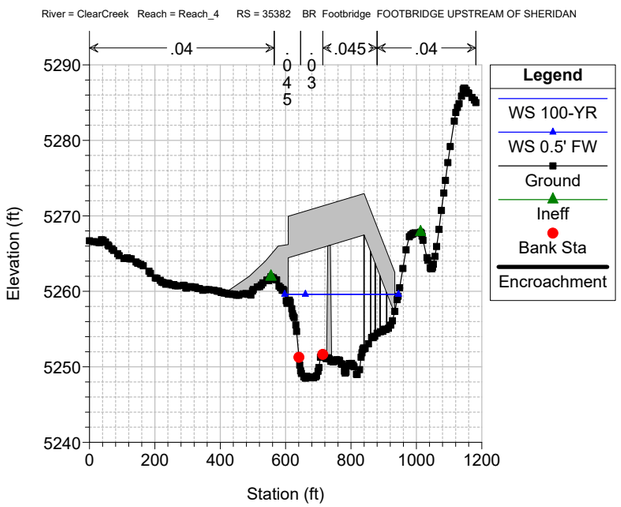


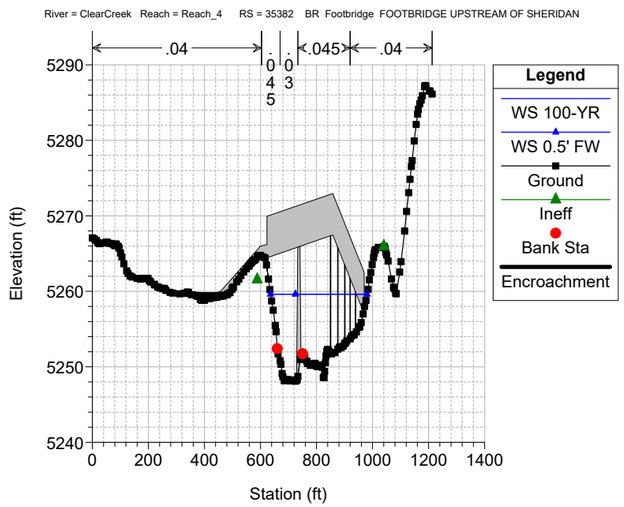
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

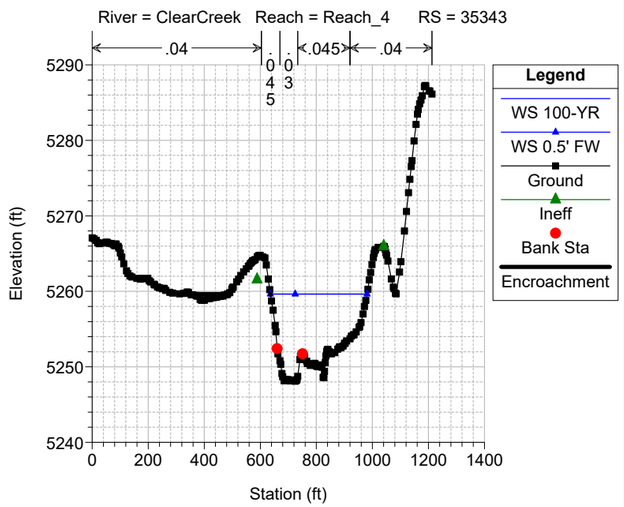
River = ClearCreek Reach = Reach_4 RS = 35468

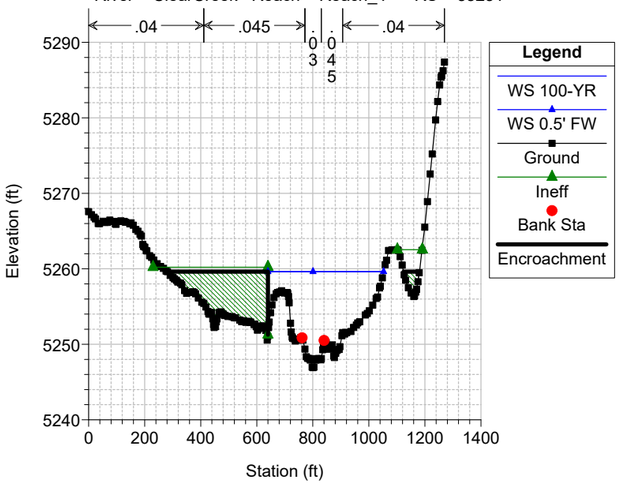


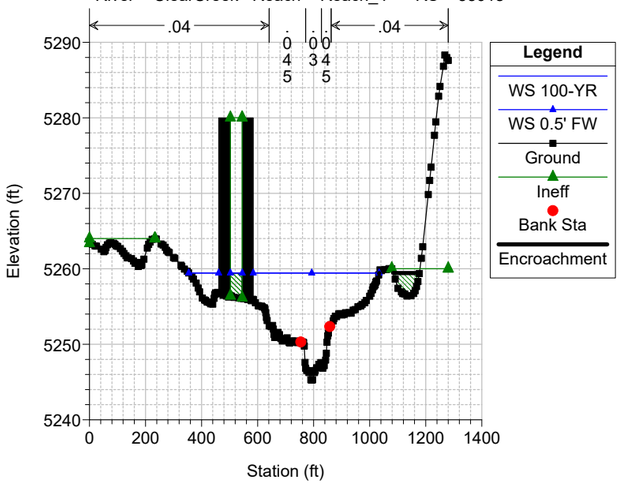
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 35401


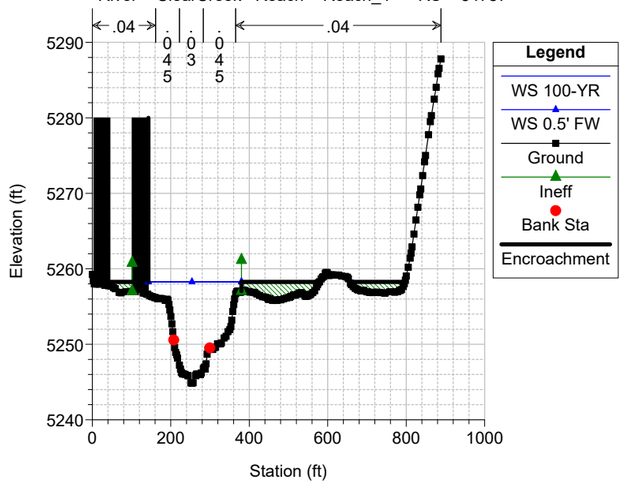
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 35382 BR Footbridge FOOTBRIDGE UPSTREAM OF SHERIDAN


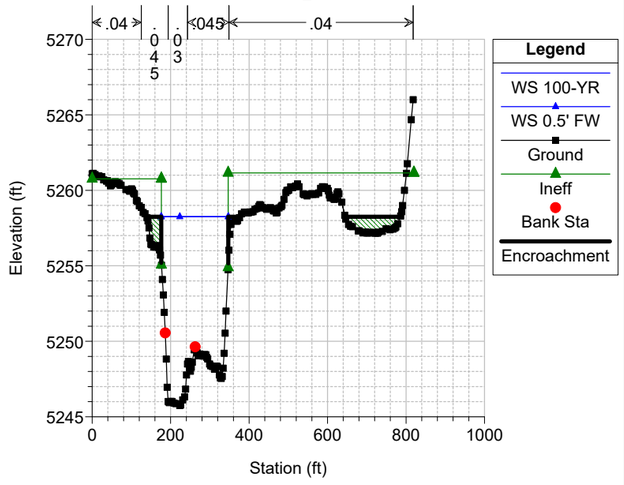
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 35382 BR Footbridge FOOTBRIDGE UPSTREAM OF SHERIDAN


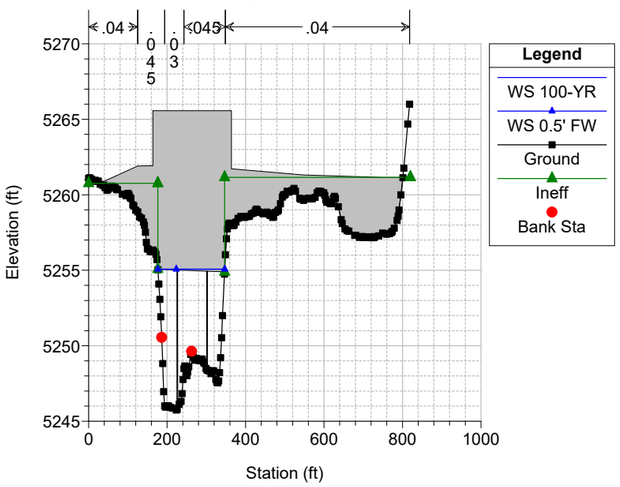
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 35343


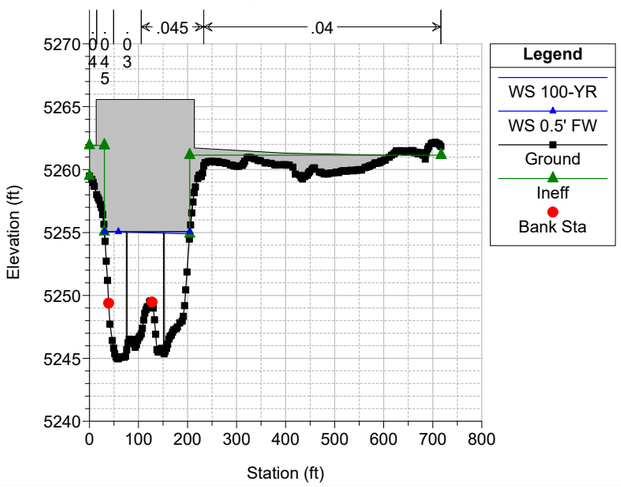
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 35231


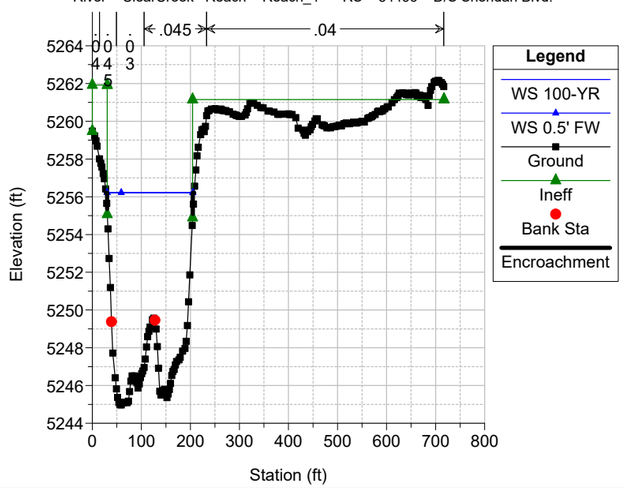
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 35018


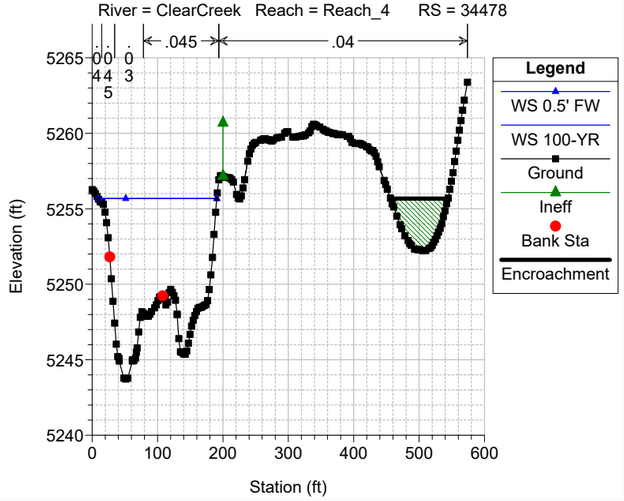
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 34757


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 34653 U/S Sheridan Blvd.


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 34574 BR Sheridan Blvd SHERIDAN BLVD.


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 34574 BR Sheridan Blvd SHERIDAN BLVD.


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 34496 D/S Sheridan Blvd.


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 34478


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 34142
.045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 33862
.045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Bank Sta

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 33496
.045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Bank Sta

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 33166 U/S I-76 West Crossing
.04 .045 .03 .045 .045
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 33030 BR I-76 W X-ing I-76 WEST CROSSING
.04 .045 .03 .045 .045 .04
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 33030 BR I-76 W X-ing I-76 WEST CROSSING
.04 .045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 32787 D/S I-76 West Crossing
.04 .045 .03 .045 .04
Elevation (ft)
Station (ft)
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment

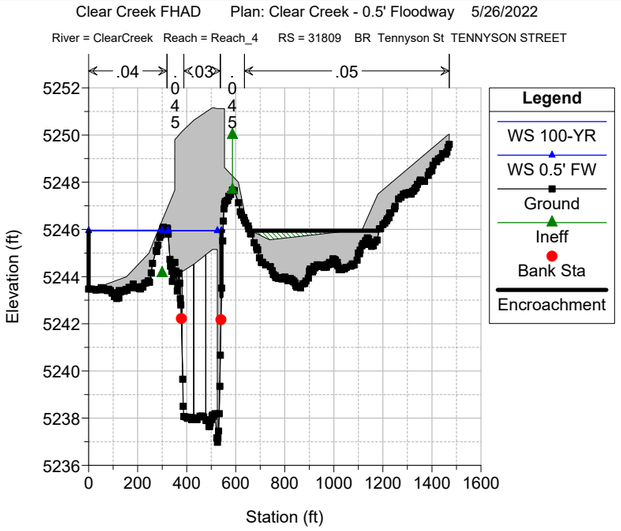
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 32573
.045 .045 .03 .045 .05
Elevation (ft)
Station (ft)
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment

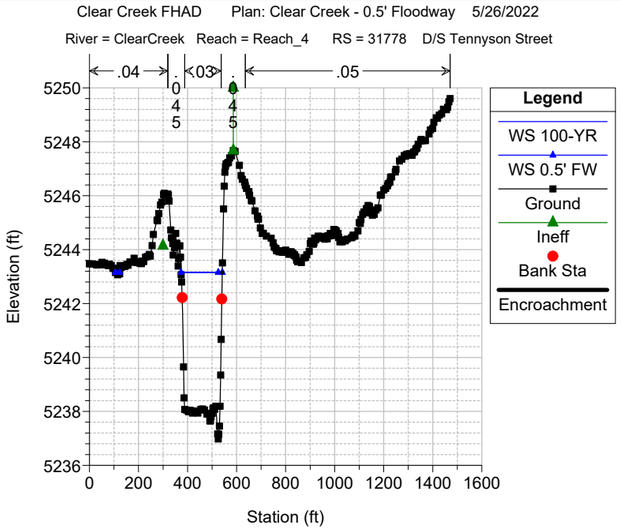
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 32467
.045 .045 .03 .045 .05
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment

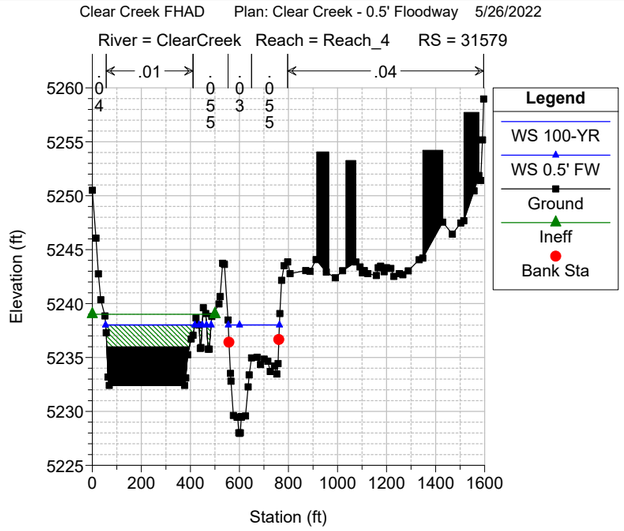
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 32160
.04 .045 .045 .03 .045 .05
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment

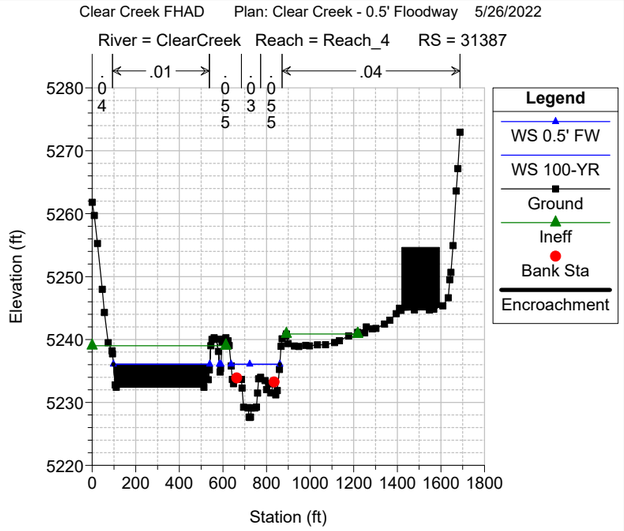
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 31859 U/S Tennyson Street
.04 .045 .045 .03 .045 .05
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment

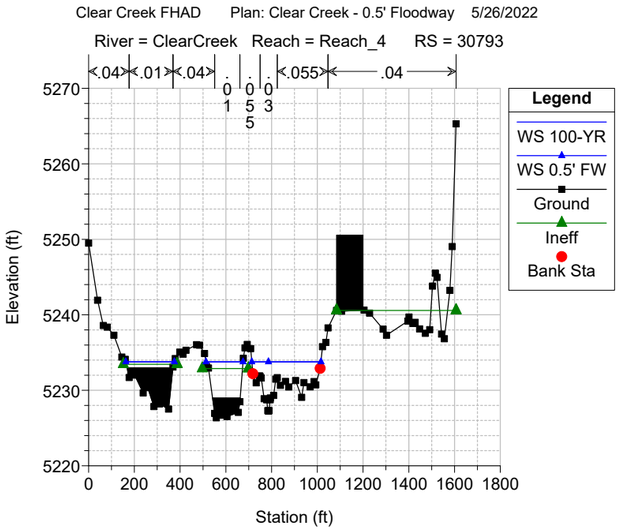
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 31809 BR Tennyson St TENNYSON STREET
.04 .045 .045 .03 .045 .05
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment

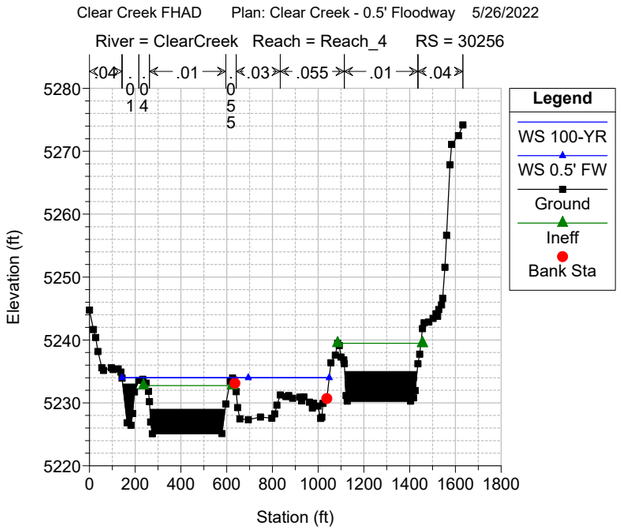
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 31809 BR Tennyson St TENNYSON STREET


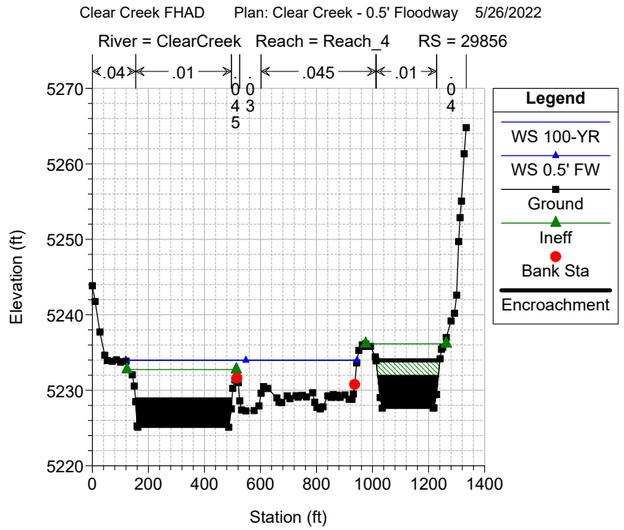
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 31778 D/S Tennyson Street


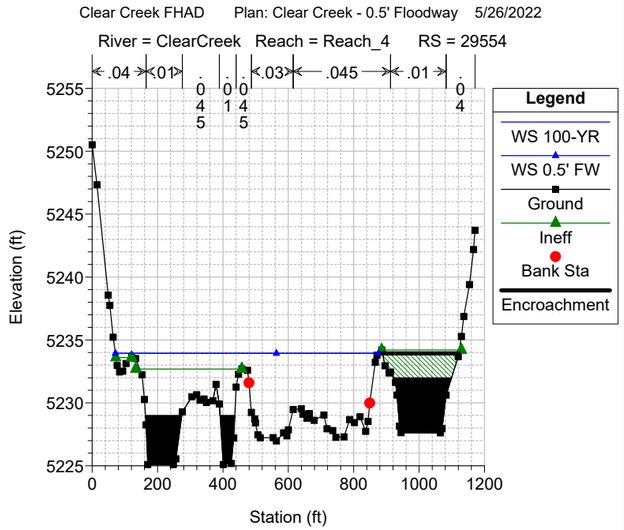
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 31579


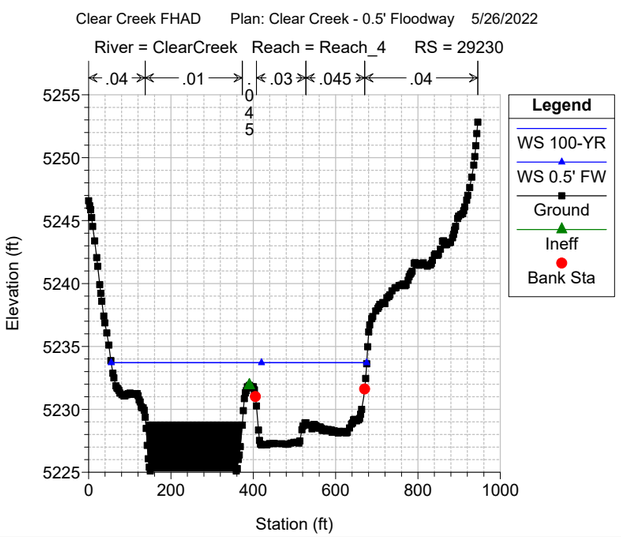
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 31387


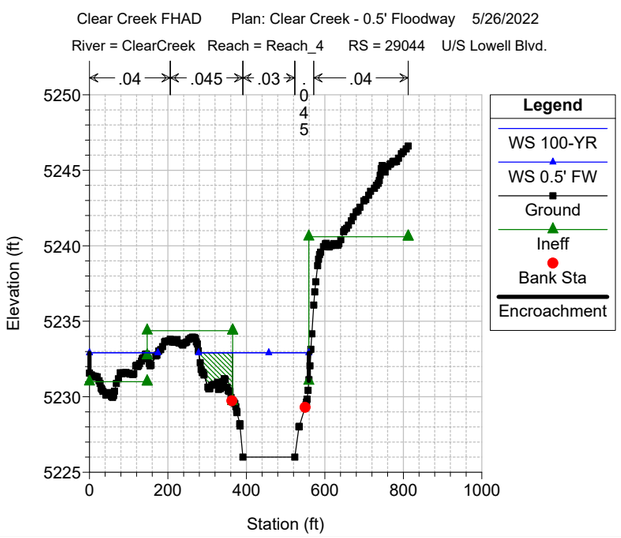
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 30793


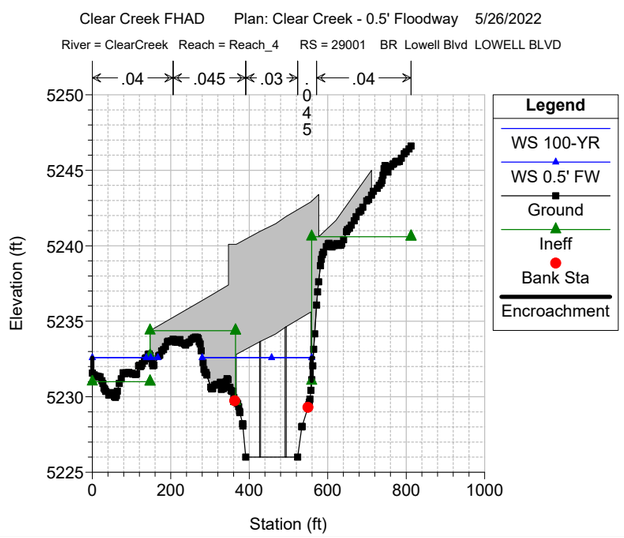
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 30256


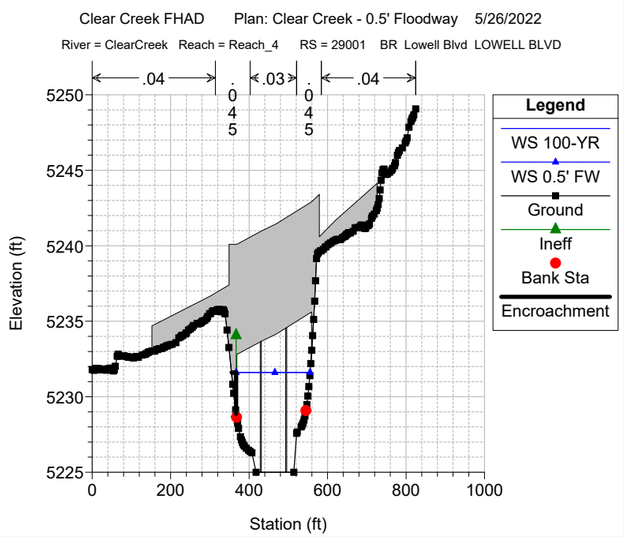
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 29856


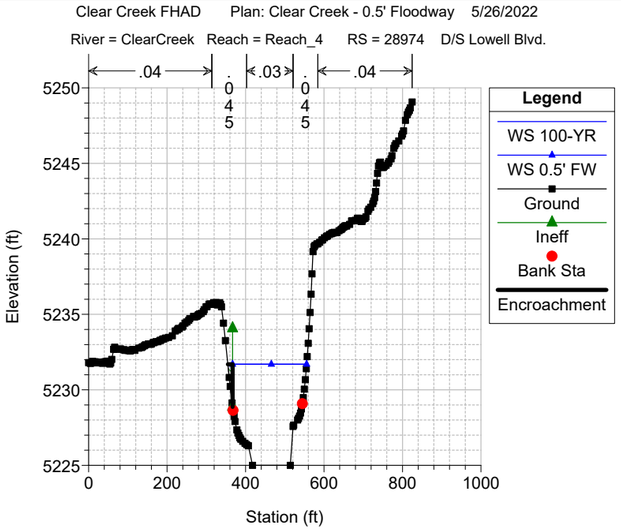
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 29554


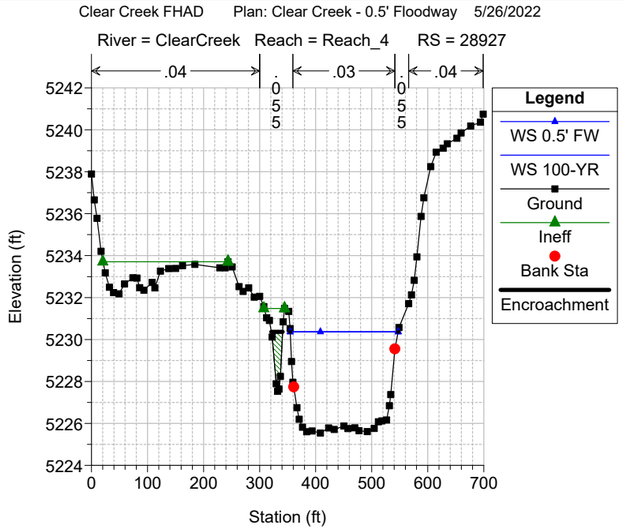
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 29230


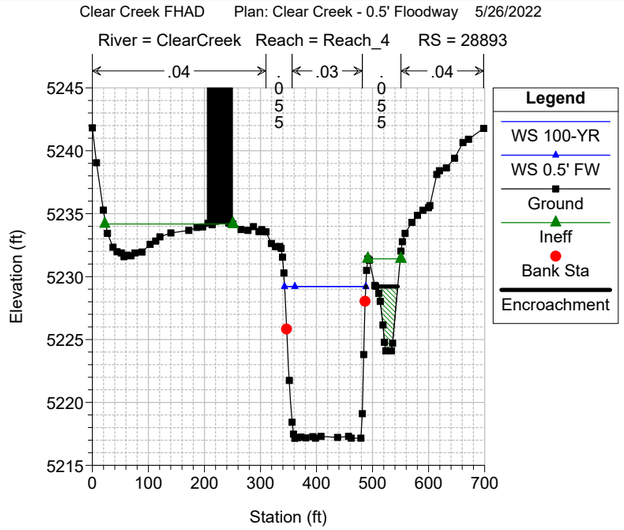
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 29044 U/S Lowell Blvd.


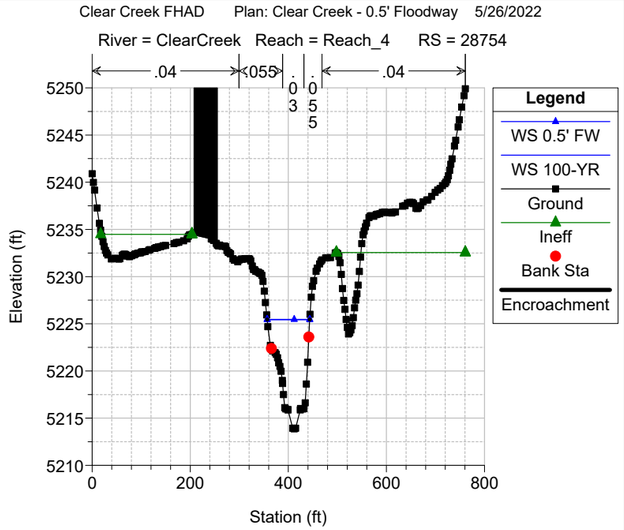
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 29001 BR Lowell Blvd LOWELL BLVD


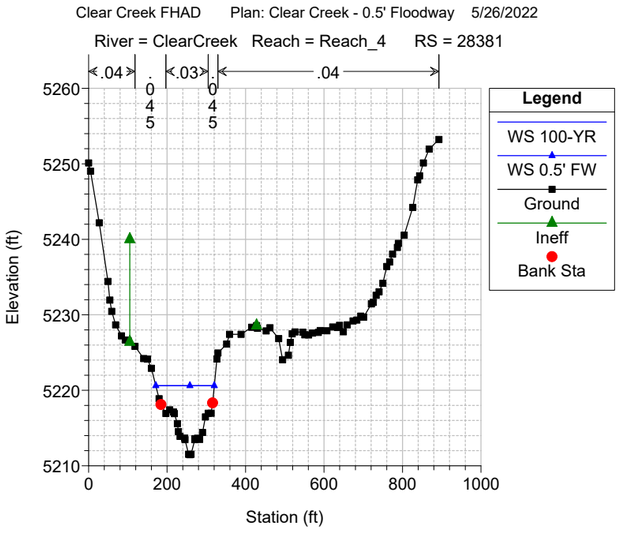
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 29001 BR Lowell Blvd LOWELL BLVD


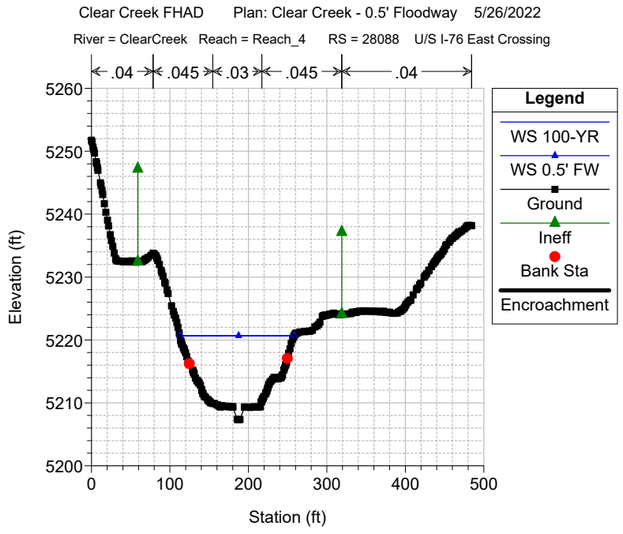

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 28974 D/S Lowell Blvd.
.04 .045 .03 .045 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

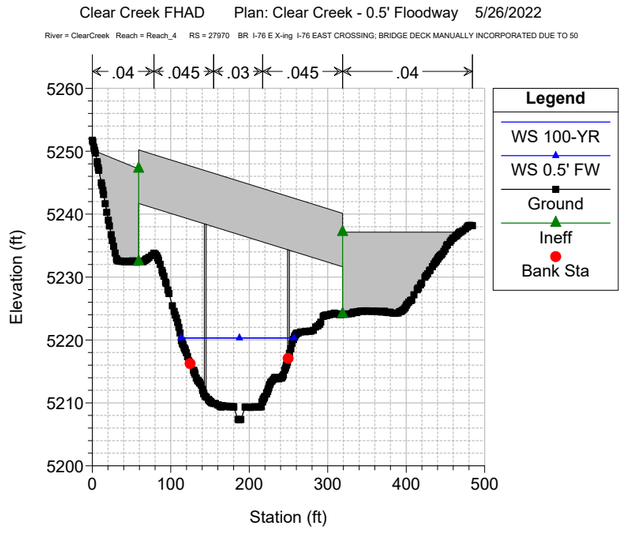

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 28927
.04 .055 .03 .055 .04
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

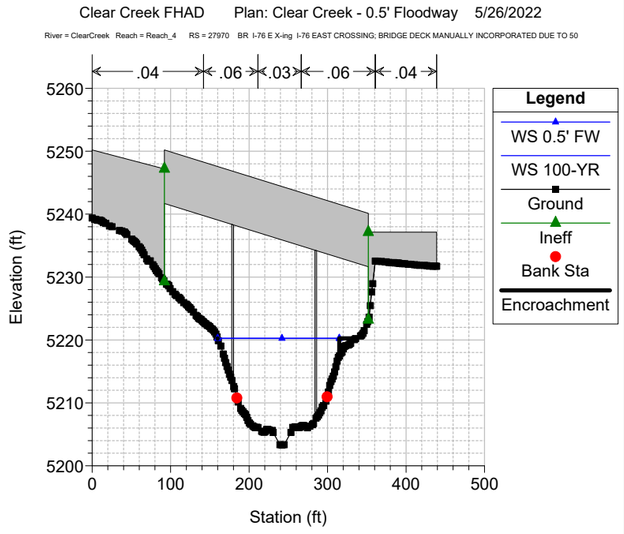

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 28893
.04 .055 .03 .055 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

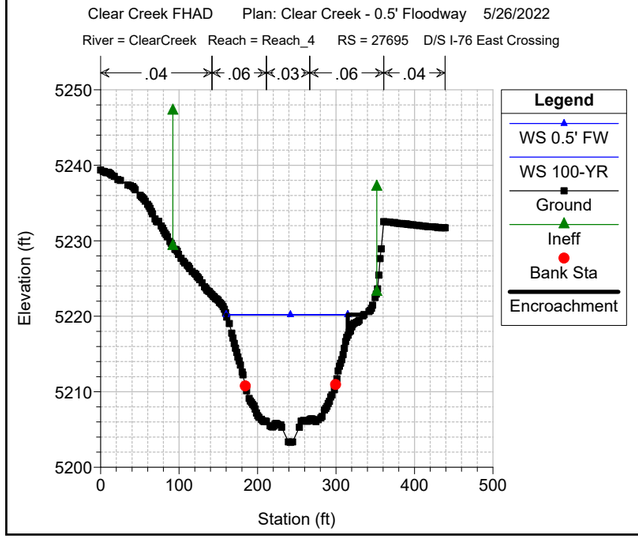

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 28754
.04 .055 .03 .055 .04
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

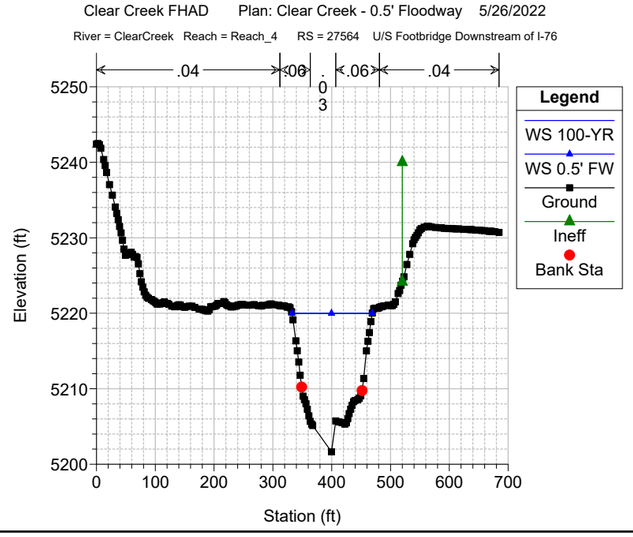

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 28381
.04 .045 .03 .045 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

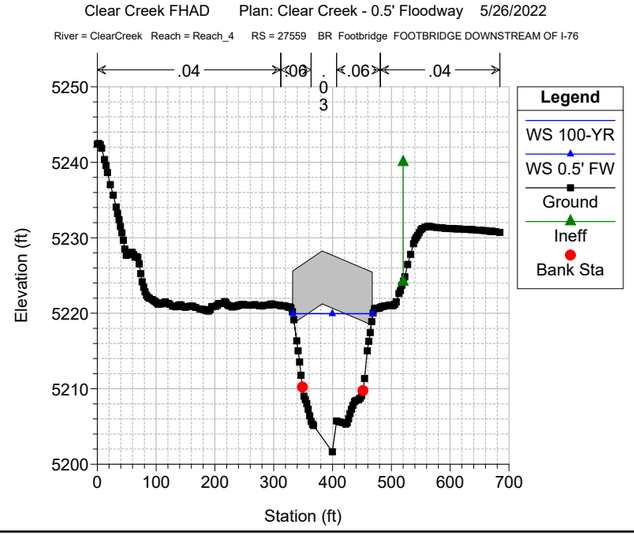

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 28088 U/S I-76 East Crossing
.04 .045 .03 .045 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

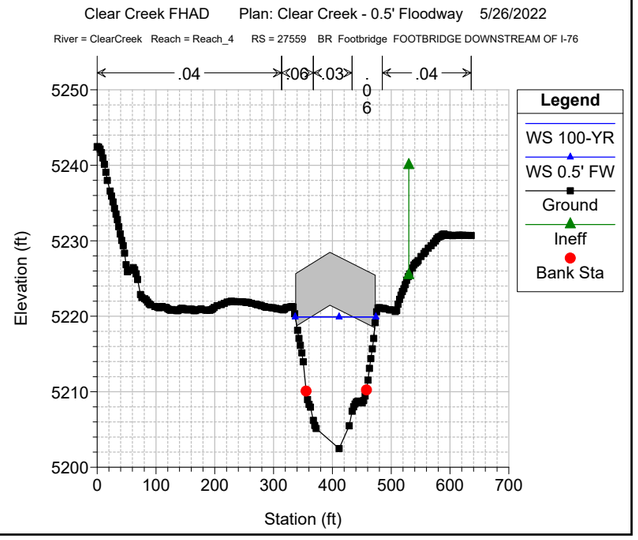

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27970 BR I-76 E X-ing I-76 EAST CROSSING; BRIDGE DECK MANUALLY INCORPORATED DUE TO 50
.04 .045 .03 .045 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27970 BR I-76 E X-ing I-76 EAST CROSSING; BRIDGE DECK MANUALLY INCORPORATED DUE TO 50
.04 .06 .03 .06 .04
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27695 D/S I-76 East Crossing
.04 .06 .03 .06 .04
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

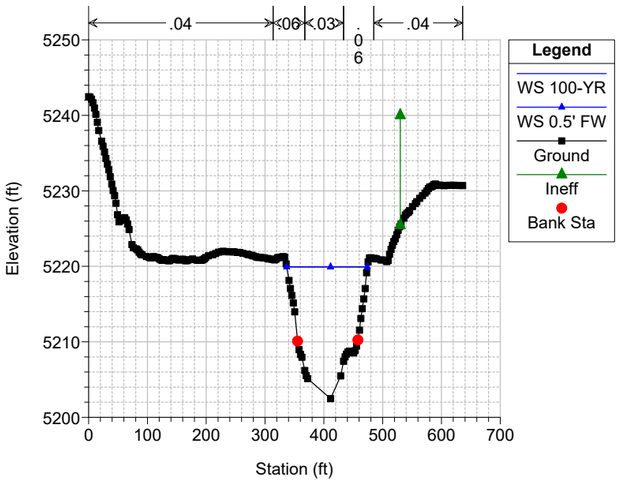

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27564 U/S Footbridge Downstream of I-76
.04 .06 .03 .06 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27559 BR Footbridge FOOTBRIDGE DOWNSTREAM OF I-76
.04 .06 .03 .06 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_4 RS = 27559 BR Footbridge FOOTBRIDGE DOWNSTREAM OF I-76
.04 .06 .03 .06 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

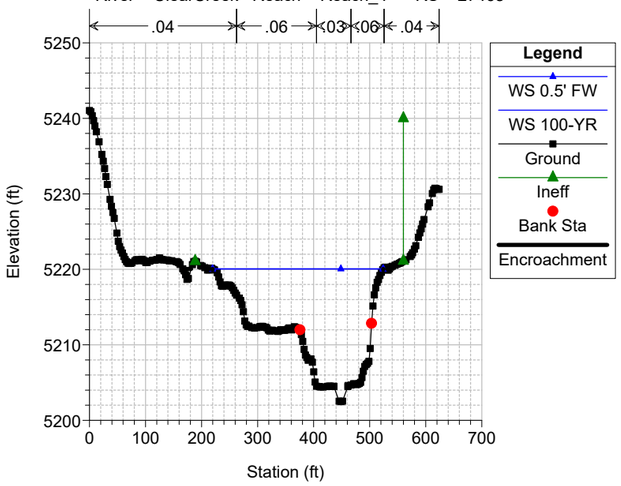
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 27548 D/S Footbridge Downstream of I-76



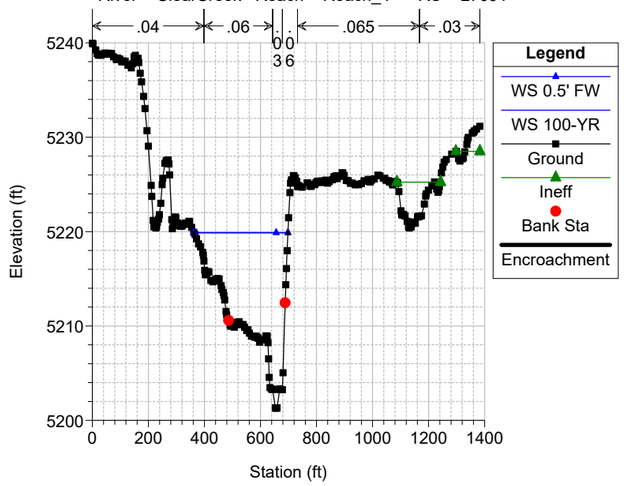
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 27468



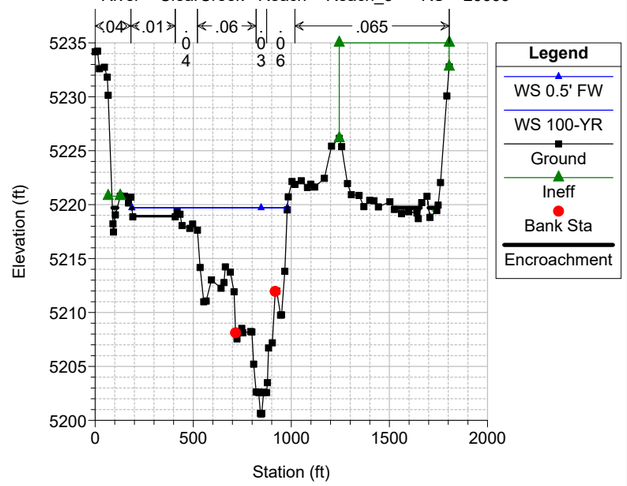
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_4 RS = 27091



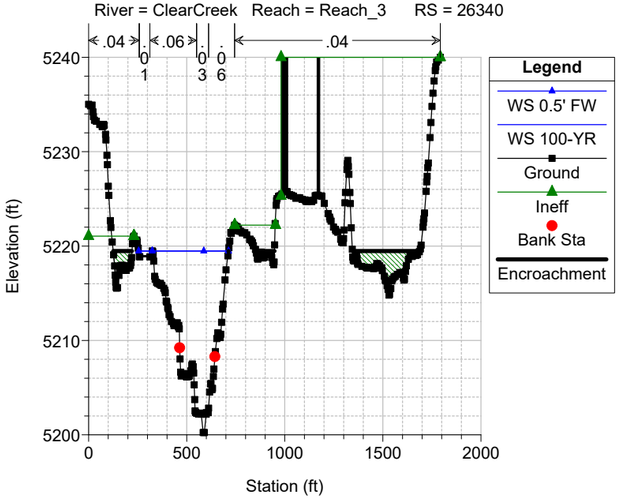
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_3 RS = 26669



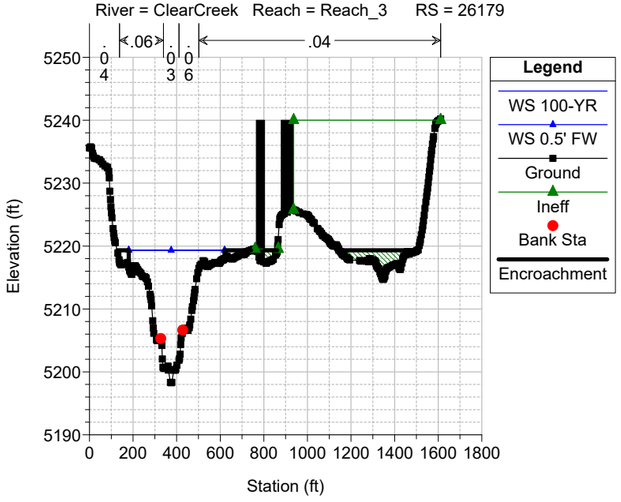
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_3 RS = 26340



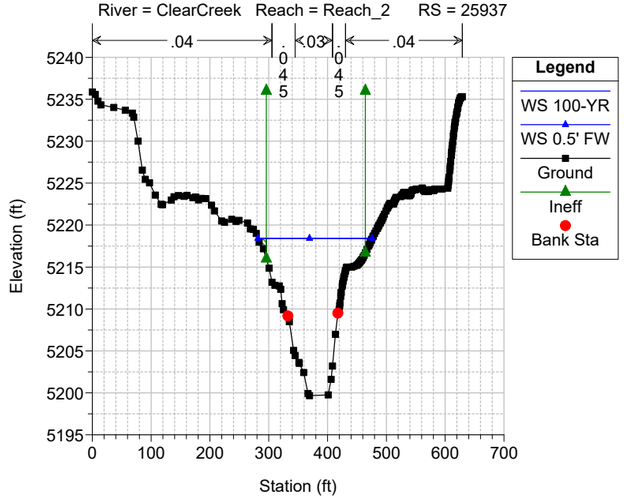
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_3 RS = 26179



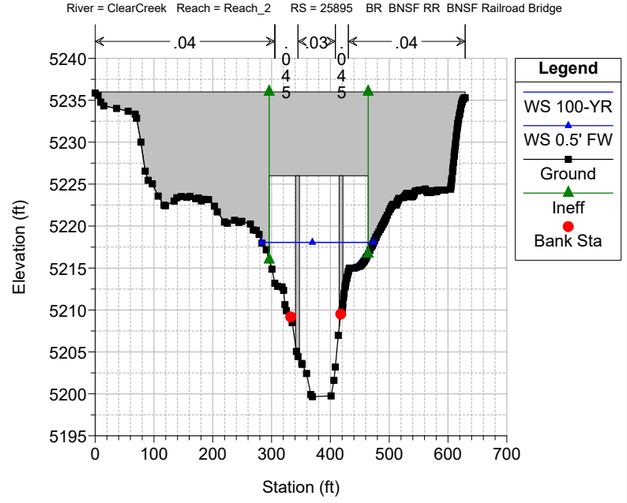
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25937



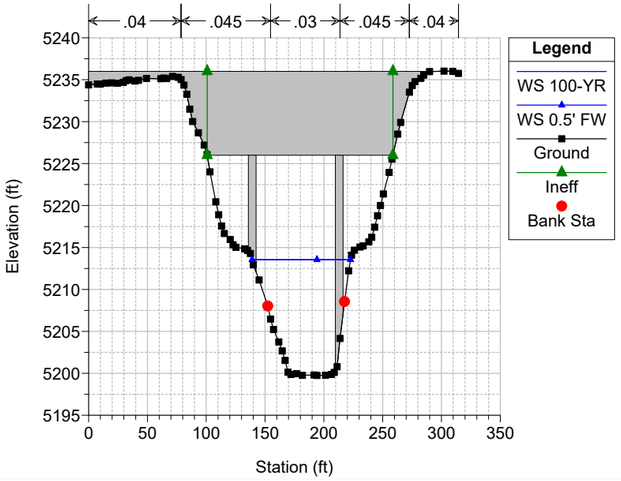
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25895 BR BNSF RR BNSF Railroad Bridge



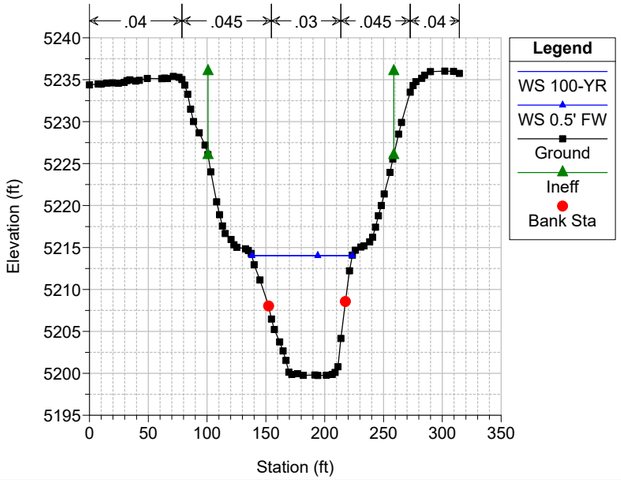
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25895 BR BNSF RR BNSF Railroad Bridge



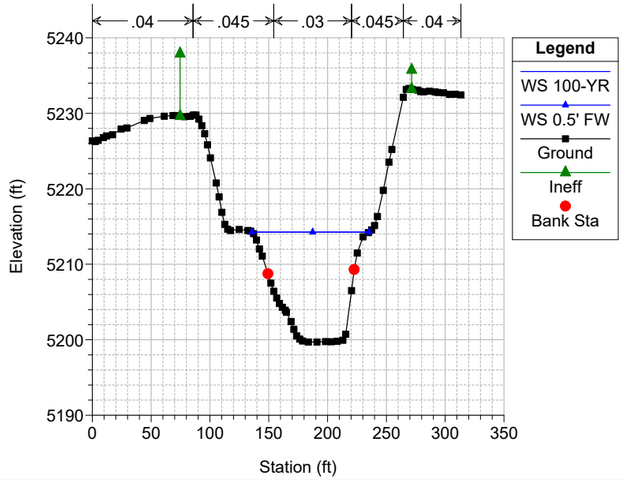
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25850



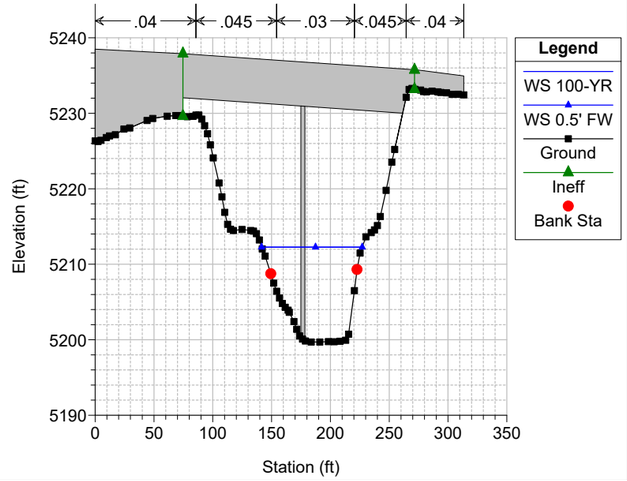
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25833



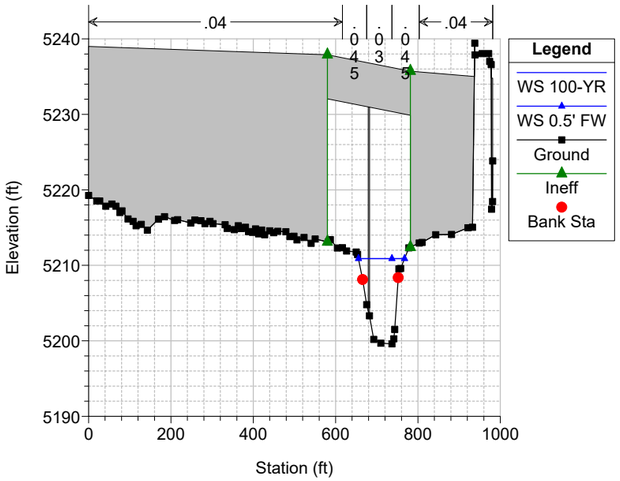
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25822 BR LRT Gold Line LRT Gold Line Bridge (As-Built following CLOMR 13-08-0099R)



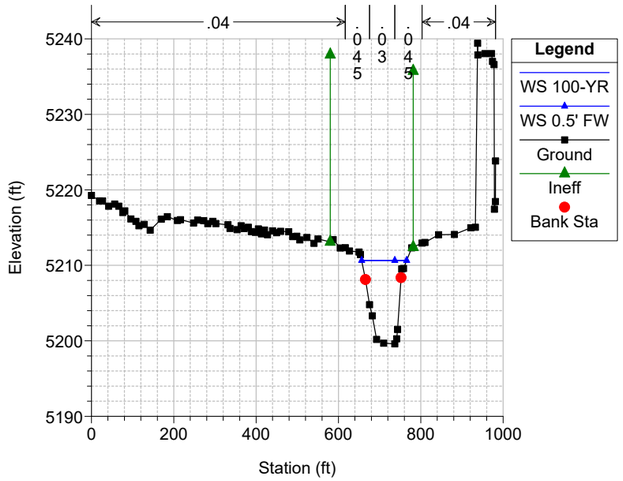
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25822 BR LRT Gold Line LRT Gold Line Bridge (As-Built following CLOMR 13-08-0099R)



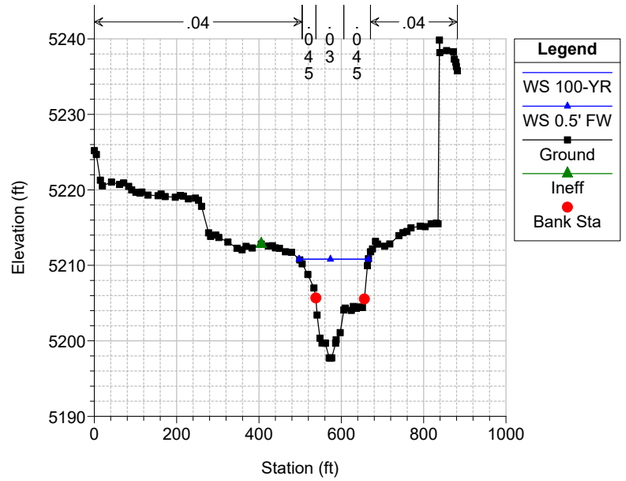
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25780 ROB Geom. data from RTD Gold Line LOMR 16-08-1204P



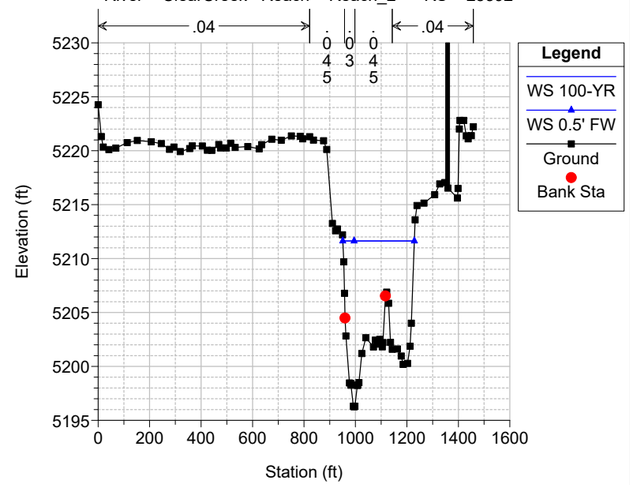
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25690 ROB Geom. data from RTD Gold Line LOMR 16-08-1204P



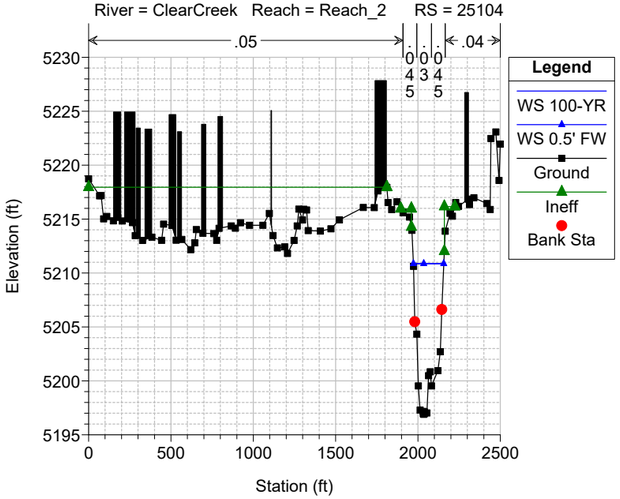
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25392



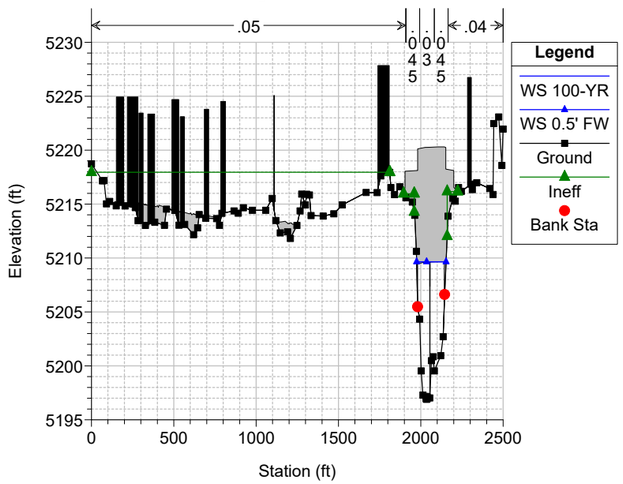
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25104



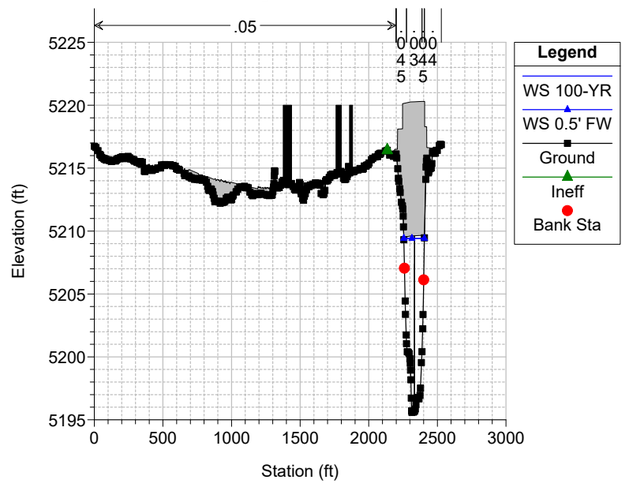
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25035 BR Federal Blvd FEDERAL BLVD



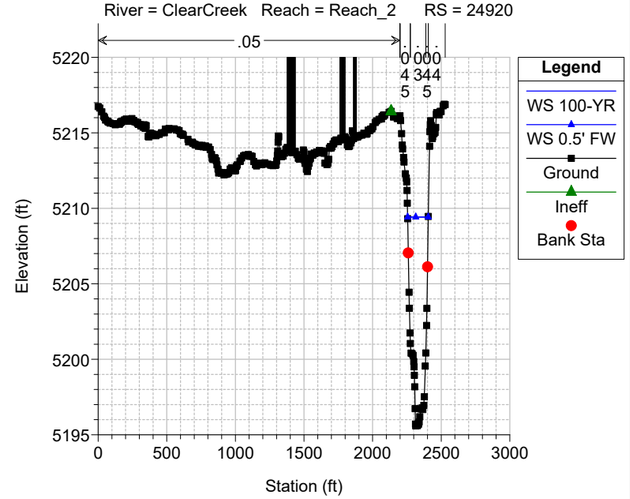
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 25035 BR Federal Blvd FEDERAL BLVD



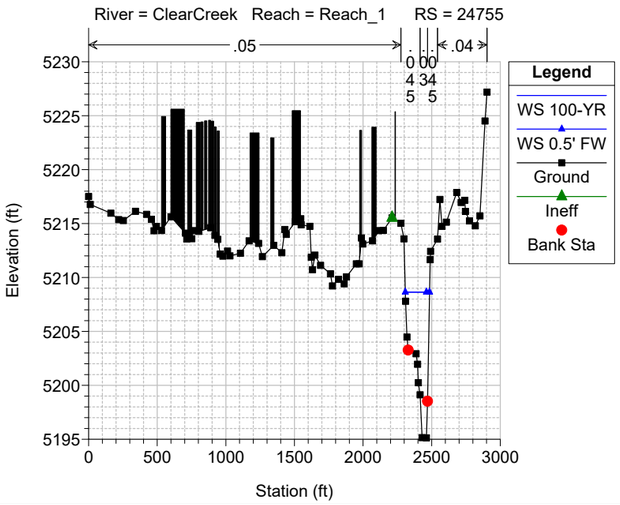
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_2 RS = 24920



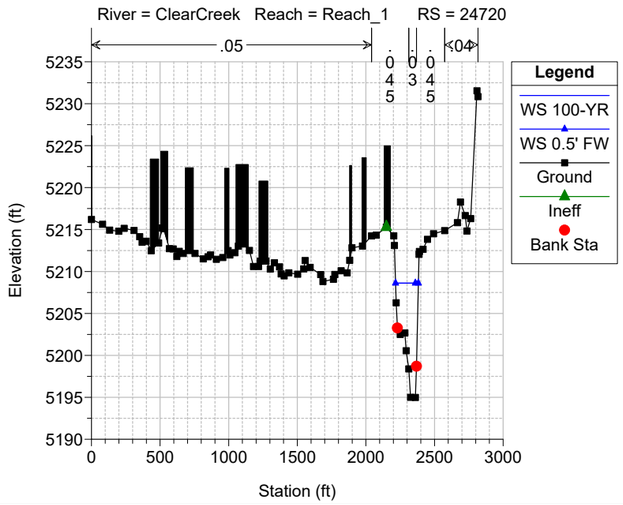
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 24755



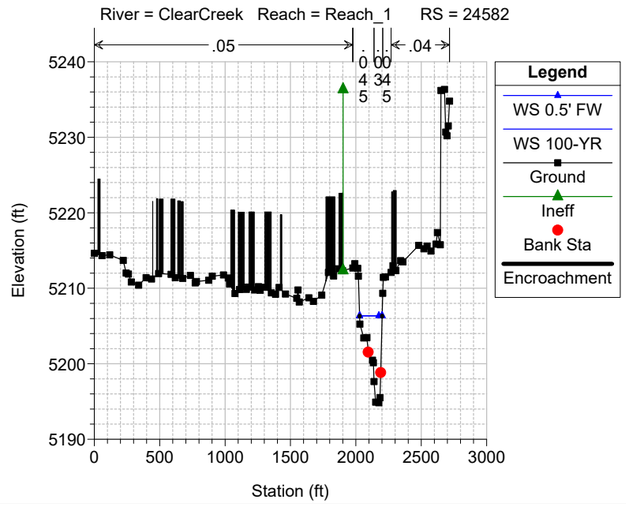
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 24720



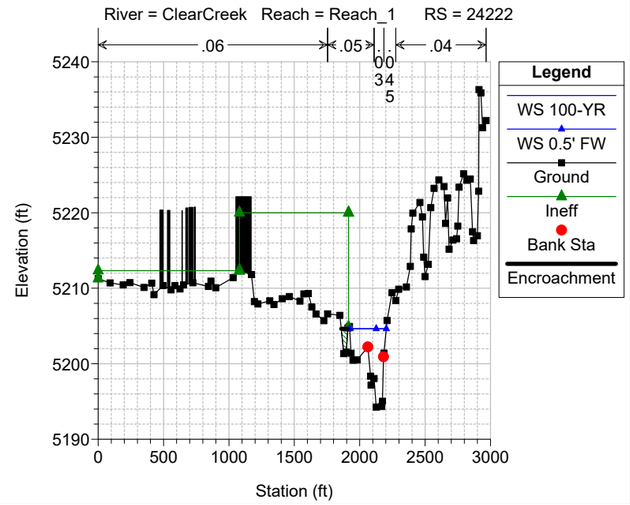
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 24582



Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 24222



Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 23845
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 23255
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 22876
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 22613 Blocked obstruction added to LOB to remove unrealistic shallow
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 22088
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21914
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21866 Merrick Survey Used for Thalweg
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21849 Merrick Survey Used for Thalweg
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21842 New XS - Merrick Survey Used for Thalweg
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21733
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21726 BR Footbridge FOOTBRIDGE DOWNSTREAM OF FEDERAL
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21726 BR Footbridge FOOTBRIDGE DOWNSTREAM OF FEDERAL
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21700
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 21401
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 20985
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 20638
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 20593 BR LRT NWES Line LRT NWES Line BRIDGE (As-Built following CLOMR)
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 20593 BR LRT NWES Line LRT NWES Line BRIDGE (As-Built following CLOMR)
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 20568
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 20561
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 20560 BR Railroad BNSF RR BRIDGE
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 20560 BR Railroad BNSF RR BRIDGE
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 20524 Merrick Survey Used for Thalweg
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 20502 Merrick Survey Used for Thalweg
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 20331 New XS - Merrick Survey Used for Thalweg
.04 .045 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 20100
.04 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 19952
.04 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 19866
.04 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 19861
.04 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 19746
.04 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 19666
.04 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

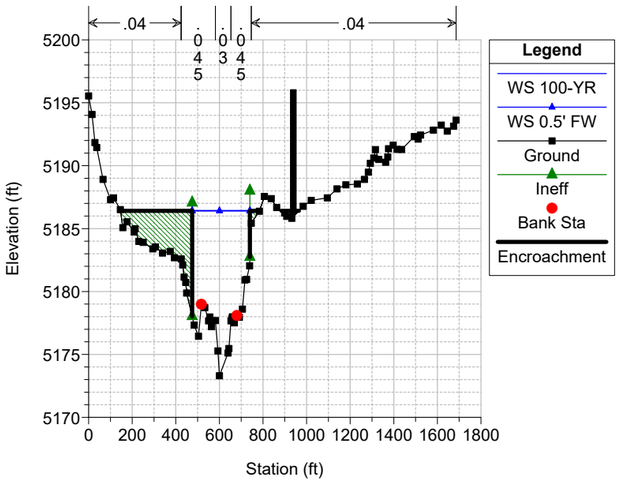
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 19578
.04 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

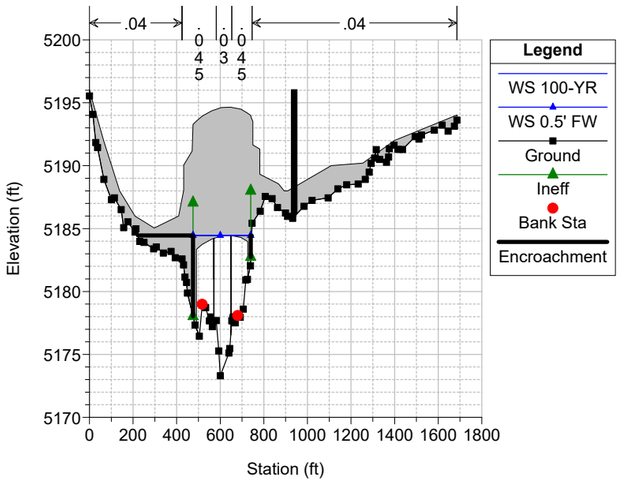
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 19327
.04 .045 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

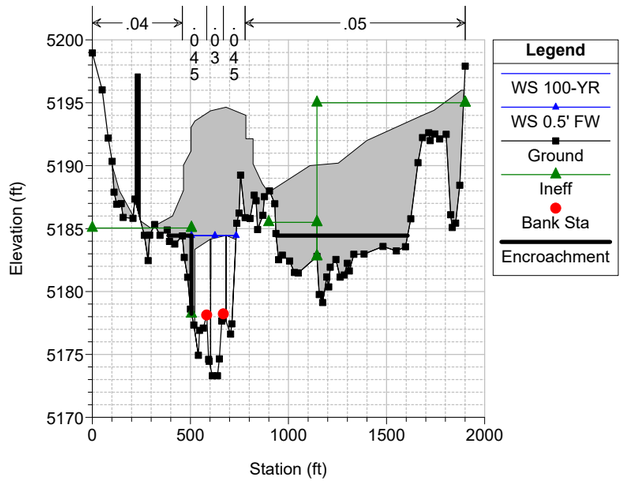
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 18997
.04 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

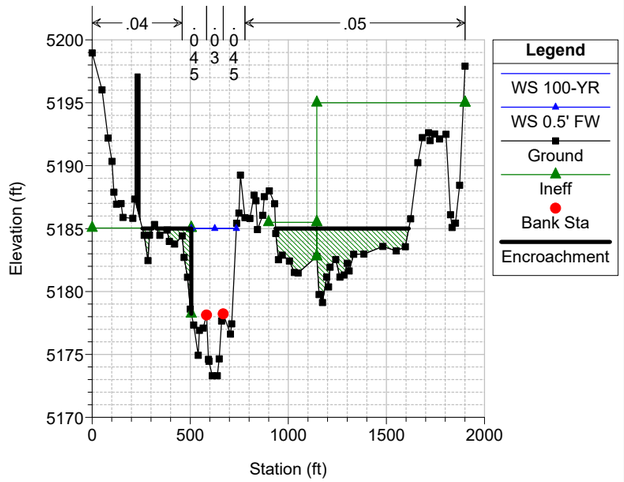
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 18905
.04 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

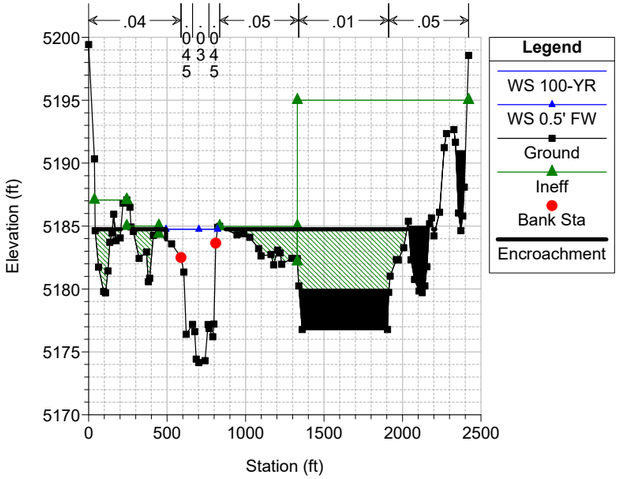
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 18733
.04 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft)
Station (ft)

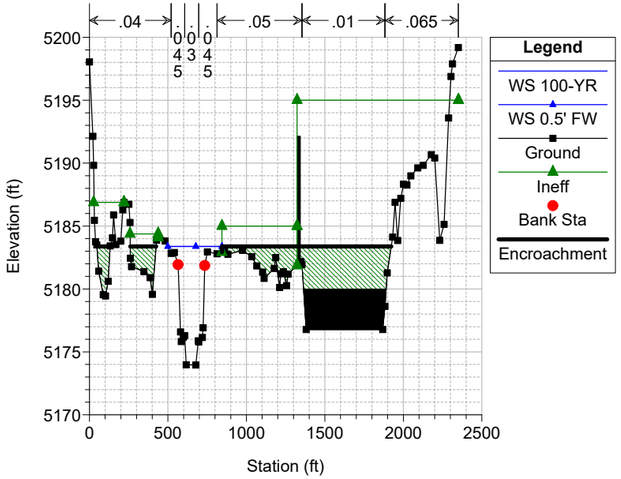
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 18648 FHAD CHANNEL GEOMETRY USED STA 595-638


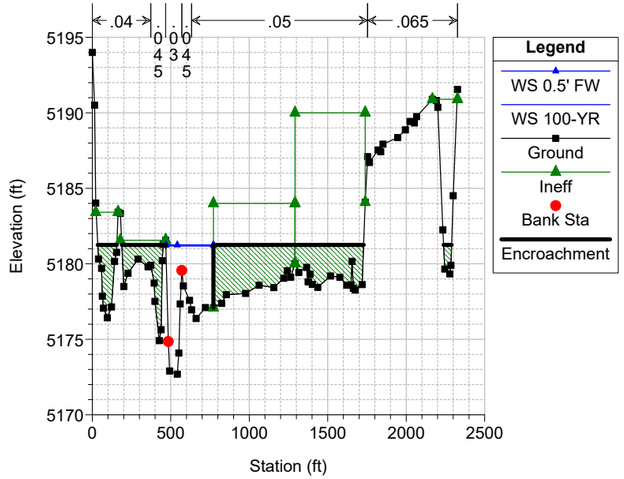
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 18574 BR Pecos St PECOS STREET BRIDGE


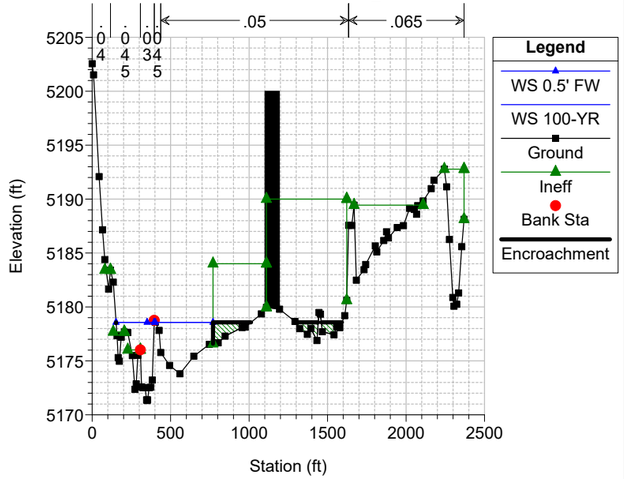
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 18574 BR Pecos St PECOS STREET BRIDGE


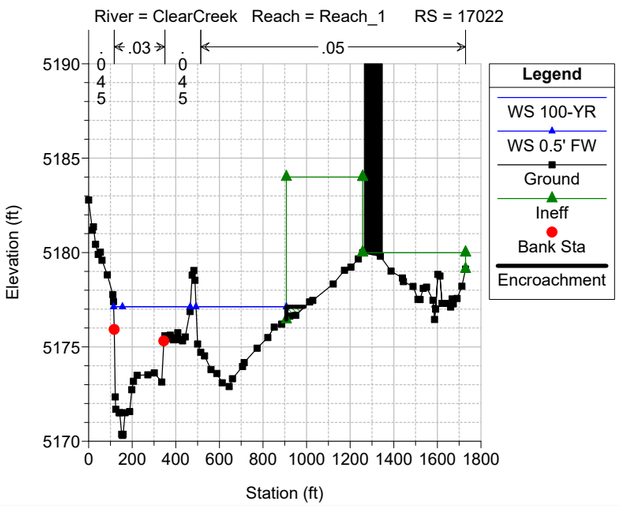
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 18466 FHAD CHANNEL GEOMETRY USED STA 592-648


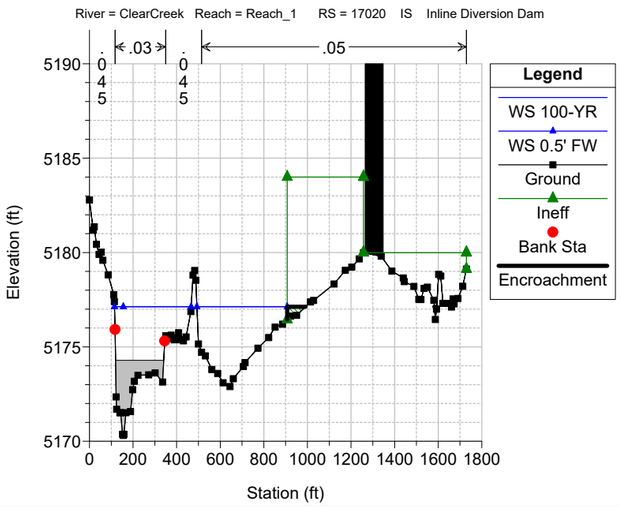
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 18273


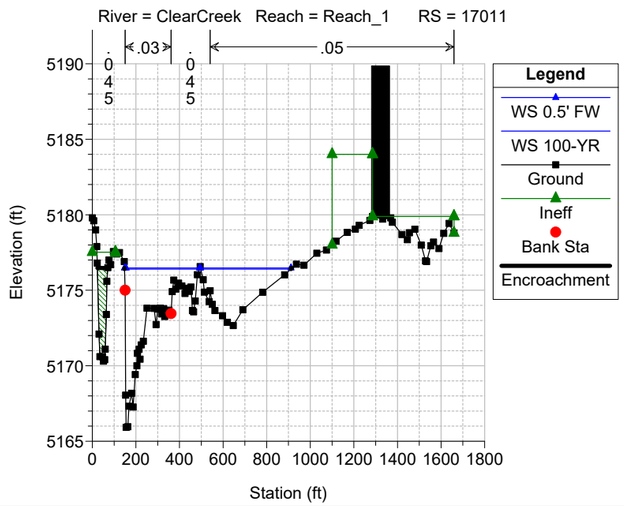
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 18090


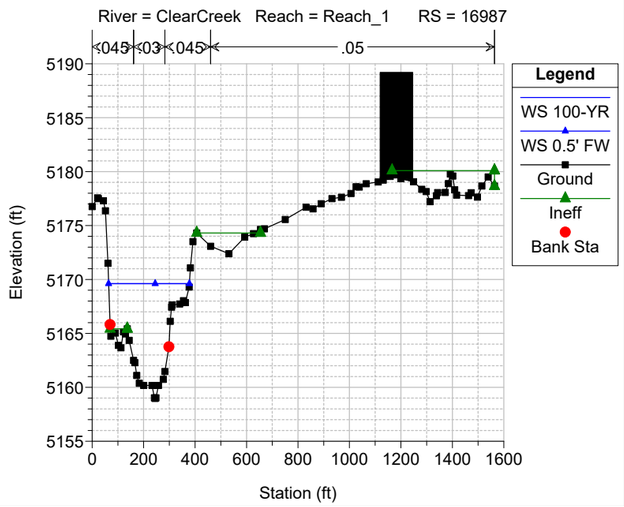
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 17743


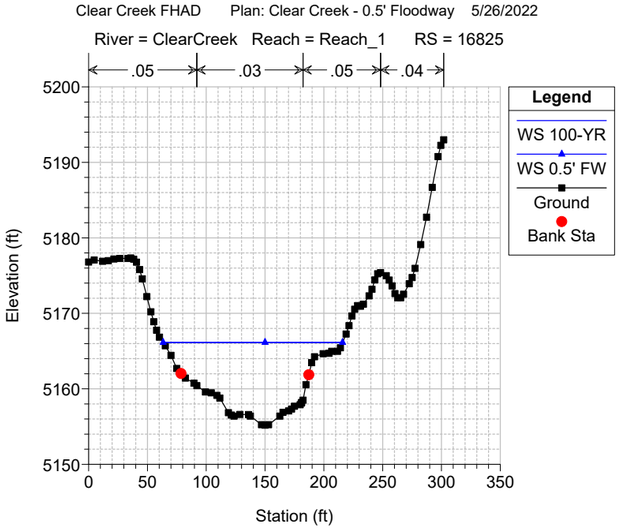
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 17393


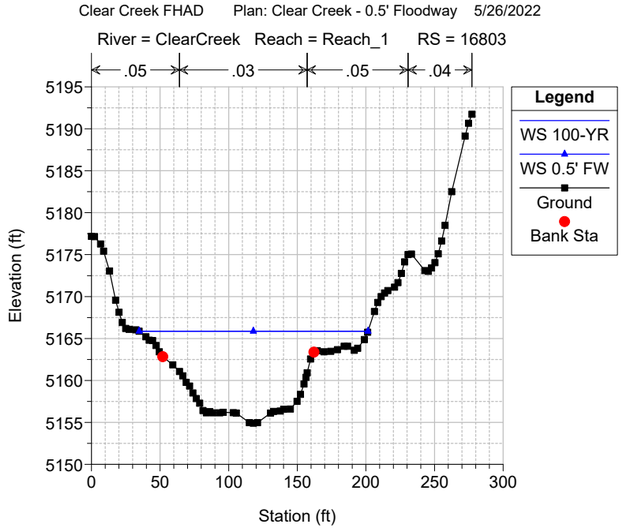
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 17022


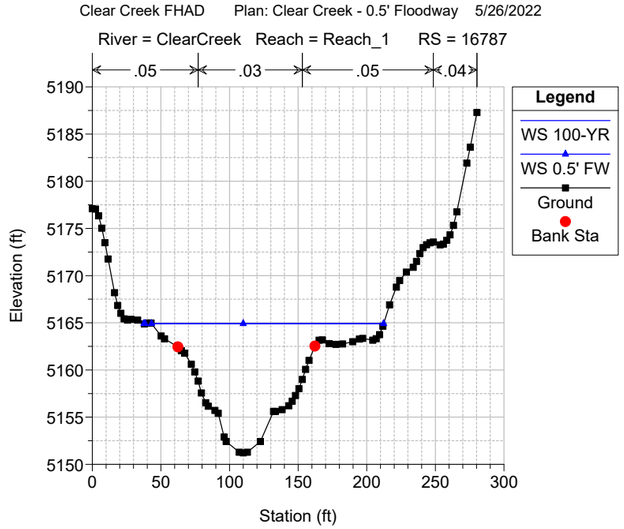
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 17020 IS Inline Diversion Dam


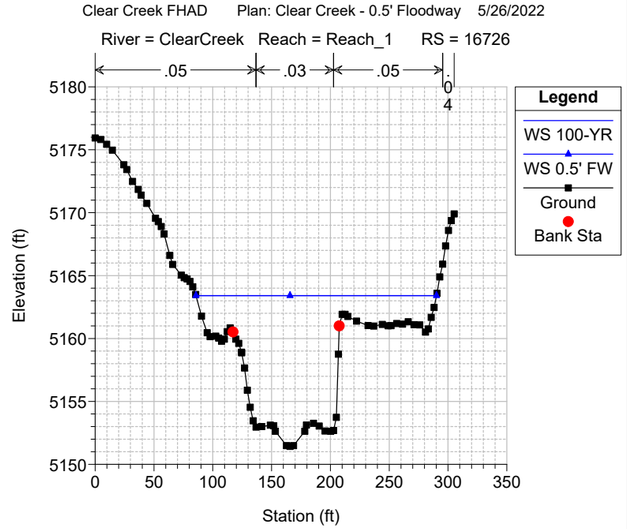
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 17011


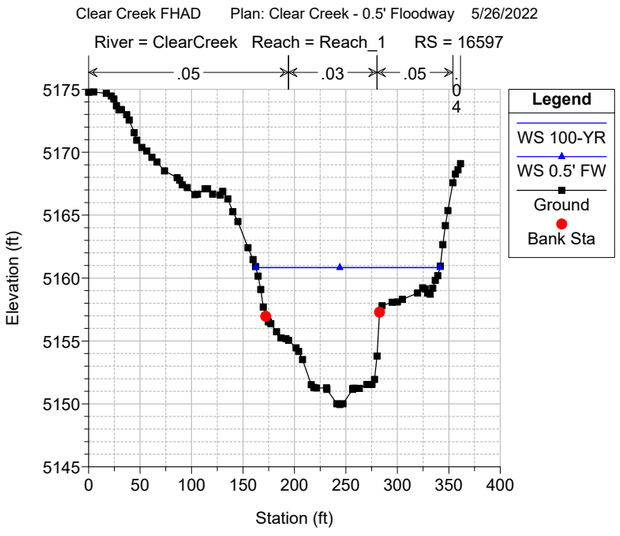
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 16987


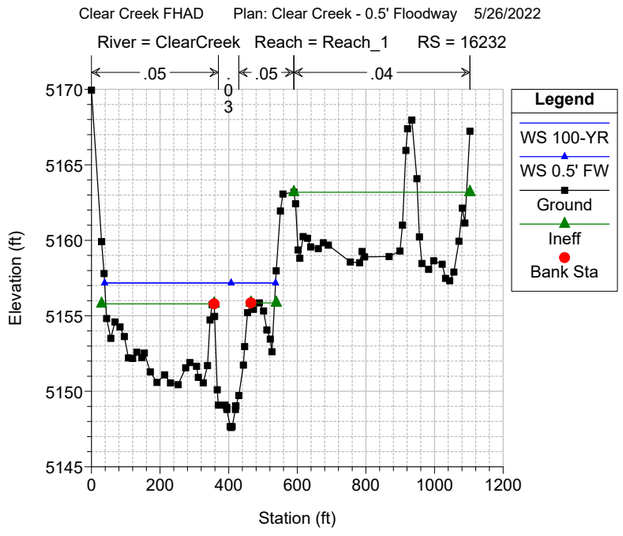

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 16825
.05 .03 .05 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)

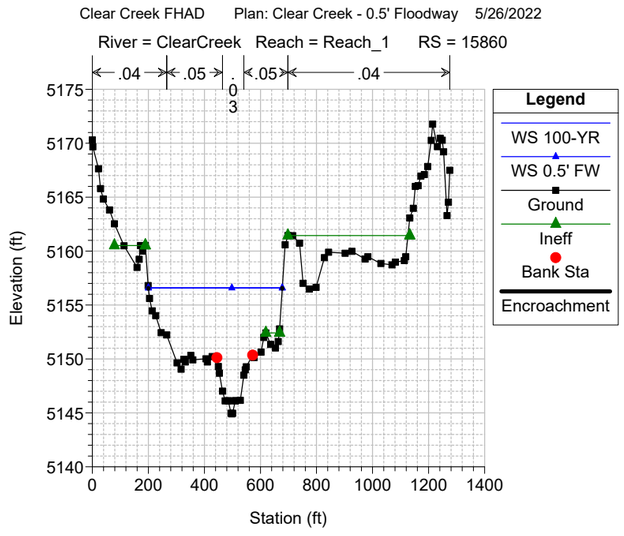

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 16803
.05 .03 .05 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)

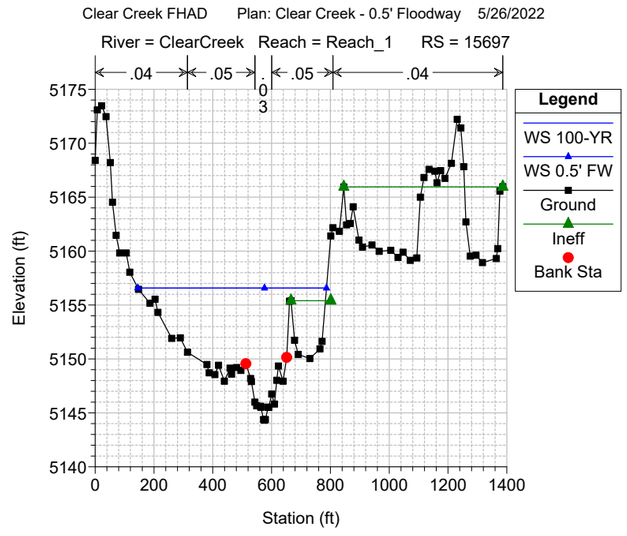

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 16787
.05 .03 .05 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)

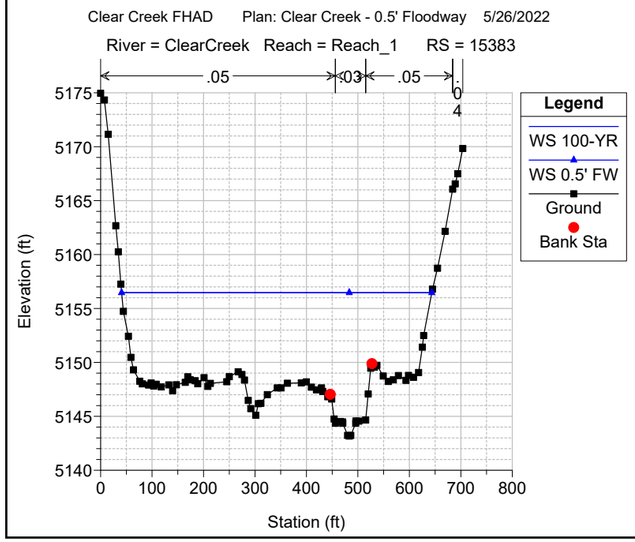

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 16726
.05 .03 .05 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)

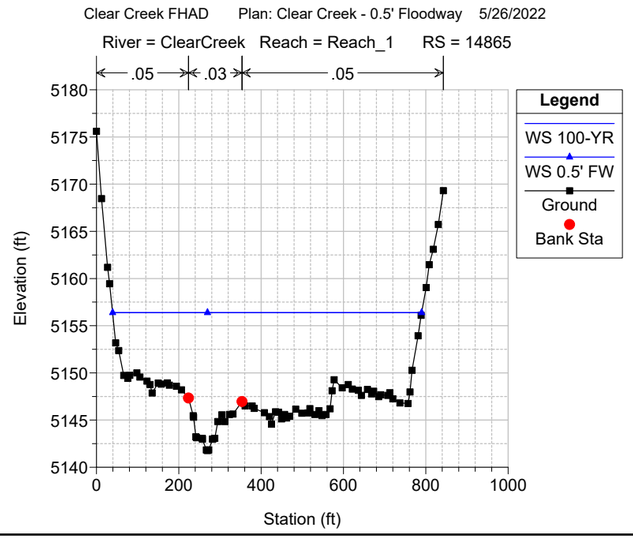

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 16597
.05 .03 .05 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)

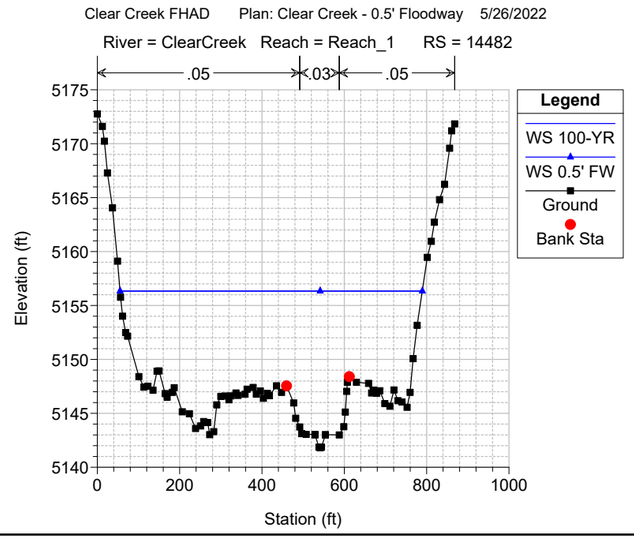

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 16232
.05 .03 .05 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

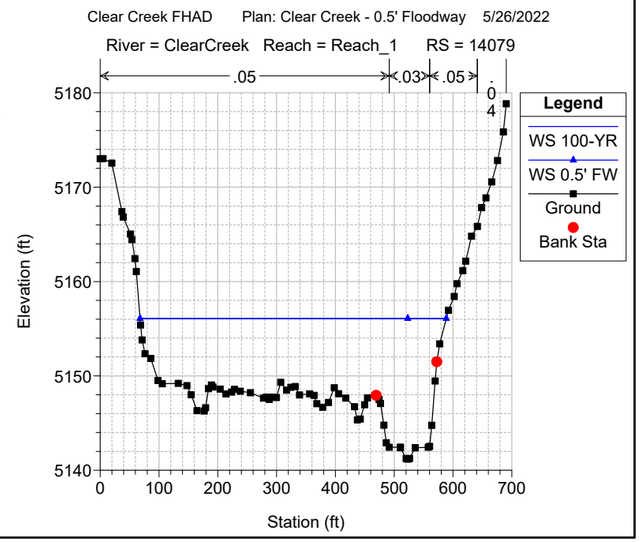

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 15860
.04 .05 .03 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 15697
.04 .05 .03 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 15383
.05 .03 .05 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 14865
.05 .03 .05
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 14482
.05 .03 .05
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 14079
.05 .03 .05 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Bank Sta
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 13859
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Bank Sta

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 13400
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12944
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12864
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12560
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12297
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12221 U/S BROADWAY BRIDGE
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12140 BR Broadway BROADWAY BRIDGE
Elevation (ft)
Station (ft)
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12140 BR Broadway BROADWAY BRIDGE
Elevation (ft)
Station (ft)
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 12081 FHAD CHANNEL GEOMETRY USED 1674-1713
Elevation (ft)
Station (ft)
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 11882
Elevation (ft)
Station (ft)
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 11760
Elevation (ft)
Station (ft)
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 11405
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 11109
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 11024
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 11020 IS Grouted Boulder Drop U/S of I-25 Ramp N
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10961 On-ramp deck piers modeled as blocked obstructions
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10815 On-ramp deck piers modeled as blocked obstructions
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Bank Sta

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10741 FHAD XS used for thalweg; On-ramp deck piers modeled as blocked
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10692 IS Grouted Boulder Drop Directly beneath I-25 Ramp D
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10680 On-ramp deck piers modeled as blocked obstructions
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10644 FHAD CHANNEL GEOMETRY USED STA 371-446
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10584 BR I-25 I-25 BRIDGES
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10584 BR I-25 I-25 BRIDGES
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10304 FHAD CHANNEL GEOMETRY USED 327-388
.04 .04 .03 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta
Elevation (ft) 5125–5160
Station (ft) 0–700

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10269 On-ramp deck piers modeled as blocked obstructions
.04 .045 .03 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Bank Sta
Elevation (ft) 5125–5160
Station (ft) 0–600

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10229 On-ramp deck piers modeled as blocked obstructions
.04 .03 .045 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Bank Sta
Elevation (ft) 5125–5160
Station (ft) 0–500

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10191
.04 .045 .03 .045 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta
Elevation (ft) 5125–5155
Station (ft) 0–400

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10161 IS Grouted boulder drop d/s of I-25 Northbound
.04 .045 .03 .045 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta
Elevation (ft) 5125–5155
Station (ft) 0–400

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10127
.04 .045 .03 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5125–5160
Station (ft) 0–600

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 10030
.04 .045 .03 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5125–5165
Station (ft) 0–800

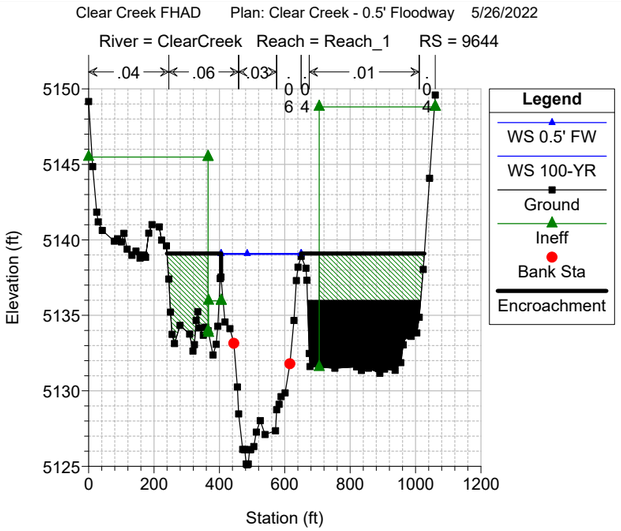
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9931
.04 .03 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5125–5165
Station (ft) 0–1400

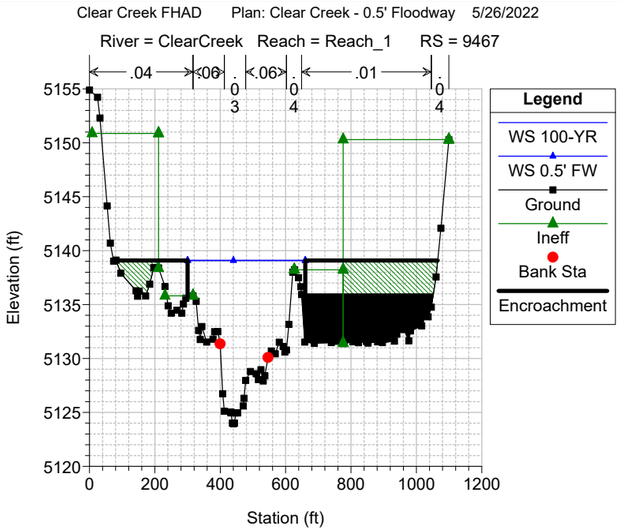
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9877
.04 .03 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5120–5170
Station (ft) 0–1400

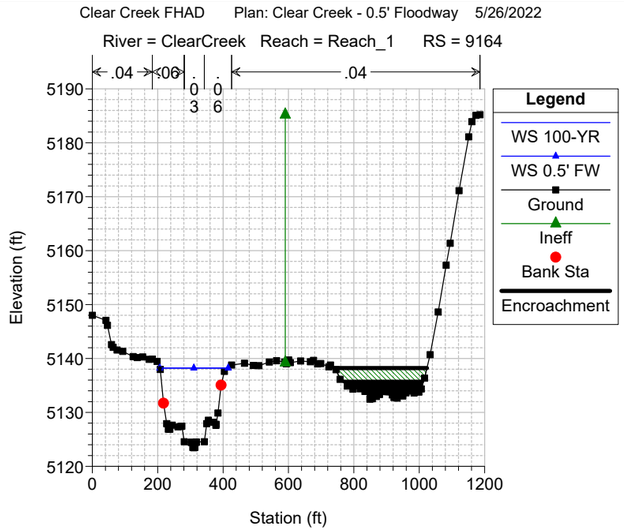
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9816 BR I-25 E Ramp I-25 RAMP EAST
.04 .03 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5120–5170
Station (ft) 0–1400

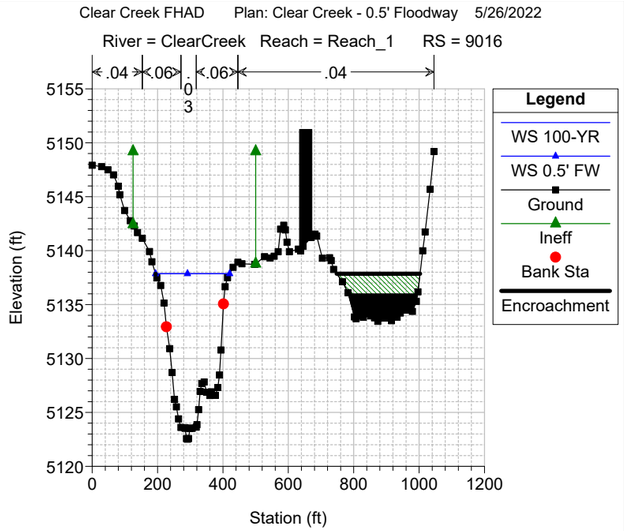
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9816 BR I-25 E Ramp I-25 RAMP EAST
.04 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5125–5160
Station (ft) 0–1600

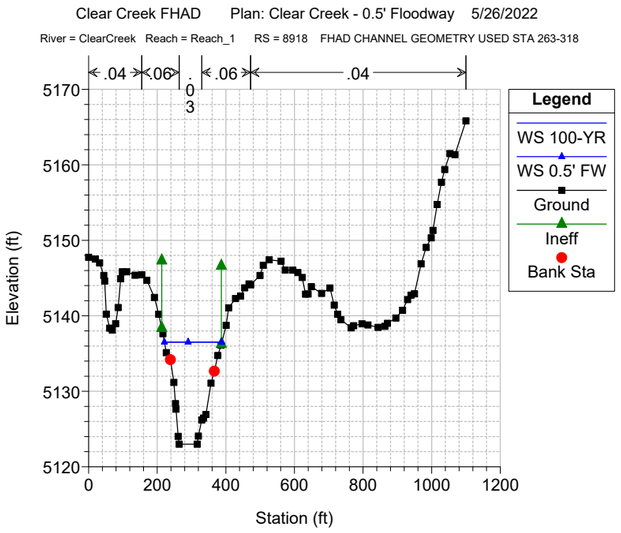
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9780
.04 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5125–5160
Station (ft) 0–1600

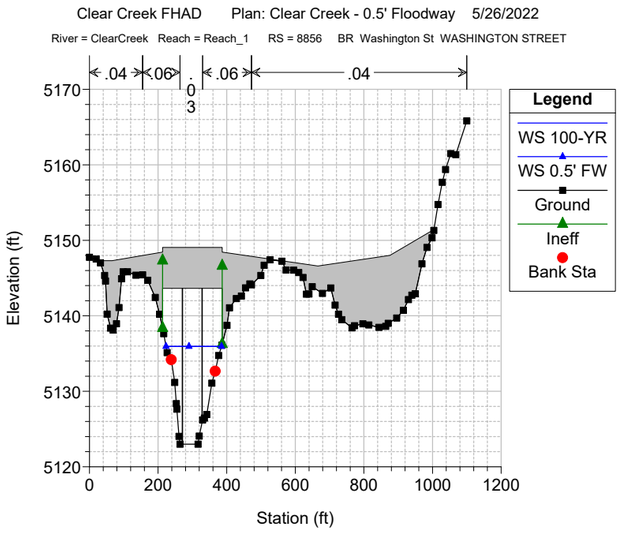

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9644
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

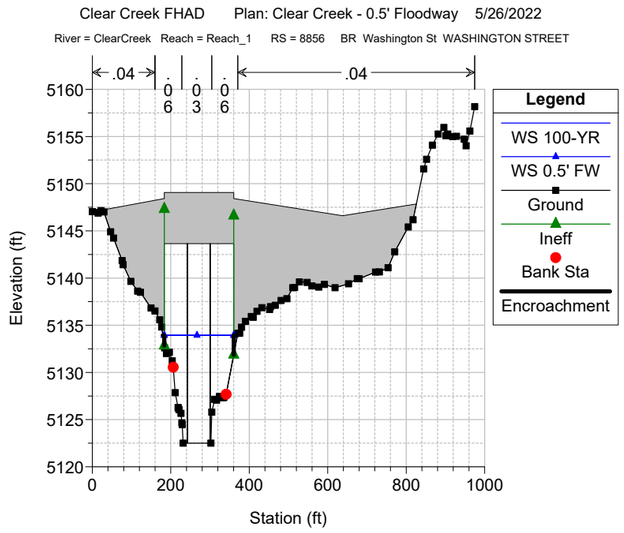

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9467
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

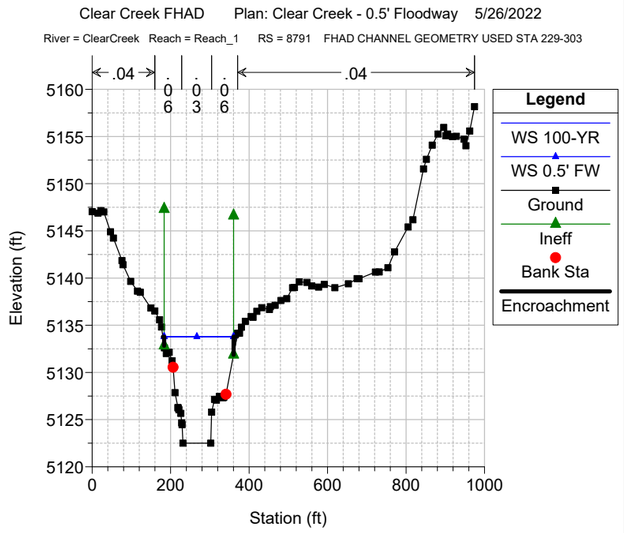

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9164
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

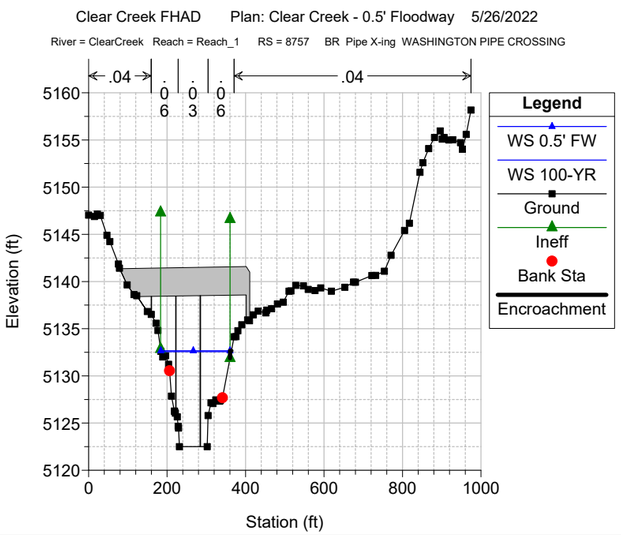

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 9016
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

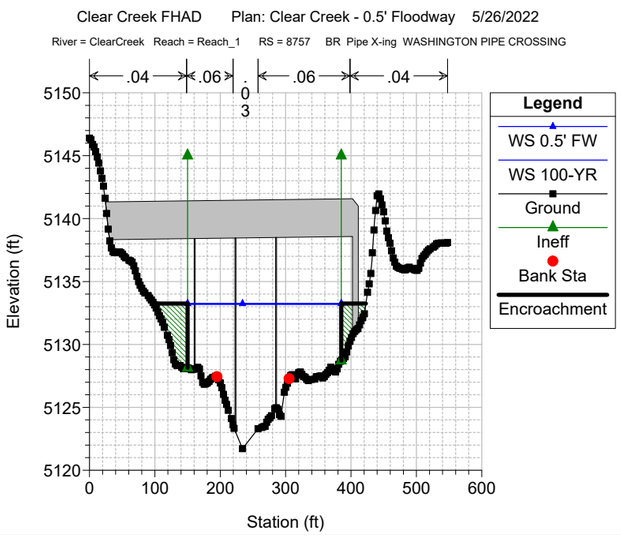

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8918 FHAD CHANNEL GEOMETRY USED STA 263-318
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta

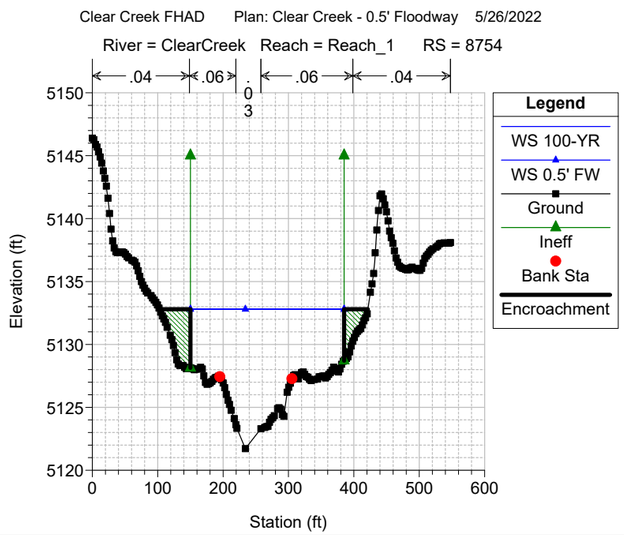

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8856 BR Washington St WASHINGTON STREET
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta

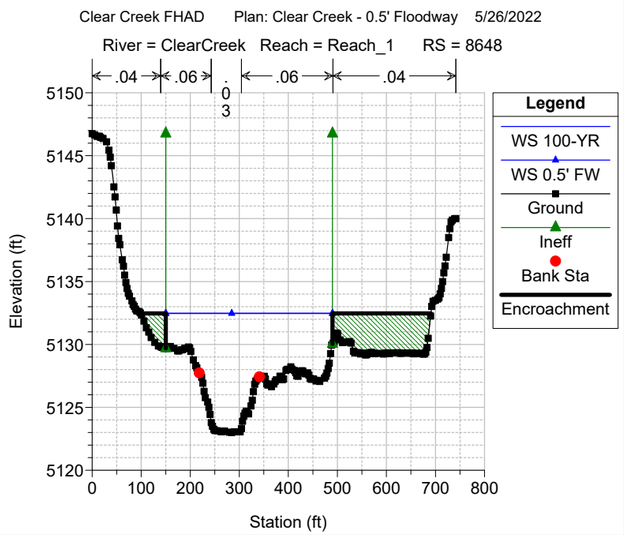

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8856 BR Washington St WASHINGTON STREET
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8791 FHAD CHANNEL GEOMETRY USED STA 229-303
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8757 BR Pipe X-ing WASHINGTON PIPE CROSSING
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8757 BR Pipe X-ing WASHINGTON PIPE CROSSING
Elevation (ft)
Station (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8754
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8648
Elevation (ft)
Station (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 8370
.04 .06 .03 .06 .04
Legend: WS 0.5' FW, WS 100-YR, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5120–5145
Station (ft) 0–700

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7946
.04 .06 .03 .06 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5120–5155
Station (ft) 0–700

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7756
.05 .06 .03 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5120–5150
Station (ft) 0–1200

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7697
.05 .06 .03 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5120–5145
Station (ft) 0–1200

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7651
.05 .05 .06 .03 .06 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5115–5145
Station (ft) 0–1200

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7516
.05 .06 .03 .06 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5115–5145
Station (ft) 0–1200

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7382
.05 .06 .03 .06 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5115–5145
Station (ft) 0–1200

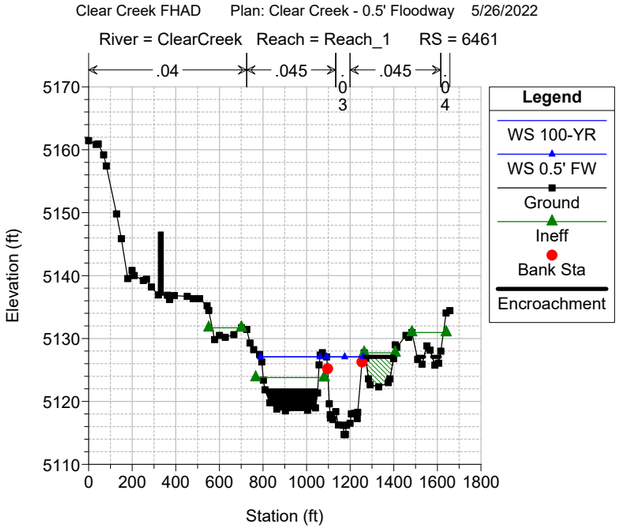
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7228
.05 .06 .03 .06 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5118–5138
Station (ft) 0–1200

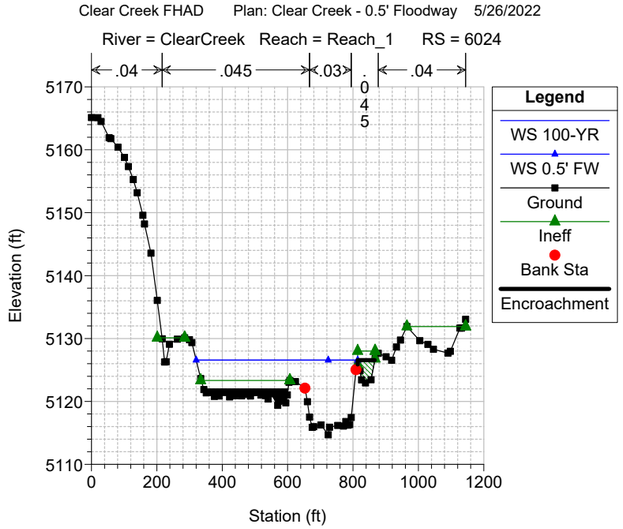
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7182
.05 .045 .03 .045 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5115–5140
Station (ft) 0–1200

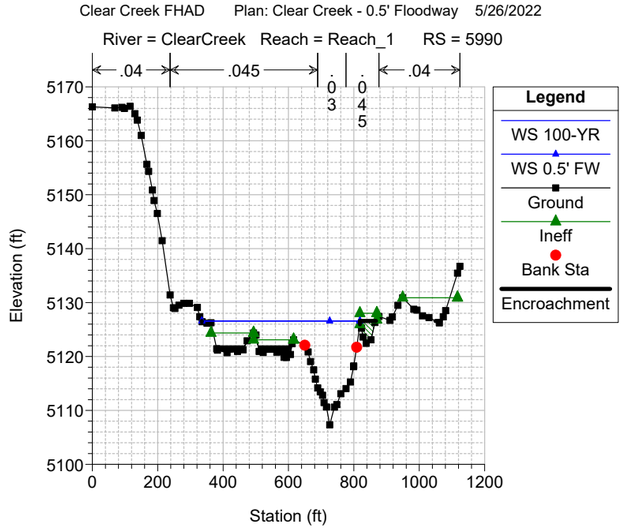
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7127 0.8 expansion coefficient used to fix drawdown
.04 .045 .03 .045 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5110–5140
Station (ft) 0–1200

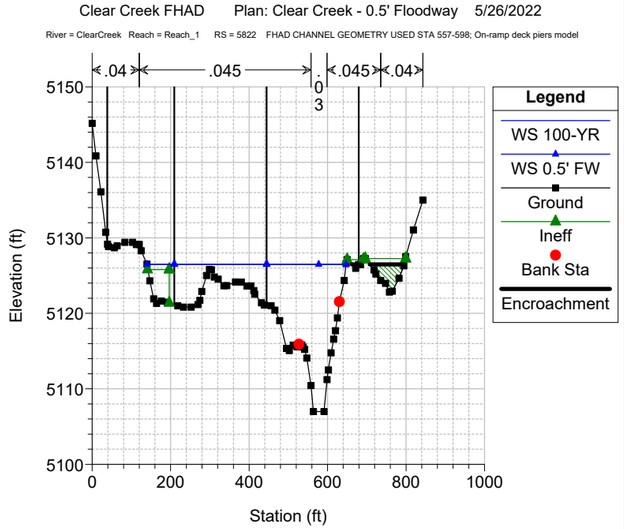
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 7017
.05 .045 .03 .045 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5110–5145
Station (ft) 0–1400

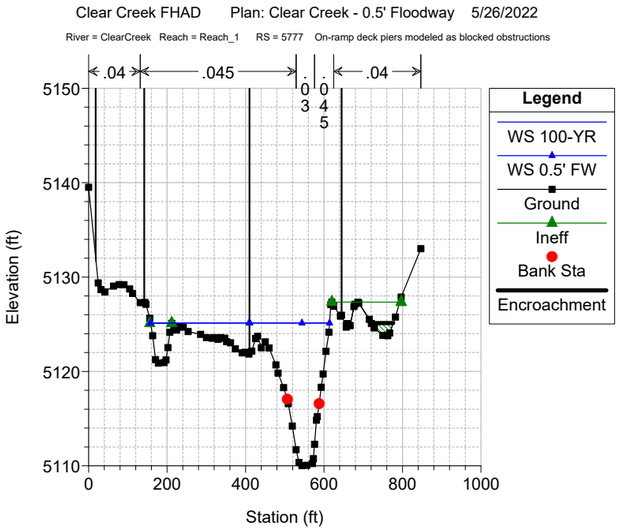
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 6827
.04 .045 .03 .045 .04
Legend: WS 100-YR, WS 0.5' FW, Ground, Ineff, Bank Sta, Encroachment
Elevation (ft) 5115–5145
Station (ft) 0–1400

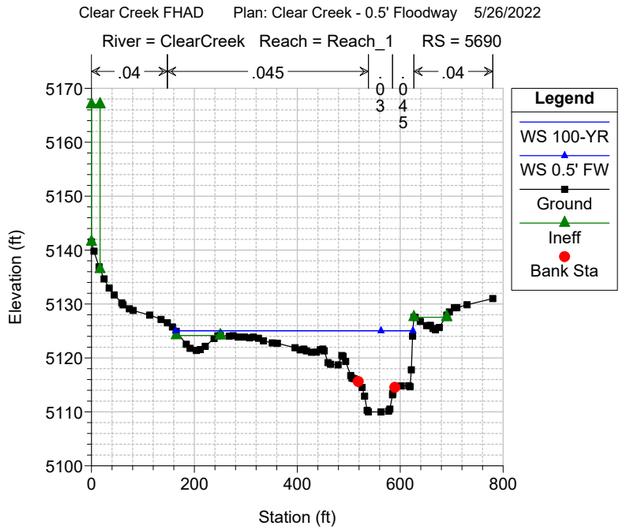

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 6461
.04 .045 .045
.03 .04
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

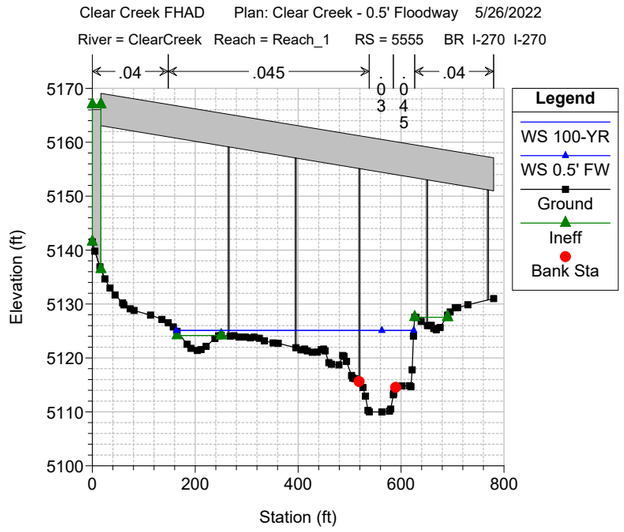

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 6024
.04 .045 .03 .04
.045
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

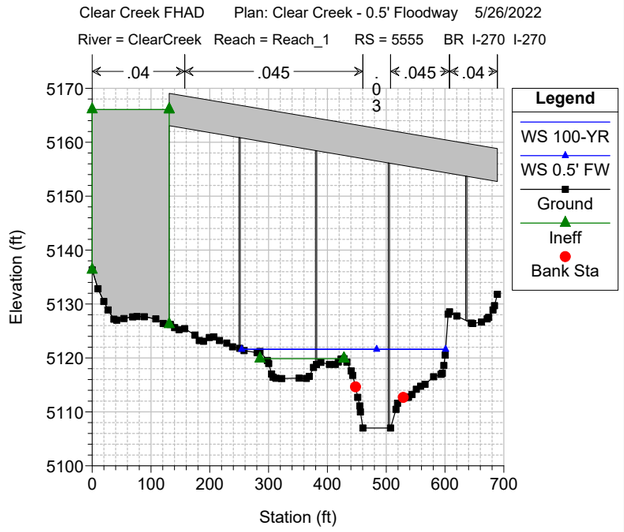

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 5990
.04 .045 .04
.03 .045
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

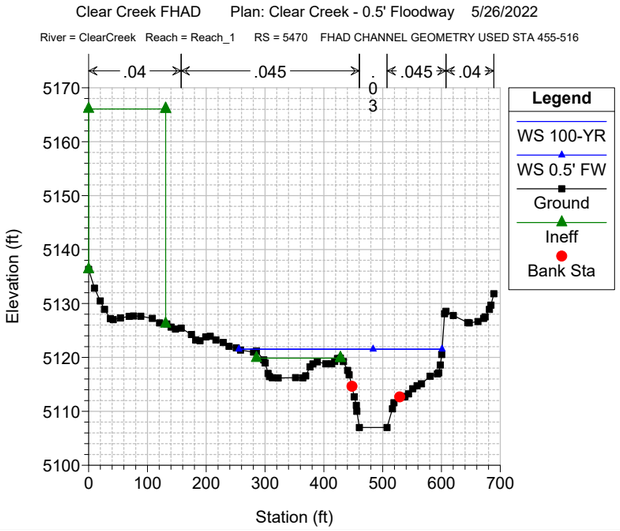

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 5822 FHAD CHANNEL GEOMETRY USED STA 557-598; On-ramp deck piers model
.04 .045 .045 .04
.03
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

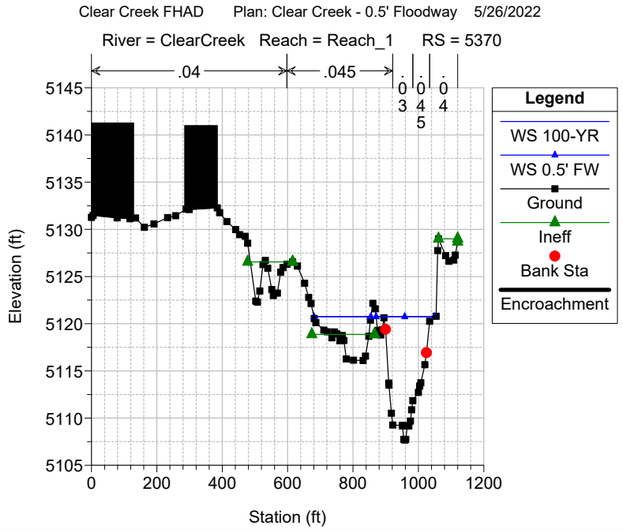

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 5777 On-ramp deck piers modeled as blocked obstructions
.04 .045 .04
.03 .045
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

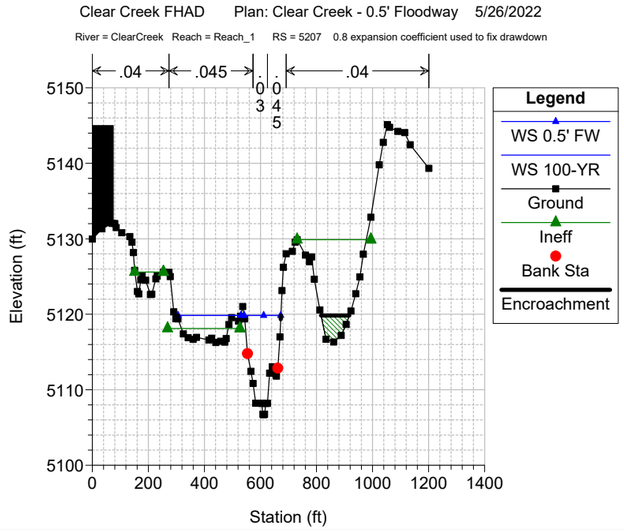

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 5690
.04 .045 .04
.03 .045
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

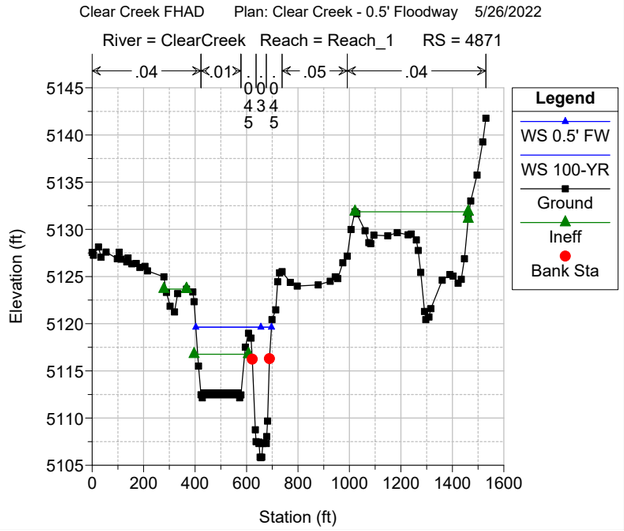

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 5555 BR I-270 I-270
.04 .045 .04
.03 .045
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 5555 BR I-270 I-270
.04 .045 .045 .04
.03
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 5470 FHAD CHANNEL GEOMETRY USED STA 455-516
.04 .045 .045 .04
.03
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 5370
.04 .045 .04
.03 .045
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 5207 0.8 expansion coefficient used to fix drawdown
.04 .045 .04
.03 .045
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 4871
.04 .01 .05 .04
.045 .03 .04
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 4589
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 4363
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 4201
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 3798
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 3388
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 3069 FHAD CHANNEL GEOMETRY USED STA 923-951
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 3030 BR York St YORK STREET
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

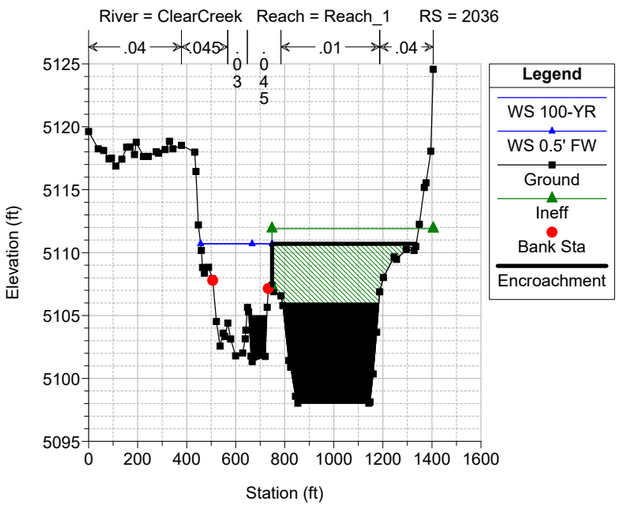
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 3030 BR York St YORK STREET
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

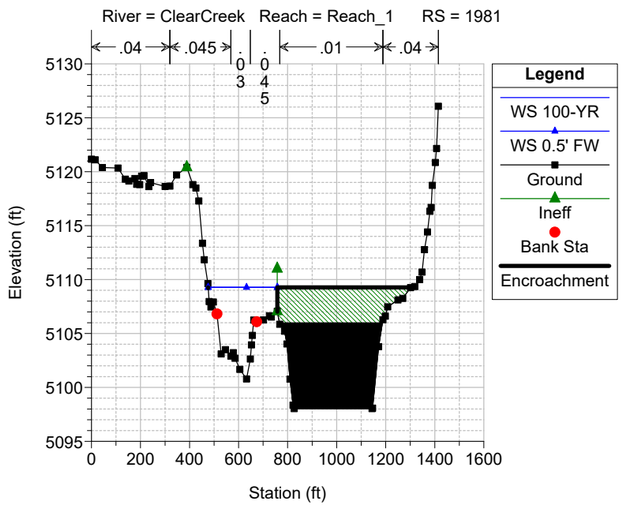
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 2942 FHAD CHANNEL GEOMETRY USED STA 924-968
Station (ft)
Elevation (ft)
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment

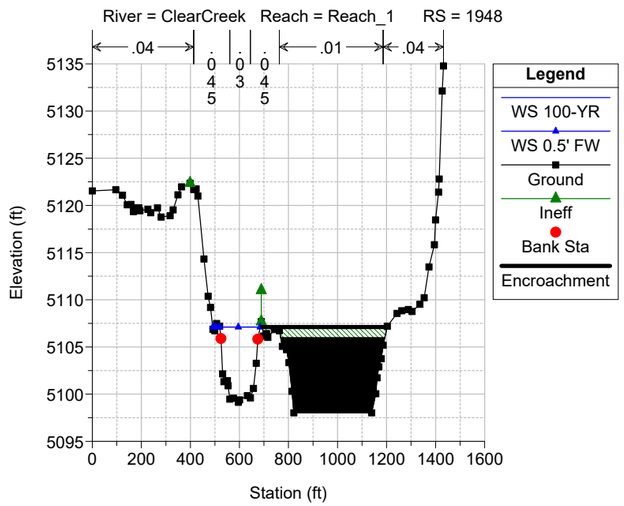
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 2830
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

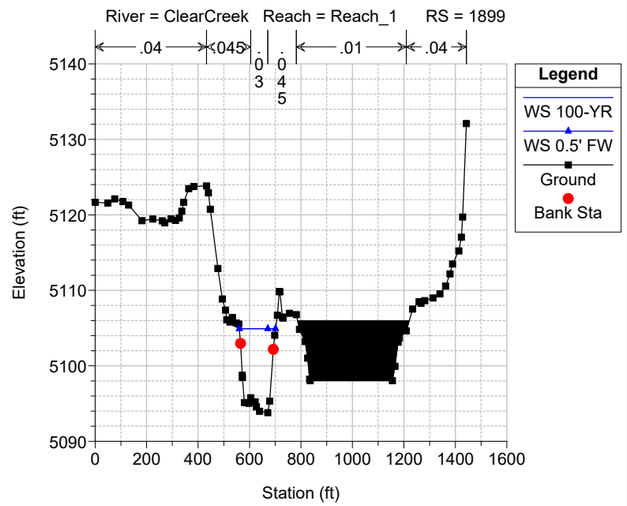
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 2459
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

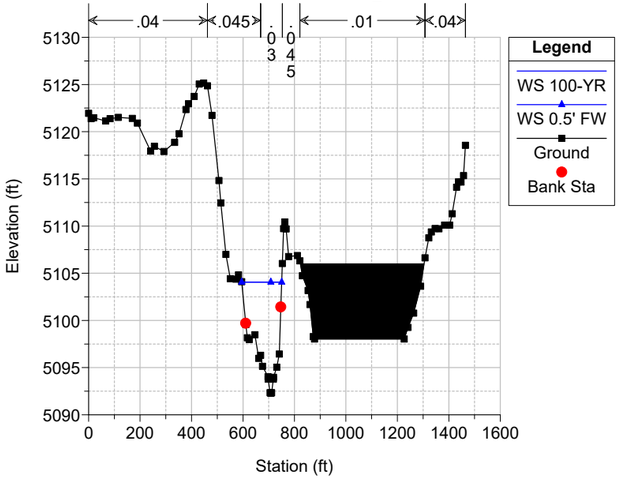
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 2316
Station (ft)
Elevation (ft)
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment

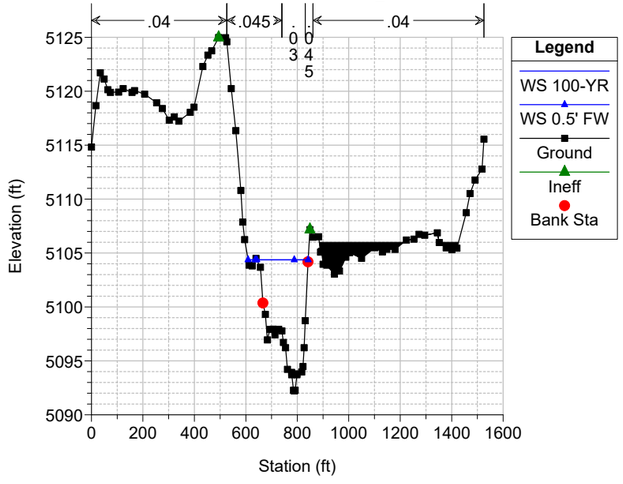
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 2036


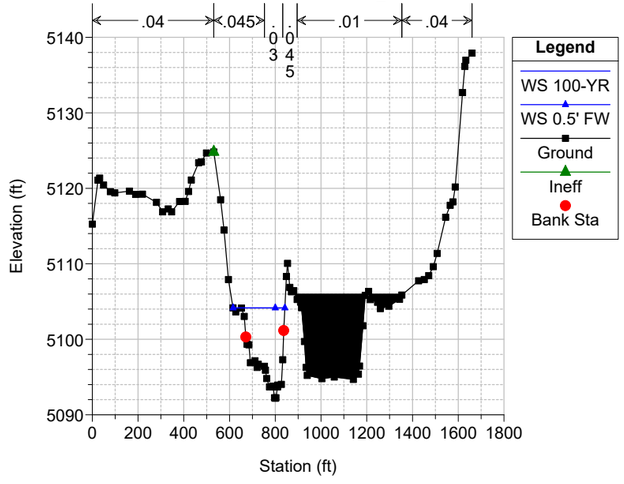
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 1981


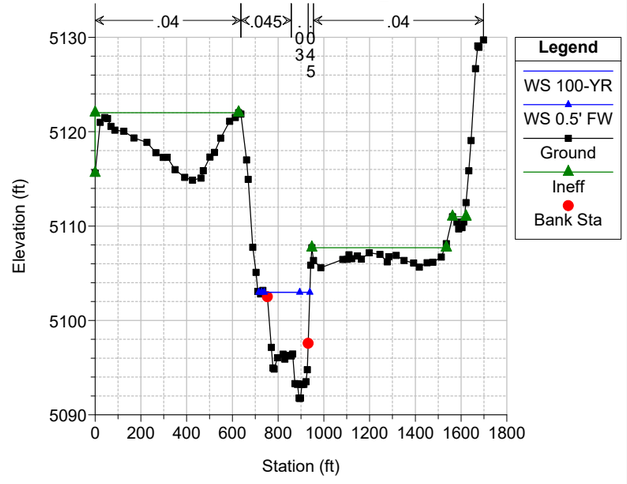
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 1948


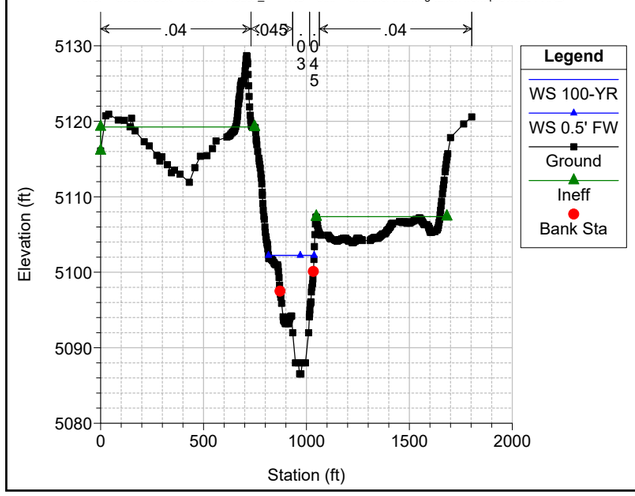
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 1899


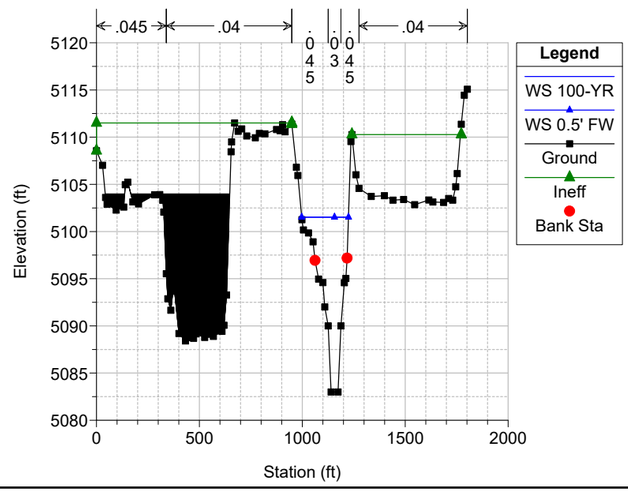
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 1791


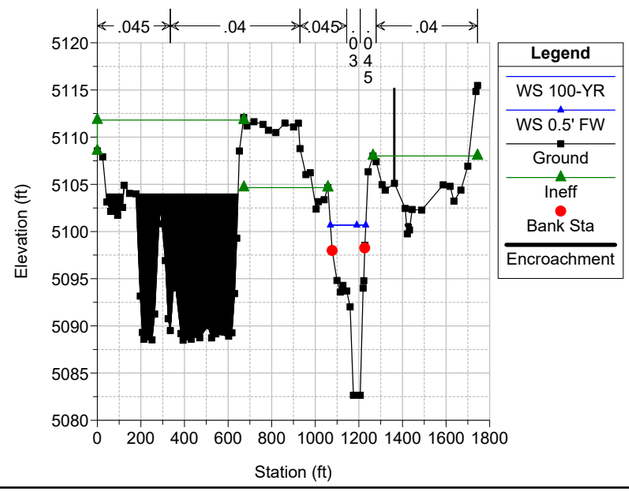
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 1719


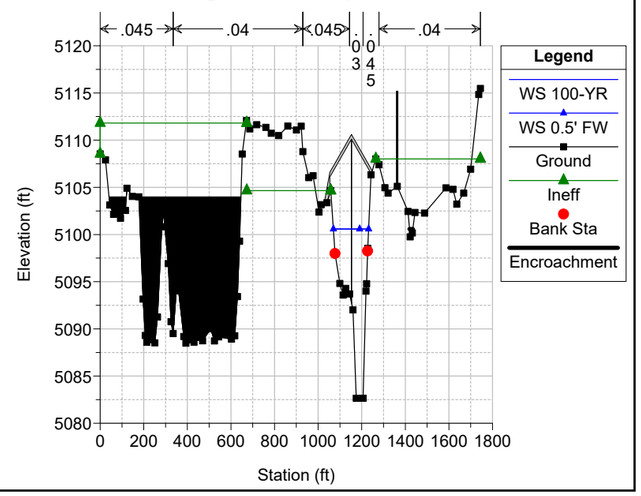
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 1668


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 1402


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 966 Channel thalweg taken from previous FHAD


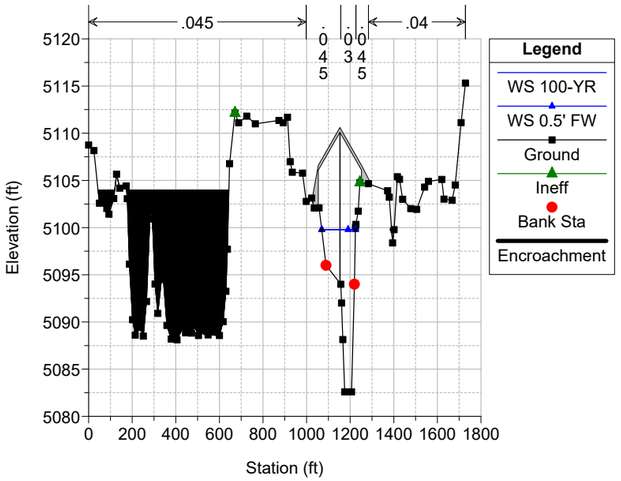
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 534 Channel Thalweg taken from Ayres FHAD XS 3.0 (3 -- thalweg estim


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 398 Channel Thalweg taken from Ayres FHAD XS 2.6 ()


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022
River = ClearCreek Reach = Reach_1 RS = 391 BR Footbridge FOOTBRIDGE UPSTREAM OF SPR CONFLUENCE


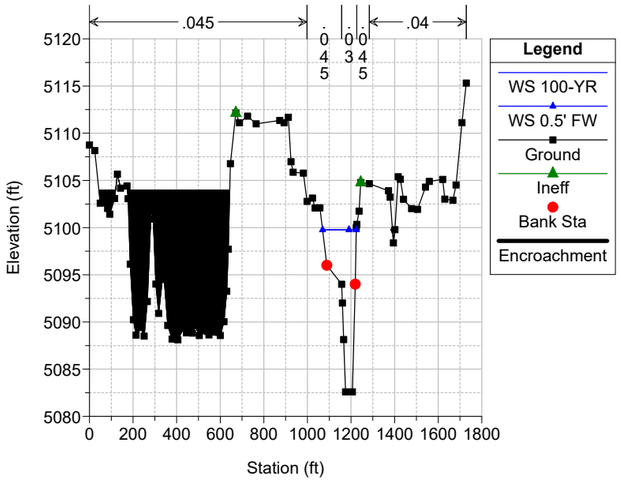
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 391 BR Footbridge FOOTBRIDGE UPSTREAM OF SPR CONFLUENCE



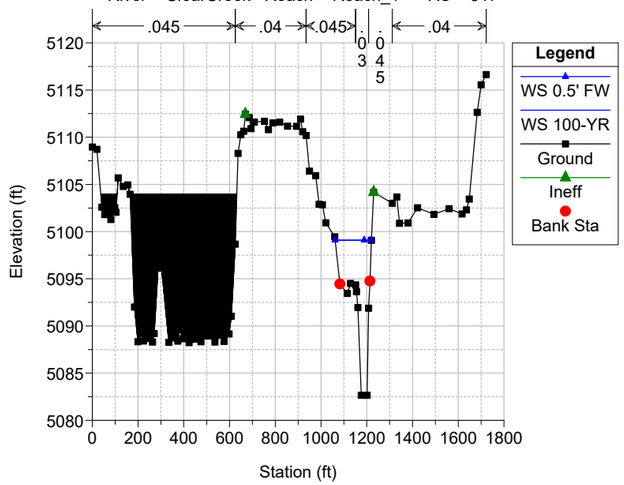
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 368 Channel thalweg taken from Ayres FHAD XS 2.4 (2.4 -- D/S face of



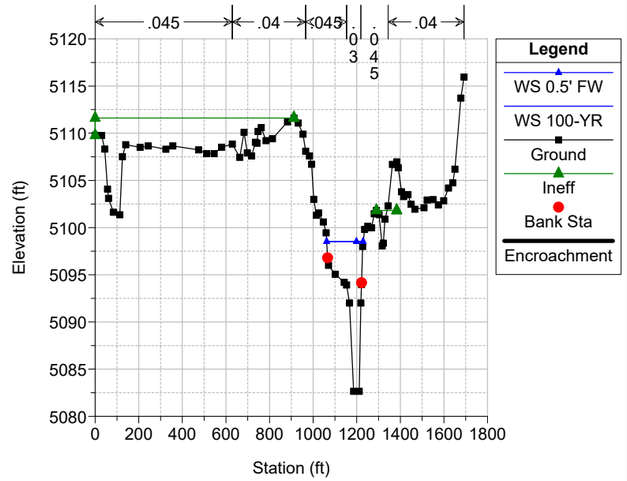
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 317



Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 258 Channel thalweg taken from Ayres FHAD XS 2 (2 -- gravel pit pond



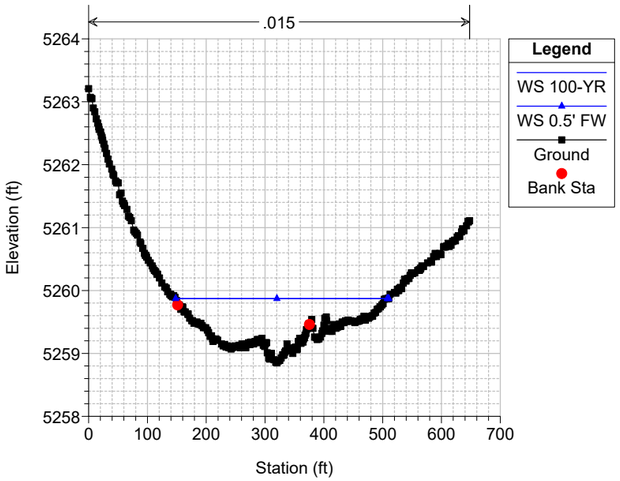
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 232 Channel thalweg taken from Ayres FHAD XS 1.2 (1.2 -- XS develope

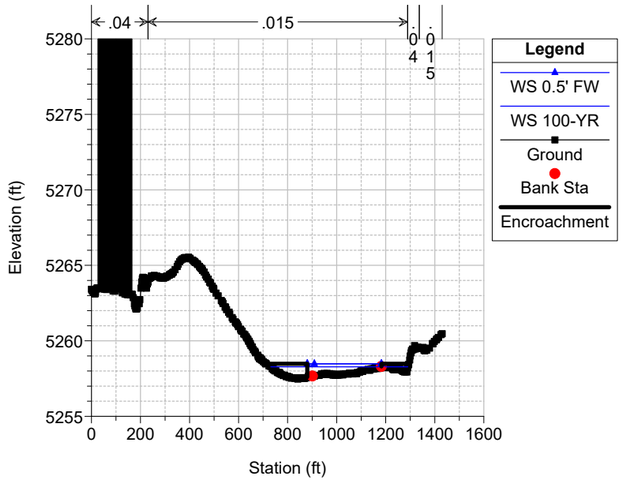
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 5/26/2022

River = ClearCreek Reach = Reach_1 RS = 157 D/S Crest of GBD structure

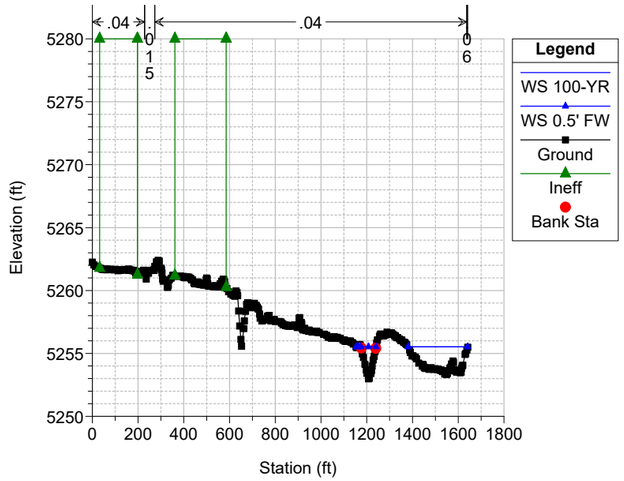
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 7991 SHERIDAN BLVD.



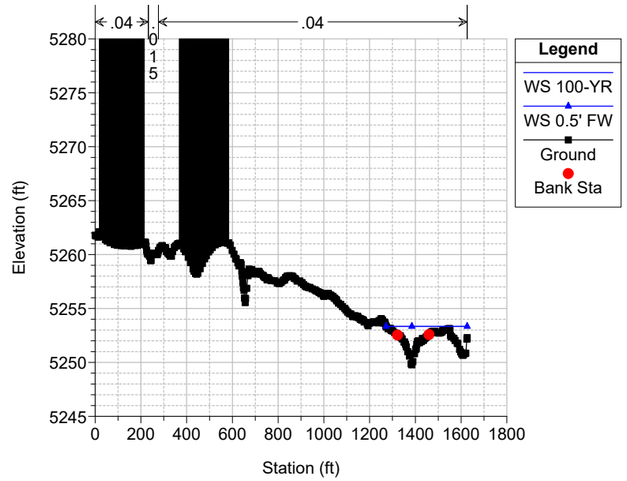
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 7879



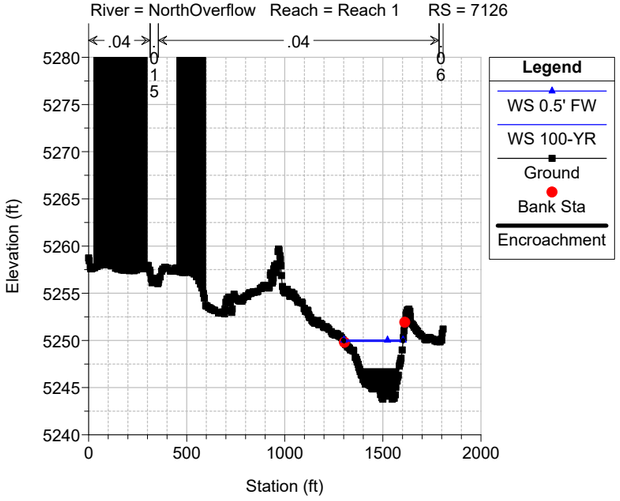
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 7650



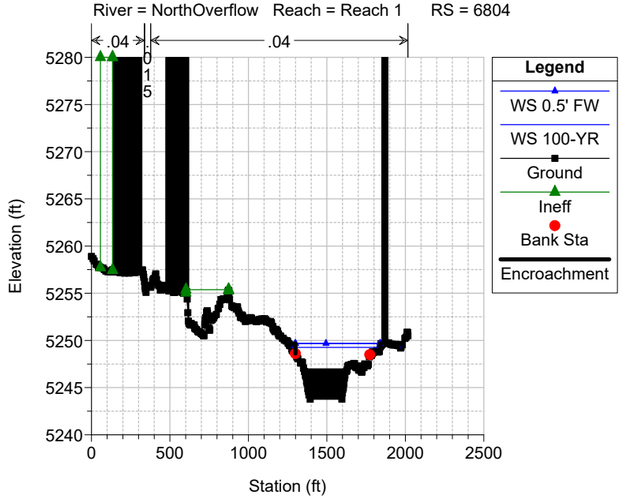
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 7365



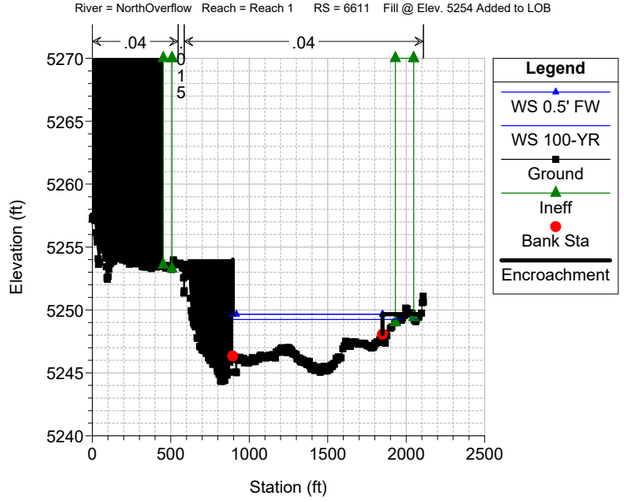
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 7126



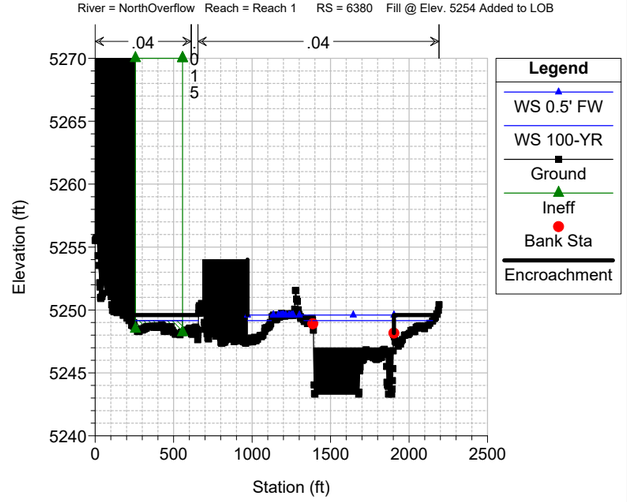
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 6804



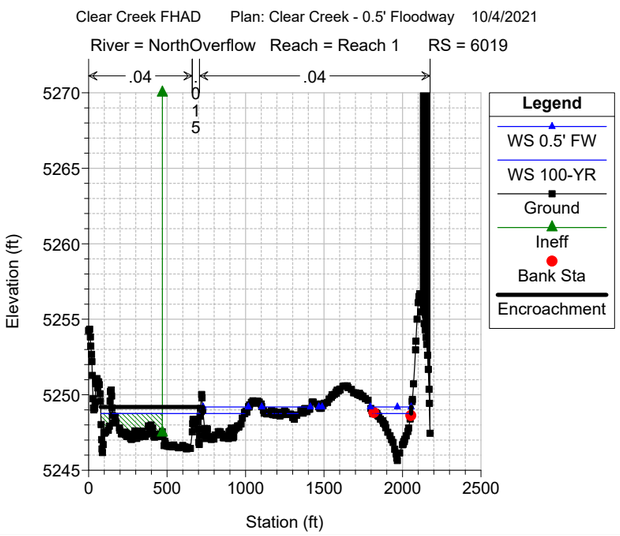
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 6611 Fill @ Elev. 5254 Added to LOB



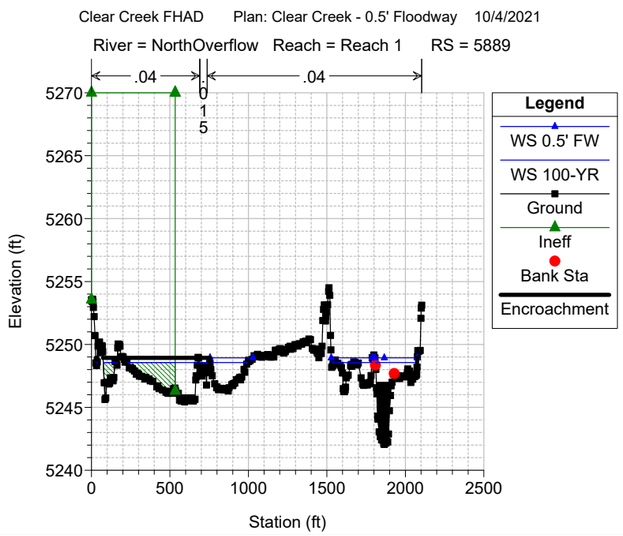
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 6380 Fill @ Elev. 5254 Added to LOB



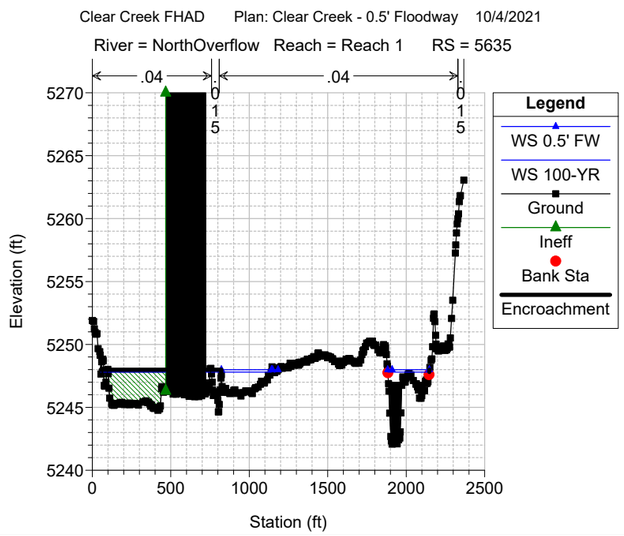
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 6019



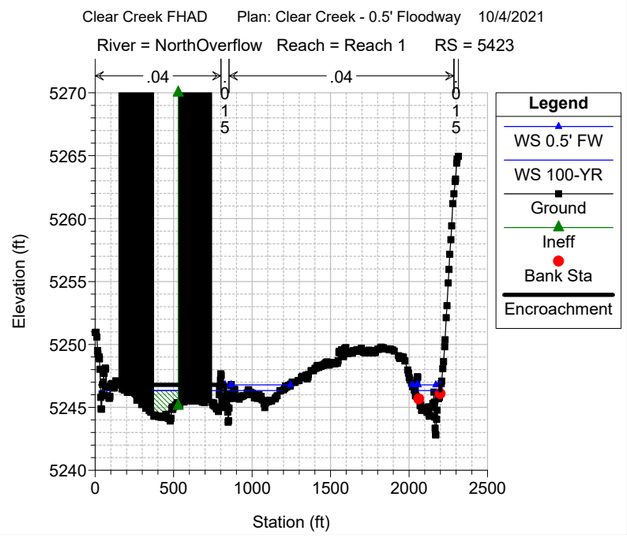
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 5889



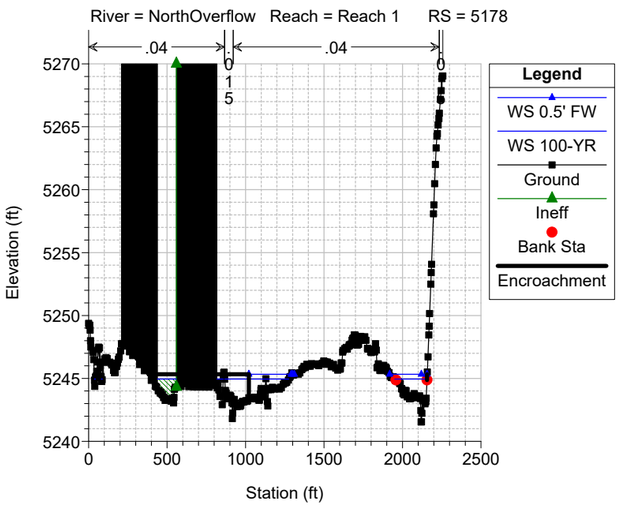
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 5635



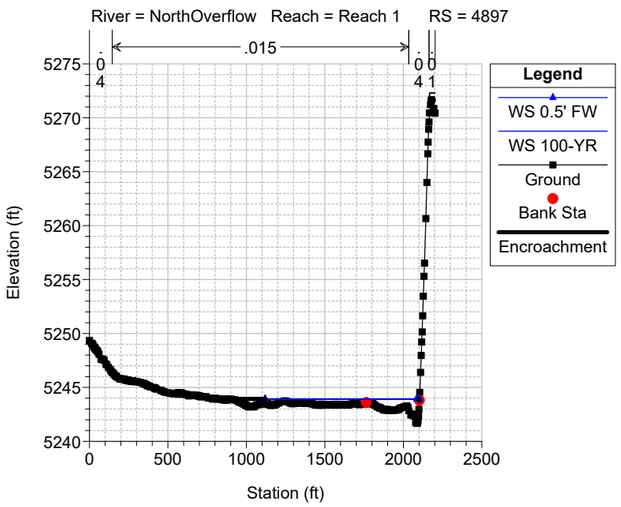
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 5423



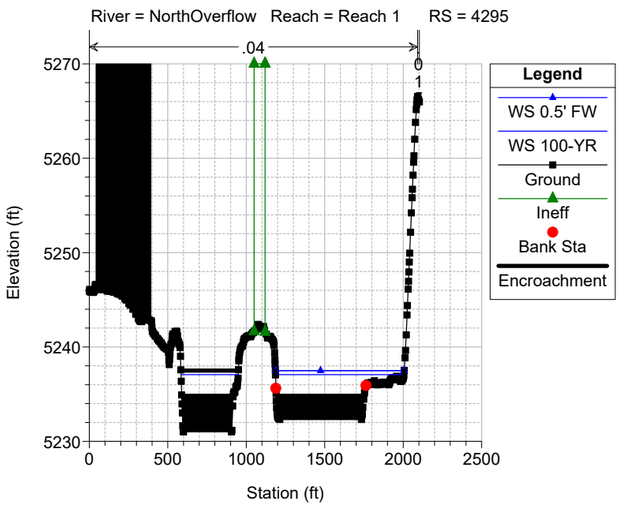
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 5178



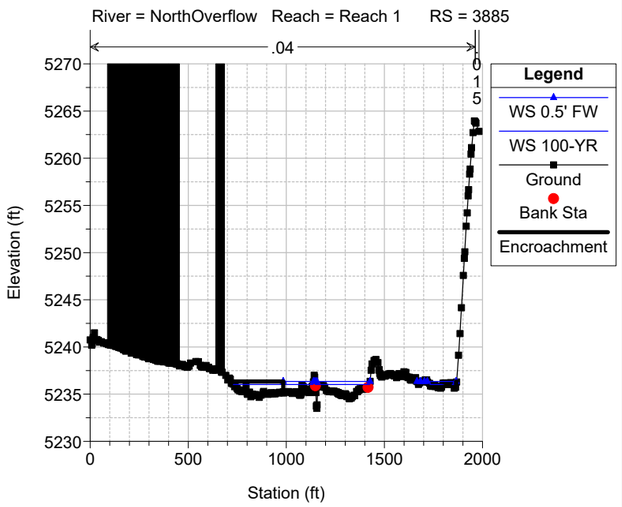
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 4897



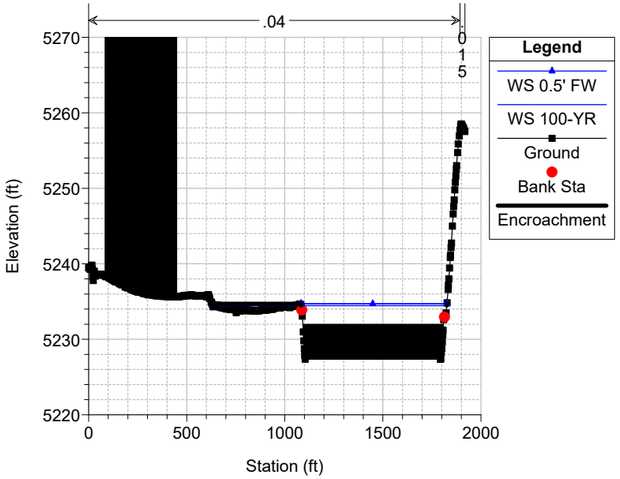
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 4295



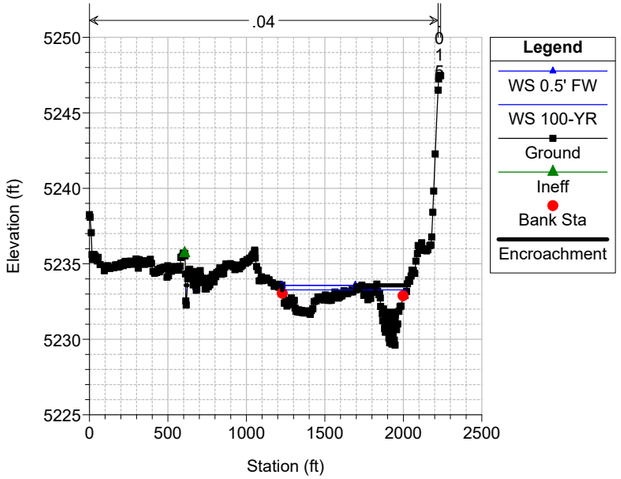
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 3885



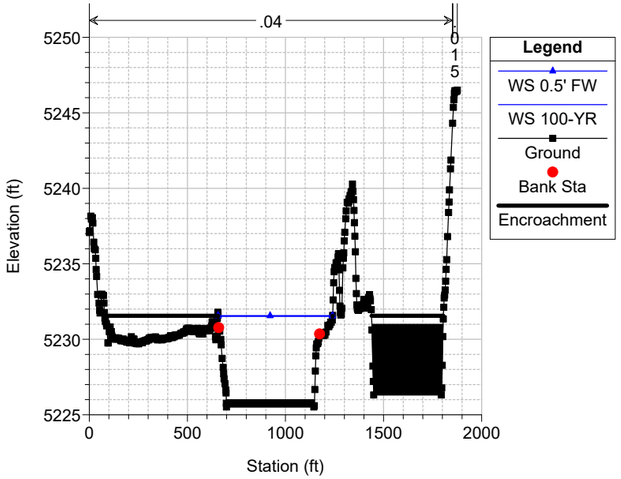
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 3638



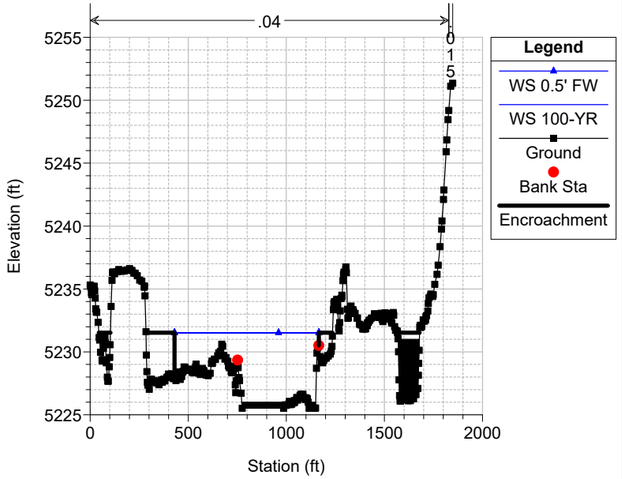
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 3090



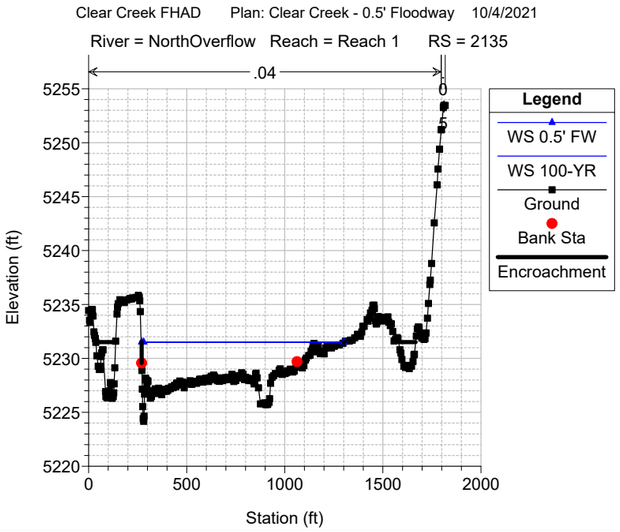
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 2852



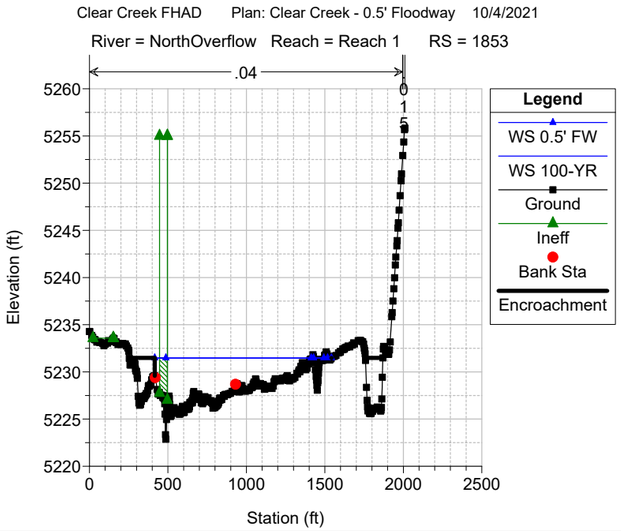
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 2382



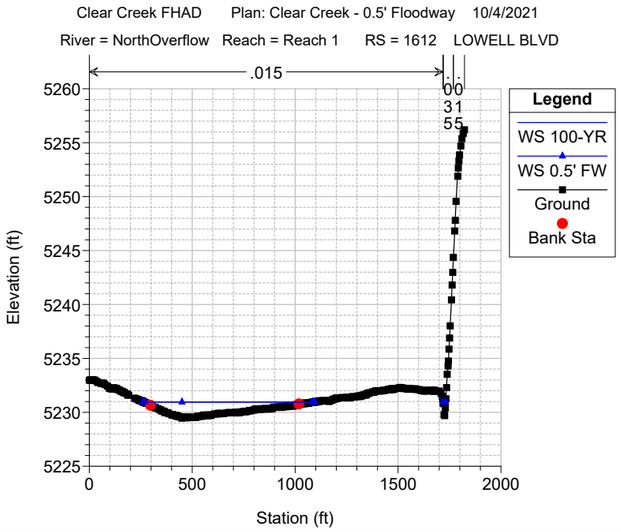
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 2135



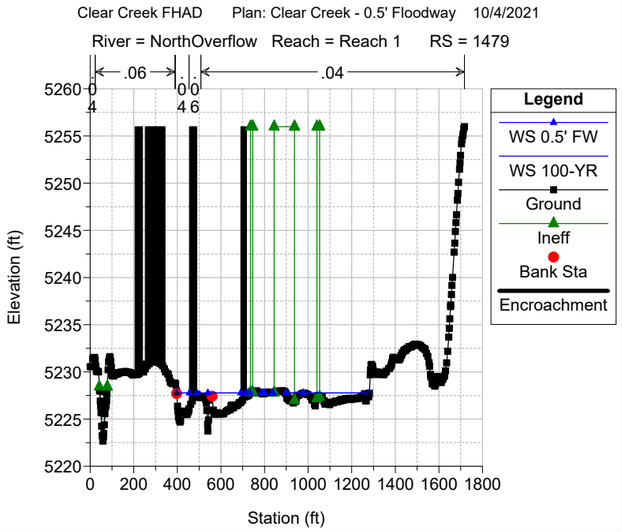
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 1853

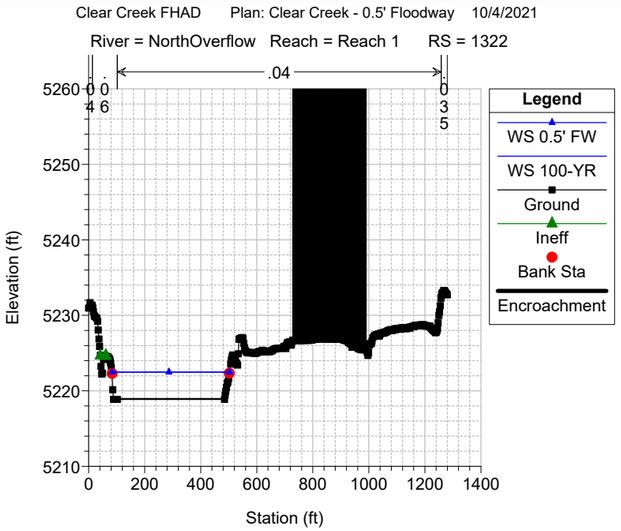


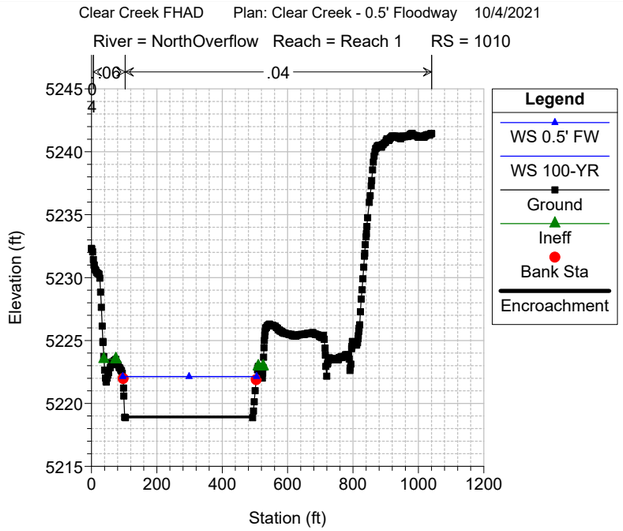
Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 1612 LOWELL BLVD

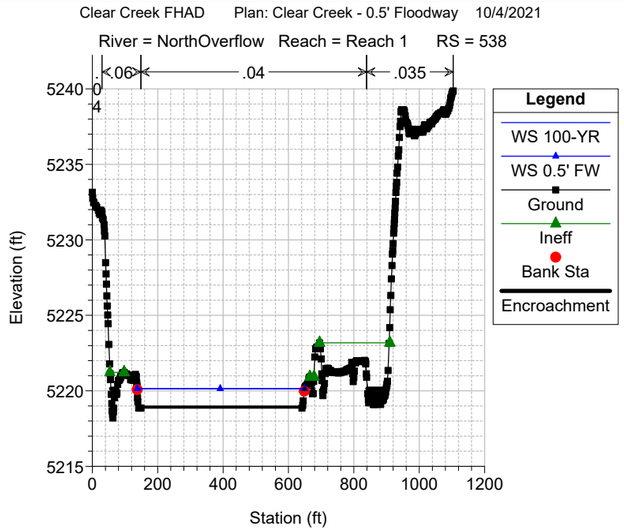


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 1479




Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 1322
.04
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 1010
.04
Legend
WS 0.5' FW
WS 100-YR
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)


Clear Creek FHAD Plan: Clear Creek - 0.5' Floodway 10/4/2021
River = NorthOverflow Reach = Reach 1 RS = 538
.04
.035
Legend
WS 100-YR
WS 0.5' FW
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)

STRUCTURE SURVEY

1

17^7
22^0
212^0

FORM NO. _____ PAGE ___ OF ___

BRIDGE/CULVERT GEOMETRY

Crossing Name: _____

URB.COCOO1.00

PROJECT CLEAR CREEK CROSSINGS DATE 5-18-16

CREW DALE PETERSEN _____

JOE MCUEELY _____

_____ _____

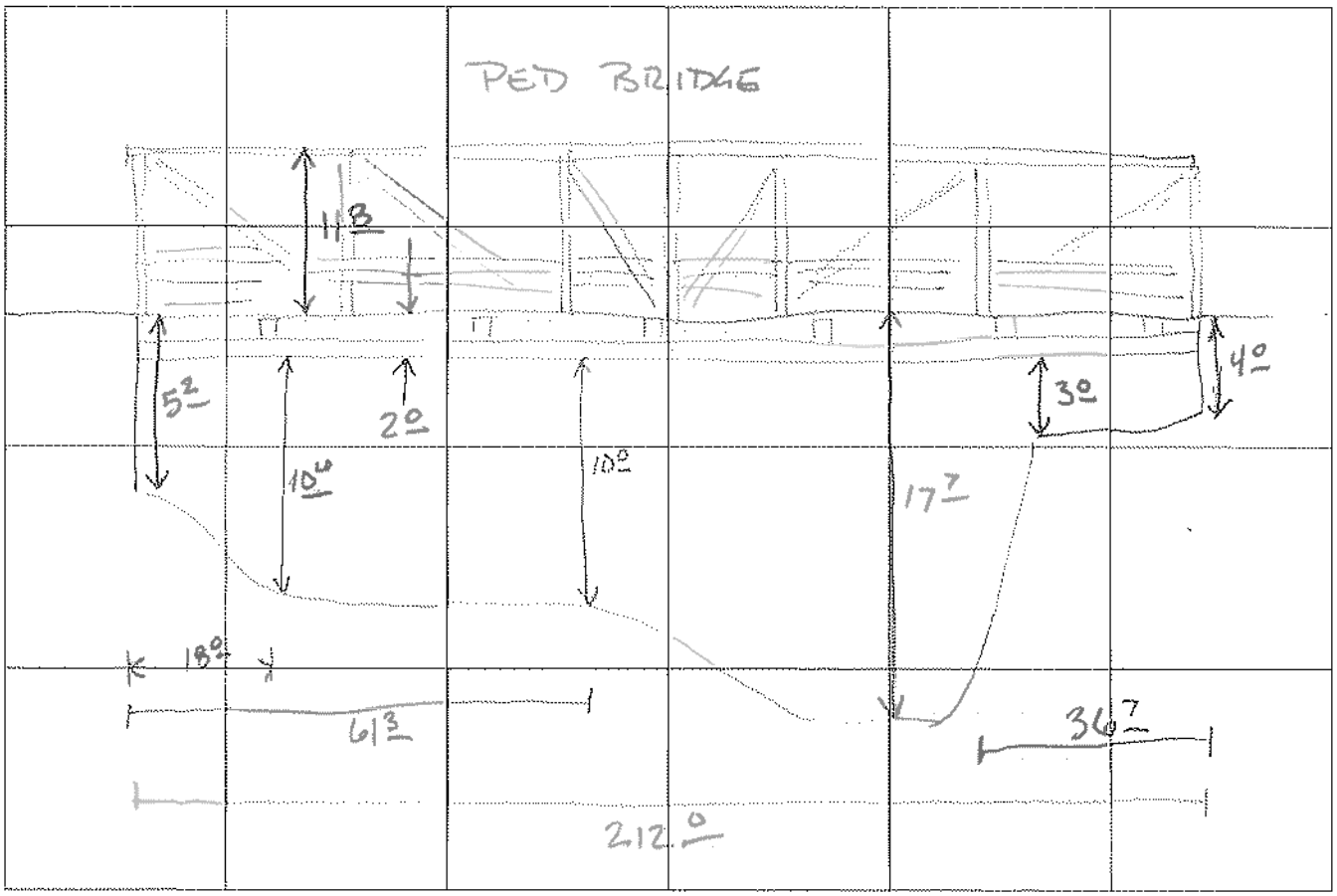
PHOTOS: ENTRANCE X OUTLET _____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. NGS M412, PID KK1449
ELEVATION OF BENCHMARK 5303.31 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO. _____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: _____

BRIDGE

Alignment N 23° E
Bridge Opening Width W 212.0
Bridge Opening Length L 26.6
Piers
--Number NONE
--Width
--Type
Elevation Low Steel 5721.70
Elevation Top 5723.15
Bridge Opening Sideslopes
Embankment Sideslopes
--Entrance R 3:1 L 4:1
--Outlet
Wingwall Angles θ
Wingwall Lengths
Angle of Bridge Skew θ
Deck Elevations 5723.15
Top of Railing 5734.95
Invert Elevations
--Entrance 5705.45
--Outlet 5701.70

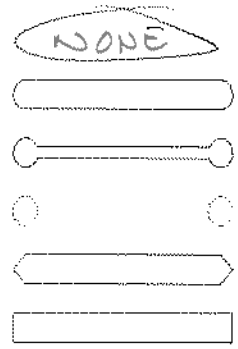
CULVERT

Inside Dimensions
--Rise(or Diameter)
--Span
Shape
Material
Invert Elevations
--Entrance
--Outlet
Length of Culvert
Embankment Sideslopes
Road Elevation
Entrance
--Wingwall Angle
--Wingwall Length
--End Projection
Outlet
--Siltation Depth
--End Projection

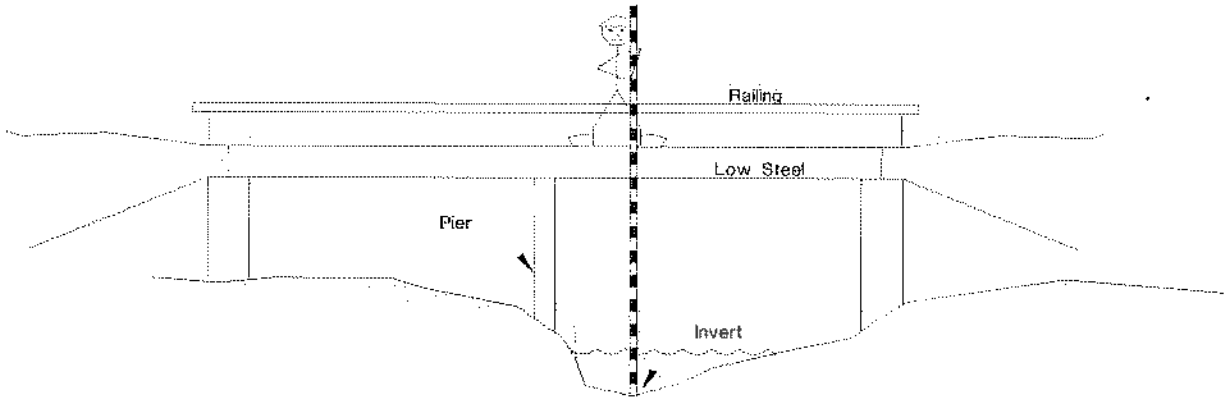
REMARKS: _____

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:
- Semi-Circular Nose and Tail----------
- Twin-Cylinder Piers With Connecting Diaphragm--------
- Twin-Cylinder Piers Without Diaphragm----------
- 90° Triangular Nose and Tail----------
- Square Nose and Tail----------



*Photographs should show Rod and Rodman as follows:



1

2

13$^{\underline{5}}$
117$^{\underline{5}}$

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

Crossing Name: _____

URB. COCOO1.00

PROJECT CLEAR CREEK CROSSINGS DATE _____

CREW _____, _____

_____, _____

_____, _____

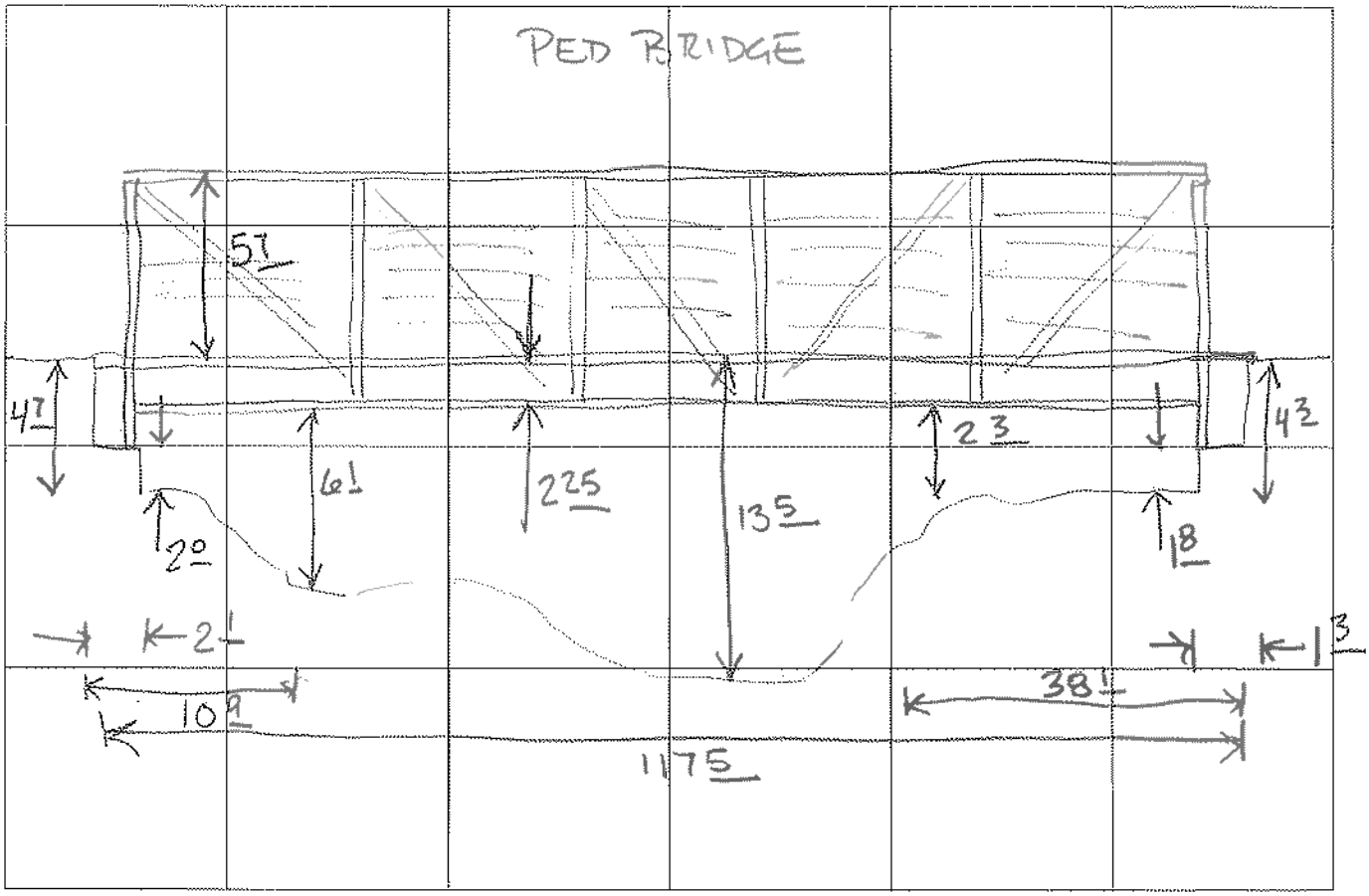
PHOTOS: ENTRANCE X OUTLET _____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. NGS M412, PID KK1449
ELEVATION OF BENCHMARK 5303.31 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO: _____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: _____

BRIDGE

Alignment N 30° W
Bridge Opening Width W 117.5
Bridge Opening Length L 11.0
Piers
--Number NONE
--Width _____
--Type _____
Elevation Low Steel 5695.52
Elevation Top 5697.77
Bridge Opening Sideslopes _____
Embankment Sideslopes _____
--Entrance R 4:1 L 2:1
--Outlet _____
Wingwall Angles 0 _____
Wingwall Lengths _____
Angle of Bridge Skew 0 _____
Deck Elevations 5697.77
Top of Railing 5703.47
Invert Elevations
--Entrance 5684.27
--Outlet 5684.33

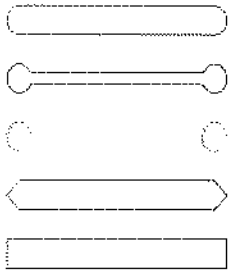
CULVERT

Inside Dimensions
--Rise(or Diameter) _____
--Span _____
Shape _____
Material _____
Invert Elevations
--Entrance _____
--Outlet _____
Length of Culvert _____
Embankment Sideslopes _____
Road Elevation _____
Entrance
--Wingwall Angle _____
--Wingwall Length _____
--End Projection _____
Outlet
--Siltation Depth _____
--End Projection _____

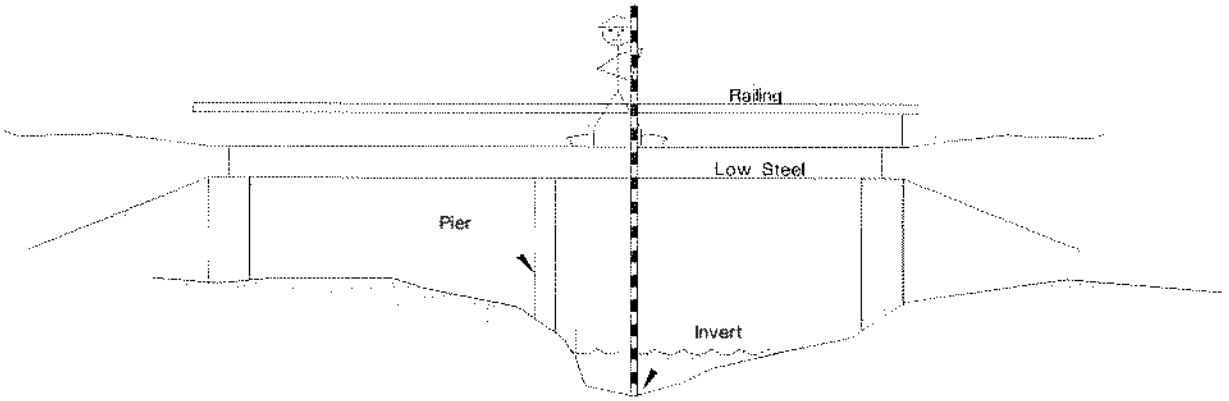
REMARKS: _____

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:
Semi-Circular Nose and Tail----------
Twin-Cylinder Piers With Connecting Diaphragm--------
Twin-Cylinder Piers Without Diaphragm----------
90° Triangular Nose and Tail----------
Square Nose and Tail----------



*Photographs should show Rod and Rodman as follows:



2

3

164
140°

FORM NO. _____ PAGE ___ OF ___

BRIDGE/CULVERT GEOMETRY

Crossing Name: _____

URB. COCOO1.00

PROJECT CLEAR CREEK CROSSINGS DATE _____

CREW _____, _____

_____, _____

_____, _____

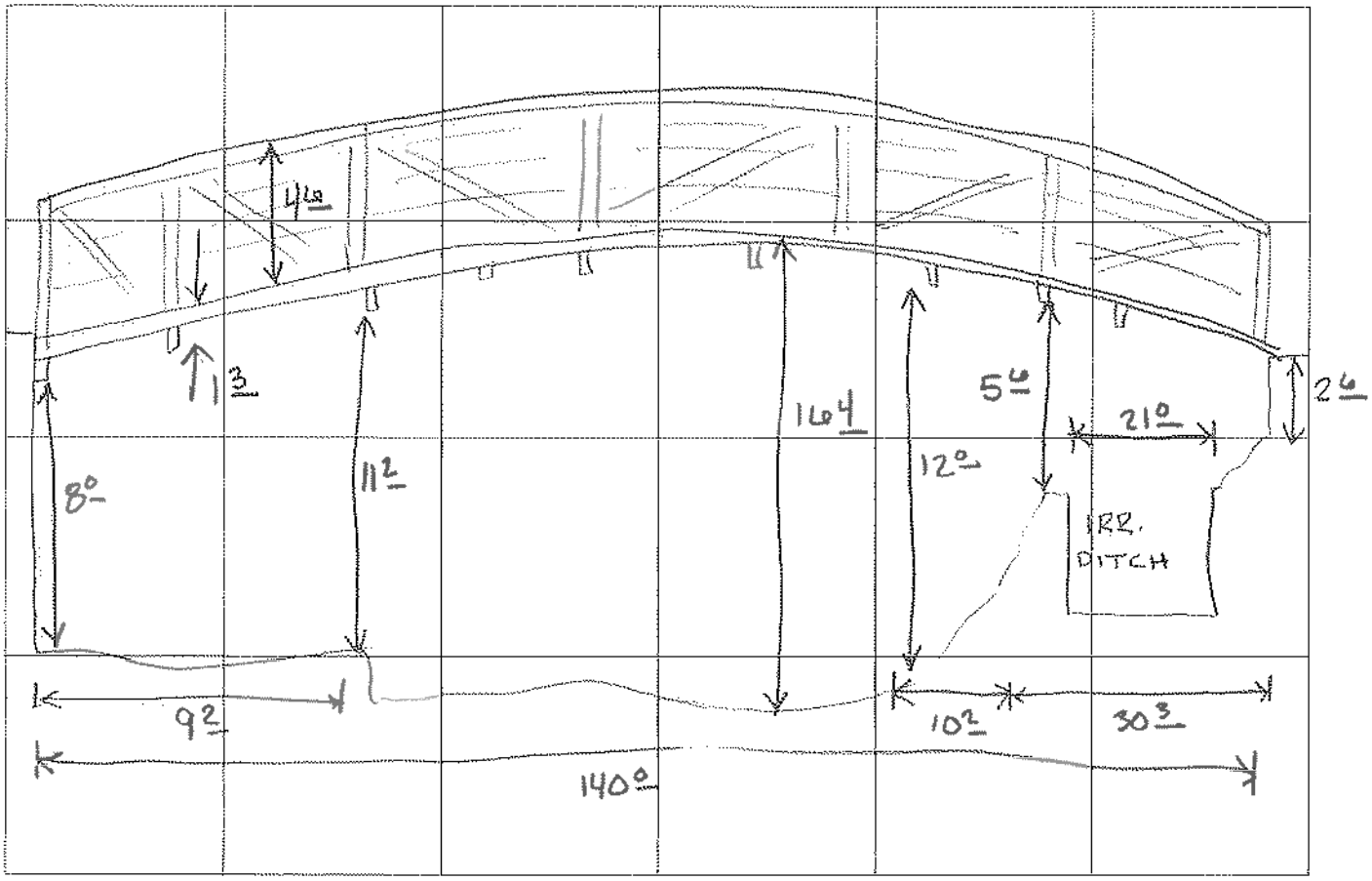
PHOTOS: ENTRANCE X OUTLET _____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. NGS M412, PID KK1449
ELEVATION OF BENCHMARK 5303.31 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO. _____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: _____

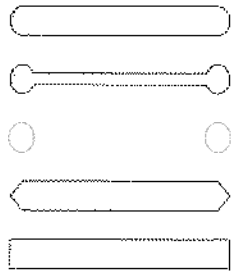
BRIDGE		CULVERT	
Alignment	N 10 E	Inside Dimensions	
Bridge Opening Width W	140.0	--Rise(or Diameter)	
Bridge Opening Length L	12.5	--Span	
Piers		Shape	
--Number	NONE	Material	
--Width		Invert Elevations	
--Type		--Entrance	
Elevation Low Steel	5661.58	--Outlet	
Elevation Top	5663.88	Length of Culvert	
Bridge Opening Sideslopes		Embankment Sideslopes	
Embankment Sideslopes		Road Elevation	
--Entrance	L 5:1 D 2:1	Entrance	
--Outlet		--Wingwall Angle	
Wingwall Angles 0		--Wingwall Length	
Wingwall Lengths		--End Projection	
Angle of Bridge Skew 0		Outlet	
Deck Elevations	5662.88	--Siltation Depth	
Top of Railing	5667.48	--End Projection	
Invert Elevations			
--Entrance	5646.48		
--Outlet	5646.46		

REMARKS: _____

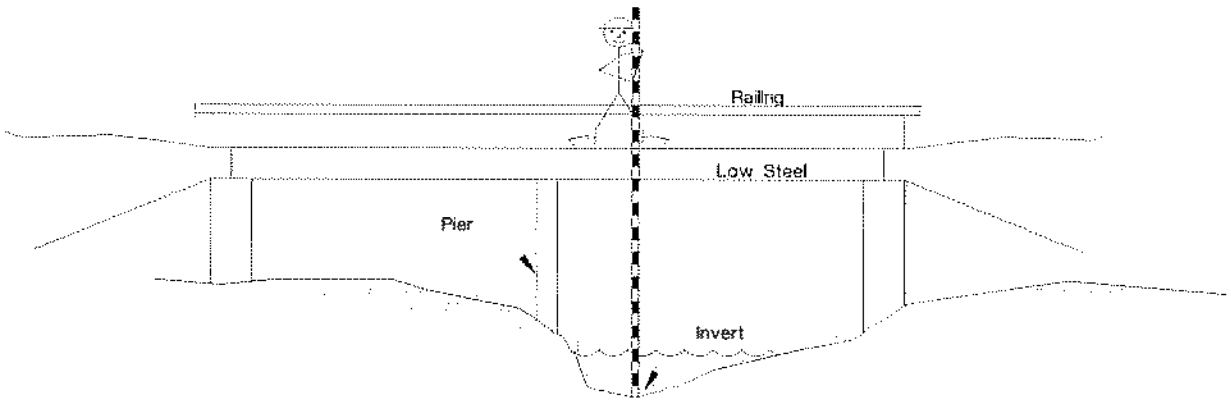
GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail----------
- Twin-Cylinder Piers With Connecting Diaphragm--------
- Twin-Cylinder Piers Without Diaphragm----------
- 90° Triangular Nose and Tail----------
- Square Nose and Tail----------



*Photographs should show Rod and Rodman as follows:



3

4

FORM NO. _____ PAGE ___ OF ___

BRIDGE/CULVERT GEOMETRY

Crossing Name: _____

PROJECT URB.COCO01.00 CLEAR CREEK CROSSINGS DATE _____

CREW _____

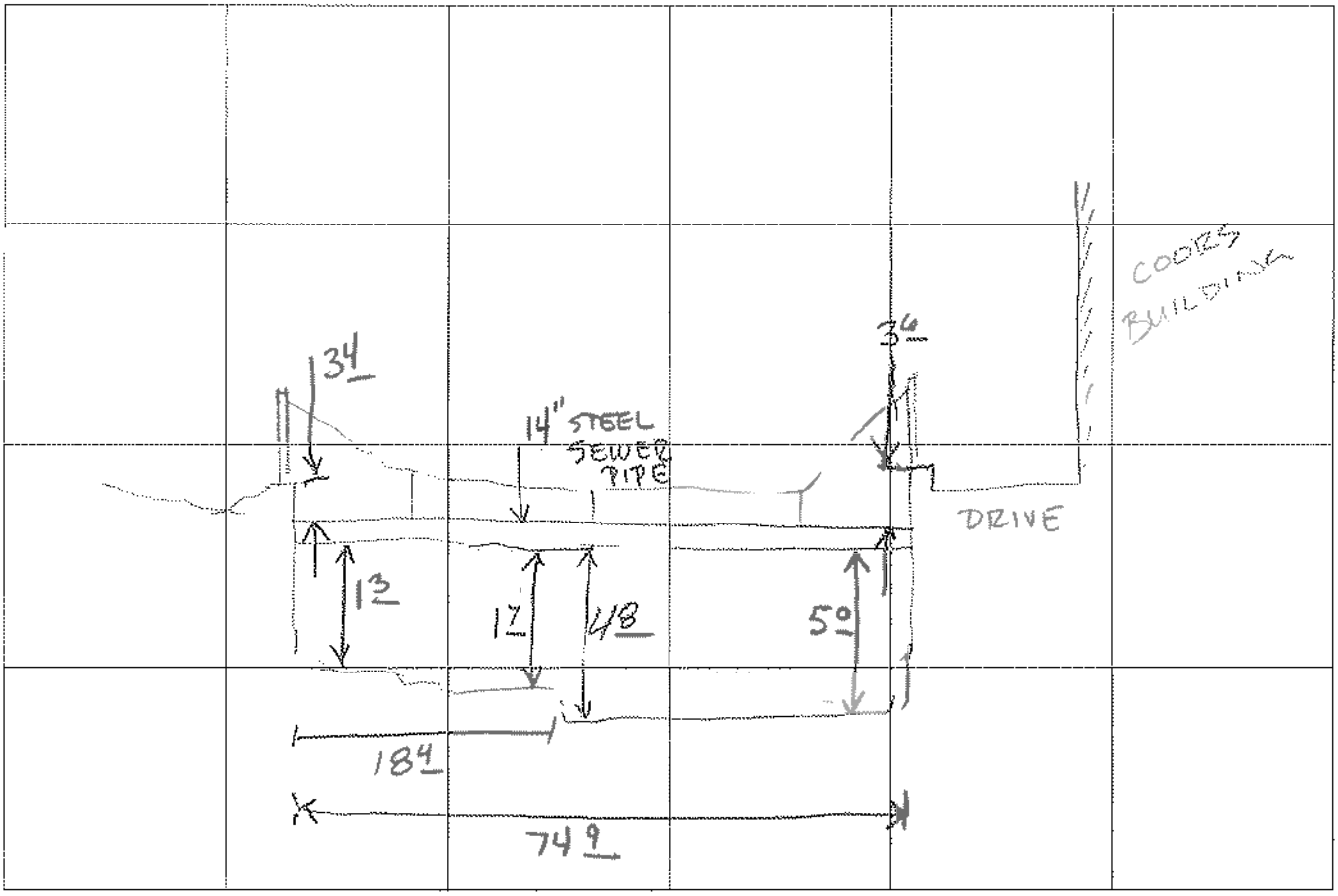
PHOTOS: ENTRANCE X OUTLET _____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. NGS IM412, PID KK1449
ELEVATION OF BENCHMARK 5303.31 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO. _____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: _____

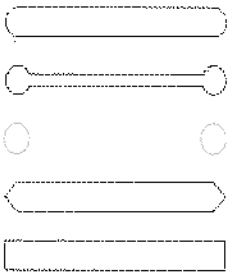
BRIDGE		CULVERT	
Alignment	N 48° W	Inside Dimensions	
Bridge Opening Width W	74.9	--Rise(or Diameter)	14"
Bridge Opening Length L	1.2	--Span	
Piers		Shape	ROUND
--Number	NONE	Material	STEEL
--Width	N/A	Invert Elevations	
--Type	N/A	--Entrance	L [ ] R [ ]
Elevation Low Steel	5625.67	--Outlet	
Elevation Top	5626.86	Length of Culvert	
Bridge Opening Sideslopes	N/A	Embankment Sideslopes	
Embankment Sideslopes:	N/A	Road Elevation	
--Entrance	N/A	Entrance	
--Outlet	N/A	--Wingwall Angle	
Wingwall Angles 0	N/A	--Wingwall Length	
Wingwall Lengths	N/A	--End Projection	
Angle of Bridge Skew 0	N/A	Outlet	
Deck Elevations	L:5627.10 R:5626.82	--Siltation Depth	
Top of Railing	N/A	--End Projection	
Invert Elevations			
--Entrance	5620.96		
--Outlet	5620.96		

REMARKS: _____

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail----------
- Twin-Cylinder Piers With Connecting Diaphragm--------
- Twin-Cylinder Piers Without Diaphragm----------
- 90° Triangular Nose and Tail----------
- Square Nose and Tail----------



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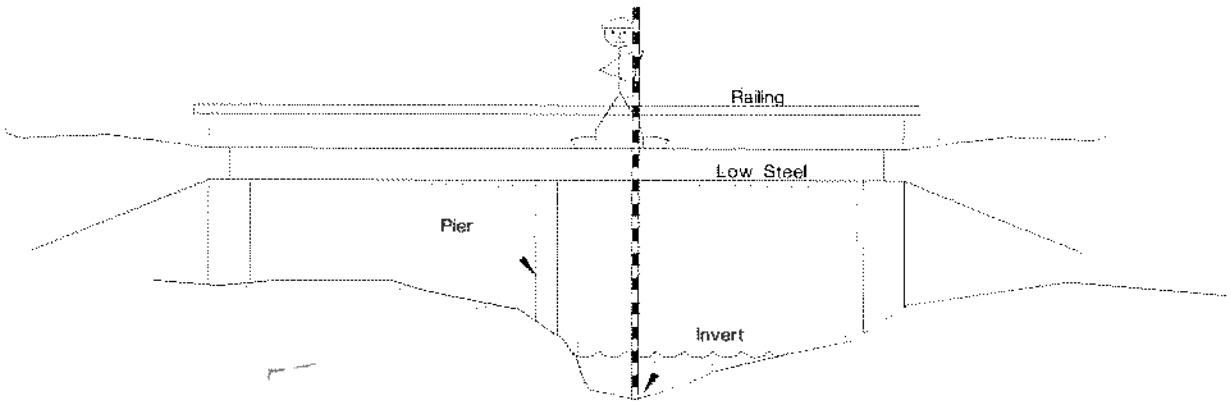


5

FORM NO. _____ PAGE ___ OF ___

BRIDGE/CULVERT GEOMETRY

Crossing Name: _____

PROJECT URB.COCOOI.00 CLEAR CREEK CROSSINGS DATE 5-19-16

CREW DALE PETERSEN _____

JEREMY WHEELER _____

_____ _____

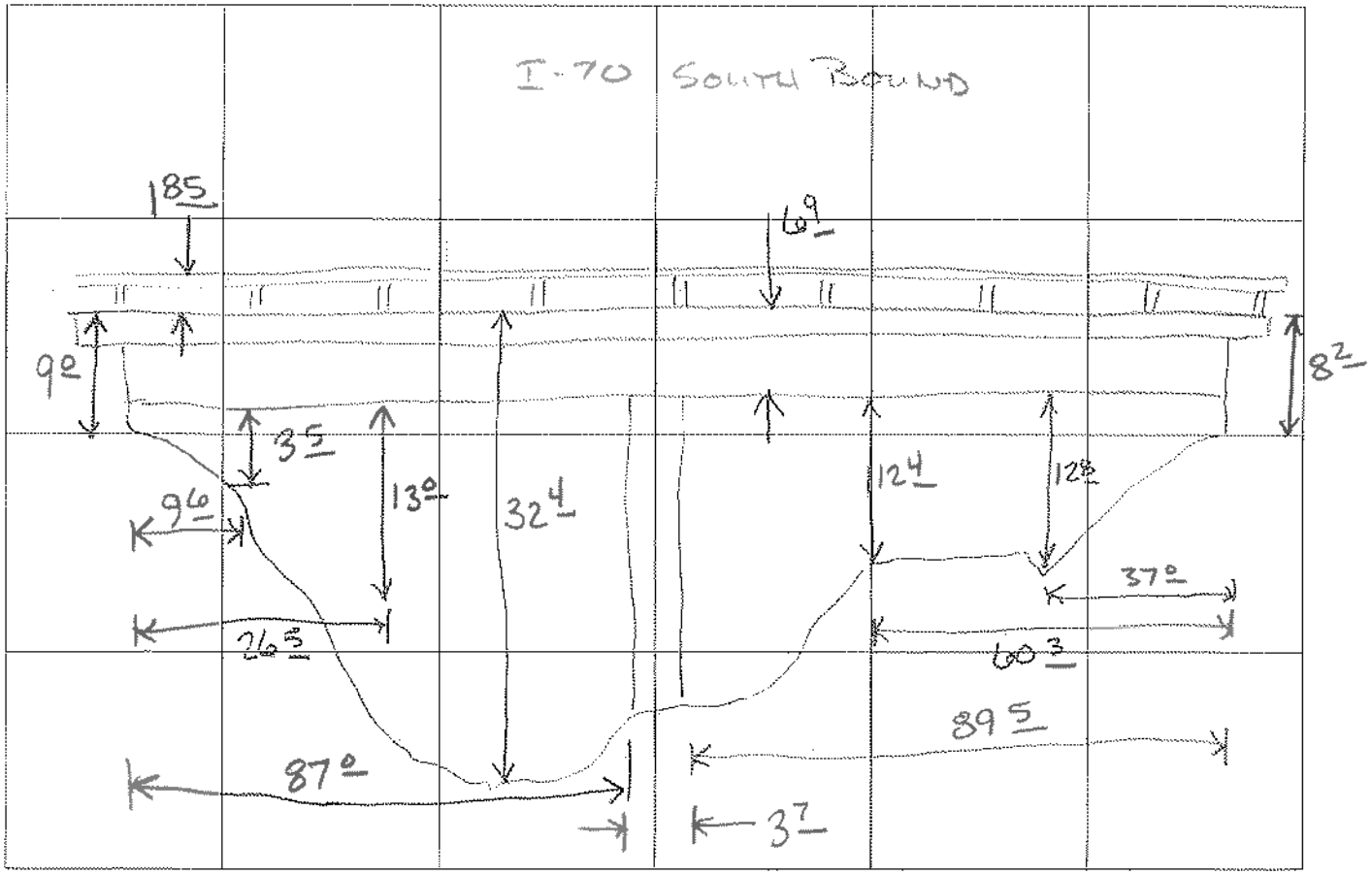
PHOTOS: ENTRANCE X OUTLET _____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. NGS M412, PID KK1449
ELEVATION OF BENCHMARK 5303.31 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO. _____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: .....

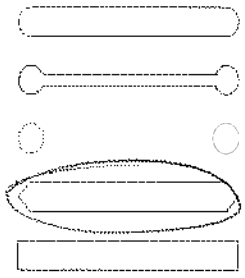
BRIDGE		CULVERT	
Alignment	N 10 W	Inside Dimensions	
Bridge Opening Width W	180.2	--Rise(or Diameter)	
Bridge Opening Length L	76.2	--Span	
Piers		Shape	
--Number	ONE	Material	
--Width	3.7	Invert Elevations	
--Type	Square nose and tail	--Entrance	
Elevation Low Steel	5440.17	--Outlet	
Elevation Top	5447.07	Length of Culvert	
Bridge Opening Sideslopes		Embankment Sideslopes	
Embankment Sideslopes		Road Elevation	
--Entrance	R 3:1 L 3:1	Entrance	
--Outlet		--Wingwall Angle	
Wingwall Angles θ	L: 93° R: 101°	--Wingwall Length	
Wingwall Lengths	L: 4.6 R: 4.6	--End Projection	
Angle of Bridge Skew θ		Outlet	
Deck Elevations	5447.07	--Siltation Depth	
Top of Railing	5448.92	--End Projection	
Invert Elevations			
--Entrance	5414.67		
--Outlet	5417.69		

REMARKS: .....

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail----------
- Twin-Cylinder Piers With Connecting Diaphragm--------
- Twin-Cylinder Piers Without Diaphragm----------
- 90° Triangular Nose and Tail----------
- ~~S~~quare Nose and Tail----------



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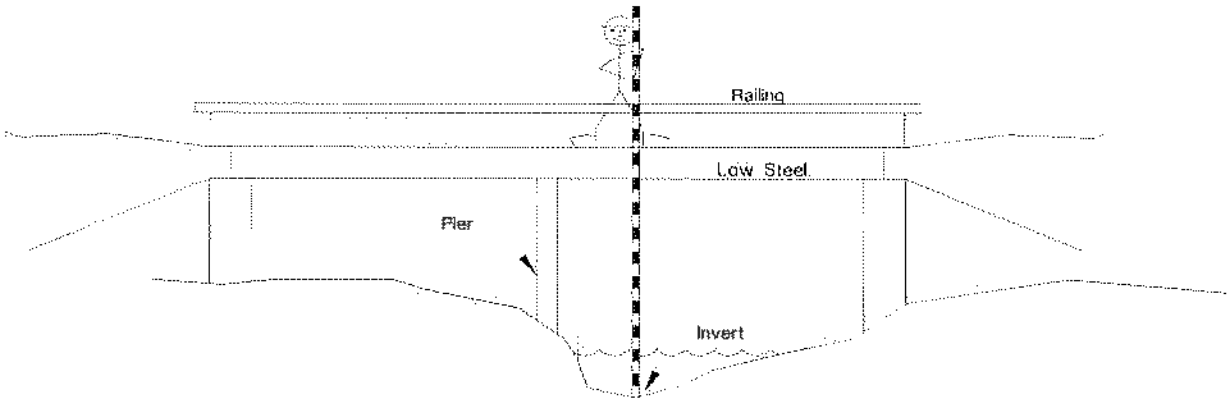


6

167
162
70

FORM NO. _____ PAGE ___ OF ___

BRIDGE/CULVERT GEOMETRY

Crossing Name: _____

URB, Co C001.00

PROJECT CLEAR CREEK CROSSINGS DATE _____

CREW _____ _____

_____ _____

_____ _____

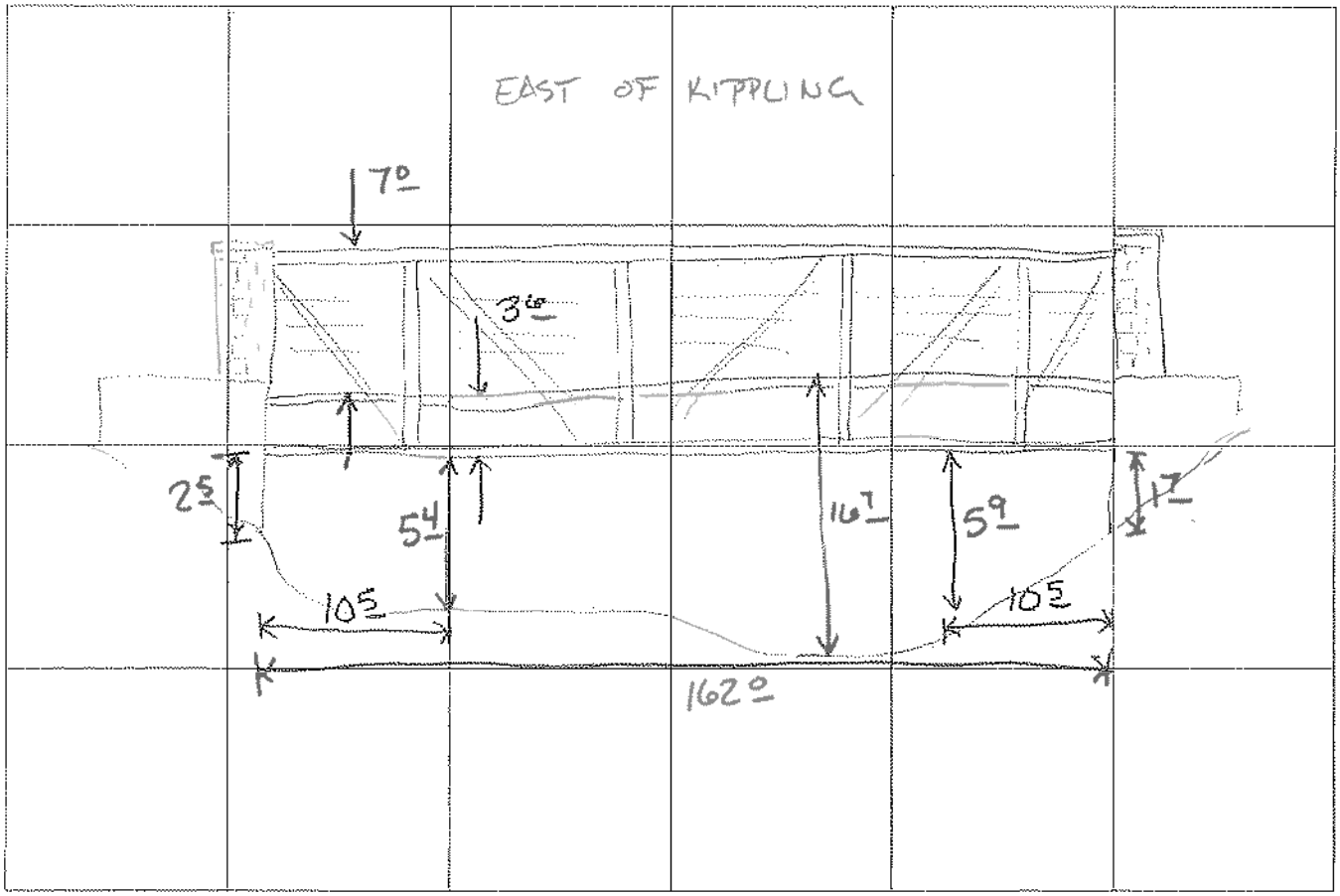
PHOTOS: ENTRANCE X OUTLET _____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. NGS M412, PID KK1449
ELEVATION OF BENCHMARK 5303.31
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO. _____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: .....

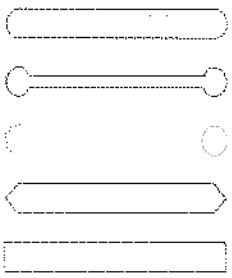
BRIDGE		CULVERT	
Alignment	N 0°W	Inside Dimensions	
Bridge Opening Width W	162.0	--Rise(or Diameter)	
Bridge Opening Length L	18.6	--Span	
Piers		Shape	
--Number	NONE	Material	
--Width	N/A	Invert Elevations	
--Type	N/A	--Entrance	
Elevation Low Steel	5364.95	--Outlet	
Elevation Top	5369.55	Length of Culvert	
Bridge Opening Sideslopes	N/A	Embankment Sideslopes	
Embankment Sideslopes	N/A	Road Elevation	
--Entrance	R 3:1 L 3:1	Entrance	
--Outlet	N/A	--Wingwall Angle	
Wingwall Angles 0	N/A	--Wingwall Length	
Wingwall Lengths	N/A	--End Projection	
Angle of Bridge Skew 0		Outlet	
Deck Elevations	5368.55	--Siltation Depth	
Top of Railing	5375.55	--End Projection	
Invert Elevations			
--Entrance	5341.85		
--Outlet	5352.02		

REMARKS: .....

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail----------
- Twin-Cylinder Piers With Connecting Diaphragm--------
- Twin-Cylinder Piers Without Diaphragm----------
- 90° Triangular Nose and Tail----------
- Square Nose and Tail----------



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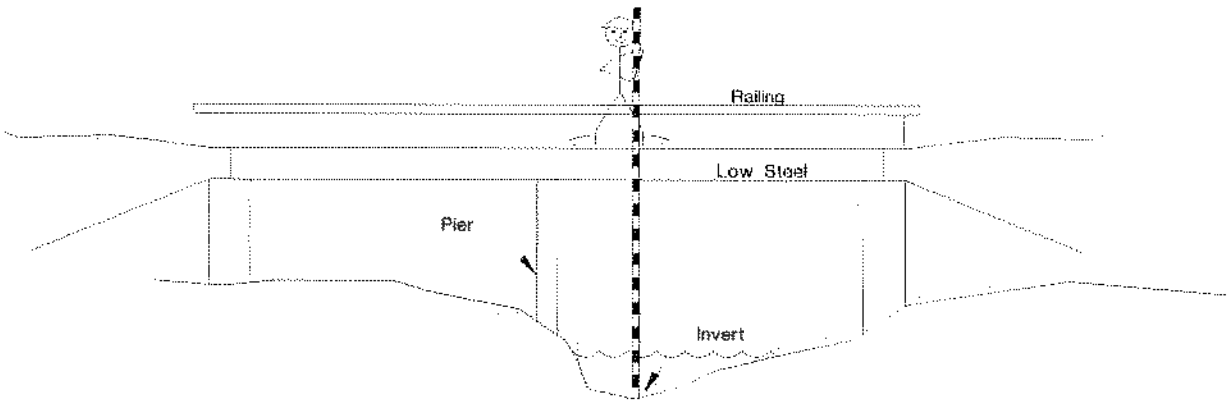

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7

46
134°
22°

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

Crossing Name: _____

URB, COCO01.00

PROJECT CLEAR CREEK CROSSINGS DATE_____

CREW _____ _____

_____ _____

_____ _____

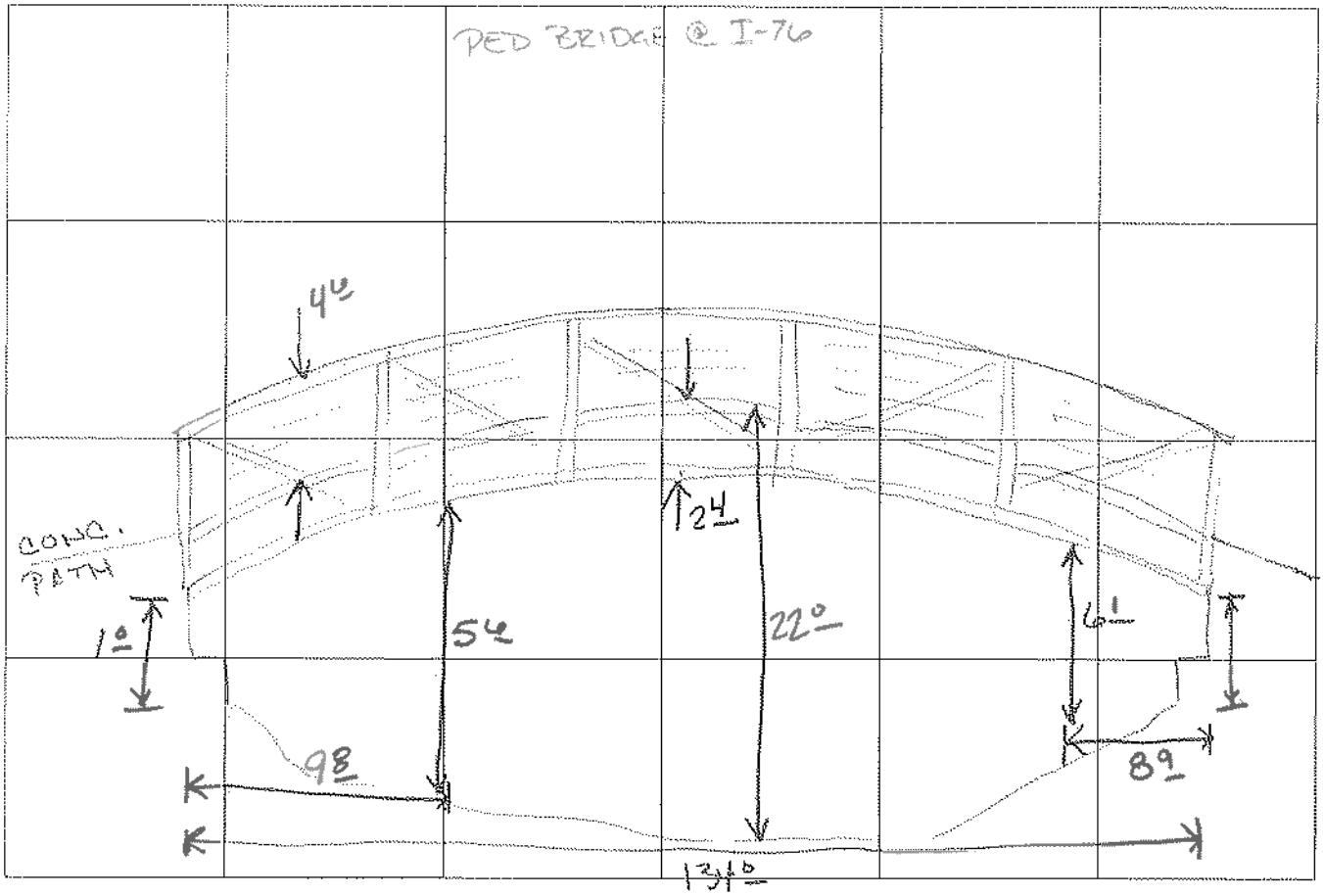
PHOTOS: ENTRANCE X OUTLET _____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. NGS M412, PID KK1449
ELEVATION OF BENCHMARK 5303.31 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: _____

BRIDGE

Alignment: N 48° W
Bridge Opening Width W: 134.0
Bridge Opening Length L: 12.5
Piers
--Number: NONE
--Width: N/A
--Type: N/A
Elevation Low Steel: 5221.25
Elevation Top: 5223.65
Bridge Opening Sideslopes: N/A
Embankment Sideslopes: N/A
--Entrance: L 3:1 R 3:1
--Outlet: N/A
Wingwall Angles θ: N/A
Wingwall Lengths: N/A
Angle of Bridge Skew θ: N/A
Deck Elevations: 5223.65
Top of Railing: 5228.25
Invert Elevations
--Entrance: 5201.65
--Outlet: 5202.47

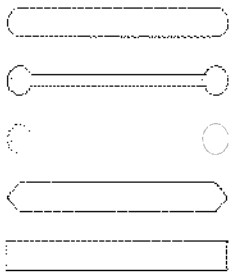
CULVERT

Inside Dimensions
--Rise(or Diameter): _____
--Span: _____
Shape: _____
Material: _____
Invert Elevations
--Entrance: _____
--Outlet: _____
Length of Culvert: _____
Embankment Sideslopes: _____
Road Elevation: _____
Entrance
--Wingwall Angle: _____
--Wingwall Length: _____
--End Projection: _____
Outlet
--Siltation Depth: _____
--End Projection: _____

REMARKS: _____

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:
- Semi-Circular Nose and Tail----------
- Twin-Cylinder Piers With Connecting Diaphragm--------
- Twin-Cylinder Piers Without Diaphragm----------
- 90° Triangular Nose and Tail----------
- Square Nose and Tail----------



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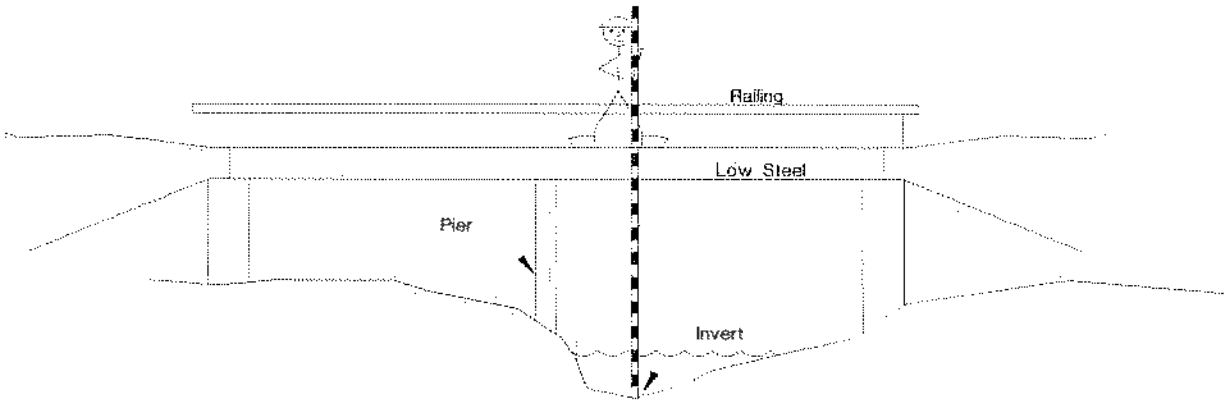


8

44º
3 6

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

Crossing Name: URB.COCOO1.00

PROJECT CLEAR CREEK CROSSINGS DATE_____

CREW _____

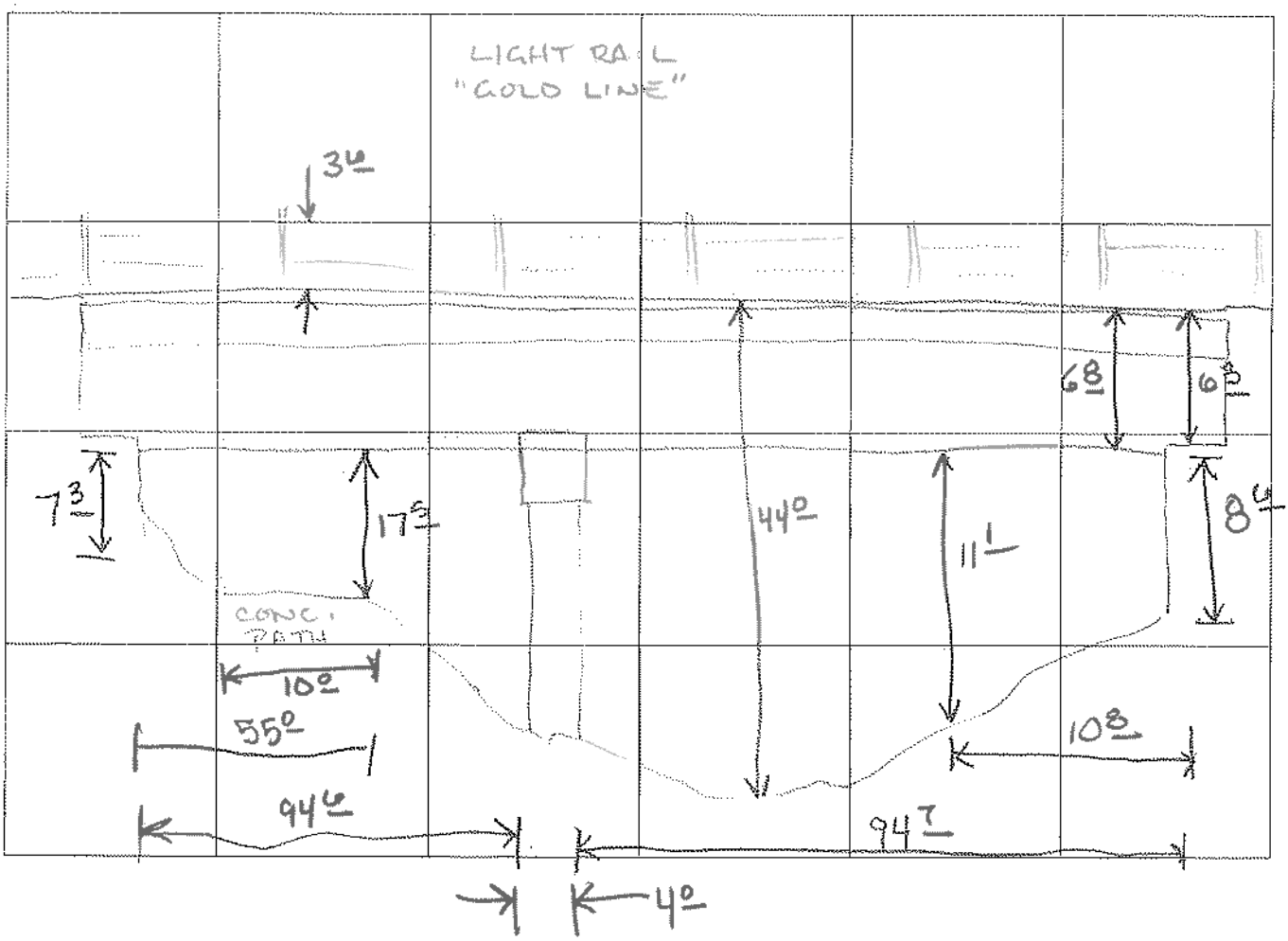
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. NGS M42, PID KK1449
ELEVATION OF BENCHMARK 5303.31 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE_____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: _____

BRIDGE

Alignment N 86° W
Bridge Opening Width W 193.3
Bridge Opening Length L 36.2
Piers
--Number TWO
--Width 48"
--Type ROUND
Elevation Low Steel 5230.19
Elevation Top 5236.99
Bridge Opening Sideslopes N/A
Embankment Sideslopes N/A
--Entrance L 2:1 R 1:1
--Outlet N/A
Wingwall Angles θ L 90°
Wingwall Lengths 14.7
Angle of Bridge Skew θ N/A
Deck Elevations 5236.99
Top of Railing 5240.59
Invert Elevations
--Entrance 5192.99
--Outlet 5196.08

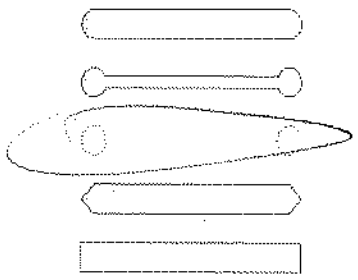
CULVERT

Inside Dimensions
--Rise(or Diameter)
--Span
Shape
Material
Invert Elevations
--Entrance
--Outlet
Length of Culvert
Embankment Sideslopes
Road Elevation
Entrance
--Wingwall Angle
--Wingwall Length
--End Projection
Outlet
--Siltation Depth
--End Projection

REMARKS: _____

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:
- Semi-Circular Nose and Tail----------
- Twin-Cylinder Piers With Connecting Diaphragm-------
- Twin-Cylinder Piers Without Diaphragm----------
- 90° Triangular Nose and Tail----------
- Square Nose and Tail----------



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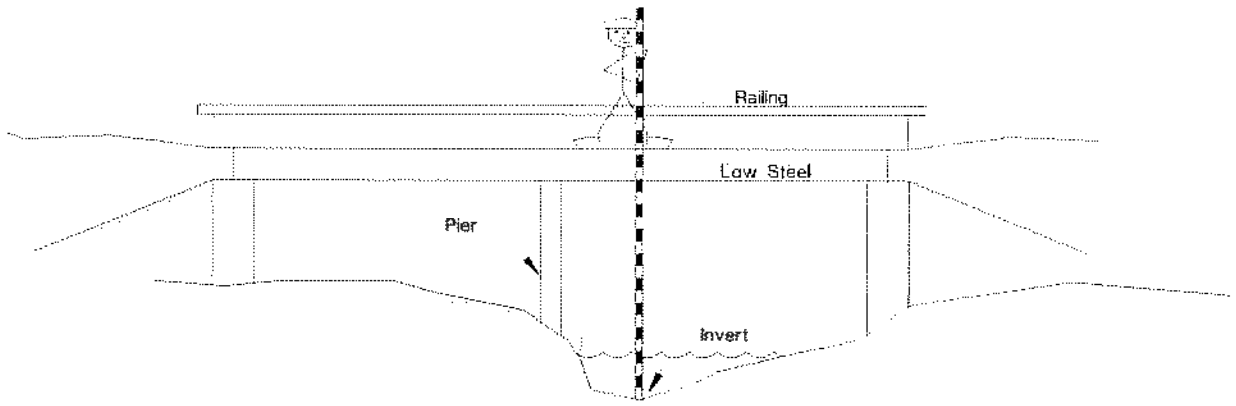


112
6
22°

FORM NO _____ PAGE ___ OF ___

BRIDGE/CULVERT GEOMETRY

Crossing Name: _____

PROJECT URB.C00001.00 CLEAR CREEK CROSSINGS DATE _____

CREW _____ _____

_____ _____

_____ _____

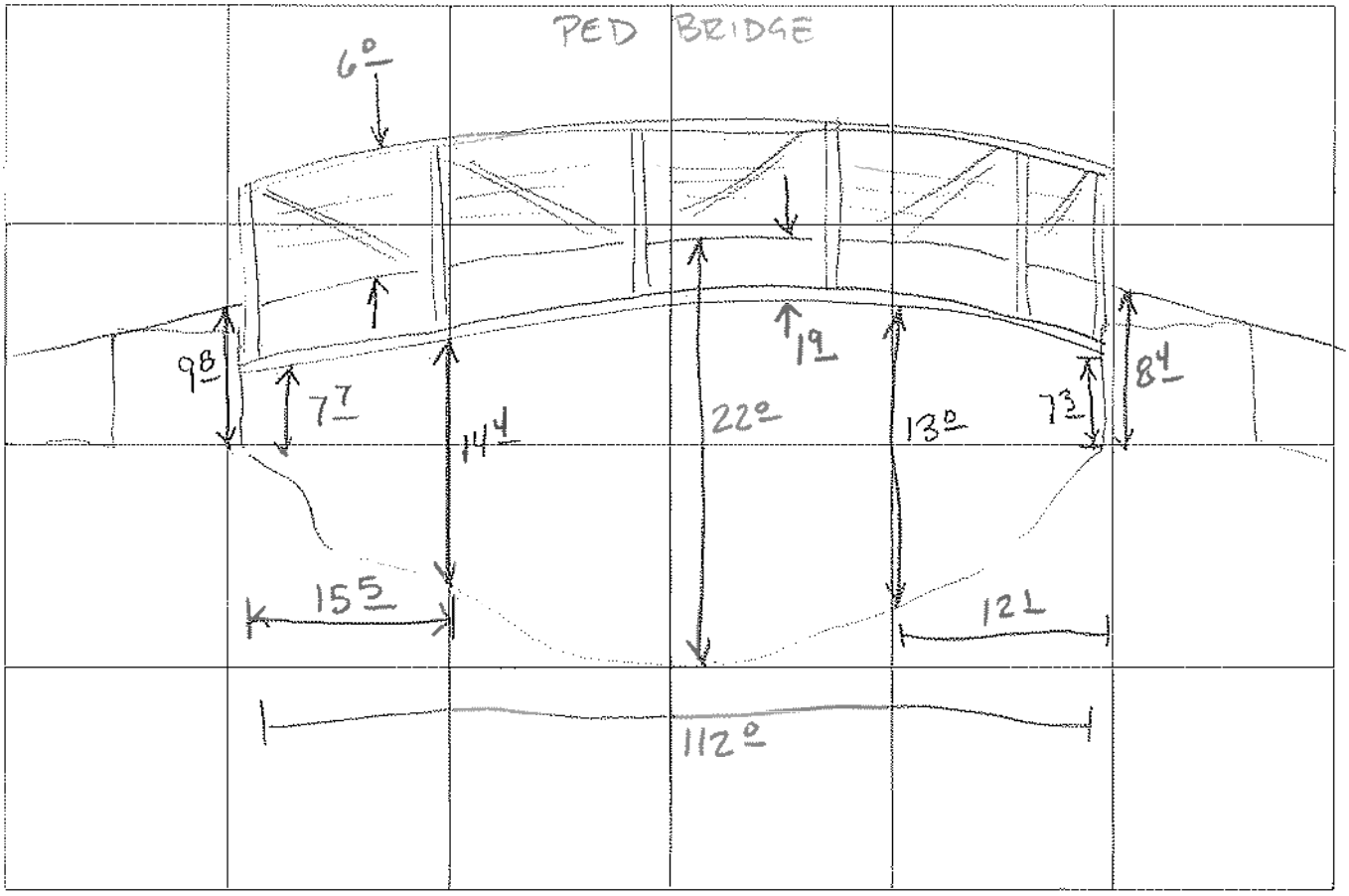
PHOTOS: ENTRANCE X OUTLET _____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. NGS M412, PID KK1449
ELEVATION OF BENCHMARK 5303.31 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO. _____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: _____

BRIDGE

Alignment N 15° W
Bridge Opening Width W 112.0
Bridge Opening Length L 14.5
Piers
--Number NONE
--Width N/A
--Type N/A
Elevation Low Steel 5204.10
Elevation Top 5206.02
Bridge Opening Sideslopes N/A
Embankment Sideslopes N/A
--Entrance N/A
--Outlet N/A
Wingwall Angles θ N/A
Wingwall Lengths N/A
Angle of Bridge Skew θ
Deck Elevations 5206.02
Top of Railing 5212.02
Invert Elevations
--Entrance 5184.00
--Outlet 5184.02

CULVERT

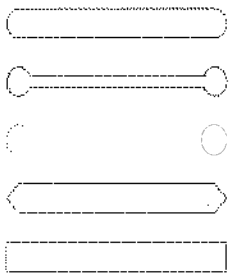
Inside Dimensions
--Rise(or Diameter)
--Span
Shape
Material
Invert Elevations
--Entrance
--Outlet
Length of Culvert
Embankment Sideslopes
Road Elevation
Entrance
--Wingwall Angle
--Wingwall Length
--End Projection
Outlet
--Siltation Depth
--End Projection

REMARKS: _____

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail----------
- Twin-Cylinder Piers With Connecting Diaphragm--------
- Twin-Cylinder Piers Without Diaphragm----------
- 90° Triangular Nose and Tail----------
- Square Nose and Tail----------



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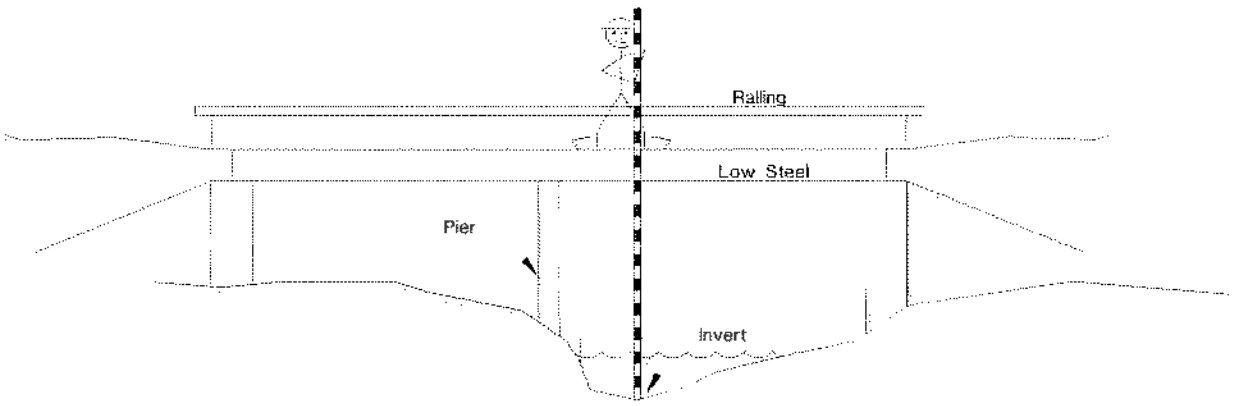


10

FORM NO. _____ PAGE ___ OF ___

BRIDGE/CULVERT GEOMETRY

Crossing Name: URB. COC001.00

PROJECT CLEAR CREEK CROSSINGS DATE _____

CREW _____ _____

_____ _____

_____ _____

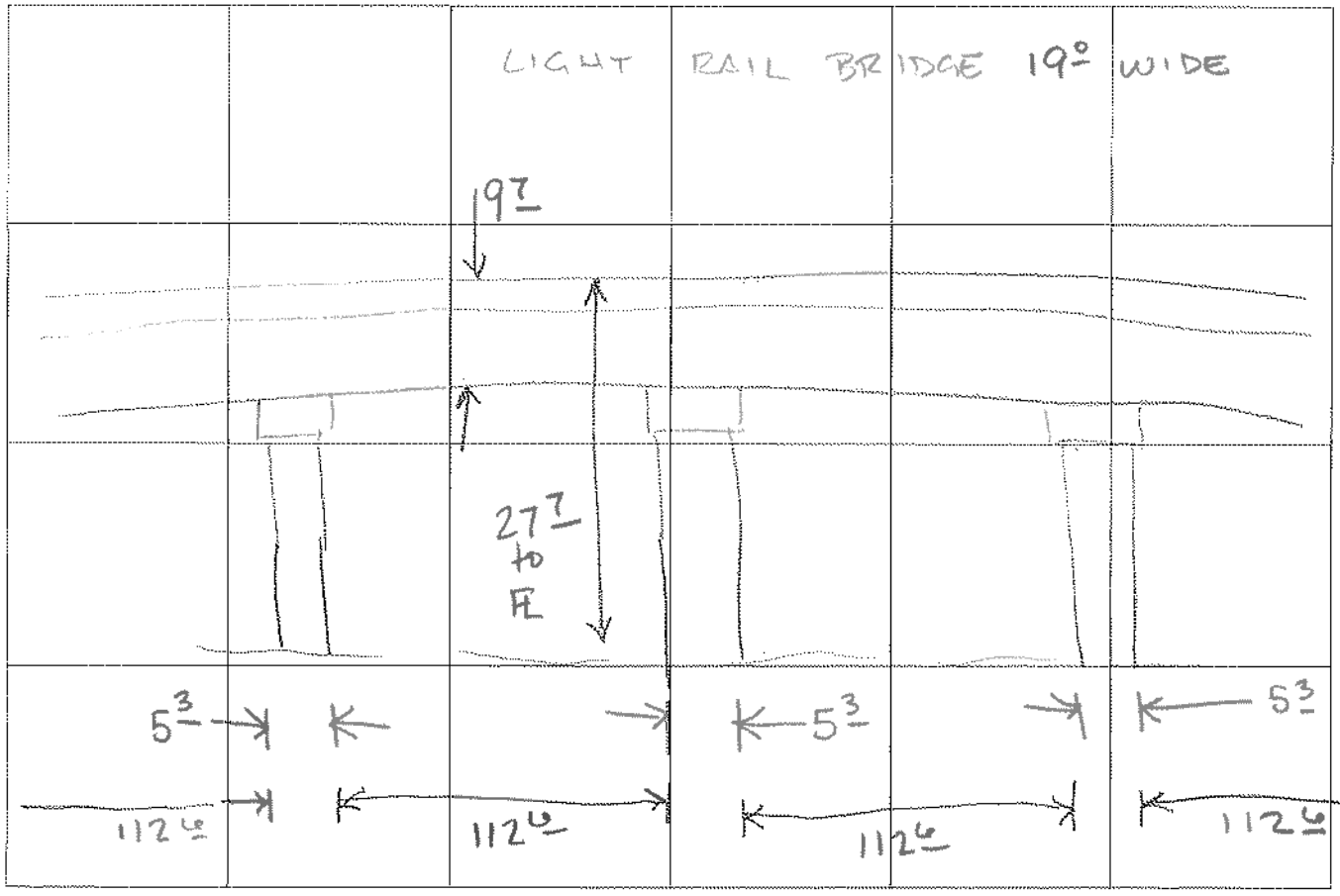
PHOTOS: ENTRANCE ✓ OUTLET _____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. NGS M412, PID KK1449
ELEVATION OF BENCHMARK 5303.31 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO. _____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: _____

BRIDGE

Alignment _____
Bridge Opening Width W _____
Bridge Opening Length L _____
Piers
--Number TWO IN RIVER
--Width 3.33
--Type ROUND
Elevation Low Steel _____
Elevation Top _____
Bridge Opening Sideslopes _____
Embankment Sideslopes _____
--Entrance L 6:1 R 6:1
--Outlet _____
Wingwall Angles 0 _____
Wingwall Lengths _____
Angle of Bridge Skew 0 _____
Deck Elevations _____
Top of Railing _____
Invert Elevations
--Entrance _____
--Outlet _____

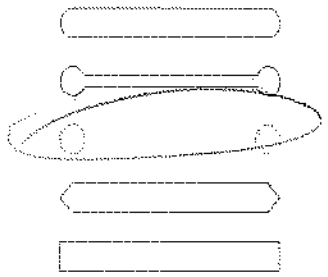
CULVERT

Inside Dimensions
--Rise(or Diameter) _____
--Span _____
Shape _____
Material _____
Invert Elevations
--Entrance _____
--Outlet _____
Length of Culvert _____
Embankment Sideslopes _____
Road Elevation _____
Entrance
--Wingwall Angle _____
--Wingwall Length _____
--End Projection _____
Outlet
--Siltation Depth _____
--End Projection _____

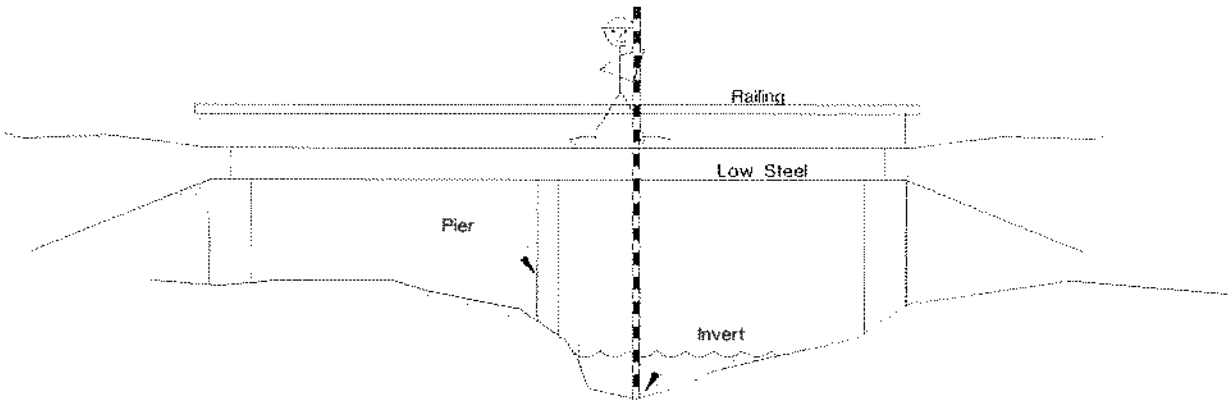
REMARKS _____

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:
Semi-Circular Nose and Tail----------
Twin-Cylinder Piers With Connecting Diaphragm--------
Twin-Cylinder Piers Without Diaphragm----------
90° Triangular Nose and Tail----------
Square Nose and Tail----------



*Photographs should show Rod and Rodman as follows:



11

$$\begin{array}{r} {}^{5} \\ \cancel{8}\,13 \\ 16 \\ \hline 47 \\ 16 \\ \hline 31 \end{array}$$

FORM NO. _____ PAGE ___ OF ___

BRIDGE/CULVERT GEOMETRY

Crossing Name: _____

PROJECT URB.COC001.00 CLEAR CREEK CROSSINGS DATE _____

CREW _____ _____

_____ _____

_____ _____

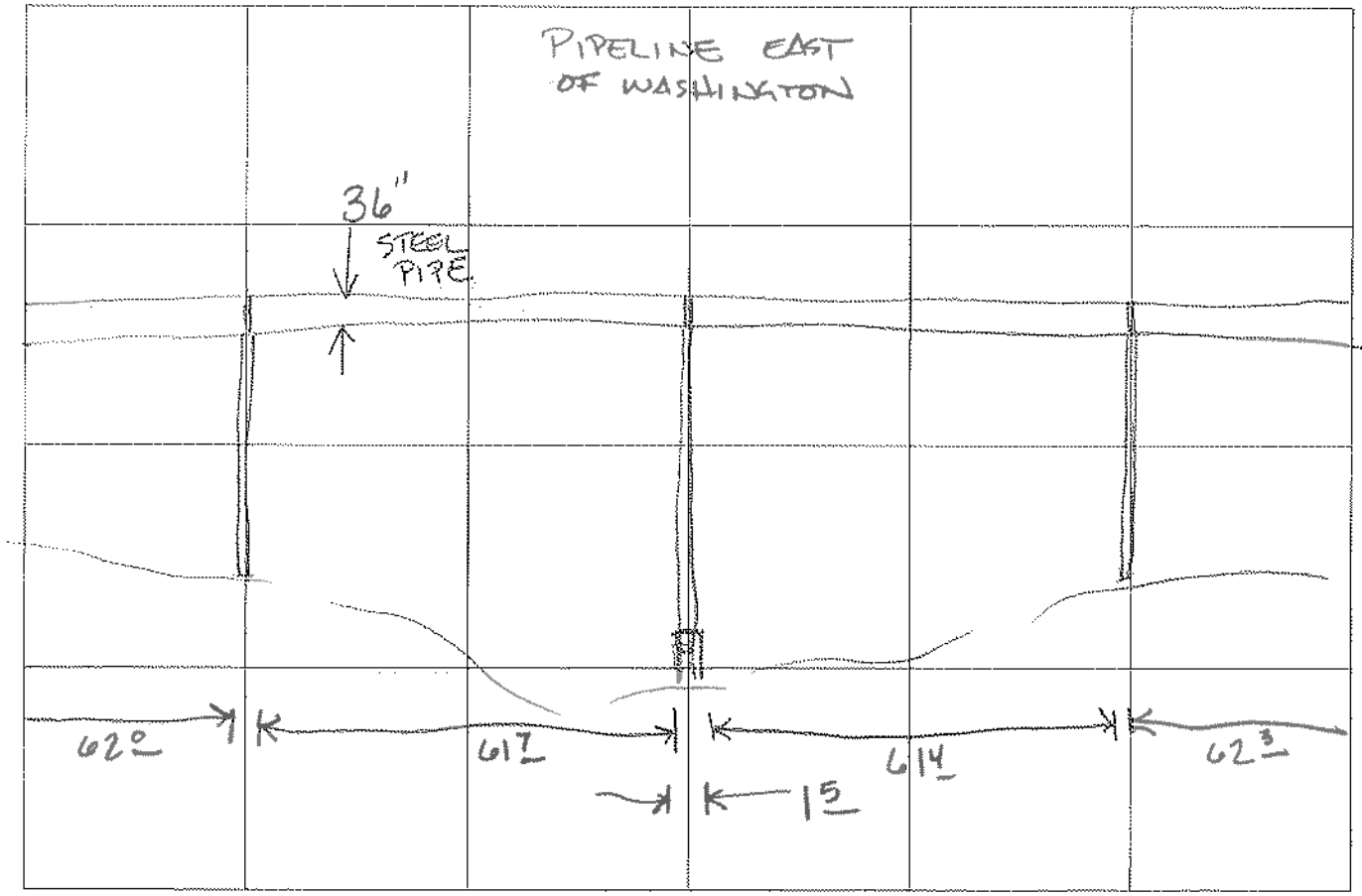
PHOTOS: ENTRANCE X OUTLET _____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. NGS M412, PID KK1449
ELEVATION OF BENCHMARK 5303.31 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO. _____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: _____

BRIDGE

Alignment N 0° W
Bridge Opening Width W 248.9
Bridge Opening Length L 1.5
Piers
--Number 2
--Width 1.5
--Type ROUND
Elevation Low Steel L: 5131.81 R: 5140.08
Elevation Top L: 5141.31 R: 5141.58
Bridge Opening Sideslopes N/A
Embankment Sideslopes N/A
--Entrance L 6:1 R 6:1
--Outlet N/A
Wingwall Angles 0 N/A
Wingwall Lengths N/A
Angle of Bridge Skew 0 N/A
Deck Elevations L: 5141.31 R: 5141.58
Top of Railing N/A
Invert Elevations
--Entrance 5122.79
--Outlet 5122.79

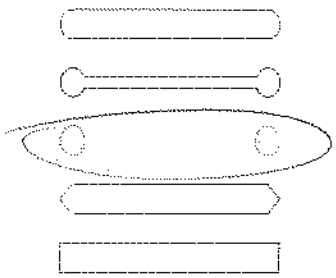
CULVERT

Inside Dimensions
--Rise(or Diameter)
--Span
Shape
Material
Invert Elevations
--Entrance
--Outlet
Length of Culvert
Embankment Sideslopes
Road Elevation
Entrance
--Wingwall Angle
--Wingwall Length
--End Projection
Outlet
--Siltation Depth
--End Projection

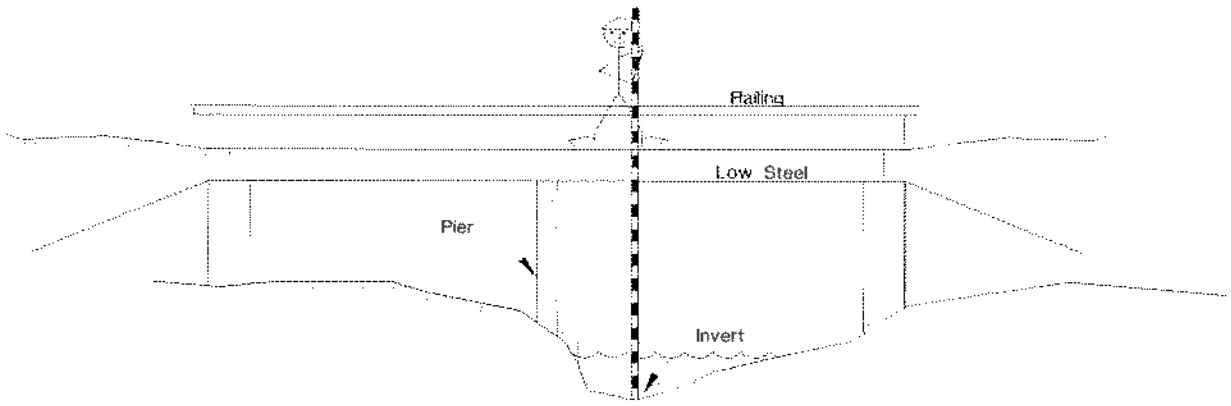
REMARKS. _____

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:
- Semi-Circular Nose and Tail----------
- Twin-Cylinder Piers With Connecting Diaphragm--------
- Twin-Cylinder Piers Without Diaphragm----------
- 90° Triangular Nose and Tail----------
- Square Nose and Tail----------



*Photographs should show Rod and Rodman as follows:



ICON
ENGINEERING, INC. 8100 S Akron Street, Suite 300, Centennial, CO 80112-Phone (303) 221-0802 / Fax (303) 221-4019

Planning

Design

Management

Clear Creek FHAD

(06-015-CLR-415-4)

Bridge Information

23

SHERIDAN

Exhibit D

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 1-12-06

CREW CNA, PARTY CHIEF

_____, _____

_____, _____

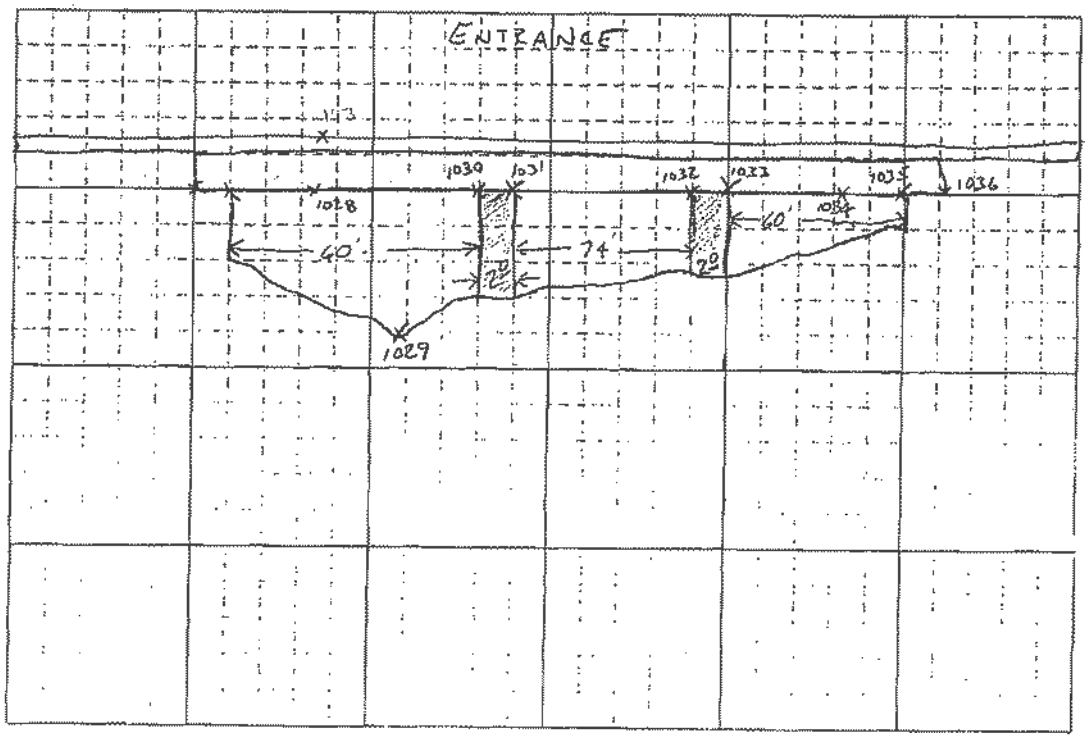
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 62 OF FIELD BOOK NO. 59E

SKETCH

(Plan, Profile, Entrance and Outlet)



23

SHERIDAN

BRIDGE/CULVERT INFORMATION

BRIDGE

Alignment SHERIDAN N-S
Bridge Opening Width W 198.21
Bridge Opening Length L 135
Piers
--Number 2
--Width 2.0
--Type 90° TRIANGULAR NOSE & TAIL
Elevation Low Steel 5257.00
Elevation Top 5260.75
Bridge Opening Sideslopes SLOPED CONCRETE/RIP RAP
Embankment Sideslopes RIP RAP / DIRT SLOPED
--Entrance RIP RAP / DIRT SLOPED
--Outlet RIP RAP / DIRT SLOPED
Wingwall Angles θ —
Wingwall Lengths —
Angle of Bridge Skew θ 90°
Deck Elevations 5260.75
Top of Railing 5266.97
Invert Elevations
--Entrance 5243.4
--Outlet —

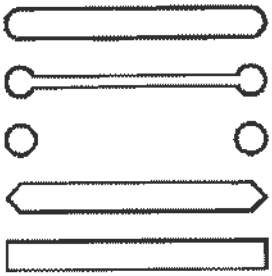
CULVERT

Inside Dimensions
--Rise(or Diameter)
--Span
Shape
Material
Invert Elevations
--Entrance
--Outlet
Length of Culvert
Embankment Sideslopes
Road Elevation
Entrance
--Wingwall Angle
--Wingwall Length
--End Projection
Outlet
--Siltation Depth
--End Projection

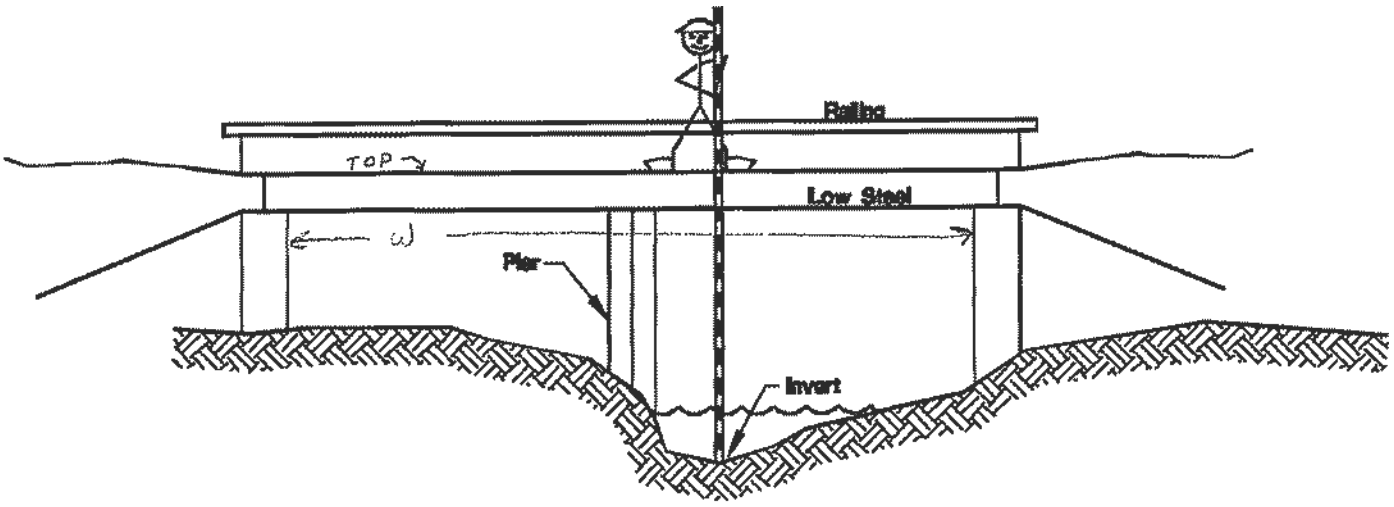
REMARKS:

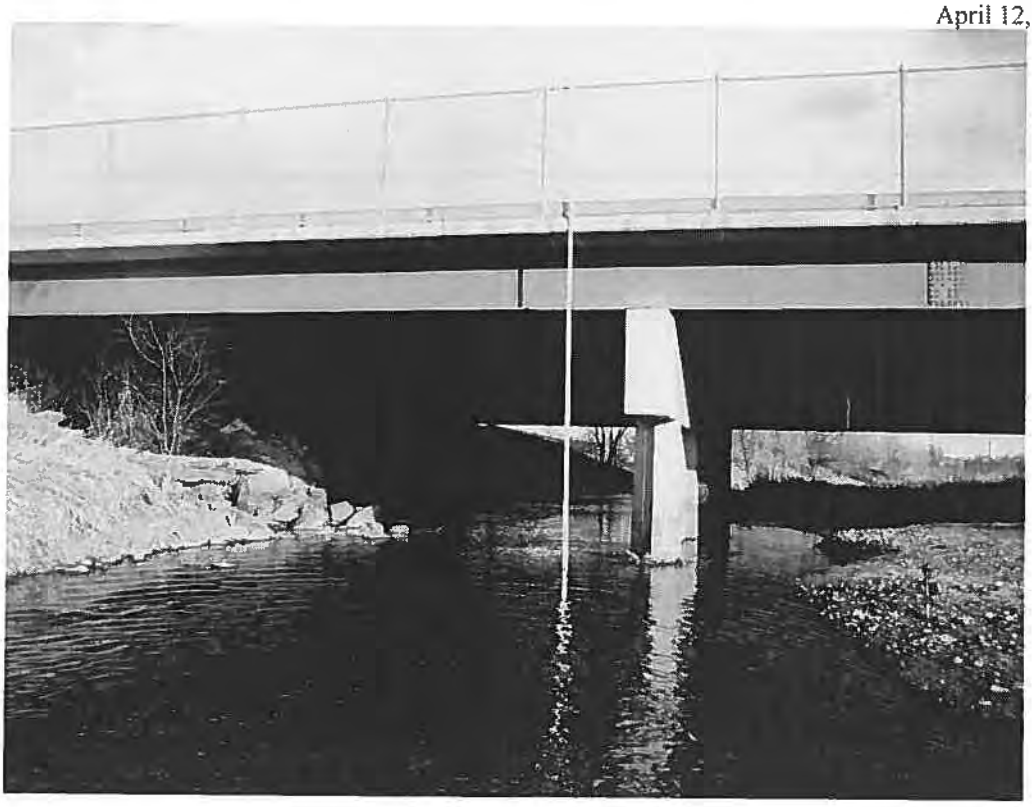
GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:
- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:





Sheridan Boulevard

ICON ENGINEERING, INC 8100 S Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY: DATE: SUBJECT: SHEET OF
CHKD. BY: DATE: JOB NO.
PEER BY: DATE: FILE NO.

PEDESTRIAN 351+34

U/S DECK

353	5260
457	5262
506	5264
545	5266
576	5266.19
576	5269.94 / 5264.44
858	5272.96 / 5268.46
902	5262.52 / 5257.02

D/S DECK

402	5260
543	5266
567	5266.19
567	5269.54 / 5264.44
602	5272.96 / 5268.46
914	5262.52 / 5257.02

PIER

701 ← main
806
856
842 } 2'
857
877

PIER

657 ← main
794
820
845 } 2'
864
883

CLEAR CREEK BRIDGE PHOTOS
May 4, 2006

Pedestrian Bridge 351+34 (Ralston Creek)

ICON ENGINEERING, INC 8100 S Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY ____ DATE ____ SUBJECT ____ SHEET ____ OF ____
CHKD. BY ____ DATE ____ JOB NO. ____
REV. BY ____ DATE ____ FILE NO. ____

Bridge Name: PEDESTRIAN 351+34

Bridge Opening Width W: 404'

Bridge Opening Length L: 13'4" → 19'5"

Piers

Number: 6
Width: 5@2' 1@16' BOTTOM ~8' TOP
Type: ~~BM 4~~ 5250 BM 3 5266

Elevation Bench Mark 1: 5253.04 **Rod Height on BM 1:** 6.59 15.64
Elevation Bench Mark 2: 5254.48 **Rod Height on BM 2:** 16.48

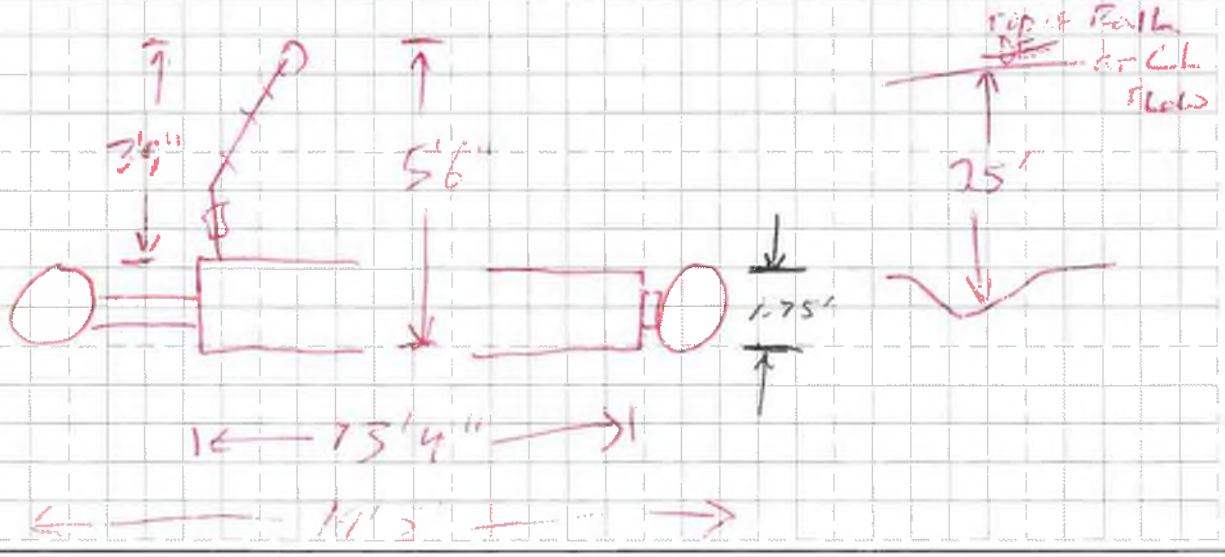
Instrument Elevation: (1) 5271.68 / (2) 5270.96 Δ=.72 → 5271.32
(3) ~~5272.51~~

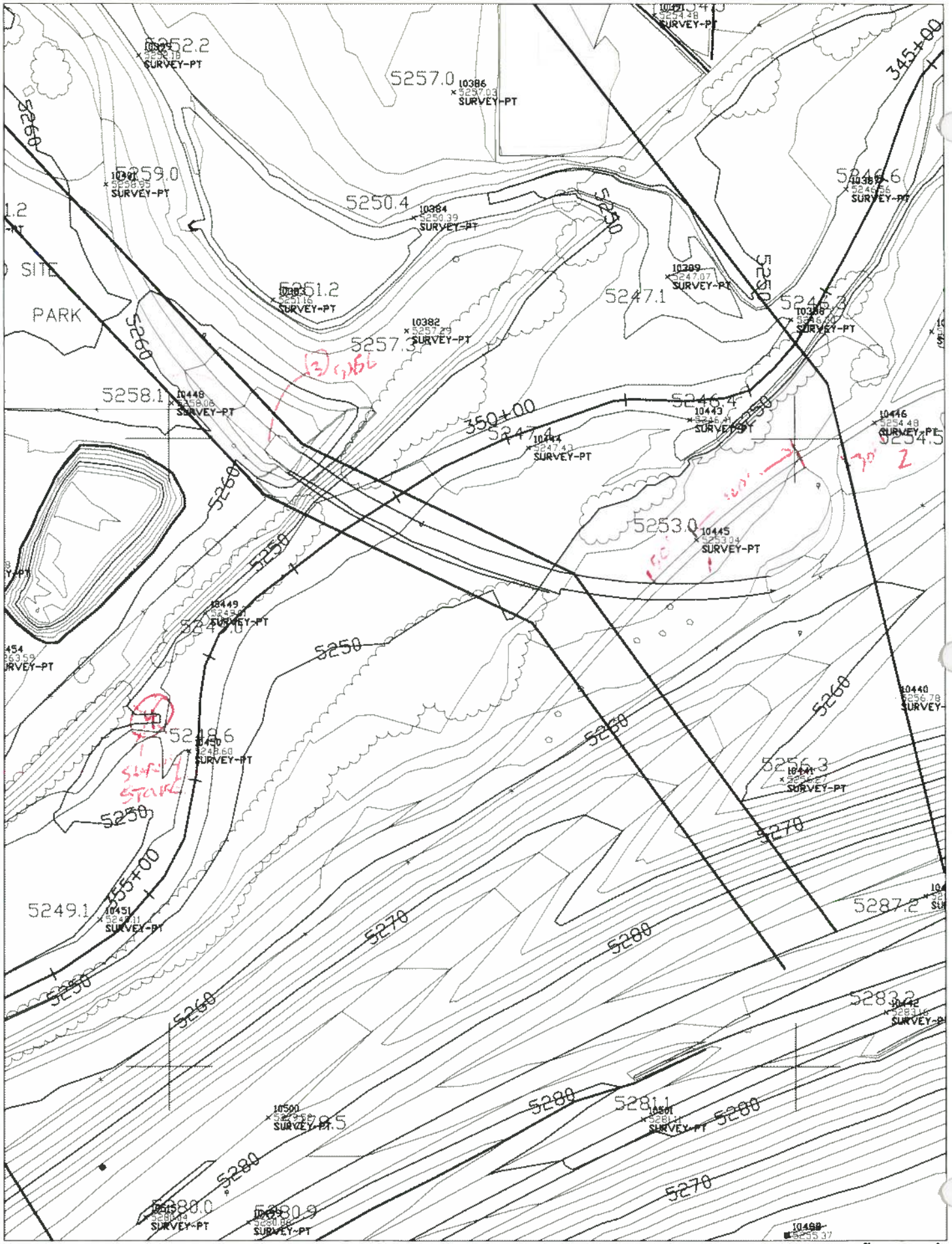
	Left	Center	Right
Elevation Top of Rail:	5269.94	5272.96	5262.52
Elevation Top of Bridge:	5266.19	5269.21	5258.77
Elevation Roadway Deck:	(5.13) ~~5276.45~~	(2.11) ~~5273.43~~	(12.55) ~~5283.87~~
Elevation Low Chord:	~~56~~ 5264.44	5267.46	5257.02

Elevation Invert:

Pictures: #1-9

Sketch:





PEDESTRIAN BRIDGE 351+34

SCALE 1" = 100'

UPSTREAM OF RALSTON CREEK CONFLUENCE. ACCESS FROM PATH AT SHERIDAN (SOUTHBOUND) AVE.

22

I-76 WESTBOUND

Exhibit D

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 2/20/06

CREW CJA

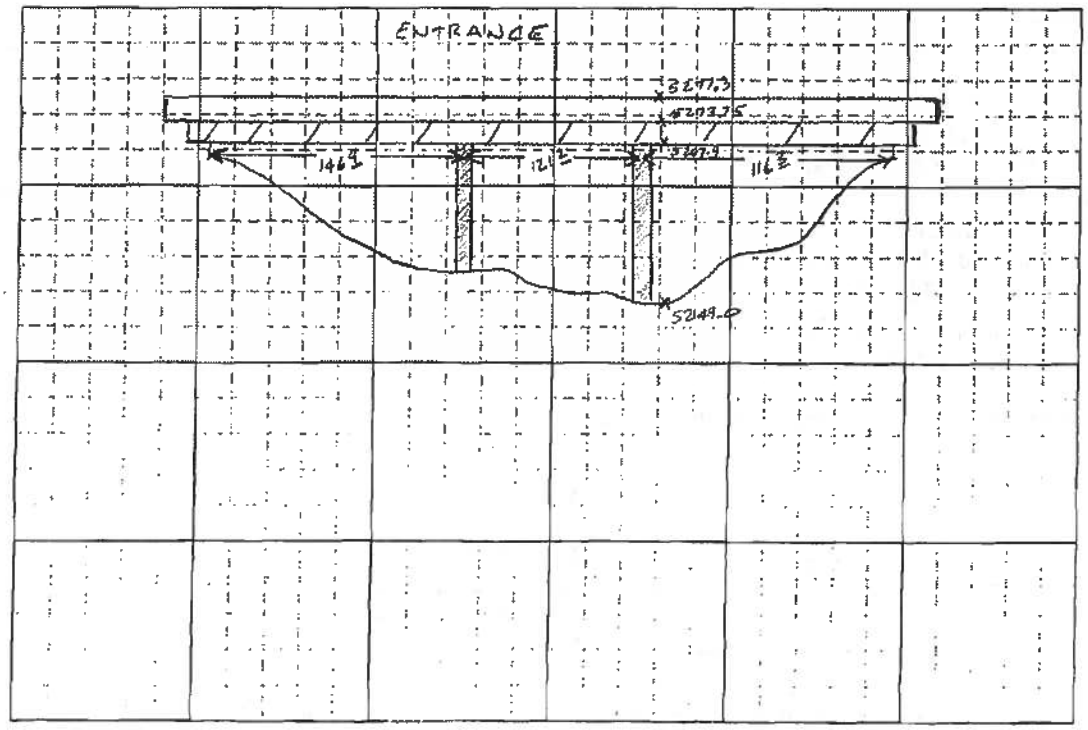
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 37 OF FIELD BOOK NO. 59F

SKETCH

(Plan, Profile, Entrance and Outlet)



22

I-76 WESTBOUND

BRIDGE/CULVERT INFORMATION

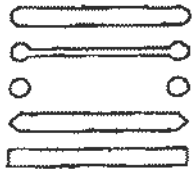
BRIDGE		CULVERT	
Alignment	I-76 WESTBOUND	Inside Dimensions	
Bridge Opening Width W	384.7	--Rise(or Diameter)	
Bridge Opening Length L	45	--Span	
Piers		Shape	
--Number	2	Material	
--Width	2'	Invert Elevations	
--Type	90° TRIANGULAR NOSE/SQUARE TAIL	--Entrance	
Elevation Low Steel	5267.90	--Outlet	
Elevation Top	5273.75	Length of Culvert	
Bridge Opening Sideslopes	RIP RAP / DIRT SLOPED	Embankment Sideslopes	
Embankment Sideslopes	RIP RAP / DIRT SLOPED	Road Elevation	
--Entrance	DIRT	Entrance	
--Outlet	RIP RAP	--Wingwall Angle	
Wingwall Angles 0	—	--Wingwall Length	
Wingwall Lengths	—	--End Projection	
Angle of Bridge Skew 0	35°	Outlet	
Deck Elevations	5275.3	--Siltation Depth	
Top of Railing	5277.3	--End Projection	
Invert Elevations			
--Entrance	5249.0		
--Outlet	—		

REMARKS:

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



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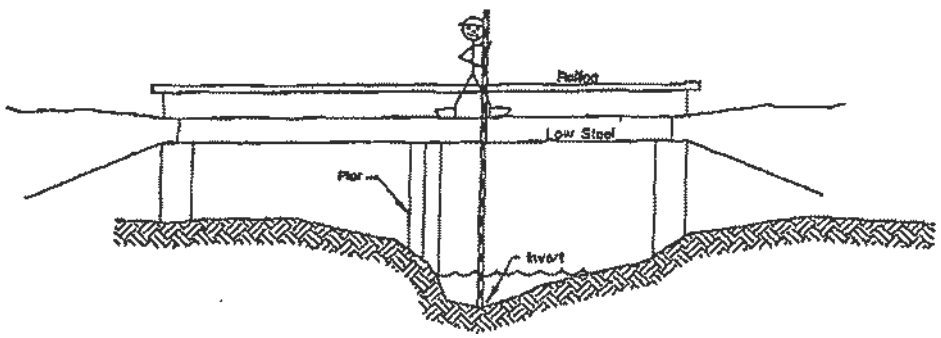


ICON ENGINEERING, INC. 8100 S. Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY: JSL DATE: 04/12/06 SUBJECT: CLEAR CREEK SHEET ___ OF ___

CHKD. BY ___ DATE ___ FHWA JOB NO. ___

FE... BY ___ DATE ___ FILE NO. ___

INTERSTATE 76 - WEST BOUND

W/S SECTION: 36596

D/S SECTION: 36473

DISTANCE TO DECK: 15

BRIDGE SECTION: 36581

DECK WIDTH: 97 ft (ALONG C.L. CENTERLINE)

W/S
LEFT PIER CL = 362
RT. PIER CL = 463

D/S
LEFT PIER CL = 434
RIGHT PIER CL = 555

TOP OF RAIL: 5277.3

LOW CHORD: 5267.9

SKEW ANGLE: ~~55~~ 90° - 35° : 55° → USE 45° (MAX FOR HEC-RAS)

W/S DECK +2 -7.9

74	5278
180	5277.2
201	5277.2 → 5279.2/5269.8
596	5277.1 → 5279.1/5269.9
~~756~~	~~5276~~
924	5277.0

D/S DECK +2 -7.9

114	5278
186	5277.2
316	5277.2
356	5279.2/5269.8
685	5279.1/5269.9
685	5277.1
927	5277.0

I-76 Westbound

21

I-76 EASTBOUND

Exhibit D

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 2/20/06

CREW GNA

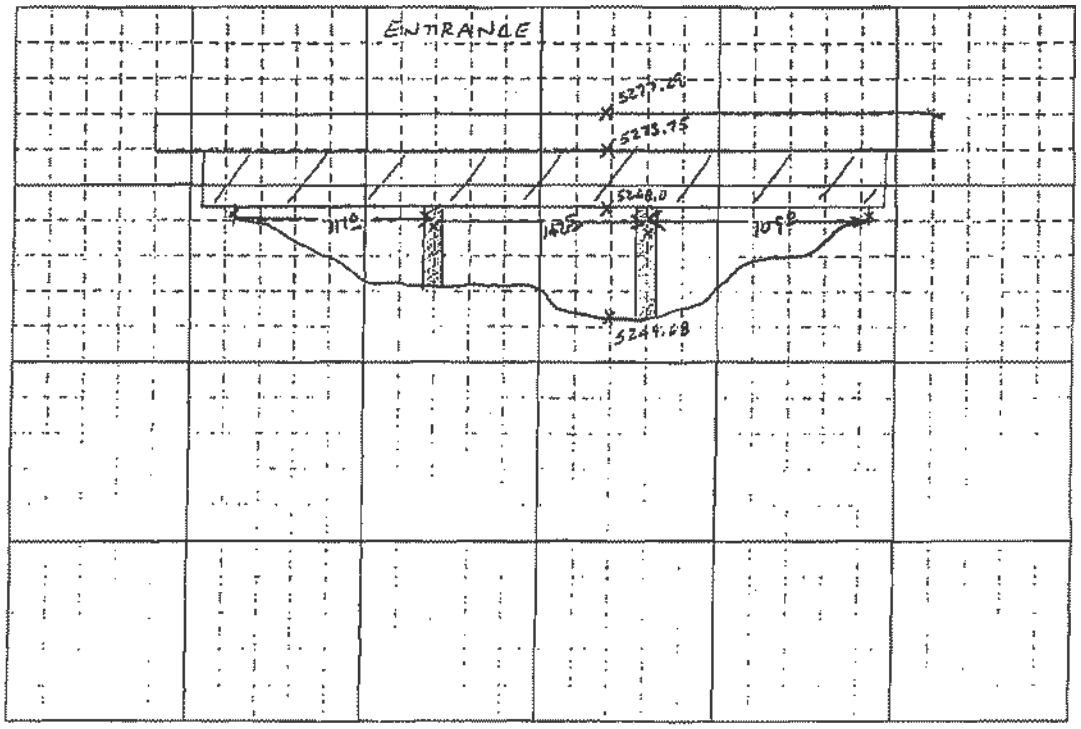
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 37 OF FIELD BOOK NO. 59F

SKETCH

(Plan, Profile, Entrance and Outlet)



21

I-76 EASTBOUND

BRIDGE/CULVERT INFORMATION

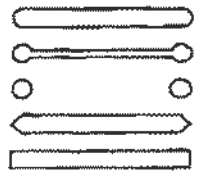
BRIDGE		CULVERT	
Alignment	I-76 EASTBOUND	Inside Dimensions	
Bridge Opening Width W	361.5	--Rise(or Diameter)	
Bridge Opening Length L	45°	--Span	
Piers		Shape	
--Number	2	Material	
--Width	2'	Invert Elevations	
--Type	90° TRIANGULAR NOSE/SQUARE TAIL	--Entrance	
Elevation Low Steel	5268.0	--Outlet	
Elevation Top	5273.75	Length of Culvert	
Bridge Opening Sideslopes	CONC PAD/DIRT/CONC WALL	Embankment Sideslopes	
Embankment Sideslopes	DIRT/RIP RAP	Road Elevation	
--Entrance	DIRT	Entrance	
--Outlet	DIRT	--Wingwall Angle	
Wingwall Angles 0	—	--Wingwall Length	
Wingwall Lengths	—	--End Projection	
Angle of Bridge Skew 0	35°	Outlet	
Deck Elevations	5275.3	--Siltation Depth	
Top of Railing	5277.29	--End Projection	
Invert Elevations			
--Entrance	5249.68		
--Outlet	—		

REMARKS: CONCRETE GUARD RAIL

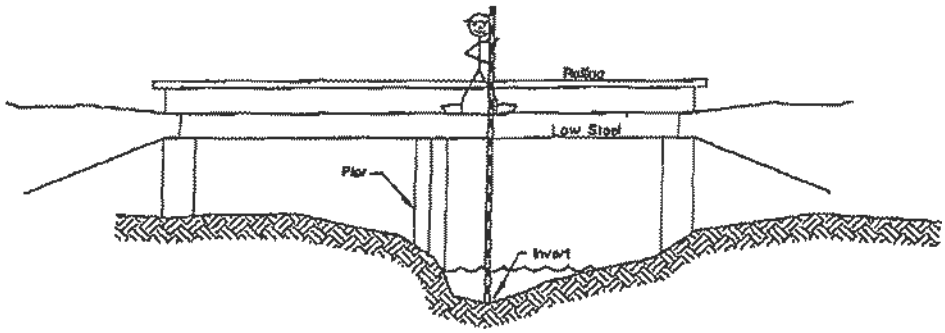
GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



ICON ENGINEERING, INC 8100 S. Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY BJL DATE 04/14/06 SUBJECT CLEAR CREEK SHEET ___ OF ___
CHKD. BY ___ DATE ___ FHAD JOB NO. ___
PE. BY ___ DATE ___ FILE NO. ___

INTERSTATE 76 - EAST BOUND

W/S SECTION : 36759

D/S SECTION : 36650

DISTANCE TO DECK : 13

BRIDGE SECTION : 36746

DECK WIDTH : 91 ft (ALONG CL)

W/S
LEFT PIER CL = 248
RIGHT PIER CL = 391

D/S
LEFT PIER CL = 319
RIGHT PIER CL = 462

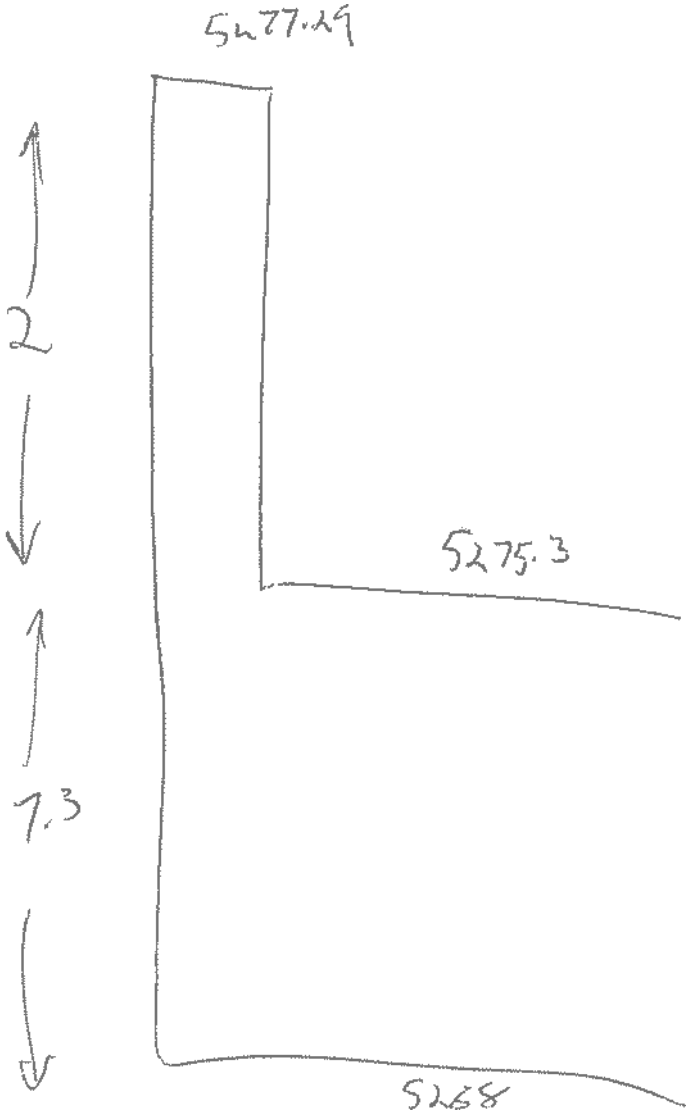
TOP OF RAIL : 5277.29

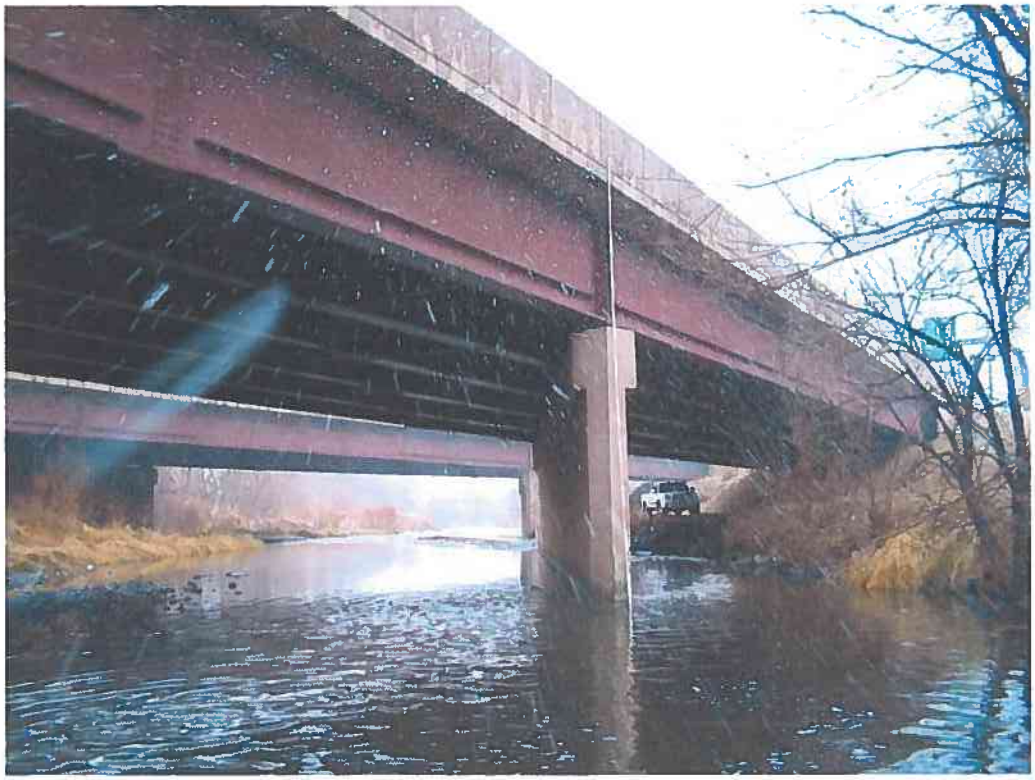
LOW CHORD : 5268.0

SKEW ANGLE = ~~35°~~ 90° - 35° = 55° → USE 45°

W/S DECK	+2 -7.3
741	5280
131	5280
131	5282 / 5272.7
522	5279.9 / 5266.6
522	5273.9
994	5272

D/S DECK	+2 -7.3
57	5280
209	5280
209	5282 / 5272.7
609	5279.9 / 5266.6
609	5273.9
994	5272


5277.29
2
5275.3
7.3
5258



I-76 Eastbound (photos 1, 2)

20

52ND AVE

Exhibit D

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 2/20/06

CREW GJA _____, _____

_____, _____

_____, _____

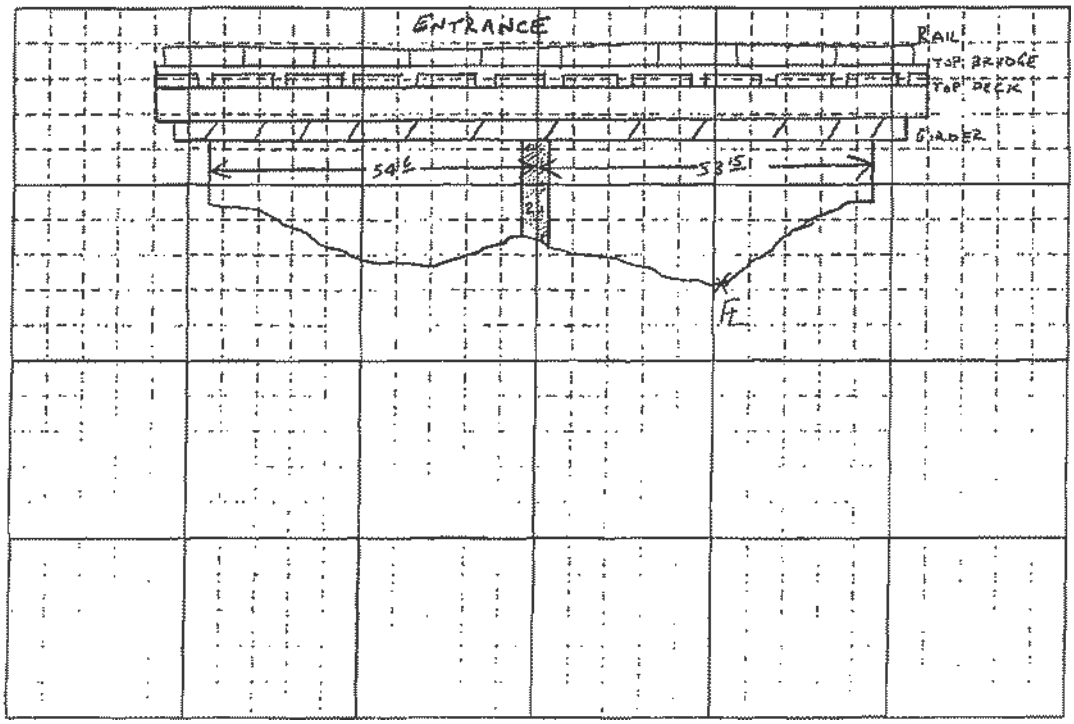
PHOTOS: ENTRANCE / OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 38 OF FIELD BOOK NO. 59F

SKETCH

(Plan, Profile, Entrance and Outlet)



52ND AVE

20

BRIDGE/CULVERT INFORMATION

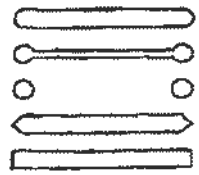
BRIDGE		CULVERT	
Alignment	52ND AVE	Inside Dimensions	
Bridge Opening Width W	107.75	--Rise(or Diameter)	
Bridge Opening Length L	52.5	--Span	
Piers		Shape	
--Number	1	Material	
--Width	2'	Invert Elevations	
--Type	90° TRIANGULAR NOSE	--Entrance	
Elevation Low Steel	5268.6	--Outlet	
Elevation Top	5272.6	Length of Culvert	
Bridge Opening Sideslopes	SLOPED RIP RAP/DIRT	Embankment Sideslopes	
Embankment Sideslopes	RIP RAP/DIRT	Road Elevation	
--Entrance	"	Entrance	
--Outlet	"	--Wingwall Angle	
Wingwall Angles θ	130°	--Wingwall Length	
Wingwall Lengths	7'	--End Projection	
Angle of Bridge Skew θ	66°	Outlet	
Deck Elevations	5271.9	--Siltation Depth	
Top of Railing	5274.6	--End Projection	
Invert Elevations			
--Entrance	5257.0		
--Outlet	———		

REMARKS: CONCRETE GIRDER ; FLOW OPENINGS BETWEEN TOP-DECK & TOP-BRIDGE = 0.6X6.6 (14 OPENINGS)

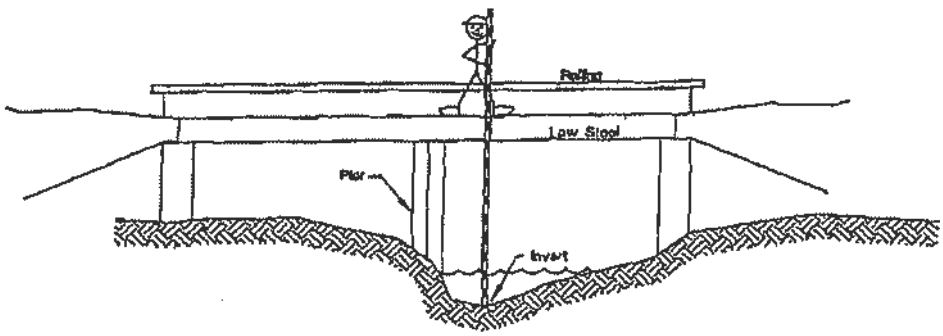
GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



ICON ENGINEERING, INC 8100 S Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-1019

BY: FSJL DATE 04/12/06 SUBJECT CLEAR CREEK SHEET OF

CHKD BY: DATE FHAD JOB NO.

FED BY: DATE FILE NO.

52ND AVE

W/S SECTION: 38099

D/S SECTION: 38022

DISTANCE TO DECK: 7

BRIDGE SECTION: 38092

DECK WIDTH: 59

W/S PIER ℄: ~~247~~ 392

D/S PIER ℄: ~~392~~ 219

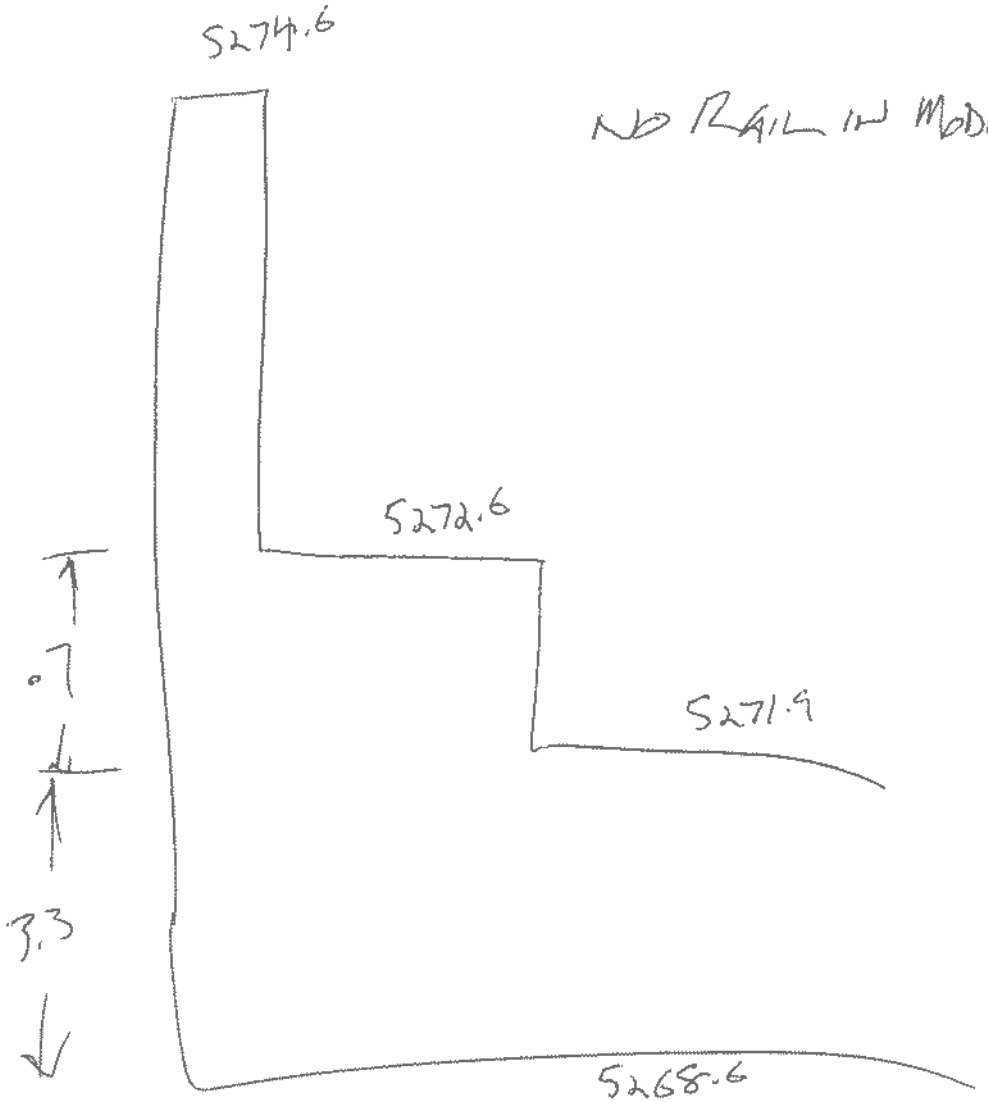
SKEW: 90-66 = 24°

HIGH CHORD = 5274.6

LOW CHORD: 5268.6

D/S DECK	+.7	-3.3
163	5272.3	
168	5273.0	/ 5269.0
275	5273.3	/ 5269.3
275	5272.6	
491	5272.6	
928	5273.3	

W/S DECK	+.7	-3.3
339	5272.3	
339	5273.0	/ 5269.0
454	5273.3	/ 5269.3
454	5272.6	
523	5272.6	
1024	5273.9	


5274.6
NO RAIL IN MODEL
5272.6
5271.9
.7
3.3
5268.6

52nd Avenue (photos 1, 2)

19

MARSHALL

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 1-13-06

CREW GNA, PARTY CHIEF

_____, _____

_____, _____

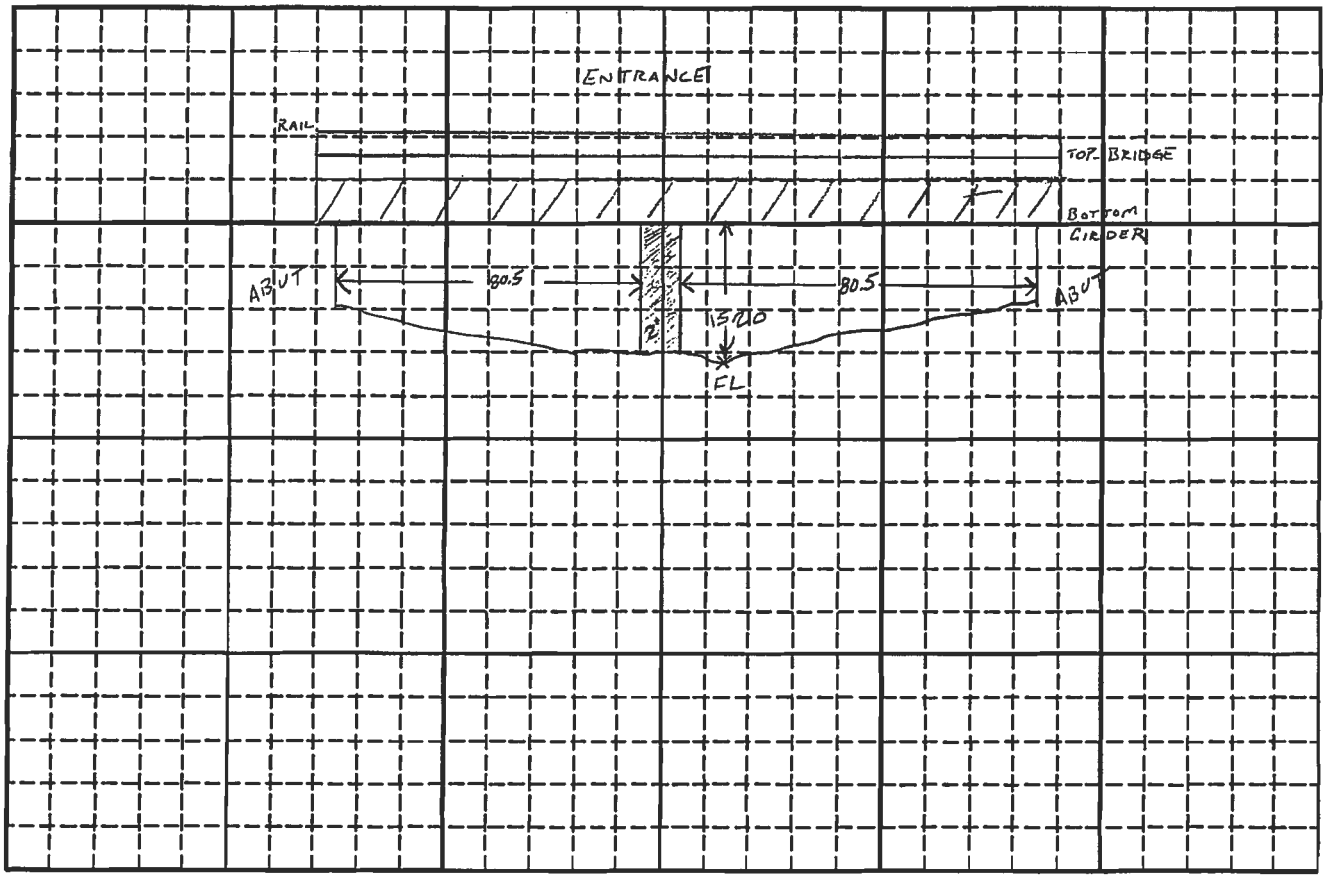
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 62 OF FIELD BOOK NO. 59E

SKETCH

(Plan, Profile, Entrance and Outlet)



19

MARSHALL

BRIDGE/CULVERT INFORMATION

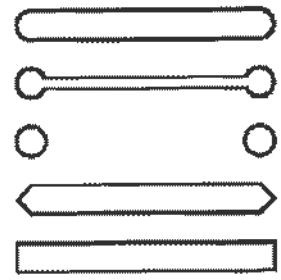
BRIDGE		CULVERT	
Alignment	MARSHALL N-S	Inside Dimensions	
Bridge Opening Width W	161.0	--Rise(or Diameter)	
Bridge Opening Length L	52.5	--Span	
Piers		Shape	
--Number	1	Material	
--Width	2.0	Invert Elevations	
--Type	90° TRIACULAR NOSE & TAIL	--Entrance	
Elevation Low Steel	5290.20	--Outlet	
Elevation Top	5296.25	Length of Culvert	
Bridge Opening Sideslopes	SLOPED GRAVEL/RIP RAP	Embankment Sideslopes	
Embankment Sideslopes	GRAVEL/RIP-RAP	Road Elevation	
--Entrance	"	Entrance	
--Outlet	"	--Wingwall Angle	
Wingwall Angles 0	—	--Wingwall Length	
Wingwall Lengths	—	--End Projection	
Angle of Bridge Skew 0	90°	Outlet	
Deck Elevations	5295.3	--Siltation Depth	
Top of Railing	5299.80	--End Projection	
Invert Elevations			
--Entrance	5275.0		
--Outlet	—		

REMARKS:

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



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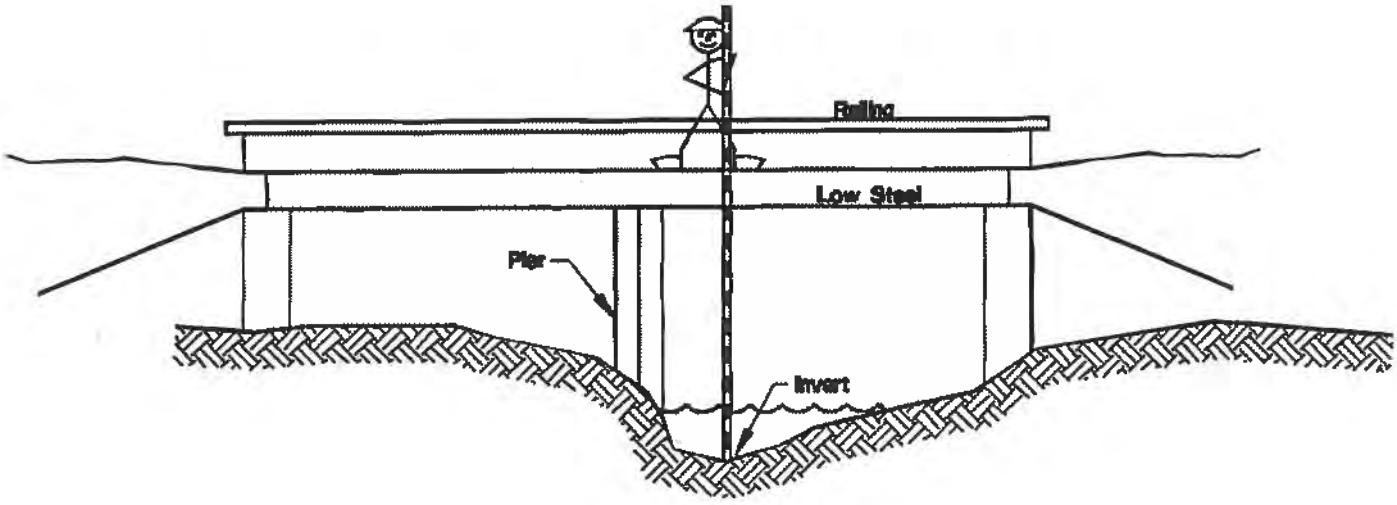

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BY BJL DATE 04/12/06 SUBJECT SHEET OF
CHKD. BY DATE JOB NO.
REV. BY DATE FILE NO.

MARSHALL STREET

W/S SECTION 41127

D/S SECTION: 41052

DISTANCE TO DECK: 11

BRIDGE SECTION: 41116

DECK WIDTH

W/S PIER ℄ 214.5

D/S PIER CL 282.5

SKEW = 90° − 90° = 0

HIGH CHORD: 5299.8

LOW CHORD: 5290.2

ABUTMENT STA W/S LEFT: 134 RIGHT: 302 D/S LEFT: 202 RIGHT: 370

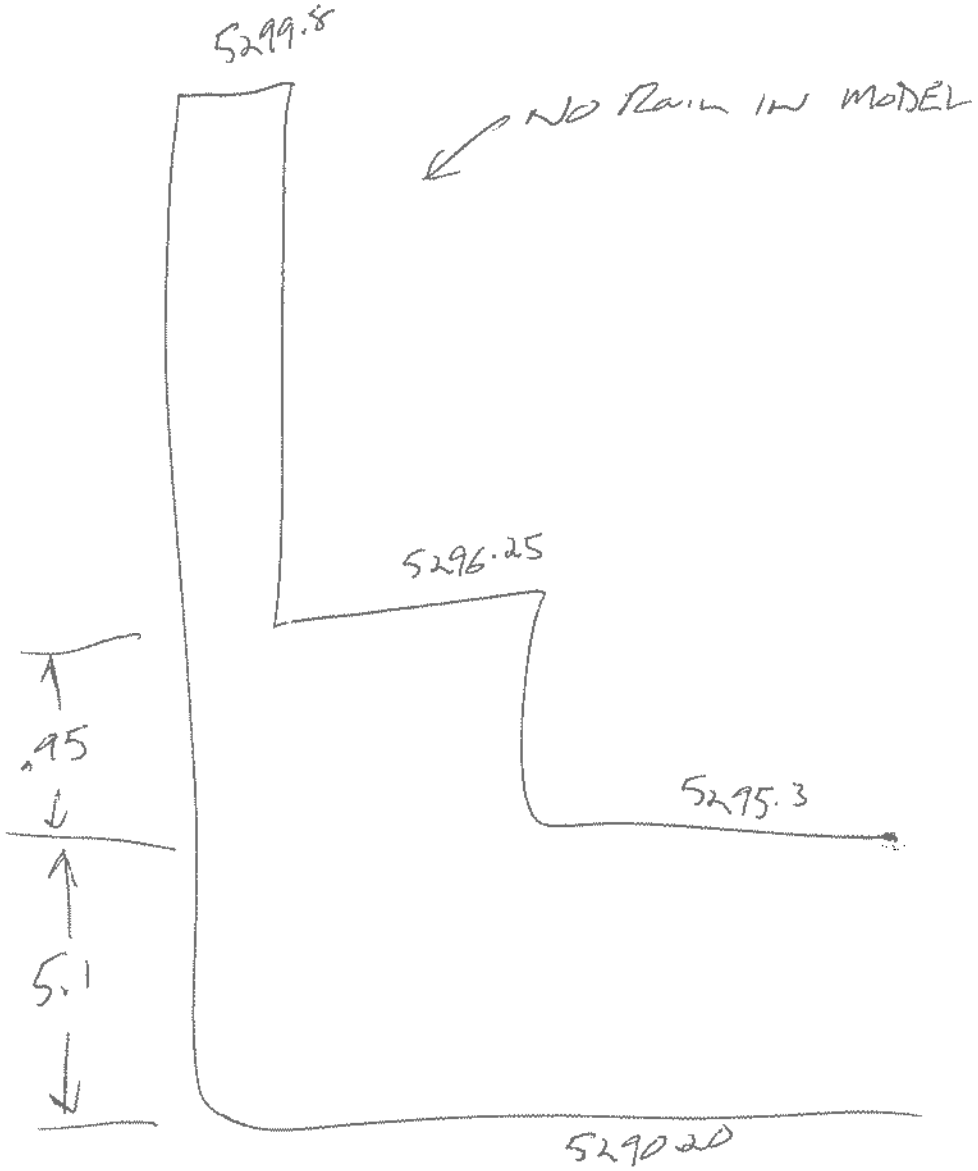
PIER CL
W/S: 214.5
D/S 282.5

W/S DECK +.95 −.51

73	5295.4	
~~121~~ 135	5295.4	
~~121~~ 135	5296.35	/ 5290.3
~~311~~ 297	5296.95	/ 5290.9
~~311~~ 297	5296.0	
382	5296.0	
516	5297.2	
693	5299.6	
1133	5316	

D/S DECK +.95 −.51

130	5295.4	
203	5295.4	
203	5296.35	/ 5290.3
365	5296.95	/ 5290.9
365	5296.0	
453	5296.0	
585	5297.2	
1201	5316.1	


5299.8
NO RAIN IN MODEL
5296.25
.95
5295.3
5.1
529020

Marshall Street

18

WADS EAST RAMP
FROM I-70

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 1-13-06

CREW CNA, PARTY CHIEF

_____, _____

_____, _____

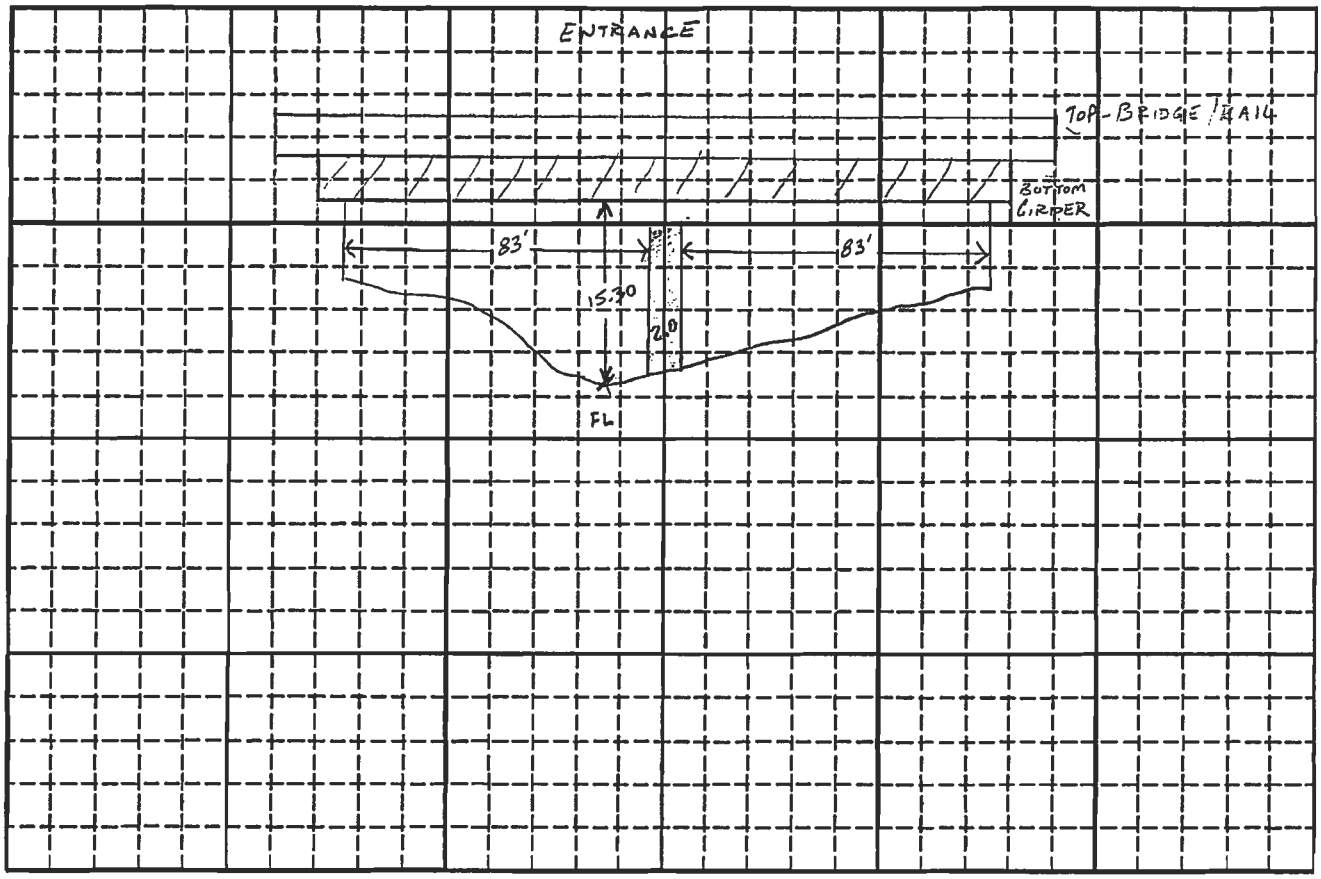
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 63 OF FIELD BOOK NO. 59E

SKETCH

(Plan, Profile, Entrance and Outlet)



18

WADS EAST RAMP
FROM I-70

BRIDGE/CULVERT INFORMATION

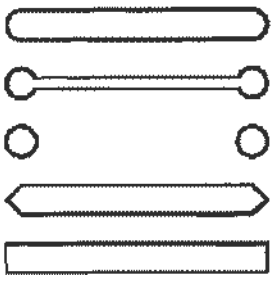
BRIDGE		CULVERT	
Alignment	WADSWORTH EAST RAMP N-S	Inside Dimensions	
Bridge Opening Width W	168.0	--Rise(or Diameter)	
Bridge Opening Length L	48	--Span	
Piers		Shape	
--Number	1	Material	
--Width	2.0	Invert Elevations	
--Type	90° TRIANGULAR NOSE + TAIL	--Entrance	
Elevation Low Steel	5294.10	--Outlet	
Elevation Top	5301.50	Length of Culvert	
Bridge Opening Sideslopes	SLOPED RIPRAP/GRAVEL	Embankment Sideslopes	
Embankment Sideslopes	GRAVEL/RIP-RAP	Road Elevation	
--Entrance	GRAVEL/RIP-RAP	Entrance	
--Outlet	"	--Wingwall Angle	
Wingwall Angles 0	—	--Wingwall Length	
Wingwall Lengths	—	--End Projection	
Angle of Bridge Skew 0	90	Outlet	
Deck Elevations	5299.4	--Siltation Depth	
Top of Railing	5301.50	--End Projection	
Invert Elevations			
--Entrance	5278.80		
--Outlet	—		

REMARKS:

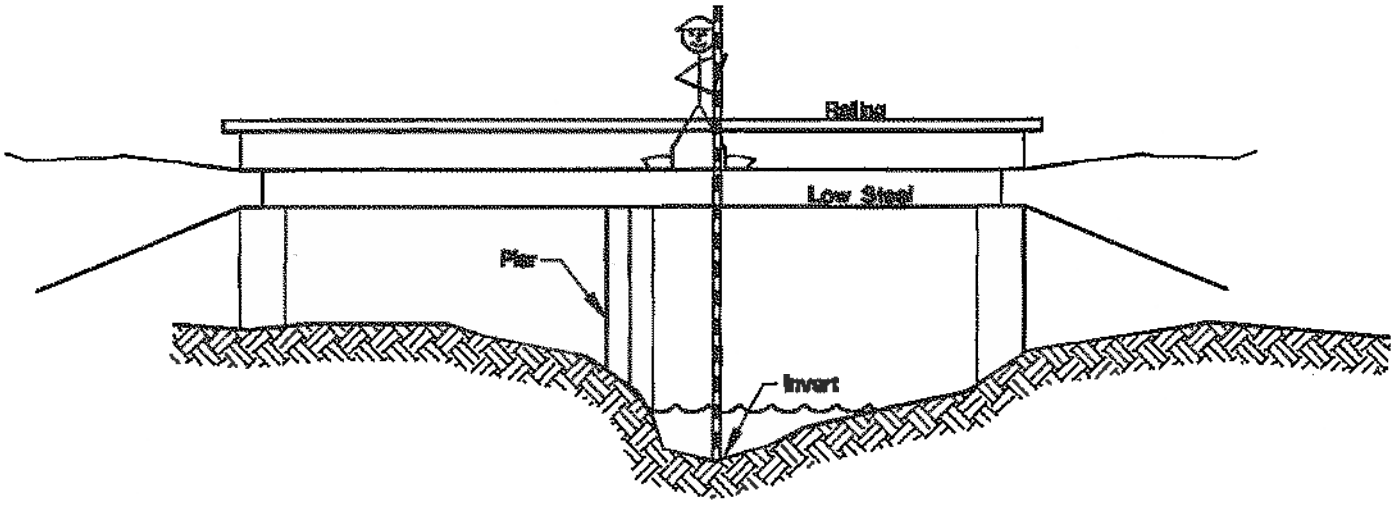
GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



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BY: BJL DATE: 04/12/06 SUBJECT: SHEET: OF:
CHKD BY: DATE: JOB NO:
FILE NO:

I-70 EXIT RAMPS (TO WADSWORTH) (EAST BOUND)

W/S SECTION: 41925

D/S SECTION: 41865

DISTANCE TO DECK: 6

BRIDGE SECTION: 41919

DECK WDT: 48

W/S PIER CL: 216

D/S PIER CL: 209

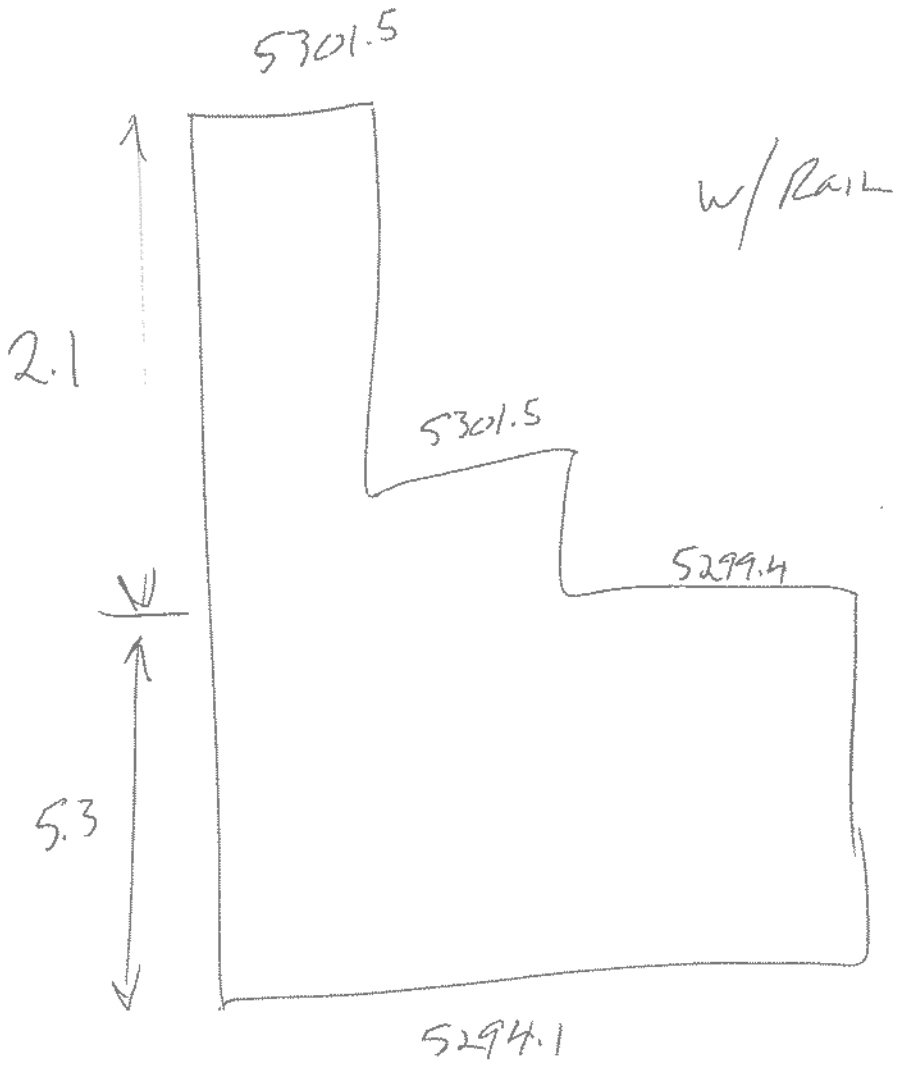
SKEW: 0°

HIGH CHORD: 5301.5

LOW CHORD: 5294.1

ABUTMENT STA W/S L: 132 R: 300 D/S L: 125 R: 293

W/S DECK +21 −5.3		D/S DECK +12.1 −5.3	
125	5298.8	160	5298.8
131	5298.8	122	5298.8
131	5300.9/5293.5	122	5300.9/5293.5
300	5302.8/5295.4	291	5302.8/5295.4
300	5300.7	291	5300.7
457	5302	460	5302
571	5304	562	04
668	5306	643	06
724	5308	685	08
795	5310	739	10
836	12	797	12
895	14	861	14
961	16	915	16
1020	18	948	18
1097	20	1021	20
1141	22	1074	22
1271	26	1144 1242	24 26


5301.5
w/ Rail
2.1
5301.5
5299.4
5.3
5294.1

17

I-70 WESTBOUND

Exhibit D

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT Clear Creek DATE 1-13-06

CREW GNA, _____

_____, _____

_____, _____

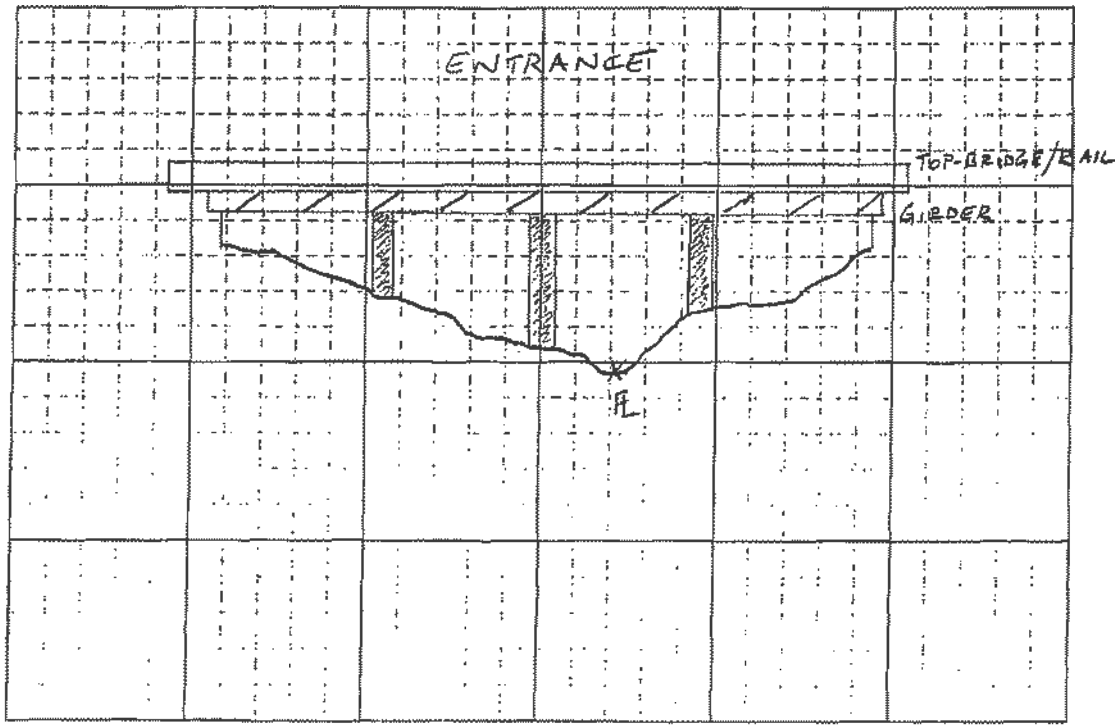
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 63 OF FIELD BOOK NO. 59E

SKETCH

(Plan, Profile, Entrance and Outlet)



17

I-70 WESTBOUND

BRIDGE/CULVERT INFORMATION

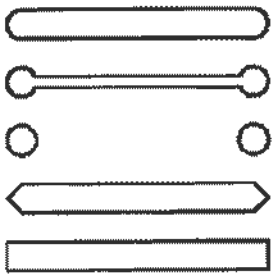
BRIDGE		CULVERT	
Alignment	I-70 WESTBOUND NW-SE	Inside Dimensions	
Bridge Opening Width W	200.5	--Rise(or Diameter)	
Bridge Opening Length L	65	--Span	
Piers		Shape	
--Number	3	Material	
--Width	1.25	Invert Elevations	
--Type	90° TRIANGULAR NOSE & TAIL	--Entrance	
Elevation Low Steel	5300.4	--Outlet	
Elevation Top	5307.0	Length of Culvert	
Bridge Opening Sideslopes	SLOPED RIPRAP	Embankment Sideslopes	
Embankment Sideslopes	RIP-RAP SLOPED	Road Elevation	
--Entrance	RIP-RAP	Entrance	
--Outlet	RIP-RAP	--Wingwall Angle	
Wingwall Angles 0	—	--Wingwall Length	
Wingwall Lengths	—	--End Projection	
Angle of Bridge Skew 0	75°	Outlet	
Deck Elevations	5304.8	--Siltation Depth	
Top of Railing	5307.0	--End Projection	
Invert Elevations			
--Entrance	5280.3		
--Outlet			

REMARKS: CONCRETE GUARDRAIL IS ELEVATION TOP

GENERAL INFORMATION

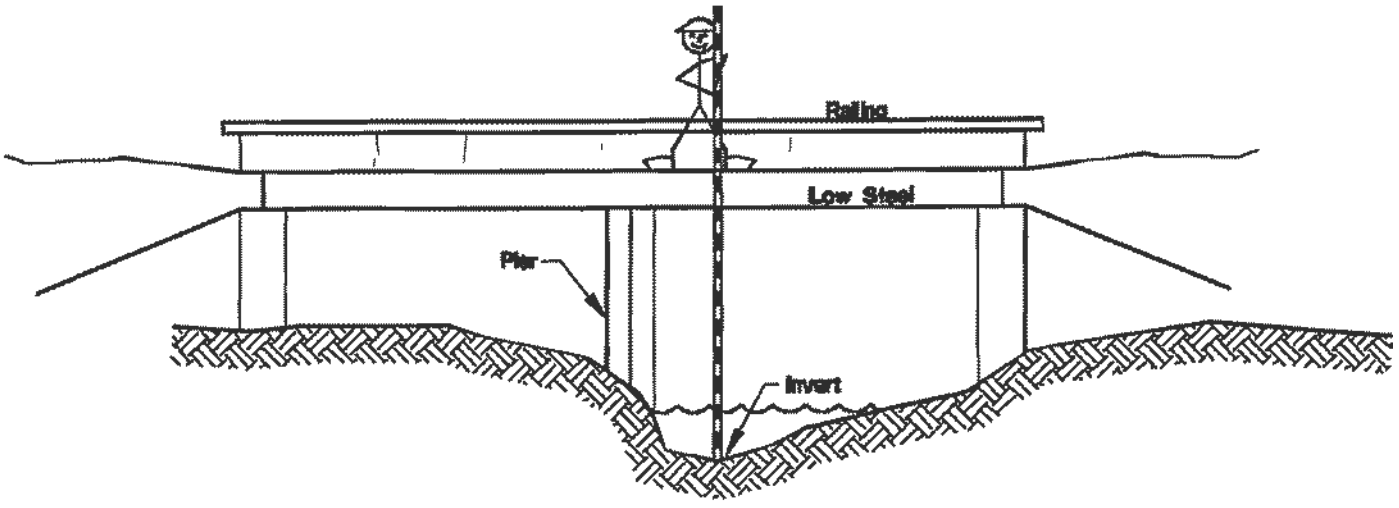
Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



43 49 45 44

*Photographs should show Rod and Rodman as follows:



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BY DSL DATE 04/17/06 SUBJECT C.C.FHAD SHEET ___ OF ___

CHKD BY ___ DATE ___ JOB NO. ___

PE BY ___ DATE ___ FILE NO. ___

I-70 WEST BOUND

U/S SECTION: 42269

D/S SECTION 42265

DISTANCE TO DECK: 11

BRIDGE SECTION: 42258

DECK WIDTH: 65.69 (ALONG CL)

U/S PIER CL: 250, 200, 300 ← APPROX LOCATION & SPACING

D/S PIER CL: 150, 100, 200 ← APPROX LOCATION & SPACING

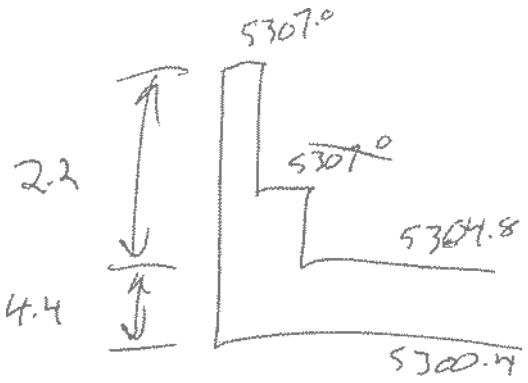
SKEW: 90-75 = 15°

HIGH CHORD: 5307.0

LOW CHORD: 5300.4

U/S DECK	+2.2 = 4.4
156	5306
161	5306
161	5308.2/5301.6
361	5308.4/5301.8
361	5306.2
464	5306.4
570	5306.7
646	5307.2
724	5308
851	5310
916	5312
1007	5314
1127	16
1186	16
1264	20
1330	22
1424	26

D/S DECK	+2.2 = 4.4
59	5306
74	5306
74	5308.2/5301.6
273	5308.4/5301.8
~~612~~	~~5308~~
364	5306.4
455	5306.7
535	5307.2
656	5308
746	10
850	12
915	14
992	16
1054	16
1131	20
1194	22
1314	26


5307.0
2.2
5307.0
5304.8
4.4
5300.4

I-70 Westbound (photo 2)

16

I-70 EASTBOUND

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT Clear Creek DATE 1-18-06

CREW N/A, Party Chief

_____, _____

_____, _____

PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

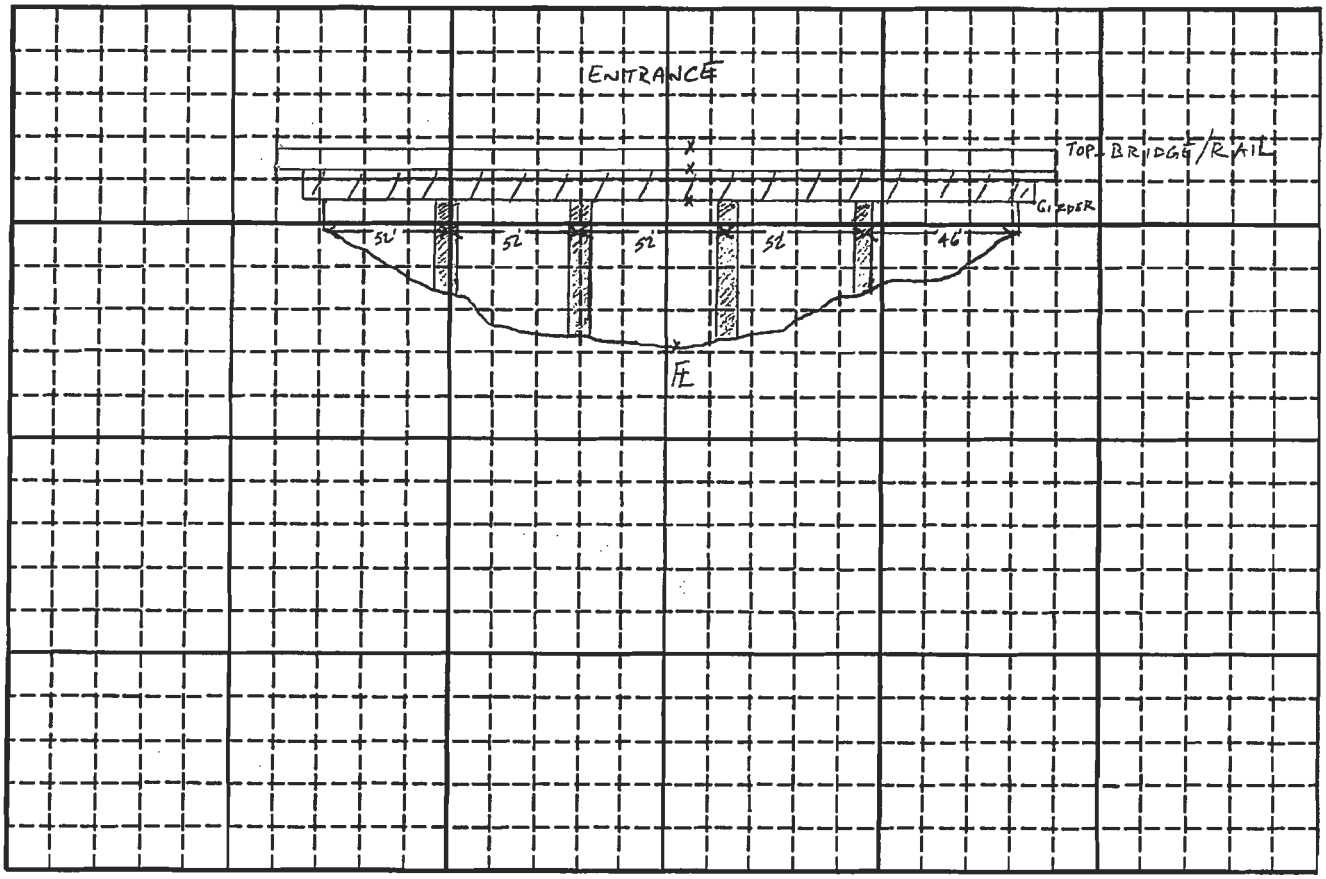
ELEVATIONS TAKEN FROM BENCH MARK NO._____

ELEVATION OF BENCHMARK_____

ELEVATION AND CROSS-SECTION NOTES ON PAGE 65 OF FIELD BOOK NO. 59E

SKETCH

(Plan, Profile, Entrance and Outlet)



16

I-70 EASTBOUND

BRIDGE/CULVERT INFORMATION

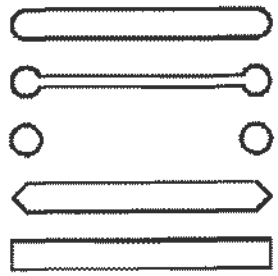
BRIDGE		CULVERT	
Alignment	I-70 EASTBOUND	Inside Dimensions	
Bridge Opening Width W	252.5	--Rise(or Diameter)	
Bridge Opening Length L	66	--Span	
Piers		Shape	
--Number	4	Material	
--Width	1.2 LOWER 2.5 UPPER	Invert Elevations	
--Type	90° TRIANGULAR NOSE & TAIL	--Entrance	
Elevation Low Steel	5300.0	--Outlet	
Elevation Top	5306.0	Length of Culvert	
Bridge Opening Sideslopes	SLOPED DIRT	Embankment Sideslopes	
Embankment Sideslopes	GRAVEL, DIRT, RIP-RAP SLOPED	Road Elevation	
--Entrance	"	Entrance	
--Outlet	"	--Wingwall Angle	
Wingwall Angles 0	—	--Wingwall Length	
Wingwall Lengths	—	--End Projection	
Angle of Bridge Skew 0	75°	Outlet	
Deck Elevations	5304.7	--Siltation Depth	
Top of Railing	5306.0	--End Projection	
Invert Elevations			
--Entrance	5283.3		
--Outlet	—		

REMARKS: CURVED BRIDGE

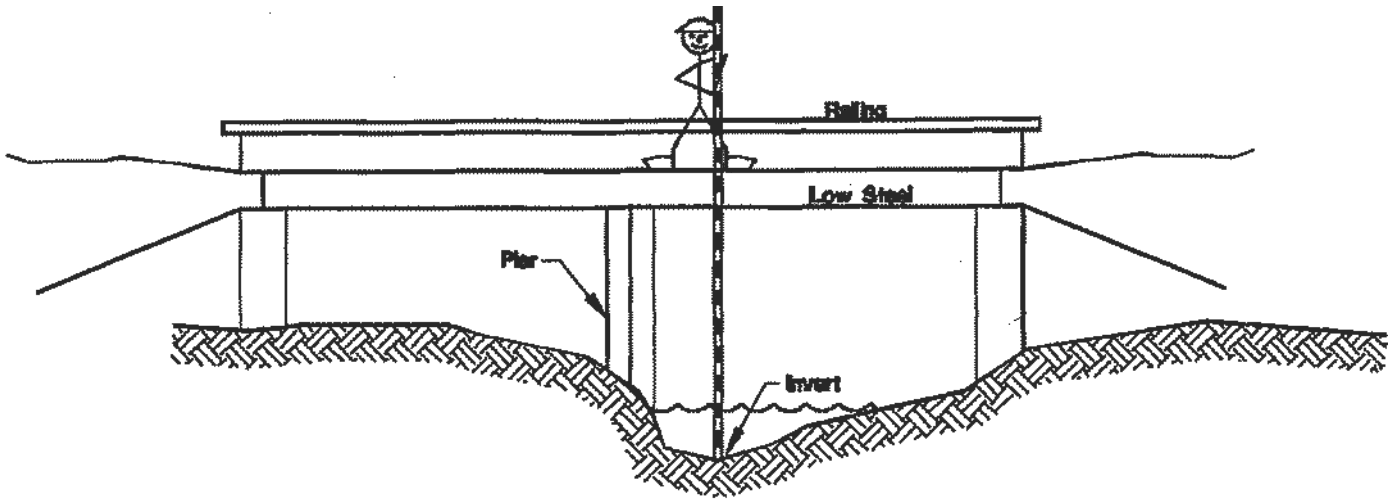
GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



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BY TJL DATE 04/17/06 SUBJECT C.C. FHAD SHEET OF
CHKD BY DATE JOB NO.
PE BY DATE FILE NO.

I-70 EAST BOUND

W/S SECTION : 42758

D/S SECTION : 42647

DISTANCE TO DECK : 16

BRIDGE SECTION : 42742

DECK WIDTH : 90 (ALONG CL)

W/S PIER CL : 202, 254, 306, 358

D/S PIER CL : 170 192, 222 244, 274 296, 326 348

APPROXIMATE STATIONING

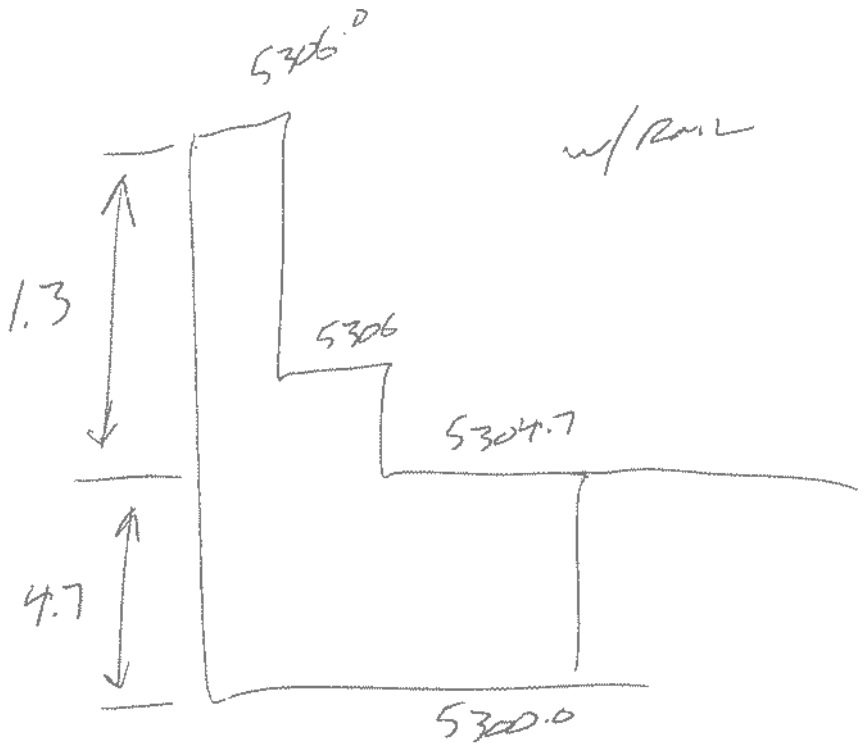
SKEW : 90-75:15°

HIGH CHORD : 5306.0

LOW CHORD : 5300.0

W/S DECK	+1.3	-4.7
60	5306	
160	5306	
160	5307.3 / 5301.3	
413	5308.1 / 5302.1	
413	5306.8	
669	5309.2	
827	5312	

D/S DECK	+1.3	-4.7
50	5306	
130	5306	
130	5307.3 / 5301.3	
379	5308.1 / 5302.1	
379	5306.8	
563	5309.2	
860	5316	


5310.0
w/ Rail
1.3
5306
5304.7
4.7
5300.0

I-70 East Ramp (Eastbound)

15

I-70 EASTBOUND WEST RAMP

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 1-13-06

CREW CNA, PARTY CHIEF

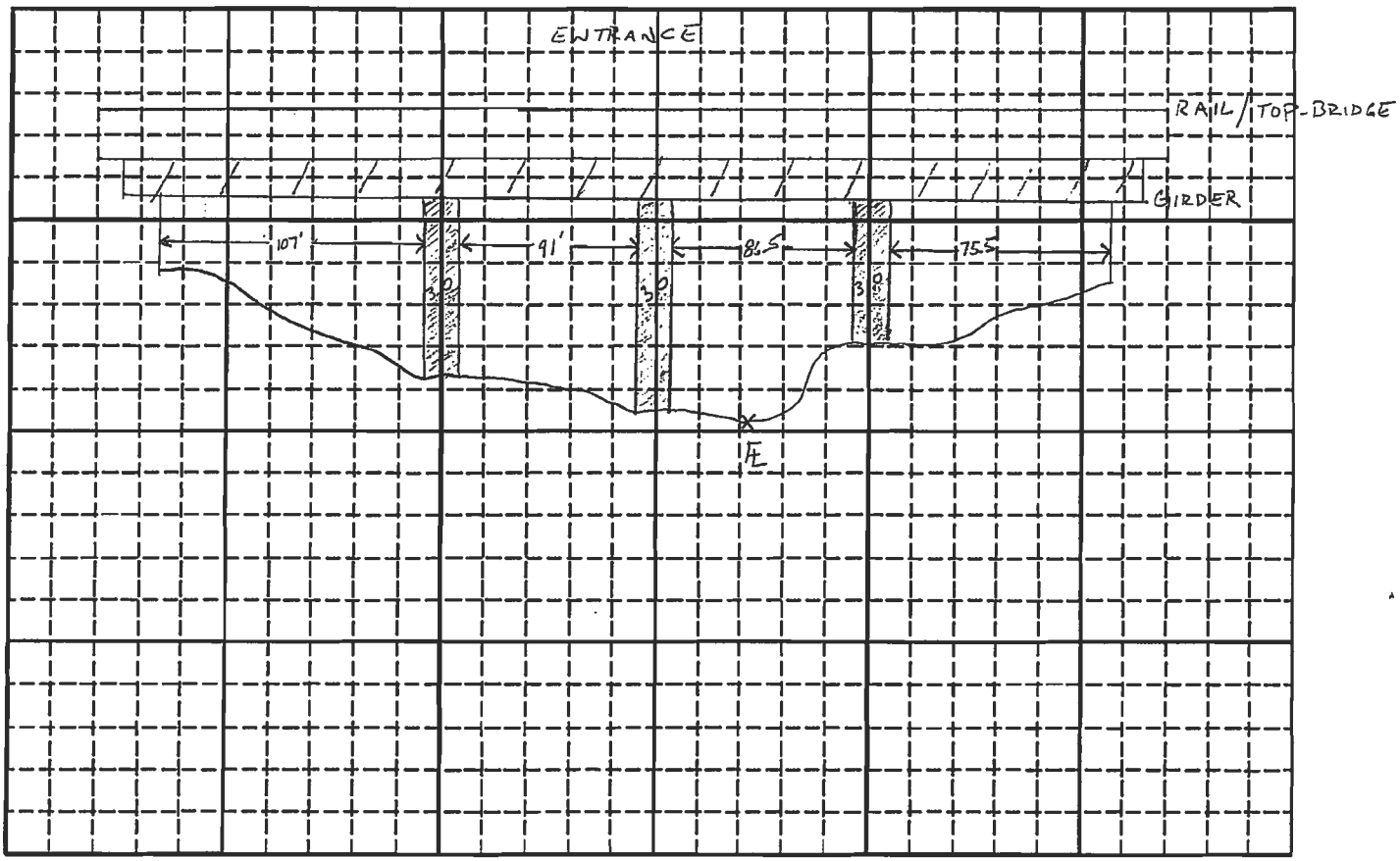
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 65 OF FIELD BOOK NO. 59E

SKETCH

(Plan, Profile, Entrance and Outlet)



plan\brid&Cul Info

15

I-70 EASTBOUND WEST RAMP

BRIDGE/CULVERT INFORMATION

BRIDGE

Alignment I-70 EASTBOUND WEST RAMP
Bridge Opening Width W 358.0
Bridge Opening Length L 47
Piers
--Number 3
--Width 3.1
--Type 90° TRIANGULAR NOSE & TAIL
Elevation Low Steel 5301.2
Elevation Top 5308.3
Bridge Opening Sideslopes SLOPED DIRT
Embankment Sideslopes SLOPED DIRT
--Entrance DIRT
--Outlet DIRT
Wingwall Angles 0 —
Wingwall Lengths —
Angle of Bridge Skew 0 35°
Deck Elevations 5305.8
Top of Railing 5308.3
Invert Elevations
--Entrance 5281.8
--Outlet

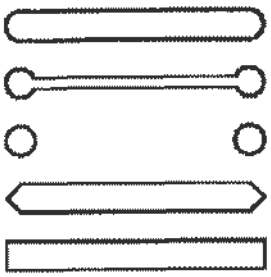
CULVERT

Inside Dimensions
--Rise(or Diameter)
--Span
Shape
Material
Invert Elevations
--Entrance
--Outlet
Length of Culvert
Embankment Sideslopes
Road Elevation
Entrance
--Wingwall Angle
--Wingwall Length
--End Projection
Outlet
--Siltation Depth
--End Projection

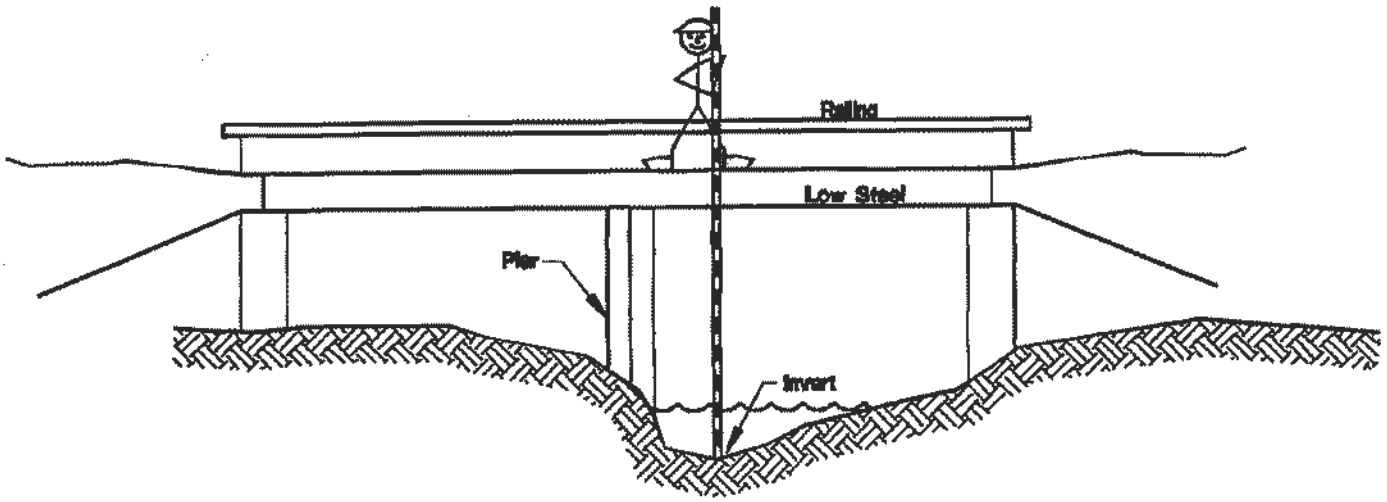
REMARKS: CURVED HIGHWAY CONCRETE GUARDRAIL

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:
- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



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BY TSJL DATE 04/17/06 SUBJECT C.C. FHAD SHEET ___ OF ___
CHK'D. BY ___ DATE ___ JOB NO. ___
PE'D. BY ___ DATE ___ FILE NO. ___

I-70 (EAST BOUND) ACCESS RAMP

W/S SECTION: 42942

D/S SECTION: 42809

DISTANCE TO DECK: 51

BRIDGE SECTION: 42891

DECK WIDTH: 74 (ALONG CL)

W/S PIER CL: 199, 294, 368

D/S PIER CL: 229, 313, 378

→ BY GRAPHICAL APPROXIMATION

SKEW: 90-35'-55 → USE 45°

HIGH CHORD: 5306.3

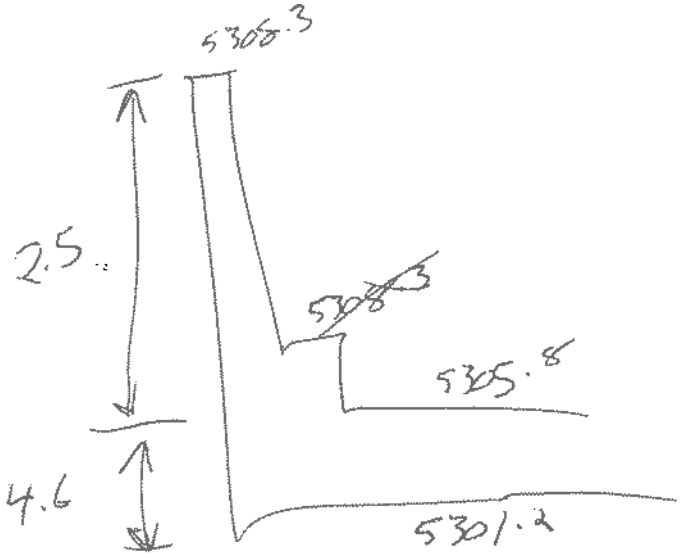
LOW CHORD: 5301.2

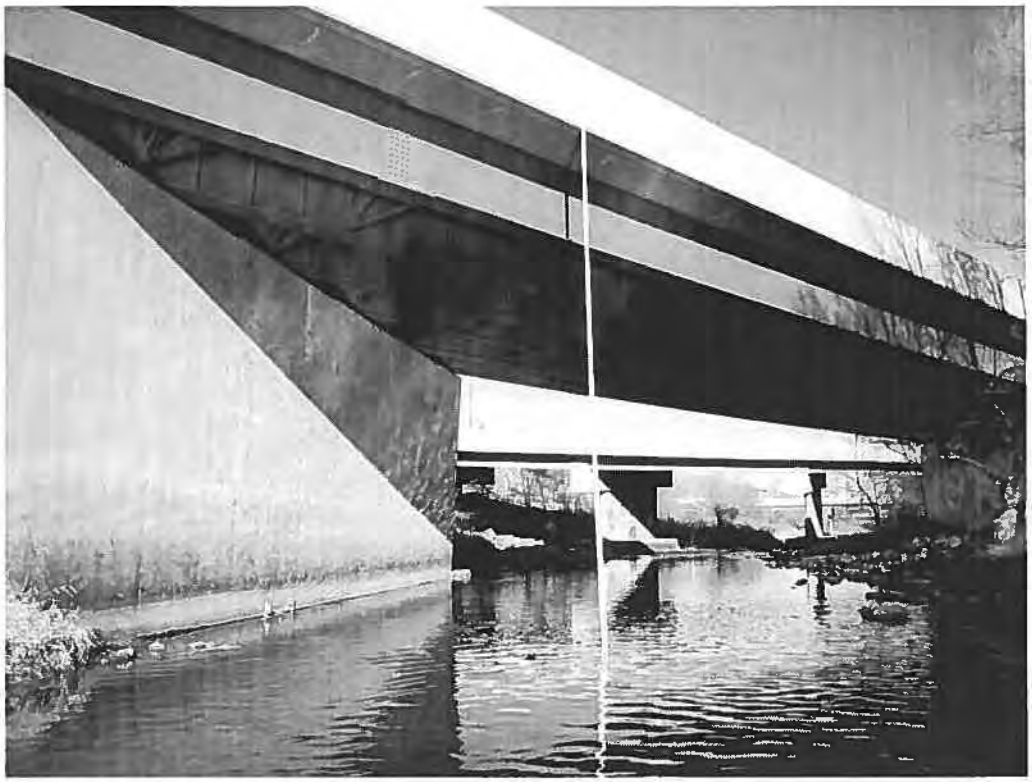
W/S DECK +2.5 -4.6

93	5314
93	5316.5 / 5309.4
454	5306.5 / 5299.4
454	5304
727	5306
~~877~~	
1155	5320

95	5314
131	5314
131	5316.5 / 5309.4
454	5306.5 / 5299.4
454	5304
603	5306

D/S DECK


535.3
2.5
535.8
4.6
530.2



I-70 West Ramp (Eastbound)

14

WADSWORTH EAST RAMP
TO I-70/I-76

FORM NO._____ PAGE__OF__

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 1-18-06

CREW GNA, PARTY CHIEF

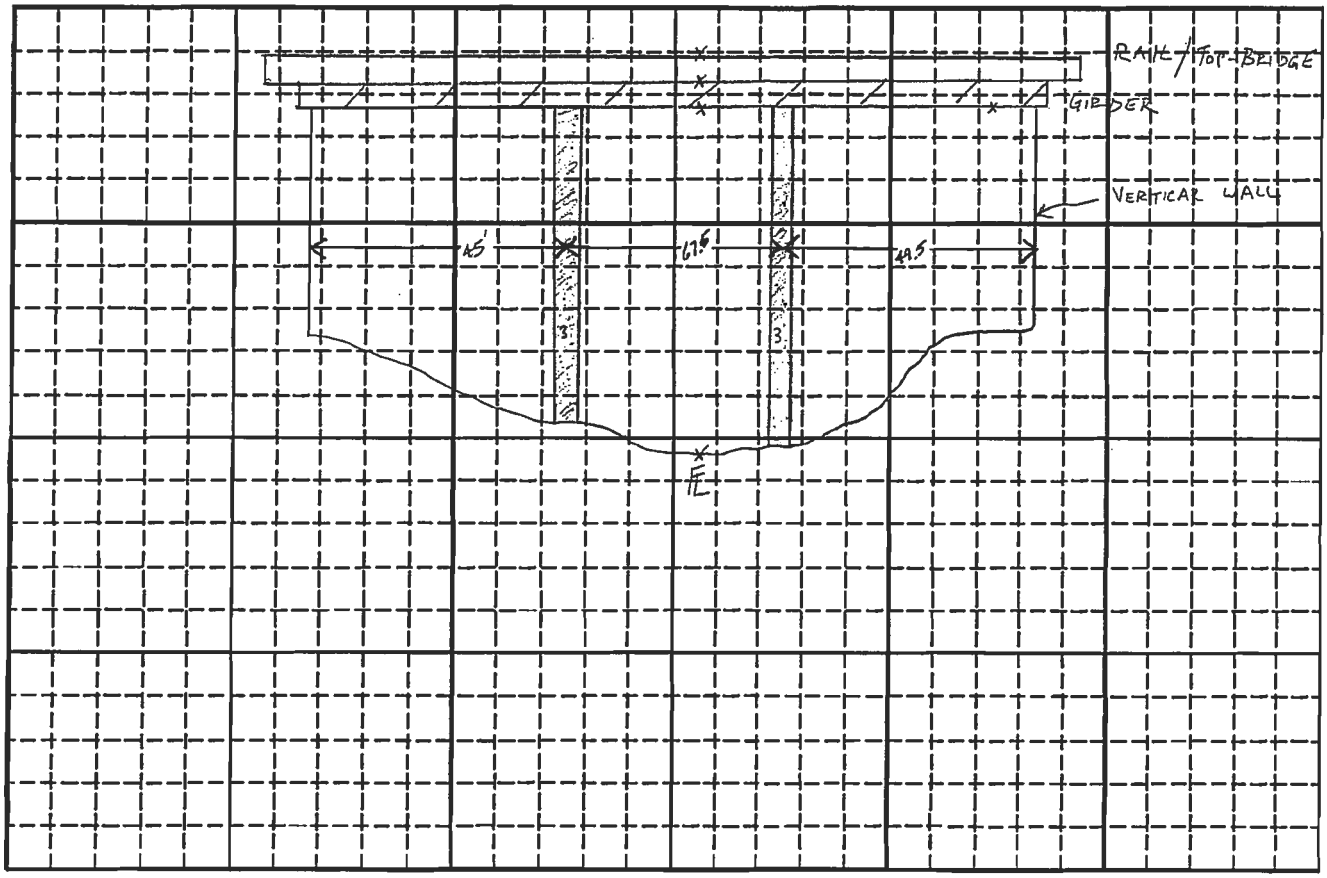
PHOTOS: ENTRANCE NONE - INVERT IS OVER 25' OUTLET —

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 66 OF FIELD BOOK NO. 59E

SKETCH

(Plan, Profile, Entrance and Outlet)



14

WADSWORTH EAST RAMP
TO I-70 / I-76

BRIDGE/CULVERT INFORMATION

BRIDGE

Alignment WADSWORTH EAST RAMP
Bridge Opening Width W 161.0
Bridge Opening Length L 40
Piers
--Number 2
--Width 3'
--Type 90° TRIANGULAR NOSE + TAIL
Elevation Low Steel 5324.6
Elevation Top 5330.9
Bridge Opening Sideslopes VERTICAL WALL / SLOPED RIP RAP
Embankment Sideslopes DIRT / RIP-RAP /
--Entrance "
--Outlet VERTICAL WALL ON NORTH / DIRT(S)
Wingwall Angles 0 0° FROM ABUTMENT
Wingwall Lengths 46'(NW) 9'(SW)
Angle of Bridge Skew 0 CURVED RAMP
Deck Elevations 5327.8
Top of Railing 5330.9
Invert Elevations
--Entrance 5297.0
--Outlet ——

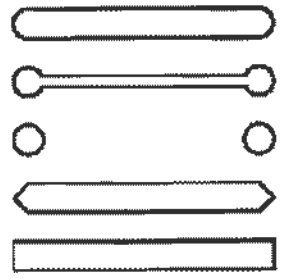
CULVERT

Inside Dimensions
--Rise(or Diameter)
--Span
Shape
Material
Invert Elevations
--Entrance
--Outlet
Length of Culvert
Embankment Sideslopes
Road Elevation
Entrance
--Wingwall Angle
--Wingwall Length
--End Projection
Outlet
--Siltation Depth
--End Projection

REMARKS: CURVED BRIDGE ; ROAD SLOPES DOWN FROM N → S
SHOTS FOR ELEVATIONS TAKEN OVER ℄ CREEK

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:
- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



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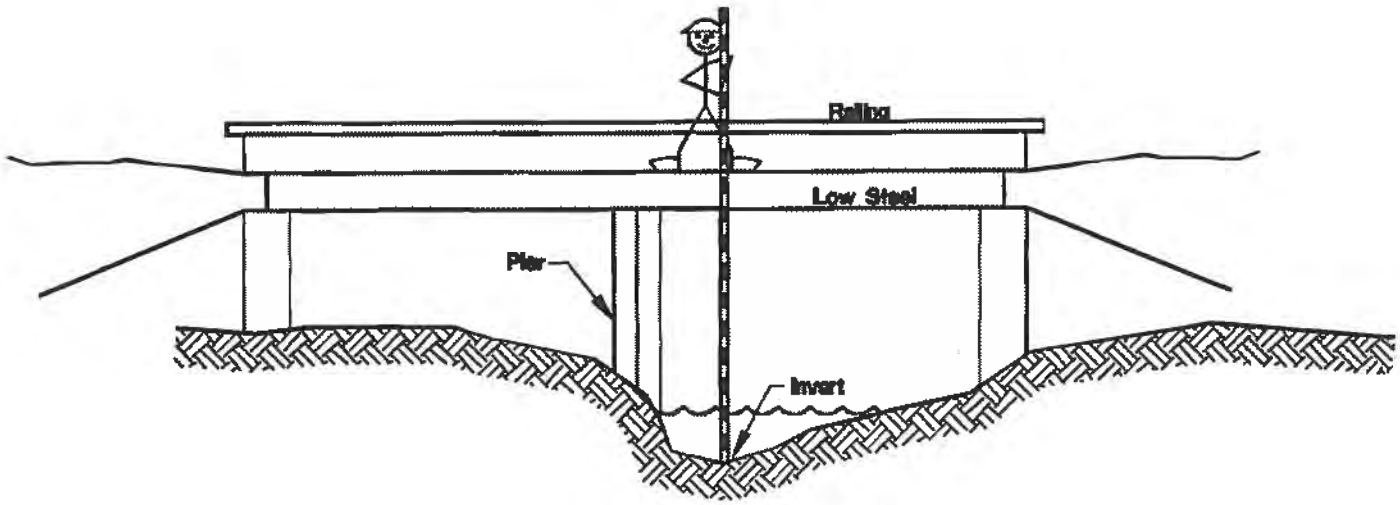

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BY FSJL DATE 04/17/06 SUBJECT C.C. FHAD SHEET ___ OF ___

CHKD BY ___ DATE ___ JOB NO. ___

FE... BY ___ DATE ___ FILE NO. ___

T-70 676 Access Ramp

W/S SECTION: 44756

D/S SECTION: 44683

DISTANCE TO DECK: 7

BRIDGE SECTION: 44751

DECK WIDTH: 44 (along CL)

W/S PIER CL: 194, 263

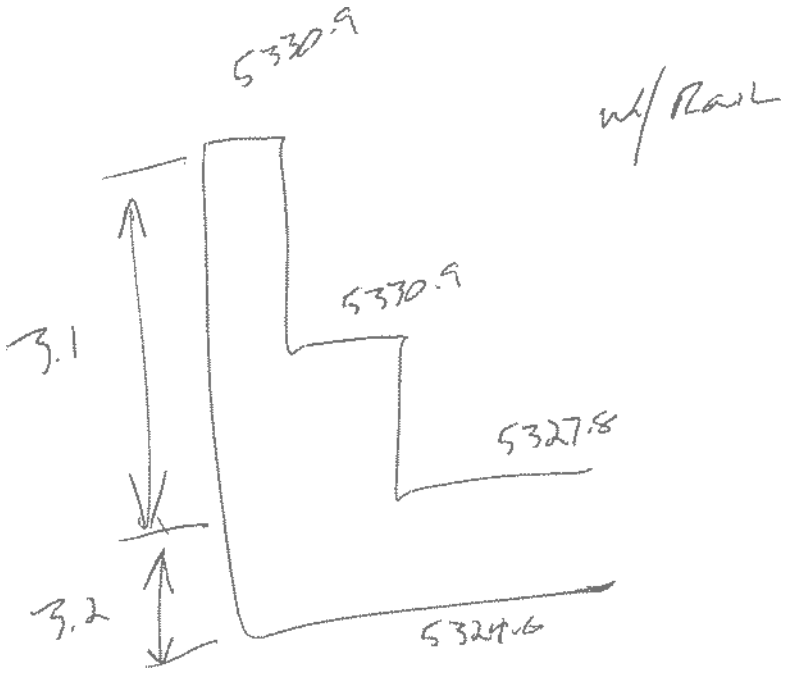
D/S PIER CL: 161, 237 → About at 257 > Graphical

SKEW: 90-62 = 28°

HIGH CHORD: 5330.9

LOW CHORD: 5324.6

W/S Deck		D/S Deck	
146	5332	112	5332
146	5335 / 5328.5	112	5335 / 5328.8
313	5329.7 / 5323.5	287	5329.7 / 5323.5
313	5326.6	287	5326.6
472	5330	416	5328


5330.9
w/ Rail
5330.9
3.1
5327.8
3.2
5324.6

Wadsworth Boulevard East Ramp (Eastbound photos 1, 2)

13

WADSWORTH

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 1-18-06

CREW GNA PARTY CHIEF

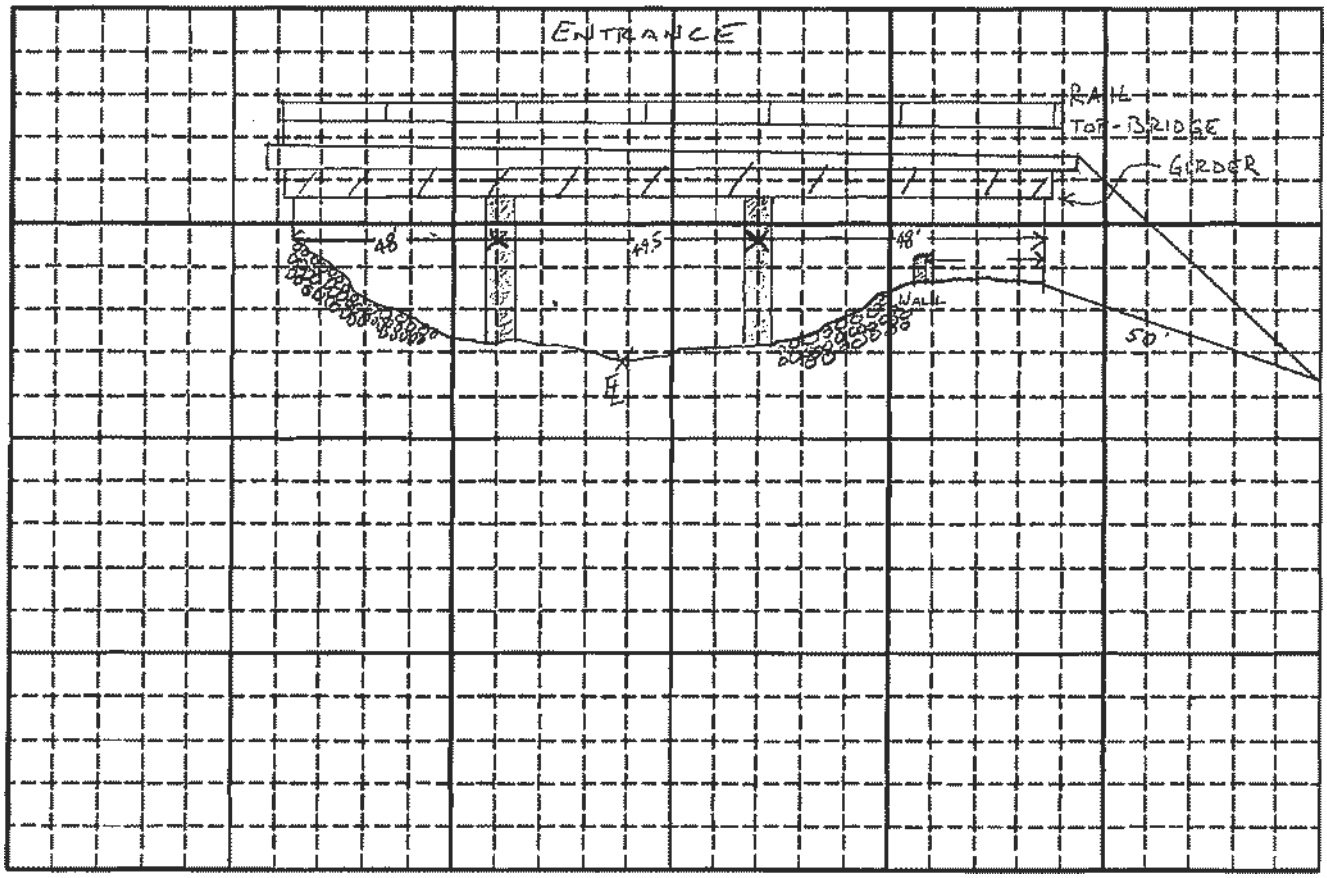
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 65 OF FIELD BOOK NO. 59E

SKETCH

(Plan, Profile, Entrance and Outlet)



plan\brid&Cul Info

13

WADSWORTH

BRIDGE/CULVERT INFORMATION

BRIDGE

Alignment WADSWORTH
Bridge Opening Width W 144.70
Bridge Opening Length L 121 AVG @ CREEK
Piers
--Number 2
--Width 1.35
--Type 90° TRIANGULAR NOSE + TAIL
Elevation Low Steel 5316.3
Elevation Top 5322.8
Bridge Opening Sideslopes VERTICAL WALL/SLOPED RIPRAP
Embankment Sideslopes RIP-RAP / GRAVEL SLOPED
--Entrance "
--Outlet "
Wingwall Angles θ 45°
Wingwall Lengths 50' (SW)
Angle of Bridge Skew θ 90°
Deck Elevations 5321.4
Top of Railing 5324.8
Invert Elevations
--Entrance 5300.0
--Outlet —

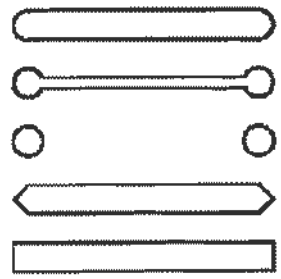
CULVERT

Inside Dimensions
--Rise(or Diameter)
--Span
Shape
Material
Invert Elevations
--Entrance
--Outlet
Length of Culvert
Embankment Sideslopes
Road Elevation
Entrance
--Wingwall Angle
--Wingwall Length
--End Projection
Outlet
--Siltation Depth
--End Projection

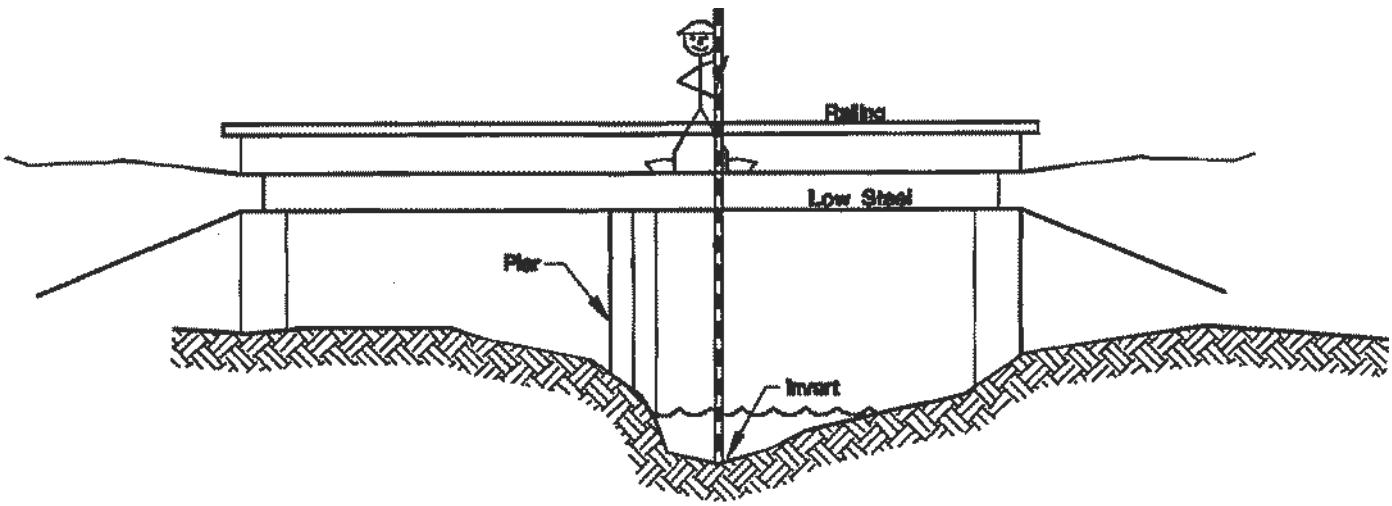
REMARKS: SLIGHTLY CURVED BRIDGE. WING WALL ON SOUTH SIDE ONLY.

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:
- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



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BY JL DATE 04/17/06 SUBJECT CL FWD SHEET OF

CHKD. BY DATE JOB NO

REV. BY DATE FILE NO

WADSWORTH BLVD.

U/S SECTION: 44910

D/S SECTION: 44770

DISTANCE TO DECK: 15

BRIDGE SECTION: 44695

DECK WIDTH: 122 (ahead Ch)

U/S PIER CL: 449, ~~503~~ 503

D/S PIER CL: ~~253~~, 209, 261 > Graphically

SKEW: 90-90=0

HIGH CHORD: 5324.8

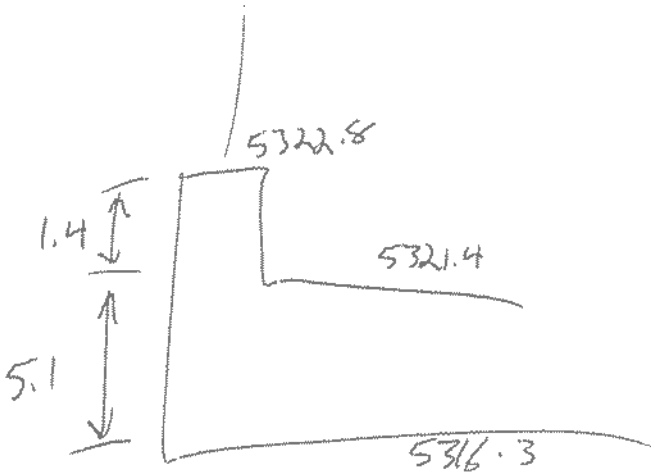
LOW CHORD: 5316.3

U/S DECK +1.4 -5.1

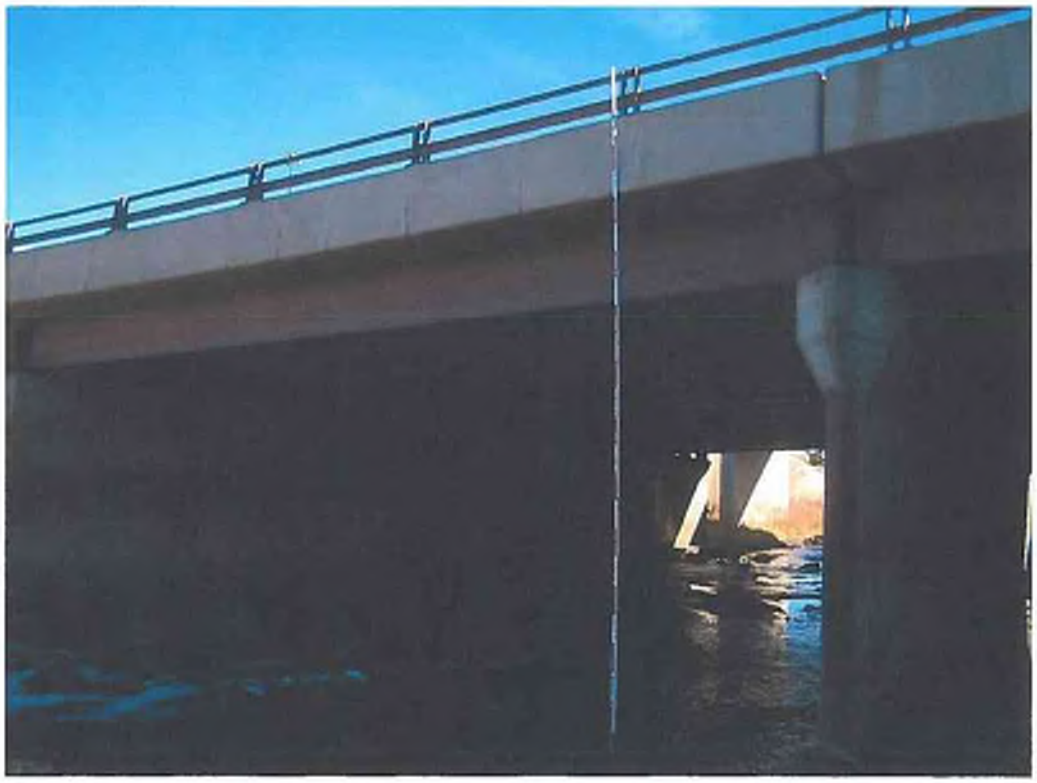
~~394~~ 394	5317.4
~~547~~ 394	5318.8 / 5312.3
547	5325.4 / 5318.9
547	5324
743	5334

D/S DECK

160	5317.4
160	5318.8 / 5312.3
310	5325.4 / 5318.9
310	5324
466	5330


5322.8
1.4
5321.4
5.1
5316.3

Wadsworth Boulevard East Ramp



Wadsworth Boulevard

Pedestrian Bridge 477+65

ICON ENGINEERING, INC 8100 S Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY _____ DATE _____ SUBJECT _____ SHEET ___ OF ___
CHKD BY _____ DATE _____ JOB NO _____
REV BY _____ DATE _____ FILE NO _____

Bridge Name: 477+65 PEDESTRIAN

Bridge Opening Width W: 82'

Bridge Opening Length L: 117'11"

Piers NONE
Number: —
Width: —
Type: —

Elevation Bench Mark 1: 5327.104 **Rod Height on BM 1:** ~~5.20~~ 6.02
Elevation Bench Mark 2: 5326.90 **Rod Height on BM 2:** 6.21

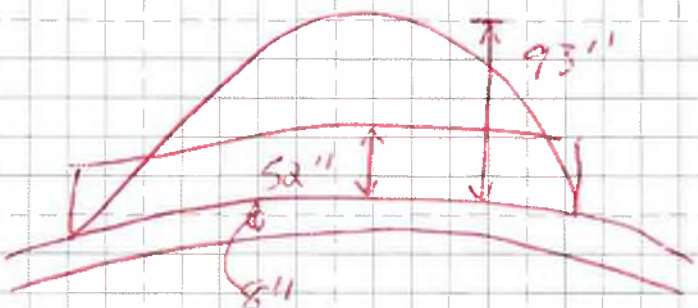
Instrument Elevation: ① 5333.04 / ② 5333.41 Δ = .05 → 5333.01

	Left	Center	Right
Elevation Top of Rail:	5333.78	5339.16	5333.74
Elevation Top of Bridge:	—	—	—
Elevation Roadway Deck:	(3.59) 5329.45	(1.63) 5331.41	(3.65) 5329.41
Elevation Low Chord:	5328.78	5330.74	5328.74

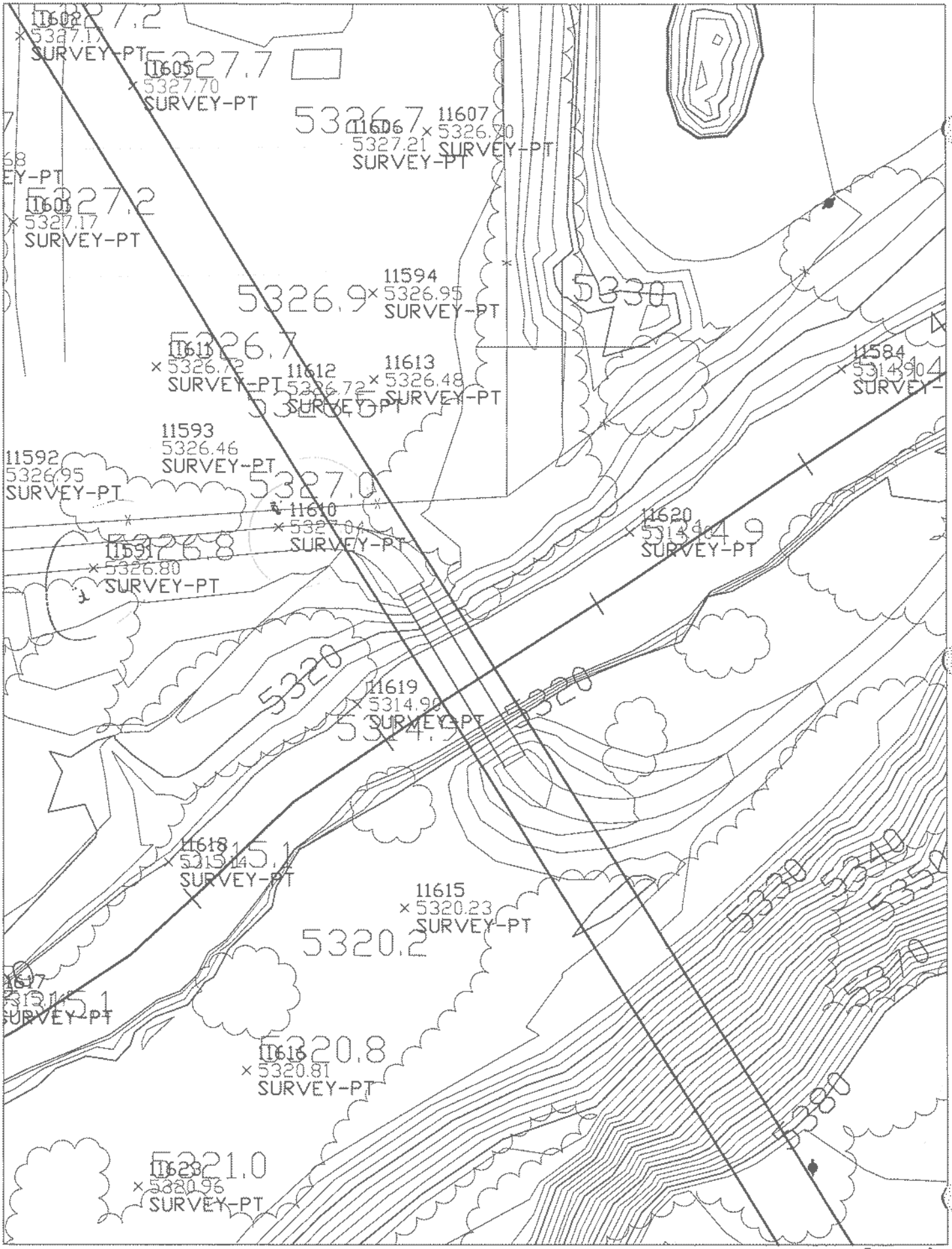
Elevation Invert:

Pictures: 10 → 12

Sketch:



W/S DECK
1008.95 5326.70
1024 5328
1054 5329.45
1054 5333.78 / 5328.78
1095 5339.16 / 5330.74
1135 5333.74 / 5328.74
1175 5329.41
1157 5328
1175 5326
1180 5322
1205 5320.55



PEDESTRIAN BRIDGE 477+65

SCALE 1" = 50'

DOWNSTREAM OF 44TH, UPSTREAM OF WADSWORTH. ACCESS FROM EASTBOUND 44TH AVE.

12

44th AVE

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 1-18-06

CREW GNA PARTY CHIEF

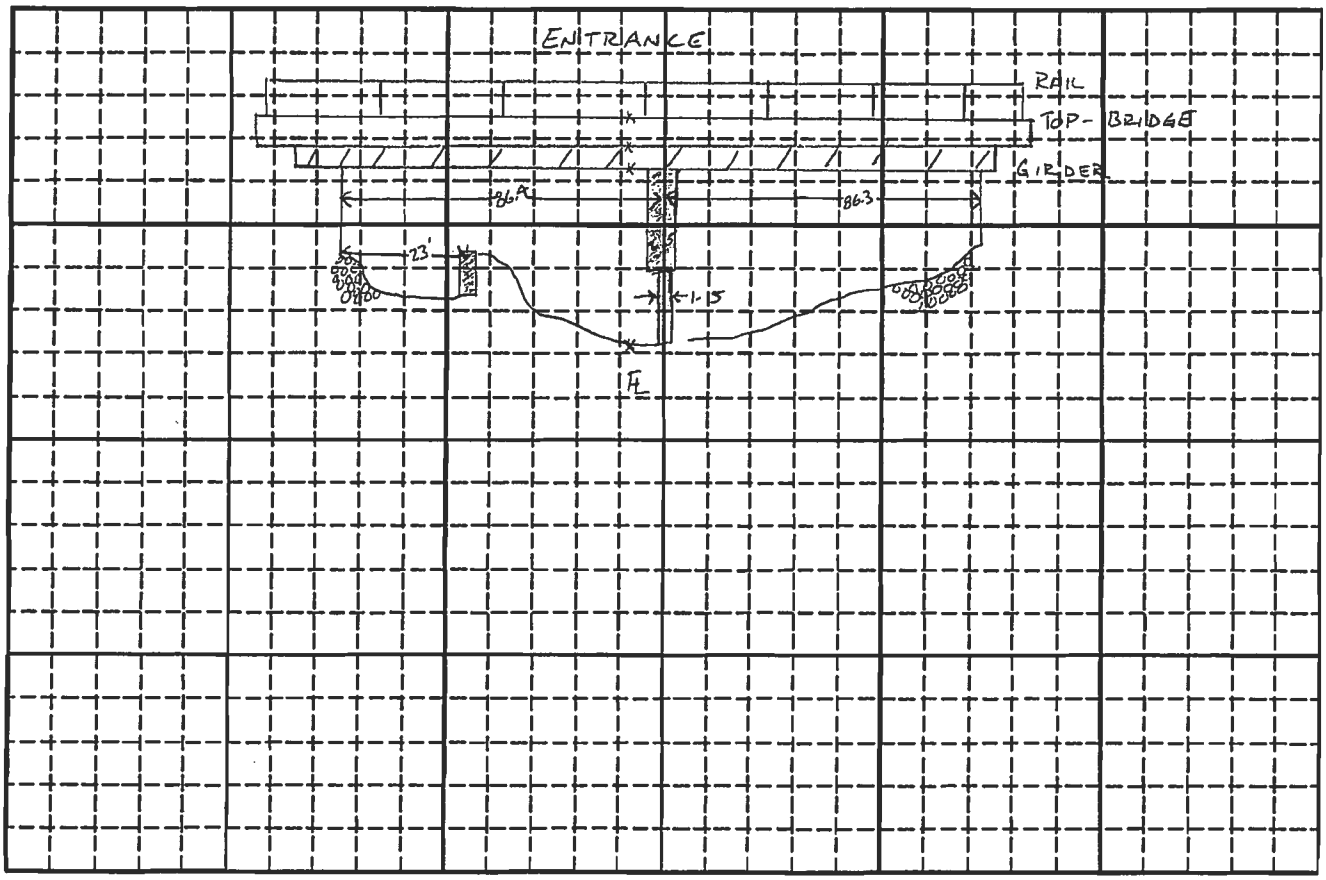
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 66 OF FIELD BOOK NO. 59E

SKETCH

(Plan, Profile, Entrance and Outlet)



12

44th AVE

BRIDGE/CULVERT INFORMATION

BRIDGE

Alignment 44th AVE
Bridge Opening Width W 172.7
Bridge Opening Length L 72.0
Piers
--Number 1
--Width 1.5 LOWER 2.5 UPPER
--Type 90° TRIANGULAR NOSE + TAIL
Elevation Low Steel 5338.0
Elevation Top 5342.2
Bridge Opening Sideslopes SLOPED RIPRAP
Embankment Sideslopes RIP-RAP/DIRT/GRAVEL
--Entrance "
--Outlet "
Wingwall Angles 0 —
Wingwall Lengths —
Angle of Bridge Skew 0 90°
Deck Elevations 5341.6
Top of Railing 5345.7
Invert Elevations
--Entrance 5327.7
--Outlet —

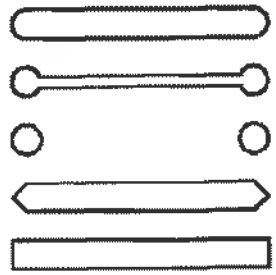
CULVERT

Inside Dimensions
--Rise(or Diameter)
--Span
Shape
Material
Invert Elevations
--Entrance
--Outlet
Length of Culvert
Embankment Sideslopes
Road Elevation
Entrance
--Wingwall Angle
--Wingwall Length
--End Projection
Outlet
--Siltation Depth
--End Projection

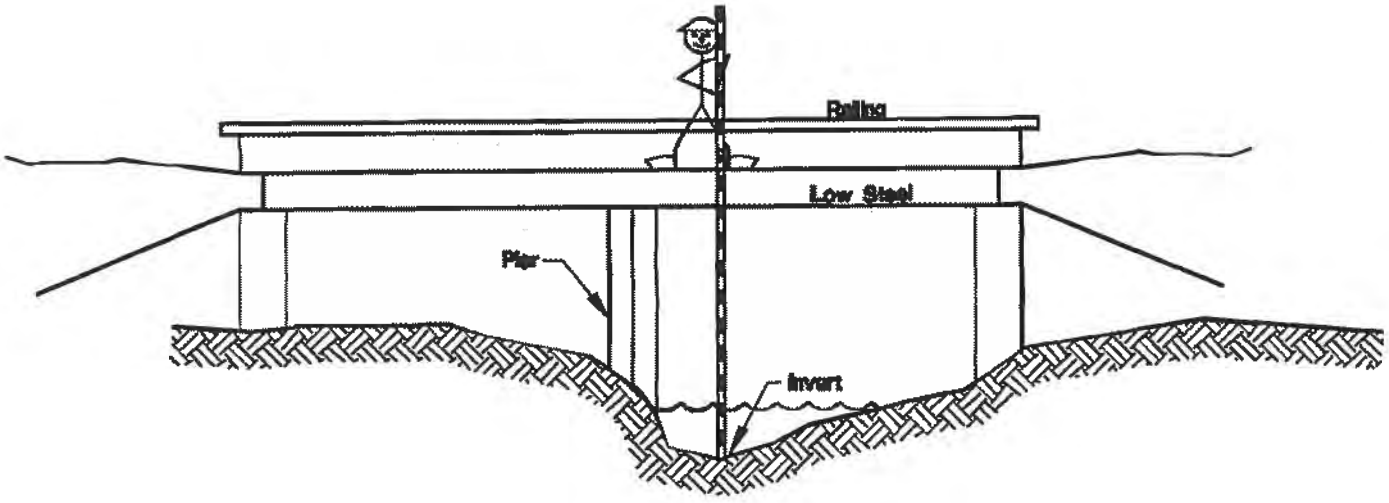
REMARKS: CHAIN LINK FENCE ; PIER WIDTH VARIES

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:
- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



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BY: BSL DATE: 04/19/06 SUBJECT: C.C. FHWD SHEET ___ OF ___

CHK'D. BY: ___ DATE: ___ JOB NO. ___

FE'D. BY: ___ DATE: ___ FILE NO. ___

44th AVE.

W/S SECTION: 49848

D/S SECTION: 49763

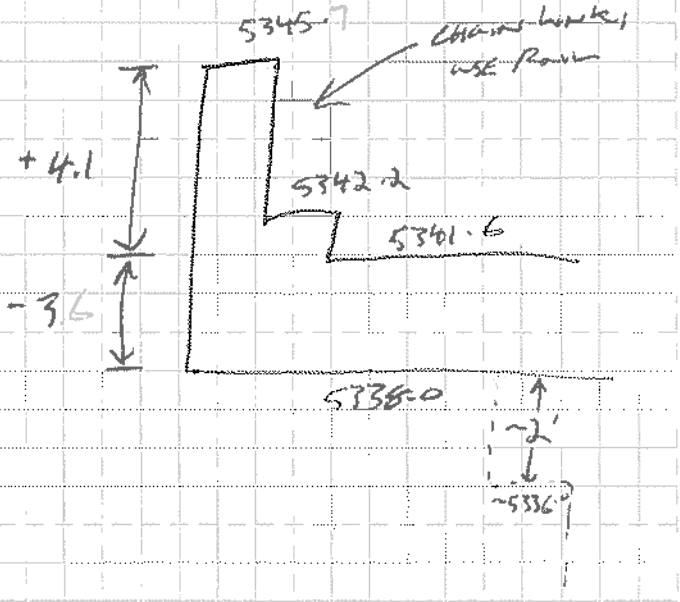
DISTANCE TO DECK: 5

BRIDGE SECTION: 49843

DECK WIDTH: 72

SKEW ANGLE: 90-90=0°

PIER CL:
W/S = 827
D/S = 845



INCF: 741 @ 5341.6
914 @ 5342.1

INCF: 756 @ 5341.6
931 @ 5342.1

W/S DECK

224	5342.3
358	5341.8
435	5341.1
683	5341.6
741	5341.6
741	5345.7 / 5336
914	5746.2 / 5336.5
914	5342.1
1130	5342.3
1307	5343
1405	5344.4
1465	5346
1560	5350
1720	5360

D/S DECK

46	5347.5
221	5342.3
353	5341.8
443	5341.1
693	5341.6
756	5341.6
756	5345.7 / 5338
931	5746.2 / 5338.5
931	5342.1
1135	5342.3
1305	5343
1412	5344.4
1474	5346
1573	5350
1756	5360

CLEAR CREEK BRIDGE PHOTOS
April 12, 2006

44th Avenue (photos 1, 2)

Pedestrian Bridge 538+06

ICON ENGINEERING INC 8100 S Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY _____ DATE _____ SUBJECT _____ SHEET ___ OF _____
CHK'D. BY _____ DATE _____ JOB NO. _____
PE. BY _____ DATE _____ FILE NO. _____

Bridge Name: PEDESTRIAN 538+06

Bridge Opening Width W: 82'

Bridge Opening Length L: 117'

Piers

Number:
Width:
Type:

Elevation Bench Mark 1: 5352.19 **Rod Height on BM 1:** 4.34
Elevation Bench Mark 2: 5351.65 **Rod Height on BM 2:** N/A
3: 5351.5 3 10.94
Instrument Elevation: @ 5361.46 / @ 5361.94 Δ = .52' → 5361.72

	Left	Center	Right
Elevation Top of Rail:	5361.72	5366.72	5361.41
Elevation Top of Bridge:	—	—	—
Elevation Roadway Deck:	(4.63) 5357.09	(2.70) 5359.02	(4.67) 5357.68
Elevation Low Chord:	5356.42	5358.35	5356.41

Elevation Invert:

Pictures: 13 → 15

Sketch:

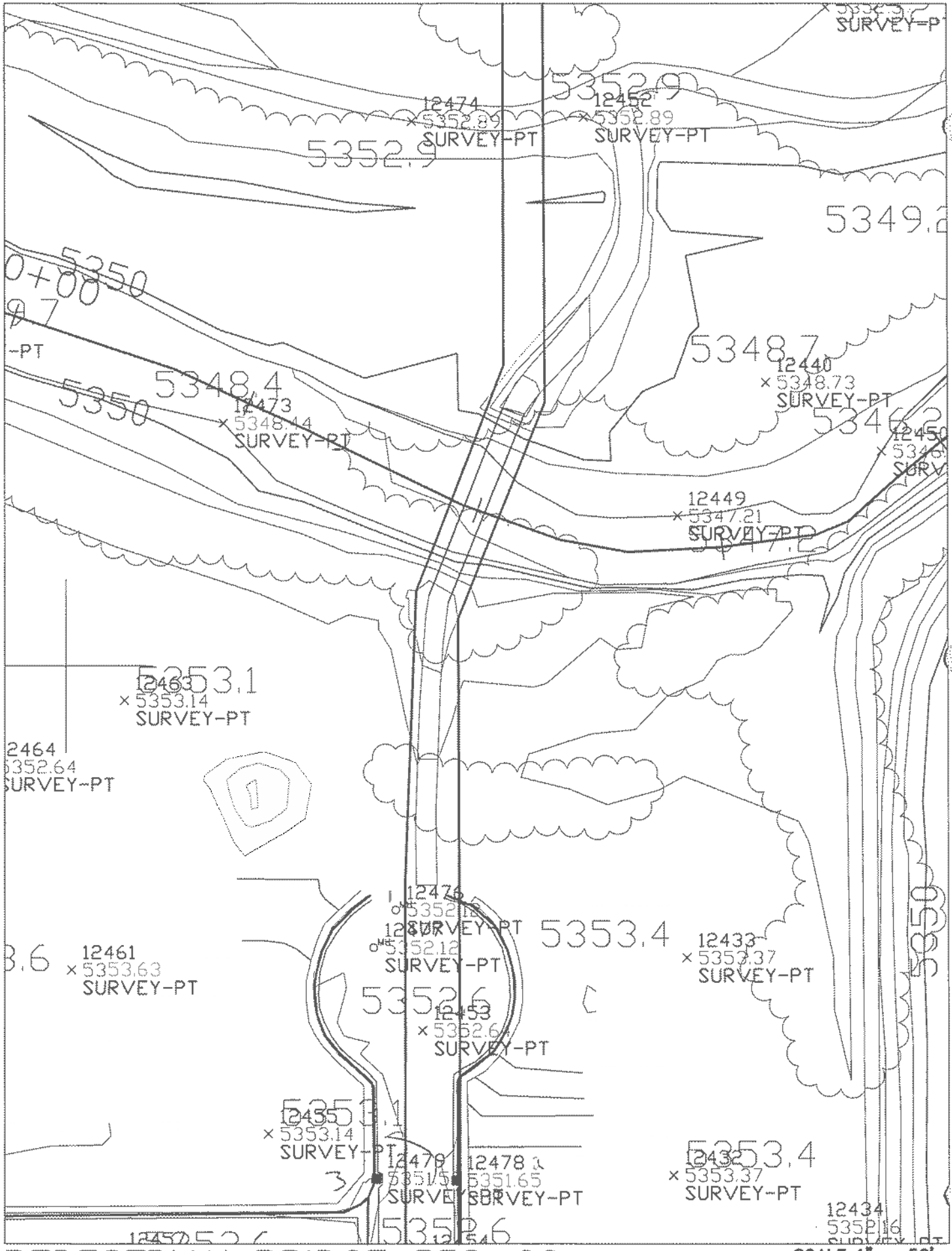
SAME AS 477+65

W/S Deck 451 ss 5353.35
1173 5352
1226 5354
1260 5356
1276 5357.09
1280 5361.42 / 5356.42
1310 5366.72 / 5358.35
1350 5361.41 / 5356.41
1351 5356 → 1350 5357.08
1417 5354
1472.71 5352.37

1149.16 5357.26
1172 5352
1239 5352

W/S Deck / 1246.72 5355.85
1260 5356
1276 5357.09
1276 5361.42 / 5356.42
1317 5366.72 / 5358.35
1357 5361.41 / 5356.41

1353 5356
1418 5354
1464.45 5352.82



PEDESTRIAN BRIDGE 538+06

SCALE 1" = 50'

DOWNSTREAM OF KIPLING, UPSTREAM OF 44TH AVE. ACCESS FROM EASTBOUND 44TH AVE, KIPLING OR INDEPENDANCE CT.

11

KIPLING

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 1-18-06

CREW GNA, PARTY CHIEF

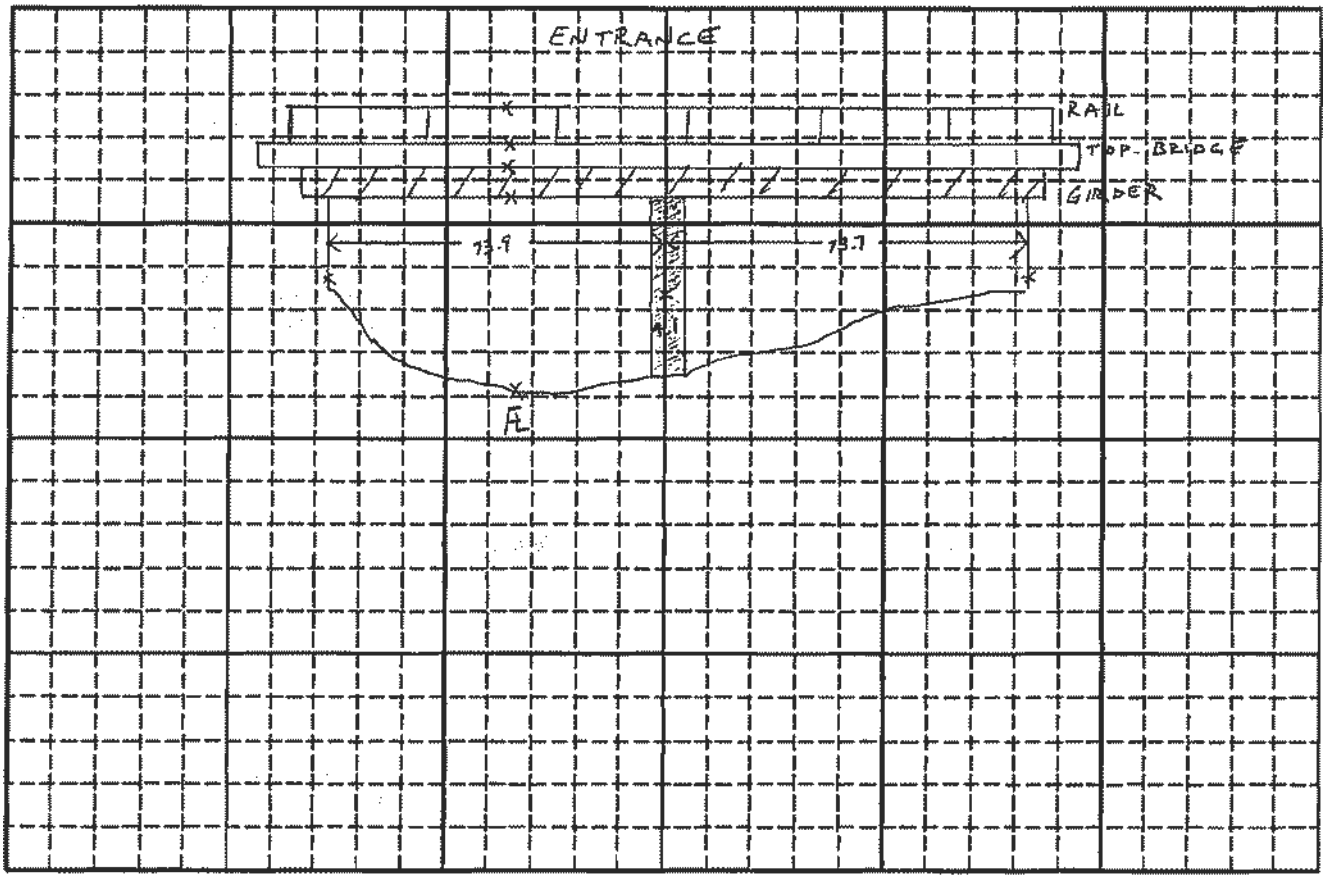
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 67 OF FIELD BOOK NO. 59E

SKETCH

(Plan, Profile, Entrance and Outlet)



11

KIPLING

BRIDGE/CULVERT INFORMATION

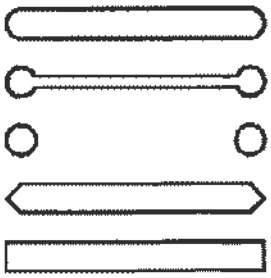
BRIDGE		CULVERT	
Alignment	KIPLING	Inside Dimensions	
Bridge Opening Width W	147.6	--Rise(or Diameter)	
Bridge Opening Length L	74	--Span	
Piers		Shape	
--Number	1	Material	
--Width	4.1	Invert Elevations	
--Type	SQUARE NOSE & TAIL	--Entrance	
Elevation Low Steel	5360.9	--Outlet	
Elevation Top	5365.7	Length of Culvert	
Bridge Opening Sideslopes	SLOPED DIRT	Embankment Sideslopes	
Embankment Sideslopes	DIRT	Road Elevation	
--Entrance	"	Entrance	
--Outlet	"	--Wingwall Angle	
Wingwall Angles 0	—	--Wingwall Length	
Wingwall Lengths	—	--End Projection	
Angle of Bridge Skew 0	65°	Outlet	
Deck Elevations	5365.7	--Siltation Depth	
Top of Railing	5369.15	--End Projection	
Invert Elevations			
--Entrance	5355.7		
--Outlet	—		

REMARKS: METAL HAND RAIL

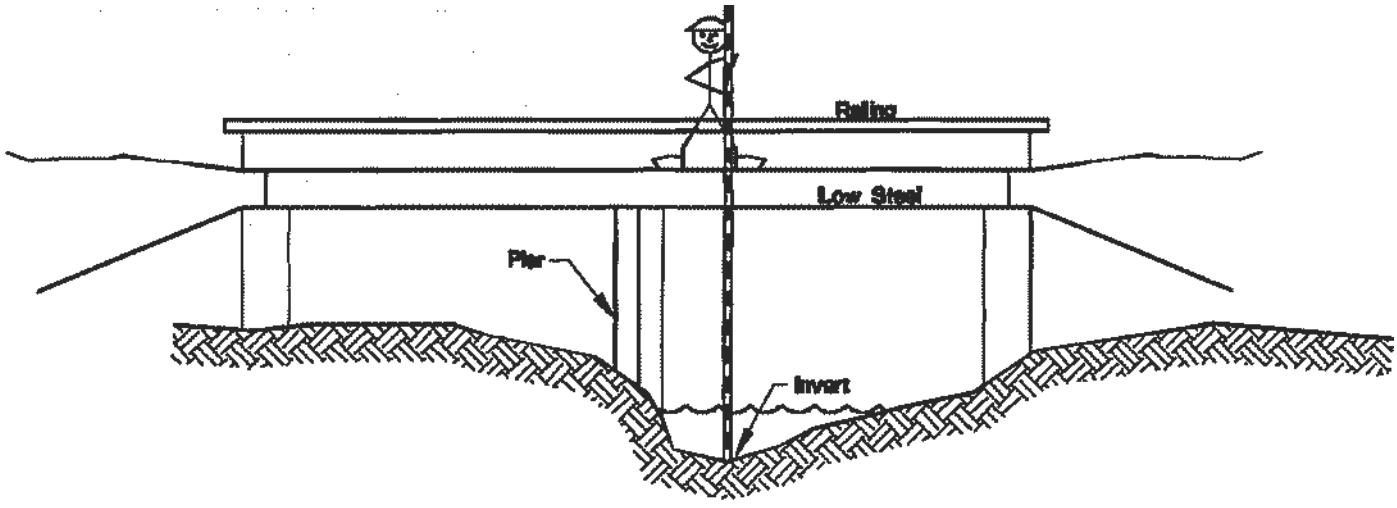
GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



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BY: BSL DATE 06/19/06 SUBJECT C.C. FHAD SHEET ___ OF ___

CHKD. BY: ___ DATE ___ JOB NO. ___

FEE: $ ___ DATE ___ FILE NO. ___

KIPLING ST.

W/S SECTION: 55156

D/S SECTION: 55034

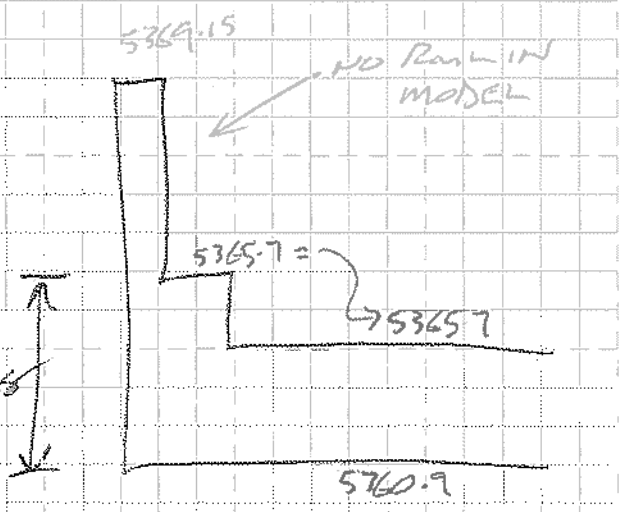
DISTANCE TO DECK: 7

BRIDGE SECTION: 55149

DECK WIDTH: 91 (ALONG CL)

SKEW ANGLE: 90-65:25°

PIER CL:
W/S = 989
D/S = 1045



INEFF 917 @ 5366.7
1066 @ 5365.8

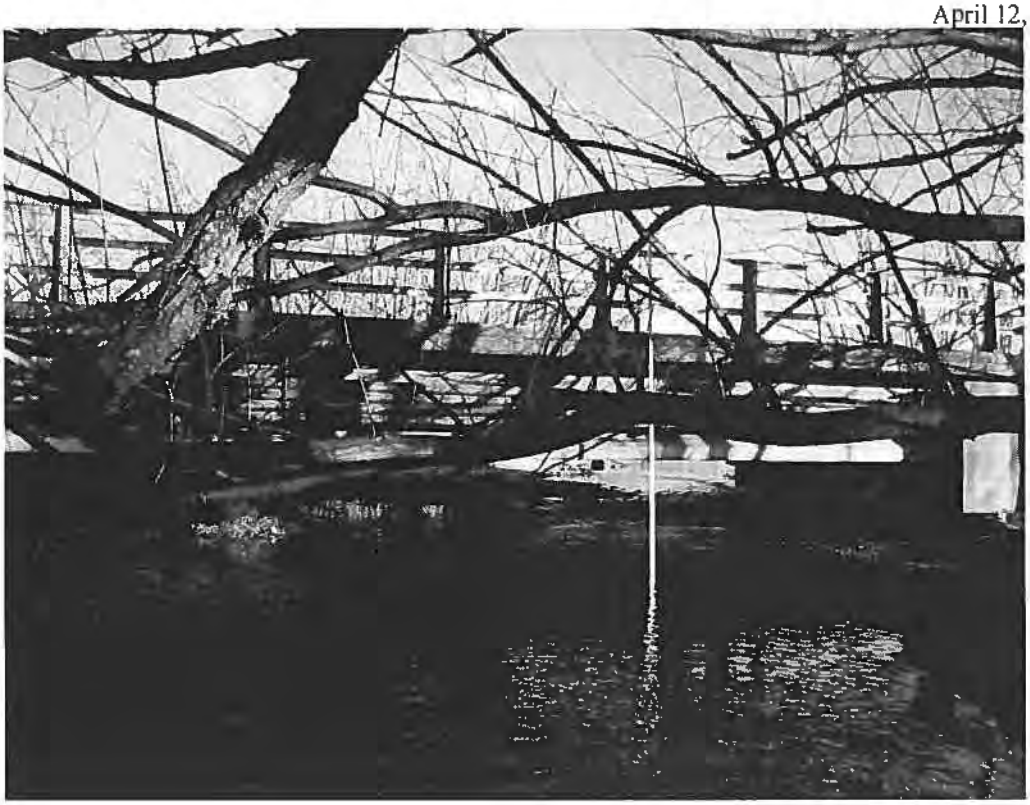
962 @ 5366.7
1111 @ 5365.8

W/S DECK

62	5367.2
119	5367.7
200	5367.7
256	5367.7
379	5366.2
478	5366.4
651	5368.4
791	5367.7
891	5366.9
917	5366.7
917	5366.7 / 5361.9
1066	5365.8 / 5361.0
1066	5365.8
1192	5365.1
1279	5364.6
1561	5363.9
1646	5364.3
1727	5365.0
1938	5367.2
2097	5368.9
2266	5371.1
2372	5372.6
2509	5375.1
2729	5384

D/S DECK

61	5367.2
117	5367.7
200	5367.7
255	5367.7
380	5366.2
471	5368.4
554	5368.7
654	5368.4
769	5367.7
891	5366.9
962	5366.7
962	5366.7 / 5361.9
1111	5365.8 / 5361.0
1111	5365.8
1194	5365.1
1279	5364.6
1369	5364.1
1561	5363.9
1643	5364.3
1725	5365
1937	5366.6
2098	5368.9
2266	5371.1
2372	5372.6
2510	5375.1
2730	5384



Kipling Street (photo 1)

Kipling Street (photos 2, 3)

Pedestrian Bridge 572+29

ICON ENGINEERING INC 8100 S Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-1019

BY: _____ DATE: _____ SUBJECT: _____ SHEET ___ OF ___
CHKD BY: _____ DATE: _____ JOB NO.: _____
PE BY: _____ DATE: _____ FILE NO.: _____

Bridge Name: 572+29 PEDESTRIAN

Bridge Opening Width W: 75.5'

Bridge Opening Length L: 11'

Piers NONE
- **Number:**
- **Width:**
- **Type:**

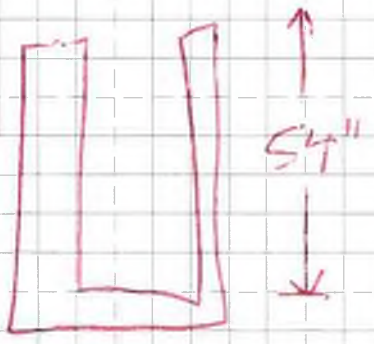
Elevation Bench Mark 1: 5377.12 **Rod Height on BM 1:** 6.04
Elevation Bench Mark 2: 5376.81 **Rod Height on BM 2:** 6.45 5.735
Instrument Elevation: ① 5383.16 ② 5383.26 Δ: .10 → 5383.21

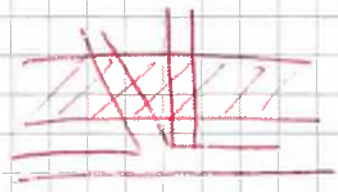
	Left	Center	Right
Elevation Top of Rail:	5382.72	5382.58	5380.78
Elevation Top of Bridge:			
Elevation Roadway Deck:	(4.99) 5378.22	(5.13) 5378.08	(6.93) 5376.28
Elevation Low Chord:	5376.97	5376.83	5375.03

Elevation Invert:

Pictures: 16 → 18

Sketch:

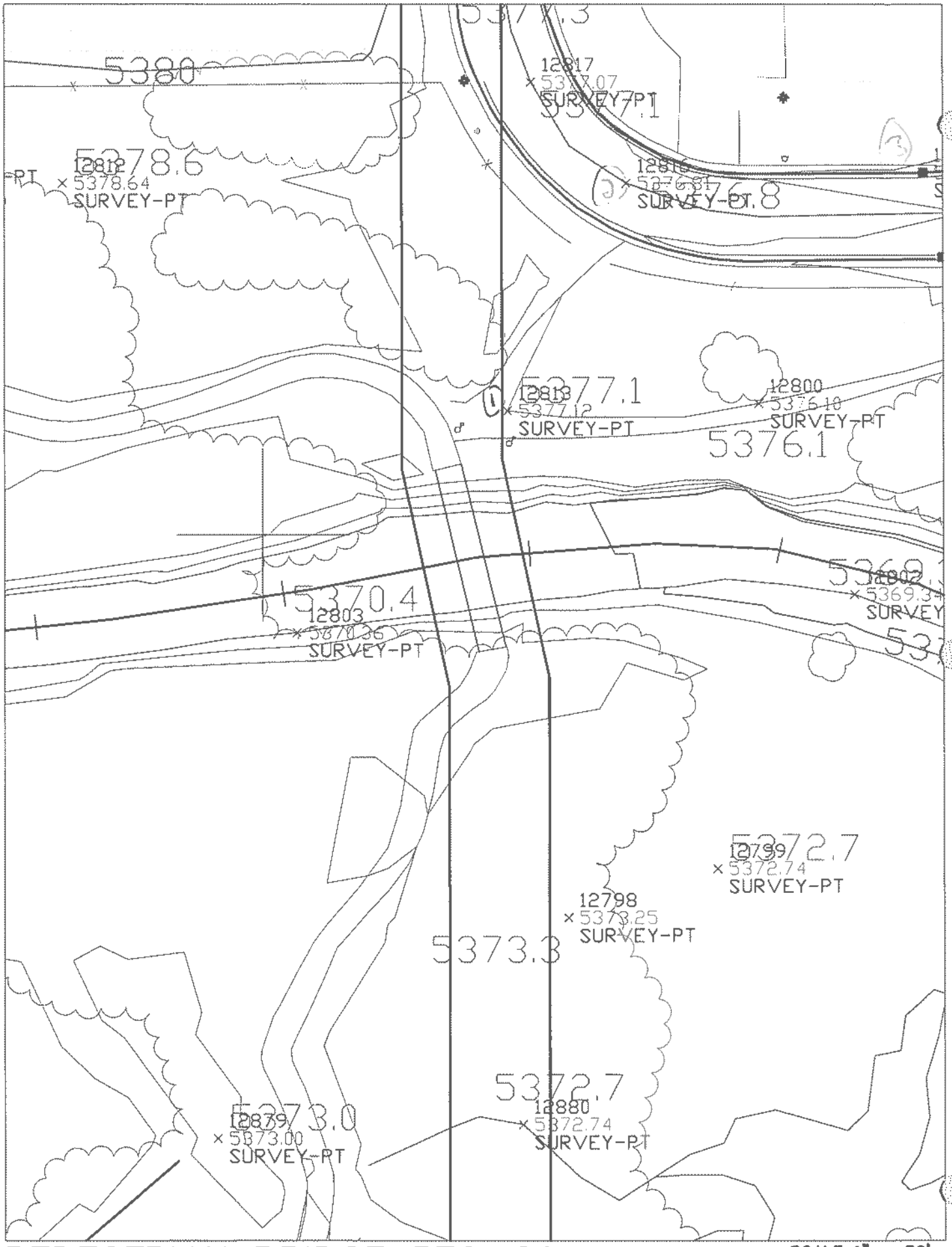




w/s Deck
533 5378.22
533 5382.72/5376.97
570 5382.58/5376.83
910 5380.78/5375.03

D/s Deck 524 5378.22
524 5382.72/5376.97
562 5382.58/5376.83
900 5380.78/5375.03
900 5376.28

903.75 5374.14



PEDESTRIAN BRIDGE 572+29

SCALE 1" = 50'

UPSTREAM OF KIPLING. ACCESS FROM 43TH/42ND AVE ~~OR PATH FROM KIPLING~~.

Pedestrian Bridge 602+17

ICON ENGINEERING, INC 8100 S Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-1019

BY _____ DATE _____ SUBJECT _____ SHEET ___ OF ___
CHKD. BY _____ DATE _____ JOB NO. _____
PE... BY _____ DATE _____ FILE NO. _____

Bridge Name: 602+17 PEDESTRIAN

Bridge Opening Width W: 87'

Bridge Opening Length L: 9'

Piers None
Number:
Width:
Type:

Elevation Bench Mark 1: 5398.96 **Rod Height on BM 1:** 4.60
Elevation Bench Mark 2: 5398.47 **Rod Height on BM 2:** 5.55
3: 5399.27 3: 4.78

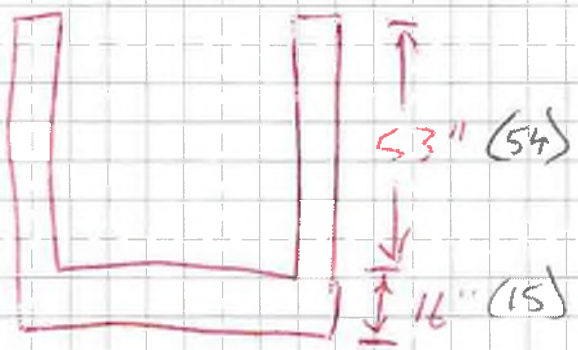
Instrument Elevation: ① 5403.56 / ② 5404.02 / ③ 5404.05 (use 2 & 3)
→ 5404.04

	Left	Center	Right
Elevation Top of Rail:	5404.85	5406.54	5404.90
Elevation Top of Bridge:	—	—	—
Elevation Roadway Deck:	(3.69) 5400.35	(2.00) 5402.04	(3.64) 5400.40
Elevation Low Chord:	5399.10	5400.79	5399.15

Elevation Invert:

Pictures: 19 → 21

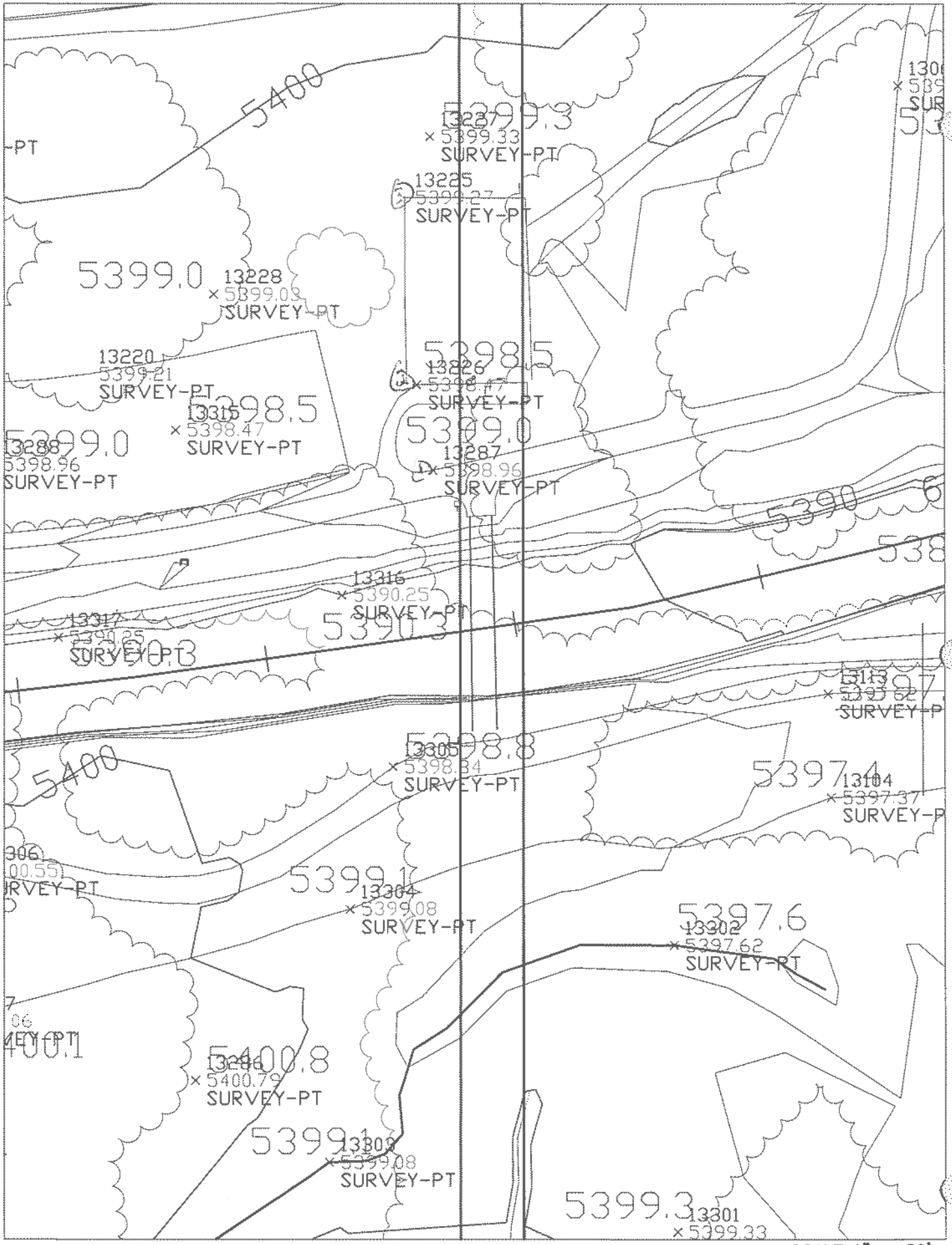
Sketch:



W/S Deck
1252 5400.35
1252 5404.85/5399.10
1295 5406.54/5400.79
1338 5404.90/5399.15
1338 5400.40

D/S Deck
1251 5400.35
1251 5404.85/5399.10
1295 5406.54/5400.79
1337 5404.90/5399.15
1337 5400.40

1237.20 5398.6
~~1339.98 5398.96~~
1353.19 5398.98



PEDESTRIAN BRIDGE 602+17

SCALE 1" = 50'

ADJACENT TO PROSPECT LAKE. ACCESS FROM PROSPECT LAKE PARK VIA 44TH AVE.

Pedestrian Bridge 630+68

ICON ENGINEERING, INC. 8100 S. Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY _____ DATE _____ SUBJECT _____ SHEET ___ OF _____
CHKD. BY _____ DATE _____ JOB NO. _____
PE... BY _____ DATE _____ FILE NO. _____

Bridge Name: 630+68 PEDESTRIAN

Bridge Opening Width W: 90.5'

Bridge Opening Length L: 134"

Piers
Number: NONE
Width:
Type:

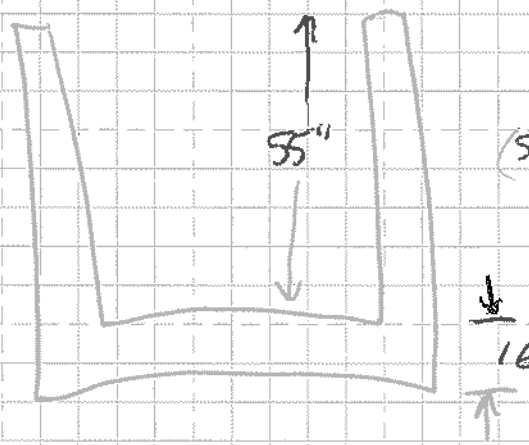
Elevation Bench Mark 1: 5415.05 **Rod Height on BM 1:** 7.98
Elevation Bench Mark 2: ~~5406.31~~ **Rod Height on BM 2:**
cont J: 5418 3: 5.18
Instrument Elevation: @5423.03 / @5423.18 Δ=.15 → 5423.11

	Left	Center	Right
Elevation Top of Rail:	5422.53	5424.22	5422.44
Elevation Top of Bridge:	—	—	—
Elevation Roadway Deck:	(5.05) 5418.03	(3.39) 5419.74	(5.19) 5417.92
Elevation Low Chord:	5416.78	5418.47	5416.67

Elevation Invert:

Pictures: 22-25

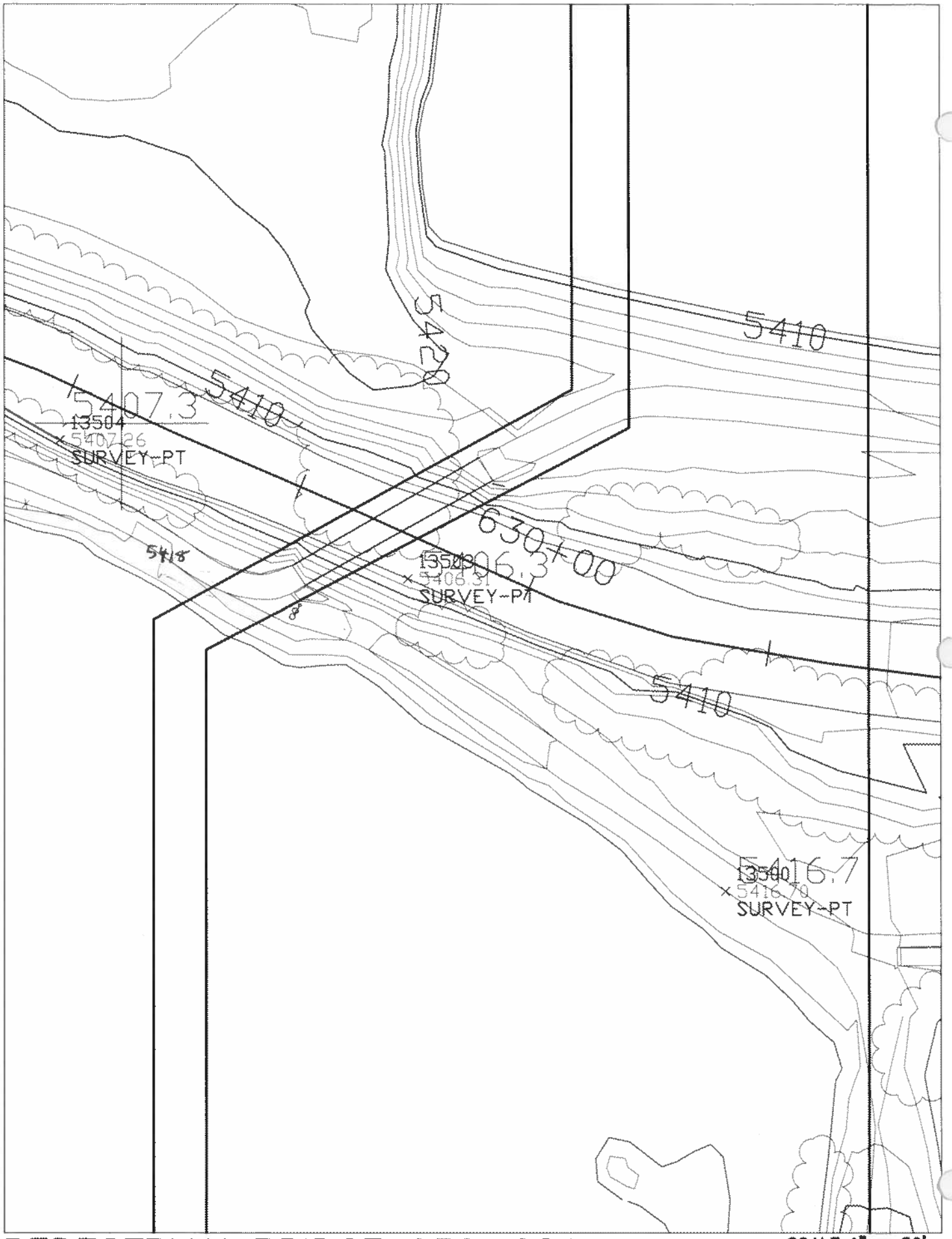
← 134" → **Sketch:**



U/S DECK
1060 5418.03
1060 5422.53 / 5416.78
1103 5424.22 / 5418.47
1147 5422.42 / 5416.67
1147 5417.92
1181 5418

D/S DECK
1058 5418.03
1058 5422.53 / 5416.78
1171 5424.22 / 5418.47
1174 5422.42 / 5416.67
1174 5417.92
1198 5418

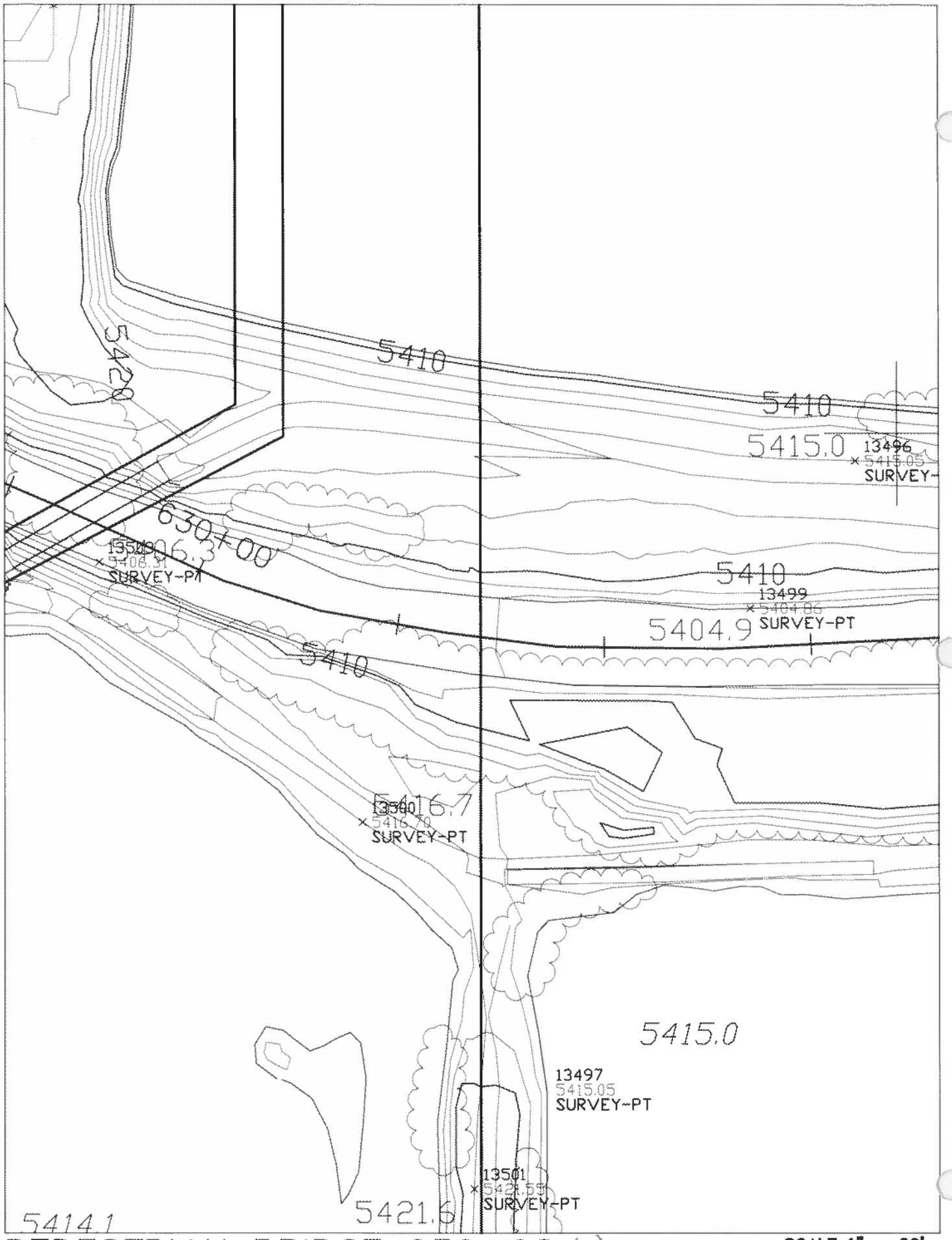
1[illegible] 5418
1065.52 5417.25



PEDESTRIAN BRIDGE 630+68(1)

SCALE 1" = 50'

ADJACENT TO TABOR LAKE. ACCESS FROM PROSPECT LAKE PARK VIA 44TH AVE OR TABOR ST.



PEDESTRIAN BRIDGE 630+68 (2)

SCALE 1" = 60'

ADJACENT TO TABOR LAKE. ACCESS FROM PROSPECT LAKE PARK VIA 44TH AVE OR TABOR ST.

10

FRONTAGE RD
(YOUNGFIELD ST.)

Exhibit D

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 3/8/06

CREW GNA, _____

_____, _____

_____, _____

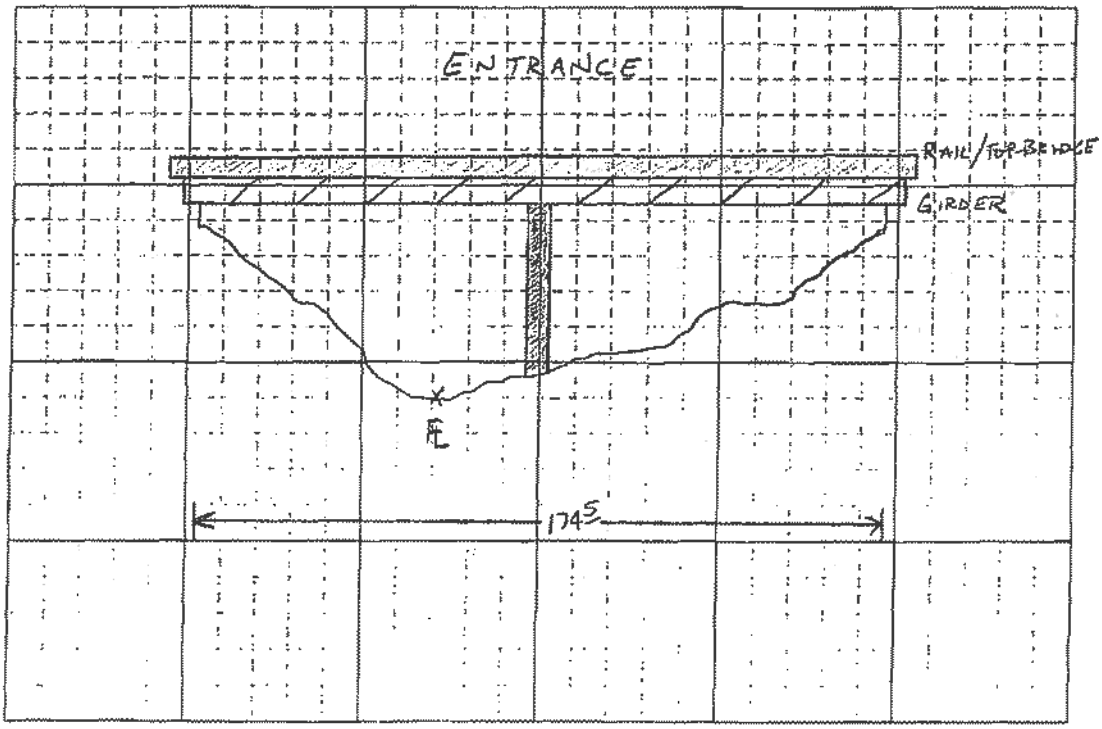
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 49 OF FIELD BOOK NO. 59F

SKETCH

(Plan, Profile, Entrance and Outlet)



10

FRONTAGE RD
(YOUNGSTOWN ST.)

BRIDGE/CULVERT INFORMATION

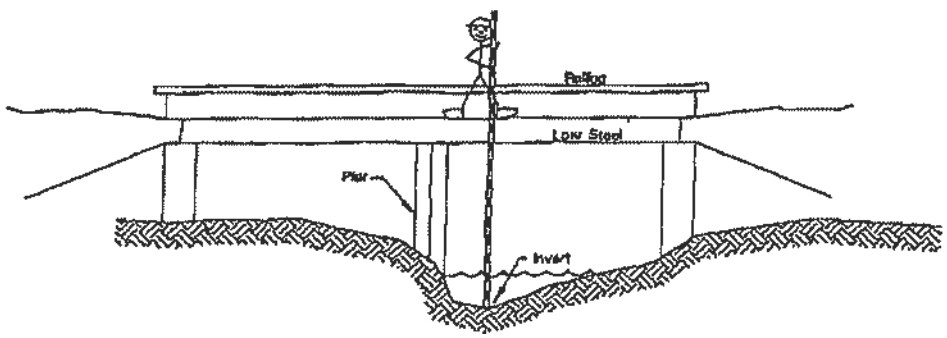
BRIDGE		CULVERT	
Alignment	FRONTAGE RD N-S	Inside Dimensions	
Bridge Opening Width W	174.50	--Rise(or Diameter)	
Bridge Opening Length L	55	--Span	
Piers		Shape	
--Number	1	Material	
--Width	3.5	Invert Elevations	
--Type	SQUARE NOSE & TAIL - NO DIAPHRAGM	--Entrance	
Elevation Low Steel	5440.4	--Outlet	
Elevation Top	5440.6	Length of Culvert	
Bridge Opening Sideslopes	SLOPED RIP RAP	Embankment Sideslopes	
Embankment Sideslopes	"	Road Elevation	
--Entrance	"	Entrance	
--Outlet	SLOPED RIP RAP / DIRT	--Wingwall Angle	
Wingwall Angles 0	90°	--Wingwall Length	
Wingwall Lengths	ENTRANCE = 9' OUTLET = 4'	--End Projection	
Angle of Bridge Skew 0	90°	Outlet	
Deck Elevations	5446.3	--Siltation Depth	
Top of Railing	5440.6	--End Projection	
Invert Elevations			
--Entrance	5418.0		
--Outlet			

REMARKS: CONCRETE GIRDERS

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:

ICON ENGINEERING, INC 8100 S. Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-9019

BY: BDL DATE: 04/24/06 SUBJECT: CL. FMAD SHEET ___ OF ___

CHKD. BY: ___ DATE: ___ JOB NO: ___

FEL. BY: ___ DATE: ___ FILE NO: ___

V/BUNGFIELD STREET

U/S SECTION: 65093

D/S SECTION: 65042

DISTANCE TO DECK: 7

65086

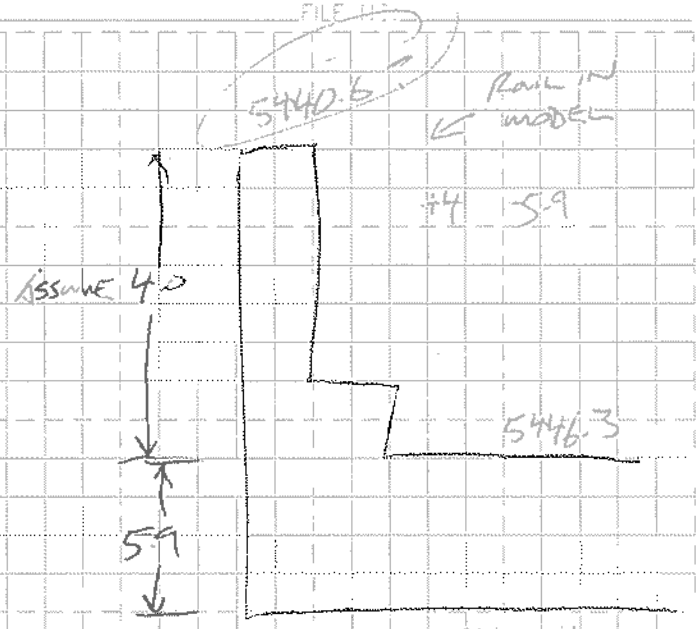
BRIDGE SECTION: 64996

DECK WIDTH: 57 (ALONG ℄)

SKEW ANGLE: 90-90=0

PIER ℄: U/S 766

D/S 755



676 @ 5446.0

851 @ 5447.1

670 @ 5446.6

844 @ 5447.1

U/S DECK

254	5444.8	1584	5447.6
392	5444.6	2058	5449.3
451	5444.8	2390	5450.0
509	5445.1	2392	5456.0
568	5445.6		
676	5446		
676	5450/5440.1		
851	5450.1/5441.2		
851	5447.1		
933	5447.1	0	5445.6
992	5446.6	44	5446.4
1035	5446.6	166	5445.1
1106	5446.3		
1162	5446.6		
1243	5446.6		
1315	5446.6		
1448	5446.8		
1559	5447.1		

D/S DECK

0	5445.6	1238	5446.6
45	5446.4	1312	5446.6
169	5445.1	1407	5446.8
262	5444.1	1445	5446.8
390	5444.6	1558	5447.1
448	5444.8	1717	5447.3
506	5445.1	1815	5447.6
567	5445.6	2053	5449.3
670	5446	2127	5450.6
670	5450/5440.1	2215	5452
844	5451.1/5441.2		
844	5447.1		
930	5447.1		
991	5446.6		
1037	5446.6		
1102	5446.3		
1159	5446.6		

Frontage Road

(Young Field St.)

9

I-70 EASTBOUND

Exhibit D

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT Clear Creek DATE 3/8/06

CREW GNA, _____

_____, _____

_____, _____

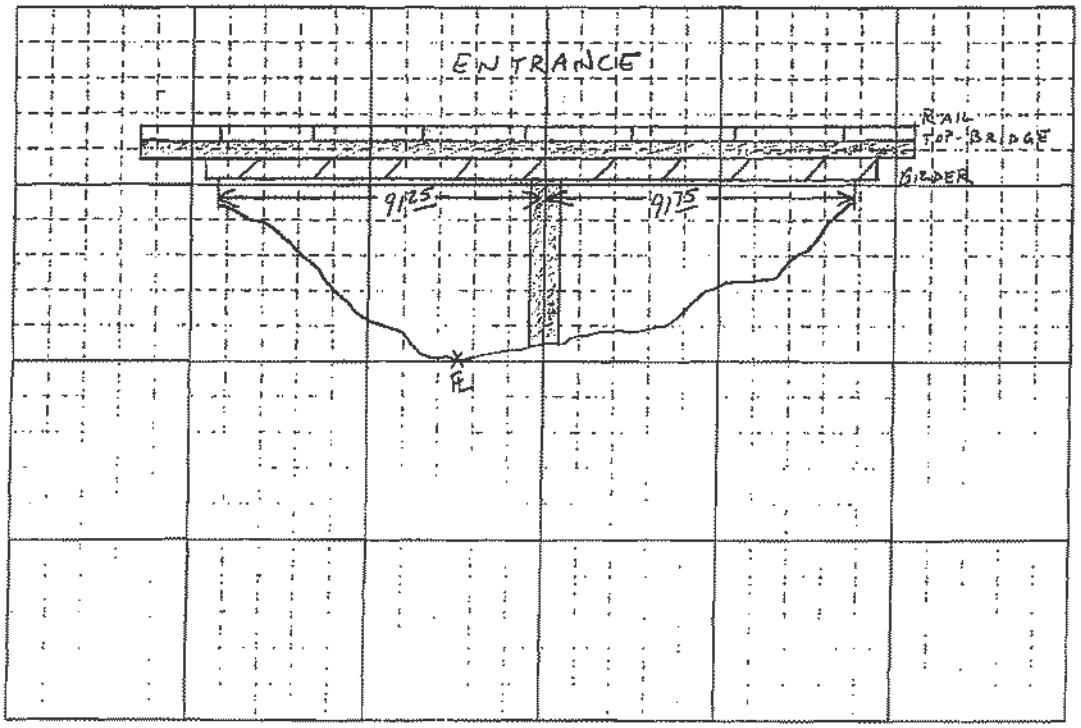
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 49 OF FIELD BOOK NO. 59F

SKETCH

(Plan, Profile, Entrance and Outlet)



9

I-70 EASTBOUND

BRIDGE/CULVERT INFORMATION

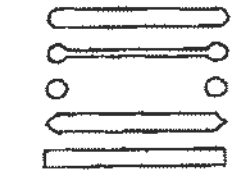
BRIDGE		CULVERT	
Alignment	I-70 EASTBOUND N-S	Inside Dimensions	
Bridge Opening Width W	183'	--Rise(or Diameter)	
Bridge Opening Length L	54'	--Span	
Piers		Shape	
--Number	1	Material	
--Width	2'-4' TAPERED	Invert Elevations	
--Type	90° TRIANGULAR NOSE + TAIL	--Entrance	
Elevation Low Steel	5442.9	--Outlet	
Elevation Top	5449.0	Length of Culvert	
Bridge Opening Sideslopes	SLOPED RIPRAP	Embankment Sideslopes	
Embankment Sideslopes	"	Road Elevation	
--Entrance	"	Entrance	
--Outlet	"	--Wingwall Angle	
Wingwall Angles 0	—	--Wingwall Length	
Wingwall Lengths	—	--End Projection	
Angle of Bridge Skew 0	80°	Outlet	
Deck Elevations	5448.5	--Siltation Depth	
Top of Railing	5451.0	--End Projection	
Invert Elevations			
--Entrance	5418.4		
--Outlet	—		

REMARKS: CONCRETE GIRDERS

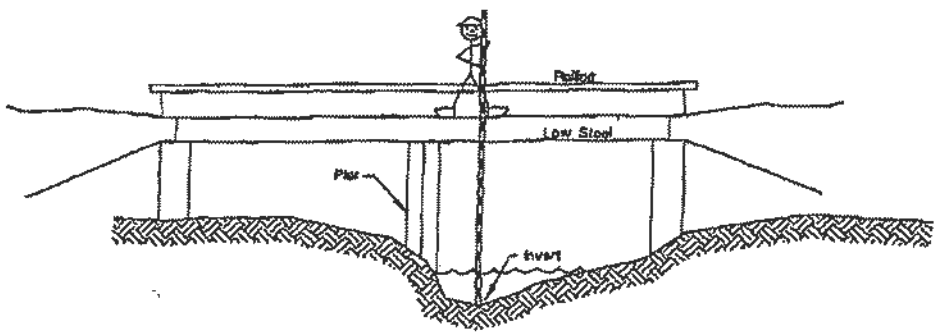
GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



ICON ENGINEERING, INC 8100 S. Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-9019

BY: TSJL DATE: 04/24/06 SUBJECT: C.C. FWD SHEET OF

CHKD. BY: DATE: JOB NO.

P.E. BY: DATE: FILE NO.

I-70 EAST BOUND

W/S SECTION 65213

D/S SECTION : 65141

DISTANCE TO DECK : 9

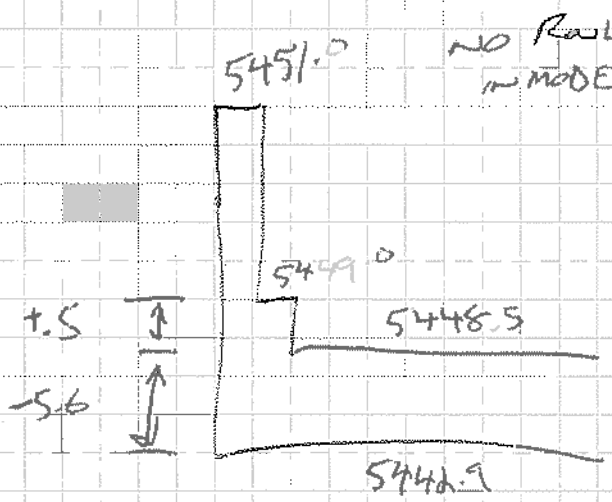
BRIDGE SECTION : 65204

DECK WIDTH : 54

SKEW ANGLE NONE

PIER CL : W/S : 798

D/S : 767



707 @ 5448.3
890 @ 5448.5

W/S DECK

115	5447.1
441	5448
707	5448.3
707	5448.8 / 5442.7
890	5449.0 / 5442.9
890	5448.5
963	5448.8
1000	5449.1
1071	5449.1
1118	5449.1
1189	5449.3
1276	5449.3
1350	5449.6

696 @ 5448.3
879 @ 5448.5

D/S DECK

115	5447.1
439	5448
696	5448.3
696	5448.8 / 5442.7
879	5449.0 / 5442.9
879	5448.5
961	5448.8
1000	5449.1
1068	5449.1
1188	5449.3
1281	5449.3
1348	5449.6
1416	5450
1583	5452
1726	5454

I-70 Eastbound

8

I-70 WESTBOUND

Exhibit D

FORM NO._____ PAGE___ OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 3-8-06

CREW GNA _____, _____

_____, _____

_____, _____

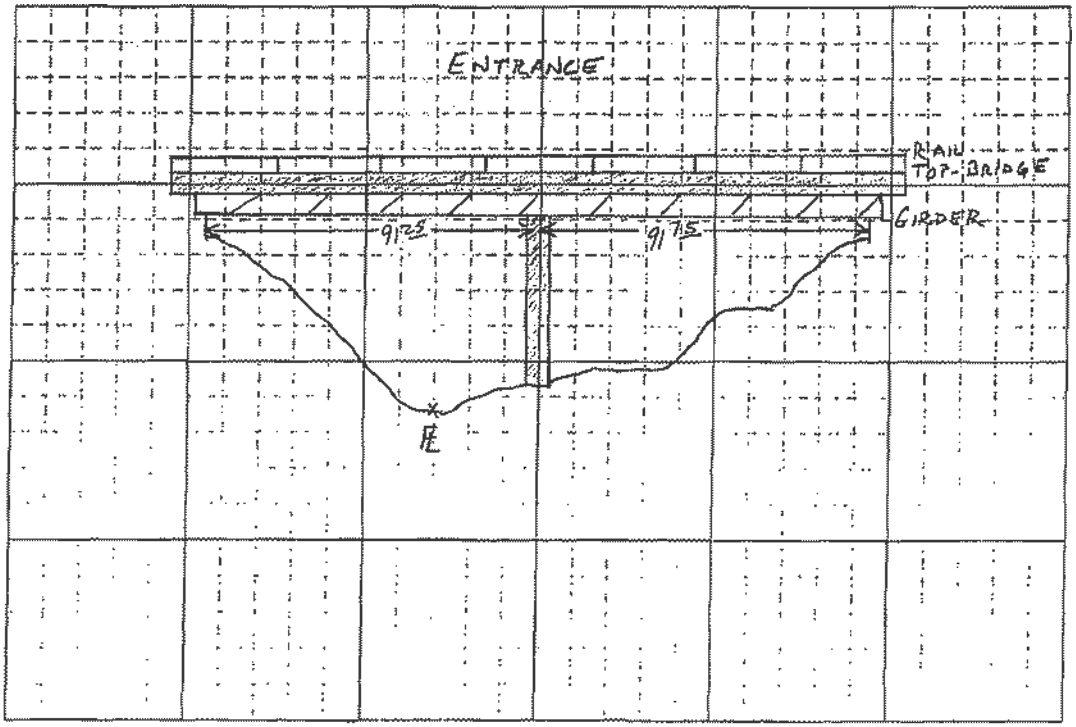
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 48 OF FIELD BOOK NO. 59F

SKETCH

(Plan, Profile, Entrance and Outlet)



8

I-70 WESTBOUND

BRIDGE/CULVERT INFORMATION

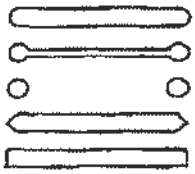
BRIDGE		CULVERT	
Alignment	I-70 WESTBOUND	Inside Dimensions	
Bridge Opening Width W	183'	--Rise(or Diameter)	
Bridge Opening Length L	54'	--Span	
Piers		Shape	
--Number	1	Material	
--Width	2'-4' TAPERED	Invert Elevations	
--Type	90° TRIANGULAR NOSE & TAIL	--Entrance	
Elevation Low Steel	5442.13	--Outlet	
Elevation Top	5448.14	Length of Culvert	
Bridge Opening Sideslopes	SLOPED RIP RAP	Embankment Sideslopes	
Embankment Sideslopes	"	Road Elevation	
--Entrance	"	Entrance	
--Outlet	"	--Wingwall Angle	
Wingwall Angles 0	—	--Wingwall Length	
Wingwall Lengths	—	--End Projection	
Angle of Bridge Skew 0	80°	Outlet	
Deck Elevations	5448.4	--Siltation Depth	
Top of Railing	5450.24	--End Projection	
Invert Elevations			
--Entrance	5418.60		
--Outlet			

REMARKS: CONCRETE GIRDERS

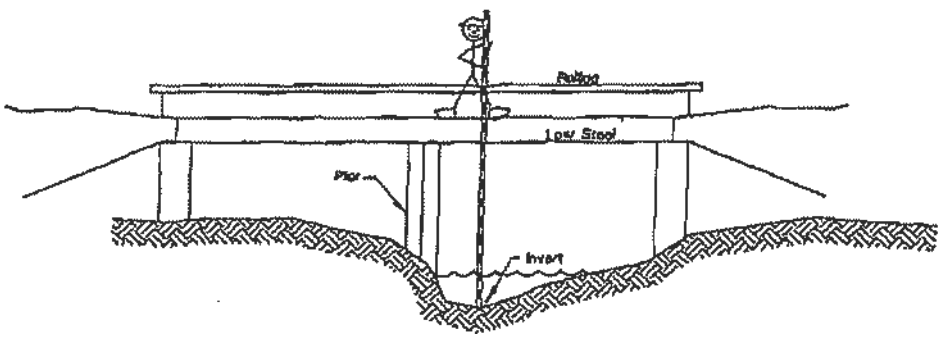
GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



ICON ENGINEERING, INC. 8100 S. Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY: BJL DATE: 04/24/06 SUBJECT: C.C. FHAD SHEET ___ OF ___
CHKD. BY: ___ DATE: ___ JOB NO.: ___
REV. BY: ___ DATE: ___ FILE NO.: ___

I-70 WEST BOUND

W/S SECTION: 65315

D/S SECTION: 65248

DISTANCE TO DECK: 10

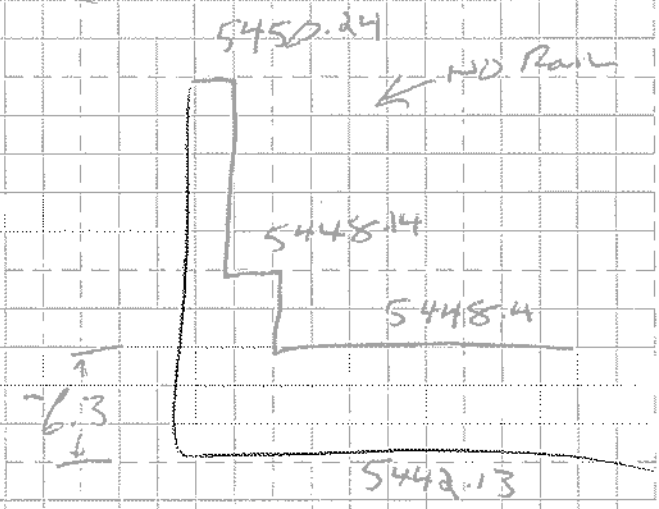
BRIDGE SECTION: 65305

DECK WIDTH: 54

SKEW ANGLE

PIER CL W/S: 809 D/S: 795

5442.5 ↓ 5421



717 @ 5448.3
900 @ 5448.8

703 @ 5448.3
886 @ 5448.8

W/S DECK

175	5449.3
299	5448.6
369	5448.6
424	5448.3
544	5448.3
656	5448.3
717	5448.3
717	5448.3 / 5442.0
900	5448.8 / 5442.5
900	5448.8
944	5448.8
995	5448.8
1071	5449.1
1185	5449.3
1224	5449.3
1306	5449.6
1513	5451.1
1686	5454
1914	5460
1985	5462

D/S DECK

175	5449.3
298	5448.6
366	5448.6
544	5448.3
654	5448.3
703	5448.3
703	5448.3 / 5442.0
886	5448.8 / 5442.5
886	5448.8
944	5448.8
995	5448.8
1072	5449.1
1184	5449.3
1224	5449.3
1305	5449.6
1365	5450

I-70 Westbound (photo 1)

I-70 Westbound Crossing

Pedestrian Bridge 682+88

ICON ENGINEERING, INC. 8100 S. Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY _____ DATE _____ SUBJECT _____ SHEET ___ OF ___
CHK'D. BY _____ DATE _____ JOB NO. _____
FLD. BY _____ DATE _____ FILE NO. _____

Bridge Name: 6824 66 PEDESTRIAN

Bridge Opening Width W: 186'

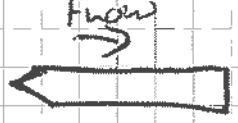
Bridge Opening Length L: 134'

U/S: 925, 989

Piers ~~NONE~~

D/S: 927, 988

Number: 2
Width: 2'
Type: CONCRETE



Elevation Bench Mark 1: 5475.38
Rod Height on BM 1: 5.48

Elevation Bench Mark 2: NOT AVAILABLE
Rod Height on BM 2:

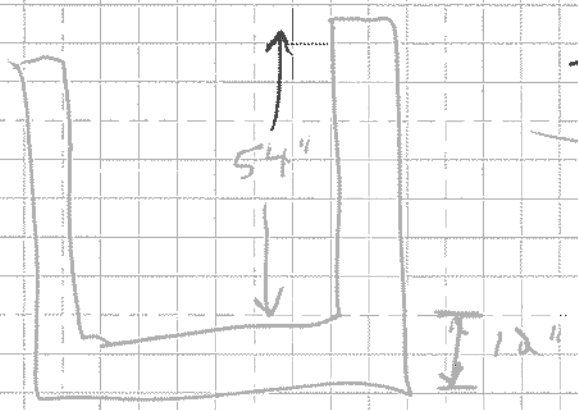
Instrument Elevation: → 5480.86

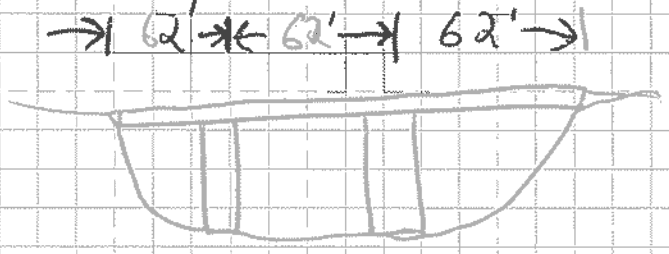
	Left	Center	Right
Elevation Top of Rail:	5479.65	5479.98	5479.47
Elevation Top of Bridge:			
Elevation Roadway Deck:	(5.71) 5475.15	(5.35) 5475.48	(5.89) 5474.97
Elevation Low Chord:	5474.15	5474.48	5473.97

Elevation Invert:

Pictures: 26 → 30

Sketch:





W/S DECK

868 5475.15

868 5479.65 / 5474.15

959 5479.98 / 5474.48

1050 5479.47 / 5473.97

1050 5474.97

D/S DECK

867 5475.15

867

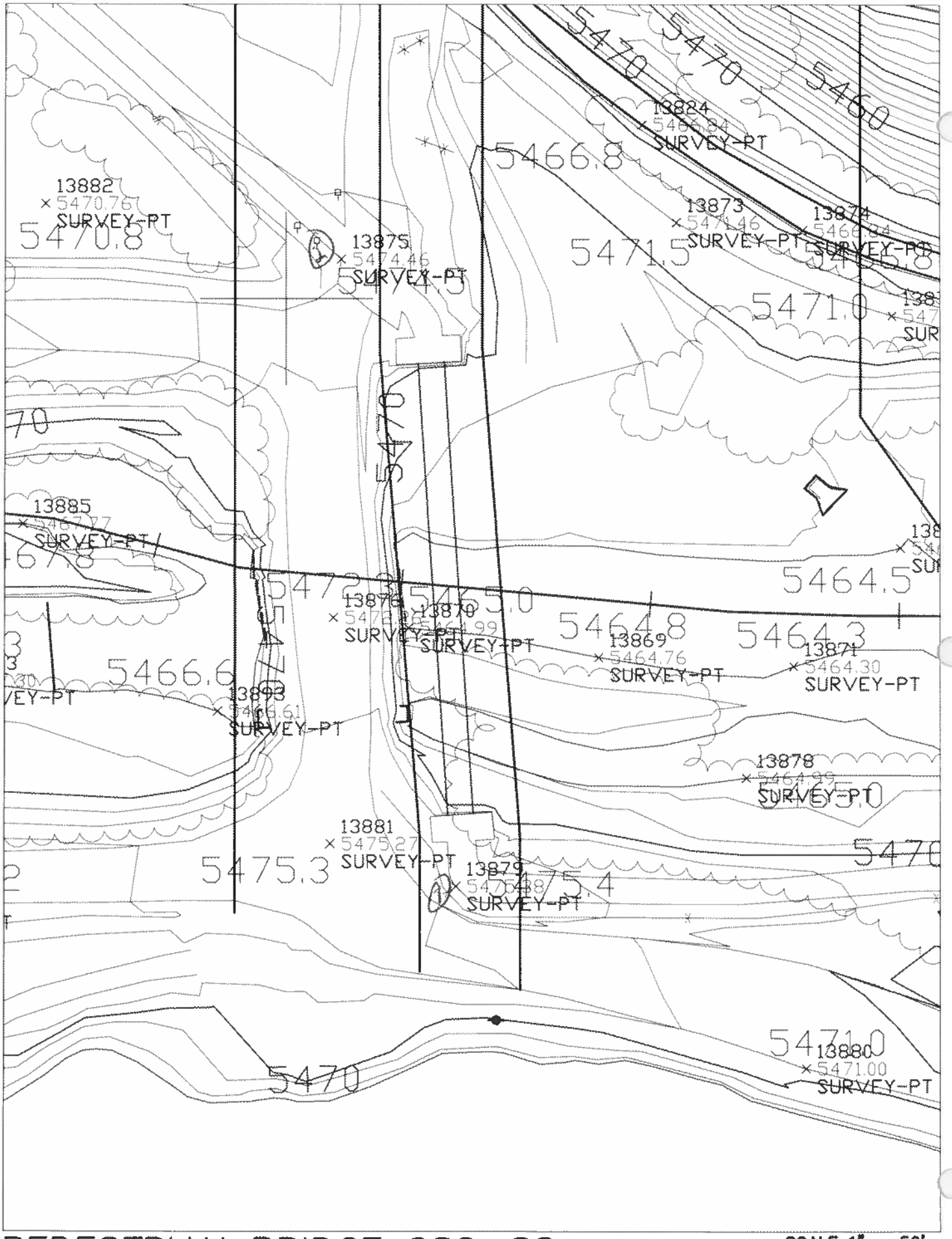
957

1049

1049

~~1063.48 5473.52~~

1066.47 5475.15



PEDESTRIAN BRIDGE 682+88

SCALE 1" = 50'

UPSTREAM OF I-70. ACCESS VIA PEDESTRIAN PATH FROM PARKING LOT OFF YOUNGFIELD ST.

7

GRAVEL RD
(WEST OF I-70)
TEMPORARY CONST. RD

Exhibit D

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 3-7-06

CREW GNA, _____

_____, _____

_____, _____

PHOTOS: ENTRANCE_____ OUTLET_____

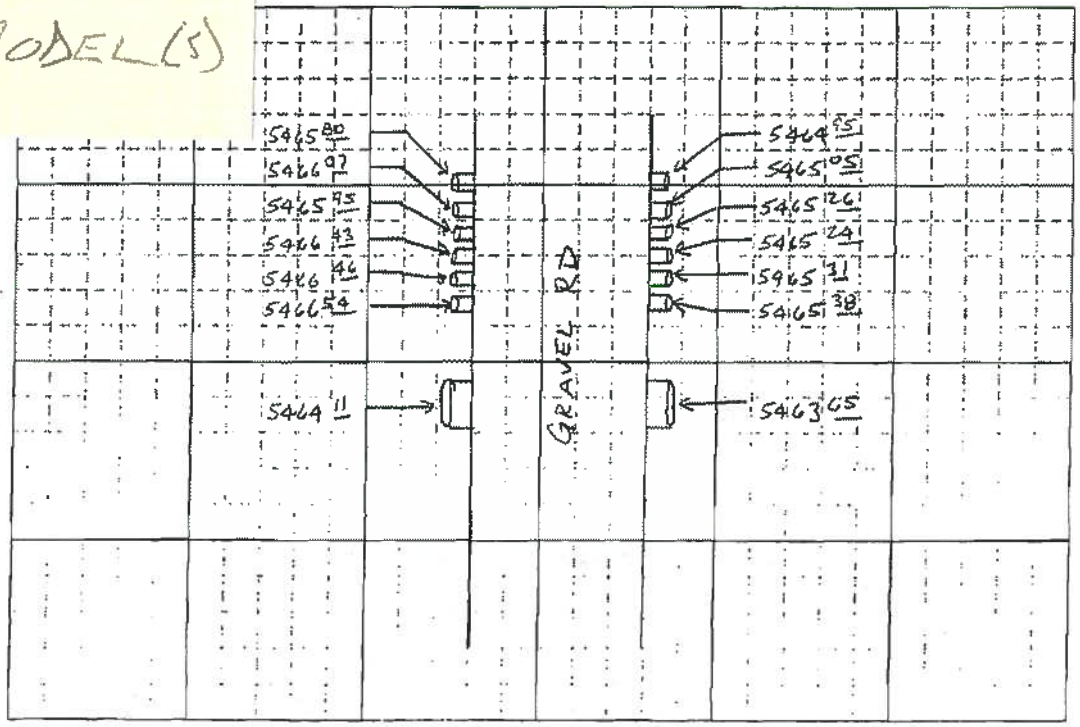
(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 47 OF FIELD BOOK NO. 59F

TEMP. ⇒ NOT IN MODEL(S)

SKETCH

(Plan, Profile, Entrance and Outlet)



7

GRAVEL RD
(WEST OF I-70)

BRIDGE/CULVERT INFORMATION

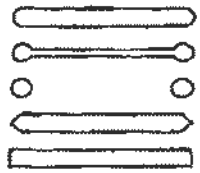
BRIDGE		CULVERT	
Alignment	N-S GRAVEL RD	Inside Dimensions	
Bridge Opening Width W		--Rise(or Diameter)	36"RCP x6 / 8'CMP
Bridge Opening Length L		--Span	—
Piers		Shape	CIRCULAR
--Number		Material	RCP / CMP
--Width		Invert Elevations	
--Type		--Entrance	SEE SKETCH
Elevation Low Steel		--Outlet	"
Elevation Top		Length of Culvert	RCP: 58' CMP: 60'
Bridge Opening Sideslopes		Embankment Sideslopes	—
Embankment Sideslopes		Road Elevation	5467±
--Entrance		Entrance	
--Outlet		--Wingwall Angle	—
Wingwall Angles 0		--Wingwall Length	—
Wingwall Lengths		--End Projection	1±
Angle of Bridge Skew 0		Outlet	
Deck Elevations		--Siltation Depth	0±
Top of Railing		--End Projection	2±
Invert Elevations			
--Entrance			
--Outlet			

REMARKS: _____

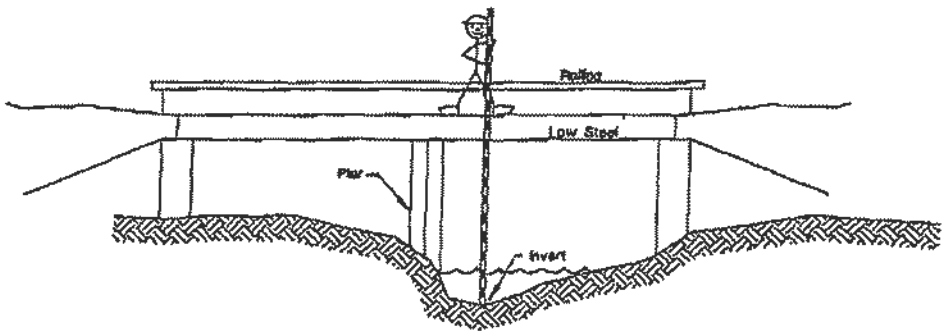
GENERAL INFORMATION

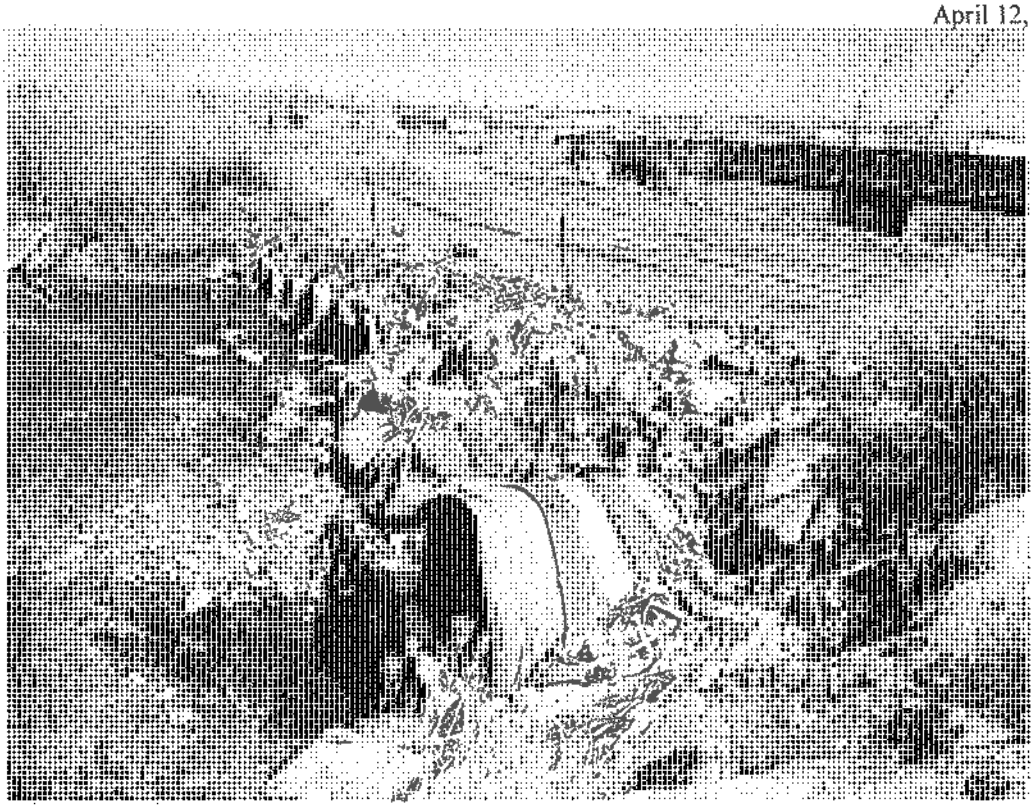
Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:





Culvert Crossing

Railroad Bridge 734+74

ICON ENGINEERING, INC. 8100 S Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY: _____ DATE _____ SUBJECT _____ SHEET ___ OF _____
CHK'D BY: _____ DATE _____ JOB NO. _____
REV'D BY: _____ DATE _____ FILE NO. _____

Bridge Name: 734 + 74 (RAILROAD)

Bridge Opening Width W: 173 (CREEK

Bridge Opening Length L:

Piers

w/s: 711
d/s: 723

Number: 1
Width: 4'
Type:

Elevation Bench Mark 1: 5524.58 **Rod Height on BM 1:** 5.00
Elevation Bench Mark 2: 5525.51 **Rod Height on BM 2:** 4.59

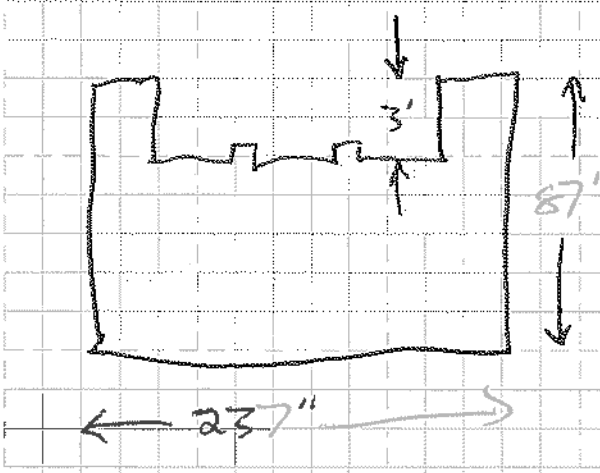
Instrument Elevation: ① 5529.58 / ② 5530.03 Δ: 0.45 → 5529.81

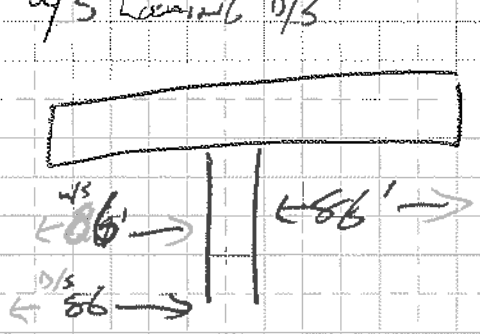
	Left	Center	Right
Elevation Top of Rail:	5528.58	5529.39	5529.69
Elevation Top of Bridge:			
Elevation Roadway Deck:	(4.23) 5525.58	(3.42) 5526.39	(3.12) 5526.69
Elevation Low Chord:	5521.93	5522.14	5523.44

Elevation Invert:

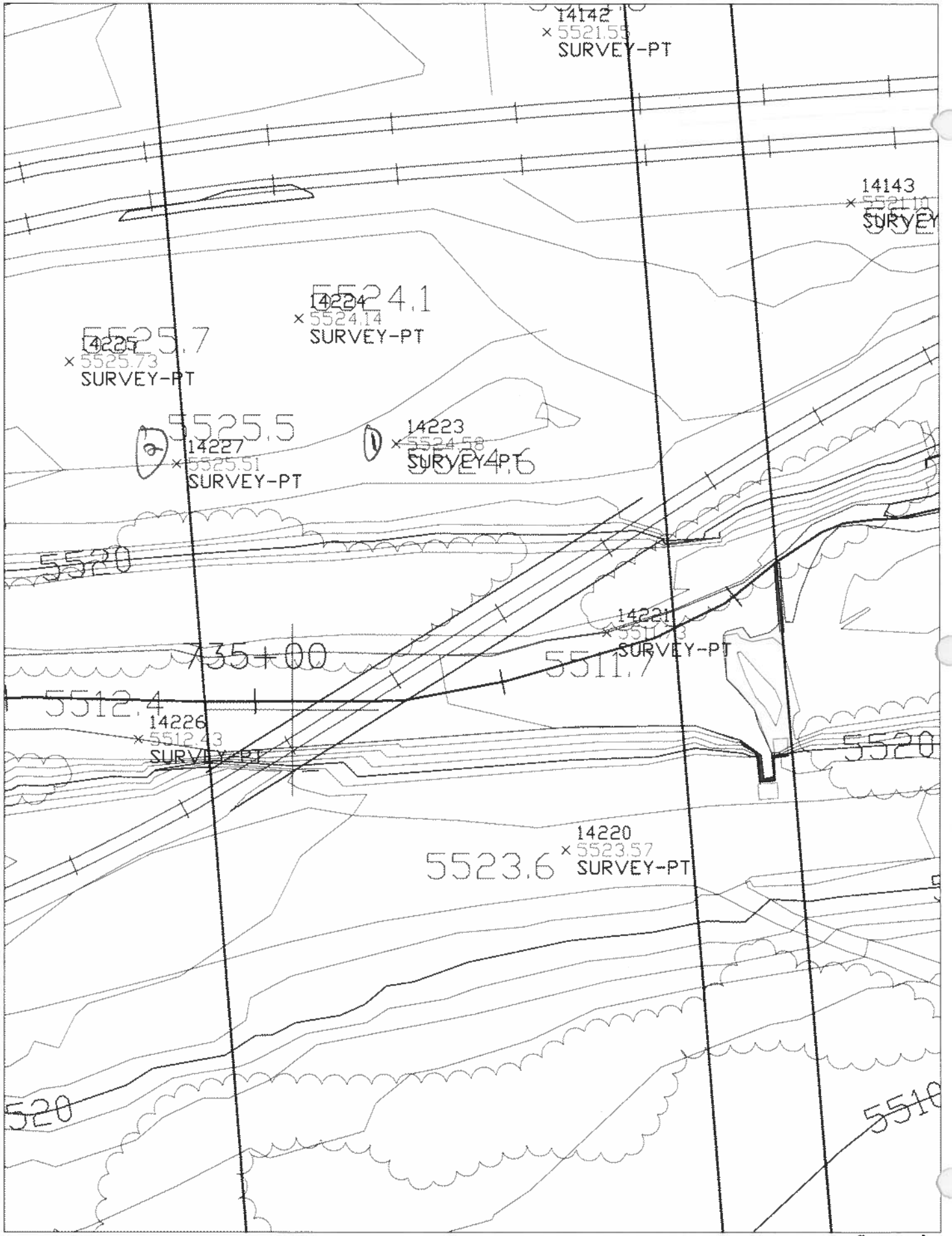
Pictures: 31 → 35

Sketch:





n/s Dec		D/s Dec
666	5528.58 / 5521.33	670
779	5529.69 / 5522.44	752



RAILROAD BRIDGE 734+74

SCALE 1" = 50'

DOWNSTREAM OF McINTYRE. ACCESS FROM DIRT ROAD OFF McINTYRE SOUTH OF CLEAR CREEK

OR ON NORTH VIA FRONTAGE ROAD (BEHIND SILOS)

6

McINTYRE RD

Exhibit D

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT Clear Creek DATE 3-9-06

CREW GNA

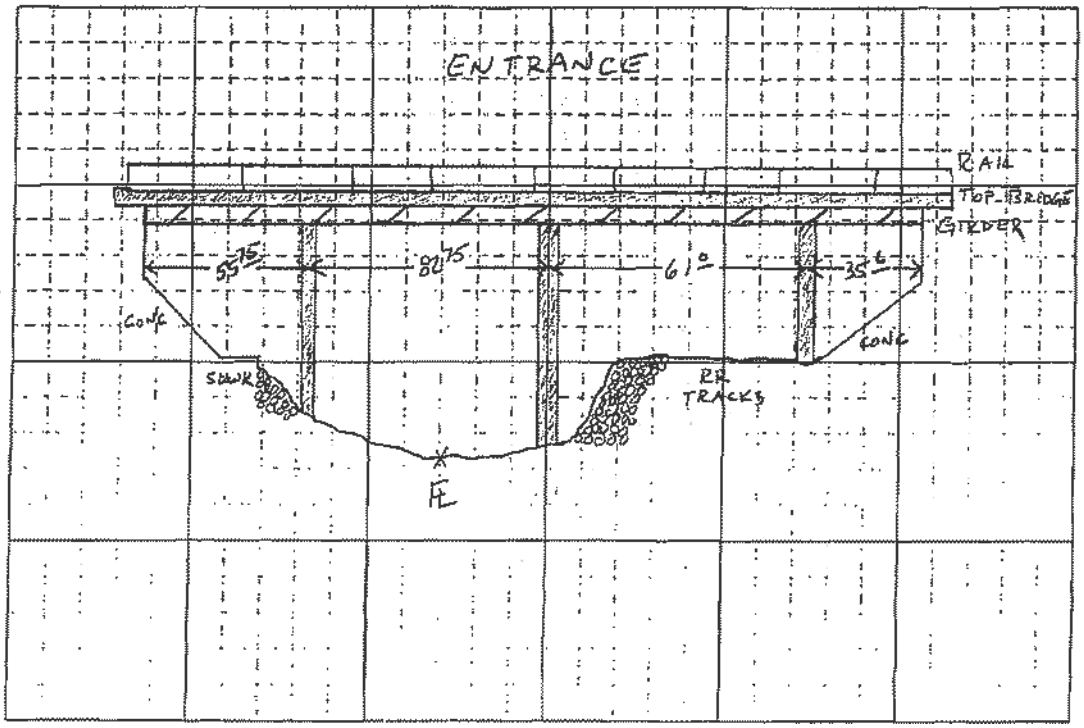
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



6

McINTYRE RD

BRIDGE/CULVERT INFORMATION

BRIDGE		CULVERT	
Alignment	McINTYRE RD	Inside Dimensions	
Bridge Opening Width W	235.20	--Rise(or Diameter)	
Bridge Opening Length L	83.4	--Span	
Piers		Shape	
--Number	3	Material	
--Width	3'	Invert Elevations	
--Type	6 CYLINDER No DIAPHRAGM	--Entrance	
Elevation Low Steel	5552.10	--Outlet	
Elevation Top	5556.30	Length of Culvert	
Bridge Opening Sideslopes	SLOPED CONC / RIP RAP / SIDEWALK	Embankment Sideslopes	
Embankment Sideslopes	RIP RAP	Road Elevation	
--Entrance	"	Entrance	
--Outlet	"	--Wingwall Angle	
Wingwall Angles 0	—	--Wingwall Length	
Wingwall Lengths	—	--End Projection	
Angle of Bridge Skew 0	90°	Outlet	
Deck Elevations	5556.2	--Siltation Depth	
Top of Railing	5558.20	--End Projection	
Invert Elevations			
--Entrance	5517.20		
--Outlet	—		

REMARKS: _____

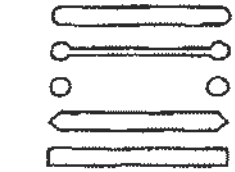
GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.

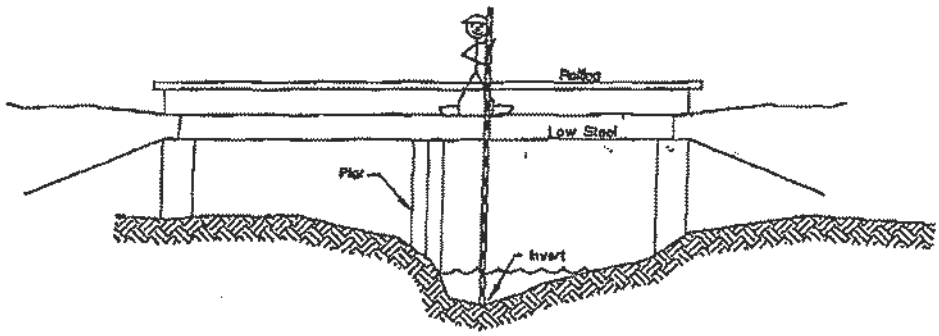
Culvert Shapes: Arch, Circular, Elliptical, Rectangular

Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



ICON ENGINEERING, INC. 8100 S. Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY: BJL DATE: 4/27/06 SUBJECT: CL FMD SHEET ___ OF ___

CHKD. BY: ___ DATE: ___ JOB NO. ___

PE. BY: ___ DATE: ___ FILE NO. ___

McINTYRE ST

W/S SECTION: 74356

D/S SECTION: 74256

DISTANCE TO DECK: 9

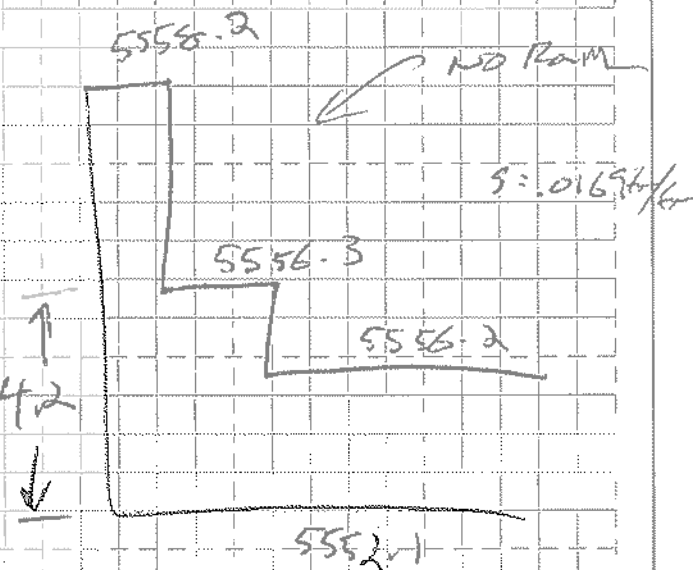
DECK SECTION: 74347

DECK WIDTH: 83'

NO SKEW

PIER CL: W/S: 594, 677, 735

D/S: 600, 683, 744



W/S DECK

510 @ 5558.25

538 5558.5

538 5558.5 / 5554.3

774 5554.5 / 5550.3

774 5554.5

792.25 5552.77

538 @ 5558.5

774 @ 5554.5

D/S DECK

529 5558.25

544

544 5558.5

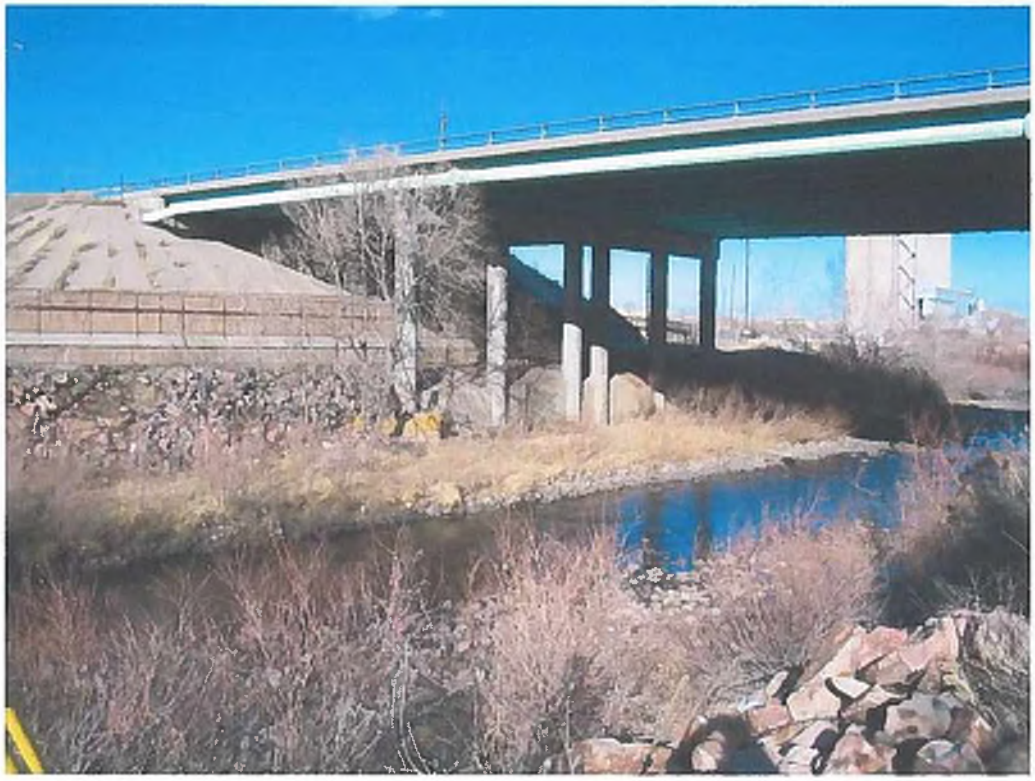
779

779

843.35 5552.0

544 @ 5558.5

779 @ 5554.5



McIntyre Street (photos 1, 2)

5

700 EAST
COORS PLANT

Exhibit D

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 3-9-06

CREW GNA, _____

_____, _____

_____, _____

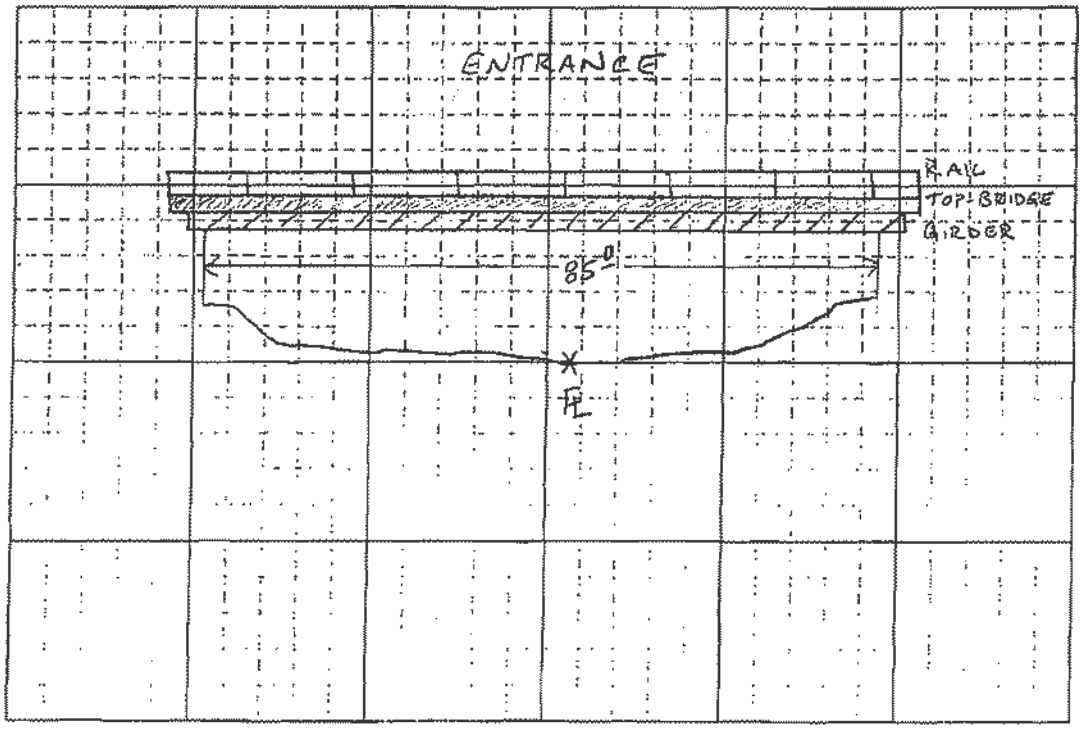
PHOTOS: ENTRANCE / OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 52 OF FIELD BOOK NO. 59F

SKETCH

(Plan, Profile, Entrance and Outlet)



5

700 EAST
COORS PLANT

BRIDGE/CULVERT INFORMATION

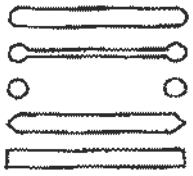
BRIDGE		CULVERT	
Alignment	700 EAST	Inside Dimensions	
Bridge Opening Width W	85'	--Rise(or Diameter)	
Bridge Opening Length L	41'	--Span	
Piers		Shape	
--Number	0	Material	
--Width	-	Invert Elevations	
--Type	-	--Entrance	
Elevation Low Steel	5609.20	--Outlet	
Elevation Top	5615.15	Length of Culvert	
Bridge Opening Sideslopes	VERT. WALL / RIP RAP	Embankment Sideslopes	
Embankment Sideslopes	RIP RAP	Road Elevation	
--Entrance	"	Entrance	
--Outlet	"	--Wingwall Angle	
Wingwall Angles 0	45°	--Wingwall Length	
Wingwall Lengths	8.5	--End Projection	
Angle of Bridge Skew 0	90°	Outlet	
Deck Elevations	5614.70	--Siltation Depth	
Top of Railing	5618.30	--End Projection	
Invert Elevations			
--Entrance	5597.90		
--Outlet	—		

REMARKS: _____

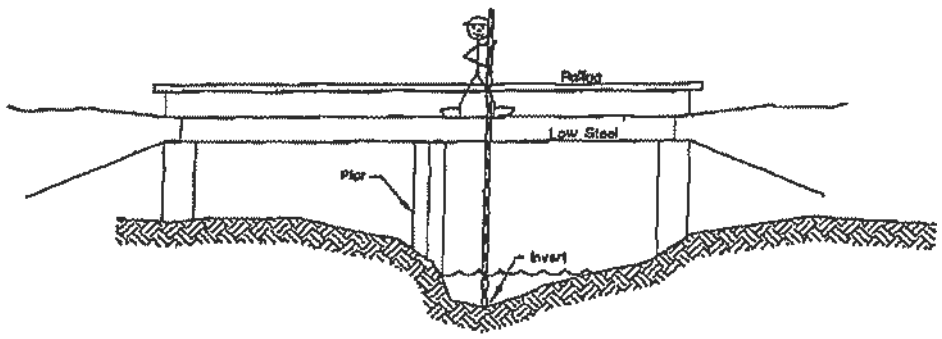
GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



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BY TJL DATE 05/01/08 SUBJECT C.C. FMD SHEET ___ OF ___

CHK'D BY ___ DATE ___ JOB NO. ___

PE'D BY ___ DATE ___ FILE NO. ___

700 East Cooks Plant

U/S SECTION: 53367

D/S SECTION: 53300

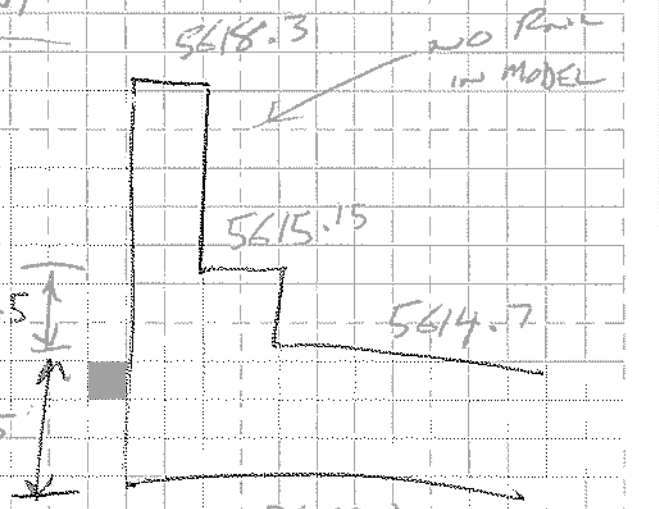
DISTANCE TO DECK: 43

BRIDGE SECTION: 53354

DECK WIDTH: 40

NO SKEW

NO PIER



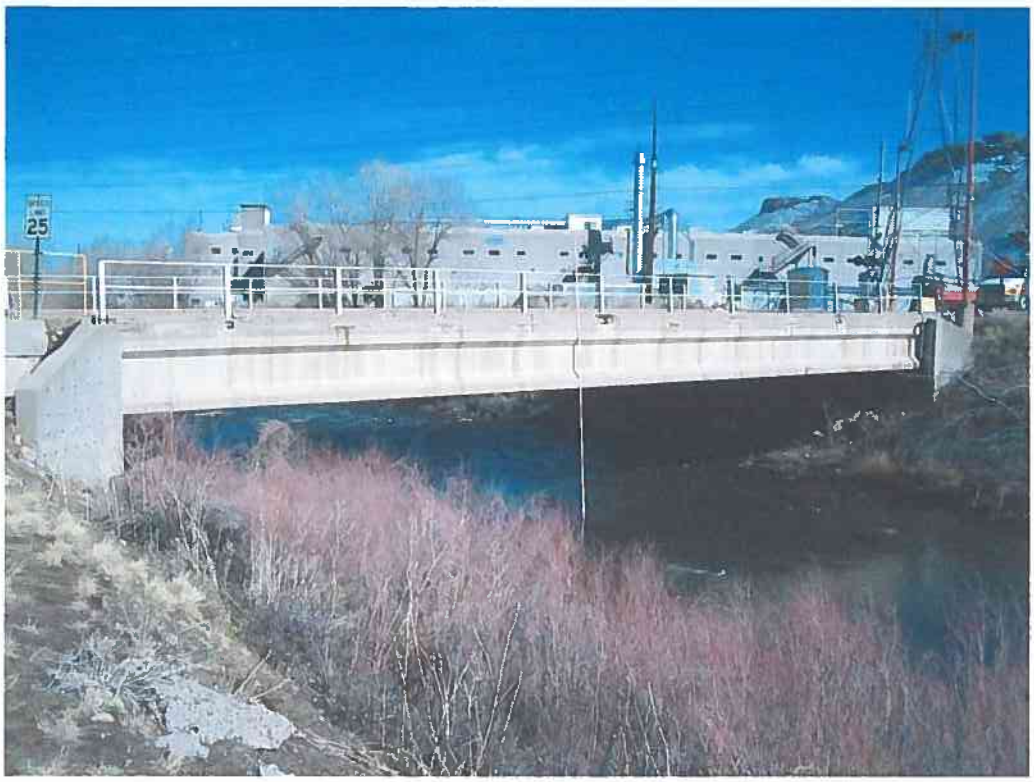
459 @ 5614
544 @ 5616.45

U/S Deck

346	5613.3
354	5613.4
446	5614.0
459	5614
459	5614.45 / 5608.5
544	5616.45 / 5610.5
544	5616
552	5616.4
673	5617.1
766	5617.1
851	5616.6
885	5618

D/S Deck

333	5613.3
351	5613.4
437	5614.0
447	5614.0
447	5614.45 / 5608.5
572	5616.45 / 5610.5
532	5616
575	5616.4
665	5617.1
779	5617.1
859	5616.6
915	5618



700 East (photos 1, 2)

ICON
ENGINEERING, INC 8100 S. Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-1019

BY: BJL DATE: 06/28/06 SUBJECT: C.L. FIELD SHEET ___ OF ___
CHK'D. BY: ___ DATE: ___ JOB NO: ___
REV. BY: ___ DATE: ___ FILE NO: ___

RAILROAD BRIDGE 857+42

W/S SECTION: 85789

D/S SECTION: 85671

DISTANCE TO DECK: 47

BRIDGE SECTION: 8574.2

DECK WIDTH: 33 (ALONG CL)

SKEW = 0

PIER: NO

MIN WEIR
5632.18

470 @ 5636.67
569 @ 5577.74
W/S DECK

475 @ 5636.67
562 @ 5633.77
D/S DECK

480	5636.67	/ 5631.67
523	5635.20	/ 5630.20
569	5633.77	/ 5628.77

475	5636.67	/ 5631.67
522	5635.20	/ 5630.2
562	5633.77	/ 5625.77

S5789 100-YR 5637.70 w/ BRIDGE

Railroad Bridge 857+42

ICON ENGINEERING, INC. 8100 S Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-1019

BY: _____ DATE: _____ SUBJECT: _____ SHEET: ___ OF: ___
CHKD. BY: _____ DATE: _____ JOB NO.: _____
PE... BY: _____ DATE: _____ FILE NO.: _____

Bridge Name: 857+42 RAILROAD

Bridge Opening Width W: 127'

Bridge Opening Length L: 22.5

Piers

Number: NONE
Width:
Type:

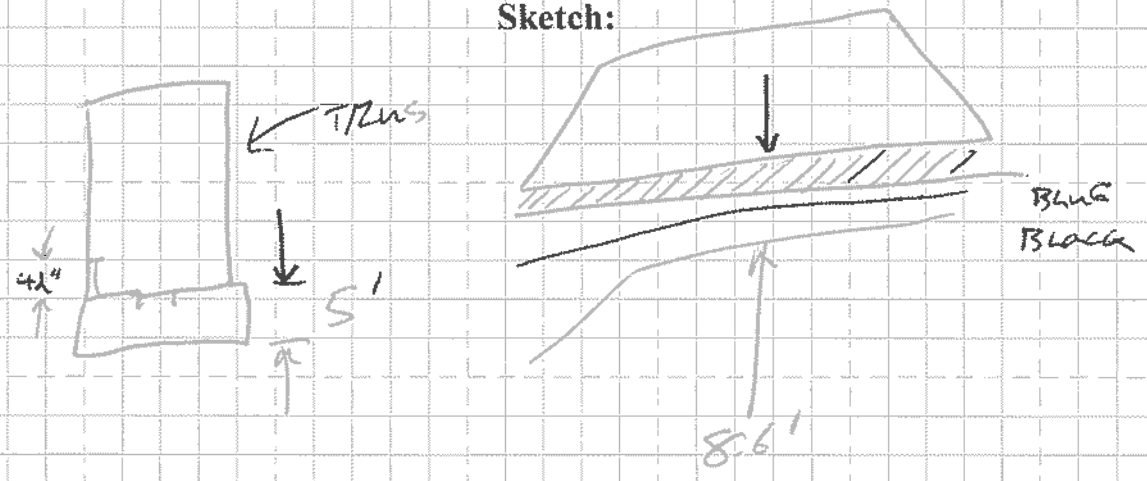
Elevation Bench Mark 1: 5637.8 **Rod Height on BM 1:** 0.42
Elevation Bench Mark 2: 5636.5 **Rod Height on BM 2:** 0.06

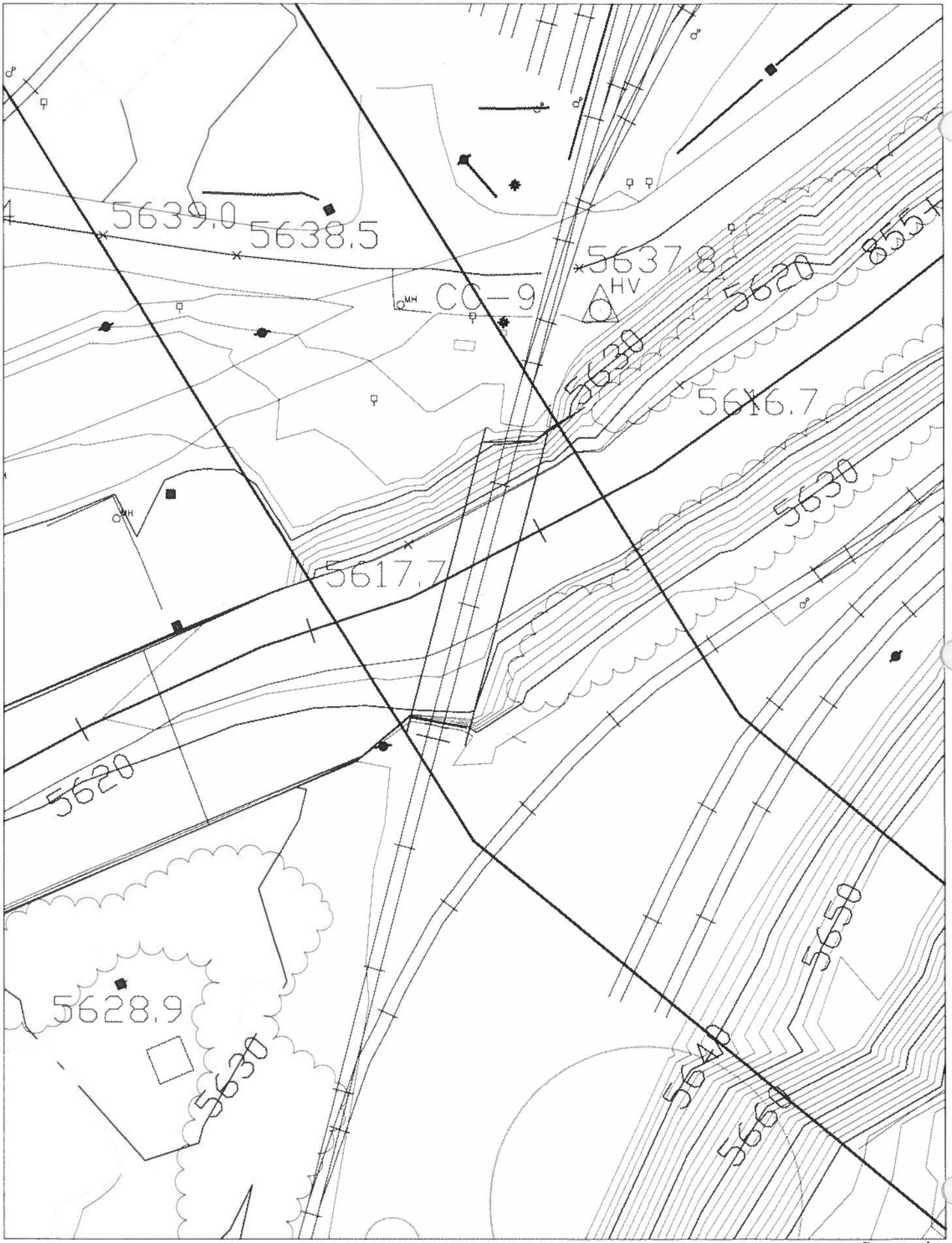
Instrument Elevation: @5638.22 / @5638.56 Δ=.34 → 5638.77

	Left	Center	Right
Elevation Top of Rail:			
Elevation Top of Bridge:			
Elevation Roadway Deck:	(1.72) 5636.47	(3.19) 5635.12	(4.62) 5633.77
Elevation Low Chord:			
Elevation Invert:			

Pictures: 36

Sketch:



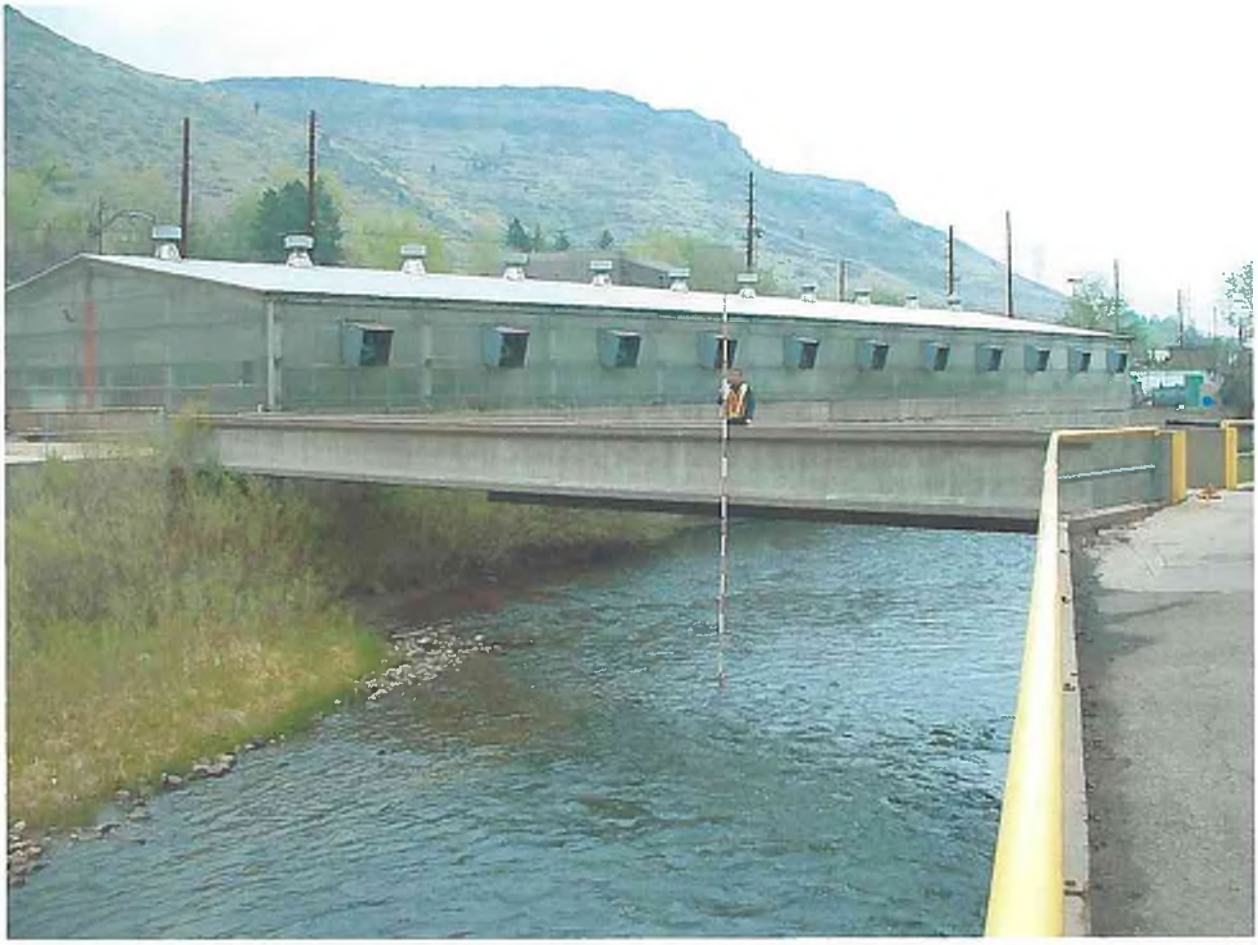


RAILROAD BRIDGE 857+42

SCALE 1" = 50'

UPSTREAM OF 700 EAST. ACCESS FROM COORS NORTH SERVICE ROAD OFF McINTYRE

Pedestrian Bridge 860+74



ICON ENGINEERING, INC 8100 S Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-1019

BY: _____ DATE _____ SUBJECT _____ SHEET ___ OF ___
CHK'D BY _____ DATE _____ JOB NO. _____
PE'D BY: _____ DATE _____ FILE NO. _____

Bridge Name: 860+74 (PEDESTRIAN)

Bridge Opening Width W: 76'

Bridge Opening Length L: 101'

Piers

Number:
Width: NONE
Type:

Elevation Bench Mark 1: SEE PREVIOUS **Rod Height on BM 1:**
Elevation Bench Mark 2: **Rod Height on BM 2:**

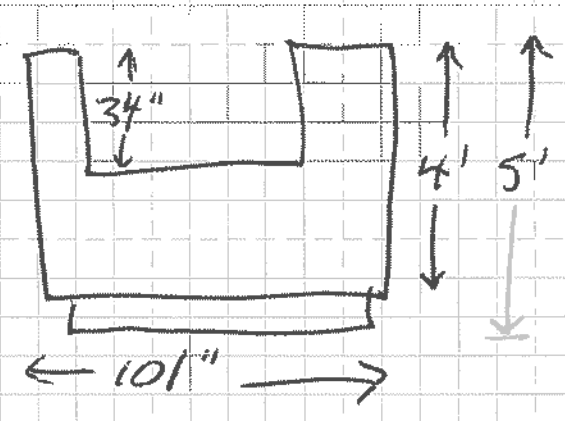
Instrument Elevation: SAME AS PREVIOUS → 5638.39

	Left	Center	Right
Elevation Top of Rail:	5633.37	5633.21	5633.42
Elevation Top of Bridge:			
Elevation Roadway Deck:	(7.85) 5630.54	(8.01) 5630.38	(7.80) 5630.59
Elevation Low Chord:	5628.37	5628.21	5628.42

Elevation Invert:

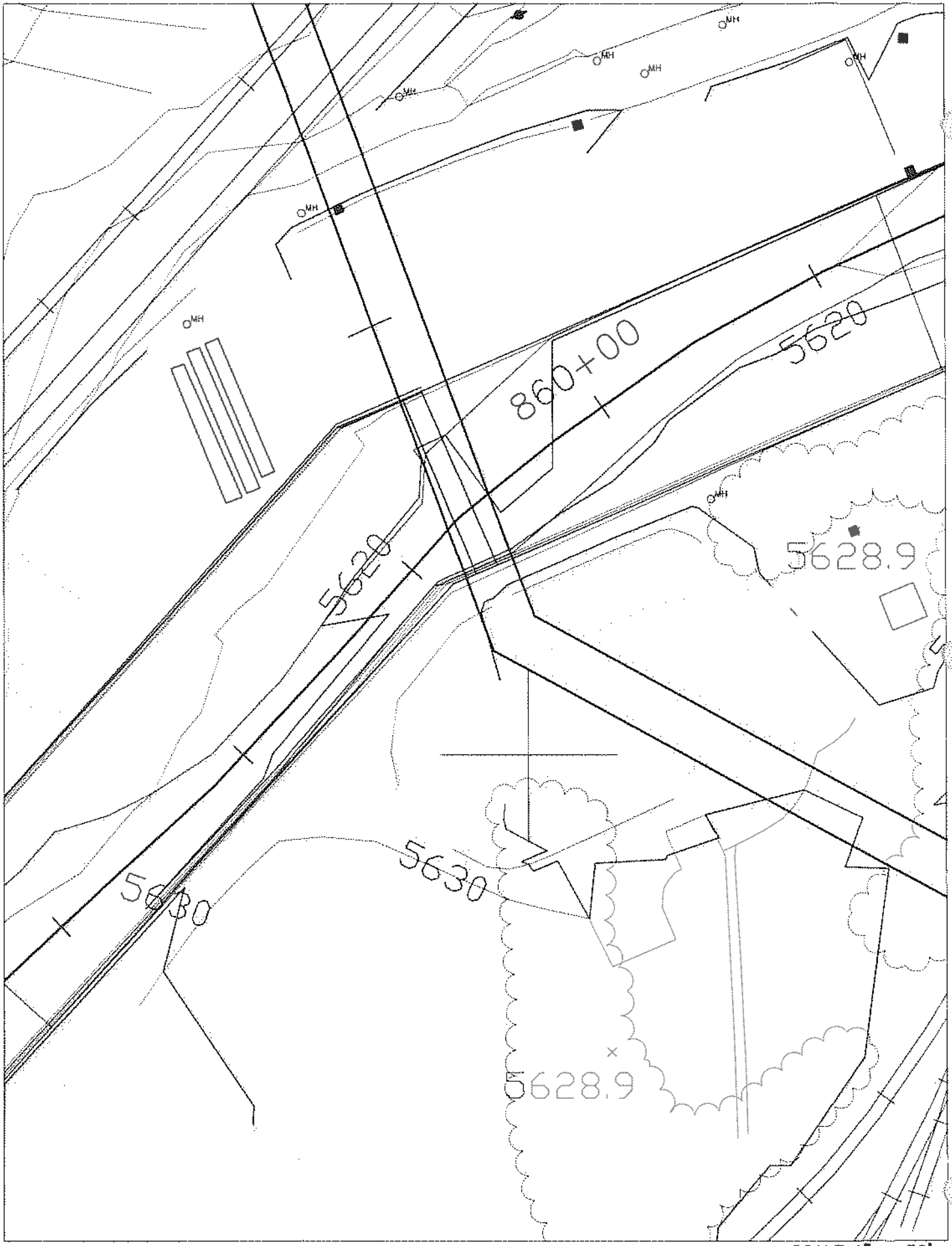
Pictures: 37

Sketch:



U/S DECK
464 5633.37 / 5628.37
502 5633.21 / 5628.21
540 5633.42 / 5628.42

D/S DECK
463
501
539
SAME



COORS MISC. BRIDGE 860+74

SCALE 1" = 50'

UPSTREAM OF 700 EAST. ACCESS FROM COORS NORTH SERVICE ROAD OFF McINTYRE

Pedestrian Bridge 868+80

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BY _____ DATE _____ SUBJECT _____ SHEET ___ OF ___
CHK'D. BY _____ DATE _____ JOB NO. _____
PEER BY _____ DATE _____ FILE NO. _____

Bridge Name: 668+80 PED BRIDGE

Bridge Opening Width W: 75'

Bridge Opening Length L: 6.5'

Piers

Number:
Width: NONE
Type:

Elevation Bench Mark 1: SEE 671+00 **Rod Height on BM 1:**
Elevation Bench Mark 2: **Rod Height on BM 2:**

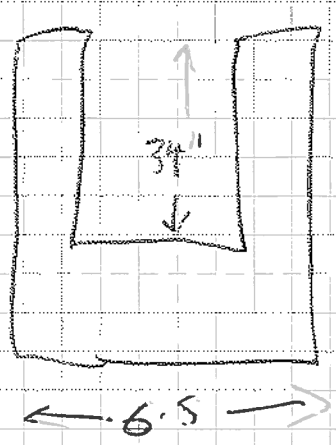
Instrument Elevation: → 5646.39

	Left	Center	Right
Elevation Top of Rail:	5641.31	5641.24	5640.87
Elevation Top of Bridge:	—	—	—
Elevation Roadway Deck:	(7.91) 5638.48	(7.98) 5638.41	(8.35) 5638.04
Elevation Low Chord:	5637.31	5637.24	5636.87

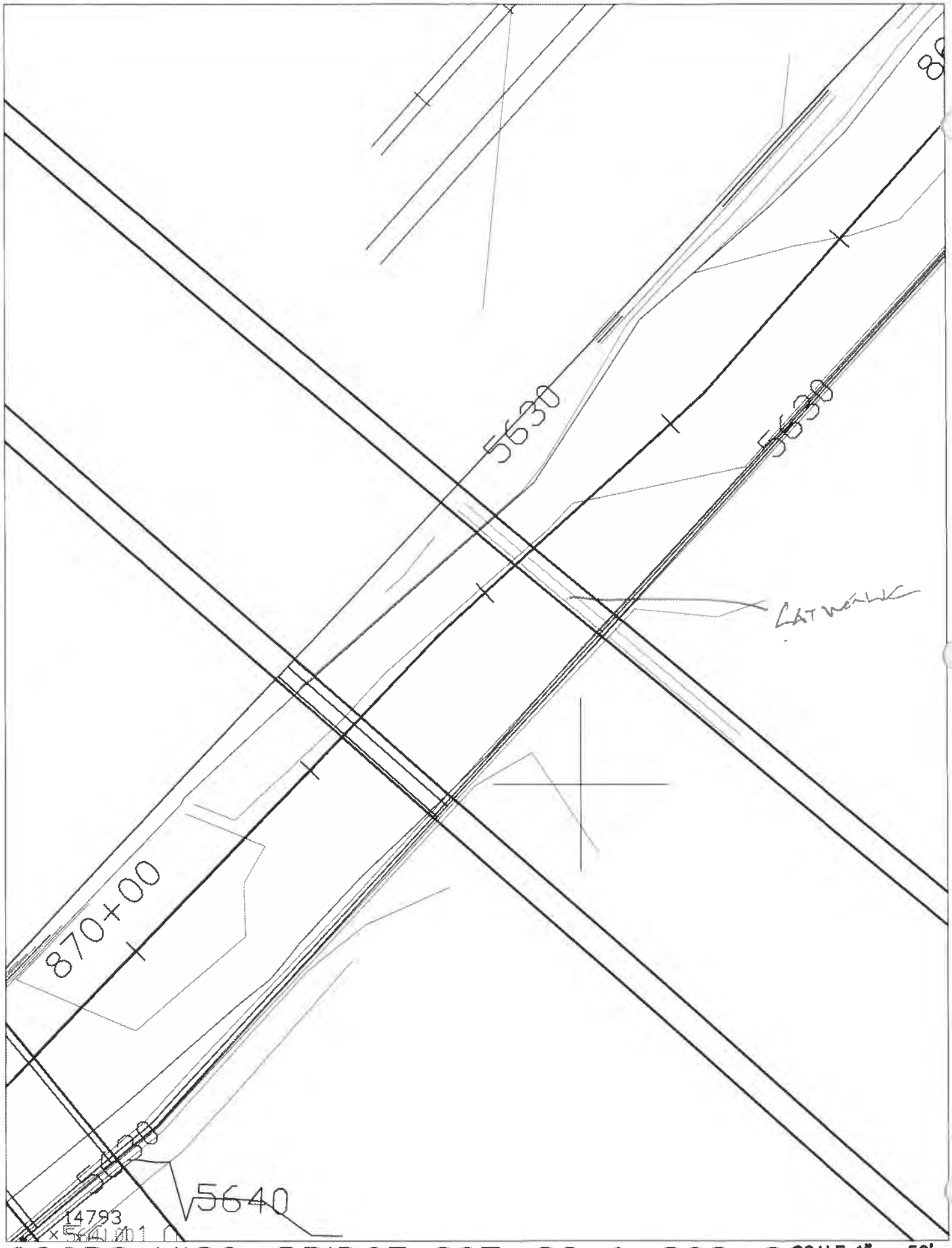
Elevation Invert:

Pictures: 1-3 CARD #2

Sketch:



	U/S Deck	D/S Deck
635	5641.31 / 5637.31	
677	5641.24 / 5637.24	
722 ~~719~~	5640.87 / 5636.87	722 719



COORS MISC. BRIDGE 867+82 & 868+80

SCALE 1" = 50'

UPSTREAM OF 700 EAST. ACCESS UNKNOWN

ICON ENGINEERING, INC 8100 S Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY: _____ DATE _____ SUBJECT _____ SHEET ___ OF ___

CHK'D BY: _____ DATE _____ JOB NO _____

REVIEWED BY: _____ DATE _____ FILE NO _____

Bridge Name: 671+00 VEHICLE

Bridge Opening Width W: 86'

Bridge Opening Length L: 37'

Piers

Number:
Width:
Type: NONE

Elevation Bench Mark 1: 5639.0 **Rod Height on BM 1:** 7.39

Elevation Bench Mark 2: 5641.00 **Rod Height on BM 2:** 5.38 → (use for RT. DECK ELEV)

Instrument Elevation: @5646.39 / @5646.38 Δ=.01 → 5646.39 − 5641.00

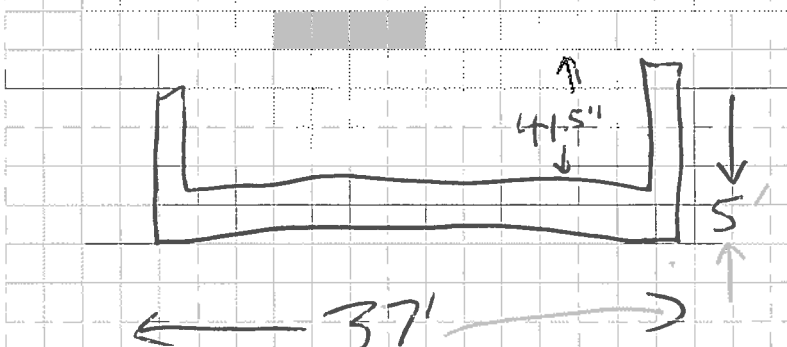
	Left	Center	Right
Elevation Top of Rail:	5644.36	5645.46	5644.47
Elevation Top of Bridge:			
Elevation Roadway Deck:	(5.49) 5640.9	(4.39) 5642.00	(5.38) 5641.01
Elevation Low Chord:	5635.90	5637.00	5636.00

Elevation Invert:

Pictures: 16-7 CARD #2

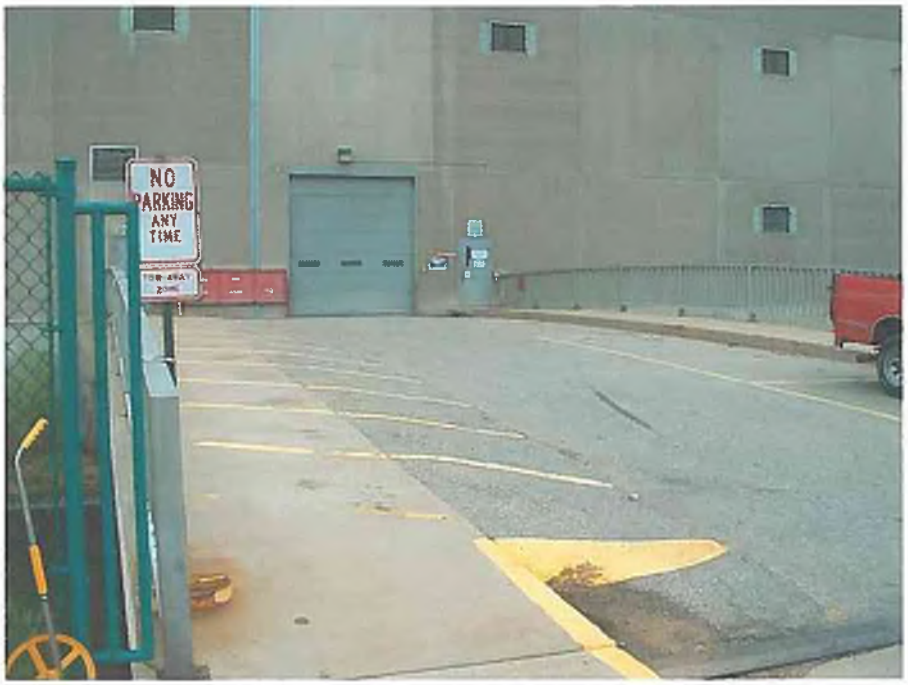
U/S DECK	
636	5644.36 / 5635.90
CSD	5645.46 / 5637.00
726	5644.47 / 5636.01

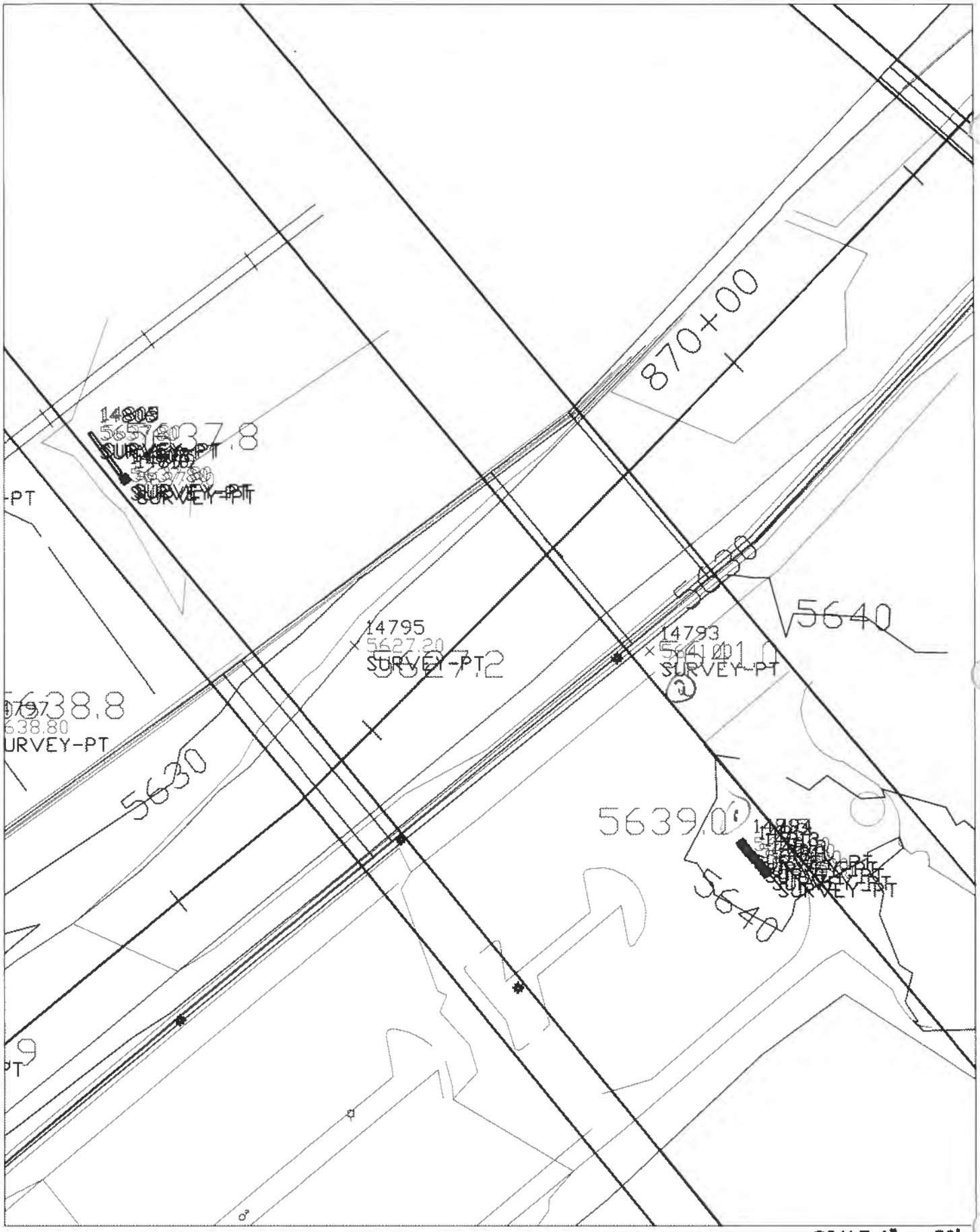
Sketch:



D/S DECK
637
681
726

Vehicle Bridge 871+00





COORS VEHICLE BRIDGE 871+00 & COOR PEDESTRIAN BRIDGE 872+31

SCALE 1" = 50'

UPSTREAM OF 700 EAST. ACCESS UNKNOWN

Pedestrian Bridge 872+31

ICON ENGINEERING, INC 8100 S Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY _____ DATE _____ SUBJECT _____ SHEET _____ OF _____
CHKD. BY _____ DATE _____ JOB NO. _____
REV. BY _____ DATE _____ FILE NO. _____

Bridge Name: 872+31 RD

Bridge Opening Width W: 95'

Bridge Opening Length L: 93"

Piers

Number:
Width:
Type: NONE

Elevation Bench Mark 1: SEE 871+00 **Rod Height on BM 1:**
Elevation Bench Mark 2: **Rod Height on BM 2:**

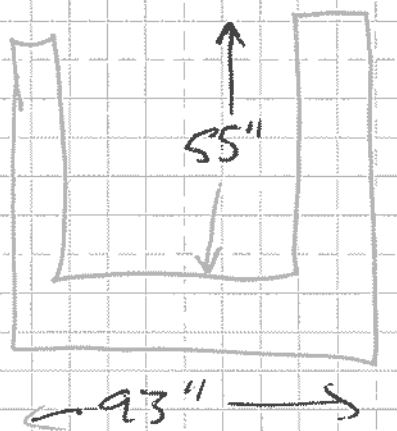
Instrument Elevation: → 5646.39

	Left	Center	Right
Elevation Top of Rail:	5643.35	5646.35	5646.47
Elevation Top of Bridge:			
Elevation Roadway Deck:	(7.62) 5638.77	(4.62) 5641.77	(4.50) 5641.89
Elevation Low Chord:	5638.27	5641.27	5641.39

Elevation Invert:

Pictures: 8-10 Core) * 2

Sketch:



U/S Deck

606	5643.35 / 5638.27
653	5646.35 / 5641.27
702	5646.47 / 5641.39

D/S Deck

607
653
702

(4)

N. SERVICE RD
COORS PLANT

Exhibit D

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 3-9-06

CREW GNA

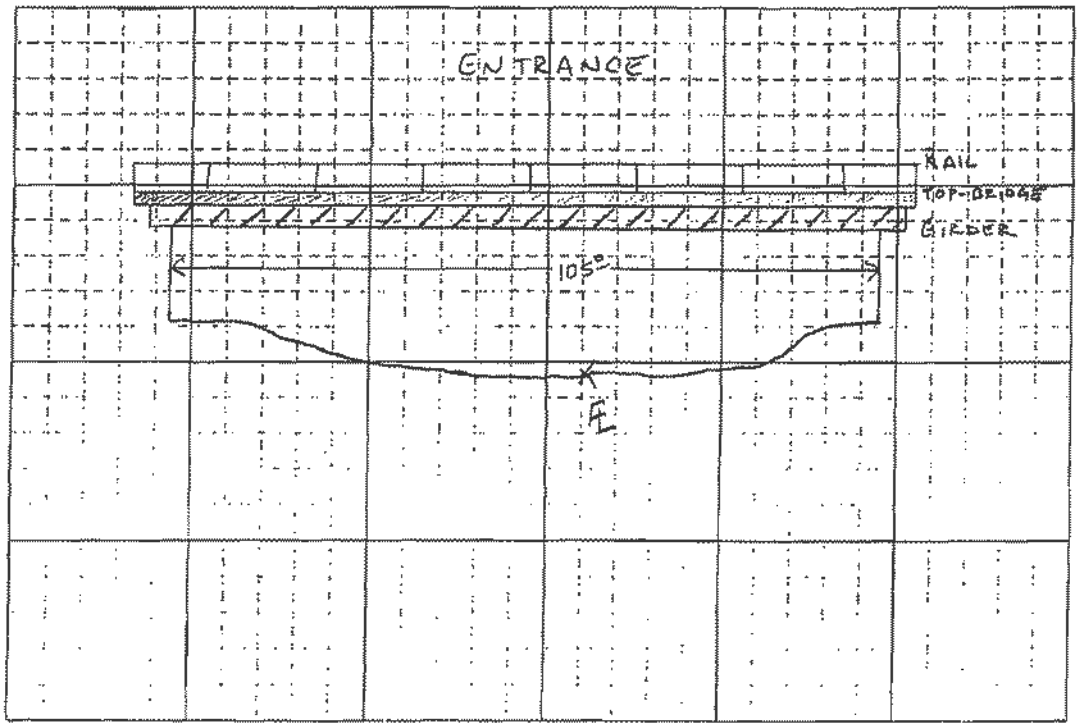
PHOTOS: ENTRANCE 1 OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 52 OF FIELD BOOK NO. 59F

SKETCH

(Plan, Profile, Entrance and Outlet)



4

N. SERVICE RD
COORS PLANT

BRIDGE/CULVERT INFORMATION

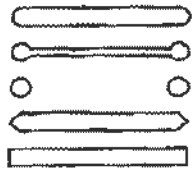
BRIDGE		CULVERT	
Alignment	N. SERVICE RD	Inside Dimensions	
Bridge Opening Width W	104.90	--Rise(or Diameter)	
Bridge Opening Length L	39.50	--Span	
Piers		Shape	
--Number	0	Material	
--Width	—	Invert Elevations	
--Type	—	--Entrance	
Elevation Low Steel	5639.50	--Outlet	
Elevation Top	5645.20	Length of Culvert	
Bridge Opening Sideslopes	VERTICAL WALL	Embankment Sideslopes	
Embankment Sideslopes		Road Elevation	
--Entrance	VERT. WALL/SLOPED DIRT ROCK	Entrance	
--Outlet	VERT. WALLS	--Wingwall Angle	
Wingwall Angles 0	45°	--Wingwall Length	
Wingwall Lengths	13'(NW) 9'(NE)	--End Projection	
Angle of Bridge Skew 0	90°	Outlet	
Deck Elevations	5644.60	--Siltation Depth	
Top of Railing	5648.75	--End Projection	
Invert Elevations			
--Entrance	5629.30		
--Outlet	—		

REMARKS: _____

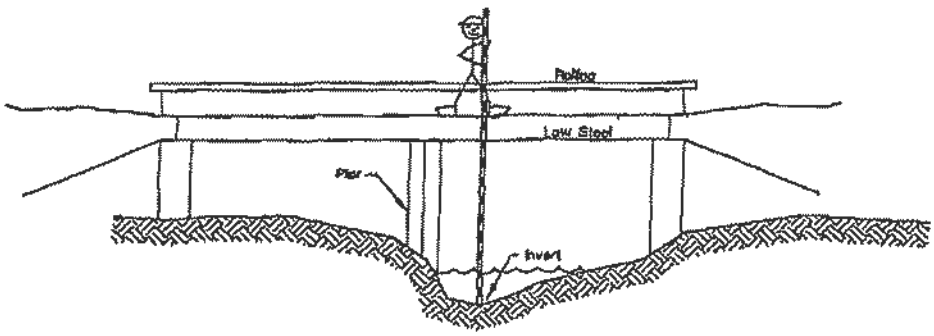
GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



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BY _____ DATE _____ SUBJECT _____ SHEET _____ OF _____
CHKD. BY _____ DATE _____ JOB NO. _____
REV. BY _____ DATE _____ FILE NO. _____

North Service Road 876+15

W/S Section 87622

D/S Section 87567

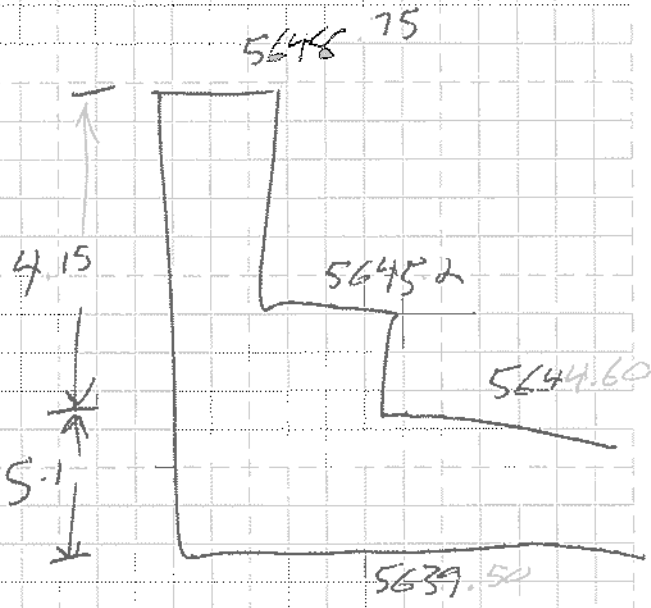
Distance 7.5 → 8

Width : 39'

Deck Section 876+15

No Skew

No Pier



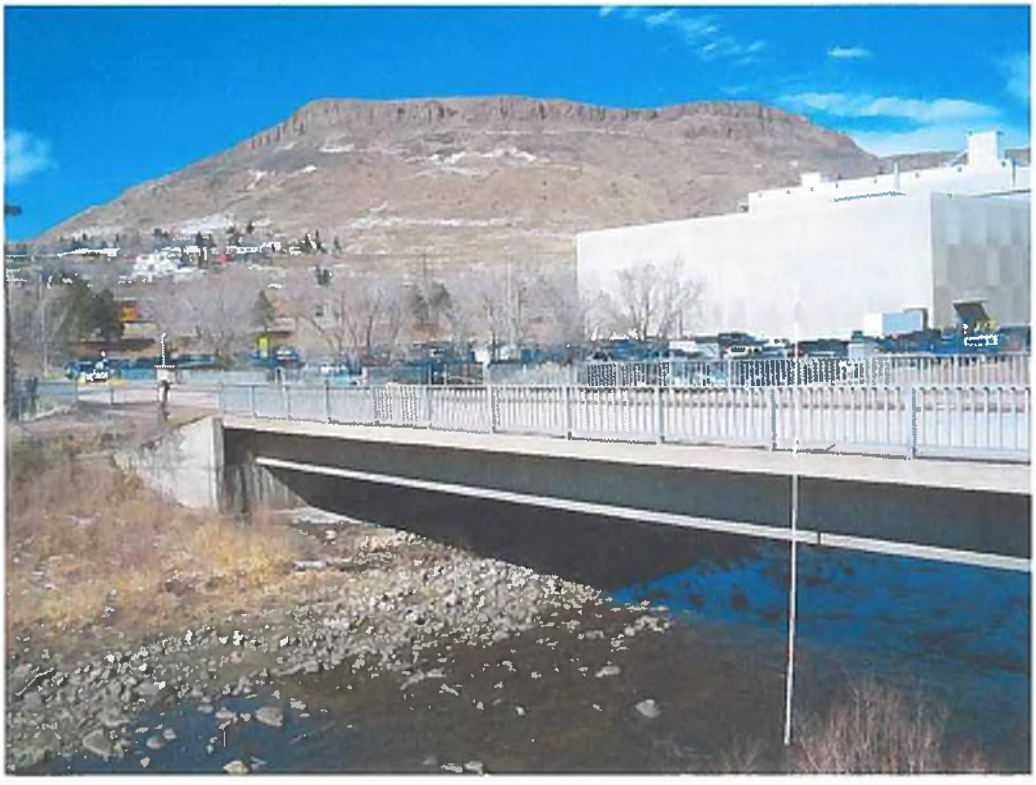
W/S Deck

~~55 5643.4~~
434.58 5644.91
476 5644
476 5648.15 / 5638.9
~~589~~ 5649.75 / 5640.5
581.53 ~~589~~ 5645.6

D/S Deck

493 5644
493 5648.15 / 5638.9
598 5649.75 / 5640.5
598 5645.6

452 5644
431.15 5641.99



North Service Road (photos 1, 2)

Pedestrian Bridge 885+87

ICON ENGINEERING, INC 8100 S Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY: DATE SUBJECT SHEET OF
CHKD. BY: DATE JOB NO.
FE.. BY: DATE FILE NO.

Bridge Name: 85,487 PEDESTRIAN

Bridge Opening Width W: 138'

Bridge Opening Length L: 136'

Piers

Number: NONE
Width:
Type:

Elevation Bench Mark 1: 5660.10 **Rod Height on BM 1:** 4.89
Elevation Bench Mark 2: 5654.20 **Rod Height on BM 2:** 10.90

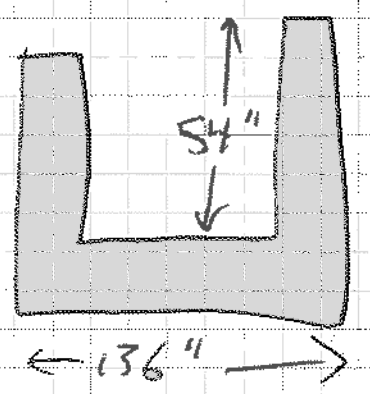
Instrument Elevation: ① 5664.99 / ② 5665.10 D=.11 → 5665.05

	Left	Center	Right
Elevation Top of Rail:	5664.45	5667.63	5664.55
Elevation Top of Bridge:			
Elevation Roadway Deck:	(5.10) 5659.95	(1.92) 5663.13	(5.00) 5660.05
Elevation Low Chord:	5659.16	5662.34	5659.26

Elevation Invert:

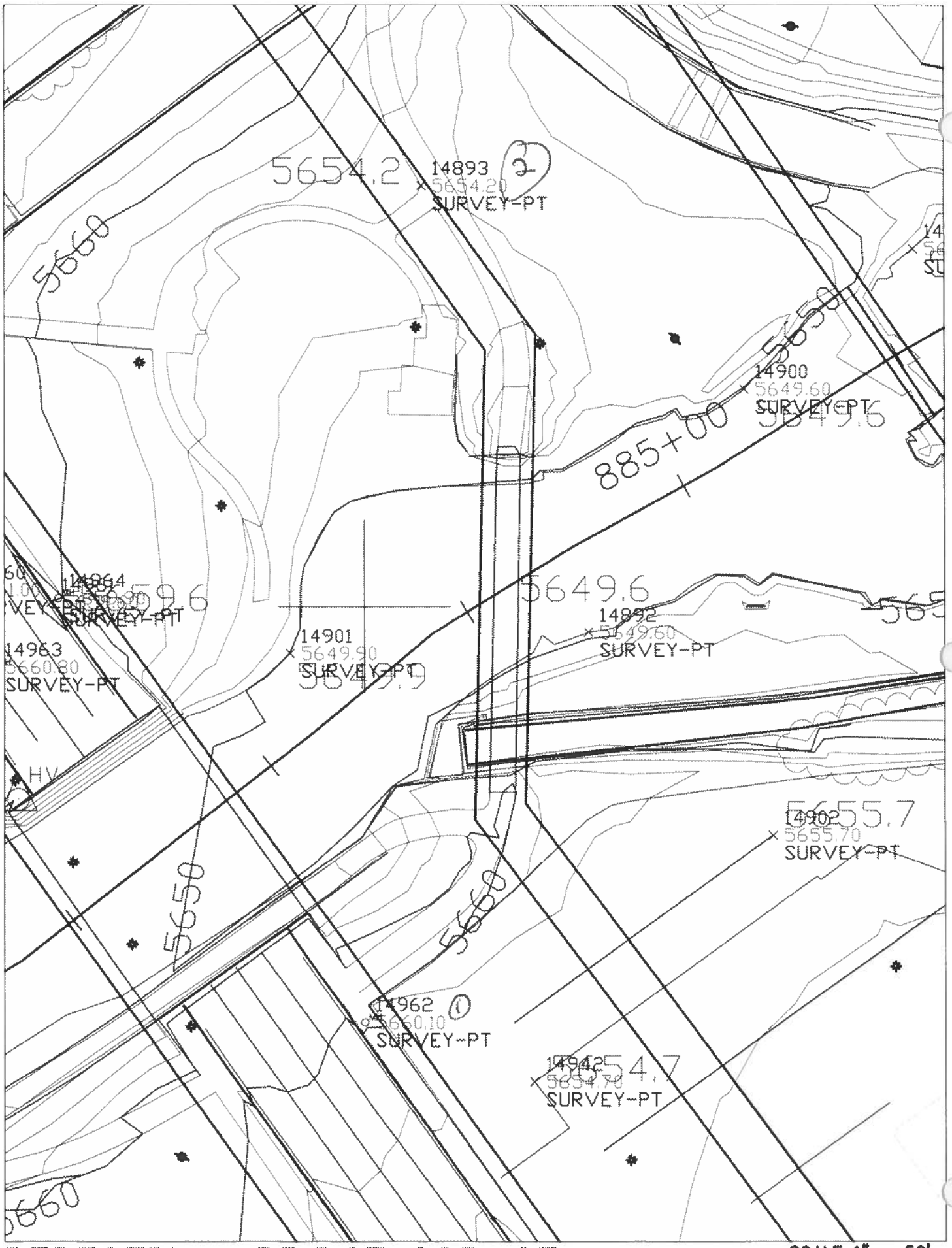
Pictures: 11–17

Sketch:



U/S Deck
537 5656 525.37 / 5654.51
546 5658
570 5660
574 5664.54 / 5659.16
641 5667.63 / 5662.34
708 5664.55 / 5659.26
727 5660

D/S Deck
559 5658 538.49 / 566.02
586 5660
586 5664.54 / 5659.16
654 5667.63 / 5662.34
721 5664.55 / 5659.26
721 5660



PEDESTRIAN BRIDGE 885+87

SCALE 1" = 50'

DOWNSTREAM OF FORD STREET. ACCESS FROM ~~FORD STREET~~

VANDALIA PARK (NORTH BANK)

2

FORD ST.

Exhibit D

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT Clear Creek DATE 3/9/06

CREW GNA

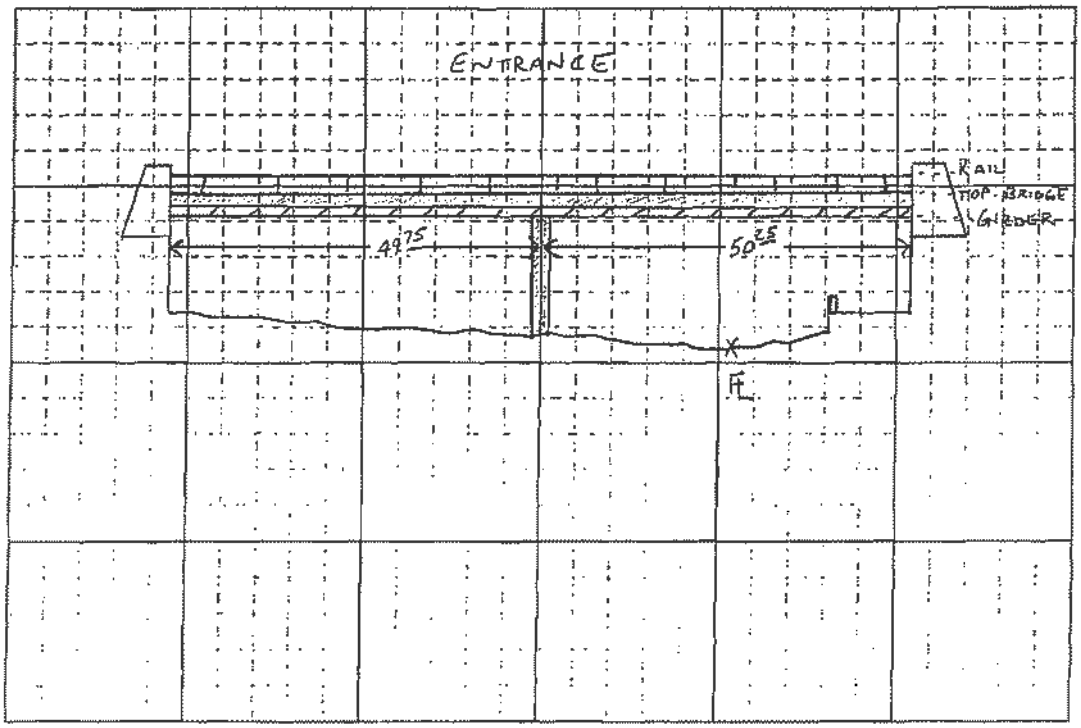
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 51 OF FIELD BOOK NO. 59F

SKETCH

(Plan, Profile, Entrance and Outlet)



FORD ST.

2

BRIDGE/CULVERT INFORMATION

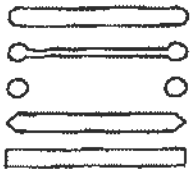
BRIDGE		CULVERT	
Alignment	FORD ST N-S	Inside Dimensions	
Bridge Opening Width W	100'	--Rise(or Diameter)	
Bridge Opening Length L	74'	--Span	
Piers		Shape	
--Number	1	Material	
--Width	2'	Invert Elevations	
--Type	90° TRIANGULAR NOSE & TAIL	--Entrance	
Elevation Low Steel	HP = 5658.50	--Outlet	
Elevation Top	HP = 5664.40	Length of Culvert	
Bridge Opening Sideslopes	VERT. WALL / SIDEWALK	Embankment Sideslopes	
Embankment Sideslopes	"	Road Elevation	
--Entrance	VERT. WALL / SLOPED DIRT / SOME RIPRAP	Entrance	
--Outlet	SOME RIP RAP / SLOPED DIRT / VERT WALL	--Wingwall Angle	
Wingwall Angles 0	—	--Wingwall Length	
Wingwall Lengths	—	--End Projection	
Angle of Bridge Skew 0	90°	Outlet	
Deck Elevations	5661.2	--Siltation Depth	
Top of Railing	HP = 5665.80	--End Projection	
Invert Elevations			
--Entrance	LP = 5647.40		
--Outlet	—		

REMARKS: BRIDGE IS CROWNED @ CENTER

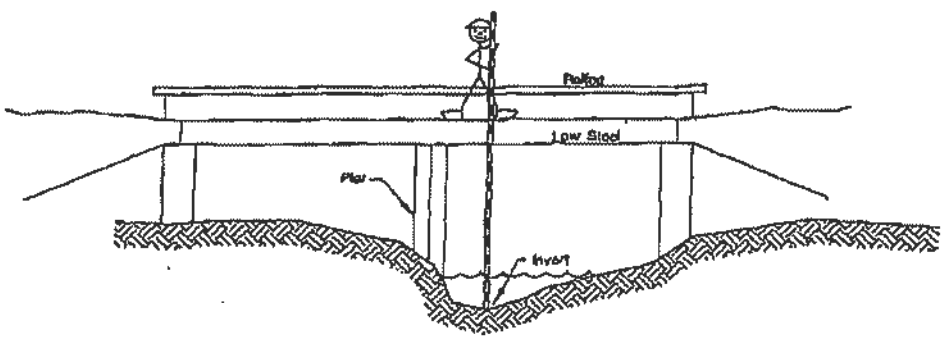
GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



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BY: DATE 05/15/06 SUBJECT C.C. FHAD SHEET OF
CHKD. BY DATE JOB NO.
REV. BY DATE FILE NO.

FORD STREET

W/S SECTION: 88802

D/S SECTION: 88717

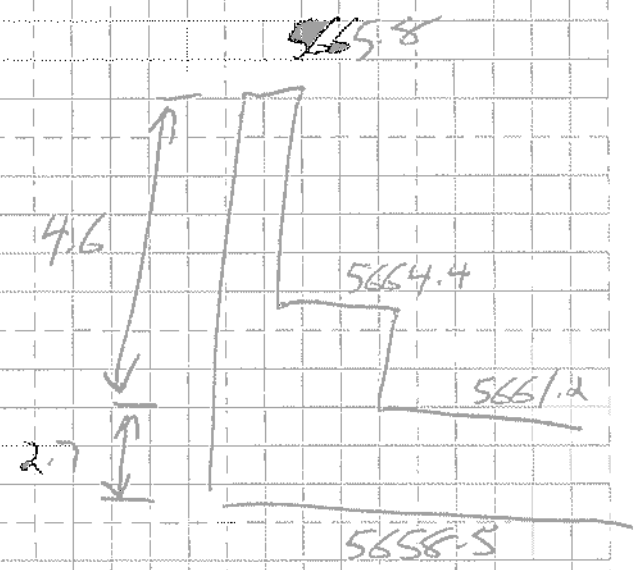
DISTANCE TO DECK: 6

BRIDGE SECTION: 88796

DECK WIDTH: 74'

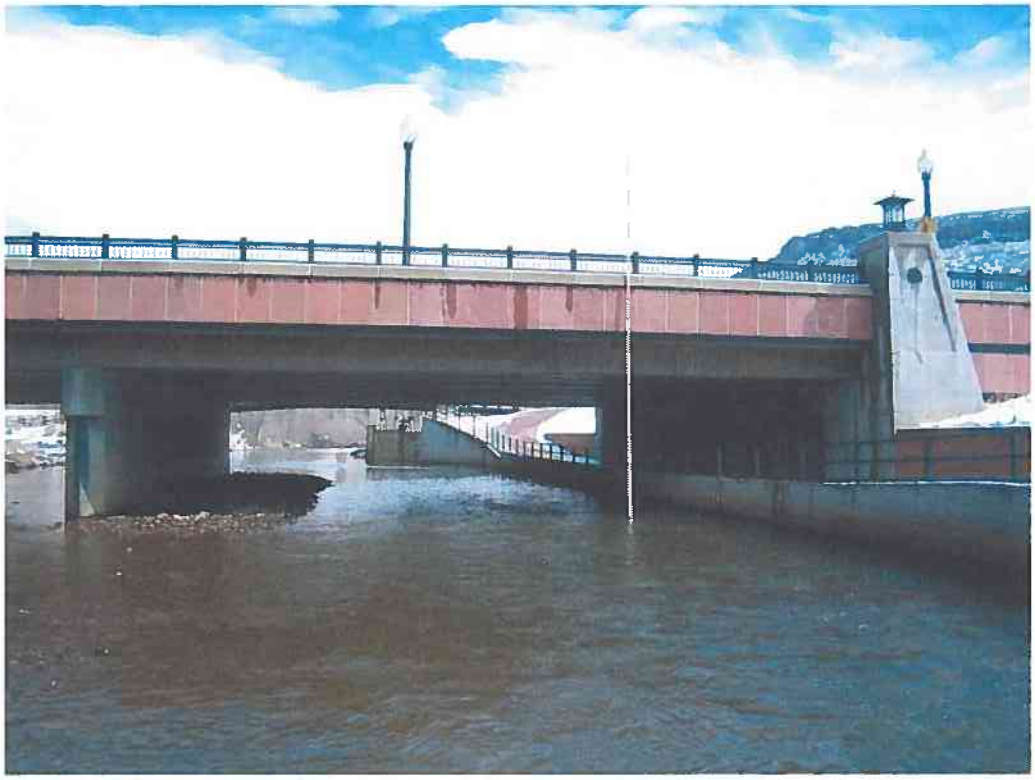
NO SKEW

PIER: W/S CL 715
D/S CL 704



W/S DECK		INEF 665 @ 5660.8, 766 @ 5660.3
50	5680	
120	5678	
173	5676	
225	5674	
292	5672	
343	5670	
386	5668	
432	5666	
477	5664	
527	5662	
665	5660.8	
665	5665.4 / 5658.1	
766	~~5660.3~~ 5664.9 / 5657.6	
766	5660.3	
807	5660	
854 ~~868~~	5658	
896	5656	
1030	5656	
1154	5658	
1335	5660	
1547	5662	

D/S DECK		INEF 0 → 654 @ 5660.8, 755 → 1039 @ 5660.8, 1083 → 1390 @ 5660.3
47	5680	
115	5678	
170	5676	
225	5674	
289	5672	
331	5670	
382	5668	
423	5666	
472	5664	
521	5662	
654	5660.8	
654	5665.4 / 5658.1	
755	5664.9 / 5657.6	
755	5660.3	
799	5660	
843	5658	
893	5656	
1027	5656	
1149	5658	
1324	5660	
1538	5662	



Ford Street (photos 1, 2)

WASHINGTON ST

3

Exhibit D

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 3-9-06

CREW GJA _____, _____

_____, _____

_____, _____

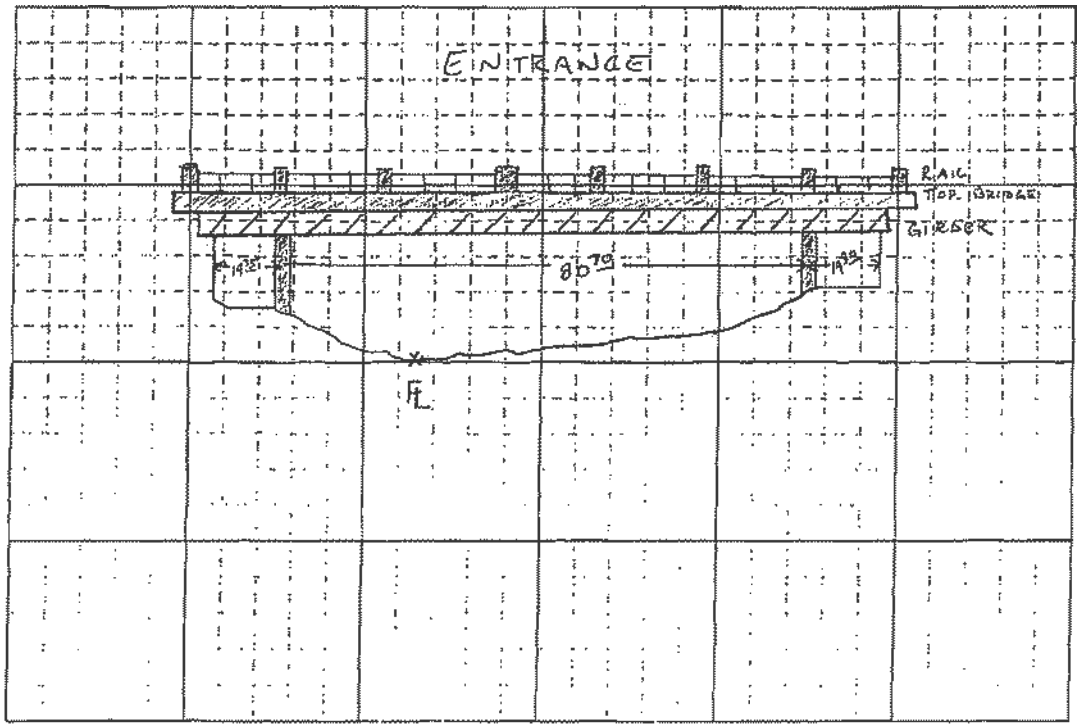
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 51 OF FIELD BOOK NO. 59F

SKETCH

(Plan, Profile, Entrance and Outlet)



WASHINGTON ST

3

BRIDGE/CULVERT INFORMATION

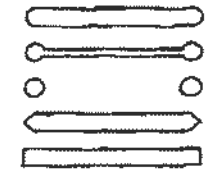
BRIDGE		CULVERT	
Alignment	WASHINGTON ST N-S	Inside Dimensions	
Bridge Opening Width W	105	--Rise(or Diameter)	
Bridge Opening Length L	72	--Span	
Piers		Shape	
--Number	2	Material	
--Width	3.7	Invert Elevations	
--Type	SQUARE NOSE+TAIL WITH 4 CYLINDERS	--Entrance	
Elevation Low Steel	5665.5	--Outlet	
Elevation Top	5671.4 TOP RAIL	Length of Culvert	
Bridge Opening Sideslopes	VERT. WALL /SIDEWALK	Embankment Sideslopes	
Embankment Sideslopes	VERT CONC	Road Elevation	
--Entrance	VERTICAL RETAINING WALL - BRICK	Entrance	
--Outlet	"	--Wingwall Angle	
Wingwall Angles 0	-	--Wingwall Length	
Wingwall Lengths	-	--End Projection	
Angle of Bridge Skew 0	90°	Outlet	
Deck Elevations	5568.0	--Siltation Depth	
Top of Railing	5671.4	--End Projection	
Invert Elevations			
--Entrance	5652.3		
--Outlet			

REMARKS: ROADWAY + PEDESTRIAN BRIDGE ARE SUPPORTED BY THE SAME PIERS + ABUTMENTS. PED BRIDGE IS UPSTREAM.

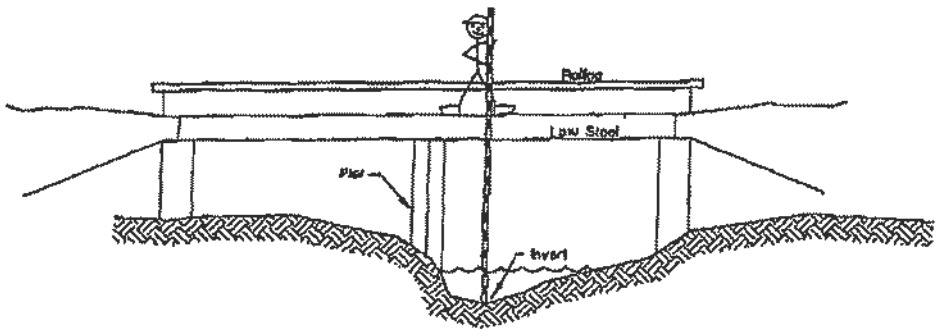
GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:



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BY: _____ DATE: _____ SUBJECT: C.C. FMD SHEET ___ OF ___

CHKD. BY: _____ DATE: _____ JOB NO: _____

REV. BY: _____ DATE: _____ FILE NO: _____

WASHINGTON ST

W/S SECTION: 89565

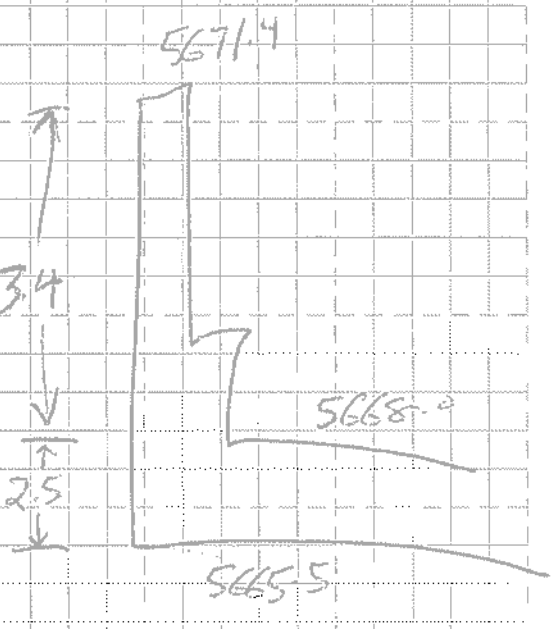
D/S SECTION: 89466

DISTANCE TO DECK: 6

BRIDGE SECTION: 89562

NO SKEW

PIERS: W/S: 665, 751
D/S: 669, 755

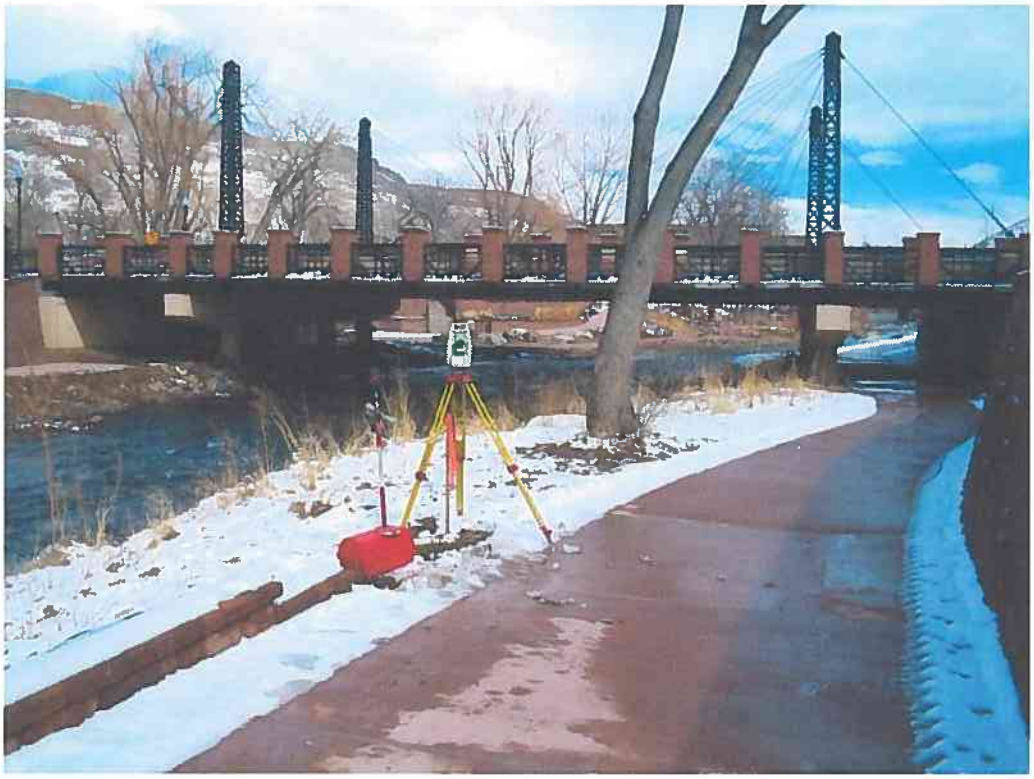


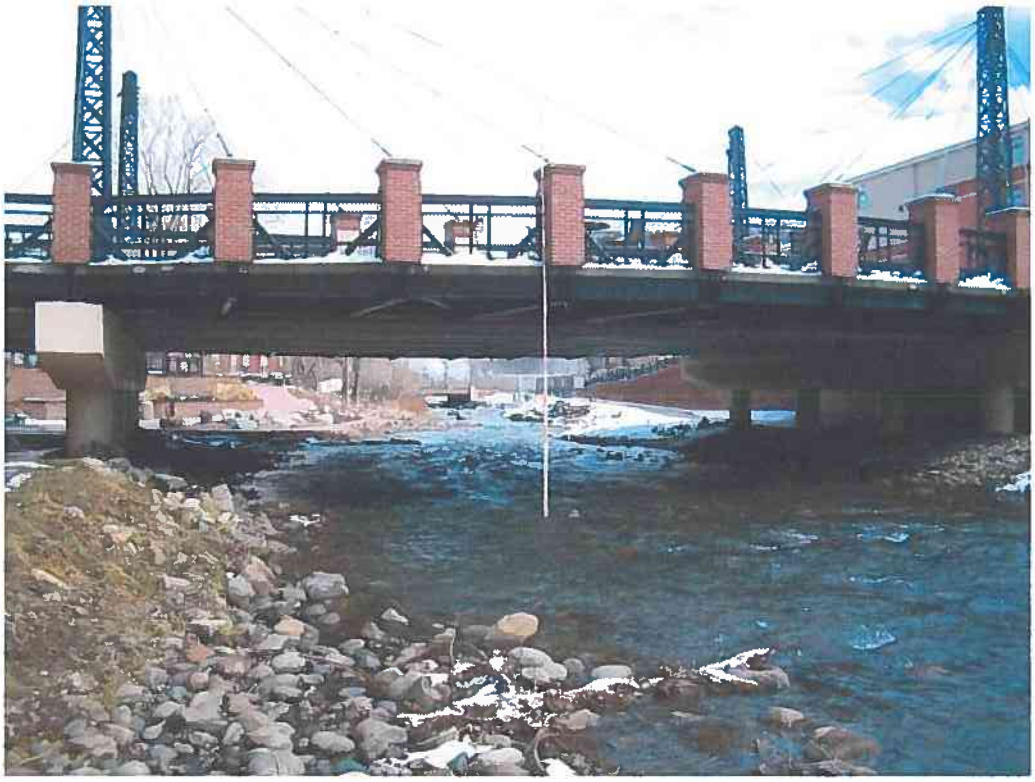
W/S DECK — INCR 645 @ 5668, 771 @ 5668

25	5680
88	5678
148	5676
198	5674
254	5672
304	5670
371	5668
520	5666.8
645	5668
645	5671.4 / 5665.5
771	5671.4 / 5665.5
771	5668
877	5670

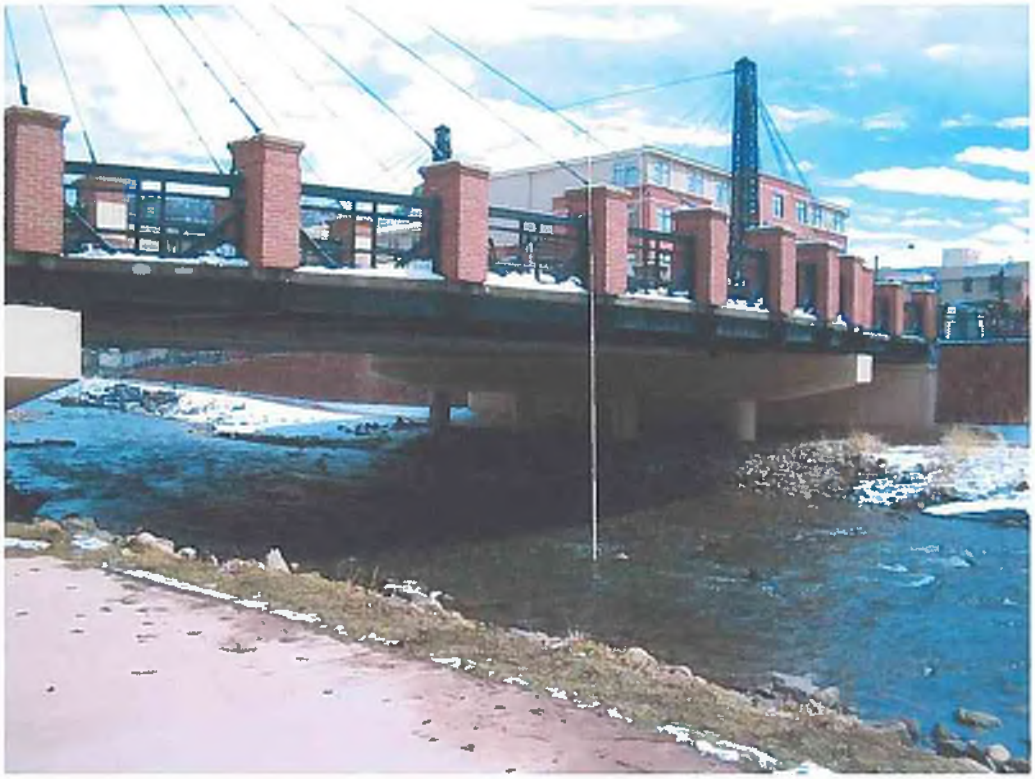
D/S DECK — INCR 649 @ 5668, 774 @ 5668

46	5680
101	5678
159	5676
210	5674
266	5672
315	5670
378	5668
574	5666.8
616	5668
649	5668
649	
774	
774	5668
914	5670
962	5672
1003	5674
1045	5675.7





Washington Street (photos 1, 2)



Washington Street (photo 3)

Pedestrian Bridge 906+49

CON
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DATE SUBJECT SHEET OF
CHKD. BY DATE JOB NO.
PE. BY DATE FILE NO.

Bridge Name: 906+49 PEDESTRIAN

Bridge Opening Width W: 90'

Bridge Opening Length L: 133'

Piers

Number:
Width: NONE
Type:

Elevation Bench Mark 1: 5677.2 **Rod Height on BM 1:** 5.56
Elevation Bench Mark 2: 5669.3 **Rod Height on BM 2:** 13.55

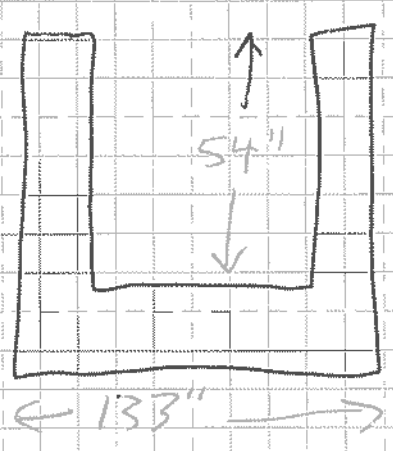
Instrument Elevation: @ 5682.76 / @ 5682.55 Δ = .09 ↔ 5682.51

	Left	Center	Right
Elevation Top of Rail:	5682.70	5684.82	5682.71
Elevation Top of Bridge:	—	—	—
Elevation Roadway Deck:	(4.61) 5678.09	(2.49) 5680.32	(4.60) 5678.21
Elevation Low Chord:	5676.37	5678.49	5676.38

Elevation Invert: 15 → 19 card #2

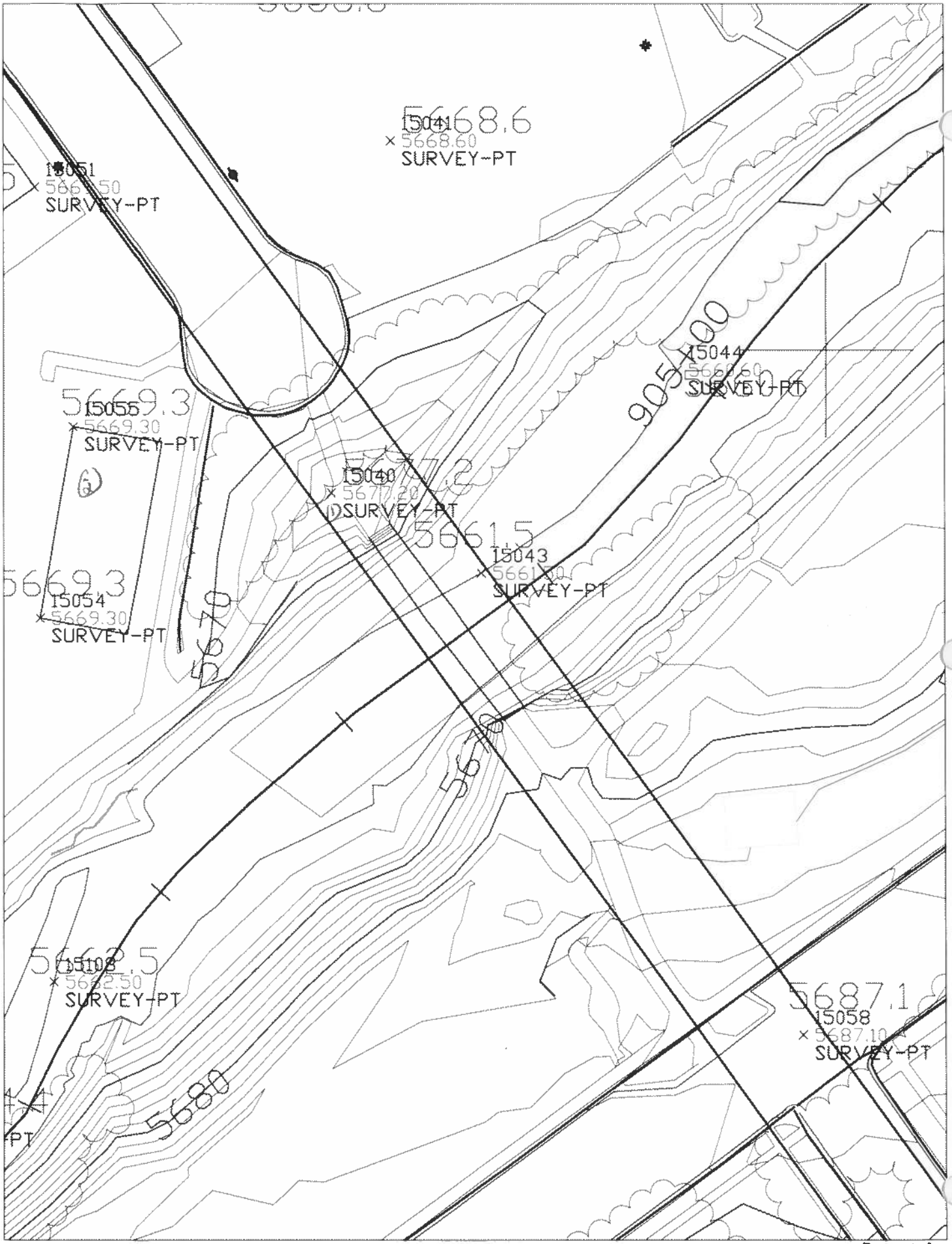
Pictures:

Sketch:



W/S DECK 1025 W @ 5677.19 5651.69
1039 5676.2
1037 5682.7 / 5676.37
1055 5684.52 / 5678.49
1130 5682.71 / 5676.38
1130 5678.21
1147.61 5679.42

D/S DECK
1046
1071 5682.7 / 5676.37
~~1132 5~~
1087 5684.52 / 5678.49
1132 5682.71 / 5676.38
1046 @ 5615.50
1143.07 5628



PEDESTRIAN BRIDGE 906+49

SCALE 1" = 50'

UPSTREAM OF WASHINGTON STREET. ACCESS FROM LIBRARY PARKING.

(1)

HWY 6

Exhibit D

FORM NO._____ PAGE___OF___

BRIDGE/CULVERT GEOMETRY

PROJECT CLEAR CREEK DATE 3/8/06

CREW GJA

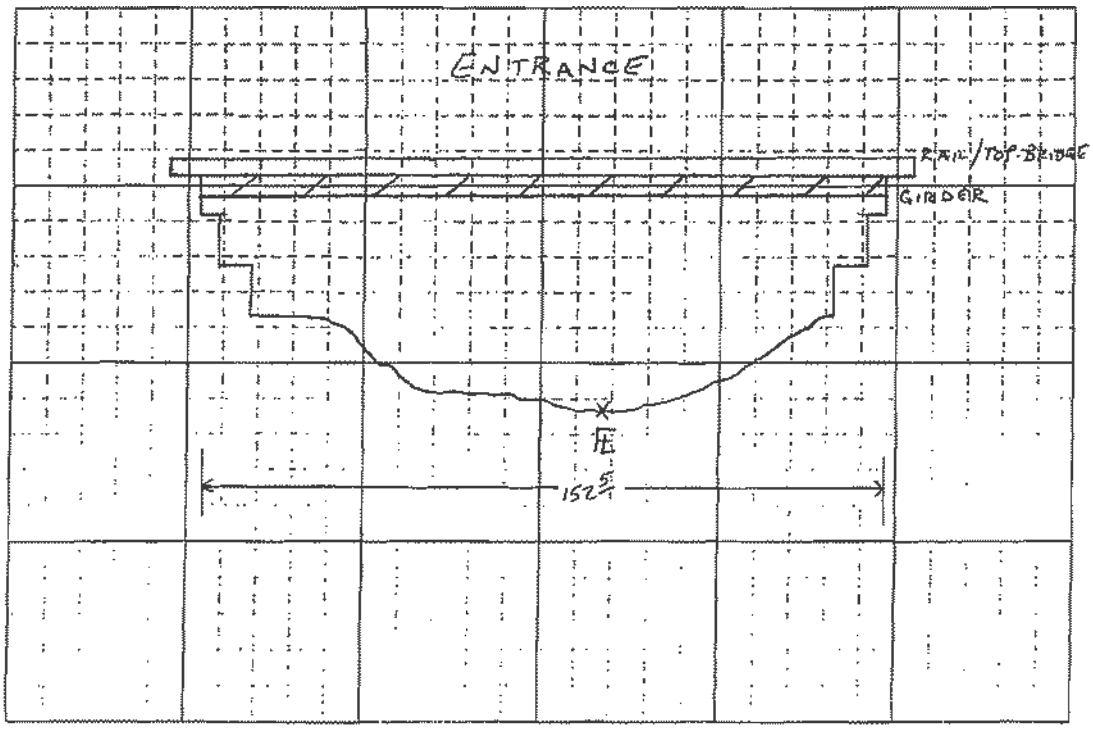
PHOTOS: ENTRANCE ✓ OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO._____
ELEVATION OF BENCHMARK_____
ELEVATION AND CROSS-SECTION NOTES ON PAGE 50 OF FIELD BOOK NO. 59F

SKETCH

(Plan, Profile, Entrance and Outlet)



Hwy 6

BRIDGE/CULVERT INFORMATION

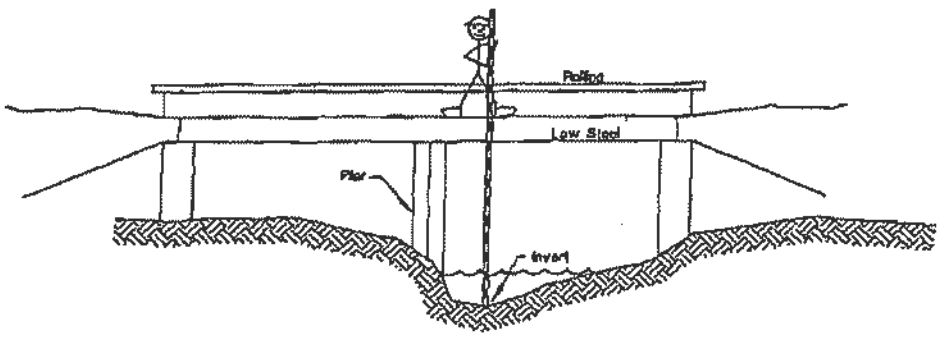
BRIDGE		CULVERT	
Alignment	Hwy 6/Hwy 93 NW-SE	Inside Dimensions	
Bridge Opening Width W	152.5	--Rise(or Diameter)	
Bridge Opening Length L	84.5	--Span	
Piers		Shape	
--Number	0	Material	
--Width	—	Invert Elevations	
--Type	—	--Entrance	
Elevation Low Steel	5727.25	--Outlet	
Elevation Top	5738.50	Length of Culvert	
Bridge Opening Sideslopes	Vert. Ret. Walls -conc. Block	Embankment Sideslopes	
Embankment Sideslopes	6+ Rip Rap Slopes	Road Elevation	
--Entrance	Vertical Retaing Walls - Conc. Block	Entrance	
--Outlet		--Wingwall Angle	
Wingwall Angles 0	0°	--Wingwall Length	
Wingwall Lengths	Top Wall for Hwy 6	--End Projection	
Angle of Bridge Skew 0	79°	Outlet	
Deck Elevations	5735.5	--Siltation Depth	
Top of Railing	5738.50	--End Projection	
Invert Elevations			
--Entrance	5689.00		
--Outlet			

REMARKS:

GENERAL INFORMATION

Culvert Materials: RCP, CMP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- Semi-Circular Nose and Tail
- Twin-Cylinder Piers With Connecting Diaphragm
- Twin-Cylinder Piers Without Diaphragm
- 90° Triangular Nose and Tail
- Square Nose and Tail



*Photographs should show Rod and Rodman as follows:

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BY: _____ DATE _____ SUBJECT _____ SHEET ___ OF ___

CHKD. BY: _____ DATE _____ JOB NO. _____

REV. BY: _____ DATE _____ FILE NO. _____

HW76

U/S SECTION: 93773

D/S SECTION: 93675

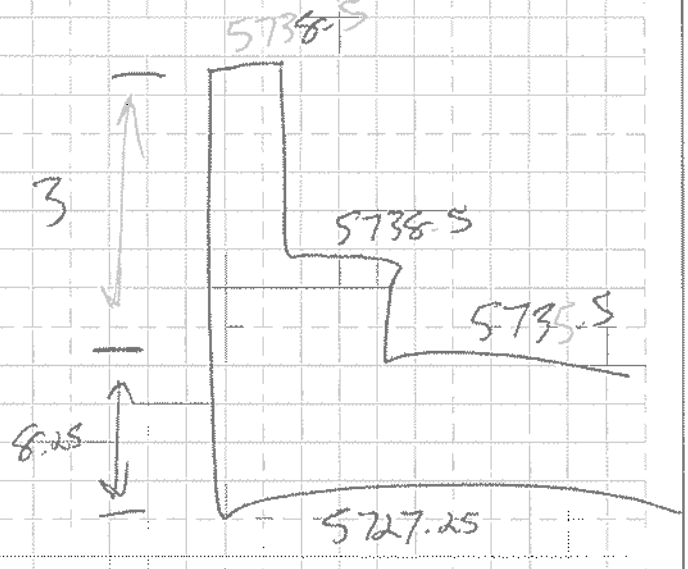
DISTANCE TO DECK: 3

DECK ~~WIDTH~~ SECTION: 93770

DECK WIDTH: 85

NO SKEW

NO PIERS



U/S Deck	
0	5752
232	5750
300	5748
364	5746
417	5744
468	5742
513	5740
587	5738
613	5736
613	5739 / 5727.75
796	5735 / 5723.75
796	5732
964	5732
1021	5731.7
1068	5732

D/S Deck	
198	5744
241	5742
300	5740
344	5738
400	5736
480	5734
539	5732
595	5732
595	5735 / 5723.75
779	5731 / 5719.75
779	5728
963	5730

Highway 6 (photos 1,2)

Highway 6 (photos 3, 4)

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BY TSJL DATE 4/26/06 SUBJECT C.C. FHAD SHEET ___ OF ___
CHKD BY ___ DATE ___ JOB NO. ___
REV BY ___ DATE ___ FILE NO. ___

PEDESTRIAN BRIDGES

1. P.B. 351+34 SURVEY PT ON PATH ~250' FROM BRIDGE MID SPAN
2. P.B. 477+65 SURVEY PT ON PATH ~100' FROM MID SPAN
3. P.B. 538+06 SURVEY PT (MANHOLE) ~160'
4. P.B. 572+29 SURVEY PT ON PATH ~60'
5. P.B. 602+17 SURVEY PT ON PATH ~70'
6. P.B. 630+68 SURVEY PT. ON PATH ~205'
7. P.B. 682+88 SURVEY PT. ON PATH ~100'

WHEAT RIDGE PARKS + OPEN SPACE: MARGRET PAGET 303.205.7554

R.R. 1 734+74 VEHICLE 871+00
R.R. 2 857+42 PED 872+31
COORS PED 860+74
MISC. 867+82
MISC. 868+80

8. P.B. 885+87 SURVEY PT ON PATH 165'
9. P.B. 906+49 SURVEY PT. ON PATH 60'

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BY _____ DATE _____ SUBJECT _____ SHEET ____ OF _____
CHKD. BY _____ DATE _____ JOB NO. _____
PE... BY _____ DATE _____ FILE NO. _____

Bridge Name:

Bridge Opening Width W:

Bridge Opening Length L:

Piers

Number:
Width:
Type:

Elevation Bench Mark 1: **Rod Height on BM 1:**
Elevation Bench Mark 2: **Rod Height on BM 2:**

Instrument Elevation:

	Left	Center	Right
Elevation Top of Rail:			
Elevation Top of Bridge:			
Elevation Roadway Deck:			
Elevation Low Chord:			

Elevation Invert:

Pictures:

Sketch:

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BY _____ DATE _____ SUBJECT _____ SHEET ___ OF _____
CHKD. BY _____ DATE _____ JOB NO. _____
FE.. BY _____ DATE _____ FILE NO. _____

Bridge Name:

Bridge Opening Width W:

Bridge Opening Length L:

Piers

Number:
Width:
Type:

Elevation Bench Mark 1: **Rod Height on BM 1:**
Elevation Bench Mark 2: **Rod Height on BM 2:**

Instrument Elevation:

	Left	Center	Right
Elevation Top of Rail:			
Elevation Top of Bridge:			
Elevation Roadway Deck:			
Elevation Low Chord:			
Elevation Invert:			

Pictures:

Sketch:

ICON ENGINEERING, INC 8100 S Akron Street, Ste 300, Centennial, CO 80112 Phone 303-221-0802 Fax 303-221-4019

BY _____ DATE _____ SUBJECT _____ SHEET ___ OF _____
CHKD. BY _____ DATE _____ JOB NO _____
REV. BY _____ DATE _____ FILE NO _____

Bridge Name:

Bridge Opening Width W:

Bridge Opening Length L:

Piers

Number:
Width:
Type:

Elevation Bench Mark 1: **Rod Height on BM 1:**
Elevation Bench Mark 2: **Rod Height on BM 2:**

Instrument Elevation:

	Left	Center	Right
Elevation Top of Rail:			
Elevation Top of Bridge:			
Elevation Roadway Deck:			
Elevation Low Chord:			

Elevation Invert:

Pictures:

Sketch:

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BY _____ DATE _____ SUBJECT _____ SHEET ____ OF _____
CHKD. BY _____ DATE _____ JOB NO. _____
APP'D. BY _____ DATE _____ FILE NO. _____

Bridge Name:

Bridge Opening Width W:

Bridge Opening Length L:

Piers

Number:
Width:
Type:

Elevation Bench Mark 1: **Rod Height on BM 1:**
Elevation Bench Mark 2: **Rod Height on BM 2:**

Instrument Elevation:

	Left	Center	Right
Elevation Top of Rail:			
Elevation Top of Bridge:			
Elevation Roadway Deck:			
Elevation Low Chord:			
Elevation Invert:			

Pictures:

Sketch:

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BY _____ DATE _____ SUBJECT _____ SHEET ___ OF _____
CHK'D BY _____ DATE _____ JOB NO. _____
REV'D BY _____ DATE _____ FILE NO. _____

Bridge Name:

Bridge Opening Width W:

Bridge Opening Length L:

Piers

Number:
Width:
Type:

Elevation Bench Mark 1: **Rod Height on BM 1:**
Elevation Bench Mark 2: **Rod Height on BM 2:**

Instrument Elevation:

	Left	Center	Right
Elevation Top of Rail:			
Elevation Top of Bridge:			
Elevation Roadway Deck:			
Elevation Low Chord:			
Elevation Invert:			

Pictures:

Sketch:

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BY _____ DATE _____ SUBJECT _____ SHEET ___ OF _____
CHKD. BY _____ DATE _____ JOB NO. _____
REV. BY _____ DATE _____ FILE NO. _____

Bridge Name:

Bridge Opening Width W:

Bridge Opening Length L:

Piers

Number:
Width:
Type:

Elevation Bench Mark 1: **Rod Height on BM 1:**
Elevation Bench Mark 2: **Rod Height on BM 2:**

Instrument Elevation:

	Left	Center	Right
Elevation Top of Rail:			
Elevation Top of Bridge:			
Elevation Roadway Deck:			
Elevation Low Chord:			
Elevation Invert:			

Pictures:

Sketch:

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BY _____ DATE _____ SUBJECT _____ SHEET ___ OF _____
CHKD. BY _____ DATE _____ JOB NO. _____
FE... BY _____ DATE _____ FILE NO. _____

Bridge Name:

Bridge Opening Width W:

Bridge Opening Length L:

Piers

Number:
Width:
Type:

Elevation Bench Mark 1: **Rod Height on BM 1:**
Elevation Bench Mark 2: **Rod Height on BM 2:**

Instrument Elevation:

	Left	Center	Right
Elevation Top of Rail:			
Elevation Top of Bridge:			
Elevation Roadway Deck:			
Elevation Low Chord:			
Elevation Invert:			

Pictures:

Sketch:

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BY _____ DATE _____ SUBJECT _____ SHEET ____ OF _____
CHK'D. BY _____ DATE _____ JOB NO. _____
PEER BY _____ DATE _____ FILE NO. _____

Bridge Name:

Bridge Opening Width W:

Bridge Opening Length L:

Piers

Number:
Width:
Type:

Elevation Bench Mark 1: **Rod Height on BM 1:**
Elevation Bench Mark 2: **Rod Height on BM 2:**

Instrument Elevation:

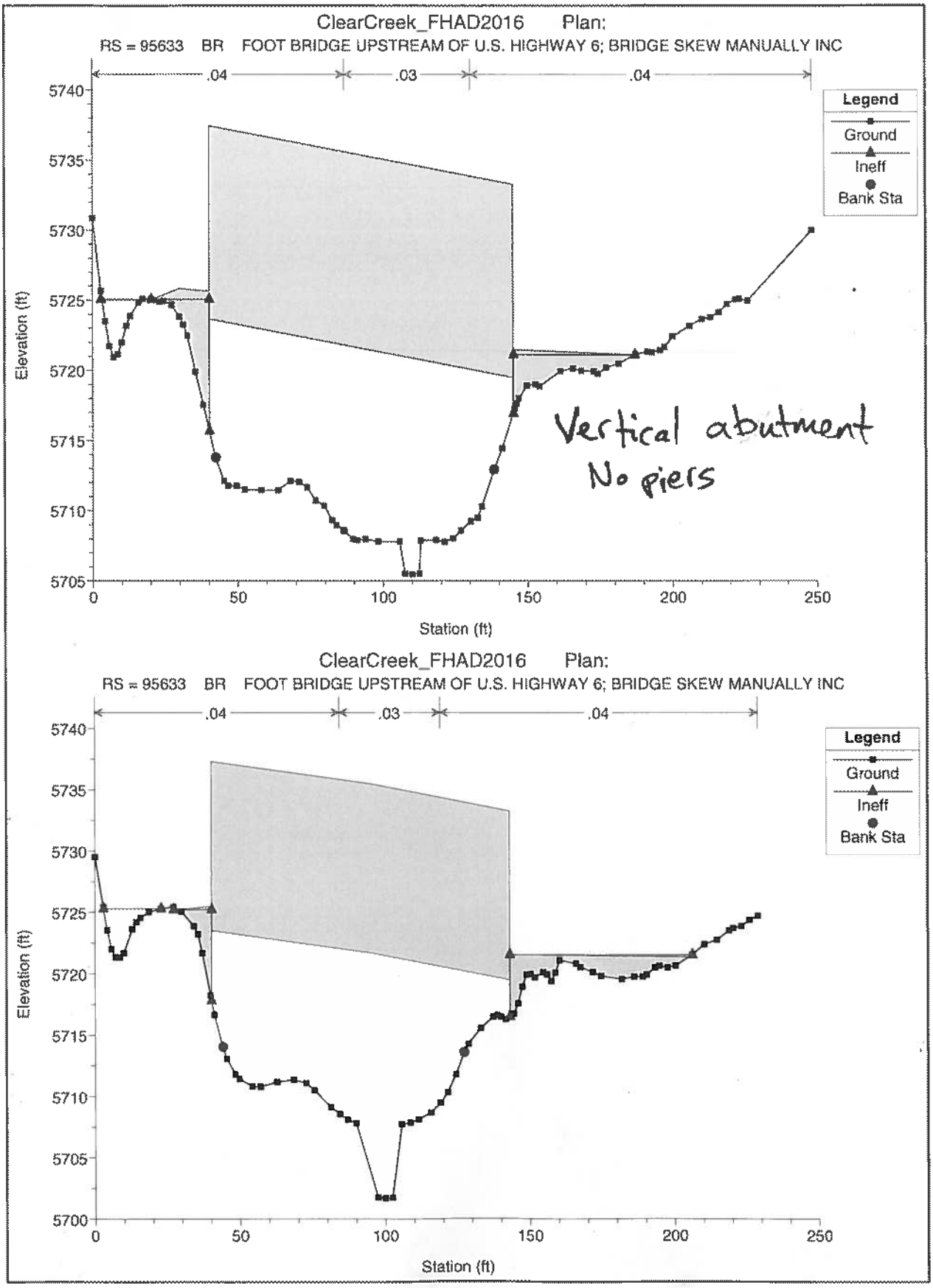
	Left	Center	Right
Elevation Top of Rail:			
Elevation Top of Bridge:			
Elevation Roadway Deck:			
Elevation Low Chord:			

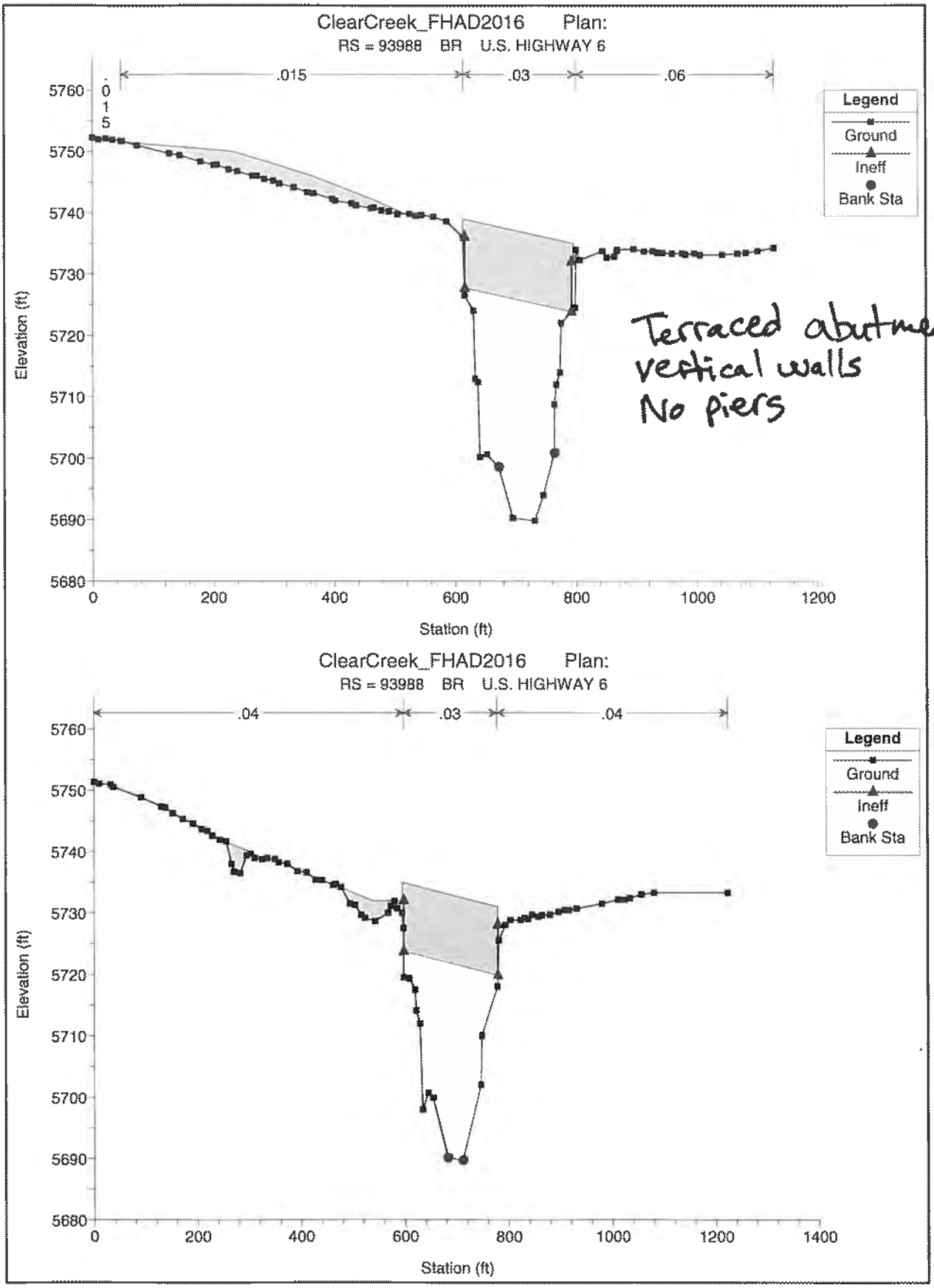
Elevation Invert:

Pictures:

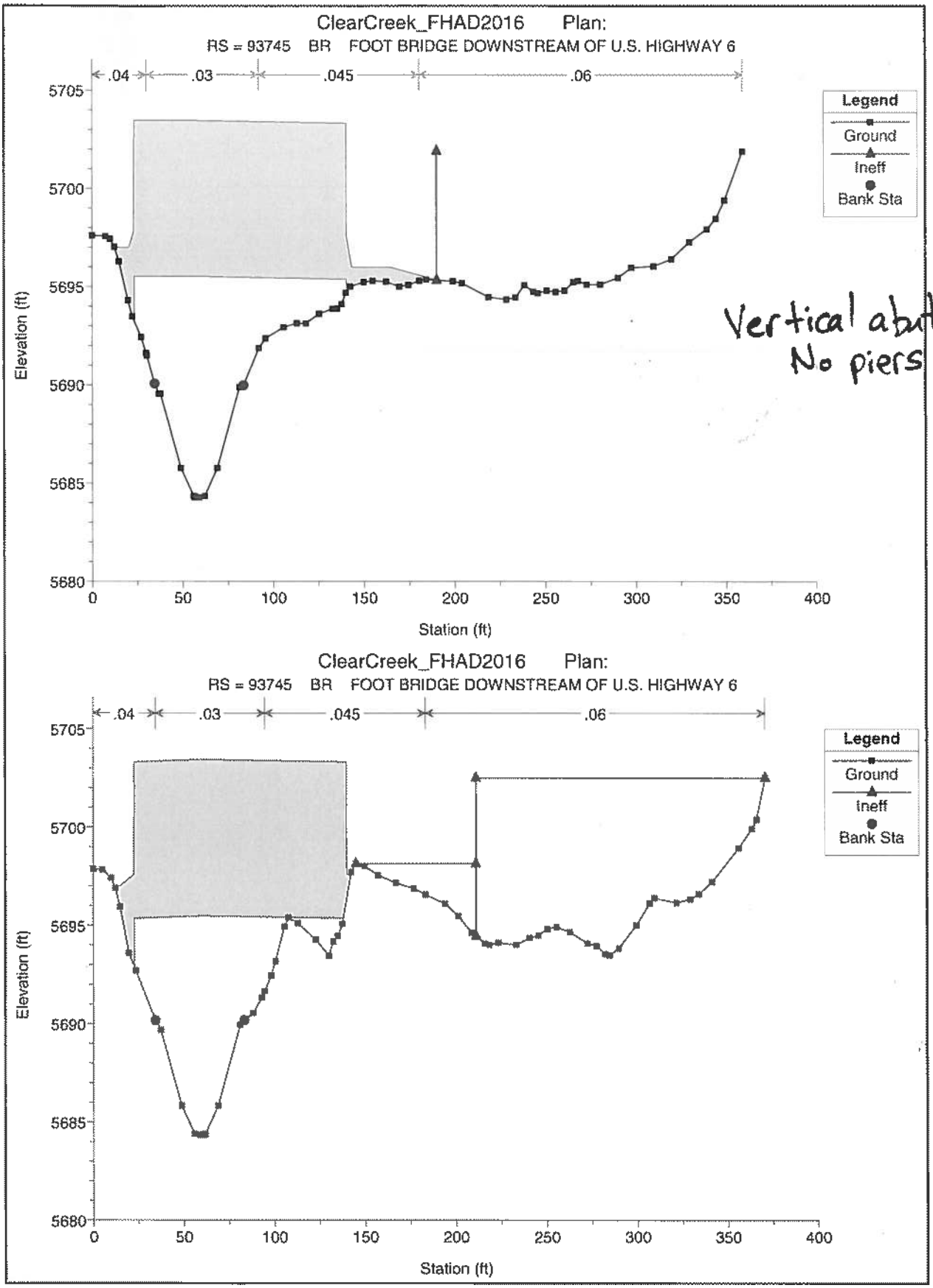
Sketch:

√BAS


ClearCreek_FHAD2016 Plan:
RS = 95633 BR FOOT BRIDGE UPSTREAM OF U.S. HIGHWAY 6; BRIDGE SKEW MANUALLY INC
.04
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Vertical abutment
No piers
ClearCreek_FHAD2016 Plan:
RS = 95633 BR FOOT BRIDGE UPSTREAM OF U.S. HIGHWAY 6; BRIDGE SKEW MANUALLY INC
.04
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

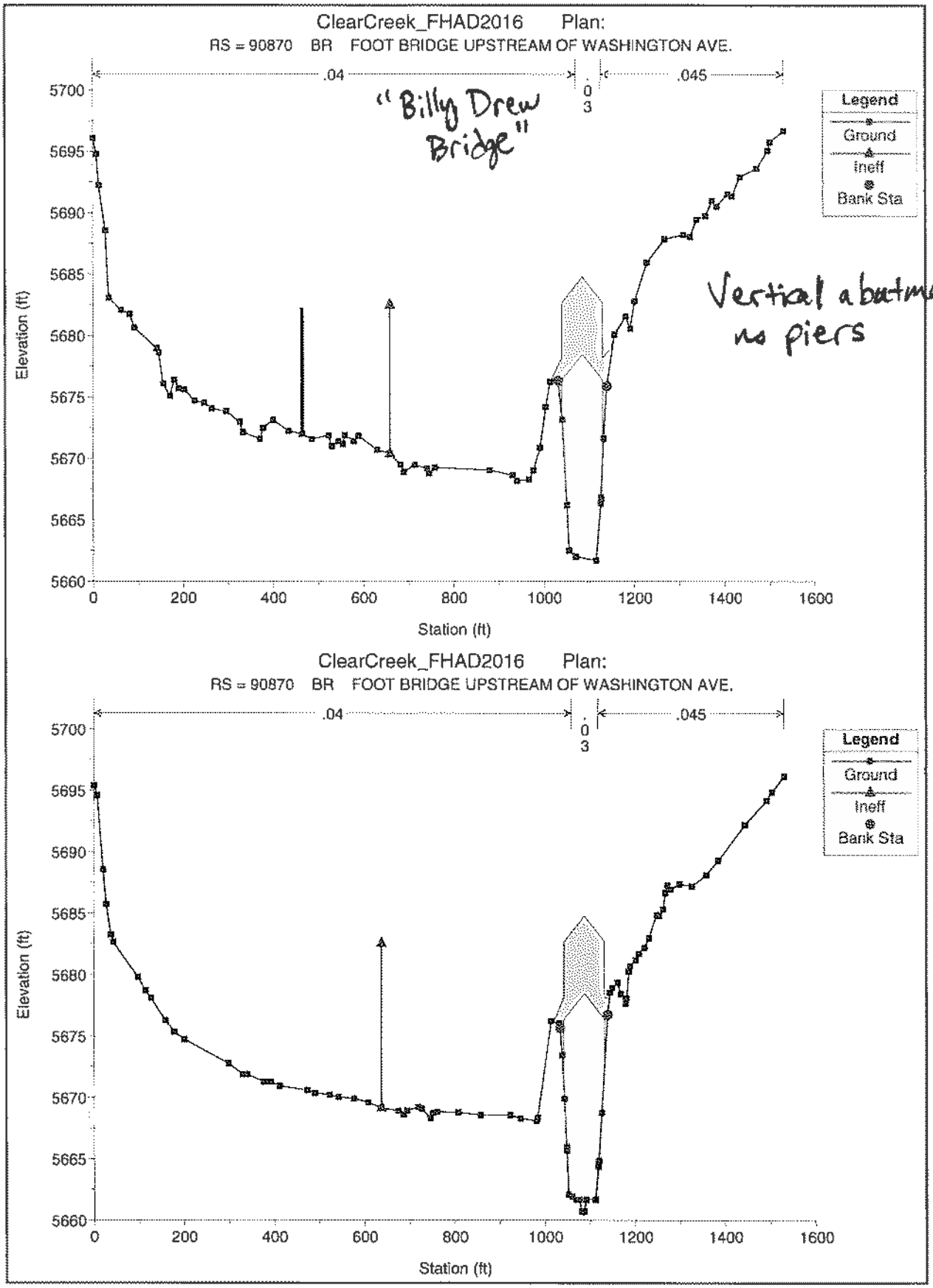

ClearCreek_FHAD2016 Plan:
RS = 93988 BR U.S. HIGHWAY 6
.015
.03
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5760
5750
5740
5730
5720
5710
5700
5690
5680
0
200
400
600
800
1000
1200
Terraced abutments
vertical walls
No piers
ClearCreek_FHAD2016 Plan:
RS = 93988 BR U.S. HIGHWAY 6
.04
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1400

√BAS

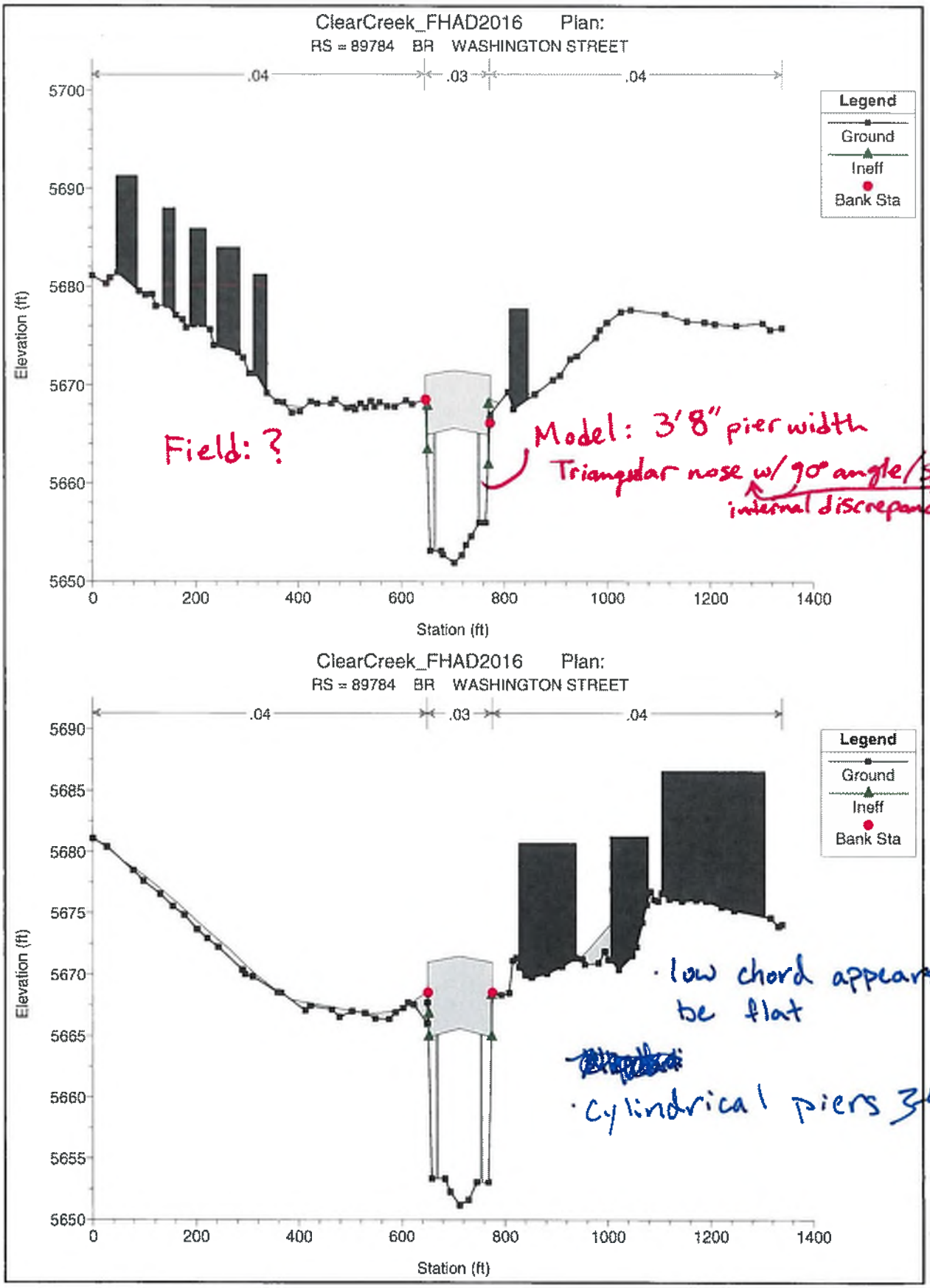


Vertical abutments
No piers

√ BAS

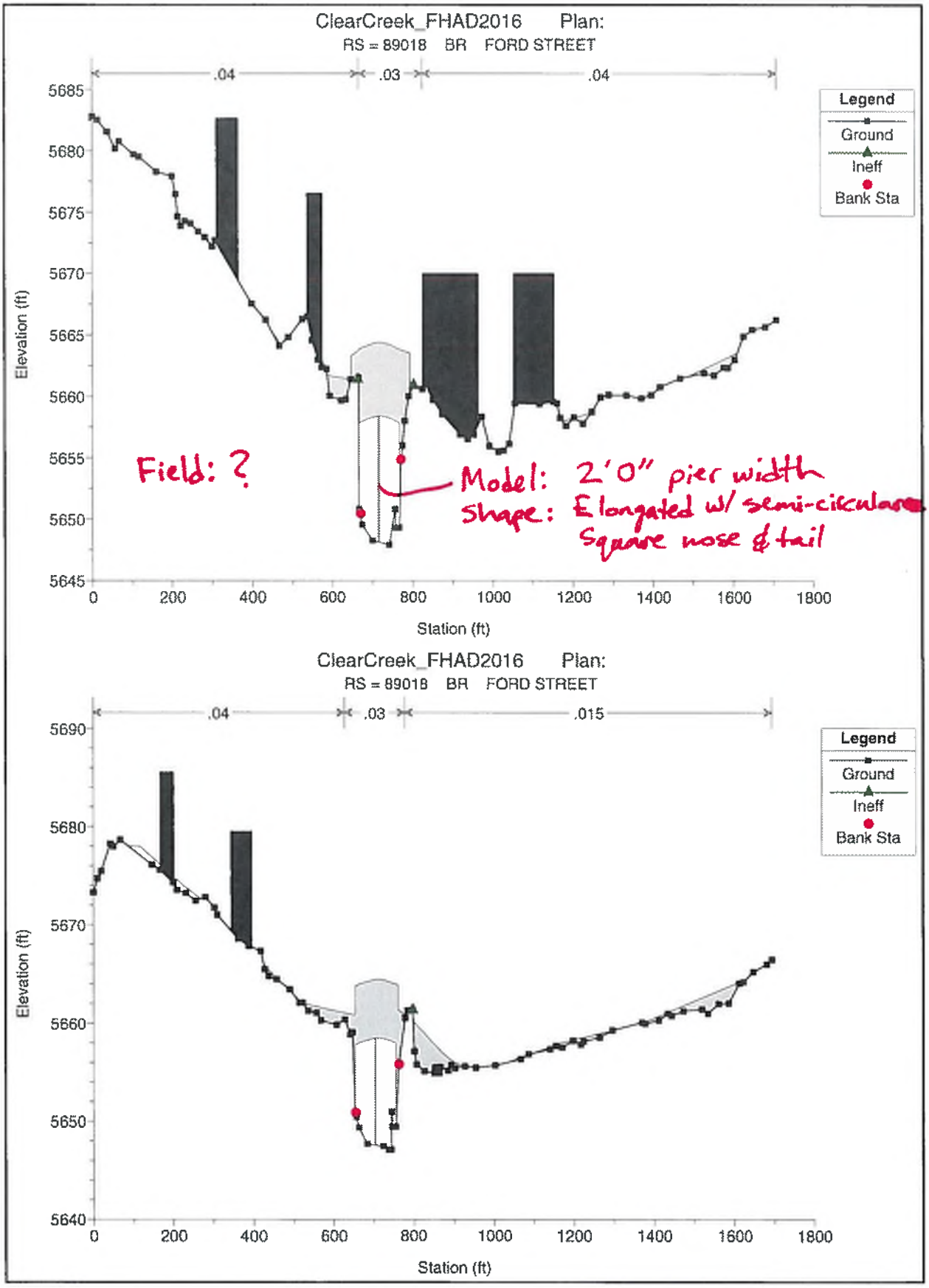

ClearCreek_FHAD2016 Plan:
RS = 90870 BR FOOT BRIDGE UPSTREAM OF WASHINGTON AVE.
.04
.03
.045
"Billy Drew Bridge"
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5700
5695
5690
5685
5680
5675
5670
5665
5660
0
200
400
600
800
1000
1200
1400
1600
Vertical abutments
no piers
ClearCreek_FHAD2016 Plan:
RS = 90870 BR FOOT BRIDGE UPSTREAM OF WASHINGTON AVE.
.04
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

✓NAS

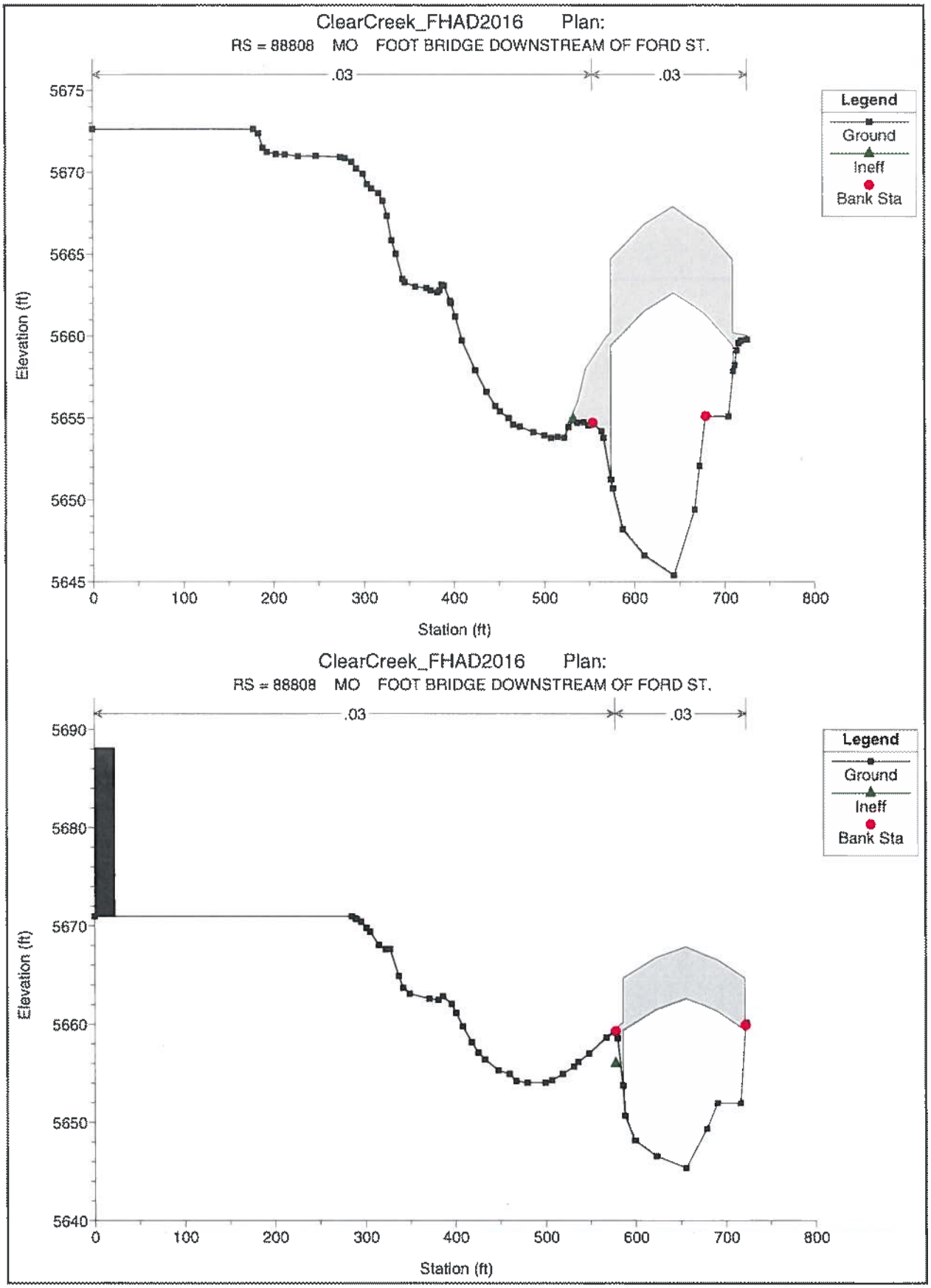

ClearCreek_FHAD2016 Plan:
RS = 89784 BR WASHINGTON STREET
.04
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5700
5690
5680
5670
5660
5650
0
200
400
600
800
1000
1200
1400
Field: ?
Model: 3'8" pier width
Triangular nose w/ 90° angle/square nose
internal discrepancy
ClearCreek_FHAD2016 Plan:
RS = 89784 BR WASHINGTON STREET
.04
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5690
5685
5680
5675
5670
5665
5660
5655
5650
0
200
400
600
800
1000
1200
1400
· low chord appears to be flat
· cylindrical piers 3'4" wide

✓ NAS

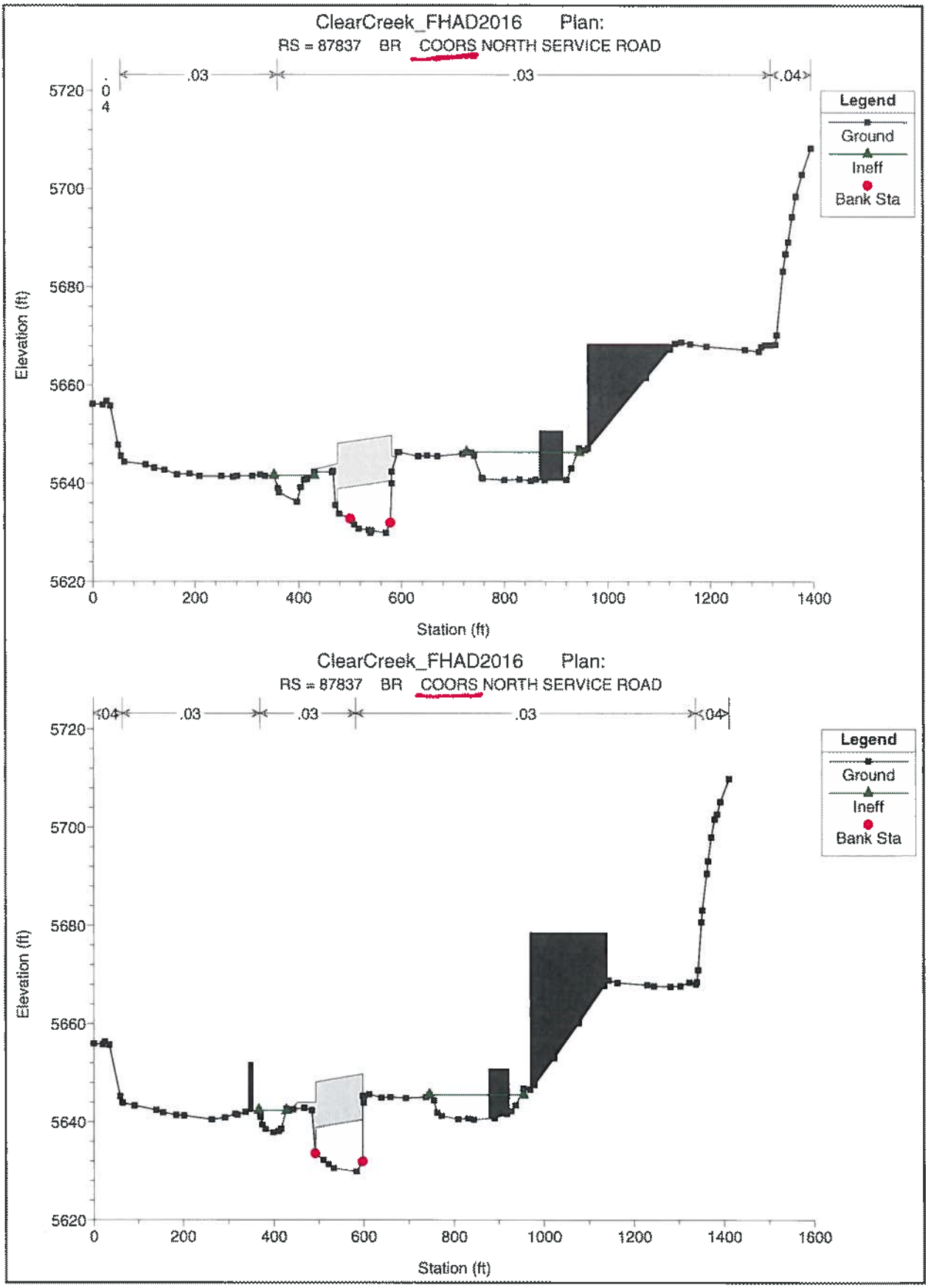
6


ClearCreek_FHAD2016 Plan:
RS = 89018 BR FORD STREET
.04
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Field: ?
Model: 2'0" pier width
Shape: Elongated w/ semi-circular ends/
Square nose & tail
ClearCreek_FHAD2016 Plan:
RS = 89018 BR FORD STREET
.04
.03
.015
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

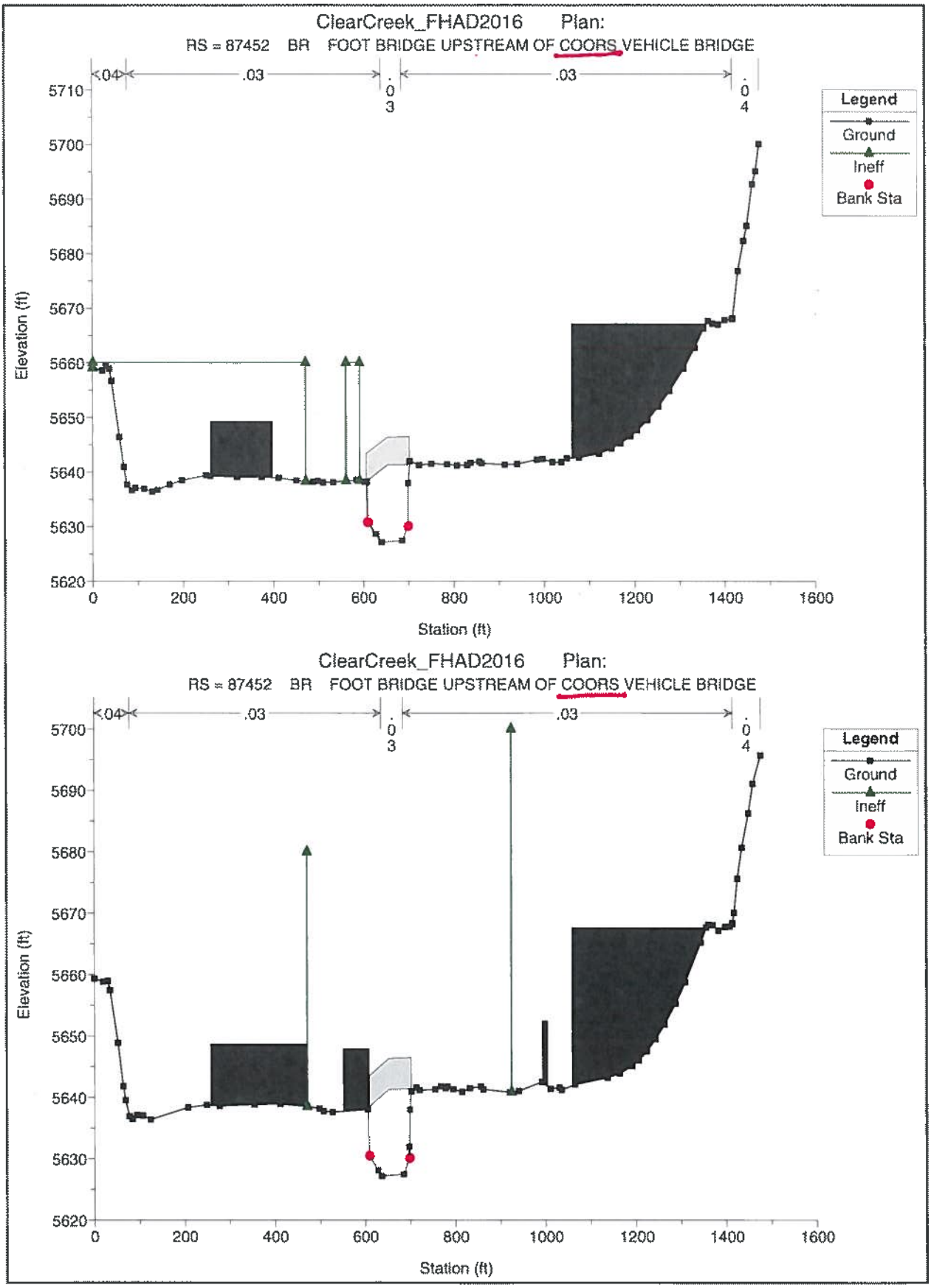
✓NAS


ClearCreek_FHAD2016 Plan:
RS = 88808 MO FOOT BRIDGE DOWNSTREAM OF FORD ST.
.03
.03
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5675
5670
5665
5660
5655
5650
5645
0
100
200
300
400
500
600
700
800
ClearCreek_FHAD2016 Plan:
RS = 88808 MO FOOT BRIDGE DOWNSTREAM OF FORD ST.
.03
.03
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5690
5680
5670
5660
5650
5640
0
100
200
300
400
500
600
700
800

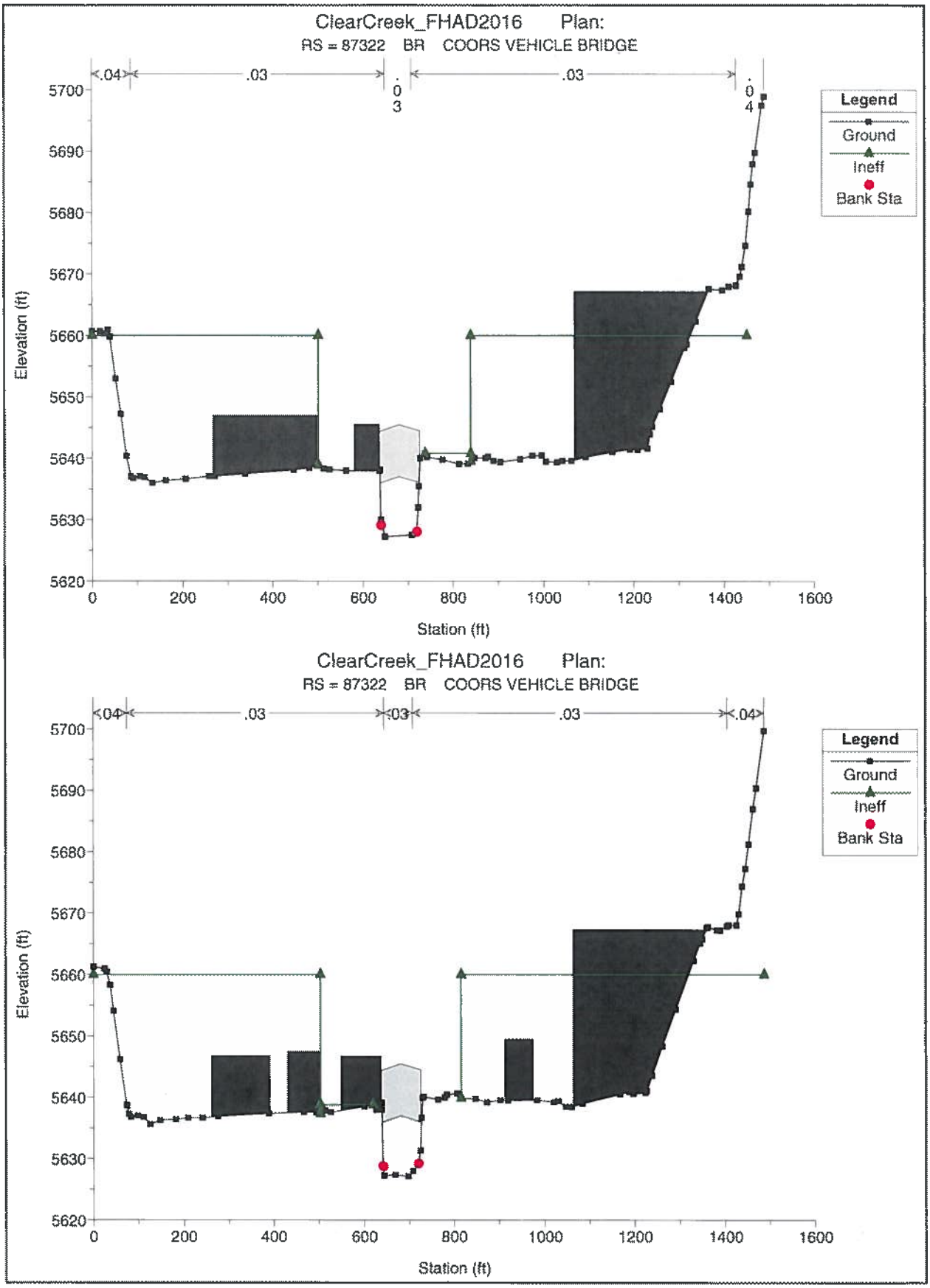
✓NAS


ClearCreek_FHAD2016 Plan:
RS = 87837 BR COORS NORTH SERVICE ROAD
.04
.03
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5720
5700
5680
5660
5640
5620
0
200
400
600
800
1000
1200
1400
Station (ft)
ClearCreek_FHAD2016 Plan:
RS = 87837 BR COORS NORTH SERVICE ROAD
.04
.03
.03
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5720
5700
5680
5660
5640
5620
0
200
400
600
800
1000
1200
1400
1600
Station (ft)

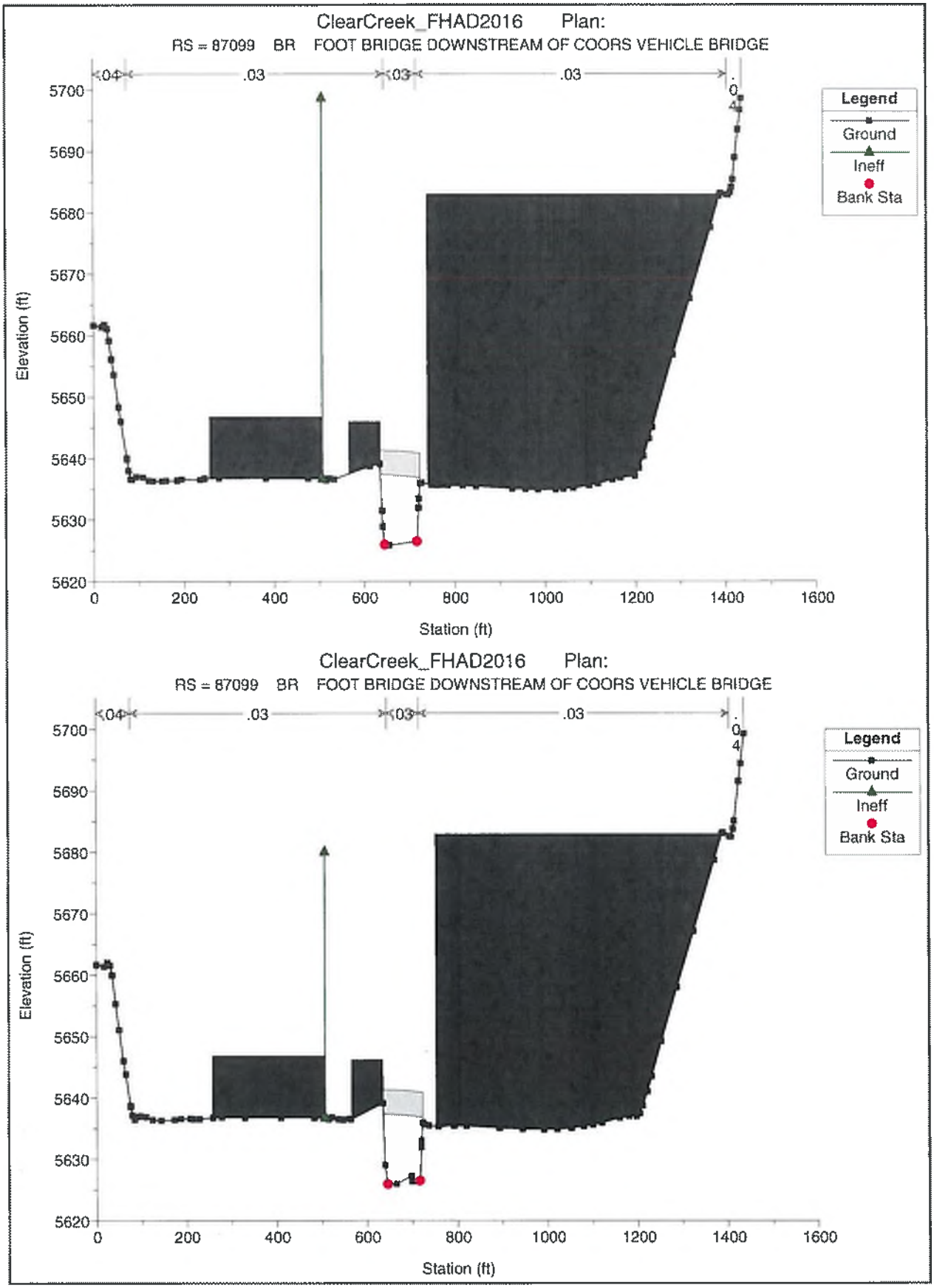
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 87452 BR FOOT BRIDGE UPSTREAM OF COORS VEHICLE BRIDGE
.04
.03
.03
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5710
5700
5690
5680
5670
5660
5650
5640
5630
5620
0
200
400
600
800
1000
1200
1400
1600
ClearCreek_FHAD2016 Plan:
RS = 87452 BR FOOT BRIDGE UPSTREAM OF COORS VEHICLE BRIDGE
.04
.03
.03
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5700
5690
5680
5670
5660
5650
5640
5630
5620
0
200
400
600
800
1000
1200
1400
1600

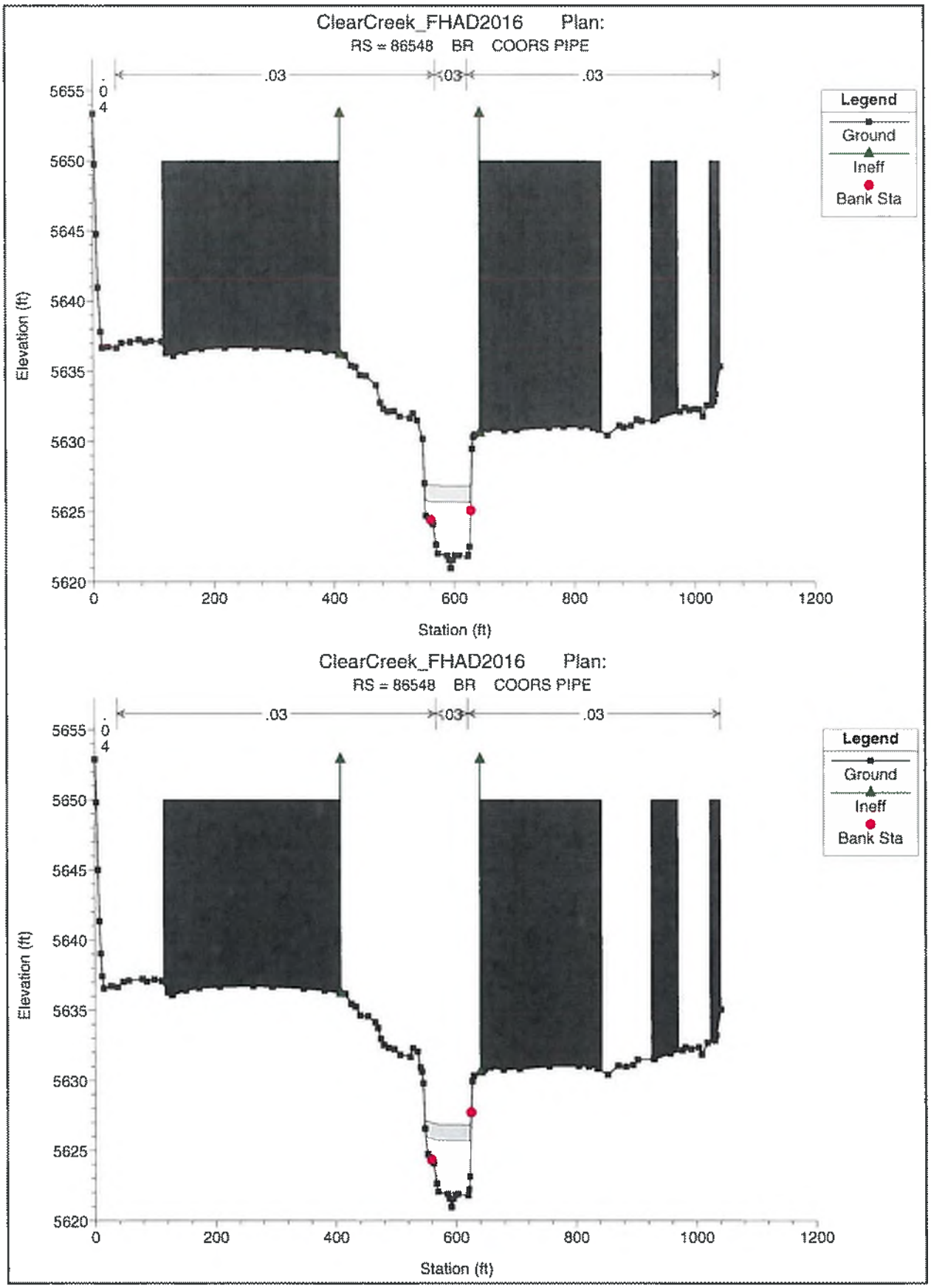
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 87322 BR COORS VEHICLE BRIDGE
.04
.03
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5700
5690
5680
5670
5660
5650
5640
5630
5620
0
200
400
600
800
1000
1200
1400
1600
ClearCreek_FHAD2016 Plan:
RS = 87322 BR COORS VEHICLE BRIDGE
.04
.03
.03
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

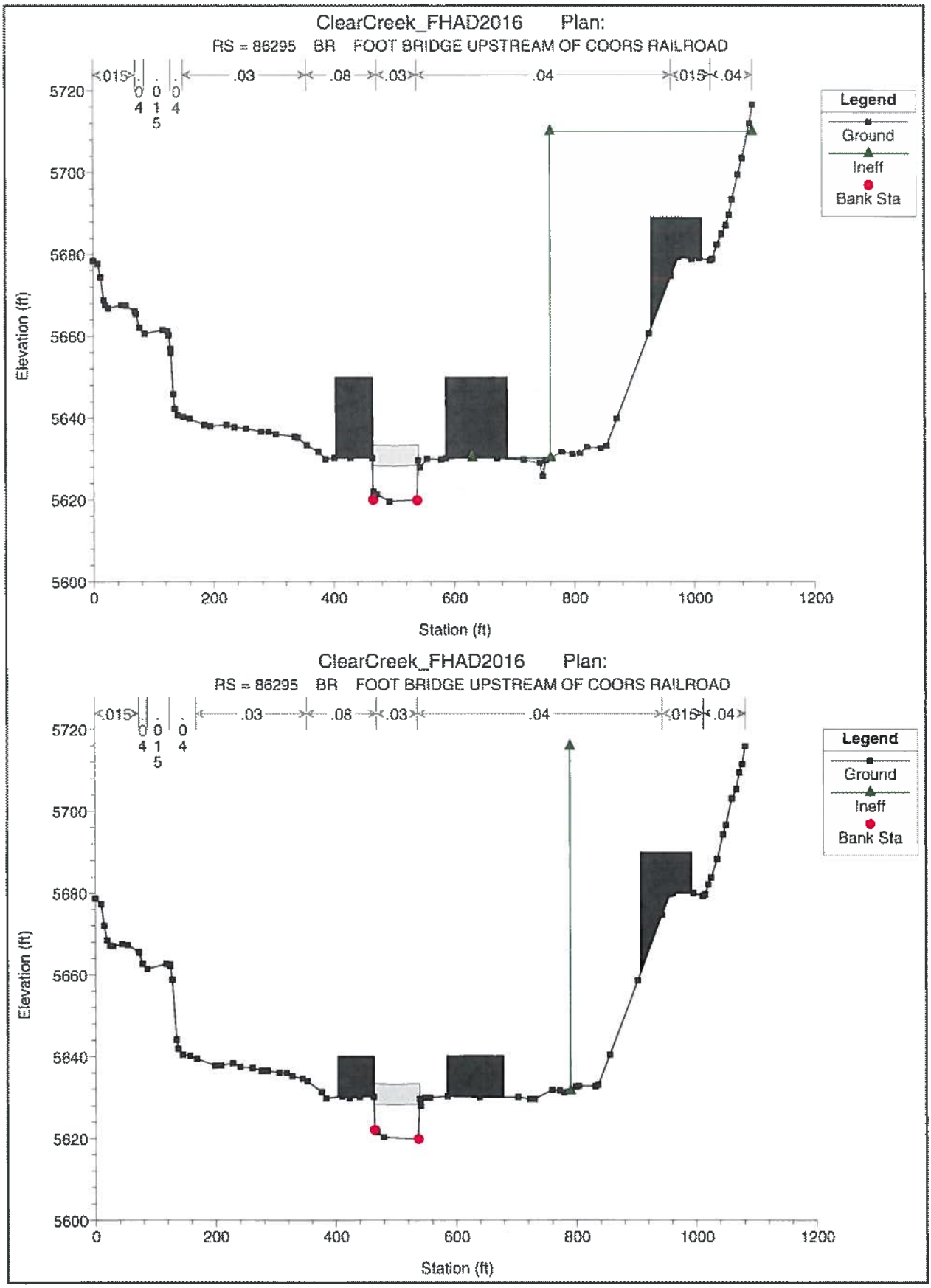
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 87099 BR FOOT BRIDGE DOWNSTREAM OF COORS VEHICLE BRIDGE
.04
.03
.03
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5700
5690
5680
5670
5660
5650
5640
5630
5620
0
200
400
600
800
1000
1200
1400
1600
Station (ft)
ClearCreek_FHAD2016 Plan:
RS = 87099 BR FOOT BRIDGE DOWNSTREAM OF COORS VEHICLE BRIDGE
.04
.03
.03
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5700
5690
5680
5670
5660
5650
5640
5630
5620
0
200
400
600
800
1000
1200
1400
1600
Station (ft)

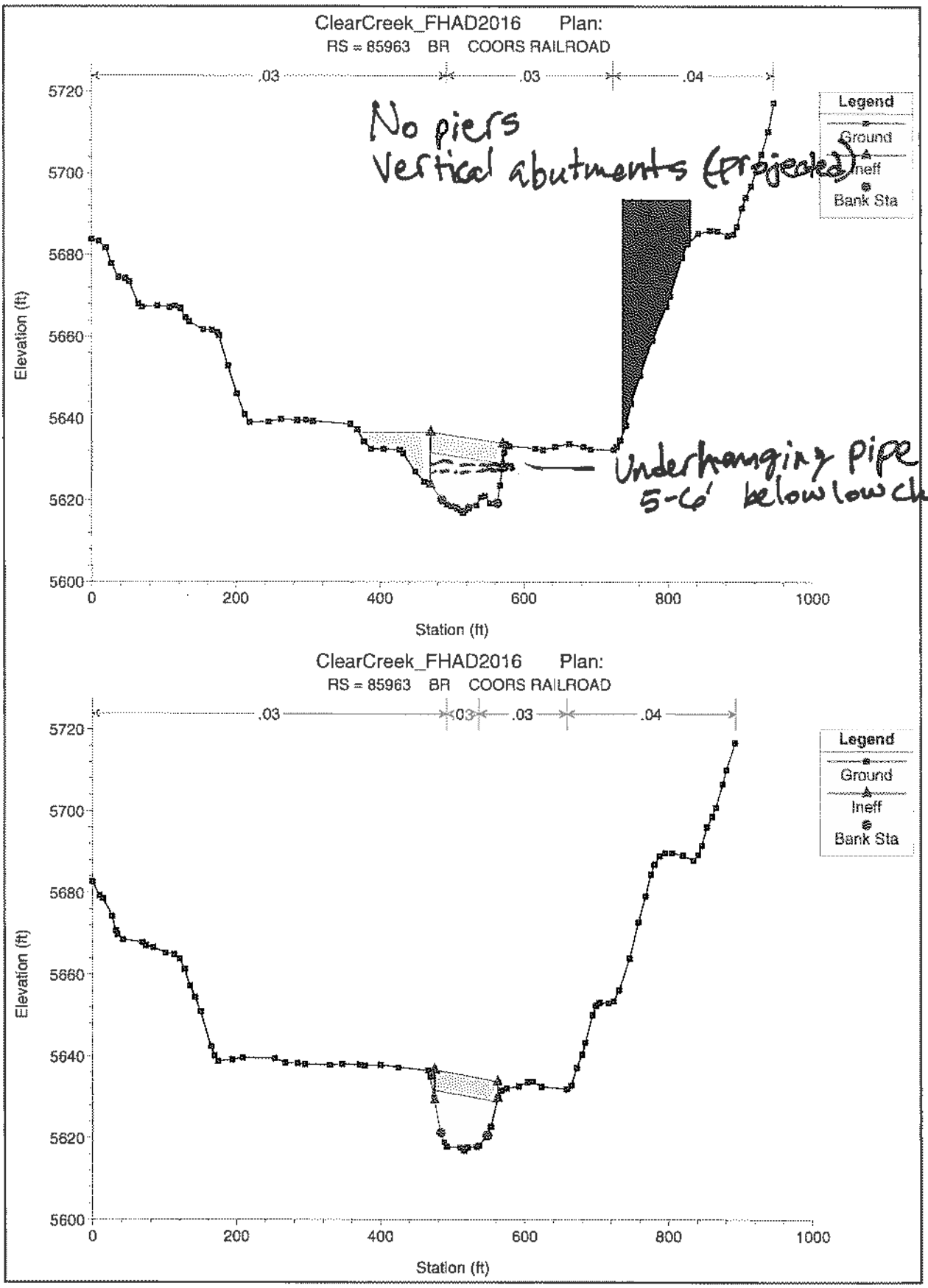
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 86548 BR COORS PIPE
.03
.03
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5655
5650
5645
5640
5635
5630
5625
5620
0
200
400
600
800
1000
1200
ClearCreek_FHAD2016 Plan:
RS = 86548 BR COORS PIPE
.03
.03
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

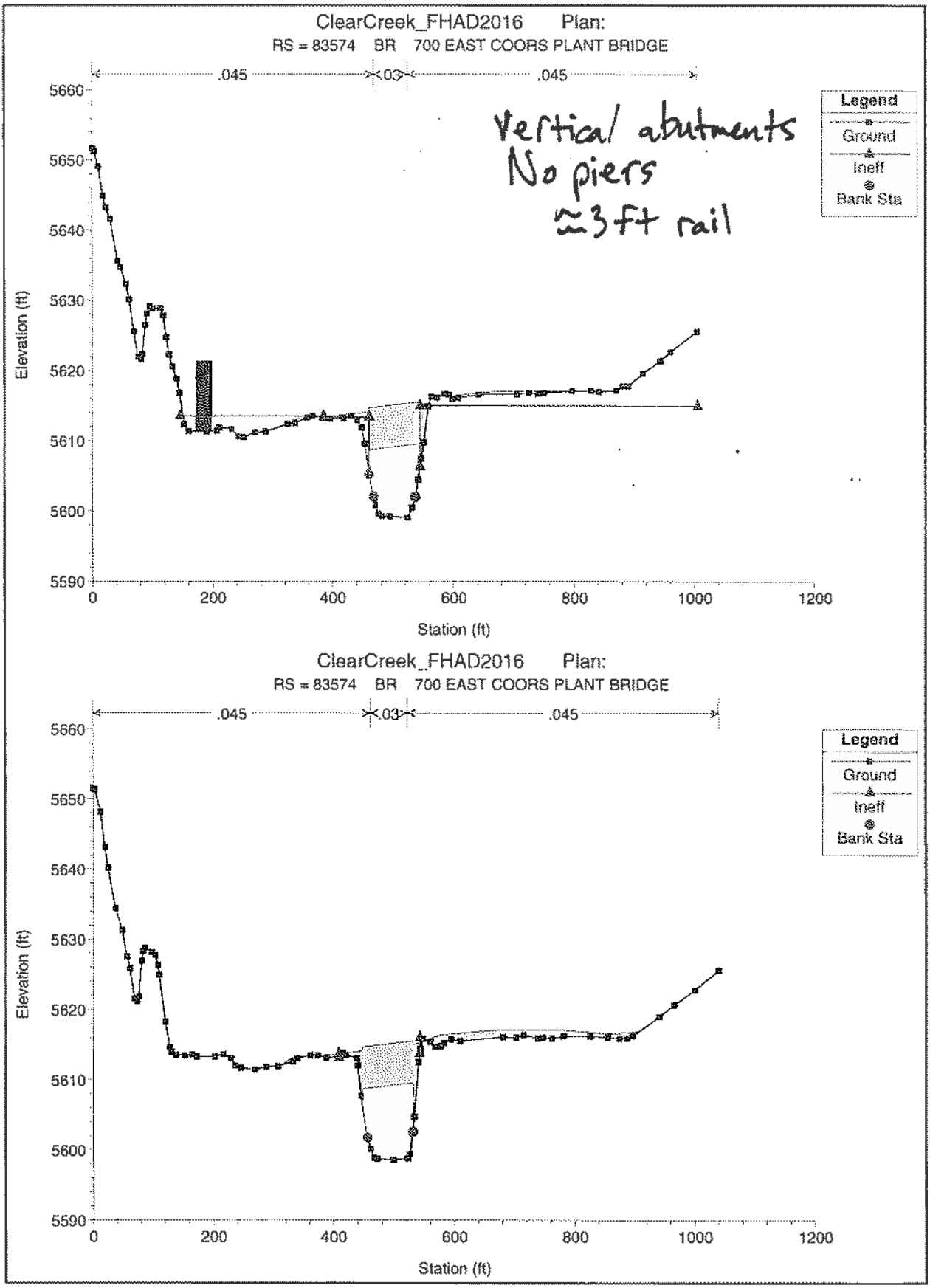
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 86295 BR FOOT BRIDGE UPSTREAM OF COORS RAILROAD
.015
.04
.015
.03
.08
.03
.04
.015
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5600
5620
5640
5660
5680
5700
5720
0
200
400
600
800
1000
1200
ClearCreek_FHAD2016 Plan:
RS = 86295 BR FOOT BRIDGE UPSTREAM OF COORS RAILROAD
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

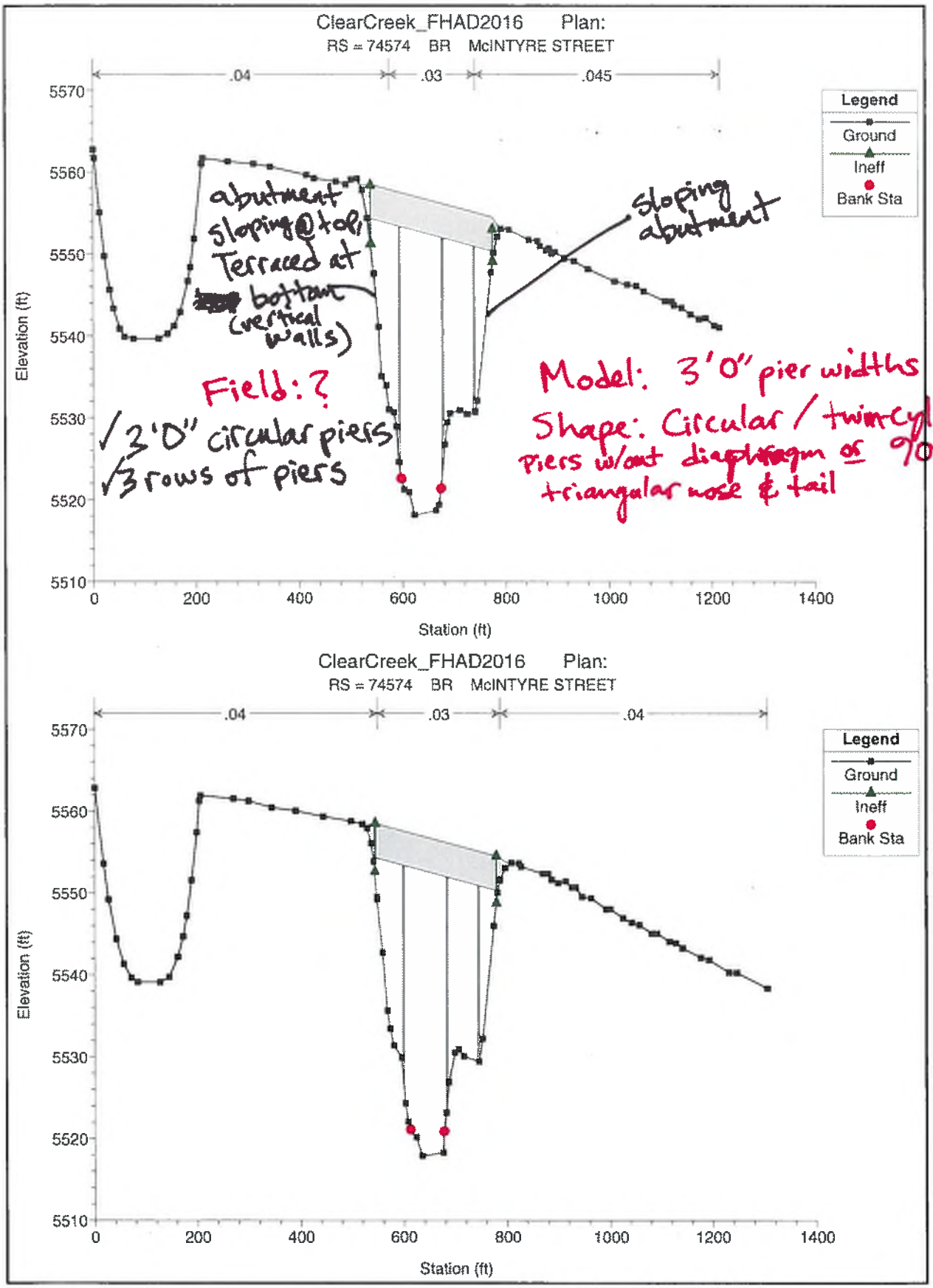
✓ BAS


ClearCreek_FHAD2016 Plan:
RS = 85963 BR COORS RAILROAD
.03
.03
.04
No piers
Vertical abutments (projected)
Legend
Ground
Ineff
Bank Sta
Underhanging pipe
5-6' below low chord
Elevation (ft)
Station (ft)
5600
5620
5640
5660
5680
5700
5720
0
200
400
600
800
1000
ClearCreek_FHAD2016 Plan:
RS = 85963 BR COORS RAILROAD
.03
.03
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

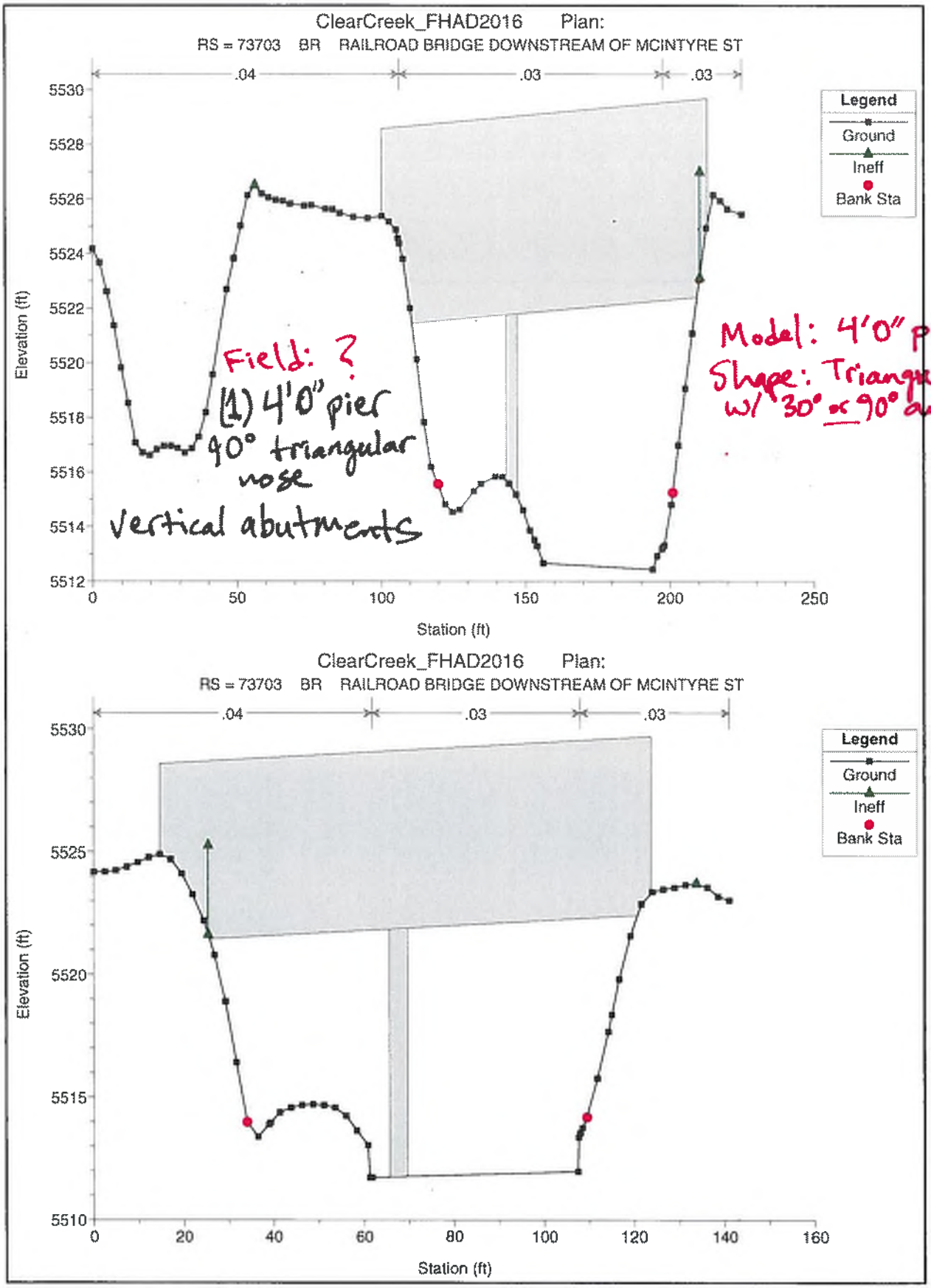
√BAS


ClearCreek_FHAD2016 Plan:
RS = 83574 BR 700 EAST COORS PLANT BRIDGE
.045
.03
.045
Vertical abutments
No piers
≃3ft rail
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5660
5650
5640
5630
5620
5610
5600
5590
0
200
400
600
800
1000
1200
Station (ft)
ClearCreek_FHAD2016 Plan:
RS = 83574 BR 700 EAST COORS PLANT BRIDGE
.045
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5660
5650
5640
5630
5620
5610
5600
5590
0
200
400
600
800
1000
1200
Station (ft)

✓BAS

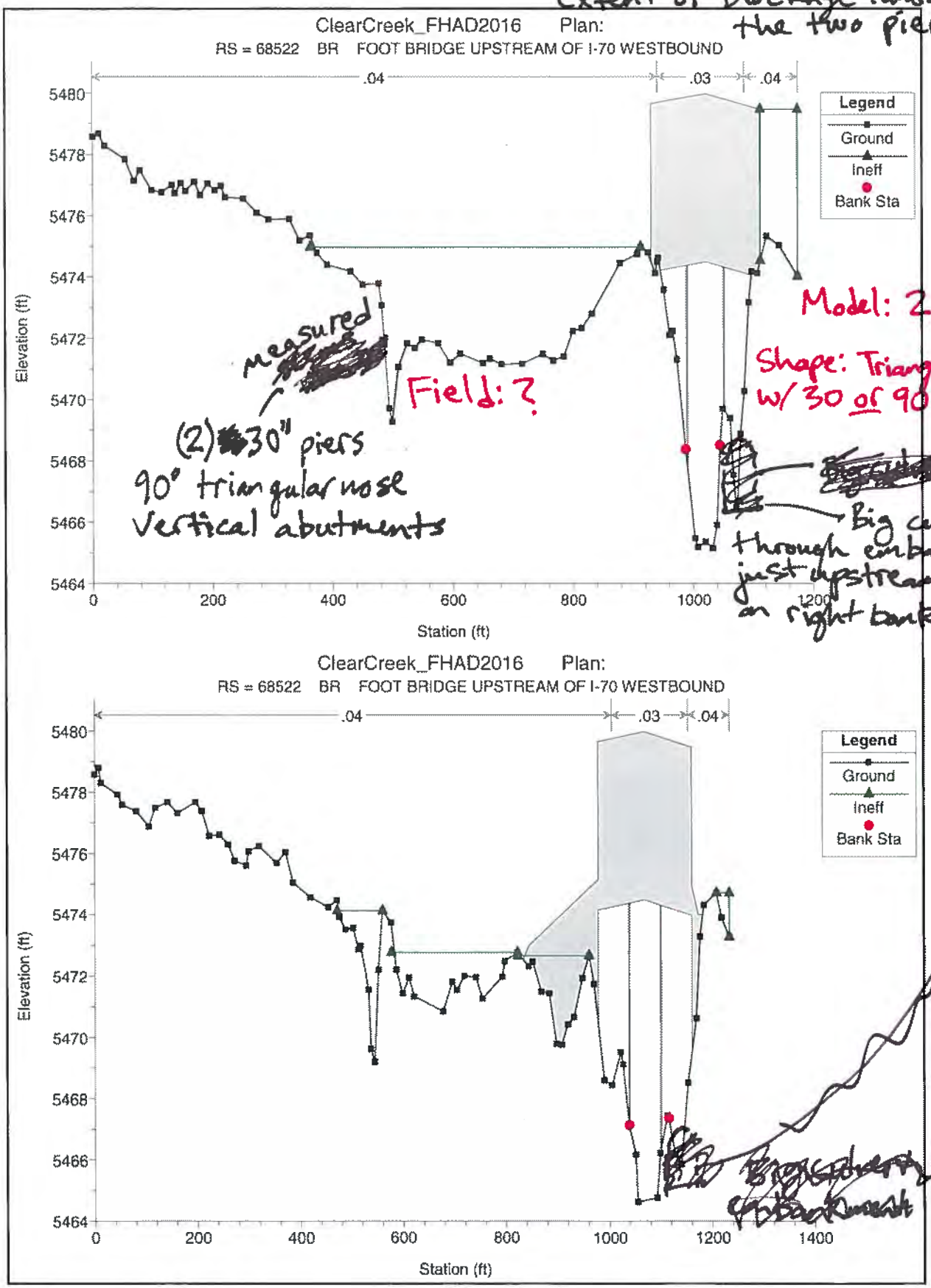

ClearCreek_FHAD2016 Plan:
RS = 74574 BR McINTYRE STREET
.04
.03
.045
Legend
Ground
Ineff
Bank Sta
abutment sloping@top, Terraced at bottom (vertical walls)
sloping abutment
Field: ?
✓3'0" circular piers
✓3 rows of piers
Model: 3'0" pier widths
Shape: Circular / twin cylinder piers w/out diaphragm or 90° triangular nose & tail
Elevation (ft)
Station (ft)
5570
5560
5550
5540
5530
5520
5510
0
200
400
600
800
1000
1200
1400
ClearCreek_FHAD2016 Plan:
RS = 74574 BR McINTYRE STREET
.04
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

✓BAS

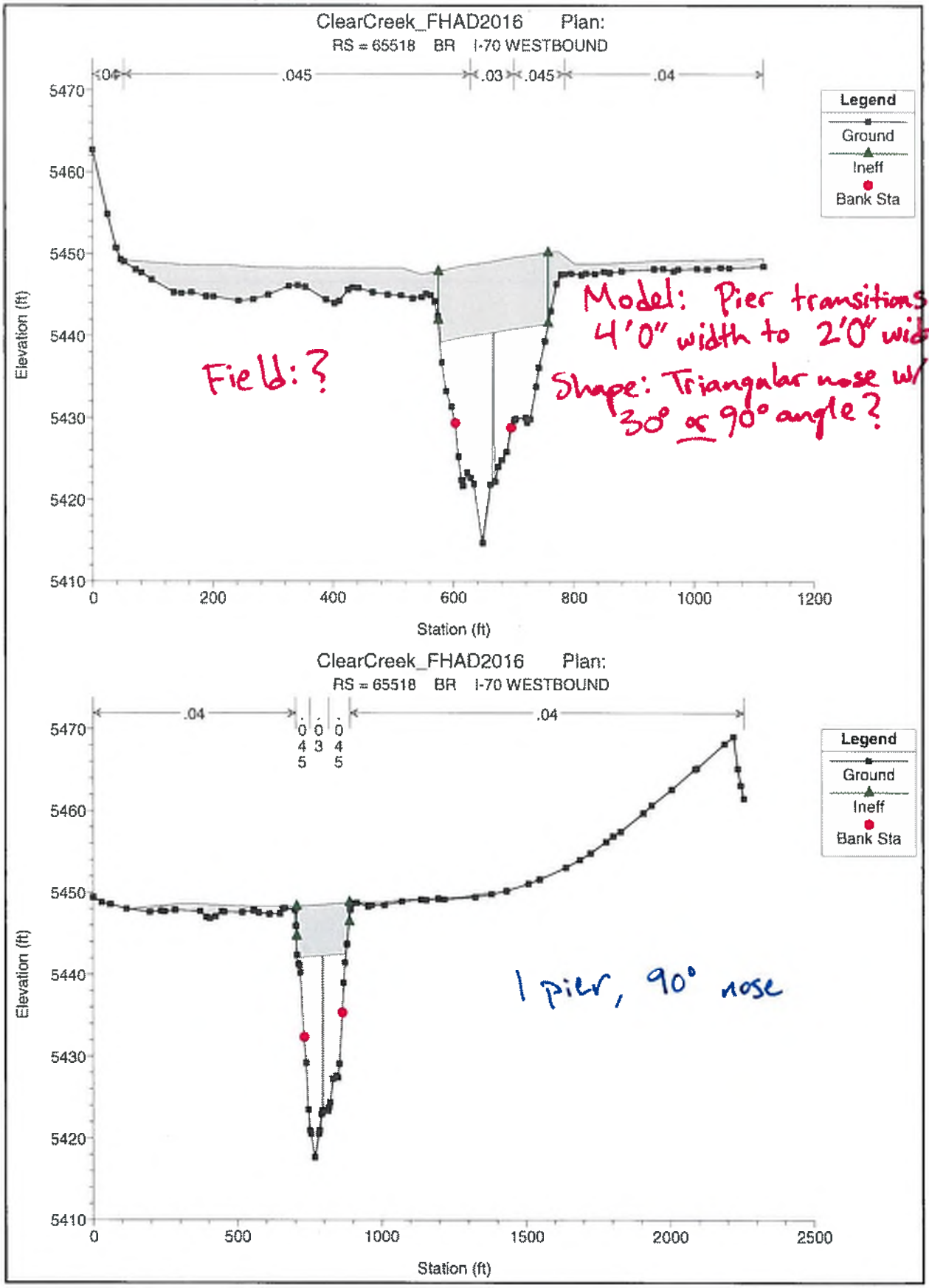

ClearCreek_FHAD2016 Plan:
RS = 73703 BR RAILROAD BRIDGE DOWNSTREAM OF MCINTYRE ST
.04
.03
.03
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Field: ?
(1) 4'0" pier
90° triangular nose
Vertical abutments
Model: 4'0" pier width
Shape: Triangular nose w/ 30° or 90° angle?
ClearCreek_FHAD2016 Plan:
RS = 73703 BR RAILROAD BRIDGE DOWNSTREAM OF MCINTYRE ST
.04
.03
.03
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

VBAS

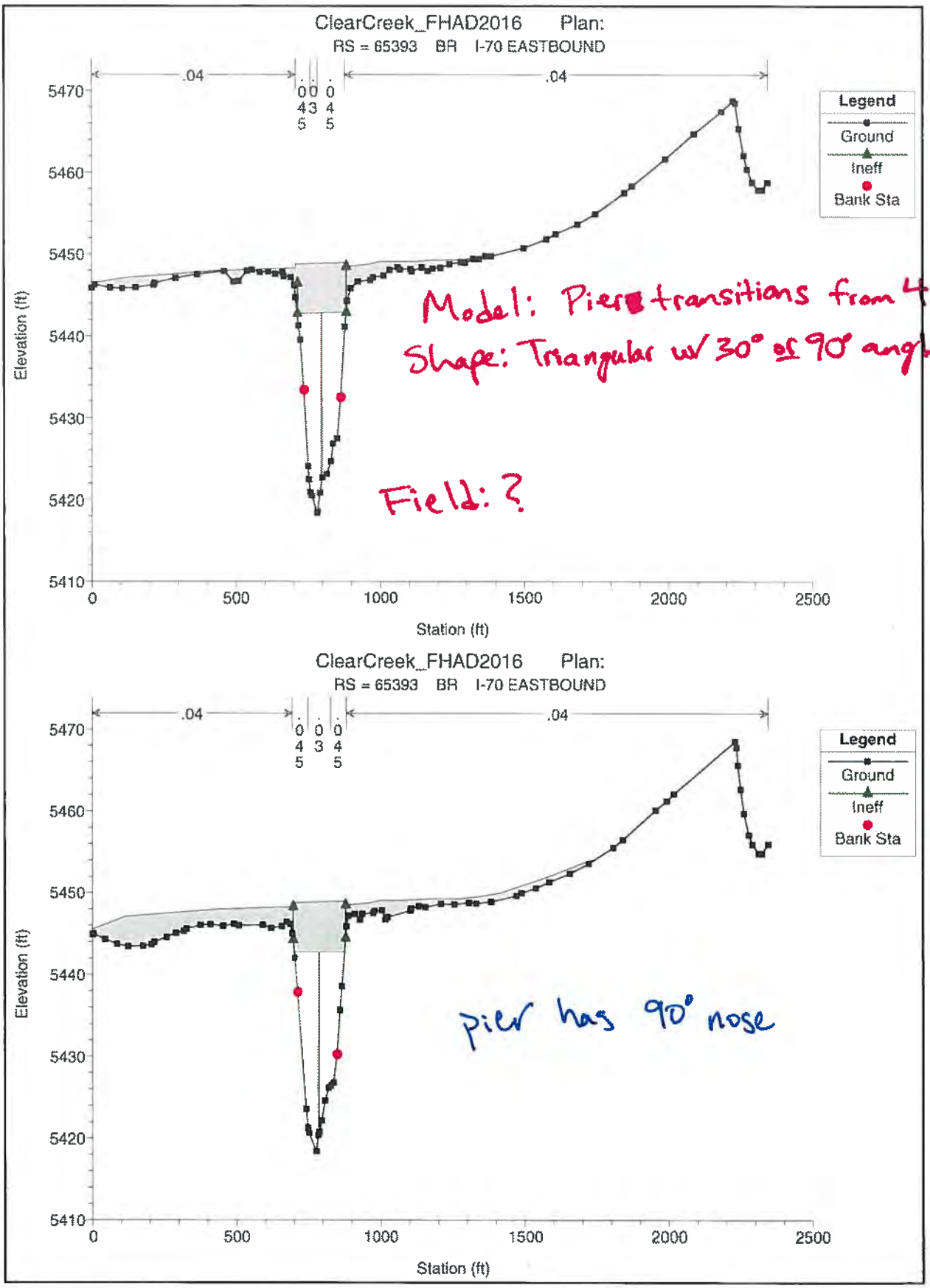
Check if XS upstream reflects extent of blockage landward of the two piers



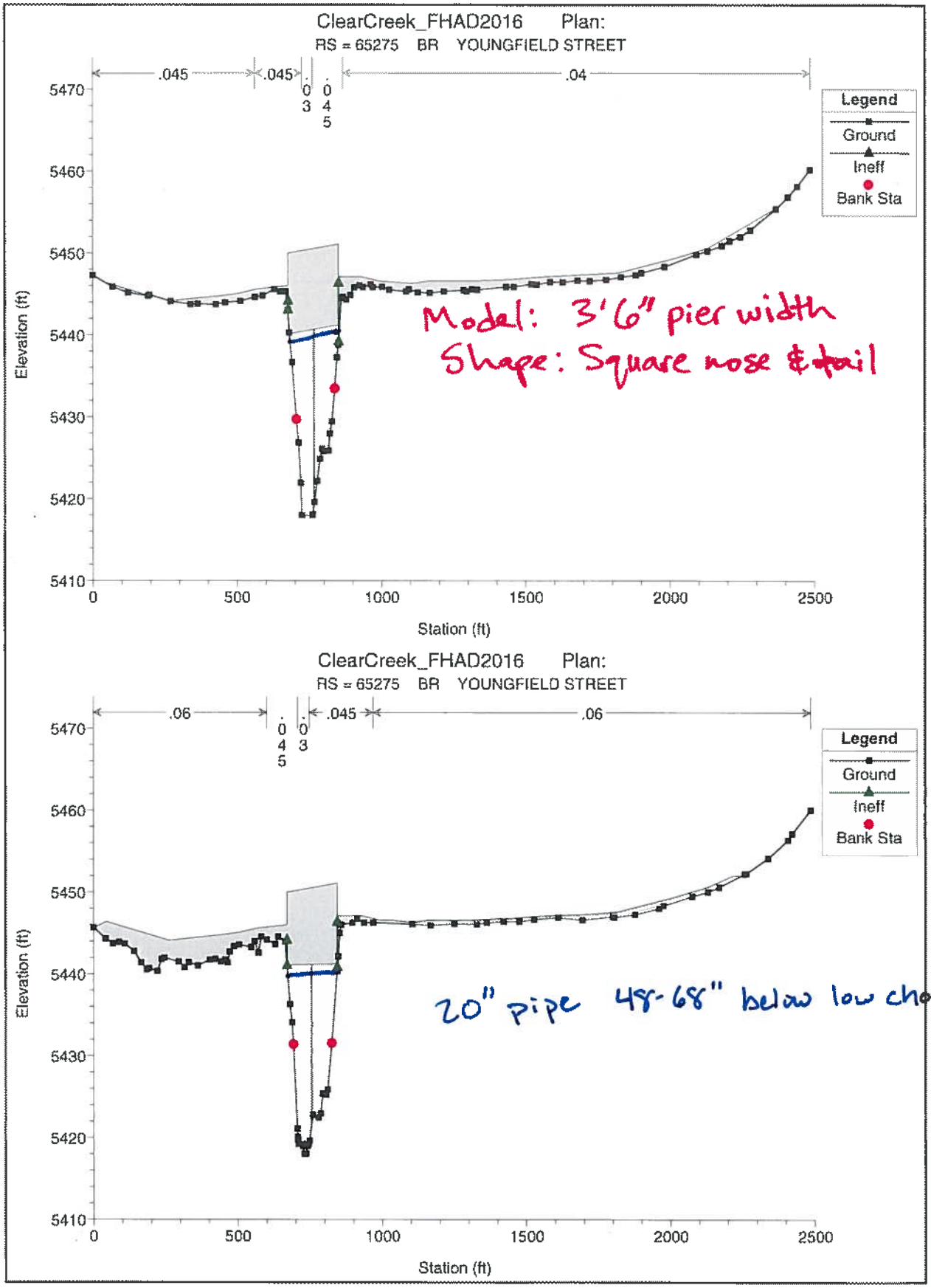
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 65518 BR I-70 WESTBOUND
.045
.03
.045
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Field: ?
Model: Pier transitions from 4'0" width to 2'0" width
Shape: Triangular nose w/ 30° or 90° angle?
ClearCreek_FHAD2016 Plan:
RS = 65518 BR I-70 WESTBOUND
.04
.045
.03
.045
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1 pier, 90° nose

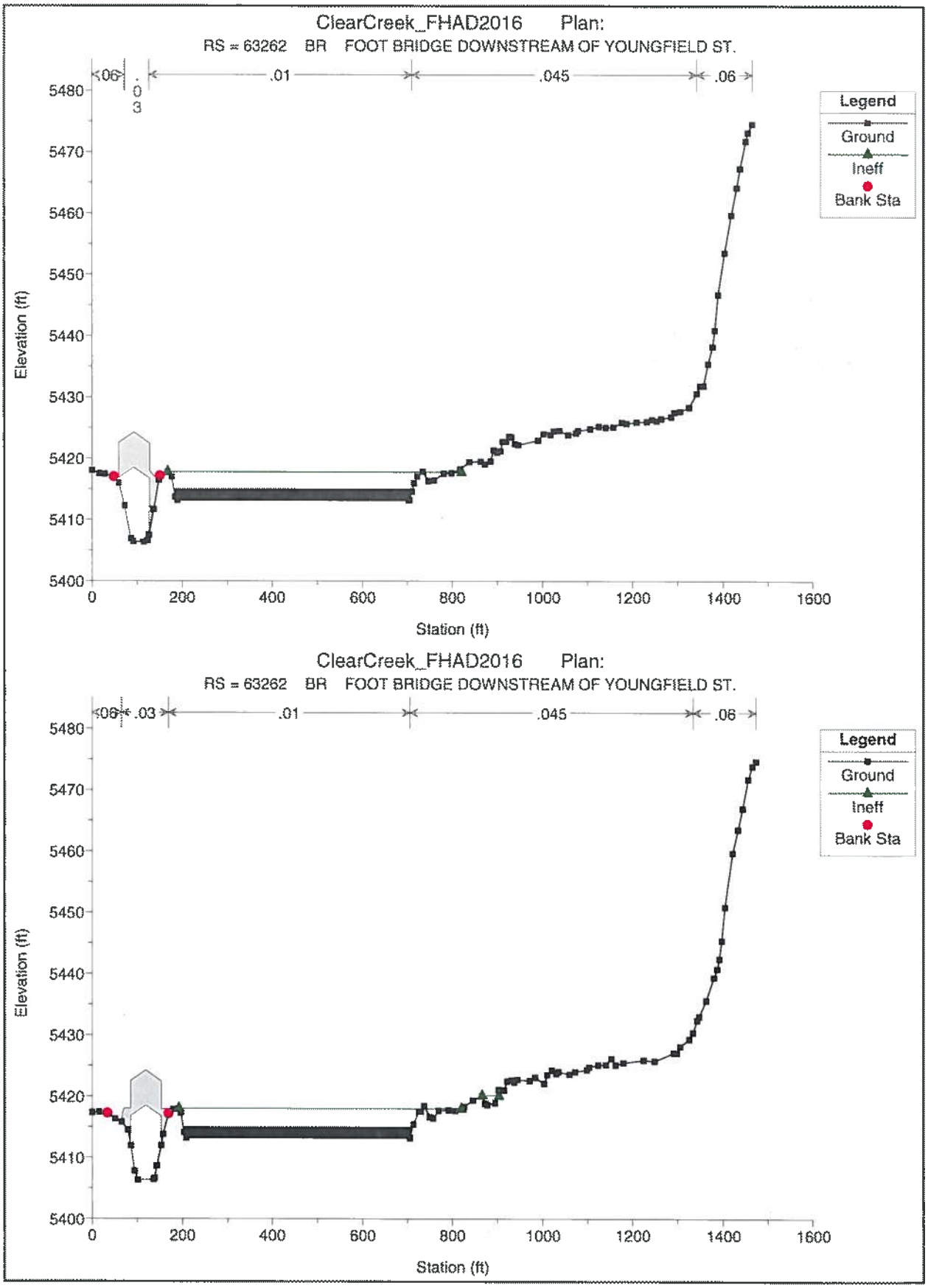
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 65393 BR I-70 EASTBOUND
.04
.045
.03
.045
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5470
5460
5450
5440
5430
5420
5410
0
500
1000
1500
2000
2500
Station (ft)
Model: Pier transitions from 4' to 2' width
Shape: Triangular w/ 30° or 90° angle?
Field: ?
ClearCreek_FHAD2016 Plan:
RS = 65393 BR I-70 EASTBOUND
.04
.045
.03
.045
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5470
5460
5450
5440
5430
5420
5410
0
500
1000
1500
2000
2500
Station (ft)
pier has 90° nose

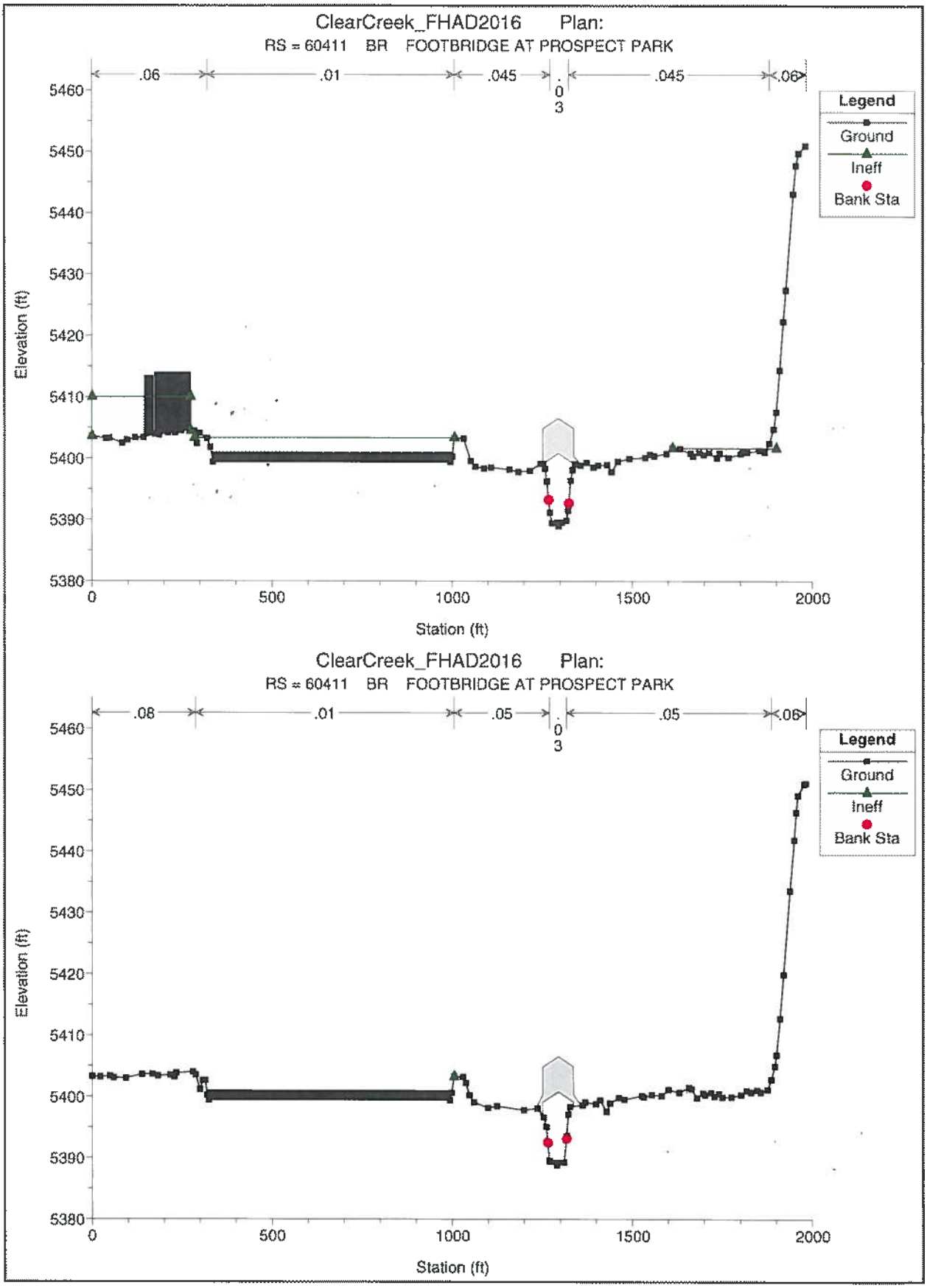
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 65275 BR YOUNGFIELD STREET
.045
.045
.03
.045
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5470
5460
5450
5440
5430
5420
5410
0
500
1000
1500
2000
2500
Station (ft)
Model: 3'6" pier width
Shape: Square nose & tail
ClearCreek_FHAD2016 Plan:
RS = 65275 BR YOUNGFIELD STREET
.06
.045
.045
.03
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5470
5460
5450
5440
5430
5420
5410
0
500
1000
1500
2000
2500
Station (ft)
20" pipe 48-68" below low chord

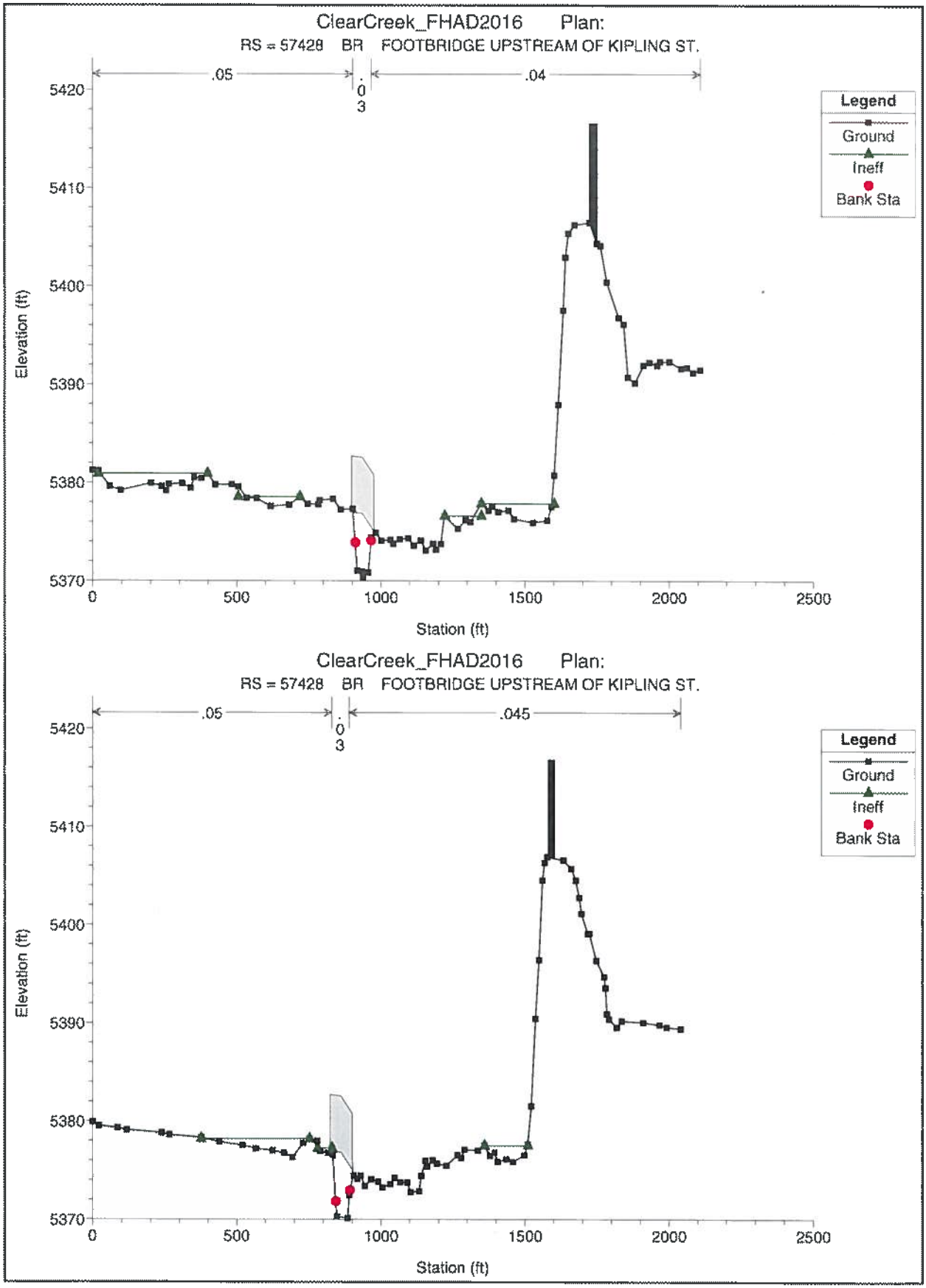
✓NAS


ClearCreek_FHAD2016 Plan:
RS = 63262 BR FOOT BRIDGE DOWNSTREAM OF YOUNGFIELD ST.
.06
.03
.01
.045
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5480
5470
5460
5450
5440
5430
5420
5410
5400
0
200
400
600
800
1000
1200
1400
1600
ClearCreek_FHAD2016 Plan:
RS = 63262 BR FOOT BRIDGE DOWNSTREAM OF YOUNGFIELD ST.
.06
.03
.01
.045
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

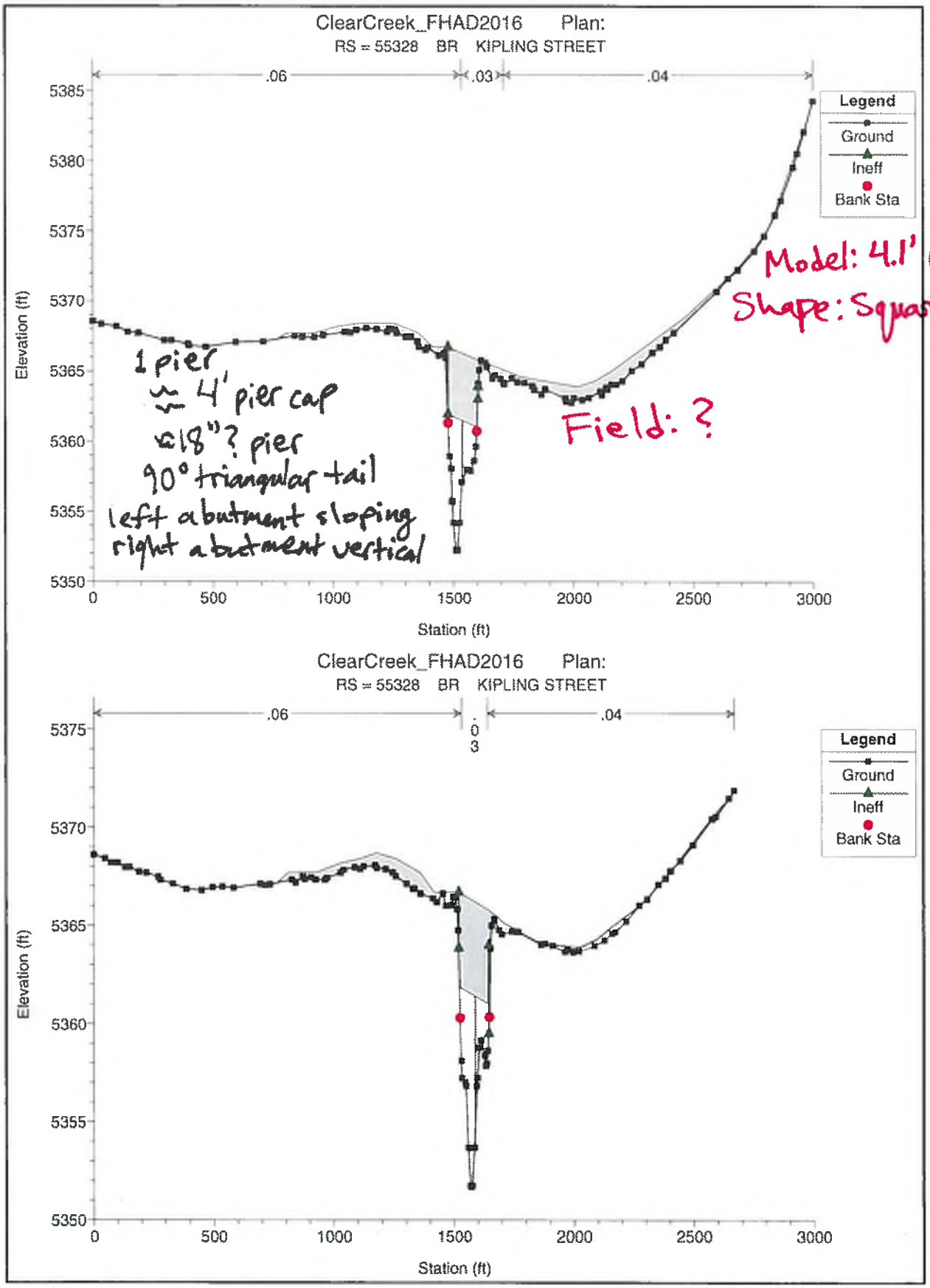
√NAS

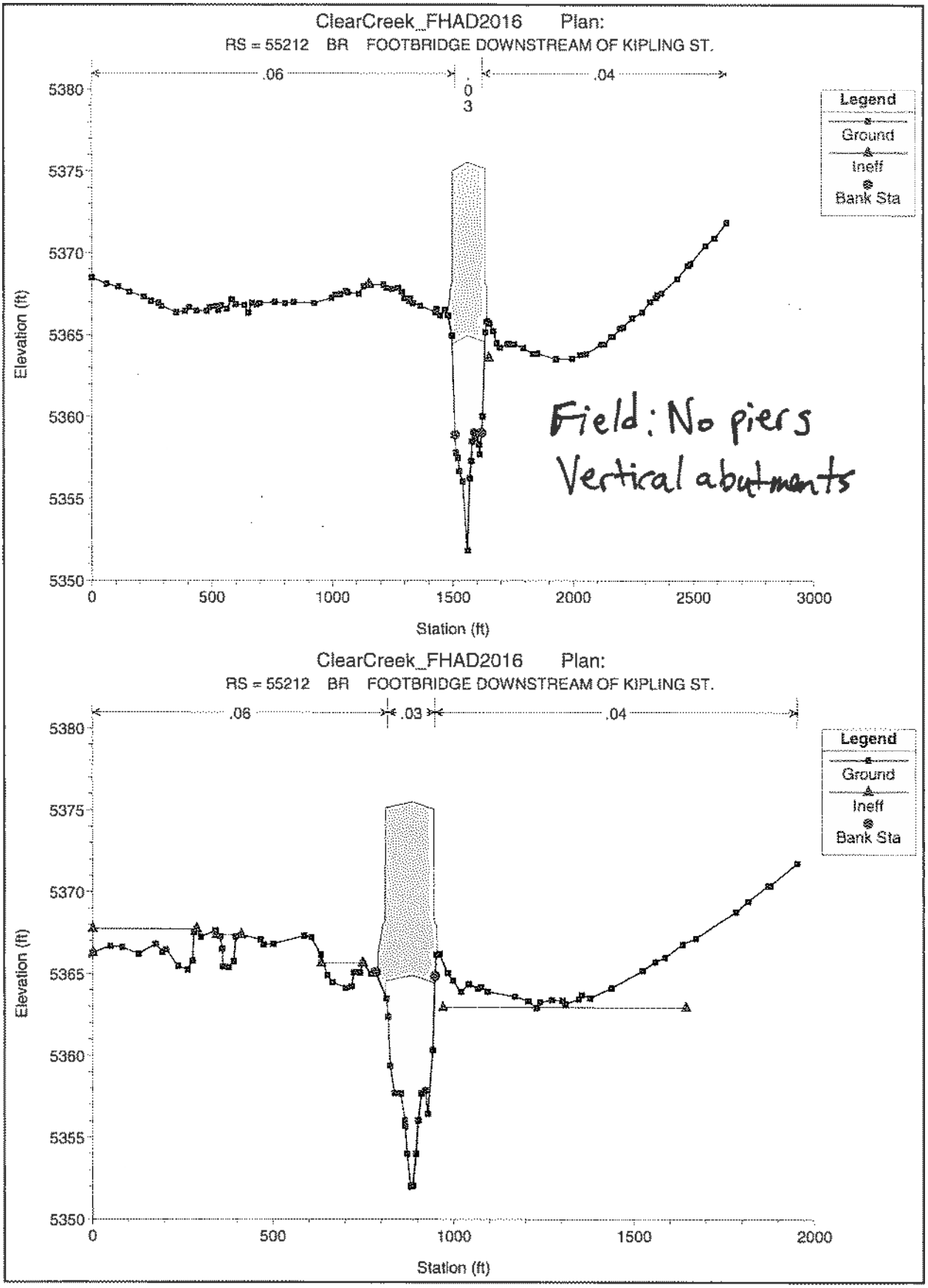

ClearCreek_FHAD2016 Plan:
RS = 60411 BR FOOTBRIDGE AT PROSPECT PARK
.06
.01
.045
.03
.045
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5460
5450
5440
5430
5420
5410
5400
5390
5380
0
500
1000
1500
2000
Station (ft)
ClearCreek_FHAD2016 Plan:
RS = 60411 BR FOOTBRIDGE AT PROSPECT PARK
.08
.01
.05
.03
.05
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5460
5450
5440
5430
5420
5410
5400
5390
5380
0
500
1000
1500
2000
Station (ft)

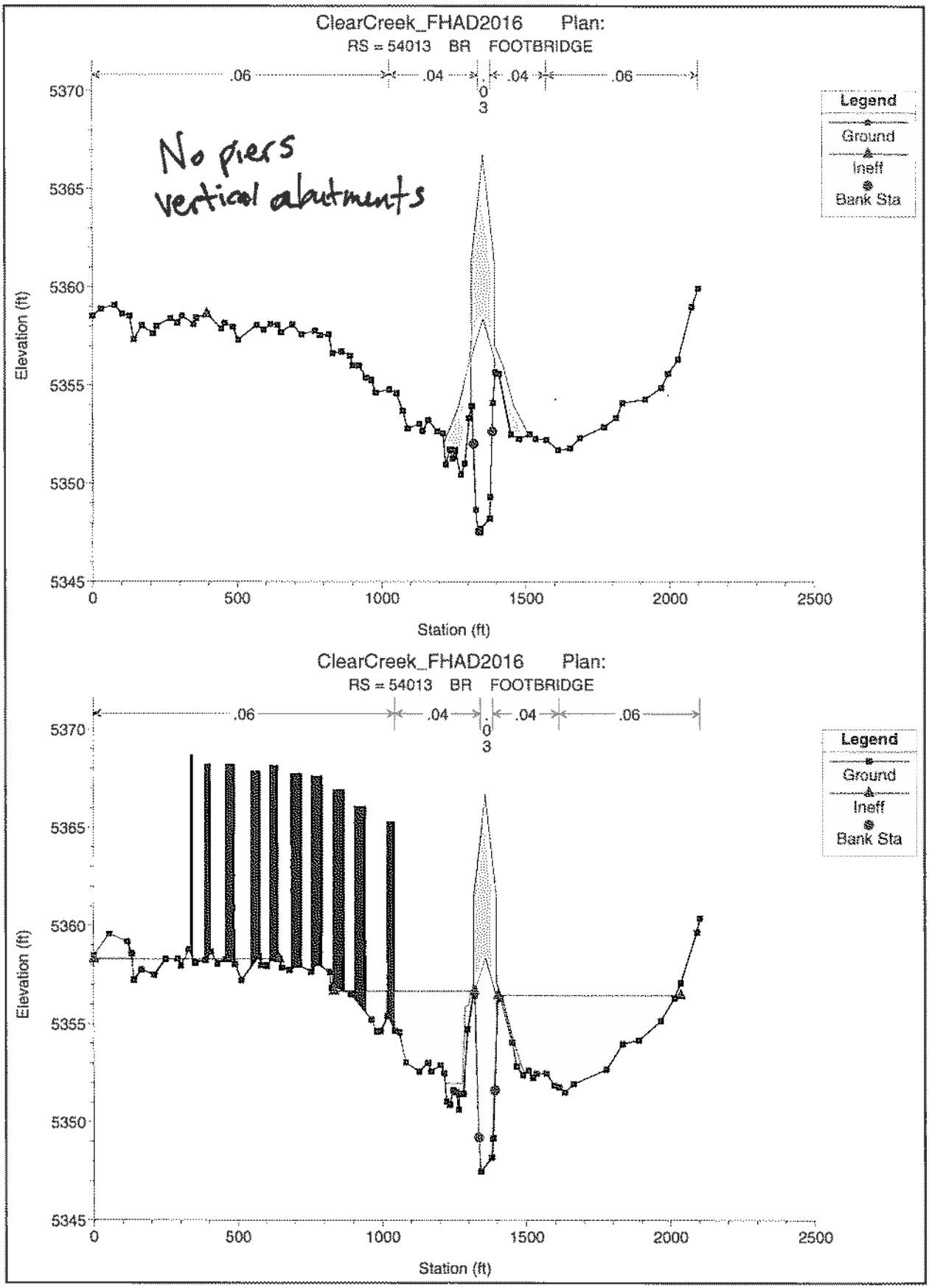
✓NAS


ClearCreek_FHAD2016 Plan:
RS = 57428 BR FOOTBRIDGE UPSTREAM OF KIPLING ST.
.05
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5420
5410
5400
5390
5380
5370
0
500
1000
1500
2000
2500
Station (ft)
ClearCreek_FHAD2016 Plan:
RS = 57428 BR FOOTBRIDGE UPSTREAM OF KIPLING ST.
.05
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5420
5410
5400
5390
5380
5370
0
500
1000
1500
2000
2500
Station (ft)

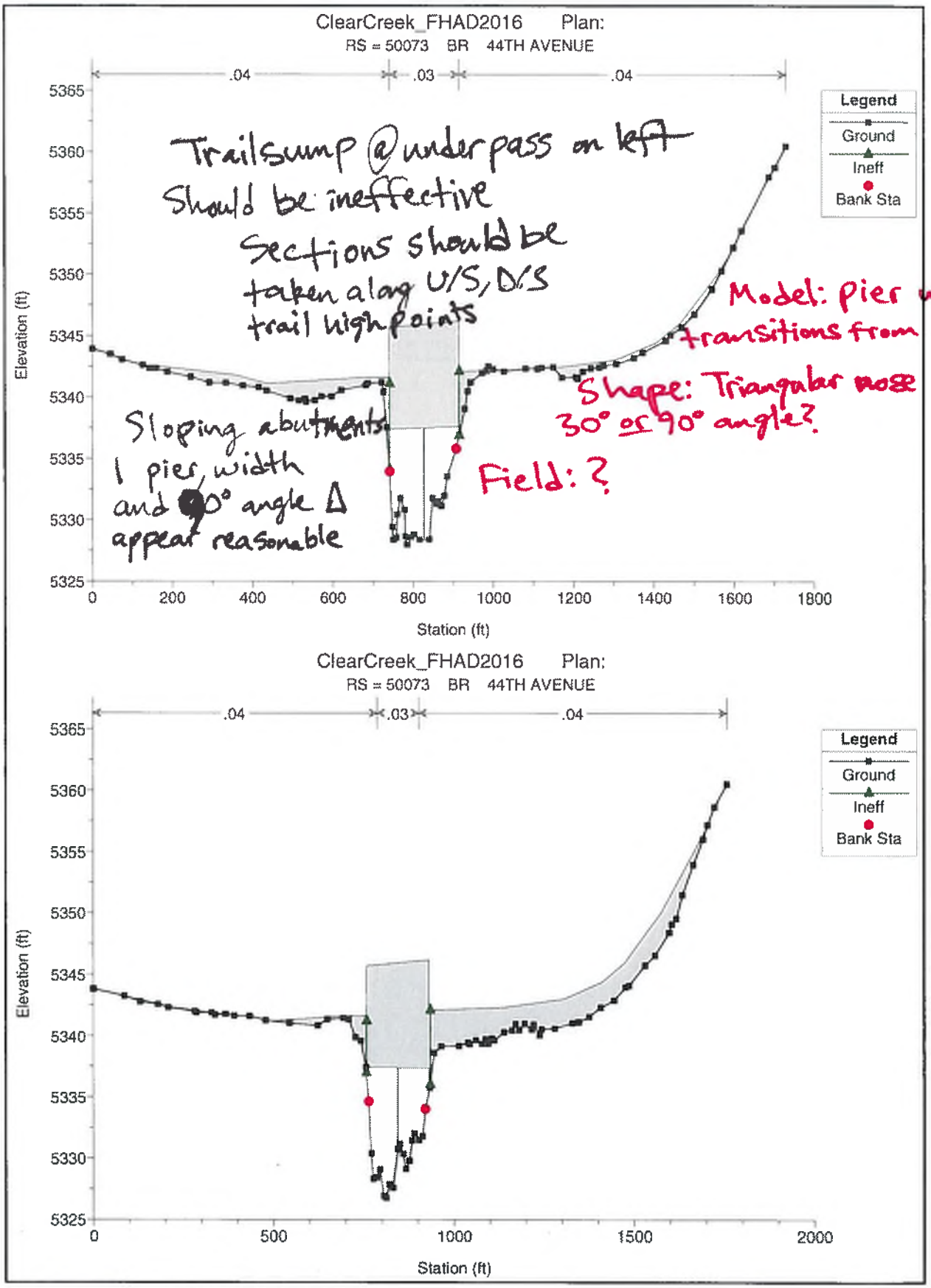
√BAS


ClearCreek_FHAD2016 Plan:
RS = 55328 BR KIPLING STREET
.06
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1 pier
≈ 4' pier cap
≈18"? pier
90° triangular tail
left abutment sloping
right abutment vertical
Field: ?
Model: 4.1' pier width
Shape: Square nose & tail
ClearCreek_FHAD2016 Plan:
RS = 55328 BR KIPLING STREET
.06
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

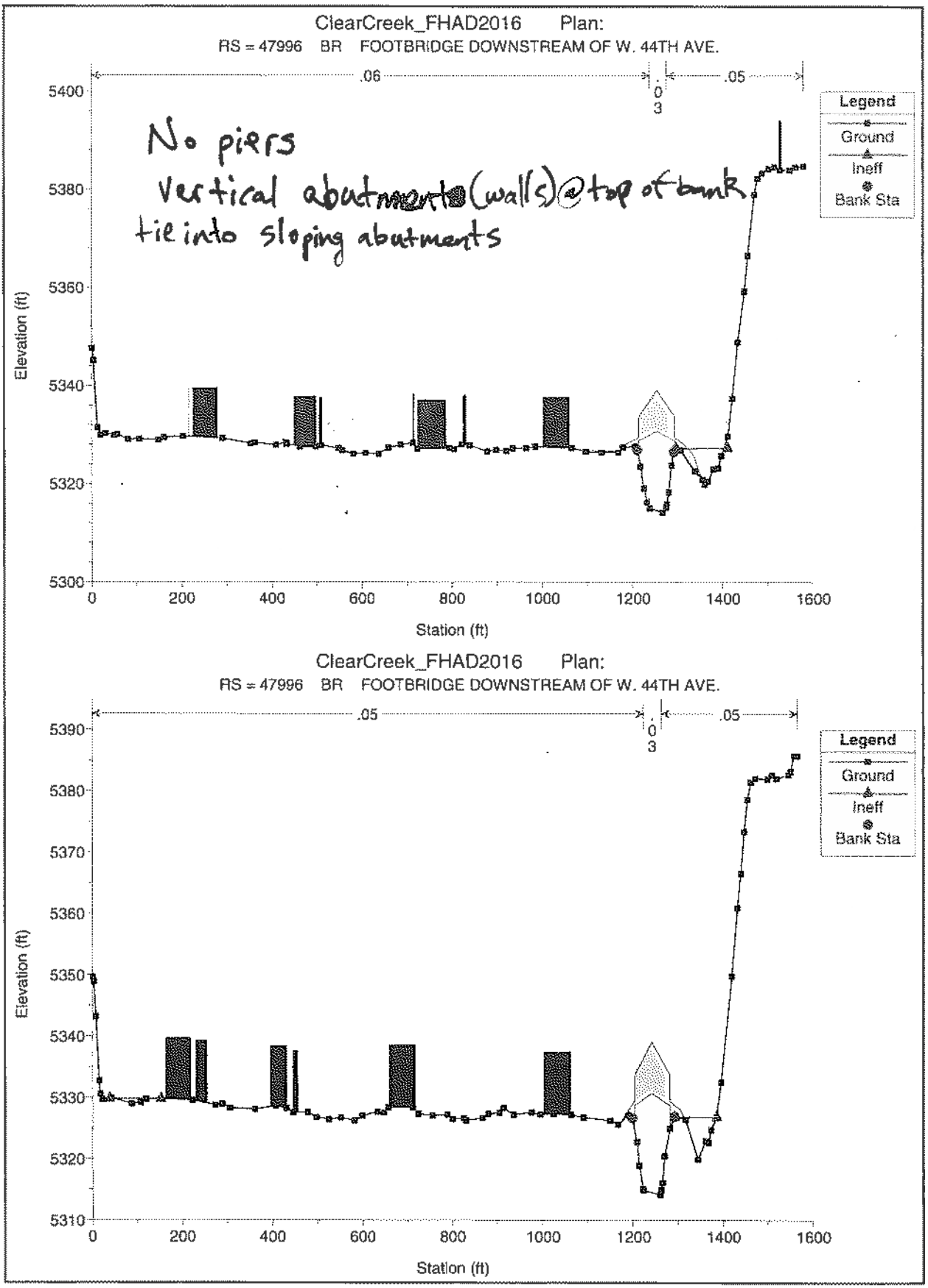

ClearCreek_FHAD2016 Plan:
RS = 55212 BR FOOTBRIDGE DOWNSTREAM OF KIPLING ST.
.06
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Field: No piers
Vertical abutments
ClearCreek_FHAD2016 Plan:
RS = 55212 BR FOOTBRIDGE DOWNSTREAM OF KIPLING ST.
.06
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


ClearCreek_FHAD2016 Plan:
RS = 54013 BR FOOTBRIDGE
.06
.04
.04
.06
0
3
No piers
vertical abutments
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5370
5365
5360
5355
5350
5345
0
500
1000
1500
2000
2500
Station (ft)
ClearCreek_FHAD2016 Plan:
RS = 54013 BR FOOTBRIDGE
.06
.04
.04
.06
0
3
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5370
5365
5360
5355
5350
5345
0
500
1000
1500
2000
2500
Station (ft)

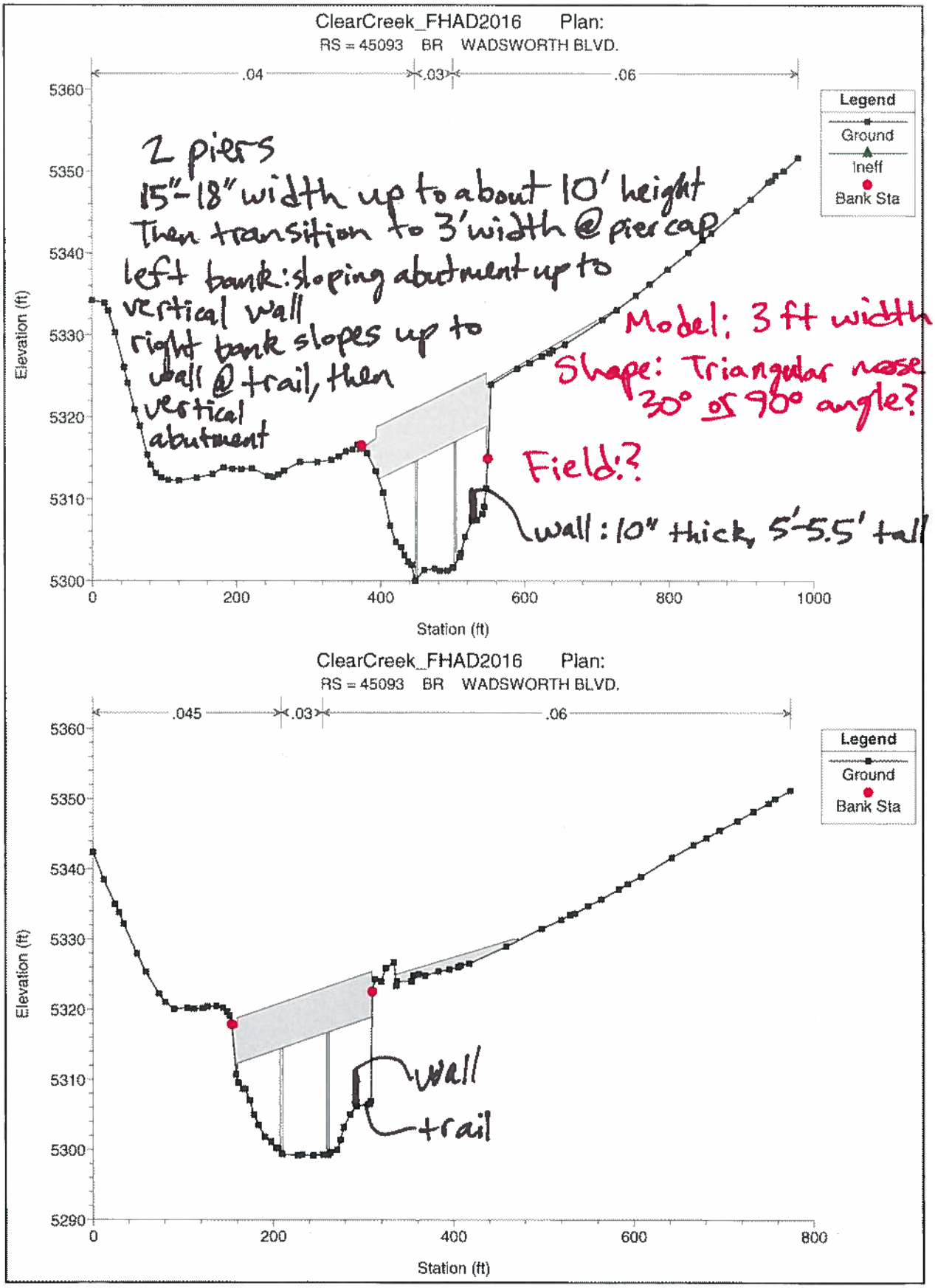
✓BAS


ClearCreek_FHAD2016 Plan:
RS = 50073 BR 44TH AVENUE
.04
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Trailsump @ underpass on left
Should be ineffective
Sections should be taken along U/S, D/S trail high points
Sloping abutments
1 pier width and 90° angle Δ appear reasonable
Field: ?
Model: pier width transitions from 1.5' to 2.5' width
Shape: Triangular nose w/ 30° or 90° angle?
ClearCreek_FHAD2016 Plan:
RS = 50073 BR 44TH AVENUE
.04
.03
.04
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

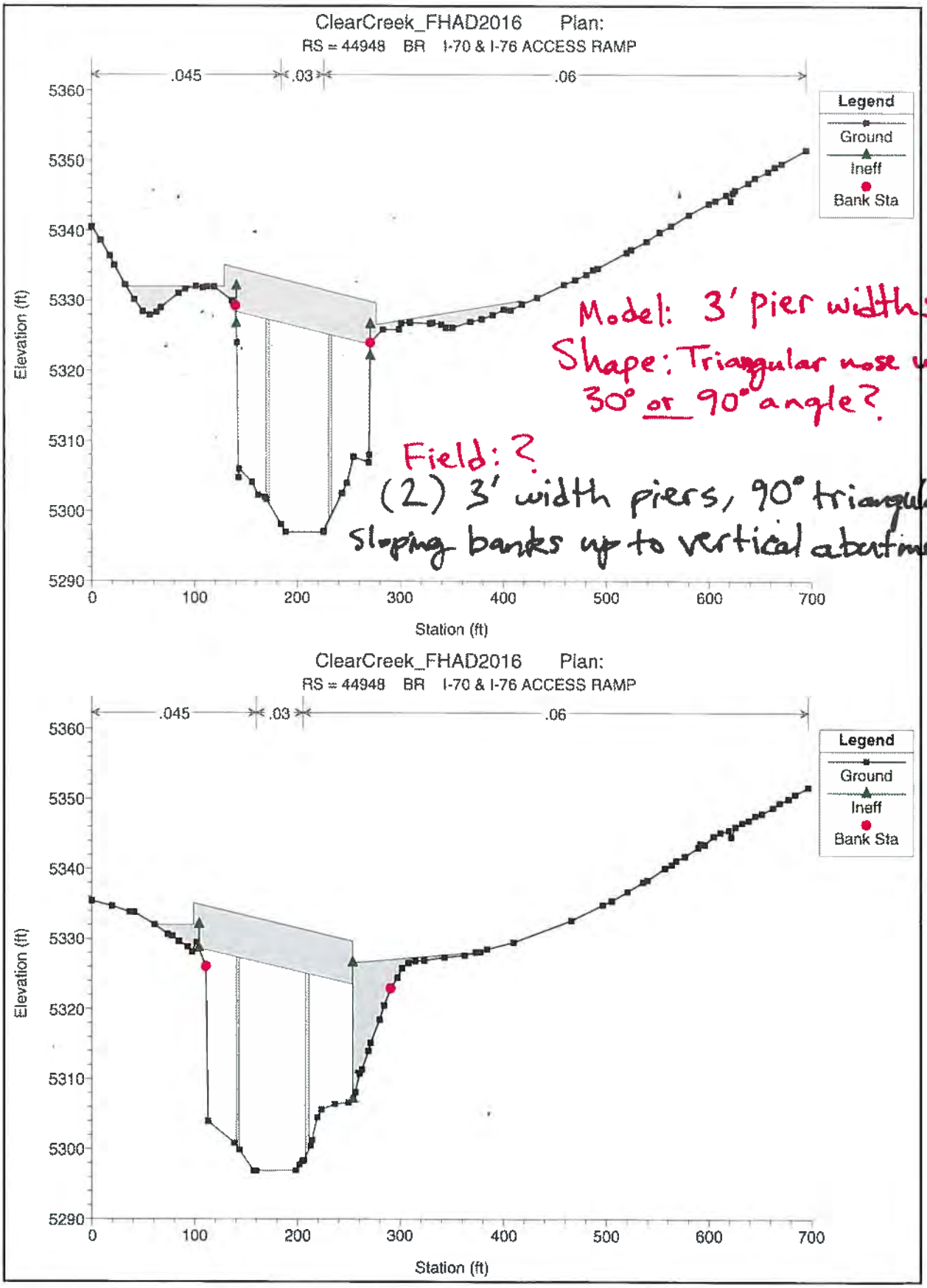
✓ BAS


ClearCreek_FHAD2016 Plan:
RS = 47996 BR FOOTBRIDGE DOWNSTREAM OF W. 44TH AVE.
.06
.03
.05
Legend
Ground
Ineff
Bank Sta
No piers
Vertical abutments (walls) @ top of bank
tie into sloping abutments
Elevation (ft)
Station (ft)
5400
5380
5360
5340
5320
5300
0
200
400
600
800
1000
1200
1400
1600
ClearCreek_FHAD2016 Plan:
RS = 47996 BR FOOTBRIDGE DOWNSTREAM OF W. 44TH AVE.
.05
.03
.05
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5390
5380
5370
5360
5350
5340
5330
5320
5310
0
200
400
600
800
1000
1200
1400
1600

✓ BAS


ClearCreek_FHAD2016 Plan:
RS = 45093 BR WADSWORTH BLVD.
.04
.03
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
2 piers
15"-18" width up to about 10' height
Then transition to 3' width @ pier cap
left bank: sloping abutment up to vertical wall
right bank slopes up to wall @ trail, then vertical abutment
Model: 3 ft width piers
Shape: Triangular nose w/ 30° or 90° angle?
Field:?
wall: 10" thick, 5'-5.5' tall
ClearCreek_FHAD2016 Plan:
RS = 45093 BR WADSWORTH BLVD.
.045
.03
.06
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
wall
trail

✓ BAS

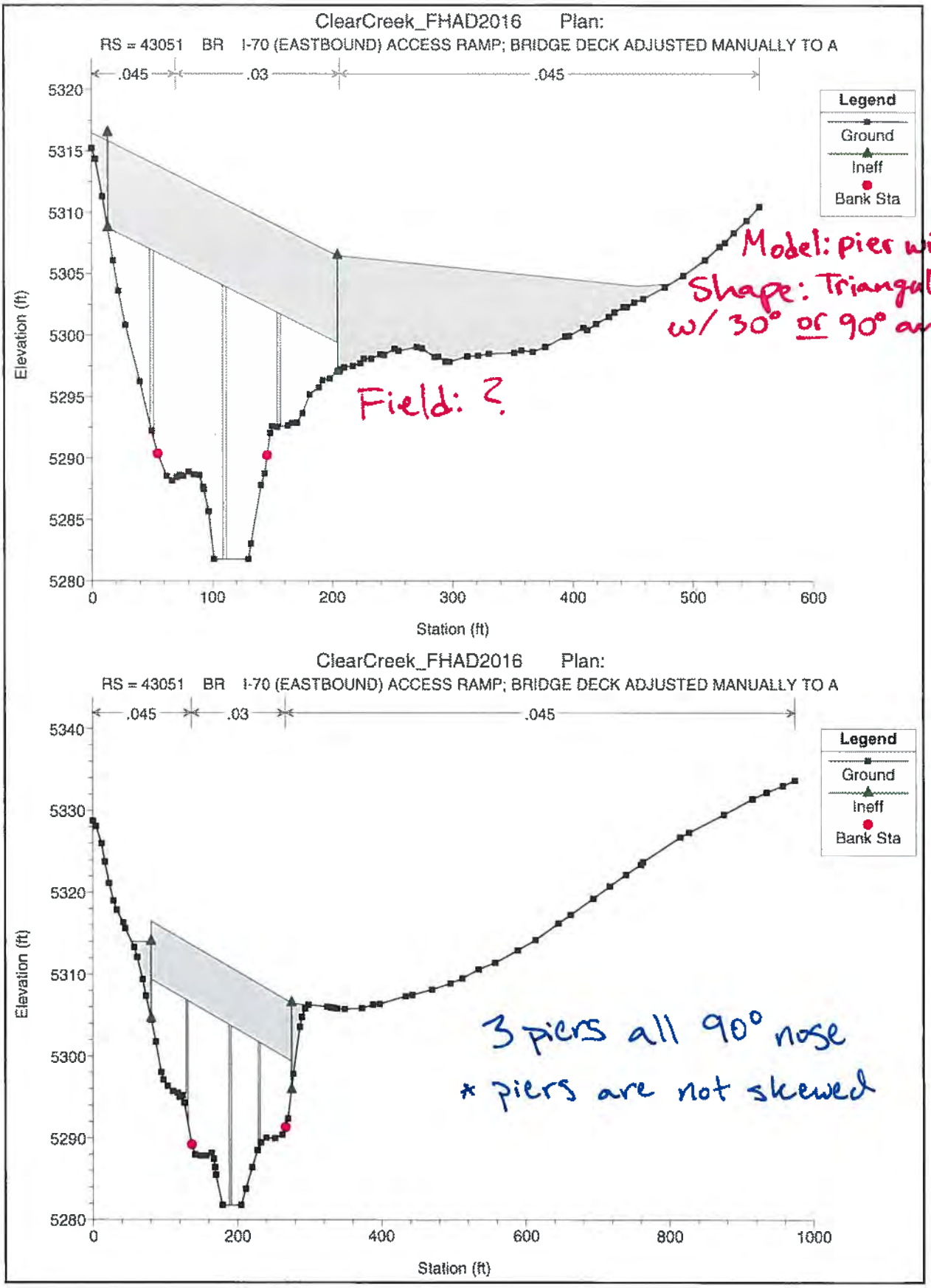


Model: 3' pier widths
Shape: Triangular nose w/ 30° or 90° angle?

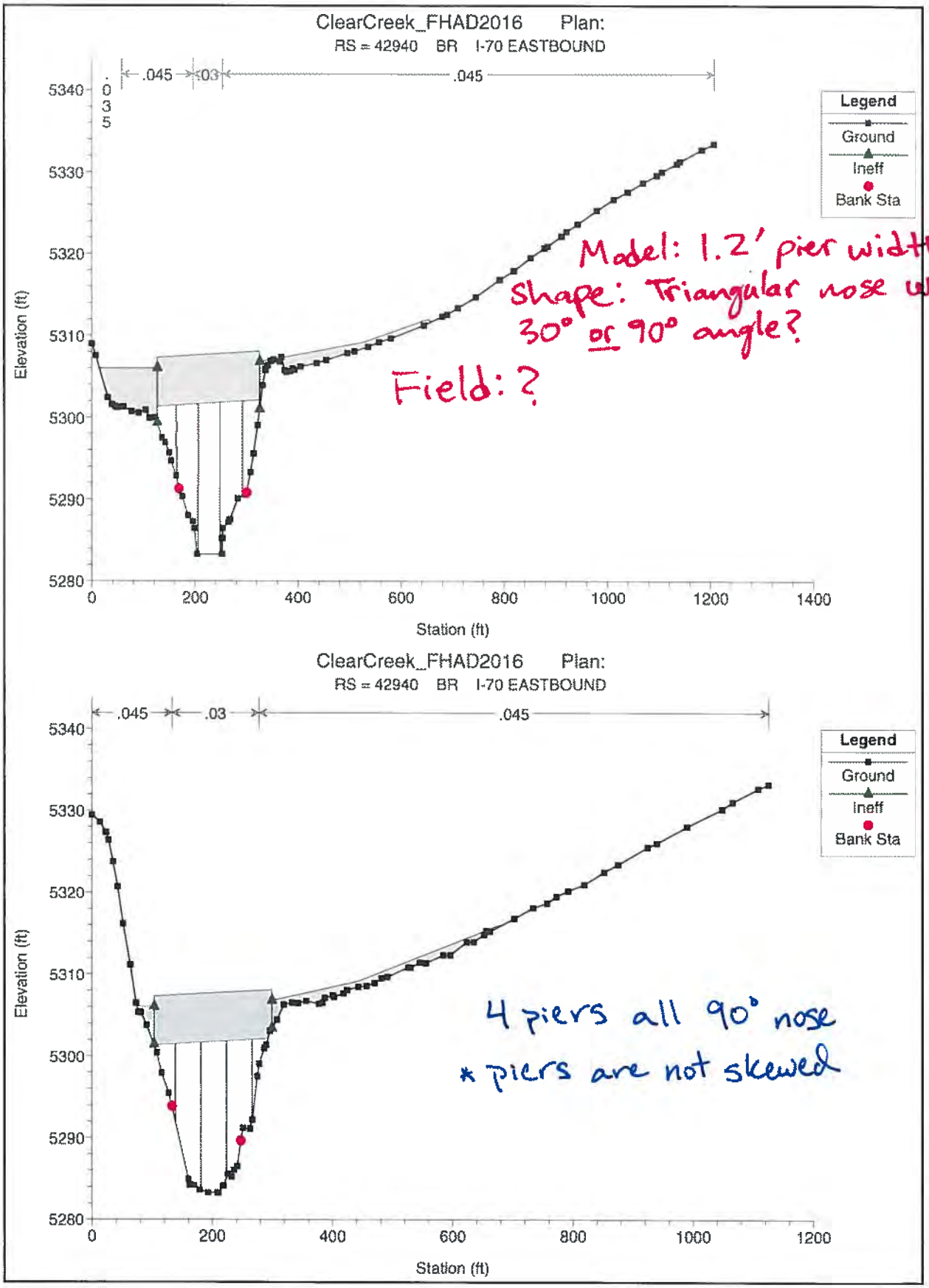
Field: ?
(2) 3' width piers, 90° triangular nose
sloping banks up to vertical abutments

ClearCreek_FHAD2016 Plan:
RS = 44948 BR I-70 & I-76 ACCESS RAMP
.045
.03
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5360
5350
5340
5330
5320
5310
5300
5290
0
100
200
300
400
500
600
700

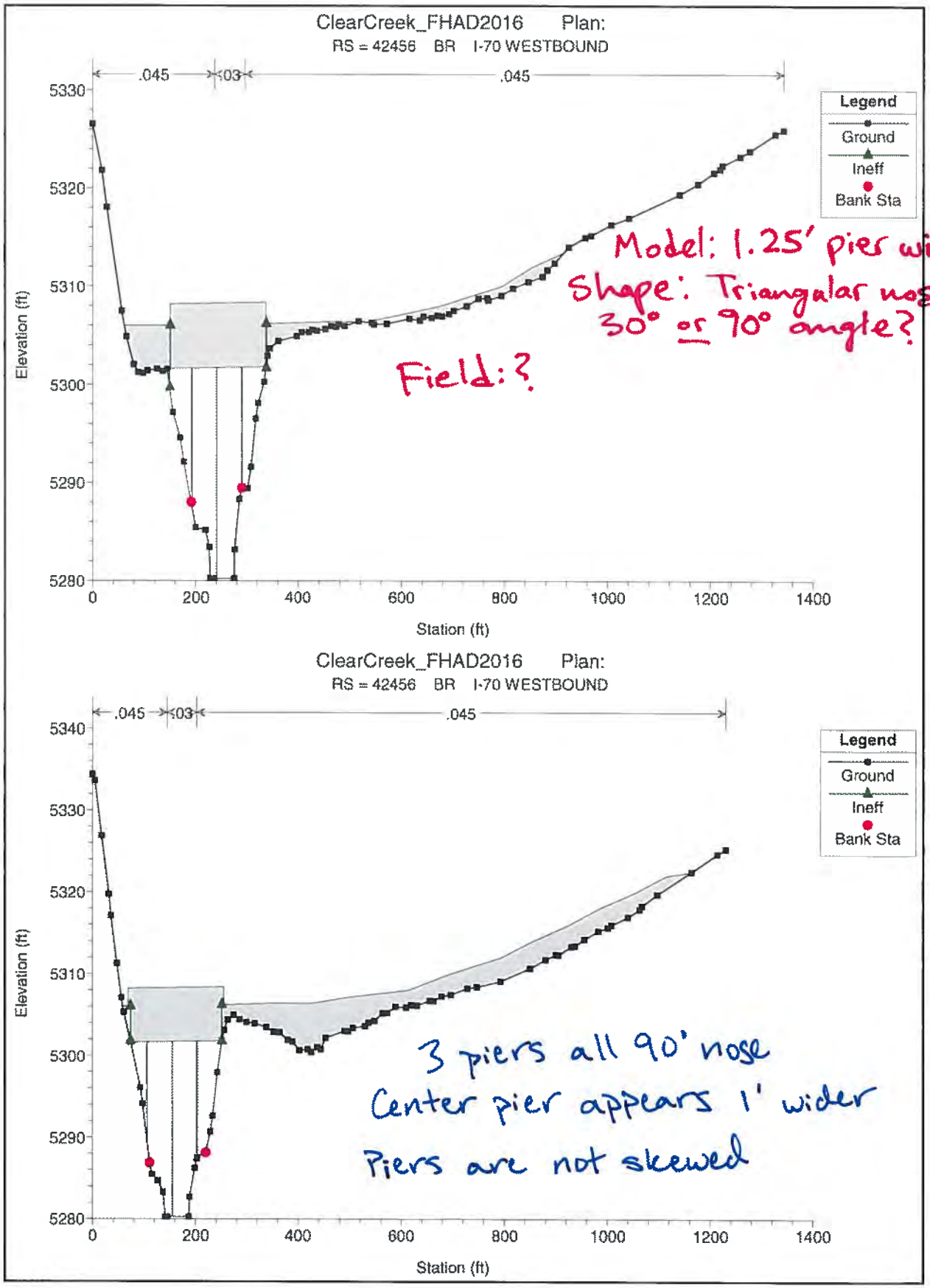
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 43051 BR I-70 (EASTBOUND) ACCESS RAMP; BRIDGE DECK ADJUSTED MANUALLY TO A
.045
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5320
5315
5310
5305
5300
5295
5290
5285
5280
0
100
200
300
400
500
600
Model: pier widths=3.1
Shape: Triangular nose
w/ 30° or 90° angle?
Field: ?
ClearCreek_FHAD2016 Plan:
RS = 43051 BR I-70 (EASTBOUND) ACCESS RAMP; BRIDGE DECK ADJUSTED MANUALLY TO A
.045
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5340
5330
5320
5310
5300
5290
5280
0
200
400
600
800
1000
3 piers all 90° nose
* piers are not skewed

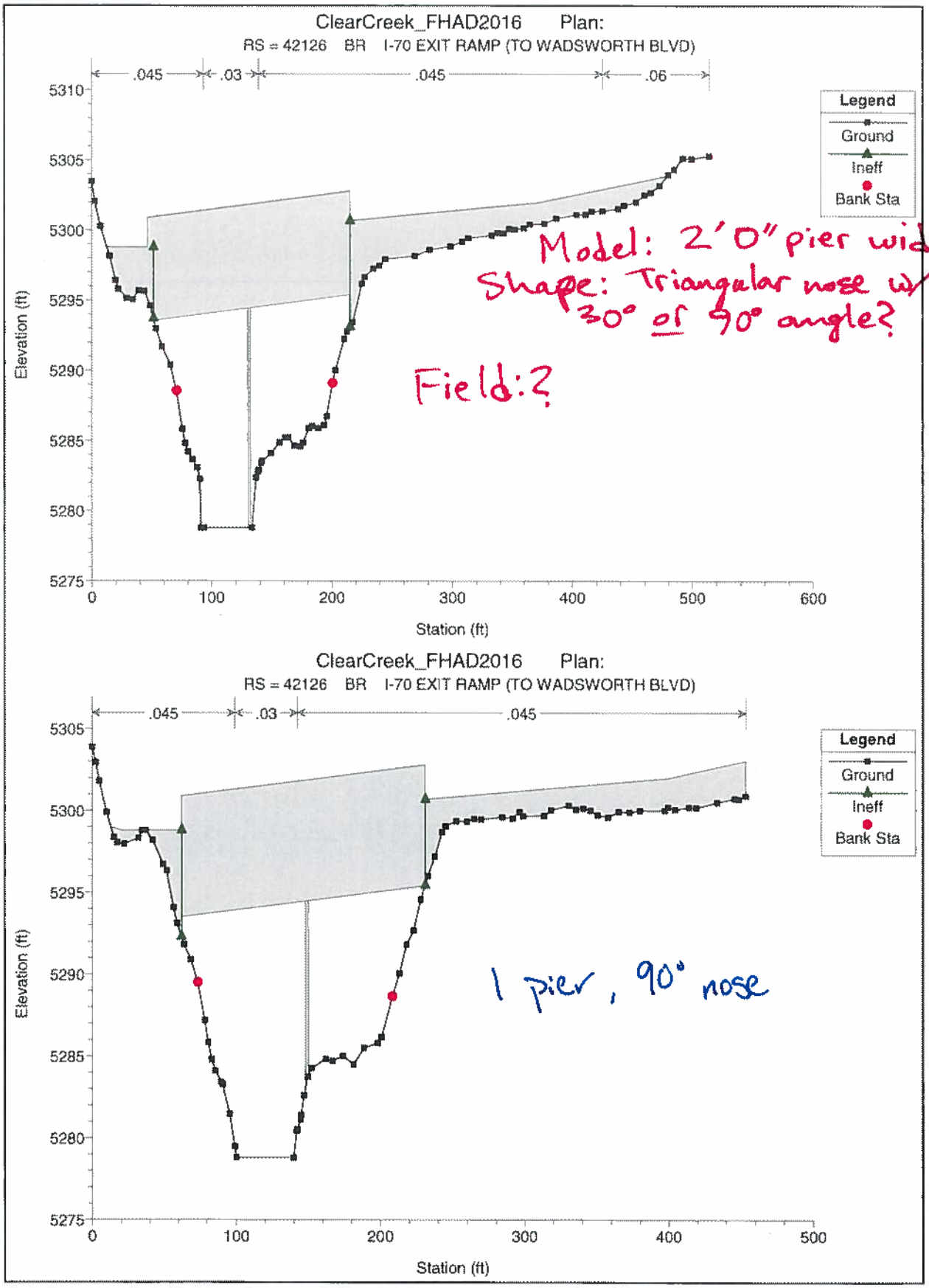
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 42940 BR I-70 EASTBOUND
.035
.045
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5340
5330
5320
5310
5300
5290
5280
0
200
400
600
800
1000
1200
1400
Model: 1.2' pier widths
Shape: Triangular nose w/
30° or 90° angle?
Field: ?
ClearCreek_FHAD2016 Plan:
RS = 42940 BR I-70 EASTBOUND
.045
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5340
5330
5320
5310
5300
5290
5280
0
200
400
600
800
1000
1200
4 piers all 90° nose
* piers are not skewed

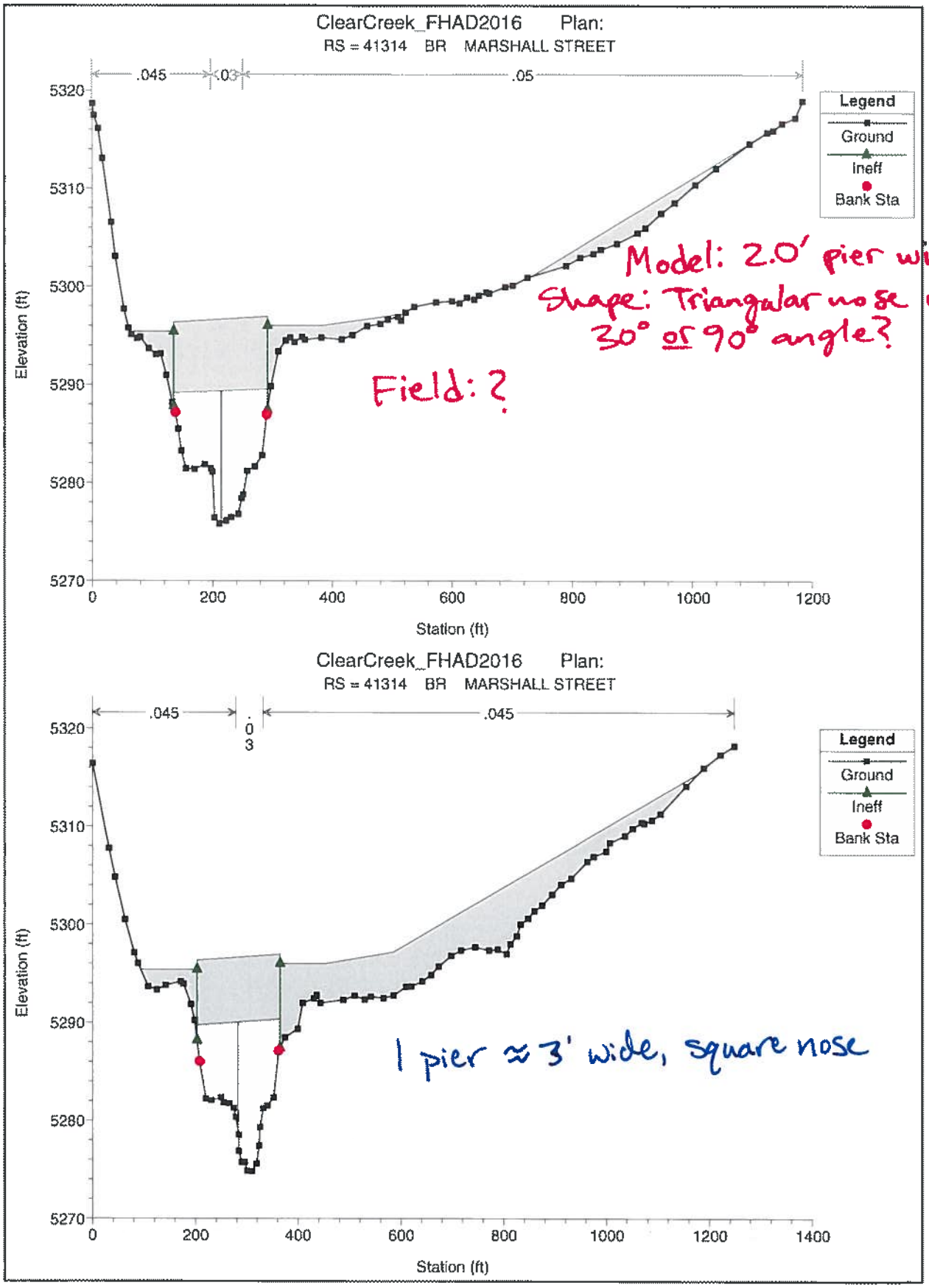
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 42456 BR I-70 WESTBOUND
.045
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5330
5320
5310
5300
5290
5280
0
200
400
600
800
1000
1200
1400
Station (ft)
Model: 1.25' pier widths
Shape: Triangular nose w/ 30° or 90° angle?
Field: ?
ClearCreek_FHAD2016 Plan:
RS = 42456 BR I-70 WESTBOUND
.045
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5340
5330
5320
5310
5300
5290
5280
0
200
400
600
800
1000
1200
1400
Station (ft)
3 piers all 90° nose
Center pier appears 1' wider
Piers are not skewed

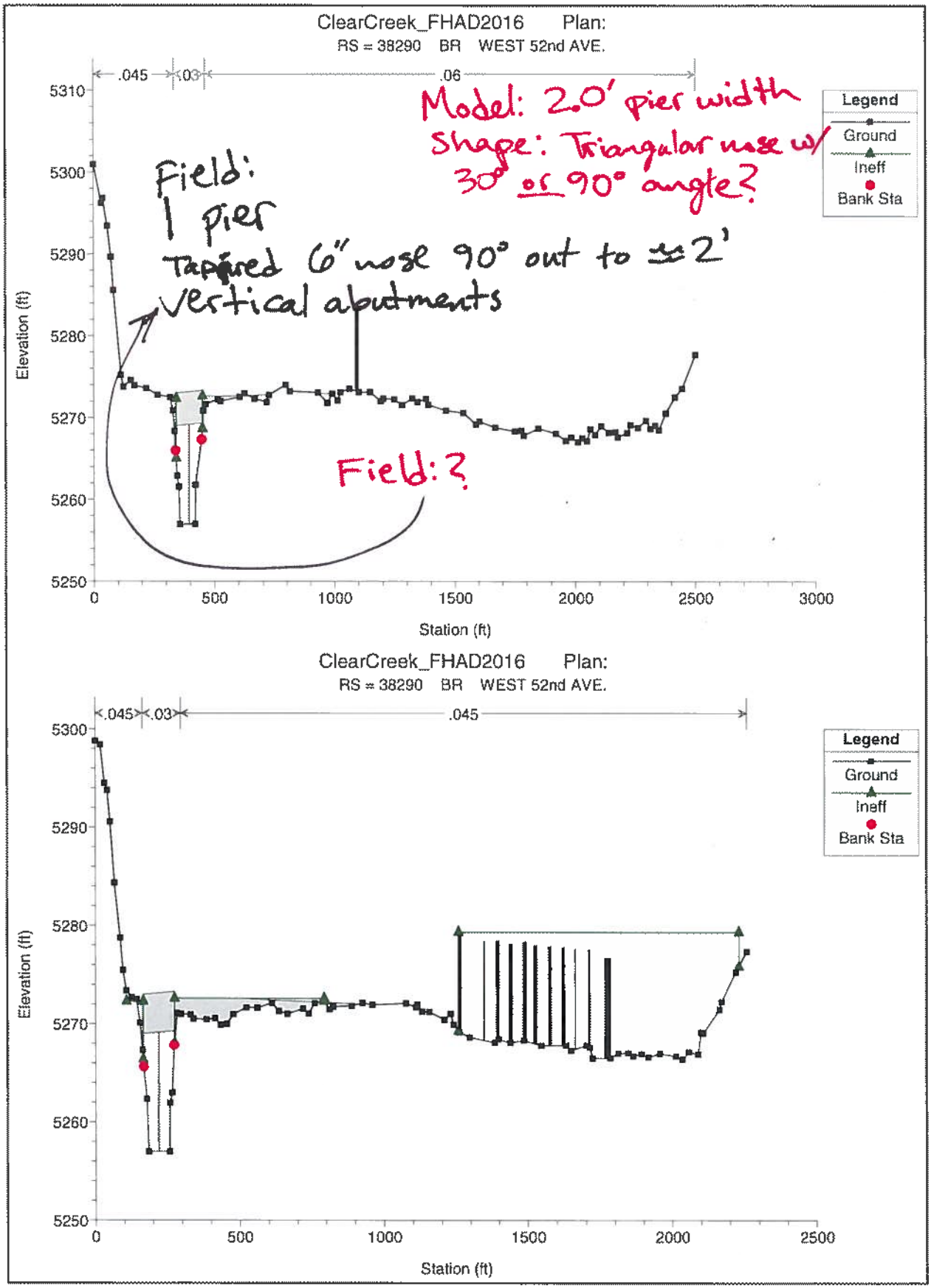
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 42126 BR I-70 EXIT RAMP (TO WADSWORTH BLVD)
.045
.03
.045
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Model: 2'0" pier width
Shape: Triangular nose w/ 30° or 90° angle?
Field:?
ClearCreek_FHAD2016 Plan:
RS = 42126 BR I-70 EXIT RAMP (TO WADSWORTH BLVD)
.045
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1 pier, 90° nose

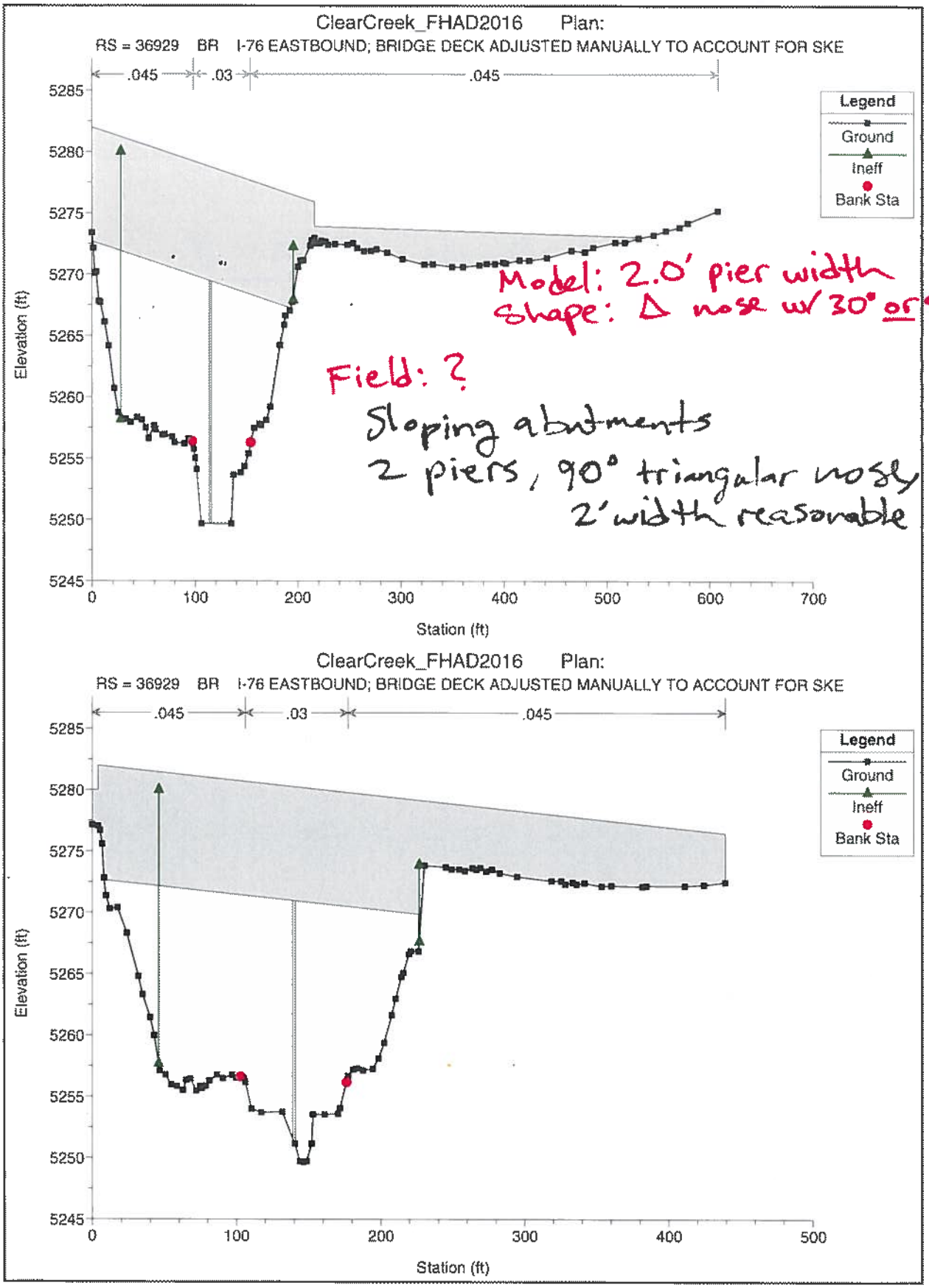
✓NAS


ClearCreek_FHAD2016 Plan:
RS = 41314 BR MARSHALL STREET
.045
.03
.05
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5320
5310
5300
5290
5280
5270
0
200
400
600
800
1000
1200
Model: 2.0' pier width
Shape: Triangular nose w/ 30° or 90° angle?
Field: ?
ClearCreek_FHAD2016 Plan:
RS = 41314 BR MARSHALL STREET
.045
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5320
5310
5300
5290
5280
5270
0
200
400
600
800
1000
1200
1400
1 pier ≈ 3' wide, square nose

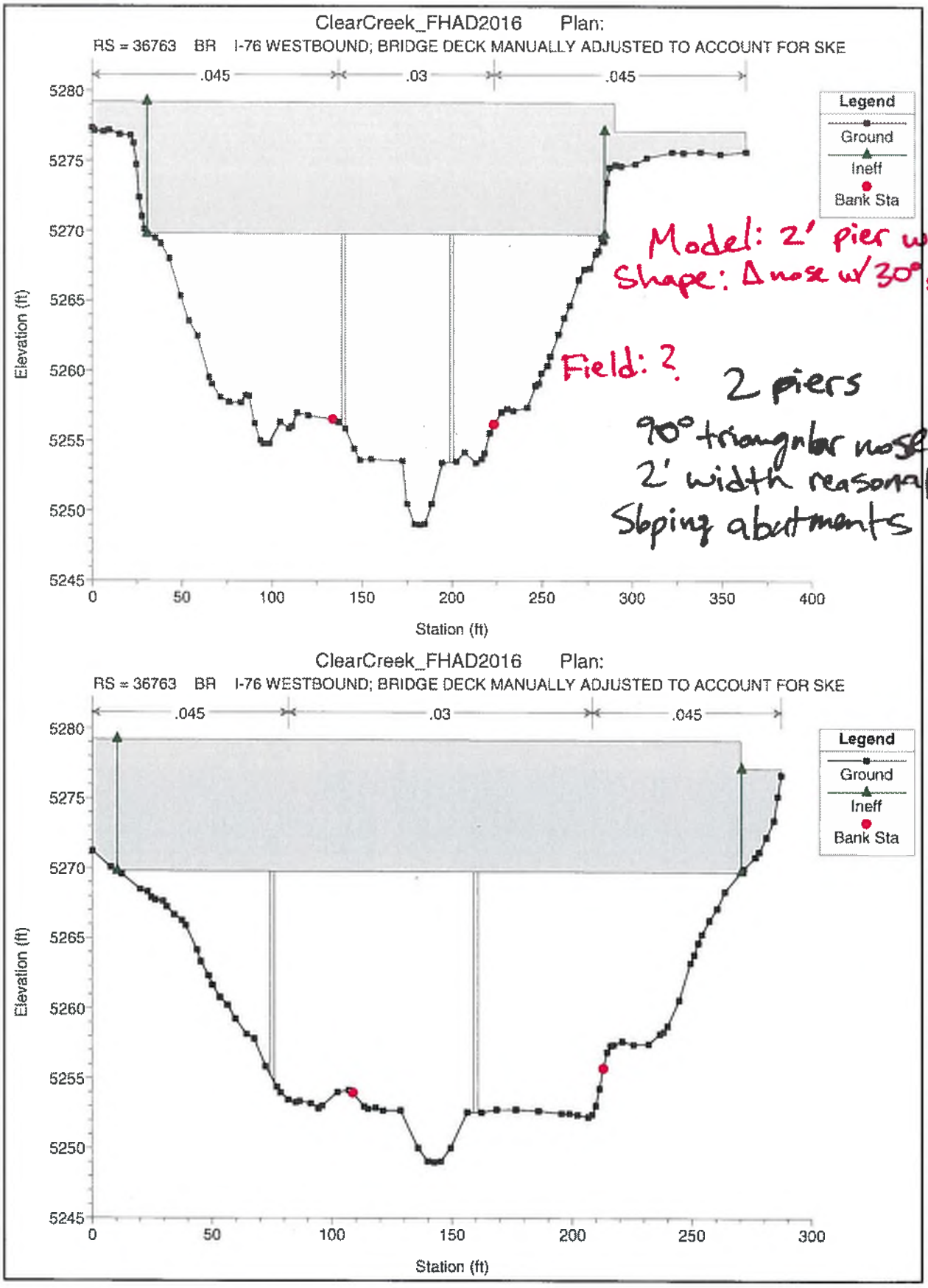
✓BAS


ClearCreek_FHAD2016 Plan:
RS = 38290 BR WEST 52nd AVE.
.045
.03
.06
Model: 2.0' pier width
Shape: Triangular nose w/
30° or 90° angle?
Field:
1 pier
Tapered 6" nose 90° out to ≈2'
vertical abutments
Field: ?
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5310
5300
5290
5280
5270
5260
5250
0
500
1000
1500
2000
2500
3000
ClearCreek_FHAD2016 Plan:
RS = 38290 BR WEST 52nd AVE.
.045
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5300
5290
5280
5270
5260
5250
0
500
1000
1500
2000
2500

✓BAS


ClearCreek_FHAD2016 Plan:
RS = 36929 BR I-76 EASTBOUND; BRIDGE DECK ADJUSTED MANUALLY TO ACCOUNT FOR SKE
.045
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5285
5280
5275
5270
5265
5260
5255
5250
5245
0
100
200
300
400
500
600
700
Model: 2.0' pier width
Shape: Δ nose w/ 30° or 90° angle?
Field: ?
Sloping abutments
2 piers, 90° triangular nosed
2' width reasonable
ClearCreek_FHAD2016 Plan:
RS = 36929 BR I-76 EASTBOUND; BRIDGE DECK ADJUSTED MANUALLY TO ACCOUNT FOR SKE
.045
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5285
5280
5275
5270
5265
5260
5255
5250
5245
0
100
200
300
400
500

√ BAS

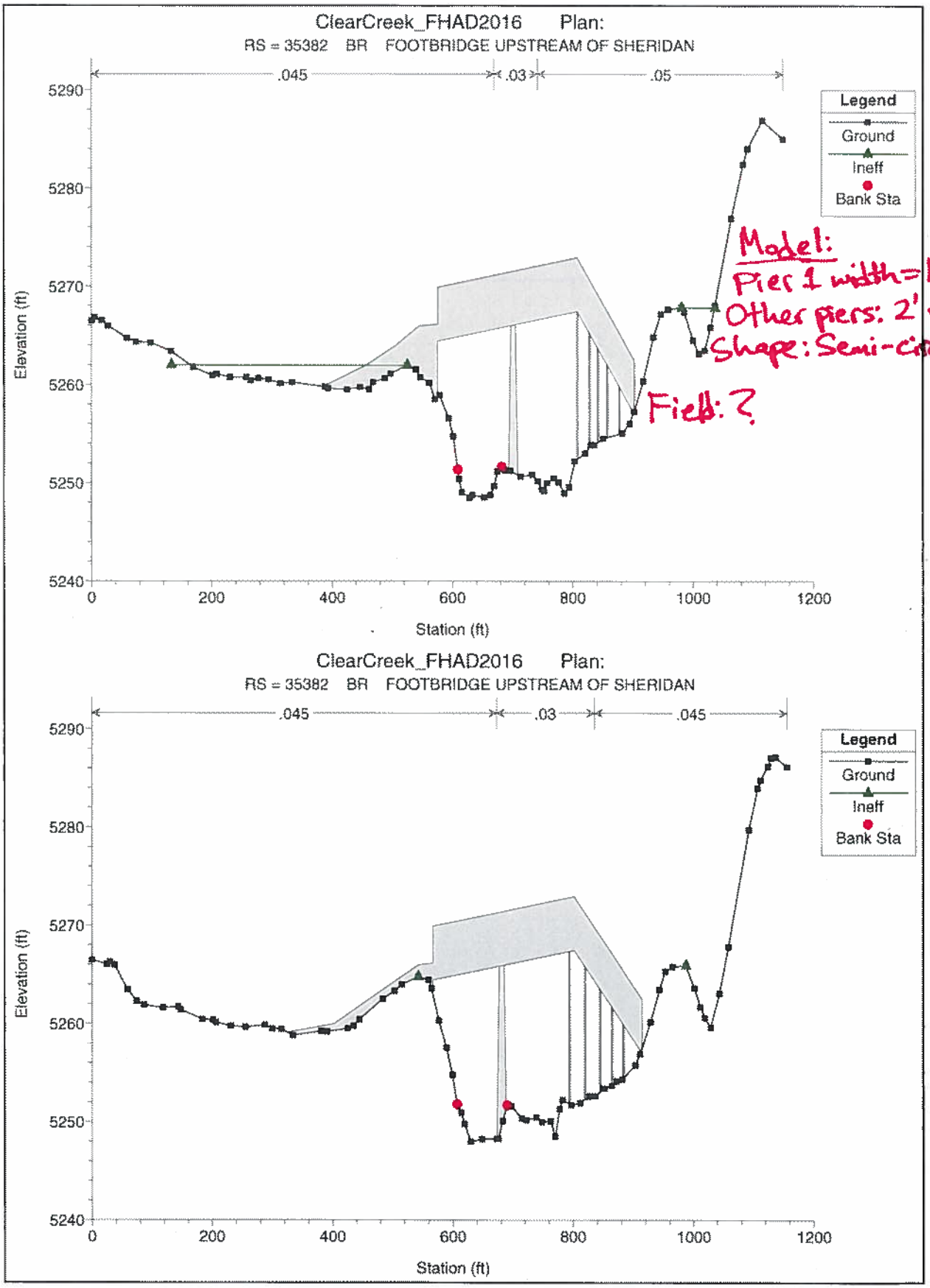


Model: 2' pier widths
Shape: Δ nose w/ 30° of 90° angle

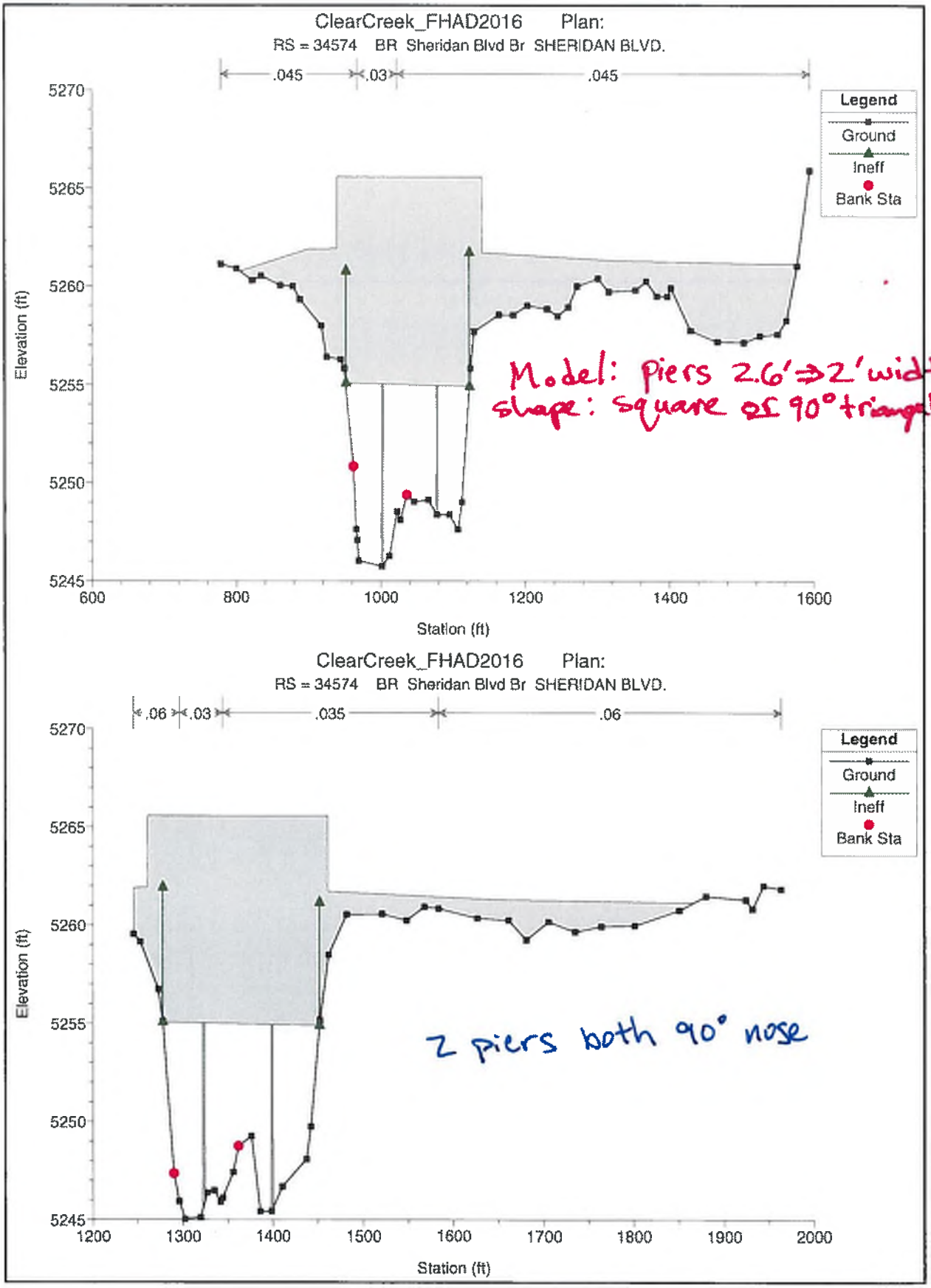
Field: ?

2 piers
90° triangular nose
2' width reasonable
Sloping abutments

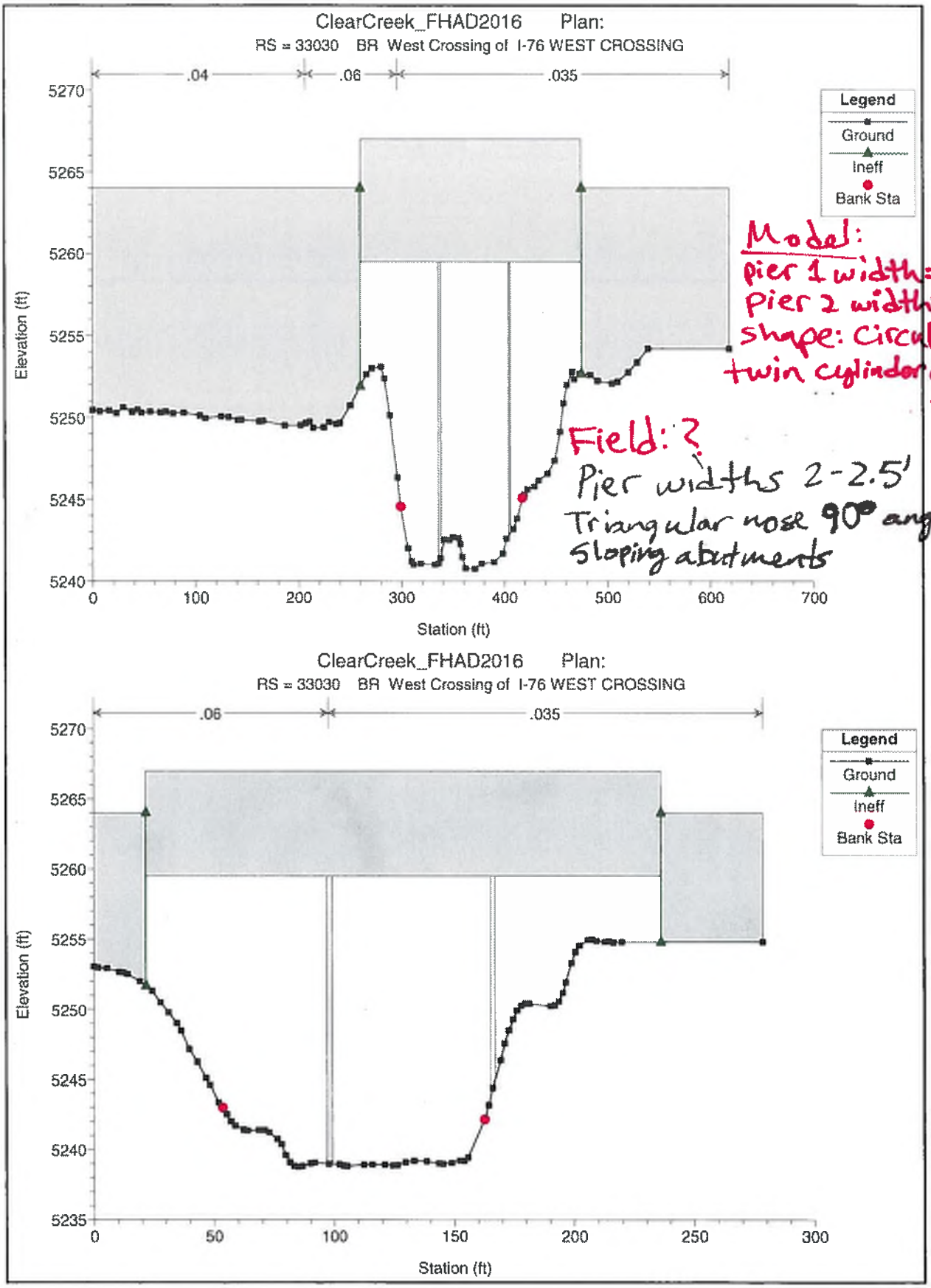
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 35382 BR FOOTBRIDGE UPSTREAM OF SHERIDAN
.045
.03
.05
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5290
5280
5270
5260
5250
5240
0
200
400
600
800
1000
1200
Station (ft)
Model:
Pier 1 width=16⇒8'
Other piers: 2' width
Shape: Semi-circular
Field: ?
ClearCreek_FHAD2016 Plan:
RS = 35382 BR FOOTBRIDGE UPSTREAM OF SHERIDAN
.045
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5290
5280
5270
5260
5250
5240
0
200
400
600
800
1000
1200
Station (ft)

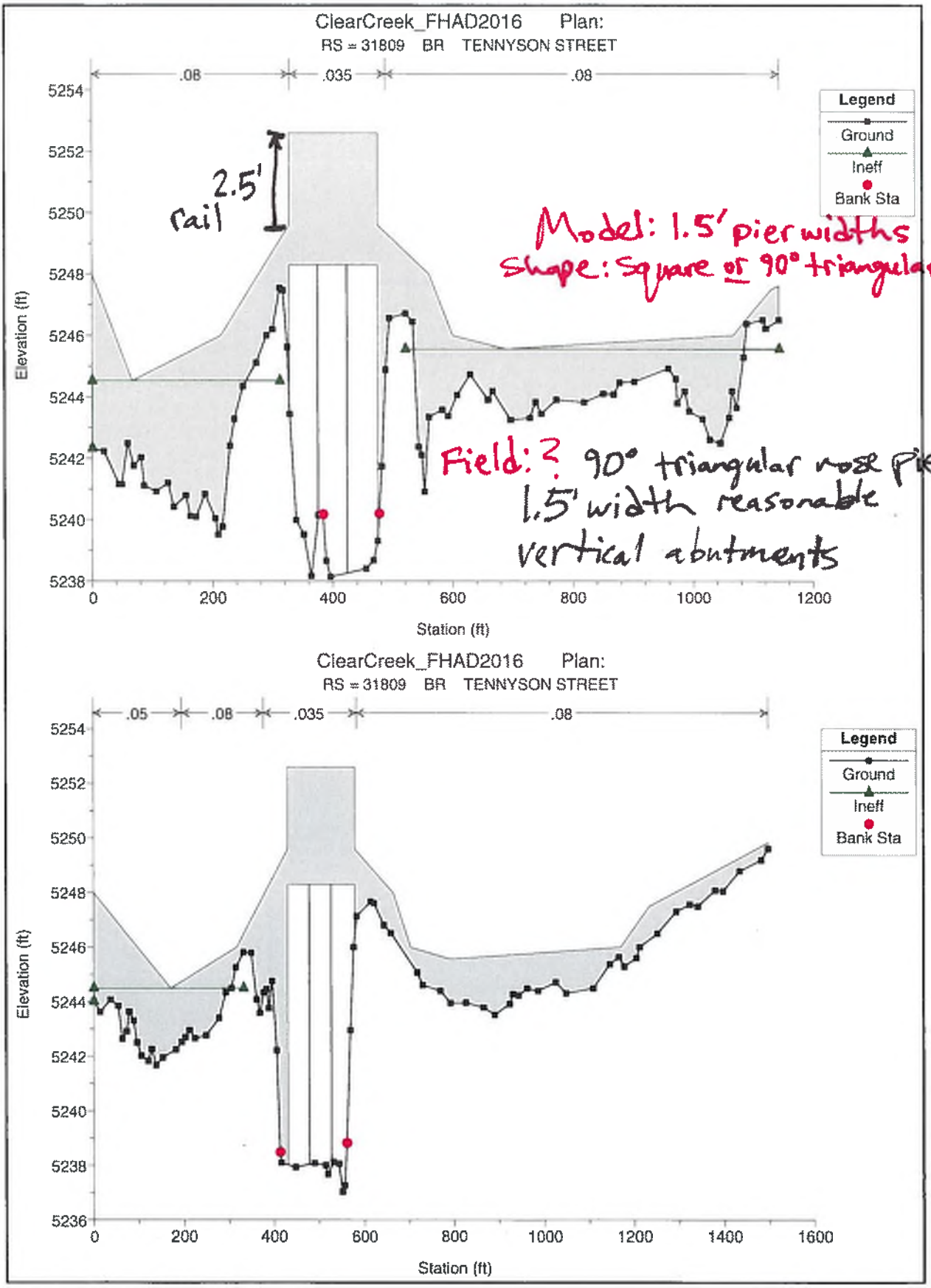
✓NAS


ClearCreek_FHAD2016 Plan:
RS = 34574 BR Sheridan Blvd Br SHERIDAN BLVD.
.045
.03
.045
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5270
5265
5260
5255
5250
5245
600
800
1000
1200
1400
1600
Model: piers 2.6'⇒2' width
shape: square or 90° triangular nose?
ClearCreek_FHAD2016 Plan:
RS = 34574 BR Sheridan Blvd Br SHERIDAN BLVD.
.06
.03
.035
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5270
5265
5260
5255
5250
5245
1200
1300
1400
1500
1600
1700
1800
1900
2000
2 piers both 90° nose

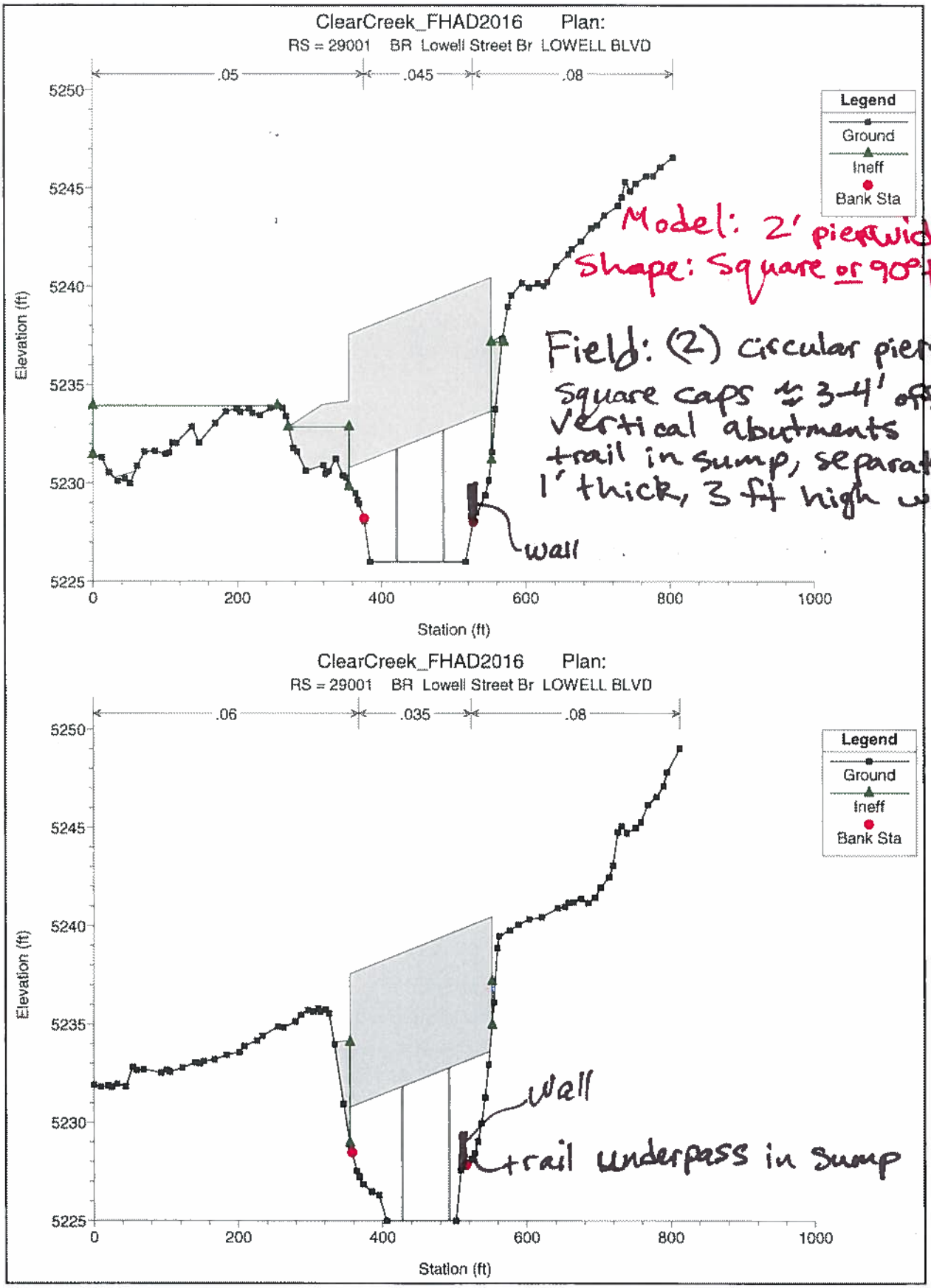
✓BAS


ClearCreek_FHAD2016 Plan:
RS = 33030 BR West Crossing of I-76 WEST CROSSING
.04
.06
.035
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5270
5265
5260
5255
5250
5245
5240
0
100
200
300
400
500
600
700
Model:
Pier 1 width = 24'
Pier 2 width = 2'
shape: circular or
twin cylinder w/out
diaphragm
Field: ?
Pier widths 2-2.5'
Triangular nose 90° angle
Sloping abutments
ClearCreek_FHAD2016 Plan:
RS = 33030 BR West Crossing of I-76 WEST CROSSING
.06
.035
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5270
5265
5260
5255
5250
5245
5240
5235
0
50
100
150
200
250
300

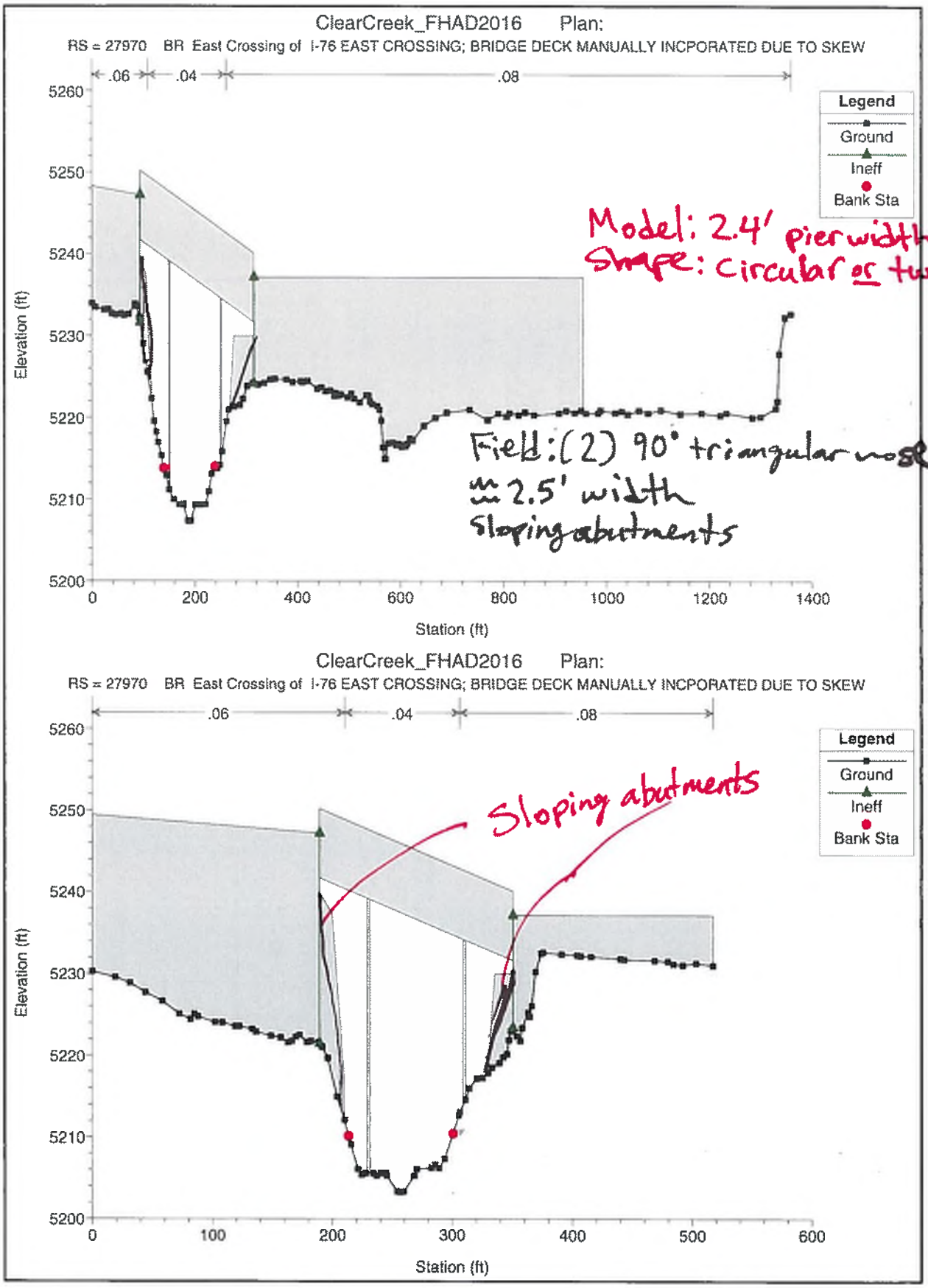
✓BAS


ClearCreek_FHAD2016 Plan:
RS = 31809 BR TENNYSON STREET
.08
.035
.08
2.5'
rail
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Model: 1.5' pier widths
Shape: Square or 90° triangular nose?
Field: ? 90° triangular nose piers (2)
1.5' width reasonable
vertical abutments
ClearCreek_FHAD2016 Plan:
RS = 31809 BR TENNYSON STREET
.05
.08
.035
.08
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

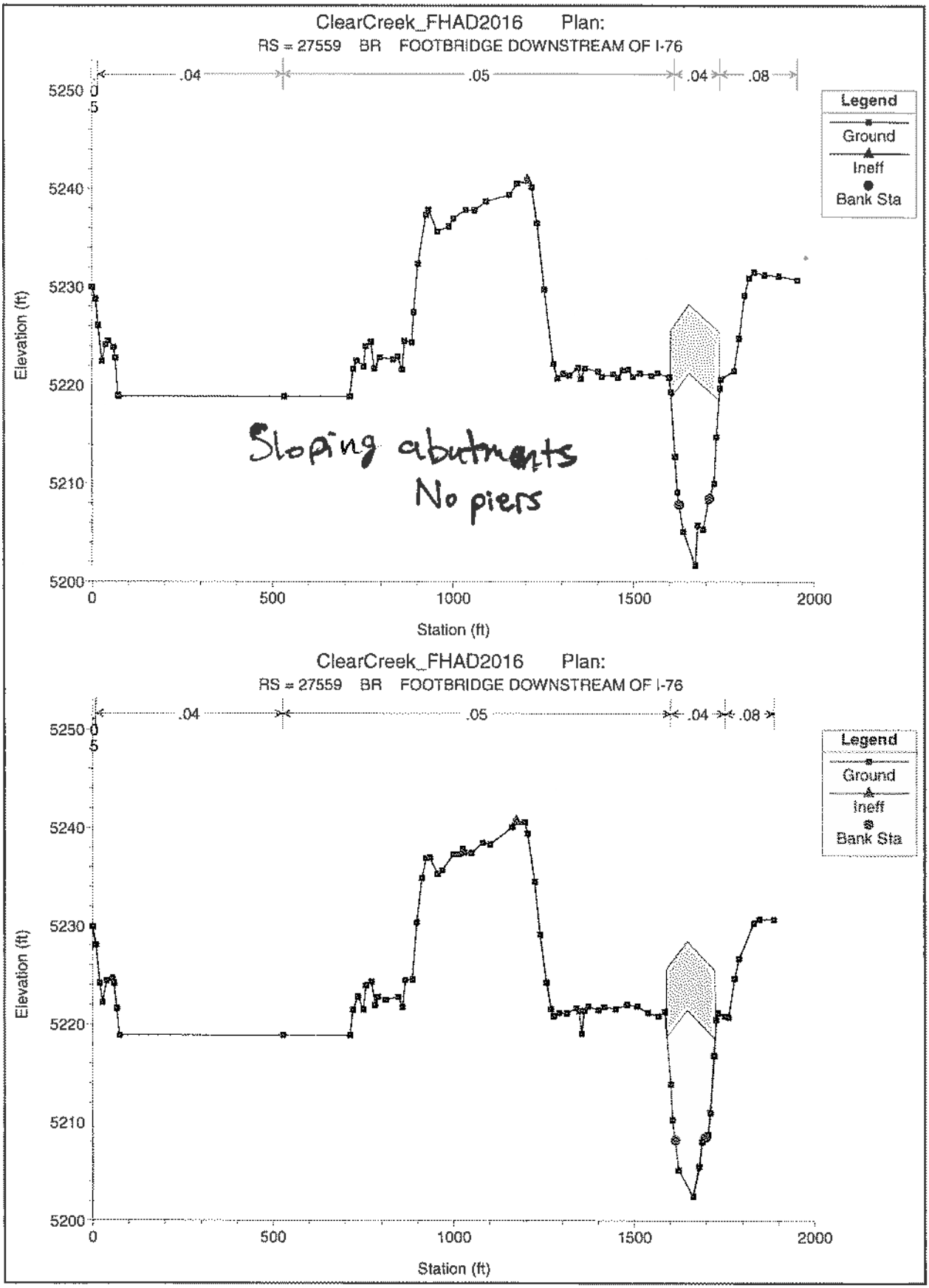
✓BAS


ClearCreek_FHAD2016 Plan:
RS = 29001 BR Lowell Street Br LOWELL BLVD
.05
.045
.08
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Model: 2' pierwidths
Shape: Square or 90° triangular nose?
Field: (2) circular piers w/ square caps ≈ 3-4' off ground
Vertical abutments
trail in sump, separated by 1' thick, 3 ft high wall
wall
ClearCreek_FHAD2016 Plan:
RS = 29001 BR Lowell Street Br LOWELL BLVD
.06
.035
.08
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Wall
trail underpass in Sump

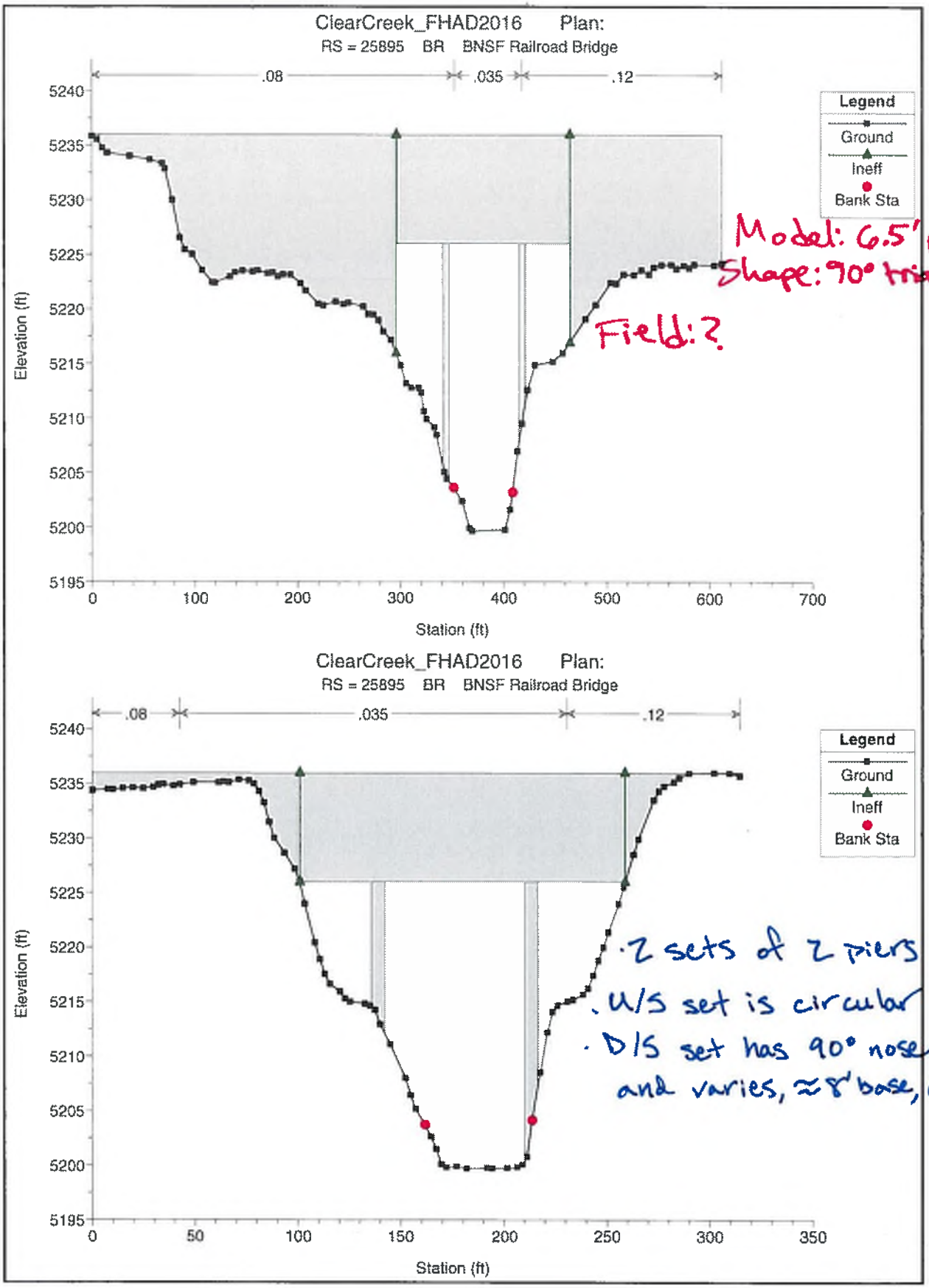
✓ BAS


ClearCreek_FHAD2016 Plan:
RS = 27970 BR East Crossing of I-76 EAST CROSSING; BRIDGE DECK MANUALLY INCPORATED DUE TO SKEW
.06
.04
.08
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Model: 2.4' pier widths
Shape: Circular or twin cylinder
Field: (2) 90° triangular nose piers
≈ 2.5' width
Sloping abutments
ClearCreek_FHAD2016 Plan:
RS = 27970 BR East Crossing of I-76 EAST CROSSING; BRIDGE DECK MANUALLY INCPORATED DUE TO SKEW
Sloping abutments

✓BAS


ClearCreek_FHAD2016 Plan:
RS = 27559 BR FOOTBRIDGE DOWNSTREAM OF I-76
.04
.05
.04
.08
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5250
5240
5230
5220
5210
5200
0
500
1000
1500
2000
Station (ft)
Sloping abutments
No piers
ClearCreek_FHAD2016 Plan:
RS = 27559 BR FOOTBRIDGE DOWNSTREAM OF I-76
.04
.05
.04
.08
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5250
5240
5230
5220
5210
5200
0
500
1000
1500
2000
Station (ft)

✓ NAS

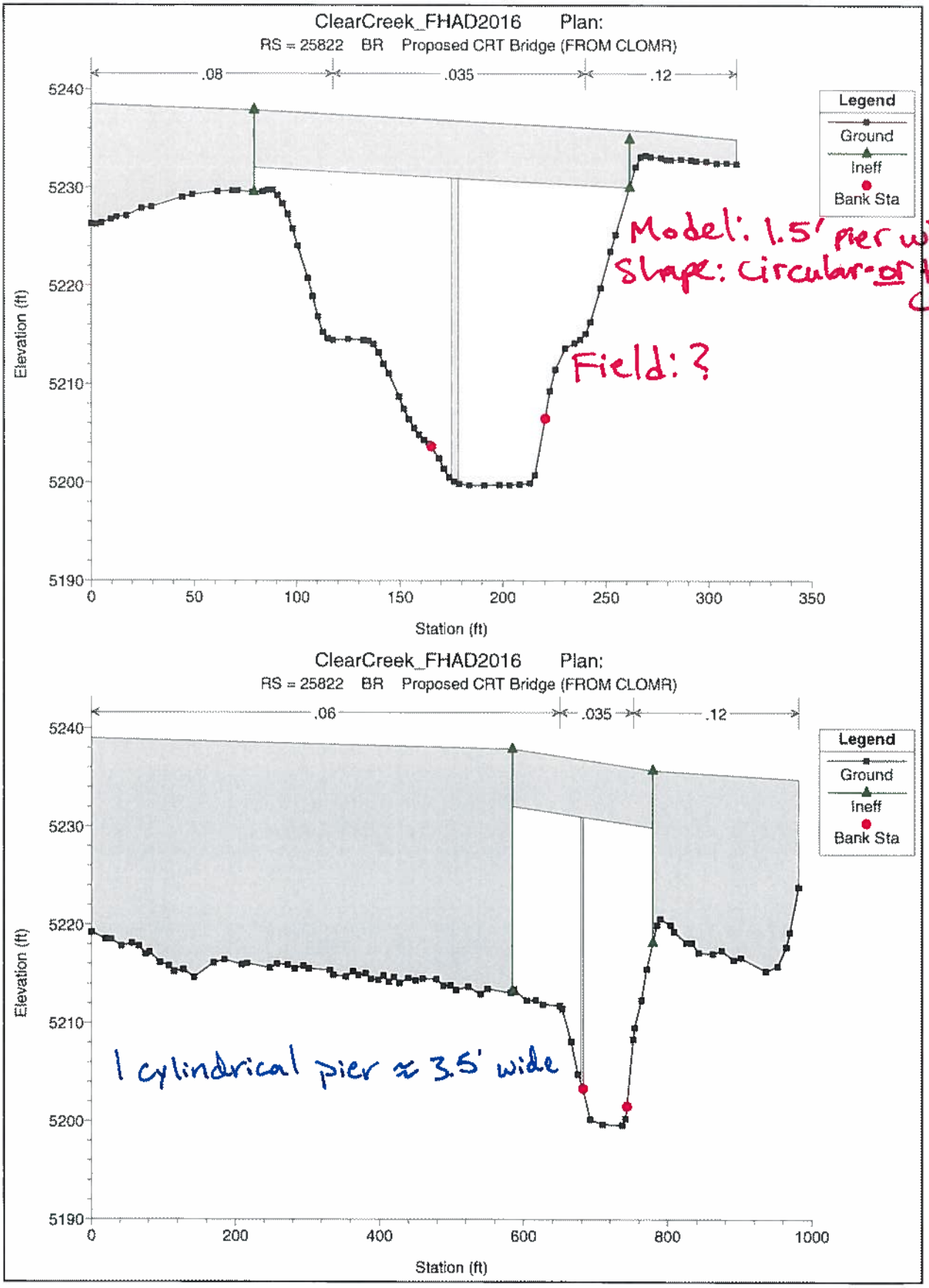


Model: 6.5' pier width
Shape: 90° triangular nos

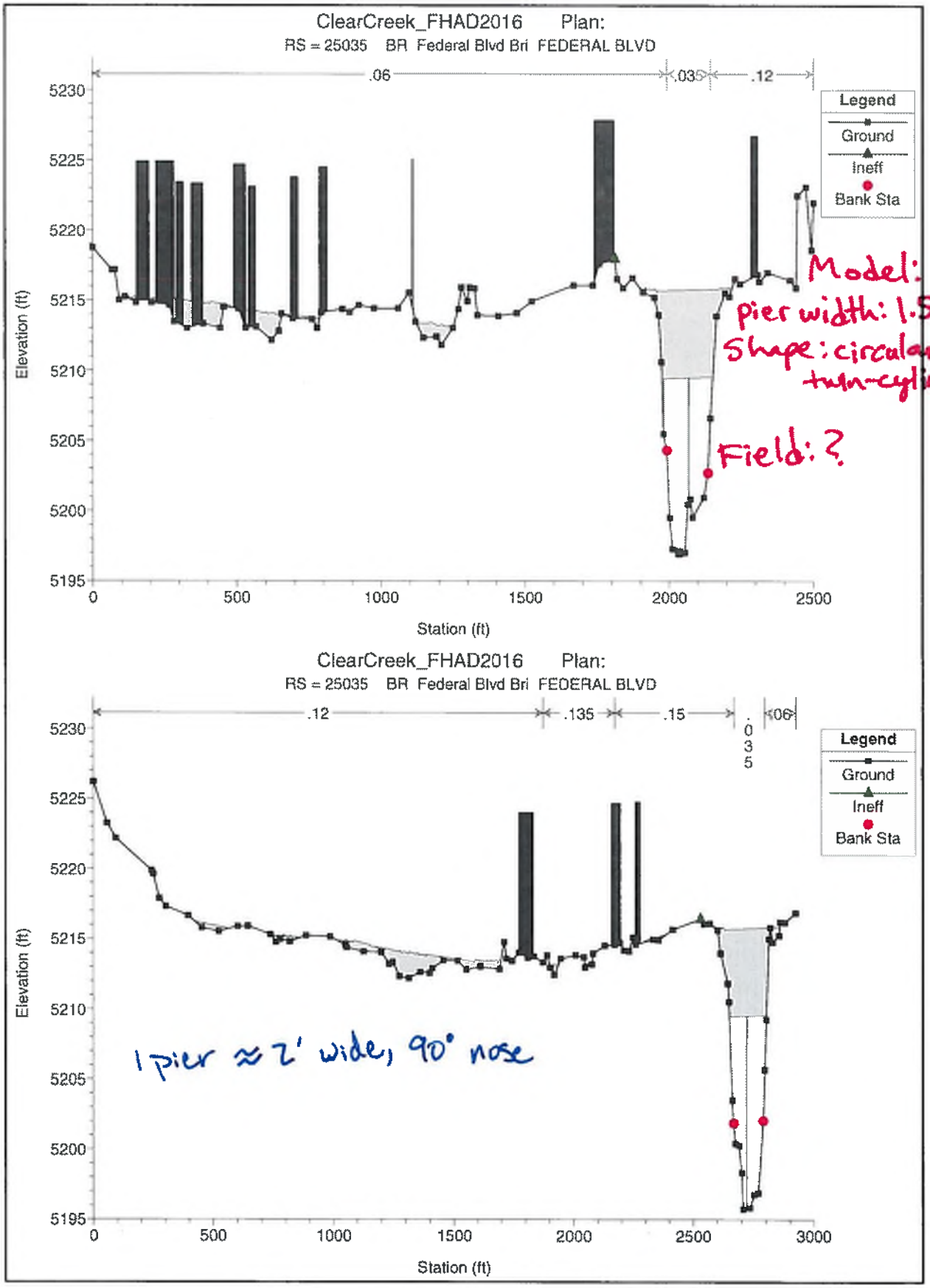
Field: ?

- 2 sets of 2 piers
- U/S set is circular
- D/S set has 90° nose and varies, ≈ 8' base, 6' head

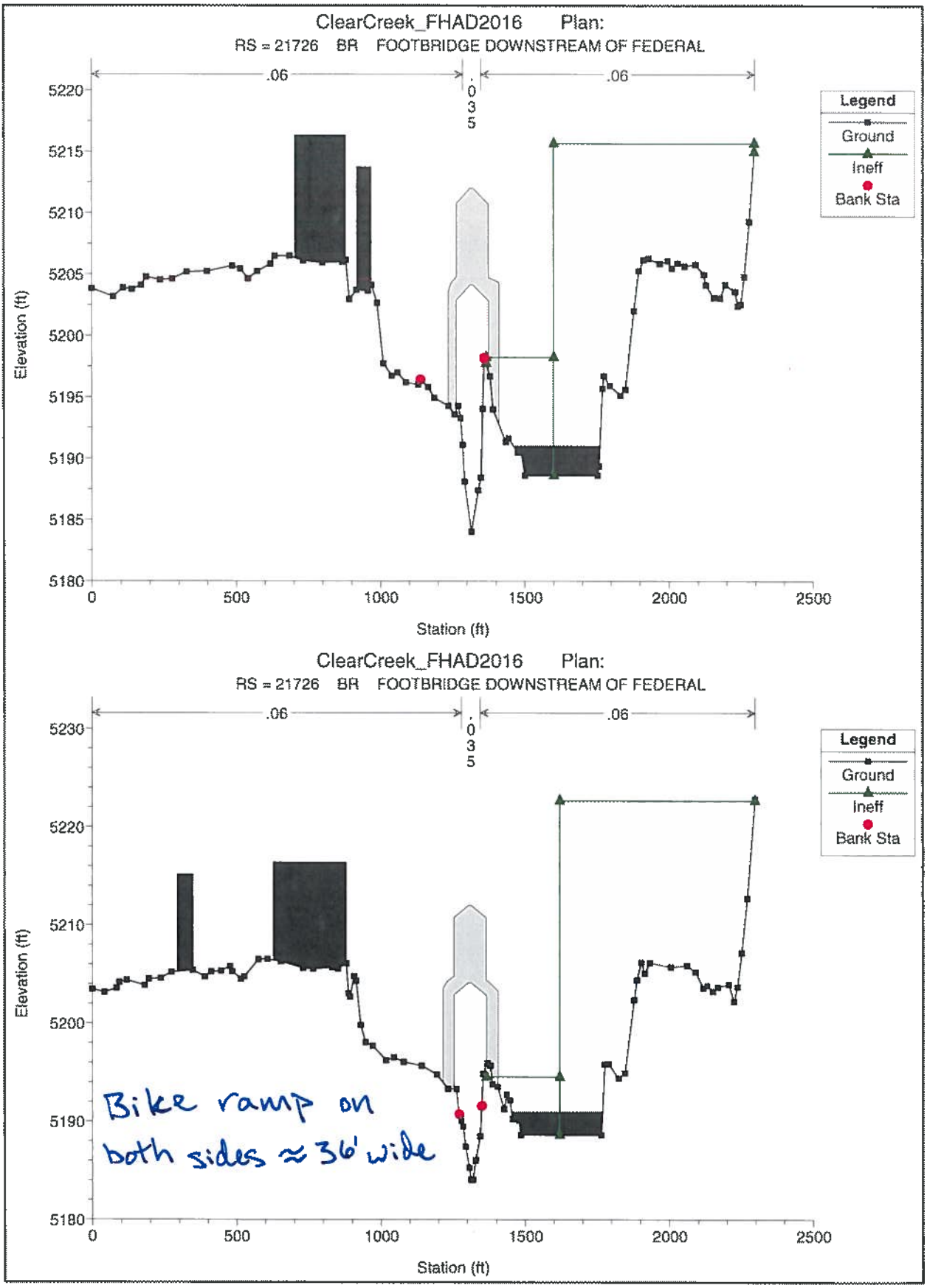
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 25822 BR Proposed CRT Bridge (FROM CLOMR)
.08
.035
.12
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Model: 1.5' pier width
Shape: Circular or twin cylinder
Field: ?
ClearCreek_FHAD2016 Plan:
RS = 25822 BR Proposed CRT Bridge (FROM CLOMR)
.06
.035
.12
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1 cylindrical pier ≈ 3.5' wide

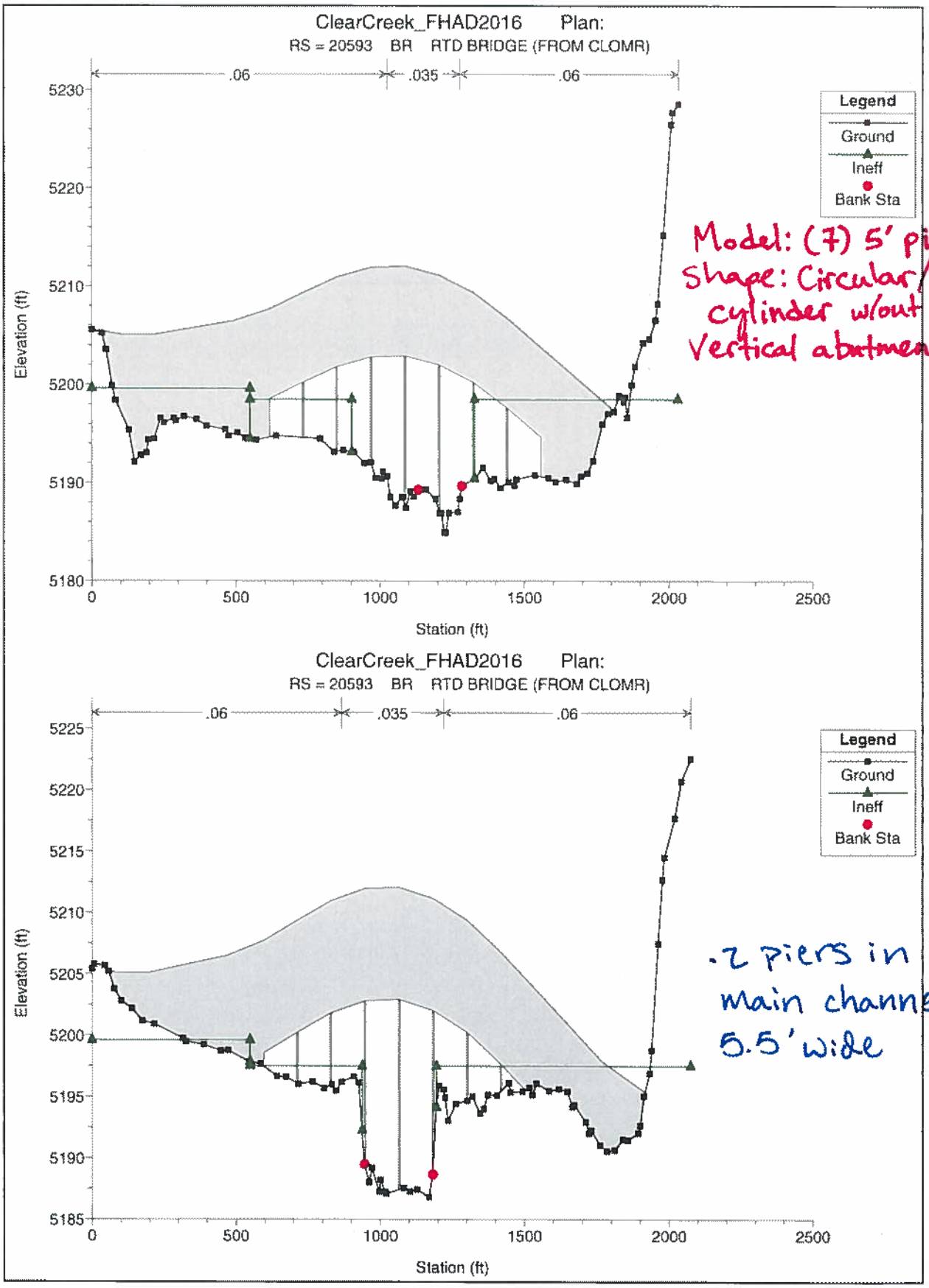
✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 25035 BR Federal Blvd Bri FEDERAL BLVD
.06
.03
.12
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5230
5225
5220
5215
5210
5205
5200
5195
0
500
1000
1500
2000
2500
Station (ft)
Model:
pier width: 1.5' ⇒ 3' cap
Shape: circular or twin-cylinder
Field: ?
ClearCreek_FHAD2016 Plan:
RS = 25035 BR Federal Blvd Bri FEDERAL BLVD
.12
.135
.15
.035
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
5230
5225
5220
5215
5210
5205
5200
5195
0
500
1000
1500
2000
2500
3000
Station (ft)
1 pier ≈ 2' wide, 90° nose

✓ NAS


ClearCreek_FHAD2016 Plan:
RS = 21726 BR FOOTBRIDGE DOWNSTREAM OF FEDERAL
.06
.035
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5180
5185
5190
5195
5200
5205
5210
5215
5220
0
500
1000
1500
2000
2500
ClearCreek_FHAD2016 Plan:
RS = 21726 BR FOOTBRIDGE DOWNSTREAM OF FEDERAL
.06
.035
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5180
5190
5200
5210
5220
5230
0
500
1000
1500
2000
2500
Bike ramp on
both sides ≈ 36' wide

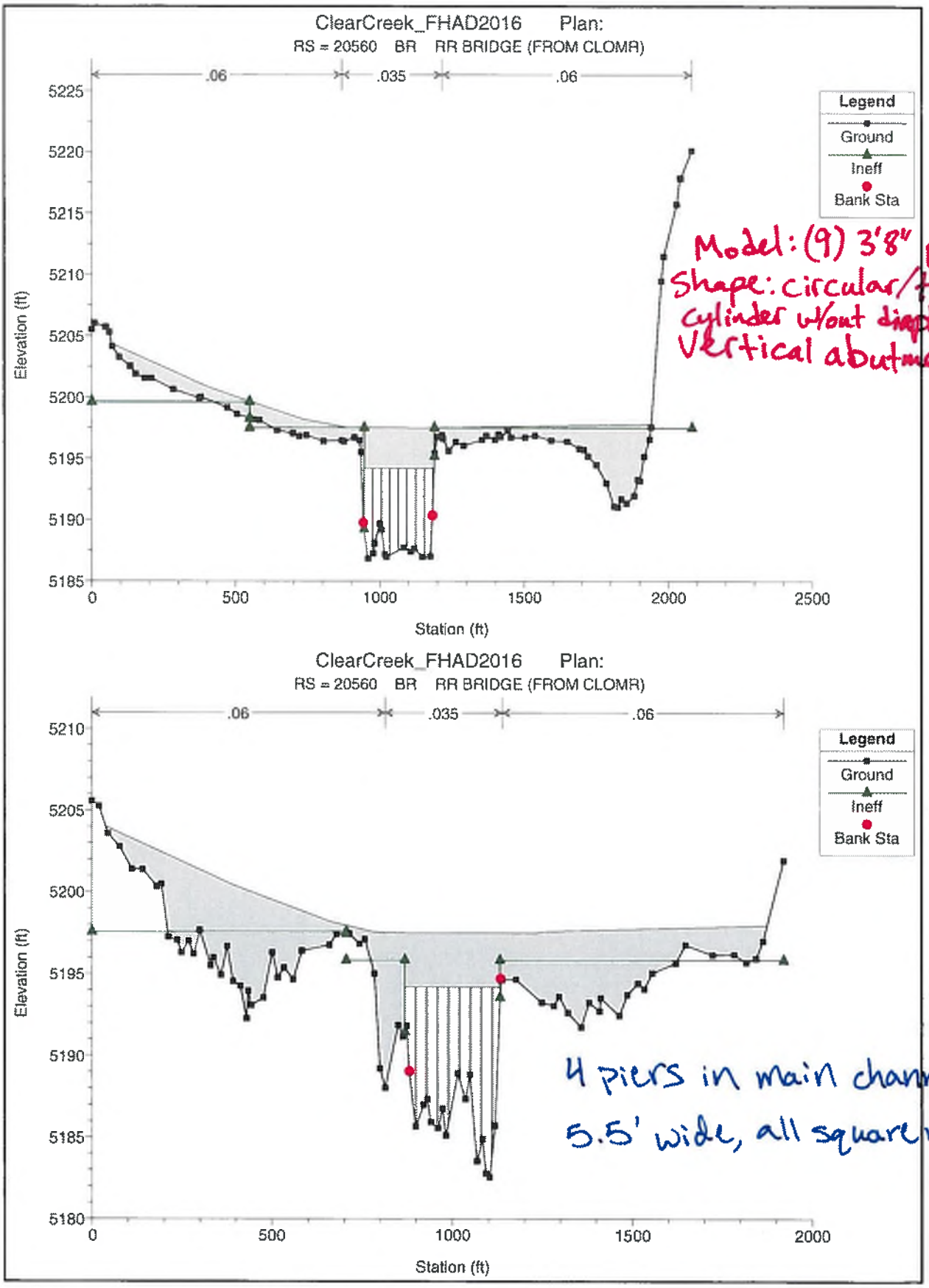
✓ NAS



Model: (7) 5' piers
Shape: Circular/twin cylinder w/out diaphragm
Vertical abutments

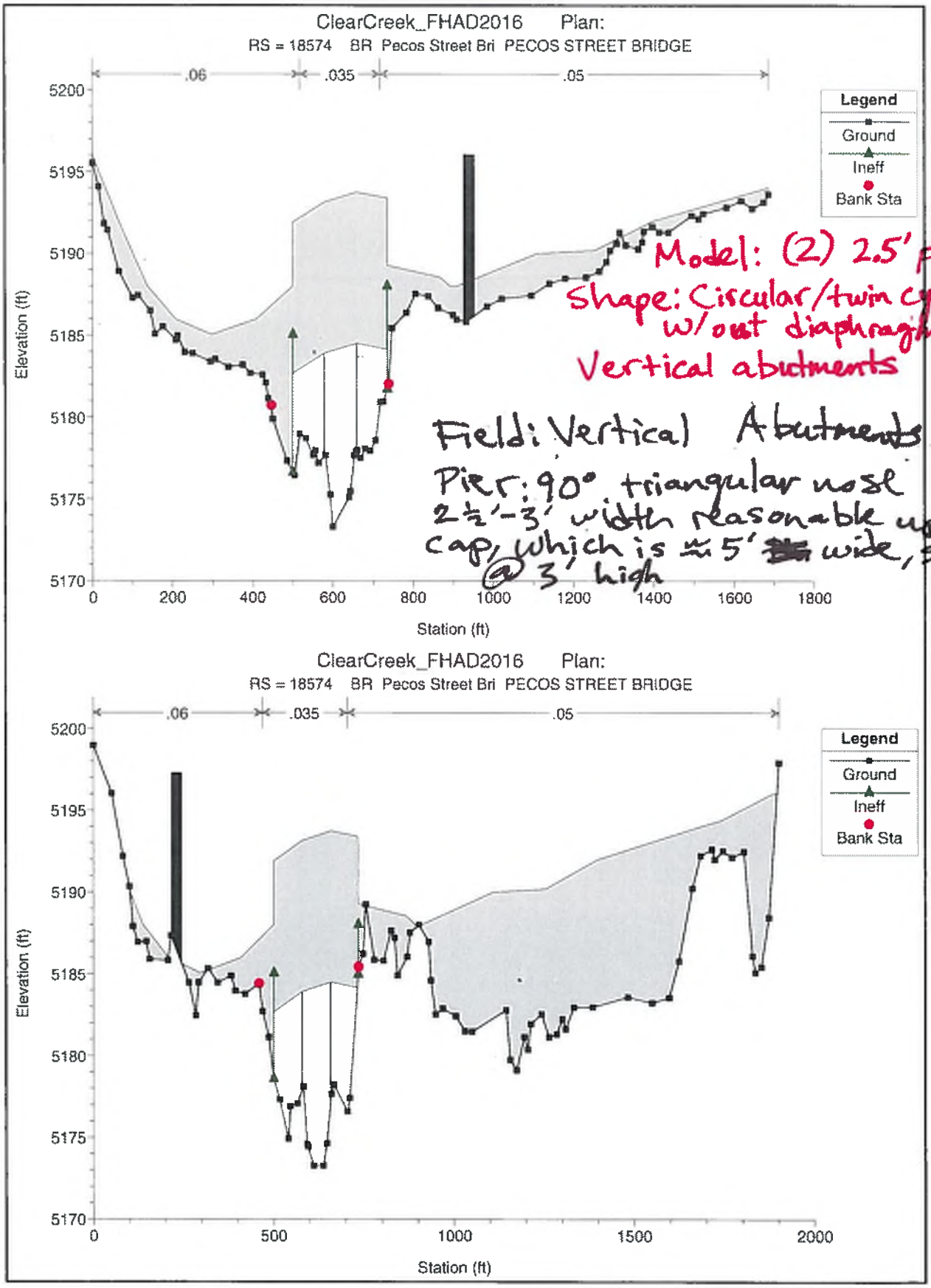
-2 piers in main channel 5.5' wide

✓ NAS



Model: (9) 3'8" piers
Shape: circular/twin cylinder w/out diaphragm
Vertical abutments

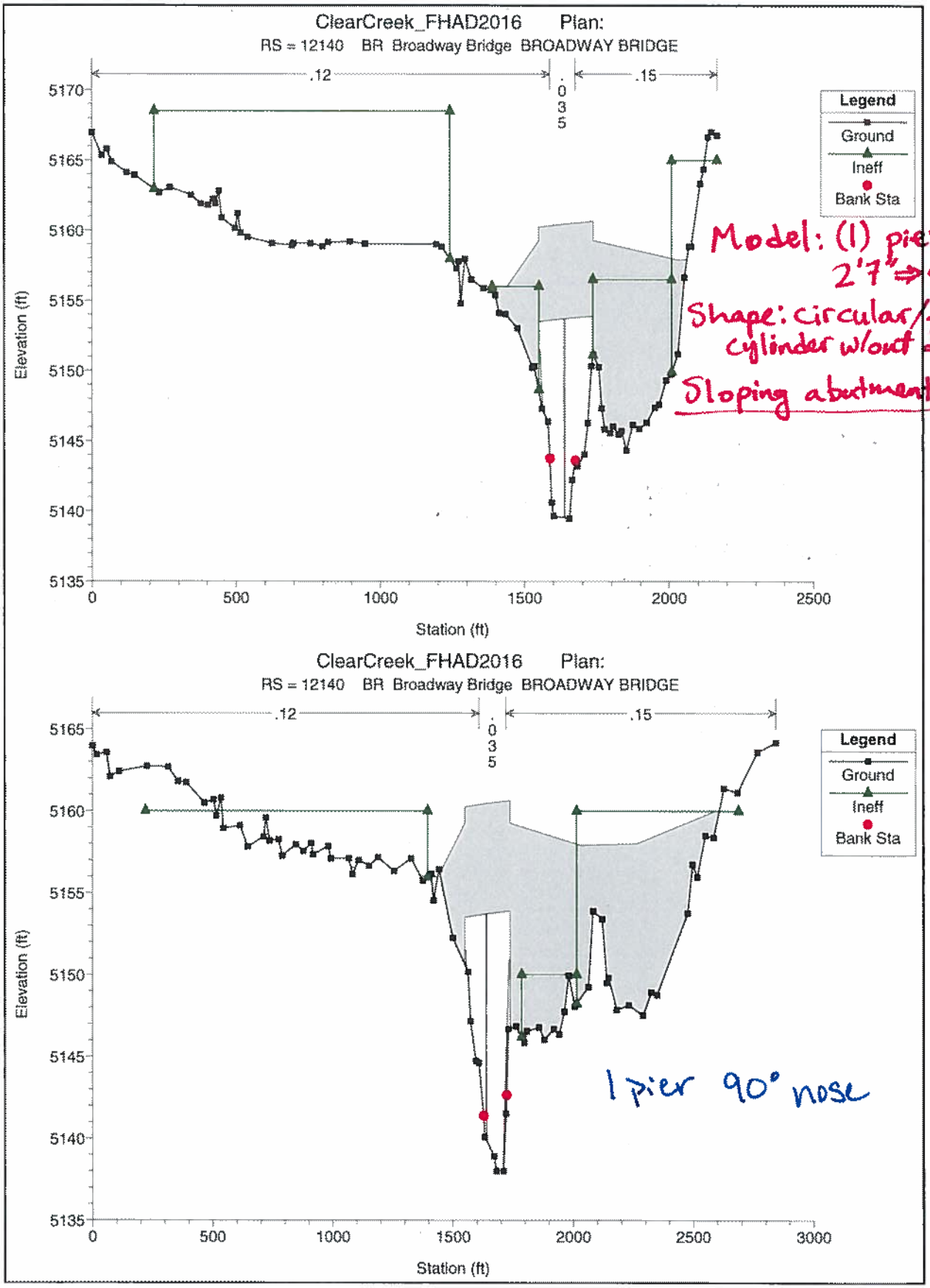
4 piers in main channel
5.5' wide, all square nose



Model: (2) 2.5' piers
Shape: Circular/twin cylinder w/out diaphragm
Vertical abutments

Field: Vertical Abutments
Pier: 90° triangular nose 2½'-3' width reasonable upto cap, which is ≈ 5' wide, starting @ 3' high

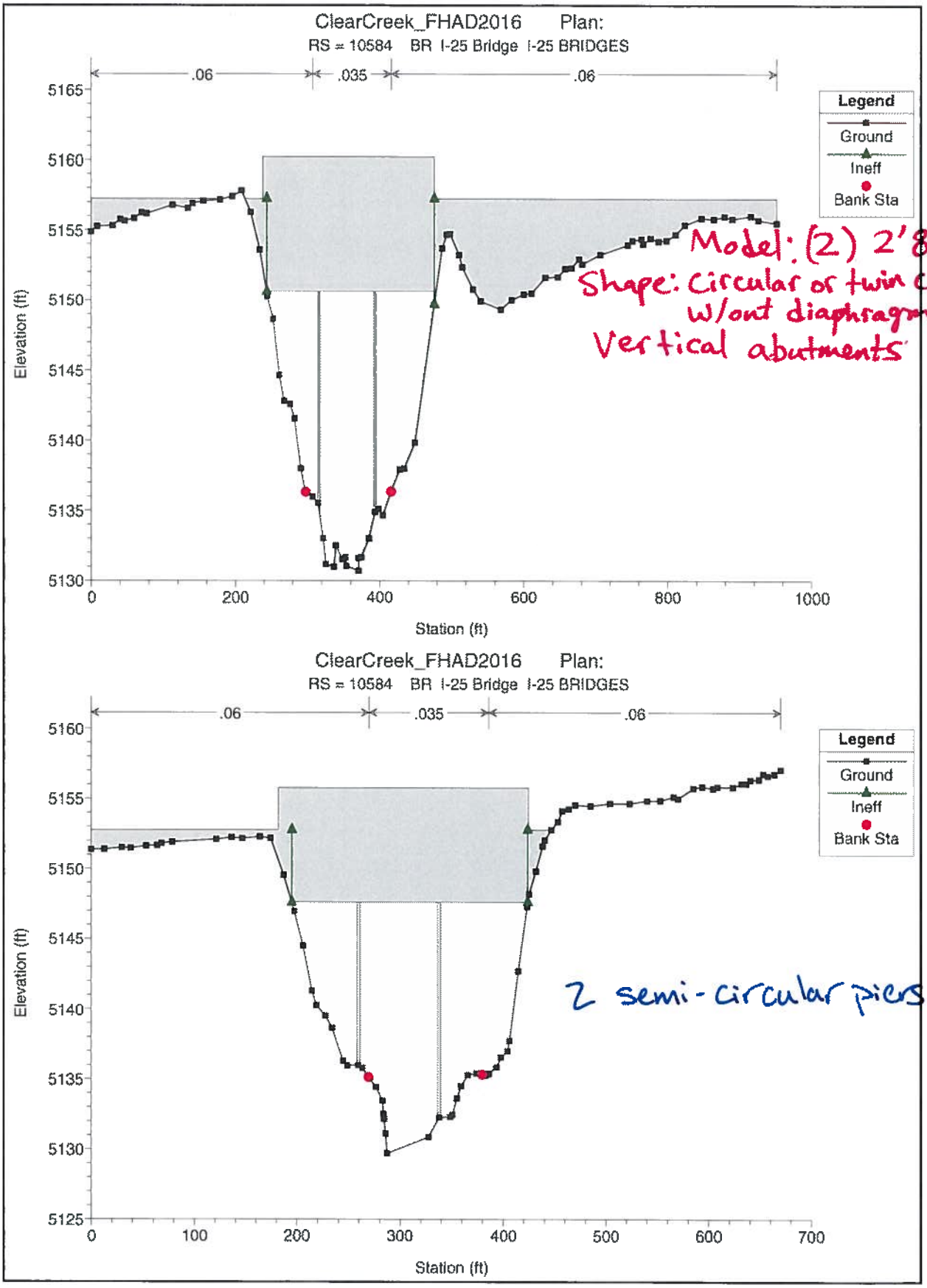
✓ NAS



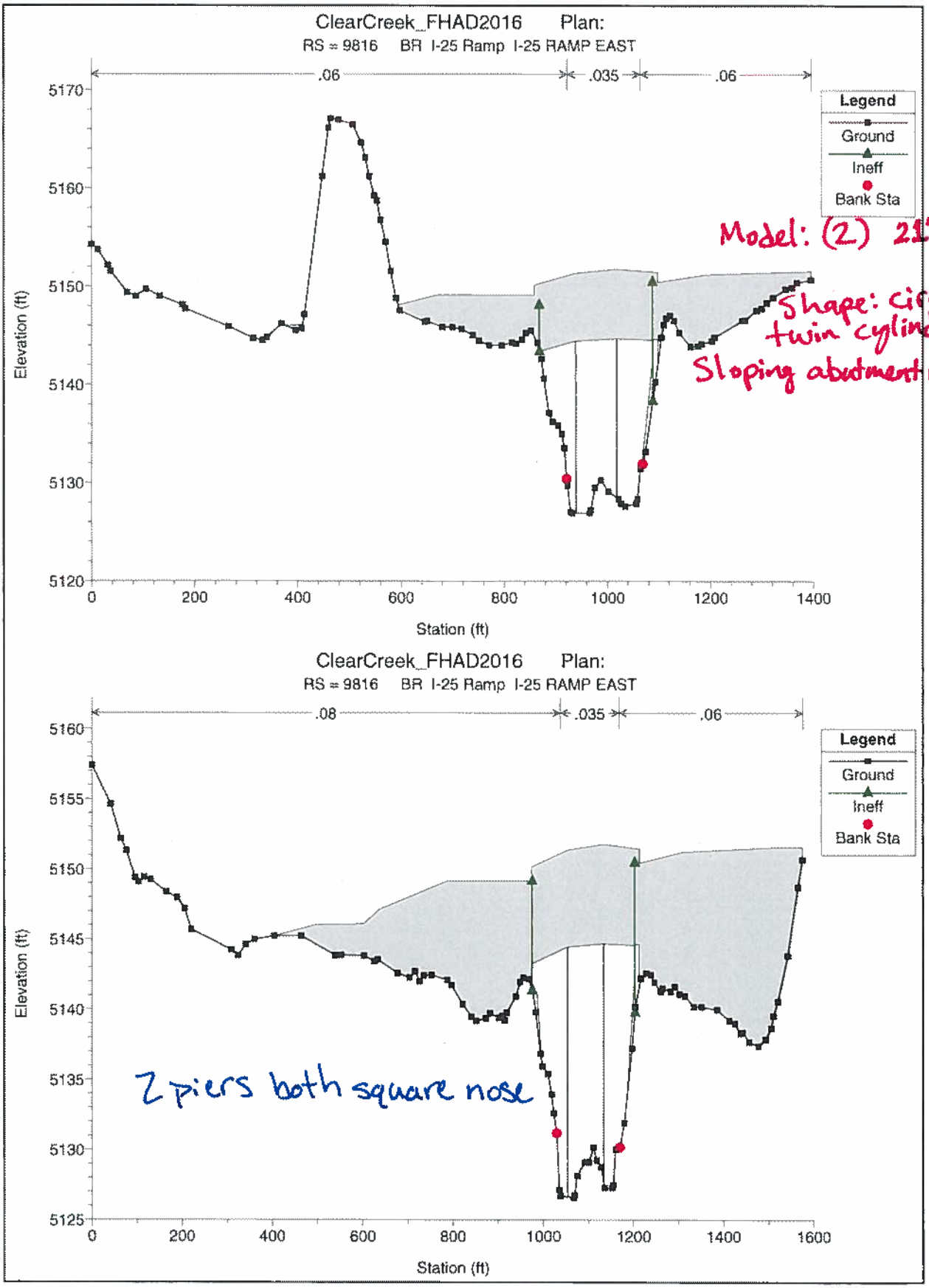
Model: (1) pier
2'7" ⇒ 4' width
Shape: circular/twin cylinder w/out diaphragm
Sloping abutments modeled

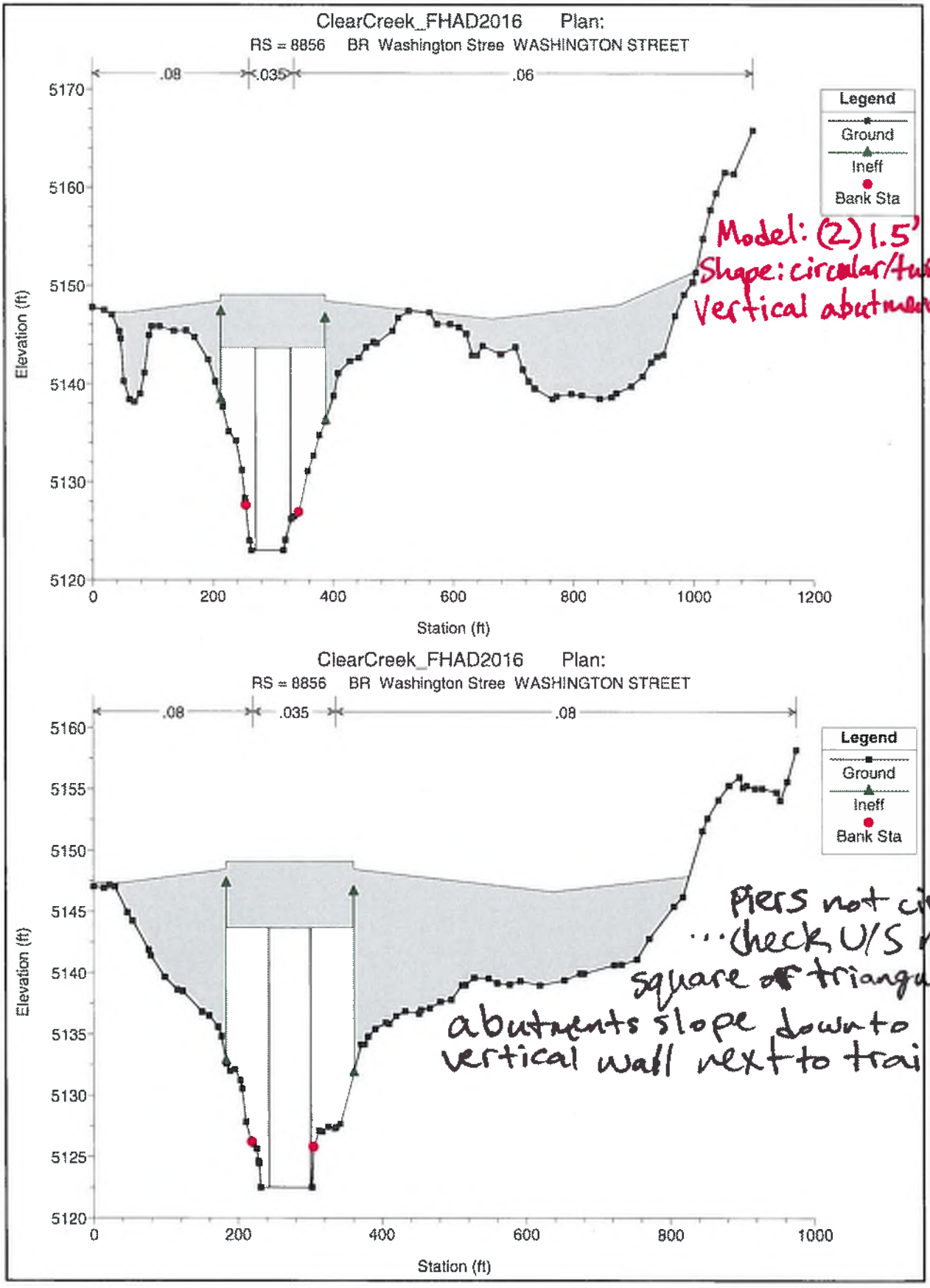
1 pier 90° nose

✓ NAS

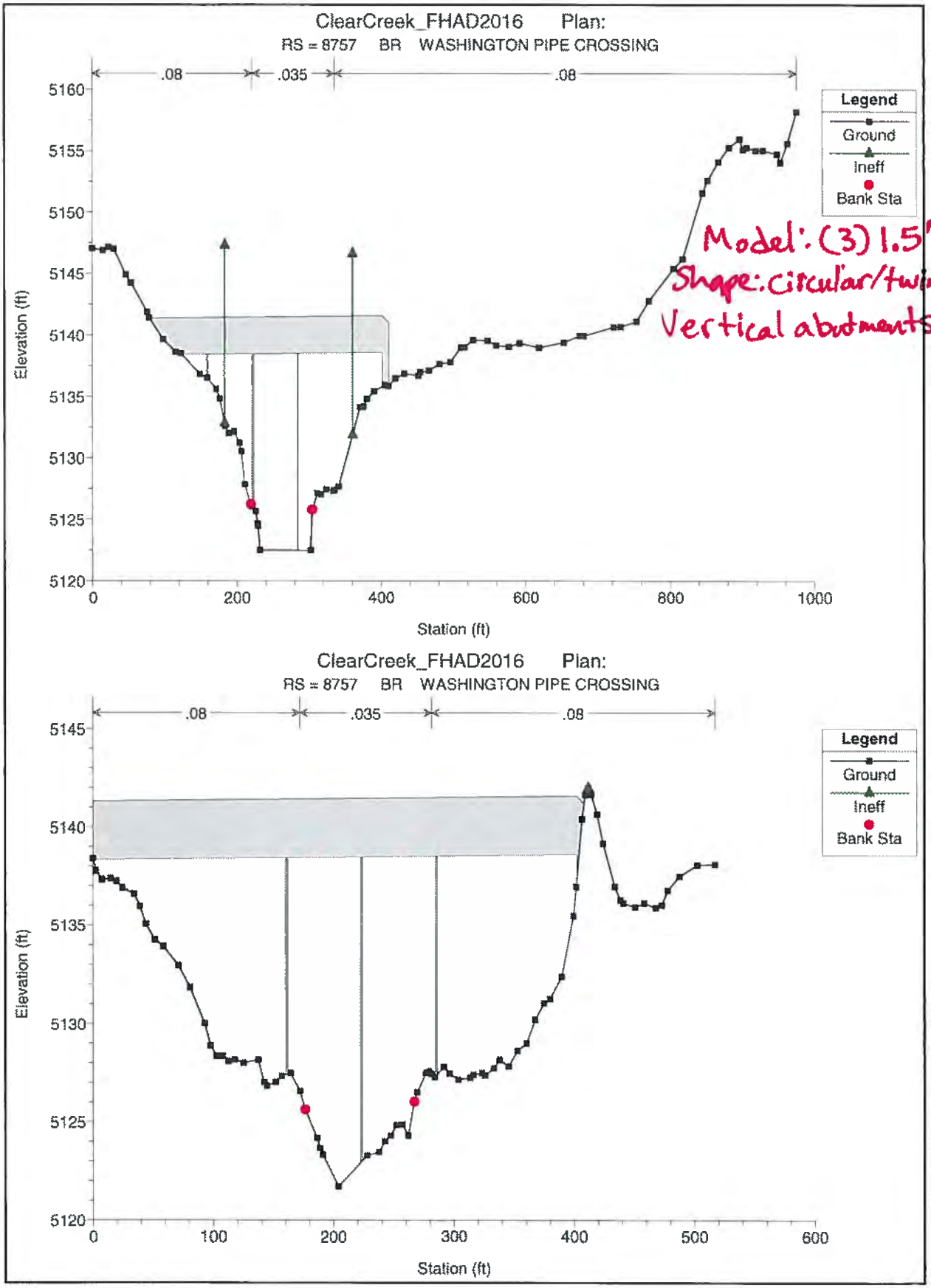

ClearCreek_FHAD2016 Plan:
RS = 10584 BR I-25 Bridge I-25 BRIDGES
.06
.035
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5165
5160
5155
5150
5145
5140
5135
5130
0
200
400
600
800
1000
Model: (2) 2'8" piers
Shape: Circular or twin cylinder w/out diaphragm
Vertical abutments
ClearCreek_FHAD2016 Plan:
RS = 10584 BR I-25 Bridge I-25 BRIDGES
.06
.035
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5160
5155
5150
5145
5140
5135
5130
5125
0
100
200
300
400
500
600
700
2 semi-circular piers

✓ NAS

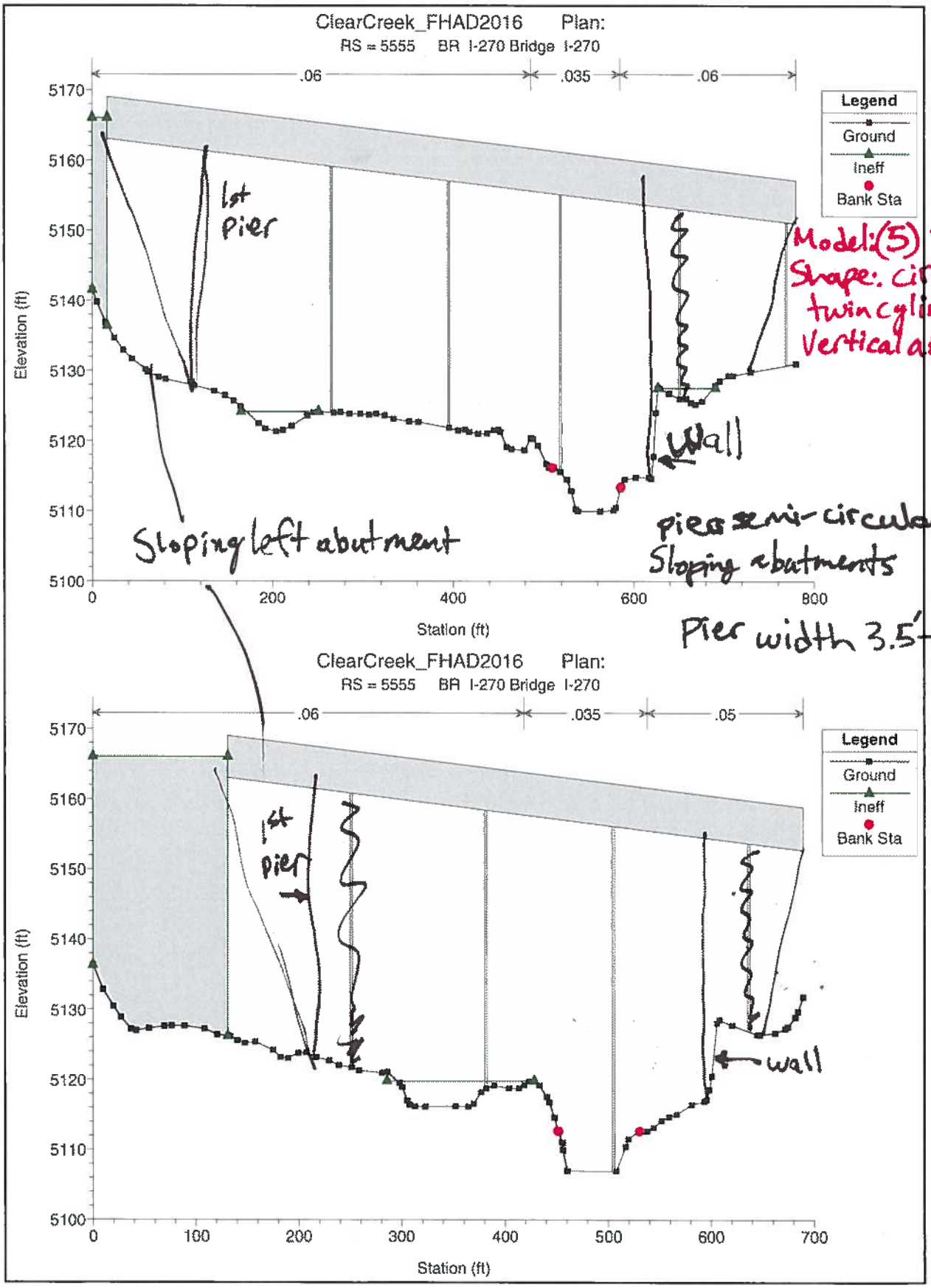

ClearCreek_FHAD2016 Plan:
RS = 9816 BR I-25 Ramp I-25 RAMP EAST
.06
.035
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Model: (2) 21" piers
Shape: circular/ twin cylinder
Sloping abutment modeled
ClearCreek_FHAD2016 Plan:
RS = 9816 BR I-25 Ramp I-25 RAMP EAST
.08
.035
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
2 piers both square nose


ClearCreek_FHAD2016 Plan:
RS = 8856 BR Washington Stree WASHINGTON STREET
.08
.035
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5170
5160
5150
5140
5130
5120
0
200
400
600
800
1000
1200
Model: (2) 1.5' piers
Shape: circular/twin cylinder
Vertical abutment
ClearCreek_FHAD2016 Plan:
RS = 8856 BR Washington Stree WASHINGTON STREET
.08
.035
.08
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5160
5155
5150
5145
5140
5135
5130
5125
5120
0
200
400
600
800
1000
Piers not circular
...check U/S notes -
square or triangular
abutments slope down to
vertical wall next to trail

✓NAS



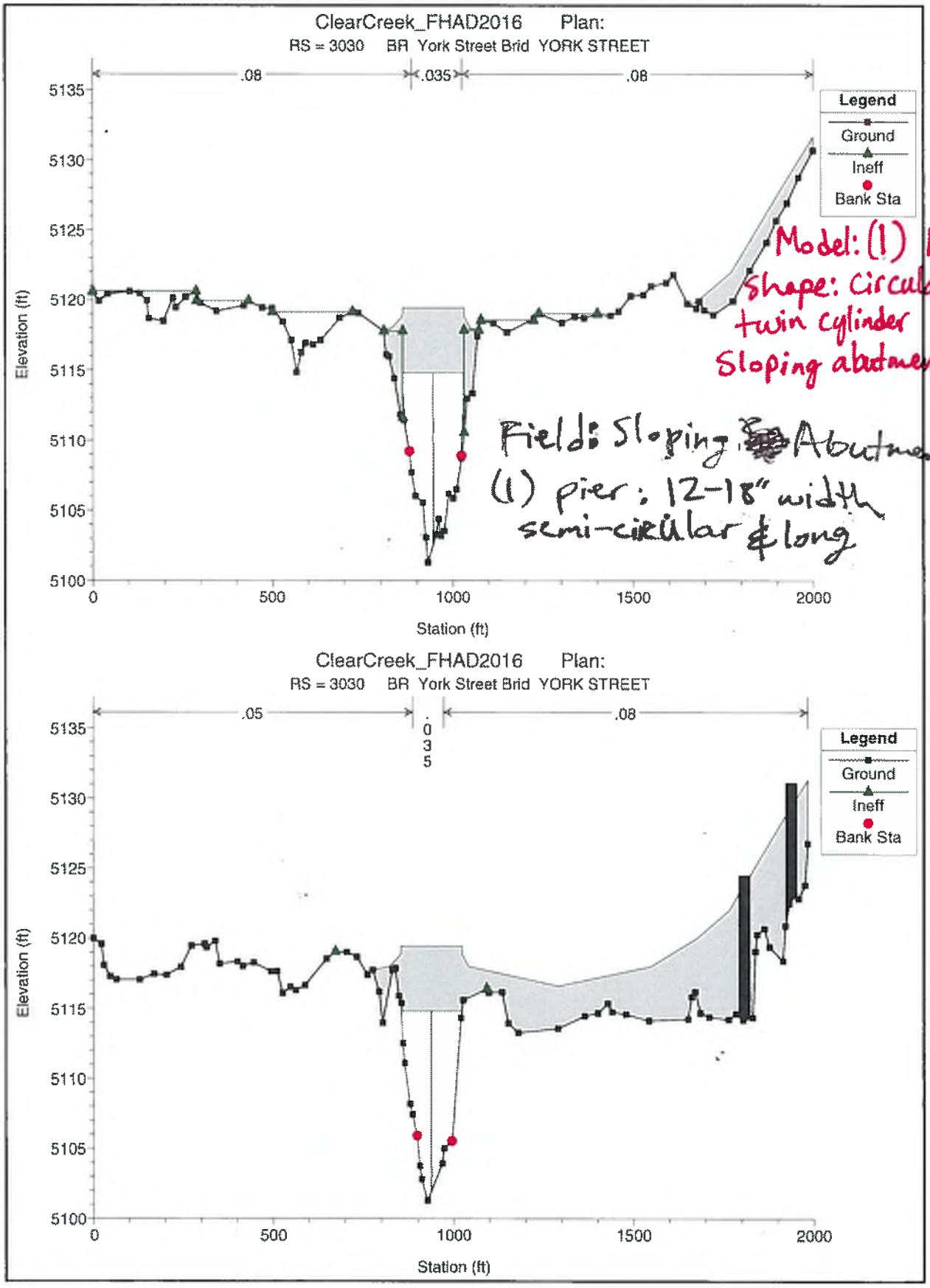
Model: (3) 1.5' piers
Shape: circular/twin cylinder
Vertical abutments



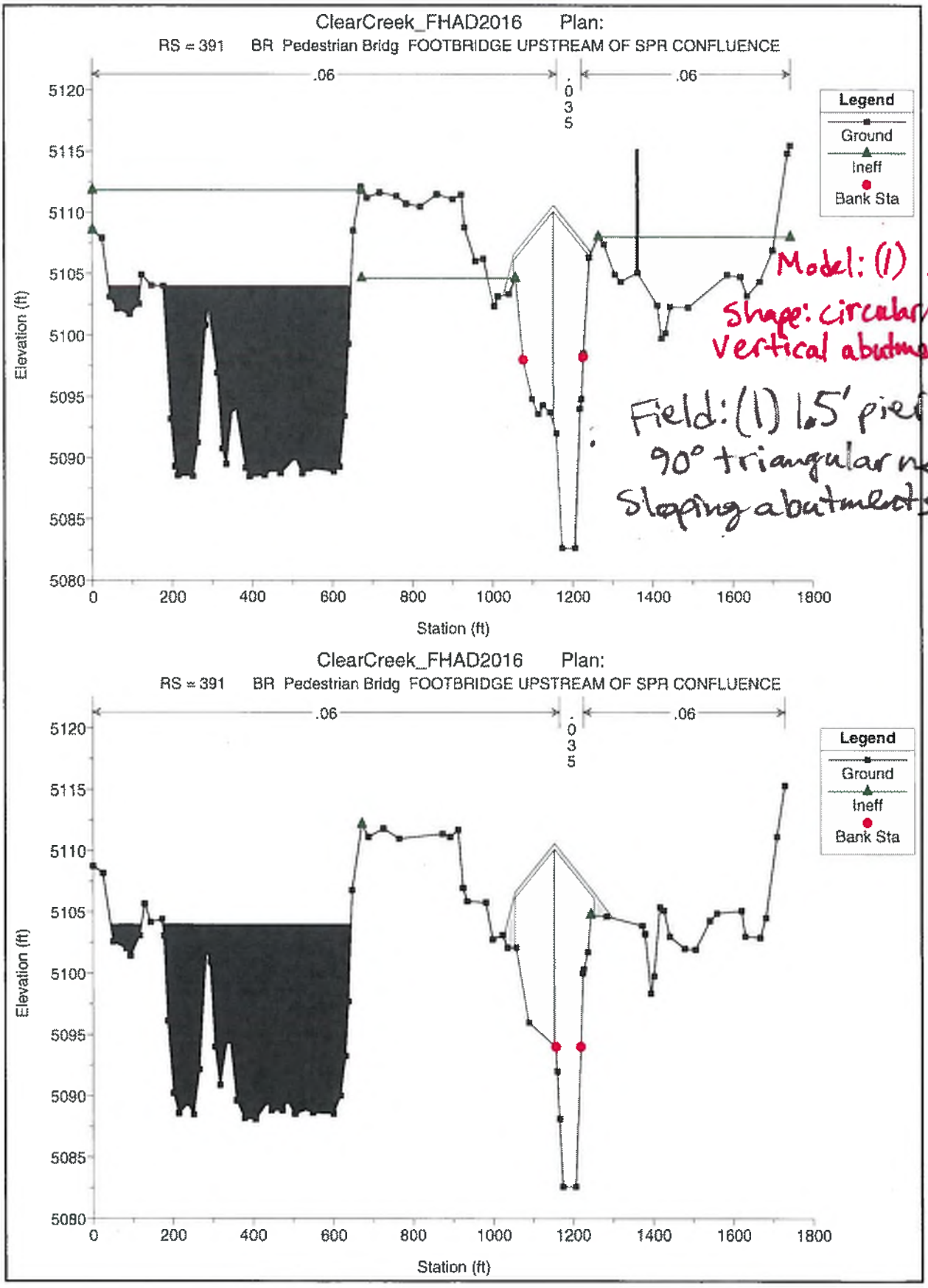
Model: (5) 2.4' piers
Shape: circular/ twin cylinder
Vertical abutments

piers semi-circular (5)
Sloping abutments

Pier width 3.5'-4'


ClearCreek_FHAD2016 Plan:
RS = 3030 BR York Street Brid YORK STREET
.08
.035
.08
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5135
5130
5125
5120
5115
5110
5105
5100
0
500
1000
1500
2000
Model: (1) 15" pier
Shape: Circular / twin cylinder
Sloping abutments modeled
Field: Sloping Abutments
(1) pier: 12-18" width semi-circular & long
ClearCreek_FHAD2016 Plan:
RS = 3030 BR York Street Brid YORK STREET
.05
.035
.08
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

Col


ClearCreek_FHAD2016 Plan:
RS = 391 BR Pedestrian Bridg FOOTBRIDGE UPSTREAM OF SPR CONFLUENCE
.06
.035
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
5120
5115
5110
5105
5100
5095
5090
5085
5080
0
200
400
600
800
1000
1200
1400
1600
1800
Model: (1) 1.5' pier
Shape: circular/twin cylinder
Vertical abutments
Field: (1) 1.5' pier
90° triangular nose
Sloping abutments
ClearCreek_FHAD2016 Plan:
RS = 391 BR Pedestrian Bridg FOOTBRIDGE UPSTREAM OF SPR CONFLUENCE
.06
.035
.06
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

MODELING MEMOS

ICONENGINEERING, INC.

Memorandum

TO: Ms. Brooke Seymour, P.E., CFM & Ms. Terri Fead, P.E., CFM

FROM: ICON Engineering, Inc.

DATE: November 5th, 2018 Revised October 29, 2020

RE: Clear Creek FHAD 2D Modeling Approach

Background:

In an effort to assist the Clear Creek FHAD hydraulic 1D modeling effort, a series of 2D models were developed at key locations along Clear Creek. These locations include:

- Left overbank spill across 44th Avenue from Kipling to XS 48477
- Right overbank spill across Sheridan Boulevard from 52nd Avenue to XS 32573
- Right overbank spill across I-76 and Federal Boulevard from XS 28381 to XS 23255
- Right overbank spill between XS 22613 to XS 22088 (Pecos Area)
- Left overbank spill in the 'North Overflow' area

The purpose of these models is to provide spill discharge information, approximate floodplain limits, and to provide flow path alignments for the key areas noted above as needed.

The 2D modeling was completed using HEC-RAS (v. 5.0.5). General modeling parameters include the following:

- 30 ft by 30 ft mesh spacing
- Break lines at key locations (channels, top of bank etc.)
- Bridge structures where deck is close to or below 100-year 1D water surface elevations (bridge structures are approximated by culverts in 2D HEC-RAS)
- Buildings were integrated into the elevation surface for the model and set as break lines

A project meeting to review initial results was held on October 11th, 2018. The general approach to the 2D modeling was reviewed and the UDFCD provided concurrence with the efforts pending the following revisions and subsequent review by the District:

- Remove the Jersey barrier from the left overbank just upstream of Sheridan Boulevard
- Extend hydrographs to ensure that all impacted storage has been filled and the model outflow has reached steady state

7000 S. Yosemite Street, Suite 120, Centennial, CO 80112
p 303.221.0802 | f 303.221.4019
www.iconeng.com

Recommendations:

Based on the 2D modeling, ICON Engineering, Inc. makes the following recommendations:

North Overflow

The 2D discharges (as noted on the attached Figure 0 through Figure 3) will be utilized within the 1D model. The creek centerline and cross-section alignment for the North Overflow will be revised based on the resulting flows as seen in the 2D results.

Right overbank spill across Sheridan Boulevard from 52nd Ave. to XS 32573

The 500-year floodplain delineation will reflect the 2D results as depicted in the attached Figure 4,

Right overbank spill between XS 22613 to XS 22088 (Pecos Area)

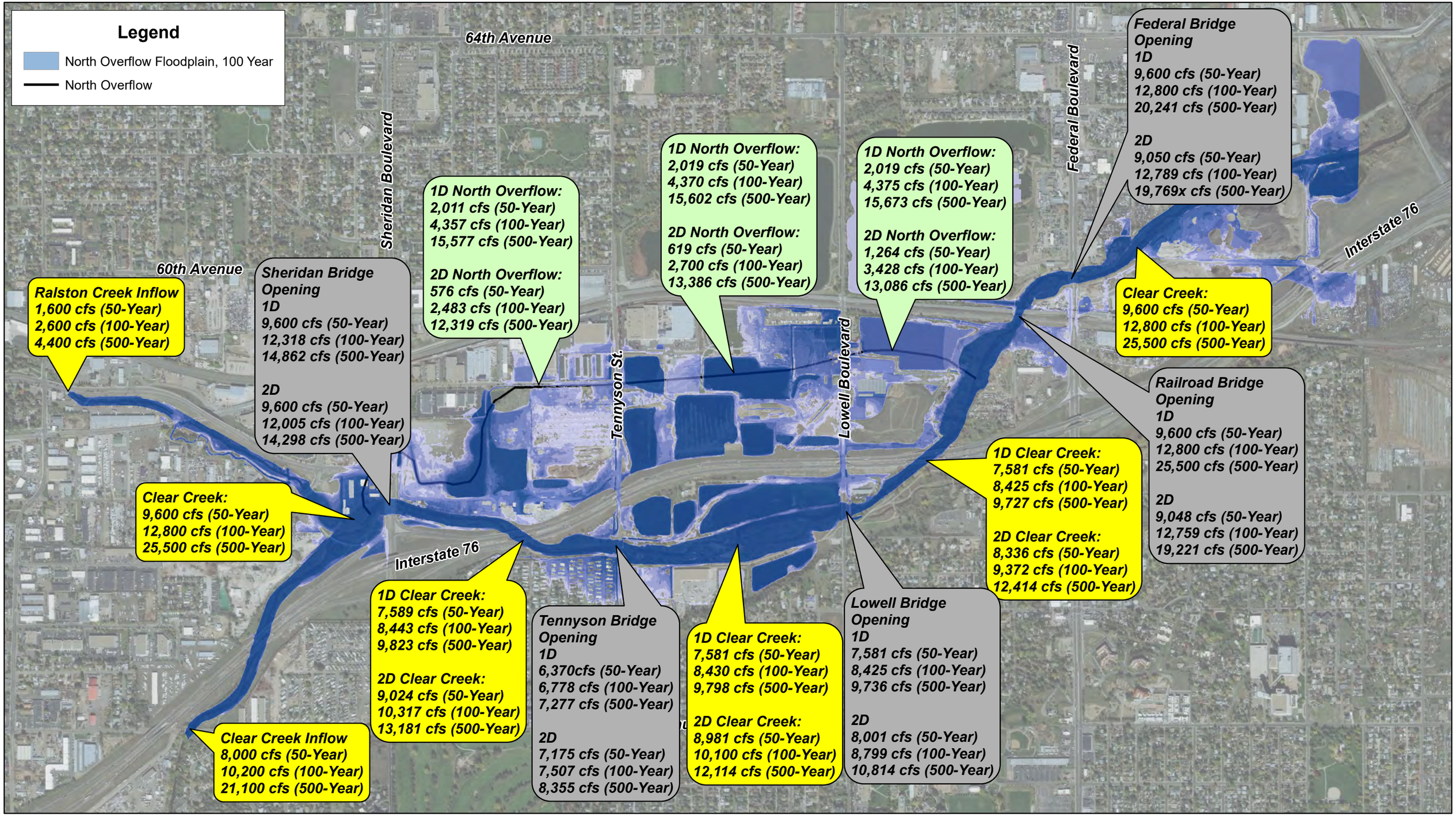
The spill discharges into the Pecos Area will be based on the 2D modeling results instead of the 1D normal depth calculations previously submitted. Figures 5 and 6 illustrate the Pecos Area as modeled based on the spill discharge values from the 1D model. However, based on the 2D modeling flow results and the comparison to the 1D water surface elevations, it is recommended that the discharges for this area utilize the 2D modeling results as noted in Figures 12 and 13. Based on the 2D discharges (147 cfs for the 100-year, and 3,046 cfs for the 500-year), it is further recommended that the Pecos Area not be studied by detailed methods, rather the 2D model will be utilized to determine the appropriate limits of flooding to be classified as Zone AO, AH, or X for the flood insurance rate map.

Left overbank spill across 44th Avenue from Kipling to XS 48477

The 2D modeling for this spill location retained more flow within the channel when compared to the 1D results. Based on these results, it is recommended that the 2D modeling be used to provide an approximate location for the Zone X shaded limits downstream of 44th Avenue.

Right overbank spill across I-76 and Federal Boulevard from XS 28381 to XS 23255

As illustrated in Figure 3, this spill location does not occur in the 2D modeling. It is recommended that no additional spill flow be incorporated into the 1D hydraulic analysis or resulting floodplain delineation at this location.



ICON ENGINEERING, INC.

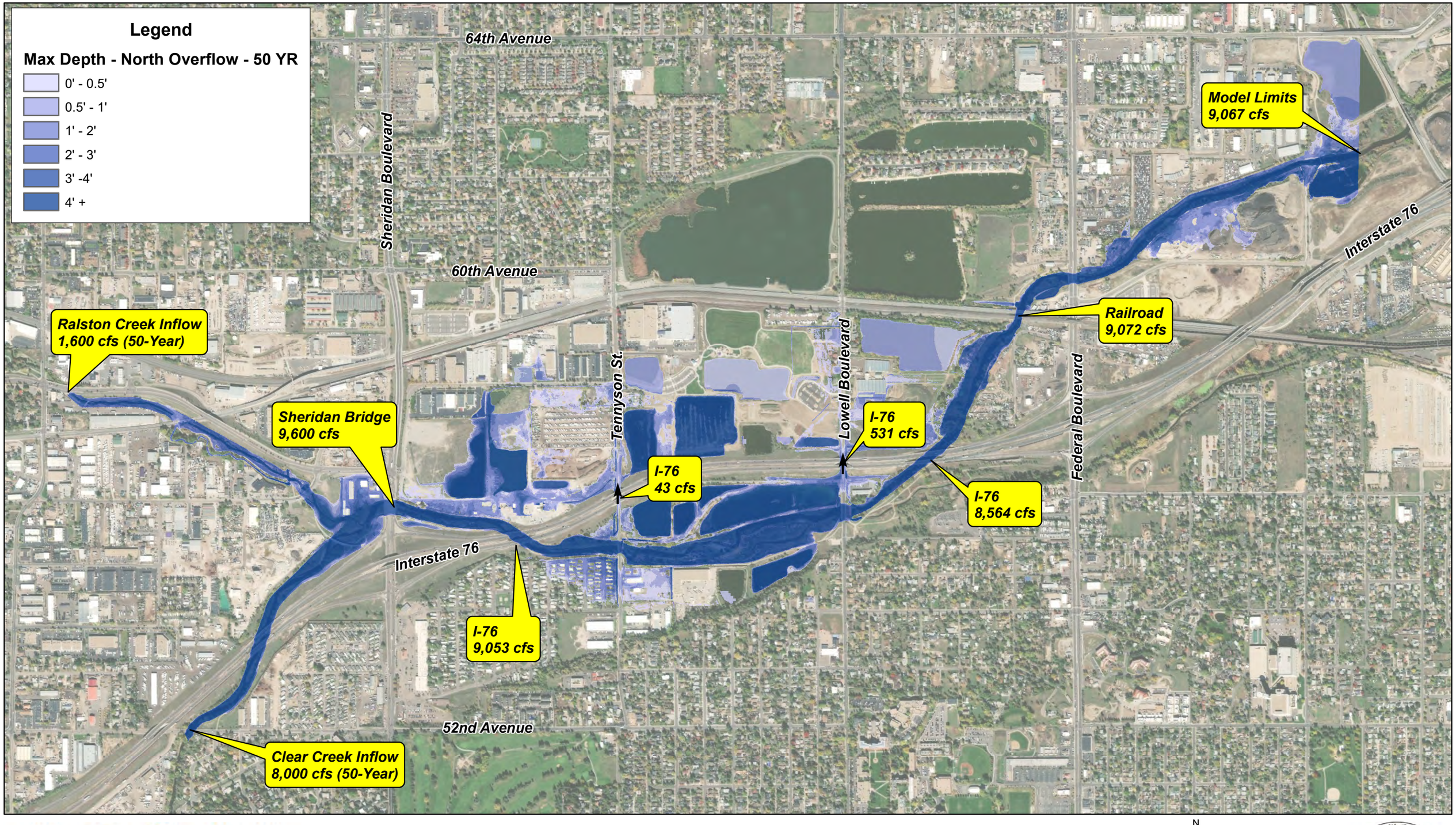
Clear Creek FHAD - 2D Modeling for Identified Spill Areas

Figure 0: North Overflow Discharge Summary *(revised bridge survey)*

N
W E
S

0 500 1,000 2,000 Feet

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT



ICON ENGINEERING, INC.

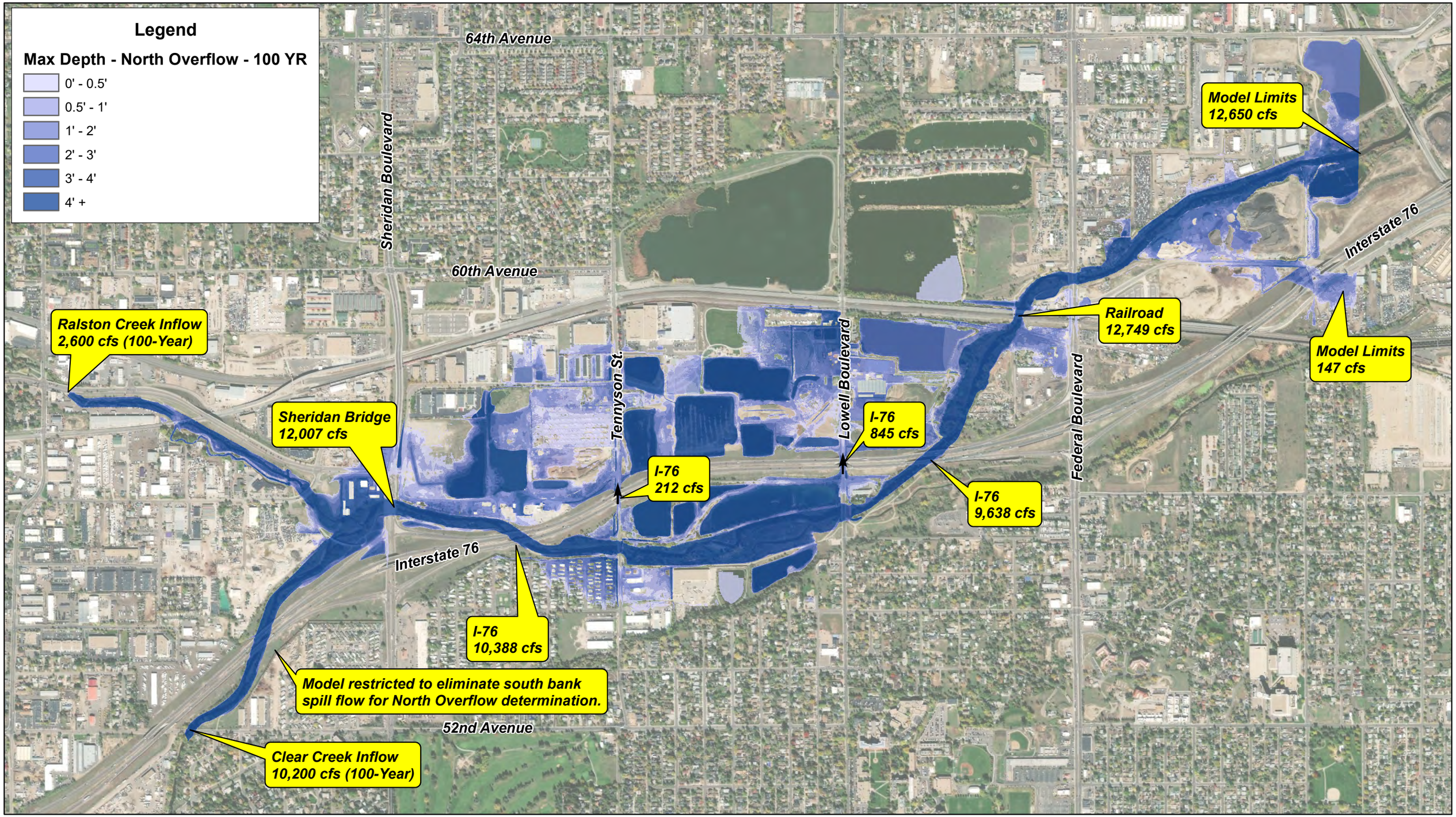
Clear Creek FHAD - 2D Modeling for Identified Spill Areas

Figure 1: North Overflow 50-Year

N
W E
S

0 500 1,000 2,000 Feet

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT



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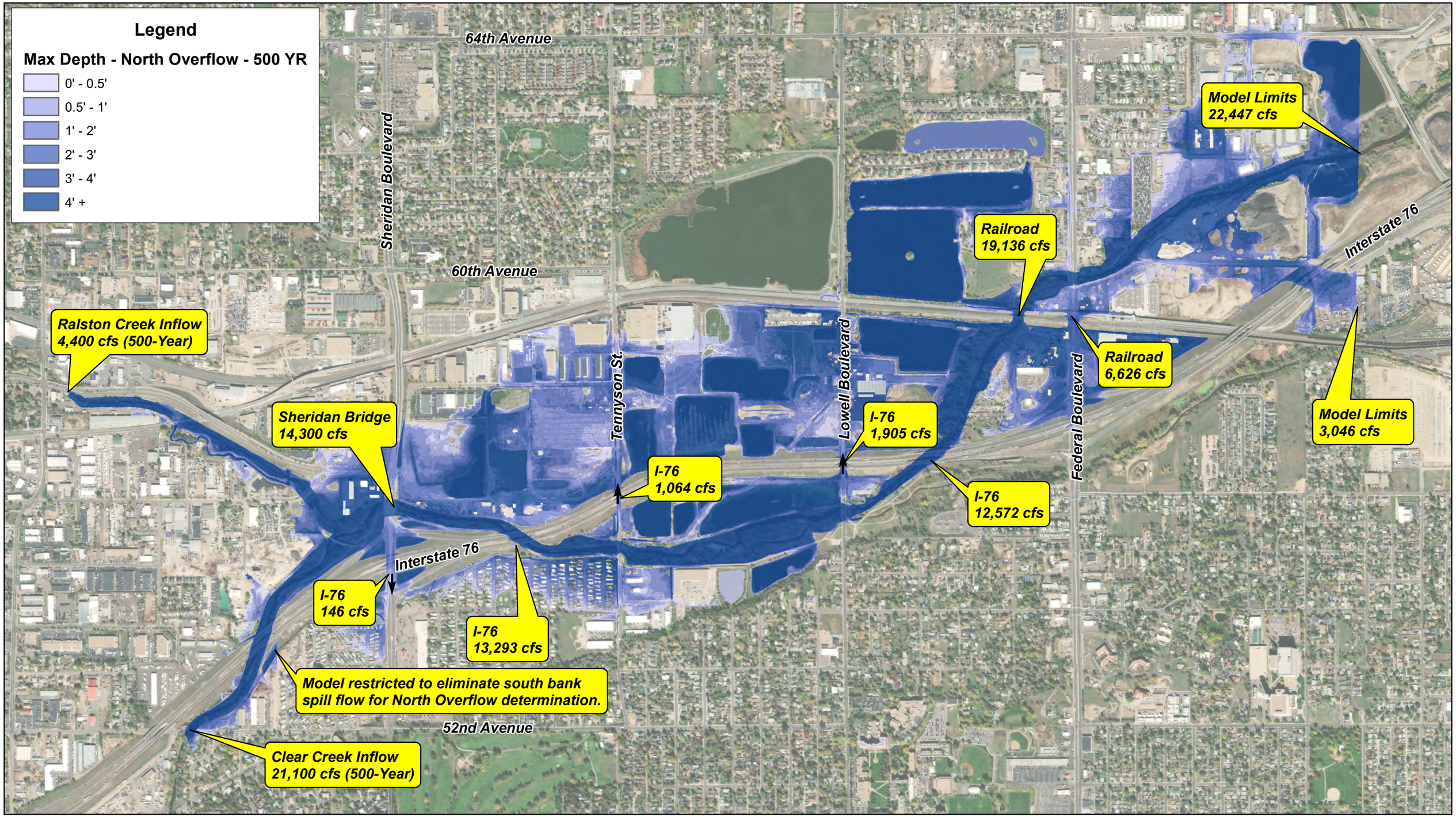
Clear Creek FHAD - 2D Modeling for Identified Spill Areas

Figure 2: North Overflow 100-Year

N
W E
S

0 500 1,000 2,000 Feet

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT



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Clear Creek FHAD - 2D Modeling for Identified Spill Areas

Figure 3: North Overflow 500-Year

N
W E
S

0 500 1,000 2,000 Feet

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT

ICON ENGINEERING, INC.

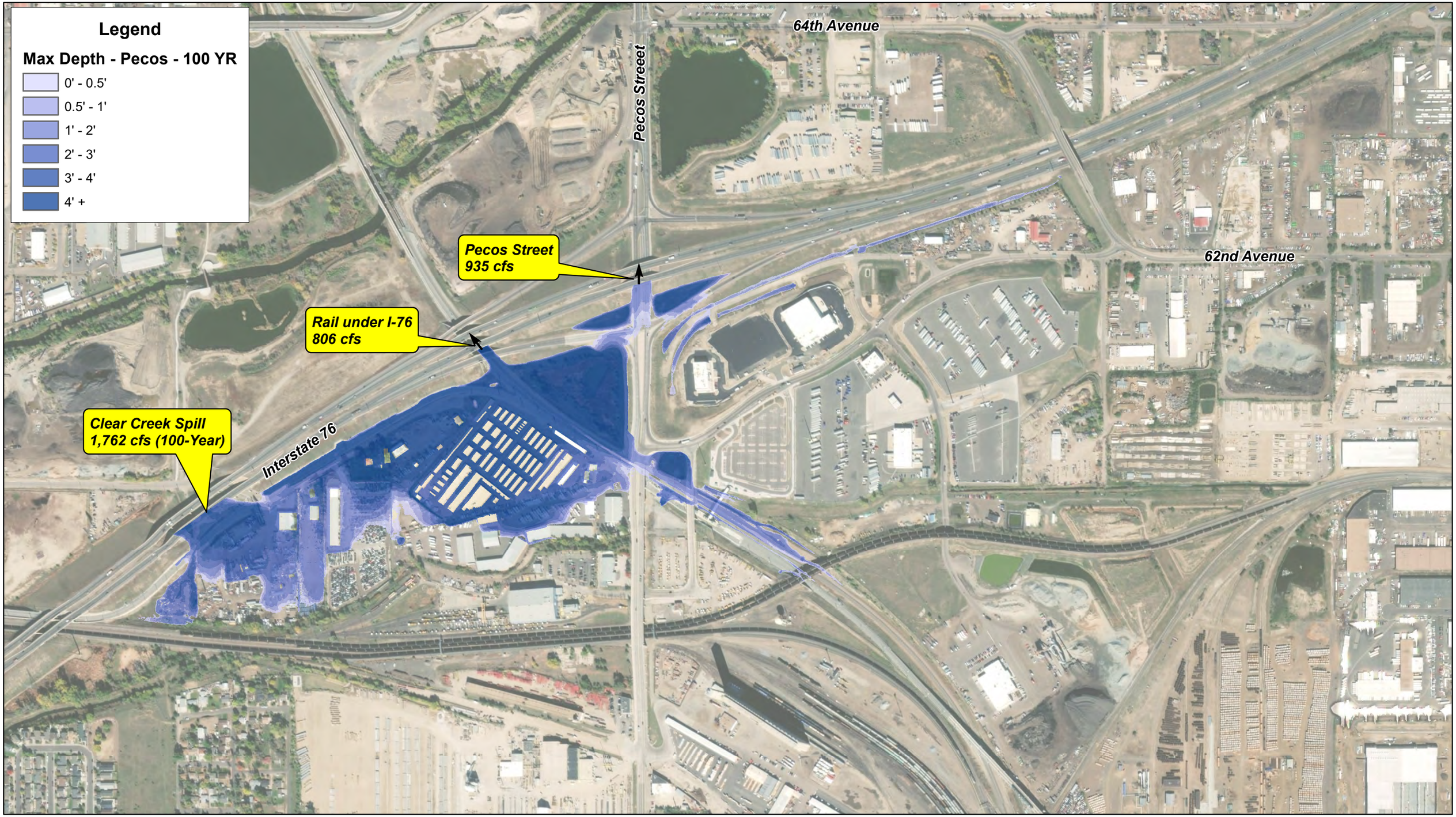
Clear Creek FHAD - 2D Modeling for Identified Spill Areas

Figure 4: Sheridan South Bank 500-Year

N
W E
S

0 175 350 700 Feet

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT



ICON ENGINEERING, INC.

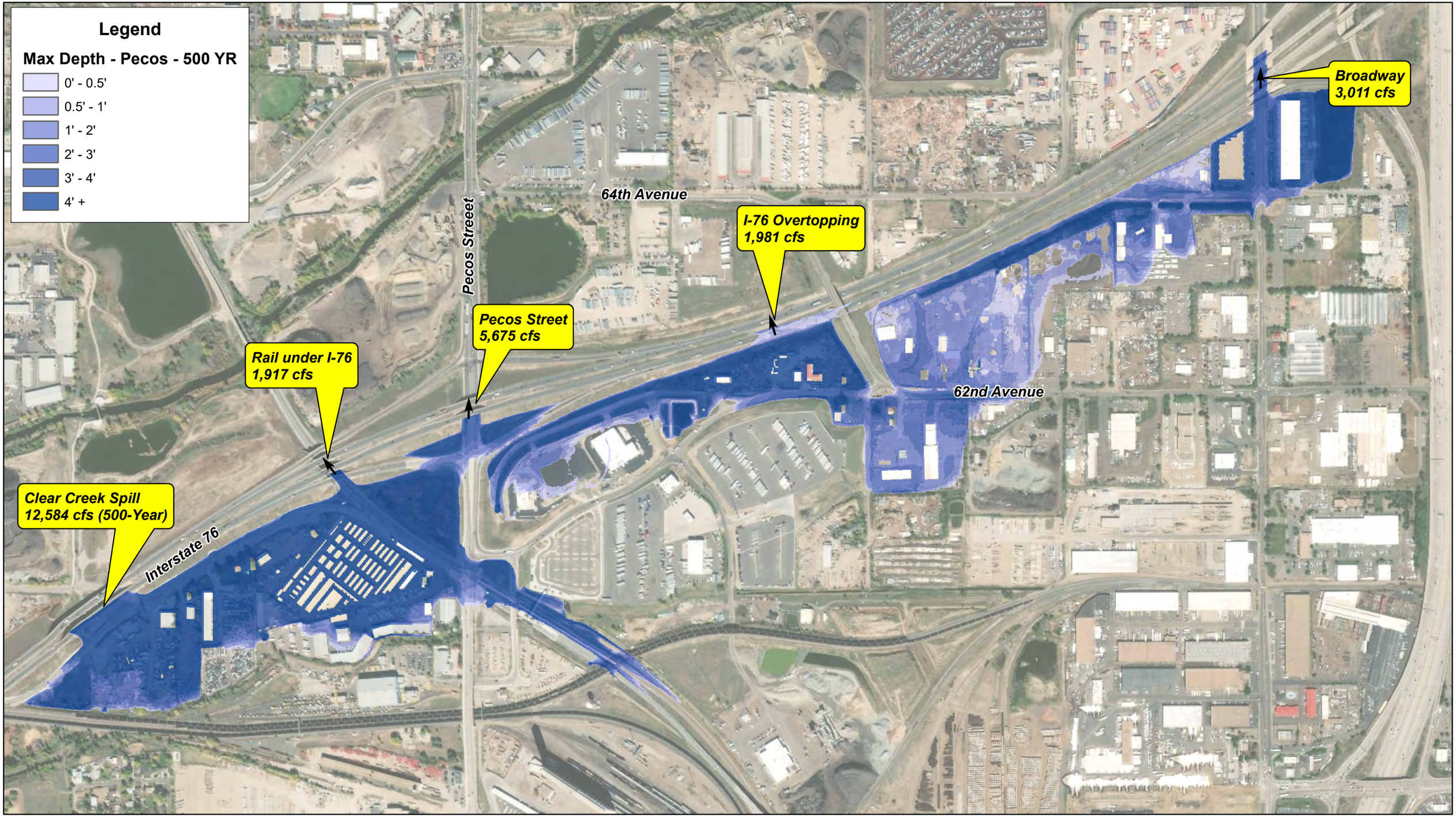
Clear Creek FHAD - 2D Modeling for Identified Spill Areas

Figure 5: Pecos 100-Year

N
W E
S

0 275 550 1,100 Feet

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT



ICON ENGINEERING, INC.

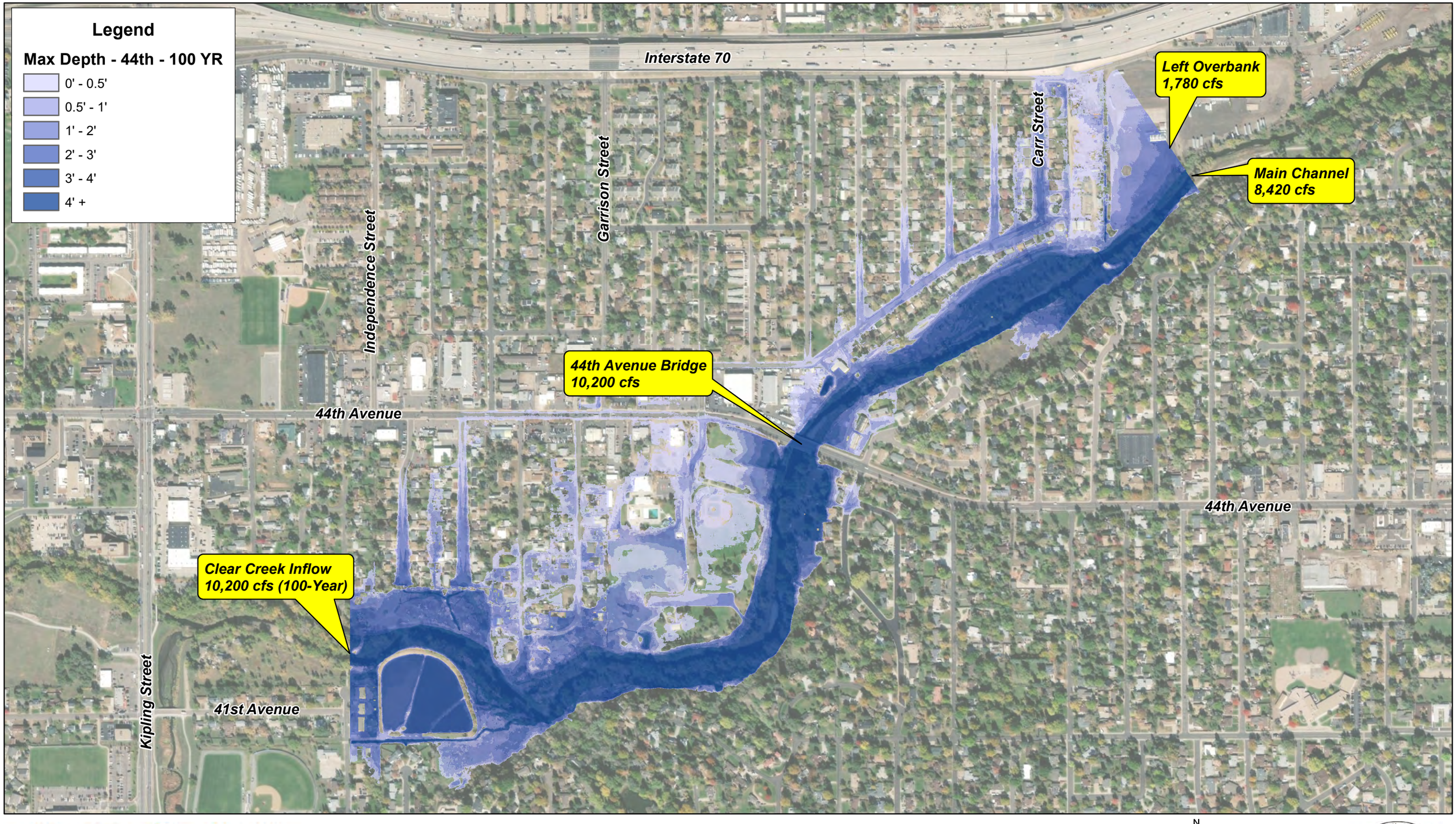
Clear Creek FHAD - 2D Modeling for Identified Spill Areas

Figure 6: Pecos 500-Year

N
W E
S

0 355 710 1,420 Fee

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT



ICON ENGINEERING, INC.

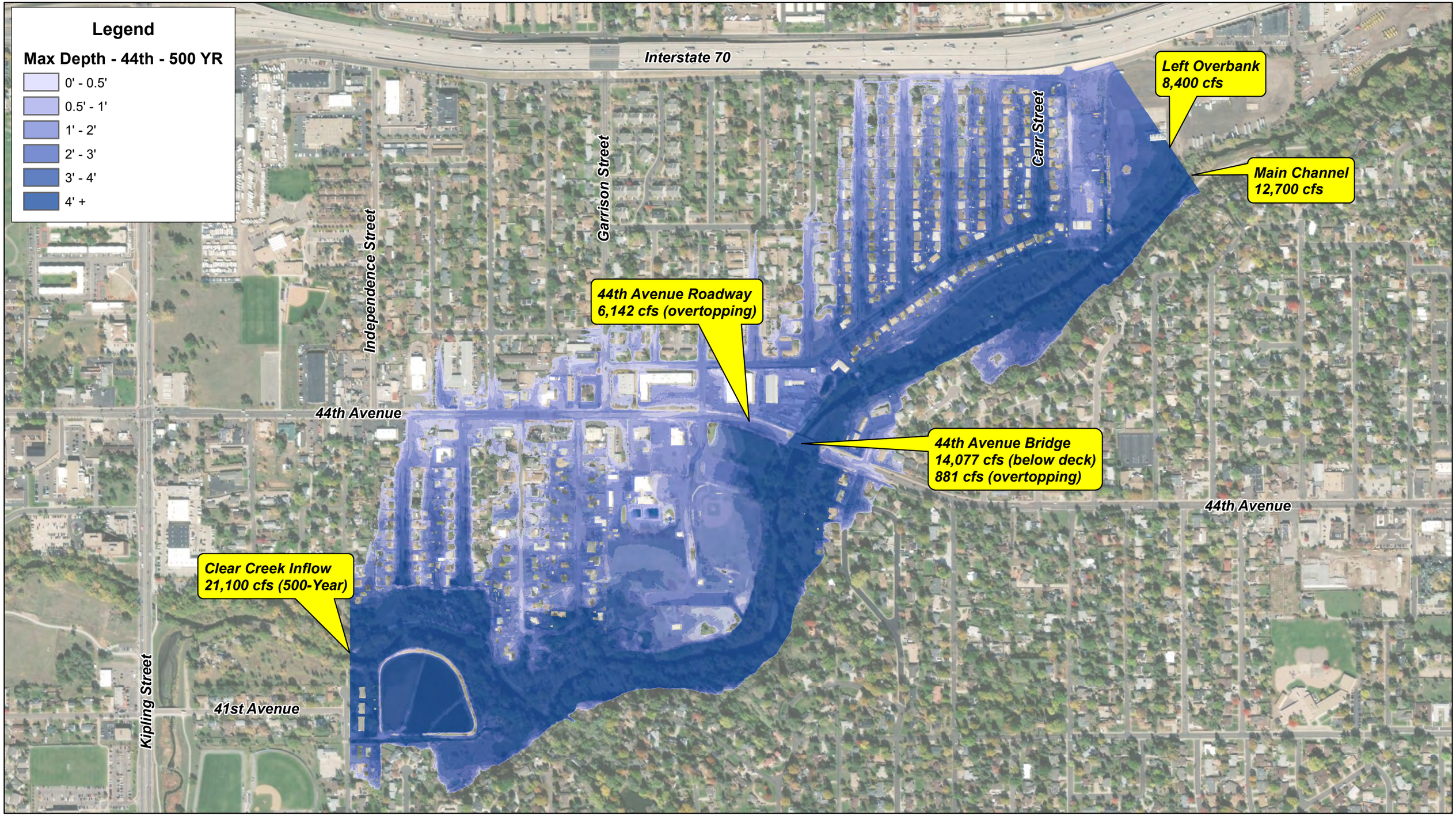
Clear Creek FHAD - 2D Modeling for Identified Spill Areas

Figure 7: 44th Avenue 100-Year

N
W E
S

0 287.5 575 1,150 Feet

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT



ICON ENGINEERING, INC.

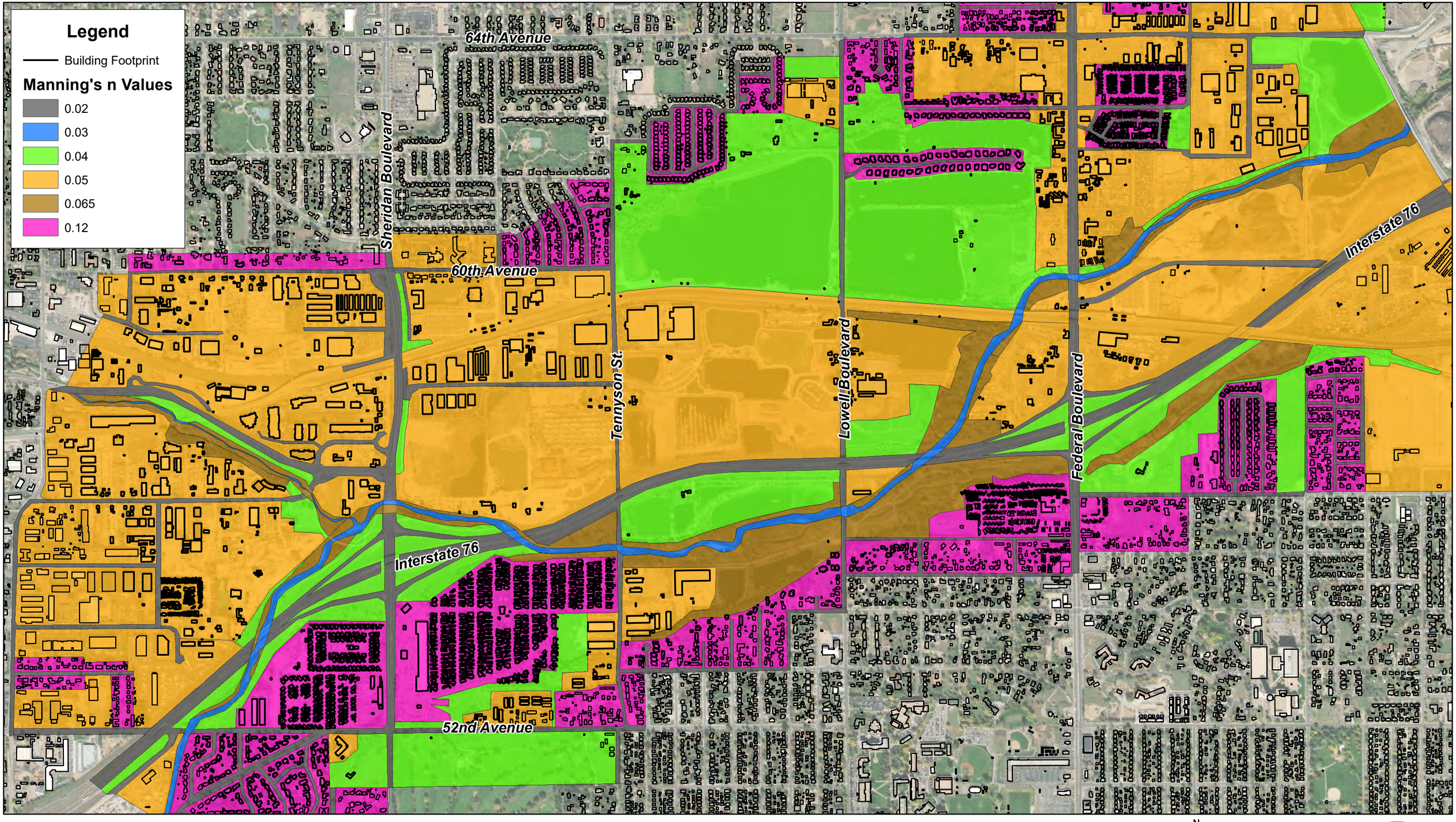
Clear Creek FHAD - 2D Modeling for Identified Spill Areas

Figure 8: 44th Avenue 500-Year

N
W E
S

0 275 550 1,100 Feet

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT



ICON ENGINEERING, INC.

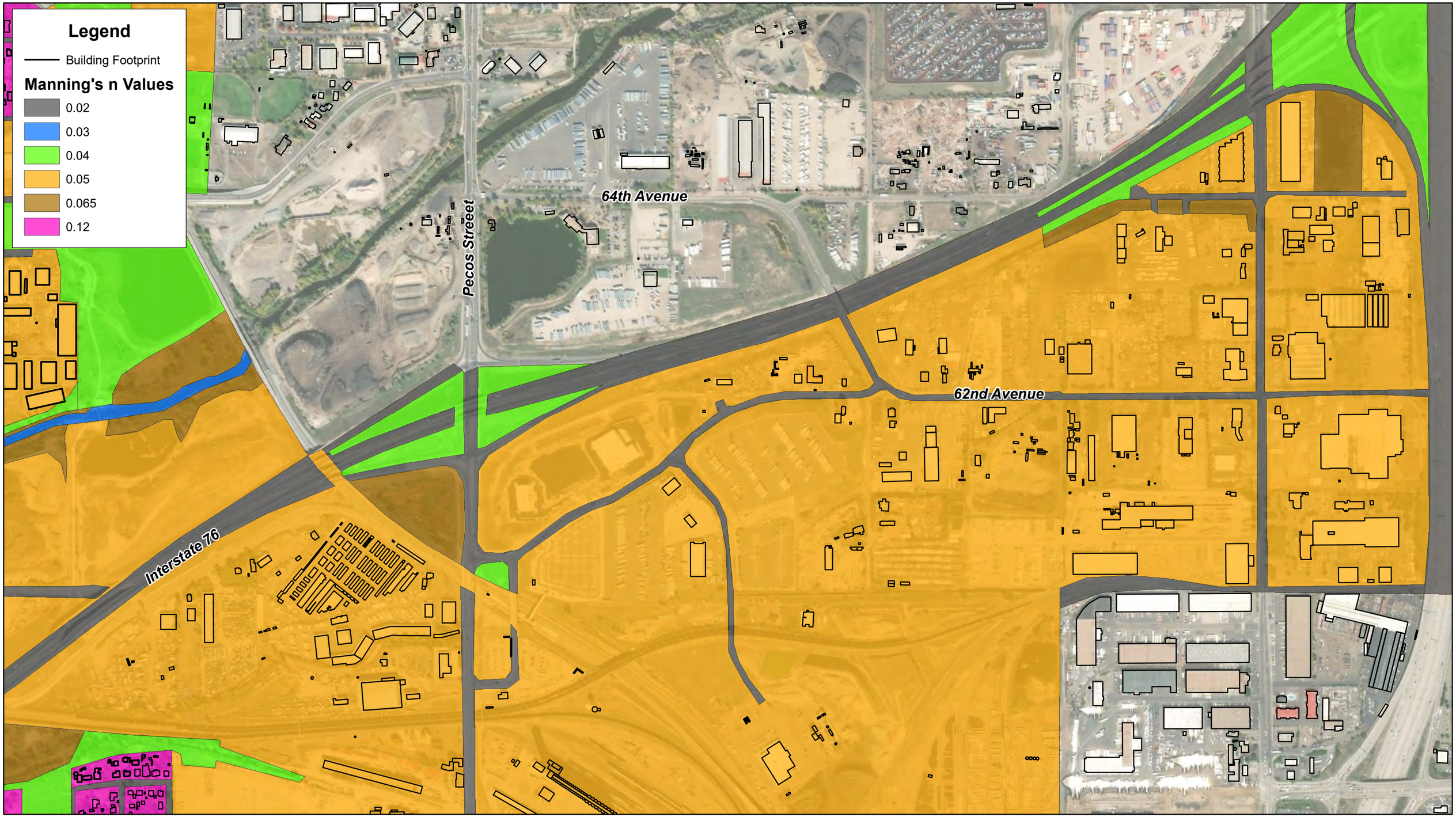
Clear Creek FHAD - 2D Modeling for Identified Spill Areas

Figure 9: North Overflow & Sheridan n Values (v03)

N
W E
S

0 500 1,000 2,000 Feet

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT



ICON ENGINEERING, INC.

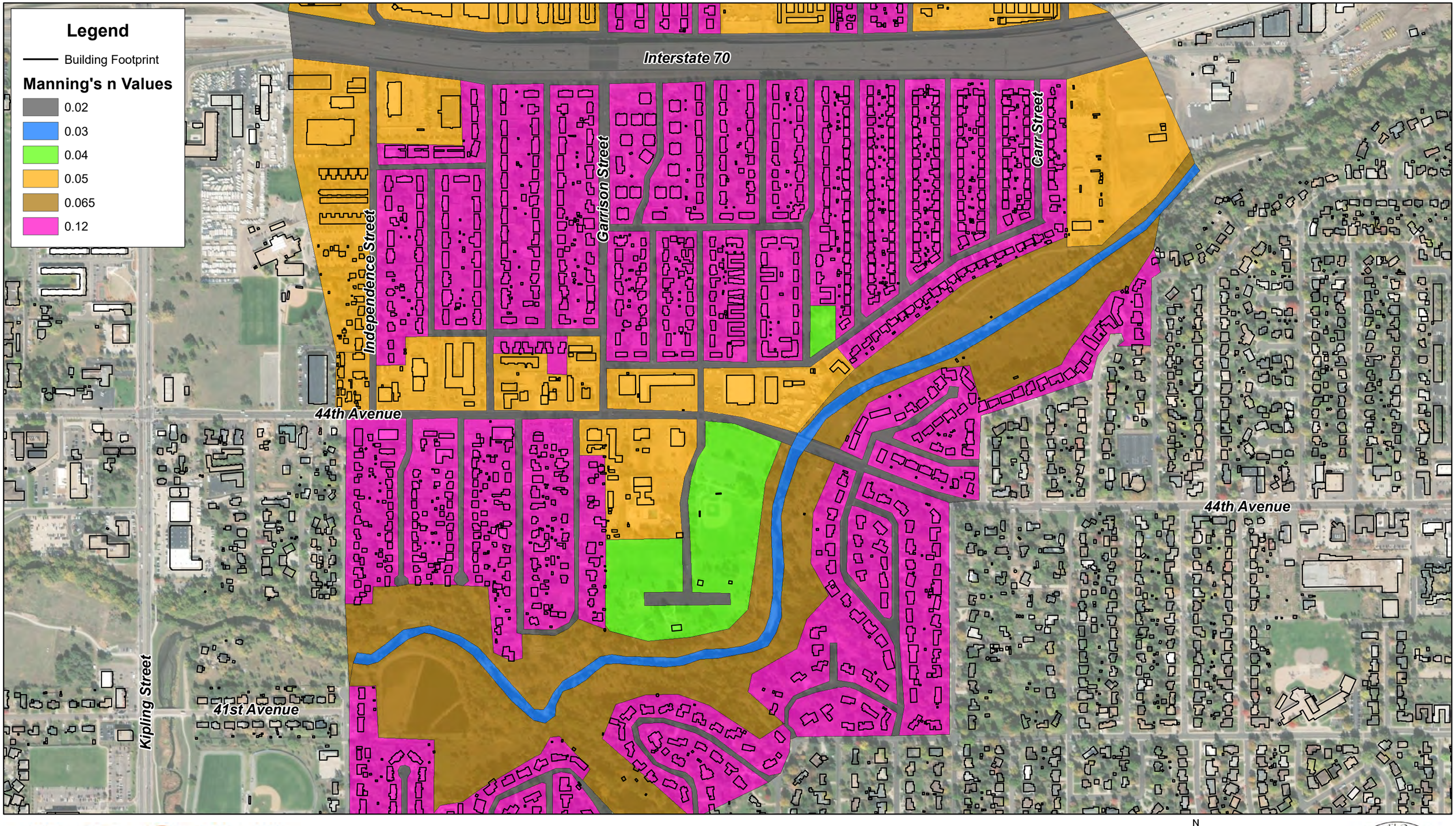
Clear Creek FHAD - 2D Modeling for Identified Spill Areas

Figure 10: Pecos Manning's n Values (v03)

N
W E
S

0 345 690 1,380 Feet

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT



ICON ENGINEERING, INC.

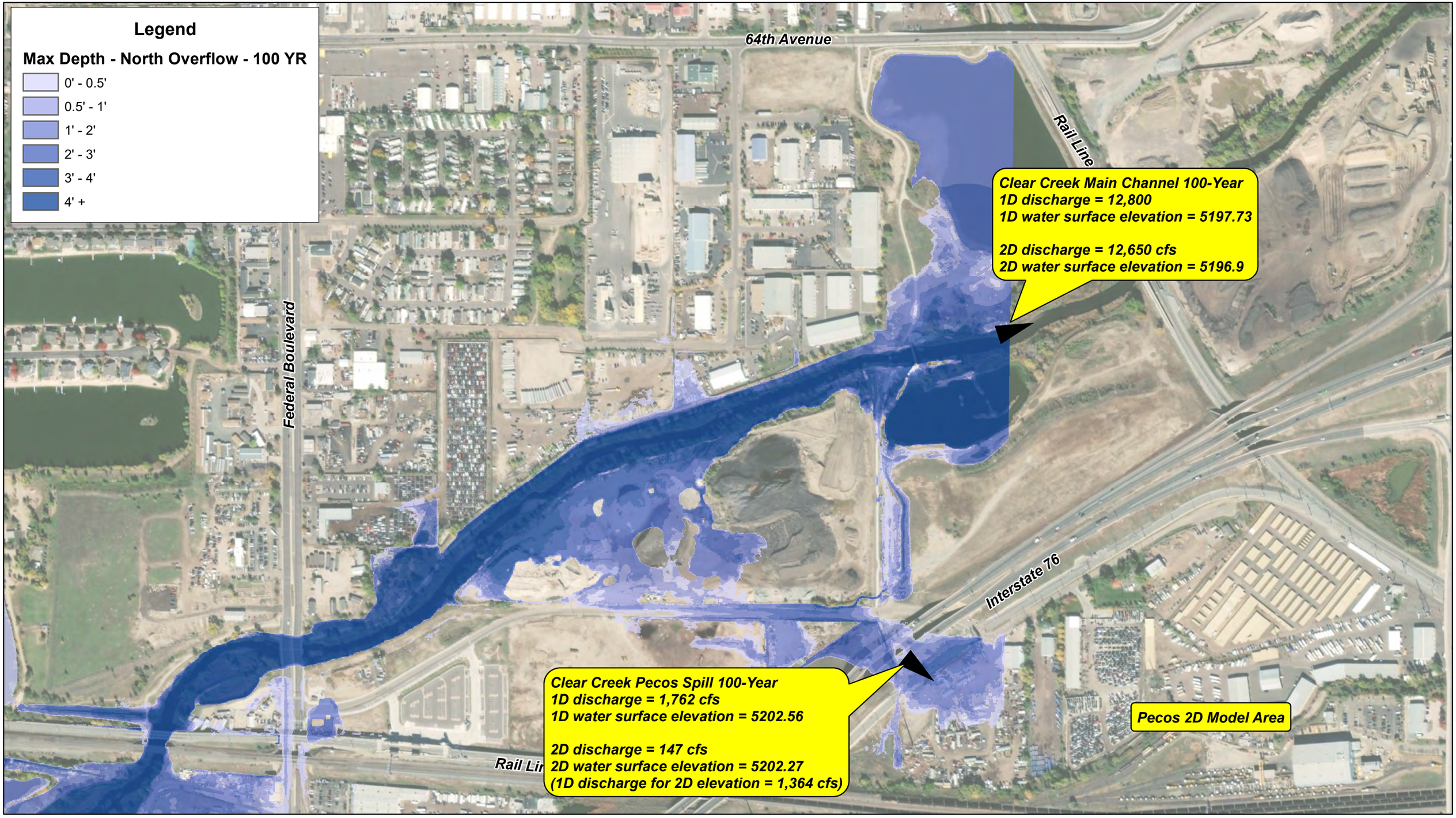
Clear Creek FHAD - 2D Modeling for Identified Spill Areas

Figure 11: 44th Avenue Manning's n Values (v03)

N
W E
S

0 287.5 575 1,150 Feet

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT



ICON ENGINEERING, INC.

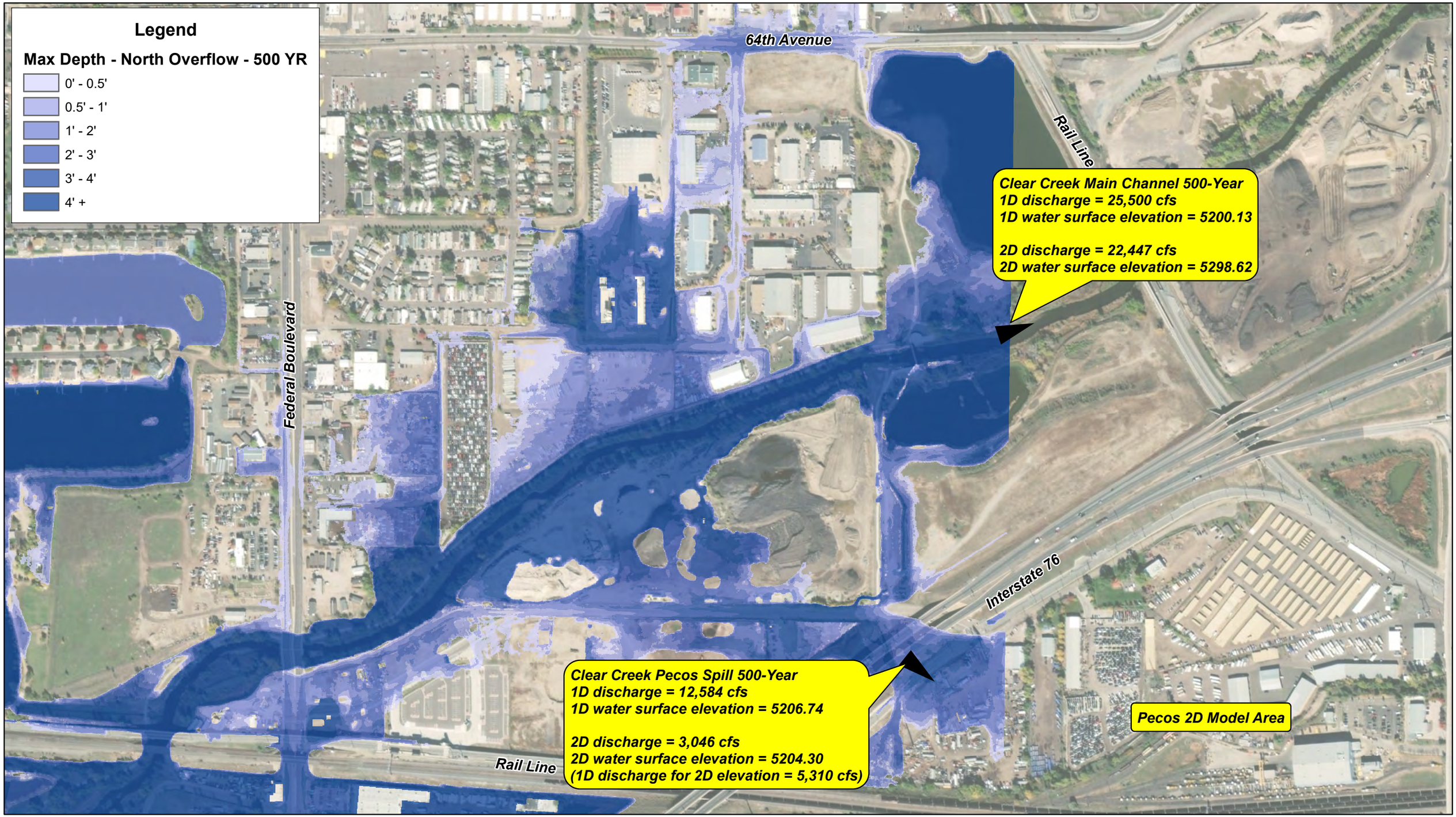
Clear Creek FHAD - 2D Modeling for Identified Spill Areas

Figure 12: Pecos Spill Comparison 100-Year

N
W E
S

0 235 470 940 Feet

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT



ICON ENGINEERING, INC.

Clear Creek FHAD - 2D Modeling for Identified Spill Areas

Figure 13: Pecos Spill Comparison 500-Year

N
W E
S

0 235 470 940 Feet

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT

ICONENGINEERING

MEMORANDUM

TO: Ms. Brooke Seymour, P.E., CFM
Mr. Dan Hill, P.E., CFM
Mile High Flood District

FROM: Justen Hamann, P.E.

DATE: September 2, 2020

RE: Clear Creek FHAD - Tabor Lake Split Flow Documentation

The purpose of this memorandum is to document the methods and process for determining the approximate split flow discharge values for the Tabor Lake Split in the Clear Creek FHAD.

The Tabor Lake Split is a left overbank flow split of Clear Creek which occurs downstream of the I-70 and Youngfield Street bridge crossings. The area has several lakes along the right and left overbanks that—along with a pedestrian bridge—complicate the hydraulics of the area and any flow split calculations. Four separate lateral structures were modeled to evaluate the flow splits in the area.

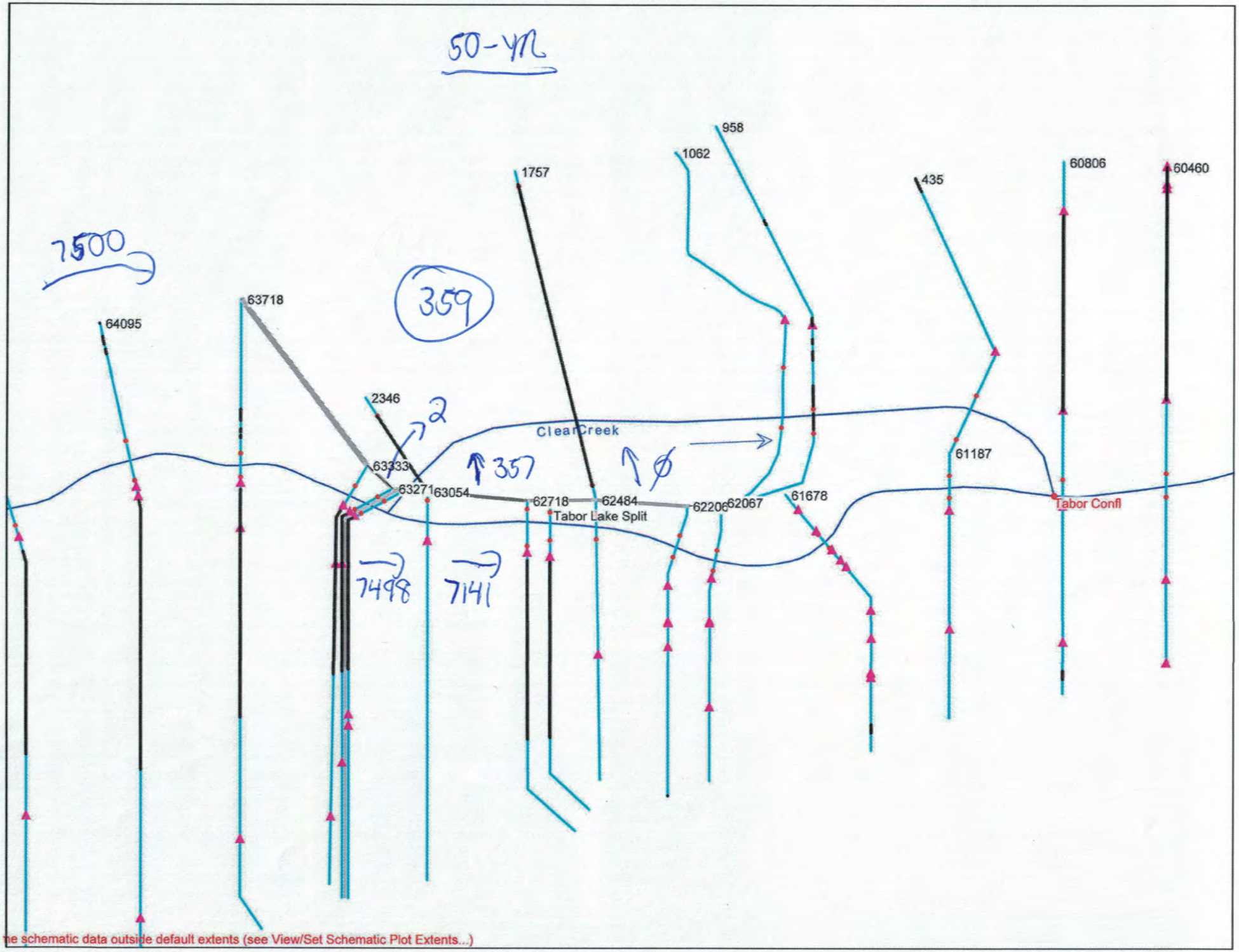
A separate plan in HEC-RAS (version 5.07) was setup and used to calculate the optimized flow splits for the Tabor Lake Split. This was an iterative process and involved the following procedure:

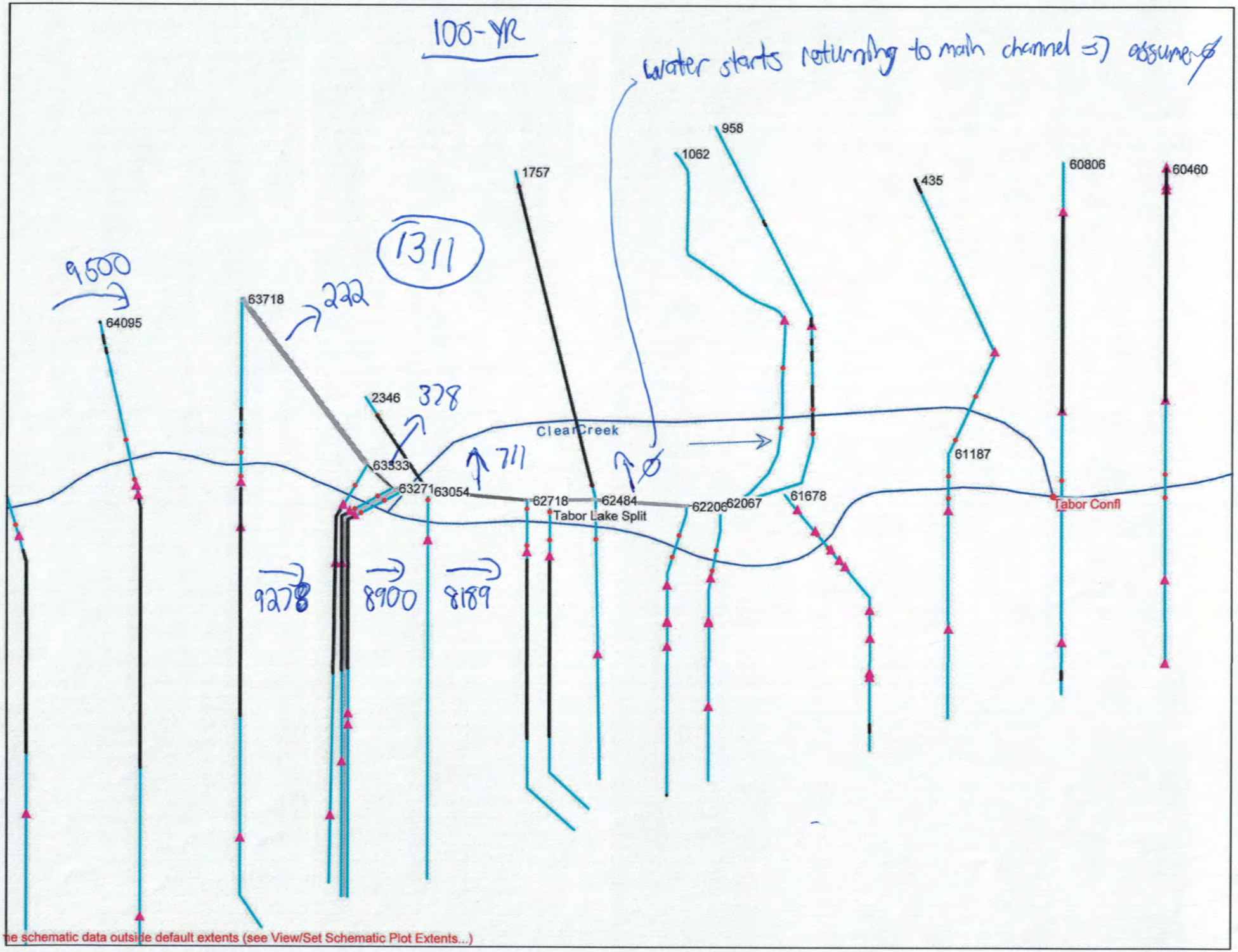
1. First, the furthest upstream lateral structure (63717) flow optimization was turned on and the resulting flow splits were then hard coded into the steady flow data.
2. Then the next downstream lateral structure (63330) was optimized and the resulting flows were again hard coded into the steady flow data before moving onto lateral structure 63050 and then finally onto 62715.

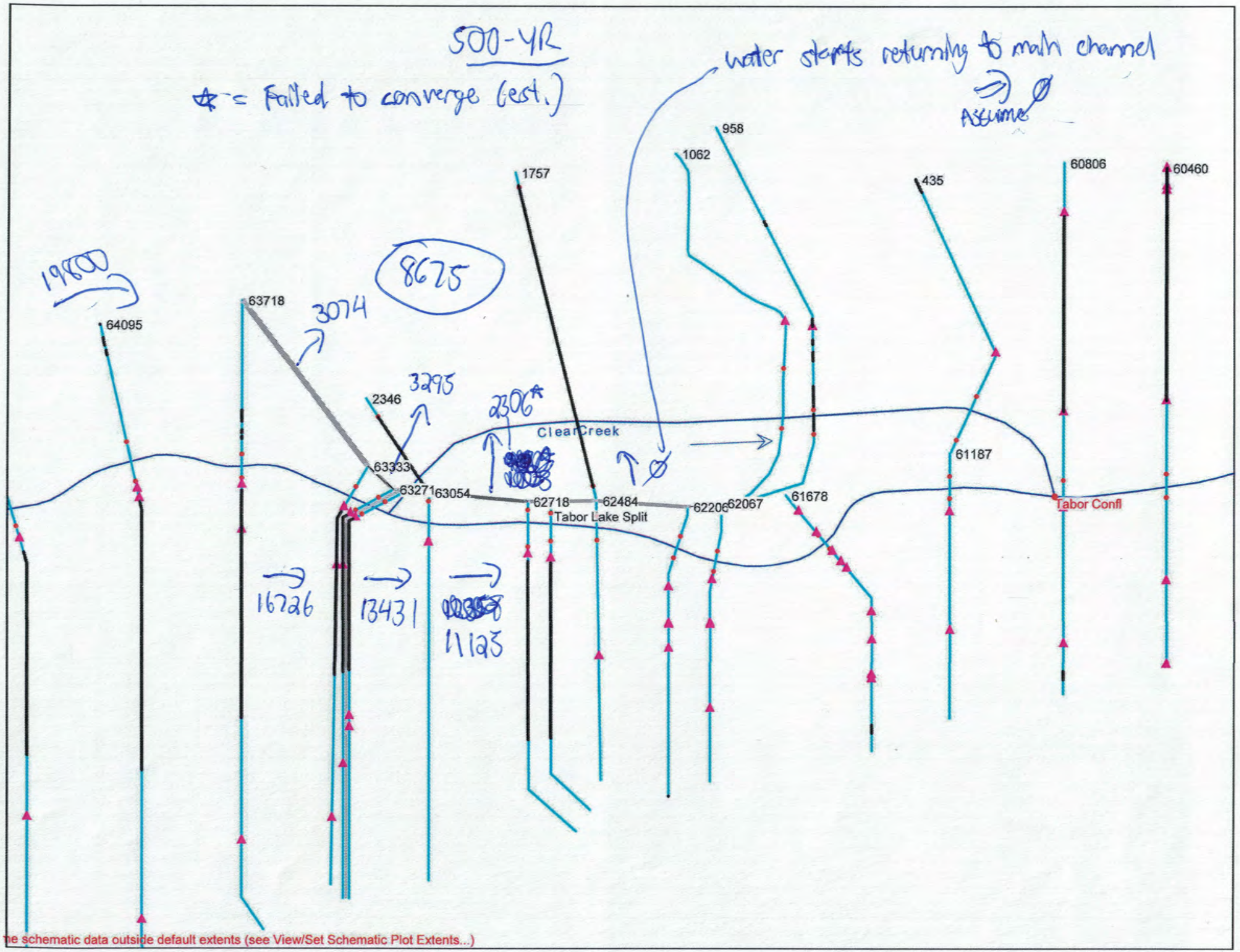
The results indicated that the Tabor Lake Split occurs for the 50-, 100-, and 500-year flood events but not the 10-year. Per District policy, the FHAD hydraulic models will not subtract the discharges from the main channel for a minor flow split, therefore when the calculated flow split was negative (indicating flow spilling back to the main channel from the flow split instead of to the flow split), the spill discharge was assumed to be zero.

Backup hand-calculations which document the results and several assumptions are attached to this memorandum.

END OF MEMORANDUM


50-YR
7500
359
64095
63718
2346
1757
958
1062
435
60806
60460
61187
63333
63271
63054
62718
62484
62206
62067
61678
Clear Creek
Tabor Lake Split
Tabor Confl
357
7498
7141
ne schematic data outside default extents (see View/Set Schematic Plot Extents...)


100-YR
water starts returning to main channel => assume ∅
958
1062
1757
435
60806
60460
1311
9500
64095
63718
222
2346
328
Clear Creek
63333
711
∅
61187
63271
63054
62718
62484
62206
62067
61678
Tabor Lake Split
Tabor Confl
9278
8900
8189
he schematic data outside default extents (see View/Set Schematic Plot Extents...)


500-YR
* = Failed to converge (est.)
water starts returning to main channel
Assume
19800
8625
3074
3295
2306*
16726
13431
11123
64095
63718
2346
63333
63271
63054
62718
62484
62206
62067
61678
61187
1757
1062
958
435
60806
60460
Clear Creek
Tabor Lake Split
Tabor Confl
he schematic data outside default extents (see View/Set Schematic Plot Extents...)

MEMO

TO: Clear Creek FHAD technical file

Date: October 2017

RE: Brannan stockpile analysis

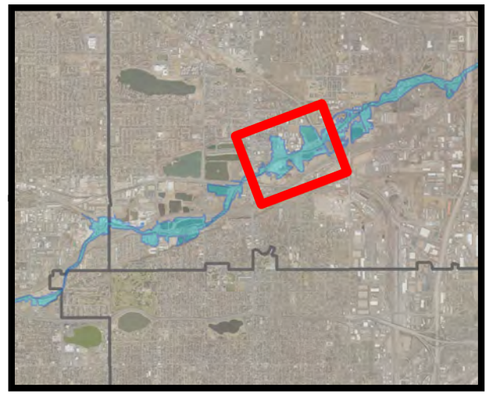
Hydraulic analysis was completed in cooperation with Adams County, MHFD and the Brannan Companies for existing and proposed conditions at the aggregate stockpile facility. The facility is located south of Clear Creek downstream of Federal Blvd and north of 60th Avenue.

This work evaluated floodplain conditions with and without the stockpiles. The comparison identified flood risk for both conditions. The County, MHFD, and Brannan then used this information to resolve plans for stockpile limits, flood risk, and land use planning for the general vicinity.

Clear Creek

Brannon Stockpile Removal Analysis

October 2017



Note to Users:
Projection: Colorado State Plane Central; EPSG Code: 2232
Horizontal Datum: North American Datum of 1983
Vertical Datum: North American Vertical Datum of 1988
Topography Data Derived from FEMA 2013 Post-Flood DEM
Aerial Provided by UDFCD 2016

Legend

- Floodway
- Floodplain
- Cross Sections
- Culvert
- Bridge
- Stream Centerline
- Approximate Brannon Parcel Boundary
- Municipal Boundary
- Minor Contour; 2-ft
- Major Contour; 10-ft

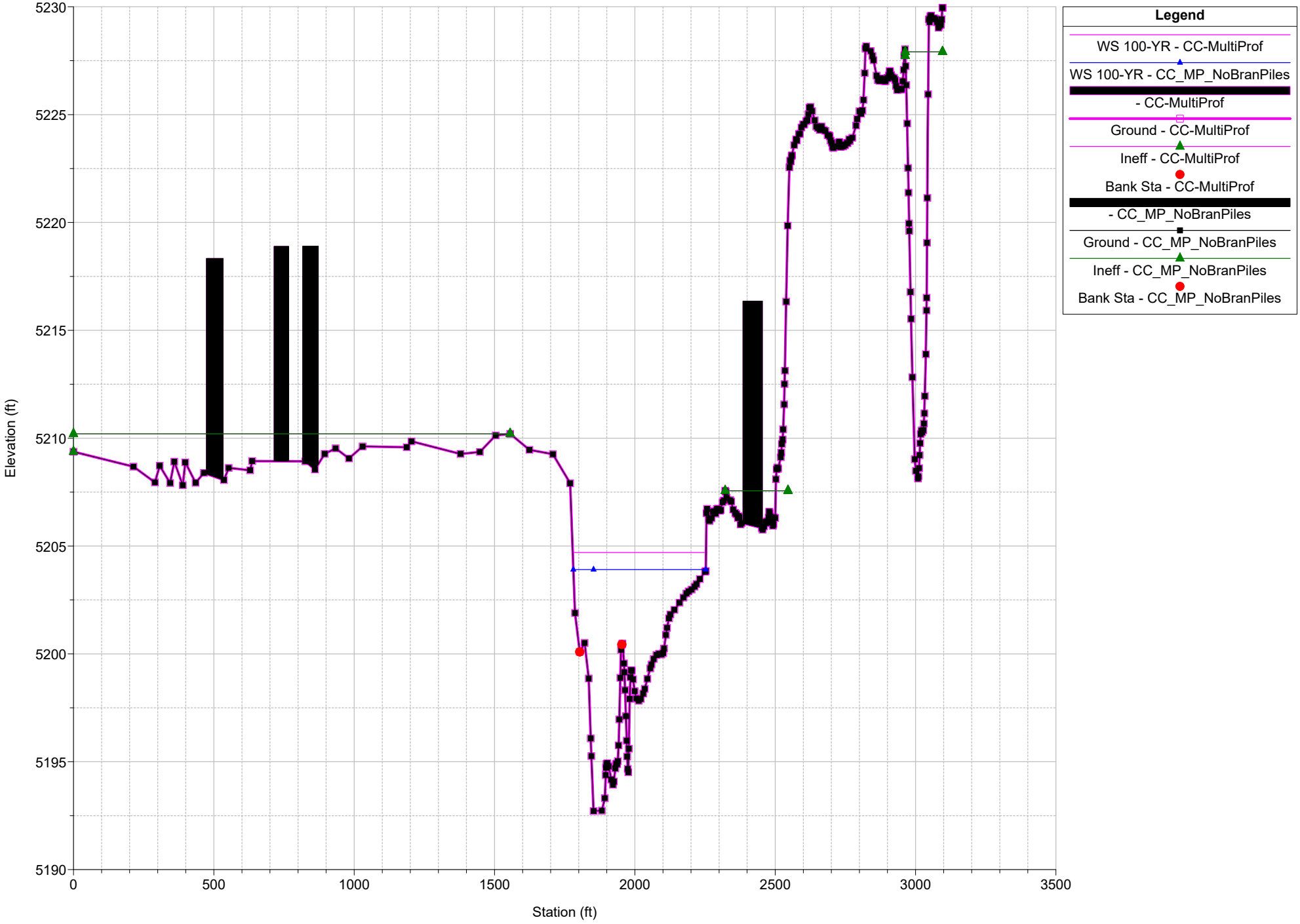
1 in = 400 ft

0 65 130 260 390 520 Feet

ICON ENGINEERING, INC.

Clear Creek FHAD Plan: 1) CC_MP_NoBranPiles 2) CC-MultiProf

RS = 23845



Clear Creek FHAD Plan: 1) CC_MP_NoBranPiles 2) CC-MultiProf

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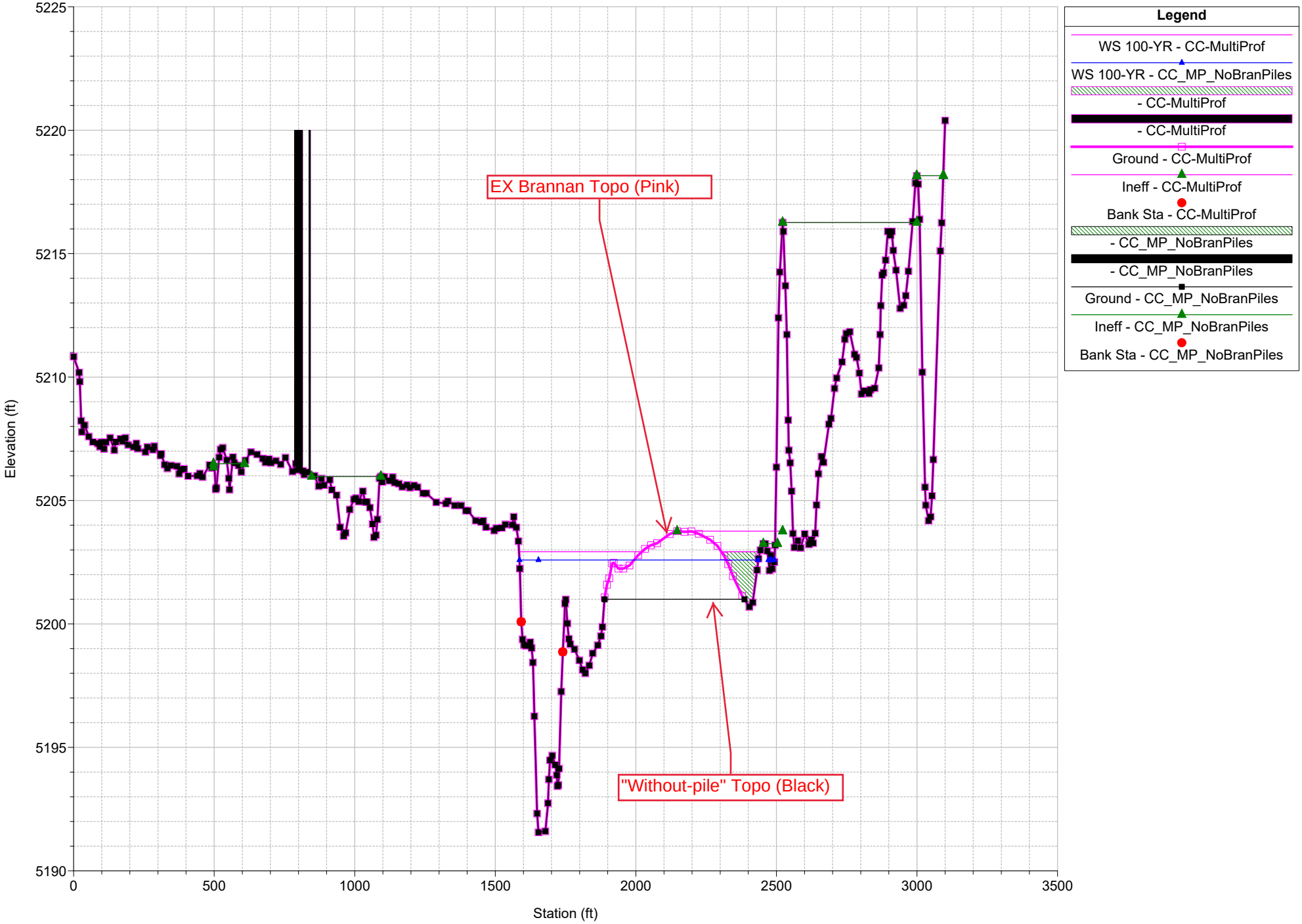

Clear Creek FHAD Plan: 1) CC_MP_NoBranPiles 2) CC-MultiProf

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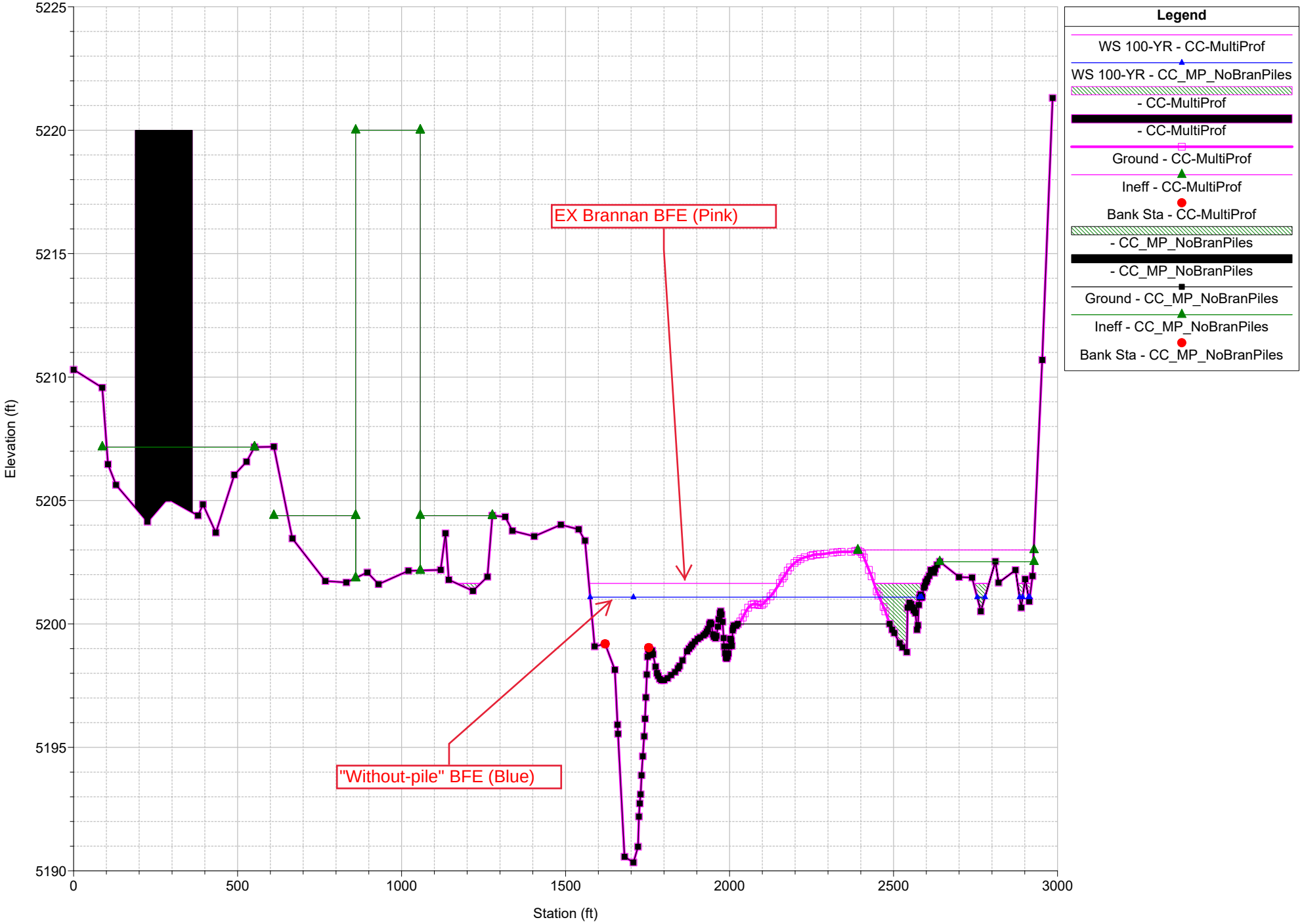

Clear Creek FHAD Plan: 1) CC_MP_NoBranPiles 2) CC-MultiProf

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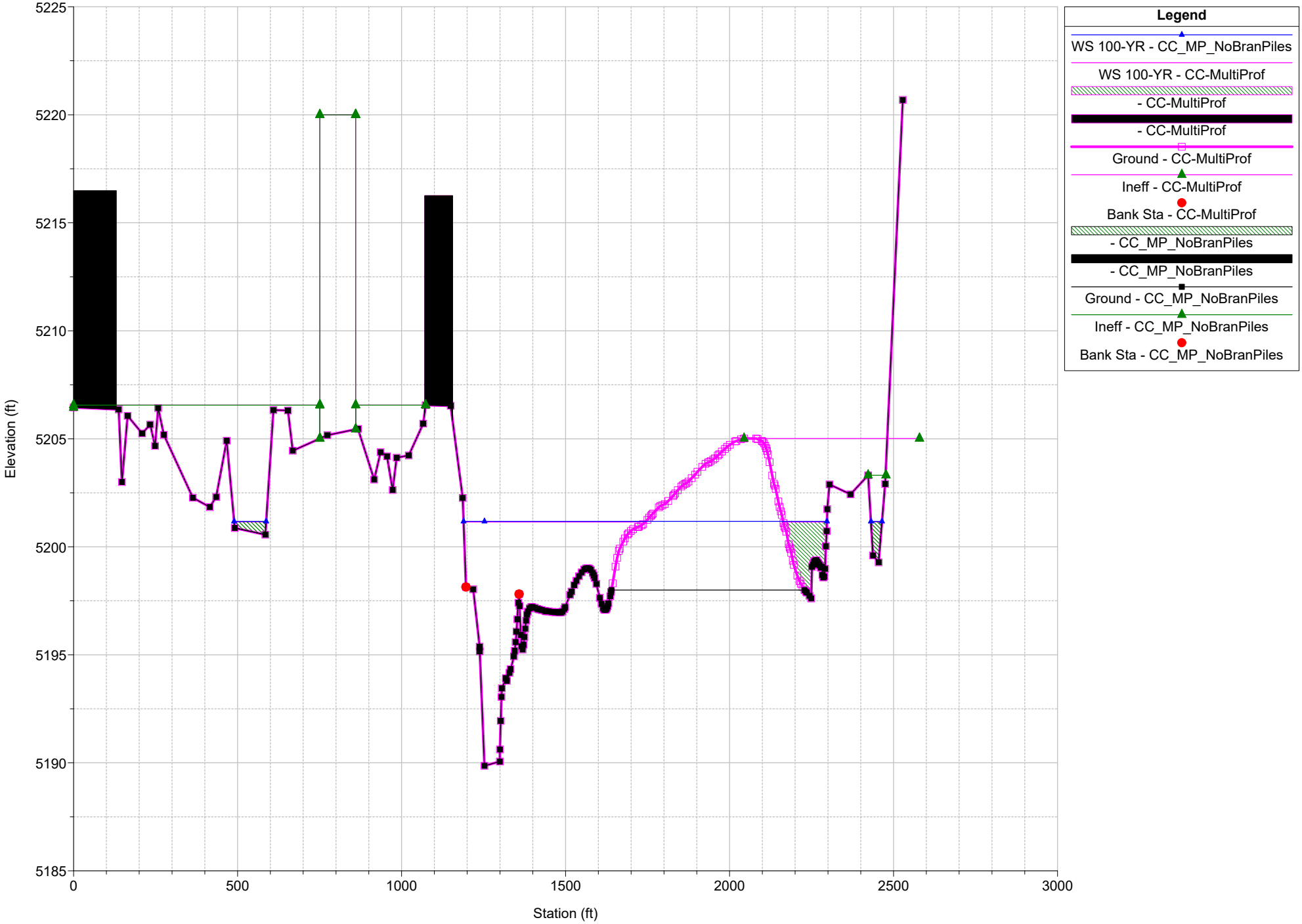
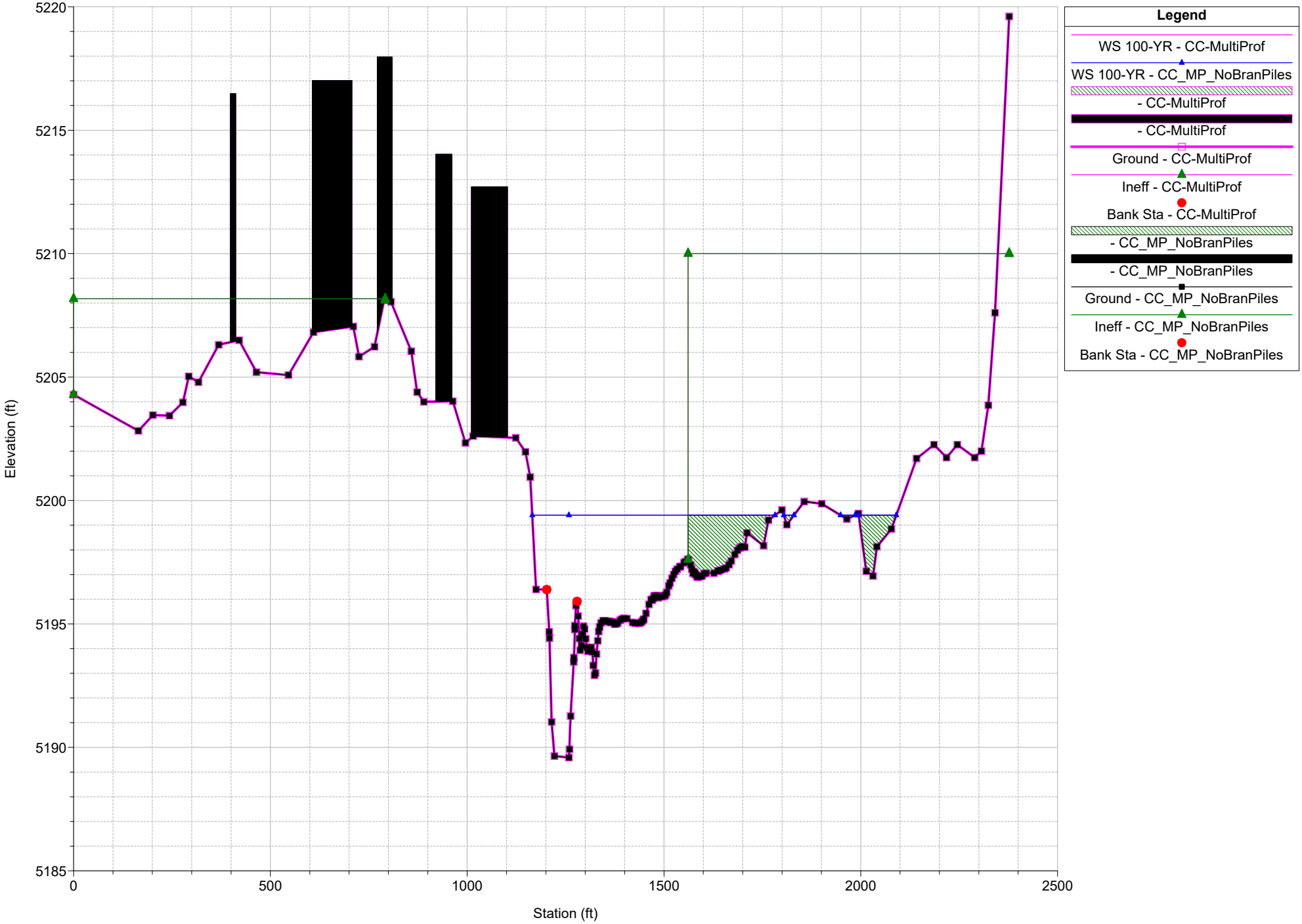


Clear Creek FHAD Plan: 1) CC_MP_NoBranPiles 2) CC-MultiProf

RS = 22088



ICONENGINEERING

MEMORANDUM

TO: Ms. Brooke Seymour, P.E., CFM
Mr. Dan Hill, P.E., CFM
Mile High Flood District

FROM: Troy Carmann, P.E., CFM
Justen Hamann, P.E.

DATE: April 19, 2021

RE: Clear Creek FHAD – Golden Survey Incorporation

The purpose of this memo is the summarize the workflow and results from incorporating field survey data along the south bank of Clear Creek between Ford Street and Washington Street in the City of Golden. More specifically, the survey was collected along a Clear Creek pedestrian trail just north of two existing buildings located at 640 and 660 11th Street.

The survey data was collected in specific locations along the creek in order to obtain more information on the adjacent trail and wall elevations. Limited spot elevations were collected adjacent to the buildings and stream bank for reference to the existing terrain mapping. The field survey data was collected by Topographic Land Surveyors in February 2021.

Survey data was incorporated into cross sections 89024, 89163, 89421, 89610, and 89687 within the 1D HEC-RAS hydraulic model for Clear Creek. The survey elevations were either incorporated directly (where the location of the points aligned closely with the modeled cross-sections) or the elevations were linearly interpolated between survey points where the location and alignment of the cross-sections were between the survey points.

In general, the survey data provided more detail on the top and toe of wall elevations that was not previously shown in the hydraulic cross sections cut exclusively from the LiDAR terrain data.

The results of the additional survey data incorporated into the hydraulic model varies for each building. The east building (640 11th Street) remains within the 1%-annual-chance floodplain delineation because the wall height is below the base flood elevation. The west building (660 11th Street) is out of the 1%-annual-chance floodplain delineation because the wall height is above the base flood elevation.

We propose to update the FHAD hydraulic model as shown with the enclosed model run. We also propose to update the 1%-annual-chance floodplain delineation to exclude the west building and include the east building as shown on the following exhibit.

END OF MEMORANDUM

7000 S. Yosemite Street, Suite 120 | Centennial, CO 80112 | (303) 221-0802 | www.iconeng.com

ICONENGINEERING

MEMORANDUM

TO: Ms. Brooke Seymour, P.E., CFM
Mr. Dan Hill, P.E., CFM
Mile High Flood District

FROM: Justen Hamann, P.E.
Vatsal Gupta

DATE: May 5, 2021

RE: Clear Creek FHAD – Martin Marietta Site Soil Pile Removal

The purpose of this memo is to summarize the workflow for removing man-made soil piles within the Martin Marietta site adjacent to Clear Creek upstream of Pecos Street.

The current 1D HEC-RAS multi-profile and floodway models reflect the with-pile site conditions while the previously submitted without-pile multi-profile model for the Brannan site, was used as the starting point for the Martin Marietta without-pile analysis. Since the Martin Marietta piles have been successfully permitted through Adams County—and believed to be permanent site features—a without-pile floodway model for this area was not developed.

Cross-sections 18733 through 20331 in the without-pile multi-profile model had their station/elevation data points modified to remove any man-made piles. Natural embankments adjacent to the creek, as well as an embankment along the Pecos Street on-ramp to westbound I-76, were not removed from the geometric data since they appeared to be natural topographic features.

The results of removing the soil piles from the hydraulic model caused increases and decreases in the Base Flood Elevations (BFEs) when compared to the with-pile model. The biggest increase in BFE was at cross-section 18905 resulting in an increase of 0.36-foot. The biggest decrease in BFE of 0.42-foot occurred at cross-section 19327.

We propose to update the FHAD "without-pile" multi-profile HEC-RAS hydraulic model with these changes and delineate both the "with" and "without-pile" floodplain results in this area.

END OF MEMORANDUM

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Wall El. 56.3
BFE 58.2
Ford St
Clear Creek Trail
East Bldg
West Bldg
11th St
Wall El. 61.2
BFE 60.3
Jackson St

Appendix D: Floodplain and Floodway Data Tables

AGREEMENT TABLE

Project Name: Clear Creek FHAD

Community(s): Jeffco/Adco
Flooding Source: Clear Creek
Reach: 6th Avenue Split

Engineer: ICON Engineering
Date: 11/7/2021

Reference Location	Cross Section	River Station	Downstream Reach Distance, ft			Cumulative Distance, ft			FP Width, ft			0.5' FW Width, ft		BFE, ft		BFE Loc.	Comments
			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map					+/- 0.5 ft			
6th Avenue Split																	
	260	2+60	286.2	--	286.8	286.2	--	287	582	619	37	--	--	5688.3	--	--	Area between spilt flow and main channel filled
	338	3+38	77.7	--	78.0	363.9	--	365	448	479	31	--	--	5688.3	--	--	Area between spilt flow and main channel filled
	409	4+09	71.0	--	71.0	434.9	--	436	757	750	-7	--	--	5695.6	--	--	
	706	7+06	297.7	--	297.0	732.6	--	733	168	168	1	--	--	5696.0	--	--	
	1108	11+08	401.1	--	402.0	1133.7	--	1135	94	94	-1	--	--	5696.3	--	--	
	1184	11+84	76.4	--	76.0	1210.2	--	1211	84	83	-1	--	--	5696.3	--	--	
	1360	13+60	175.6	--	176.0	1385.8	--	1387	153	194	41	--	--	5696.4	--	--	Transition with Split Flow

AGREEMENT TABLE

Project Name: Clear Creek FHAD

Community(s): Jeffco/Adco
Flooding Source: Clear Creek
Reach: Federal Split

Engineer: ICON Engineering
Date: 11/7/2021

Reference Location	Cross Section	River Station	Downstream Reach Distance, ft			Cumulative Distance, ft			FP Width, ft			0.5' FW Width, ft		BFE, ft		BFE Loc.	Comments
			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map					+/- 0.5 ft			
Federal Split																	
	326	3+26	364.9	--	327	364.9	--	326.9	149	163	14	--	--	5213.6	--	--	
D/S Federal Blvd. Railroad Underpass	458	4+58	132.3	--	132	497.2	--	458.9	129	169	40	--	--	5216.2	--	--	Skew applied
U/S Federal Blvd. Railroad Underpass	627	6+27	169.0	--	169	666.2	--	627.9	141	140	-1	--	--	5218.6	--	--	
	773	7+73	146.0	--	146	812.2	--	773.9	1741	1740	-1	--	--	5218.7	--	--	
	923	9+23	150.2	--	150	962.3	--	923.9	1610	1611	1	--	--	5218.7	--	--	
	980	9+80	57.1	--	57	1019.4	--	980.9	1078	1078	0	--	--	5218.7	--	--	
	1075	10+75	94.9	--	95	1114.3	--	1075.9	1036	1036	1	--	--	5218.7	--	--	
	1198	11+98	123.4	--	123	1237.7	--	1198.9	1035	1037	2	--	--	5218.7	--	--	

AGREEMENT TABLE

Project Name: Clear Creek FHAD

Community(s): Jeffco/Adco
Flooding Source: Clear Creek
Reach: Main Channel & Normal Depth Area

Engineer: ICON Engineering
Date: 11/7/2021

Reference Location	Cross Section	River Station	Downstream Reach Distance, ft			Cumulative Distance, ft			FP Width, ft			0.5' FW Width, ft		BFE, ft		BFE Loc.	Comments
			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map					+/- 0.5 ft			
Clear Creek - Normal Depth Area																	
	900	9+00	--	--	--	--	--	--	727	727	0	--	--	--	--	--	
	1000	10+00	--	--	--	--	--	--	469	472	3	--	--	--	--	--	

AGREEMENT TABLE

Project Name: Clear Creek FHAD

Community(s): Jeffco/Adco
Flooding Source: Clear Creek
Reach: North Overflow Split

Engineer: ICON Engineering
Date: 11/7/2021

Reference Location	Cross Section	River Station	Downstream Reach Distance, ft			Cumulative Distance, ft			FP Width, ft			0.5' FW Width, ft			BFE, ft		BFE Loc.	Comments
			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Difference	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
North Overflow Split																		
	538	5+38	603.0	--	623.0	603.0	--	623	842	845	4	512	767	255	5220.1	--	--	Delineated using 2D model results
	1010	10+10	471.7	--	472.0	1074.7	--	1095	481	777	296	409	724	315	5222.1	--	--	Delineated using 2D model results
	1322	13+22	312.1	--	312.0	1386.8	--	1407	456	1199	743	419	1162	743	5222.5	--	--	Delineated using 2D model results
	1479	14+79	157.0	--	157.0	1543.8	--	1564	1237	1589	352	884	882	-2	5227.8	--	--	Floodplain in ROB used to join North Overflow to Main Channel
	1612	16+12	133.2	--	133.0	1520.0	--	1540	1471	1472	1	1471	1472	1	5230.9	--	--	
	1853	18+53	240.6	--	241.0	1760.6	--	1781	1617	1615	-1	1126	1077	-49	5231.5	--	--	ROB island not mapped
	2135	21+35	282.6	--	282.0	2043.2	--	2063	1630	1629	-1	1031	1026	-5	5231.5	--	--	
	2382	23+82	246.4	--	247.0	2289.6	--	2310	1635	1633	-3	736	736	1	5231.5	--	--	
	2852	28+52	470.0	--	470.0	2759.6	--	2780	1726	1726	0	584	577	-7	5231.5	--	--	
	3090	30+90	238.6	--	238.0	2998.2	--	3018	1409	1407	-2	465	795	330	5233.3	--	--	Floodway equals floodplain in ROB
	3638	36+38	548.2	--	548.0	3546.4	--	3566	1194	1194	0	743	743	-1	5234.5	--	--	
	3885	38+85	246.3	--	247.0	3792.7	--	3813	1136	1137	1	881	880	-1	5236.0	--	--	
	4295	42+95	410.6	--	410.0	4203.3	--	4223	1421	1419	-1	819	818	-1	5237.1	--	--	
	4897	48+97	601.3	--	602.0	4804.6	--	4825	1265	1266	1	983	984	1	5243.9	--	--	
	5178	51+78	281.4	--	281.0	5086.0	--	5106	2120	2081	-39	1135	1137	1	5245.0	--	--	Far LOB island not mapped
	5423	54+23	244.7	--	245.0	5330.7	--	5351	2166	2125	-42	1372	1372	0	5246.3	--	--	Far LOB island not mapped
	5635	56+35	212.6	--	212.0	5543.3	--	5563	2094	2071	-23	1326	1324	-2	5247.8	--	--	
	5889	58+89	253.6	--	254.0	5796.9	--	5817	2048	2002	-47	1320	1321	1	5248.6	--	--	LOB island not mapped
	6019	60+19	130.4	--	130.0	5927.3	--	5947	1977	1975	-2	1325	1314	-11	5248.8	--	--	Floodway delineation does not include obstruction
	6380	63+80	360.8	--	361.0	6288.1	--	6308	1894	1973	79	934	1222	288	5249.2	--	--	Main Channel and North Overflow Floodplains joined in ROB area
	6611	66+11	230.8	--	231.0	6518.9	--	6539	1173	1472	299	954	1207	253	5249.3	--	--	Main Channel and North Overflow Floodplains joined in ROB area
	6804	68+04	193.6	--	193.0	6712.5	--	6732	700	746	46	540	723	184	5249.3	--	--	Main Channel and North Overflow Floodplains joined in ROB area
	7126	71+26	321.4	--	322.0	7033.9	--	7054	490	506	16	301	505	204	5249.9	--	--	Main Channel and North Overflow Floodplains joined in ROB area
	7365	73+65	238.7	--	239.0	7272.6	--	7293	355	355	0	355	355	0	5253.3	--	--	
	7650	76+50	285.0	--	285.0	7557.6	--	7578	488	470	-18	488	470	-18	5255.5	--	--	
	7879	78+79	229.8	--	229.0	7787.4	--	7807	559	567	8	303	304	2	5258.3	--	--	
	7991	79+91	111.4	--	112.0	7898.8	--	7919	362	437	75	362	362	0	5259.9	--	--	Delineated using 2D model results

AGREEMENT TABLE

Project Name: Clear Creek FHAD

Community(s): Jeffco/Adco
Flooding Source: Clear Creek
Reach: Tabor Lake Split

Engineer: ICON Engineering
Date: 11/7/2021

Reference Location	Cross Section	River Station	Downstream Reach Distance, ft			Cumulative Distance, ft			FP Width, ft			0.5' FW Width, ft		BFE, ft		BFE Loc.	Comments
			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map					+/- 0.5 ft			
Tabor Lake Split																	
	435	4+35	463.8	--	461	463.8	--	460.9	405	398	-6	--	--	5406.9	--	--	
	958	9+58	522.7	--	523	986.5	--	983.9	403	574	171	--	--	5412.7	--	--	ROB extended on map
	1062	10+62	104.0	--	104	1090.6	--	1087.9	872	710	625	--	--	5415.8	--	--	ROB extended on map, innudation just north of XS in LOB removed
	1757	17+57	695.2	--	695	1785.8	--	1782.9	1059	1053	-6	--	--	5416.1	--	--	
	2346	23+46	589.2	--	589	2374.9	--	2371.9	314	310	-4	--	--	5416.1	--	--	

AGREEMENT TABLE

Project Name: Clear Creek FHAD

Community(s): Jeffco/Adco
Flooding Source: Clear Creek
Reach: Main Channel & Splits

Engineer: ICON Engineering
Date: 5/27/2022

Reference Location	Cross Section	River Station	Downstream Reach Distance, ft			Cumulative Distance, ft			FP Width, ft			0.5' FW Width, ft			BFE, ft		BFE Loc.	Comments
			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Difference	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
Clear Creek - Main Channel																		
	157	1+57	--	--	44	79.0	--	79.0	640	641	1	201	202	1	5097.2	--	--	
	232	2+32	75.5	--	75	154.5	--	154.0	254	253	0	188	192	4	5098.7	--	--	
	258	2+58	26.3	--	26	180.8	--	180.0	261	166	-95	168	166	-2	5098.5	--	--	ROB island not mapped
	317	3+17	58.9	--	59	239.7	--	239.0	158	157	-2	158	157	-2	5099.1	--	--	
	368	3+68	50.9	--	51	290.5	--	290.0	332	333	1	155	165	11	5099.8	--	--	
	398	3+98	30.0	--	30	320.5	--	320.0	365	366	1	162	163	1	5100.7	--	--	
	534	5+34	135.9	--	136	456.4	--	456.0	227	229	1	227	229	1	5101.5	--	--	
	966	9+66	431.6	--	432	888.0	--	888.0	222	225	3	222	225	3	5102.2	--	--	
	1402	14+02	436.4	--	436	1324.4	--	1324.0	223	224	1	223	224	1	5103.0	--	--	
	1668	16+68	266.1	--	266	1590.6	--	1590.0	227	573	347	226	227	0	5104.2	--	--	Floodplain top width includes obstruction
	1719	17+19	50.2	--	51	1640.8	--	1641.0	233	378	145	233	234	0	5104.4	--	--	Floodplain top width includes obstruction
	1791	17+91	72.3	--	72	1713.1	--	1713.0	155	699	544	155	157	2	5104.1	--	--	Floodplain top width includes obstruction
	1899	18+99	108.5	--	108	1821.6	--	1821.0	141	651	510	141	142	1	5104.9	--	--	Floodplain top width includes obstruction
	1948	19+48	48.1	--	49	1869.7	--	1870.0	711	712	0	193	200	6	5107.1	--	--	
	1981	19+81	33.9	--	33	1903.6	--	1903.0	830	833	3	282	289	7	5109.3	--	--	
	2036	20+36	54.1	--	55	1957.7	--	1958.0	879	879	-1	291	292	0	5110.7	--	--	
	2316	23+16	280.6	--	280	2238.4	--	2238.0	1382	1382	-1	430	430	0	5111.9	--	--	
	2459	24+59	143.2	--	143	2381.6	--	2381.0	1398	1040	-358	381	382	1	5112.3	--	--	LOB island not included in top width, does not provide active conveyance
	2830	28+30	370.7	--	371	2752.2	--	2752.0	1174	1079	-95	297	294	-3	5112.9	--	--	LOB island not included in top width, does not provide active conveyance
	2942	29+42	111.9	--	112	2864.1	--	2864.0	152	151	-1	133	131	-2	5112.2	--	--	
D/S York Street	3069	30+69	128.0	--	127	2992.1	--	2991.0	515	513	-1	141	141	0	5117.1	--	--	
U/S York Street	3388	33+88	318.2	--	319	3310.3	--	3310.0	451	454	3	247	247	0	5118.0	--	--	
	3798	37+98	410.7	--	410	3721.0	--	3720.0	409	407	-2	247	248	2	5118.2	--	--	
	4201	42+01	403.1	--	403	4124.1	--	4123.0	624	622	-2	270	269	0	5119.1	--	--	
	4363	43+63	161.8	--	162	4285.9	--	4285.0	407	407	0	275	274	0	5119.1	--	--	
	4589	45+89	225.6	--	226	4511.5	--	4511.0	282	287	5	282	287	5	5119.5	--	--	
	4871	48+71	282.6	--	282	4794.1	--	4793.0	294	293	-1	294	293	-1	5119.6	--	--	
	5207	52+07	335.1	--	336	5129.3	--	5129.0	623	366	-256	366	366	0	5119.8	--	--	ROB not included in pond with. Pond is adjacent on-site detention
	5370	53+70	163.5	--	163	5292.8	--	5292.0	373	358	-15	368	358	-10	5120.8	--	--	
D/S I-270	5470	54+70	99.8	--	100	5392.6	--	5392.0	346	345	-1	346	345	-1	5121.5	--	--	
U/S I-270	5690	56+90	219.0	--	220	5611.6	--	5612.0	461	460	-1	461	460	-1	5125.1	--	--	
	5777	57+77	86.9	--	87	5698.5	--	5699.0	619	615	-4	456	458	2	5125.1	--	--	
	5822	58+22	45.3	--	45	5743.8	--	5744.0	655	657	2	507	509	2	5126.5	--	--	
	5990	59+90	167.6	--	168	5911.4	--	5912.0	730	734	4	484	484	0	5126.6	--	--	
	6024	60+24	34.5	--	34	5945.8	--	5946.0	695	599	-96	494	495	1	5126.6	--	--	LOB island not mapped
	6461	64+61	436.5	--	437	6382.3	--	6383.0	824	818	-5	472	465	-7	5127.1	--	--	
	6827	68+27	366.4	--	366	6748.7	--	6749.0	695	696	1	558	558	0	5127.7	--	--	
	7017	70+17	190.3	--	190	6939.0	--	6939.0	610	614	4	508	510	2	5127.9	--	--	
	7127	71+27	109.8	--	110	7048.8	--	7049.0	597	598	1	504	506	3	5128.0	--	--	

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			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Difference	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
	7182	71+82	54.5	--	55	7103.3	--	7104.0	661	662	0	554	556	2	5128.1	--	--	
	7228	72+28	46.6	--	46	7149.9	--	7150.0	653	652	0	542	541	0	5128.2	--	--	
	7382	73+82	153.5	--	154	7303.4	--	7304.0	627	626	-1	494	494	-1	5128.5	--	--	
	7516	75+16	134.4	--	134	7437.7	--	7438.0	619	616	-3	451	450	-1	5128.7	--	--	
	7651	76+51	135.1	--	135	7572.8	--	7573.0	575	577	1	406	405	0	5128.9	--	--	
	7697	76+97	45.9	--	46	7618.7	--	7619.0	565	567	2	412	413	1	5129.0	--	--	
	7756	77+56	59.3	--	59	7677.9	--	7678.0	551	554	3	376	377	1	5129.1	--	--	
	7946	79+46	189.6	--	190	7867.6	--	7868.0	522	521	-1	437	437	1	5130.4	--	--	
	8370	83+70	424.3	--	424	8291.9	--	8292.0	496	495	0	462	462	0	5132.0	--	--	
	8648	86+48	278.2	--	278	8570.1	--	8570.0	592	594	2	340	339	-1	5132.5	--	--	
	8754	87+54	105.3	--	106	8675.4	--	8676.0	319	319	0	235	236	1	5132.8	--	--	
D/S Washington Street	8791	87+91	35.0	--	37	8710.4	--	8713.0	189	198	9	177	198	21	5133.8	--	--	
U/S Washington Street	8918	89+18	128.0	--	127	8838.4	--	8840.0	168	172	4	168	172	4	5136.5	--	--	
	9016	90+16	97.4	--	98	8935.8	--	8938.0	809	811	2	227	230	3	5137.9	--	--	
	9164	91+64	148.8	--	148	9084.5	--	9086.0	817	818	1	209	215	5	5138.2	--	--	
	9467	94+67	302.5	--	303	9387.1	--	9389.0	992	994	2	360	356	-4	5139.1	--	--	
	9644	96+44	177.4	--	177	9564.5	--	9566.0	896	900	4	245	245	0	5139.0	--	--	
D/S I-25 Ramp East	9780	97+80	135.7	--	136	9700.2	--	9702.0	523	521	-2	217	216	-1	5139.1	--	--	
U/S I-25 Ramp East	9877	98+77	100.0	--	97	9800.2	--	9799.0	211	211	0	208	211	3	5139.5	--	--	
	9931	99+31	54.3	--	54	9854.5	--	9853.0	576	573	-3	207	207	0	5139.5	--	--	
	10030	100+30	98.8	--	99	9953.3	--	9952.0	184	184	-1	185	184	-1	5139.4	--	--	
	10127	101+27	96.9	--	97	10050.2	--	10049.0	170	172	2	171	172	1	5139.1	--	--	
	10191	101+91	63.9	--	64	10114.1	--	10113.0	198	198	0	198	198	0	5141.6	--	--	
	10229	102+29	37.7	--	38	10151.8	--	10151.0	190	233	43	190	233	43	5141.5	--	--	Skew of 35 degrees applied
	10269	102+69	40.1	--	40	10191.9	--	10191.0	213	260	47	213	260	47	5142.3	--	--	Skew of 35 degrees applied
D/S I-25	10304	103+04	34.9	--	35	10226.8	--	10226.0	204	234	31	204	234	31	5142.7	--	--	Skew of 30 degrees applied
U/S I-25	10644	106+44	341.0	--	340	10567.8	--	10566.0	201	232	31	201	232	31	5144.8	--	--	Skew of 30 degrees applied
	10680	106+80	35.9	--	36	10603.7	--	10602.0	399	246	-153	213	246	33	5144.6	--	--	Skew of 30 degrees applied
	10741	107+41	61.5	--	61	10665.2	--	10663.0	1000	274	-726	238	275	37	5145.5	--	--	Skew of 30 degrees applied. LOB island not included in top width, does not provide active conveyance
	10815	108+15	73.4	--	74	10738.5	--	10737.0	199	248	49	199	248	49	5145.1	--	--	Skew of 36 degrees applied
	10961	109+61	146.2	--	146	10884.7	--	10883.0	432	255	-177	205	255	50	5146.6	--	--	Skew of 36 degrees applied. LOB island not included in top width, does not provide active conveyance
	11024	110+24	63.1	--	63	10947.9	--	10946.0	521	534	13	222	222	0	5148.2	--	--	
	11109	111+09	84.5	--	85	11032.3	--	11031.0	235	239	4	235	239	4	5148.6	--	--	
	11405	114+05	296.3	--	296	11328.6	--	11327.0	499	499	0	499	499	0	5149.9	--	--	
	11760	117+60	355.0	--	355	11683.6	--	11682.0	573	576	4	573	576	4	5150.3	--	--	
	11882	118+82	122.3	--	122	11805.9	--	11804.0	942	941	-1	353	353	0	5150.5	--	--	
D/S Broadway	12081	120+81	199.0	--	199	12004.9	--	12003.0	833	822	-11	197	193	-4	5150.4	--	--	
U/S Broadway	12221	122+21	142.0	--	140	12146.9	--	12143.0	592	588	-4	223	223	0	5153.7	--	--	
	12297	122+97	75.6	--	76	12222.5	--	12219.0	604	604	0	313	312	-1	5154.1	--	--	

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			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Difference	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
	12560	125+60	262.5	--	263	12485.1	--	12482.0	479	480	1	479	480	1	5154.5	--	--	
	12864	128+64	303.9	--	304	12789.0	--	12786.0	310	310	0	310	310	0	5154.3	--	--	
	12944	129+44	80.2	--	80	12869.1	--	12866.0	353	352	0	353	352	0	5154.8	--	--	
	13400	134+00	456.3	--	456	13325.5	--	13322.0	486	487	1	486	487	1	5155.2	--	--	
	13859	138+59	459.4	--	459	13784.8	--	13781.0	488	488	-1	488	488	-1	5155.9	--	--	
	14079	140+79	219.9	--	220	14004.8	--	14001.0	521	521	0	521	521	0	5156.1	--	--	
	14482	144+82	403.3	--	403	14408.1	--	14404.0	734	734	0	734	734	0	5156.3	--	--	
	14865	148+65	382.3	--	383	14790.3	--	14787.0	751	752	1	751	752	1	5156.4	--	--	
	15383	153+83	518.0	--	518	15308.4	--	15305.0	603	604	1	603	604	1	5156.5	--	--	
	15697	156+97	314.4	--	314	15622.8	--	15619.0	642	642	0	642	642	0	5156.6	--	--	
	15860	158+60	163.0	--	163	15785.8	--	15782.0	590	477	-113	478	477	-1	5156.6	--	--	ROB island not mapped
	16232	162+32	372.1	--	372	16157.9	--	16154.0	498	497	-1	498	497	-1	5157.2	--	--	
	16597	165+97	364.5	--	365	16522.3	--	16519.0	179	181	2	179	181	2	5160.8	--	--	
	16726	167+26	129.3	--	129	16651.6	--	16648.0	204	206	1	204	206	1	5163.4	--	--	
	16787	167+87	60.9	--	61	16712.6	--	16709.0	175	172	-3	175	172	-3	5164.9	--	--	
	16803	168+03	16.4	--	16	16728.9	--	16725.0	167	167	1	167	167	1	5165.9	--	--	
	16825	168+25	21.8	--	22	16750.7	--	16747.0	153	156	3	153	156	3	5166.1	--	--	
	16987	169+87	162.2	--	162	16912.9	--	16909.0	314	609	295	314	609	295	5169.6	--	--	Delineated using logical transition from upstream cross section
	17011	170+11	24.0	--	24	16937.0	--	16933.0	888	889	1	764	757	-7	5176.4	--	--	
	17022	170+22	10.6	--	11	16947.5	--	16944.0	1546	1475	-71	793	788	-4	5177.1	--	--	ROB island not mapped
	17393	173+93	370.8	--	371	17318.4	--	17315.0	1439	1442	2	618	619	1	5178.6	--	--	
	17743	177+43	350.0	--	350	17668.4	--	17665.0	2254	2099	-155	303	303	1	5181.2	--	--	LOB island not included in top width, does not provide active conveyance
	18090	180+90	347.4	--	347	18015.7	--	18012.0	1876	1755	-121	345	345	0	5183.4	--	--	LOB island not included in top width, does not provide active conveyance
	18273	182+73	183.4	--	183	18199.1	--	18195.0	2168	2169	0	328	328	0	5184.8	--	--	
D/S Pecos Street	18466	184+66	193.0	--	193	18392.1	--	18388.0	1358	1727	369	230	248	18	5185.0	--	--	Skew of 38 degrees applied
U/S Pecos Street	18648	186+48	180.0	--	182	18572.1	--	18570.0	820	1008	188	265	336	71	5186.4	--	--	Skew of 38 degrees applied
	18733	187+33	85.1	--	85	18657.2	--	18655.0	1770	1697	-73	448	433	-15	5186.5	--	--	ROB island not included in top width, does not provide active conveyance
	18905	189+05	171.9	--	172	18829.1	--	18827.0	2071	1881	-190	378	378	0	5186.6	--	--	ROB island not mapped
	18997	189+97	92.3	--	92	18921.4	--	18919.0	2035	1840	-195	504	503	-1	5187.7	--	--	ROB island not mapped
	19327	193+27	330.1	--	330	19251.4	--	19249.0	1866	1694	-172	472	471	-1	5189.6	--	--	ROB island not mapped
	19578	195+78	250.5	--	251	19501.9	--	19500.0	1711	1567	-144	520	531	11	5190.2	--	--	ROB island not mapped
	19666	196+66	88.4	--	88	19590.3	--	19588.0	1507	1504	-3	495	491	-4	5190.2	--	--	
	19746	197+46	80.1	--	80	19670.4	--	19668.0	1462	1460	-2	505	502	-3	5190.2	--	--	
	19861	198+61	114.9	--	115	19785.4	--	19783.0	1391	1386	-4	462	463	1	5190.1	--	--	
	19866	198+66	4.9	--	5	19790.3	--	19788.0	1386	1381	-5	463	462	-1	5190.1	--	--	
	19952	199+52	86.3	--	86	19876.5	--	19874.0	1384	1361	-23	394	398	3	5190.1	--	--	
	20100	201+00	147.8	--	148	20024.4	--	20022.0	1411	1409	-1	411	411	0	5190.2	--	--	
	20331	203+31	230.0	--	231	20254.4	--	20253.0	1292	1286	-5	290	293	3	5190.0	--	--	
	20502	205+02	171.5	--	171	20425.9	--	20424.0	1515	1504	-12	271	270	-1	5191.5	--	--	

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			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
D/S Railroad	20524	205+24	21.9	--	22	20447.7	--	20446.0	336	332	-3	254	249	-5	5191.1	--	--	
U/S Railroad	20561	205+61	38.0	--	37	20485.7	--	20483.0	1269	1250	-19	255	253	-2	5197.2	--	--	
D/S LRT NWES	20568	205+68	6.8	--	7	20492.5	--	20490.0	1322	1307	-15	259	258	-1	5197.2	--	--	
U/S LRT NWES	20638	206+38	72.0	--	70	20564.5	--	20560.0	1766	1762	-4	382	381	-1	5197.6	--	--	
	20985	209+85	346.2	--	347	20910.7	--	20907.0	1754	1753	-1	516	514	-2	5197.8	--	--	
	21401	214+01	416.2	--	416	21326.9	--	21323.0	1641	1637	-4	550	551	1	5197.9	--	--	
	21700	217+00	299.1	--	299	21626.0	--	21622.0	896	886	-10	520	520	0	5197.8	--	--	
	21733	217+33	32.0	--	33	21658.0	--	21655.0	852	847	-5	500	500	0	5198.0	--	--	
	21842	218+42	109.2	--	109	21767.2	--	21764.0	632	630	-1	403	401	-2	5197.8	--	--	
	21849	218+49	6.9	--	7	21774.1	--	21771.0	629	631	1	401	405	3	5197.7	--	--	
	21866	218+66	17.2	--	17	21791.3	--	21788.0	625	630	5	398	405	7	5197.7	--	--	
	21914	219+14	47.3	--	48	21838.6	--	21836.0	580	583	3	338	343	5	5198.0	--	--	
	22088	220+88	174.6	--	174	22013.2	--	22010.0	925	927	2	396	400	4	5199.4	--	--	
	22613	226+13	524.4	--	525	22537.6	--	22535.0	1276	1279	3	560	561	1	5201.2	--	--	
	22876	228+76	263.6	--	263	22801.2	--	22798.0	1993	1350	-643	519	528	9	5201.6	--	--	LOB island not mapped
	23255	232+55	378.7	--	379	23179.8	--	23177.0	910	910	0	518	515	-3	5202.9	--	--	
	23845	238+45	589.8	--	590	23769.6	--	23767.0	475	473	-2	475	473	-2	5204.6	--	--	
	24222	242+22	376.8	--	377	24146.4	--	24144.0	345	352	7	280	292	12	5204.6	--	--	
	24582	245+82	360.1	--	360	24506.5	--	24504.0	172	175	2	172	175	2	5206.4	--	--	
	24720	247+20	138.7	--	138	24645.2	--	24642.0	166	167	0	166	167	0	5208.6	--	--	
D/S Federal Boulevard	24755	247+55	34.8	--	35	24680.0	--	24677.0	177	178	1	177	178	1	5208.7	--	--	
U/S Federal Boulevard	24920	249+20	164.5	--	165	24844.5	--	24842.0	150	149	-1	150	149	-1	5209.4	--	--	
	25104	251+04	183.0	--	184	25027.5	--	25026.0	184	184	0	184	184	0	5210.9	--	--	
	25392	253+92	287.4	--	288	25314.8	--	25314.0	278	277	-1	278	277	-1	5211.6	--	--	
D/S LRT Gold Line	25690	256+90	298.0	--	298	25612.9	--	25612.0	168	168	-1	168	167	-1	5210.8	--	--	
U/S LRT Gold Line	25780	257+80	90.1	--	90	25702.9	--	25702.0	109	102	-7	109	102	-7	5210.7	--	--	
D/S BNSF Railroad	25833	258+33	52.0	--	53	25754.9	--	25755.0	100	97	-2	100	97	-2	5214.3	--	--	
U/S BNSF Railroad	25850	258+50	16.8	--	17	25771.7	--	25772.0	85	86	1	85	86	1	5214.0	--	--	
	25937	259+37	89.0	--	87	25860.7	--	25859.0	194	193	-2	194	193	-2	5218.4	--	--	
	26179	261+79	243.0	--	242	26103.7	--	26101.0	1378	1377	-1	440	441	1	5219.3	--	--	
	26340	263+40	160.6	--	161	26264.4	--	26262.0	1562	1559	-3	458	456	-3	5219.5	--	--	
	26669	266+69	329.5	--	329	26593.9	--	26591.0	1657	1655	-2	793	794	1	5219.7	--	--	
	27091	270+91	421.5	--	422	27015.4	--	27013.0	335	334	-2	335	333	-2	5219.9	--	--	
	27468	274+68	376.8	--	377	27392.2	--	27390.0	368	369	1	304	315	11	5220.1	--	--	
	27548	275+48	80.3	--	80	27472.4	--	27470.0	137	138	0	137	138	0	5219.9	--	--	
D/S I-76 East Crossing	27564	275+64	15.0	--	16	27487.4	--	27486.0	137	138	1	137	138	1	5220.0	--	--	
U/S I-76 East Crossing	27695	276+95	130.9	--	131	27618.3	--	27617.0	176	275	99	155	251	96	5220.2	--	--	Skew of 50 degrees applied
	28088	280+88	394.0	--	393	28012.3	--	28010.0	146	228	82	146	228	82	5220.7	--	--	Skew of 50 degrees applied
	28381	283+81	292.1	--	293	28304.5	--	28303.0	149	147	-2	149	147	-2	5220.6	--	--	
	28754	287+54	373.3	--	373	28677.7	--	28676.0	175	174	-1	87	87	0	5225.5	--	--	
	28893	288+93	139.5	--	139	28817.2	--	28815.0	202	201	-1	145	143	-2	5229.2	--	--	
D/S Lowell Boulevard	28927	289+27	33.7	--	34	28850.9	--	28849.0	226	226	0	193	191	-2	5230.4	--	--	

AGREEMENT TABLE

Project Name: Clear Creek FHAD

Community(s): Jeffco/Adco
Flooding Source: Clear Creek
Reach: Main Channel & Splits

Engineer: ICON Engineering
Date: 5/27/2022

Reference Location	Cross Section	River Station	Downstream Reach Distance, ft			Cumulative Distance, ft			FP Width, ft			0.5' FW Width, ft			BFE, ft		BFE Loc.	Comments
			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Difference	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
U/S Lowell Boulevard	28974	289+74	47.0	--	47	28897.8	--	28896.0	201	555	354	189	555	366	5231.7	--	--	Floodplain delineated with 2D model extents
	29044	290+44	71.0	--	70	28968.8	--	28966.0	564	563	-1	559	559	0	5232.9	--	--	
	29230	292+30	186.3	--	186	29155.1	--	29152.0	621	620	0	621	620	0	5233.7	--	--	
	29554	295+54	323.9	--	324	29478.9	--	29476.0	1050	1050	-1	806	801	-4	5233.9	--	--	
	29856	298+56	301.6	--	302	29780.5	--	29778.0	1187	1187	0	825	823	-2	5234.0	--	--	
	30256	302+56	400.3	--	400	30180.8	--	30178.0	906	906	0	906	907	0	5234.0	--	--	
	30793	307+93	536.9	--	537	30717.8	--	30715.0	853	856	3	853	856	3	5233.8	--	--	
	31387	313+87	594.3	--	594	31312.0	--	31309.0	763	1107	343	763	759	-5	5236.0	--	--	Roadway overtopping of Tennyson St., top width adjusted for Flood Map delineations
D/S Tennyson Street	31579	315+79	191.4	--	192	31503.4	--	31501.0	709	1099	390	709	711	2	5238.0	--	--	Roadway overtopping of Tennyson St., top width adjusted for Flood Map delineations
U/S Tennyson Street	31778	317+78	199.0	--	199	31702.4	--	31700.0	436	1078	643	436	541	105	5243.2	--	--	Roadway overtopping of Tennyson St., top width adjusted for Flood Map delineations
	31859	318+59	80.0	--	81	31782.4	--	31781.0	1482	1295	-187	563	561	-2	5246.8	--	--	ROB island not mapped
	32160	321+60	300.5	--	301	32082.9	--	32082.0	980	889	-91	220	218	-2	5247.1	--	--	ROB island not mapped
	32467	324+67	307.1	--	307	32389.9	--	32389.0	607	615	8	193	191	-1	5247.7	--	--	
D/S I-76 West Crossing	32573	325+73	105.6	--	106	32495.5	--	32495.0	416	419	3	141	140	-1	5247.5	--	--	
U/S I-76 West Crossing	32787	327+87	214.8	--	214	32710.4	--	32709.0	132	192	61	132	192	61	5248.1	--	--	Skew of 45 degrees applied
	33166	331+66	380.0	--	379	33090.4	--	33088.0	424	596	172	164	241	77	5251.8	--	--	Skew of 45 degrees applied
	33496	334+96	330.2	--	330	33420.6	--	33418.0	177	177	0	177	177	0	5252.1	--	--	
	33862	338+62	365.5	--	366	33786.1	--	33784.0	184	182	-2	184	175	-8	5253.3	--	--	
	34142	341+42	280.3	--	280	34066.4	--	34064.0	251	251	-1	180	180	0	5254.2	--	--	
D/S Sheridan Boulevard	34478	344+78	335.9	--	336	34402.3	--	34400.0	535	564	29	181	179	-2	5255.7	--	--	Shallow flooding from 2D analysis in ROB mapped
U/S Sheridan Boulevard	34496	344+96	18.5	--	18	34420.7	--	34418.0	180	662	482	175	175	0	5256.2	--	--	Shallow flooding from 2D analysis in ROB mapped
	34653	346+53	158.0	--	157	34578.7	--	34575.0	647	769	122	171	318	147	5258.3	--	--	Connected area between main channel and split
	34757	347+57	104.1	--	104	34682.8	--	34679.0	793	809	16	237	385	147	5258.3	--	--	Connected area between main channel and split
	35018	350+18	261.2	--	261	34944.1	--	34940.0	823	1027	204	680	876	196	5259.5	--	--	Shallow flooding from 2D analysis in ROB mapped
	35231	352+31	212.8	--	213	35156.9	--	35153.0	899	909	10	413	412	-1	5259.6	--	--	
	35343	353+43	112.5	--	112	35269.3	--	35265.0	630	742	112	345	345	0	5259.7	--	--	Shallow flooding from 2D analysis in ROB mapped
	35401	354+01	59.0	--	58	35328.3	--	35323.0	533	533	0	349	350	0	5259.8	--	--	
	35468	354+68	67.0	--	67	35395.3	--	35390.0	513	517	4	352	352	0	5259.8	--	--	
	35958	359+58	490.0	--	490	35885.2	--	35880.0	176	174	-2	176	174	-2	5259.7	--	--	
	36262	362+62	303.4	--	304	36188.7	--	36184.0	148	148	1	148	148	1	5260.7	--	--	
D/S I-76 Westbound	36563	365+63	301.0	--	301	36489.7	--	36485.0	148	147	-1	148	147	-1	5262.0	--	--	
U/S I-76 Westbound	36727	367+27	164.2	--	164	36653.9	--	36649.0	205	319	114	205	319	114	5263.6	--	--	Skew of 50 degrees applied
	36856	368+56	130.0	--	129	36783.9	--	36778.0	208	322	114	208	322	114	5263.7	--	--	Skew of 50 degrees applied

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			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Difference	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
D/S I-76 Eastbound	36879	368+79	23.0	--	23	36806.8	--	36801.0	170	314	143	170	314	143	5263.5	--	--	Skew of 57 degrees applied
U/S I-76 Eastbound	36901	369+01	22.1	--	22	36829.0	--	36823.0	179	326	148	179	326	148	5263.8	--	--	Skew of 57 degrees applied
	37007	370+07	107.0	--	106	36936.0	--	36929.0	166	307	141	166	307	141	5264.1	--	--	Skew of 57 degrees applied
	37204	372+04	196.3	--	197	37132.3	--	37126.0	1643	1610	-33	152	153	1	5264.5	--	--	
	37300	373+00	96.1	--	96	37228.4	--	37222.0	1539	1540	1	149	149	0	5264.7	--	--	
	37772	377+72	472.6	--	472	37700.9	--	37694.0	138	137	-1	138	137	-1	5265.8	--	--	
D/S West 52nd Avenue	38186	381+86	413.8	--	414	38114.8	--	38108.0	1891	111	-1780	111	110	-1	5267.8	--	--	ROB island not mapped
U/S West 52nd Avenue	38267	382+67	80.9	--	81	38195.6	--	38189.0	1979	125	-1854	108	105	-3	5270.2	--	--	ROB island not mapped
	38345	383+45	77.0	--	78	38272.6	--	38267.0	2065	130	-1935	108	108	0	5271.3	--	--	ROB island not mapped
	38441	384+41	96.2	--	96	38368.8	--	38363.0	2171	87	-2084	80	80	0	5270.1	--	--	ROB island not mapped
	38688	386+88	247.2	--	247	38616.0	--	38610.0	81	79	-2	81	79	-2	5272.7	--	--	
	39183	391+83	495.3	--	495	39111.2	--	39105.0	66	65	-1	66	65	-1	5275.4	--	--	
	39601	396+01	417.5	--	418	39528.7	--	39523.0	206	205	-1	206	205	-1	5279.8	--	--	
	40002	400+02	400.8	--	401	39929.5	--	39924.0	449	448	-1	350	355	5	5282.9	--	--	
	40434	404+34	432.1	--	432	40361.6	--	40356.0	518	520	2	395	394	-1	5283.5	--	--	
	40883	408+83	449.0	--	449	40810.6	--	40805.0	430	430	0	388	386	-2	5286.7	--	--	
	40947	409+47	64.3	--	64	40874.8	--	40869.0	276	277	1	275	277	2	5286.8	--	--	
	41025	410+25	78.5	--	78	40953.3	--	40947.0	599	598	-1	244	245	0	5289.3	--	--	
D/S Marshall Street	41139	411+39	113.6	--	114	41067.0	--	41061.0	556	560	4	190	178	-12	5290.7	--	--	
U/S Marshall Street	41282	412+82	142.8	--	143	41209.8	--	41204.0	286	304	18	162	162	0	5292.2	--	--	
	41357	413+57	76.0	--	75	41285.8	--	41279.0	205	192	-13	157	157	0	5293.2	--	--	
	41417	414+17	60.3	--	60	41346.0	--	41339.0	439	424	-14	268	264	-4	5293.2	--	--	
	41773	417+73	356.1	--	356	41702.1	--	41695.0	769	762	-7	224	206	-18	5293.3	--	--	
U/S I-70 Exit Ramp	41978	419+78	204.5	--	205	41906.7	--	41900.0	976	966	-10	207	204	-3	5293.5	--	--	
U/S I-70 Exit Ramp	42105	421+05	126.7	--	127	42033.4	--	42027.0	168	167	-1	164	162	-1	5293.7	--	--	
	42165	421+65	59.0	--	60	42092.4	--	42087.0	170	168	-2	164	168	4	5294.1	--	--	
D/S I-70 Westbound	42287	422+87	121.9	--	122	42214.3	--	42209.0	259	251	-8	173	174	1	5294.4	--	--	
U/S I-70 Westbound	42415	424+15	128.1	--	128	42342.4	--	42337.0	139	151	12	139	151	12	5294.4	--	--	
	42499	424+99	83.0	--	84	42425.4	--	42421.0	146	156	10	146	156	10	5295.0	--	--	
D/S I-70 Eastbound	42676	426+76	176.9	--	177	42602.3	--	42598.0	144	141	-3	144	153	9	5295.2	--	--	
U/S I-70 Eastbound	42877	428+77	201.3	--	201	42803.6	--	42799.0	148	186	38	148	231	83	5296.1	--	--	Skew of 38 degrees applied
	42988	429+88	110.0	--	111	42913.6	--	42910.0	174	219	45	174	252	78	5296.9	--	--	Skew of 38 degrees applied
D/S I-70 Eastbound Access Ramp	43009	430+09	21.2	--	21	42934.8	--	42931.0	185	253	68	185	287	103	5296.7	--	--	Skew of 44 degrees applied
U/S I-70 Eastbound Access Ramp	43039	430+39	30.1	--	30	42964.9	--	42961.0	180	292	112	178	327	149	5297.3	--	--	Skew of 52 degrees applied
	43134	431+34	97.0	--	95	43061.9	--	43056.0	277	440	163	169	277	107	5298.3	--	--	Skew of 52 degrees applied
	43235	432+35	100.8	--	101	43162.7	--	43157.0	425	422	-4	156	157	1	5298.4	--	--	
	43444	434+44	208.4	--	209	43371.1	--	43366.0	152	150	-2	129	125	-5	5298.8	--	--	
	43824	438+24	380.8	--	380	43751.9	--	43746.0	132	131	-1	132	131	-1	5299.6	--	--	
	44185	441+85	360.3	--	361	44112.2	--	44107.0	142	141	-2	142	141	-2	5300.4	--	--	
	44466	444+66	281.1	--	281	44393.3	--	44388.0	91	91	0	91	90	-1	5302.6	--	--	
	44692	446+92	226.5	--	226	44619.8	--	44614.0	161	160	-1	161	160	-1	5306.7	--	--	
D/S I-70 & I-76 Access Ramp	44826	448+26	134.0	--	134	44753.8	--	44748.0	164	165	1	164	165	1	5306.7	--	--	
U/S I-70 & I-76 Access Ramp	44913	449+13	86.9	--	87	44840.8	--	44835.0	121	149	28	121	149	28	5306.3	--	--	Skew of 28 degrees applied

AGREEMENT TABLE

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			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Difference	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
D/S Wadsworth Boulevard	44988	449+88	74.0	--	75	44914.8	--	44910.0	127	165	38	127	165	38	5308.7	--	--	Skew of 28 degrees applied
U/S Wadsworth Boulevard	45000	450+00	12.9	--	12	44927.6	--	44922.0	146	152	6	146	152	6	5309.2	--	--	
	45140	451+40	139.0	--	140	45066.6	--	45062.0	145	136	-9	145	141	-4	5311.3	--	--	
	45243	452+43	103.1	--	103	45169.7	--	45165.0	571	595	24	245	244	-1	5314.2	--	--	
	45311	453+11	67.8	--	68	45237.6	--	45233.0	726	724	-3	314	313	-1	5316.1	--	--	
	45604	456+04	292.9	--	293	45530.5	--	45526.0	691	692	1	365	363	-2	5316.7	--	--	
	46171	461+71	566.9	--	567	46097.3	--	46093.0	507	506	-1	251	250	-1	5317.9	--	--	
	46532	465+32	361.5	--	361	46458.9	--	46454.0	652	654	2	280	280	0	5319.9	--	--	
	46985	469+85	452.6	--	453	46911.5	--	46907.0	875	877	2	414	413	-1	5322.3	--	--	
	47490	474+90	505.3	--	505	47416.8	--	47412.0	935	936	1	576	586	10	5325.1	--	--	
	47719	477+19	228.8		229	47645.5		47641.0	1006	1051	46	689	692	3	5325.6	--	--	Area in LOB filled in
	47862	478+62	371.0	--	372	48016.5	--	48013.0	1125	1160	35	776	770	-5	5326.2	--	--	Area in LOB filled in
	47979	479+79	116.8	--	117	48133.3	--	48130.0	794	1236	442	784	689	-96	5326.4	--	--	Area in LOB filled in
	48004	480+04	24.0	--	25	48157.3	--	48155.0	1272	1266	-6	808	799	-10	5329.1	--	--	
	48066	480+66	62.5	--	62	48219.8	--	48217.0	1300	1297	-3	789	786	-3	5329.5	--	--	
	48477	484+77	410.6	--	411	48630.5	--	48628.0	1397	1385	-12	570	571	1	5329.8	--	--	
	49071	490+71	594.1	--	594	49224.5	--	49222.0	562	561	-1	497	497	-1	5329.7	--	--	
	49418	494+18	347.6	--	347	49572.1	--	49569.0	591	567	-24	514	500	-15	5331.7	--	--	
	49530	495+30	111.9	--	112	49684.0	--	49681.0	519	539	20	412	422	10	5332.2	--	--	
	49591	495+91	60.8	--	61	49744.8	--	49742.0	911	912	1	400	398	-2	5334.5	--	--	
	49640	496+40	48.4	--	49	49793.2	--	49791.0	811	813	2	368	368	0	5335.0	--	--	
D/S 44th Avenue	49812	498+12	172.2	--	172	49965.4	--	49963.0	772	772	-1	337	333	-4	5336.2	--	--	
U/S 44th Avenue	49993	499+93	181.3	--	181	50146.7	--	50144.0	183	186	3	176	174	-2	5337.4	--	--	
	50078	500+78	86.0	--	85	50232.7	--	50229.0	194	200	6	183	182	-1	5338.5	--	--	
	50170	501+70	92.2	--	92	50324.8	--	50321.0	544	539	-4	265	263	-2	5338.9	--	--	
	50437	504+37	267.2	--	267	50592.0	--	50588.0	374	385	11	255	254	-1	5339.6	--	--	
	50912	509+12	474.4	--	475	51066.3	--	51063.0	268	267	-1	251	251	1	5340.8	--	--	
	51250	512+50	338.5	--	338	51404.8	--	51401.0	290	292	2	290	292	2	5341.9	--	--	
	51703	517+03	452.4	--	453	51857.3	--	51854.0	1091	250	-841	250	250	0	5344.0	--	--	LOB island not mapped
	52143	521+43	439.9	--	440	52297.1	--	52294.0	1331	845	-486	355	353	-1	5346.7	--	--	LOB island not mapped
	52630	526+30	487.7	--	487	52784.8	--	52781.0	537	537	0	349	350	1	5348.2	--	--	
	53103	531+03	473.0	--	473	53257.8	--	53254.0	2279	2279	0	646	644	-2	5350.3	--	--	
	53268	532+68	164.9	--	165	53422.7	--	53419.0	2226	2228	2	740	753	13	5352.3	--	--	
	53431	534+31	162.8	--	163	53585.5	--	53582.0	2059	2060	1	760	762	2	5352.7	--	--	
	53751	537+51	320.2	--	320	53905.7	--	53902.0	1339	1338	-2	777	782	5	5354.9	--	--	
	53915	539+15	164.1	--	164	54069.8	--	54066.0	1140	1154	14	600	601	1	5355.4	--	--	
	54004	540+04	88.5	--	89	54158.4	--	54155.0	1027	1039	12	565	561	-4	5355.5	--	--	
	54021	540+21	16.0	--	17	54174.4	--	54172.0	1159	1155	-4	551	550	-1	5356.5	--	--	
	54064	540+64	43.3	--	43	54217.7	--	54215.0	1213	1226	13	505	509	4	5356.6	--	--	
	54353	543+53	288.7	--	289	54506.4	--	54504.0	984	1003	19	250	251	1	5356.7	--	--	
	54621	546+21	267.5	--	268	54773.9	--	54772.0	1252	1237	-15	280	276	-4	5359.3	--	--	
	54961	549+61	340.5	--	340	55114.4	--	55112.0	1174	1198	24	358	360	2	5361.5	--	--	

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			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
	55123	551+23	161.5	--	162	55275.9	--	55274.0	657	1086	430	262	259	-3	5362.4	--	--	Roadway overtopping of Kipling St., top width adjusted for Flood Map delineations
	55193	551+93	70.6	--	70	55346.5	--	55344.0	128	963	835	128	151	23	5362.8	--	--	Roadway overtopping of Kipling St., top width adjusted for Flood Map delineations
D/S Kipling Street	55224	552+24	30.0	--	31	55376.5	--	55375.0	708	973	266	540	293	-246	5365.4	--	--	Skew of 33 degrees applied, Roadway overtopping of Kipling St., top width adjusted for Flood Map delineations
U/S Kipling Street	55239	552+39	15.2	--	15	55391.7	--	55390.0	711	983	271	544	337	-207	5365.4	--	--	Skew of 33 degrees applied, Roadway overtopping of Kipling St., top width adjusted for Flood Map delineations
	55335	553+35	95.0	--	96	55486.7	--	55486.0	979	1126	147	498	304	-194	5366.6	--	--	Skew of 33 degrees applied
	55415	554+15	80.3	--	80	55567.0	--	55566.0	2150	2155	5	600	601	1	5367.0	--	--	
	55687	556+87	271.5	--	272	55838.5	--	55838.0	1588	1598	10	650	651	1	5367.2	--	--	
	56096	560+96	409.2	--	409	56247.7	--	56247.0	1285	1276	-9	630	626	-4	5368.3	--	--	
	56520	565+20	424.4	--	424	56672.0	--	56671.0	783	787	5	416	416	0	5371.4	--	--	
	56972	569+72	451.2	--	452	57123.2	--	57123.0	645	584	-61	340	339	-1	5374.1	--	--	Floodplain top width includes obstruction
	57293	572+93	321.4	--	321	57444.6	--	57444.0	806	801	-5	480	498	18	5376.9	--	--	
	57402	574+02	108.8	--	109	57553.4	--	57553.0	1035	1025	-10	610	586	-24	5377.8	--	--	
	57442	574+42	39.0	--	40	57592.4	--	57593.0	990	997	7	603	588	-15	5377.8	--	--	
	57496	574+96	53.7	--	54	57646.1	--	57647.0	969	861	-109	550	565	15	5378.3	--	--	LOB island not mapped
	57791	577+91	295.4	--	295	57941.5	--	57942.0	1044	1045	1	565	564	-1	5381.1	--	--	
	58172	581+72	380.5	--	381	58322.0	--	58323.0	855	854	-1	560	559	-1	5384.2	--	--	
	58630	586+30	458.8	--	458	58780.8	--	58781.0	812	765	-47	390	389	-1	5386.5	--	--	LOB island not mapped
	59010	590+10	379.4	--	380	59160.1	--	59161.0	751	654	-97	380	388	8	5389.1	--	--	LOB island not mapped
	59302	593+02	292.6	--	292	59452.7	--	59453.0	890	888	-2	460	460	0	5391.3	--	--	
	59399	593+99	96.4	--	97	59549.1	--	59550.0	1165	1171	6	440	438	-2	5392.0	--	--	
	59441	594+41	42.2	--	42	59591.4	--	59592.0	1232	1238	6	445	447	2	5392.8	--	--	
	59484	594+84	43.6	--	43	59634.9	--	59635.0	1210	1202	-8	445	445	0	5393.1	--	--	
	59850	598+50	365.3	--	366	60000.2	--	60001.0	801	801	0	380	379	-1	5395.7	--	--	
	60157	601+57	307.4	--	307	60307.6	--	60308.0	468	469	1	455	457	2	5397.6	--	--	
	60301	603+01	143.6	--	144	60451.2	--	60452.0	726	1528	802	481	481	0	5399.5	--	--	Floodplain top width includes obstruction
	60391	603+91	89.9	--	90	60541.1	--	60542.0	765	1497	731	546	541	-5	5400.7	--	--	Floodplain top width includes obstruction
	60416	604+16	26.0	--	25	60567.1	--	60567.0	1540	1544	4	521	520	-2	5401.3	--	--	
	60460	604+60	44.1	--	44	60611.1	--	60611.0	1516	1521	5	523	522	-2	5401.6	--	--	
	60806	608+06	346.0	--	346	60957.1	--	60957.0	1230	1230	-1	430	436	6	5402.5	--	--	
	61187	611+87	380.8	--	381	61337.9	--	61338.0	518	548	30	150	149	0	5404.7	--	--	Transition with Split Flow
	61678	616+78	491.7	--	491	61829.6	--	61829.0	545	578	33	283	285	2	5407.6	--	--	Transition with Split Flow
	62067	620+67	388.6	--	389	62218.2	--	62218.0	317	317	0	259	253	-5	5409.2	--	--	
	62206	622+06	139.1	--	139	62357.3	--	62357.0	327	328	1	252	247	-6	5410.5	--	--	
	62484	624+84	278.2	--	278	62635.4	--	62635.0	179	163	-16	151	153	2	5413.3	--	--	
	62640	626+40	156.2	--	156	62791.6	--	62791.0	795	794	-1	179	180	1	5416.0	--	--	
	62718	627+18	77.8	--	78	62869.5	--	62869.0	863	863	0	162	161	0	5416.8	--	--	
	63054	630+54	335.4	--	336	63204.8	--	63205.0	296	294	-2	265	256	-9	5417.7	--	--	

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			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Difference	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
	63243	632+43	188.9	--	189	63393.7	--	63394.0	642	821	179	210	266	56	5418.0	--	--	Transition with Split Flow
	63271	632+71	29.0	--	28	63422.7	--	63422.0	697	885	187	200	254	54	5420.5	--	--	Transition with Split Flow
	63333	633+33	61.6	--	62	63484.3	--	63484.0	857	859	1	218	213	-5	5420.4	--	--	
	63718	637+18	385.0	--	385	63869.3	--	63869.0	1039	1041	2	197	203	6	5420.4	--	--	
	64095	640+95	377.0	--	377	64246.3	--	64246.0	1128	1131	3	145	144	-1	5421.4	--	--	
	64534	645+34	439.5	--	439	64685.8	--	64685.0	1096	1095	-1	140	139	0	5424.1	--	--	
	64938	649+38	404.2	--	404	65090.0	--	65089.0	178	178	0	120	119	-1	5425.8	--	--	
D/S Youngfield Street	65211	652+11	272.8	--	273	65362.8	--	65362.0	119	123	4	119	123	4	5428.1	--	--	
U/S Youngfield Street	65282	652+82	70.0	--	71	65432.8	--	65433.0	123	123	0	123	123	0	5429.7	--	--	
D/S I-70 Eastbound	65330	653+30	48.0	--	48	65480.8	--	65481.0	116	117	0	116	117	0	5429.4	--	--	
U/S I-70 Eastbound	65402	654+02	71.0	--	72	65551.8	--	65553.0	123	122	-1	123	122	0	5431.7	--	--	
D/S I-70 Westbound	65437	654+37	34.7	--	35	65586.4	--	65588.0	126	127	1	126	127	1	5432.0	--	--	
U/S I-70 Westbound	65528	655+28	92.0	--	91	65678.4	--	65679.0	143	143	0	143	128	-15	5432.6	--	--	
	65852	658+52	324.1	--	324	66002.5	--	66003.0	546	545	-1	373	374	1	5434.4	--	--	
	66246	662+46	394.5	--	394	66397.0	--	66397.0	675	670	-6	395	396	1	5435.8	--	--	
	66656	666+56	410.1	--	410	66807.1	--	66807.0	250	251	1	250	250	0	5439.0	--	--	
	67024	670+24	367.0	--	368	67174.1	--	67175.0	810	824	14	198	198	0	5442.0	--	--	
	67460	674+60	436.4	--	436	67610.5	--	67611.0	533	535	1	147	151	4	5445.9	--	--	
	67953	679+53	493.2	--	493	68103.6	--	68104.0	106	107	1	106	107	1	5451.0	--	--	
	68123	681+23	169.6	--	170	68273.2	--	68274.0	141	1662	1520	141	141	0	5457.4	--	--	Lake in ROB mapped
	68136	681+36	13.2	--	13	68286.5	--	68287.0	141	1665	1524	141	144	3	5458.0	--	--	Lake in ROB mapped
	68216	682+16	80.3	--	80	68366.8	--	68367.0	1684	1684	-1	154	155	2	5464.4	--	--	
	68327	683+27	110.3	--	111	68477.0	--	68478.0	1862	1730	-132	230	304	74	5469.4	--	--	ROB island not mapped, FW extended from upstream with a logical transition
	68494	684+94	167.7	--	167	68644.7	--	68645.0	2039	2030	-9	459	476	16	5471.9	--	--	
	68535	685+35	40.0	--	41	68684.7	--	68686.0	2176	2176	0	377	380	3	5474.8	--	--	
	68566	685+66	30.6	--	31	68715.3	--	68717.0	2305	2280	-24	378	379	1	5476.1	--	--	
	68669	686+69	103.3	--	103	68818.6	--	68820.0	2189	2195	5	216	219	3	5476.7	--	--	
	68947	689+47	278.2	--	278	69096.8	--	69098.0	2185	2187	2	175	180	5	5477.4	--	--	
	69089	690+89	141.6	--	142	69238.4	--	69240.0	2245	2247	2	171	171	0	5478.2	--	--	
	69098	690+98	9.4	--	9	69247.7	--	69249.0	2762	2765	3	172	172	0	5478.6	--	--	
	69192	691+92	93.7	--	94	69341.4	--	69343.0	2724	2727	3	171	171	0	5480.1	--	--	
	69912	699+12	720.5	--	720	70061.9	--	70063.0	3146	3148	2	183	183	1	5486.3	--	--	
	70238	702+38	325.7	--	326	70387.6	--	70389.0	3494	3496	2	179	179	0	5488.2	--	--	
	70310	703+10	71.7	--	72	70459.3	--	70461.0	3463	3463	1	178	179	1	5488.6	--	--	
	70345	703+45	35.2	--	35	70494.5	--	70496.0	3462	3463	1	183	182	-1	5489.6	--	--	
	70392	703+92	47.1	--	47	70541.6	--	70543.0	3395	3399	4	184	184	0	5490.7	--	--	
	70721	707+21	328.8	--	329	70870.4	--	70872.0	774	775	1	189	189	0	5493.4	--	--	
	71111	711+11	390.1	--	390	71260.5	--	71262.0	4055	4056	2	174	173	-1	5495.8	--	--	
	71155	711+55	44.4	--	44	71304.8	--	71306.0	4058	4058	0	175	175	-1	5496.8	--	--	
	71462	714+62	306.5	--	307	71611.4	--	71613.0	4048	4051	3	177	177	0	5499.1	--	--	
	71505	715+05	43.3	--	43	71654.6	--	71656.0	4040	4026	-14	176	176	0	5499.4	--	--	
	71570	715+70	64.8	--	65	71719.4	--	71721.0	3515	3515	0	170	170	0	5499.5	--	--	

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			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Difference	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
	71596	715+96	25.9	--	26	71745.3	--	71747.0	4013	3518	-495	175	175	0	5500.6	--	--	LOB island not mapped
	71865	718+65	268.4	--	269	72013.7	--	72016.0	3908	3417	-491	172	170	-2	5502.7	--	--	LOB island not mapped
	71930	719+30	65.7	--	65	72079.4	--	72081.0	3433	3435	2	170	172	2	5503.1	--	--	
	71962	719+62	31.3	--	32	72110.8	--	72113.0	3920	3921	1	178	177	0	5504.3	--	--	
	72004	720+04	42.2	--	42	72152.9	--	72155.0	3997	4001	4	179	179	0	5505.2	--	--	
	72282	722+82	278.5	--	278	72431.5	--	72433.0	3971	3972	1	183	183	1	5508.2	--	--	
	72339	723+39	57.0	--	57	72488.4	--	72490.0	3899	3899	0	177	178	2	5508.5	--	--	
	72377	723+77	37.5	--	38	72525.9	--	72528.0	3882	3884	2	174	177	3	5508.1	--	--	
	72411	724+11	34.6	--	34	72560.5	--	72562.0	3885	3886	1	181	181	0	5509.2	--	--	
	72656	726+56	244.8	--	245	72805.3	--	72807.0	3862	3864	2	182	182	0	5511.1	--	--	
	72733	727+33	76.8	--	77	72882.1	--	72884.0	3769	3770	0	179	179	0	5511.6	--	--	
	72772	727+72	39.3	--	39	72921.4	--	72923.0	3754	3755	1	181	181	0	5511.6	--	--	
	72854	728+54	81.4	--	82	73002.8	--	73005.0	3824	3826	2	187	187	0	5513.3	--	--	
	73020	730+20	166.7	--	166	73169.5	--	73171.0	3699	3347	-352	194	194	0	5514.5	--	--	LOB island not mapped
	73150	731+50	129.4	--	130	73298.9	--	73301.0	3657	3658	2	177	178	1	5514.8	--	--	
D/S Railroad	73169	731+69	19.6	--	19	73318.4	--	73320.0	3643	3646	3	178	178	0	5515.5	--	--	
U/S Railroad	73513	735+13	343.7	--	344	73662.1	--	73664.0	3565	3152	-413	102	101	-1	5519.8	--	--	LOB island not mapped
	73557	735+57	44.0	--	44	73706.2	--	73708.0	3548	3146	-401	3548	131	-3416	5520.5	--	--	LOB island not mapped, floodway delineated using logical transitions
	73749	737+49	193.0	--	192	73899.2	--	73900.0	3508	3162	-346	3508	106	-3403	5525.9	--	--	LOB island not mapped, floodway delineated using logical transitions
	73810	738+10	61.6	--	61	73960.8	--	73961.0	3489	3164	-324	139	104	-35	5526.0	--	--	LOB island not mapped
D/S McIntyre Street	74098	740+98	287.8	--	288	74248.6	--	74249.0	3316	3140	-176	104	99	-5	5526.6	--	--	LOB island not mapped
U/S McIntyre Street	74344	743+44	245.7	--	246	74494.3	--	74495.0	3109	3109	0	93	93	0	5526.4	--	--	
	74484	744+84	140.6	--	140	74634.9	--	74635.0	87	87	0	87	87	0	5527.1	--	--	
	74583	745+83	100.0	--	99	74734.9	--	74734.0	101	100	-1	101	100	-1	5529.7	--	--	
	74619	746+19	36.8	--	36	74771.6	--	74770.0	104	104	0	104	104	0	5529.6	--	--	
	74808	748+08	188.3	--	189	74959.9	--	74959.0	1314	1311	-3	94	92	-2	5529.7	--	--	
	74891	748+91	83.0	--	83	75043.0	--	75042.0	1372	1373	1	94	94	0	5531.2	--	--	
	74916	749+16	25.4	--	25	75068.3	--	75067.0	1387	1389	2	91	91	0	5531.7	--	--	
	74940	749+40	24.2	--	24	75092.6	--	75091.0	1499	1506	7	98	98	0	5533.0	--	--	
	75333	753+33	392.5	--	393	75485.1	--	75484.0	1342	1338	-4	98	98	0	5534.8	--	--	
	75747	757+47	413.9	--	414	75899.0	--	75898.0	1547	1419	-128	98	98	0	5538.4	--	--	ROB island not mapped
	76173	761+73	426.0	--	426	76324.9	--	76324.0	1751	1751	-1	99	98	0	5541.5	--	--	
	76522	765+22	349.3	--	349	76674.2	--	76673.0	1496	1494	-2	97	97	0	5544.7	--	--	
	77010	770+10	488.1	--	488	77162.3	--	77161.0	1402	1387	-15	98	98	0	5548.4	--	--	
	77427	774+27	417.0	--	417	77579.3	--	77578.0	988	977	-11	93	92	-1	5551.8	--	--	
	77804	778+04	376.4	--	377	77955.7	--	77955.0	93	93	0	93	93	0	5555.4	--	--	
	78228	782+28	424.1	--	424	78379.8	--	78379.0	92	92	0	92	92	0	5557.5	--	--	
	78717	787+17	488.9	--	489	78868.7	--	78868.0	77	507	430	77	122	45	5560.9	--	--	Skew of 50 degrees applied, plus inundation from upstream
	78728	787+28	11.6	--	11	78880.3	--	78879.0	81	509	428	81	126	45	5563.1	--	--	Skew of 50 degrees applied, plus inundation from upstream

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			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Difference	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
	78803	788+03	74.5	--	75	78954.8	--	78954.0	152	555	403	73	146	73	5565.3	--	--	Skew of 60 degrees applied, plus inundation from upstream
	78846	788+46	43.8	--	43	78998.6	--	78997.0	151	560	409	76	152	76	5567.1	--	--	Skew of 60 degrees applied, plus inundation from upstream
	78946	789+46	99.7	--	100	79098.3	--	79097.0	656	661	5	165	165	0	5570.4	--	--	
	79129	791+29	183.1	--	183	79281.4	--	79280.0	140	461	321	80	160	81	5570.2	--	--	Skew of 60 degrees applied, plus inundation from upstream
	79141	791+41	11.6	--	12	79293.0	--	79292.0	139	458	319	78	160	82	5569.6	--	--	Skew of 60 degrees applied, plus inundation from upstream
	79217	792+17	76.0	--	76	79369.0	--	79368.0	399	395	-4	115	115	1	5572.9	--	--	
	79610	796+10	392.6	--	393	79761.6	--	79761.0	360	359	0	108	107	-1	5573.6	--	--	
	80018	800+18	408.3	--	408	80169.9	--	80169.0	240	240	0	133	134	1	5575.7	--	--	
	80202	802+02	184.3	--	184	80354.2	--	80353.0	357	357	0	280	277	-3	5577.1	--	--	
	80244	802+44	41.5	--	42	80395.7	--	80395.0	316	316	0	192	251	59	5577.5	--	--	Floodway delineated using logical transitions, along diversion structure on Clear Creek.
	80380	803+80	136.3	--	136	80531.9	--	80531.0	231	232	0	231	232	0	5582.3	--	--	
	80633	806+33	253.0	--	253	80784.9	--	80784.0	121	121	0	121	121	0	5585.3	--	--	
	81047	810+47	413.9	--	414	81198.8	--	81198.0	167	177	10	116	116	-1	5589.3	--	--	
	81456	814+56	409.3	--	409	81608.1	--	81607.0	215	236	21	119	118	-1	5591.1	--	--	
	81821	818+21	365.4	--	365	81973.5	--	81972.0	208	207	0	103	103	0	5591.7	--	--	
	82011	820+11	190.0	--	190	82163.4	--	82162.0	102	163	61	102	102	0	5592.6	--	--	Islands in ROB joined
	82107	821+07	95.4	--	96	82258.8	--	82258.0	90	138	48	90	90	0	5593.5	--	--	Islands inROB joined
	82141	821+41	33.8	--	34	82292.6	--	82292.0	141	141	0	101	101	0	5598.2	--	--	
	82208	822+08	67.7	--	67	82360.3	--	82359.0	131	130	0	98	98	-1	5598.8	--	--	
	82371	823+71	163.1	--	163	82523.4	--	82522.0	121	121	1	121	121	0	5601.0	--	--	
	82530	825+30	159.0	--	159	82682.4	--	82681.0	87	87	0	87	87	0	5601.1	--	--	
	82682	826+82	151.7	--	152	82834.1	--	82833.0	86	86	-1	86	86	-1	5602.5	--	--	
	82737	827+37	55.2	--	55	82889.3	--	82888.0	96	95	-1	96	95	-1	5605.0	--	--	
D/S 700 East Coors Plant	82909	829+09	172.1	--	172	83061.4	--	83060.0	168	167	-1	91	89	-1	5605.3	--	--	
U/S 700 East Coors Plant	83322	833+22	412.8	--	413	83474.2	--	83473.0	88	88	0	88	88	0	5606.4	--	--	
	83423	834+23	100.9	--	101	83575.1	--	83574.0	92	91	0	92	91	0	5606.8	--	--	
	83521	835+21	97.6	--	98	83672.7	--	83672.0	90	91	0	90	91	0	5607.4	--	--	
	83587	835+87	63.0	--	66	83735.7	--	83738.0	96	97	1	96	97	0	5609.2	--	--	
	83649	836+49	62.5	--	62	83798.2	--	83800.0	146	142	-4	98	97	0	5609.6	--	--	
	83964	839+64	314.9	--	315	84113.1	--	84115.0	281	282	1	92	92	0	5610.6	--	--	
	84131	841+31	166.5	--	167	84279.6	--	84282.0	343	349	6	107	108	0	5612.4	--	--	
	84232	842+32	101.4	--	101	84381.0	--	84383.0	400	401	1	116	116	0	5613.1	--	--	
	84320	843+20	88.1	--	88	84469.1	--	84471.0	408	407	0	99	99	0	5615.9	--	--	
	84358	843+58	38.1	--	38	84507.2	--	84509.0	389	394	5	91	93	2	5616.9	--	--	
	84495	844+95	136.3	--	137	84643.4	--	84646.0	350	345	-5	101	97	-4	5619.6	--	--	
	84628	846+28	132.8	--	133	84776.3	--	84779.0	111	109	-2	111	109	-2	5620.4	--	--	
	84651	846+51	23.6	--	23	84799.8	--	84802.0	234	106	-128	107	106	-2	5620.4	--	--	LOB island not mapped

AGREEMENT TABLE

Project Name: Clear Creek FHAD

Community(s): Jeffco/Adco
Flooding Source: Clear Creek
Reach: Main Channel & Splits

Engineer: ICON Engineering
Date: 5/27/2022

Reference Location	Cross Section	River Station	Downstream Reach Distance, ft			Cumulative Distance, ft			FP Width, ft			0.5' FW Width, ft			BFE, ft		BFE Loc.	Comments
			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Difference	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
	84717	847+17	65.8	--	66	84865.6	--	84868.0	89	88	0	89	88	0	5620.4	--	--	
	85036	850+36	319.2	--	319	85184.8	--	85187.0	88	88	1	88	88	1	5623.2	--	--	
D/S Coors Railroad	85484	854+84	448.3	--	448	85633.1	--	85635.0	73	73	0	73	73	0	5624.5	--	--	
U/S Coors Railroad	85799	857+99	314.5	--	315	85947.5	--	85950.0	83	84	0	83	84	0	5627.4	--	--	
	85891	858+91	92.7	--	92	86040.2	--	86042.0	83	82	-1	83	82	-1	5627.8	--	--	
	86010	860+10	120.0	--	119	86160.2	--	86161.0	344	349	5	101	101	0	5633.8	--	--	
	86081	860+81	71.8	--	71	86232.0	--	86232.0	328	376	48	155	154	-1	5633.7	--	--	Floodplain top width includes ineffective flow area
	86138	861+38	56.6	--	57	86288.6	--	86289.0	376	415	39	210	210	0	5634.2	--	--	Floodplain top width includes obstruction
	86277	862+77	139.2	--	139	86427.7	--	86428.0	490	487	-3	330	328	-2	5634.2	--	--	
	86299	862+99	23.0	--	22	86450.7	--	86450.0	512	511	-1	335	338	3	5634.5	--	--	
	86333	863+33	34.8	--	34	86485.5	--	86484.0	536	536	0	288	291	3	5634.6	--	--	
	86503	865+03	169.4	--	170	86654.9	--	86654.0	523	935	412	170	170	0	5634.1	--	--	Floodplain top width includes obstruction
	86546	865+46	43.4	--	43	86698.3	--	86697.0	558	1022	465	175	180	5	5634.1	--	--	Floodplain top width includes obstruction
	86550	865+50	1.6	--	4	86699.9	--	86701.0	572	1024	452	189	188	-1	5634.6	--	--	Floodplain top width includes obstruction
	86580	865+80	30.6	--	30	86730.5	--	86731.0	575	1035	461	190	190	0	5634.7	--	--	Floodplain top width includes obstruction
	86719	867+19	138.8	--	139	86869.3	--	86870.0	500	1073	573	109	236	127	5634.8	--	--	Floodplain top width includes obstruction, floodway delineated using logical transition
	86917	869+17	197.5	--	198	87066.8	--	87068.0	114	1021	907	114	238	123	5634.9	--	--	Floodplain top width includes obstruction, floodway delineated using logical transition
	86989	869+89	72.2	--	72	87139.0	--	87140.0	122	1011	888	122	245	123	5634.9	--	--	Floodplain top width includes obstruction, floodway delineated using logical transition
	87000	870+00	11.0	--	11	87150.0	--	87151.0	134	1034	900	134	251	117	5635.4	--	--	Floodplain top width includes obstruction, floodway delineated using logical transition
	87037	870+37	37.3	--	37	87187.3	--	87188.0	133	1016	883	133	255	122	5635.2	--	--	Floodplain top width includes obstruction, floodway delineated using logical transition
	87090	870+90	52.5	--	53	87239.8	--	87241.0	85	1012	927	116	237	121	5635.2	--	--	Floodplain top width includes obstruction, floodway delineated using logical transition
	87101	871+01	10.0	--	11	87249.8	--	87252.0	665	1134	469	233	234	0	5638.9	--	--	Floodplain top width includes obstruction
D/S Coors Vehicle	87132	871+32	31.1	--	31	87280.9	--	87283.0	670	1140	470	238	238	0	5639.1	--	--	Floodplain top width includes obstruction
U/S Coors Vehicle	87185	871+85	52.9	--	53	87333.8	--	87336.0	681	1153	472	247	246	-1	5638.9	--	--	Floodplain top width includes obstruction
	87281	872+81	95.9	--	96	87429.7	--	87432.0	989	1027	38	227	225	-2	5639.2	--	--	Floodplain top width includes obstruction
	87326	873+26	44.0	--	45	87473.7	--	87477.0	993	1075	81	237	237	0	5641.0	--	--	Floodplain top width includes obstruction
	87379	873+79	53.7	--	53	87527.4	--	87530.0	990	989	-1	231	230	-1	5641.0	--	--	
	87438	874+38	58.6	--	59	87586.0	--	87589.0	880	881	2	236	234	-3	5641.2	--	--	
	87458	874+58	21.0	--	20	87607.0	--	87609.0	972	892	-79	232	233	1	5641.9	--	--	Floodplain top width includes obstruction
	87486	874+86	27.7	--	28	87634.6	--	87637.0	973	851	-122	248	249	1	5641.9	--	--	Floodplain top width includes obstruction
D/S Coors North Service Road	87616	876+16	130.1	--	130	87764.7	--	87767.0	840	842	2	313	314	0	5642.2	--	--	
U/S Coors North Service Road	87666	876+66	50.4	--	50	87815.1	--	87817.0	808	808	0	328	328	0	5642.2	--	--	
	87789	877+89	122.5	--	123	87937.6	--	87940.0	776	778	1	449	452	3	5642.1	--	--	
	87844	878+44	54.0	--	55	87991.6	--	87995.0	799	795	-5	453	454	1	5643.0	--	--	
	87897	878+97	53.5	--	53	88045.1	--	88048.0	781	774	-7	320	318	-2	5643.1	--	--	
	88062	880+62	165.4	--	165	88210.4	--	88213.0	106	101	-5	106	101	-5	5642.3	--	--	

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Engineer: ICON Engineering
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Reference Location	Cross Section	River Station	Downstream Reach Distance, ft			Cumulative Distance, ft			FP Width, ft			0.5' FW Width, ft			BFE, ft		BFE Loc.	Comments
			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Difference	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
	88313	883+13	250.4	--	251	88460.8	--	88464.0	108	199	92	108	109	1	5643.1	--	--	Floodplain top width includes obstruction
	88370	883+70	56.8	--	57	88517.5	--	88521.0	302	218	-84	145	146	1	5650.2	--	--	ROB island not mapped
	88394	883+94	24.1	--	24	88541.6	--	88545.0	268	262	-6	152	153	1	5651.0	--	--	
	88487	884+87	93.1	--	93	88634.8	--	88638.0	155	184	29	155	154	-1	5652.1	--	--	Floodplain top width includes obstruction
	88616	886+16	129.2	--	129	88764.0	--	88767.0	326	336	10	281	278	-3	5652.7	--	--	
	88626	886+26	10.0	--	10	88774.1	--	88777.0	361	365	5	310	309	-1	5653.9	--	--	
	88696	886+96	70.0	--	70	88844.0	--	88847.0	583	584	2	295	313	18	5655.4	--	--	
	88764	887+64	68.3	--	68	88912.3	--	88915.0	405	495	89	252	313	61	5656.3	--	--	Skew of 36 degrees applied
	88791	887+91	27.1	--	27	88939.4	--	88942.0	492	605	112	237	291	54	5657.0	--	--	Skew of 36 degrees applied
D/S Ford Street	88815	888+15	23.0	--	24	88962.4	--	88966.0	604	709	105	229	281	52	5657.7	--	--	Skew of 36 degrees applied
U/S Ford Street	88854	888+54	38.4	--	39	89000.8	--	89005.0	618	692	74	235	274	39	5657.8	--	--	Skew of 36 degrees applied
	88939	889+39	85.7	--	85	89086.6	--	89090.0	570	529	-41	122	119	-3	5657.8	--	--	ROB island not mapped
	89024	890+24	84.0	--	85	89170.6	--	89175.0	570	568	-2	136	136	0	5658.2	--	--	
	89163	891+63	138.7	--	139	89309.3	--	89314.0	118	128	10	118	128	10	5658.2	--	--	
D/S Washington Street	89421	894+21	258.7	--	258	89567.9	--	89572.0	123	125	1	101	101	0	5660.3	--	--	
U/S Washington Street	89610	896+10	189.4	--	189	89757.3	--	89761.0	98	100	2	98	100	2	5662.9	--	--	
	89687	896+87	76.1	--	77	89833.3	--	89838.0	124	122	-2	124	122	-2	5664.2	--	--	
	89790	897+90	101.0	--	103	89934.3	--	89941.0	124	128	4	124	128	4	5666.4	--	--	
	89862	898+62	72.0	--	72	90006.3	--	90013.0	156	155	-1	156	155	-1	5666.2	--	--	
	89976	899+76	114.1	--	114	90120.4	--	90127.0	142	139	-3	142	139	-3	5666.2	--	--	
	90006	900+06	30.0	--	30	90150.5	--	90157.0	134	133	-1	134	133	-1	5666.0	--	--	
	90060	900+60	54.6	--	54	90205.1	--	90211.0	142	141	-1	142	141	-1	5666.0	--	--	
	90168	901+68	107.9	--	108	90312.9	--	90319.0	501	501	0	162	166	4	5667.4	--	--	
	90252	902+52	83.3	--	84	90396.2	--	90403.0	521	527	5	159	160	1	5667.4	--	--	
	90305	903+05	53.8	--	53	90450.0	--	90456.0	496	500	3	144	144	0	5667.1	--	--	
	90380	903+80	74.4	--	75	90524.4	--	90531.0	530	533	3	136	134	-3	5667.4	--	--	
	90603	906+03	223.6	--	223	90748.0	--	90754.0	467	480	13	220	225	5	5668.9	--	--	
	90759	907+59	155.9	--	156	90904.0	--	90910.0	487	511	24	346	347	2	5670.0	--	--	
	90839	908+39	79.9	--	80	90983.8	--	90990.0	766	759	-7	420	418	-2	5671.5	--	--	
	90879	908+79	39.0	--	40	91022.8	--	91030.0	607	605	-3	466	464	-2	5671.6	--	--	
	91012	910+12	133.4	--	133	91156.2	--	91163.0	568	509	-59	512	508	-3	5671.8	--	--	LOB island not mapped
	91225	912+25	212.3	--	213	91368.5	--	91376.0	498	499	1	445	445	0	5673.0	--	--	
	91383	913+83	158.6	--	158	91527.1	--	91534.0	465	464	-1	392	391	-1	5674.7	--	--	
	91424	914+24	40.6	--	41	91567.7	--	91575.0	583	581	-2	406	406	0	5675.1	--	--	
	91576	915+76	152.3	--	152	91719.9	--	91727.0	758	571	-187	353	353	0	5676.2	--	--	LOB island not mapped
	91713	917+13	136.9	--	137	91856.9	--	91864.0	412	414	2	412	414	2	5677.3	--	--	
	91748	917+48	35.0	--	35	91891.9	--	91899.0	435	434	-1	435	434	-1	5678.4	--	--	
	91865	918+65	117.2	--	117	92009.1	--	92016.0	601	597	-4	423	415	-7	5679.7	--	--	
	91890	918+90	25.1	--	25	92034.2	--	92041.0	566	565	-1	386	389	3	5679.8	--	--	
	92150	921+50	259.6	--	260	92293.7	--	92301.0	184	188	4	184	188	4	5680.3	--	--	
	92295	922+95	145.4	--	145	92439.2	--	92446.0	496	497	1	146	146	0	5683.1	--	--	
	92326	923+26	30.2	--	31	92469.4	--	92477.0	536	540	4	131	129	-2	5684.8	--	--	
	92509	925+09	183.4	--	183	92652.7	--	92660.0	103	305	202	103	103	-1	5685.9	--	--	Transition with Split Flow

AGREEMENT TABLE

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			Model	Profile	Map	Model	Profile	Map	Model	Map	Difference	Model	Map	Difference	Model	Profile		
			+/- 10% of FDT			+/- 5% of FDT			Largest value: 25 feet or 5% of Width on Map						+/- 0.5 ft			
	92649	926+49	140.0	--	140	92792.8	--	92800.0	197	277	80	197	197	0	5688.7	--	--	Transition with Split Flow
	93090	930+90	441.5	--	441	93234.2	--	93241.0	312	321	9	312	321	9	5691.6	--	--	
	93493	934+93	402.5	--	403	93636.7	--	93644.0	339	336	-3	240	240	1	5694.8	--	--	
	93727	937+27	234.0	--	234	93870.7	--	93878.0	320	324	4	197	198	1	5696.5	--	--	
D/S U.S. Highway 6	93753	937+53	38.0	--	26	93908.7	--	93904.0	351	351	0	191	189	-2	5699.2	--	--	
U/S U.S. Highway 6	93795	937+95	42.0	--	42	93950.7	--	93946.0	401	401	0	184	183	-1	5699.2	--	--	
	93893	938+93	97.6	--	98	94048.2	--	94044.0	107	83	-24	107	84	-24	5700.0	--	--	
	93990	939+90	98.0	--	97	94146.2	--	94141.0	123	130	7	123	130	7	5703.0	--	--	
	94176	941+76	185.2	--	186	94331.4	--	94327.0	339	338	-1	271	270	-1	5703.8	--	--	
	94416	944+16	240.4	--	240	94571.8	--	94567.0	309	309	0	309	309	0	5704.4	--	--	
	94827	948+27	411.0	--	411	94982.8	--	94978.0	243	243	0	243	243	0	5707.9	--	--	
	95215	952+15	387.8	--	388	95370.7	--	95366.0	239	240	1	239	240	1	5712.2	--	--	
	95504	955+04	289.0	--	289	95659.6	--	95655.0	138	138	0	138	138	0	5714.7	--	--	
	95613	956+13	108.8	--	109	95768.4	--	95764.0	101	174	73	101	173	72	5716.4	--	--	Skew of 54 degrees applied
	95641	956+41	29.0	--	28	95797.4	--	95792.0	120	204	84	106	181	75	5719.2	--	--	Skew of 54 degrees applied
	95719	957+19	77.3	--	78	95874.7	--	95870.0	187	188	0	187	188	0	5720.1	--	--	
	95972	959+72	253.1	--	253	96127.8	--	96123.0	215	216	1	215	216	1	5721.3	--	--	

Table No. 1
Clear Creek FHAD
Floodplain and Floodway Data Table

REFERENCE LOCATION	CROSS SECTION / RIVER STATION	THALWEG ELEVATION (FT)	PEAK DISCHARGES (CFS)				WATER SURFACE ELEVATION (FT)				100-YEAR FLOODPLAIN (FT)		100-YEAR FLOODWAY (0.5 FOOT MAX. RISE IN EGL)						NOTE #	COMMENT
			10-YR	50-YR	100-YR	500-YR	10-YR	50-YR	100-YR	500-YR	WIDTH	EGL	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	WSEL SURCHARGE (FT)	EGL SURCHARGE (FT)		
Clear Creek - Main Channel																				
	157	5086.46	4900	10400	14100	27700	5097.10	5097.19	5097.20	5100.40	640	5099.69	5097.20	201	1262	11.2	0.00	0.00		
	232	5083.00	4900	10400	14100	27700	5097.22	5097.83	5098.65	5099.29	254	5100.03	5098.65	188	1549	9.1	0.00	0.00		
	258	5082.65	4900	10400	14100	27700	5097.20	5097.75	5098.53	5102.61	261	5101.02	5098.53	168	1122	12.6	0.00	0.00		
	317	5082.65	4900	10400	14100	27700	5097.30	5098.16	5099.09	5102.22	158	5101.48	5099.09	158	1167	12.1	0.00	0.00	FP=FW	
	368	5082.60	4900	10400	14100	27700	5097.39	5098.59	5099.77	5102.53	332	5101.79	5099.76	155	1267	11.1	0.00	0.00		
	398	5082.65	4900	10400	14100	27700	5097.53	5099.20	5100.67	5105.54	365	5102.08	5100.67	162	1493	9.5	0.00	0.00		
	534	5083.00	4900	10400	14100	27700	5097.79	5099.87	5101.52	5106.77	227	5102.44	5101.52	227	1913	7.4	0.00	0.00	FP=FW	
	966	5086.50	4900	10400	14100	27700	5098.15	5100.57	5102.23	5107.83	222	5103.28	5102.23	222	1768	8.0	0.00	0.00	FP=FW	
	1402	5091.72	4900	10400	14100	27700	5098.61	5101.34	5102.98	5108.14	223	5104.65	5102.98	223	1374	10.3	0.00	0.00	FP=FW	
	1668	5092.19	4900	10400	14100	27700	5100.27	5102.75	5104.16	5109.40	227	5105.73	5104.15	226	1432	9.9	0.00	0.00		
	1719	5092.21	4900	10400	14100	27700	5100.43	5102.94	5104.37	5109.21	233	5105.93	5104.37	233	1431	9.9	0.00	0.00	FP=FW	
	1791	5092.28	4900	10400	14100	27700	5100.53	5102.82	5104.06	5109.47	155	5106.54	5104.06	155	1138	12.4	0.00	0.00	FP=FW	
	1899	5093.80	4900	10400	14100	27700	5101.14	5103.65	5104.93	5109.50	141	5107.09	5104.93	141	1206	11.7	0.00	0.00	FP=FW	
	1948	5099.14	4900	10400	14100	27700	5103.57	5105.81	5107.11	5111.01	711	5110.22	5107.11	193	1006	14.0	0.00	0.00		
	1981	5100.78	4900	10400	14100	27700	5106.06	5108.33	5109.28	5111.01	830	5111.52	5109.28	282	1294	10.9	0.00	0.00		
	2036	5101.79	4900	10400	14100	27700	5107.49	5109.65	5110.70	5111.74	879	5111.90	5110.70	291	1670	8.5	0.00	0.00		
	2316	5101.78	4900	10400	14100	27700	5108.38	5110.72	5111.94	5115.51	1382	5112.61	5111.94	430	2401	5.9	0.00	0.00		
	2459	5101.76	4900	10400	14100	27700	5108.32	5111.12	5112.31	5115.75	1398	5112.87	5112.31	381	2547	5.5	0.00	0.00		
	2830	5102.60	4900	10400	14100	27700	5110.03	5111.68	5112.87	5115.57	1174	5113.86	5112.87	297	1888	7.5	0.00	0.00		
D/S York Street	2942	5101.30	4900	10400	14100	27700	5110.88	5111.44	5112.22	5118.71	152	5115.50	5112.22	133	999	14.1	0.00	0.00		
U/S York Street	3069	5101.30	4900	10400	14100	27700	5111.20	5113.16	5117.07	5117.43	515	5118.12	5117.07	141	1713	8.2	0.00	0.00		
	3388	5102.60	4900	10400	14100	27700	5111.82	5114.52	5117.99	5121.35	451	5118.54	5118.00	247	2415	5.8	0.01	0.01		
	3798	5103.23	4900	10400	14100	27700	5112.59	5115.20	5118.22	5121.58	409	5119.21	5118.23	247	1858	7.6	0.01	0.01		
	4201	5104.25	4900	10400	14100	27700	5113.54	5116.51	5119.07	5123.02	624	5119.84	5119.08	270	2128	6.6	0.01	0.01		
	4363	5105.06	4900	10400	14100	27700	5113.52	5116.37	5119.08	5122.70	407	5120.27	5119.09	275	1870	7.5	0.01	0.00		
	4589	5105.49	4900	10400	14100	27700	5114.83	5117.66	5119.51	5122.97	282	5120.57	5119.51	282	1896	7.4	0.01	0.00	FP=FW	
	4871	5105.80	4900	10400	14100	27700	5115.93	5117.85	5119.63	5123.05	294	5120.75	5119.63	294	1956	7.2	0.00	0.00	FP=FW	
	5207	5106.69	4900	10400	14100	27700	5118.03	5118.16	5119.84	5123.41	623	5121.53	5119.85	366	1652	8.5	0.01	-0.01		Negative surcharge due to normal computational error
	5370	5107.68	4900	10400	14100	27700	5118.30	5119.50	5120.76	5123.91	373	5122.22	5120.74	368	1698	8.3	-0.03	-0.01		Negative surcharge due to normal computational error
D/S I-270	5470	5107.00	4900	10400	14100	27700	5118.55	5119.81	5121.53	5124.45	346	5122.59	5121.52	346	2120	6.7	-0.01	-0.01	FP=FW	Negative surcharge due to normal computational error
U/S I-270	5690	5109.97	4900	10400	14100	27700	5121.52	5123.22	5125.06	5128.27	461	5126.05	5125.05	461	2407	5.9	-0.01	-0.01	FP=FW	Negative surcharge due to normal computational error
	5777	5110.01	4900	10400	14100	27700	5121.56	5123.31	5125.14	5128.40	619	5126.54	5125.13	456	2001	7.1	-0.01	0.00		Negative surcharge due to normal computational error
	5822	5107.00	4900	10400	14100	27700	5122.02	5124.89	5126.49	5129.48	655	5126.90	5126.49	507	3346	4.2	0.00	0.00		
	5990	5107.32	4900	10400	14100	27700	5122.11	5125.04	5126.59	5129.58	730	5127.03	5126.59	484	3180	4.4	0.00	0.00		
	6024	5114.70	4900	10400	14100	27700	5121.90	5124.96	5126.57	5129.59	695	5127.09	5126.57	494	2939	4.8	0.00	0.00		
	6461	5114.70	4900	10400	14100	27700	5122.82	5125.63	5127.09	5130.24	824	5127.62	5127.09	472	2762	5.1	0.00	0.00		
	6827	5115.04	4900	10400	14100	27700	5123.64	5126.27	5127.69	5130.74	695	5128.08	5127.69	558	3214	4.4	0.00	0.00		
	7017	5114.58	4900	10400	14100	27700	5124.22	5126.55	5127.92	5130.93	610	5128.28	5127.92	508	3253	4.3	0.00	0.00		
	7127	5113.45	4900	10400	14100	27700	5124.38	5126.64	5128.01	5131.04	597	5128.44	5128.01	504	3213	4.4	0.00	0.00		
	7182	5118.63	4900	10400	14100	27700	5123.76	5126.74	5128.13	5131.26	661	5128.50	5128.13	554	3216	4.4	0.00	0.00		
	7228	5119.42	4900	10400	14100	27700	5124.15	5126.85	5128.22	5131.35	653	5128.57	5128.22	542	3201	4.4	0.00	0.00		
	7382	5119.49	4900	10400	14100	27700	5126.30	5127.21	5128.53	5131.65	627	5128.92	5128.53	494	3030	4.7	0.00	0.00		
	7516	5119.55	4900	10400	14100	27700	5126.75	5127.43	5128.72	5131.83	619	5129.24	5128.72	451	2805	5.0	0.00	0.00		
	7651	5118.39	4900	10400	14100	27700	5127.17	5127.66	5128.91	5132.04	575	5129.67	5128.91	406	2292	6.2	0.00	0.00		
	7697	5121.05	4900	10400	14100	27700	5126.76	5127.72	5128.96	5132.14	565	5129.95	5128.96	412	1912	7.4	0.00	0.00		
	7756	5122.53	4900	10400	14100	27700	5127.51	5128.00	5129.13	5132.22	551	5130.41	5129.13	376	1768	8.0	0.00	0.00		
	7946	5122.64	4900	10400	14100	27700	5128.86	5129.20	5130.35	5132.95	522	5131.33	5130.35	437	1954	7.2	0.00	0.00		
	8370	5122.64	4900	10400	14100	27700	5129.70	5130.92	5131.97	5134.41	496	5132.66	5131.98	462	2510	5.6	0.00	0.00		
	8648	5123.00	4900	10400	14100	27700	5129.94	5131.47	5132.47	5134.93	592	5133.72	5132.47	340	1937	7.3	0.00	0.01		
	8754	5121.72	4900	10400	14100	27700	5130.16	5131.82	5132.80	5135.16	319	5134.35	5132.79	235	1603	8.8	-0.01	0.03		Negative surcharge due to normal computational error
D/S Washington Street	8791	5122.50	4900	10400	14100	27700	5130.35	5132.38	5133.80	5138.22	189	5135.60	5133.78	177	1366	10.3	-0.02	0.00		Negative surcharge due to normal computational error
U/S Washington Street	8918	5123.00	4900	10400	14100	27700	5132.03	5134.86	5136.51	5141.44	168	5138.20	5136.51	168	1397	10.1	0.00	0.00	FP=FW	
	9016	5122.52	4900	10400	14100	27700	5132.63	5135.99	5137.86	5143.60	809	5138.62	5137.86	227	2068	6.8	0.00	0.00		
	9164	5123.45	4900	10400	14100	27700	5132.95	5136.35	5138.23	5144.09	817	5138.97	5138.22	209	2067	6.8	0.00	0.00		
	9467	5123.95	4900	10400	14100	27700	5133.55	5137.13	5139.09	5144.57	992	5139.36	5139.09	360	3002	4.7	0.00	0.14		
	9644	5125.10	4900	10400	14100	27700	5133.82	5137.25	5139.03	5144.39	896	5139.60	5139.10	245	2188	6.4	0.06	0.23		
D/S I-25 Ramp East	9780	5126.56	4900	10400	14100	27700	5134.05	5137.38	5139.07	5144.22	523	5140.02	5139.26	217	1900	7.4	0.19	0.15		
U/S I-25 Ramp East	9877	5126.92	4900	10400	14100	27700	5134.35	5137.75	5139.50	5146.36	211	5140.43	5139.67	208	1924	7.3	0.17	0.14		
	9931	5126.90	4900	10400	14100	27700	5134.41	5137.80	5139.54	5146.38	576	5140.50	5139.71	207	1890	7.5	0.17	0.14		
	10030	5127.90	4900	10400	14100	27700	5134.37	5137.68	5139.37	5146.13	184	5140.78	5139.55	185	1566	9.0	0.18	0.12		

REFERENCE LOCATION	CROSS SECTION / RIVER STATION	THALWEG ELEVATION (FT)	PEAK DISCHARGES (CFS)				WATER SURFACE ELEVATION (FT)				100-YEAR FLOODPLAIN (FT)		100-YEAR FLOODWAY (0.5 FOOT MAX. RISE IN EGL)						NOTE #	COMMENT
			10-YR	50-YR	100-YR	500-YR	10-YR	50-YR	100-YR	500-YR	WIDTH	EGL	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	WSEL SURCHARGE (FT)	EGL SURCHARGE (FT)		
	10127	5127.88	4900	10400	14100	27700	5134.34	5137.50	5139.14	5145.93	170	5141.53	5139.33	171	1221	11.6	0.19	0.08		
	10191	5128.85	4900	10400	14100	27700	5137.64	5140.23	5141.58	5146.55	198	5143.16	5141.58	198	1456	9.7	0.00	0.00	FP=FW	
	10229	5129.28	4900	10400	14100	27700	5137.61	5140.16	5141.49	5146.44	190	5143.50	5141.49	190	1293	10.9	0.00	0.00	FP=FW	
	10269	5129.35	4900	10400	14100	27700	5137.78	5140.69	5142.31	5147.62	213	5143.80	5142.31	213	1499	9.4	0.00	0.00	FP=FW	
D/S I-25	10304	5129.72	4900	10400	14100	27700	5138.34	5141.20	5142.70	5147.64	204	5143.95	5142.70	204	1620	8.7	0.00	0.00	FP=FW	
U/S I-25	10644	5130.71	4900	10400	14100	27700	5140.06	5143.16	5144.79	5149.90	201	5145.85	5144.79	201	1755	8.0	0.00	0.00	FP=FW	
	10680	5131.45	4900	10400	14100	27700	5139.88	5142.99	5144.61	5149.73	399	5146.17	5144.61	213	1479	9.5	0.00	0.00		
	10741	5132.72	4900	10400	14100	27700	5140.95	5143.85	5145.53	5150.84	1000	5146.42	5145.53	238	1935	7.3	0.00	0.00		
	10815	5134.26	4900	10400	14100	27700	5140.64	5143.34	5145.08	5150.50	199	5147.24	5145.08	199	1237	11.4	0.00	0.00	FP=FW	
	10961	5134.34	4900	10400	14100	27700	5142.84	5145.33	5146.57	5151.42	432	5148.19	5146.57	205	1411	10.0	0.00	0.00		
	11024	5135.42	4900	10400	14100	27700	5144.16	5146.90	5148.16	5151.73	521	5149.56	5148.19	222	1532	9.2	0.03	0.02		
	11109	5135.59	4900	10400	14100	27700	5144.43	5147.21	5148.57	5152.33	235	5149.80	5148.59	235	1653	8.5	0.02	0.02	FP=FW	
	11405	5136.75	4900	10400	14100	27700	5145.25	5148.34	5149.93	5154.41	499	5150.29	5149.95	499	3301	4.3	0.01	0.01	FP=FW	
	11760	5137.48	4900	10400	14100	27700	5145.80	5148.72	5150.26	5154.75	573	5150.73	5150.27	573	2898	4.9	0.01	0.01	FP=FW	
	11882	5137.60	4900	10400	14100	27700	5146.43	5149.06	5150.52	5155.12	942	5150.92	5150.53	353	2818	5.0	0.01	0.01		
D/S Broadway	12081	5138.00	4900	10400	14100	27700	5146.62	5149.06	5150.40	5154.10	833	5151.77	5150.41	197	1544	9.1	0.01	0.01		
U/S Broadway	12221	5139.46	4900	10400	14100	27700	5148.26	5152.49	5153.65	5159.04	592	5154.41	5153.65	223	2052	6.9	-0.01	0.00		
	12297	5138.45	4900	10400	14100	27700	5148.52	5152.83	5154.14	5159.63	604	5154.54	5154.14	313	2951	4.8	0.00	0.00		
	12560	5138.55	4900	10400	14100	27700	5148.87	5153.11	5154.49	5160.05	479	5154.70	5154.49	479	4517	3.1	0.00	0.00	FP=FW	
	12864	5139.38	4900	10400	14100	27700	5148.60	5152.91	5154.25	5159.96	310	5155.08	5154.25	310	2322	6.1	0.00	0.00	FP=FW	
	12944	5139.45	4900	10400	14100	27700	5149.44	5153.37	5154.78	5160.35	353	5155.21	5154.78	353	3029	4.7	0.00	0.00	FP=FW	
	13400	5140.93	4900	10400	14100	27700	5150.10	5153.78	5155.24	5160.32	486	5155.71	5155.24	486	3142	4.5	0.00	0.00	FP=FW	
	13859	5141.19	4900	10400	14100	27700	5151.00	5154.37	5155.85	5160.77	488	5156.15	5155.85	488	3875	3.6	0.00	0.00	FP=FW	
	14079	5141.18	4900	10400	14100	27700	5151.26	5154.59	5156.08	5160.99	521	5156.28	5156.08	521	4463	3.2	0.00	0.00	FP=FW	
	14482	5141.80	4900	10400	14100	27700	5151.49	5154.82	5156.34	5161.29	734	5156.41	5156.34	734	7214	2.0	0.00	0.00	FP=FW	
	14865	5141.77	4900	10400	14100	27700	5151.54	5154.86	5156.38	5161.33	751	5156.48	5156.38	751	6848	2.1	0.00	0.00	FP=FW	
	15383	5143.17	4900	10400	14100	27700	5151.66	5154.95	5156.47	5161.41	603	5156.61	5156.47	603	5121	2.8	0.00	0.00	FP=FW	
	15697	5144.32	4900	10400	14100	27700	5151.78	5155.01	5156.57	5161.51	642	5156.83	5156.57	642	3965	3.6	0.00	0.00	FP=FW	
	15860	5144.91	4900	10400	14100	27700	5151.97	5155.12	5156.58	5161.50	590	5157.05	5156.58	478	3065	4.6	0.00	0.00		
	16232	5147.60	4900	10400	14100	27700	5154.16	5155.82	5157.18	5161.77	498	5157.77	5157.18	498	2478	5.7	0.00	0.00	FP=FW	
	16597	5149.95	4900	10400	14100	27700	5157.95	5159.40	5160.83	5164.66	179	5164.11	5160.83	179	1056	13.4	0.00	0.00	FP=FW	
	16726	5151.43	4900	10400	14100	27700	5157.85	5161.81	5163.41	5167.25	204	5166.54	5163.41	204	1140	12.4	0.00	0.00	FP=FW	
	16787	5151.22	4900	10400	14100	27700	5159.50	5163.05	5164.90	5169.12	175	5168.46	5164.90	175	1008	14.0	0.00	0.00	FP=FW	
	16803	5154.91	4900	10400	14100	27700	5161.18	5164.27	5165.86	5169.91	167	5169.31	5165.86	167	1011	13.9	0.00	0.00	FP=FW	
	16825	5155.19	4900	10400	14100	27700	5161.82	5164.46	5166.14	5170.33	153	5169.75	5166.14	153	974	14.5	0.00	0.00	FP=FW	
	16987	5158.97	4900	10400	14100	27700	5164.08	5167.62	5169.61	5175.45	314	5170.59	5169.61	314	1869	7.5	0.00	0.00	FP=FW	
	17011	5165.92	4900	10400	14100	27700	5174.26	5175.76	5176.40	5178.31	888	5177.77	5176.47	764	2035	6.9	0.07	0.00		
	17022	5170.31	4900	10400	14100	27700	5175.94	5176.71	5177.13	5178.26	1546	5178.10	5177.13	793	2239	6.3	0.00	0.00		
	17393	5171.32	4900	10400	14100	27700	5176.64	5177.94	5178.57	5180.28	1439	5179.81	5178.57	618	2046	6.9	0.00	0.00		
	17743	5172.69	4900	10400	14100	27700	5178.63	5180.35	5181.17	5182.87	2254	5183.43	5181.25	303	1486	9.5	0.07	0.02		
	18090	5173.95	4900	10400	14100	27700	5180.42	5182.41	5183.38	5185.00	1876	5185.11	5183.38	345	1418	9.9	0.00	0.00		
	18273	5174.15	4900	10400	14100	27700	5180.89	5183.41	5184.75	5187.73	2168	5185.67	5184.75	328	1917	7.4	0.00	0.00		
D/S Pecos Street	18466	5173.30	4900	10400	14100	27700	5181.15	5183.71	5185.02	5187.61	1358	5186.10	5185.01	230	1922	7.3	-0.01	0.02		Negative surcharge due to normal computational error
U/S Pecos Street	18648	5173.30	4900	10400	14100	27700	5182.11	5185.17	5186.44	5190.46	820	5187.04	5186.41	265	2376	5.9	-0.03	-0.01		Negative surcharge due to normal computational error
	18733	5173.93	4900	10400	14100	27700	5182.14	5185.19	5186.49	5190.73	1770	5187.21	5186.47	448	2325	6.1	-0.02	-0.01		Negative surcharge due to normal computational error
	18905	5174.70	4900	10400	14100	27700	5181.82	5184.69	5186.61	5190.75	2071	5188.73	5186.63	378	1473	9.6	0.02	0.01		
	18997	5174.72	4900	10400	14100	27700	5181.92	5186.11	5187.65	5190.59	2035	5189.44	5187.64	504	1592	8.9	0.00	0.15		
	19327	5174.76	4900	10400	14100	27700	5184.89	5188.67	5189.63	5190.94	1866	5190.17	5189.65	472	2500	5.6	0.01	0.27		
	19578	5174.77	4900	10400	14100	27700	5185.96	5189.21	5190.21	5192.16	1711	5190.32	5190.41	520	3904	3.6	0.20	0.36		
	19666	5174.89	4900	10400	14100	27700	5185.95	5189.19	5190.18	5192.06	1507	5190.36	5190.34	495	3143	4.5	0.17	0.40		
	19746	5174.89	4900	10400	14100	27700	5185.98	5189.20	5190.19	5192.08	1462	5190.40	5190.44	505	3429	4.1	0.26	0.42		
	19861	5175.01	4900	10400	14100	27700	5184.98	5189.14	5190.11	5192.07	1391	5190.51	5190.38	462	2819	5.0	0.27	0.45		
	19866	5175.12	4900	10400	14100	27700	5185.15	5189.15	5190.12	5192.07	1386	5190.51	5190.40	463	2830	5.0	0.28	0.45		
	19952	5175.05	4900	10400	14100	27700	5186.55	5189.14	5190.07	5192.23	1384	5190.66	5190.58	394	2876	4.9	0.50	0.40		
	20100	5175.21	4900	10400	14100	27700	5186.98	5189.23	5190.19	5192.18	1411	5190.84	5190.61	411	2615	5.4	0.42	0.40		
	20331	5174.86	4900	10400	14100	27700	5187.06	5189.17	5190.04	5191.47	1292	5191.45	5190.55	290	1816	7.8	0.50	0.30		
	20502	5177.86	4900	10400	14100	27700	5187.51	5190.21	5191.45	5194.96	1515	5191.69	5191.63	271	3030	4.7	0.18	0.29		
D/S Railroad	20524	5186.16	4900	10400	14100	27700	5188.70	5190.11	5191.12	5193.85	336	5193.45	5191.16	254	1177	12.0	0.04	0.00		
U/S Railroad	20561	5186.85	4900	10400	14100	27700	5191.06	5194.96	5197.18	5198.76	1269	5197.75	5197.25	255	2377	5.9	0.07	0.06		
D/S LRT NWES	20568	5186.82	4900	10400	14100	27700	5191.09	5194.97	5197.19	5199.18	1322	5197.75	5197.26	259	2411	5.9	0.06	0.06		
U/S LRT NWES	20638	5184.89	4900	10400	14100	27700	5191.59	5195.35	5197.61	5199.98	1766	5197.93	5197.66	382	3190	4.4	0.06	0.06		
	20985	5184.88	4900	10400	14100	27700	5192.58	5195.53	5197.83	5199.80	1754	5198.04	5197.91	516	2987	4.7	0.09	0.27		
	21401	5185.08	4500	9600	12800	25500	5193.57	5195.67	5197.90	5199.96	1641	5198.09	5198.15	550	3337	3.8	0.25	0.45		
	21700	5184.02	4500	9600	12800	25500	5193.22	5195.60	5197.82	5199.74	896	5198.26	5198.21	520	3069	4.2	0.39	0.38		
	21733	5184.02	4500	9600	12800	25500	5194.74	5195.78	5197.99	5200.46	852	5198.52	5198.40	500	2967	4.3	0.41	0.34		

REFERENCE LOCATION	CROSS SECTION / RIVER STATION	THALWEG ELEVATION (FT)	PEAK DISCHARGES (CFS)				WATER SURFACE ELEVATION (FT)				100-YEAR FLOODPLAIN (FT)		100-YEAR FLOODWAY (0.5 FOOT MAX. RISE IN EGL)						NOTE #	COMMENT
			10-YR	50-YR	100-YR	500-YR	10-YR	50-YR	100-YR	500-YR	WIDTH	EGL	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	WSEL SURCHARGE (FT)	EGL SURCHARGE (FT)		
	21849	5187.66	4500	9600	12800	25500	5194.22	5195.78	5197.72	5200.03	629	5198.72	5197.83	401	1818	7.0	0.12	0.04		
	21866	5185.36	4500	9600	12800	25500	5194.29	5195.83	5197.73	5200.07	625	5198.75	5197.85	398	1773	7.2	0.12	0.04		
	21914	5189.50	4500	9600	12800	25500	5195.97	5197.27	5197.95	5200.06	580	5199.73	5197.96	338	1359	9.4	0.01	0.01		
	22088	5189.59	4500	9600	12800	25500	5196.85	5198.54	5199.41	5202.19	925	5200.59	5199.42	396	1830	7.0	0.01	0.01		
	22613	5189.86	4500	9600	12800	25500	5198.17	5200.22	5201.15	5204.20	1276	5201.87	5201.15	451	2234	5.7	0.00	-0.01		Negative surcharge due to normal computational error
	22876	5190.34	4500	9600	12800	25500	5198.49	5200.61	5201.64	5205.16	1993	5202.66	5201.61	484	1832	7.0	-0.03	-0.01		Negative surcharge due to normal computational error
	23255	5191.56	4500	9600	12800	25500	5200.02	5202.23	5202.93	5205.11	910	5204.05	5202.92	437	1796	7.1	0.00	0.00		
	23845	5192.71	4500	9600	12800	25500	5201.05	5203.50	5204.63	5206.56	475	5205.21	5204.63	475	2603	4.9	0.00	0.00	FP=FW	
	24222	5194.27	4500	9600	12800	25500	5201.28	5203.61	5204.63	5206.72	345	5206.29	5204.63	280	1474	8.7	0.00	0.00		
	24582	5194.84	4500	9600	12800	25500	5202.08	5204.96	5206.36	5210.13	172	5209.39	5206.36	172	1019	12.6	0.01	0.00	FP=FW	
	24720	5194.98	4500	9600	12800	25500	5203.76	5207.21	5208.61	5212.59	166	5210.02	5208.61	166	1396	9.2	0.00	0.00	FP=FW	
	24755	5195.13	4500	9600	12800	25500	5203.66	5207.22	5208.65	5212.82	177	5210.12	5208.64	177	1378	9.3	0.00	0.00	FP=FW	
D/S Federal Boulevard	24920	5195.59	4500	9600	12800	25500	5204.78	5208.01	5209.42	5213.60	150	5210.55	5209.42	150	1511	8.5	0.00	0.00	FP=FW	
U/S Federal Boulevard	25104	5196.90	4500	9600	12800	25500	5206.05	5210.31	5210.87	5216.70	184	5211.67	5210.87	184	1815	7.1	0.00	0.00	FP=FW	
	25392	5196.25	4500	9600	12800	25500	5206.47	5210.79	5211.62	5217.79	278	5211.97	5211.62	278	2714	4.7	0.00	0.00	FP=FW	
	25690	5197.69	4500	9600	12800	25500	5206.23	5210.30	5210.80	5217.71	168	5212.96	5210.80	168	1148	11.2	0.00	0.00	FP=FW	
D/S LRT Gold Line	25780	5199.60	4500	9600	12800	25500	5206.45	5209.96	5210.65	5216.37	109	5214.77	5210.65	109	802	16.0	0.00	0.00	FP=FW	
U/S LRT Gold Line	25833	5199.70	4500	9600	12800	25500	5208.07	5212.21	5214.26	5220.02	100	5217.23	5214.26	100	962	13.3	0.00	0.00	FP=FW	
D/S BNSF Railroad	25850	5199.74	4500	9600	12800	25500	5208.06	5212.05	5214.03	5219.44	85	5217.60	5214.03	85	881	14.5	0.00	0.00	FP=FW	
U/S BNSF Railroad	25937	5199.66	4500	9600	12800	25500	5209.78	5215.40	5218.41	5227.38	194	5219.42	5218.41	194	1794	7.2	0.00	0.00	FP=FW	
	26179	5198.27	4500	9600	12800	25500	5210.65	5216.35	5219.34	5228.52	1378	5219.64	5219.34	440	3757	3.4	0.00	0.00		
	26340	5200.24	4500	9600	12800	25500	5210.76	5216.53	5219.47	5228.58	1562	5219.71	5219.47	458	3881	3.3	0.00	0.00		
	26669	5200.58	4500	9600	12800	25500	5211.17	5216.79	5219.71	5228.64	1657	5219.84	5219.71	793	4894	2.6	0.00	0.00		
	27091	5201.27	4500	8336	9372	12414	5212.46	5217.11	5219.89	5228.69	335	5220.05	5219.89	335	3027	3.1	0.00	0.00	FP=FW	
	27468	5202.48	4500	8336	9372	12414	5213.32	5217.46	5220.06	5228.70	368	5220.27	5220.06	304	2810	3.3	0.00	0.00		
	27548	5202.47	4500	8336	9372	12414	5213.35	5217.35	5219.93	5228.68	137	5220.51	5219.93	137	1620	5.8	0.00	0.00	FP=FW	
	27564	5201.65	4500	8336	9372	12414	5213.40	5217.40	5220.00	5228.71	137	5220.56	5220.00	137	1630	5.8	0.00	0.00	FP=FW	
D/S I-76 East Crossing	27695	5203.30	4500	8336	9372	12414	5213.67	5217.70	5220.21	5228.77	176	5220.70	5220.22	155	1789	5.2	0.00	0.00		
U/S I-76 East Crossing	28088	5207.31	4500	8336	9372	12414	5216.28	5218.73	5220.68	5228.77	146	5221.60	5220.68	146	1241	7.6	0.00	0.00	FP=FW	
	28381	5211.47	4500	8336	9372	12414	5218.46	5220.18	5220.61	5228.80	149	5223.17	5220.61	149	744	12.6	0.00	0.00	FP=FW	
	28754	5213.87	4500	8336	9372	12414	5222.32	5224.84	5225.45	5227.00	175	5229.15	5225.46	87	619	15.2	0.01	0.00		
	28893	5217.15	4500	8336	9372	12414	5224.90	5228.40	5229.22	5231.48	202	5229.75	5229.21	145	1604	5.8	0.00	0.00		
	28927	5225.54	4500	8336	9372	12414	5228.65	5230.06	5230.36	5231.25	226	5232.50	5230.37	193	806	11.6	0.01	0.00		
D/S Lowell Boulevard	28974	5225.00	4500	8336	9372	12414	5229.69	5231.30	5231.70	5232.72	201	5233.00	5231.69	189	1033	9.1	-0.01	0.00		Negative surcharge due to normal computational error
U/S Lowell Boulevard	29044	5226.00	4500	8981	10100	12114	5230.21	5232.37	5232.92	5234.13	564	5233.88	5232.91	559	1611	7.1	-0.01	0.00		Negative surcharge due to normal computational error
	29230	5227.17	4500	8981	10100	12114	5231.21	5233.18	5233.71	5234.78	621	5234.05	5233.71	621	2860	3.5	0.00	0.00	FP=FW	
	29554	5226.98	4500	8981	10100	12114	5232.22	5233.41	5233.94	5235.03	1050	5234.14	5233.94	806	3536	2.9	0.00	0.00		
	29856	5227.27	4500	8981	10100	12114	5232.58	5233.47	5233.98	5235.01	1187	5234.20	5233.97	825	3989	2.5	0.00	0.00		
	30256	5227.32	4500	8981	10100	12114	5232.68	5233.49	5234.00	5235.03	906	5234.25	5234.00	906	3766	2.7	0.00	0.00	FP=FW	
	30793	5227.25	4500	8981	10100	12114	5232.83	5233.36	5233.76	5234.78	853	5234.85	5233.76	853	1764	5.7	0.00	0.00	FP=FW	
	31387	5227.61	4500	8981	10100	12114	5235.60	5235.76	5236.04	5236.64	763	5238.15	5236.08	763	972	10.8	0.04	0.00	FP=FW	
	31579	5227.96	4500	8981	10100	12114	5235.98	5237.61	5238.02	5238.65	709	5239.44	5238.01	709	1805	9.5	-0.02	-0.01	FP=FW	Negative surcharge due to normal computational error
D/S Tennyson Street	31778	5236.98	4500	8981	10100	12114	5241.02	5242.73	5243.15	5244.53	436	5245.58	5243.15	436	811	12.5	0.00	0.00	FP=FW	
U/S Tennyson Street	31859	5238.12	4500	9024	10317	13181	5243.44	5246.44	5246.81	5247.70	1482	5247.19	5246.81	563	2392	4.3	0.00	0.00		
	32160	5236.66	4500	9024	10317	13181	5244.76	5246.77	5247.10	5247.84	980	5247.92	5247.10	220	1479	7.0	0.00	0.00		
	32467	5236.47	4500	9024	10317	13181	5245.17	5247.27	5247.66	5248.49	607	5248.74	5247.66	193	1344	7.7	0.00	0.00		
	32573	5236.93	4500	9024	10317	13181	5245.20	5247.15	5247.49	5248.16	416	5249.25	5247.49	141	1027	10.1	0.00	0.00		
D/S I-76 West Crossing	32787	5238.80	4500	9024	10317	13181	5245.58	5247.70	5248.10	5248.92	132	5250.12	5248.10	132	980	10.5	0.00	0.00	FP=FW	
U/S I-76 West Crossing	33166	5240.80	4500	9024	10317	13181	5248.51	5251.16	5251.76	5253.03	424	5252.75	5251.76	164	1387	7.4	0.00	0.00		
	33496	5239.97	4500	9024	10317	13181	5248.81	5251.50	5252.14	5253.47	177	5253.37	5252.13	177	1264	8.2	0.00	0.00	FP=FW	
	33862	5241.72	4500	9024	10317	13181	5249.87	5252.67	5253.31	5254.65	184	5254.57	5253.31	184	1206	8.6	0.00	0.00	FP=FW	
	34142	5244.57	4500	9024	10317	13181	5250.78	5253.51	5254.15	5255.57	251	5255.73	5254.15	180	1143	9.0	0.00	0.00		
	34478	5243.72	4500	9600	12005	14298	5252.56	5255.20	5255.67	5256.70	535	5257.07	5255.67	181	1326	9.1	0.00	0.00		
D/S Sheridan Boulevard	34496	5244.97	4500	9600	12005	14298	5252.79	5255.57	5256.22	5257.23	180	5257.24	5256.22	175	1539	7.8	0.00	0.00		
U/S Sheridan Boulevard	34653	5245.74	4500	9600	12005	14298	5254.18	5256.61	5258.25	5260.53	647	5259.13	5258.25	171	1688	7.1	0.00	0.00		
	34757	5244.84	4500	9600	12800	25500	5254.24	5256.68	5258.26	5258.79	793	5259.36	5258.26	237	1723	7.4	0.00	0.00		
	35018	5245.25	4500	9600	12800	25500	5254.74	5257.76	5259.45	5262.98	823	5259.72	5259.45	680	3633	3.7	0.00	0.00		
	35231	5246.91	3700	8000	10200	21100	5255.01	5257.96	5259.62	5263.28	899	5259.84	5259.62	413	3030	3.4	0.00	0.00		
	35343	5248.09	3700	8000	10200	21100	5255.06	5258.01	5259.65	5263.18	630	5259.94	5259.64	345	2647	3.9	0.00	0.00		
	35401	5248.50	3700	8000	10200	21100	5255.21	5258.13	5259.78	5263.34	533	5260.09	5259.77	349	2573	4.0	0.00	0.00		
	35468	5247.54	3700	8000	10200	21100	5255.24	5258.14	5259.79	5263.37	513	5260.17	5259.79	352	2291	4.5	0.00	0.00		
	35958	5248.46	3700	8000	10200	21100	5255.87	5258.30	5259.68	5261.94	176	5261.33	5259.68	176	1116	9.1	0.00	0.00	FP=FW	
	36262	5249.74	3700	8000	10200	21100	5256.90	5259.51	5260.71	5264.05	148	5262.49	5260.71	148	1038	9.8	0.00	0.00	FP=FW	
	36563	5250.00	3700	8000	10200	21100	5258.21	5260.84	5261.96	5266.70	148	5263.60	5261.96	148	1132	9.0	0.00	0.00	FP=FW	
D/S I-76 Westbound	36727	5249.00	3700	8000	10200	21100	5259.07	5262.23	5263.57	5268.51	205	5264.17	5263.57	205	1848	5.5	0.00	0.00	FP=FW	

REFERENCE LOCATION	CROSS SECTION / RIVER STATION	THALWEG ELEVATION (FT)	PEAK DISCHARGES (CFS)				WATER SURFACE ELEVATION (FT)				100-YEAR FLOODPLAIN (FT)		100-YEAR FLOODWAY (0.5 FOOT MAX. RISE IN EGL)						NOTE #	COMMENT
			10-YR	50-YR	100-YR	500-YR	10-YR	50-YR	100-YR	500-YR	WIDTH	EGL	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	WSEL SURCHARGE (FT)	EGL SURCHARGE (FT)		
U/S I-76 Westbound	36856	5249.00	3700	8000	10200	21100	5259.16	5262.35	5263.69	5268.69	208	5264.46	5263.69	208	1612	6.3	0.00	0.00	FP=FW	
	36879	5249.68	3700	8000	10200	21100	5259.10	5262.21	5263.51	5268.34	170	5264.72	5263.51	170	1328	7.7	0.00	0.00	FP=FW	
D/S I-76 Eastbound	36901	5249.68	3700	8000	10200	21100	5259.28	5262.48	5263.83	5268.91	179	5264.83	5263.83	179	1424	7.2	0.00	0.00	FP=FW	
U/S I-76 Eastbound	37007	5249.68	3700	8000	10200	21100	5259.67	5262.78	5264.12	5269.37	166	5265.19	5264.12	166	1358	7.5	0.00	0.00	FP=FW	
	37204	5252.14	3700	8000	10200	21100	5260.20	5263.17	5264.45	5270.79	1643	5265.67	5264.45	152	1178	8.7	0.00	0.00		
	37300	5252.06	3700	8000	10200	21100	5260.43	5263.45	5264.72	5270.72	1539	5265.90	5264.72	149	1182	8.6	0.00	0.00		
	37772	5254.56	3700	8000	10200	21100	5262.10	5264.66	5265.75	5271.47	138	5267.87	5265.75	138	901	11.3	0.00	0.00	FP=FW	
	38186	5256.08	3700	8000	10200	21100	5264.42	5266.90	5267.83	5271.85	1891	5270.61	5267.83	111	785	13.0	0.00	0.00		
D/S West 52nd Avenue	38267	5257.00	3700	8000	10200	21100	5265.48	5268.83	5270.23	5271.94	1979	5271.36	5270.22	108	1199	8.5	-0.01	0.00		Negative surcharge due to normal computational error
U/S West 52nd Avenue	38345	5257.00	3700	8000	10200	21100	5266.10	5269.02	5271.25	5274.32	2065	5272.31	5271.25	108	1238	8.2	0.00	0.00		
	38441	5258.31	3700	8000	10200	21100	5265.38	5268.74	5270.11	5275.46	2171	5274.33	5270.12	80	666	15.3	0.01	0.02		
	38688	5259.49	3700	8000	10200	21100	5267.94	5271.38	5272.70	5278.91	81	5275.96	5272.73	81	718	14.2	0.03	0.01	FP=FW	
	39183	5261.27	3700	8000	10200	21100	5270.40	5274.11	5275.43	5282.33	66	5279.17	5275.43	66	667	15.3	0.00	0.00	FP=FW	
	39601	5267.74	3700	8000	10200	21100	5274.83	5278.37	5279.77	5283.91	206	5282.36	5279.77	206	943	10.8	0.00	0.00	FP=FW	
	40002	5270.50	3700	8000	10200	21100	5278.38	5281.81	5282.92	5285.96	449	5283.57	5282.91	350	1974	5.2	0.00	0.00		
	40434	5271.12	3700	8000	10200	21100	5279.77	5282.42	5283.48	5286.56	518	5284.32	5283.49	395	1881	5.4	0.00	0.00		
	40883	5273.48	3700	8000	10200	21100	5280.83	5285.57	5286.71	5289.29	430	5288.47	5286.70	388	1422	7.2	-0.01	-0.01		Negative surcharge due to normal computational error
	40947	5273.35	3700	8000	10200	21100	5282.95	5285.81	5286.78	5290.12	276	5289.73	5286.77	275	835	12.2	-0.01	0.00		Negative surcharge due to normal computational error
	41025	5276.10	3700	8000	10200	21100	5283.07	5286.44	5289.30	5292.09	599	5291.81	5289.32	244	1062	9.6	0.02	0.00		
	41139	5276.16	3700	8000	10200	21100	5285.05	5289.47	5290.72	5293.27	556	5292.22	5290.70	190	1223	8.3	-0.02	0.00		Negative surcharge due to normal computational error
D/S Marshall Street	41282	5274.85	3700	8000	10200	21100	5286.34	5290.86	5292.21	5293.07	286	5292.69	5292.21	162	1860	5.5	0.00	0.00		
U/S Marshall Street	41357	5275.84	3700	8000	10200	21100	5286.54	5291.36	5293.16	5296.72	205	5293.59	5293.16	157	1986	5.1	0.00	0.00		
	41417	5276.82	3700	8000	10200	21100	5286.54	5291.35	5293.22	5297.25	439	5293.61	5293.20	268	2187	4.7	-0.02	0.00		Negative surcharge due to normal computational error
	41773	5278.31	3700	8000	10200	21100	5286.95	5291.57	5293.33	5297.50	769	5293.99	5293.32	224	1791	5.7	0.00	0.00		
	41978	5278.86	3700	8000	10200	21100	5287.28	5291.76	5293.54	5297.45	976	5294.28	5293.54	207	1605	6.4	0.00	0.00		
U/S I-70 Exit Ramp	42105	5278.80	3700	8000	10200	21100	5287.82	5291.93	5293.68	5297.40	168	5294.52	5293.68	164	1531	6.7	0.00	0.00		
U/S I-70 Exit Ramp	42165	5278.80	3700	8000	10200	21100	5288.25	5292.37	5294.14	5300.28	170	5294.92	5294.14	164	1562	6.5	0.00	0.00		
	42287	5279.59	3700	8000	10200	21100	5288.48	5292.63	5294.42	5300.91	259	5295.11	5294.41	173	1586	6.4	-0.01	0.00		Negative surcharge due to normal computational error
D/S I-70 Westbound	42415	5280.30	3700	8000	10200	21100	5288.77	5292.71	5294.43	5300.67	139	5295.49	5294.43	139	1322	7.7	0.00	0.00	FP=FW	
U/S I-70 Westbound	42499	5280.30	3700	8000	10200	21100	5289.22	5293.28	5295.02	5303.04	146	5296.02	5295.02	146	1361	7.5	0.00	0.00	FP=FW	
	42676	5281.70	3700	8000	10200	21100	5289.59	5293.51	5295.22	5303.26	144	5296.54	5295.21	144	1171	8.7	0.00	0.00	FP=FW	
D/S I-70 Eastbound	42877	5283.27	3700	8000	10200	21100	5290.61	5294.43	5296.07	5303.43	148	5297.07	5296.07	148	1313	7.8	0.00	0.00	FP=FW	
U/S I-70 Eastbound	42988	5283.30	3700	8000	10200	21100	5291.51	5295.29	5296.86	5304.83	174	5297.66	5296.86	174	1468	7.0	0.00	0.00	FP=FW	
	43009	5281.80	3700	8000	10200	21100	5291.44	5295.18	5296.71	5304.85	185	5297.87	5296.71	185	1397	7.3	0.00	0.00	FP=FW	
D/S I-70 Eastbound Access Ramp	43039	5281.80	3700	8000	10200	21100	5291.84	5295.64	5297.26	5304.84	180	5298.02	5297.26	178	1528	6.7	0.00	0.00		
U/S I-70 Eastbound Access Ramp	43134	5281.80	3700	8000	10200	21100	5292.47	5296.55	5298.27	5305.21	277	5299.44	5298.27	169	1454	7.0	0.00	0.00		
	43235	5283.62	3700	8000	10200	21100	5292.44	5296.59	5298.36	5306.37	425	5299.61	5298.35	156	1313	7.8	0.00	0.00		
	43444	5284.40	3700	8000	10200	21100	5293.44	5297.21	5298.78	5306.09	152	5300.26	5298.78	129	1096	9.3	0.00	-0.01		Negative surcharge due to normal computational error
	43824	5286.16	3700	8000	10200	21100	5294.67	5298.16	5299.63	5306.10	132	5301.52	5299.62	132	1017	10.0	-0.01	0.00	FP=FW	Negative surcharge due to normal computational error
	44185	5288.67	3700	8000	10200	21100	5295.74	5299.15	5300.43	5306.37	142	5303.31	5300.42	142	869	11.7	0.00	0.00	FP=FW	
	44466	5290.63	3700	8000	10200	21100	5298.03	5301.24	5302.55	5308.19	91	5306.72	5302.55	91	709	14.4	0.00	0.00	FP=FW	
	44692	5292.21	3700	8000	10200	21100	5300.87	5304.83	5306.66	5313.80	161	5308.02	5306.66	161	1299	7.9	0.00	0.00	FP=FW	
	44826	5296.00	3700	8000	10200	21100	5301.31	5304.91	5306.65	5313.60	164	5308.61	5306.65	164	1198	8.5	0.00	0.00	FP=FW	
D/S I-70 & I-76 Access Ramp	44913	5296.96	3700	8000	10200	21100	5302.15	5305.02	5306.34	5313.37	121	5309.64	5306.34	121	763	13.4	0.00	0.00	FP=FW	
U/S I-70 & I-76 Access Ramp	44988	5297.00	3700	8000	10200	21100	5304.15	5307.34	5308.67	5314.65	127	5310.85	5308.67	127	960	10.6	0.00	0.00	FP=FW	
D/S Wadsworth Boulevard	45000	5299.16	3700	8000	10200	21100	5304.00	5307.42	5309.19	5315.99	146	5311.00	5309.19	146	1028	9.9	0.00	0.00	FP=FW	
U/S Wadsworth Boulevard	45140	5300.00	3700	8000	10200	21100	5307.95	5310.23	5311.28	5318.18	145	5312.75	5311.28	145	1068	9.6	0.00	0.00	FP=FW	
	45243	5306.09	3700	8000	10200	21100	5310.84	5313.21	5314.16	5318.19	571	5316.32	5314.20	245	981	10.4	0.04	0.00		
	45311	5307.12	3700	8000	10200	21100	5312.24	5315.12	5316.08	5319.59	726	5316.74	5316.07	314	1733	5.9	-0.01	0.00		Negative surcharge due to normal computational error
	45604	5306.68	3700	8000	10200	21100	5313.83	5315.75	5316.67	5320.41	691	5317.48	5316.66	365	1828	5.9	-0.01	0.02		Negative surcharge due to normal computational error
	46171	5307.87	3700	8000	10200	21100	5315.30	5317.17	5317.91	5320.84	507	5319.54	5317.92	251	1203	8.5	0.00	0.11		
	46532	5308.92	3700	8000	10200	21100	5316.50	5318.96	5319.91	5322.39	652	5320.87	5319.91	280	1292	7.9	0.00	0.25		
	46985	5310.89	3700	8000	10200	21100	5318.72	5320.81	5322.26	5324.29	875	5323.93	5322.27	414	1203	8.5	0.01	0.00		
	47490	5312.19	3700	8000	10200	21100	5321.52	5324.34	5325.10	5327.00	935	5325.96	5325.07	576	1857	5.9	-0.02	0.11		Negative surcharge due to normal computational error
	47719	5312.85	3700	8000	10200	21100	5322.22	5324.41	5325.64	5327.54	1006	5327.01	5325.63	689	1584	6.4	-0.02	0.16		Negative surcharge due to normal computational error
	47862	5313.16	3700	8000	10200	21100	5322.67	5325.76	5326.23	5328.67	1125	5327.39	5326.42	776	1717	6.3	0.19	0.19		
	47979	5314.16	3700	8000	10200	21100	5322.87	5325.91	5326.38	5329.48	794	5328.69	5326.58	784	1015	10.1	0.19	0.05		
	48004	5314.16	3700	8000	10200	21100	5323.00	5325.63	5329.09	5330.58	1272	5329.69	5329.08	808	2635	3.9	0.00	0.03		
	48066	5314.01	3700	8000	10200	21100	5323.81	5327.99	5329.50	5331.16	1300	5329.77	5329.48	789	3022	3.4	-0.02	0.03		Negative surcharge due to normal computational error
	48477	5316.29	3700	8000	10200	21100	5324.50	5328.50	5329.83	5331.60	1397	5329.98	5329.84	570	3338	3.1	0.01	0.07		
	49071	5317.94	3700	8000	10200	21100	5325.17	5328.76	5329.70	5332.78	562	5331.84	5329.69	497	1168	8.7	-0.01	0.00		Negative surcharge due to normal computational error
	49418	5320.13	3700	8000	10200	21100	5328.64	5330.49	5331.65	5334.13	591	5333.56	5331.65	514	1224	8.3	0.00	0.00		
	49530	5320.03	3700	8000	10200	21100	5329.20	5331.43	5332.16	5334.81	519	5333.99	5332.16	412	1121	9.1	0.00	0.00		
	49591	5327.20	3700	8000	10200	21100	5332.74	5334.04	5334.54	5335.99	911	5335.89	5334.66	400	1299	7.9	0.12	0.36		
	49640	5326.96	3700	8000	10200	21100	5332.68	5334.52	5335.00	5336.84	811	5336.39	5335.10	368	1260	8.1	0.10	0.45		

REFERENCE LOCATION	CROSS SECTION / RIVER STATION	THALWEG ELEVATION (FT)	PEAK DISCHARGES (CFS)				WATER SURFACE ELEVATION (FT)				100-YEAR FLOODPLAIN (FT)		100-YEAR FLOODWAY (0.5 FOOT MAX. RISE IN EGL)						NOTE #	COMMENT
			10-YR	50-YR	100-YR	500-YR	10-YR	50-YR	100-YR	500-YR	WIDTH	EGL	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	WSEL SURCHARGE (FT)	EGL SURCHARGE (FT)		
	49812	5327.34	3700	8000	10200	21100	5334.23	5335.36	5336.21	5338.09	772	5337.65	5336.23	337	1200	8.5	0.01	0.17		
D/S 44th Avenue	49993	5326.80	3700	8000	10200	21100	5335.20	5337.18	5337.44	5338.80	183	5338.52	5337.71	176	1280	8.0	0.28	0.20		
U/S 44th Avenue	50078	5328.01	3700	8000	10200	21100	5335.84	5338.45	5338.48	5342.30	194	5339.41	5338.84	183	1408	7.2	0.36	0.28		
	50170	5329.14	3700	8000	10200	21100	5335.47	5338.69	5338.93	5343.02	544	5339.65	5338.94	265	1467	7.0	0.01	0.32		
	50437	5329.41	3700	8000	10200	21100	5337.10	5339.13	5339.56	5343.56	374	5340.36	5339.82	255	1450	7.0	0.26	0.43		
	50912	5330.49	3700	8000	10200	21100	5338.09	5340.15	5340.81	5343.95	268	5342.00	5341.23	251	1548	6.6	0.42	0.24		
	51250	5333.05	3700	8000	10200	21100	5338.82	5341.09	5341.92	5345.62	290	5343.37	5342.10	290	1471	6.9	0.18	0.07	FP=FW	
	51703	5334.34	3700	8000	10200	21100	5341.31	5343.21	5344.02	5347.17	1091	5345.63	5344.00	250	1227	8.3	-0.01	0.00		Negative surcharge due to normal computational error
	52143	5335.90	3700	8000	10200	21100	5343.41	5345.72	5346.65	5348.61	1331	5347.43	5346.65	355	1765	5.8	0.00	0.01		
	52630	5339.20	3700	8000	10200	21100	5345.40	5347.35	5348.16	5350.08	537	5349.02	5348.17	349	1555	6.6	0.00	0.09		
	53103	5341.19	3700	8000	10200	21100	5347.74	5349.62	5350.28	5352.59	2279	5351.95	5350.25	646	1132	9.0	-0.03	0.12		Negative surcharge due to normal computational error
	53268	5343.11	3700	8000	10200	21100	5349.40	5351.55	5352.27	5354.04	2226	5352.91	5352.28	740	1526	6.7	0.00	0.28		
	53431	5343.42	3700	8000	10200	21100	5350.34	5352.13	5352.69	5354.74	2059	5354.20	5352.81	760	1125	9.1	0.11	0.50		
	53751	5346.17	3700	8000	10200	21100	5352.59	5354.30	5354.91	5357.12	1339	5355.48	5355.24	777	2870	5.8	0.33	0.50		
	53915	5346.38	3700	8000	10200	21100	5353.11	5354.76	5355.44	5358.09	1140	5355.85	5355.88	600	2568	4.0	0.44	0.50		
	54004	5347.45	3700	8000	10200	21100	5353.49	5354.78	5355.46	5358.18	1027	5356.34	5355.86	565	1928	5.3	0.41	0.50		
	54021	5347.51	3700	8000	10200	21100	5354.45	5355.97	5356.49	5358.46	1159	5356.84	5356.94	551	2619	3.9	0.45	0.50		
	54064	5346.52	3700	8000	10200	21100	5354.57	5356.10	5356.63	5358.59	1213	5356.92	5357.06	505	2483	4.1	0.43	0.50		
	54353	5348.45	3700	8000	10200	21100	5354.89	5356.01	5356.73	5358.88	984	5358.62	5356.94	250	1004	10.2	0.20	0.26		
	54621	5351.12	3700	8000	10200	21100	5356.52	5358.53	5359.28	5360.01	1252	5360.79	5359.47	280	1173	8.7	0.19	0.16		
	54961	5352.42	3700	8000	10200	21100	5359.27	5360.97	5361.54	5362.23	1174	5362.78	5361.63	358	1557	6.6	0.09	0.04		
	55123	5353.50	3500	7500	9500	19800	5360.14	5361.81	5362.43	5364.41	657	5364.07	5362.46	262	1013	9.4	0.03	0.01		
	55193	5352.02	3500	7500	9500	19800	5360.53	5362.24	5362.76	5366.33	128	5365.27	5362.78	128	751	12.7	0.01	0.00	FP=FW	
	55224	5351.85	3500	7500	9500	19800	5360.85	5363.16	5365.40	5367.40	708	5366.24	5365.37	540	1551	6.1	-0.03	0.04		Negative surcharge due to normal computational error
D/S Kipling Street	55239	5351.70	3500	7500	9500	19800	5361.37	5363.83	5365.41	5367.34	711	5366.29	5365.39	544	1566	6.1	-0.02	0.03		Negative surcharge due to normal computational error
U/S Kipling Street	55335	5352.20	3500	7500	9500	19800	5361.90	5365.64	5366.60	5367.69	979	5367.04	5367.03	498	2305	4.1	0.43	0.48		
	55415	5355.58	3500	7500	9500	19800	5362.00	5366.08	5367.01	5368.73	2150	5367.13	5367.46	600	3450	2.8	0.45	0.48		
	55687	5357.16	3500	7500	9500	19800	5363.62	5366.25	5367.17	5369.03	1588	5367.42	5367.62	650	2593	3.7	0.45	0.49		
	56096	5360.31	3500	7500	9500	19800	5366.16	5367.79	5368.27	5369.77	1285	5369.49	5368.46	630	1515	6.3	0.19	0.33		
	56520	5362.86	3500	7500	9500	19800	5369.40	5370.84	5371.41	5372.74	783	5372.39	5371.66	416	1422	6.7	0.25	0.17		
	56972	5366.98	3500	7500	9500	19800	5372.01	5373.50	5374.12	5376.35	645	5375.48	5374.13	340	1292	7.4	0.00	0.00		
	57293	5369.04	3500	7500	9500	19800	5374.50	5376.05	5376.92	5378.88	806	5377.64	5376.89	480	1627	5.8	-0.03	0.03		Negative surcharge due to normal computational error
	57402	5370.13	3500	7500	9500	19800	5375.74	5377.20	5377.75	5379.61	1035	5378.40	5377.75	610	1837	5.2	0.01	0.06		
	57442	5370.36	3500	7500	9500	19800	5376.22	5377.19	5377.83	5379.65	990	5378.49	5377.84	603	1701	5.6	0.00	0.10		
	57496	5370.48	3500	7500	9500	19800	5376.61	5377.95	5378.29	5379.63	969	5379.29	5378.48	550	1642	5.8	0.19	0.40		
	57791	5371.93	3500	7500	9500	19800	5378.43	5380.60	5381.10	5382.51	1044	5382.13	5381.18	565	1762	5.4	0.08	0.39		
	58172	5374.43	3500	7500	9500	19800	5381.26	5383.76	5384.16	5385.67	855	5385.18	5384.16	560	1760	5.4	0.00	0.24		
	58630	5377.96	3500	7500	9500	19800	5384.55	5385.96	5386.53	5388.48	812	5387.58	5386.79	390	1335	7.1	0.26	0.48		
	59010	5379.64	3500	7500	9500	19800	5386.57	5388.74	5389.07	5391.02	751	5390.20	5389.44	380	1382	6.9	0.36	0.50		
	59302	5383.52	3500	7500	9500	19800	5389.33	5391.05	5391.32	5393.01	890	5392.41	5391.55	460	1354	7.0	0.23	0.50		
	59399	5383.97	3500	7500	9500	19800	5390.09	5391.66	5392.01	5393.53	1165	5393.16	5392.20	440	1362	7.0	0.19	0.39		
	59441	5385.94	3500	7500	9500	19800	5390.52	5392.12	5392.83	5394.53	1232	5393.47	5392.88	445	1408	6.7	0.05	0.41		
	59484	5386.14	3500	7500	9500	19800	5391.52	5392.81	5393.12	5394.69	1210	5393.76	5393.36	445	1470	6.5	0.24	0.50		
	59850	5386.52	3500	7500	9500	19800	5393.60	5394.90	5395.68	5397.32	801	5396.81	5395.69	380	1291	7.4	0.01	0.47		
	60157	5387.07	3500	7500	9500	19800	5394.96	5396.35	5397.57	5400.15	468	5399.28	5397.63	455	1310	7.3	0.05	0.00		
	60301	5388.09	3500	7500	9500	19800	5395.00	5398.87	5399.46	5401.59	726	5401.05	5399.49	481	1360	7.0	0.03	0.01		
	60391	5388.77	3500	7500	9500	19800	5396.27	5399.74	5400.68	5402.72	765	5402.17	5400.68	546	1523	6.2	0.00	0.00		
	60416	5388.98	3500	7500	9500	19800	5396.80	5401.24	5401.30	5404.55	1540	5402.21	5401.32	521	1784	5.3	0.01	0.02		
	60460	5389.13	3500	7500	9500	19800	5396.95	5401.36	5401.56	5404.55	1516	5402.37	5401.58	523	1864	5.1	0.03	0.02		
	60806	5390.76	3500	7500	9500	19800	5399.32	5401.97	5402.51	5404.53	1230	5404.30	5402.51	430	1148	8.3	0.00	0.02		
	61187	5391.66	3500	7500	9500	19800	5400.88	5403.96	5404.71	5407.88	518	5406.51	5404.73	150	1005	9.5	0.02	0.01		
	61678	5396.21	3500	7500	9500	19800	5402.85	5406.32	5407.62	5410.79	545	5408.94	5407.62	283	1393	6.8	0.00	0.00		
	62067	5398.81	3500	7500	9500	19800	5406.74	5408.26	5409.20	5412.13	317	5411.38	5409.43	259	1028	9.2	0.22	0.33		
	62206	5401.00	3500	7500	9500	19800	5406.86	5409.80	5410.52	5413.16	327	5412.49	5410.70	252	1046	9.1	0.18	0.50		
	62484	5403.38	3500	7500	9500	19800	5409.85	5412.46	5413.34	5418.10	179	5416.05	5413.34	151	799	11.9	0.00	0.02		
	62640	5403.51	3500	7500	9500	19800	5411.95	5414.91	5415.96	5419.51	795	5417.37	5415.98	179	1111	8.6	0.03	0.02		
	62718	5403.96	3500	7500	9500	19800	5412.56	5415.72	5416.79	5419.38	863	5417.76	5416.80	162	1243	7.7	0.02	0.01		
	63054	5405.48	3500	7500	9500	19800	5413.28	5416.53	5417.73	5420.07	296	5418.74	5417.74	265	1339	7.1	0.01	0.02		
	63243	5406.30	3500	7500	9500	19800	5413.44	5417.21	5418.02	5421.79	642	5420.18	5418.10	210	853	11.1	0.08	0.17		
	63271	5406.35	3500	7500	9500	19800	5414.14	5418.59	5420.46	5422.18	697	5421.41	5420.76	200	1336	7.1	0.31	0.37		
	63333	5406.52	3500	7500	9500	19800	5415.02	5418.56	5420.37	5422.40	857	5421.48	5420.68	218	1404	6.8	0.31	0.38		
	63718	5408.26	3500	7500	9500	19800	5416.70	5418.90	5420.37	5421.89	1039	5421.92	5420.88	197	1147	8.3	0.50	0.36		
	64095	5411.04	3500	7500	9500	19800	5418.27	5420.47	5421.43	5422.81	1128	5422.79	5421.92	145	1096	8.7	0.49	0.32		
	64534	5414.18	3500	7500	9500	19800	5420.73	5423.14	5424.14	5426.23	1096	5425.35	5424.21	140	966	9.8	0.07	0.36		
	64938	5416.57	3500	7500	9500	19800	5423.04	5424.95	5425.80	5429.53	178	5428.64	5426.15	120	762	12.5	0.35	0.23		

REFERENCE LOCATION	CROSS SECTION / RIVER STATION	THALWEG ELEVATION (FT)	PEAK DISCHARGES (CFS)				WATER SURFACE ELEVATION (FT)				100-YEAR FLOODPLAIN (FT)		100-YEAR FLOODWAY (0.5 FOOT MAX. RISE IN EGL)						NOTE #	COMMENT
			10-YR	50-YR	100-YR	500-YR	10-YR	50-YR	100-YR	500-YR	WIDTH	EGL	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	WSEL SURCHARGE (FT)	EGL SURCHARGE (FT)		
D/S Youngfield Street	65211	5418.00	3500	7500	9500	19800	5424.37	5427.33	5428.07	5431.80	119	5430.89	5428.24	119	731	13.0	0.17	0.02	FP=FW	
U/S Youngfield Street	65282	5418.00	3500	7500	9500	19800	5425.20	5428.58	5429.69	5434.45	123	5431.63	5429.69	123	864	11.0	0.00	0.00	FP=FW	
D/S I-70 Eastbound	65330	5418.40	3500	7500	9500	19800	5425.48	5428.29	5429.38	5434.08	116	5432.40	5429.38	116	704	13.5	0.00	0.00	FP=FW	
U/S I-70 Eastbound	65402	5418.40	3500	7500	9500	19800	5427.59	5430.52	5431.66	5436.26	123	5433.25	5431.65	123	963	9.9	-0.01	0.00	FP=FW	Negative surcharge due to normal computational error
D/S I-70 Westbound	65437	5417.69	3500	7500	9500	19800	5427.80	5430.85	5432.03	5436.83	126	5433.44	5432.03	126	1008	9.4	0.00	0.00	FP=FW	
U/S I-70 Westbound	65528	5414.67	3500	7500	9500	19800	5428.32	5431.37	5432.58	5437.67	143	5433.97	5432.58	143	1067	8.9	0.00	0.00	FP=FW	
	65852	5423.55	3500	7500	9500	19800	5429.46	5432.92	5434.35	5440.20	546	5434.96	5434.34	373	2032	4.7	-0.01	0.00		Negative surcharge due to normal computational error
	66246	5428.75	3500	7500	9500	19800	5433.61	5435.23	5435.77	5440.41	675	5437.42	5435.77	395	1359	7.0	0.01	0.01		
	66656	5431.87	3500	7500	9500	19800	5437.51	5438.66	5439.01	5441.13	250	5440.70	5439.02	250	1113	8.5	0.01	0.00	FP=FW	
	67024	5433.19	3500	7500	9500	19800	5441.02	5441.67	5441.98	5446.23	810	5442.73	5442.02	198	1404	6.8	0.04	0.05		
	67460	5436.91	3500	7500	9500	19800	5443.86	5445.94	5445.94	5447.90	533	5447.73	5445.94	147	930	10.2	0.00	0.15		
	67953	5442.00	3500	7500	9500	19800	5448.57	5450.06	5451.01	5455.12	106	5454.21	5451.06	106	668	14.2	0.05	0.00	FP=FW	
	68123	5449.22	3500	7500	9500	19800	5454.57	5456.57	5457.37	5460.82	141	5460.00	5457.37	141	735	12.9	0.01	0.00	FP=FW	
	68136	5451.56	3500	7500	9500	19800	5455.28	5457.21	5457.97	5461.51	141	5460.66	5457.95	141	727	13.1	-0.02	0.00	FP=FW	Negative surcharge due to normal computational error
	68216	5456.74	3500	7500	9500	19800	5461.64	5463.66	5464.42	5467.75	1684	5466.95	5464.45	154	754	12.6	0.04	0.00		
	68327	5464.51	3500	7500	9500	19800	5467.45	5468.83	5469.39	5471.63	1862	5471.27	5469.38	230	863	11.0	-0.01	0.00		Negative surcharge due to normal computational error
	68494	5464.63	3500	7500	9500	19800	5469.66	5471.43	5471.89	5473.43	2039	5472.96	5471.86	459	1828	8.8	-0.03	0.19		Negative surcharge due to normal computational error
	68535	5465.15	3500	7500	9500	19800	5471.71	5473.58	5474.80	5477.13	2176	5475.79	5475.31	377	1679	6.5	0.50	0.49		
	68566	5465.22	3500	7500	9500	19800	5471.00	5475.81	5476.08	5477.31	2305	5477.12	5476.24	378	2132	8.4	0.16	0.38		
	68669	5467.32	3500	7500	9500	19800	5473.79	5476.43	5476.68	5477.79	2189	5477.50	5477.18	216	1440	6.6	0.50	0.39		
	68947	5468.38	3500	7500	9500	19800	5474.35	5476.90	5477.36	5478.94	2185	5478.68	5477.69	175	1093	8.7	0.33	0.19		
	69089	5470.90	3500	7500	9500	19800	5475.80	5477.46	5478.18	5481.17	2245	5480.46	5478.18	171	787	12.1	0.00	0.00		
	69098	5472.53	3500	7500	9500	19800	5476.25	5477.94	5478.62	5481.61	2762	5480.91	5478.62	172	784	12.1	0.00	0.00		
	69192	5473.91	3500	7500	9500	19800	5477.90	5479.47	5480.14	5482.68	2724	5482.10	5480.12	171	835	11.4	-0.02	0.02		Negative surcharge due to normal computational error
	69912	5478.73	3500	7500	9500	19800	5483.58	5485.55	5486.32	5489.41	3146	5487.56	5486.39	183	1079	8.8	0.06	0.04		
	70238	5479.28	3500	7500	9500	19800	5485.52	5487.41	5488.16	5490.40	3494	5489.73	5488.16	179	950	10.0	0.01	0.00		
	70310	5481.42	3500	7500	9500	19800	5486.10	5487.91	5488.62	5491.88	3463	5490.40	5488.62	178	891	10.7	0.00	0.00		
	70345	5483.63	3500	7500	9500	19800	5487.36	5488.93	5489.63	5492.98	3462	5491.81	5489.62	183	803	11.8	0.00	0.00		
	70392	5483.44	3500	7500	9500	19800	5488.37	5490.06	5490.74	5493.70	3395	5492.36	5490.74	184	935	10.2	0.00	0.00		
	70721	5484.92	3500	7500	9500	19800	5490.67	5492.59	5493.37	5495.81	774	5494.59	5493.37	189	1076	8.8	0.00	0.00		
	71111	5488.39	3500	7500	9500	19800	5493.47	5495.14	5495.80	5499.33	4055	5497.87	5495.80	174	825	11.5	0.00	0.00		
	71462	5489.29	3500	7500	9500	19800	5496.22	5498.28	5499.11	5502.40	4048	5500.37	5499.11	177	1056	9.0	0.00	0.00		
	71505	5490.07	3500	7500	9500	19800	5496.49	5498.59	5499.43	5502.66	4040	5500.60	5499.43	176	1095	8.7	0.00	0.00		
	71570	5493.42	3500	7500	9500	19800	5497.17	5498.83	5499.53	5502.73	3515	5501.82	5499.53	170	783	12.1	0.00	0.00		
	71596	5492.94	3500	7500	9500	19800	5497.97	5499.80	5500.57	5503.60	4013	5502.16	5500.57	175	940	10.1	0.00	0.00		
	71865	5494.40	3500	7500	9500	19800	5500.07	5501.92	5502.66	5505.47	3908	5504.27	5502.66	172	937	10.1	0.00	0.00		
	71930	5493.56	3500	7500	9500	19800	5500.57	5502.37	5503.09	5505.63	3433	5504.88	5503.09	170	886	10.7	0.00	0.00		
	71962	5497.21	3500	7500	9500	19800	5502.09	5503.71	5504.34	5507.80	3920	5506.60	5504.37	178	792	12.0	0.03	0.00		
	72004	5497.74	3500	7500	9500	19800	5502.96	5504.54	5505.18	5508.25	3997	5507.19	5505.14	179	830	11.4	-0.04	0.00		Negative surcharge due to normal computational error
	72282	5499.75	3500	7500	9500	19800	5505.40	5507.38	5508.16	5510.77	3971	5509.39	5508.18	183	1075	8.8	0.02	0.01		
	72339	5499.44	3500	7500	9500	19800	5505.69	5507.68	5508.45	5511.03	3899	5509.68	5508.46	177	1070	8.9	0.01	0.01		
	72377	5501.68	3500	7500	9500	19800	5505.76	5507.40	5508.05	5511.40	3882	5510.34	5508.05	174	785	12.1	0.01	0.00		
	72411	5501.89	3500	7500	9500	19800	5506.66	5508.47	5509.23	5513.42	3885	5510.77	5509.23	181	959	9.9	0.00	0.00		
	72656	5502.11	3500	7500	9500	19800	5508.37	5510.35	5511.11	5513.97	3862	5512.40	5511.11	182	1047	9.1	0.00	0.00		
	72733	5503.14	3500	7500	9500	19800	5508.79	5510.80	5511.57	5514.20	3769	5512.83	5511.57	179	1060	9.0	0.00	0.00		
	72772	5505.26	3500	7500	9500	19800	5509.35	5510.95	5511.61	5514.35	3754	5513.81	5511.61	181	798	11.9	0.00	0.00		
	72854	5505.68	3500	7500	9500	19800	5510.74	5512.56	5513.30	5514.86	3824	5514.63	5513.30	187	1032	9.2	0.00	0.00		
	73020	5506.16	3500	7500	9500	19800	5511.71	5513.66	5514.45	5515.79	3699	5515.61	5514.45	194	1098	8.7	0.00	0.00		
	73150	5508.07	3500	7500	9500	19800	5512.55	5514.16	5514.77	5518.30	3657	5517.06	5514.82	177	794	12.0	0.06	0.00		
	73169	5509.40	3500	7500	9500	19800	5513.14	5514.78	5515.46	5518.40	3643	5517.70	5515.46	178	795	12.0	0.00	0.00		
	73513	5512.16	3500	7500	9500	19800	5517.14	5518.84	5519.81	5523.14	3565	5523.07	5519.80	102	659	14.4	-0.01	0.00		
D/S Railroad	73557	5511.73	3500	7500	9500	19800	5517.38	5519.09	5520.46	5523.61	3548	5524.06	5520.46	3548	54294	15.1	0.00	0.00	FP=FW	
U/S Railroad	73749	5512.44	3500	7500	9500	19800	5519.40	5522.80	5525.87	5527.70	3508	5527.00	5525.87	3508	69213	8.2	0.00	0.00		
	73810	5513.02	3500	7500	9500	19800	5519.56	5522.93	5525.96	5527.58	3489	5527.17	5525.95	139	1089	8.7	0.00	0.00		
	74098	5513.83	3500	7500	9500	19800	5521.02	5523.47	5526.58	5529.61	3316	5528.17	5526.58	104	951	10.0	0.00	0.00		
	74344	5516.56	3500	7500	9500	19800	5522.71	5525.37	5526.39	5531.34	3109	5529.14	5526.39	93	717	13.3	0.00	0.00		
D/S McIntyre Street	74484	5517.90	3500	7500	9500	19800	5523.48	5525.99	5527.09	5532.88	87	5530.88	5527.09	87	619	15.4	0.00	0.00	FP=FW	
U/S McIntyre Street	74583	5518.16	3500	7500	9500	19800	5525.07	5528.71	5529.70	5535.42	101	5531.58	5529.70	101	879	10.8	0.00	0.00	FP=FW	
	74619	5518.56	3500	7500	9500	19800	5525.02	5528.62	5529.57	5535.40	104	5531.80	5529.57	104	878	10.8	0.00	0.00	FP=FW	
	74808	5520.58	3500	7500	9500	19800	5525.76	5528.71	5529.65	5536.73	1314	5533.02	5529.65	94	656	14.5	0.00	0.00		
	74891	5520.04	3500	7500	9500	19800	5527.23	5530.05	5531.19	5534.39	1372	5533.53	5531.19	94	807	11.8	0.00	0.00		
	74916	5523.03	3500	7500	9500	19800	5527.76	5530.53	5531.71	5538.93	1387	5535.43	5531.71	91	646	14.7	0.00	0.00		
	74940	5522.66	3500	7500	9500	19800	5528.48	5531.60	5533.00	5539.24	1499	5535.68	5533.00	98	762	12.5	0.00	0.00		
	75333	5525.36	3500	7500	9500	19800	5531.22	5533.73	5534.82	5539.65	1342	5538.22	5534.82	98	671	14.2	0.00	0.00		
	75747	5529.15	3500	7500	9500	19800	5534.71	5537.33	5538.42	5542.99	1547	5541.92	5538.44	98	660	14.4	0.02	0.00		

REFERENCE LOCATION	CROSS SECTION / RIVER STATION	THALWEG ELEVATION (FT)	PEAK DISCHARGES (CFS)				WATER SURFACE ELEVATION (FT)				100-YEAR FLOODPLAIN (FT)		100-YEAR FLOODWAY (0.5 FOOT MAX. RISE IN EGL)						NOTE #	COMMENT
			10-YR	50-YR	100-YR	500-YR	10-YR	50-YR	100-YR	500-YR	WIDTH	EGL	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	WSEL SURCHARGE (FT)	EGL SURCHARGE (FT)		
	76173	5532.69	3500	7500	9500	19800	5538.19	5540.45	5541.54	5546.17	1751	5545.03	5541.56	99	664	14.3	0.02	0.00		
	76522	5535.18	3500	7500	9500	19800	5541.00	5543.62	5544.74	5549.15	1496	5548.25	5544.74	97	655	14.5	0.00	0.00		
	77010	5539.06	3500	7500	9500	19800	5545.00	5547.28	5548.37	5552.87	1402	5551.85	5548.38	98	657	14.5	0.01	0.00		
	77427	5542.05	3500	7500	9500	19800	5547.98	5550.68	5551.83	5556.68	988	5555.49	5551.83	93	650	14.6	0.00	0.00		
	77804	5543.74	3500	7500	9500	19800	5551.12	5554.18	5555.42	5560.35	93	5557.59	5555.42	93	822	11.6	0.00	0.00	FP=FW	
	78228	5547.18	3500	7500	9500	19800	5553.67	5556.31	5557.45	5562.21	92	5561.05	5557.45	92	639	14.9	0.00	0.00	FP=FW	
	78728	5554.16	3500	7500	9500	19800	5559.14	5561.93	5563.12	5570.24	81	5566.96	5563.12	81	609	15.6	0.00	0.00	FP=FW	
	78803	5555.83	3500	7500	9500	19800	5561.09	5564.07	5565.29	5571.48	152	5569.42	5565.29	73	588	16.2	0.00	0.00		
	78846	5557.64	3500	7500	9500	19800	5562.97	5565.86	5567.07	5572.20	151	5571.05	5567.07	76	597	15.9	0.00	0.00		
	78946	5557.68	3500	7500	9500	19800	5564.98	5568.77	5570.43	5574.31	656	5571.79	5570.43	165	1070	8.9	0.00	0.00		
	79129	5557.20	3500	7500	9500	19800	5565.50	5568.85	5570.22	5575.12	140	5572.82	5570.22	80	745	12.8	0.00	0.00		
	79141	5559.82	3500	7500	9500	19800	5565.59	5568.40	5569.61	5575.98	139	5573.54	5569.62	78	605	15.7	0.00	0.00		
	79217	5560.16	3500	7500	9500	19800	5567.51	5571.29	5572.89	5579.31	399	5574.15	5572.89	115	1070	8.9	0.00	0.00		
	79610	5562.71	3500	7500	9500	19800	5568.92	5572.20	5573.63	5579.22	360	5575.64	5573.63	108	863	11.0	0.00	0.00		
	80018	5565.58	3500	7500	9500	19800	5571.42	5574.34	5575.68	5578.63	240	5577.16	5575.69	133	998	9.5	0.00	0.00		
	80202	5568.00	3500	7500	9500	19800	5572.54	5575.71	5577.14	5581.95	357	5577.47	5577.14	280	2118	4.5	0.00	0.00		
	80244	5571.78	3500	7500	9500	19800	5575.25	5576.86	5577.53	5580.59	316	5579.77	5577.59	192	820	11.6	0.05	0.00		
	80380	5577.60	3500	7500	9500	19800	5580.40	5581.70	5582.27	5584.68	231	5584.18	5582.27	231	864	11.0	0.00	0.00	FP=FW	
	80633	5577.66	3500	7500	9500	19800	5582.71	5584.38	5585.29	5590.44	121	5588.23	5585.29	121	701	13.6	0.00	0.00	FP=FW	
	81047	5577.76	3500	7500	9500	19800	5585.39	5588.25	5589.27	5591.53	167	5591.01	5589.27	116	913	10.4	0.00	0.00		
	81456	5579.29	3500	7500	9500	19800	5586.71	5589.83	5591.05	5595.71	215	5592.39	5591.05	119	1041	9.1	0.00	0.00		
	81821	5581.34	3500	7500	9500	19800	5587.74	5590.54	5591.67	5595.84	208	5593.94	5591.67	103	803	11.8	0.00	0.00		
	82011	5583.19	3500	7500	9500	19800	5588.88	5591.48	5592.57	5595.95	102	5595.12	5592.57	102	753	12.6	0.00	0.00	FP=FW	
	82107	5584.44	3500	7500	9500	19800	5589.60	5592.25	5593.49	5598.28	90	5597.15	5593.49	90	637	14.9	0.00	0.00	FP=FW	
	82141	5589.90	3500	7500	9500	19800	5594.68	5597.13	5598.17	5602.75	141	5601.54	5598.17	101	665	14.3	0.01	0.00		
	82208	5590.02	3500	7500	9500	19800	5595.51	5597.68	5598.76	5603.15	131	5602.25	5598.76	98	670	14.2	0.00	0.00		
	82371	5590.53	3500	7500	9500	19800	5596.91	5599.82	5601.04	5604.10	121	5603.28	5601.04	121	834	11.4	0.00	0.00	FP=FW	
	82530	5591.58	3500	7500	9500	19800	5597.26	5599.95	5601.09	5606.40	87	5604.87	5601.09	87	623	15.3	0.00	0.00	FP=FW	
	82682	5592.05	3500	7500	9500	19800	5598.96	5601.17	5602.47	5608.59	86	5606.41	5602.47	86	624	15.2	0.00	0.00	FP=FW	
	82737	5592.05	3500	7500	9500	19800	5599.89	5603.50	5605.01	5611.04	96	5606.87	5605.01	96	907	10.5	0.00	0.00	FP=FW	
	82909	5593.32	3500	7500	9500	19800	5600.26	5603.78	5605.27	5611.68	168	5607.53	5605.26	91	817	11.6	0.00	0.00		
	83322	5594.59	3500	7500	9500	19800	5602.08	5605.13	5606.44	5612.92	88	5609.50	5606.44	88	709	13.4	0.00	0.00	FP=FW	
	83423	5595.68	3500	7500	9500	19800	5602.52	5605.50	5606.81	5610.39	92	5610.16	5606.81	92	673	14.1	0.00	0.00	FP=FW	
D/S 700 East Coors Plant	83521	5598.62	3500	7500	9500	19800	5603.36	5606.25	5607.37	5618.16	90	5610.76	5607.37	90	662	14.3	0.00	0.00	FP=FW	
U/S 700 East Coors Plant	83587	5599.05	3500	7500	9500	19800	5604.91	5607.87	5609.18	5618.50	96	5611.73	5609.18	96	765	12.7	0.00	0.00	FP=FW	
	83649	5598.90	3500	7500	9500	19800	5605.22	5608.22	5609.61	5618.38	146	5612.00	5609.61	98	786	12.1	0.00	0.00		
	83964	5600.48	3500	7500	9500	19800	5606.73	5609.42	5610.59	5618.70	269	5613.60	5610.59	92	711	13.4	0.00	0.00		
	84131	5601.83	3500	7500	9500	19800	5607.80	5611.03	5612.42	5618.88	343	5614.38	5612.42	107	866	11.0	0.00	0.00		
	84232	5602.48	3500	7500	9500	19800	5608.58	5611.70	5613.08	5618.71	380	5614.71	5613.08	116	950	10.0	0.00	0.00		
	84320	5608.18	3500	7500	9500	19800	5612.33	5614.84	5615.90	5619.62	408	5619.34	5615.91	99	660	14.4	0.01	0.00		
	84358	5607.71	3500	7500	9500	19800	5613.00	5615.77	5616.93	5620.22	389	5620.71	5616.96	91	633	15.0	0.03	0.00		
	84495	5607.83	3500	7500	9500	19800	5614.89	5618.20	5619.59	5624.68	350	5621.45	5619.58	101	906	10.5	-0.01	0.00		
	84628	5608.14	3500	7500	9500	19800	5615.39	5618.92	5620.41	5623.43	111	5621.76	5620.40	111	1076	8.8	-0.01	0.00	FP=FW	
	84651	5611.27	3500	7500	9500	19800	5615.83	5618.88	5620.36	5623.43	234	5622.72	5620.36	107	796	11.9	-0.01	0.00		
	84717	5611.28	3500	7500	9500	19800	5616.47	5619.21	5620.35	5625.24	89	5624.09	5620.35	89	634	15.0	0.00	0.00	FP=FW	
	85036	5611.81	3500	7500	9500	19800	5619.03	5621.96	5623.16	5628.17	88	5625.70	5623.16	88	752	12.6	0.00	0.00	FP=FW	
	85484	5613.67	3500	7500	9500	19800	5620.45	5623.27	5624.54	5630.14	73	5628.74	5624.54	73	583	16.3	0.00	0.00	FP=FW	
	85799	5616.52	3500	7500	9500	19800	5622.74	5626.09	5627.44	5633.76	83	5630.51	5627.44	83	695	13.7	0.00	0.00	FP=FW	
D/S Coors Railroad	85891	5616.90	3500	7500	9500	19800	5623.36	5626.46	5627.78	5634.00	83	5630.98	5627.78	83	680	14.0	0.00	0.00	FP=FW	
U/S Coors Railroad	86010	5616.90	3500	7500	9500	19800	5624.93	5631.46	5633.76	5639.19	344	5634.49	5633.94	101	1416	6.7	0.18	0.19		
	86081	5618.04	3500	7500	9500	19800	5624.49	5631.24	5633.74	5639.46	328	5634.58	5633.81	155	1389	6.8	0.08	0.24		
	86138	5618.14	3500	7500	9500	19800	5625.22	5631.54	5634.17	5639.90	376	5634.66	5634.26	210	1703	5.6	0.09	0.25		
	86277	5619.80	3500	7500	9500	19800	5626.14	5631.67	5634.20	5639.95	490	5634.81	5634.35	330	1720	5.5	0.14	0.22		
	86299	5619.60	3500	7500	9500	19800	5626.38	5632.59	5634.50	5640.06	512	5635.00	5634.85	335	1895	5.0	0.35	0.41		
	86333	5619.89	3500	7500	9500	19800	5626.16	5632.73	5634.62	5640.15	536	5635.03	5634.86	288	1847	5.1	0.23	0.40		
	86503	5620.91	3500	7500	9500	19800	5627.05	5632.36	5634.06	5639.37	523	5635.48	5634.53	170	1159	8.2	0.47	0.32		
	86546	5620.96	3500	7500	9500	19800	5627.26	5632.41	5634.13	5639.42	558	5635.56	5634.62	175	1198	7.9	0.48	0.31		
	86550	5620.96	3500	7500	9500	19800	5629.15	5633.39	5634.63	5639.85	572	5635.86	5635.04	189	1301	7.3	0.40	0.28		
	86580	5621.55	3500	7500	9500	19800	5629.13	5633.40	5634.66	5639.96	575	5635.91	5635.06	190	1286	7.4	0.41	0.27		
	86719	5622.00	3500	7500	9500	19800	5629.55	5633.61	5634.78	5639.31	500	5636.20	5635.13	109	1085	8.8	0.35	0.25		
	86917	5624.25	3500	7500	9500	19800	5629.76	5633.68	5634.87	5640.21	114	5636.82	5635.21	114	928	10.2	0.34	0.19	FP=FW	
	86989	5624.48	3500	7500	9500	19800	5630.05	5633.76	5634.90	5640.06	122	5637.19	5635.24	122	844	11.3	0.34	0.14	FP=FW	
	87000	5624.70	3500	7500	9500	19800	5630.40	5634.14	5635.36	5640.52	134	5637.27	5635.61	134	914	10.4	0.25	0.13	FP=FW	
	87037	5625.10	3500	7500	9500	19800	5630.44	5634.05	5635.19	5640.59	133	5637.57	5635.45	133	810	11.7	0.26	0.11	FP=FW	
	87090	5625.80	3500	7500	9500	19800	5630.58	5634.07	5635.17	5640.18	85	5638.13	5635.41	116	716	13.3	0.24	0.08		

REFERENCE LOCATION	CROSS SECTION / RIVER STATION	THALWEG ELEVATION (FT)	PEAK DISCHARGES (CFS)				WATER SURFACE ELEVATION (FT)				100-YEAR FLOODPLAIN (FT)		100-YEAR FLOODWAY (0.5 FOOT MAX. RISE IN EGL)						NOTE #	COMMENT
			10-YR	50-YR	100-YR	500-YR	10-YR	50-YR	100-YR	500-YR	WIDTH	EGL	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	WSEL SURCHARGE (FT)	EGL SURCHARGE (FT)		
	87101	5625.80	3500	7500	9500	19800	5631.66	5634.78	5638.88	5643.13	665	5640.09	5638.88	233	1202	7.9	0.00	0.00		
	87132	5626.45	3500	7500	9500	19800	5631.70	5634.88	5639.05	5643.68	670	5640.15	5639.05	238	1238	7.7	0.00	0.00		
	87185	5626.75	3500	7500	9500	19800	5631.86	5634.86	5638.92	5643.51	681	5640.35	5638.92	247	1088	8.7	0.00	0.00		
D/S Coors Vehicle	87281	5627.16	3500	7500	9500	19800	5632.59	5636.10	5639.17	5644.06	989	5640.56	5639.17	227	1056	9.0	0.00	0.00		
U/S Coors Vehicle	87326	5627.21	3500	7500	9500	19800	5632.96	5638.78	5641.03	5647.00	993	5641.86	5641.34	237	1438	6.6	0.31	0.31		
	87379	5627.56	3500	7500	9500	19800	5632.99	5638.83	5641.04	5647.17	990	5641.94	5641.39	231	1425	6.7	0.34	0.29		
	87438	5627.20	3500	7500	9500	19800	5633.80	5639.10	5641.20	5647.33	880	5642.03	5641.54	236	1502	6.3	0.35	0.29		
	87458	5627.20	3500	7500	9500	19800	5633.85	5639.14	5641.85	5647.69	972	5642.55	5641.91	232	1753	6.1	0.06	0.07		
	87486	5627.19	3500	7500	9500	19800	5633.67	5639.13	5641.93	5647.75	973	5642.58	5642.00	248	1804	5.5	0.08	0.07		
	87616	5627.98	3500	7500	9500	19800	5634.30	5639.29	5642.22	5648.03	840	5642.68	5642.21	313	1956	4.9	0.00	0.06		
	87666	5628.31	3500	7500	9500	19800	5634.36	5639.38	5642.21	5648.01	808	5642.74	5642.24	328	1868	5.1	0.02	0.05		
D/S Coors North Service Road	87789	5629.90	3500	7500	9500	19800	5635.24	5639.51	5642.11	5647.92	776	5643.06	5642.16	449	1572	6.9	0.04	0.03		
U/S Coors North Service Road	87844	5629.94	3500	7500	9500	19800	5635.51	5641.65	5642.98	5648.03	799	5643.76	5643.03	453	1908	5.6	0.04	0.03		
	87897	5631.17	3500	7500	9500	19800	5635.55	5641.61	5643.13	5648.10	781	5643.82	5643.15	320	1742	5.5	0.02	0.03		
	88062	5631.89	3500	7500	9500	19800	5637.27	5641.24	5642.26	5646.70	106	5644.60	5642.31	106	800	11.9	0.04	0.02	FP=FW	
	88313	5635.29	3500	7500	9500	19800	5639.67	5642.01	5643.09	5646.97	108	5645.82	5643.11	108	735	12.9	0.02	0.00	FP=FW	
	88370	5644.86	3500	7500	9500	19800	5647.82	5649.50	5650.17	5653.84	302	5652.59	5650.35	145	755	12.6	0.18	0.35		
	88394	5644.83	3500	7500	9500	19800	5648.08	5650.00	5651.02	5653.85	268	5652.91	5651.20	152	865	11.0	0.18	0.24		
	88487	5643.30	3500	7500	9500	19800	5649.21	5651.12	5652.06	5654.22	155	5653.27	5652.39	155	1149	8.3	0.34	0.23		
	88616	5644.00	3300	7100	8800	18700	5649.44	5652.25	5652.67	5656.21	326	5654.32	5652.69	281	923	9.5	0.02	0.00		
	88626	5648.81	3300	7100	8800	18700	5652.28	5653.38	5653.92	5655.76	361	5655.42	5653.92	310	944	9.3	0.00	0.00		
	88696	5644.90	3300	7100	8800	18700	5653.20	5654.98	5655.41	5657.65	583	5656.91	5655.42	295	1046	8.4	0.02	0.08		
	88764	5645.30	3300	7000	8800	18600	5653.60	5655.72	5656.34	5658.76	405	5658.16	5656.34	252	1007	9.3	0.00	0.00		
	88791	5645.40	3300	7000	8800	18600	5654.89	5656.67	5657.04	5659.00	492	5658.39	5657.04	237	1104	8.0	0.00	0.00		
	88815	5645.40	3300	7000	8800	18600	5654.97	5657.05	5657.69	5660.44	604	5658.58	5657.69	229	1343	6.6	0.00	0.00		
	88854	5646.54	3300	7000	8800	18600	5655.04	5657.16	5657.84	5660.81	618	5658.66	5657.84	235	1274	6.9	0.00	0.00		
D/S Ford Street	88939	5647.13	3300	7000	8800	18600	5655.14	5657.21	5657.84	5660.81	570	5658.98	5657.85	122	1041	8.5	0.00	0.00		
U/S Ford Street	89024	5647.95	3300	7000	8800	18600	5655.22	5657.44	5658.24	5662.29	570	5659.51	5658.24	136	1013	8.7	0.00	0.00		
	89163	5648.86	3300	7000	8800	18600	5655.23	5657.46	5658.24	5660.41	118	5659.99	5658.25	118	836	10.5	0.00	0.00	FP=FW	
	89421	5649.84	3300	7000	8800	18600	5656.65	5659.27	5660.25	5664.92	123	5663.47	5660.26	101	638	13.9	0.01	0.00		
	89610	5651.08	3300	7000	8800	18600	5658.83	5661.76	5662.88	5667.70	98	5664.50	5662.88	98	864	10.2	0.00	0.00	FP=FW	
D/S Washington Street	89687	5651.21	3300	7000	8800	18600	5659.52	5662.87	5664.19	5668.90	124	5664.88	5664.19	124	1357	6.5	0.00	0.00	FP=FW	
U/S Washington Street	89790	5651.90	3300	7000	8800	18600	5660.64	5664.09	5666.43	5670.43	124	5667.00	5666.43	124	1484	6.0	0.00	0.00	FP=FW	
	89862	5653.61	3300	7000	8800	18600	5660.10	5663.71	5666.17	5670.40	156	5667.20	5666.17	156	1133	7.8	0.00	0.00	FP=FW	
	89976	5653.54	3300	6900	8600	18300	5660.58	5663.76	5666.19	5670.59	142	5667.51	5666.19	142	976	8.8	0.00	0.00	FP=FW	
	90006	5655.51	3300	6900	8600	18300	5661.24	5663.53	5665.97	5670.60	134	5667.74	5665.97	134	829	10.4	0.00	0.00	FP=FW	
	90060	5655.97	3300	6900	8600	18300	5662.11	5664.05	5666.03	5670.19	142	5668.03	5666.03	142	881	9.8	0.00	0.00	FP=FW	
	90168	5656.63	3300	6900	8600	18300	5663.18	5666.15	5667.44	5671.75	501	5668.41	5667.44	162	1144	7.5	0.00	0.00		
	90252	5656.38	3300	6900	8600	18300	5663.31	5666.15	5667.40	5671.87	521	5668.66	5667.40	159	1106	7.8	0.00	0.00		
	90305	5658.07	3300	6900	8600	18300	5663.16	5665.76	5667.06	5671.93	496	5669.03	5667.07	144	806	10.7	0.00	0.00		
	90380	5659.08	3300	6900	8600	18300	5664.38	5666.46	5667.43	5672.40	530	5669.43	5667.44	136	780	11.0	0.01	0.00		
	90603	5659.70	3300	6900	8600	18300	5665.45	5667.79	5668.92	5672.23	467	5671.13	5668.99	220	854	10.1	0.07	0.00		
	90759	5660.68	3300	6900	8600	18300	5666.59	5669.07	5670.02	5673.11	487	5671.82	5670.02	346	990	8.7	0.00	0.00		
	90839	5660.68	3300	6900	8600	18300	5666.91	5670.63	5671.48	5673.19	766	5672.31	5671.48	420	1540	5.6	0.00	0.00		
	90879	5661.70	3300	6900	8600	18300	5667.24	5670.74	5671.55	5673.42	607	5672.45	5671.55	466	1532	5.6	0.00	0.00		
	91012	5662.19	3300	6900	8600	18300	5667.89	5670.92	5671.79	5674.29	568	5672.74	5671.79	512	1512	5.7	0.00	0.00		
	91225	5664.06	3300	6900	8600	18300	5669.42	5672.59	5673.04	5674.78	498	5674.31	5673.04	445	1258	6.8	0.00	0.07		
	91383	5664.62	3300	6900	8600	18300	5670.65	5674.20	5674.68	5676.57	465	5676.04	5674.72	392	1200	7.2	0.04	0.17		
	91424	5666.09	3300	6900	8600	18300	5671.64	5674.64	5675.09	5676.84	583	5676.36	5675.13	406	1202	7.2	0.04	0.14		
	91576	5667.28	3300	6900	8600	18300	5673.03	5675.61	5676.20	5678.06	758	5677.56	5676.27	353	1139	7.6	0.07	0.22		
	91713	5668.32	3300	6900	8600	18300	5674.50	5676.43	5677.29	5680.01	412	5678.96	5677.29	412	1102	7.8	0.00	0.00	FP=FW	
	91748	5669.35	3300	6900	8600	18300	5675.41	5677.74	5678.40	5680.63	435	5679.92	5678.40	435	1203	7.2	0.00	0.00	FP=FW	
	91865	5670.77	3300	6900	8600	18300	5676.35	5679.09	5679.69	5682.14	601	5680.41	5679.69	423	1488	5.8	0.00	0.00		
	91890	5671.18	3300	6900	8600	18300	5676.61	5679.20	5679.80	5682.16	566	5680.50	5679.80	386	1450	5.9	0.00	0.00		
	92150	5672.95	3300	6900	8600	18300	5679.10	5679.63	5680.28	5683.75	184	5682.47	5680.28	184	816	10.5	0.00	0.00	FP=FW	
	92295	5674.15	3300	6900	8600	18300	5680.02	5682.36	5683.14	5686.34	496	5685.74	5683.14	146	737	11.7	0.00	0.00		
	92326	5675.94	3300	6900	8600	18300	5681.67	5683.94	5684.76	5688.22	536	5687.55	5684.76	131	714	12.1	0.00	0.00		
	92509	5676.68	3300	6900	8600	18300	5683.18	5684.90	5685.91	5690.64	103	5689.16	5685.91	103	605	14.2	0.00	0.00	FP=FW	
	92649	5678.10	3300	6900	8600	18300	5684.01	5687.31	5688.71	5693.35	197	5690.05	5688.71	197	1102	7.8	0.00	0.00	FP=FW	
	93090	5681.30	3300	6900	8600	18300	5688.62	5690.42	5691.56	5694.82	312	5693.52	5691.56	312	960	9.0	0.00	0.00	FP=FW	
	93493	5685.10	3300	6900	8600	18300	5692.07	5694.28	5694.81	5697.15	339	5696.50	5694.84	240	894	9.6	0.03	0.24		
	93727	5684.33	3300	6900	8600	18300	5693.50	5695.07	5696.54	5699.98	320	5699.01	5696.54	197	814	10.6	0.00	0.00		
	93753	5684.27	3300	6900	8600	18300	5693.59	5698.09	5699.21	5705.84	351	5700.24	5699.21	191	1315	6.6	0.00	0.00		
	93795	5685.91	3300	6900	8600	18300	5693.74	5698.04	5699.17	5705.85	401	5700.35	5699.17	184	1118	7.7	0.00	0.00		
D/S U.S. Highway 6	93893	5689.70	3300	6900	8600	18300	5695.94	5698.87	5700.01	5704.53	107	5703.38	5700.01	107	593	14.5	0.00	0.00	FP=FW	

REFERENCE LOCATION	CROSS SECTION / RIVER STATION	THALWEG ELEVATION (FT)	PEAK DISCHARGES (CFS)				WATER SURFACE ELEVATION (FT)				100-YEAR FLOODPLAIN (FT)		100-YEAR FLOODWAY (0.5 FOOT MAX. RISE IN EGL)						NOTE #	COMMENT
			10-YR	50-YR	100-YR	500-YR	10-YR	50-YR	100-YR	500-YR	WIDTH	EGL	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	WSEL SURCHARGE (FT)	EGL SURCHARGE (FT)		
U/S U.S. Highway 6	93990	5689.87	3300	6900	8600	18300	5698.11	5701.73	5703.02	5708.43	123	5704.24	5703.02	123	1022	8.4	0.00	0.00	FP=FW	
	94176	5691.78	3300	6900	8600	18300	5698.48	5702.31	5703.84	5710.09	339	5704.57	5703.84	271	1738	5.0	0.00	0.00		
	94416	5693.82	3300	6900	8600	18300	5700.99	5702.97	5704.35	5710.53	309	5705.21	5704.35	309	1421	6.1	0.00	0.00	FP=FW	
	94827	5697.72	3300	6900	8600	18300	5705.63	5707.07	5707.87	5710.83	243	5709.90	5707.87	243	876	9.8	0.00	0.00	FP=FW	
	95215	5701.50	3300	6900	8600	18300	5709.19	5711.45	5712.15	5714.81	239	5714.14	5712.15	239	964	8.9	0.00	0.00	FP=FW	
	95504	5704.20	3300	6900	8600	18300	5712.27	5714.11	5714.71	5718.50	138	5717.44	5714.71	138	751	11.5	0.00	0.00	FP=FW	
	95613	5701.70	3300	6900	8600	18300	5713.01	5715.36	5716.42	5721.92	101	5719.88	5716.42	101	631	13.6	0.00	0.00	FP=FW	
	95641	5705.45	3300	6900	8600	18300	5714.17	5717.88	5719.24	5726.48	120	5720.66	5719.24	106	969	8.9	0.00	0.00		
	95719	5708.28	3300	6900	8600	18300	5714.46	5718.49	5720.06	5727.85	187	5721.02	5720.06	187	1328	6.5	0.00	0.00	FP=FW	
	95972	5713.33	3300	6900	8600	18300	5719.16	5720.74	5721.34	5728.00	215	5723.32	5721.34	215	960	9.0	0.00	0.00	FP=FW	

Table No. 2

Clear Creek FHAD

Floodplain and Floodway Data Table

REFERENCE LOCATION	CROSS SECTION / RIVER STATION	THALWEG ELEVATION (FT)	PEAK DISCHARGES (CFS)				WATER SURFACE ELEVATION (FT)				100-YEAR FLOODPLAIN (FT)		100-YEAR FLOODWAY (0.5 FOOT MAX. RISE IN EGL)						NOTE #	COMMENT
			10-YR	50-YR	100-YR	500-YR	10-YR	50-YR	100-YR	500-YR	WIDTH	EGL	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	WSEL SURCHARGE (FT)	EGL SURCHARGE (FT)		
6th Avenue Split																				
	260	5683.30	0	0	126	1711	5685.08	5687.30	5688.34	5691.92	582	5688.34	--	--	--	--	--	--		
	338	5683.34	0	0	126	1711	5685.08	5687.30	5688.34	5691.92	448	5688.34	--	--	--	--	--	--		
	409	5694.45	0	0	126	1711	5694.48	5694.48	5695.60	5696.34	757	5695.71	--	--	--	--	--	--		
	706	5694.24	0	0	126	1711	5694.48	5694.48	5696.00	5698.35	168	5696.31	--	--	--	--	--	--		
	1108	5694.00	0	0	126	1711	5694.48	5694.48	5696.34	5699.49	94	5696.35	--	--	--	--	--	--		
	1184	5694.00	0	0	126	1711	5694.48	5694.48	5696.34	5699.43	84	5696.35	--	--	--	--	--	--		
	1360	5694.00	0	0	126	1711	5694.48	5694.48	5696.35	5699.70	153	5696.35	--	--	--	--	--	--		

Table No. 3

Clear Creek FHAD

Floodplain and Floodway Data Table

REFERENCE LOCATION	CROSS SECTION / RIVER STATION	THALWEG ELEVATION (FT)	PEAK DISCHARGES (CFS)				WATER SURFACE ELEVATION (FT)				100-YEAR FLOODPLAIN (FT)		100-YEAR FLOODWAY (0.5 FOOT MAX. RISE IN EGL)						NOTE #	COMMENT
			10-YR	50-YR	100-YR	500-YR	10-YR	50-YR	100-YR	500-YR	WIDTH	EGL	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	WSEL SURCHARGE (FT)	EGL SURCHARGE (FT)		
Tabor Lake Split																				
	435	5404.42	0	359	1311	8675	5404.45	5405.96	5406.88	5407.90	405	5406.96	--	--	--	--	--	--		
	958	5410.82	0	359	1311	8675	5410.33	5411.75	5412.70	5415.12	403	5413.19	--	--	--	--	--	--		
	1062	5414.90	0	359	1311	8675	5414.89	5415.42	5415.82	5417.12	872	5416.10	--	--	--	--	--	--		
	1757	5412.00	0	359	1311	8675	5414.89	5415.58	5416.13	5418.02	1059	5416.13	--	--	--	--	--	--		
	2346	5412.00	0	359	1311	8675	5414.89	5415.58	5416.12	5417.73	314	5416.14	--	--	--	--	--	--		

Table No. 4

Clear Creek FHAD

Floodplain and Floodway Data Table

REFERENCE LOCATION	CROSS SECTION / RIVER STATION	THALWEG ELEVATION (FT)	PEAK DISCHARGES (CFS)				WATER SURFACE ELEVATION (FT)				100-YEAR FLOODPLAIN (FT)		100-YEAR FLOODWAY (0.5 FOOT MAX. RISE IN EGL)						NOTE #	COMMENT
			10-YR	50-YR	100-YR	500-YR	10-YR	50-YR	100-YR	500-YR	WIDTH	EGL	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	WSEL SURCHARGE (FT)	EGL SURCHARGE (FT)		
North Overflow Split																				
	538	5219.00	1	1264	3428	13086	5219.02	5219.58	5220.14	5228.69	842	5220.69	5220.14	512.43	579.91	5.91	0.00	0.00		
	1010	5219.00	1	1264	3428	13086	5219.07	5220.96	5222.13	5228.73	481	5222.25	5222.14	409.45	1255.95	2.73	0.00	0.00		
	1322	5219.00	1	1264	3428	13086	5219.08	5221.18	5222.48	5228.82	456	5222.57	5222.48	419.45	1422.22	2.41	0.00	0.00		
	1479	5223.73	1	1264	3428	13086	5224.16	5226.98	5227.76	5229.01	1237	5228.26	5227.76	884.03	646.90	5.57	0.00	0.00		
	1612	5229.46	1	1264	3428	13086	5229.56	5230.46	5230.94	5232.15	1471	5231.38	5230.94	1471.07	661.71	5.18	0.00	0.00		
	1853	5222.87	1	619	2700	13386	5229.56	5230.76	5231.46	5233.10	1617	5231.47	5231.48	1125.83	3592.99	0.81	0.02	0.02		
	2135	5224.17	1	619	2700	13386	5229.56	5230.76	5231.48	5233.21	1630	5231.48	5231.51	1030.96	3180.51	0.85	0.03	0.03		
	2382	5226.00	1	619	2700	13386	5229.56	5230.76	5231.49	5233.31	1635	5231.50	5231.52	735.79	3069.86	0.88	0.04	0.03		
	2852	5226.00	1	619	2700	13386	5229.56	5230.77	5231.52	5233.48	1726	5231.53	5231.56	583.66	2736.41	0.99	0.05	0.04		
	3090	5231.65	1	619	2700	13386	5231.80	5232.54	5233.28	5234.71	1409	5233.66	5233.57	465.43	478.21	5.65	0.41	0.30		
	3638	5232.00	1	619	2700	13386	5232.03	5233.26	5234.45	5236.61	1194	5234.49	5234.71	743.14	1981.55	1.36	0.25	0.26		
	3885	5233.49	1	619	2700	13386	5233.76	5235.43	5236.02	5237.34	1136	5236.40	5236.35	881.06	524.25	5.15	0.39	0.33		
	4295	5235.00	1	619	2700	13386	5235.03	5236.05	5237.07	5239.19	1421	5237.10	5237.49	818.76	1711.12	1.58	0.43	0.42		
	4897	5241.66	1	619	2700	13386	5241.77	5243.46	5243.89	5244.86	1265	5244.16	5243.93	982.70	616.16	4.38	0.08	0.04		
	5178	5241.55	1	576	2483	12319	5242.11	5244.23	5244.95	5246.06	2120	5245.10	5245.33	1135.08	672.30	3.69	0.44	0.38		
	5423	5242.81	1	576	2483	12319	5242.98	5245.53	5246.33	5248.38	2166	5246.74	5246.78	1372.18	645.95	3.84	0.28	0.45		
	5635	5247.00	1	576	2483	12319	5244.83	5246.92	5247.80	5249.62	2094	5248.01	5247.99	1325.61	709.84	3.50	0.18	0.19		
	5889	5246.91	1	576	2483	12319	5246.03	5247.51	5248.56	5250.54	2048	5248.62	5248.93	1320.00	1194.99	2.08	0.38	0.37		
	6019	5245.64	1	576	2483	12319	5246.10	5247.69	5248.76	5250.77	1977	5248.84	5249.19	1325.32	974.67	2.55	0.45	0.43		
	6380	5247.00	1	576	2483	12319	5247.02	5248.04	5249.15	5251.21	1894	5249.19	5249.59	933.79	1617.51	1.54	0.44	0.44		
	6611	5245.01	1	576	2483	12319	5247.02	5248.08	5249.25	5251.43	1173	5249.26	5249.67	954.41	3135.94	0.79	0.42	0.42		
	6804	5246.62	1	576	2483	12319	5247.02	5248.09	5249.26	5251.41	700	5249.35	5249.67	539.50	1243.81	2.00	0.39	0.42		
	7126	5247.01	1	576	2483	12319	5247.08	5248.52	5249.89	5252.37	490	5250.08	5250.04	301.30	748.77	3.32	0.13	0.16		
	7365	5249.78	1	576	2483	12319	5249.95	5252.03	5253.34	5255.45	355	5253.92	5253.34	354.68	427.54	5.81	0.00	0.00		
	7650	5252.98	1	1	795	11202	5253.19	5254.29	5255.52	5258.13	488	5255.56	5255.52	488.01	478.55	1.66	0.00	0.00		
	7879	5257.66	1	1	795	11202	5257.56	5257.56	5258.28	5260.13	559	5258.49	5258.48	302.55	182.70	4.35	0.28	0.19		
	7991	5258.85	1	1	795	11202	5258.94	5258.94	5259.87	5262.10	362	5260.15	5259.87	362.27	193.48	4.11	0.00	0.00		

Table No. 5

Clear Creek FHAD

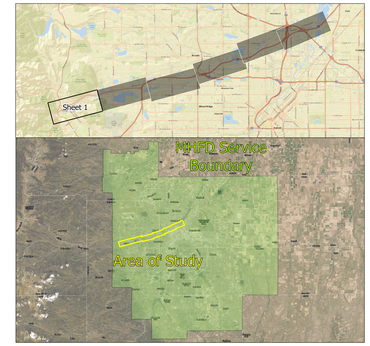
Floodplain and Floodway Data Table

REFERENCE LOCATION	CROSS SECTION / RIVER STATION	THALWEG ELEVATION (FT)	PEAK DISCHARGES (CFS)				WATER SURFACE ELEVATION (FT)				100-YEAR FLOODPLAIN (FT)		100-YEAR FLOODWAY (0.5 FOOT MAX. RISE IN EGL)						NOTE #	COMMENT
			10-YR	50-YR	100-YR	500-YR	10-YR	50-YR	100-YR	500-YR	WIDTH	EGL	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	WSEL SURCHARGE (FT)	EGL SURCHARGE (FT)		
Federal Split																				
	326	5212.21	0	0	414	5692	5210.74	5210.74	5213.56	5217.41	149	5213.99	--	--	--	--	--	--		
	458	5215.31	0	0	414	5692	5213.13	5213.13	5216.15	5219.25	129	5216.62	--	--	--	--	--	--		
	627	5216.39	0	0	414	5692	5216.46	5216.46	5218.56	5223.08	141	5218.63	--	--	--	--	--	--		
	773	5217.00	0	0	414	5692	5216.46	5216.46	5218.69	5223.98	1741	5218.70	--	--	--	--	--	--		
	923	5216.67	0	0	414	5692	5216.46	5216.46	5218.71	5224.10	1610	5218.71	--	--	--	--	--	--		
	980	5216.16	0	0	414	5692	5216.46	5216.46	5218.70	5224.05	1078	5218.71	--	--	--	--	--	--		
	1075	5215.40	0	0	414	5692	5216.46	5216.46	5218.71	5224.09	1036	5218.71	--	--	--	--	--	--		
	1198	5215.00	0	0	414	5692	5216.46	5216.46	5218.71	5224.13	1035	5218.72	--	--	--	--	--	--		

Appendix E: Flood Maps

Clear Creek

Flood Hazard Area Delineation | September 2022



Notes to User:
Projection: Colorado State Plane Central; EPSG Code : 2232
Horizontal Datum: North American Datum of 1983
Vertical Datum: North American Vertical Datum of 1988
Topography Data Derived from FEMA 2013 Post-Flood DEM
Aerial Sourced From DRCOG 2018 DRAPP

Printing to Map Scale Instructions:
1. Using the "Snapshot" tool, select the desired area to print.
2. Click 'File' -> Print
3. Select your printer from the printer dropdown menu.
4. Set the desired size using the printer 'Properties' menu.
5. Choose the 'Selected Graphic' option under 'Print Range'.
6. Select 'None' from the 'Page Scaling' dropdown menu,
7. Unselect 'Choose paper source by PDF page size'.
8. Click 'OK' to print selection.

Legend

- Matchline
- Bridge
- Lateral Structure
- Cross Section (Cross Section ID; Base Flood Elevation)
- Floodway
- 100-Yr Floodplain
- 100-Yr Shallow Flooding
- 500-Yr Floodplain
- Insurable Structure
- Stream Centerline
- Ditch, Canal, Creek
- Municipal Boundary
- Major Contour; 10-ft
- Minor Contour; 2-ft

0 200 400 800 1,200 1,600 Feet

1 inch = 200 feet

N

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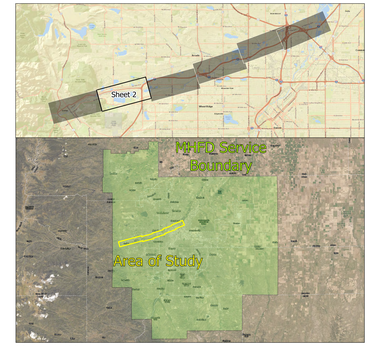
Clear Creek

Flood Hazard Area Delineation | September 2022



Notes to User:
Projection: Colorado State Plane Central; EPSG Code : 2232
Horizontal Datum: North American Datum of 1983
Vertical Datum: North American Vertical Datum of 1988
Topography Data Derived from FEMA 2013 Post-Flood DEM
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Legend

- Matchline
- Bridge
- Lateral Structure
- Cross Section (Cross Section ID, Base Flood Elevation)
- Floodway
- 100-Yr Floodplain
- 100-Yr Shallow Flooding
- 500-Yr Floodplain
- Insurable Structure
- Stream Centerline
- Ditch, Canal, Creek
- Municipal Boundary
- Major Contour; 10-ft
- Minor Contour; 2-ft

0 200 400 800 1,200 1,600 Feet

1 inch = 200 feet

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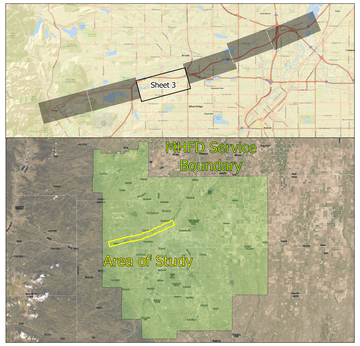
Clear Creek

Flood Hazard Area Delineation | September 2022



Notes to User:
Projection: Colorado State Plane Central; EPSG Code : 2232
Horizontal Datum: North American Datum of 1983
Vertical Datum: North American Vertical Datum of 1988
Topography Data Derived from FEMA 2013 Post-Flood DEM
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Legend

- Matchline
- Bridge
- Lateral Structure
- Cross Section
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- 100-Yr Floodplain
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- 500-Yr Floodplain
- Insurable Structure
- Stream Centerline
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- Major Contour; 10-ft
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0 200 400 800 1,200 1,600 Feet

1 inch = 200 feet

N

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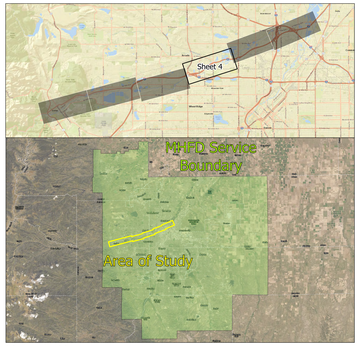
Clear Creek

Flood Hazard Area Delineation | September 2022



Notes to User:
Projection: Colorado State Plane Central; EPSG Code : 2232
Horizontal Datum: North American Datum of 1983
Vertical Datum: North American Vertical Datum of 1988
Topography Data Derived from FEMA 2013 Post-Flood DEM
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Legend

- Matchline
- Bridge
- Lateral Structure
- Cross Section
- Floodway
- 100-Yr Floodplain
- 100-Yr Shallow Flooding
- 500-Yr Floodplain
- Insurable Structure
- Stream Centerline
- Ditch, Canal, Creek
- Municipal Boundary
- Major Contour; 10-ft
- Minor Contour; 2-ft

0 200 400 800 1,200 1,600 Feet

1 inch = 200 feet

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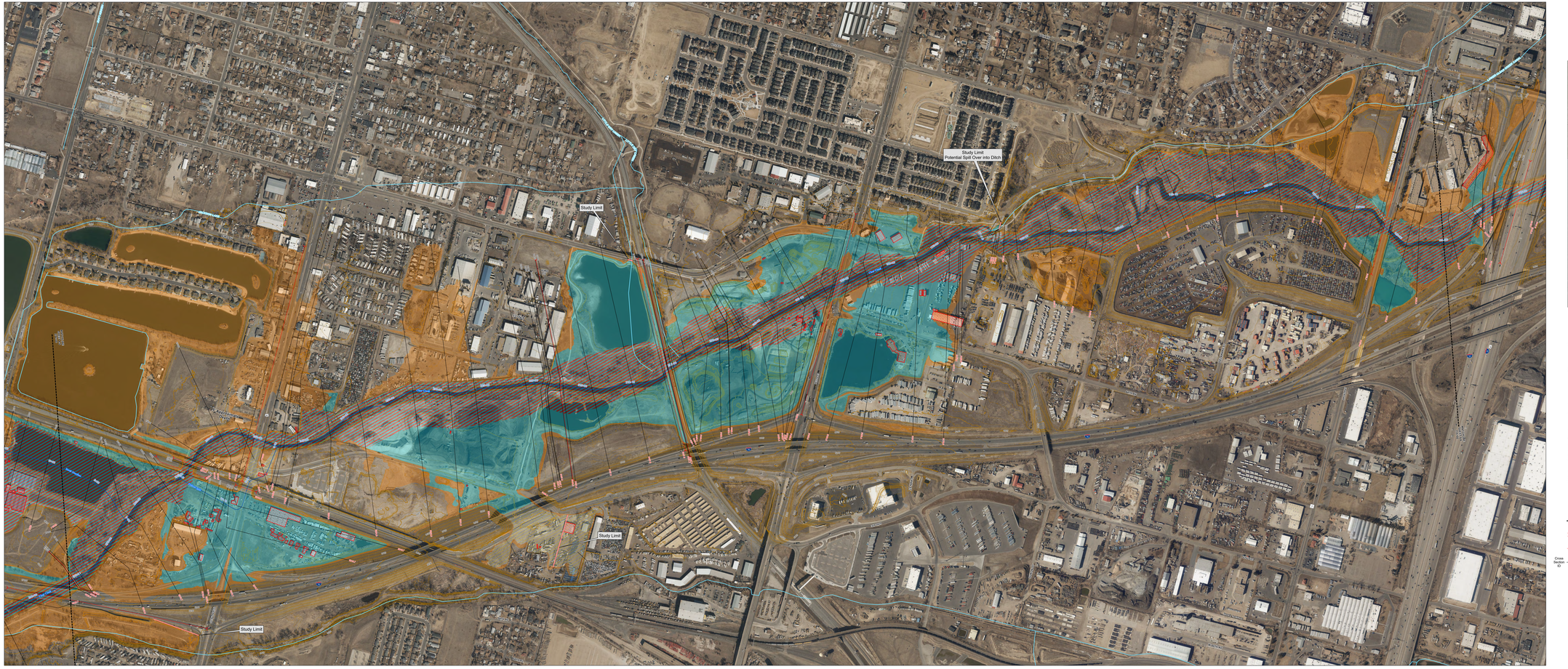
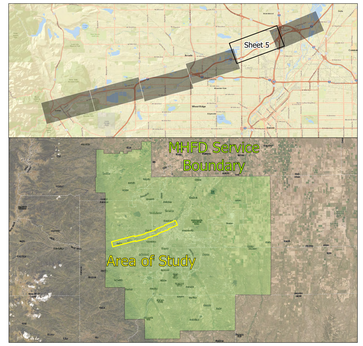
Clear Creek

Flood Hazard Area Delineation | September 2022





Notes to User:
Projection: Colorado State Plane Central; EPSG Code : 2232
Horizontal Datum: North American Datum of 1983
Vertical Datum: North American Vertical Datum of 1988
Topography Data Derived from FEMA 2013 Post-Flood DEM
Aerial Sourced From DRCOG 2018 DRAPP

Printing to Map Scale Instructions:
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5. Choose the 'Selected Graphic' option under 'Print Range'.
6. Select 'None' from the 'Page Scaling' dropdown menu,
7. Unselect 'Choose paper source by PDF page size'.
8. Click 'OK' to print selection.

Legend

- Matchline
- Bridge
- Lateral Structure
- Cross Section (Cross Section ID, Flow Elevation)
- Floodway
- 100-Yr Floodplain
- 100-Yr Shallow Flooding
- 500-Yr Floodplain
- Insurable Structure
- Stream Centerline
- Ditch, Canal, Creek
- Municipal Boundary
- Major Contour; 10-ft
- Minor Contour; 2-ft

0 200 400 800 1,200 1,600 Feet

1 inch = 200 feet

N

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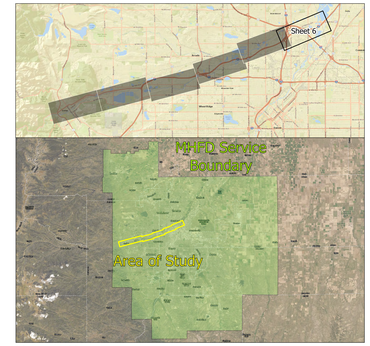
Clear Creek

Flood Hazard Area Delineation | September 2022



Notes to User:
Projection: Colorado State Plane Central; EPSG Code : 2232
Horizontal Datum: North American Datum of 1983
Vertical Datum: North American Vertical Datum of 1988
Topography Data Derived from FEMA 2013 Post-Flood DEM
Aerial Sourced From DRCOG 2018 DRAPP

Printing to Map Scale Instructions:
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4. Set the desired size using the printer 'Properties' menu.
5. Choose the 'Selected Graphic' option under 'Print Range'.
6. Select 'None' from the 'Page Scaling' dropdown menu.
7. Unselect 'Choose paper source by PDF page size'.
8. Click 'OK' to print selection.

Legend

- Matchline
- Bridge
- Lateral Structure
- Cross Section
- Floodway
- 100-Yr Floodplain
- 100-Yr Shallow Flooding
- 500-Yr Floodplain
- Insurable Structure
- Stream Centerline
- Ditch, Canal, Creek
- Municipal Boundary
- Major Contour; 10-ft
- Minor Contour; 2-ft

0 200 400 800 1,200 1,600 Feet

1 inch = 200 feet

N

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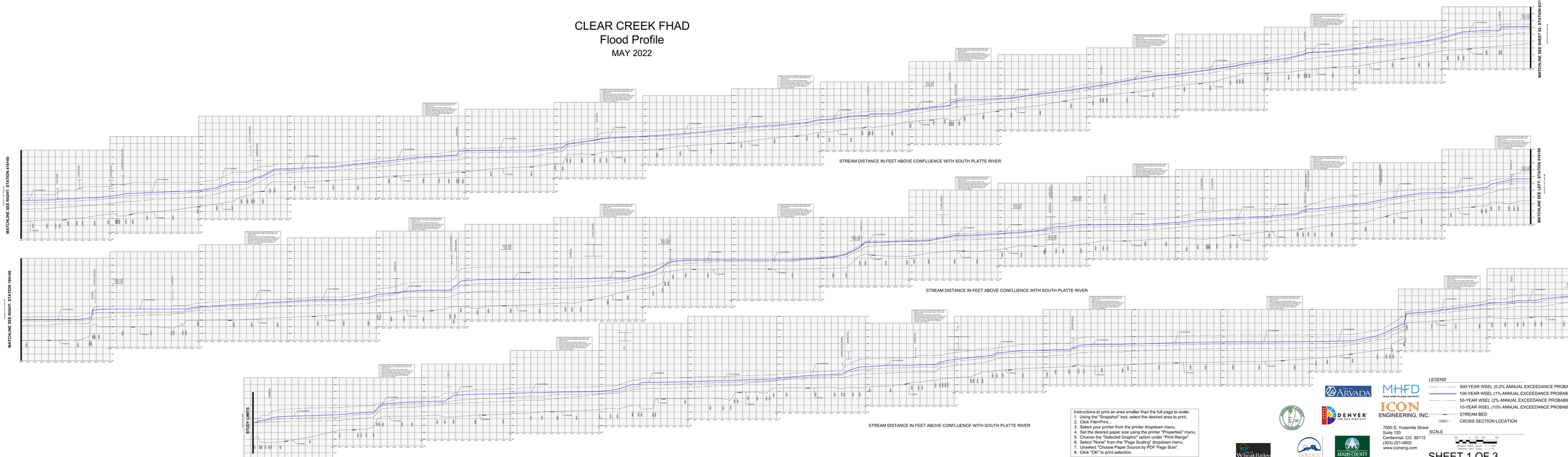
Appendix F: Flood Profiles

CLEAR CREEK FHAD
Flood Profile
MAY 2022



Instructions to print an area smaller than the full page to scale:
1. Using the "Snapshot" tool, select the desired area to print.
2. Click File>Print...
3. Select your printer from the printer dropdown menu.
4. Set the desired paper size using the printer "Properties" menu.
5. Choose the "Selected Graphic" option under "Print Range"
6. Select "None" from the "Page Scaling" dropdown menu.
7. Unselect "Choose Paper Source by PDF Page Size".
8. Click "OK" to print selection.

LEGEND
- 500-YEAR WSEL (0.2% ANNUAL EXCEEDANCE PROBABILITY)
- 100-YEAR WSEL (1% ANNUAL EXCEEDANCE PROBABILITY)
- 50-YEAR WSEL (2% ANNUAL EXCEEDANCE PROBABILITY)
- 10-YEAR WSEL (10% ANNUAL EXCEEDANCE PROBABILITY)
- STREAM BED
- CROSS SECTION LOCATION

SCALE
0 100 200 400
HORIZONTAL: 1" = 200'
VERTICAL: 1" = 40'

ICON ENGINEERING, INC.
7000 S. Yosemite Street
Suite 120
Centennial, CO 80112
(303) 221-0802
www.iconeng.com

SHEET 1 OF 3

Instructions to print an area smaller than the full page to scale:
1. Using the "Snapshot" tool, select the desired area to print.
2. Click File>Print...
3. Select your printer from the printer dropdown menu.
4. Set the desired paper size using the printer "Properties" menu.
5. Choose the "Selected Graphic" option under "Print Range".
6. Select "None" from the "Page Scaling" dropdown menu.
7. Unselect "Choose Paper Source by PDF Page Size".
8. Click "OK" to print selection.

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Centennial, CO 80112
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LEGEND

- 500-YEAR WSEL (0.2% ANNUAL EXCEEDANCE PROBABILITY)
- 100-YEAR WSEL (1% ANNUAL EXCEEDANCE PROBABILITY)
- 50-YEAR WSEL (2% ANNUAL EXCEEDANCE PROBABILITY)
- 10-YEAR WSEL (10% ANNUAL EXCEEDANCE PROBABILITY)
- STREAM BED
- CROSS SECTION LOCATION

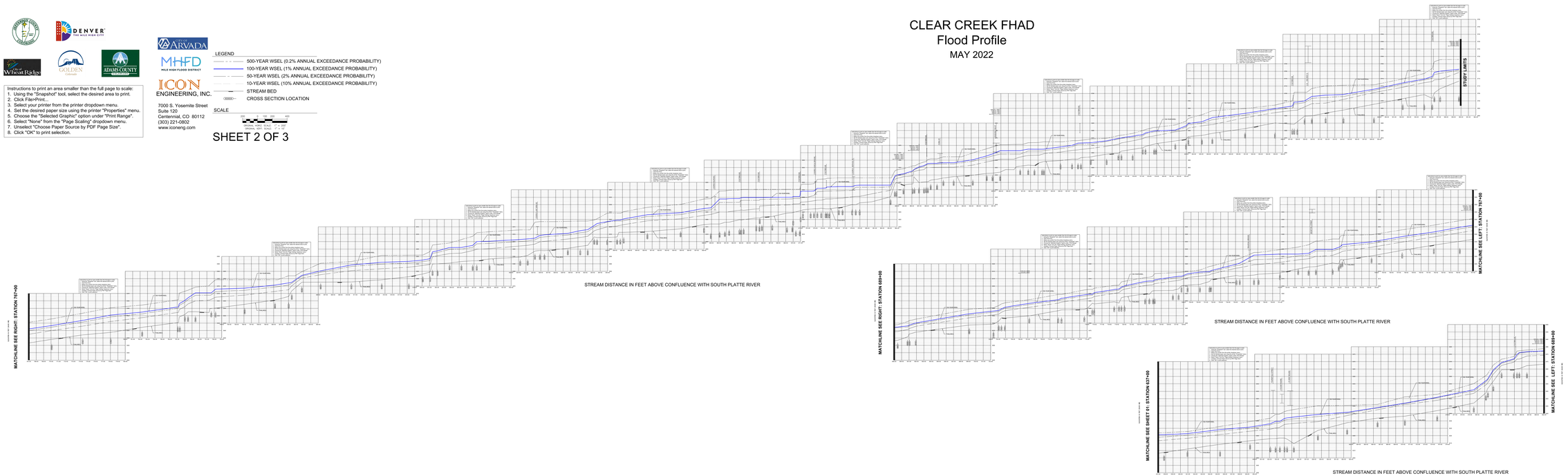
SCALE

250 0 250 500

ORIGINAL SCALE: 1" = 250'
ORIGINAL KEY SCALE: 1" = 10'

SHEET 2 OF 3

CLEAR CREEK FHAD
Flood Profile
MAY 2022

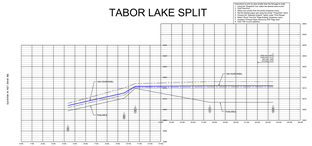


CLEAR CREEK FHAD
Flood Profile
MAY 2022

6TH AVE SPLIT

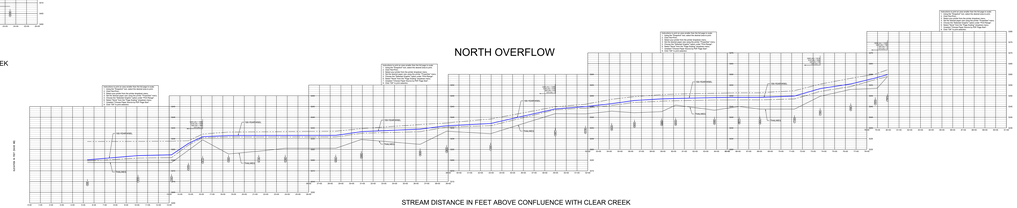
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH CLEAR CREEK

TABOR LAKE SPLIT



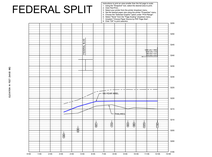
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH CLEAR CREEK

NORTH OVERFLOW



STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH CLEAR CREEK

FEDERAL SPLIT



STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH CLEAR CREEK

Instructions to print an area smaller than the full page to scale:
1. Using the "Snapshot" tool, select the desired area to print.
2. Click File>Print...
3. Select your printer from the printer dropdown menu.
4. Set the desired paper size using the printer "Properties" menu.
5. Choose the "Selected Graphic" option under "Print Range".
6. Select "None" from the "Page Scaling" dropdown menu.
7. Unselect "Choose Paper Source by PDF Page Size".
8. Click "OK" to print selection.

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- STREAM BED
- CROSS SECTION LOCATION

SCALE

0 100 200 400

ORIGINAL HORZ. SCALE: 1" = 200'
ORIGINAL VERT. SCALE: 1" = 10'

SHEET 3 OF 3