Appendix B4
Hydrologic Resources

Arlington Ave Bridges Hydrology and Hydraulics Memorandum - FINAL

ARLINGTON AVENUE BRIDGES PROJECT

June 2021

Prepared for

RTC

CITY OF RENO
BIGGEST LITTLE CITY IN THE WORLD

Revision History

Version	Description/Comment	Date	Notes, As Required
Draft	Submitted for External Review. Comments Received.	5/18/2021	
Final	Addressed Report Comments	6/9/2021	

Table of Contents

Executive Summary

The purpose of this report is to summarize the review and investigation of current hydraulic capacity requirements for two new bridges being constructed along the Truckee River at Arlington Avenue. Evaluation of the current (June 21, 2018) Carson-Truckee Water Conservancy District (CTWCD) model to determine existing conditions for the conveyance of 14,000 cfs will be used to develop potential hydraulic constraints and opportunities related to the proposed bridge configurations. Hydraulic modeling of the river with multiple potential flood scenarios related to different bridge type alternatives was not included in the scope of this work.

Spanning the Truckee River in downtown Reno, the northern Arlington Avenue bridge was built in 1921 and the southern Arlington Avenue bridge was built in 1938. The two bridges are identified by NDOT as bridges B-1532 (north) and B-1531 (south). The north bridge was constructed as a concrete tee beam bridge with two piers. The total length of the bridge is 122 feet, with three spans of approximately 40 feet each. The north bridge is 76 feet in width. The existing south bridge is a rigid frame structure with a clear span of 48 feet and a width of 60 feet. The bridges are located at an approximate latitude/longitude of +39.52464, -119.81667 / 39°31'29" North, 119°49'00" West and UTM coordinate of Zone 11N / 257891 East / 4378787 North.

The baseline of the hydrology and hydraulics are HEC-RAS 5.0.3 models distributed by Carson-Truckee Water Conservancy District (CTWCD) dated June 21, 2018. This HEC-RAS model extends from Keystone Avenue downstream to just beyond Glendale Avenue. Any hydrology, hydraulics, new adjacent development, LiDAR data or water surface elevation (WSEL) changes after June 21, 2018, including updates to the Glendale Weir were not incorporated into the model. The one exception is the construction of the Whitewater Kayak Park in 2004, which was incorporated into the CTWCD model provided to Jacobs.

In addition to the CTWCD models, FEMA regulates its own official clearing house and effective flood models, as well as mapping data. The current effective Flood Insurance Study (FIS) for the Project area is dated June 18, 2013 and the current effective Flood Insurance Rate Map (FIRM) for the Truckee River for the Project area is dated March 16, 2009. Updating the effective hydrology, hydraulic models, and submitting FEMA permit application were not under the scope of this Memo.

The Northern Nevada Comprehensive Regional Water Management Plan Staff Report (2016) noted the 100-year flow within the Truckee River is 20,700 cfs. United States Army Corps of Engineers (USACE) Sacramento District Nevada Feasibility Report and Environmental Impact Statement (1985) noted the 100-year flow as 18,500 cfs. The historical flood event that occurred in year 2005 indicated peak flows of 16,400 cfs, equivalent to approximately a 74-year storm event.

The CTWCD regulates and requires analysis for a flow of 14,000 cfs, approximately equivalent to a 50-year storm event, within the Truckee River to obtain a Section 108 permit. Freeboard design and requirements are per the Authority Having Jurisdiction (AHJ) requirements. No significant proposed in-stream embankment work is expected. Manning's n roughness coefficient values where the proposed grading is located were lowered from 0.4 to 0.3 per Chow et al. (1959) to reflect the anticipated erosion control and compaction establishment at the site.

Using the CTWCD's HEC-RAS baseline model and a rate of 14,000 cfs, the existing north bridge has a freeboard of 1.30 feet and the south bridge has a freeboard of 0.17 feet. Neither of the two existing bridges meet the CTWCD's requirement for 2 feet freeboard at 14,000 cfs.

The purpose of the Arlington Avenue Bridges Replacement Project (Project) is to replace both existing bridges with one of the following alternatives:

- Alternative 1:
  North Arlington Avenue Bridge - 131 feet long, 78 feet wide clear span bridge.
  South Arlington Avenue Bridge – 56 feet long, 78 feet wide cast-in-place clear span bridge.

- Alternative 2:
  North Arlington Avenue Bridge - 125 feet long, 78 feet cast-in-place bridge with a single pier.
  South Arlington Avenue Bridge – 56 feet long, 78 feet wide cast-in-place clear span bridge.

Using the CTWCD baseline model, a flow of 14,000 cfs, and the proposed Alternative 1 bridge types, the north bridge will have 6.70 feet of freeboard and the south bridge will have 1.89 feet of freeboard. Using the CTWCD baseline model, a flow of 14,000 cfs, and the proposed Alternative 2 bridge types, the north bridge will have 5.78 feet of freeboard and the south bridge 1.27 feet of freeboard. NDOT and the Truckee Meadows Regional Drainage Manual generally require a minimum of 2.0 feet freeboard for a 100-year storm event, but no less that existing conditions. During the technical advisory committee meetings for the project, freeboard requirements were discussed. It was agreed upon that since USACE would not provide any funding for the project, the freeboard for the project could be less than 2 feet. The recently constructed Virginia Street Bridge, located 0.25 miles downstream of the Arlington Bridges was designed and constructed using 1-foot freeboard requirement. Final design of bridge deck thickness, minor profile adjustments, and refined hydraulic modeling will be accommodated to ensure the agreed upon freeboard is provided.

The analysis did not include any net balance of earthwork within the channel. It is assumed there will be no significant fill/embankment placed within the channel. Bridge inspection reports and field investigations related to the debris and health of the bridges were considered as part of the design and this report. No adverse water surface elevation impacts were found in the hydrology and hydraulics analysis.

Acronyms and Abbreviations

1-D	1-Dimensional
2-D	2-Dimensional
BFE	Base Flood Elevation
CFS	Cubic Feet Per Second
CLOMR	Conditional Letter of Map Revision
CTWCD	Carson-Truckee Water Conservancy District
CWA	Clean Water Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
HEC-RAS	Hydrologic Engineering Center's River Analysis System
LiDAR	Light Detection and Ranging
LOMR	Letter of Map Revision
NDOT	Nevada Department of Transportation
NPDES	National Pollutant Discharge Elimination System
Project	Arlington Avenue Bridges Replacement Project
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
TRFMA	Truckee River Flood Management Authority
UTM	Universal Transverse Mercator
WSEL	Water Surface Elevation

1. Introduction

Spanning the Truckee River in downtown City of Reno, Washoe County, NV. The northern Arlington Avenue bridge was built in 1921 and the south bridge was built in 1938. Both bridges were rehabilitated in 1967. The bridges are identified by Nevada Department of Transportation (NDOT) as bridges B-1531 (south) and B-1532 (north). The north bridge was constructed as a concrete tee beam bridge, with three spans approximately 40 feet in length for a total bridge length of 122 feet. The existing north bridge is 76 feet wide. The existing south bridge is a rigid frame structure with a clear span of 48 feet and a width of 60 feet. The bridges are located at an approximate latitude/longitude of +39.52464, -119.816`67 / 39°31'29" North, 119°49'00" West and Universal Transverse Mercator (UTM) coordinate of Zone 11N / 257891 East / 4378787 North.

The Arlington Avenue Bridges Replacement Project (Project) is located 1.75 miles west of I-580 and 0.5 miles south of I-80. **Figure 1** illustrates the Project location map of the existing two bridges to be replaced across the Truckee River. **Figure 2** presents Project location within the south part of Washoe County, NV between the Pyramid Lake and Lake Tahoe. **Figure 3** shows the large-scale Project location map. The Project is 12.9 miles east of the Nevada and California state boundaries. The proposed bridge types for two alternatives are summarized below:

- Alternative 1:
  North Arlington Avenue Bridge - 131 feet long, 78 feet wide clear span bridge.
  South Arlington Avenue Bridge – 56 feet long, 78 feet wide cast-in-place clear span bridge.
- Alternative 2:
  North Arlington Avenue Bridge - 125 feet long, 78 feet cast-in-place bridge with a single pier.
  South Arlington Avenue Bridge – 56 feet long, 78 feet wide cast-in-place clear span bridge.

Figure 1. Project Vicinity Map

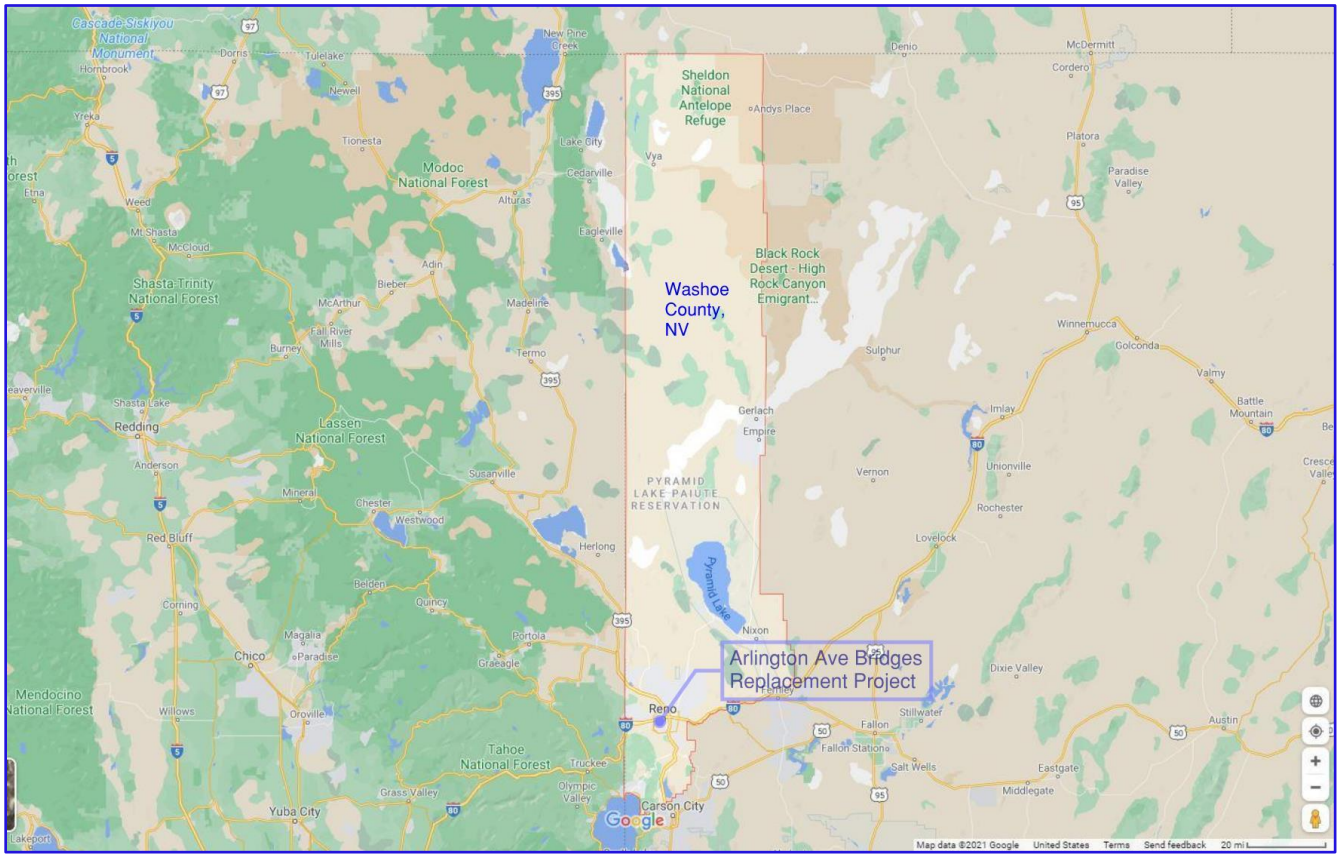


Figure 2. Project Location Within the South Part of Washoe County, NV

Figure 3. Large-Scale Project Location Map

2. Background Information

The hydraulic model is a 1-dimensional (1-D) HEC-RAS model currently running in version 5.0.3. It is intended to model flow primarily in the (14,000 cfs) river channel and does not include fine detail in floodplains. The model, dated June 21, 2018, was provided to Jacobs by the Carson-Truckee Water Conservancy District (CTWCD). The model extends downstream to just beyond Glendale, and the quality of geometry varies significantly. Geometry accuracy is generally highest in more urbanized areas, with Light Detection and Ranging (LiDAR)-derived terrain. Accuracy and quality generally decrease going upstream since there has been little need for detailed models in that vicinity. The downtown Reno portion of the Truckee River Model generally reaches upstream from Keystone Avenue downstream to Glendale Avenue. The CTWCD's version of the downtown Reno model was adapted from the Truckee River Flood Management Authority (TRFMA) model, which was a combined 1-D/2-D model. In-stream cross sections were extracted from the TRFMA model and were supplemented with LiDAR-derived terrain outside the channel by CTWCD.

2.1 Available Authority Model

The CTWCD baseline hydrology and hydraulics model provided to Jacobs is dated June 21, 2018. This model was the most up-to-date model when received by Jacobs and therefore has been developed as the baseline model of the hydrology and hydraulic analysis.

2.1.1 Assumptions and Limitation of the Study

- The model runs in HEC-RAS version 5.0.3 and produces results consistent with CTWCD's understanding of the input hydrograph.
- Hydrology has been calibrated by CTWCD to match 14,000 cfs peak flows.
- New development, adjacent project hydraulic updates developed by others, and any hydrology, LiDAR data or water surface elevation (WSEL) changes after this date were not incorporated into this model, with one exception.
- CTWCD did update the baseline model with the as-built geometry of the Whitewater Park constructed in 2004.
- The Glendale Weir was in the process of being updated by others in 2018 but is not included in the baseline model.
- This model will be focusing on the Arlington Avenue Bridges improvements.
- The analysis assumes no significant in-stream embankment will be placed and earthwork will have a net-zero balance or export of earthwork within the project limits.
- As included in the RTC's 2050 RTP, two of the downstream bridges, Sierra Street and Lake Street are upgraded to adequately pass the 100-year storm, while Center Street remains in its current condition, and Virginia Street is the recently constructed configuration within the baseline model.
- As included in the RTC's 2050 RTP, one upstream bridge, Keystone Avenue, is upgraded to adequately pass the 100-year storm, while the other local upstream bridge, Booth Street, remains in its current condition within the baseline model.

3. Federal Emergency Management Agency (FEMA) Effective Floodplain and Flood Zone

In addition to the CTWCD model, FEMA regulates its own official clearing house and effective flood modeling, as well as mapping data. FEMA currently lists the effective Flood Insurance Study (FIS) as revised on June 18, 2013 and Flood Insurance Rate Map (FIRM) for Truckee River as revised on March 16, 2009. The effective FIRMette is located in Appendix A of this memo. Floodway data was not analyzed in FEMA FIS at the approximate location of the CTWCD models.

The Project is located in FEMA FIRM Panel 32031C3037G, Washoe County, Nevada and Incorporated Areas. The Project is located in Flood Zone AE, an area that presents a 1% annual chance of flooding and a 26% chance over the life of a 30-year mortgage, according to FEMA. The FEMA reported Base Flood Elevation (BFE) for the Arlington Avenue Bridges is 4500.1 feet above mean sea level. Flooding has been a problem in southern Washoe County, particularly throughout the Truckee Meadows. The Truckee River is one of the principal sources of flooding near the Cities of Reno and Sparks because of the flat topography (FEMA FIS, June 18, 2013). **Figure 4** shows the approximate location of historical downtown Reno flooding areas.

During final design, the proposed project will be evaluated to ensure there are no effects on the hydrologic or hydraulic characteristics of the flooding source that would result in modifications of the existing regulatory floodway, the effective Base Flood Elevations (BFEs) and the Special Flood Hazard Area, thus avoiding the requirement to obtain a Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision.

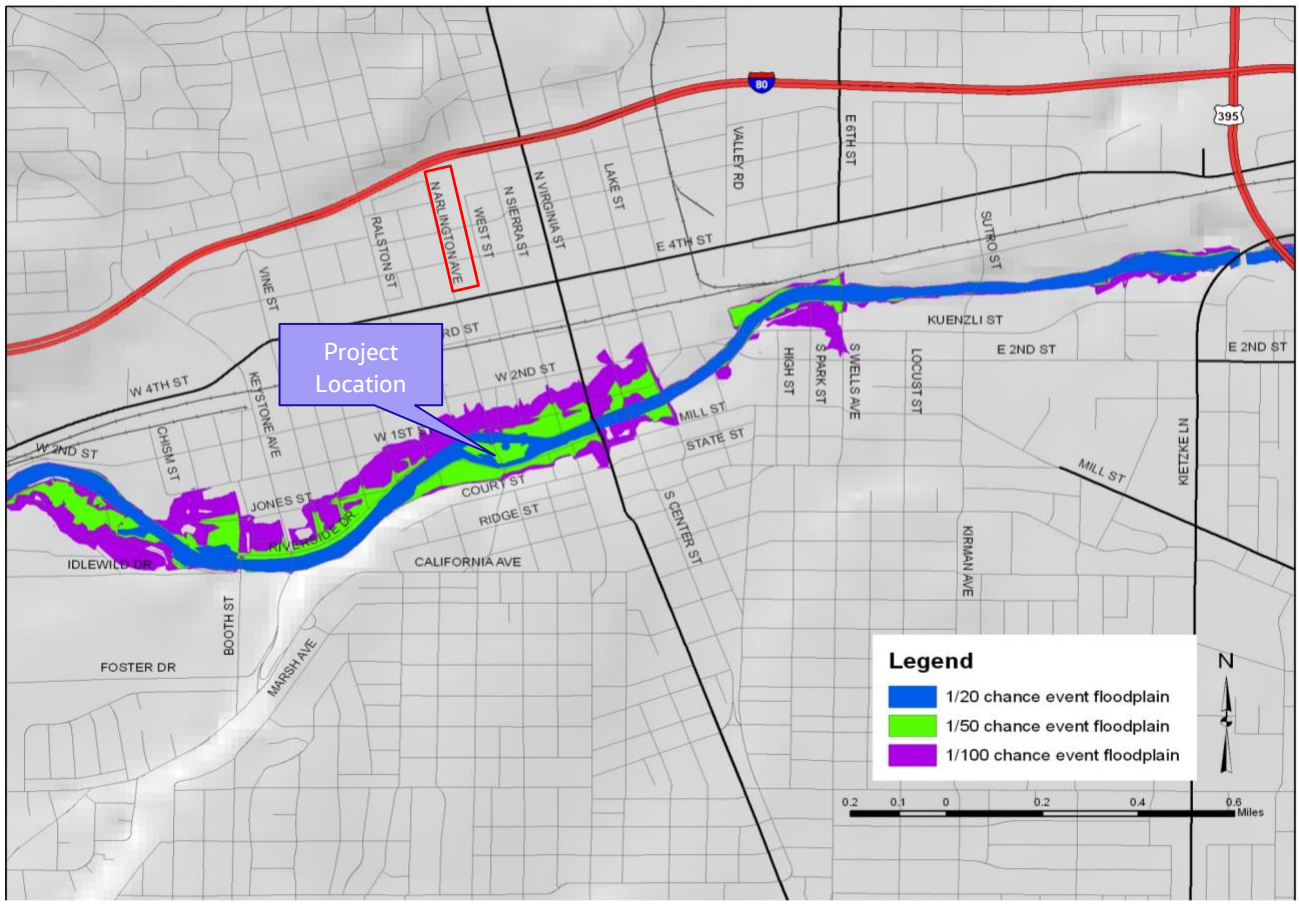


Figure 4. Flooding Locations Near Project Vicinity

Source: Truckee Meadows Flood Control Project, Nevada USACE (May, 2013)

4. Flood Mitigation Design Requirements

The following design criteria will be used as a basis when the final freeboard requirements are discussed and agreed upon by the Agencies during final design for the Arlington Avenue Bridges.

- Carson-Truckee Water Conservation District: 50-Year flood (14,000 cfs) with 2 feet of freeboard;
- Truckee Meadows Regional Drainage Manual: 74-year flood (16,400 cfs, approximate historical flood event of year 2005) with 2 feet of freeboard;
- Nevada Department of Transportation Drainage and Structural Design Manuals: 100-year flood (20,676 cfs) with 2 feet of freeboard when practical, match existing low-chord elevations at a minimum;
- Truckee Meadows Regional Drainage Manual: 100-year flood (20,676 cfs) with 2 feet of freeboard;
- U.S. Army Corps of Engineers: 100-year flood (20,676 cfs) with 4 feet of freeboard to account for risk and uncertainty requirements; and
- Federal Emergency Management Agency: 100-year flood (18,000 cfs) to allow Special Flood Hazard Areas (SFHA) AE Zone FEMA flood protection with no increase in water surface elevations, comparing to pre-Project conditions.
- Nearby, recently constructed, Virginia Street Bridge along the Truckee River: 100-year flood with 1 foot of freeboard.

5. Hydrology

As discussed in Section 2.1, peak flows of the unsteady 1-D model are 14,000 cfs. This data remains unchanged for existing (Pre-Project) and proposed (Post-Project) models. Representative river stations are listed in **Table 1**.

Table 1. CTWCD Effective Truckee River Hydrology near Project Vicinity

RIVER STATION	DESCRIPTION	APPROX. 50-YR EVENT OR 2 PERCENT ANNUAL CHANCE PEAK FLOW (CFS)
River Station 74449.19 to River Station 50671.96	From Upstream near Mayberry Dr to just Upstream of Arlington Avenue Bridges	14,000
River Station 50625	Arlington Avenue Bridges	14,000
River Station 50578.08 to 37492.76	From just Downstream of Arlington Avenue Bridges to just Upstream of SR 648	14,000

6. Hydraulics

The existing (Pre-Project) north bridge has two piers, with three spans, each approximately 40 feet in length. The total length of the north bridge is 122 feet and is 76 feet in width. The existing south bridge is a rigid frame structure with a clear span of 48 feet and a width of 60 feet. **Figure 5** shows the existing bridges geometry, dimensions and freeboard for the 14,000 cfs flow. The existing freeboard of both bridges is less than 2 feet.

The proposed (Post-Project) model was updated to replace the existing bridges with the conceptual alignment, embankment and abutment dimensions, plan, and elevation information of the proposed bridges. It was assumed no overbank terrain changes would result from the Project and any in-stream excavation or embankment would balance to a net-zero volume. Manning's n roughness coefficient values where the proposed grading is located were lowered from 0.4 to 0.3 per Chow et al. (1959) to reflect the anticipated erosion control and compaction establishment at site. Conservatively, the north bridge has an approximate of 17 feet clearance, measuring from the low chords to main channel average low points. The south bridge has an approximate of 15 feet clearance, measuring from the low chords to main channel average low points.

The proposed condition shows no-rise compared to the Pre-Project Model condition. The outputs of the Pre-Project and Post-Project, as well as hydraulic modeling output results are shown in Appendix D. **Figure 6** shows proposed bridges geometry and freeboard of Alternative 1 - North Arlington Avenue Bridge - 131 feet long, 78 feet wide clear span bridge. South Arlington Avenue Bridge – 56 feet long, 78 feet wide Cast-In-Place (CIP) clear span bridge. **Figure 7** shows proposed bridges geometry and freeboard for Alternative 2 -North Arlington Avenue Bridge - 125 feet long, 78 feet wide CIP bridge with one pier. South Arlington Avenue Bridge – 56 feet long, 78 feet wide Cast-In-Place (CIP) clear span bridge. **Table 2** shows comparison of water surface elevation between Pre- and Post- Projects Alternative 1 - Clear Span at North Arlington Avenue Bridges proximity. **Table 3** shows comparison of water surface elevation between Pre- and Post- Projects Alternative 2 - 1 pier at North Arlington Avenue Bridges proximity. **Table 4** presents freeboard at existing (Pre-Project) and two proposed (Post-Project) alternatives.

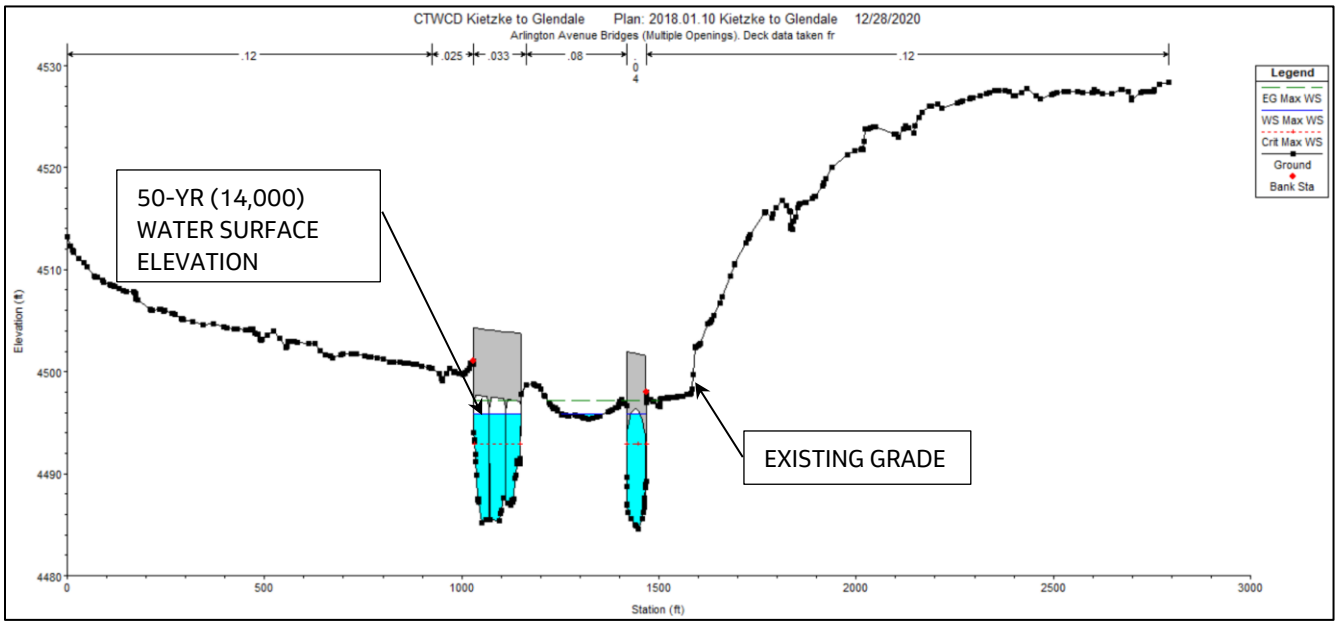


Figure 5. Existing Bridges and Freeboard

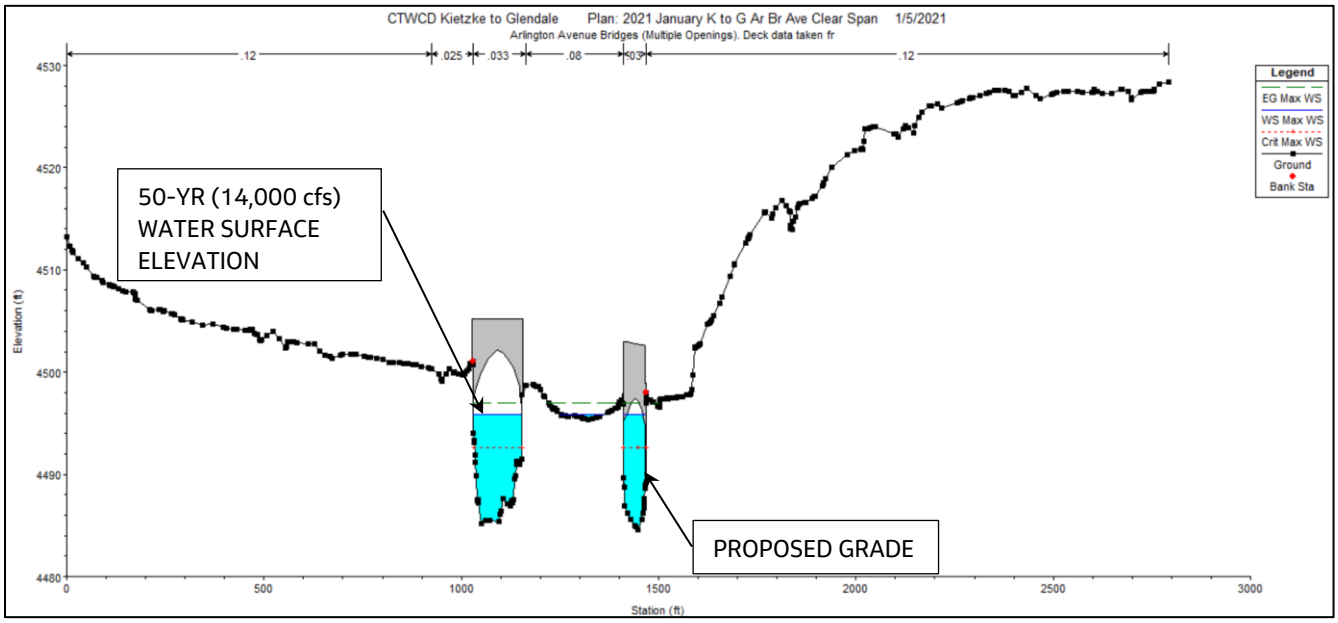


Figure 6. Proposed Bridges Geometry and Freeboard for Alternative 1

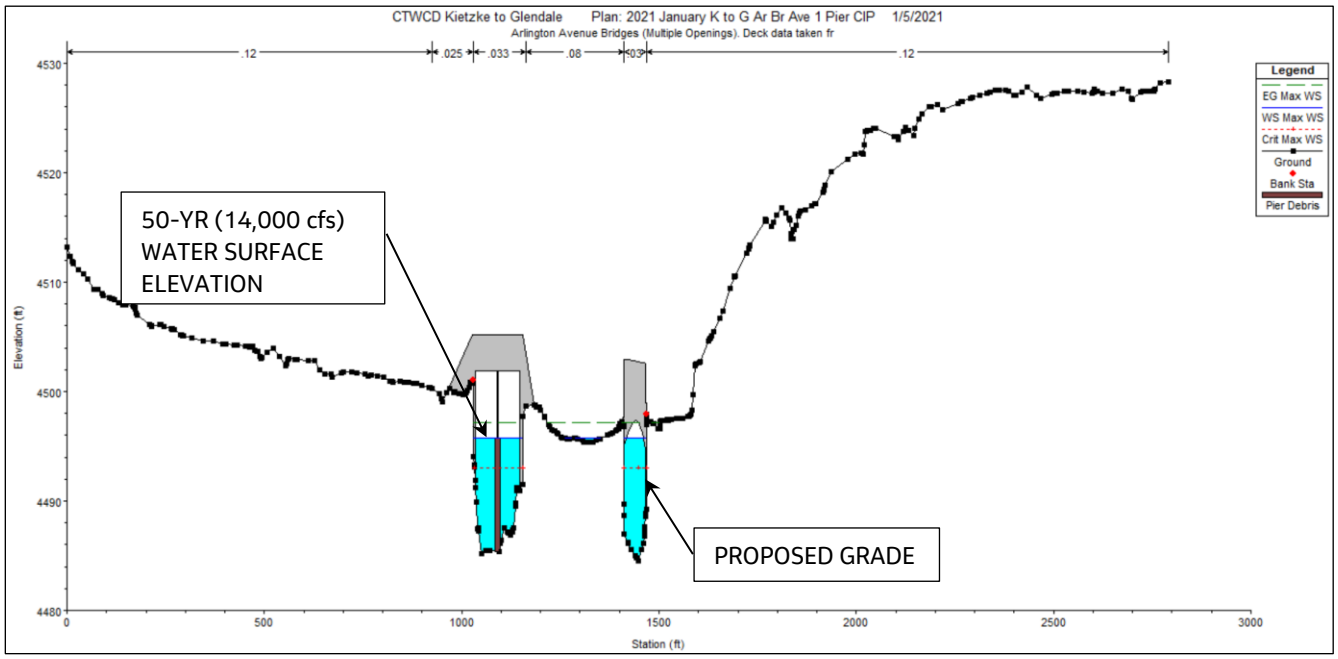


Figure 7. Proposed Bridges Geometry and Freeboard for Alternative 2

Table 2. Comparison of WSELs between Pre- and Post- Projects Alternative 1 - Clear Span at North Arlington Avenue Bridges proximity.

River Stations	Existing (Pre-Project) Water Surface Elevation (WSEL, ft) @ 14,000 cfs	Alternative 1: Proposed (Post-Project) Water Surface Elevation (WSEL, ft) @ 14,000 cfs	Difference (ft)
50681.29	4496.69	4496.16	-0.53
50671.96	4496.19	4495.47	-0.72
Arlington Avenue Bridge			
50578.08	4495.52	4495.45	-0.07
50519.86	4495.31	4495.29	-0.02

Table 3. Comparison of WSELs between Pre- and Post- Projects Alternative 2 - 1 pier at North Arlington Avenue Bridges proximity.

River Stations	Existing (Pre-Project) Water Surface Elevation (WSEL, ft) @ 14,000 cfs	Alternative 2: Proposed (Post-Project) Water Surface Elevation (WSEL, ft) @ 14,000 cfs	Difference (ft)
50681.29	4496.69	4496.61	-0.08
50671.96	4496.19	4496.09	-0.1
Arlington Avenue Bridge			
50578.08	4495.52	4495.45	-0.07
50519.86	4495.31	4495.29	-0.02

Table 4. Freeboard at Existing (Pre-Project) and two Proposed (Post-Project) Alternatives

	Existing (Pre-Project) Bridge	Proposed (Post-Project) Bridge Alternative 1	Proposed (Post-Project) Bridge Alternative 2
North Bridge Freeboard (ft) Upstream Face	1.30	6.70	5.78
South Bridge Freeboard (ft) Upstream Face	0.17	1.89	1.27

7. Permits Considerations

This section discusses the potential permits that need to be prepared for the construction of this Project.

7.1 FEMA CLOMR/LOMR Application

The Project is located in a Zone AE floodplain. However, the final design of the Project will ensure no water surface elevation rise or no adverse impacts to avoid the need for a CLOMR/LOMR.

7.2 CTWCD Flood Channel Encroachment Permit (408 Permit)

The Project will require a 408 Encroachment Permit Authorized by both the Carson-Truckee Water Conservancy District and the USACE Flood Branch. The CTWCD Encroachment Permit application form is attached in Appendix B.

7.3 USACE 404 or 401 Permit

This project proposes construction within a jurisdictional riverine wetland (ID: R3UBH), therefore a 401 or 404 permit has been considered by the Environmental Team to meet the Clean Water Act (CWA). USACE and USFWS representatives are engaged with this Project and are aware of the need to obtain a permit.

8. Conclusions and Recommendations

The following summarizes study results and recommendations for permits:

- For CTWCD design criteria of 14,000 cfs plus 2 feet of freeboard, a minimum low chord elevation of 4498.19′ is recommended.
- For regional review, 100-year WSEL + 2.0 feet of freeboard is recommended. If using 20,700 cfs for 100-year flows per Northern Nevada Comprehensive Regional Water Management Plan Staff Report (2016), 4502.12′ + 2.0 feet = a minimum low chord elevation of 4504.12′.
- The south bridge did not meet 2-ft freeboard criteria in the preliminary design for the 50-year storm event. During final design, freeboard requirements will be agreed upon by the agencies, and refinement of bridge deck thickness, minor profile adjustments, and detailed grading around the bridge abutments will be completed.
- Design will balance excavation and embankment located within the Truckee River floodplain to avoid the need to file FEMA CLOMR/LOMR applications.
- Encroachment permit should be filed with CTWCD. The review takes approximately 45 days. CTWCD will escalate the permit to USACE that may take up to a year to review.
- Prepare a stormwater pollution prevention plan (SWPPP) to meet NPDES regulations.
- The Environmental Team will be required to apply for USACE 404 or 401 Permit.
- The Project is not expected to have water surface elevation rise impacts to the Truckee River.
- NEPA/Design phase needs to consider impacts to the hydraulics of the Whitewater Park.

9. References

Federal Emergency Management Agency (FEMA). 2009. National Flood Insurance Program Flood Insurance Rate Map (FIRM) 32031C3037G.

Nevada Department of Transportation (NDOT). 2006. *Drainage Manual*. 2nd Edition.

US Army Corps of Engineers. *Hydrologic Engineering Center River Analysis System (HEC-RAS) Hydraulic Reference Mania*.

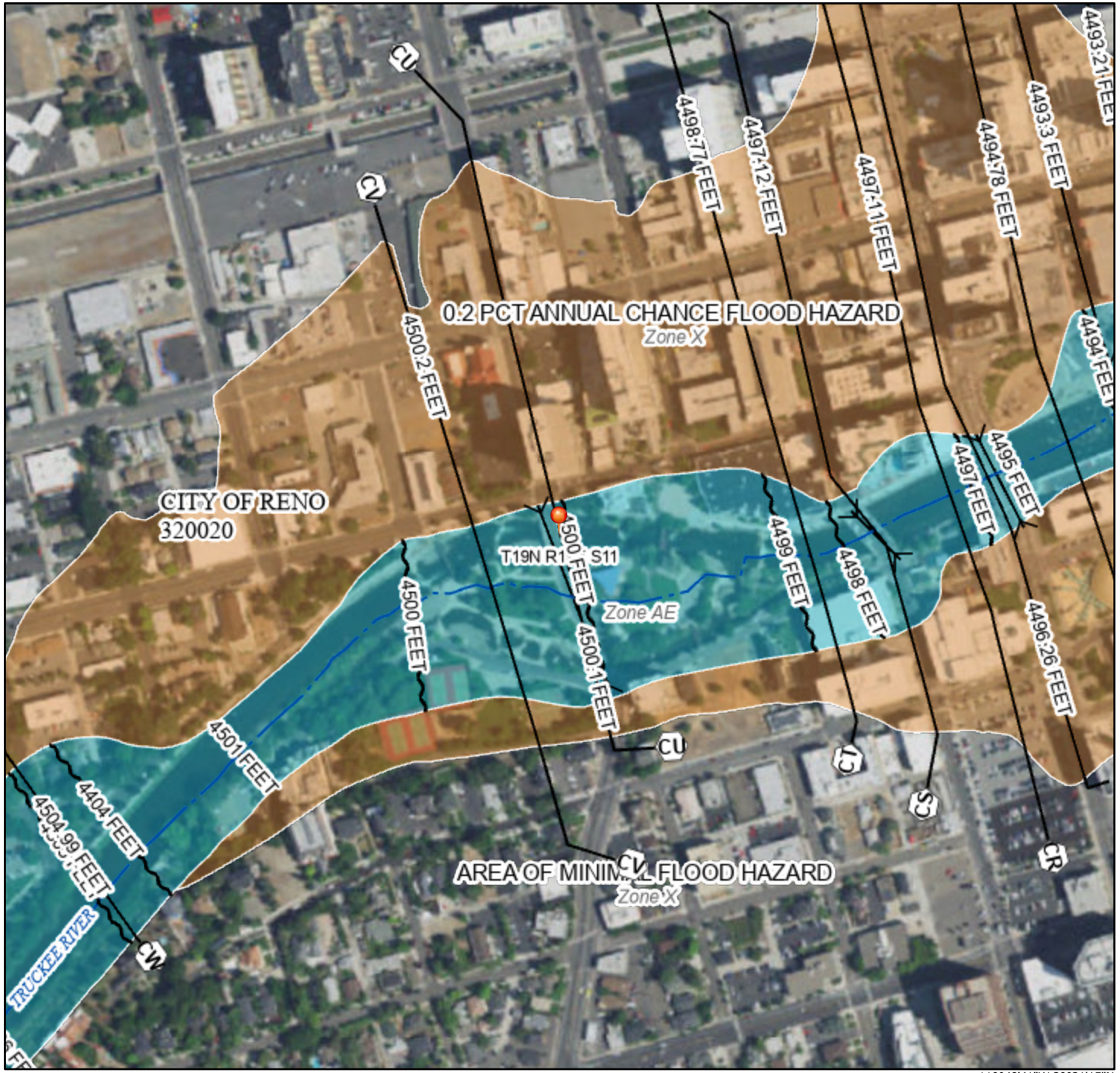
Washoe County. April 2009. *Truckee Meadows Regional Drainage Manual*.

Appendix A. FEMA FIRMette

National Flood Hazard Layer FIRMette

FEMA

119°49'19"W 39°31'42"N



119°48'41"W 39°31'15"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/11/2021 at 2:38 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix B. CTWCD Encroachment Permit

CARSON TRUCKEE WATER CONSERVANCY DISTRICT
APPLICATION FOR FLOOD CHANNEL 408 ENCROACHMENT PERMIT

UPPER TRUCKEE RIVER – NV/CA STATE LINE to GLENDALE BRIDGE
APPLICATION #: _____

APPLICANT/OWNER NAME: _____

APPLICANT ADDRESS: _____
City County State Zip Code

_____ _____
Email Address Phone Number

APPLICANT's AGENT: _____

AGENT's ADDRESS: _____
City County State Zip Code

_____ _____
Email Address Phone Number

APPLICATION DATE: _____

PROJECT NAME: _____

PROJECT LOCATION DESCRIPTION:

_____

PROJECT DESCRIPTION: Briefly describe the overall general project scope, necessity and potential encroachments/impacts to the flood channel. Additional information may be attached.

_____
_____
_____
_____
_____

☐ **1) Attach a vicinity map showing the project Location with Longitude and Latitude; include any residential neighborhoods near the project.**

☐ **2) Attach an area map showing the project area, disturbance area, access routes, staging areas, etc. with topography, established benchmarks and survey (see note in 5 below). Note the 14,000cfs flood channel demarcation on this map.**

☐ **3) Attach photos showing the project area, pre-project conditions, access routes, staging areas, vegetation, Ordinary High Water Mark (OHWM) identification and other relevant features.**

☐ **4) Provide evidence of property ownership or right of access agreements for all properties used by the project; note if any federal property is involved.**

☐ **5) Provide Project Plans including descriptions of work to be performed, project features, materials specifications, design details with cross-sections, survey data with date, 14,000cfs flood channel demarcation, channel cross-sections and geometry, identification of the OHWM, floodplain zone identifications and other relevant information. NOTE: all survey data must be using Horizontal Datum Nevada Coordinate System West Zone, NAD83, US Survey Feet, Vertical Datum: NAVD88, and Geoid: 03 CONUS; date of survey must be provided. Demonstrate how the design does not impact public interest or impair the 14,000cfs flood channel capacity.**

☐ **6) Provide information regarding the structural impacts of the project to the flood channel including scour analysis, geotechnical impacts and stability analysis for the project design and describe how these factors were incorporated into the design for river flows up to 14,000cfs.**

☐ **7) Provide information regarding the hydraulic impact of the project to the flood channel including hydraulic model analyses for areas upstream, downstream and in the immediate area of the project using survey data compliant with note in 5 above. HEC-RAS model is preferred. Alternatively, provide percentage blockage analysis of the project at the critical flow cross-section. Demonstrate through these analyses that the project does not impair the flow channel.**

<u>CONSTRUCTION METHODS</u>: Generally describe construction methods to be used for the project installation, equipment to be used, dewatering plans and other relevant construction information.

_____

_____

_____

_____

_____

☐ **8) Provide details of the temporary dewatering plan and post project restoration of flows.**

☐ **9) Provide information regarding vegetation disturbance/removal required for the project work and provide a revegetation plan for all project areas; especially those areas within the 14,000cfs flood channel.**

☐ **10) Provide information regarding disturbance of the river channel and plans for restoration of the impacted channel areas.**

<u>PROJECT SCHEDULE/ TIMELINE</u>: Please provide a general project schedule and construction timeline for the project including an estimated project start date and completion date.

_____

_____

_____

_____

☐ **11) Please provide a detailed project schedule/timeline including mobilization, construction and demobilization; delineate periods during which the river channel capacity will be impacted with dewatering, construction, excavation and materials. NOTE: Work between November 1 and June 30 may require additional District authorization.**

☐ **12) Please provide information regarding project requirements or limitations related to schedule and permitting (ie: grant expiration date, river flow limitation, etc).**

<u>ENVIRONMENTAL (NEPA) REQUIREMENTS</u>:

☐ **13) Is your project applying for a USACE Regulatory 404/Nationwide Permit? Yes _____ No_____ ; If yes, please request coordination of the NEPA review between the Regulatory and Flood Branches of the USACE when applying for the Regulatory Permit.**

☐ **14) If your project is <u>not</u> applying for a USACE Regulatory Permit and is only applying for a 408 Permit, please provide the following or provide a request for the USACE Flood Branch to manage NEPA reviews for this project (this may extend permitting timelines):**

- ☐ **a. An Environmental Assessment, Environmental Impact Statement or a request for the USACE Flood Branch to consider the project of a Categorical Exclusion.**

☐ **b. A Biological Assessment for ESA Section 7 Consultation with the USFWS or a request for the USACE Flood Branch to manage this need for this project.**

☐ **c. A Cultural Resources/Archeological Report assessing the effects on cultural resources for Section 106 National Historic Preservation Act consultation or a request for the USACE Flood Branch to manage this need for this project.**

☐ **d. Evidence of Tribal Coordination or a request for the USACE Flood Branch to manage this need for this project.**

☐ **e. A map of the project depicting the impacted floodplains and any information which demonstrates any impacts to the floodplain and the level of hazard to the project and surrounding community.**

☐ **f. Provide information on any air quality impacts from the project including durations and permits required.**

☐ **g. Provide any mitigation plans for the project.**

<u>REQUIRED PERMITS OR APPROVALS</u>: List all permits, licenses and approvals that are required for your project and note if each has been acquired or is in process. If in process, note the current status and expected approval date. Below are typical permits and approval contact phone numbers; however, this list is not all inclusive and obtaining all required permits and approvals is the responsibility of the applicant.

- **U.S. Army Corp of Engineers Regulatory Branch- Reno Office 775-784-5304**
- **Nevada Division of State Lands 775-687-2720**
- **Nevada Division of Environmental Protection, Bureau of Water Pollution Control 775-687-9418**
- **Nevada Division of Environmental Protection, Bureau of Water Quality Planning 775-687-9456**
- **Nevada Department of Transportation 775-834-8330**
- **Nevada Department of Wildlife 775-688-1506**
- **U.S. Fish & Wildlife Service, Nevada Office 775-861-6300**
- **Other local jurisdictional permits- building, grading, air-quality, etc**

<u>OTHER INFORMATION</u>: Provide any information that may be important to the approval of this application.

<u>FINAL PROJECT REPORT & AS BUILT DRAWINGS</u>: Project applicant shall submit a final report to the District within 30days of project completion which shall detail the project elements completed; The Applicant shall provide as-built drawings for the project upon request by the District. If requested by the District Board, the applicant shall provide a presentation regarding the project to the Board at a regularly scheduled Board meeting.

APPLICATION & FEE: A complete application package along with all submittals shall be made to the Carson-Truckee Water Conservancy District; review will begin once all items have been submitted and the initial Application Fee is received by the District. Submission should be in a typically used electronic format (such as PDF) on a USB flash drive or via email to ctwcd1958@gmail.com ; applications may also be submitted through access to a share site when documents are too large to email.

Submittals made via print materials shall have three copies submitted to the Carson-Truckee Water Conservancy District, Attention: Encroachment Permitting, 1005 Terminal Way, Suite 150, Reno NV 89502.

☐ **An Application Fee shall be submitted to the Carson Truckee Water Conservancy District with the completed application and submittals based on the Districts current Application Fee Levels; the appropriate Fee Level for each project will be determined by the District's Engineer. See the attached Fee Policy for details.**

APPLICATION AUTHORIZATION: I certify that I am familiar with the information contained in this application, and that to the best of my knowledge and belief, such information is true, complete and accurate. I further certify that I have the authority to undertake the proposed Project and that as the applicant, I assume all responsibility for all project elements including, but not limited to, compliance with all 408 Permit Conditions, compliance with all environmental and safety regulations, and compliance with all relevant construction standards. I certify that as the applicant, I or the agency I represent will be the Grantee/ Permittee and Owner of the permit issued for the Project.

SIGNED: _____

NAME: _____

TITLE: _____

DATE: _____

THE CARSON-TRUCKEE WATER CONSERVANCY DISTRICT WILL RESPOND TO APPLICATIONS WITHIN 45 DAYS FROM THE DATE THE COMPLETE APPLICATION AND PERMIT FEE IS RECEIVED. THE CARSON-TRUCKEE WATER CONSERVANCY DISTRICT RESERVES THE RIGHT TO REQUEST ADDITIONAL INFORMATION AND/OR TO DENY ANY APPLICATION FOR FLOOD CHANNEL 408 ENCROACHMENT PERMIT, BASED ON INFORMATION PROVIDED.

NOTE: ALL 408 ENCROACHMENT PERMITS REQUIRE AUTHORIZATION FROM THE SACRAMENTO FLOOD BRANCH OF THE USACE; PERMIT PROCESSING AND REVIEW BY THE USACE MAY TAKE UP TO 18 MONTHS TO COMPLETE FOR THE ISSUANCE OF THE PERMIT. Refer to the Section 408 Requirements at http://www.usace.army.mil/Missions/Civil-Works/Section408/ ; and Refer to the Policy Guidance document EC 1165-2-216 at http://www.publications.usace.army.mil/Portals/76/Publications/EngineerCirculars/EC_1165-2-216.pdf;

NOTE: THE 408 ENCROACHMENT PERMIT MUST BE AUTHORIZED BY THE SACRAMENTO FLOOD BRANCH OF THE USACE PRIOR TO THE ISSUANCE OF THE SECTION 404 REGULATORY PERMIT.

CTWCD
FEE POLICY
For 408 Permit Application Review
June 2020

Notice: Failure to apply for a 408 Permit when a District Permit Review & Approval is required, and when Authorization by the USACE Flood Branch is required, may result in the removal of the unauthorized project from the Truckee River Channel and/or the cost of the project review being assessed to the owner.

Fee Structure: The appropriate project application and review fee below will be collected with the project application. The project application will not be reviewed until the appropriate fee is received by the District. Review fees have been established at levels which are expected to cover the full costs of the Permit review. Based on the anticipated general project details as discussed with the applicant, the District's Engineer shall select the appropriate tier level for each project based on complexity and similar project review costs.

- Level 1- $1000 Application Fee- This level is for projects such as utility crossings, decks etc whose structures, construction and excavation are entirely outside the 14,000cfs Flow Channel, but which require a 408 Permit.
- Level 2- $2500 Application Fee- This level is for small projects which have minimal or Temporary disturbance in the 14,000cfs flood channel and require minimal flow modeling and minimal bed and bank disturbance and restoration.
- Level 3- $7500 Application Fee- This level is for typical projects which have some temporary or minimal disturbance in the 14,000cfs flood channel, require some level of flow modeling, disturb the bed or banks and require river channel restoration.
- Level 4- $10,000 Application Fee- This level is for projects which have some permanent disturbance in the 14,000cfs flood channel, require flow modeling and/or scour analysis, and disturb the bed or banks and require river channel restoration.

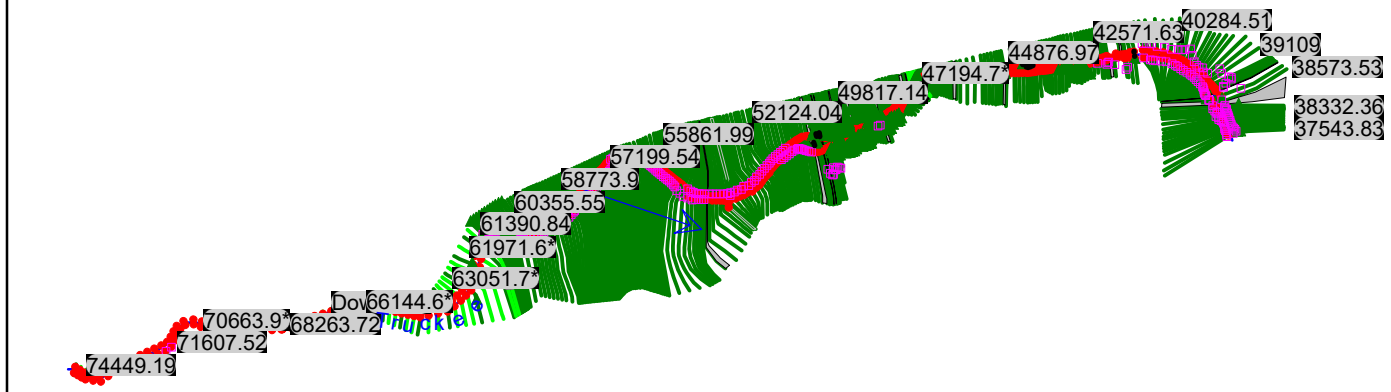
1. Permit Review hours and any District costs associated with processing the permit or payment to the District for the Permit review, will be billed at $175/hour (or an updated rate approved by the Board from time to time).
2. No permit review will begin until the Application Fee is paid in full.
3. The District will provide the applicant a complete statement of hours worked on the permit review and processing once the review is complete; the statement will show the additional dollars owed to the District or unused dollars to be refunded to the applicant.

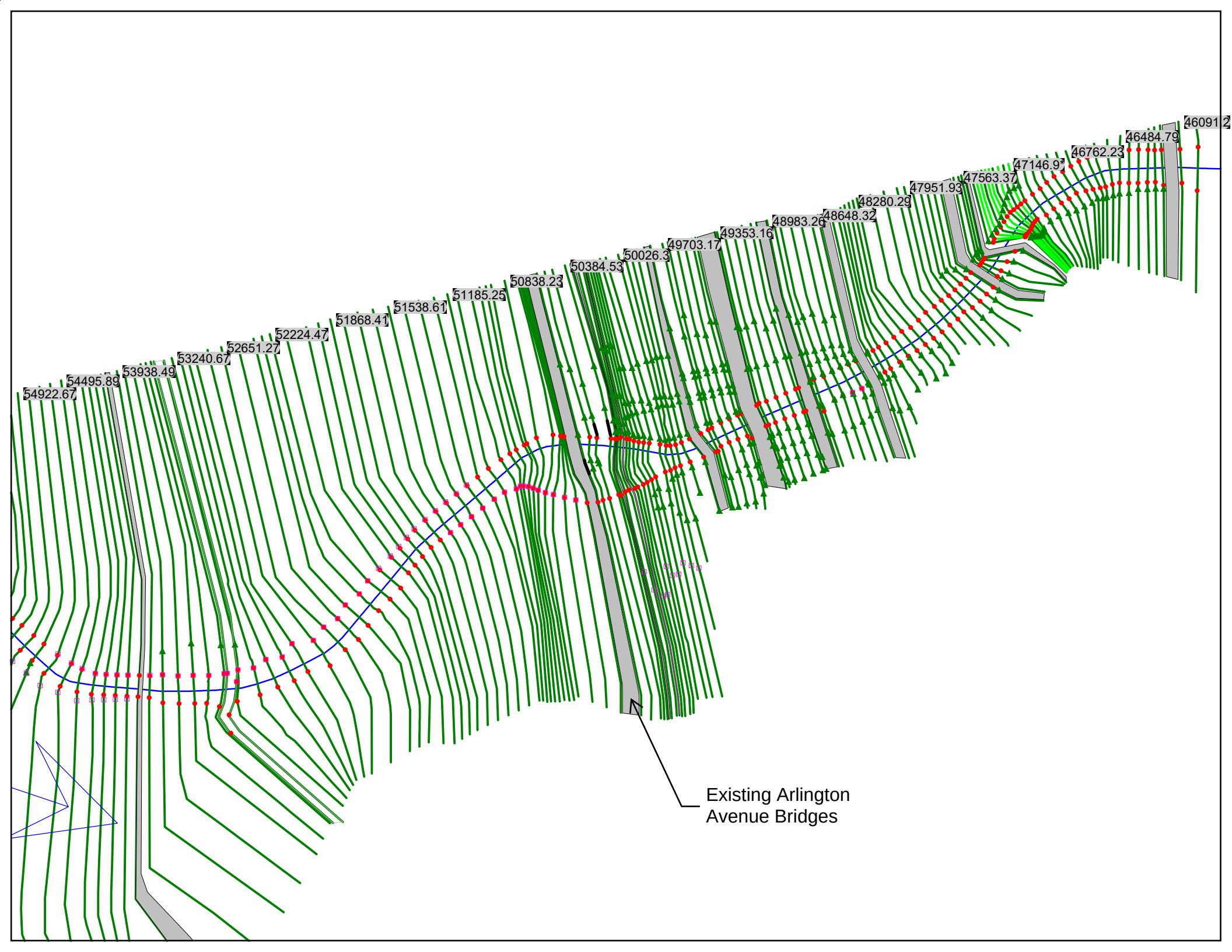
4. Any unused portion of the Application Fee be returned to the applicant once the District permit review and USACE authorization is completed; the District will NOT pay interest on any unused funds held.
5. If the initial Application Fee is insufficient to cover all review, processing and authorization costs; the 408 Permit will NOT be issued until such time as the fee balance, including any additional processing costs incurred for fee collection, is paid in full.
    a. Once the review and processing costs exceed the initial application fee, the applicant will be invoiced monthly with a statement of hours for the additional costs incurred during the prior month; invoices are to be paid within 30days.
    b. Failure to remit payments for review and processing fees will result in curtailment of the project review until delinquent fees are paid in full and the assessment of interest at 5% per month on unpaid balances more than 30 days in arears.
6. This Policy is an attachment to the 408 Permit Application.

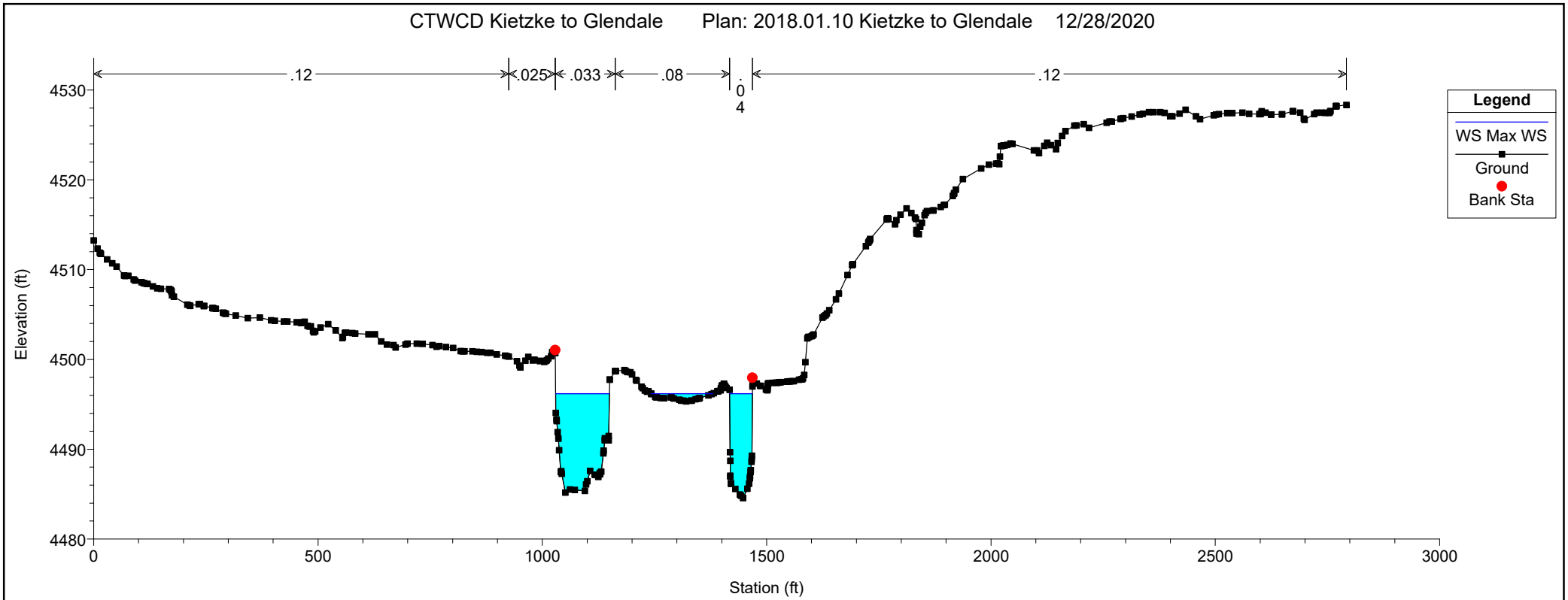
Appendix C. Hydrology and Hydraulics Output Results

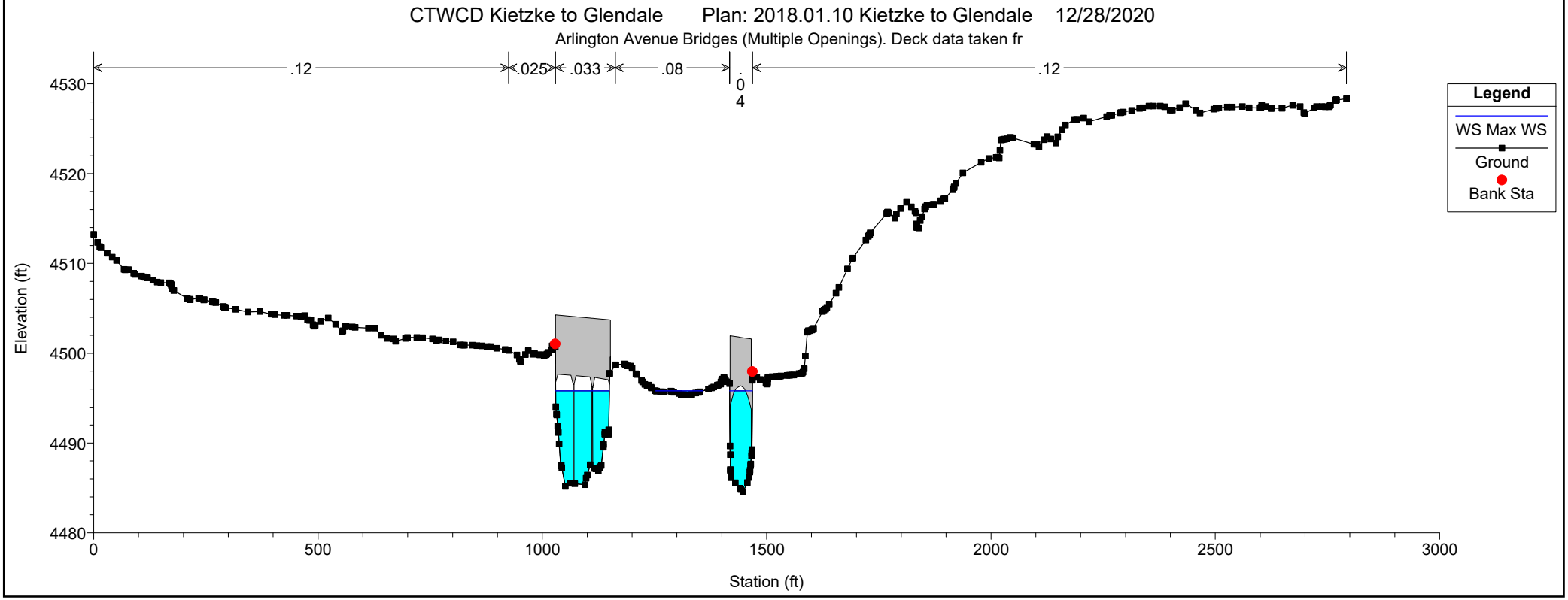
- Existing (Pre-Project)
- Proposed (Post-Project) Alternative 1: North Arlington Avenue Bridge Clear Span; South Arlington Avenue Bridge Clear Span
- Proposed (Post-Project) Alternative 2: North Arlington Avenue Bridge One Pier; South Arlington Avenue Bridge Clear Span

Existing (Pre-Project)


40284.51
42571.63
39109
44876.97
38573.53
47194.7*
49817.14
38332.36
52124.04
37543.83
55861.99
57199.54
58773.9
60355.55
61390.84
61971.6*
63051.7*
66144.6*
70663.9*
68263.72
71607.52
74449.19

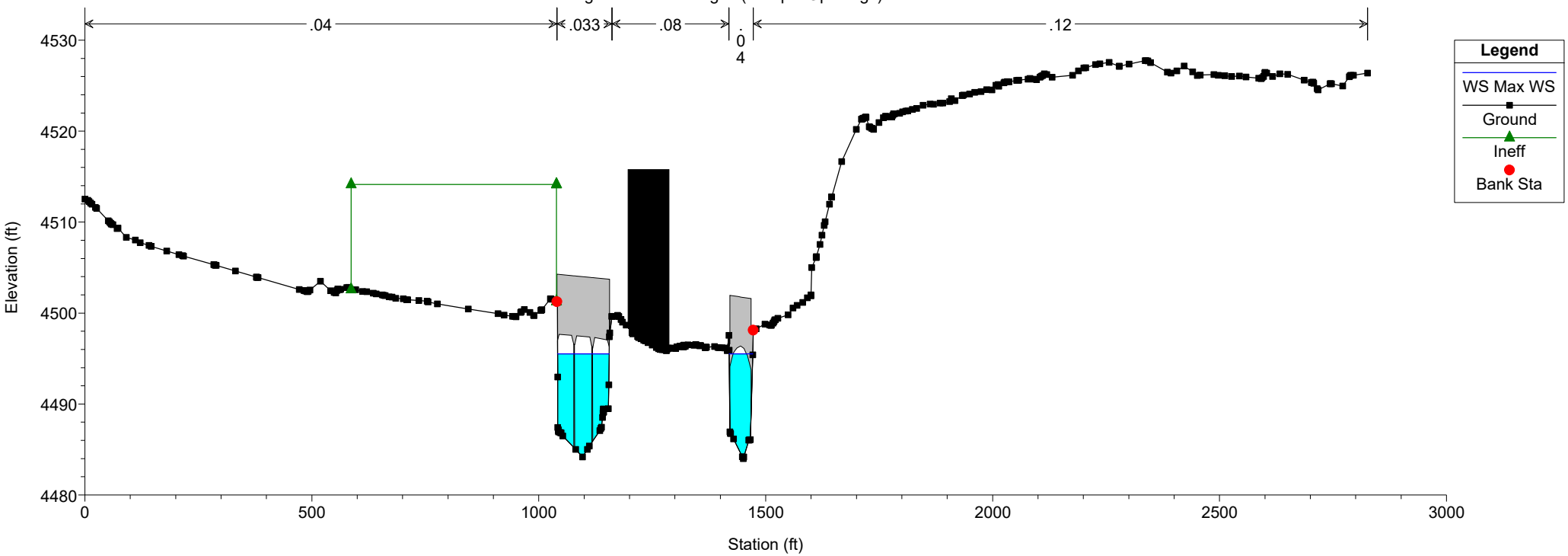

54922.67
54495.89
53938.49
53240.67
52651.27
52224.47
51868.41
51538.61
51185.25
50838.23
50384.53
50026.3
49703.17
49353.16
48983.26
48648.32
48280.29
47951.93
47563.37
47146.9
46762.23
46484.79
46091.2
Existing Arlington
Avenue Bridges


CTWCD Kietzke to Glendale Plan: 2018.01.10 Kietzke to Glendale 12/28/2020
.12
.025
.033
.08
.04
.12
Legend
WS Max WS
Ground
Bank Sta
Elevation (ft)
4530
4520
4510
4500
4490
4480
0
500
1000
1500
2000
2500
3000
Station (ft)

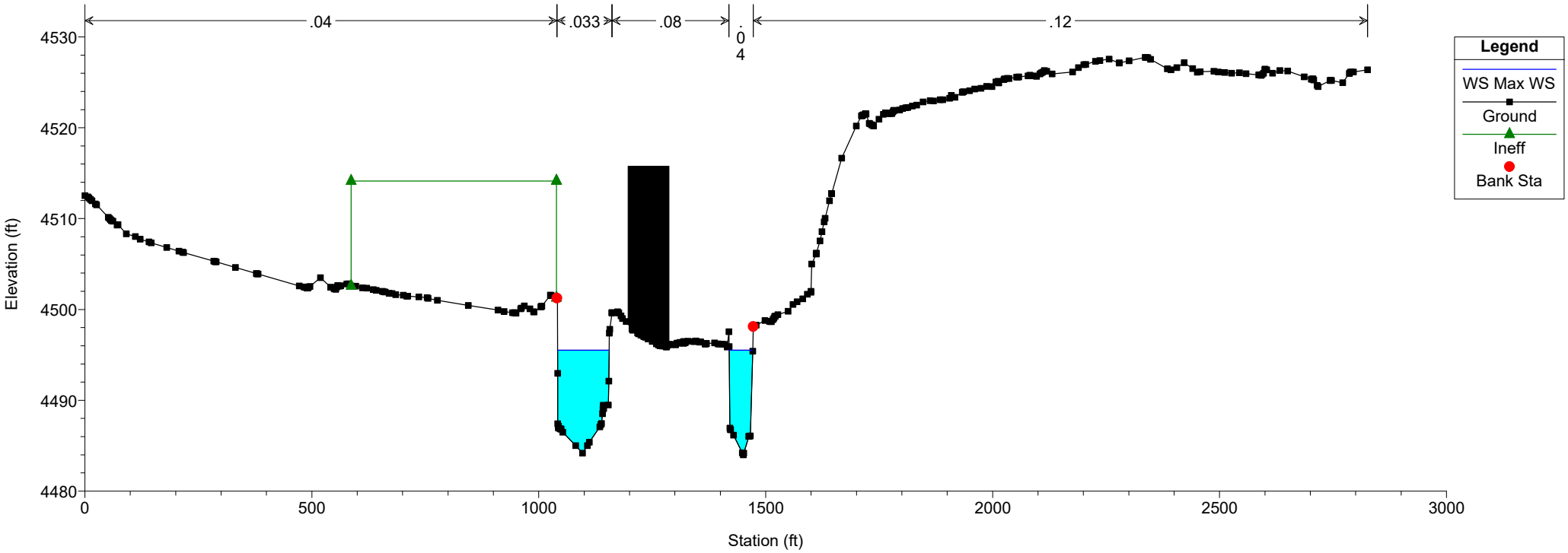

CTWCD Kietzke to Glendale Plan: 2018.01.10 Kietzke to Glendale 12/28/2020
Arlington Avenue Bridges (Multiple Openings). Deck data taken fr
.12
.025
.033
.08
.04
.12
Legend
WS Max WS
Ground
Bank Sta
Elevation (ft)
4530
4520
4510
4500
4490
4480
0
500
1000
1500
2000
2500
3000
Station (ft)

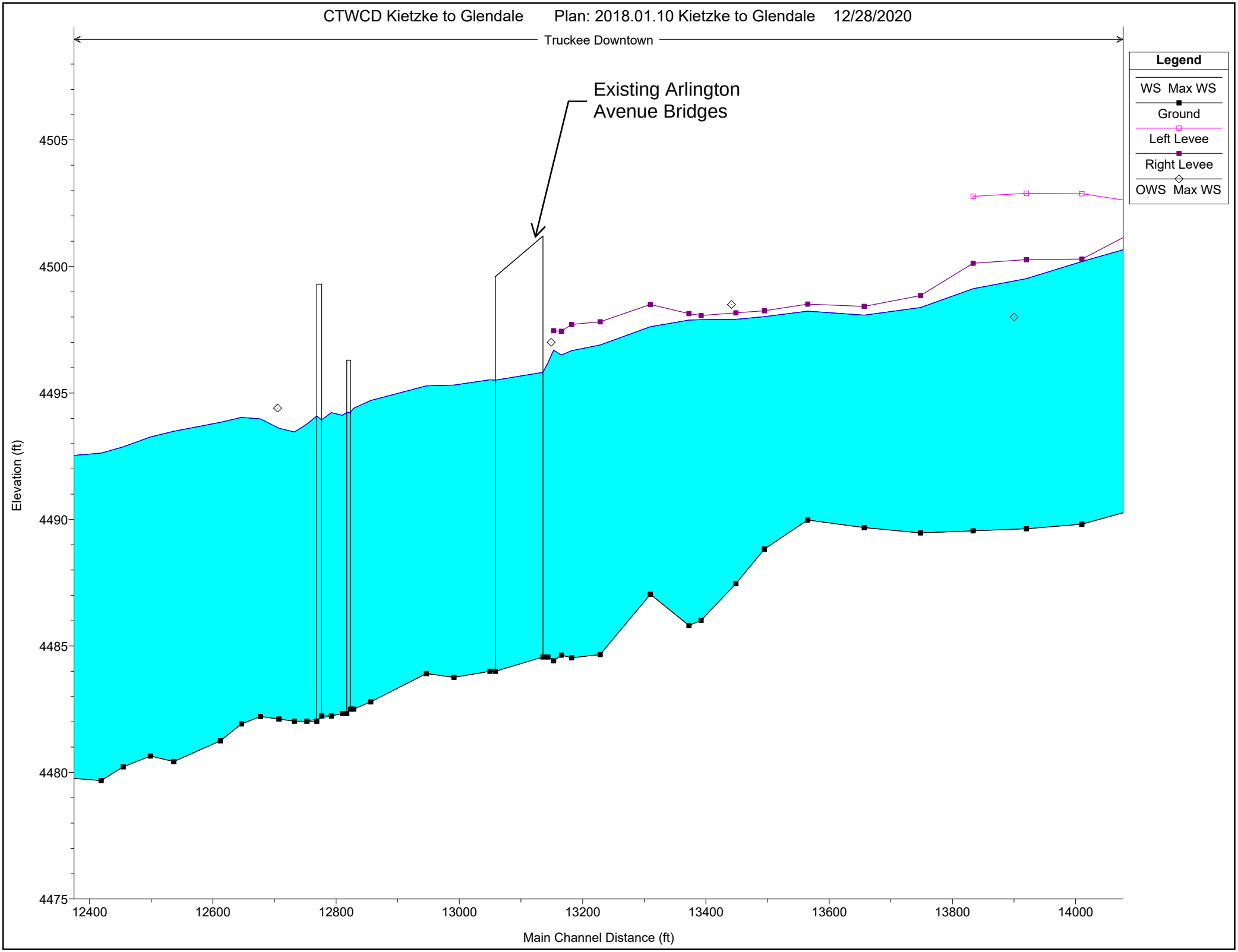
CTWCD Kietzke to Glendale Plan: 2018.01.10 Kietzke to Glendale 12/28/2020

Arlington Avenue Bridges (Multiple Openings). Deck data taken fr



CTWCD Kietzke to Glendale Plan: 2018.01.10 Kietzke to Glendale 12/28/2020




CTWCD Kietzke to Glendale
Plan: 2018.01.10 Kietzke to Glendale
12/28/2020
Truckee Downtown
Existing Arlington Avenue Bridges
Legend
WS Max WS
Ground
Left Levee
Right Levee
OWS Max WS
Elevation (ft)
4505
4500
4495
4490
4485
4480
4475
12400
12600
12800
13000
13200
13400
13600
13800
14000
Main Channel Distance (ft)

HEC-RAS Plan: 2018.03.01 K to G River: Truckee Reach: Downtown Profile: Max WS

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)	
Downtown	74449.19	Max WS	13997.39	4603.85	4613.20		4615.36	0.005493	11.88	1270.27	219.33	0.77
Downtown	74314.8*	Max WS	13997.42	4603.33	4612.49		4614.65	0.005443	11.89	1318.06	234.36	0.77
Downtown	74180.5*	Max WS	13997.12	4602.82	4611.80		4613.91	0.005248	11.86	1382.62	243.84	0.76
Downtown	74046.25	Max WS	13996.58	4602.30	4611.30		4613.23	0.004634	11.48	1510.42	255.24	0.72
Downtown	73865.0*	Max WS	13996.32	4601.46	4610.73		4612.44	0.004197	10.72	1543.16	255.08	0.68
Downtown	73683.84	Max WS	13995.99	4600.62	4610.05		4611.63	0.004008	10.26	1562.11	252.57	0.66
Downtown	73455.3*	Max WS	13995.69	4599.79	4608.95		4610.67	0.004531	10.64	1473.35	247.76	0.70
Downtown	73226.85	Max WS	13994.84	4598.95	4607.20	4606.68	4609.62	0.006807	12.60	1233.24	238.29	0.85
Downtown	73038.4*	Max WS	13995.20	4597.62	4606.11		4608.33	0.006058	12.06	1268.91	236.27	0.80
Downtown	72849.95	Max WS	13994.94	4596.30	4605.44		4607.24	0.004404	10.84	1410.59	237.50	0.69
Downtown	72637.8*	Max WS	13994.48	4595.38	4604.51		4606.29	0.004367	10.75	1403.78	235.07	0.69
Downtown	72425.7*	Max WS	13994.41	4594.46	4603.63		4605.36	0.004228	10.59	1411.35	233.10	0.68
Downtown	72213.6*	Max WS	13993.61	4593.54	4602.86		4604.48	0.003892	10.26	1447.51	232.12	0.65
Downtown	72001.5*	Max WS	13993.88	4592.62	4602.25		4603.70	0.003333	9.72	1525.26	233.31	0.61
Downtown	71789.48	Max WS	13993.25	4591.70	4601.81		4603.06	0.002705	9.01	1648.23	232.38	0.55
Downtown	71607.52	Max WS	13993.38	4590.30	4600.76		4602.45	0.004382	10.47	1387.54	209.62	0.68
Downtown	71439.2*	Max WS	13992.94	4589.53	4599.94		4601.75	0.004264	10.88	1375.64	211.98	0.68
Downtown	71270.9*	Max WS	13992.73	4588.75	4599.31		4601.04	0.004018	10.60	1408.67	214.88	0.66
Downtown	71102.59	Max WS	13992.94	4587.98	4598.74		4600.37	0.003696	10.30	1452.57	215.23	0.64
Downtown	70883.2*	Max WS	13992.42	4587.20	4598.10		4599.66	0.003480	10.07	1484.91	215.50	0.62
Downtown	70663.9*	Max WS	13992.25	4586.43	4597.18		4598.78	0.003694	10.22	1456.04	215.37	0.64
Downtown	70444.66	Max WS	13992.38	4585.65	4596.36		4597.96	0.003735	10.22	1452.30	215.38	0.64
Downtown	70216.4*	Max WS	13992.02	4584.88	4595.56		4597.07	0.003885	9.86	1440.80	212.04	0.64
Downtown	69988.2*	Max WS	13991.92	4584.10	4594.46		4596.09	0.004453	10.24	1380.72	206.22	0.68
Downtown	69760.09	Max WS	13992.21	4583.33	4592.98		4594.96	0.006270	11.31	1246.12	206.49	0.80
Downtown	69510.7*	Max WS	13991.58	4581.82	4591.34		4593.39	0.006344	11.49	1224.86	201.62	0.80
Downtown	69261.3*	Max WS	13991.86	4580.31	4589.67		4591.80	0.006441	11.70	1203.54	196.55	0.81
Downtown	69011.9*	Max WS	13991.44	4578.80	4588.01		4590.19	0.006448	11.85	1191.61	191.45	0.81
Downtown	68762.5*	Max WS	13992.00	4577.30	4586.59		4588.66	0.005649	11.54	1241.84	201.05	0.77
Downtown	68513.1*	Max WS	13991.72	4575.79	4585.79		4587.43	0.003769	10.33	1452.66	227.26	0.64
Downtown	68263.72	Max WS	13991.82	4574.28	4585.48		4586.65	0.002159	8.79	1868.02	280.74	0.50
Downtown	68243.34	Max WS	13991.27	4574.16	4585.46		4586.60	0.002084	8.69	1896.07	285.51	0.49
Downtown	68234.48	Max WS	13991.72	4574.11	4585.45		4586.58	0.002053	8.65	1908.14	287.54	0.49
Downtown	68231.84	Max WS	13991.04	4574.10	4585.45	4581.84	4586.57	0.002050	8.65	1909.46	287.76	0.49
Downtown	68150		Inl Struct									
Downtown	68012.49	Max WS	13991.66	4569.20	4579.73		4581.47	0.004288	10.57	1323.17	174.42	0.68
Downtown	67779.0*	Max WS	13991.64	4568.16	4578.73		4580.48	0.004236	10.60	1319.76	171.89	0.67
Downtown	67545.5*	Max WS	13991.68	4567.11	4577.71		4579.48	0.004219	10.65	1313.20	169.38	0.67
Downtown	67312.0*	Max WS	13991.39	4566.07	4576.66		4578.46	0.004279	10.76	1299.96	167.01	0.68
Downtown	67078.5*	Max WS	13991.32	4565.02	4575.63		4577.45	0.004303	10.83	1291.95	165.20	0.68
Downtown	66845.1*	Max WS	13991.11	4563.98	4574.60		4576.45	0.004346	10.90	1283.95	163.93	0.69
Downtown	66611.6*	Max WS	13991.06	4562.93	4573.55		4575.43	0.004434	10.99	1273.36	169.60	0.69
Downtown	66378.1*	Max WS	13991.00	4561.89	4572.48		4574.40	0.004482	11.10	1278.13	195.33	0.70
Downtown	66144.6*	Max WS	13990.93	4560.84	4571.40		4573.35	0.004551	11.22	1296.07	209.34	0.70
Downtown	65911.2	Max WS	13990.59	4559.80	4570.29		4572.29	0.004673	11.36	1319.50	220.89	0.71
Downtown	65743.6*	Max WS	13990.36	4558.93	4569.49		4571.52	0.004732	11.47	1295.22	225.22	0.72
Downtown	65576.0*	Max WS	13990.73	4558.07	4568.63		4570.72	0.004851	11.62	1260.95	225.18	0.73

HEC-RAS Plan: 2018.03.01 K to G River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	65408.52	Max WS	13990.38	4557.20	4567.77		4569.89	0.005014	11.71	1246.24	204.59	0.74
Downtown	65235.0*	Max WS	13990.44	4556.33	4566.82		4569.02	0.005213	11.88	1211.46	191.76	0.75
Downtown	65061.6*	Max WS	13990.50	4555.47	4565.85		4568.11	0.005333	12.06	1188.64	181.06	0.76
Downtown	64888.24	Max WS	13990.26	4554.60	4564.85		4567.17	0.005472	12.25	1168.86	173.30	0.77
Downtown	64718.7*	Max WS	13990.00	4553.73	4563.90		4566.25	0.005429	12.32	1159.15	169.13	0.77
Downtown	64549.2*	Max WS	13985.91	4552.87	4563.02		4565.34	0.005162	12.23	1165.73	164.93	0.76
Downtown	64379.75	Max WS	13986.69	4552.00	4562.31		4564.50	0.004563	11.87	1201.99	162.05	0.72
Downtown	64144.1*	Max WS	13987.45	4551.03	4561.71		4563.72	0.003977	11.39	1272.03	186.48	0.67
Downtown	63908.5*	Max WS	13982.80	4550.07	4560.64		4562.69	0.004112	11.49	1263.77	182.53	0.68
Downtown	63672.88	Max WS	13985.30	4549.10	4559.25		4561.49	0.004792	12.02	1204.85	169.75	0.73
Downtown	63465.8*	Max WS	13977.11	4548.37	4558.53		4560.46	0.004693	11.13	1258.14	171.25	0.71
Downtown	63258.8*	Max WS	13981.02	4547.65	4557.49		4559.42	0.004775	11.15	1254.31	166.96	0.72
Downtown	63051.7*	Max WS	13970.63	4546.92	4556.57		4558.46	0.004690	11.02	1268.20	169.12	0.71
Downtown	62844.75	Max WS	13970.89	4546.19	4555.63		4557.52	0.004715	11.04	1269.10	172.45	0.71
Downtown	62632.5*	Max WS	13966.25	4545.23	4554.33		4556.32	0.005376	11.32	1234.13	173.79	0.75
Downtown	62420.4*	Max WS	13949.97	4544.26	4553.26		4555.21	0.005319	11.19	1246.23	178.68	0.75
Downtown	62208.23	Max WS	13981.21	4543.30	4552.45		4554.21	0.004700	10.66	1312.09	183.42	0.70
Downtown	61971.6*	Max WS	13977.86	4541.94	4551.49		4553.21	0.004249	10.53	1339.04	225.37	0.68
Downtown	61735.06	Max WS	13975.49	4540.59	4550.70		4552.17	0.003648	9.75	1577.12	329.32	0.63
Downtown	61551.1*	Max WS	13972.53	4539.70	4550.37		4551.53	0.002629	8.82	2105.92	580.86	0.54
Downtown	61390.84	Max WS	13971.21	4536.92	4549.21		4551.03	0.003968	10.87	1377.45	559.01	0.66
Downtown	61313.72	Max WS	13826.43	4537.43	4549.16		4550.69	0.003287	9.98	1506.02	556.33	0.61
Downtown	61236.36	Max WS	13971.92	4538.64	4548.05		4550.47	0.007766	12.61	1236.43	500.89	0.89
Downtown	61161.9	Max WS	13972.10	4536.99	4547.51		4549.65	0.006388	11.86	1329.94	499.52	0.81
Downtown	61074.4	Max WS	13970.20	4537.09	4546.92	4546.34	4548.78	0.006965	11.25	1680.44	472.04	0.83
Downtown	60992.78	Max WS	13970.21	4537.61	4546.35		4548.69	0.006928	12.33	1196.24	185.14	0.85
Downtown	60901.2	Max WS	13971.48	4536.16	4545.77		4548.09	0.005839	12.24	1183.44	308.91	0.80
Downtown	60820.68	Max WS	13969.99	4533.93	4544.76		4547.83	0.007502	14.07	1009.72	342.12	0.90
Downtown	60738.97	Max WS	13969.74	4533.43	4544.89		4546.92	0.004309	11.49	1269.26	174.61	0.70
Downtown	60650.37	Max WS	13966.11	4534.23	4544.81		4546.51	0.004189	10.46	1347.03	185.72	0.67
Downtown	60549.14	Max WS	13966.64	4533.11	4544.19		4546.04	0.005621	10.94	1343.80	223.05	0.76
Downtown	60457.36	Max WS	13967.74	4532.63	4543.70		4545.51	0.005948	10.84	1381.38	250.49	0.77
Downtown	60355.55	Max WS	13967.18	4531.72	4543.64		4544.96	0.003775	9.24	1596.32	266.49	0.63
Downtown	60280.38	Max WS	13967.04	4531.41	4542.97		4544.68	0.005278	10.53	1424.46	257.46	0.74
Downtown	60201.47	Max WS	13966.82	4532.14	4542.70		4544.29	0.004457	10.14	1477.48	250.38	0.68
Downtown	60121.58	Max WS	13966.19	4531.38	4542.03		4543.93	0.005864	11.10	1331.21	242.35	0.77
Downtown	60009.25	Max WS	13965.89	4531.34	4541.43		4543.30	0.005542	10.99	1321.82	231.56	0.76
Downtown	59932.31	Max WS	13966.17	4531.80	4540.61		4542.91	0.006505	12.21	1221.06	187.98	0.82
Downtown	59826.81	Max WS	13966.22	4530.52	4540.80		4542.27	0.003387	9.72	1452.20	197.17	0.61
Downtown	59750.03	Max WS	13965.75	4527.25	4540.14		4542.01	0.004259	10.95	1295.81	179.01	0.68
Downtown	59674.98	Max WS	13965.65	4526.76	4539.05		4541.76	0.006444	13.20	1057.83	134.97	0.83
Downtown	59588.64	Max WS	13965.17	4525.76	4538.04		4541.36	0.007070	14.62	955.09	110.68	0.88
Downtown	59522.56	Max WS	13965.28	4525.15	4538.09		4540.79	0.005256	13.19	1058.86	114.43	0.76
Downtown	59451.87	Max WS	13965.31	4525.81	4537.46		4540.43	0.006406	13.83	1009.78	118.97	0.84
Downtown	59379.98	Max WS	13965.36	4525.33	4536.69		4540.09	0.007461	14.79	944.35	112.17	0.90
Downtown	59297.86	Max WS	13965.21	4525.42	4536.25		4539.42	0.007078	14.28	978.05	117.69	0.87
Downtown	59213.49	Max WS	13965.10	4525.77	4536.09		4538.74	0.006118	13.11	1119.28	168.83	0.81

HEC-RAS Plan: 2018.03.01 K to G River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	59121.68	Max WS	13965.08	4525.51	4535.68		4538.16	0.005894	12.64	1129.45	168.61	0.80
Downtown	59028.33	Max WS	13964.85	4525.38	4535.37		4537.59	0.005300	11.97	1168.26	153.29	0.76
Downtown	58939.15	Max WS	13964.86	4524.89	4534.75		4537.14	0.005382	12.38	1127.75	137.67	0.76
Downtown	58849.53	Max WS	13964.60	4524.60	4533.79		4536.76	0.007688	13.82	1010.13	136.72	0.90
Downtown	58773.9	Max WS	13964.36	4523.66	4533.08	4532.80	4536.29	0.008486	14.36	972.46	134.90	0.94
Downtown	58696.11	Max WS	13964.08	4523.09	4532.40	4532.21	4535.68	0.008729	14.54	960.59	133.91	0.96
Downtown	58630.9	Max WS	13964.67	4522.26	4532.10		4534.82	0.006902	13.21	1057.12	142.60	0.86
Downtown	58558.62	Max WS	13964.51	4520.96	4531.90		4534.31	0.005628	12.46	1129.33	150.19	0.78
Downtown	58492.6	Max WS	13964.76	4520.21	4531.75		4533.95	0.004639	11.91	1194.87	148.81	0.72
Downtown	58415.56	Max WS	13964.58	4520.87	4530.74		4533.71	0.007041	13.83	1009.88	127.87	0.87
Downtown	58340.16	Max WS	13964.62	4519.94	4530.58		4533.10	0.005975	12.73	1097.02	142.09	0.80
Downtown	58263.24	Max WS	13964.46	4518.88	4530.63		4532.62	0.004599	11.31	1235.13	155.82	0.71
Downtown	58175.27	Max WS	13964.23	4518.86	4529.78		4532.21	0.005796	12.51	1116.50	143.84	0.79
Downtown	58086.83	Max WS	13964.20	4518.71	4529.25		4531.64	0.006839	12.42	1124.65	166.67	0.84
Downtown	57999.15	Max WS	13964.29	4518.60	4528.95		4531.03	0.005653	11.57	1207.21	171.03	0.77
Downtown	57909.99	Max WS	13964.34	4518.52	4528.93		4530.54	0.004386	10.20	1379.04	206.29	0.68
Downtown	57814.81	Max WS	13964.24	4518.41	4528.70		4530.16	0.003536	9.69	1440.39	188.53	0.62
Downtown	57726.95	Max WS	13963.74	4518.19	4528.13		4529.81	0.004656	10.38	1344.85	195.26	0.70
Downtown	57643.12	Max WS	13963.77	4517.68	4528.07		4529.47	0.003075	9.51	1480.48	186.10	0.58
Downtown	57557.54	Max WS	13963.29	4516.71	4527.66		4529.21	0.003206	9.97	1400.96	163.22	0.60
Downtown	57469.2	Max WS	13963.36	4516.61	4527.17		4528.90	0.003946	10.54	1324.70	164.84	0.66
Downtown	57380.45	Max WS	13963.30	4515.81	4526.91		4528.57	0.003574	10.31	1354.01	159.85	0.62
Downtown	57289.76	Max WS	13962.89	4516.97	4526.72		4528.25	0.003370	9.95	1428.34	179.97	0.61
Downtown	57199.54	Max WS	13963.08	4515.75	4526.62		4527.97	0.002844	9.33	1518.88	186.95	0.56
Downtown	57125.7	Max WS	13963.13	4516.32	4526.55		4527.77	0.002498	8.86	1601.05	191.38	0.53
Downtown	57051.28	Max WS	13962.80	4516.76	4526.01		4527.55	0.003544	9.95	1403.40	175.30	0.62
Downtown	56977.72	Max WS	13962.51	4515.63	4525.65		4527.27	0.003873	10.22	1365.76	175.69	0.65
Downtown	56919.37	Max WS	13962.69	4514.45	4525.04		4527.03	0.005062	11.32	1233.16	166.52	0.73
Downtown	56859.04	Max WS	13962.43	4514.22	4525.03		4526.73	0.004441	10.44	1336.95	183.87	0.68
Downtown	56797.87	Max WS	13962.19	4514.56	4525.29		4526.48	0.002935	8.76	1595.69	212.79	0.56
Downtown	56736.2	Max WS	13962.50	4515.54	4524.98		4526.29	0.003354	9.19	1519.83	208.54	0.60
Downtown	56672.83	Max WS	13961.74	4515.69	4524.53		4526.05	0.004084	9.88	1413.06	202.43	0.66
Downtown	56610.6	Max WS	13962.15	4514.95	4524.21		4525.79	0.004307	10.10	1382.10	197.51	0.67
Downtown	56536.19	Max WS	13961.85	4514.51	4523.58		4525.45	0.005207	10.96	1273.81	185.38	0.74
Downtown	56460.58	Max WS	13962.33	4513.68	4522.84		4525.06	0.006356	11.96	1169.52	176.60	0.81
Downtown	56386.73	Max WS	13962.05	4512.48	4522.08		4524.65	0.007330	12.86	1086.14	161.27	0.87
Downtown	56297.28	Max WS	13962.10	4511.75	4521.45		4523.96	0.007190	12.71	1098.56	162.14	0.86
Downtown	56207.74	Max WS	13962.29	4511.30	4520.75		4523.27	0.007516	12.73	1098.52	172.33	0.88
Downtown	56136.74	Max WS	13961.84	4510.15	4520.49		4522.58	0.008216	11.59	1208.25	195.05	0.80
Downtown	56068.44	Max WS	13961.82	4511.03	4519.83		4522.00	0.009372	11.80	1183.83	198.08	0.85
Downtown	56010.74	Max WS	13961.89	4510.95	4519.74		4521.45	0.005725	10.51	1330.68	227.75	0.76
Downtown	55931.37	Max WS	13961.96	4510.19	4519.03		4520.92	0.008489	11.03	1271.23	224.33	0.80
Downtown	55861.99	Max WS	13961.77	4509.57	4518.85		4520.42	0.004516	10.07	1396.80	214.54	0.69
Downtown	55797.14	Max WS	13961.54	4509.11	4518.37		4520.08	0.006226	10.51	1333.84	199.35	0.71
Downtown	55734.24	Max WS	13961.68	4507.71	4518.10		4519.72	0.004997	10.24	1366.17	178.34	0.65
Downtown	55677.53	Max WS	13961.75	4507.00	4517.22		4519.48	0.005568	12.06	1157.98	154.24	0.77
Downtown	55620.45	Max WS	13961.10	4507.11	4516.74		4519.12	0.007585	12.39	1128.12	150.54	0.79

HEC-RAS Plan: 2018.03.01 K to G River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	55552.21	Max WS	13961.74	4506.35	4516.38		4518.62	0.006692	11.99	1165.19	147.72	0.75
Downtown	55484.78	Max WS	13961.40	4505.41	4515.63		4518.16	0.007888	12.77	1093.23	139.18	0.80
Downtown	55424.03	Max WS	13961.41	4504.74	4515.24		4517.75	0.005584	12.71	1098.42	132.53	0.78
Downtown	55357.82	Max WS	13960.03	4503.39	4514.84		4517.33	0.006953	12.66	1102.58	129.17	0.76
Downtown	55282.86	Max WS	13958.15	4502.83	4514.71		4516.84	0.005541	11.71	1196.05	137.13	0.69
Downtown	55207.95	Max WS	13930.80	4502.09	4514.51		4516.44	0.004792	11.16	1251.24	138.08	0.65
Downtown	55139.17	Max WS	13915.06	4502.73	4514.26		4516.14	0.003453	11.01	1268.87	139.45	0.63
Downtown	55067.83	Max WS	14046.16	4502.56	4513.91		4515.99	0.003853	11.58	1226.45	140.56	0.67
Downtown	54995.48	Max WS	14019.46	4501.65	4513.63		4515.71	0.003872	11.59	1231.17	144.94	0.67
Downtown	54922.67	Max WS	13996.92	4501.56	4513.28		4515.41	0.004015	11.73	1210.37	138.30	0.68
Downtown	54825.64	Max WS	13993.62	4501.88	4512.95		4515.02	0.003979	11.59	1223.28	139.70	0.67
Downtown	54728.89	Max WS	13991.88	4501.26	4512.94		4514.67	0.003144	10.73	1375.28	204.40	0.61
Downtown	54613.88	Max WS	13995.97	4501.16	4512.87		4514.32	0.002848	9.88	1551.65	217.20	0.57
Downtown	54495.89	Max WS	13995.66	4501.00	4512.84		4514.00	0.002107	8.75	1763.53	250.55	0.50
Downtown	54398.03	Max WS	13993.21	4499.46	4512.63		4513.79	0.001986	8.80	1832.90	349.83	0.48
Downtown	54300.43	Max WS	13993.77	4497.82	4512.43		4513.62	0.002229	9.13	1763.40	383.92	0.51
Downtown	54227.41	Max WS	13995.14	4497.97	4512.34		4513.46	0.001908	8.85	1802.83	294.46	0.47
Downtown	54154.1	Max WS	13994.47	4497.65	4512.43		4513.32	0.001367	7.96	2076.25	361.34	0.41
Downtown	54080.27	Max WS	13994.53	4497.36	4512.05		4513.20	0.001799	8.77	1682.64	202.06	0.46
Downtown	54009.13	Max WS	13994.39	4497.46	4511.85	4507.04	4513.07	0.001845	8.92	1640.89	240.53	0.47
Downtown	53973		Bridge									
Downtown	53938.49	Max WS	13992.28	4498.06	4510.21		4511.94	0.006092	10.53	1328.63	136.84	0.60
Downtown	53852.32	Max WS	13992.21	4498.43	4510.47		4511.45	0.004680	8.07	1804.88	308.82	0.46
Downtown	53753.17	Max WS	13993.33	4498.00	4509.80		4511.03	0.003148	9.02	1629.32	254.18	0.55
Downtown	53650.57	Max WS	13992.60	4497.31	4509.01		4510.59	0.006688	10.07	1388.88	169.29	0.62
Downtown	53562.67	Max WS	13991.77	4497.00	4508.72		4510.05	0.003116	9.40	1636.51	309.58	0.58
Downtown	53465.09	Max WS	13991.60	4497.63	4508.92		4509.70	0.003956	7.41	2015.93	428.37	0.44
Downtown	53445.09	Max WS	13991.66	4497.67	4508.50	4505.37	4509.69	0.002673	8.86	1897.72	355.91	0.54
Downtown	53380.08	Max WS	13991.99	4497.25	4508.57	4505.09	4509.45	0.003304	7.80	1914.88	357.85	0.50
Downtown	53366.7	Max WS	13991.39	4497.25	4508.25		4509.43	0.004413	8.85	1799.76	398.86	0.57
Downtown	53240.67	Max WS	13991.58	4496.62	4507.89		4509.03	0.002327	8.78	1739.05	312.06	0.54
Downtown	53124.96	Max WS	13990.89	4495.26	4507.54		4508.54	0.005416	8.17	1761.76	319.91	0.50
Downtown	53021.55	Max WS	13990.55	4494.63	4507.09		4508.13	0.002688	8.42	1805.81	320.03	0.49
Downtown	52913.77	Max WS	13989.20	4493.55	4507.17		4507.72	0.004363	6.34	2501.25	474.21	0.37
Downtown	52774.59	Max WS	13989.08	4493.31	4506.41		4507.32	0.002501	7.84	1931.47	386.05	0.48
Downtown	52651.27	Max WS	13986.17	4491.64	4505.64		4506.76	0.006506	8.59	1651.20	345.21	0.55
Downtown	52547.66	Max WS	13987.93	4492.08	4505.01		4506.36	0.003722	9.30	1503.95	185.96	0.58
Downtown	52441.86	Max WS	13986.62	4491.50	4504.55		4505.91	0.002983	9.38	1491.62	178.34	0.57
Downtown	52336.23	Max WS	13987.02	4491.59	4503.64		4505.57	0.003893	11.14	1256.20	154.85	0.69
Downtown	52224.47	Max WS	13985.90	4491.94	4503.47		4504.78	0.010109	9.19	1522.50	166.00	0.53
Downtown	52124.04	Max WS	13986.83	4492.59	4502.94		4504.15	0.002401	8.81	1589.90	184.56	0.52
Downtown	52018.42	Max WS	13986.23	4491.72	4502.13		4503.84	0.003547	10.49	1336.76	156.28	0.62
Downtown	51944.18	Max WS	13986.35	4492.11	4501.94		4503.60	0.003191	10.35	1427.95	219.60	0.60
Downtown	51868.41	Max WS	13986.21	4491.86	4501.55		4503.35	0.003699	10.77	1363.31	226.05	0.64
Downtown	51791.2	Max WS	13986.12	4491.64	4501.36		4503.05	0.003678	10.46	1390.99	206.24	0.62
Downtown	51712.2	Max WS	13986.28	4491.11	4501.11		4502.76	0.003608	10.30	1382.43	231.53	0.62
Downtown	51629.06	Max WS	13985.28	4490.42	4500.83		4502.45	0.003642	10.23	1367.38	161.96	0.62

HEC-RAS Plan: 2018.03.01 K to G River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	51538.61	Max WS	13986.31	4489.81	4500.19		4502.08	0.004745	11.01	1269.89	166.17	0.70
Downtown	51448.57	Max WS	13986.02	4489.63	4499.52		4501.61	0.005886	11.61	1205.11	170.48	0.77
Downtown	51362.21	Max WS	13985.43	4489.55	4499.12		4501.11	0.005559	11.32	1235.87	173.57	0.75
Downtown	51276.75	Max WS	13985.89	4489.47	4498.38		4500.62	0.006749	12.02	1163.72	175.87	0.82
Downtown	51185.25	Max WS	13985.85	4489.68	4498.07		4500.01	0.005549	11.17	1251.85	182.97	0.75
Downtown	51093.72	Max WS	13985.84	4489.98	4498.24		4499.54	0.003761	9.17	1525.43	212.87	0.60
Downtown	51023.43	Max WS	13985.77	4488.83	4498.02		4499.22	0.005433	8.79	1590.47	225.81	0.58
Downtown	50977.11	Max WS	13985.50	4487.46	4497.91		4498.98	0.004787	8.31	1683.36	245.27	0.56
Downtown	50920.73	Max WS	13985.38	4486.01	4497.90		4498.73	0.003909	7.33	1907.68	263.93	0.48
Downtown	50900.82	Max WS	13985.13	4485.81	4497.88		4498.66	0.003275	7.08	1976.67	302.84	0.49
Downtown	50838.23	Max WS	13985.58	4487.04	4497.62		4498.35	0.006527	6.87	2035.01	342.37	0.50
Downtown	50756.84	Max WS	13985.02	4484.66	4496.90		4497.69	0.009810	7.13	1962.30	374.90	0.55
Downtown	50710.61	Max WS	13985.13	4484.53	4496.68		4497.38	0.003232	6.75	2071.45	379.17	0.51
Downtown	50694	Max WS	13984.82	4484.64	4496.50		4497.34	0.002651	7.32	1910.15	387.31	0.58
Downtown	50681.29	Max WS	13984.59	4484.41	4496.69		4497.31	0.001611	6.29	2223.89	364.91	0.45
Downtown	50671.96	Max WS	13984.72	4484.56	4496.19	4492.72	4497.30	0.002614	8.45	1655.36	308.01	0.64
Downtown	50625		Bridge									
Downtown	50578.08	Max WS	13984.09	4484.00	4495.52		4496.80	0.002822	9.07	1541.07	165.72	0.52
Downtown	50519.86	Max WS	13984.34	4483.76	4495.31		4496.62	0.003275	9.18	1523.16	355.73	0.72
Downtown	50474.94	Max WS	13984.05	4483.91	4495.28		4496.42	0.005279	8.56	1632.78	348.41	0.68
Downtown	50384.53	Max WS	13982.88	4482.79	4494.70		4496.01	0.004004	9.18	1531.73	314.86	0.71
Downtown	50356.91	Max WS	13980.46	4482.50	4494.40	4491.71	4495.90	0.004820	9.85	1424.56	248.42	0.64
Downtown	50345		Bridge									
Downtown	50338.63	Max WS	13889.23	4482.33	4494.12		4495.69	0.005742	10.07	1389.63	331.76	0.76
Downtown	50320.94	Max WS	13932.17	4482.23	4494.22		4495.57	0.005354	9.34	1510.51	407.29	0.76
Downtown	50300		Mult Open									
Downtown	50280	Max WS	13983.61	4482.02	4493.77		4494.99	0.003649	8.87	1600.75	432.79	0.72
Downtown	50260.01	Max WS	13983.91	4482.02	4493.46		4494.98	0.004621	9.94	1437.51	408.66	0.84
Downtown	50234.71	Max WS	13984.16	4482.11	4493.61		4494.80	0.002896	8.76	1610.00	377.65	0.67
Downtown	50204.78	Max WS	13984.16	4482.21	4493.97		4494.70	0.002398	6.85	2053.91	300.13	0.44
Downtown	50174.02	Max WS	13984.27	4481.92	4494.04		4494.64	0.001325	6.25	2252.13	274.22	0.37
Downtown	50139.65	Max WS	13984.16	4481.25	4493.84		4494.60	0.001012	6.99	2013.76	246.32	0.41
Downtown	50064.3	Max WS	13983.21	4480.43	4493.49		4494.52	0.001203	8.15	1715.66	181.18	0.47
Downtown	50026.3	Max WS	13983.69	4480.65	4493.26		4494.46	0.002265	8.77	1594.03	163.78	0.50
Downtown	49982.23	Max WS	13983.40	4480.22	4492.87		4494.36	0.001922	9.80	1426.71	143.69	0.55
Downtown	49946.24	Max WS	13983.17	4479.68	4492.62		4494.28	0.002759	10.32	1354.37	136.81	0.58
Downtown	49896.5	Max WS	13983.29	4479.77	4492.52		4494.15	0.002603	10.22	1368.47	134.73	0.57
Downtown	49817.14	Max WS	13983.33	4479.20	4492.38	4488.93	4493.98	0.001513	10.14	1378.47	137.17	0.56
Downtown	49770		Bridge									
Downtown	49736.07	Max WS	13983.34	4479.18	4491.90		4493.53	0.001586	10.23	1367.18	140.63	0.58
Downtown	49703.17	Max WS	13983.10	4479.24	4491.87		4493.46	0.002486	10.14	1379.25	145.92	0.58
Downtown	49674.77	Max WS	13983.06	4479.66	4491.66		4493.40	0.002428	10.58	1330.72	151.35	0.59
Downtown	49612.19	Max WS	13982.35	4480.02	4491.47		4493.24	0.002498	10.69	1323.89	154.29	0.60
Downtown	49549.05	Max WS	13983.35	4480.05	4491.55		4493.09	0.002131	9.97	1415.64	157.45	0.55
Downtown	49487.33	Max WS	13982.50	4480.05	4491.72		4492.97	0.001605	8.97	1568.24	165.90	0.49
Downtown	49466.08	Max WS	13983.15	4480.03	4491.68	4487.71	4492.94	0.001223	9.00	1553.62	158.77	0.51
Downtown	49420		Bridge									

HEC-RAS Plan: 2018.03.01 K to G River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	49353.16	Max WS	13982.98	4479.70	4490.51		4491.98	0.002508	9.85	1464.65	152.42	0.56
Downtown	49334.7	Max WS	13981.59	4479.60	4489.72		4491.93	0.004481	11.94	1170.92	136.71	0.72
Downtown	49286.93	Max WS	13983.00	4479.21	4489.59		4491.64	0.004125	11.48	1218.55	139.80	0.69
Downtown	49220.73	Max WS	13981.64	4478.69	4489.81		4491.39	0.002942	10.10	1384.19	147.23	0.58
Downtown	49154.55	Max WS	13982.17	4478.91	4489.45		4491.19	0.003326	10.57	1322.82	149.00	0.63
Downtown	49088.39	Max WS	13982.11	4478.26	4489.65		4490.99	0.002350	9.29	1504.32	154.82	0.53
Downtown	49070.63	Max WS	13982.80	4478.25	4489.64	4486.17	4490.95	0.002313	9.19	1521.74	156.02	0.52
Downtown	49020		Bridge									
Downtown	48983.26	Max WS	13981.58	4478.25	4488.90		4490.27	0.002310	9.42	1484.60	171.00	0.55
Downtown	48960.04	Max WS	13982.47	4478.33	4489.00		4490.22	0.002192	8.85	1579.35	171.61	0.51
Downtown	48884.44	Max WS	13982.51	4478.01	4488.64		4490.05	0.002451	9.51	1470.62	158.23	0.55
Downtown	48820.9	Max WS	13982.54	4476.98	4488.61		4489.90	0.002165	9.10	1536.26	163.39	0.52
Downtown	48759.22	Max WS	13982.69	4476.46	4488.62		4489.77	0.001975	8.62	1621.76	169.39	0.49
Downtown	48699.6	Max WS	13982.30	4476.17	4488.60		4489.66	0.001670	8.29	1687.38	167.57	0.46
Downtown	48648.32	Max WS	13982.01	4475.99	4488.55	4483.97	4489.58	0.001554	8.15	1716.43	163.87	0.44
Downtown	48600		Bridge									
Downtown	48556.86	Max WS	13982.46	4474.83	4487.06		4488.31	0.001873	8.95	1563.12	166.50	0.50
Downtown	48518.43	Max WS	13982.22	4474.37	4486.87		4488.23	0.002180	9.36	1494.39	151.33	0.52
Downtown	48471.73	Max WS	13982.32	4474.06	4486.34		4488.11	0.003098	10.66	1311.76	143.92	0.62
Downtown	48410.95	Max WS	13982.33	4473.54	4486.09		4487.92	0.003159	10.85	1288.51	140.49	0.63
Downtown	48345.53	Max WS	13982.14	4473.22	4485.82		4487.71	0.003235	11.01	1269.48	137.25	0.64
Downtown	48280.29	Max WS	13982.09	4472.92	4485.15		4487.48	0.004163	12.26	1140.78	126.67	0.72
Downtown	48215.45	Max WS	13982.19	4472.53	4484.23		4487.68	0.007403	14.90	938.10	118.59	0.93
Downtown	48148.16	Max WS	13981.86	4472.12	4484.02		4486.97	0.006114	13.77	1015.71	124.31	0.85
Downtown	48081.13	Max WS	13982.07	4471.88	4484.10		4486.51	0.004351	12.47	1120.85	124.03	0.73
Downtown	48014.16	Max WS	13981.92	4472.42	4483.88		4486.21	0.004606	12.25	1141.67	137.77	0.75
Downtown	47951.93	Max WS	13982.06	4472.88	4483.54		4485.92	0.004743	12.36	1130.90	138.50	0.76
Downtown	47892.98	Max WS	13981.74	4472.27	4483.68		4485.65	0.003607	11.24	1244.43	138.52	0.66
Downtown	47837.03	Max WS	13981.56	4471.94	4483.57		4485.44	0.003479	11.00	1271.44	141.38	0.65
Downtown	47779.19	Max WS	13981.93	4472.21	4483.43		4485.23	0.003869	10.75	1300.46	162.73	0.67
Downtown	47723.17	Max WS	13982.05	4472.25	4482.48		4485.11	0.005922	13.03	1073.23	144.13	0.84
Downtown	47669.23	Max WS	13981.57	4470.80	4483.20	4479.79	4484.65	0.002572	9.64	1450.80	159.74	0.56
Downtown	47650		Bridge									
Downtown	47595.25	Max WS	13981.81	4468.58	4483.33		4484.58	0.001647	8.98	1602.39	160.78	0.46
Downtown	47563.37	Max WS	13981.82	4468.69	4482.98		4484.53	0.002285	9.99	1436.76	163.21	0.55
Downtown	47514.67	Max WS	13981.61	4468.93	4483.22		4484.42	0.001707	8.79	1642.79	186.55	0.48
Downtown	47469.54	Max WS	13980.96	4469.13	4482.66	4479.61	4484.34	0.002802	10.39	1382.40	167.61	0.60
Downtown	47400		Bridge									
Downtown	47351.45	Max WS	13981.88	4469.93	4480.06	4479.78	4483.42	0.007592	14.71	950.53	127.90	0.95
Downtown	47334.9*	Max WS	13981.25	4469.96	4480.06		4483.08	0.007106	13.94	1002.69	139.95	0.92
Downtown	47318.3*	Max WS	13978.69	4469.99	4480.30		4482.71	0.005489	12.45	1123.09	153.52	0.81
Downtown	47301.8	Max WS	13979.66	4470.02	4480.81		4482.54	0.003528	10.57	1323.08	165.84	0.66
Downtown	47273.6*	Max WS	13980.10	4469.80	4480.71		4482.44	0.003486	10.56	1323.99	164.56	0.66
Downtown	47245.4*	Max WS	13979.59	4469.57	4480.63		4482.34	0.003405	10.51	1330.26	163.50	0.65
Downtown	47217.32	Max WS	13978.66	4469.35	4480.56		4482.25	0.003299	10.43	1340.68	162.64	0.64
Downtown	47194.7*	Max WS	13979.51	4469.10	4480.38		4482.17	0.003469	10.76	1299.10	155.82	0.66
Downtown	47172.22	Max WS	13976.00	4468.85	4480.20		4482.10	0.003430	11.07	1269.54	152.82	0.66

HEC-RAS Plan: 2018.03.01 K to G River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	47146.9*	Max WS	13978.85	4468.58	4480.11		4482.02	0.003348	11.09	1268.07	145.92	0.65
Downtown	47121.71	Max WS	13978.67	4468.30	4480.02		4481.93	0.003273	11.09	1268.12	143.22	0.65
Downtown	47059.13	Max WS	13978.74	4467.68	4480.28		4481.74	0.002474	9.69	1442.33	155.94	0.56
Downtown	46997.03	Max WS	13978.00	4467.35	4480.08		4481.58	0.002526	9.83	1429.26	166.47	0.57
Downtown	46935.21	Max WS	13978.55	4467.85	4479.77		4481.41	0.003078	10.29	1358.47	160.93	0.62
Downtown	46877.18	Max WS	13977.99	4468.19	4479.68		4481.23	0.003009	9.99	1400.63	177.43	0.61
Downtown	46819.52	Max WS	13978.04	4467.23	4479.91		4481.09	0.001833	8.70	1634.92	203.87	0.49
Downtown	46762.23	Max WS	13977.84	4466.60	4480.08		4480.99	0.001405	7.63	1836.83	202.37	0.43
Downtown	46709.06	Max WS	13977.55	4466.61	4480.07		4480.91	0.001373	7.39	1892.16	198.61	0.42
Downtown	46654.94	Max WS	13977.88	4466.61	4480.01		4480.84	0.001339	7.31	1913.44	199.83	0.42
Downtown	46610.97	Max WS	13976.58	4466.61	4479.92		4480.78	0.001419	7.44	1877.73	198.99	0.43
Downtown	46546.92	Max WS	13978.07	4466.61	4479.82		4480.69	0.001400	7.49	1865.84	192.58	0.42
Downtown	46484.79	Max WS	13977.67	4466.62	4479.66		4480.60	0.001527	7.79	1794.01	186.42	0.44
Downtown	46424.93	Max WS	13977.55	4466.60	4479.72		4480.52	0.001185	7.17	1950.54	196.88	0.40
Downtown	46365.15	Max WS	13977.51	4466.56	4479.70		4480.45	0.001105	6.96	2009.22	211.11	0.38
Downtown	46305.39	Max WS	13977.04	4466.53	4479.68		4480.39	0.001014	6.72	2081.18	281.43	0.37
Downtown	46258.14	Max WS	13976.62	4466.51	4479.65		4480.34	0.000980	6.65	2101.63	220.62	0.36
Downtown	46210.57	Max WS	13977.02	4466.49	4479.73	4473.55	4480.29	0.000812	6.03	2329.90	247.06	0.33
Downtown	46150		Bridge									
Downtown	46091.2	Max WS	13976.91	4464.95	4474.08		4475.25	0.002669	8.68	1609.93	212.18	0.56
Downtown	45983.39	Max WS	13976.93	4463.88	4473.69		4474.95	0.002875	8.98	1556.98	214.99	0.59
Downtown	45798.97	Max WS	13976.83	4462.44	4472.42		4474.30	0.004540	11.00	1270.77	181.29	0.73
Downtown	45597.26	Max WS	13976.24	4460.72	4470.84		4473.38	0.005347	12.78	1093.73	138.99	0.80
Downtown	45398.64	Max WS	13976.00	4456.90	4469.05		4472.48	0.006482	14.85	940.93	108.08	0.89
Downtown	45302.05	Max WS	13976.30	4456.66	4468.56		4471.82	0.005880	14.52	979.66	127.06	0.85
Downtown	45205.32	Max WS	13976.41	4456.41	4468.75		4470.96	0.003478	11.93	1178.65	137.32	0.66
Downtown	45110.24	Max WS	13976.07	4456.04	4468.81		4470.64	0.002829	10.90	1318.61	158.06	0.61
Downtown	45014.75	Max WS	13976.26	4455.67	4468.44		4470.36	0.003043	11.11	1258.04	127.30	0.62
Downtown	44945.88	Max WS	13976.14	4455.14	4468.41		4470.15	0.002913	10.57	1322.12	141.34	0.61
Downtown	44876.97	Max WS	13976.20	4454.62	4468.29		4469.94	0.003211	10.28	1359.70	149.45	0.60
Downtown	44808.06	Max WS	13975.94	4454.09	4468.17		4469.71	0.003205	9.96	1403.17	160.24	0.59
Downtown	44719.45	Max WS	13975.42	4454.09	4468.50	4464.29	4469.48	0.001895	7.91	1765.88	194.27	0.46
Downtown	44650		Bridge									
Downtown	44609.2	Max WS	13976.24	4452.25	4463.35		4465.10	0.003570	10.62	1316.32	149.67	0.63
Downtown	44538.60	Max WS	13975.89	4452.25	4462.86		4464.83	0.004162	11.26	1240.77	143.79	0.68
Downtown	44496.75	Max WS	13975.44	4452.25	4462.21		4464.67	0.005836	12.58	1110.52	141.75	0.79
Downtown	44402.78	Max WS	13975.64	4450.97	4461.34		4464.15	0.006782	13.45	1039.38	134.28	0.85
Downtown	44307.87	Max WS	13976.00	4449.68	4460.53		4463.53	0.007157	13.89	1005.97	127.07	0.87
Downtown	44212.27	Max WS	13975.53	4448.40	4459.77		4462.89	0.006850	14.18	985.75	111.49	0.84
Downtown	44164.2	Max WS	13975.22	4448.42	4459.08	4458.71	4462.98	0.008462	15.85	881.64	101.11	0.95
Downtown	44096.59	Max WS	13975.28	4448.06	4458.58	4458.19	4462.31	0.008410	15.49	902.26	107.35	0.94
Downtown	44028.56	Max WS	13975.80	4447.71	4458.25		4461.50	0.007458	14.45	966.98	119.25	0.89
Downtown	43960.63	Max WS	13975.04	4447.35	4458.09		4460.88	0.006243	13.40	1042.56	126.86	0.82
Downtown	43863.31	Max WS	13975.79	4446.53	4457.80		4460.28	0.005168	12.64	1106.01	127.18	0.76
Downtown	43764.57	Max WS	13975.59	4445.70	4458.26		4459.81	0.002902	9.98	1400.27	149.40	0.57
Downtown	43697.38	Max WS	13975.69	4445.70	4458.05		4459.61	0.003134	10.02	1395.22	157.61	0.59
Downtown	43630.21	Max WS	13975.09	4445.70	4457.81		4459.40	0.003176	10.11	1382.62	154.57	0.60

HEC-RAS Plan: 2018.03.01 K to G River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	43563.05	Max WS	13975.63	4445.70	4457.58		4459.18	0.003314	10.13	1379.27	159.11	0.61
Downtown	43468.11	Max WS	13975.54	4445.30	4457.21		4458.85	0.003474	10.28	1359.37	159.50	0.62
Downtown	43373.02	Max WS	13975.38	4444.90	4457.03		4458.54	0.003142	9.84	1420.44	165.72	0.59
Downtown	43293.25	Max WS	13975.16	4444.90	4456.68		4458.28	0.003323	10.17	1393.81	176.82	0.61
Downtown	43213.3	Max WS	13974.88	4444.90	4455.83		4457.97	0.005185	11.75	1189.18	155.06	0.75
Downtown	43137.05	Max WS	13975.12	4444.85	4455.06		4457.59	0.006460	12.74	1096.66	148.65	0.83
Downtown	43061.5	Max WS	13974.83	4444.80	4454.88		4457.09	0.005403	11.92	1172.33	153.87	0.76
Downtown	42964.86	Max WS	13974.84	4444.62	4454.21		4456.55	0.006147	12.30	1144.14	164.35	0.80
Downtown	42868.91	Max WS	13975.31	4444.44	4454.26		4455.96	0.004336	10.58	1383.27	206.54	0.68
Downtown	42776.38	Max WS	13975.32	4445.40	4453.56		4455.49	0.006302	11.15	1255.57	219.81	0.80
Downtown	42712.78	Max WS	13975.00	4444.67	4452.98		4455.11	0.007408	11.71	1198.21	223.38	0.86
Downtown	42650.83	Max WS	13975.01	4443.93	4452.61		4454.62	0.007250	11.37	1229.03	218.42	0.85
Downtown	42571.63	Max WS	13974.44	4443.19	4451.90	4451.59	4454.19	0.008451	12.16	1158.32	229.95	0.91
Downtown	42496.35	Max WS	13974.43	4442.45	4451.44		4453.35	0.006979	11.09	1262.70	233.27	0.83
Downtown	42424.35	Max WS	13975.02	4440.14	4451.72		4452.83	0.002905	8.43	1658.82	233.22	0.56
Downtown	42343.67	Max WS	13975.36	4437.69	4451.40		4452.61	0.002671	8.87	1604.03	212.39	0.54
Downtown	42248.44	Max WS	13974.06	4437.59	4450.64		4452.37	0.003420	10.86	1381.14	188.64	0.63
Downtown	42111.79	Max WS	13974.84	4437.14	4449.21	4448.41	4452.63	0.005812	15.20	994.53	129.48	0.83
Downtown	42040.67	Max WS	13974.73	4438.25	4449.20		4451.99	0.004921	13.87	1100.95	141.13	0.77
Downtown	41973.57	Max WS	13974.35	4438.24	4449.38		4451.58	0.004016	12.30	1234.33	166.24	0.69
Downtown	41937.04	Max WS	13973.85	4437.50	4449.33		4451.44	0.003708	12.20	1263.26	163.32	0.67
Downtown	41794.81	Max WS	13974.03	4435.81	4449.72	4445.48	4450.93	0.001728	9.16	1667.09	188.73	0.47
Downtown	41611.81		Bridge									
Downtown	41608.47	Max WS	13973.72	4434.57	4448.33		4449.82	0.002443	10.68	1525.54	182.05	0.55
Downtown	41482.09	Max WS	13973.77	4433.63	4448.16		4449.53	0.001693	9.67	1543.95	143.92	0.47
Downtown	41435.94	Max WS	13973.94	4433.85	4448.02		4449.45	0.001794	9.78	1513.62	143.15	0.48
Downtown	41313.22	Max WS	13973.37	4433.80	4447.88		4449.19	0.002125	9.17	1534.69	165.24	0.50
Downtown	41197.77	Max WS	13973.55	4434.04	4447.43		4448.89	0.002937	9.72	1437.55	151.99	0.56
Downtown	40959.95	Max WS	13972.80	4434.55	4447.12		4448.31	0.001897	8.76	1594.82	163.17	0.49
Downtown	40798.2	Max WS	13972.84	4435.15	4446.93		4448.02	0.001811	8.37	1695.70	208.14	0.48
Downtown	40713.66	Max WS	13972.97	4435.04	4446.65		4447.85	0.002154	8.85	1614.65	214.21	0.52
Downtown	40613.39	Max WS	13972.19	4433.88	4446.28		4447.64	0.002449	9.51	1555.01	228.99	0.56
Downtown	40432.02	Max WS	13971.83	4432.73	4445.86		4447.21	0.002252	9.37	1548.03	223.79	0.54
Downtown	40284.51	Max WS	13971.45	4431.86	4445.47		4446.91	0.002116	9.82	1552.89	242.33	0.53
Downtown	40105.75	Max WS	13970.70	4432.47	4445.58		4446.56	0.001455	8.33	1891.89	259.26	0.44
Downtown	40007.36	Max WS	13971.42	4432.35	4445.44		4446.41	0.001455	8.12	1883.95	256.82	0.44
Downtown	39916.85	Max WS	13970.85	4432.29	4445.19		4446.24	0.001720	8.24	1696.73	184.03	0.47
Downtown	39828.46	Max WS	13970.87	4432.08	4445.00		4446.10	0.001680	8.39	1679.94	194.40	0.47
Downtown	39723.22	Max WS	13970.81	4432.17	4444.94		4445.93	0.001443	8.02	1766.56	192.26	0.44
Downtown	39625.06	Max WS	13970.96	4431.99	4444.79		4445.79	0.001515	8.02	1756.74	194.16	0.45
Downtown	39527.65	Max WS	13970.37	4432.61	4444.63		4445.63	0.001609	8.04	1748.22	198.51	0.46
Downtown	39447.91	Max WS	13970.26	4432.63	4444.55		4445.51	0.001542	7.92	1802.85	208.66	0.45
Downtown	39366.91	Max WS	13970.67	4433.03	4444.12		4445.38	0.002215	9.15	1594.70	205.50	0.53
Downtown	39285.87	Max WS	13970.21	4432.97	4443.86		4445.19	0.002556	9.40	1551.09	212.12	0.57
Downtown	39203.81	Max WS	13970.07	4432.61	4443.48		4444.98	0.002947	10.12	1472.04	208.17	0.61
Downtown	39109	Max WS	13970.41	4429.68	4443.84		4444.73	0.001297	7.65	1888.24	208.60	0.42
Downtown	39013.93	Max WS	13969.80	4429.78	4443.63		4444.60	0.001374	8.00	1804.44	199.43	0.43

HEC-RAS Plan: 2018.03.01 K to G River: Truckee Reach: Downtown Profile: Max WS (Continued)

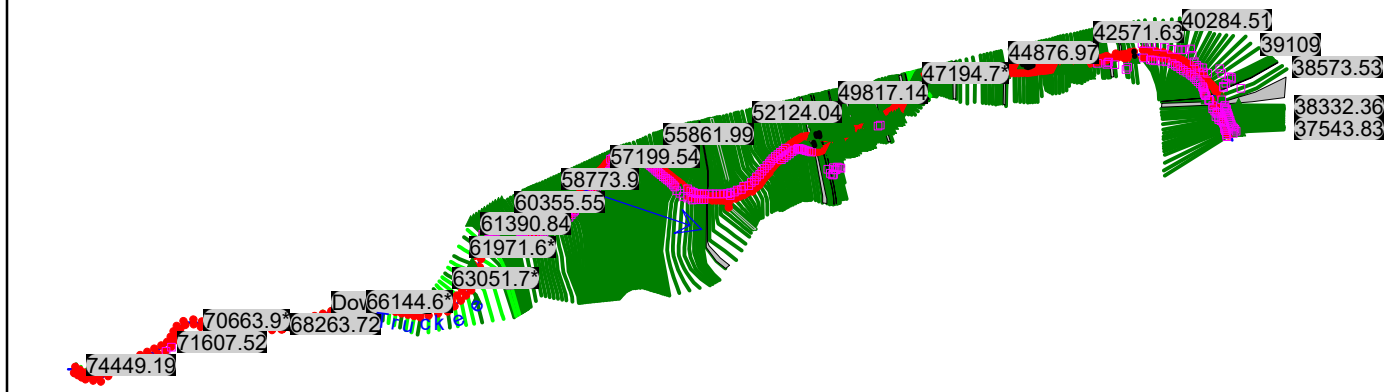
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downtown	38946.54	Max WS	13969.26	4427.25	4443.69		4444.52	0.001150	7.43	1970.18	216.47	0.40
Downtown	38894.55	Max WS	13969.95	4426.99	4443.81		4444.46	0.000913	6.54	2212.01	236.19	0.35
Downtown	38848.37	Max WS	13970.00	4426.97	4443.42		4444.00	0.018760	6.11	2330.27	259.64	0.34
Downtown	38813.19	Max WS	13969.29	4427.04	4443.09		4443.65	0.000932	6.02	2363.29	272.38	0.35
Downtown	38758.33	Max WS	13969.62	4427.49	4443.11		4443.65	0.000942	5.95	2398.07	284.19	0.35
Downtown	38732.61	Max WS	13970.33	4431.53	4442.85	4439.58	4443.59	0.001572	6.93	2057.64	284.48	0.44
Downtown	38576.81		Inl Struct									
Downtown	38573.53	Max WS	13943.00	4428.24	4436.21	4436.11	4438.47	0.008837	12.04	1157.87	237.55	0.96
Downtown	38492.13	Max WS	13970.84	4424.74	4436.10	4433.10	4437.06	0.002328	7.88	1772.49	251.87	0.52
Downtown	38336.81		Bridge									
Downtown	38332.36	Max WS	13969.80	4423.90	4435.49		4436.52	0.002652	8.40	1736.95	280.11	0.56
Downtown	38277.95	Max WS	13970.22	4423.84	4434.73		4436.39	0.004336	10.53	1386.58	241.26	0.71
Downtown	38228.19	Max WS	13970.18	4423.59	4434.57		4436.18	0.003360	10.25	1399.72	196.64	0.64
Downtown	38183.57	Max WS	13969.46	4423.95	4434.28		4436.04	0.003380	10.78	1343.60	180.59	0.65
Downtown	38145.05	Max WS	13970.07	4423.90	4434.14		4435.92	0.003285	11.02	1347.78	179.58	0.65
Downtown	38098.2	Max WS	13969.67	4424.28	4433.82		4435.78	0.003732	11.69	1300.04	182.70	0.69
Downtown	38050.81	Max WS	13969.49	4423.47	4433.88		4435.58	0.003564	11.04	1389.38	187.42	0.64
Downtown	38003.02	Max WS	13969.50	4423.53	4433.44		4435.44	0.004187	11.94	1298.09	183.13	0.70
Downtown	37954.86	Max WS	13911.52	4423.01	4432.98		4435.24	0.004744	12.69	1210.13	169.67	0.74
Downtown	37906.33	Max WS	13911.04	4422.29	4432.58		4435.03	0.005068	13.20	1160.32	160.34	0.76
Downtown	37852.33	Max WS	13910.03	4421.61	4431.93		4434.85	0.005953	14.29	1060.91	145.06	0.83
Downtown	37797.18	Max WS	13969.54	4420.84	4431.36	4431.09	4434.65	0.007257	15.12	1006.15	136.39	0.87
Downtown	37741.16	Max WS	13969.71	4420.70	4430.82	4430.69	4434.42	0.008404	15.67	949.76	128.44	0.92
Downtown	37684.6	Max WS	13969.48	4420.36	4430.32	4430.16	4434.05	0.009440	15.88	925.68	126.34	0.96
Downtown	37639.51	Max WS	13969.72	4420.60	4429.87	4430.08	4433.85	0.010538	16.39	890.63	122.73	1.01
Downtown	37592.27	Max WS	13969.90	4420.58	4429.29	4430.25	4434.16	0.014244	17.87	802.35	120.97	1.16
Downtown	37543.83	Max WS	13969.77	4420.31	4428.53	4429.73	4433.61	0.016961	18.30	785.68	129.82	1.25
Downtown	37492.76	Max WS	13968.71	4420.68	4427.26	4429.65	4434.92	0.033103	22.32	636.11	126.36	1.69

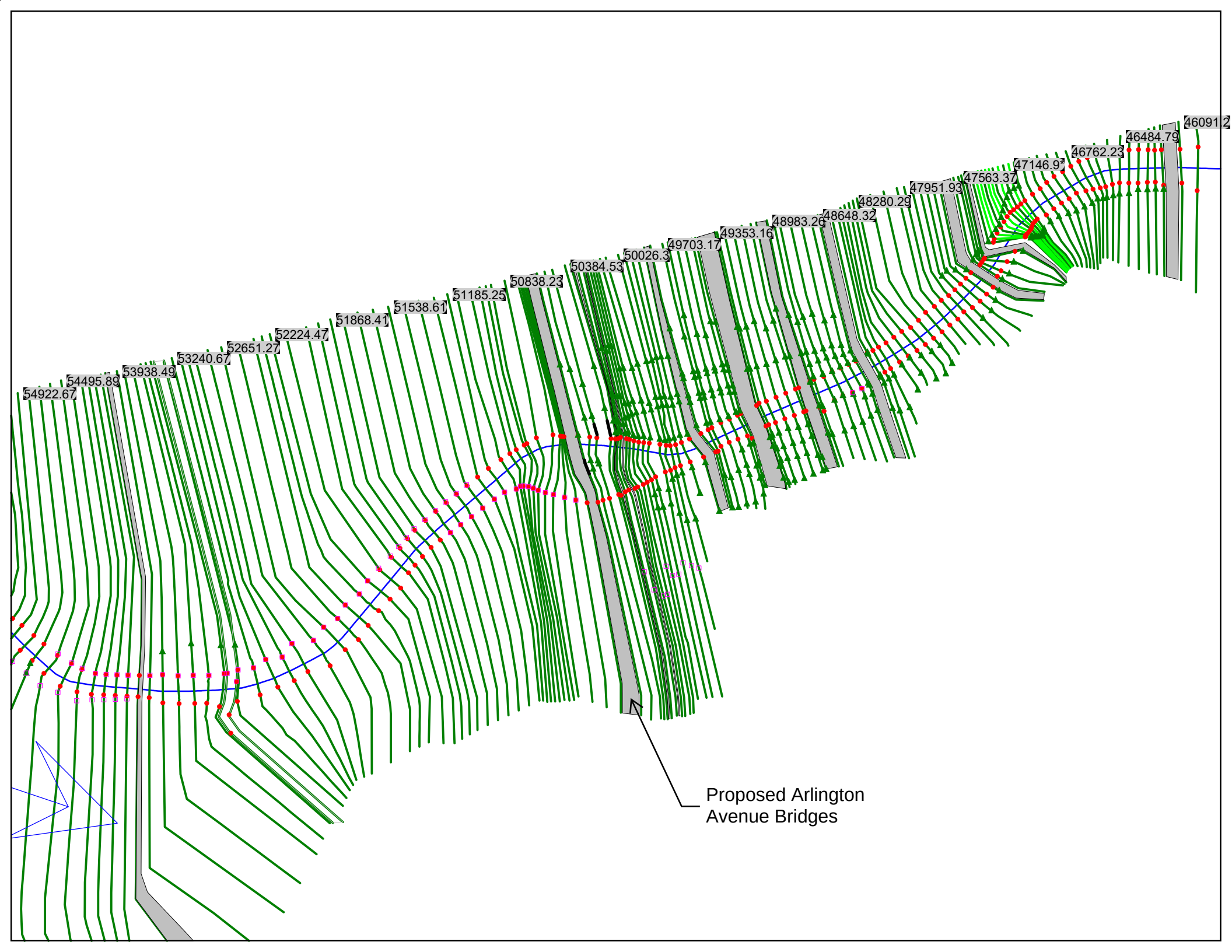
Jacobs

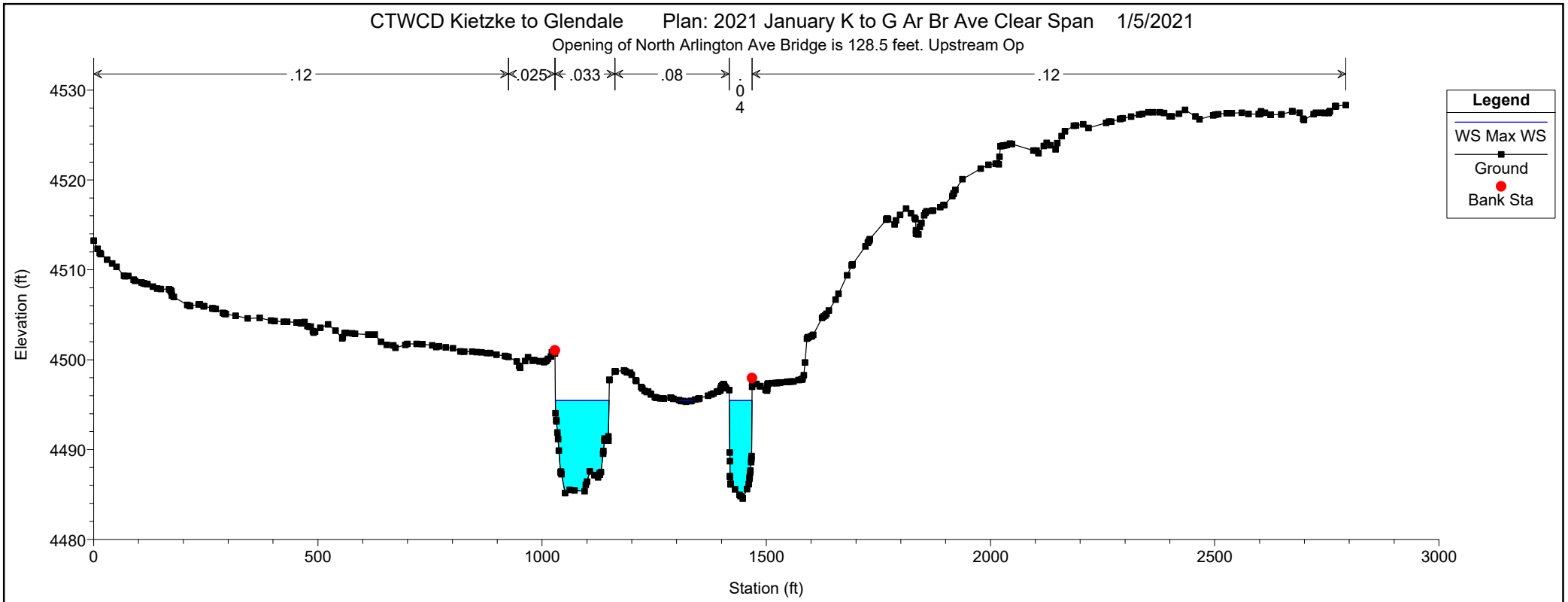
Proposed (Post-Project) Alternative 1:

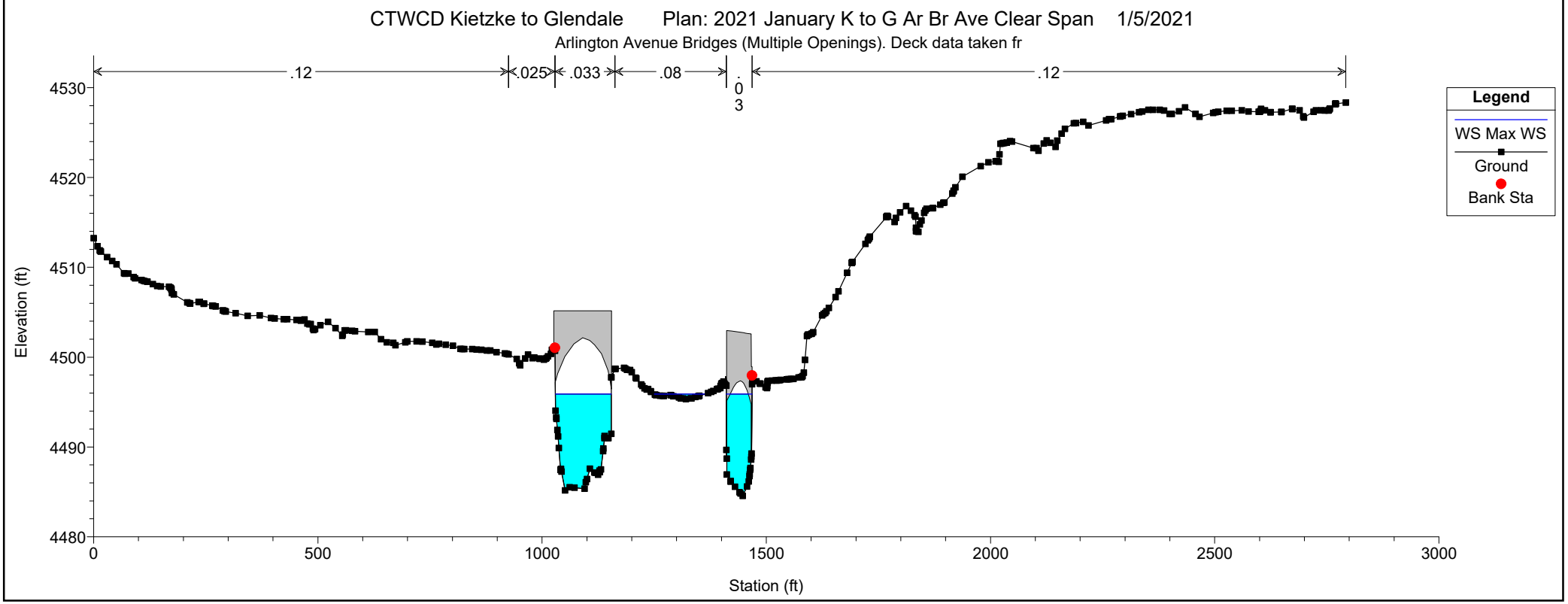
North Arlington Avenue Bridge Clear Span

South Arlington Avenue Bridge Clear Span


40284.51
42571.63
39109
44876.97
38573.53
47194.7*
49817.14
38332.36
52124.04
37543.83
55861.99
57199.54
58773.9
60355.55
61390.84
61971.6*
63051.7*
66144.6*
70663.9*
68263.72
71607.52
74449.19

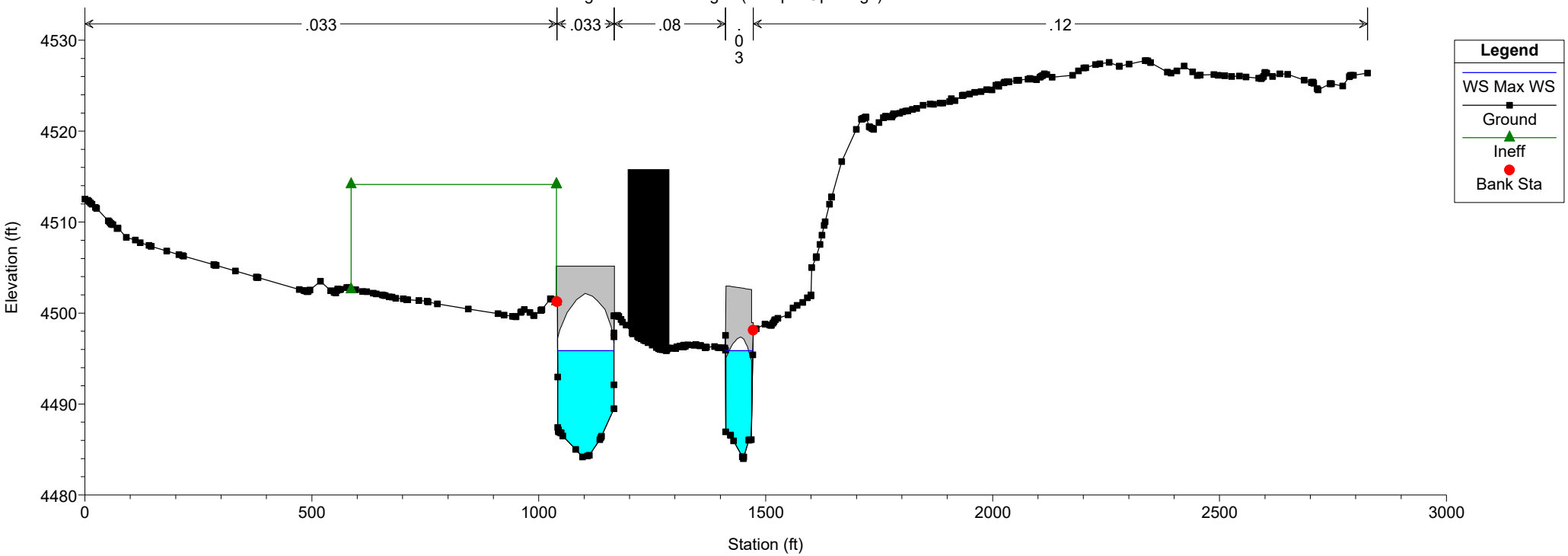

54922.67
54495.89
53938.49
53240.67
52651.27
52224.47
51868.41
51538.61
51185.25
50838.23
50384.53
50026.3
49703.17
49353.16
48983.26
48648.32
48280.29
47951.93
47563.37
47146.97
46762.23
46484.79
46091.2
Proposed Arlington
Avenue Bridges


CTWCD Kietzke to Glendale Plan: 2021 January K to G Ar Br Ave Clear Span 1/5/2021
Opening of North Arlington Ave Bridge is 128.5 feet. Upstream Op
.12
.025
.033
.08
.04
.12
Legend
WS Max WS
Ground
Bank Sta
Elevation (ft)
4530
4520
4510
4500
4490
4480
0
500
1000
1500
2000
2500
3000
Station (ft)

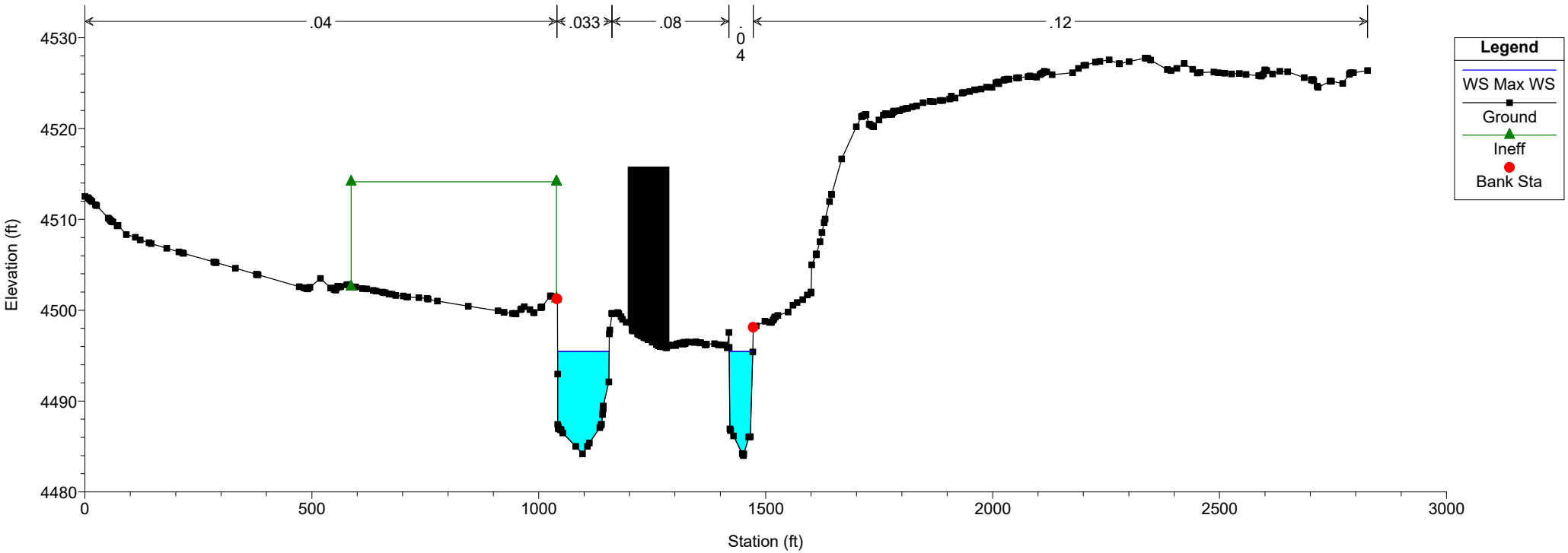

CTWCD Kietzke to Glendale Plan: 2021 January K to G Ar Br Ave Clear Span 1/5/2021
Arlington Avenue Bridges (Multiple Openings). Deck data taken fr
.12
.025
.033
.08
.03
.12
Legend
WS Max WS
Ground
Bank Sta
Elevation (ft)
4530
4520
4510
4500
4490
4480
0
500
1000
1500
2000
2500
3000
Station (ft)

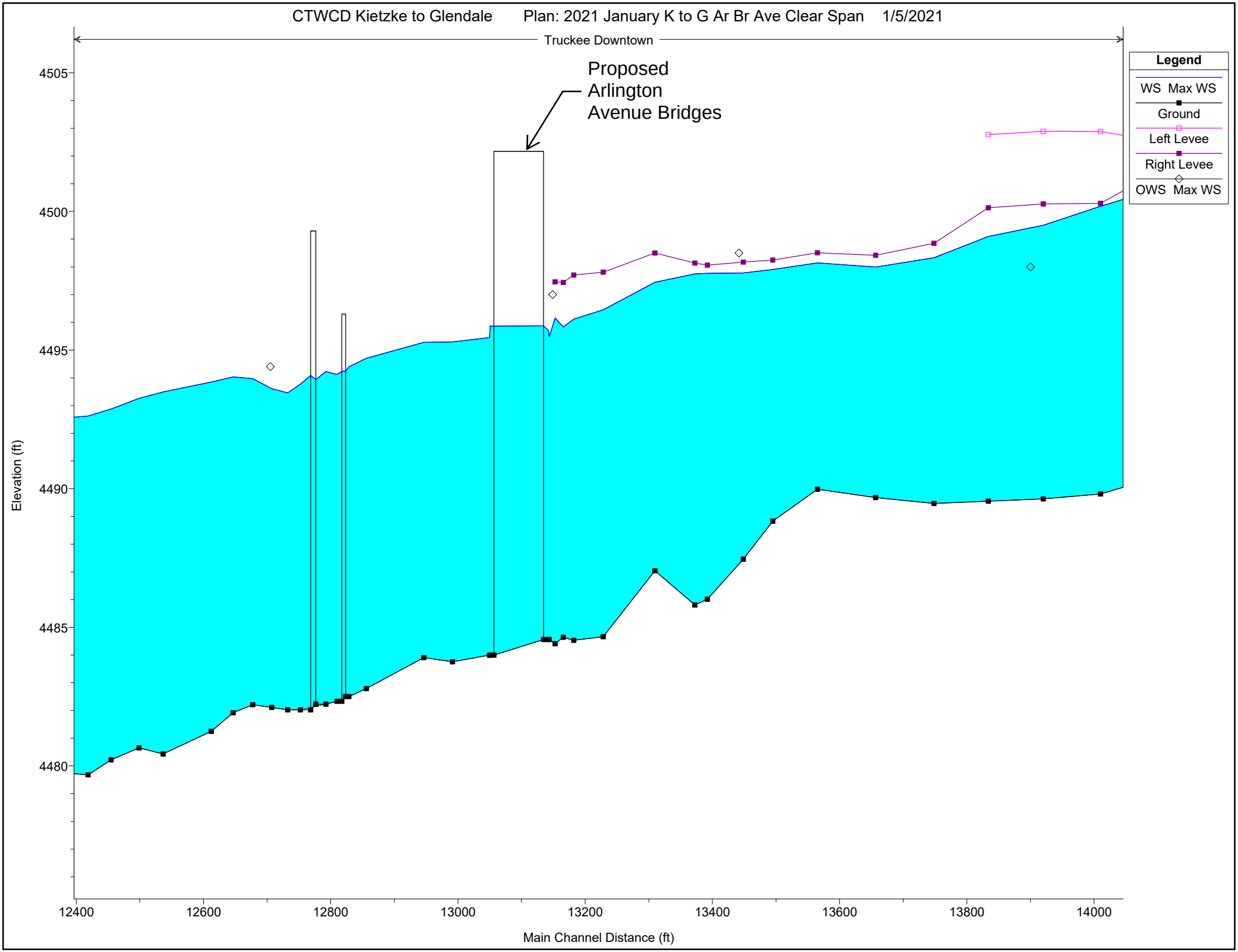
CTWCD Kietzke to Glendale Plan: 2021 January K to G Ar Br Ave Clear Span 1/5/2021

Arlington Avenue Bridges (Multiple Openings). Deck data taken fr



CTWCD Kietzke to Glendale Plan: 2021 January K to G Ar Br Ave Clear Span 1/5/2021




CTWCD Kietzke to Glendale Plan: 2021 January K to G Ar Br Ave Clear Span 1/5/2021
Truckee Downtown
Proposed
Arlington
Avenue Bridges
Legend
WS Max WS
Ground
Left Levee
Right Levee
OWS Max WS
Elevation (ft)
4505
4500
4495
4490
4485
4480
12400
12600
12800
13000
13200
13400
13600
13800
14000
Main Channel Distance (ft)

HEC-RAS Plan: 2021 K to G Clear Span River: Truckee Reach: Downtown Profile: Max WS

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)	
Downtown	74449.19	Max WS	13998.06	4603.85	4613.20		4615.36	0.005494	11.88	1270.27	219.33	0.77
Downtown	74314.8*	Max WS	13996.79	4603.33	4612.49		4614.65	0.005443	11.89	1318.06	234.36	0.77
Downtown	74180.5*	Max WS	13997.12	4602.82	4611.80		4613.91	0.005248	11.86	1382.62	243.84	0.76
Downtown	74046.25	Max WS	13996.74	4602.30	4611.30		4613.23	0.004634	11.48	1510.42	255.24	0.72
Downtown	73865.0*	Max WS	13996.59	4601.46	4610.73		4612.44	0.004198	10.72	1543.16	255.08	0.68
Downtown	73683.84	Max WS	13995.57	4600.62	4610.05		4611.63	0.004008	10.26	1562.11	252.57	0.66
Downtown	73455.3*	Max WS	13995.69	4599.79	4608.95		4610.67	0.004531	10.64	1473.35	247.76	0.70
Downtown	73226.85	Max WS	13994.91	4598.95	4607.20	4606.68	4609.62	0.006807	12.60	1233.24	238.29	0.85
Downtown	73038.4*	Max WS	13995.14	4597.62	4606.11		4608.33	0.006058	12.06	1268.91	236.27	0.80
Downtown	72849.95	Max WS	13995.11	4596.30	4605.44		4607.24	0.004404	10.84	1410.59	237.50	0.69
Downtown	72637.8*	Max WS	13994.14	4595.38	4604.51		4606.29	0.004367	10.75	1403.78	235.07	0.69
Downtown	72425.7*	Max WS	13994.28	4594.46	4603.63		4605.36	0.004228	10.59	1411.35	233.10	0.68
Downtown	72213.6*	Max WS	13993.91	4593.54	4602.86		4604.48	0.003892	10.26	1447.51	232.12	0.65
Downtown	72001.5*	Max WS	13993.53	4592.62	4602.25		4603.70	0.003333	9.72	1525.26	233.31	0.61
Downtown	71789.48	Max WS	13993.44	4591.70	4601.81		4603.06	0.002705	9.01	1648.23	232.38	0.55
Downtown	71607.52	Max WS	13993.42	4590.30	4600.76		4602.45	0.004382	10.47	1387.54	209.62	0.68
Downtown	71439.2*	Max WS	13992.18	4589.53	4599.94		4601.75	0.004263	10.88	1375.64	211.98	0.68
Downtown	71270.9*	Max WS	13992.75	4588.75	4599.31		4601.04	0.004018	10.60	1408.67	214.88	0.66
Downtown	71102.59	Max WS	13992.45	4587.98	4598.74		4600.37	0.003696	10.30	1452.57	215.23	0.64
Downtown	70883.2*	Max WS	13991.99	4587.20	4598.10		4599.66	0.003480	10.07	1484.91	215.50	0.62
Downtown	70663.9*	Max WS	13992.37	4586.43	4597.18		4598.78	0.003694	10.22	1456.04	215.37	0.64
Downtown	70444.66	Max WS	13992.37	4585.65	4596.36		4597.96	0.003735	10.22	1452.30	215.38	0.64
Downtown	70216.4*	Max WS	13992.46	4584.88	4595.56		4597.07	0.003885	9.86	1440.80	212.04	0.64
Downtown	69988.2*	Max WS	13992.21	4584.10	4594.46		4596.09	0.004453	10.24	1380.72	206.22	0.68
Downtown	69760.09	Max WS	13992.17	4583.33	4592.98		4594.96	0.006270	11.31	1246.12	206.49	0.80
Downtown	69510.7*	Max WS	13991.48	4581.82	4591.34		4593.39	0.006344	11.49	1224.86	201.62	0.80
Downtown	69261.3*	Max WS	13991.80	4580.31	4589.67		4591.80	0.006441	11.70	1203.54	196.55	0.81
Downtown	69011.9*	Max WS	13991.88	4578.80	4588.01		4590.19	0.006448	11.85	1191.61	191.45	0.81
Downtown	68762.5*	Max WS	13991.78	4577.30	4586.59		4588.66	0.005648	11.54	1241.84	201.05	0.77
Downtown	68513.1*	Max WS	13991.45	4575.79	4585.79		4587.43	0.003768	10.33	1452.88	227.27	0.64
Downtown	68263.72	Max WS	13991.83	4574.28	4585.48		4586.65	0.002159	8.79	1868.02	280.74	0.50
Downtown	68243.34	Max WS	13991.26	4574.16	4585.46		4586.60	0.002084	8.69	1896.07	285.51	0.49
Downtown	68234.48	Max WS	13991.87	4574.11	4585.45		4586.58	0.002054	8.65	1908.14	287.54	0.49
Downtown	68231.84	Max WS	13991.06	4574.10	4585.45	4581.84	4586.57	0.002050	8.65	1909.46	287.76	0.49
Downtown	68150		Inl Struct									
Downtown	68012.49	Max WS	13991.83	4569.20	4579.73		4581.47	0.004288	10.57	1323.17	174.42	0.68
Downtown	67779.0*	Max WS	13991.40	4568.16	4578.73		4580.48	0.004236	10.60	1319.76	171.89	0.67
Downtown	67545.5*	Max WS	13991.64	4567.11	4577.71		4579.48	0.004219	10.65	1313.20	169.38	0.67
Downtown	67312.0*	Max WS	13991.25	4566.07	4576.66		4578.46	0.004279	10.76	1299.96	167.01	0.68
Downtown	67078.5*	Max WS	13991.60	4565.02	4575.63		4577.45	0.004303	10.83	1291.95	165.20	0.68
Downtown	66845.1*	Max WS	13991.47	4563.98	4574.60		4576.45	0.004347	10.90	1283.95	163.93	0.69
Downtown	66611.6*	Max WS	13991.07	4562.93	4573.55		4575.43	0.004434	10.99	1273.36	169.60	0.69
Downtown	66378.1*	Max WS	13991.24	4561.89	4572.48		4574.40	0.004482	11.10	1278.13	195.33	0.70
Downtown	66144.6*	Max WS	13991.18	4560.84	4571.40		4573.35	0.004551	11.22	1296.07	209.34	0.70
Downtown	65911.2	Max WS	13990.76	4559.80	4570.29		4572.29	0.004673	11.36	1319.50	220.89	0.71
Downtown	65743.6*	Max WS	13990.71	4558.93	4569.49		4571.52	0.004732	11.47	1295.22	225.22	0.72
Downtown	65576.0*	Max WS	13990.70	4558.07	4568.63		4570.72	0.004851	11.62	1260.95	225.18	0.73

HEC-RAS Plan: 2021 K to G Clear Span River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	65408.52	Max WS	13990.26	4557.20	4567.77		4569.89	0.005016	11.71	1246.04	204.56	0.74
Downtown	65235.0*	Max WS	13990.57	4556.33	4566.82		4569.02	0.005213	11.88	1211.46	191.76	0.75
Downtown	65061.6*	Max WS	13990.25	4555.47	4565.85		4568.11	0.005333	12.06	1188.64	181.06	0.76
Downtown	64888.24	Max WS	13990.25	4554.60	4564.85		4567.17	0.005472	12.25	1168.86	173.30	0.77
Downtown	64718.7*	Max WS	13990.19	4553.73	4563.90		4566.25	0.005429	12.32	1159.15	169.13	0.77
Downtown	64549.2*	Max WS	13986.12	4552.87	4563.02		4565.35	0.005162	12.23	1165.73	164.93	0.76
Downtown	64379.75	Max WS	13986.68	4552.00	4562.31		4564.50	0.004565	11.88	1201.83	162.01	0.72
Downtown	64144.1*	Max WS	13983.12	4551.03	4561.71		4563.72	0.003975	11.39	1272.03	186.48	0.67
Downtown	63908.5*	Max WS	13983.23	4550.07	4560.64		4562.69	0.004112	11.49	1263.77	182.53	0.68
Downtown	63672.88	Max WS	13981.74	4549.10	4559.25		4561.49	0.004793	12.02	1204.52	169.73	0.73
Downtown	63465.8*	Max WS	13978.62	4548.37	4558.53		4560.46	0.004696	11.13	1257.97	171.24	0.71
Downtown	63258.8*	Max WS	13984.98	4547.65	4557.49		4559.42	0.004782	11.15	1253.98	166.93	0.72
Downtown	63051.7*	Max WS	13970.79	4546.92	4556.57		4558.46	0.004690	11.02	1268.20	169.12	0.71
Downtown	62844.75	Max WS	13975.16	4546.19	4555.62		4557.52	0.004729	11.05	1268.09	172.40	0.71
Downtown	62632.5*	Max WS	13965.72	4545.23	4554.33		4556.32	0.005375	11.32	1234.13	173.79	0.75
Downtown	62420.4*	Max WS	13954.41	4544.26	4553.25		4555.21	0.005336	11.21	1245.18	178.64	0.75
Downtown	62208.23	Max WS	13980.96	4543.30	4552.45		4554.21	0.004700	10.66	1312.09	183.42	0.70
Downtown	61971.6*	Max WS	13976.20	4541.94	4551.49		4553.21	0.004248	10.53	1339.04	225.37	0.68
Downtown	61735.06	Max WS	13974.77	4540.59	4550.70		4552.17	0.003648	9.75	1577.12	329.32	0.63
Downtown	61551.1*	Max WS	13973.55	4539.70	4550.37		4551.53	0.002629	8.82	2105.92	580.86	0.54
Downtown	61390.84	Max WS	13972.00	4536.92	4549.21		4551.03	0.003968	10.87	1377.45	559.01	0.66
Downtown	61313.72	Max WS	13826.54	4537.43	4549.16		4550.69	0.003287	9.98	1506.02	556.33	0.61
Downtown	61236.36	Max WS	13972.00	4538.64	4548.05		4550.47	0.007766	12.61	1236.43	500.89	0.89
Downtown	61161.9	Max WS	13971.76	4536.99	4547.51		4549.65	0.006388	11.86	1329.94	499.52	0.81
Downtown	61074.4	Max WS	13973.52	4537.09	4546.92	4546.33	4548.78	0.006968	11.26	1680.44	472.04	0.83
Downtown	60992.78	Max WS	13969.97	4537.61	4546.35		4548.69	0.006928	12.33	1196.24	185.14	0.85
Downtown	60901.2	Max WS	13970.46	4536.16	4545.77		4548.09	0.005838	12.24	1183.44	308.91	0.80
Downtown	60820.68	Max WS	13970.08	4533.93	4544.76		4547.83	0.007503	14.07	1009.72	342.12	0.90
Downtown	60738.97	Max WS	13969.71	4533.43	4544.89		4546.92	0.004309	11.49	1269.26	174.61	0.70
Downtown	60650.37	Max WS	13965.42	4534.23	4544.81		4546.51	0.004189	10.46	1347.03	185.72	0.67
Downtown	60549.14	Max WS	13967.06	4533.11	4544.19		4546.04	0.005622	10.94	1343.80	223.05	0.76
Downtown	60457.36	Max WS	13968.09	4532.63	4543.70		4545.51	0.005948	10.85	1381.38	250.49	0.77
Downtown	60355.55	Max WS	13967.92	4531.72	4543.64		4544.96	0.003776	9.24	1596.32	266.49	0.63
Downtown	60280.38	Max WS	13967.55	4531.41	4542.97		4544.68	0.005278	10.53	1424.46	257.46	0.74
Downtown	60201.47	Max WS	13966.76	4532.14	4542.70		4544.29	0.004457	10.14	1477.48	250.38	0.68
Downtown	60121.58	Max WS	13966.47	4531.38	4542.03		4543.93	0.005864	11.10	1331.21	242.35	0.77
Downtown	60009.25	Max WS	13966.10	4531.34	4541.43		4543.30	0.005542	10.99	1321.82	231.56	0.76
Downtown	59932.31	Max WS	13965.35	4531.80	4540.61		4542.91	0.006501	12.21	1221.25	187.98	0.82
Downtown	59826.81	Max WS	13965.46	4530.52	4540.80		4542.27	0.003385	9.72	1452.39	197.17	0.61
Downtown	59750.03	Max WS	13965.37	4527.25	4540.14		4542.01	0.004259	10.95	1295.81	179.01	0.68
Downtown	59674.98	Max WS	13965.51	4526.76	4539.05		4541.76	0.006444	13.20	1057.83	134.97	0.83
Downtown	59588.64	Max WS	13965.43	4525.76	4538.04		4541.36	0.007070	14.62	955.09	110.68	0.88
Downtown	59522.56	Max WS	13965.63	4525.15	4538.09		4540.79	0.005256	13.19	1058.86	114.43	0.76
Downtown	59451.87	Max WS	13965.29	4525.81	4537.46		4540.43	0.006406	13.83	1009.78	118.97	0.84
Downtown	59379.98	Max WS	13965.27	4525.33	4536.69		4540.09	0.007461	14.79	944.35	112.17	0.90
Downtown	59297.86	Max WS	13965.30	4525.42	4536.25		4539.42	0.007078	14.28	978.05	117.69	0.87
Downtown	59213.49	Max WS	13964.88	4525.77	4536.09		4538.74	0.006117	13.10	1119.28	168.83	0.81

HEC-RAS Plan: 2021 K to G Clear Span River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	59121.68	Max WS	13965.36	4525.51	4535.68		4538.16	0.005894	12.64	1129.45	168.61	0.80
Downtown	59028.33	Max WS	13965.18	4525.38	4535.37		4537.59	0.005300	11.97	1168.26	153.29	0.76
Downtown	58939.15	Max WS	13964.84	4524.89	4534.75		4537.14	0.005382	12.38	1127.75	137.67	0.76
Downtown	58849.53	Max WS	13964.46	4524.60	4533.79		4536.76	0.007688	13.82	1010.13	136.72	0.90
Downtown	58773.9	Max WS	13964.21	4523.66	4533.08	4532.81	4536.29	0.008486	14.36	972.46	134.90	0.94
Downtown	58696.11	Max WS	13964.57	4523.09	4532.40	4532.19	4535.68	0.008730	14.54	960.59	133.91	0.96
Downtown	58630.9	Max WS	13964.83	4522.26	4532.10		4534.82	0.006902	13.21	1057.12	142.60	0.86
Downtown	58558.62	Max WS	13964.82	4520.96	4531.90		4534.31	0.005629	12.46	1129.33	150.19	0.78
Downtown	58492.6	Max WS	13964.63	4520.21	4531.75		4533.95	0.004639	11.91	1194.87	148.81	0.72
Downtown	58415.56	Max WS	13964.18	4520.87	4530.74		4533.71	0.007041	13.83	1009.88	127.87	0.87
Downtown	58340.16	Max WS	13964.55	4519.94	4530.58		4533.10	0.005975	12.73	1097.02	142.09	0.80
Downtown	58263.24	Max WS	13964.33	4518.88	4530.63		4532.62	0.004599	11.31	1235.13	155.82	0.71
Downtown	58175.27	Max WS	13964.29	4518.86	4529.78		4532.21	0.005796	12.51	1116.50	143.84	0.79
Downtown	58086.83	Max WS	13963.58	4518.71	4529.25		4531.64	0.006839	12.42	1124.65	166.67	0.84
Downtown	57999.15	Max WS	13963.73	4518.60	4528.95		4531.03	0.005650	11.57	1207.38	171.03	0.77
Downtown	57909.99	Max WS	13963.71	4518.52	4528.93		4530.54	0.004385	10.20	1379.04	206.29	0.68
Downtown	57814.81	Max WS	13963.90	4518.41	4528.70		4530.16	0.003536	9.69	1440.39	188.53	0.62
Downtown	57726.95	Max WS	13964.09	4518.19	4528.13		4529.81	0.004657	10.38	1344.85	195.26	0.70
Downtown	57643.12	Max WS	13963.56	4517.68	4528.07		4529.47	0.003074	9.51	1480.48	186.10	0.58
Downtown	57557.54	Max WS	13963.37	4516.71	4527.66		4529.21	0.003206	9.97	1400.96	163.22	0.60
Downtown	57469.2	Max WS	13963.20	4516.61	4527.17		4528.90	0.003946	10.54	1324.70	164.84	0.66
Downtown	57380.45	Max WS	13963.15	4515.81	4526.91		4528.57	0.003574	10.31	1354.01	159.85	0.62
Downtown	57289.76	Max WS	13963.06	4516.97	4526.72		4528.25	0.003370	9.95	1428.34	179.97	0.61
Downtown	57199.54	Max WS	13963.12	4515.75	4526.62		4527.97	0.002844	9.33	1518.88	186.95	0.56
Downtown	57125.7	Max WS	13962.99	4516.32	4526.55		4527.77	0.002498	8.86	1601.05	191.38	0.53
Downtown	57051.28	Max WS	13962.69	4516.76	4526.01		4527.55	0.003544	9.95	1403.40	175.30	0.62
Downtown	56977.72	Max WS	13962.57	4515.63	4525.65		4527.27	0.003873	10.22	1365.76	175.69	0.65
Downtown	56919.37	Max WS	13962.71	4514.45	4525.04		4527.03	0.005062	11.32	1233.16	166.52	0.73
Downtown	56859.04	Max WS	13962.61	4514.22	4525.03		4526.73	0.004441	10.44	1336.95	183.87	0.68
Downtown	56797.87	Max WS	13962.16	4514.56	4525.29		4526.48	0.002935	8.76	1595.69	212.79	0.56
Downtown	56736.2	Max WS	13962.24	4515.54	4524.97		4526.29	0.003355	9.19	1519.63	208.53	0.60
Downtown	56672.83	Max WS	13962.23	4515.69	4524.53		4526.05	0.004085	9.89	1413.06	202.43	0.66
Downtown	56610.6	Max WS	13962.16	4514.95	4524.21		4525.79	0.004307	10.10	1382.10	197.51	0.67
Downtown	56536.19	Max WS	13962.42	4514.51	4523.58		4525.45	0.005205	10.96	1273.99	185.39	0.74
Downtown	56460.58	Max WS	13962.33	4513.68	4522.84		4525.06	0.006356	11.96	1169.52	176.60	0.81
Downtown	56386.73	Max WS	13961.93	4512.48	4522.08		4524.65	0.007330	12.86	1086.14	161.27	0.87
Downtown	56297.28	Max WS	13962.09	4511.75	4521.45		4523.96	0.007190	12.71	1098.56	162.14	0.86
Downtown	56207.74	Max WS	13962.00	4511.30	4520.75		4523.27	0.007516	12.73	1098.52	172.33	0.88
Downtown	56136.74	Max WS	13962.21	4510.15	4520.49		4522.58	0.008216	11.59	1208.25	195.05	0.80
Downtown	56068.44	Max WS	13961.53	4511.03	4519.83		4522.00	0.009371	11.80	1183.83	198.08	0.85
Downtown	56010.74	Max WS	13962.16	4510.95	4519.74		4521.45	0.005725	10.51	1330.68	227.75	0.76
Downtown	55931.37	Max WS	13961.79	4510.19	4519.03		4520.92	0.008489	11.03	1271.23	224.33	0.80
Downtown	55861.99	Max WS	13961.71	4509.57	4518.85		4520.42	0.004516	10.07	1396.80	214.54	0.69
Downtown	55797.14	Max WS	13961.86	4509.11	4518.37		4520.08	0.006226	10.51	1333.84	199.35	0.71
Downtown	55734.24	Max WS	13961.66	4507.71	4518.10		4519.72	0.004997	10.24	1366.17	178.34	0.65
Downtown	55677.53	Max WS	13961.52	4507.00	4517.22		4519.48	0.005568	12.06	1157.98	154.24	0.77
Downtown	55620.45	Max WS	13961.23	4507.11	4516.74		4519.12	0.007585	12.39	1128.12	150.54	0.79

HEC-RAS Plan: 2021 K to G Clear Span River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	55552.21	Max WS	13961.67	4506.35	4516.38		4518.62	0.006692	11.99	1165.19	147.72	0.75
Downtown	55484.78	Max WS	13961.16	4505.41	4515.63		4518.16	0.007888	12.77	1093.23	139.18	0.80
Downtown	55424.03	Max WS	13961.49	4504.74	4515.24		4517.75	0.005584	12.71	1098.42	132.53	0.78
Downtown	55357.82	Max WS	13933.17	4503.39	4514.84		4517.32	0.006924	12.64	1102.70	129.17	0.76
Downtown	55282.86	Max WS	13934.14	4502.83	4514.71		4516.83	0.005518	11.68	1196.32	137.14	0.69
Downtown	55207.95	Max WS	13953.40	4502.09	4514.50		4516.45	0.004815	11.19	1250.57	138.06	0.65
Downtown	55139.17	Max WS	13870.64	4502.73	4514.26		4516.13	0.003437	10.98	1268.19	139.41	0.63
Downtown	55067.83	Max WS	14046.14	4502.56	4513.91		4515.99	0.003853	11.58	1226.45	140.56	0.67
Downtown	54995.48	Max WS	14010.67	4501.65	4513.63		4515.70	0.003874	11.59	1230.46	144.91	0.67
Downtown	54922.67	Max WS	13998.49	4501.56	4513.28		4515.41	0.004020	11.74	1209.90	138.28	0.68
Downtown	54825.64	Max WS	13996.25	4501.88	4512.94		4515.02	0.003983	11.59	1223.00	139.70	0.67
Downtown	54728.89	Max WS	13996.71	4501.26	4512.94		4514.67	0.003147	10.74	1375.12	204.37	0.61
Downtown	54613.88	Max WS	13995.71	4501.16	4512.87		4514.32	0.002848	9.88	1551.65	217.20	0.57
Downtown	54495.89	Max WS	13995.60	4501.00	4512.84		4514.00	0.002107	8.75	1763.53	250.55	0.50
Downtown	54398.03	Max WS	13992.84	4499.46	4512.63		4513.79	0.001986	8.80	1832.90	349.83	0.48
Downtown	54300.43	Max WS	13993.86	4497.82	4512.43		4513.62	0.002229	9.13	1763.40	383.92	0.51
Downtown	54227.41	Max WS	13994.75	4497.97	4512.34		4513.46	0.001908	8.85	1802.83	294.46	0.47
Downtown	54154.1	Max WS	13994.11	4497.65	4512.43		4513.32	0.001367	7.96	2076.25	361.34	0.41
Downtown	54080.27	Max WS	13994.58	4497.36	4512.05		4513.20	0.001799	8.77	1682.64	202.06	0.46
Downtown	54009.13	Max WS	13993.95	4497.46	4511.85	4507.03	4513.07	0.001845	8.92	1640.89	240.53	0.47
Downtown	53973		Bridge									
Downtown	53938.49	Max WS	13994.13	4498.06	4510.21		4511.94	0.006095	10.53	1328.49	136.84	0.60
Downtown	53852.32	Max WS	13992.16	4498.43	4510.47		4511.45	0.004680	8.07	1804.88	308.82	0.46
Downtown	53753.17	Max WS	13992.83	4498.00	4509.80		4511.03	0.003148	9.02	1629.32	254.18	0.55
Downtown	53650.57	Max WS	13992.97	4497.31	4509.01		4510.59	0.006688	10.08	1388.88	169.29	0.62
Downtown	53562.67	Max WS	13990.66	4497.00	4508.72		4510.05	0.003116	9.40	1636.51	309.58	0.58
Downtown	53465.09	Max WS	13992.17	4497.63	4508.92		4509.70	0.003957	7.41	2015.93	428.37	0.44
Downtown	53445.09	Max WS	13991.13	4497.67	4508.50	4505.38	4509.69	0.002673	8.86	1897.72	355.91	0.54
Downtown	53380.08	Max WS	13991.40	4497.25	4508.57	4505.11	4509.45	0.003304	7.80	1914.88	357.85	0.50
Downtown	53366.7	Max WS	13991.88	4497.25	4508.24		4509.43	0.004415	8.86	1799.42	398.79	0.57
Downtown	53240.67	Max WS	13991.41	4496.62	4507.89		4509.03	0.002327	8.78	1739.05	312.06	0.54
Downtown	53124.96	Max WS	13990.71	4495.26	4507.54		4508.54	0.005416	8.17	1761.76	319.91	0.50
Downtown	53021.55	Max WS	13989.89	4494.63	4507.09		4508.13	0.002688	8.42	1805.81	320.03	0.49
Downtown	52913.77	Max WS	13989.77	4493.55	4507.17		4507.72	0.004363	6.34	2501.25	474.21	0.37
Downtown	52774.59	Max WS	13989.11	4493.31	4506.41		4507.32	0.002501	7.84	1931.47	386.05	0.48
Downtown	52651.27	Max WS	13988.60	4491.64	4505.64		4506.76	0.006512	8.60	1650.86	344.98	0.55
Downtown	52547.66	Max WS	13988.28	4492.08	4505.01		4506.36	0.003723	9.30	1503.77	185.95	0.58
Downtown	52441.86	Max WS	13987.54	4491.50	4504.55		4505.92	0.002983	9.38	1491.62	178.34	0.57
Downtown	52336.23	Max WS	13987.00	4491.59	4503.64		4505.57	0.003894	11.14	1256.04	154.84	0.69
Downtown	52224.47	Max WS	13987.39	4491.94	4503.46		4504.78	0.010117	9.19	1522.18	165.98	0.53
Downtown	52124.04	Max WS	13986.54	4492.59	4502.94		4504.15	0.002402	8.81	1589.72	184.55	0.52
Downtown	52018.42	Max WS	13986.79	4491.72	4502.13		4503.84	0.003551	10.49	1336.30	156.27	0.62
Downtown	51944.18	Max WS	13986.67	4492.11	4501.94		4503.59	0.003194	10.35	1427.53	219.59	0.60
Downtown	51868.41	Max WS	13986.71	4491.86	4501.55		4503.35	0.003705	10.78	1362.43	225.94	0.64
Downtown	51791.2	Max WS	13985.70	4491.64	4501.36		4503.05	0.003685	10.46	1389.98	206.13	0.62
Downtown	51712.2	Max WS	13985.70	4491.11	4501.11		4502.76	0.003616	10.31	1381.07	231.14	0.62
Downtown	51629.06	Max WS	13985.69	4490.42	4500.82		4502.45	0.003651	10.24	1366.35	161.96	0.62

HEC-RAS Plan: 2021 K to G Clear Span River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	51538.61	Max WS	13986.15	4489.81	4500.19		4502.08	0.004763	11.03	1268.43	166.16	0.70
Downtown	51448.57	Max WS	13986.20	4489.63	4499.51		4501.61	0.005930	11.63	1202.37	170.47	0.77
Downtown	51362.21	Max WS	13985.96	4489.55	4499.10		4501.10	0.005621	11.36	1231.54	173.56	0.75
Downtown	51276.75	Max WS	13985.97	4489.47	4498.33		4500.61	0.006892	12.10	1156.17	175.85	0.83
Downtown	51185.25	Max WS	13985.43	4489.68	4498.00		4499.98	0.005753	11.30	1237.92	182.95	0.77
Downtown	51093.72	Max WS	13985.81	4489.98	4498.15		4499.49	0.003915	9.28	1506.51	212.83	0.62
Downtown	51023.43	Max WS	13984.90	4488.83	4497.91		4499.15	0.005717	8.93	1565.67	225.76	0.60
Downtown	50977.11	Max WS	13986.05	4487.46	4497.78		4498.90	0.005056	8.46	1652.95	245.18	0.57
Downtown	50920.73	Max WS	13985.76	4486.01	4497.77		4498.64	0.004103	7.46	1874.20	263.43	0.49
Downtown	50900.82	Max WS	13985.87	4485.81	4497.75		4498.56	0.003460	7.22	1935.86	302.78	0.50
Downtown	50838.23	Max WS	13985.59	4487.04	4497.45		4498.23	0.007192	7.08	1975.69	342.02	0.52
Downtown	50756.84	Max WS	13985.76	4484.66	4496.45		4497.40	0.013164	7.79	1795.56	374.77	0.63
Downtown	50710.61	Max WS	13985.62	4484.53	4496.11		4496.99	0.004130	7.52	1858.79	378.94	0.60
Downtown	50694	Max WS	13985.43	4484.64	4495.84		4496.94	0.003572	8.41	1663.83	357.25	0.69
Downtown	50681.29	Max WS	13985.21	4484.41	4496.16		4496.89	0.001976	6.87	2035.90	339.26	0.49
Downtown	50671.96	Max WS	13984.25	4484.56	4495.47		4496.89	0.003377	9.54	1465.66	199.59	0.62
Downtown	50670.96	Max WS	13985.41	4484.56	4495.71	4492.58	4496.89	0.002320	8.72	1604.27	254.69	0.61
Downtown	50625		Bridge									
Downtown	50579.08	Max WS	13984.24	4484.00	4495.87		4496.78	0.001554	7.64	1830.12	184.45	0.43
Downtown	50578.08	Max WS	13984.23	4484.00	4495.45		4496.78	0.002963	9.25	1512.25	165.66	0.54
Downtown	50519.86	Max WS	13985.09	4483.76	4495.29		4496.61	0.002764	9.22	1516.83	355.13	0.72
Downtown	50474.94	Max WS	13983.44	4483.91	4495.28		4496.42	0.005279	8.56	1632.78	348.41	0.68
Downtown	50384.53	Max WS	13985.01	4482.79	4494.70		4496.01	0.004005	9.18	1531.73	314.86	0.71
Downtown	50356.91	Max WS	13981.29	4482.50	4494.40	4491.69	4495.90	0.004820	9.85	1424.56	248.42	0.64
Downtown	50345		Bridge									
Downtown	50338.63	Max WS	13933.76	4482.33	4494.12		4495.70	0.005776	10.10	1389.91	331.80	0.76
Downtown	50320.94	Max WS	13933.53	4482.23	4494.22		4495.57	0.005355	9.34	1510.51	407.29	0.76
Downtown	50300		Mult Open									
Downtown	50280	Max WS	13984.25	4482.02	4493.77		4494.99	0.003649	8.88	1600.75	432.79	0.72
Downtown	50260.01	Max WS	13984.97	4482.02	4493.46		4494.98	0.004622	9.94	1437.51	408.66	0.84
Downtown	50234.71	Max WS	13984.59	4482.11	4493.61		4494.80	0.002895	8.76	1610.33	377.66	0.67
Downtown	50204.78	Max WS	13984.63	4482.21	4493.97		4494.70	0.002398	6.85	2053.91	300.13	0.44
Downtown	50174.02	Max WS	13984.76	4481.92	4494.04		4494.64	0.001325	6.25	2252.13	274.22	0.37
Downtown	50139.65	Max WS	13984.18	4481.25	4493.84		4494.60	0.001012	6.99	2014.12	246.32	0.41
Downtown	50064.3	Max WS	13984.56	4480.43	4493.49		4494.52	0.001203	8.15	1715.66	181.18	0.47
Downtown	50026.3	Max WS	13984.10	4480.65	4493.26		4494.46	0.002265	8.77	1594.03	163.78	0.50
Downtown	49982.23	Max WS	13984.18	4480.22	4492.87		4494.36	0.001922	9.80	1426.71	143.69	0.55
Downtown	49946.24	Max WS	13983.93	4479.68	4492.62		4494.28	0.002759	10.33	1354.37	136.81	0.58
Downtown	49896.5	Max WS	13984.00	4479.77	4492.52		4494.15	0.002603	10.22	1368.47	134.73	0.57
Downtown	49817.14	Max WS	13983.80	4479.20	4492.38	4488.95	4493.98	0.001513	10.14	1378.47	137.17	0.56
Downtown	49770		Bridge									
Downtown	49736.07	Max WS	13983.76	4479.18	4491.90		4493.53	0.001586	10.23	1367.18	140.63	0.58
Downtown	49703.17	Max WS	13983.95	4479.24	4491.87		4493.46	0.002486	10.14	1379.25	145.92	0.58
Downtown	49674.77	Max WS	13983.66	4479.66	4491.66		4493.40	0.002428	10.58	1330.72	151.35	0.59
Downtown	49612.19	Max WS	13983.59	4480.02	4491.47		4493.24	0.002499	10.69	1323.89	154.29	0.60
Downtown	49549.05	Max WS	13983.76	4480.05	4491.55		4493.09	0.002131	9.97	1415.64	157.45	0.55
Downtown	49487.33	Max WS	13983.50	4480.05	4491.72		4492.97	0.001606	8.97	1568.24	165.90	0.49

HEC-RAS Plan: 2021 K to G Clear Span River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	49466.08	Max WS	13983.39	4480.03	4491.68	4487.71	4492.94	0.001223	9.00	1553.62	158.77	0.51
Downtown	49420		Bridge									
Downtown	49353.16	Max WS	13983.24	4479.70	4490.51		4491.98	0.002508	9.85	1464.65	152.42	0.56
Downtown	49334.7	Max WS	13983.89	4479.60	4489.72		4491.93	0.004483	11.94	1170.92	136.71	0.72
Downtown	49286.93	Max WS	13982.04	4479.21	4489.59		4491.64	0.004124	11.47	1218.55	139.80	0.69
Downtown	49220.73	Max WS	13983.40	4478.69	4489.81		4491.39	0.002943	10.10	1384.19	147.23	0.58
Downtown	49154.55	Max WS	13983.41	4478.91	4489.45		4491.19	0.003327	10.57	1322.82	149.00	0.63
Downtown	49088.39	Max WS	13983.26	4478.26	4489.65		4490.99	0.002350	9.30	1504.32	154.82	0.53
Downtown	49070.63	Max WS	13982.52	4478.25	4489.64	4486.17	4490.95	0.002313	9.19	1521.74	156.02	0.52
Downtown	49020		Bridge									
Downtown	48983.26	Max WS	13983.14	4478.25	4488.90		4490.27	0.002311	9.42	1484.60	171.00	0.55
Downtown	48960.04	Max WS	13983.26	4478.33	4489.00		4490.22	0.002192	8.85	1579.35	171.61	0.51
Downtown	48884.44	Max WS	13982.40	4478.01	4488.64		4490.05	0.002450	9.51	1470.77	158.23	0.55
Downtown	48820.9	Max WS	13982.73	4476.98	4488.61		4489.90	0.002164	9.10	1536.42	163.39	0.52
Downtown	48759.22	Max WS	13982.32	4476.46	4488.62		4489.77	0.001975	8.62	1621.93	169.39	0.49
Downtown	48699.6	Max WS	13982.49	4476.17	4488.60		4489.66	0.001670	8.29	1687.38	167.57	0.46
Downtown	48648.32	Max WS	13982.42	4475.99	4488.55	4483.94	4489.58	0.001554	8.15	1716.43	163.87	0.44
Downtown	48600		Bridge									
Downtown	48556.86	Max WS	13982.46	4474.83	4487.06		4488.31	0.001873	8.95	1563.12	166.50	0.50
Downtown	48518.43	Max WS	13982.22	4474.37	4486.87		4488.23	0.002180	9.36	1494.39	151.33	0.52
Downtown	48471.73	Max WS	13982.47	4474.06	4486.34		4488.11	0.003098	10.66	1311.76	143.92	0.62
Downtown	48410.95	Max WS	13982.04	4473.54	4486.09		4487.92	0.003158	10.85	1288.65	140.49	0.63
Downtown	48345.53	Max WS	13982.41	4473.22	4485.82		4487.71	0.003235	11.01	1269.48	137.25	0.64
Downtown	48280.29	Max WS	13982.17	4472.92	4485.15		4487.48	0.004163	12.26	1140.78	126.67	0.72
Downtown	48215.45	Max WS	13982.27	4472.53	4484.23		4487.69	0.007403	14.90	938.10	118.59	0.93
Downtown	48148.16	Max WS	13982.45	4472.12	4484.02		4486.97	0.006115	13.77	1015.71	124.31	0.85
Downtown	48081.13	Max WS	13981.97	4471.88	4484.10		4486.51	0.004351	12.47	1120.85	124.03	0.73
Downtown	48014.16	Max WS	13982.22	4472.42	4483.88		4486.21	0.004606	12.25	1141.67	137.77	0.75
Downtown	47951.93	Max WS	13982.30	4472.88	4483.54		4485.92	0.004744	12.36	1130.90	138.50	0.76
Downtown	47892.98	Max WS	13981.89	4472.27	4483.68		4485.65	0.003607	11.24	1244.43	138.52	0.66
Downtown	47837.03	Max WS	13981.73	4471.94	4483.57		4485.44	0.003479	11.00	1271.44	141.38	0.65
Downtown	47779.19	Max WS	13981.91	4472.21	4483.43		4485.23	0.003869	10.75	1300.46	162.73	0.67
Downtown	47723.17	Max WS	13982.07	4472.25	4482.48		4485.11	0.005922	13.03	1073.23	144.13	0.84
Downtown	47669.23	Max WS	13981.86	4470.80	4483.20	4479.79	4484.65	0.002572	9.64	1450.80	159.74	0.56
Downtown	47650		Bridge									
Downtown	47595.25	Max WS	13981.28	4468.58	4483.33		4484.58	0.001647	8.98	1602.39	160.78	0.46
Downtown	47563.37	Max WS	13981.97	4468.69	4482.98		4484.53	0.002285	9.99	1436.76	163.21	0.55
Downtown	47514.67	Max WS	13981.82	4468.93	4483.22		4484.42	0.001707	8.79	1642.79	186.55	0.48
Downtown	47469.54	Max WS	13981.89	4469.13	4482.66	4479.61	4484.34	0.002802	10.39	1382.57	167.61	0.60
Downtown	47400		Bridge									
Downtown	47351.45	Max WS	13981.88	4469.93	4480.06	4479.78	4483.42	0.007592	14.71	950.53	127.90	0.95
Downtown	47334.9*	Max WS	13981.62	4469.96	4480.06		4483.08	0.007106	13.94	1002.69	139.95	0.92
Downtown	47318.3*	Max WS	13979.78	4469.99	4480.30		4482.71	0.005489	12.45	1123.09	153.52	0.81
Downtown	47301.8	Max WS	13978.59	4470.02	4480.81		4482.54	0.003527	10.57	1323.08	165.84	0.66
Downtown	47273.6*	Max WS	13978.76	4469.80	4480.71		4482.44	0.003484	10.56	1324.15	164.57	0.66
Downtown	47245.4*	Max WS	13980.03	4469.57	4480.63		4482.34	0.003405	10.51	1330.26	163.50	0.65
Downtown	47217.32	Max WS	13979.49	4469.35	4480.56		4482.25	0.003300	10.43	1340.68	162.64	0.64

HEC-RAS Plan: 2021 K to G Clear Span River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	47194.7*	Max WS	13979.65	4469.10	4480.38		4482.18	0.003470	10.76	1299.10	155.82	0.66
Downtown	47172.22	Max WS	13977.92	4468.85	4480.20		4482.10	0.003431	11.07	1269.54	152.82	0.66
Downtown	47146.9*	Max WS	13979.37	4468.58	4480.11		4482.02	0.003348	11.09	1268.07	145.92	0.65
Downtown	47121.71	Max WS	13979.09	4468.30	4480.02		4481.93	0.003273	11.09	1268.12	143.22	0.65
Downtown	47059.13	Max WS	13979.16	4467.68	4480.28		4481.74	0.002474	9.69	1442.33	155.94	0.56
Downtown	46997.03	Max WS	13978.45	4467.35	4480.08		4481.58	0.002526	9.83	1429.26	166.47	0.57
Downtown	46935.21	Max WS	13975.87	4467.85	4479.77		4481.41	0.003077	10.29	1358.47	160.93	0.62
Downtown	46877.18	Max WS	13977.21	4468.19	4479.68		4481.23	0.003009	9.99	1400.63	177.43	0.61
Downtown	46819.52	Max WS	13978.52	4467.23	4479.91		4481.09	0.001833	8.70	1634.92	203.87	0.49
Downtown	46762.23	Max WS	13978.05	4466.60	4480.08		4480.99	0.001405	7.63	1836.83	202.37	0.43
Downtown	46709.06	Max WS	13978.35	4466.61	4480.07		4480.91	0.001373	7.39	1892.16	198.61	0.42
Downtown	46654.94	Max WS	13978.06	4466.61	4480.01		4480.84	0.001338	7.30	1913.63	199.83	0.42
Downtown	46610.97	Max WS	13977.66	4466.61	4479.92		4480.78	0.001419	7.44	1877.73	198.99	0.43
Downtown	46546.92	Max WS	13977.93	4466.61	4479.82		4480.69	0.001400	7.49	1865.84	192.58	0.42
Downtown	46484.79	Max WS	13977.56	4466.62	4479.66		4480.60	0.001527	7.79	1794.01	186.42	0.44
Downtown	46424.93	Max WS	13977.82	4466.60	4479.72		4480.52	0.001185	7.17	1950.54	196.88	0.40
Downtown	46365.15	Max WS	13976.97	4466.56	4479.70		4480.45	0.001104	6.96	2009.41	211.42	0.38
Downtown	46305.39	Max WS	13977.08	4466.53	4479.68		4480.39	0.001014	6.72	2081.18	281.43	0.37
Downtown	46258.14	Max WS	13977.06	4466.51	4479.65		4480.34	0.000980	6.65	2101.83	220.69	0.36
Downtown	46210.57	Max WS	13977.11	4466.49	4479.73	4473.55	4480.29	0.000812	6.03	2329.90	247.06	0.33
Downtown	46150		Bridge									
Downtown	46091.2	Max WS	13976.95	4464.95	4474.08		4475.25	0.002669	8.68	1609.93	212.18	0.56
Downtown	45983.39	Max WS	13976.53	4463.88	4473.70		4474.95	0.002874	8.98	1557.19	215.00	0.59
Downtown	45798.97	Max WS	13976.29	4462.44	4472.42		4474.30	0.004539	11.00	1270.77	181.29	0.73
Downtown	45597.26	Max WS	13976.40	4460.72	4470.84		4473.38	0.005347	12.78	1093.73	138.99	0.80
Downtown	45398.64	Max WS	13976.77	4456.90	4469.05		4472.48	0.006483	14.85	940.93	108.08	0.89
Downtown	45302.05	Max WS	13976.38	4456.66	4468.56		4471.82	0.005880	14.52	979.66	127.06	0.85
Downtown	45205.32	Max WS	13976.29	4456.41	4468.75		4470.96	0.003478	11.93	1178.65	137.32	0.66
Downtown	45110.24	Max WS	13975.85	4456.04	4468.81		4470.64	0.002829	10.90	1318.61	158.06	0.61
Downtown	45014.75	Max WS	13976.20	4455.67	4468.44		4470.36	0.003042	11.11	1258.04	127.30	0.62
Downtown	44945.88	Max WS	13976.38	4455.14	4468.41		4470.15	0.002913	10.57	1322.12	141.34	0.61
Downtown	44876.97	Max WS	13976.43	4454.62	4468.29		4469.94	0.003211	10.28	1359.70	149.45	0.60
Downtown	44808.06	Max WS	13976.02	4454.09	4468.17		4469.71	0.003205	9.96	1403.17	160.24	0.59
Downtown	44719.45	Max WS	13974.86	4454.09	4468.50	4464.25	4469.48	0.001895	7.91	1765.88	194.27	0.46
Downtown	44650		Bridge									
Downtown	44609.2	Max WS	13976.14	4452.25	4463.35		4465.10	0.003570	10.62	1316.32	149.67	0.63
Downtown	44538.60	Max WS	13976.14	4452.25	4462.86		4464.83	0.004162	11.26	1240.77	143.79	0.68
Downtown	44496.75	Max WS	13975.89	4452.25	4462.21		4464.67	0.005836	12.59	1110.52	141.75	0.79
Downtown	44402.78	Max WS	13975.68	4450.97	4461.34		4464.15	0.006782	13.45	1039.38	134.28	0.85
Downtown	44307.87	Max WS	13975.94	4449.68	4460.53		4463.53	0.007157	13.89	1005.97	127.07	0.87
Downtown	44212.27	Max WS	13975.48	4448.40	4459.77		4462.89	0.006850	14.18	985.75	111.49	0.84
Downtown	44164.2	Max WS	13975.68	4448.42	4459.08	4458.70	4462.98	0.008462	15.85	881.64	101.11	0.95
Downtown	44096.59	Max WS	13975.27	4448.06	4458.58	4458.19	4462.31	0.008410	15.49	902.26	107.35	0.94
Downtown	44028.56	Max WS	13975.43	4447.71	4458.25		4461.50	0.007457	14.45	966.98	119.25	0.89
Downtown	43960.63	Max WS	13975.57	4447.35	4458.09		4460.88	0.006243	13.41	1042.56	126.86	0.82
Downtown	43863.31	Max WS	13975.82	4446.53	4457.80		4460.28	0.005168	12.64	1106.01	127.18	0.76
Downtown	43764.57	Max WS	13975.72	4445.70	4458.26		4459.81	0.002902	9.98	1400.27	149.40	0.57

HEC-RAS Plan: 2021 K to G Clear Span River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	43697.38	Max WS	13975.69	4445.70	4458.05		4459.61	0.003134	10.02	1395.22	157.61	0.59
Downtown	43630.21	Max WS	13975.38	4445.70	4457.81		4459.40	0.003176	10.11	1382.62	154.57	0.60
Downtown	43563.05	Max WS	13975.70	4445.70	4457.58		4459.18	0.003314	10.13	1379.27	159.11	0.61
Downtown	43468.11	Max WS	13975.39	4445.30	4457.21		4458.85	0.003473	10.28	1359.37	159.50	0.62
Downtown	43373.02	Max WS	13975.38	4444.90	4457.03		4458.54	0.003142	9.84	1420.44	165.72	0.59
Downtown	43293.25	Max WS	13975.18	4444.90	4456.68		4458.28	0.003323	10.17	1393.81	176.82	0.61
Downtown	43213.3	Max WS	13975.17	4444.90	4455.83		4457.98	0.005185	11.75	1189.18	155.06	0.75
Downtown	43137.05	Max WS	13975.30	4444.85	4455.06		4457.59	0.006460	12.74	1096.66	148.65	0.83
Downtown	43061.5	Max WS	13974.93	4444.80	4454.88		4457.09	0.005404	11.92	1172.33	153.87	0.76
Downtown	42964.86	Max WS	13974.29	4444.62	4454.21		4456.55	0.006147	12.30	1144.14	164.35	0.80
Downtown	42868.91	Max WS	13975.39	4444.44	4454.26		4455.96	0.004336	10.58	1383.27	206.54	0.68
Downtown	42776.38	Max WS	13975.39	4445.40	4453.56		4455.49	0.006302	11.15	1255.57	219.81	0.80
Downtown	42712.78	Max WS	13974.73	4444.67	4452.98		4455.11	0.007407	11.71	1198.21	223.38	0.86
Downtown	42650.83	Max WS	13975.27	4443.93	4452.61		4454.62	0.007251	11.37	1229.03	218.42	0.85
Downtown	42571.63	Max WS	13974.50	4443.19	4451.90	4451.59	4454.19	0.008451	12.16	1158.32	229.95	0.91
Downtown	42496.35	Max WS	13973.82	4442.45	4451.44		4453.35	0.006979	11.09	1262.70	233.27	0.83
Downtown	42424.35	Max WS	13973.95	4440.14	4451.72		4452.83	0.002904	8.43	1658.82	233.22	0.56
Downtown	42343.67	Max WS	13974.75	4437.69	4451.40		4452.61	0.002671	8.87	1604.03	212.39	0.54
Downtown	42248.44	Max WS	13974.52	4437.59	4450.64		4452.37	0.003420	10.87	1381.14	188.64	0.63
Downtown	42111.79	Max WS	13974.92	4437.14	4449.21	4448.41	4452.63	0.005812	15.20	994.53	129.48	0.83
Downtown	42040.67	Max WS	13974.39	4438.25	4449.20		4451.99	0.004921	13.87	1100.95	141.13	0.77
Downtown	41973.57	Max WS	13974.09	4438.24	4449.38		4451.58	0.004016	12.30	1234.33	166.24	0.69
Downtown	41937.04	Max WS	13974.16	4437.50	4449.33		4451.44	0.003708	12.20	1263.26	163.32	0.67
Downtown	41794.81	Max WS	13974.18	4435.81	4449.72	4445.48	4450.93	0.001728	9.16	1667.09	188.73	0.47
Downtown	41611.81		Bridge									
Downtown	41608.47	Max WS	13973.65	4434.57	4448.33		4449.82	0.002443	10.68	1525.54	182.05	0.55
Downtown	41482.09	Max WS	13974.15	4433.63	4448.16		4449.53	0.001693	9.67	1543.95	143.92	0.47
Downtown	41435.94	Max WS	13973.67	4433.85	4448.02		4449.45	0.001794	9.78	1513.62	143.15	0.48
Downtown	41313.22	Max WS	13972.40	4433.80	4447.88		4449.19	0.002125	9.17	1534.69	165.24	0.50
Downtown	41197.77	Max WS	13973.52	4434.04	4447.43		4448.89	0.002937	9.72	1437.55	151.99	0.56
Downtown	40959.95	Max WS	13972.69	4434.55	4447.12		4448.31	0.001897	8.76	1594.82	163.17	0.49
Downtown	40798.2	Max WS	13972.89	4435.15	4446.93		4448.02	0.001811	8.37	1695.70	208.14	0.48
Downtown	40713.66	Max WS	13972.83	4435.04	4446.65		4447.85	0.002154	8.85	1614.65	214.21	0.52
Downtown	40613.39	Max WS	13972.24	4433.88	4446.28		4447.64	0.002449	9.51	1555.01	228.99	0.56
Downtown	40432.02	Max WS	13972.02	4432.73	4445.86		4447.21	0.002252	9.37	1548.03	223.79	0.54
Downtown	40284.51	Max WS	13971.45	4431.86	4445.47		4446.91	0.002116	9.82	1552.89	242.33	0.53
Downtown	40105.75	Max WS	13971.18	4432.47	4445.58		4446.56	0.001456	8.33	1891.64	259.25	0.45
Downtown	40007.36	Max WS	13971.36	4432.35	4445.44		4446.41	0.001455	8.12	1883.95	256.82	0.44
Downtown	39916.85	Max WS	13971.15	4432.29	4445.19		4446.24	0.001720	8.24	1696.73	184.03	0.47
Downtown	39828.46	Max WS	13971.26	4432.08	4445.00		4446.10	0.001680	8.39	1679.94	194.40	0.47
Downtown	39723.22	Max WS	13971.19	4432.17	4444.94		4445.93	0.001443	8.02	1766.56	192.26	0.44
Downtown	39625.06	Max WS	13970.73	4431.99	4444.79		4445.79	0.001515	8.02	1756.74	194.16	0.45
Downtown	39527.65	Max WS	13970.81	4432.61	4444.63		4445.63	0.001610	8.04	1748.22	198.51	0.46
Downtown	39447.91	Max WS	13970.37	4432.63	4444.55		4445.51	0.001542	7.92	1802.85	208.66	0.45
Downtown	39366.91	Max WS	13970.16	4433.03	4444.12		4445.38	0.002215	9.15	1594.70	205.50	0.53
Downtown	39285.87	Max WS	13970.29	4432.97	4443.86		4445.19	0.002556	9.40	1551.09	212.12	0.57
Downtown	39203.81	Max WS	13970.38	4432.61	4443.48		4444.98	0.002948	10.12	1472.04	208.17	0.61

HEC-RAS Plan: 2021 K to G Clear Span River: Truckee Reach: Downtown Profile: Max WS (Continued)

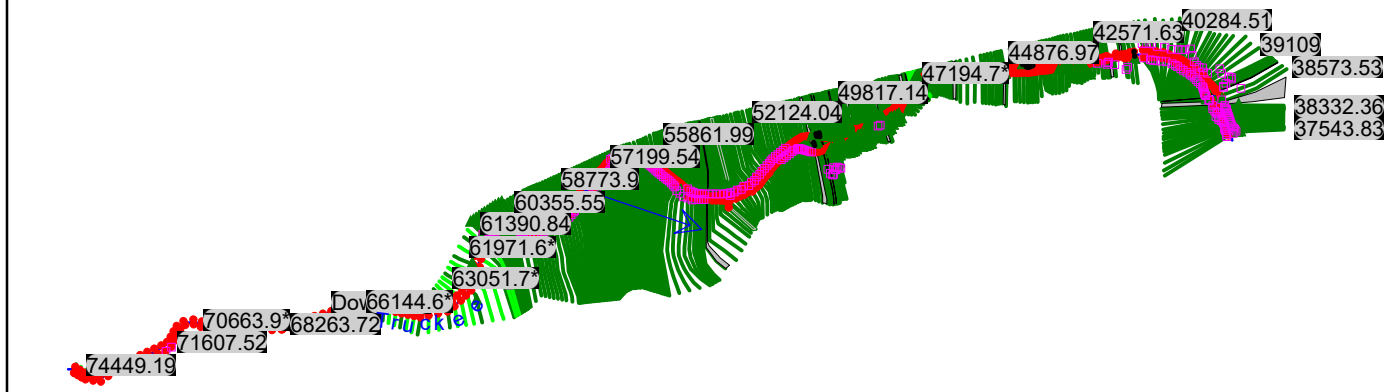
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downtown	39109	Max WS	13970.41	4429.68	4443.84		4444.73	0.001297	7.65	1888.24	208.60	0.42
Downtown	39013.93	Max WS	13969.50	4429.78	4443.63		4444.60	0.001374	8.00	1804.44	199.43	0.43
Downtown	38946.54	Max WS	13969.28	4427.25	4443.69		4444.52	0.001150	7.43	1970.18	216.47	0.40
Downtown	38894.55	Max WS	13970.08	4426.99	4443.81		4444.46	0.000913	6.54	2212.01	236.19	0.35
Downtown	38848.37	Max WS	13969.93	4426.97	4443.42		4444.00	0.018760	6.11	2330.27	259.64	0.34
Downtown	38813.19	Max WS	13970.02	4427.04	4443.09		4443.65	0.000932	6.02	2363.29	272.38	0.35
Downtown	38758.33	Max WS	13969.24	4427.49	4443.11		4443.65	0.000942	5.95	2398.07	284.19	0.35
Downtown	38732.61	Max WS	13970.25	4431.53	4442.85	4439.58	4443.59	0.001572	6.93	2057.64	284.48	0.44
Downtown	38576.81		Inl Struct									
Downtown	38573.53	Max WS	13938.38	4428.24	4436.21	4436.12	4438.47	0.008843	12.04	1157.41	237.54	0.96
Downtown	38492.13	Max WS	13971.31	4424.74	4436.10	4433.07	4437.06	0.002328	7.88	1772.49	251.87	0.52
Downtown	38336.81		Bridge									
Downtown	38332.36	Max WS	13969.85	4423.90	4435.49		4436.52	0.002652	8.40	1736.95	280.11	0.56
Downtown	38277.95	Max WS	13970.04	4423.84	4434.73		4436.39	0.004336	10.53	1386.58	241.26	0.71
Downtown	38228.19	Max WS	13970.39	4423.59	4434.57		4436.18	0.003360	10.25	1399.72	196.64	0.64
Downtown	38183.57	Max WS	13969.82	4423.95	4434.28		4436.04	0.003380	10.78	1343.60	180.59	0.65
Downtown	38145.05	Max WS	13970.03	4423.90	4434.14		4435.92	0.003285	11.02	1347.78	179.58	0.65
Downtown	38098.2	Max WS	13970.00	4424.28	4433.82		4435.78	0.003732	11.69	1300.04	182.70	0.69
Downtown	38050.81	Max WS	13969.95	4423.47	4433.88		4435.58	0.003564	11.04	1389.38	187.42	0.64
Downtown	38003.02	Max WS	13969.39	4423.53	4433.44		4435.44	0.004187	11.94	1298.09	183.13	0.70
Downtown	37954.86	Max WS	13912.08	4423.01	4432.98		4435.24	0.004742	12.69	1210.29	169.67	0.74
Downtown	37906.33	Max WS	13910.85	4422.29	4432.58		4435.03	0.005067	13.20	1160.32	160.34	0.76
Downtown	37852.33	Max WS	13911.16	4421.61	4431.93		4434.85	0.005951	14.29	1061.05	145.06	0.83
Downtown	37797.18	Max WS	13969.76	4420.84	4431.36	4431.09	4434.65	0.007258	15.12	1006.15	136.39	0.87
Downtown	37741.16	Max WS	13969.46	4420.70	4430.82	4430.70	4434.42	0.008403	15.67	949.76	128.44	0.92
Downtown	37684.6	Max WS	13969.40	4420.36	4430.32	4430.18	4434.05	0.009440	15.88	925.68	126.34	0.96
Downtown	37639.51	Max WS	13969.42	4420.60	4429.87	4430.10	4433.85	0.010537	16.39	890.63	122.73	1.01
Downtown	37592.27	Max WS	13970.22	4420.58	4429.29	4430.24	4434.16	0.014244	17.87	802.35	120.97	1.16
Downtown	37543.83	Max WS	13969.42	4420.31	4428.53	4429.74	4433.61	0.016960	18.30	785.68	129.82	1.25
Downtown	37492.76	Max WS	13968.48	4420.68	4427.26	4429.65	4434.92	0.033102	22.32	636.11	126.36	1.69

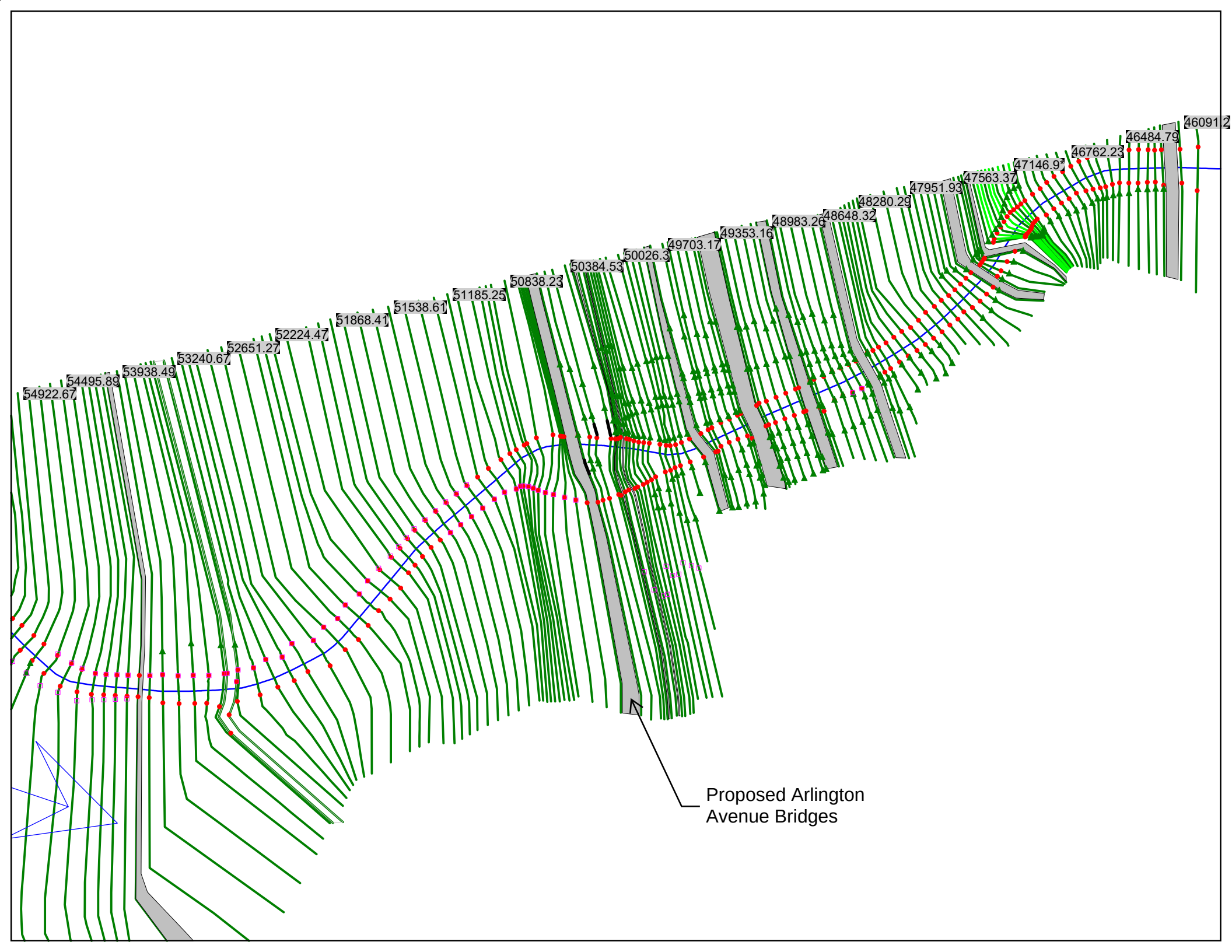
Jacobs

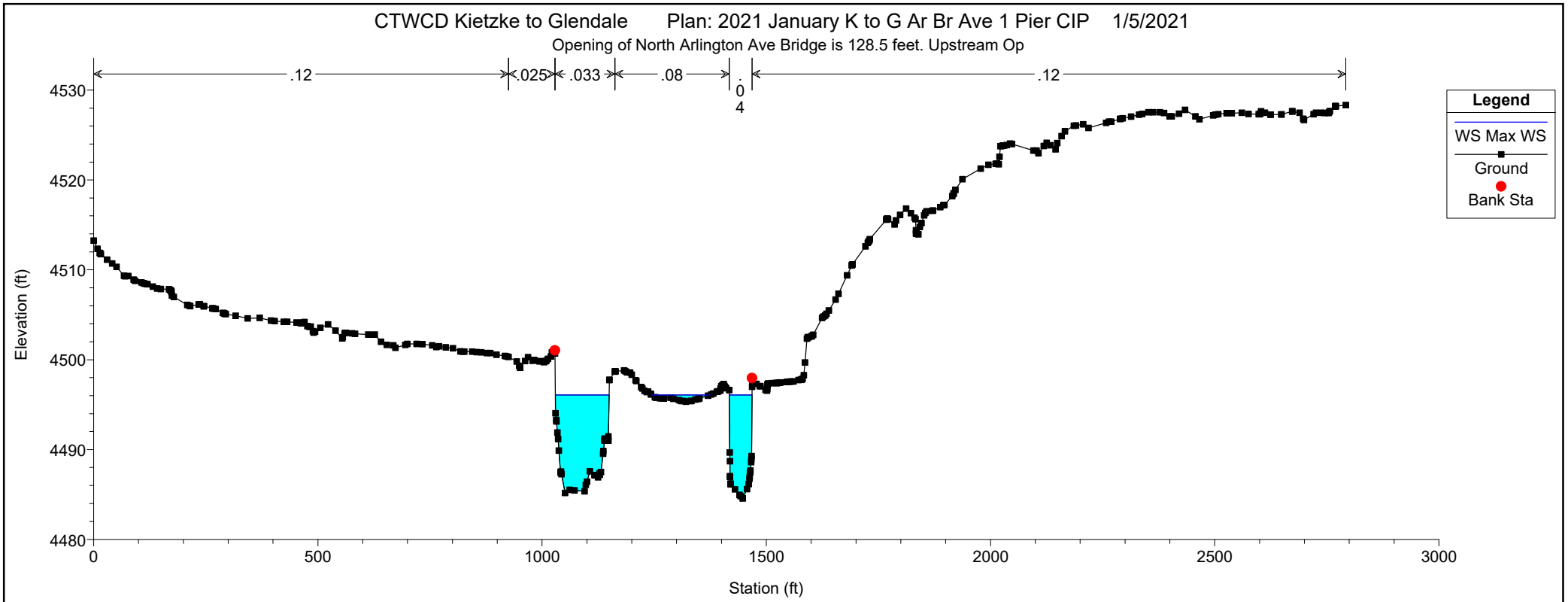
Proposed (Post-Project) Alternative 2:

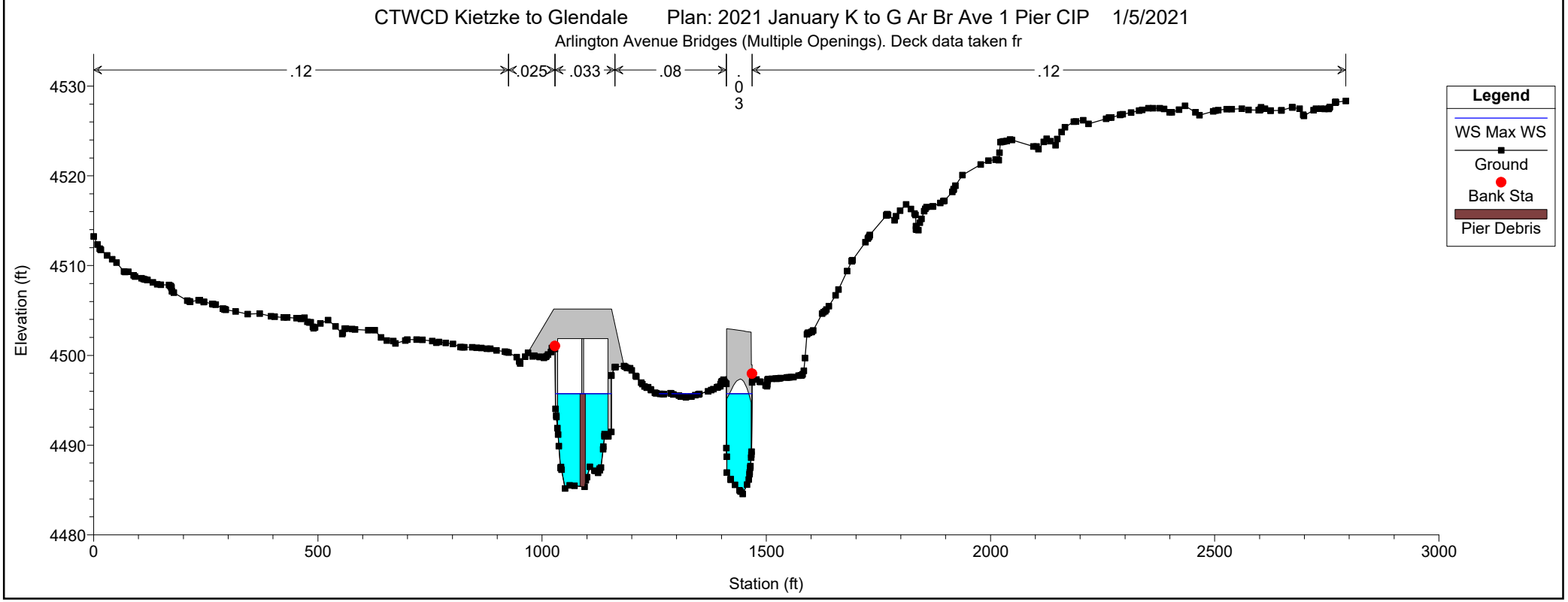
North Arlington Avenue Bridge One Pier

South Arlington Avenue Bridge Clear Span


40284.51
42571.63
39109
44876.97
38573.53
47194.7*
49817.14
38332.36
52124.04
37543.83
55861.99
57199.54
58773.9
60355.55
61390.84
61971.6*
63051.7*
66144.6*
70663.9*
68263.72
71607.52
74449.19

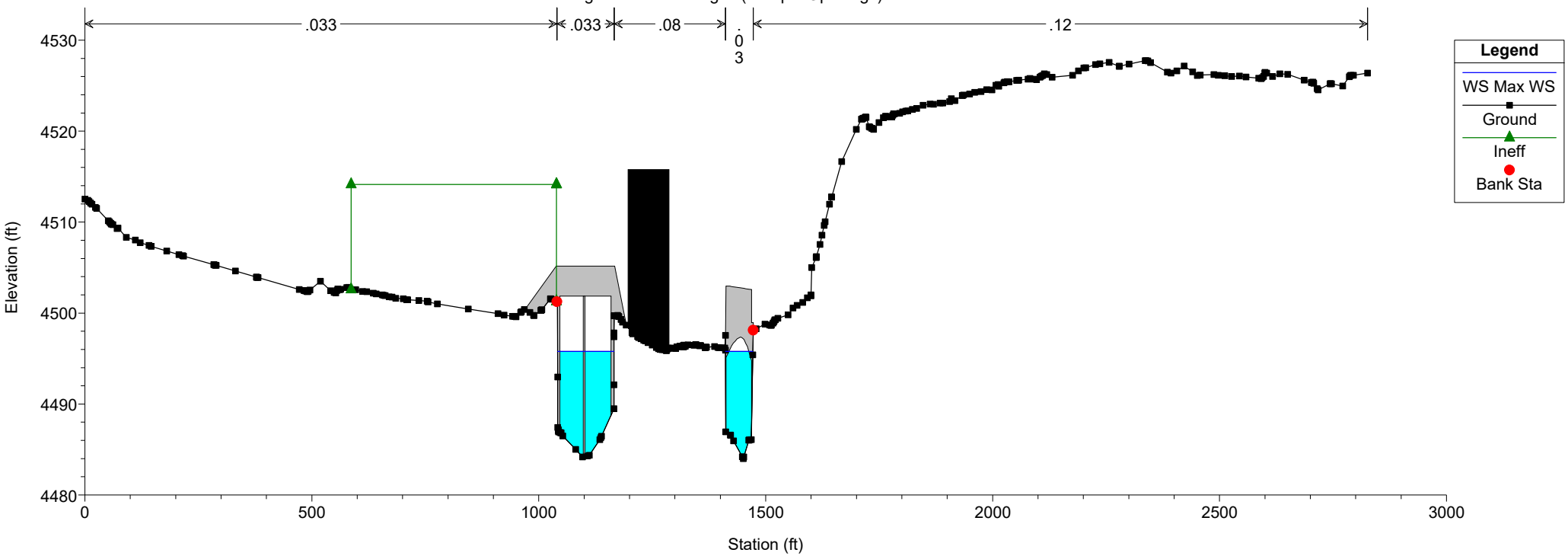

54922.67
54495.89
53938.49
53240.67
52651.27
52224.47
51868.41
51538.61
51185.25
50838.23
50384.53
50026.3
49703.17
49353.16
48983.26
48648.32
48280.29
47951.93
47563.37
47146.97
46762.23
46484.79
46091.2
Proposed Arlington
Avenue Bridges


CTWCD Kietzke to Glendale Plan: 2021 January K to G Ar Br Ave 1 Pier CIP 1/5/2021
Opening of North Arlington Ave Bridge is 128.5 feet. Upstream Op
.12
.025
.033
.08
.04
.12
Legend
WS Max WS
Ground
Bank Sta
Elevation (ft)
4530
4520
4510
4500
4490
4480
0
500
1000
1500
2000
2500
3000
Station (ft)

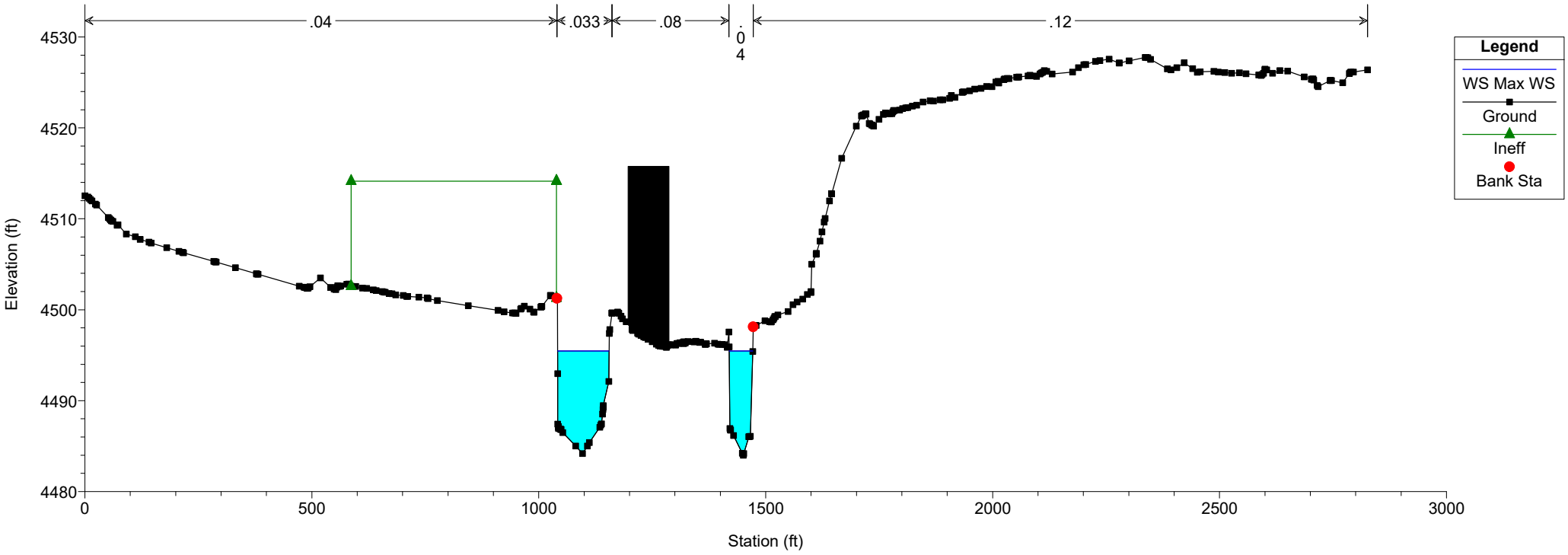

CTWCD Kietzke to Glendale Plan: 2021 January K to G Ar Br Ave 1 Pier CIP 1/5/2021
Arlington Avenue Bridges (Multiple Openings). Deck data taken fr
.12
.025
.033
.08
.03
.12
Legend
WS Max WS
Ground
Bank Sta
Pier Debris
Elevation (ft)
4530
4520
4510
4500
4490
4480
0
500
1000
1500
2000
2500
3000
Station (ft)

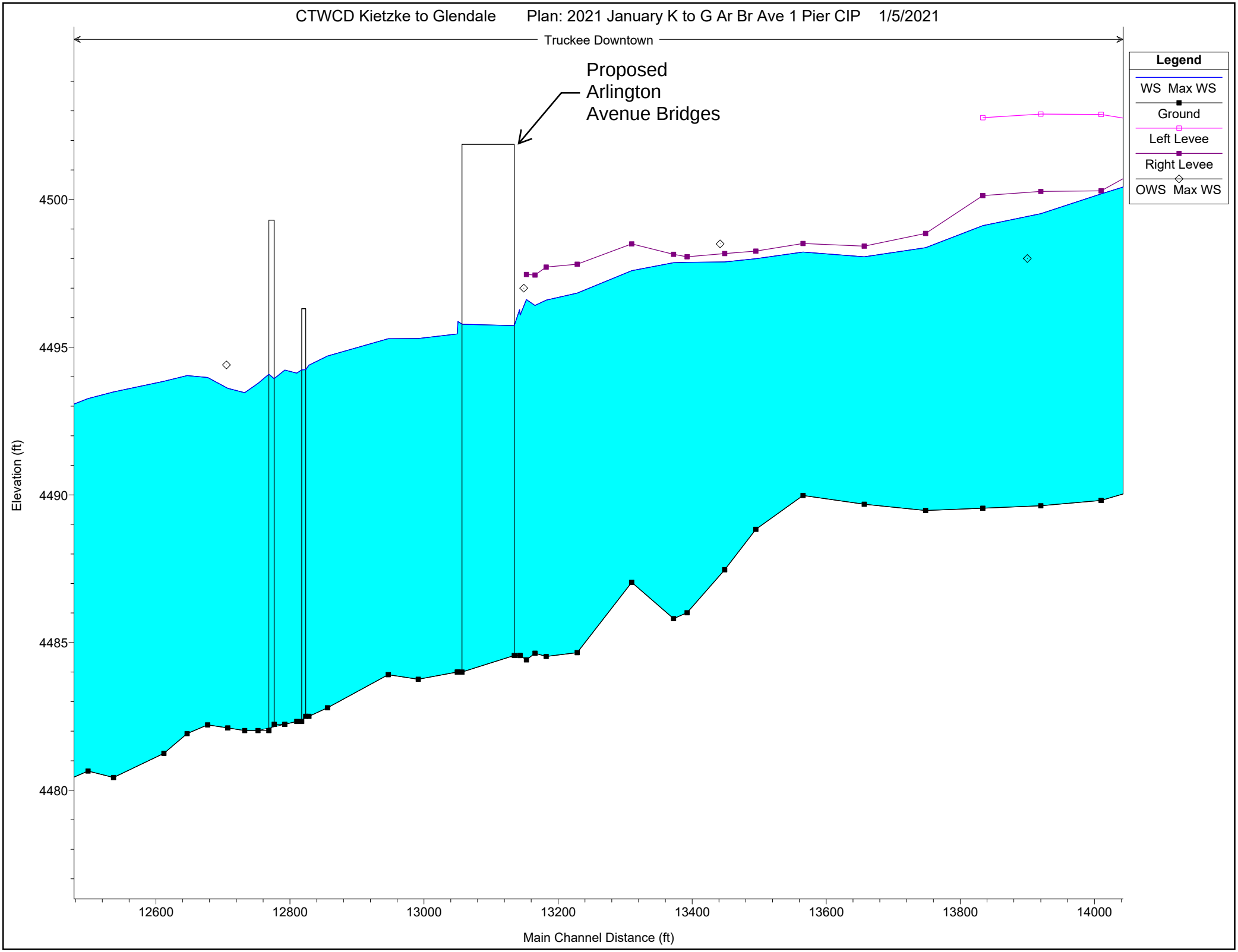
CTWCD Kietzke to Glendale Plan: 2021 January K to G Ar Br Ave 1 Pier CIP 1/5/2021

Arlington Avenue Bridges (Multiple Openings). Deck data taken fr



CTWCD Kietzke to Glendale Plan: 2021 January K to G Ar Br Ave 1 Pier CIP 1/5/2021




CTWCD Kietzke to Glendale Plan: 2021 January K to G Ar Br Ave 1 Pier CIP 1/5/2021
Truckee Downtown
Proposed
Arlington
Avenue Bridges
Legend
WS Max WS
Ground
Left Levee
Right Levee
OWS Max WS
Elevation (ft)
4500
4495
4490
4485
4480
12600
12800
13000
13200
13400
13600
13800
14000
Main Channel Distance (ft)

HEC-RAS Plan: 2021 K to G 1 Pier CIP River: Truckee Reach: Downtown Profile: Max WS

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)	
Downtown	74449.19	Max WS	13997.56	4603.85	4613.20		4615.36	0.005494	11.88	1270.27	219.33	0.77
Downtown	74314.8*	Max WS	13997.40	4603.33	4612.49		4614.65	0.005443	11.89	1318.06	234.36	0.77
Downtown	74180.5*	Max WS	13996.71	4602.82	4611.80		4613.91	0.005247	11.86	1382.62	243.84	0.76
Downtown	74046.25	Max WS	13996.59	4602.30	4611.30		4613.23	0.004634	11.48	1510.42	255.24	0.72
Downtown	73865.0*	Max WS	13996.33	4601.46	4610.73		4612.44	0.004197	10.72	1543.16	255.08	0.68
Downtown	73683.84	Max WS	13995.54	4600.62	4610.05		4611.63	0.004008	10.26	1562.11	252.57	0.66
Downtown	73455.3*	Max WS	13995.67	4599.79	4608.95		4610.67	0.004531	10.64	1473.35	247.76	0.70
Downtown	73226.85	Max WS	13995.14	4598.95	4607.20	4606.66	4609.62	0.006808	12.60	1233.24	238.29	0.85
Downtown	73038.4*	Max WS	13994.44	4597.62	4606.11		4608.33	0.006055	12.05	1269.14	236.28	0.80
Downtown	72849.95	Max WS	13994.88	4596.30	4605.44		4607.24	0.004404	10.84	1410.59	237.50	0.69
Downtown	72637.8*	Max WS	13994.15	4595.38	4604.51		4606.29	0.004367	10.75	1403.78	235.07	0.69
Downtown	72425.7*	Max WS	13994.06	4594.46	4603.63		4605.36	0.004228	10.59	1411.35	233.10	0.68
Downtown	72213.6*	Max WS	13993.55	4593.54	4602.86		4604.48	0.003892	10.26	1447.51	232.12	0.65
Downtown	72001.5*	Max WS	13993.32	4592.62	4602.25		4603.70	0.003333	9.72	1525.26	233.31	0.61
Downtown	71789.48	Max WS	13993.05	4591.70	4601.81		4603.06	0.002705	9.01	1648.23	232.38	0.55
Downtown	71607.52	Max WS	13993.52	4590.30	4600.76		4602.45	0.004382	10.47	1387.54	209.62	0.68
Downtown	71439.2*	Max WS	13993.31	4589.53	4599.94		4601.75	0.004264	10.88	1375.64	211.98	0.68
Downtown	71270.9*	Max WS	13992.74	4588.75	4599.31		4601.04	0.004018	10.60	1408.67	214.88	0.66
Downtown	71102.59	Max WS	13992.98	4587.98	4598.74		4600.37	0.003696	10.30	1452.57	215.23	0.64
Downtown	70883.2*	Max WS	13992.48	4587.20	4598.10		4599.66	0.003480	10.07	1484.91	215.50	0.62
Downtown	70663.9*	Max WS	13992.15	4586.43	4597.18		4598.78	0.003694	10.22	1456.04	215.37	0.64
Downtown	70444.66	Max WS	13992.41	4585.65	4596.36		4597.96	0.003735	10.22	1452.30	215.38	0.64
Downtown	70216.4*	Max WS	13992.34	4584.88	4595.56		4597.07	0.003885	9.86	1440.80	212.04	0.64
Downtown	69988.2*	Max WS	13992.21	4584.10	4594.46		4596.09	0.004453	10.24	1380.72	206.22	0.68
Downtown	69760.09	Max WS	13991.55	4583.33	4592.98		4594.96	0.006273	11.31	1245.91	206.49	0.80
Downtown	69510.7*	Max WS	13991.68	4581.82	4591.34		4593.39	0.006344	11.49	1224.86	201.62	0.80
Downtown	69261.3*	Max WS	13992.19	4580.31	4589.67		4591.80	0.006441	11.70	1203.54	196.55	0.81
Downtown	69011.9*	Max WS	13992.09	4578.80	4588.01		4590.19	0.006448	11.85	1191.61	191.45	0.81
Downtown	68762.5*	Max WS	13991.88	4577.30	4586.59		4588.66	0.005649	11.54	1241.84	201.05	0.77
Downtown	68513.1*	Max WS	13991.41	4575.79	4585.79		4587.43	0.003769	10.33	1452.66	227.26	0.64
Downtown	68263.72	Max WS	13991.72	4574.28	4585.48		4586.65	0.002159	8.79	1868.02	280.74	0.50
Downtown	68243.34	Max WS	13991.33	4574.16	4585.46		4586.60	0.002084	8.69	1896.07	285.51	0.49
Downtown	68234.48	Max WS	13991.89	4574.11	4585.45		4586.58	0.002054	8.65	1908.14	287.54	0.49
Downtown	68231.84	Max WS	13991.18	4574.10	4585.45	4581.84	4586.57	0.002050	8.65	1909.46	287.76	0.49
Downtown	68150		Inl Struct									
Downtown	68012.49	Max WS	13991.65	4569.20	4579.73		4581.47	0.004288	10.57	1323.17	174.42	0.68
Downtown	67779.0*	Max WS	13991.37	4568.16	4578.73		4580.48	0.004236	10.60	1319.76	171.89	0.67
Downtown	67545.5*	Max WS	13991.89	4567.11	4577.71		4579.48	0.004219	10.65	1313.20	169.38	0.67
Downtown	67312.0*	Max WS	13991.34	4566.07	4576.66		4578.46	0.004279	10.76	1299.96	167.01	0.68
Downtown	67078.5*	Max WS	13991.36	4565.02	4575.63		4577.45	0.004303	10.83	1291.95	165.20	0.68
Downtown	66845.1*	Max WS	13991.25	4563.98	4574.60		4576.45	0.004346	10.90	1283.95	163.93	0.69
Downtown	66611.6*	Max WS	13991.18	4562.93	4573.55		4575.43	0.004435	10.99	1273.36	169.60	0.69
Downtown	66378.1*	Max WS	13991.06	4561.89	4572.48		4574.40	0.004482	11.10	1278.13	195.33	0.70
Downtown	66144.6*	Max WS	13990.93	4560.84	4571.40		4573.35	0.004551	11.22	1296.07	209.34	0.70
Downtown	65911.2	Max WS	13990.82	4559.80	4570.29		4572.29	0.004673	11.36	1319.50	220.89	0.71
Downtown	65743.6*	Max WS	13990.88	4558.93	4569.49		4571.52	0.004732	11.47	1295.22	225.22	0.72
Downtown	65576.0*	Max WS	13990.65	4558.07	4568.63		4570.72	0.004851	11.62	1260.95	225.18	0.73

HEC-RAS Plan: 2021 K to G 1 Pier CIP River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	65408.52	Max WS	13989.85	4557.20	4567.77		4569.89	0.005013	11.71	1246.24	204.59	0.74
Downtown	65235.0*	Max WS	13990.20	4556.33	4566.82		4569.02	0.005213	11.88	1211.46	191.76	0.75
Downtown	65061.6*	Max WS	13989.24	4555.47	4565.85		4568.11	0.005332	12.06	1188.64	181.06	0.76
Downtown	64888.24	Max WS	13989.95	4554.60	4564.85		4567.17	0.005472	12.25	1168.86	173.30	0.77
Downtown	64718.7*	Max WS	13988.56	4553.73	4563.90		4566.25	0.005428	12.32	1159.15	169.13	0.77
Downtown	64549.2*	Max WS	13986.22	4552.87	4563.02		4565.35	0.005162	12.23	1165.73	164.93	0.76
Downtown	64379.75	Max WS	13986.53	4552.00	4562.31		4564.50	0.004563	11.87	1201.99	162.05	0.72
Downtown	64144.1*	Max WS	13986.99	4551.03	4561.71		4563.72	0.003977	11.39	1272.03	186.48	0.67
Downtown	63908.5*	Max WS	13984.01	4550.07	4560.64		4562.69	0.004111	11.49	1263.94	182.61	0.68
Downtown	63672.88	Max WS	13984.72	4549.10	4559.25		4561.49	0.004790	12.02	1205.01	169.76	0.73
Downtown	63465.8*	Max WS	13982.08	4548.37	4558.53		4560.46	0.004698	11.13	1257.97	171.24	0.71
Downtown	63258.8*	Max WS	13979.77	4547.65	4557.49		4559.42	0.004773	11.14	1254.47	166.97	0.72
Downtown	63051.7*	Max WS	13970.84	4546.92	4556.57		4558.46	0.004690	11.02	1268.20	169.12	0.71
Downtown	62844.75	Max WS	13972.97	4546.19	4555.62		4557.52	0.004720	11.04	1268.77	172.43	0.71
Downtown	62632.5*	Max WS	13965.83	4545.23	4554.33		4556.32	0.005375	11.32	1234.13	173.79	0.75
Downtown	62420.4*	Max WS	13954.86	4544.26	4553.25		4555.21	0.005339	11.21	1245.01	178.63	0.75
Downtown	62208.23	Max WS	13980.85	4543.30	4552.45		4554.21	0.004700	10.66	1312.09	183.42	0.70
Downtown	61971.6*	Max WS	13980.46	4541.94	4551.49		4553.21	0.004250	10.53	1339.04	225.37	0.68
Downtown	61735.06	Max WS	13975.52	4540.59	4550.70		4552.17	0.003648	9.75	1577.12	329.32	0.63
Downtown	61551.1*	Max WS	13971.64	4539.70	4550.37		4551.53	0.002629	8.82	2105.92	580.86	0.54
Downtown	61390.84	Max WS	13969.98	4536.92	4549.21		4551.03	0.003967	10.86	1377.45	559.01	0.66
Downtown	61313.72	Max WS	13826.24	4537.43	4549.16		4550.69	0.003286	9.98	1506.02	556.33	0.61
Downtown	61236.36	Max WS	13972.07	4538.64	4548.05		4550.47	0.007766	12.61	1236.43	500.89	0.89
Downtown	61161.9	Max WS	13970.89	4536.99	4547.51		4549.65	0.006387	11.86	1329.94	499.52	0.81
Downtown	61074.4	Max WS	13968.86	4537.09	4546.92	4546.35	4548.78	0.006964	11.25	1680.44	472.04	0.83
Downtown	60992.78	Max WS	13969.65	4537.61	4546.35		4548.69	0.006927	12.33	1196.24	185.14	0.85
Downtown	60901.2	Max WS	13970.27	4536.16	4545.77		4548.09	0.005838	12.24	1183.44	308.91	0.80
Downtown	60820.68	Max WS	13970.03	4533.93	4544.76		4547.83	0.007502	14.07	1009.72	342.12	0.90
Downtown	60738.97	Max WS	13969.73	4533.43	4544.89		4546.92	0.004309	11.49	1269.26	174.61	0.70
Downtown	60650.37	Max WS	13969.49	4534.23	4544.81		4546.51	0.004193	10.47	1346.85	185.72	0.67
Downtown	60549.14	Max WS	13967.10	4533.11	4544.19		4546.04	0.005622	10.94	1343.80	223.05	0.76
Downtown	60457.36	Max WS	13967.38	4532.63	4543.70		4545.51	0.005947	10.84	1381.38	250.49	0.77
Downtown	60355.55	Max WS	13967.28	4531.72	4543.64		4544.96	0.003775	9.24	1596.32	266.49	0.63
Downtown	60280.38	Max WS	13966.86	4531.41	4542.97		4544.68	0.005278	10.53	1424.46	257.46	0.74
Downtown	60201.47	Max WS	13966.79	4532.14	4542.70		4544.29	0.004457	10.14	1477.48	250.38	0.68
Downtown	60121.58	Max WS	13966.46	4531.38	4542.03		4543.93	0.005864	11.10	1331.21	242.35	0.77
Downtown	60009.25	Max WS	13966.22	4531.34	4541.43		4543.30	0.005542	10.99	1321.82	231.56	0.76
Downtown	59932.31	Max WS	13965.72	4531.80	4540.61		4542.91	0.006505	12.21	1221.06	187.98	0.82
Downtown	59826.81	Max WS	13965.64	4530.52	4540.80		4542.27	0.003387	9.72	1452.20	197.17	0.61
Downtown	59750.03	Max WS	13965.53	4527.25	4540.14		4542.01	0.004259	10.95	1295.81	179.01	0.68
Downtown	59674.98	Max WS	13965.33	4526.76	4539.05		4541.76	0.006444	13.20	1057.83	134.97	0.83
Downtown	59588.64	Max WS	13965.26	4525.76	4538.04		4541.36	0.007070	14.62	955.09	110.68	0.88
Downtown	59522.56	Max WS	13965.41	4525.15	4538.09		4540.79	0.005256	13.19	1058.86	114.43	0.76
Downtown	59451.87	Max WS	13965.22	4525.81	4537.46		4540.43	0.006406	13.83	1009.78	118.97	0.84
Downtown	59379.98	Max WS	13965.13	4525.33	4536.69		4540.09	0.007461	14.79	944.35	112.17	0.90
Downtown	59297.86	Max WS	13965.13	4525.42	4536.25		4539.42	0.007078	14.28	978.05	117.69	0.87
Downtown	59213.49	Max WS	13964.64	4525.77	4536.09		4538.74	0.006117	13.10	1119.28	168.83	0.81

HEC-RAS Plan: 2021 K to G 1 Pier CIP River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	59121.68	Max WS	13965.04	4525.51	4535.68		4538.16	0.005894	12.64	1129.45	168.61	0.80
Downtown	59028.33	Max WS	13965.11	4525.38	4535.37		4537.59	0.005300	11.97	1168.26	153.29	0.76
Downtown	58939.15	Max WS	13964.97	4524.89	4534.75		4537.14	0.005382	12.38	1127.75	137.67	0.76
Downtown	58849.53	Max WS	13964.66	4524.60	4533.79		4536.76	0.007688	13.82	1010.13	136.72	0.90
Downtown	58773.9	Max WS	13964.27	4523.66	4533.08	4532.81	4536.29	0.008486	14.36	972.46	134.90	0.94
Downtown	58696.11	Max WS	13964.75	4523.09	4532.40	4532.19	4535.68	0.008730	14.54	960.59	133.91	0.96
Downtown	58630.9	Max WS	13964.70	4522.26	4532.10		4534.82	0.006902	13.21	1057.12	142.60	0.86
Downtown	58558.62	Max WS	13964.66	4520.96	4531.90		4534.31	0.005629	12.46	1129.33	150.19	0.78
Downtown	58492.6	Max WS	13964.63	4520.21	4531.75		4533.95	0.004639	11.91	1194.87	148.81	0.72
Downtown	58415.56	Max WS	13964.63	4520.87	4530.74		4533.71	0.007041	13.83	1009.88	127.87	0.87
Downtown	58340.16	Max WS	13964.16	4519.94	4530.58		4533.10	0.005974	12.73	1097.02	142.09	0.80
Downtown	58263.24	Max WS	13964.28	4518.88	4530.63		4532.62	0.004599	11.31	1235.13	155.82	0.71
Downtown	58175.27	Max WS	13964.62	4518.86	4529.78		4532.21	0.005796	12.51	1116.50	143.84	0.79
Downtown	58086.83	Max WS	13963.92	4518.71	4529.25		4531.64	0.006839	12.42	1124.65	166.67	0.84
Downtown	57999.15	Max WS	13963.05	4518.60	4528.95		4531.03	0.005649	11.56	1207.38	171.03	0.77
Downtown	57909.99	Max WS	13963.80	4518.52	4528.93		4530.54	0.004385	10.20	1379.04	206.29	0.68
Downtown	57814.81	Max WS	13963.67	4518.41	4528.70		4530.16	0.003536	9.69	1440.39	188.53	0.62
Downtown	57726.95	Max WS	13963.38	4518.19	4528.13		4529.81	0.004656	10.38	1344.85	195.26	0.70
Downtown	57643.12	Max WS	13963.42	4517.68	4528.07		4529.47	0.003074	9.51	1480.48	186.10	0.58
Downtown	57557.54	Max WS	13963.05	4516.71	4527.66		4529.21	0.003206	9.97	1400.96	163.22	0.60
Downtown	57469.2	Max WS	13963.20	4516.61	4527.17		4528.90	0.003946	10.54	1324.70	164.84	0.66
Downtown	57380.45	Max WS	13963.16	4515.81	4526.91		4528.57	0.003574	10.31	1354.01	159.85	0.62
Downtown	57289.76	Max WS	13962.62	4516.97	4526.72		4528.25	0.003370	9.95	1428.34	179.97	0.61
Downtown	57199.54	Max WS	13962.71	4515.75	4526.62		4527.97	0.002844	9.33	1518.88	186.95	0.56
Downtown	57125.7	Max WS	13963.12	4516.32	4526.55		4527.77	0.002498	8.86	1601.05	191.38	0.53
Downtown	57051.28	Max WS	13963.05	4516.76	4526.01		4527.55	0.003544	9.95	1403.40	175.30	0.62
Downtown	56977.72	Max WS	13962.73	4515.63	4525.65		4527.27	0.003873	10.22	1365.76	175.69	0.65
Downtown	56919.37	Max WS	13962.82	4514.45	4525.04		4527.03	0.005062	11.32	1233.16	166.52	0.73
Downtown	56859.04	Max WS	13962.72	4514.22	4525.03		4526.73	0.004442	10.44	1336.95	183.87	0.68
Downtown	56797.87	Max WS	13961.96	4514.56	4525.29		4526.48	0.002935	8.75	1595.69	212.79	0.56
Downtown	56736.2	Max WS	13961.92	4515.54	4524.97		4526.29	0.003355	9.19	1519.63	208.53	0.60
Downtown	56672.83	Max WS	13962.41	4515.69	4524.53		4526.05	0.004085	9.89	1413.06	202.43	0.66
Downtown	56610.6	Max WS	13962.18	4514.95	4524.21		4525.79	0.004307	10.10	1382.10	197.51	0.67
Downtown	56536.19	Max WS	13961.67	4514.51	4523.58		4525.45	0.005207	10.96	1273.81	185.38	0.74
Downtown	56460.58	Max WS	13962.45	4513.68	4522.84		4525.06	0.006356	11.96	1169.52	176.60	0.81
Downtown	56386.73	Max WS	13961.67	4512.48	4522.08		4524.65	0.007330	12.86	1086.14	161.27	0.87
Downtown	56297.28	Max WS	13962.34	4511.75	4521.45		4523.96	0.007190	12.71	1098.56	162.14	0.86
Downtown	56207.74	Max WS	13962.29	4511.30	4520.75		4523.27	0.007516	12.73	1098.52	172.33	0.88
Downtown	56136.74	Max WS	13961.88	4510.15	4520.49		4522.58	0.008216	11.59	1208.25	195.05	0.80
Downtown	56068.44	Max WS	13961.79	4511.03	4519.83		4522.00	0.009372	11.80	1183.83	198.08	0.85
Downtown	56010.74	Max WS	13962.05	4510.95	4519.74		4521.45	0.005725	10.51	1330.68	227.75	0.76
Downtown	55931.37	Max WS	13961.93	4510.19	4519.03		4520.92	0.008489	11.03	1271.23	224.33	0.80
Downtown	55861.99	Max WS	13961.61	4509.57	4518.85		4520.42	0.004515	10.07	1396.80	214.54	0.69
Downtown	55797.14	Max WS	13961.68	4509.11	4518.37		4520.08	0.006226	10.51	1333.84	199.35	0.71
Downtown	55734.24	Max WS	13961.81	4507.71	4518.10		4519.72	0.004997	10.24	1366.17	178.34	0.65
Downtown	55677.53	Max WS	13961.49	4507.00	4517.22		4519.48	0.005568	12.06	1157.98	154.24	0.77
Downtown	55620.45	Max WS	13961.34	4507.11	4516.74		4519.12	0.007585	12.39	1128.12	150.54	0.79

HEC-RAS Plan: 2021 K to G 1 Pier CIP River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	55552.21	Max WS	13961.46	4506.35	4516.38		4518.62	0.006692	11.99	1165.19	147.72	0.75
Downtown	55484.78	Max WS	13961.03	4505.41	4515.63		4518.16	0.007888	12.77	1093.23	139.18	0.80
Downtown	55424.03	Max WS	13961.27	4504.74	4515.24		4517.75	0.005584	12.71	1098.42	132.53	0.78
Downtown	55357.82	Max WS	13959.73	4503.39	4514.84		4517.33	0.006952	12.66	1102.58	129.17	0.76
Downtown	55282.86	Max WS	13872.30	4502.83	4514.71		4516.81	0.005471	11.63	1196.19	137.13	0.68
Downtown	55207.95	Max WS	13930.87	4502.09	4514.51		4516.44	0.004792	11.16	1251.24	138.08	0.65
Downtown	55139.17	Max WS	13915.21	4502.73	4514.26		4516.14	0.003453	11.01	1268.87	139.45	0.63
Downtown	55067.83	Max WS	14045.35	4502.56	4513.91		4515.99	0.003853	11.58	1226.45	140.56	0.67
Downtown	54995.48	Max WS	14019.90	4501.65	4513.63		4515.71	0.003872	11.59	1231.17	144.94	0.67
Downtown	54922.67	Max WS	13997.05	4501.56	4513.28		4515.41	0.004015	11.73	1210.37	138.30	0.68
Downtown	54825.64	Max WS	13993.69	4501.88	4512.95		4515.02	0.003979	11.59	1223.28	139.70	0.67
Downtown	54728.89	Max WS	13991.97	4501.26	4512.94		4514.67	0.003144	10.73	1375.28	204.40	0.61
Downtown	54613.88	Max WS	13993.94	4501.16	4512.87		4514.32	0.002848	9.87	1551.65	217.20	0.57
Downtown	54495.89	Max WS	13995.21	4501.00	4512.84		4514.00	0.002107	8.75	1763.53	250.55	0.50
Downtown	54398.03	Max WS	13993.23	4499.46	4512.63		4513.79	0.001986	8.80	1832.90	349.83	0.48
Downtown	54300.43	Max WS	13993.67	4497.82	4512.43		4513.62	0.002229	9.13	1763.40	383.92	0.51
Downtown	54227.41	Max WS	13995.01	4497.97	4512.34		4513.46	0.001908	8.85	1802.83	294.46	0.47
Downtown	54154.1	Max WS	13994.45	4497.65	4512.43		4513.32	0.001367	7.96	2076.25	361.34	0.41
Downtown	54080.27	Max WS	13994.77	4497.36	4512.05		4513.20	0.001799	8.77	1682.64	202.06	0.46
Downtown	54009.13	Max WS	13994.32	4497.46	4511.85	4507.04	4513.07	0.001845	8.92	1640.89	240.53	0.47
Downtown	53973		Bridge									
Downtown	53938.49	Max WS	13981.93	4498.06	4510.21		4511.94	0.006083	10.52	1328.63	136.84	0.60
Downtown	53852.32	Max WS	13993.69	4498.43	4510.47		4511.45	0.004681	8.07	1804.88	308.82	0.46
Downtown	53753.17	Max WS	13992.86	4498.00	4509.80		4511.03	0.003148	9.02	1629.32	254.18	0.55
Downtown	53650.57	Max WS	13992.98	4497.31	4509.01		4510.59	0.006688	10.08	1388.88	169.29	0.62
Downtown	53562.67	Max WS	13992.47	4497.00	4508.71		4510.05	0.003118	9.40	1636.21	309.56	0.58
Downtown	53465.09	Max WS	13992.63	4497.63	4508.92		4509.70	0.003957	7.41	2015.93	428.37	0.44
Downtown	53445.09	Max WS	13991.72	4497.67	4508.50	4505.37	4509.69	0.002673	8.86	1897.72	355.91	0.54
Downtown	53380.08	Max WS	13992.44	4497.25	4508.57	4505.11	4509.45	0.003304	7.80	1914.88	357.85	0.50
Downtown	53366.7	Max WS	13992.23	4497.25	4508.24		4509.43	0.004416	8.86	1799.42	398.79	0.57
Downtown	53240.67	Max WS	13991.65	4496.62	4507.89		4509.03	0.002327	8.78	1739.05	312.06	0.54
Downtown	53124.96	Max WS	13990.42	4495.26	4507.54		4508.54	0.005415	8.17	1761.76	319.91	0.50
Downtown	53021.55	Max WS	13990.14	4494.63	4507.09		4508.13	0.002690	8.42	1805.34	319.98	0.50
Downtown	52913.77	Max WS	13989.59	4493.55	4507.17		4507.72	0.004363	6.34	2501.25	474.21	0.37
Downtown	52774.59	Max WS	13989.33	4493.31	4506.41		4507.32	0.002501	7.84	1931.47	386.05	0.48
Downtown	52651.27	Max WS	13988.19	4491.64	4505.64		4506.76	0.006511	8.60	1650.86	344.98	0.55
Downtown	52547.66	Max WS	13987.87	4492.08	4505.01		4506.36	0.003723	9.30	1503.77	185.95	0.58
Downtown	52441.86	Max WS	13987.13	4491.50	4504.55		4505.92	0.002983	9.38	1491.62	178.34	0.57
Downtown	52336.23	Max WS	13986.50	4491.59	4503.64		4505.57	0.003893	11.13	1256.20	154.85	0.69
Downtown	52224.47	Max WS	13986.53	4491.94	4503.47		4504.78	0.010113	9.19	1522.34	165.99	0.53
Downtown	52124.04	Max WS	13986.39	4492.59	4502.94		4504.15	0.002401	8.81	1589.90	184.56	0.52
Downtown	52018.42	Max WS	13985.97	4491.72	4502.13		4503.84	0.003548	10.49	1336.61	156.28	0.62
Downtown	51944.18	Max WS	13986.28	4492.11	4501.94		4503.60	0.003191	10.35	1427.95	219.60	0.60
Downtown	51868.41	Max WS	13986.14	4491.86	4501.55		4503.35	0.003700	10.77	1363.09	226.02	0.64
Downtown	51791.2	Max WS	13986.23	4491.64	4501.36		4503.05	0.003680	10.46	1390.79	206.22	0.62
Downtown	51712.2	Max WS	13985.34	4491.11	4501.11		4502.76	0.003609	10.30	1382.20	231.46	0.62
Downtown	51629.06	Max WS	13985.81	4490.42	4500.83		4502.45	0.003644	10.23	1367.22	161.96	0.62

HEC-RAS Plan: 2021 K to G 1 Pier CIP River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	51538.61	Max WS	13985.99	4489.81	4500.19		4502.08	0.004749	11.02	1269.56	166.17	0.70
Downtown	51448.57	Max WS	13985.88	4489.63	4499.52		4501.61	0.005894	11.61	1204.61	170.48	0.77
Downtown	51362.21	Max WS	13985.56	4489.55	4499.12		4501.11	0.005571	11.32	1235.02	173.57	0.75
Downtown	51276.75	Max WS	13985.04	4489.47	4498.37		4500.62	0.006777	12.03	1162.18	175.87	0.83
Downtown	51185.25	Max WS	13985.76	4489.68	4498.06		4500.01	0.005589	11.20	1249.08	182.97	0.76
Downtown	51093.72	Max WS	13985.58	4489.98	4498.22		4499.53	0.003789	9.19	1521.90	212.87	0.61
Downtown	51023.43	Max WS	13985.37	4488.83	4498.00		4499.21	0.005485	8.82	1585.73	225.80	0.59
Downtown	50977.11	Max WS	13985.50	4487.46	4497.88		4498.96	0.004838	8.34	1677.37	245.25	0.56
Downtown	50920.73	Max WS	13985.06	4486.01	4497.87		4498.72	0.003945	7.36	1901.36	263.84	0.48
Downtown	50900.82	Max WS	13985.17	4485.81	4497.86		4498.64	0.003310	7.10	1968.84	302.83	0.49
Downtown	50838.23	Max WS	13985.25	4487.04	4497.59		4498.33	0.006648	6.91	2023.64	342.30	0.50
Downtown	50756.84	Max WS	13984.67	4484.66	4496.83		4497.64	0.010242	7.22	1936.86	374.89	0.56
Downtown	50710.61	Max WS	13984.53	4484.53	4496.59		4497.32	0.003347	6.85	2040.35	379.14	0.52
Downtown	50694	Max WS	13984.80	4484.64	4496.41		4497.27	0.002759	7.46	1874.86	377.94	0.59
Downtown	50681.29	Max WS	13985.23	4484.41	4496.61		4497.24	0.001660	6.37	2195.00	356.55	0.45
Downtown	50671.96	Max WS	13984.42	4484.56	4496.09		4497.24	0.002713	8.62	1623.04	301.13	0.65
Downtown	50670.96	Max WS	13984.61	4484.56	4496.27	4492.58	4497.24	0.001901	7.88	1774.55	323.95	0.59
Downtown	50625		Bridge									
Downtown	50579.08	Max WS	13984.27	4484.00	4495.87		4496.78	0.001554	7.64	1830.12	184.45	0.43
Downtown	50578.08	Max WS	13984.25	4484.00	4495.45		4496.78	0.002963	9.25	1512.25	165.66	0.54
Downtown	50519.86	Max WS	13984.64	4483.76	4495.29		4496.61	0.002764	9.22	1516.83	355.13	0.72
Downtown	50474.94	Max WS	13983.20	4483.91	4495.28		4496.42	0.005279	8.56	1632.78	348.41	0.68
Downtown	50384.53	Max WS	13983.58	4482.79	4494.70		4496.01	0.004004	9.18	1531.73	314.86	0.71
Downtown	50356.91	Max WS	13981.30	4482.50	4494.40	4491.69	4495.90	0.004820	9.85	1424.56	248.42	0.64
Downtown	50345		Bridge									
Downtown	50338.63	Max WS	13933.64	4482.33	4494.12		4495.70	0.005776	10.10	1389.91	331.80	0.76
Downtown	50320.94	Max WS	13932.56	4482.23	4494.22		4495.57	0.005355	9.34	1510.51	407.29	0.76
Downtown	50300		Mult Open									
Downtown	50280	Max WS	13983.59	4482.02	4493.77		4494.99	0.003649	8.87	1600.75	432.79	0.72
Downtown	50260.01	Max WS	13984.27	4482.02	4493.46		4494.98	0.004621	9.94	1437.51	408.66	0.84
Downtown	50234.71	Max WS	13983.99	4482.11	4493.61		4494.80	0.002896	8.76	1610.00	377.65	0.67
Downtown	50204.78	Max WS	13984.05	4482.21	4493.97		4494.70	0.002398	6.85	2053.91	300.13	0.44
Downtown	50174.02	Max WS	13984.28	4481.92	4494.04		4494.64	0.001325	6.25	2252.13	274.22	0.37
Downtown	50139.65	Max WS	13984.47	4481.25	4493.84		4494.60	0.001012	6.99	2013.76	246.32	0.41
Downtown	50064.3	Max WS	13983.94	4480.43	4493.49		4494.52	0.001203	8.15	1715.66	181.18	0.47
Downtown	50026.3	Max WS	13983.89	4480.65	4493.26		4494.46	0.002265	8.77	1594.03	163.78	0.50
Downtown	49982.23	Max WS	13983.32	4480.22	4492.87		4494.36	0.001922	9.80	1426.71	143.69	0.55
Downtown	49946.24	Max WS	13983.17	4479.68	4492.62		4494.28	0.002759	10.32	1354.37	136.81	0.58
Downtown	49896.5	Max WS	13983.74	4479.77	4492.52		4494.15	0.002603	10.22	1368.47	134.73	0.57
Downtown	49817.14	Max WS	13983.45	4479.20	4492.38	4488.95	4493.98	0.001513	10.14	1378.47	137.17	0.56
Downtown	49770		Bridge									
Downtown	49736.07	Max WS	13983.55	4479.18	4491.90		4493.53	0.001586	10.23	1367.18	140.63	0.58
Downtown	49703.17	Max WS	13983.37	4479.24	4491.87		4493.46	0.002486	10.14	1379.25	145.92	0.58
Downtown	49674.77	Max WS	13983.29	4479.66	4491.66		4493.40	0.002428	10.58	1330.72	151.35	0.59
Downtown	49612.19	Max WS	13982.97	4480.02	4491.47		4493.24	0.002498	10.69	1323.89	154.29	0.60
Downtown	49549.05	Max WS	13983.36	4480.05	4491.55		4493.09	0.002131	9.97	1415.64	157.45	0.55
Downtown	49487.33	Max WS	13983.15	4480.05	4491.72		4492.97	0.001606	8.97	1568.24	165.90	0.49

HEC-RAS Plan: 2021 K to G 1 Pier CIP River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	49466.08	Max WS	13983.24	4480.03	4491.68	4487.71	4492.94	0.001223	9.00	1553.62	158.77	0.51
Downtown	49420		Bridge									
Downtown	49353.16	Max WS	13983.19	4479.70	4490.51		4491.98	0.002508	9.85	1464.65	152.42	0.56
Downtown	49334.7	Max WS	13983.17	4479.60	4489.72		4491.93	0.004482	11.94	1170.92	136.71	0.72
Downtown	49286.93	Max WS	13983.16	4479.21	4489.59		4491.64	0.004125	11.48	1218.55	139.80	0.69
Downtown	49220.73	Max WS	13983.03	4478.69	4489.81		4491.39	0.002943	10.10	1384.19	147.23	0.58
Downtown	49154.55	Max WS	13982.99	4478.91	4489.45		4491.19	0.003326	10.57	1322.82	149.00	0.63
Downtown	49088.39	Max WS	13982.51	4478.26	4489.65		4490.99	0.002350	9.29	1504.32	154.82	0.53
Downtown	49070.63	Max WS	13983.03	4478.25	4489.64	4486.15	4490.95	0.002313	9.19	1521.74	156.02	0.52
Downtown	49020		Bridge									
Downtown	48983.26	Max WS	13981.61	4478.25	4488.90		4490.27	0.002310	9.42	1484.60	171.00	0.55
Downtown	48960.04	Max WS	13982.87	4478.33	4489.00		4490.22	0.002192	8.85	1579.35	171.61	0.51
Downtown	48884.44	Max WS	13982.59	4478.01	4488.64		4490.05	0.002451	9.51	1470.62	158.23	0.55
Downtown	48820.9	Max WS	13982.08	4476.98	4488.61		4489.90	0.002164	9.10	1536.42	163.39	0.52
Downtown	48759.22	Max WS	13982.69	4476.46	4488.62		4489.77	0.001975	8.62	1621.93	169.39	0.49
Downtown	48699.6	Max WS	13982.68	4476.17	4488.60		4489.66	0.001670	8.29	1687.38	167.57	0.46
Downtown	48648.32	Max WS	13982.34	4475.99	4488.55	4483.94	4489.58	0.001554	8.15	1716.43	163.87	0.44
Downtown	48600		Bridge									
Downtown	48556.86	Max WS	13982.46	4474.83	4487.06		4488.31	0.001873	8.95	1563.12	166.50	0.50
Downtown	48518.43	Max WS	13982.16	4474.37	4486.87		4488.23	0.002180	9.36	1494.39	151.33	0.52
Downtown	48471.73	Max WS	13982.31	4474.06	4486.34		4488.11	0.003098	10.66	1311.76	143.92	0.62
Downtown	48410.95	Max WS	13982.16	4473.54	4486.09		4487.92	0.003159	10.85	1288.51	140.49	0.63
Downtown	48345.53	Max WS	13982.17	4473.22	4485.82		4487.71	0.003235	11.01	1269.48	137.25	0.64
Downtown	48280.29	Max WS	13981.80	4472.92	4485.15		4487.48	0.004162	12.26	1140.78	126.67	0.72
Downtown	48215.45	Max WS	13981.85	4472.53	4484.23		4487.68	0.007402	14.90	938.10	118.59	0.93
Downtown	48148.16	Max WS	13982.50	4472.12	4484.02		4486.97	0.006115	13.77	1015.71	124.31	0.85
Downtown	48081.13	Max WS	13981.87	4471.88	4484.10		4486.51	0.004351	12.47	1120.85	124.03	0.73
Downtown	48014.16	Max WS	13982.21	4472.42	4483.88		4486.21	0.004606	12.25	1141.67	137.77	0.75
Downtown	47951.93	Max WS	13982.06	4472.88	4483.54		4485.92	0.004743	12.36	1130.90	138.50	0.76
Downtown	47892.98	Max WS	13981.80	4472.27	4483.68		4485.65	0.003607	11.24	1244.43	138.52	0.66
Downtown	47837.03	Max WS	13981.45	4471.94	4483.57		4485.44	0.003479	11.00	1271.44	141.38	0.65
Downtown	47779.19	Max WS	13982.23	4472.21	4483.43		4485.23	0.003870	10.75	1300.46	162.73	0.67
Downtown	47723.17	Max WS	13982.05	4472.25	4482.48		4485.11	0.005922	13.03	1073.23	144.13	0.84
Downtown	47669.23	Max WS	13981.55	4470.80	4483.20	4479.79	4484.65	0.002572	9.64	1450.80	159.74	0.56
Downtown	47650		Bridge									
Downtown	47595.25	Max WS	13981.50	4468.58	4483.33		4484.58	0.001647	8.98	1602.39	160.78	0.46
Downtown	47563.37	Max WS	13981.85	4468.69	4482.98		4484.53	0.002285	9.99	1436.76	163.21	0.55
Downtown	47514.67	Max WS	13981.55	4468.93	4483.22		4484.42	0.001707	8.79	1642.79	186.55	0.48
Downtown	47469.54	Max WS	13980.98	4469.13	4482.66	4479.61	4484.34	0.002802	10.39	1382.40	167.61	0.60
Downtown	47400		Bridge									
Downtown	47351.45	Max WS	13981.98	4469.93	4480.06	4479.77	4483.42	0.007593	14.71	950.53	127.90	0.95
Downtown	47334.9*	Max WS	13981.11	4469.96	4480.06		4483.08	0.007106	13.94	1002.69	139.95	0.92
Downtown	47318.3*	Max WS	13978.03	4469.99	4480.30		4482.71	0.005488	12.45	1123.09	153.52	0.81
Downtown	47301.8	Max WS	13979.85	4470.02	4480.81		4482.54	0.003528	10.57	1323.08	165.84	0.66
Downtown	47273.6*	Max WS	13979.87	4469.80	4480.71		4482.44	0.003486	10.56	1323.99	164.56	0.66
Downtown	47245.4*	Max WS	13979.69	4469.57	4480.63		4482.34	0.003405	10.51	1330.26	163.50	0.65
Downtown	47217.32	Max WS	13978.90	4469.35	4480.56		4482.25	0.003299	10.43	1340.68	162.64	0.64

HEC-RAS Plan: 2021 K to G 1 Pier CIP River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	47194.7*	Max WS	13978.79	4469.10	4480.38		4482.17	0.003469	10.76	1299.10	155.82	0.66
Downtown	47172.22	Max WS	13979.37	4468.85	4480.20		4482.10	0.003432	11.08	1269.39	152.78	0.66
Downtown	47146.9*	Max WS	13979.17	4468.58	4480.11		4482.02	0.003348	11.09	1268.07	145.92	0.65
Downtown	47121.71	Max WS	13978.34	4468.30	4480.02		4481.93	0.003273	11.09	1268.12	143.22	0.65
Downtown	47059.13	Max WS	13979.25	4467.68	4480.28		4481.74	0.002474	9.69	1442.33	155.94	0.56
Downtown	46997.03	Max WS	13977.28	4467.35	4480.08		4481.58	0.002526	9.83	1429.26	166.47	0.57
Downtown	46935.21	Max WS	13977.89	4467.85	4479.77		4481.41	0.003078	10.29	1358.47	160.93	0.62
Downtown	46877.18	Max WS	13978.10	4468.19	4479.68		4481.23	0.003009	9.99	1400.63	177.43	0.61
Downtown	46819.52	Max WS	13977.09	4467.23	4479.91		4481.09	0.001832	8.70	1634.92	203.87	0.49
Downtown	46762.23	Max WS	13977.53	4466.60	4480.08		4480.99	0.001405	7.63	1836.83	202.37	0.43
Downtown	46709.06	Max WS	13977.57	4466.61	4480.07		4480.91	0.001373	7.39	1892.16	198.61	0.42
Downtown	46654.94	Max WS	13977.45	4466.61	4480.01		4480.84	0.001339	7.30	1913.44	199.83	0.42
Downtown	46610.97	Max WS	13976.72	4466.61	4479.92		4480.78	0.001419	7.44	1877.73	198.99	0.43
Downtown	46546.92	Max WS	13977.23	4466.61	4479.82		4480.69	0.001400	7.49	1865.84	192.58	0.42
Downtown	46484.79	Max WS	13977.29	4466.62	4479.66		4480.60	0.001527	7.79	1794.01	186.42	0.44
Downtown	46424.93	Max WS	13976.82	4466.60	4479.72		4480.52	0.001185	7.17	1950.54	196.88	0.40
Downtown	46365.15	Max WS	13976.72	4466.56	4479.70		4480.45	0.001105	6.96	2009.22	211.11	0.38
Downtown	46305.39	Max WS	13977.12	4466.53	4479.68		4480.39	0.001014	6.72	2081.18	281.43	0.37
Downtown	46258.14	Max WS	13976.94	4466.51	4479.65		4480.34	0.000980	6.65	2101.63	220.62	0.36
Downtown	46210.57	Max WS	13977.11	4466.49	4479.73	4473.55	4480.29	0.000812	6.03	2329.90	247.06	0.33
Downtown	46150		Bridge									
Downtown	46091.2	Max WS	13976.66	4464.95	4474.08		4475.25	0.002669	8.68	1609.93	212.18	0.56
Downtown	45983.39	Max WS	13976.60	4463.88	4473.69		4474.95	0.002875	8.98	1556.98	214.99	0.59
Downtown	45798.97	Max WS	13976.49	4462.44	4472.42		4474.30	0.004540	11.00	1270.77	181.29	0.73
Downtown	45597.26	Max WS	13976.63	4460.72	4470.84		4473.38	0.005347	12.78	1093.73	138.99	0.80
Downtown	45398.64	Max WS	13976.42	4456.90	4469.05		4472.48	0.006483	14.85	940.93	108.08	0.89
Downtown	45302.05	Max WS	13976.30	4456.66	4468.56		4471.82	0.005880	14.52	979.66	127.06	0.85
Downtown	45205.32	Max WS	13976.16	4456.41	4468.75		4470.96	0.003478	11.93	1178.65	137.32	0.66
Downtown	45110.24	Max WS	13975.75	4456.04	4468.81		4470.64	0.002829	10.90	1318.61	158.06	0.61
Downtown	45014.75	Max WS	13975.96	4455.67	4468.44		4470.36	0.003042	11.11	1258.04	127.30	0.62
Downtown	44945.88	Max WS	13975.84	4455.14	4468.41		4470.15	0.002913	10.57	1322.12	141.34	0.61
Downtown	44876.97	Max WS	13976.28	4454.62	4468.29		4469.94	0.003211	10.28	1359.70	149.45	0.60
Downtown	44808.06	Max WS	13976.17	4454.09	4468.17		4469.71	0.003205	9.96	1403.17	160.24	0.59
Downtown	44719.45	Max WS	13974.92	4454.09	4468.50	4464.25	4469.48	0.001895	7.91	1765.88	194.27	0.46
Downtown	44650		Bridge									
Downtown	44609.2	Max WS	13975.88	4452.25	4463.35		4465.10	0.003570	10.62	1316.32	149.67	0.63
Downtown	44538.60	Max WS	13976.02	4452.25	4462.86		4464.83	0.004162	11.26	1240.77	143.79	0.68
Downtown	44496.75	Max WS	13975.81	4452.25	4462.21		4464.67	0.005836	12.58	1110.52	141.75	0.79
Downtown	44402.78	Max WS	13975.64	4450.97	4461.34		4464.15	0.006782	13.45	1039.38	134.28	0.85
Downtown	44307.87	Max WS	13975.96	4449.68	4460.53		4463.53	0.007157	13.89	1005.97	127.07	0.87
Downtown	44212.27	Max WS	13975.31	4448.40	4459.77		4462.89	0.006849	14.18	985.75	111.49	0.84
Downtown	44164.2	Max WS	13975.59	4448.42	4459.08	4458.70	4462.98	0.008462	15.85	881.64	101.11	0.95
Downtown	44096.59	Max WS	13975.25	4448.06	4458.58	4458.18	4462.31	0.008410	15.49	902.26	107.35	0.94
Downtown	44028.56	Max WS	13975.59	4447.71	4458.25		4461.50	0.007458	14.45	966.98	119.25	0.89
Downtown	43960.63	Max WS	13975.68	4447.35	4458.09		4460.88	0.006246	13.41	1042.43	126.86	0.82
Downtown	43863.31	Max WS	13975.52	4446.53	4457.80		4460.28	0.005167	12.64	1106.01	127.18	0.76
Downtown	43764.57	Max WS	13975.53	4445.70	4458.26		4459.81	0.002902	9.98	1400.27	149.40	0.57

HEC-RAS Plan: 2021 K to G 1 Pier CIP River: Truckee Reach: Downtown Profile: Max WS (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)	
Downtown	43697.38	Max WS	13975.69	4445.70	4458.05		4459.61	0.003134	10.02	1395.22	157.61	0.59
Downtown	43630.21	Max WS	13975.03	4445.70	4457.81		4459.40	0.003176	10.11	1382.62	154.57	0.60
Downtown	43563.05	Max WS	13975.59	4445.70	4457.58		4459.18	0.003314	10.13	1379.27	159.11	0.61
Downtown	43468.11	Max WS	13975.13	4445.30	4457.21		4458.85	0.003473	10.28	1359.37	159.50	0.62
Downtown	43373.02	Max WS	13975.26	4444.90	4457.03		4458.54	0.003142	9.84	1420.44	165.72	0.59
Downtown	43293.25	Max WS	13975.06	4444.90	4456.68		4458.28	0.003323	10.17	1393.81	176.82	0.61
Downtown	43213.3	Max WS	13974.99	4444.90	4455.83		4457.97	0.005185	11.75	1189.18	155.06	0.75
Downtown	43137.05	Max WS	13975.29	4444.85	4455.06		4457.59	0.006460	12.74	1096.66	148.65	0.83
Downtown	43061.5	Max WS	13974.21	4444.80	4454.88		4457.09	0.005403	11.92	1172.33	153.87	0.76
Downtown	42964.86	Max WS	13974.69	4444.62	4454.21		4456.55	0.006147	12.30	1144.14	164.35	0.80
Downtown	42868.91	Max WS	13975.14	4444.44	4454.26		4455.96	0.004336	10.58	1383.27	206.54	0.68
Downtown	42776.38	Max WS	13975.13	4445.40	4453.56		4455.49	0.006302	11.15	1255.57	219.81	0.80
Downtown	42712.78	Max WS	13974.90	4444.67	4452.98		4455.11	0.007408	11.71	1198.21	223.38	0.86
Downtown	42650.83	Max WS	13974.59	4443.93	4452.61		4454.62	0.007250	11.37	1229.03	218.42	0.85
Downtown	42571.63	Max WS	13974.96	4443.19	4451.90	4451.61	4454.19	0.008451	12.16	1158.32	229.95	0.91
Downtown	42496.35	Max WS	13975.19	4442.45	4451.44		4453.35	0.006984	11.10	1262.47	233.26	0.83
Downtown	42424.35	Max WS	13974.77	4440.14	4451.72		4452.83	0.002905	8.43	1658.82	233.22	0.56
Downtown	42343.67	Max WS	13974.52	4437.69	4451.40		4452.61	0.002671	8.87	1604.03	212.39	0.54
Downtown	42248.44	Max WS	13974.19	4437.59	4450.64		4452.37	0.003420	10.86	1381.14	188.64	0.63
Downtown	42111.79	Max WS	13974.29	4437.14	4449.21	4448.42	4452.63	0.005812	15.20	994.53	129.48	0.83
Downtown	42040.67	Max WS	13974.05	4438.25	4449.20		4451.99	0.004921	13.87	1100.95	141.13	0.77
Downtown	41973.57	Max WS	13974.25	4438.24	4449.38		4451.58	0.004016	12.30	1234.33	166.24	0.69
Downtown	41937.04	Max WS	13973.95	4437.50	4449.33		4451.44	0.003708	12.20	1263.26	163.32	0.67
Downtown	41794.81	Max WS	13973.83	4435.81	4449.72	4445.48	4450.93	0.001728	9.16	1667.09	188.73	0.47
Downtown	41611.81		Bridge									
Downtown	41608.47	Max WS	13973.69	4434.57	4448.33		4449.82	0.002443	10.68	1525.54	182.05	0.55
Downtown	41482.09	Max WS	13973.85	4433.63	4448.16		4449.53	0.001693	9.67	1543.95	143.92	0.47
Downtown	41435.94	Max WS	13973.72	4433.85	4448.02		4449.45	0.001794	9.78	1513.62	143.15	0.48
Downtown	41313.22	Max WS	13973.69	4433.80	4447.88		4449.19	0.002125	9.17	1534.69	165.24	0.50
Downtown	41197.77	Max WS	13973.52	4434.04	4447.43		4448.89	0.002937	9.72	1437.55	151.99	0.56
Downtown	40959.95	Max WS	13972.74	4434.55	4447.12		4448.31	0.001897	8.76	1594.82	163.17	0.49
Downtown	40798.2	Max WS	13972.83	4435.15	4446.93		4448.02	0.001811	8.37	1695.70	208.14	0.48
Downtown	40713.66	Max WS	13972.08	4435.04	4446.65		4447.85	0.002154	8.85	1614.65	214.21	0.52
Downtown	40613.39	Max WS	13972.00	4433.88	4446.28		4447.64	0.002449	9.51	1555.01	228.99	0.56
Downtown	40432.02	Max WS	13971.33	4432.73	4445.86		4447.21	0.002251	9.36	1548.03	223.79	0.54
Downtown	40284.51	Max WS	13971.29	4431.86	4445.47		4446.91	0.002116	9.82	1552.89	242.33	0.53
Downtown	40105.75	Max WS	13971.02	4432.47	4445.58		4446.56	0.001456	8.33	1891.64	259.25	0.45
Downtown	40007.36	Max WS	13970.67	4432.35	4445.44		4446.41	0.001455	8.12	1883.95	256.82	0.44
Downtown	39916.85	Max WS	13970.79	4432.29	4445.19		4446.24	0.001720	8.24	1696.73	184.03	0.47
Downtown	39828.46	Max WS	13970.99	4432.08	4445.00		4446.10	0.001680	8.39	1679.94	194.40	0.47
Downtown	39723.22	Max WS	13970.37	4432.17	4444.94		4445.93	0.001443	8.02	1766.56	192.26	0.44
Downtown	39625.06	Max WS	13970.54	4431.99	4444.79		4445.79	0.001515	8.02	1756.74	194.16	0.45
Downtown	39527.65	Max WS	13970.18	4432.61	4444.63		4445.63	0.001609	8.04	1748.22	198.51	0.46
Downtown	39447.91	Max WS	13970.48	4432.63	4444.55		4445.51	0.001542	7.92	1802.85	208.66	0.45
Downtown	39366.91	Max WS	13969.70	4433.03	4444.12		4445.38	0.002215	9.15	1594.70	205.50	0.53
Downtown	39285.87	Max WS	13970.06	4432.97	4443.86		4445.19	0.002556	9.40	1551.09	212.12	0.57
Downtown	39203.81	Max WS	13970.08	4432.61	4443.48		4444.98	0.002947	10.12	1472.04	208.17	0.61

HEC-RAS Plan: 2021 K to G 1 Pier CIP River: Truckee Reach: Downtown Profile: Max WS (Continued)

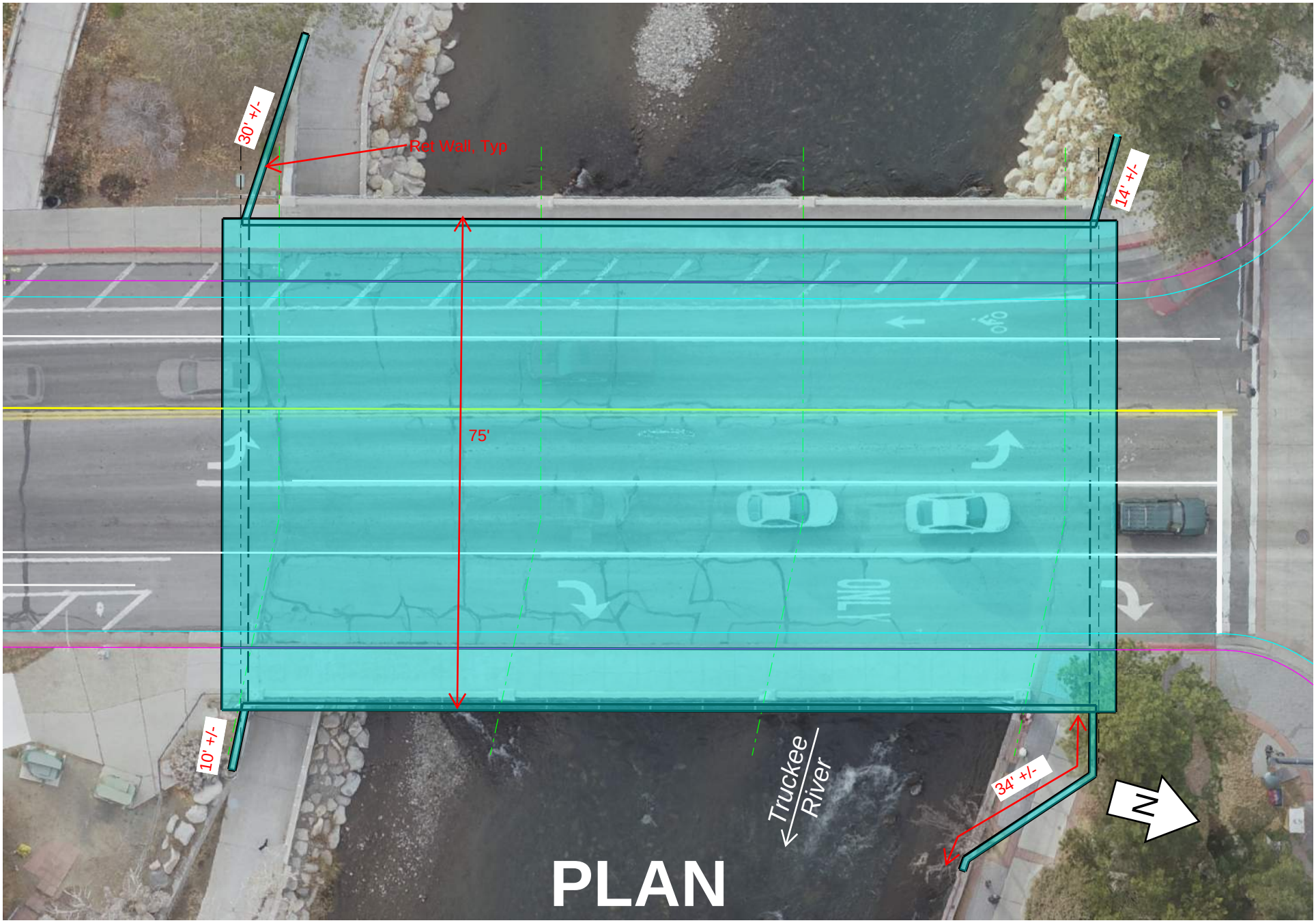
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downtown	39109	Max WS	13970.43	4429.68	4443.84		4444.73	0.001297	7.65	1888.24	208.60	0.42
Downtown	39013.93	Max WS	13969.77	4429.78	4443.63		4444.60	0.001374	8.00	1804.44	199.43	0.43
Downtown	38946.54	Max WS	13969.13	4427.25	4443.69		4444.52	0.001150	7.43	1970.18	216.47	0.40
Downtown	38894.55	Max WS	13970.07	4426.99	4443.81		4444.46	0.000913	6.54	2212.01	236.19	0.35
Downtown	38848.37	Max WS	13970.01	4426.97	4443.42		4444.00	0.018760	6.11	2330.27	259.64	0.34
Downtown	38813.19	Max WS	13969.16	4427.04	4443.09		4443.65	0.000932	6.02	2363.29	272.38	0.35
Downtown	38758.33	Max WS	13969.48	4427.49	4443.11		4443.65	0.000942	5.95	2398.07	284.19	0.35
Downtown	38732.61	Max WS	13970.29	4431.53	4442.85	4439.58	4443.59	0.001572	6.93	2057.64	284.48	0.44
Downtown	38576.81		Inl Struct									
Downtown	38573.53	Max WS	13970.05	4428.24	4436.21	4436.12	4438.48	0.008888	12.07	1157.17	237.53	0.96
Downtown	38492.13	Max WS	13969.96	4424.74	4436.10	4433.12	4437.06	0.002328	7.88	1772.49	251.87	0.52
Downtown	38336.81		Bridge									
Downtown	38332.36	Max WS	13970.06	4423.90	4435.49		4436.52	0.002652	8.40	1736.95	280.11	0.56
Downtown	38277.95	Max WS	13969.78	4423.84	4434.73		4436.39	0.004335	10.53	1386.58	241.26	0.71
Downtown	38228.19	Max WS	13969.85	4423.59	4434.57		4436.18	0.003360	10.25	1399.72	196.64	0.64
Downtown	38183.57	Max WS	13969.35	4423.95	4434.28		4436.04	0.003380	10.78	1343.60	180.59	0.65
Downtown	38145.05	Max WS	13969.40	4423.90	4434.14		4435.92	0.003285	11.02	1347.78	179.58	0.65
Downtown	38098.2	Max WS	13969.92	4424.28	4433.82		4435.78	0.003732	11.69	1300.04	182.70	0.69
Downtown	38050.81	Max WS	13969.69	4423.47	4433.88		4435.58	0.003564	11.04	1389.38	187.42	0.64
Downtown	38003.02	Max WS	13969.45	4423.53	4433.44		4435.44	0.004187	11.94	1298.09	183.13	0.70
Downtown	37954.86	Max WS	13910.57	4423.01	4432.98		4435.24	0.004743	12.69	1210.13	169.67	0.74
Downtown	37906.33	Max WS	13910.10	4422.29	4432.58		4435.03	0.005067	13.20	1160.32	160.34	0.76
Downtown	37852.33	Max WS	13909.55	4421.61	4431.93		4434.85	0.005952	14.29	1060.91	145.06	0.83
Downtown	37797.18	Max WS	13969.52	4420.84	4431.36	4431.09	4434.65	0.007257	15.12	1006.15	136.39	0.87
Downtown	37741.16	Max WS	13969.66	4420.70	4430.82	4430.69	4434.42	0.008404	15.67	949.76	128.44	0.92
Downtown	37684.6	Max WS	13969.44	4420.36	4430.32	4430.16	4434.05	0.009440	15.88	925.68	126.34	0.96
Downtown	37639.51	Max WS	13970.14	4420.60	4429.87	4430.04	4433.85	0.010538	16.39	890.63	122.73	1.01
Downtown	37592.27	Max WS	13969.83	4420.58	4429.29	4430.21	4434.16	0.014243	17.87	802.35	120.97	1.16
Downtown	37543.83	Max WS	13969.26	4420.31	4428.53	4429.75	4433.61	0.016960	18.30	785.68	129.82	1.25
Downtown	37492.76	Max WS	13969.22	4420.68	4427.26	4429.62	4434.92	0.033105	22.32	636.11	126.36	1.69

Appendix D. Proposed Bridge Plans

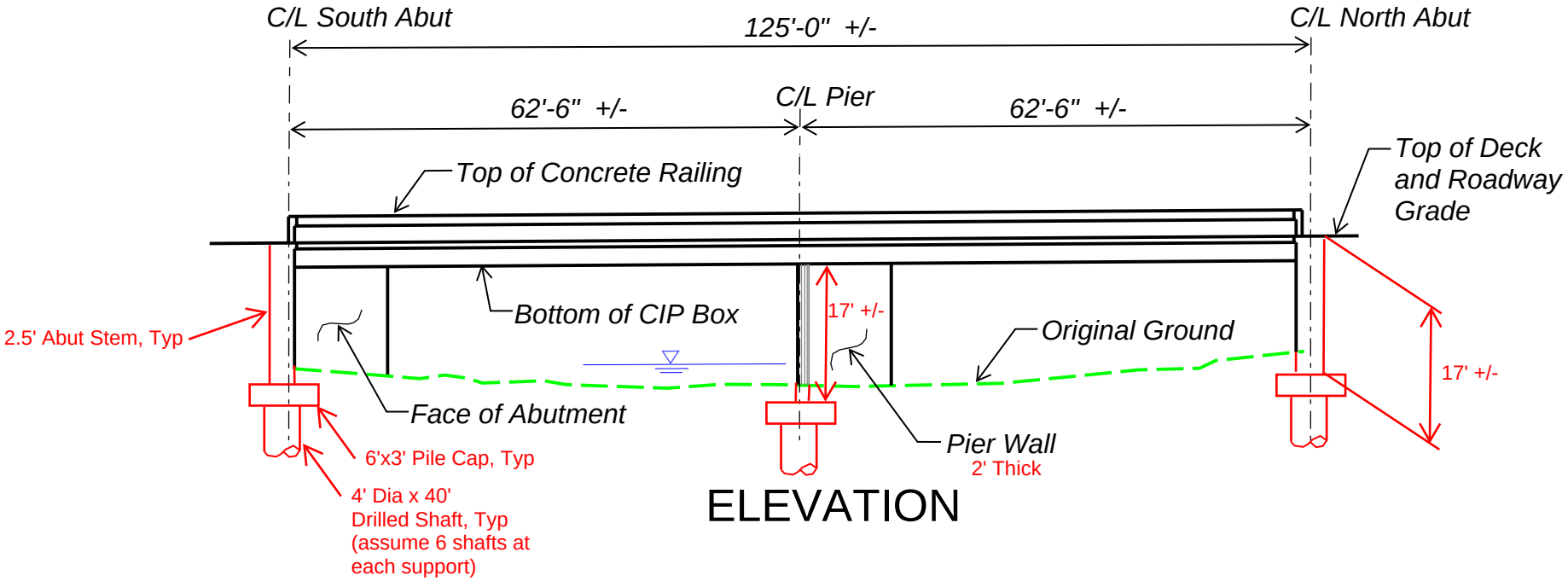
Alternative 2 North Bridge


Ret Wall, Typ
14' +/-
14' +/-
76' +/-
75'
68' +/-
24' +/-
10' +/-
Truckee River
N
PLAN

Alternative 1 South Bridge

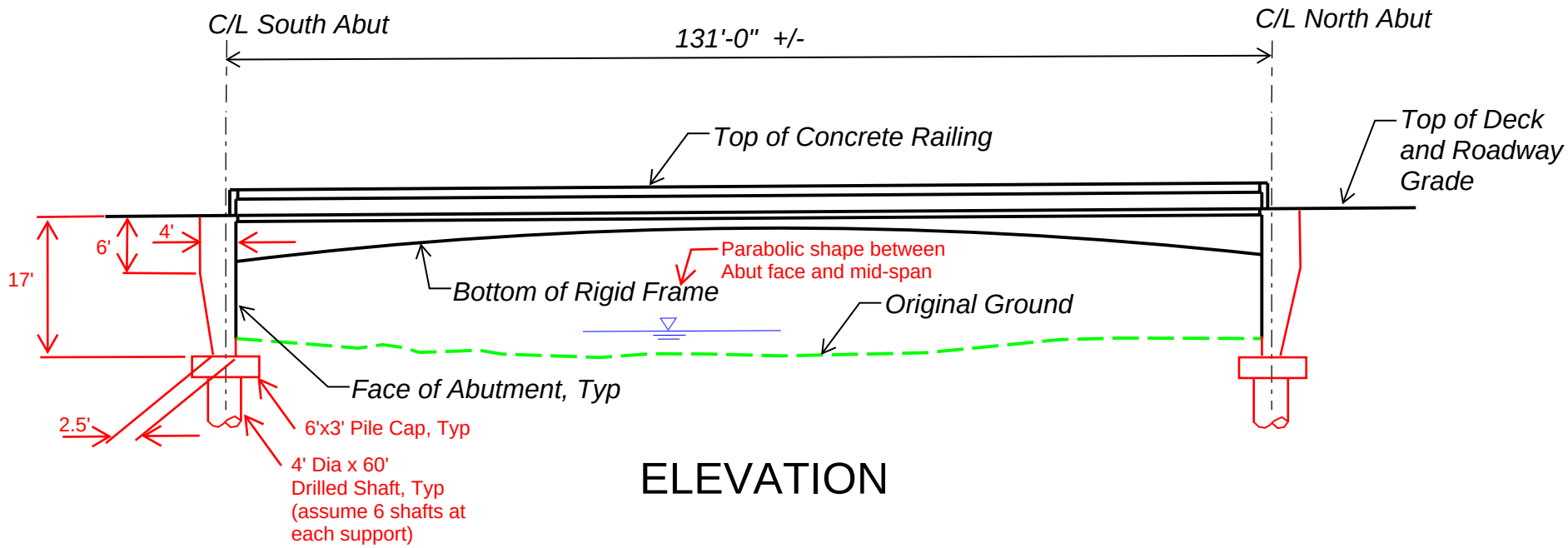

30' +/-
Ret Wall, Typ
14' +/-
75'
10' +/-
Truckee River
34' +/-
N
PLAN

Alternative 2 North Bridge


C/L South Abut
125'-0" +/-
C/L North Abut
62'-6" +/-
C/L Pier
62'-6" +/-
Top of Concrete Railing
Top of Deck and Roadway Grade
Bottom of CIP Box
17' +/-
2.5' Abut Stem, Typ
Original Ground
17' +/-
Face of Abutment
6'x3' Pile Cap, Typ
Pier Wall
2' Thick
4' Dia x 40' Drilled Shaft, Typ (assume 6 shafts at each support)

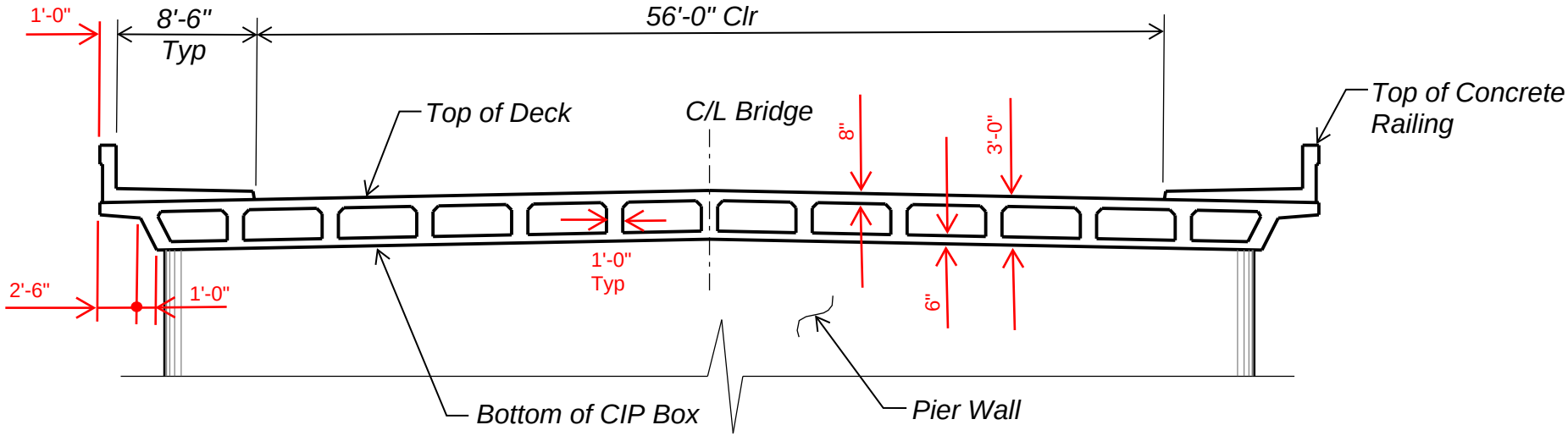
ELEVATION

Alternative 1 North Bridge


C/L South Abut
131'-0" +/-
C/L North Abut
Top of Concrete Railing
Top of Deck
and Roadway
Grade
17'
6'
4'
Parabolic shape between
Abut face and mid-span
Bottom of Rigid Frame
Original Ground
Face of Abutment, Typ
2.5'
6'x3' Pile Cap, Typ
4' Dia x 60'
Drilled Shaft, Typ
(assume 6 shafts at
each support)

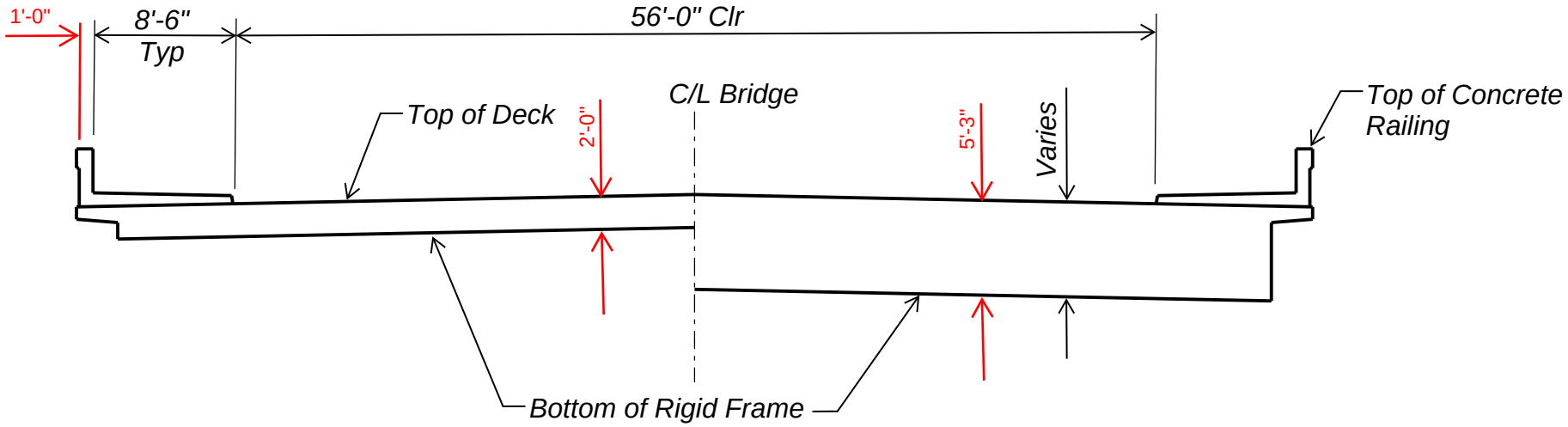
ELEVATION

Alternative 1 South Bridge



TYPICAL SECTION

Alternative 2 South Bridge



TYPICAL SECTION