# **APPENDIX H**

## **FEASIBILITY REPORT**

SAN BERNARDINO CLASS 1 BIKE TRAIL PROJECT CIP No. 95117

# **Feasibility Report**





County of El Dorado Department of Transportation EIP #03.01.02.0040

September 2019

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### **EXECUTIVE SUMMARY**

### Background

The San Bernardino Class 1 Bike Trail Project (Project) is identified as Environmental Improvement Program Project <u>#03.01.02.0040</u> and will construct approximately 0.37 miles of Class 1 shared use path and a Class 3 bike route. The Class 1 shared use path begins at the end of West San Bernardino Ave towards Tahoe Paradise Park. The Class 3 bike route designation will utilize the roadways of West San Bernardino Ave and East San Bernardino Ave to connect with bike lane facilities on North Upper Truckee Rd from the west and Apache Ave to the east. The pathway will cross the Upper Truckee River and include connections to Washoe Meadows State Park, Tahoe Paradise Park, and the Lake Tahoe Environmental Science Magnet School (LTESMS) in the community of Meyers in the Tahoe Basin.

The Project builds upon the Meyers Bikeway and provides a critical link to the bicycle network between the neighborhood on North Upper Truckee Road and the community of Meyers. The Project supports the *Linking Tahoe: Active Transportation Plan*<sup>1</sup>, approved by the Tahoe Metropolitan Planning Organization in March 2016 and the *Meyers Area Plan*, approved in March 2018. The Project proposes to install a shared use path bridge over the Upper Truckee River just west of Tahoe Paradise Park and link the bike lane facilities along North Upper Truckee Rd from the west and Apache Ave to the east.

Opportunities exist with this Project to address traffic and pedestrian safety operations at the intersection of Apache Ave at East San Bernardino Ave as identified in the *Lake Tahoe Unified School District Safe Routes to School Master Plan*<sup>2</sup> and improving the LTESMS frontage and driveway access. This Project will also connect to the future Apache Avenue Pedestrian Safety and Connectivity Project (#03.01.01.0004) which is an El Dorado County-led effort to improve overall pedestrian and bicycle safety for students, parents and the community accessing LTESMS, Apache Ave and Meyers.

This Project is part of a series of erosion control/water quality, environmental restoration and shared use path projects implemented by the El Dorado County Department of Transportation. This Feasibility Report (Report) is the first phase within the Project Delivery Process (PDP) for the Project and is intended to describe the background on existing information concerning the Project area. Additionally, this Report is also intended to further define the scope of work as it relates to potential alternative solutions that might be implemented to address problems identified in order to achieve the project's goals and objectives.

<sup>&</sup>lt;sup>1</sup> *Linking Tahoe: Active Transportation Plan* (Tahoe Regional Planning Agency/ Tahoe Metropolitan Planning Organization, 2016), 4-45.

<sup>&</sup>lt;sup>2</sup> Ibid. Appendix D.

# **1.0 Existing Conditions**

This Feasibility Report (Report) has been developed pursuant to the Storm Water Quality Improvement Committee (SWQIC) guidelines for environmental improvement project<sup>i</sup> in the Lake Tahoe Basin (Basin) and has been prepared by the County of EI Dorado (County) Community Development Services, Department of Transportation (County). This Report includes analysis of the existing conditions and an analysis of potential alternatives for the San Bernardino Class 1 Bike Trail Project (Project).

#### 1.1 Introduction

The County is proposing to implement the Project funded by Tahoe Regional Planning Agency (TRPA) Air Quality Mitigation Funds and the Congestion Mitigation and Air Quality (CMAQ) Program. The Project's stakeholders include the general public and visitors of the Basin, County representatives, public agencies within the Basin, and other technical representatives which make up the Project Development Team (PDT).

#### 1.1.1 Project Goals and Project Objectives

#### **Project Goals**

Currently there is a continuous shared used path from the community of Meyers to the City of South Lake Tahoe that includes the Pat Lowe Memorial Bike Trail (both sides of the highway through Meyers from State Route 89 to Pioneer Trail), the Sawmill Bike Trail (along the highway and Sawmill Rd from Santa Fe Rd to Lake Tahoe Blvd), and the bicycle trail contiguous with Lake Tahoe Blvd at Sawmill Pond towards Viking Rd/ D St (Figure 6). The primary goal for this Project is to provide a shared used path connection from the subdivisions off N Upper Truckee Rd, over the Upper Truckee



River, to Tahoe Paradise Park (Park) and E San Bernardino Ave towards the community of Meyers. The Project is identified in the *Meyers Area Plan*<sup>ii</sup> (Area Plan) and encourages

pedestrian and bicycle linkages between land uses and providing safe, functional pathways. Further the Project will be consistent with TRPA's *Linking Tahoe: Active* 

*Transportation Plan<sup>iii</sup>* to provide access to local businesses, schools, and offices for bicyclists and pedestrians, to reduce vehicular transportation, and to enhance



recreational opportunities within the basin.

#### **Project Objective**

The Project objectives represent physical conditions that can be measured to assess the success of the Project in achieving the Project goal. The Project will conform to the Preferred Design Approach as detailed in the SWQIC process.

The objectives of the Project include:

 Providing a pathway link supporting TRPA's *Linking Tahoe: Active Transportation Plan*;

- Providing access to local businesses, schools, and employment for bicyclists and pedestrians to reduce vehicle miles traveled (VMT);
- Enhancing recreational opportunities within the Basin;
- Hardscape improvements shall blend into the scenic environment to the maximum extent practicable;
- Reduce fine and coarse sediment, stormwater runoff volume, and peak flows by 33%, to the maximum extent practicable; and,
- Stabilize eroding cut slopes, roadside ditches, and capture road abrasives utilizing source control Best Management Practices (BMPs).

#### **1.2 Project Area Information**

The Project is located in eastern El Dorado County, in the Tahoe Basin, near the community of Meyers (see Figure 1). With a potential alignment roughly matching a compacted dirt access road that starts at the eastern terminus of W San Bernardino Ave through a United States Forest Service (USFS) property, over the Upper Truckee



River and through the Park to E San Bernardino Ave where it meets the entrance to the Park (approximately 2,000 feet or roughly 0.4 miles). The Project involves the

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installation of a Class 1 shared use path linking the subdivisions off of N Upper Truckee Rd to the existing County shared use path network in Meyers. In addition, the alignment alternatives will follow any existing paths/trails wherever possible, to minimize disturbance to vegetation and impact to current land use along the proposed alignment.

The alignment will likely be contained within a 25-foot wide corridor through an undeveloped USFS property through a special use permit, over the Upper Truckee River and through multiple parcels owned by the Park.



Existing land use includes residential neighborhoods at both ends of the proposed alignment and recreational use through the undeveloped USFS parcel and the Park. Mature vegetation is present along the alignment in clusters and wetland vegetation species are present along the corridor, particularly surrounding the alignment of the Upper Truckee River. Existing roadways and trails currently provide public access for dispersed recreational activities such as hiking and cycling in the Project area. Additionally, it will connect the subdivisions off of North Upper Truckee Rd to the Lake Valley State Recreation Area (Washoe Meadows) and the Lake Tahoe Golf Course which provide numerous recreational opportunities and located directly adjacent to the existing County pathway network.

The following sections provide further detail regarding the Project area's existing conditions with respect to topography, soils



and geology, land use and land capabilities, land ownership, utilities, environmental resources, Federal Emergency Management Agency (FEMA) floodplain, and monitoring information.

#### 1.2.1 Topography

The Basin straddles the border of California and Nevada with about one-third of the Basin in Nevada and two-thirds in California. The Basin is a north trending basin bounded by the Sierra Nevada to the west and the Carson Range to the east.

The Basin was formed by geologic block (normal) faulting about 5 to 10 million vears ago. Resulting mountain peaks rise to more than 10,000 feet (3,048 m) above sea level. Volcanic activity about 2 million years ago blocked the northern end of the Basin and ultimately filled the lake. The original surface of the lake was over 600 feet higher than it is today. The Truckee River flowed through the lava dam, eventually lowering the surface of Lake Tahoe to an average elevation of about 6,225 feet (1,897 m) above mean sea level (US Geological Survey 1927 datum). Glaciers formed in the last Ice Age (10,000 years ago) are responsible for much of the area's current topography

The Project is located on the Echo Lake USGS 7.5-minute quadrangle map.



In general, the topography of the Project

area is relatively flat/level with an average slope of approximately 2 percent. An existing dirt path/trail along with a utility access road is present in some areas of the proposed shared use alignment alternatives. The proposed bike path will cross the North Upper Truckee River just before entering into Park.



#### 1.2.2 Soils and Geology

#### Soils

The 2007 National Resource Conservation Service (NRCS) soil survey data for the El

Dorado County Tahoe Basin Area<sup>iv</sup> indicates the primary soils units within the Project area as described below. The soils found within the Project boundaries are presented on



Figure 4 and are described as follows:

- Pits and dumps, (7031). Located in urban areas.
- Tahoe complex, 0 to 5 percent slopes (7042). This complex is typically along riparian corridors, floodplains and valley flats. The parental material consists of alluvium derived from granitic and volcanic rocks. The soil is poorly drained. Shrink-swell potential is low











- and the soil is frequently flooded. Surface runoff is very high. The hydrologic soil group is A/D.
- Celio series, 0 to 5 percent slopes (7431). This complex is typically found in the southern part of the Basin. The parental material consists of alluvium and/or outwash. The soil is somewhat poorly drained. Shrink-swell potential is low and the soil is rarely flooded. Surface runoff is high. The hydrologic soil group is A/D.
- Meeks gravelly loamy coarse sand, 5 to 15 percent slopes, stony (7482). This complex is typically found in the southwestern part of the Basin. The parental material consists of outwash and/or till derived from granodiorite. The soil is somewhat excessively drained. Shrink-swell potential is low and the soil has no potential for flooding. Surface runoff is very low. The hydrologic soil group is A.

# Table 1 - Distribution by Hydrologic SoilGroup and Erosion Hazard

NRCS Series	Hydrologic Group	Erosion Hazard	% of Area
7031	-	not rated	0.3
7042	A/D	slight	18.5
7431	A/D	slight	63.0
7482	А	moderate	18.2

The Geotechnical Investigation Report<sup>v</sup> contains more specific information related to the soils and the proposed bridge foundation recommendations.

#### Geology

The geology of the Project area primarily consists of Pleistocene age Quaternary alluvial and fluvial deposits forming glacial moraines. The alluvium is composed of very poorly sorted, sandy small pebble gravel that has been deposited on an erosion surface cut on granodiorite. The runoff from the Project area flows into floodplain and lacustrine deposits that border the Upper Truckee River.

#### 1.2.3 Land Use and Land Capability

#### Land Use

"The Meyers Area Plan serves as the comprehensive land use and zoning plan for the community of Meyers, consistent with the Lake Tahoe Regional Plan (Regional Plan) and the El Dorado County General Plan (General Plan)."<sup>vi</sup>



### Land Capability

The USFS, in cooperation with TRPA, developed the land capability system currently used in the Basin. Lands within the Basin are divided into seven classes based on soil types, potential for erosion, and other related characteristics. Lands with a ranking of 1 have the highest potential for erosion and 7 have the lowest. Class 1 is also subdivided into 3 categories (1a, 1b, and 1c), all of which are high hazard. The land within this Project area fits into Classes 1b and 5 (see Table 2 and Figure 8). Class 5 has a lower potential for erosion than Class 1b. The land capability





shown on Figure 8 is preliminary and still requires verification.

Table 2 - Area	Distribution	by Land
Capability Clas	SS	

Land	NRCS Series			
Capability Class	7031	7042	7431	7482
1a				$\checkmark$
1b		$\checkmark$	$\square$	$\checkmark$
1c	$\checkmark$			
3			$\square$	$\square$
5				$\checkmark$

The TRPA land capability verification (LCV) application was submitted in May 2018. As of the date of this Report, no response has been received from TRPA. See Figure 8 for further preliminary land capability information.

#### 1.2.4 Land Ownership

Land ownership is summarized in Table 3 and depicted in Figure 9, which was developed from record parcel maps, subdivision maps, deed information, and assessors documents and shows County right-of-way, property lines, and publicly owned properties. In addition the County road right-of-way, the Project is comprised of private and public parcels, with the public parcels owned by the County (3), Park (5), California Tahoe Conservancy (3), and the USFS (14). County will pursue the necessary easements, special use permits, and/or license agreements for any affected parcels during the development of the preferred project alignment.

#### Table 3 - Land Ownership

APN	Owner
034-450-211	County of El Dorado
034-450-210	County of El Dorado
034-020-006	County of El Dorado
034-591-05	USFS
034-020-012	USFS
034-020-014	USFS
034-010-013	Tahoe Paradise Park
034-010-022	Tahoe Paradise Park
034-010-024	Tahoe Paradise Park
034-020-017	Tahoe Paradise Park
034-020-032	Tahoe Paradise Park
034-010-023	USFS
034-020-026	USFS
034-382-016	USFS
034-382-017	USFS
034-382-018	CA Tahoe Conservancy
034-382-019	CA Tahoe Conservancy
034-382-20	USFS
034-372-011	USFS
034-372-012	CA Tahoe Conservancy
034-382-021	USFS
034-382-022	USFS
034-372-017	USFS
034-372-017	USFS
034-382-026	USFS

- As of September 2019.

#### 1.2.5 Utilities

Numerous utilities are situated underground and overhead within the Project. In order to better define these utilities, a utilities base map was obtained and coordinated with each company (see Figure 10). Utility owners are listed below in Table 4. Any conflicts will be addressed with the appropriate utility owner.





Table 4 -	Utilities	Representa	tive List
-----------	-----------	------------	-----------

Utility	Owner	Owner Address	Contact
Natural Gas	Southwest Gas	1740 D St, Unit No. 4 S Lake Tahoe, CA 96150	Chris Foster
Telephone	AT&T	12824 Earhart Ave Auburn, CA 95602	Astrid Willard
Electricity	Liberty Utilities	933 Eloise Ave S Lake Tahoe, CA 96150	Andrew Gregorich
Water & Sewer	South Tahoe PUD	1275 Meadow Crest Dr S Lake Tahoe, CA 96150	Steve Caswell
Cable Television	Charter Communi- cations	9335 Prototype Dr Reno, NV 89521	Anthony Lefanto

#### **1.2.6 Environmental Resources**

The environmental resources investigated as part of this Project include cultural/archaeological, biological, vegetation, and wetlands. Each is described below.

#### **Cultural/Archaeological Resources**

An Archaeological Survey Report was completed by NCE to document and evaluate the cultural resources present in the Project area (report available upon request). This investigation resulted in the identification of no archaeological resources within the Area of Potential Effect on archival research or the archaeological survey.

#### **Biological Resources**

The Lake Tahoe area provides suitable habitat for over 250 species of animals. In order to characterize the existing biological conditions present within the Project area, an inventory and evaluation of the Project area's vegetation and wildlife communities was conducted and a Biological Assessment was completed in 2019 NCE (report available upon request). This report also identifies the potential occurrence of special status plant and animal species within the Project area, as summarized in Table 5.

# Table 5 - Special Status Wildlife andPlant Species with Suitable HabitatAvailability in the Project Area

-		-	
Common Name	Scientific Name	Status	Suitable Habitat
Mammals			
California Wolverine	Gulo gulo luscus	PT, ST, FP	Absent
Amphibians			
Sierra Nevada yellow- legged frog	Rana sierrae	FE, ST, WL	Unlikely
Fishes			
Lahontan Cutthroat Trout	Oncorhynchus clarki henshawi	FT	Unlikely
Agency Code	s		

Agency Co	463
CDFW	CA Dept of Fish and Wildlife
USFWS	US Fish and Wildlife Service
TRPA	Tahoe Regional Planning Agency
Status Code	es
FE	Federally Endangered
FT	Federally Threatened
FP	CDFW Fully Protected
ST	State Threatened
WL	CDFW Watch List

#### Vegetation

Several vegetation types were identified within the Project area during a 2019 field survey for the Biological Assessment (see Figure 5). These vegetation types include: Jeffrey pine, Lodegepole pine, perennial grassland, sagebrush alliance, Sierran mixed conifer, as reported by NCE.

The Project area is primarily bordered by pine trees, with the immediate alignment containing plant species tolerant of disturbed areas.

 Jeffrey Pine Forest: Composed of Jeffrey pine (*Pinus jeffreyi*) and white fir (*Abies concolor*), occurs throughout the Sierra Nevada mountains raised stream benches, ridges, and plateaus on all slopes and aspects.

- Lodgepole Pine Forest (*Pinus contorta* ssp. *murrayana*): Grows in a variety of conditions and occurs in terraces, lake and meadow margins, and depressions that flood seasonally; upland slopes and ridges to the tree line.
- Perennial Grassland: Occurs on ridges and south facing slopes, alternating with forest and scrub in valleys and north facing slopes. Key grasses include Idaho fescue (*Fescue idahoensis*), Red fescue (*Festuca rubra*), and Italian wild rye (*Festuca perennis*).
- Sagebrush Alliance (Artemesia tridentata): Dominant or codominant in the shrub canopy and is associated with Jeffrey pine at low cover, usually found in many vegetation types. Many forests and woodlands in the ponderosa pine, Jeffery pine, single-leaf pinyon, lodgepole pine may have sagebrush as an understory component. Stands without trees occur as openings in these forests. Stands occur in drier portions and microsites throughout most of the Sierra Nevada range.
- Sierran Mixed Conifer: The Sierran mixed conifer is a mix of hardwood and conifer species that forms a multilayered forest. Historically burning and logging have caused a wide variability in stand structure. Five conifers and one hardwood typify the mixed conifer forest. White fir tends to be the most common species due to its shade tolerance and ability to survive long periods in brush fields. Jefferey pine dominates at high elevations and on cold sites with incense cedar (*Calocedrus decurens*), ponderosa pine (*Pinus ponderosa*), and

sugar pine (*Pinus lambertiana*) and California black oak (*Quercus kellogii*).

 Urban or Developed: Developed urban land areas are characterized by built infrastructure and impermeable surfaces. Vegetated areas are landscaped. Developed areas include the paved corridors of E and W San Bernardino Ave as well as developed private lots. Often these developed areas are located adjacent to disturbed natural communities.

#### Wetlands

A Final Aquatic Resources Delineation Report was completed by NCE in August 2019 to identify the potential presence of wetlands and other jurisdictional waters. Based on the required wetland parameters, potential jurisdictional waters were identified within the Project area. The surveyed area of approximately 6.74 acres, delineated three unnamed drainages that are potentially jurisdictional waters of the United States due to the presence of ordinary highwater mark indicators and a connection to the Upper Truckee River. The Upper Truckee River which is a potentially jurisdictional waters of the United States due to the presence of ordinary high-water mark indicators and the Upper Truckee River is a tributary to Lake Tahoe. A final wetland determination has not been issued by the Corps of Engineers.

#### Federal Emergency Management Agency Floodplain



The Federal Emergency Management Agency (FEMA) has designated a floodplain associated with the Upper Truckee River. The floodplain designation is identified on FEMA Flood Insurance Rate Map:

 06017C0362E effective September 26, 2008.

The floodplains designated include:

- Zone AE: Areas of 100-year flood, including base flood elevations
- Zone X: Areas between limits of the 100-year and 500-year flood

A Draft Hydrologic Analysis Report prepared by the County in July 2019 identified the following flows and water surface elevations:

		Water
Return		Surface
Period	Peak Flow	Elevation
50-year	4072 cfs	6296.96 feet
100-year	8477 cfs	6297.55 feet

There are varying regulatory requirements for freeboard between the water surface elevation of the design flow and the bridge soffit elevation. The different requirements will be investigated as well as the freeboard during the preferred alternative phase of the Project. A goal of this Project is to minimize the impacts to the floodplain.

#### 1.2.7 Monitoring Information

A pre-construction photo inventory was completed and is included as Appendix B to this Report. The photographs were utilized to identify potential physical and environmental constraints and evaluate Project alternatives as discussed in Section 2 of this Report. A more detailed photo inventory will be conducted once the final alignment is determined.

#### **1.3 Hydrologic Conditions**

The Basin has been divided into 63 Watersheds, all of which drain into Lake Tahoe. The Project area falls within the largest watershed in the Basin, the Upper Truckee River (USGS Basin #73).

# 1.3.1 Watershed, Drainage Area and Sub-area Boundaries

Both the Upper Truckee River sub-basin (approximately 39.1 square miles) and the Chiapa sub-basin (approximately 0.36 square miles) are upstream from the proposed bridge location. The Upper Truckee River watershed is approximately 10 miles in length and 6.5 miles in width with a slightly elongated shape and a spur in the northwest region encompassing the Echo Lake drainage. In general, the basin consists of mountainous terrain within the unincorporated area of El Dorado County at elevation ranges from 6320 feet to 9590 feet. This basin is roughly aligned southnorth and east-west with an average slope of the watershed of approximately 8 percent.

The Chiapa tributary area is approximately 0.36 square miles upstream from the proposed bridge location. The watershed is

approximately 1.0 mile in length and 0.5 miles in width with an elongated southwestnortheast shape. In general, the basin consists of a sparsely developed neighborhood within mountain terrain located within the unincorporated areas of El Dorado County at elevation range from 6310 feet to 6690 feet. This basin is roughly aligned southwest-northeast with an average watershed slope of 7 percent.

#### 1.3.2 Storm Frequency

The County utilizes the 1995 County of El Dorado Drainage Manual<sup>vii</sup> (Drainage Manual) as a guidance document for hydrologic design within the Basin. The Drainage Manual requires utilizing the 100year storm event, which has the probability of occurrence of 0.01 in any given year, for drainage areas greater than 100 acres, to design drainage facility conveyance structures. All drainage facilities for areas less than 100 acres need to be designed to safely convey the 10-year event, probability of 0.10 in any given year, without the headwater depth exceeding the culvert barrel height.

The TRPA's Lake Tahoe Water Quality Management Plan<sup>viii</sup> (also known as the 208 Plan or WQMP) requires that the 10-yr, 24hr storm event be used to design stormwater conveyance facilities and the 50-year storm event be used when designing the conveyance facility through a Stream Environment Zone (SEZ).

The Lahontan Regional Water Quality Control Board (Lahontan) Basin Plan requires that the minimum "design storm" for storm water treatment facilities in the Basin is the 20-year, 1-hour storm event. Based on several reports completed by Lahontan, this event equates to approximately 1 inch of rainfall within 1 hour.

Based on various areal historical precipitation data within the Basin, the Drainage Manual requirements, the regulatory requirements mentioned, and the observed events, the hydrologic storm frequencies utilized for this Project design are as follows:

#### 10-year, 6 hour

Conveyance facilities for areas less than 100 acres and not in an SEZ. The 10-year, 6-hour storms tend to be associated with Fall/Spring frontal systems with resultant peak Spring snow melt.

#### 20-year, 1 hour

Conveyance facilities discharging to storm water treatment facilities for County right-ofway drainage tributary areas; storm water treatment capacity for County right-of-way drainage tributary areas for all impound/detention facilities. Typically, this event occurs in summer as localized thundershowers, or convective storm systems.

#### 100 – year, 24 hour

Conveyance within the County right-of-way; all outfall structures from impound/detention facilities which discharge through an SEZ, or directly to a tributary of Lake Tahoe, or Lake Tahoe; conveyance facilities for drainage areas greater than 100 acres within the County right-of-way; conveyance facilities downstream of the impound facilities for hydrologic wave control. Events in this category may be characterized as warm frontal systems producing a rain-onsnow event.





RAINFALL INTENSITY DURATION FREQUENCY CURVE



#### 1.3.3 Precipitation

The precipitation depth for the design storm frequency was obtained from the Drainage Manual. Based on the mean annual precipitation depth isohyetal maps, and the value of 34 inches for the Project area, the following precipitation depths were selected from the Rainfall Depth tables.

Design Storm	Rainfall Depth (inches)
10-year, 6-hour	2.2
20-year, 1-hour	1.0
100-year, 24-hour	6.4

#### 1.3.4 Hydrologic Method

The Rational Method will be used to calculate estimated peak flows within the Project area. The Rational Method was selected because the sub-basins within the Project area are less than one acre. This method is commonly used to determine peak flow when the watershed is small (less than 100 acres). Generally, the Rational Method is used when the watershed was less than one acre.

#### **1.4 Hydraulics Summary**

The hydraulic analysis consisted of two main portions, the cross drainage culverts and the proposed bridge structure hydraulics. Each is discussed below.

#### 1.4.1 Cross Drainage Hydraulics

There are no existing culverts within the proposed Project area other than the crossdrainage culverts under the existing roadways. The proposed shared use path will likely provide cross drainage culverts according to topographic features and vertical profile alignment of the path.

#### **1.5 Stormwater Quality**

The Lake Tahoe Watershed Assessment<sup>ix</sup>



provides a synthesis of water quality data and analysis with an emphasis on watershed sediment and nutrient loadings and their effects on Lake Tahoe. According to the

report, research has shown the onset of cultural eutrophication of oligotrophic Lake Tahoe, and a corresponding decline in the lake's exceptional clarity at the rate of approximately one foot per year. Research has also shown a fundamental shift in the limiting nutrient for biostimulation in Lake Tahoe from nitrogen to phosphorous.

#### **1.5.1 Priority Pollutants**

It has been shown that a large portion of the total phosphorous load is transported with sediment; therefore, current research and management efforts in the Basin focus on the management of watershed sediment and erosion control. The long-term average nutrient flux from watersheds in the Basin has been significantly related to disturbance and land use, leading to sediment and the associated nutrients being the primary pollutants of concern.



#### **1.5.2 Priority Pollutant Sources**

#### **Sediment Sources**

In general, land disturbance is a primary cause of elevated sediment supply. However, the effects of land disturbance on sediment supply are manifested in different ways and may result in changes in sediment supply that vary by orders of magnitude. Because sediment transport is an exponential function of drainage discharge, identification of increased sediment supply is clearly linked to drainage or stream flows. In addition, changes in hydrologic characteristics may initiate geomorphic changes in a project area or watershed that have the potential to modify land surface or channel characteristics, thereby increasing historical sediment supply by one or more orders of magnitude.

#### **Nutrient Sources**

The primary nutrients of concern with respect to Lake Tahoe clarity are phosphorous and nitrogen. Research over the past few decades has shown that primary productivity in Lake Tahoe is predominately phosphorous-limited. However, co-limitation by nitrogen and phosphorous still occurs, especially in summer months, so control of both nutrients is important. A nutrient-loading budget for Lake Tahoe indicates that atmospheric deposition, stream loading, direct runoff, and groundwater are major contributors of nutrients to Lake Tahoe. Most water quality improvement projects have little opportunity to affect atmospheric deposition. However, runoff from the Project area may contribute significantly to stream loading.

Total nutrient and sediment loads are related because a portion of the nutrient loads occur as particulates or adsorbed onto particulates. However, only a portion

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of the total nutrient loads may be in biologically available form. The biologically available fraction has the largest potential impact on water quality and is therefore of greatest concern in water quality projects. The atmosphere is the dominant global source of nitrogen as N<sub>2</sub>, while rock weathering is the dominant source of phosphorous. Both nutrients are recycled and retained within the biosphere at rates that are much higher than contributions from original sources. Their uptake, retention, and recycling, in biomass is highly sensitive to landscape disturbance. Mobilization due to disturbance causes a loss of nutrients from the local biological or physical system, and transport downstream in particulate and dissolved forms.

#### 1.5.3 Other Pollutant Sources

In addition to the priority pollutants described in Section 1.6.1 of this document, other potential pollutants have been identified based on Project area characteristics. These pollutants include typical materials used during construction such as oil and grease from equipment, vehicles, road base, concrete, and other construction materials. In order to mitigate the possibility of potential pollutants being discharged from the site, an aggressive Storm Water Pollution Prevention Plan (SWPPP) will be developed and implemented. The SWPPP will identify specific control measures to be implemented both during and after construction.

#### 1.5.4 Pollutant Transport Processes

In addition to the identification of pollutant sources as described in Sections 1.6.2 and 1.6.3 of this document, key pollutant transport processes must be considered in order to formulate and evaluate potential control strategies in subsequent project phases. For this Project, it is anticipated that the pollutant transport process will be closely linked to the hydrology, thus increasing the necessity of good stormwater management.

# 1.6 Project Opportunities and Constraints

#### **Opportunities**

With the completion of this Project, greater opportunities exist for improvement by implementing a continuous transportation/ recreation trail for bicyclists and pedestrians alike. The corridor for the proposed shared use path is also part of TRPA's *Linking Tahoe: Active Transportation Plan*, with the goals of providing access to local businesses, schools, and offices for bicyclists and pedestrians, reducing vehicular transportation, and enhancing recreational opportunities within the Basin.

One of the main opportunities of this Project in addition to providing recreational links is to provide traffic mitigation and potential air quality improvement. However, the Project will also aid in general water quality improvement by providing alternative transportation opportunities, thereby reducing vehicle emissions, and providing additional permanent vegetation to filter stormwater runoff.

#### Constraints

The Project faces several challenges, primarily in regard to the alignment of the proposed shared use path. Right-of-way issues, river crossing, and the presence of sensitive environmental resources each represent a consideration in determining the proposed alignment. For much of the alignment, the shared use path will likely be contained within the existing disturbed, compacted trail. However east of the Upper Truckee River, the alignment enters the Park. Therefore, this would require the need to acquire property or new easements.

The existing SEZ/floodplain areas near the river will need to be avoided as much as possible during the design of the proposed alignment. Any impact may involve mitigation at a 1.5:1 ratio and the SEZ areas require a 25-foot setback.

Finally, sensitive environmental resources in the Project area would necessitate avoidance where possible. Specifically, the locations of wetlands, existing vegetation and mature trees, and Waters of the US should be considered and avoided to the maximum extent practicable.

As the alignment approaches from the west, it will have to cross over the Upper Truckee River requiring the need for a bridge. Crossing the river presents a constraint, as the construction of the foundations will have to take into account the sensitive environment, scour potential of the river, as well as the potential lateral migration of the channel. In addition, to avoid any disturbance to the river itself, the bridge will have to span the entire width of the river without any intermediate supports. Additionally, when the option exists, the proposed alignment should be located in areas with a land capability of Class 5, rather than the more sensitive lands designated in the Project area as Class 1b due to potential erosion.

### 2.0 Formulating Alternatives

#### 2.1 Alignment Alternatives

The Meyers Area Plan and the Linking Tahoe: Active Transportation Plan identifies a Class 1 shared use path through this reach and a Class 3 (Bike Route) along W San Bernardino Ave and E San Bernardino Ave.

Three alignment alternatives were identified and evaluated for this Report. The alternatives discussed in this section only describe the Class 1 portion of the path. It is assumed the remaining portion of the Project will be a Class 3 along the existing roadway sections.

- Alternative 1 Most direct alignment following the existing disturbed, compacted trail.
- Alternative 2 Avoids the steel sheet pile, proposed alignment is downstream to avoid any conflicts.
- Alternative 3 Utilizes the sewer access road in the northerly direction and potentially avoids any floodplain impacts.

# ALT1 – Most direct alignment along the existing disturbed, compacted trail

Alignment 1 generally follows the existing disturbed trail beginning just east of W San Bernardino Ave.

#### Advantages

- Potentially less disturbance to mature vegetation and trees.
- □ Use of existing cleared trails.

 Connection to other recreation opportunities.

#### Disadvantages

- Elevations west of the river are much lower than the east side.
- Longer length of bridge.
- □ Impacts floodplain.

# ALT2 – River crossing downstream of the steel sheet pile

Alignment 2 is similar to Alternative 1 with a differing alignment and crossing point over the Upper Truckee River downstream of the existing steel sheet pile, to the paved parking lot at the Park.

#### Advantages

- □ Shortest path to cross the river.
- Minimal grading (west of the river) as the alignment follows existing access road.
- Eliminates potential conflict with utilities and the steel sheet pile.

#### Disadvantages

- Elevations west of the river are much lower than the east side.
- Longer length of bridge.
- □ Impacts floodplain.

# ALT3 – Follows the sewer line access road

Alignment 3 is longer alignment veering to the north along the utility access road and crosses the Park just south of the existing picnic area.

#### Advantages

Relative elevations of the river banks are equal on both sides, potentially reducing the length of bridge required to span the river.

#### Disadvantages

- Requires bank stabilization and work in the active river to remove log jam and debris field.
- Longer path length.
- Potential greater disturbance in environmentally sensitive areas.

#### 2.2 Roadway Alternatives

Due to funding constraints, a Class 3 (Bike Route) bicycle facility is proposed on County roadways of W San Bernardino Ave and E San Bernardino Ave. This also includes the parking lot area entering the Park from the west. Another alternative could be a Class 2 (Bike Lane); however, this alternative would most likely require a roadway widening, drainage improvements, and other roadway upgrades. Additionally, the Park parking lot, paved areas, and access road would require an extensive evaluation.

#### 2.3 Bridge Alternatives

The proposed shared use path would cross the Upper Truckee River via a new bridge. The bridge alternatives will follow the Basin standards.

The proposed shared use path bridge will be chosen after reviewing various bridge type options. The structure type will take into account that the bridge will need to be one simple clear span between the abutments. The bridge will be designed for the capacity of carrying pedestrian, bicycle, and standard HS-20 truck loads. The various alternatives have spans ranging in length from 100 feet to 250 feet. Pre-fabricated steel bridges carrying HS-20 truckloads typically have a maximum clear span of 170 feet.

The location of the shared use path bridge abutments will need to consider the sensitive environmental areas to minimize disturbance of wetlands, vegetation, and trees. The abutment foundations will likely be standard, friction or end bearing, driven concrete piles or steel H-section piles similar to those recently designed and constructed in the Basin.

There are varying regulatory requirements for freeboard between the water surface elevation of the design flow and the bridge soffit elevation from agencies such as the Bureau of Reclamation. The different requirements will be investigated as the Project progresses. Typical bridges are designed to take into account the 50-year design flood requirement of a two-foot minimum freeboard while the 100-year base flood requirement allows for no freeboard.



### 3.0 Summary

#### 3.1 Existing Conditions

This Report has sought to describe the existing conditions of the Project area in which a new bike path is proposed. These conditions include the following:

- Topography. In general, the topography of the Project area is relatively flat/level, with one area of the Project (just east of the subdivision limit at W San Bernardino Ave) having a slightly more pronounced grade relative to the proposed shared use path alignment.
- User Trail. An existing natural ground trail/path/access road is present along the sections west of the Upper Truckee River. The alternatives provided are proposed to follow this existing trail to minimize impact to existing land use.
- Soils. The Project area soils fall primarily within group A, signifying a moderate to low runoff potential.
- Land Use. It is expected that the proposed shared use path would be located within an existing disturbed, compacted area, and therefore the Project would likely not conflict with existing land uses in the area.
- Land Capability. The land within the Project area fits into land capability Classes 1b and 5, with the majority falling into Class 1b and therefore having a moderate to low potential for erosion. A land capability verification has not yet been completed by TRPA, however, preliminary research indicates SEZ areas in addition to the Upper

#### San Bernardino Class 1 Bike Trail Project Feasibility Report, September 2019

Truckee River within the Project area require a 25-foot setback.

- Land Ownership. As discussed in the Report, the shared use path would likely require utilizing public lands; the County will pursue the needed easements and permits for any affected parcels during the development of the preferred project alignment.
- Utilities. A South Tahoe Public Utility District (STPUD) waterline is a Project consideration in terms of shared use path alignment. The County will consult with STPUD should any planned improvements conflict with this feature.

#### • Environmental Resources.

Appropriate environmental inventories including, biological, wetland/Waters of the US and cultural, have been conducted and sensitive resources identified. For the most part, the proposed shared use path will avoid these resources. Where the resources cannot be avoided (e.g., possibly some vegetation and wetlands areas), potential impacts will be mitigated to the maximum extent feasible.

 Hydrology. Water quality improvements, utilizing low impact development principles, will be part of the Project.

#### 3.2 Formulating Alternatives

Three alignment alternatives were described and evaluated in this Report. In general, there is one proposed alignment alternative, with two separate locations where the proposed shared use path can make use of existing disturbed trails. By remaining close to the existing disturbed area, the proposed shared use path could avoid landscaping on private property and

close proximity to residential land. However, disadvantages include the potential loss of dense groves of mature trees, grade issues, and potential disturbance to existing drainages. Following the proposed alignment alternative would be advantageous in that the alignment would remain within the existing disturbed trail, there would potentially be fewer disturbances to mature vegetation and trees, and the proposed shared use path could make use of existing cleared trails.

Currently, there are three possible alternatives for the proposed bridge over the Upper Truckee River, just west of Tahoe Paradise Park. The complexity of the design and constructability arises from the sensitive environment as well as various site constraints. In considering the alternatives, the design of the proposed bridge will need to account for overall bridge length for cost considerations, existing floodplain, vegetation, and trees.
# 4.0 References

### 4.1 References

<sup>1</sup> Storm Water Quality Improvement Committee, Lake Tahoe Basin Storm Water Quality Improvement Committee (SWQIC), Formulating and Evaluating Alternatives for Water Quality Improvement Projects, July 2004.

<sup>ii</sup> County of El Dorado, *Meyers Area Plan*, March 2018, page 3-5.

<sup>III</sup> Tahoe Regional Planning Agency and Tahoe Metropolitan Planning Organization, *Linking Tahoe: Active Transportation Plan*, March 2016, page 4-45.

<sup>iv</sup> United States Department of Agriculture, Natural Resources Conservation Service. 2007. *Soil Survey of the Tahoe Basin Area, California and Nevada*. Accessible online at: http://soils.usda.gov/survey/printed\_surveys/.

<sup>v</sup> Corestone Engineering, Inc. 2019. Geotechnical Investigation San Bernardino Class 1 Bike Trail Project, El Dorado County, California.

<sup>vi</sup> Meyers Area Plan, page 1-1.

<sup>vii</sup> County of El Dorado, *Drainage Manual*, March 1995, Section 2.

<sup>viii</sup> Tahoe Regional Planning Agency, *Lake Tahoe Water Quality Management Plan*, June 2013, page 20.

<sup>ix</sup> United States Department of Agriculture, Forest Service. 2000. *Lake Tahoe Watershed Assessment*. <u>Appendix A</u>

HYDROLOGY AND HYDRAULICS



# COUNTY OF EL DORADO DEPARTMENT OF TRANSPORTATION

# INTEROFFICE MEMORANDUM

Date: July 18, 2019

To: File

From: Daniel Kikkert, PE

## Subject: San Bernardino Class 1 Bike Trail Project crossing at Upper Truckee River Drainage Design Report, County Project 95117 (36107017)

### 1. Introduction

### 1.1. General

The San Bernardino Class 1 Bike Trail project area lies in El Dorado County, California, within the boundaries of the Tahoe Paradise Subdivision 28, extending from the end of West San Bernardino Ave towards Tahoe Paradise Park. This phase of the Project focuses on construction of approximately 0.37 miles of Class 1 shared use path between the east end of West San Bernardino Ave and Tahoe Paradise Park and a Class 3 bike route between Tahoe Paradise Park and Apache Ave. The Project is located in the southern section of the Lake Tahoe Basin in Sections 30 and 31 of Township 12 North, Range 18 East, Mount Diablo Meridian. The Project is bordered by the North Upper Truckee Road on the west, Washoe Meadows State Parks on the north, U.S. Highway 50 (US 50) on the south and Apache Avenue on the east. The total Project area is approximately 10.0 acres and encompasses County Right of Way (ROW), Tahoe Paradise Park, and United States Forest Service (USFS) parcels. (see Figure 1). The proposed San Bernardino Class 1 Bike Trail Project is a project funded through the Surface Transportation Block Grant (STBG), Congestion Mitigation Air Quality (CMAQ), and Tahoe Regional Planning Agency (TRPA) Air Quality Mitigation funds.

The Project builds upon the Meyers Bikeway and provides a critical link to the bicycle network between the neighborhoods on North Upper Truckee Road, Tahoe Paradise Parks and Recreation District, the Lake Tahoe Environmental Science Magnet School, and the community of Meyers. The Project supports the *Linking Tahoe: Active Transportation Plan*, approved by the Tahoe Metropolitan Planning Organization in March 2016 and the *Meyers Area Plan*, approved in March 2018. The Project proposes to install a shared use path bridge over the Upper Truckee River just west of Tahoe Paradise Park and link the bike lane facilities from the west along North Upper Truckee Rd and Apache Ave to the east.

## 1.2. Purpose

The purpose of this drainage analysis is to develop 10-year, 25-year, 50-year, 100-year and 500-year peak flows to provide a hydraulic evaluation for the proposed bridge location. This report is intended to detail and document the hydrologic parameters and assumptions used to forecast the

flows applicable to design the bridge at the Upper Truckee River. The report also summarizes the potential scour condition for the proposed bridge location.



Figure 1: San Bernardino Class 1 Bike Trail Project Crossing Locations (USGS, 1973 South Lake Tahoe Quadrangle Map)

## 2. Background

The drainage analysis is necessary to ensure that the proposed bridge will meet the specific design standards provided by El Dorado County, Department of Transportation (DOT) and California Department of Transportation (Caltrans). DOT does not provide specific freeboard design criteria. However, the County has a practice of designing freeboard based on Caltrans Highway Design Manual. The proposed bridge design will satisfy the following standards:

- 1. County of El Dorado Drainage Manual, dated March 1995<sup>1</sup>
- 2. Caltrans Local Assistance Procedure Manual, Chapter 11, dated July 23, 2006<sup>2</sup>
  - The basic rule for hydraulic design of bridges is that they should be designed to pass the two percent (2%) probability flood or tide ( $Q_{50}$ ) or the flood-of-record, whichever is greater without causing objectionable backwater, excessive flow velocities, or encroaching on through traffic lanes. Sufficient freeboard, the vertical clearance between the lowest structural member, and the water surface elevation of the design flood should be provided. A minimum freeboard of 2 feet is often assumed for preliminary bridge design.
  - The final design should be able to convey the base flood, Q100.
  - The minimum design flood for foundation analysis should be the base flood (Q100). Bridges with scourable beds should withstand the effects of the base flood (Q100) without failure.
- 3. Caltrans Highway Design Manual dated December 2018<sup>3</sup>
  - The basic rule for the hydraulic design of bridges is that they should pass a 2% probability flood (50-year).
  - Freeboard, vertical clearance between the lowest structural member and the water surface elevation of the design flood, sufficient to accommodate the effects of the bedload and debris should be provided. Alternatively, a waterway area sufficient to pass the 1 percent probability flood without freeboard should be provided. Two feet of freeboard is often assumed for preliminary bridge design.

## 3. Previous Studies and Reference Documents

The County completed a Draft Feasibility Report for the crossing of the Upper Truckee River in December 2018. The USGS has been operating a stream gauge (103366092) at the US 50 crossing from 1990 to present day<sup>4</sup>. A frequency curve was developed using the recorded peak flows from this gauge site (Appendix C).

According to Federal Emergency Management Agency (FEMA) maps 06017C0632E dated September 2008 for the US 50 crossing, the proposed bridge and boardwalk locations carry flood zone designations<sup>5</sup>. The 100 year base flood elevations (adjusted down 4 feet to match the survey vertical datum) is approximately 6297 feet near the proposed bike path crossing.

## 4. Hydrology

## 4.1. Basin Characteristics

Both the Upper Truckee River sub-basin (approximately 39.1 square miles) and the Chiapa subbasin (approximately 0.36 square miles) are upstream from the proposed bridge location. The Upper Truckee River watershed is approximately 10 miles in length and 6.5 miles in width with a slightly elongated shape and a spur in the northwest region encompassing the Echo Lake drainage. In general, the basin consists of mountainous terrain within the unincorporated area of

El Dorado County at elevation ranges from 6320 feet to 9590 feet. This basin is roughly aligned south-north and east-west with an average slope of the watershed of approximately 8 percent (see Figure 2).

The Chiapa tributary area is approximately 0.36 square miles upstream from the proposed bridge location. The watershed is approximately 1.0 mile in length and 0.5 miles in width with an elongated southwest-northeast shape. In general, the basin consists of a sparsely developed neighborhood within mountain terrain located within the unincorporated areas of El Dorado County at elevation range from 6310 feet to 6690 feet. This basin is roughly aligned southwest-northeast with an average watershed slope of 7 percent (see Figure 2).

### 4.2. Soil Characteristics

Corestone Engineering, Inc. completed a geotechnical report with soil borings located near the proposed Upper Truckee River crossing<sup>6</sup>. Soil borings were completed in May of 2019. The soils profile throughout the site typically consists of surficial silty to poorly graded sand with some gravel through 5 feet depth below existing ground surface and through a slightly deeper horizon (12.5 feet) near the Upper Truckee River. Beneath the gravelly soils are silt or very fine silty sand soils from about 5 to 10 feet beneath the ground surface. The underlying soils consist of fine to medium silty sand through the maximum depth of exploration, 41.5 feet beneath the existing ground surface.

### 4.3. Groundwater

Within the alignment, groundwater was encountered in each boring at variable depths of approximately 1.5 to 7 feet below the existing ground surface. The depth to groundwater generally becomes shallower towards the Upper Truckee River, and near the river the groundwater matched the river water level.

### 4.4. Climate

The average temperatures in the vicinity of the project are approximately 80°F in August and approximately 18°F in winter. The winter storm season typically extends from November to April, and storms generally moves from west to south-west and travels in a northeasterly to easterly direction.

### 4.5. Rainfall Data

Generally, the project area receives precipitation during winter months. Precipitation data used for model input was obtained from the County of El Dorado Drainage Manual. The Mean Annual Precipitation (MAP) for the project vicinity of the Upper Truckee River crossing for the Chiapa watershed is 38 inches, and for the Upper Truckee River watershed is 45 inches.

### 4.6. Time of Concentration

Time of concentration estimations were performed per the County of El Dorado Drainage Manual. Sheet flow is assumed to occur for maximum length of 300 ft and sheet flow travel time is calculated based on the following equation:

$$T_t = \frac{0.007(nL)^{0.08}}{(P_2)^{0.5} S^{0.4}}$$

Where:

 $T_t$  = sheet flow travel time, in hr

n = overland-flow roughness coefficient, 0.4 was chosen for this project L = length of overland flow surface, in ft (maximum 300 ft.)  $P_2 = 2$ -yr, 24-hr rainfall depth in inches S = land slope, in ft/ft.

The velocity of shallow flow over an unpaved surface is estimated based on the following equation:

 $V = 16.1345(\sqrt{S_o})$ Where, V = shallow-concentrated flow velocity, in ft/sec; S<sub>o</sub> = slope, in ft/ft.

Shallow Concentrated Flow travel time is the flow path length divided by the velocity.

The USGS regression equation was used to estimate the 2-year event flow<sup>7</sup>. The 2-year event flow was used to calculate the velocity. The channel flow travel time is the channel length divided by the flow velocity.

Total time of concentration was computed as the sum of the sheet flow travel time, the shallow flow travel time and the channel flow travel time. A summary of the resulting time of concentration values for the Chiapa sub-basin is listed in Table 1. Appendix A provides details of each time of concentrations. The measured data from the USGS gauge was used for the Upper Truckee River sub-basin in place of modeled data.

### 5. Hydrologic Model Development

Mean Annual Precipitation data was obtained from the County of El Dorado Drainage Manual dated March 14, 1995 (see appendix A) which then was utilized with the USACOE HEC-HMS Program Version 4.2 dated August, 2016<sup>8</sup> to develop a hydrologic model for the Upper Truckee River crossing tributary watersheds. The hydrologic model upstream of the bridge was divided into two sub-basins. Figure 2 shows the Upper Truckee River sub-basin and Chiapa sub-basin delineations for the proposed bridge.

### 5.1. Hydrologic Parameters

Appendix A provides the HMS model diagram and Mean Annual Precipitation for the entire watershed. Also included in Appendix A are the 24 hour precipitation, sheet and shallow concentrated flow travel time, channel flow travel time, and total time of concentration. Parameters used in the hydrologic model were based on concept of the Soil Conservation Service (SCS) Curve Number (CN) method. A unit hydrograph (UH), based on SCS type 1A temporal distribution consistent with the County of El Dorado Drainage Manual was used to simulate the runoff of excess precipitation. Guidelines given in the Drainage Manual recommend using type 1A temporal distribution for projects located at an elevation above 1640 ft in elevation.

The design model storms were based on 24-hour duration for a 10-year, 25-year, 50-year, 100-year and 500-year storm frequency using:

• Precipitation depth and hydrologic parameters provided by the County of El Dorado Drainage Manual, See Appendix A.

Table 1 summarizes the input parameters used for the HEC-HMS hydrologic modeling, including curve number, conveyance and rainfall.



Figure 2: Upper Truckee River Sub-basin and Chiapa Sub-basin Delineations

Parameters	Upper Truckee Crossing						
Sub-basin	Upper Truckee River	Chiapa					
Watershed Area (mi <sup>2</sup> )	39.1	0.36					
Loss Rate	-	SCS CN					
Transform method	Log Pearson	SCS UH					
Loss Rates							
Initial Abstraction (in)	-	5.14					
Curve Number	-	28					
Impervious Area (%)	-	6.39					
Transformation							
Graph Type	-	Standard					
Time of Concentration (min)	-	43.5					
Lag Time (min)	-	26.1					
Precipitation							
Hydrograph Duration	-	24 hour					
Temporal Distribution	-	Type 1A					
Mean Annual Precipitation (in)	-	38					
500-year precipitation (in/day)	-	8.19					
100-year precipitation (in/day)	-	6.94					
50-year precipitation (in/day)	-	6.36					
25-year precipitation (in/day)	-	5.76					
10-year precipitation (in/day)	-	4.91					

#### Table 1: Hydrologic Model Summary Parameters for shared use bridge at Upper Truckee

### 5.2. Land Use/Hydrologic Soil Type/Curve Number

Land use was determined using the Natural Resource Conservation Service (NRCS) web soil survey which indicates that the watershed partially consists of steep mountainsides, areas of less steep land that occur in riparian corridors, and meadows along with residential areas in the less steep land. The majority of the soils are Meeks gravelly and loamy coarse sand, Celio loamy coarse sand, and Tahoe complex. Weighted SCS curve numbers were used in the model and chosen from "runoff curve numbers for other agricultural lands". Appendix A provides the Chiapa watershed hydrologic soil group data.

#### 5.3. Peak Discharges

Peak discharges were analyzed using HEC-HMS. Appendix B provides the peak flow hydrographs developed from the HEC-HMS models for 10-year, 25-year, 50-year, 100-year and 500-year peak flows. A combination of peak flows from HEC-HMS and from a frequency analysis of the US 50 USGS gauge data were combined to generate peak flows for input into the HEC-RAS model. Using the combined flows is a conservative approach with the assumption that peak flows from both the gauged watershed (Upper Truckee River Sub-basin) and the modeled watershed (Chiapa Sub-basin) arrived concurrently. Table 2 lists the HEC-HMS peak discharge data based on hydrologic model parameters listed in Table 1.

Upper Truckee River Crossing												
HEC-HMS	Sub-basin	Cumulative	10-yr	25-yr	50-yr	100-yr	500-yr					
Node	Area	Sub-basin	Peak	Peak	Peak	Peak Flow	Peak Flow					
Location	( <b>mi</b> <sup>2</sup> )	Area (mi <sup>2</sup> )	Flow (cfs)	Flow (cfs)	Flow (cfs)	(cfs)	(cfs)					
US 50 Gauge <sup>1</sup>	39.1		2104	3123	4054	5149	8453					
Chiapa	0.36		14.1	16.5	18.2	19.9	23.5					
New Bridge <sup>2</sup>		39.86	2118.1	3139.5	4072.2	5168.9	8476.5					

#### Table 2: Hydrograph Analysis Summary of Results

1. USGS Gauge 1033666092

2. Flows at new bridge crossing were based on modeled peak flows for Chiapa combined with gauge flows at US 50.

### 5.4. Model Reasonableness

There is a stream gauge at the US 50 bridge above the proposed bridge crossing where data has been recorded from 1990 to present day. During this time, the maximum observed peak flow reached 5120 cfs on January 2, 1997. A flood frequency curve for the data available from the US 50 Bridge (Upper Truckee River Gauge) can be found in Appendix C. The frequency curve was generated from this data set using PeakFQ software, version 7.2, developed by the United States Geological Survey<sup>9</sup>. As a conservative approach the results from PeakFQ were added to the peak flows generated from the HEC-HMS model, at the specified recurrence intervals, to solve for peak flows at the new bridge crossing.

### 6. Hydraulic Model Development

The hydraulic model was extended approximately 1725 feet upstream (Station 36+75.89) and 1109 feet downstream (Station 10+46.49) of the proposed bridge location (Station 21+51.73). A steady-flow model was developed using HEC-RAS version  $5.0.3^{10}$ . Five water surface profiles, corresponding to 10-year, 25-year, 50-year, 100-year and 500-year peak discharges were developed.

### 6.1. Stream Channel Geometry Development

Cross section and alignment used for hydraulic modeling were derived using AutoCAD<sup>11</sup> surface data based on topographic surveys performed by the DOT. The terrain model was augmented with the Airborne Lidar data collected in partnership by the Bureau of Land Management, United States Geological Survey, and Tahoe Regional Planning Agency in August 2010. For each stream reach, four sets of data were used to develop HEC-RAS geometry: 1) stream centerline, 2) cross section cut lines, 3) lines representing left and right banks, and 4) flow paths. Cross sections were developed for the proposed project locations upstream and downstream of the bridge.

### 6.2. Bridge Modeling

Bridge scenarios were modeled using AutoCAD cross sections for computation of energy losses. Table 3 summarizes the proposed bridge dimensions used in the HEC-RAS model.

	U					
Upper	HEC-RAS	Possible Bridge	Total	<mark>No of</mark>	Low Chord	Approx. Angle of Attack
Truckee	River	Waterway (ft)	<mark>Bridge</mark>	<b>Piers</b>	Elevation (ft)	Against the Abutment (deg)
River	<b>Station</b>		<mark>Width</mark>			
Bridge			(ft)			
Crossing						
Proposed	<mark>202+80</mark>	<mark>105</mark>	<mark>12</mark>	<mark>20</mark>	<mark>6253.33</mark>	<mark>75</mark>

#### Table 3: Existing and Proposed Bridge Parameters

Proposed construction includes wing walls connecting into the interior corners of the bridge abutments, see drawing included in Appendix D.

### 6.3. Boundary Condition

Steady flow boundary condition was used for proposed bridge to represent the general channel hydraulics. For existing and proposed conditions normal depth was used and normal depth slope of 0.0044 ft/ft for the Upper Truckee River crossing was utilized for all profiles based on existing ground conditions.

### 6.4. Losses

Selection of an appropriate value for Manning's n is very significant to the accuracy of the computed water surface profiles. The value of Manning's n is highly variable and depends on a number of factors including: surface roughness, vegetation, channel irregularities, channel alignment, scour and deposition, obstruction, sizes and shape of the channel, stage and discharge, seasonal changes, temperature, suspended materials, and bedload.

The most important factors that affect that selection of the channel n values are: 1) the type and size of the materials that compose the bed and banks of a channel, and 2) the shape of the channel. Manning's n values were estimated by analyzing existing land and site visits of the study area. The estimated roughness coefficients utilized for the Upper Truckee River and overbank reaches for this report are summarized in Table 4.

Reach	East Overbank n	Channel n	West Overbank n
Upper Truckee Entire Study Reach-Existing Condition	0.055	0.04	0.055

In general, contraction and expansion coefficients used are 0.1 and 0.3, respectively. For the typical bridge section contraction and expansion coefficients used are 0.3 and 0.5 respectively.

## 6.5. Ineffective Flow Location

The ineffective area option for the proposed bridge was used to keep all the active flow in the area of the existing creek channel.

## 7. Bridge Hydraulic Analysis

Two hydraulic model scenarios were developed to evaluate the Upper Truckee River crossing hydrology study area. These scenarios represent the existing and proposed condition. Each condition has unique geometry and hydraulic circumstances.

- Scenario 1: Existing No Bridge Hydraulic Model for Scenario 1 represents the Upper Truckee River with no shared use trail bridge crossing the Upper Truckee River.
- Scenario 2: Proposed Bridge- Hydraulic Model for Scenario 2 represents the proposed bridge at or close to the proposed bridge location for the Upper Truckee River.

## 8. Hydraulic Model Results

## <mark>8.1. General</mark>

The summary of HEC-RAS output table is included in Appendix F.

### 8.2. Hydraulic Findings

Table 5 summarizes the hydraulic model results.

#### Table 5: Summary of the Results at the Bridge Location.

Profile	Peak	WSE	U/S Velocity	Freeboard Requirement
	Flow (cfs)		(ft/s)	
10-year Existing	2118.0	6295.31	7.25	-
10-year Proposed				
50-year Existing	4072.0	6296.96	6.24	-
50-year Proposed				
100-year Existing	5169.0	6297.55	6.30	-
100-year Proposed				

Upper Truckee River Crossing (STA 21+51.73), low chord at 6255.00

U/S = upstream

#### **Existing condition for the Upper Truckee River**

The cross section provided in Appendix D from hydraulic modeling indicates that the 100-year and 50-year event water surfaces are 6297.55 feet and 6296.96 feet, respectively.

### Proposed condition for the Upper Truckee River Bridge

The cross section provided in Appendix E-2 from hydraulic modeling indicates that the 100-year and 50-year event water surfaces are 6250.15 feet and 6249.83 feet, respectively. To maintain minimum of 2 ft freeboard for design flood (50-year event), the low chord elevation of the bridge shall be located at or above an elevation of 6251.83 ft. But the proposed preliminary design has shown that the low chord elevation will be set at an approximate elevation of 6253.33 ft (high chord estimated at 6355.33 feet).

### 9. Scour Analysis

#### 9.1. General

Flow velocities at the bridge location were reviewed for the purpose of determining scour potential. The minimum design standard for bridge scour is the base flood (100-year event). Bridge foundations were evaluated to ensure that they will not fail due to scour resulting from the occurrence of a 500-year flood. Scour analysis has been performed using the methodology described in Hydraulic Engineering Circular No 18, Evaluating Scour at Bridge (April 2012)<sup>12</sup>.

Scour is the result of the erosive action of flowing water, excavating and carrying away materials from the bed and the bank of the stream and from around the piers and abutments of the bridges. The most common cause of the bridge failure is scouring of bed materials around bridge foundations. It should be noted that scour rates are dependent on the particular materials found adjacent to foundations. Loose granular soils are prone to rapid erosion by flowing water, while cohesive or cemented soils are more scour resistant.

### 9.2. Scour Analysis Methodology

No geologic hazards have been identified at the Upper Truckee River Bridge site. As mentioned before, the proposed Upper Truckee River bridge site consists of 8 feet of silty sand and poorly graded sand underlying dense silty sand, sandy silt, and clayey silt. No bedrock was encountered during the boring performed at the Upper Truckee River Bridge site.

A preliminary scour analysis has been computed using the hydraulic model developed and available soil data. Particle size distribution test was completed by Crawford. Crawford approximates the value of mean size fraction of the bed material ( $D_{50}$ ) to be 0.15 mm for a bed sample within 2' of the ground surface taken from Upper Truckee River at the proposed bridge crossing location.

#### 9.3. Long Term Aggradation and Degradation

Long-term aggradation and degradation may be the result of natural or anthropogenic forces. The streambed may be aggrading, degrading, or in relative equilibrium in the vicinity of the bridge crossing. No long term degradation and aggradation data is available at the Upper Truckee River bridge location. Therefore long term aggradation and degradation is assumed to be negligible.

#### 9.4. Contraction Scour

Contraction scour occurs when the flow area of the stream is reduced by natural features or by constructed features, such as a bridge. The HEC-RAS program offer options to either manually input one these forms of contraction or to select the default option where the program automatically determines the form of contraction to be used based on critical velocities and mean flow velocities in the channel and overbanks.

As stated before, a value of 0.15 mm was assigned for  $D_{50}$  (creek channel) and water temperature was assumed to be 50°F. Contraction scour was computed for the 100-year and scour evaluated for the 500-year flood event. Results of the contraction scour are presented in Table 6.

	100-year Flood										
Parameters	South Overbank	<b>Channel</b>	North Overbank								
Contraction Scour											
Scour Depth Ys (ft)	<mark>0.00</mark>	<mark>2.19</mark>	<mark>0.00</mark>								
Critical Velocity (ft/s)											
Equation		Live .									

#### Table 6: Summary of Contraction Scour at the Proposed Bridge

#### 9.5. Local Scour

Local scour consists of pier and abutment scour. Potential local scour for the proposed boardwalk piers and at the bridge abutment is a concern. Scour occurs when the abutment and the embankment obstruct the flow.

Abutment scour was computed by Froehilich's equation. The user is required to enter the abutment type and skew angles. The program selects values for all of the other variables based on the hydraulic output and the default settings. The results of the abutment scour are presented in Table 7.

Table 7: Summary of Local Scour at the Proposed Bridge

	100-year Flood								
Parameters	West Overbank	East Overbank							
Scour Depth Y <sub>s</sub> (ft)	<mark>16.11</mark>	<mark>19.82</mark>							
$Q_e/A_e = V_e$	<mark>5.85</mark>	<mark>4.61</mark>							
Froude Number	<mark>0.49</mark>	0.42							
Equation	<b>Froehlich</b>	<b>Froehlich</b>							

#### 9.6. Total Scour

Total scour is the combination of long-term elevation changes (aggradation and degradation), contraction scour, and local scour at each individual pier and abutment location. Since long term bed elevation changes and contraction scour were assumed to be negligible, total scour was computed as the local scour. The total scour of the proposed bridge is presented in Table 8. Figure 3 represents the total scour at the proposed bridge location.

### Table 8: Summary of \*Total Scour at the Proposed Bridge

	100-year Flood											
Parameters	South Overbank	<mark>Channel</mark>	North Overbank									
Total Scour Depth (ft)	<mark>18.43</mark>	<mark>22.14</mark>	<mark>22.14</mark>									

\*Total scour does not consider other type of soil or metamorphic rock & competent rock present in the field and the type of foundations that are being proposed. Scour should not occur below the elevation of the competent rock.

Potential total scour is in the range of 18 to 23 feet for the east abutment based on assumed sample which is erodible course gravel. Total scour resulting form 500-year flood is approximately 26 feet for erodible course gravel. Assumed soil does not represent fractured metamorphic rock, fresh rock or bedrock. Due to soil sample location total scour shown in Table 8 is not reasonable and is overly conservative.

Because of the possible scour on Upper Truckee River during extreme event, rip-rap or artificial armor is recommended for both abutments protection as applicable. Based on the upstream velocity from the proposed bridge location and the maximum rip-rap placement slope 1.5:1, the size of the designed rock is 60 lb (Class No. 2) or equivalent consistent to the Caltrans Highway Design Manual and USACOE EM 1110-2-1601<sup>13</sup>. If Rock Slope Protection (RSP) is chosen it is recommended that the designed rocks shall be placed by method B per Caltrans Standard Specifications<sup>14</sup>.



#### 10. Conclusion

To satisfy Caltrans hydraulic design requirements for 50-year peak flows, it is advised to follow the recommendations below. Table 9 summarizes the recommendations based on Caltrans and the County of El Dorado design criteria.

• The proposed bridge shall be able to pass the two percent (2%) probability flood or tide (Q <sub>50</sub> ) or the flood-of-record, whichever is greater without causing objectionable backwater, excessive flow velocities, or encroaching on through traffic lanes. Sufficient freeboard, the vertical clearance between the lowest structural member, and the water surface elevation of the design flood should be provided. A minimum freeboard of 2 feet is often assumed	<ul> <li>To meet the minimum requirement of 2 ft freeboard for 50-year event flood, the low chord elevation of the proposed bridge is recommended to be set at or above an elevation of 6253.00. Banks and abutments shall be protected with 60 lb rip-rap, method B placement considering low turbulence condition.</li> <li>The foundations of the bridge will be set to a sufficient depth or to competent rock in order to ensure scour protection and stability.</li> <li>Foundation type should be consistent to the Construction Consideration section of the Construction Report</li> </ul>
surface elevation of the design flood should be provided. A minimum	• Foundation type should be consistent to the <i>Construction Consideration</i> section of the
freeboard of 2 feet is often assumed for preliminary bridge design.	<ul> <li>Geotechnical Report.</li> <li>The transitions between proposed bridge section and adjacent sections, both downstream and upstream of the bridge, shall be smooth to prevent turbulent flows.</li> </ul>

#### Table 9: Recommendations

## Appendix A: HEC-HMS Model Parameters

## Appendix B: HEC-HMS Results

Appendix C: Flood Frequency Curve For US 50 Bridge

Appendix D: Summary of HEC-RAS Output (Existing)

### 11. References

- <sup>9</sup> USGS (March 2018), PeakFQ Annual Flood-Frequency Analysis Using Bulleting 17B Guidelines. Version 7.2.
- <sup>10</sup> USACOE(September 2016), Hydrologic Engineering Center-River Analysis System version 5.03

<sup>11</sup> AutoCAD (2017) Civil3D

- <sup>12</sup> FHWA (April 2012), Evaluating Scour at Bridges, Fifth Edition
- <sup>13</sup> USACOE (30 June 1994), Engineer Manual 1110-2-1601, Hydraulic Design of Flood Control Channels.
- <sup>14</sup> Caltrans (2015), Standard Specifications

<sup>&</sup>lt;sup>1</sup> County of El Dorado (March 1995), Drainage Manual

<sup>&</sup>lt;sup>2</sup> Caltrans (July 2006), Local Assistance Procedure Manual Sixth Edition, Page 11-18 and 11-19

<sup>&</sup>lt;sup>3</sup> Caltrans (December 2018), Highway Design Manual Sixth Edition, Page 820-2

<sup>&</sup>lt;sup>4</sup> https://waterdata.usgs.gov/ca/nwis/inventory/?site\_no=103366092&agency\_cd=USGS

<sup>&</sup>lt;sup>5</sup> FEMA Flood Control Maps. Available at https://msc.fema.gov/portal/home

<sup>&</sup>lt;sup>6</sup> Geotechnical Investigation. San Bernardino Class I Bike Path, El Dorado County, CA (June 28, 2019). Corestone Engineering, Inc.

<sup>&</sup>lt;sup>7</sup> USGS, <u>http://water.usgs.gov/software/NFF/manual/ca/index.html</u> retrieved on 2/22/19

<sup>&</sup>lt;sup>8</sup> USACOE (August 2016), Hydrologic Engineering Center-Hydrologic Modeling System version 4.2

Appendix A

**HEC-HMS Parameters** 



# Table A-1 Depth Duration Frequency (2008 Goodridge Tables)

	2 YR	10 YR	25 YR	50 YR	100 YR	500 YR
MAP	1 day	1 day	1 day	1 day	1 day	1 day
30	2.44	3.88	4.55	5.02	5.48	6.47
35	2.85	4.52	5.3	5.86	6.39	7.54
38	3.10	4.91	5.76	6.36	6.94	8.19
40	3.26	5.17	6.06	6.70	7.31	8.62
45	3.67	5.81	6.82	6.82 7.53 8.22		9.7
50	4.07	6.46	7.58	8.37	9.13	10.78

# 24 Hour SCS Storm Type 1A

Chiapa Sub-basin: Average MAP 38"

Upper Truckee River Sub-basin: Average MAP 45"

_	Overland Sheet Flow					Shallow Unpaved				Channel Flow <sup>2</sup>						Total Time (min)					
Sub watershed	Sheet Flow Length	P2 (in) <sup>1</sup>	Slope (%)	n	Tt (min)	Paved (Y,N)	Length	High Elev (ft)	Low Elev (ft)	Slope (%)	Velocity ft/s)	Tt (min)	Legnth (ft)	Desc.	R (ft)	Slope (%)	n	V (ft/s)	Tt (min)	Tc (min) <sup>1</sup>	Lag Time (min)
CHIAPA <sup>2</sup>	300	3.1	18.4%	0.4	21.6	n	29475					15.8								43.4	26.1

1. Plus 6 minutes per TR-55 for watersheds

2. Shallow unpaved travel time based on multiple lengths at differing slopes as follows:

	Length	High	Low	Slope	Velocity	Tt(min)
n	2284	6633.83	6300.86	14.58%	6.16	6.2
n	833	6320.86	6313.99	0.80%	1.44	9.6

Average Mean Annual Precipitation (MAP) for watersheds, in inches per year:

CHIAPA 38" per year

 Table 2-2c
 Runoff curve numbers for other agricultural lands 1/

Cover description	Hydrologic	Curve numbers for hydrologic soil group			
Cover type	condition	А	В	С	D
Pasture, grassland, or range—continuous	Poor	68	79	86	89
forage for grazing. $\frac{2}{}$	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush	Poor	48	67	77	83
the major element. 3/	Fair	35	56	70	77
	Good	30 4/	48	65	73
Woods—grass combination (orchard	Poor	57	73	82	86
or tree farm). 5/	Fair	43	65	76	82
	Good	32	58	72	79
Woods. 6/	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 4∕	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	_	59	74	82	86

<sup>1</sup> Average runoff condition, and  $I_a = 0.2S$ .

<sup>2</sup> Poor: <50%) ground cover or heavily grazed with no mulch. Fair: 50 to 75% ground cover and not heavily grazed.

*Good:* > 75% ground cover and lightly or only occasionally grazed.

<sup>3</sup> *Poor*: <50% ground cover.

Fair: 50 to 75% ground cover.

Good: >75% ground cover.

 $^4$   $\,$  Actual curve number is less than 30; use CN = 30 for runoff computations.

<sup>5</sup> CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

<sup>6</sup> *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning. *Fair:* Woods are grazed but not burned, and some forest litter covers the soil. *Good:* Woods are protected from grazing, and litter and brush adequately cover the soil.

Assumed Woods, Good for all watersheds. Soil type A-D is based on results of the 2008 NRCS Soil Survey for the Tahoe Basin

	ID	Description	%	Area of Coverage	Area of WS
95117					
Α					
	41	Roads_Impervious	5%	452237	9905226
	1001	SFR_Impervious	2%	181031	9905226
			6%	633269	

	Soil Type	CN:	%	Wt CN	Area of Soil Type	Area of WS
95117						
Α						
	7042	30	10%	3	971769	9905226
	7431	30	21%	6	2111530	9905226
	7462	30	7%	2	697500	9905226
	7481	30	2%	0	160971	9905226
	7482	30	35%	11	3487972	9905226
	7484	30	6%	2	619013	9905226
	7487	30	10%	3	1017118	9905226
	7488	30	2%	1	232895	9905226
			94%	28	9298768	

Appendix B

**HEC- HMS Results** 



# Project: SB\_EWS\_A Simulation Run: 010 yr 24 hr 38 in

Start of Run:01Jul2020, 12:00Basin Model:SB-Q10End of Run:03Jul2020, 00:00Meteorologic Model:10 YR 24 HCompute Time: DATA CHANGED, RECOMPUTE Control Specifications:24 Hour

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
USGS 103366092	39.5	2104.000	01Jul2020, 12:00	6259.835
BRIDGE	39.86	2118.078	01Jul2020, 20:15	6265.859

# Project: SB\_EWS\_A Simulation Run: 025 yr 24 hr 38 in

Start of Run:01Jul2020, 12:00Basin Model:SB-Q25End of Run:03Jul2020, 00:00Meteorologic Model:25 YR 24 HCompute Time: DATA CHANGED, RECOMPUTEControl Specifications:24 Hour

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
USGS 103366092	39.5	3123.000	01Jul2020, 12:00	9291.570
BRIDGE	39.86	3139.504	01Jul2020, 20:15	9298.889
				-

# Project: SB\_EWS\_A Simulation Run: 050 yr 24 hr 38 in

Start of Run:01Jul2020, 12:00Basin Model:SB-Q50End of Run:03Jul2020, 00:00Meteorologic Model:50 YR 24 HCompute Time: DATA CHANGED, RECOMPUTE Control Specifications:24 Hour

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
USGS 103366092	39.5	4054.000	01Jul2020, 12:00	12061.488
BRIDGE	39.86	4072.247	01Jul2020, 20:15	12070.291
				-

# Project: SB\_EWS\_A Simulation Run: 100 yr 24 hr 38 in

Start of Run:01Jul2020, 12:00Basin Model:SB-Q100End of Run:03Jul2020, 00:00Meteorologic Model:100 YR 24 HCompute Time:DATA CHANGED, RECOMPUTEControl Specifications:24 Hour

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
USGS 103366092	39.5	5149.000	01Jul2020, 12:00	15319.339
BRIDGE	39.86	5168.904	01Jul2020, 20:15	15329.971

# Project: SB\_EWS\_A Simulation Run: 500 yr 24 hr 38 in

Start of Run:01Jul2020, 12:00Basin Model:SB-Q500End of Run:03Jul2020, 00:00Meteorologic Model:500 YR 24 HCompute Time:DATA CHANGED, RECOMPUTEControl Specifications:24 Hour

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
USGS 103366092	39.5	8453.000	01Jul2020, 12:00	25149.422
BRIDGE	39.86	8476.477	01Jul2020, 20:15	25165.263



Junction North Upper Truckee Bridge Crossing - 10 YR RUN



# Junction North Upper Truckee Bridge Crossing - 25 YR RUN



Junction North Upper Truckee Bridge Crossing - 50 YR RUN





Junction North Upper Truckee Bridge Crossing - 500 YR RUN

USGS 103366092 RUN:500 YR 24 HR 38 IN FLOW
Appendix C Flood Frequency Curve USGS Station 103366092



USGS 103366092 UPPER TRUCKEE RV AT HWY 50 ABV MEYERS, CA



#### PEAKDATA\_103366092. PRT

Program PeakFq U. S. GEOLOGI CAL SURVEY Seq. 002. 000 Version 7.2 Run Date / Time Annual peak flow frequency analysis 3/28/2018 06/14/2019 14:53 --- PROCESSING OPTIONS ---Plot option = Graphics device Basin char output Print option = None = Yes Debug print = No Input peaks listing = Long Input peaks format = WATSTORE peak file Input files used: peaks (ascii) -\\CDAData5\TD-SLT-Engineering\PR0JECTS\95117 - San Bernardi no\Agenci es\USGS\PEAKDATA\_103366092. TXT specifications -\\CDAData5\TD-SLT-Engineering\PR0JECTS\95117 - San Bernardi no\Agenci es\ŬSGS\PKFQWPSF. TMP Output file(s): main - \\CDAData5\TD-SLT-Engineering\PROJECTS\95117 -San Bernardi no\Agenci es\USGS\PEAKDATA\_103366092. PRT

\*\*\* User responsible for assessment and interpretation of the following analysis  $\ ^{***}$ 

1

1

Program PeakFq	U. S. GEOLOGI CAL SURVEY	Seq. 001. 001
Version 7.2	Annual peak flow frequency analysis	Run Date / Time
3/28/2018		06/14/2019
14: 53		

Station - 103366092 UPPER TRUCKEE RV AT HWY 50 ABV MEYERS, CA

#### TABLE 1 - INPUT DATA SUMMARY

Number of peaks in record	=	27	
Peaks not used in analysis	=	0	
Gaged peaks in analysis	=	27	
Historic peaks in analysis	=	0	
Beginning Year	=	1991	
Ending Year	=	2017	
Historical Period Length	=	27	
Skew option	=	REGI ONAL	
Regional skew	=	0. 197	
Standard error	=	0.550	
Mean Square error	=	0.303	
Gage base discharge	=	0.0	
User supplied high outlier threshol	d =		
User supplied PILF (LO) criterion	=		
Plotting position parameter	=	0.00	
Type of analysis		FMA	
PLLF (10) Test Method		MGBT	
Perceptible Ranges:			
Start Year End Year Lower Bo	und	Upper Bound	
1991 2017	0 0	INF	DEEAULT
2017	0.0	1 101	DEIMOLI

Interval Data

=

TABLE 2 - DIAGNOSTIC MESSAGE AND PILF RESULTS

\*WCF151I-17B WEIGHTED SKEW REPLACED BY USER OPTION. 0.352 0.197 1 \*\*WCF233W-EXPECTED PROB OUT OF RANGE AT TAB PROB. 0.00000 0.00000 WCF002J-CALCS COMPLETED. RETURN CODE = 2 EMA002W-CONFIDENCE INTERVALS ARE NOT EXACT IF HISTORIC PERIOD > 0

MULTIPLE GRUBBS-BECK TEST RESULTSMULTIPLE GRUBBS-BECK PILF THRESHOLDN/ANUMBER OF PILFS IDENTIFIED0

Kendall's Tau Parameters

	TAU	P-VALUE	MEDI AN SLOPE	No. of PEAKS
GAGED PEAKS	-0. 060	0. 677	-9.000	27

1

Program PeakFq	U. S. GEOLOGICAL SURVEY	Seq. 001. 002
Version 7.2	Annual peak flow frequency analysis	Run Date / Time
3/28/2018		06/14/2019
14: 53		

Station - 103366092 UPPER TRUCKEE RV AT HWY 50 ABV MEYERS, CA

TABLE 3 - ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

LOGARI THMI C

	MEAN	STANDARD DEVI ATI ON	SKEW
EMA WITHOUT REG SKEW	2. 8908	0. 3324	0. 468
EMA WITH REG SKEW	2. 8908	0. 3324	0. 197

EMA ESTIMATE OF MSE OF SKEW WITHOUT REG SKEW0. 2262EMA ESTIMATE OF MSE OF SKEW W/GAGED PEAKS ONLY (AT-SITE)0. 2262

TABLE 4 - ANNUAL FREQUENCY CURVE -- DI SCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL	<- EMA ES	TIMATE ->	<- FOR EMA EST	IMATE WITH	REG SKEW ->
EXCEEDANCE	WITH	WI THOUT	LOG VARIANCE	<-CONFIDEN	CE LIMITS->
PROBABI LI TY	REG SKEW	REG SKEW	OF EST.	5% LOWER	95% UPPER
0. 9950	124.8	151.5	0. 0264	36.4	213.1
0. 9900	146.5	171.1	0. 0195	50.8	233.3
0.9500	230.8	246.5	0.0087	118.4	325.3
0. 9000	296.8	305.4	0.0062	180. 7	409.6
0.8000	405.8	403.8	0.0049	280.8	555.7

PEAKDATA_103366092. PRT					
0. 6667	548.2	534.6	0.0046	395.0	749.9
0.5000	758.3	732.7	0.0047	550.2	1051.0
0. 4292	869.8	840. 2	0.0048	630.9	1220. 0
0.2000	1468.	1446.	0. 0061	1054.0	2285.0
0. 1000	2104.	2137.	0.0087	1469.0	3919.0
0.0400	3123.	3331.	0. 0146	2058.0	8398.0
0. 0200	4054.	4504.	0. 0213	2525.0	15590.0
0.0100	5149.	5971.	0.0300	3009.0	26600.0
0.0050	6429.	7795.	0.0408	3509.0	42760.0
0.0020	8453.	10890.	0. 0584	4188.0	79690.0

\*Note: If Station Skew option is selected then EMA ESTIMATE WITH REG SKEW will display values for and be equal to EMA ESTIMATE WITHOUT REG SKEW.

1

Program PeakFq	U. S. GEOLOGI CAL SURVEY	Seq. 001. 003
Veršion 7.2	Annual peak flow frequency analysis	Run Date / Time
3/28/2018		06/14/2019
14: 53		

Station - 103366092 UPPER TRUCKEE RV AT HWY 50 ABV MEYERS, CA

## TABLE 5 - INPUT DATA LISTING

	PEAK	PEAKFQ	FLOW INTERVA	LS (WHERE LO	WER BOUND	NOT = UPPER
YEAR	VALUE	CODES	LOWER BOUND	UPPER BOUND	REMARKS	
1991	511.0					
1992	289.0					
1993	1600. 0					
1994	268.0					
1995	1230. 0					
1996	2320.0					
1997	5120.0					
1998	853.0					
1999	1230. 0					
2000	830. 0					
2001	352.0					
2002	486.0					
2003	799.0					
2004	447.0					
2005	1440. 0					
2006	2010. 0					
2007	319.0					
2008	571.0					
2009	603.0					
2010	1120. 0					
2011	1650. 0					
2012	603.0					
2013	517.0					
2014	218.0					
2015	548.0					
2016	499.0					
2017	2090.0					

Explanation of peak discharge qualification codes

PeakFQ	NWI S	
CODE	CODE	DEFINITION

PEAKDATA\_103366092. PRT Dam failure, non-recurrent flow anomaly Discharge greater than stated value Both of the above D 3 8 G Х 3+8 L Discharge less than stated value 4 Known effect of regulation or urbanization Κ 6 OR C Н Historic peak 7 Minus-flagged discharge -- Not used in computation \_ -8888.0 -- No discharge value given Minus-flagged water year -- Historic peak used in computation Program PeakFq U. S. GEOLOGI CAL SURVEY Seq. 001. 004

Versi on 7. 2 Annual peak flow frequency analysis Run Date / Time 3/28/2018 06/14/2019 14: 53

Station - 103366092 UPPER TRUCKEE RV AT HWY 50 ABV MEYERS, CA

TABLE 6 - EMPIRICAL FREQUENCY CURVES -- HIRSCH-STEDINGER PLOTTING POSITIONS

RANKED	EMA	FLOW INTERVALS (WHERE LOWER BOUND NOT =
D)		
DI SCHARGE	ESTIMATE	LOWER BOUND UPPER BOUND
5120. 0	0. 0356	
2320. 0	0. 0713	
2090. 0	0. 1070	
2010. 0	0. 1427	
1650. 0	0. 1785	
1600. 0	0. 2142	
1440.0	0.2499	
1230.0	0.3214	
1230.0	0.2856	
1120.0	0.3571	
853.0	0.3928	
830.0	0. 4285	
799.0	0.4643	
603.0	0.5357	
603.0	0.5000	
571.0	0.5715	
548.0	0.6072	
517.0	0.6429	
511.0	0.6786	
499.0	0.7144	
486.0	0.7501	
447.0	0. 7858	
352.0	0.8215	
319.0	0.8573	
289.0	0.8930	
268.0	0. 9287	
218.0	0.9644	
	RANKED D) DI SCHARGE 5120. 0 2320. 0 2090. 0 2010. 0 1650. 0 1600. 0 1440. 0 1230. 0 1230. 0 1230. 0 1230. 0 1230. 0 1230. 0 513. 0 853. 0 830. 0 799. 0 603. 0 571. 0 548. 0 517. 0 511. 0 499. 0 486. 0 447. 0 352. 0 319. 0 289. 0 268. 0 218. 0	$\begin{array}{c ccccc} {\sf RANKED} & {\sf EMA} \\ {\sf D}) \\ {\sf DI} & {\sf SCHARGE} & {\sf ESTIMATE} \\ 5120.0 & 0.0356 \\ 2320.0 & 0.0713 \\ 2090.0 & 0.1070 \\ 2010.0 & 0.1427 \\ 1650.0 & 0.1427 \\ 1650.0 & 0.2142 \\ 1440.0 & 0.2499 \\ 1230.0 & 0.3214 \\ 1230.0 & 0.3214 \\ 1230.0 & 0.3571 \\ 853.0 & 0.3928 \\ 830.0 & 0.4285 \\ 799.0 & 0.4643 \\ 603.0 & 0.5357 \\ 603.0 & 0.5357 \\ 603.0 & 0.5000 \\ 571.0 & 0.5715 \\ 548.0 & 0.6072 \\ 517.0 & 0.6429 \\ 511.0 & 0.6786 \\ 499.0 & 0.7144 \\ 486.0 & 0.7501 \\ 447.0 & 0.7858 \\ 352.0 & 0.8215 \\ 319.0 & 0.8573 \\ 289.0 & 0.8930 \\ 268.0 & 0.9287 \\ 218.0 & 0.9644 \\ \end{array}$

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Program PeakFq	U. S. GEOLOGICAL SURVEY	Seq. 001. 005
Version 7.2	Annual peak flow frequency analysis	Run Date / Time
3/28/2018		06/14/2019
14: 53		

Station - 103366092 UPPER TRUCKEE RV AT HWY 50 ABV MEYERS, CA

## PEAKDATA\_103366092. PRT

## TABLE 7 - EMA REPRESENTATION OF DATA

><	FINAL	>				
WATER	< OBSERV	ED><-	EMA	><-	PERCEPTI BLE	RANGES -><-
YEAR	Q_LOWER	Q_UPPER	Q_LOWER	Q_UPPER	LOWER	UPPER
1991	511. 0	511.0	511.0	511.0	0.0	INF
1992	289. 0	289.0	289.0	289.0	0.0	INF
1993	1600. 0	1600. 0	1600. 0	1600.0	0.0	INF
1994	268.0	268.0	268.0	268.0	0.0	INF
1995	1230. 0	1230.0	1230. 0	1230. 0	0.0	INF
1996	2320. 0	2320.0	2320.0	2320.0	0.0	INF
1997	5120.0	5120.0	5120.0	5120.0	0.0	INF
1998	853.0	853.0	853.0	853.0	0.0	INF
1999	1230. 0	1230.0	1230. 0	1230. 0	0.0	INF
2000	830. 0	830.0	830.0	830.0	0.0	INF
2001	352.0	352.0	352.0	352.0	0.0	INF
2002	486. 0	486.0	486.0	486.0	0.0	INF
2003	799.0	799.0	799.0	799.0	0.0	INF
2004	447.0	447.0	447.0	447.0	0.0	INF
2005	1440. 0	1440.0	1440.0	1440. 0	0.0	INF
2006	2010.0	2010. 0	2010. 0	2010. 0	0.0	INF
2007	319.0 0 INF	319.0	319.0	319.0	0.0	INF
2008	571.0 D INF	571.0	571.0	571.0	0.0	INF
2009	603.0 D INF	603.0	603.0	603.0	0.0	INF
2010 0. 0	1120.0 D INF	1120. 0	1120. 0	1120. 0	0.0	INF
2011	1650. 0 0 INF	1650. 0	1650. 0	1650. 0	0.0	INF
2012 0. 0	603.0 D INF	603.0	603.0	603.0	0.0	INF
2013 0. 0	517.0 D INF	517.0	517.0	517.0	0.0	INF
2014 0. 0	218.0	218.0	218.0	218.0	0.0	INF
2015 0. (	548. 0 ) INF	548.0	548.0	548.0	0.0	INF
2016 0. (	499. 0 ) INF	499. 0	499.0	499.0	0.0	INF
2017 0. (	2090. 0 ) INF	2090. 0	2090.0	2090.0	0.0	INF
1						

### <---- USER-ENTERED

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#### PEAKDATA\_103366092. PRT

End PeakFQ analysis.		
Stations processed	:	1
Number of errors	:	0
Stations skipped	:	0
Station years	:	27

Data records may have been ignored for the stations listed below. (Card type must be Y, Z, N, H, I, 2, 3, 4, or \*.) (2, 4, and \* records are ignored.)

For the station below, the following records were ignored:

FINISHED PROCESSING STATION: 103366092 USGS UPPER TRUCKEE RV AT HWY 50 AB

For the station below, the following records were ignored:

FINISHED PROCESSING STATION:

Appendix D

**Upper Truckee River HEC-RAS Results** 

# UPPER TRUCKEE RIVER SECTIONS




























































































HEC-RAS Plan: SB UT	STEADY FLOW	River: UPPER TRUCKEE RI	Reach: Upper Truckee Ri

Image Transmin         Image Transmin <thimage th="" transmin<="">         Image Tr</thimage>	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
Ubber Lander         Ubber Lander<				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Description         Description <thdescription< th=""> <thdescription< th=""></thdescription<></thdescription<>	Upper Truckee Ri	3875.89	Q 10	2118.00	6296.65	6301.95		6302.20	0.002685	4.21	588.41	286.05	0.41
Number Norma	Upper Truckee Ri	3875.89	0.50	4072.00	6296.65	6303.54		6303.18	0.002102	4.37	1146.47	405 32	0.38
Under Trussen         WS-50         690.70         6	Upper Truckee Ri	3875.89	Q 100	5169.00	6296.65	6304.16		6304.46	0.001967	4.94	1404.31	416.08	0.38
Unit         NT6.82         0         D	Upper Truckee Ri	3875.89	Q 500	8476.00	6296.65	6305.78		6306.13	0.001842	5.55	2245.57	617.81	0.38
Diper Trans.         Diver         1         20022         4.46         47.60         47.70         <													
Upper Tracker 6:         2708.20         0.25         918.00         000.21         000.22         0.00027         0.00027         0.000         000.00         0.000         0.00007         0.00007         0.00007         0.0000         0.00007         0.0000         0.00007         0.0000         0.0000         0.00007         0.0000         0.0000         0.0000         0.00007         0.0000         0.0000         0.0000         0.00007         0.00000         0.000000         0.000000         0.000000         0.000000         0.000000<	Upper Truckee Ri	3706.62	Q 10	2118.00	6294.29	6301.39		6301.71	0.003235	4.56	467.80	160.67	0.45
Uber         Transen         UNAGE         0 bit         497/20         Color         <	Upper Truckee Ri	3706.62	Q 25	3140.00	6294.29	6302.41		6302.77	0.002985	4.93	702.77	317.01	0.44
Unper Transart         1994 20         10.0         518 00         0010 00	Upper Truckee Ri	3706.62	Q 50	4072.00	6294.29	6303.03		6303.43	0.002827	5.27	926.05	397.09	0.44
Obsert Tuckes R         Oxida L	Upper Truckee Ri	3706.62	Q 100	5169.00	6294.29	6303.71		6304.12	0.002515	5.43	1208.85	431.65	0.42
Deper         Depart         Depart </td <td>Upper Truckee RI</td> <td>3706.62</td> <td>Q 500</td> <td>8476.00</td> <td>6294.29</td> <td>6305.46</td> <td></td> <td>6305.85</td> <td>0.001977</td> <td>5.70</td> <td>2073.87</td> <td>606.53</td> <td>0.39</td>	Upper Truckee RI	3706.62	Q 500	8476.00	6294.29	6305.46		6305.85	0.001977	5.70	2073.87	606.53	0.39
Upper Truckes R         Match E         O        O	Upper Truckee Ri	3635.16	Q 10	2118.00	6294.24	6301.26		6301.48	0.002515	3.71	570.16	200.17	0.39
Upger Truckes R1         9581 fs         969         9902 80         9900 80         9902 80         9902 80	Upper Truckee Ri	3635.16	Q 25	3140.00	6294.24	6302.30		6302.52	0.002804	3.84	818.29	297.42	0.41
Upper Tuckes R         SK516         0 100         9590.00         9594.24         SK03.64         SK03.67         OLT         111.3         OLT           Upper Tuckes R         SK01.6         0 00         244.24         SK03.64         SK03.64         0 00         21.00         0.00172         44.10         0.020         0.0017           Upper Tuckes R         SK01.6         0 00         900.00         SK01.6         0 00         0.0000         4.12         97.06         0.0017         4.33         4.33         0.33           Upper Tuckes R         SK01.6         0 00         900.0         SK01.6         0 00         0.0000         4.12         97.06         0.0000         0.00000         4.13         0.0000         0.0000         4.14         0.0000         0.0000         4.14         0.00000         0.00000         4.14         0.00000         0.00000         1.12         7.75         0.00000         0.00000         1.12         0.000000         1.12         0.000000         1.12         0.000000         1.12         0.000000         1.12         0.000000         1.12         0.000000         1.12         0.000000         1.12         0.0000000         1.12         0.0000000         1.12         0.00000000         <	Upper Truckee Ri	3635.16	Q 50	4072.00	6294.24	6302.95		6303.20	0.002378	4.00	1019.16	307.94	0.39
Upger Truckes R         3605.16         0         0         0         0.00172         4.7         1785.14         0.041           Upger Truckes R         300.11         0.10         21118.0         6204.0         6200.0         6201.19         6.0002         6401.19         6.0002         6401.19         6.0002         6401.19         6.0002         6401.19         6.0002         6401.19         6.0002         6401.19         6.0002         6401.19         6.0002         6401.19         6.0002         6401.19         6.0002         6401.19         6.0002         6401.19         6.0002         6401.19         6.0002         6401.19         6.0002         6401.19         6.0002         6401.19         6.0002         6401.19         6.0002         6441.10         611.40         6401.19         6.0002         6.001.19 </td <td>Upper Truckee Ri</td> <td>3635.16</td> <td>Q 100</td> <td>5169.00</td> <td>6294.24</td> <td>6303.64</td> <td></td> <td>6303.92</td> <td>0.002067</td> <td>4.19</td> <td>1232.36</td> <td>311.33</td> <td>0.37</td>	Upper Truckee Ri	3635.16	Q 100	5169.00	6294.24	6303.64		6303.92	0.002067	4.19	1232.36	311.33	0.37
Upper Truckee R         S205.19         0.10         2118.00         C694.44         630.10         6300.20         6401.10         0.00264         4.44         572.10         150.00         0.01           Upper Truckee R         S205.18         0.23         344.00         C594.04         6301.30         6502.20         0.000264         4.44         572.15         0.04           Upper Truckee R         S205.18         0.20         644.44         0.02240         6.44         1410.20         289.22         0.44           Upper Truckee R         S205.18         0.10         C71.01         5.60         0.000718         5.60         954.88         144.15         0.44           Upper Truckee R         944.62         0.25         477.00         C524.51         600.13         600.050         0.00550         6.00         954.81         144.5         0.44         140.20         289.43         0.00         0.00550         6.00         954.81         142.3         0.00         0.00550         0.00550         6.00         140.20         289.43         0.00         0.00550         0.00498         142.3         0.00         0.00550         199.44         199.44         199.44         199.44         199.44         199.44         19	Upper Truckee Ri	3635.16	Q 500	8476.00	6294.24	6305.36		6305.71	0.001722	4.77	1795.14	384.34	0.36
Upger Tuckee R         Stol: 16         O <tho< th="">         O         O         O</tho<>													
Olgen Truckee R         Socia II         Outon         Columb A	Upper Truckee Ri	3526.18	Q 10	2118.00	6294.04	6300.92		6301.19	0.002684	4.14	512.16	159.99	0.41
Olden         Disclere         Disclere <thdisclere< th=""> <thdisclere< th=""> <thd< td=""><td>Upper Truckee Ri</td><td>3526.18</td><td>Q 25</td><td>3140.00</td><td>6294.04</td><td>6301.89</td><td></td><td>6302.20</td><td>0.003026</td><td>4.48</td><td>700.98</td><td>212.93</td><td>0.44</td></thd<></thdisclere<></thdisclere<>	Upper Truckee Ri	3526.18	Q 25	3140.00	6294.04	6301.89		6302.20	0.003026	4.48	700.98	212.93	0.44
Opper Truckee R         2021 19         200         9470 00         C294.06         COURS 46         COURS 46 <thcours 46<="" th="">         &lt;</thcours>	Upper Truckee Ri	3526.18	Q 30	5169.00	6294.04	6302.00		6303.64	0.002841	4.03	042.01	217.05	0.43
Apper Trucker R         Add 42         O         Display         Display <thdisplay< th=""> <t< td=""><td>Upper Truckee Ri</td><td>3526.18</td><td>Q 500</td><td>8476.00</td><td>6294.04</td><td>6304.86</td><td></td><td>6305.45</td><td>0.002863</td><td>6.14</td><td>1410.20</td><td>368.23</td><td>0.44</td></t<></thdisplay<>	Upper Truckee Ri	3526.18	Q 500	8476.00	6294.04	6304.86		6305.45	0.002863	6.14	1410.20	368.23	0.44
Upper Tuckee R         3444.22         0 10         2118.00         6224.51         530.30         650.83         0.007196         6.80         394.89         144.15         0.64           Upper Tuckee R         3444.22         0.50         4224.51         530.18         6502.56         0.00560         7.12         722.45         174.30         0.62         116.82         116.82         116.82         116.82         116.82         0.62         116.82         116.82         116.82         116.82         116.82         0.62         116.83         116.92         116.92         116.92         116.92         116.92         116.92         116.92         116.92         116.92         116.92         116.92         116.92         116.92         116.92         116				20.00		223				04		2 30.20	00
Upger Tuckker Ri         3444.62         Q.25         3140.00         G204.51         G201.26         G201.26 <thg201.26< th=""></thg201.26<>	Upper Truckee Ri	3444.62	Q 10	2118.00	6294.51	6300.30		6300.83	0.007198	5.80	364.89	144.15	0.64
Upger Tuckee Ri         3444.82         Q 50         4472.00         629.451         S001.89         600.05500         7.12         772.84         177.83         Q 772.84         Q 772.00         Q 782.85         Q 772.00 <td>Upper Truckee Ri</td> <td>3444.62</td> <td>Q 25</td> <td>3140.00</td> <td>6294.51</td> <td>6301.26</td> <td></td> <td>6301.84</td> <td>0.005875</td> <td>6.09</td> <td>515.61</td> <td>162.74</td> <td>0.60</td>	Upper Truckee Ri	3444.62	Q 25	3140.00	6294.51	6301.26		6301.84	0.005875	6.09	515.61	162.74	0.60
Upper Truckere Ri         3444.82         O 100         6199.00         6294.51         SS02.51         GS03.00         O005100         8.66         P1.2         7.22         7.24         7.14         7.12         7.22         7.24         7.14	Upper Truckee Ri	3444.62	Q 50	4072.00	6294.51	6301.89		6302.56	0.005620	6.57	619.82	168.82	0.60
Upper Truckee R         3444.62         0 500         687.0         687.0         683.08         630.08         6.005.05         8.66         988.77         245.15         0.07           Upper Truckee R         3350.87         0 10         2118.00         6244.25         6300.79         6300.13         0.00552         5.47         387.08         132.33         0.66           Upper Truckee R         3350.87         0 50         647.00         6244.25         6300.14         6332.26         0.004477         66.0         67.41         118.24         0.67           Upper Truckee R         3350.87         0 50         6244.25         6300.16         6302.75         0.004477         66.0         67.41         118.24         0.67           Upper Truckee R         3267.3         0 10         215.00         6244.25         6300.00         6300.45         0.004471         6.7         319.82         122.17         0.05         117.22         117.26         0.72.21         172.26         117.27         248.7         248.7         248.7         248.7         248.7         248.7         248.7         248.7         248.7         248.7         248.7         248.7         248.7         248.7         248.7         248.7         248.7	Upper Truckee Ri	3444.62	Q 100	5169.00	6294.51	6302.51		6303.30	0.005600	7.12	726.34	174.93	0.62
Upper Truckee R         3850.87         Q 10         218.00         6294.25         6290.77         6530.23         0.005522         5.47         387.08         132.33         0.58           Upper Truckee R         3850.87         Q 65         477         C65         0.00486         6.27         C643.13         0.005522         5.47         C65.01         0.04766         6.27         C654.14         0.00486         6.27         C654.14         0.00486         6.27         C656.14         0.057         C656.14         0.0475         C658.14         0.0475         C658.14         0.0475         C658.14         0.0475         C658.14         0.0475         C658.14         0.05085         7.3         D50.04         D70.0         C658.14         C600.00         C630.75         0.004711         C6.7         238.7         0.05         C658.14         C600.00         C630.75         0.00555         7.3         C5.0         C5.77         C6.6         C630.14         C630.14         C630.16         C530.28         0.00565         C7.3         C52.04         C629.10         C630.28         0.002456         C5.0         C7.7         C62.14         C630.16         C530.28         0.005245         C6.1         C630.28         C630.29         C630.29	Upper Truckee Ri	3444.62	Q 500	8476.00	6294.51	6303.89		6305.06	0.006150	8.66	988.57	245.15	0.67
Oper Trucker R         Oper Tr	Lipper Truckee Ri	3350.87	0.10	2118.00	6204 25	6200 77		6300.23	0.005262	5 47	387.08	132 33	0.56
Upper Trucker B:         339.07         Q.50         4072.00         6294.25         6.50.465         6.20         67.41         191.26         0.07           Upper Trucker B:         3390.87         Q.500         2476.00         6294.25         6303.55         6304.50         0.004776         6.66         79.10         1197.98         396.94         0.56           Upper Trucker B:         3267.3         Q.10         211.80.0         6294.22         6303.55         6304.50         0.004711         6.76         731.01         1197.98         396.94         0.56           Upper Trucker B:         3267.3         Q.50         4072.00         6294.28         6309.05         6501.58         0.00585         7.33         6329.99         223.61         0.67           Upper Trucker B:         3267.3         Q.500         2674.28         6303.14         6304.10         0.00585         7.33         632.99         223.81         0.630           Upper Trucker B:         3198.85         Q.10         211.80.0         6293.39         6300.05         6302.40         0.005324         4.06         0.83         1.46.0         0.402         0.402         0.402         0.402         0.402         0.402         0.402         0.402         0	Upper Truckee Ri	3350.87	Q 25	3140.00	6294.25	6300.79		6301.31	0.005082	5.77	543.91	167.27	0.56
Upper Truckee RI         3330.87         Q 100         516.00         6294.25         6302.10         5302.79         0.004717         6.68         781.00         196.24         0.077           Upper Truckee RI         3303.07         Q 100         2118.00         6294.25         6303.65         6304.65         0.004355         731         1197.98         335.94         0.007411         6.75         1192.92         112.17         0.684         0.07411         6.75         1192.92         112.17         0.684         0.07411         6.75         1192.92         122.17         0.684         0.07411         6.75         1192.92         122.17         0.684         0.07411         6.75         1192.92         122.17         0.684         0.07411         6.75         1192.92         123.17         0.684         0.075         0.0731         0.279         0.00411         7.22         472.80         118.79         0.0533         0.0231         0.0533         0.0231         0.00535         7.51         1192.97         0.041         0.041         0.041         0.041         0.041         0.041         0.041         0.041         0.041         0.041         0.041         0.041         0.041         0.041         0.041         0.041         0.041	Upper Truckee Ri	3350.87	Q 50	4072.00	6294.25	6301.45		6302.05	0.004886	6.20	657.41	181.26	0.57
Upper Truckee Ri         335.07         Q 500         674.00         6294.25         630.55         C 524.95         620.955         7.91         1197.98         39.54         0.09           Upper Truckee Ri         3267.3         Q 10         2118.00         6294.26         6298.96         6299.69         0.00911         7.72         77.28         77.21         77.28         77.21         77.28         77.21         77.28         77.21         77.28         77.21         77.28         77.21         77.28         77.21         77.28         77.21         77.28         77.28         77.28         77.31         782.97         288.27         0.001         6501.56         6500.40         6.00141         0.004596         8.56         131.84         466.49         0.60           Upper Truckee Ri         3188.56         Q 50         477.00         6283.38         600.07         6300.39         0.002245         4.66         663.22         1.60         6293.30         0.00246         6.46         666.20         2.27.7         0.42           Upper Truckee Ri         3188.56         Q 10         2118.00         6293.37         6300.40         6301.20         0.00246         6.41         149.72         423.42         0.00246         6.	Upper Truckee Ri	3350.87	Q 100	5169.00	6294.25	6302.10		6302.79	0.004717	6.68	781.00	196.24	0.57
Upper Truckee Ri         3267.3         0 10         2118.00         6224.28         62296.99         0.007411         6.75         319.92         122.17         0.08           Upper Truckee Ri         3267.3         0 25         3140.00         6224.28         6300.00         6500.79         0.009811         7.22         472.40         187.64         0.67           Upper Truckee Ri         3267.3         0 500         5610.00         6230.31         6300.41         0.009519         7.51         826.77         228.27         0.61           Upper Truckee Ri         3198.85         0 10         2118.00         6239.39         6299.05         6299.30         0.002243         4.05         523.34         148.60         0.38           Upper Truckee Ri         3198.85         0 10         5160.00         623.38         6300.35         6301.22         0.00243         4.60         6.85         148.60         0.43           Upper Truckee Ri         3198.85         0 50         4470.00         623.34         6301.55         6303.37         0.002747         6.61         1459.72         7.042           Upper Truckee Ri         3149.97         0 10         2118.00         6233.47         6298.88         6299.18         0.002717 <td>Upper Truckee Ri</td> <td>3350.87</td> <td>Q 500</td> <td>8476.00</td> <td>6294.25</td> <td>6303.55</td> <td></td> <td>6304.50</td> <td>0.004585</td> <td>7.91</td> <td>1197.98</td> <td>395.94</td> <td>0.59</td>	Upper Truckee Ri	3350.87	Q 500	8476.00	6294.25	6303.55		6304.50	0.004585	7.91	1197.98	395.94	0.59
Upper Truckee Ri 3267.3 0 10 2118.00 6294.28 6298.99 6299.69 0.007411 6.75 319.82 122.17 0.68 Upper Truckee Ri 3267.3 0 50 4072.00 6294.28 6300.00 6301.58 0.009411 7.22 472.40 187.64 0.67 Upper Truckee Ri 3267.3 0 50 4072.00 6294.28 6300.00 6301.58 0.005855 7.33 632.99 223.61 0.63 Upper Truckee Ri 3267.3 0 50 8470.00 6294.28 6303.16 6302.28 0.005169 7.51 826.77 228 27.061 0.63 Upper Truckee Ri 3198.85 0 10 2118.00 6293.39 6290.05 6299.30 0.002243 4.05 53.34 148.60 0.038 Upper Truckee Ri 3198.85 0 50 4072.00 6293.39 6300.39 6300.70 6500.39 0.002243 4.05 53.34 148.60 0.38 Upper Truckee Ri 3198.85 0 50 4072.00 6293.39 6500.55 650.222 7.042 Upper Truckee Ri 3198.85 0 50 4470.20 6293.39 6500.55 650.222 7.042 Upper Truckee Ri 3198.85 0 50 8476.00 6293.39 6500.55 6502.22 7.042 Upper Truckee Ri 3198.85 0 50 8476.00 6293.39 6500.55 6502.22 7.042 Upper Truckee Ri 3198.85 0 50 8476.00 6293.39 6500.55 6502.22 7.042 Upper Truckee Ri 3198.85 0 50 8476.00 6293.39 6500.52 600.2671 6.514 469.72 483.62 0.46 Upper Truckee Ri 3149.97 0 10 2118.00 6293.47 6298.88 6200.22 7.042 0.002450 5.49 995.60 222.70 0.42 Upper Truckee Ri 3149.97 0 10 2118.00 6293.47 6298.88 6200.22 7.042 0.002450 5.49 995.60 222.70 0.42 Upper Truckee Ri 3149.97 0 50 4072.00 6293.47 6299.88 6300.26 0.002247 6.61 1459.72 483.62 0.46 Upper Truckee Ri 3149.97 0 100 2118.00 6293.47 6298.88 6200.22 7.042 0.002450 5.14 146.96.7 137.55 0.46 0.96 1499.72 0.22 24 24 630.27 6301.87 0.002274 6.61 1459.72 483.62 0.46 0.96 1459.72 0.22 24 24 630.27 6301.86 0.00224 5.17 177.26 155.96 0.44 0.99 19.00073 129.70 0.20 242 4.76 6301.27 6301.87 0.002276 6.29 884.70 270.42 0.49 Upper Truckee Ri 3149.97 0 100 5160.00 6293.47 6302.26 6303.36 10.003026 1.514 610.67 1.37.56 0.49 0.40 Upper Truckee Ri 3126.67 0 250 347 6302.27 6629.88 6300.18 0.003276 6.29 884.70 1.93.50 0.38 Upper Truckee Ri 3126.67 0 250 347 600.228.78 6299.88 6300.187 0.003276 1.24 147.66 47.95 0.48 0.40 Upper Truckee Ri 3025.53 0 100 5169.00 6292.78 6299.89 6303.32 0.0002171 5.34 1900.63 3.26 0.00 270 1.24 147.60 0.													
Upper Truckee Ri         3267.3         Q.25         3140.00         6230.79         0.006911         7.22         472.80         167.64         0.072           Upper Truckee Ri         3267.3         Q.60         4501.26         6301.56         0.006518         7.51         622.97         226.17         0.61           Upper Truckee Ri         3267.3         Q.600         6294.28         6303.14         6500.40         0.004596         8.56         133.84         466.49         0.60           Upper Truckee Ri         3198.85         Q.10         2118.00         6293.38         6300.07         6300.39         0.002212         4.60         685.26         164.01         0.40           Upper Truckee Ri         3198.85         Q.50         C.6293.38         6300.47         6300.32         0.002245         5.01         112.47         175.67         0.41           Upper Truckee Ri         3198.85         Q.500         6293.38         6303.11         6303.72         0.002245         5.01         112.47         175.67         0.42           Upper Truckee Ri         3149.87         Q.10         2118.00         6293.47         6303.61         6002.22         5.71         1145.72         4.856         0.42	Upper Truckee Ri	3267.3	Q 10	2118.00	6294.28	6298.99		6299.69	0.007411	6.75	319.92	122.17	0.68
Opper Truckee R         367.3         0.30         407.2.0         6294.28         6301.65         6302.36         0.008655         7.33         632.97         223.61         0.05           Upper Truckee R         3867.3         0.100         5169.00         6224.28         6301.56         6302.36         0.001496         8.66         1331.84         466.49         0.66           Upper Truckee R         3198.85         0.10         2118.00         6229.39         6209.05         6299.30         0.002243         4.05         523.34         144.60         0.30           Upper Truckee R         3198.85         0.50         4072.00         6223.38         6300.71         6.002245         5.01         812.22         77         0.41           Upper Truckee R         3198.85         0.500         4476.00         6223.39         6303.11         6.6302.02         0.002450         5.44         480.73         1.22.77         0.42           Upper Truckee R         3149.97         0.10         2.118.00         6293.47         6298.85         6300.26         5.01         1172.76         15.96         0.43           Upper Truckee R         3149.97         0.50         4772.00         6293.47         6299.85         6303.67	Upper Truckee Ri	3267.3	Q 25	3140.00	6294.28	6300.00		6300.79	0.006911	7.22	472.80	187.64	0.67
Oper Truckee R         3003         Close X         Close X <thclose th="" x<=""></thclose>	Upper Truckee Ri	3267.3	Q 50	4072.00	6294.28	6300.80		6301.58	0.005855	7.33	032.99	223.01	0.63
Construction         Construction<	Upper Truckee Ri	3267.3	Q 500	8476.00	6294.28	6303.14		6304.10	0.003189	8.56	1331.84	466.49	0.60
Upper Truckee Ri         198.85         Q 10         2118.00         6293.39         6299.05         6293.09         0.002243         4.05         523.34         148.60         0.38           Upper Truckee Ri         3198.85         Q 50         4107.00         6233.39         6300.03         6300.32         0.002312         4.60         683.25         1164.01         0.40           Upper Truckee Ri         3198.85         Q 500         8476.00         6233.39         6301.32         0.002316         5.44         986.20         222.77         0.42           Upper Truckee Ri         3149.97         Q 10         2118.00         6233.47         6289.88         6299.16         0.002459         4.41         480.75         0.43           Upper Truckee Ri         3149.97         Q 50         4470.20         6233.47         6239.88         6230.187         0.002426         5.71         712.76         16.50         0.43         Upper Truckee Ri         3149.97         Q 500         8470.00         6234.47         6230.88         6300.18         0.002426         5.71         712.76         16.50         0.43           Upper Truckee Ri         3149.97         Q 500         8470.00         6232.47         6302.86         6300.18													
Upper Truckee Ri         318.85         Q.55         3140.00         C233.39         G300.07         G303.80         0.002345         G.501         B12.47         D175.67         O.41           Upper Truckee Ri         3198.85         Q.100         5169.00         6293.39         G300.83         G301.22         0.002245         5.48         956.20         222.77         O.42           Upper Truckee Ri         3198.85         Q.500         4476.00         6293.39         G303.11         G303.77         0.002245         5.48         956.20         222.77         O.42           Upper Truckee Ri         3149.97         Q.55         3140.00         6293.47         6298.88         G290.18         0.002249         4.41         480.73         129.70         O.40           Upper Truckee Ri         3149.97         Q.100         5169.00         6293.47         G300.87         G301.81         0.0002276         6.57.11         712.76         155.56         O.46           Upper Truckee Ri         3149.97         Q.100         5169.00         6293.47         G302.86         G303.61         0.0002276         4.447.76         467.95         O.48           Upper Truckee Ri         3126.67         Q.10         2118.00         6292.78	Upper Truckee Ri	3198.85	Q 10	2118.00	6293.39	6299.05		6299.30	0.002243	4.05	523.34	148.60	0.38
Upper Truckee Ri         3188.85         Q 50         4072.00         6233.39         6300.83         6302.22         0.002365         5.01         812.47         175.67         0.41           Upper Truckee Ri         3198.85         Q 500         8476.00         6293.39         6303.11         6303.77         0.002450         65.48         956.20         222.77         0.42           Upper Truckee Ri         3149.97         Q 10         2118.00         6293.47         6298.88         6299.18         0.002249         4.41         480.73         129.70         0.40           Upper Truckee Ri         3149.97         Q 100         5169.00         6293.47         6300.87         6301.08         0.002249         4.41         480.73         129.70         0.40           Upper Truckee Ri         3149.97         Q 100         5169.00         6293.47         6301.26         6301.81         0.003267         6.29         854.70         270.42         0.44           Upper Truckee Ri         3149.97         Q 100         5169.00         6293.47         6302.86         6301.18         0.003267         6.29         159.31         0.36           Upper Truckee Ri         3126.67         Q 100         5169.00         6292.78         62	Upper Truckee Ri	3198.85	Q 25	3140.00	6293.39	6300.07		6300.39	0.002312	4.60	683.25	164.01	0.40
Upper Truckee Ri         3188.65         Q 100         5169.00         6293.39         6301.56         6302.02         0.002240         5.48         956.20         222.77         0.42           Upper Truckee Ri         3189.85         Q 100         2118.00         6293.31         6303.11         6303.77         0.002247         1459.72         4483.62         0.46           Upper Truckee Ri         3149.97         Q 25         3140.00         6293.47         6299.85         6300.26         0.002248         5.71         712.76         155.86         0.43           Upper Truckee Ri         3149.97         Q 500         4072.00         6293.47         6301.67         6331.87         0.003266         6.29         85.70         270.42         0.49           Upper Truckee Ri         3149.97         Q 500         8476.00         6292.78         6298.89         6291.11         0.001731         3.73         567.40         1448.95         0.34           Upper Truckee Ri         3126.67         Q 100         5189.00         6292.78         6299.89         6300.62         6300.84         0.001731         3.73         567.40         148.95         0.34           Upper Truckee Ri         3126.67         Q 500         8476.00 <t< td=""><td>Upper Truckee Ri</td><td>3198.85</td><td>Q 50</td><td>4072.00</td><td>6293.39</td><td>6300.83</td><td></td><td>6301.22</td><td>0.002365</td><td>5.01</td><td>812.47</td><td>175.67</td><td>0.41</td></t<>	Upper Truckee Ri	3198.85	Q 50	4072.00	6293.39	6300.83		6301.22	0.002365	5.01	812.47	175.67	0.41
Upper Truckee Ri         3198.85         0 500         8476.00         6293.37         6303.71         6303.77         0.002/47         6.61         1469.72         483.62         0.46           Upper Truckee Ri         3149.97         0 10         2118.00         6293.81         6299.88         6299.18         0.002489         4.41         480.72         129.70         0.40           Upper Truckee Ri         3149.97         0 50         4072.00         6293.47         6300.57         6301.06         0.002224         5.71         712.76         155.96         0.48           Upper Truckee Ri         3149.97         0 500         6475.00         6293.47         6302.66         6303.61         0.000278         6.29         884.70         270.42         0.49           Upper Truckee Ri         3126.67         0 10         2118.00         6292.78         6329.88         6300.18         0.001751         4.33         720.92         159.31         0.36           Upper Truckee Ri         3126.67         0 50         4072.00         6292.78         6300.85         0.001751         5.34         0.001731         6301.37         6301.31         6301.75         0.00211         5.34         0.040         0.001731         5.350.60         0.4	Upper Truckee Ri	3198.85	Q 100	5169.00	6293.39	6301.56		6302.02	0.002450	5.48	956.20	222.77	0.42
Upper Truckee Ri         3149.97         Q 10         2118.00         6293.47         6298.88         6299.18         0.002489         4.41         480.73         129.70         0.40           Upper Truckee Ri         3149.97         Q 25         3340.00         6293.47         6299.85         6300.26         0.0022671         5.14         610.67         137.55         0.43           Upper Truckee Ri         3149.97         Q 100         5169.00         6293.47         6301.26         6301.87         0.0002264         5.71         712.76         155.96         0.46           Upper Truckee Ri         3149.97         Q 100         5169.00         6292.47         6302.26         6303.61         0.0002264         5.71         1447.76         467.95         0.49           Upper Truckee Ri         3126.67         Q 25         3140.00         6292.78         6299.88         6300.18         0.001875         4.36         720.92         159.31         0.38           Upper Truckee Ri         3126.67         Q 500         8476.00         6292.78         6301.31         6301.75         0.002171         5.34         1006.73         267.08         0.40           Upper Truckee Ri         3126.67         Q 500         8476.00	Upper Truckee Ri	3198.85	Q 500	8476.00	6293.39	6303.11		6303.77	0.002747	6.61	1459.72	483.62	0.46
Opper Truckee Ri         3149.97         Q.25         3140.00         6293.87         6298.85         6300.26         0.00271         5.14         610.67         137.55         0.43           Upper Truckee Ri         3149.97         Q.50         4072.00         6293.87         6300.26         0.002271         5.14         610.67         137.55         0.43           Upper Truckee Ri         3149.97         Q.500         8476.00         6293.47         6301.26         6301.87         0.003260         7.24         1447.76         467.95         0.49           Upper Truckee Ri         3126.67         Q.10         2118.00         6292.78         6299.88         6300.18         0.001731         3.73         567.40         148.95         0.34           Upper Truckee Ri         3126.67         Q.25         3140.00         6292.78         6299.88         6300.18         0.001731         3.73         567.40         148.95         0.30           Upper Truckee Ri         3126.67         Q.50         4072.00         6292.78         6300.82         6300.98         0.00225         4.44         447.60         188.50         0.38           Upper Truckee Ri         3126.67         Q.500         8476.00         6292.78         6303.50<	Linner Truckee Ri	3149.97	0.10	2118.00	6293 47	6298.88		6299 18	0.002489	4 4 1	480 73	129 70	0.40
Upper Truckee Ri         3149.97         Q 50         4072.00         6293.47         6300.57         6301.08         0.002824         5.71         712.76         155.96         0.46           Upper Truckee Ri         3149.97         Q 100         5169.00         6293.47         6301.26         6601.87         0.003276         6.29         854.70         270.42         0.49           Upper Truckee Ri         3149.97         Q 100         2118.00         6292.78         6302.86         6209.11         0.001375         4.36         720.92         159.31         0.36           Upper Truckee Ri         3126.67         Q 50         4072.00         6292.78         6300.62         6300.98         0.001375         4.36         720.92         159.31         0.36           Upper Truckee Ri         3126.67         Q 50         4072.00         6292.78         6300.62         6300.98         0.002261         5.34         1006.73         267.08         0.40           Upper Truckee Ri         3126.67         Q 50         4072.00         6292.78         6300.42         6300.42         1006.73         267.08         0.40           Upper Truckee Ri         3126.67         Q 50         4072.00         6292.76         6298.75         629	Upper Truckee Ri	3149.97	Q 25	3140.00	6293.47	6299.85		6300.26	0.002403	5.14	610.67	137.55	0.43
Upper Truckee Ri         3149.97         Q 100         5169.00         6293.47         6301.26         6301.87         0.003278         6.29         854.70         270.42         0.49           Upper Truckee Ri         3149.97         Q 500         8476.00         6293.47         6302.86         6303.61         0.003278         6.29         854.70         270.42         0.49           Upper Truckee Ri         3126.67         Q 10         2118.00         6292.78         6298.88         6300.18         0.001731         3.73         567.40         148.95         0.34           Upper Truckee Ri         3126.67         Q 50         4072.00         6292.78         6300.62         6300.88         0.000205         4.48         47.60         188.50         0.38           Upper Truckee Ri         3126.67         Q 500         8476.00         6292.78         6301.31         6301.75         0.002161         5.34         1006.73         267.08         0.40           Upper Truckee Ri         3055.35         Q 10         2118.00         6292.26         6298.75         6298.98         0.001720         3.85         550.46         138.79         0.34           Upper Truckee Ri         3055.35         Q 50         8476.00         6292.2	Upper Truckee Ri	3149.97	Q 50	4072.00	6293.47	6300.57		6301.08	0.002924	5.71	712.76	155.96	0.46
Upper Truckee Ri         3149.97         Q 500         8476.00         6293.47         6302.86         6303.61         0.003060         7.24         1447.76         467.95         0.49           Upper Truckee Ri         3126.67         Q 10         2118.00         6292.78         6298.89         6299.11         0.001731         3.73         567.40         148.95         0.34           Upper Truckee Ri         3126.67         Q 50         4072.00         6292.78         6300.62         6300.75         0.002161         5.34         1006.73         2567.08         0.40           Upper Truckee Ri         3126.67         Q 500         8476.00         6292.78         6303.31         6303.50         0.002161         5.34         1006.73         2567.08         0.40           Upper Truckee Ri         3126.67         Q 500         8476.00         6292.78         6302.33         6303.50         0.002171         6.28         1676.15         530.69         0.42           Upper Truckee Ri         3055.35         Q 10         2118.00         6292.26         6298.75         6298.98         0.001720         3.85         550.46         138.79         0.34           Upper Truckee Ri         3055.35         Q 50         4747.00	Upper Truckee Ri	3149.97	Q 100	5169.00	6293.47	6301.26		6301.87	0.003278	6.29	854.70	270.42	0.49
Upper Truckee Ri         3126.67         Q 10         218.00         6292.78         6298.89         66290.11         0.001737         3.73         567.40         148.95         0.34           Upper Truckee Ri         3126.67         Q 50         4072.00         6292.78         6300.62         6300.98         0.001737         4.36         720.92         159.31         0.36           Upper Truckee Ri         3126.67         Q 100         5169.00         6292.78         6301.31         6301.75         0.002161         5.34         1006.73         267.08         0.40           Upper Truckee Ri         3126.67         Q 100         2118.00         6292.26         6298.72         6300.47         6301.75         0.002171         6.28         106.73         267.08         0.40           Upper Truckee Ri         3055.35         Q 10         2118.00         6292.26         6298.72         6300.44         6300.83         0.001720         3.85         550.46         138.79         0.34           Upper Truckee Ri         3055.35         Q 500         8476.00         6292.26         6300.44         6300.83         0.001265         5.08         843.60         190.53         0.38           Upper Truckee Ri         3055.35         Q	Upper Truckee Ri	3149.97	Q 500	8476.00	6293.47	6302.86		6303.61	0.003060	7.24	1447.76	467.95	0.49
Upper Truckee Ri         3126.67         Q 10         2118.00         6229.78         6298.89         6299.11         0.001731         3.73         567.40         148.95         0.34           Upper Truckee Ri         3126.67         Q 25         3140.00         6292.78         6300.62         6300.18         0.001875         4.36         720.92         159.31         0.36           Upper Truckee Ri         3126.67         Q 500         8476.00         6292.78         6300.32         6303.50         0.002161         5.34         1006.73         267.08         0.40           Upper Truckee Ri         3126.67         Q 500         8476.00         6292.78         6302.93         6303.50         0.002161         5.34         1006.73         267.08         0.40           Upper Truckee Ri         3055.35         Q 10         2118.00         6292.26         6298.75         6298.98         0.001720         3.85         550.46         138.79         0.34           Upper Truckee Ri         3055.35         Q 50         4072.00         6292.26         6300.44         6300.83         0.001865         5.08         843.60         190.53         0.38           Upper Truckee Ri         3055.35         Q 500         4476.00         6292		0405	0.15	=									
Upper Truckee Ri         3126.67         Q 25         3140.00         6292.78         6299.78         6300.18         0.001875         4.36         720.92         193.31         0.36           Upper Truckee Ri         3126.67         Q 500         8476.00         6300.62         6300.98         0.00225         4.44         447.60         188.50         0.38           Upper Truckee Ri         3126.67         Q 500         8476.00         6292.78         6301.31         6301.75         0.002161         5.34         1006.73         267.08         0.40           Upper Truckee Ri         3055.35         Q 10         2118.00         6292.26         6298.75         6298.98         0.001720         3.85         550.46         138.79         0.34           Upper Truckee Ri         3055.35         Q 50         4072.00         6292.26         6299.72         6300.44         6300.83         0.001847         4.54         712.32         178.90         0.36           Upper Truckee Ri         3055.35         Q 100         5199.00         6292.26         6301.11         6301.60         0.002169         5.68         893.47         2.451.5         0.41           Upper Truckee Ri         3025.62         Q 10         2118.00         6292.	Upper Truckee Ri	3126.67	Q 10	2118.00	6292.78	6298.89		6299.11	0.001731	3.73	567.40	148.95	0.34
Opper Truckee Ri         3126.67         Q 100         5169.00         6292.78         6301.31         6301.75         0.002161         5.34         1006.73         257.08         0.42           Upper Truckee Ri         3126.67         Q 500         8476.00         6292.78         6301.31         6301.75         0.002161         5.34         1006.73         257.08         0.42           Upper Truckee Ri         3055.35         Q 10         2118.00         6292.78         6300.43         6300.64         0.001720         3.85         550.46         138.79         0.34           Upper Truckee Ri         3055.35         Q 25         3140.00         6292.26         6299.72         6300.44         6300.83         0.001720         3.85         550.46         138.79         0.34           Upper Truckee Ri         3055.35         Q 50         4072.00         6292.26         6301.11         6301.60         0.002169         5.68         989.47         245.15         0.41           Upper Truckee Ri         3055.35         Q 500         8476.00         6292.73         6298.93         0.001419         3.53         600.27         147.50         0.31           Upper Truckee Ri         3025.62         Q 10         2118.00         6291	Upper Truckee Ri	3126.67	Q 25 Q 50	3140.00	6292.78	6300 63		6300.18	0.001875	4.36	720.92	159.31	0.36
Upper Truckee Ri         3126.67         Q 500         8476.00         6292.78         6303.50         0.002171         6.28         1676.15         530.69         0.42           Upper Truckee Ri         3055.35         Q 10         2118.00         6292.26         6298.75         6298.98         0.001720         3.85         550.46         138.79         0.34           Upper Truckee Ri         3055.35         Q 25         3140.00         6292.26         6299.72         6300.04         0.001847         4.54         712.32         178.90         0.36           Upper Truckee Ri         3055.35         Q 100         5169.00         6292.26         6301.11         6301.60         0.002169         5.68         989.47         245.15         0.41           Upper Truckee Ri         3055.35         Q 500         8476.00         6292.26         6302.59         6303.32         0.002548         7.13         1458.23         408.13         0.46           Upper Truckee Ri         3025.62         Q 10         2118.00         6291.96         6299.97         6.001419         3.53         600.27         147.50         0.31           Upper Truckee Ri         3025.62         Q 50         8476.00         6291.96         6300.43         6300	Upper Truckee Ri	3126.67	Q 100	5169.00	6292.78	6301.31		6301.96	0.002025	4.04 5.34	1006 73	267 08	0.30
Upper Truckee Ri         3055.35         Q 10         2118.00         6292.26         6298.75         6298.98         0.001720         3.85         550.46         138.79         0.34           Upper Truckee Ri         3055.35         Q 25         3140.00         6292.26         6299.72         6300.04         0.001847         4.54         712.32         178.90         0.36           Upper Truckee Ri         3055.35         Q 100         5169.00         6292.26         6300.44         6300.83         0.001965         5.68         989.47         245.15         0.41           Upper Truckee Ri         3055.35         Q 500         8476.00         6292.26         6302.59         6303.32         0.002548         7.13         1458.23         408.13         0.46           Upper Truckee Ri         3025.62         Q 10         2118.00         6291.96         6298.73         6298.93         0.001419         3.53         600.27         147.50         0.31           Upper Truckee Ri         3025.62         Q 50         4072.00         6291.96         6300.43         6300.76         0.001441         4.63         881.38         192.54         0.36           Upper Truckee Ri         3025.62         Q 500         8476.00         6291.	Upper Truckee Ri	3126.67	Q 500	8476.00	6292.78	6302.93		6303.50	0.002171	6.28	1676.15	530.69	0.42
Upper Truckee Ri         3055.35         Q 10         2118.00         6292.26         6298.75         6298.98         0.001720         3.85         550.46         138.79         0.34           Upper Truckee Ri         3055.35         Q 25         3140.00         6292.26         6299.72         6300.04         0.001847         4.54         712.32         1778.90         0.36           Upper Truckee Ri         3055.35         Q 100         5169.00         6292.26         6300.44         6300.83         0.001965         5.68         989.47         245.15         0.41           Upper Truckee Ri         3055.35         Q 500         8476.00         6292.26         6302.59         6303.32         0.002248         7.13         1458.23         406.13         0.46           Upper Truckee Ri         3025.62         Q 10         2118.00         6291.96         6298.71         6299.93         0.001419         3.53         600.27         147.50         0.31           Upper Truckee Ri         3025.62         Q 50         4072.00         6291.96         6300.43         6300.76         0.001441         4.63         881.38         192.54         0.36           Upper Truckee Ri         3025.62         Q 500         8476.00         6291													
Upper Truckee Ri         3055.35         Q 25         3140.00         6292.26         6299.72         6300.04         0.001847         4.54         712.32         178.90         0.36           Upper Truckee Ri         3055.35         Q 50         4072.00         6292.26         6300.44         6300.83         0.001985         5.08         843.60         190.53         0.38           Upper Truckee Ri         3055.35         Q 100         5169.00         6292.26         6301.11         6301.60         0.002169         5.68         989.47         245.15         0.41           Upper Truckee Ri         3055.35         Q 500         8476.00         6292.26         6303.25         0.6303.32         0.002548         7.13         1458.23         408.13         0.46           Upper Truckee Ri         3025.62         Q 10         2118.00         6291.96         6298.73         6298.93         0.001141         4.63         881.38         192.54         0.31           Upper Truckee Ri         3025.62         Q 50         4072.00         6291.96         6300.43         6300.76         0.001841         4.63         881.38         192.54         0.33           Upper Truckee Ri         3025.62         Q 500         8476.00         629	Upper Truckee Ri	3055.35	Q 10	2118.00	6292.26	6298.75		6298.98	0.001720	3.85	550.46	138.79	0.34
Upper Truckee Ri         3055.35         Q 50         4072.00         6292.26         6300.44         6300.83         0.001965         5.08         843.60         190.53         0.38           Upper Truckee Ri         3055.35         Q 100         5169.00         6292.26         6301.11         6301.60         0.002169         5.68         989.47         245.15         0.41           Upper Truckee Ri         3055.35         Q 500         8476.00         6292.26         6302.50         6333.32         0.002548         7.13         1458.23         408.13         0.46           Upper Truckee Ri         3025.62         Q 10         2118.00         6291.96         6298.73         6298.93         0.001714         4.16         755.02         167.01         0.31           Upper Truckee Ri         3025.62         Q 25         3140.00         6291.96         6300.43         6300.76         0.001714         4.16         755.02         167.01         0.34           Upper Truckee Ri         3025.62         Q 100         5169.00         6291.96         6301.10         6301.51         0.00202         5.14         1033.36         241.87         0.39           Upper Truckee Ri         3025.62         Q 500         8476.00         6291	Upper Truckee Ri	3055.35	Q 25	3140.00	6292.26	6299.72		6300.04	0.001847	4.54	712.32	178.90	0.36
Upper Truckee Ri         3055.35         Q 100         5169.00         6292.26         6301.11         6301.60         0.002169         5.68         989.47         245.15         0.41           Upper Truckee Ri         3055.35         Q 500         8476.00         6292.26         6302.59         6303.20         0.002248         7.13         1458.23         408.13         0.46           Upper Truckee Ri         3025.62         Q 10         2118.00         6291.96         6298.73         6298.93         0.001419         3.53         600.27         147.50         0.31           Upper Truckee Ri         3025.62         Q 25         3140.00         6291.96         6300.43         6300.76         0.001841         4.63         881.38         192.54         0.36           Upper Truckee Ri         3025.62         Q 100         5169.00         6291.96         6301.10         6301.51         0.002002         5.14         1033.36         241.87         0.39           Upper Truckee Ri         3025.62         Q 100         5169.00         6291.96         6302.61         6302.22         0.001841         4.63         881.38         192.54         0.36           Upper Truckee Ri         3025.62         Q 100         5169.00         63	Upper Truckee Ri	3055.35	Q 50	4072.00	6292.26	6300.44		6300.83	0.001965	5.08	843.60	190.53	0.38
Upper Truckee Ri         3055.35         Q 500         8476.00         6292.26         6302.59         6303.32         0.002548         7.13         1458.23         408.13         0.46           Upper Truckee Ri         3025.62         Q 10         2118.00         6291.96         6298.73         6298.93         0.001419         3.53         600.27         147.50         0.31           Upper Truckee Ri         3025.62         Q 25         3140.00         6291.96         6300.43         6300.76         0.001714         4.16         755.02         167.01         0.34           Upper Truckee Ri         3025.62         Q 50         4072.00         6291.96         6301.10         6301.51         0.002002         5.14         1033.36         241.87         0.39           Upper Truckee Ri         3025.62         Q 100         5169.00         6291.96         6301.10         6301.51         0.002002         5.14         1033.36         241.87         0.39           Upper Truckee Ri         3025.62         Q 100         2118.00         6292.13         6298.89         0.001373         3.64         581.88         132.61         0.31           Upper Truckee Ri         2998.16         Q 10         2118.00         6292.13         629	Upper Truckee Ri	3055.35	Q 100	5169.00	6292.26	6301.11		6301.60	0.002169	5.68	989.47	245.15	0.41
Upper Truckee Ri         3025.62         Q 10         2118.00         6291.96         6298.73         6298.93         0.001419         3.53         600.27         147.50         0.31           Upper Truckee Ri         3025.62         Q 25         3140.00         6291.96         6299.71         6299.97         0.001714         4.16         755.02         167.01         0.34           Upper Truckee Ri         3025.62         Q 50         4072.00         6291.96         6300.43         6300.76         0.001841         4.63         881.38         192.54         0.36           Upper Truckee Ri         3025.62         Q 100         5169.00         6291.96         6301.10         6301.51         0.002002         5.14         1033.36         241.87         0.39           Upper Truckee Ri         3025.62         Q 100         2118.00         6291.96         6302.61         6302.21         6301.51         0.002002         5.14         1033.36         241.87         0.39           Upper Truckee Ri         3025.62         Q 500         8476.00         6292.13         6298.89         0.001373         3.64         581.88         132.61         0.31           Upper Truckee Ri         2998.16         Q 250         3140.00         629	Upper Truckee Ri	3055.35	Q 500	8476.00	6292.26	6302.59		6303.32	0.002548	7.13	1458.23	408.13	0.46
Opper Truckee Ri         325.62         Q 25         3140.00         6291.96         6299.71         6299.97         0.001419         3.35         000.27         147.50         0.33           Upper Truckee Ri         3025.62         Q 50         4072.00         6291.96         6300.43         6300.76         0.001419         4.16         755.02         167.01         0.34           Upper Truckee Ri         3025.62         Q 50         4072.00         6291.96         6301.43         6300.76         0.001414         4.63         881.38         192.54         0.36           Upper Truckee Ri         3025.62         Q 100         5169.00         6291.96         6301.10         6301.51         0.002002         5.14         1033.36         241.87         0.39           Upper Truckee Ri         3025.62         Q 500         8476.00         6291.96         6302.61         6303.22         0.002261         6.38         1511.82         409.24         0.43           Upper Truckee Ri         2998.16         Q 10         2118.00         6292.13         6298.68         6299.92         0.001373         3.64         581.88         132.61         0.31           Upper Truckee Ri         2998.16         Q 50         4072.00         6292.1	Upper Truckee Pi	3025.62	0.10	2118 00	6201.04	6208 72		6208 03	0.001/10	3 5 2	600.27	1/17 50	0.21
Upper Truckee Ri         3025.62         Q 50         4072.00         6291.96         6300.43         6300.76         0.001841         4.63         881.38         192.54         0.36           Upper Truckee Ri         3025.62         Q 100         5169.00         6291.96         6301.10         6301.51         0.002002         5.14         1033.36         241.87         0.39           Upper Truckee Ri         3025.62         Q 500         8476.00         6291.96         6302.61         6303.22         0.002261         6.38         1511.82         409.24         0.43           Upper Truckee Ri         2998.16         Q 10         2118.00         6292.13         6298.68         6298.89         0.001373         3.64         581.88         132.61         0.31           Upper Truckee Ri         2998.16         Q 25         3140.00         6292.13         6299.62         6299.92         0.001902         4.40         714.98         167.99         0.36           Upper Truckee Ri         2998.16         Q 50         4072.00         6292.13         6300.33         6300.70         0.002037         4.90         851.50         214.53         0.38           Upper Truckee Ri         2998.16         Q 500         8476.00         6292	Upper Truckee Ri	3025.62	Q 25	3140.00	6291.96	6299.71		6299.97	0.001714	4.16	755.02	167.01	0.34
Upper Truckee Ri         3025.62         Q 100         5169.00         6291.96         6301.10         6301.51         0.002002         5.14         1033.36         241.87         0.39           Upper Truckee Ri         3025.62         Q 500         8476.00         6291.96         6302.61         6303.22         0.002261         6.38         1511.82         409.24         0.43           Upper Truckee Ri         2998.16         Q 10         2118.00         6292.13         6299.62         6299.92         0.001902         4.40         714.98         167.99         0.36           Upper Truckee Ri         2998.16         Q 50         4072.00         6292.13         6300.33         6300.70         0.002037         4.90         851.50         214.53         0.38           Upper Truckee Ri         2998.16         Q 50         4072.00         6292.13         6300.33         6300.70         0.002037         4.90         851.50         214.53         0.38           Upper Truckee Ri         2998.16         Q 100         5169.00         6292.13         6301.45         0.002204         5.44         1009.37         269.59         0.40           Upper Truckee Ri         2998.16         Q 500         8476.00         6292.13         63	Upper Truckee Ri	3025.62	Q 50	4072.00	6291.96	6300.43		6300.76	0.001841	4.63	881.38	192.54	0.36
Upper Truckee Ri         3025.62         Q 500         8476.00         6291.96         6302.61         6303.22         0.002261         6.38         1511.82         409.24         0.43           Upper Truckee Ri         2998.16         Q 10         2118.00         6292.13         6298.68         6298.89         0.001373         3.64         581.88         132.61         0.31           Upper Truckee Ri         2998.16         Q 25         3140.00         6292.13         6299.62         6299.92         0.001902         4.40         714.98         167.99         0.36           Upper Truckee Ri         2998.16         Q 50         4072.00         6292.13         6300.33         6300.70         0.002037         4.90         851.50         214.53         0.38           Upper Truckee Ri         2998.16         Q 100         5169.00         6292.13         6301.40         6301.45         0.002204         5.44         1009.37         269.59         0.40           Upper Truckee Ri         2998.16         Q 500         8476.00         6292.13         6302.52         6303.15         0.002204         5.44         1009.37         269.59         0.40           Upper Truckee Ri         2998.16         Q 500         8476.00         63	Upper Truckee Ri	3025.62	Q 100	5169.00	6291.96	6301.10		6301.51	0.002002	5.14	1033.36	241.87	0.39
Upper Truckee Ri         2998.16         Q 10         2118.00         6292.13         6299.62         6299.82         0.001373         3.64         581.88         132.61         0.31           Upper Truckee Ri         2998.16         Q 25         3140.00         6292.13         6299.62         6299.92         0.001902         4.40         714.98         167.99         0.36           Upper Truckee Ri         2998.16         Q 50         4072.00         6292.13         6300.33         6300.70         0.002037         4.90         851.50         214.53         0.38           Upper Truckee Ri         2998.16         Q 100         5169.00         6292.13         6301.00         6301.45         0.002204         5.44         1009.37         269.59         0.40           Upper Truckee Ri         2998.16         Q 500         8476.00         6302.52         6303.15         0.002204         5.44         1009.37         269.59         0.40           Upper Truckee Ri         2998.16         Q 500         8476.00         6302.52         6303.15         0.002268         6.57         1518.78         409.56         0.45	Upper Truckee Ri	3025.62	Q 500	8476.00	6291.96	6302.61		6303.22	0.002261	6.38	1511.82	409.24	0.43
Upper Truckee Ri         2998.16         Q 10         2118.00         6292.13         6298.68         6298.89         0.001373         3.64         581.88         132.61         0.31           Upper Truckee Ri         2998.16         Q 25         3140.00         6292.13         6299.62         6299.92         0.001902         4.40         714.98         167.99         0.36           Upper Truckee Ri         2998.16         Q 50         4072.00         6292.13         6300.33         6300.70         0.002037         4.90         851.50         214.53         0.38           Upper Truckee Ri         2998.16         Q 100         5169.00         6292.13         6301.00         6301.45         0.002204         5.44         1009.37         269.59         0.40           Upper Truckee Ri         2998.16         Q 500         8476.00         6292.13         6302.52         6303.15         0.002204         5.44         1009.37         269.59         0.40           Upper Truckee Ri         2998.16         Q 500         8476.00         6292.13         6302.52         6303.15         0.002268         6.57         1518.78         409.56         0.45													
Upper Truckee Ri         2998.16         Q 25         3140.00         6292.13         6299.62         6299.92         0.001902         4.40         714.98         167.99         0.36           Upper Truckee Ri         2998.16         Q 50         4072.00         6292.13         6300.33         6300.70         0.002037         4.90         851.50         214.53         0.38           Upper Truckee Ri         2998.16         Q 100         5169.00         6292.13         6301.00         6301.45         0.002204         5.44         1009.37         269.59         0.40           Upper Truckee Ri         2998.16         Q 500         8476.00         6292.13         6302.52         6303.15         0.002266         6.57         1518.78         409.56         0.45	Upper Truckee Ri	2998.16	Q 10	2118.00	6292.13	6298.68		6298.89	0.001373	3.64	581.88	132.61	0.31
Opper Indexee Ni         2390.10         Q 50         4072.00         0292.13         0300.33         0300.70         0.002037         4.90         851.50         214.53         0.38           Upper Truckee Ri         2998.16         Q 100         5169.00         6292.13         6301.00         6301.45         0.002204         5.44         1009.37         269.59         0.40           Upper Truckee Ri         2998.16         Q 500         8476.00         6292.13         6302.52         6303.15         0.002268         6.57         1518.78         409.56         0.45	Upper Truckee Ri	2998.16	Q 25	3140.00	6292.13	6299.62		6299.92	0.001902	4.40	714.98	167.99	0.36
Upper Truckee Ri         2998.16         Q 500         8476.00         6392.13         6301.40         6301.45         0.002204         5.44         1009.37         268.59         0.40           Upper Truckee Ri         2998.16         Q 500         8476.00         6292.13         6302.52         6303.15         0.002568         6.57         1518.78         409.56         0.45	Upper Truckee Ri	2998.16	Q 50	4072.00	6292.13	6201.00		6201 45	0.002037	4.90	851.50	214.53	0.38
	Upper Truckee Ri	2998.16	Q 500	8476.00	6292.13	6302.52		6303 15	0.002204	5.44 6.57	1518 78	209.59	0.40
				2.1.0.00	1202.10	2002.02		2300.10	2.302030	0.01	.0.0.70		0.10

HEC-RAS Plan: SB_U	JI_SIEADY H	-LOW River:	UPPER IRUC	CKEE RI Rea	ch: Upper Truc	kee Ri (Contir	nued)	
Booch	Divor Sto	Drofilo	O Total	Min Ch El	W/S Elow	Crit W/S		EC

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)	
Upper Truckee Ri	2984.73	Q 10	2118.00	6291.93	6298.55		6298.85	0.002275	4.41	483.31	127.68	0.39
Upper Truckee Di	2004.72	0.05	2110.00	6201.00	6200.00		6200.00	0.002210	5.05	610.00	192.02	0.00
Оррег Пискее Кі	2904.73	Q 25	3140.00	6291.93	0299.40		6299.00	0.002800	5.25	019.09	102.93	0.44
Upper Truckee Ri	2984.73	Q 50	4072.00	6291.93	6300.16		6300.66	0.003124	5.72	774.86	268.42	0.47
Upper Truckee Ri	2984.73	Q 100	5169.00	6291.93	6300.85		6301.41	0.003003	6.12	972.30	295.57	0.47
Upper Truckee Ri	2984.73	Q 500	8476.00	6291.93	6302.41		6303.11	0.002978	7.09	1478.60	376.24	0.48
Linner Trucken Di	2020.4.0	0.10	2110.00	6204 75	6200.20		6000 74	0.000000	4.50	464.05	100.41	0.20
Оррег Пискее Кі	2920.16	QIU	2116.00	6291.75	0290.39		6296.71	0.002036	4.56	461.95	100.41	0.30
Upper Truckee Ri	2920.18	Q 25	3140.00	6291.75	6299.18		6299.69	0.002760	5.75	563.27	158.61	0.45
Upper Truckee Ri	2920.18	Q 50	4072.00	6291.75	6299.78		6300.43	0.003258	6.56	676.10	219.14	0.49
Upper Truckee Ri	2920.18	Q 100	5169.00	6291.75	6300.36		6301.16	0.003754	7.34	825.35	287.27	0.53
Linner Truckee Ri	2920.18	0.500	8476.00	6291 75	6301.82	6300.66	6302.82	0.004361	8 60	1294 42	382 36	0.59
	2020110	Q 000	0110.00	0201110	0001.02	0000.00	0002.02	0.001001	0.00	1201112	002.00	0.00
Upper Truckee Ri	2878.11	Q 10	2118.00	6291.81	6298.18		6298.60	0.002835	5.19	410.24	111.14	0.44
Upper Truckee Ri	2878.11	Q 25	3140.00	6291.81	6298.87		6299.54	0.003918	6.59	495.03	141.88	0.52
Upper Truckee Ri	2878.11	Q 50	4072.00	6291.81	6299.34		6300.24	0.005056	7.68	576.27	196.61	0.60
Upper Truckee Ri	2878.11	Q 100	5169.00	6291.81	6299.75	6298.50	6300.91	0.006545	8.84	667.80	260.01	0.68
Upper Truckee Ri	2878 11	Q 500	8476.00	6291.81	6300.82	6300.82	6302 51	0.008151	11.03	993 83	327 13	0.78
	2070.11	<u><u>a</u> 000</u>	0110.00	0201101	0000.02	0000.02	0002.01	0.000101		000.00	021110	0.10
Upper Truckee Ri	2783.38	Q 10	2118.00	6291.56	6298.02		6298.28	0.002955	4.11	542.29	242.61	0.42
Upper Truckee Ri	2783.38	Q 25	3140.00	6291.56	6298.79		6299.11	0.002987	4.66	739.09	272.60	0.44
Upper Truckee Ri	2783.38	Q 50	4072.00	6291.56	6299.32		6299.71	0.003233	5.12	905.55	338.21	0.46
Upper Truckee Ri	2783.38	Q 100	5169.00	6291.56	6299.83		6300.27	0.003259	5.56	1078.68	345.35	0.47
Upper Truckee Ri	2783.38	Q 500	8476.00	6201 56	6300.01		6301 56	0.003720	6.87	1457 34	352 60	0.52
opport ruckee M	2100.00	2 000	5470.00	0231.30	000.01		0001.00	0.000128	0.07	1401.04	002.00	0.02
	0000.5-	0.10		0.5-1	0		0.5-5-1					
Upper Truckee Ri	2686.85	Q 10	2118.00	6291.43	6297.83		6298.00	0.002363	3.34	673.59	310.21	0.37
Upper Truckee Ri	2686.85	Q 25	3140.00	6291.43	6298.64		6298.84	0.001974	3.66	948.72	357.38	0.35
Upper Truckee Ri	2686.85	Q 50	4072.00	6291.43	6299.19		6299.42	0.001912	3.97	1147.69	367.30	0.36
Upper Truckee Ri	2686.85	Q 100	5169.00	6291 43	6299 70		6299 97	0.001986	4.38	1334 99	379 32	0.37
Lipper Truckee Bi	2686.85	0.500	8476 00	6201.40	6300.70		6201.07	0.003464		1750 07	101.02	0.07
opper muckee Ki	2000.00	2 500	0470.00	0291.43	0300.76		0301.20	0.002451	00.0	1103.27	421.24	0.42
Upper Truckee Ri	2636.46	Q 10	2118.00	6291.15	6297.72		6297.89	0.002014	3.32	664.44	274.74	0.35
Upper Truckee Ri	2636.46	Q 25	3140.00	6291.15	6298.53		6298.74	0.001957	3.72	904.34	317.97	0.35
Upper Truckee Ri	2636.46	Q 50	4072.00	6291.15	6299.06		6299.31	0.001998	4.11	1084.62	355.21	0.36
Upper Truckee Ri	2636.46	0 100	5169.00	6291 15	6299.55		6299.86	0.002148	4.61	1275 54	412.89	0.39
Upper Truckee Ri	2000.40	0.500	0100.00	0201.10	0200.00		0200.00	0.002140	5.01	1270.04	412.00	0.00
Upper Truckee RI	2636.46	Q 500	8476.00	6291.15	6300.58		6301.06	0.002613	5.84	1763.06	554.17	0.44
Upper Truckee Ri	2499.44	Q 10	2118.00	6291.24	6297.53		6297.67	0.001160	2.99	709.18	194.17	0.27
Upper Truckee Ri	2499.44	Q 25	3140.00	6291.24	6298.31		6298.52	0.001361	3.63	891.75	282.68	0.31
Upper Truckee Ri	2499.44	Q 50	4072.00	6291.24	6298.81		6299.08	0.001584	4.16	1065.21	403.23	0.34
Upper Truckee Ri	2400.44	0.100	5160.00	6201.21	6200.01		6200.50	0.001001	4 70	1264.17	E02.06	0.01
	2499.44	0 100	5109.00	0291.24	0299.20		0299.39	0.001884	4.70	1204.17	503.90	0.37
Upper Truckee Ri	2499.44	Q 500	8476.00	6291.24	6300.23		6300.73	0.002422	6.00	1827.96	657.94	0.43
Upper Truckee Ri	2401.44	Q 10	2118.00	6291.25	6297.39		6297.55	0.001415	3.20	662.64	199.45	0.30
Upper Truckee Ri	2401 44	0.25	3140.00	6291 25	6298 13		6298.36	0.001769	3.85	850.39	330.60	0.34
Upper Truckee Pi	2401.44	0.50	4072.00	6201.25	6208.61		6208.00	0.002068	4 35	1030 37	467.81	0.38
Upper Truckee Ri	2401.44	0.100	4072.00 5460.00	6201.25	6200.01		6200.30	0.002000	4.00	1000.07	407.01 504.01	0.30
Оррег Пискее Кі	2401.44	Q 100	5169.00	6291.25	6299.03		6299.36	0.002375	4.00	1200.90	564.21	0.41
Upper Truckee Ri	2401.44	Q 500	8476.00	6291.25	6300.00		6300.48	0.002721	5.94	1939.10	767.80	0.45
Upper Truckee Ri	2361.95	Q 10	2118.00	6291.37	6297.01		6297.42	0.005207	5.20	422.84	211.99	0.55
Upper Truckee Ri	2361.95	Q 25	3140.00	6291.37	6297.74		6298.22	0.005331	5.72	629.32	356.54	0.57
Upper Truckee Ri	2361.95	Q 50	4072.00	6201 37	6208 10		6208 74	0.005280	6.22	810 10	4/6 07	0.50
Upper Truckee N	2001.90	0.100	4072.00	0231.37	0230.19		0230.74	0.000209	0.22	4005.07	440.07	0.56
	2301.95	0,100	5169.00	6291.37	6298.60		6299.21	0.005277	6.69	1005.87	505.23	0.59
Upper Truckee Ri	2361.95	Q 500	8476.00	6291.37	6299.56		6300.29	0.005284	7.73	1573.17	731.68	0.61
Upper Truckee Ri	2323.99	Q 10	2118.00	6291.12	6296.95		6297.22	0.003383	4.21	537.20	302.61	0.45
Upper Truckee Ri	2323.99	Q 25	3140.00	6291.12	6297.71		6298.01	0.003068	4.56	828.98	484.93	0.44
Upper Truckee Ri	2323.99	Q 50	4072.00	6201 12	6208 10		6298 52	0.002035	4 88	1079.50	542 63	0.44
Lippor Truckee D	2222.00	0.100	F160.00	6201.12	6200.19		6200.02	0.002300		1000.00	602.05	0.44
	2323.99	0.500	5169.00	0291.12	0298.62		0298.98	0.002929	5.24	1326.40	623.05	0.45
Opper Truckee Ri	2323.99	Q 500	8476.00	6291.12	6299.58		6300.04	0.003200	6.26	2027.96	797.35	0.48
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Upper Truckee Ri	2230.35	Q 10	2118.00	6291.31	6296.54		6296.90	0.003228	4.88	446.08	199.01	0.46
Upper Truckee Ri	2230.35	Q 25	3140.00	6291.31	6297.17		6297.68	0.004016	5.83	645.46	405.19	0.52
Upper Truckee Ri	2230.35	Q 50	4072 00	6291.31	6297 61	6296 20	6298 19	0.004282	6.43	846 29	515 78	0.54
Lipper Truckee Bi	2230.35	0.100	5160.00	6201.01	6207.07	0200.20	6200.13	0.004677	7 00	10/7 /5	597.00	0.54
Upper Truckee KI	2200.00	0.500	0.70.00	0291.31	0291.91		0290.04	0.004077	7.09	1047.40	001.00	0.56
Opper Truckee Ri	2230.35	Q 500	8476.00	6291.31	6299.17		6299.76	0.003705	7.34	1890.95	806.81	0.53
Upper Truckee Ri	2202.46	Q 10	2118.00	6292.16	6296.09	6295.66	6296.73	0.008933	6.56	355.72	217.31	0.72
Upper Truckee Ri	2202.46	Q 25	3140.00	6292.16	6296.58	6296.39	6297.46	0.010531	7.79	475.67	277.10	0.80
Upper Truckee Ri	2202.46	Q 50	4072.00	6202 16	6207 16	6297.05	6207 08	0 000200	7 77	680 33	431 00	0.76
Lipper Truckee Di	2202.40	0.100	=160.00	6202.10	6207 77	6207 50	6200 47	0.000230	7 47	000.55	E70 07	0.70
	2202.46	0.500	5169.00	0292.16	0297.77	0297.53	0298.47	0.006980	1.47	990.55	5/8.8/	0.68
Upper Truckee Ri	2202.46	Q 500	8476.00	6292.16	6299.06		6299.61	0.004439	7.25	1884.48	772.02	0.57
												I
Upper Truckee Ri	2151.73	Q 10	2118.00	6292.14	6295.32	6295.19	6296.13	0.015510	7.24	298.21	197.85	0.91
Upper Truckee Ri	2151.73	Q 25	3140.00	6292 14	6296 15	6295 85	6296 90	0.009546	7 13	493 55	273 21	0.75
Lipper Truckee Ri	2151 73	0.50	4072.00	6202.14	6206.97	2200.00	6207 52	0.006520	00.1	713 73	3/6 02	0.00
Upper Truckee KI	0454.70	0.400	4072.00	0292.14	0230.07		0281.00	0.000030	0.00	113.72	340.03	0.05
Opper Truckee Ri	2151.73	0,100	5169.00	6292.14	6297.48		6298.12	0.005463	7.00	989.78	550.23	0.61
Upper Truckee Ri	2151.73	Q 500	8476.00	6292.14	6298.82		6299.38	0.003800	7.06	1901.38	755.16	0.53
									T			<u> </u>
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HEC-RAS Plan: SB_L	JT_STEADY F	LOW River:	UPPER TRUC	CKEE RI Rea	ch: Upper Truc	kee Ri (Contir	nued)	
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Image         Definition         Definition </th <th>Reach</th> <th>River Sta</th> <th>Profile</th> <th>Q Total</th> <th>Min Ch El</th> <th>W.S. Elev</th> <th>Crit W.S.</th> <th>E.G. Elev</th> <th>E.G. Slope</th> <th>Vel Chnl</th> <th>Flow Area</th> <th>Top Width</th> <th>Froude # Chl</th>	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
Obsert Trainer         Distance				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Uber         Tarter         2023         31460         COD         COD <thcod< th="">         COD         COD         C</thcod<>	Upper Truckee Ri	2102.28	Q 10	2118.00	6290.76	6294.97		6295.51	0.007978	5.88	362.94	164.08	0.67
Ubert         Ubert <th< td=""><td>Upper Truckee Ri</td><td>2102.28</td><td>Q 25</td><td>3140.00</td><td>6290.76</td><td>6295.89</td><td></td><td>6296.47</td><td>0.006182</td><td>6.15</td><td>533.75</td><td>234.50</td><td>0.62</td></th<>	Upper Truckee Ri	2102.28	Q 25	3140.00	6290.76	6295.89		6296.47	0.006182	6.15	533.75	234.50	0.62
ujger         Linger         Linger <thlinger< th="">         Linger         <thlinger< th=""> <thlinger< th=""> <thlinger< th=""></thlinger<></thlinger<></thlinger<></thlinger<>	Upper Truckee Ri	2102.28	Q 50	4072.00	6290.76	6296.67		6297.21	0.005041	6.02	789.95	434.74	0.57
upper Table         Norm	Upper Truckee Ri	2102.28	Q 100	5169.00	6290.76	6297.37		6297.84	0.003846	5.87	1141.96	562.62	0.51
Uniter         Table 20         Table 20 <thtable 20<="" th="">         Table 20         <t< td=""><td>Upper Truckee Ri</td><td>2102.28</td><td>Q 500</td><td>8476.00</td><td>6290.76</td><td>6298.75</td><td></td><td>6299.18</td><td>0.002745</td><td>6.02</td><td>2083.78</td><td>765.30</td><td>0.45</td></t<></thtable>	Upper Truckee Ri	2102.28	Q 500	8476.00	6290.76	6298.75		6299.18	0.002745	6.02	2083.78	765.30	0.45
Upber Index         Normal         Control         Solar													
Upper Index         Addam         O part         Addam         Outper Vision         Addam         Addam <t< td=""><td>Upper Truckee Ri</td><td>2048.85</td><td>Q 10</td><td>2118.00</td><td>6289.99</td><td>6294.75</td><td></td><td>6295.17</td><td>0.004338</td><td>5.19</td><td>408.39</td><td>130.71</td><td>0.52</td></t<>	Upper Truckee Ri	2048.85	Q 10	2118.00	6289.99	6294.75		6295.17	0.004338	5.19	408.39	130.71	0.52
Yane         Yane <th< td=""><td>Upper Truckee Ri</td><td>2048.85</td><td>Q 25</td><td>3140.00</td><td>6289.99</td><td>6295.64</td><td></td><td>6296.19</td><td>0.004276</td><td>5.96</td><td>530.21</td><td>148.52</td><td>0.53</td></th<>	Upper Truckee Ri	2048.85	Q 25	3140.00	6289.99	6295.64		6296.19	0.004276	5.96	530.21	148.52	0.53
Super Transell         Solda         O 199         Solda         O 1990         Solda         O 1990         C 1	Upper Truckee Ri	2048.85	Q 50	4072.00	6289.99	6296.30		6296.94	0.004279	6.50	682.08	324.95	0.54
Deser         Transe         24845         0 200         87300         CE02 00         20000         7.75         100-04         77.75         100-04           Open Transes         171.50         0 10         211600         CE03.10         <	Upper Truckee Ri	2048.85	Q 100	5169.00	6289.99	6296.92		6297.61	0.004082	6.87	936.18	479.72	0.54
Normal         Normal         Normal         Normal         Normal         Normal         Normal         Normal           Ubeer Trukes R         1971-90         0.05         5110.00         6688.70         6281.53         6285.56         600500         6.00         777.27         232.6         0.040           Ubeer Trukes R         1971.90         0.00         1000         6200.70         6280.20         0.0280.20         6.00         777.27         232.8         0.040           Ubeer Trukes R         197.290         0.00         110.00         6200.77         6283.21         6284.44         0.05701         6.60         110.00         0.000           Ubeer Trukes R         197.220         0.00         407.00         620.77         6283.21         6284.44         0.0584         6.60         110.00         0.000         0.0597         6283.2         6283.2         6283.24         0.0428         6.70         6283.2         0.0284         6.70         6283.2         6284.20         0.0284         6.70         6583.1         0.02         0.027         6.70         6283.2         6284.20         0.0284         6.70         6583.1         0.02         0.02         0.02         0.02         0.02         0.02 <t< td=""><td>Upper Truckee Ri</td><td>2048.85</td><td>Q 500</td><td>8476.00</td><td>6289.99</td><td>6298.40</td><td></td><td>6299.00</td><td>0.003039</td><td>7.05</td><td>1869.43</td><td>747.53</td><td>0.49</td></t<>	Upper Truckee Ri	2048.85	Q 500	8476.00	6289.99	6298.40		6299.00	0.003039	7.05	1869.43	747.53	0.49
Unper Transe Ri         Per Trans         Des Transe Ri         Per Transe													
Unper Transe 80         197.490         0.02         197.490         0.02         197.490         0.02         197.44         2.02.00         197.44         2.02.00         197.44         2.02.00         197.44         2.02.00         197.45         2.02.00         197.55         0.00         197.55         197.55         0.00         197.55         197.55         0.00         197.55         197.55         0.00         197.55         197.55         197.55	Upper Truckee Ri	1971.59	Q 10	2118.00	6288.70	6294.48		6294.87	0.003212	5.01	427.03	129.19	0.46
Dame         Times P1         017.99         0         09         0.72.2         34.46         0.50           Upper Transes R1         197.99         0.80         549.00         0.808.70         0.67.84         0.602.81         0.002.81         0.67.21         0.63.0         0.50.3 </td <td>Upper Truckee Ri</td> <td>1971.59</td> <td>Q 25</td> <td>3140.00</td> <td>6288.70</td> <td>6295.35</td> <td></td> <td>6295.88</td> <td>0.003500</td> <td>5.90</td> <td>577.64</td> <td>232.50</td> <td>0.49</td>	Upper Truckee Ri	1971.59	Q 25	3140.00	6288.70	6295.35		6295.88	0.003500	5.90	577.64	232.50	0.49
Daser Truckes R         197.90         0.100         198.00         0.828.00         0.829.00	Upper Truckee Ri	1971 59	0.50	4072.00	6288 70	6296.05		6296.63	0.003430	6.33	772 22	334.86	0.50
Depart Transles R         197.59         0 500         4/75.00         C503.70         C503.82         C503.82         C503.82         C503.82         C503.82         C503.82         C503.82         C503.82         C503.82 <thc50.82< th=""></thc50.82<>	Upper Truckee Ri	1971.59	Q 100	5169.00	6288 70	6296.68		6297.31	0.003381	6.73	1035.45	520.23	0.50
Open Truckes R         07102         02000	Upper Truckee Ri	1971 59	0.500	8476.00	6288 70	6298.28		6298 78	0.002468	6.65	2181.07	840 54	0.44
Upper Trusses R         1972.20         2.0         3140.00         0.00117         623.44         0.00176         5.46         0.00176         0.001         0.0017         0.0017         0.0014         0.0017         0.0014         0.0017         0.0014         0.0017         0.0014         0.0014         0.0014         0.0014         0.0014         0.0017         0.0014         0.0017         0.0014         0.0017         0.0014         0.0017         0.0014         0.0017         0.0014         0.0017         0.0014         0.0017         0.0014         0.0017         0.0014 <th< td=""><td></td><td>1071.00</td><td></td><td>0470.00</td><td>0200.70</td><td>0200.20</td><td></td><td>0200.10</td><td>0.002400</td><td>0.00</td><td>2101.07</td><td>040.04</td><td>0.44</td></th<>		1071.00		0470.00	0200.70	0200.20		0200.10	0.002400	0.00	2101.07	040.04	0.44
Unper Truckes R         197.2.9         22.8         91.40.0         0.909.17         624.81         0.909.40         0.909.40         0.909.40         0.911.0         10.10         92.83         0.909           Upper Truckes R         197.2.0         0.00         570.60         0.00407         777.00         390.00         0.077.20         390.00         0.077.20         390.00         0.077.20         300.00         0.077.20         300.00         0.077.20         300.00         0.077.20         300.00         0.077.20         300.00         0.072.90         0.002.94         44.71         576.15         0.002.94         44.71         576.15         0.002.94         44.71         576.15         0.002.94         44.71         576.15         0.002.94         44.71         576.15         0.002.94         44.71         576.15         0.002.94         44.71         576.15         0.002.94         44.71         576.15         0.002.94         44.71         576.15         0.002.94         477.00         578.84         628.40         626.41         626.94         600.94         477.00         578.84         628.94         626.94         600.919         44.71         576.15         0.00196         44.94         44.94         44.94         44.94         44.94	Lipper Truckee Ri	1873.28	0.10	2118.00	6290.17	6203.02		6204.44	0.005781	5.83	370.20	134.86	0.59
Upper Trustes R         197.2.3         29.0         597.0         693.0         Constraint         00000         201.3         0.00           Upper Trustes R         197.2.3         0.00         877.2         0.00000         880.0         7         627.6         7.77         777.6         777.7         523.0         523.0         523.0         523.0         523.0         523.0         523.0         523.0         523.0         523.0         523.0         523.0         523.0         510	Upper Truckee Ri	1073.20	0.25	2110.00	6200.17	6204.91		6205.45	0.005/01	5.05 6.40	510.20	190.20	0.59
Dayser Trackes R         197.32         2 900         For 200         ESS 10         Description         ESS 10	Upper Truckee Ri	1073.20	0.50	4072.00	6290.17	6205 52		6295.45	0.005438	6 79	690.00	100.30	0.60
Construction         Construction<	Upper Truckee RI	1873.20	0 100	5160.00	6200.17	6206 40		6206.04	0.003240	0.70	000.99	200.00	0.59
Organ         Organ <th< td=""><td>Upper Truckee Ri</td><td>1073.20</td><td>0.500</td><td>0476.00</td><td>6200.17</td><td>6290.19</td><td>6206.20</td><td>6200.40</td><td>0.004007</td><td>1.07</td><td>1550 70</td><td>309.01</td><td>0.57</td></th<>	Upper Truckee Ri	1073.20	0.500	0476.00	6200.17	6290.19	6206.20	6200.40	0.004007	1.07	1550 70	309.01	0.57
Upper Truckes R         841.36         Q         Q         211.00         6228.01         6228.20         6028.20         6028	opper Truckee Ri	1073.28	\$ 500	04/0.00	0290.17	0297.57	0290.39	o∠98.42	0.004305	8.07	1553.79	0/1.25	0.58
ungam         ungam <th< td=""><td>Lippor Truckers Di</td><td>10/1 00</td><td>0.10</td><td>2440.00</td><td>6000.00</td><td>6000.00</td><td>  </td><td>6004.00</td><td>0.000400</td><td></td><td>E40 45</td><td>450 71</td><td>0.00</td></th<>	Lippor Truckers Di	10/1 00	0.10	2440.00	6000.00	6000.00		6004.00	0.000400		E40 45	450 71	0.00
ugger Tucker M         Test.so         U.2         3140.00         6256.20         0.002246         4.91         67.31         20.33         0.41           Upger Tucker N         1641.36         Q         0.00         678.00         6286.63         6266.23         6.002257         6.56         1074.82         302.70         0.43           Upger Tucker N         1819.07         0         0         2118.00         6286.43         6264.23         0.002256         6.56         1076.30         169.84         0.33           Upger Tucker N         1919.07         0         0         2214.00         6284.41         2285.14         0.001186         4.46         790.07         224.74         0.33           Upger Tucker N         1919.07         0         50         6284.44         6295.20         2285.64         0.001184         4.44         17.996.07         223.47         0.33           Upger Tucker N         173.086         0.10         2111.00         6294.42         6293.15         0.001183         4.44         197.65         0.44           Upger Tucker N         173.086         0.50         4477.60         6294.45         6294.45         6294.45         6294.45         6294.45         6665.33         50.	Opper Truckee Ri	1841.36	0.10	2118.00	6288.63	6293.99		0294.26	0.002188	4.17	516.15	150.74	0.38
ugaper Tuckee R         141.36         Q 100         5/100         6/200.25         6/200.27         6.54         684.43         301.43         Q 43           Ugaper Tuckee R         1441.36         Q 500         847/0.00         6286.63         6297.65         6292.73         0.002550         5.78         1014.22         320.70         0.43           Ugaper Tuckee R         1818.07         Q 10         2118.00         6288.44         6294.91         6292.62         0.002550         5.87         1014.22         320.07         6.83         166.36         0.271.40         3.84         629.64         0.001586         4.81         9.86.07         3.42.25         0.83         102.87         101.42         3.32.25         0.63.84         629.64         0.001586         4.81         120.85         1147.40         3.32         166.36         0.29.41         0.43         0.33         102.97         1.83         0.41.74         0.33         102.97         0.29.41         10.43         0.32         1.46         0.37         1.63         1.85         1.99.02         1.99.04         1.99.04         1.99.04         1.99.04         1.99.04         1.99.04         1.99.04         1.99.04         1.99.04         1.99.04         1.99.04         1.99.04	Upper Truckee Ri	1841.36	0.25	3140.00	6288.63	6294.89		6295.26	0.002494	4.91	673.01	203.93	0.41
upger Tuncker N         181.36         Q 100         5190.00         6290.52         6290.72         0.002550         6.75         1074.62         392.70         0.43           Upger Tuncker N         1813.00         Q 000         6280.53         6290.52         6.69         1.683.0         668.66         0.645           Upger Tuncker N         1819.07         Q 25         31470.00         6280.44         6294.41         6295.41         0.001458         4.87         708.68         3422         0.33           Upger Tuncker N         1819.07         Q 100         5169.00         6282.44         6294.41         6001458         4.87         708.68         3422         0.38           Upger Tuncker N         1819.07         Q 100         5169.00         6282.44         6294.40         0.001462         4.48         603.43         107.85         0.44         0.43           Upger Tuncker N         173.08         Q 25         31410.00         6287.44         6293.49         0.002456         4.81         600.00         2444         0.43         0.43         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.45 <td>Upper Truckee Ri</td> <td>1841.36</td> <td>0.50</td> <td>4072.00</td> <td>6288.63</td> <td>6295.59</td> <td>  </td> <td>6296.02</td> <td>0.002624</td> <td>5.34</td> <td>854.34</td> <td>301.43</td> <td>0.43</td>	Upper Truckee Ri	1841.36	0.50	4072.00	6288.63	6295.59		6296.02	0.002624	5.34	854.34	301.43	0.43
Upger Trucker N         191.30         Q 500         8470.00         688.80         6297.65         6294.23         0.002557         6.66         1808.80         666.96         0.65           Upger Trucker N         1819.07         Q 10         2118.00         6284.40         6294.40         6294.40         6294.40         6294.40         6294.40         6294.40         6294.40         6294.40         6294.40         6294.40         6294.40         6294.40         6294.40         6294.40         6294.40         6294.41         6294.51         6294.52         6	Upper Truckee Ri	1841.36	Q 100	5169.00	6288.63	6296.25		6296.73	0.002560	5.75	1074.92	392.70	0.43
Upper Truckee Ri         1818.07         0         2118.00         6288.48         6294.01         6294.20         0.001428         3.50         607.03         166.66         0.31           Upper Truckee Ri         1818.07         0.25         3140.00         6288.48         6294.61         6.0251.18         0.0011630         4.18         70.067         234.74         0.34           Upper Truckee Ri         1818.07         0.00         6758.00         6786.01         6.001163         4.48         129.31         4.107.4         0.37           Upper Truckee Ri         1730.86         0.10         2118.00         6287.42         6203.72         6.264.14         0.001429         4.20         663.01         6.068         0.044         0.02149         4.20         663.01         6.068         0.044         0.02149         4.20         663.01         6.068         0.044         0.02149         4.20         663.01         6.068         0.044         0.02149         4.20         663.01         6.068         0.044         0.02149         4.20         623.44         0.02251         6.01         7.73         6.04         0.043         4.50         0.045.71         6.73         7.73         6.04         0.045.71         6.73         7.7	Upper Truckee Ri	1841.36	Q 500	8476.00	6288.63	6297.65		6298.23	0.002557	6.69	1808.90	686.96	0.45
Upger Truckee Ri         181807         0 10         2118.00         c288.48         c294.01         c262.420         0.001665         4.18         770.07         234.74         0.03           Upger Truckee Ri         181807         0 50         4072.00         c288.48         6296.62         c226.54         0.001656         4.18         770.07         234.74         0.03           Upger Truckee Ri         181807         0 50         6200         c286.44         6296.12         c226.54         0.001613         4.49         723.85         0.03           Upger Truckee Ri         181807         0 50         6207.42         c229.73         c2264.00         0.00349         4.20         50.39         167.55         0.64           Upger Truckee Ri         1730.86         0 50         4072.00         6287.42         6294.03         0.0022651         4.91         860.00         234.44         0.03           Upger Truckee Ri         1730.86         0 50         4072.00         6287.42         6294.02         6292.73         0.0022651         4.91         860.00         234.44         0.03           Upger Truckee Ri         1870.11         0 10         518.00         6287.42         6294.02         6292.73         0.0022651													
Upger Truckee Ri         1818.07         Q.25         3140.00         CE38.48         CE29.518         0.001630         4.18         70.07         234.74         0.34           Upger Truckee Ri         1818.07         0.50         407.00         CE38.48         6295.62         CE36.54         0.001630         4.57         986.80         0.33           Upger Truckee Ri         1818.07         0.50         447.60.0         CE38.48         6292.62         CE38.45         0.0016130         4.57         986.80         0.023           Upger Truckee Ri         1730.86         0.10         211.60         CE37.42         CE39.34         0.002452         4.59         885.53         206.80         0.43           Upger Truckee Ri         1730.86         0.50         447.60         CE37.42         CE39.34         0.002251         6.17         177.35         88.68         0.43           Upger Truckee Ri         1700.11         0.10         211.80         CE37.60         CE39.34         0.002251         6.17         177.35         88.68         0.627.55         0.44           Upger Truckee Ri         1670.11         0.10         211.80         CE37.60         CE39.35         CE39.44         0.002435         5.66         177.75	Upper Truckee Ri	1819.07	Q 10	2118.00	6288.48	6294.01		6294.20	0.001428	3.50	607.03	166.36	0.31
Upger Tuckee Ri         1615.07         Q 50         4072.00         C288.46         C288.46         C285.54         Q0.0183         6.47         986.80         342.25         0.33           Upger Tuckee Ri         1619.07         Q 500         628.46         C287.42         C293.75         C283.46         Q 001918         5.86         1395.32         686.80         342.25         0.33           Upger Tuckee Ri         1730.86         Q 50         4477.00         C287.42         C293.72         C294.06         0.003192         4.40         1035.92         686.80         0.433           Upger Tuckee Ri         1730.86         Q 50         4477.00         C287.42         C293.63         C293.73         0.002595         4.51         0.77.75         386.80         0.433           Upger Tuckee Ri         1700.86         Q 500         6287.42         C297.40         C297.40         C297.57         0.004305         6.61         1733.60         0.97.55         0.97.55         0.97.55         0.97.55         0.97.55         0.97.55         0.97.55         0.97.55         0.97.55         0.97.55         0.97.55         0.97.55         0.97.55         0.97.55         0.97.55         0.97.55         0.97.55         0.97.55         0.97.57 <t< td=""><td>Upper Truckee Ri</td><td>1819.07</td><td>Q 25</td><td>3140.00</td><td>6288.48</td><td>6294.91</td><td></td><td>6295.18</td><td>0.001656</td><td>4.18</td><td>780.67</td><td>234.74</td><td>0.34</td></t<>	Upper Truckee Ri	1819.07	Q 25	3140.00	6288.48	6294.91		6295.18	0.001656	4.18	780.67	234.74	0.34
Upger Truckee Ri         1619.07         Q 100         5169.00         Q 258.48         C 298.64         Q 2019         A 4 4         1235.19         A 17.4         0.7.7           Upger Truckee Ri         1619.07         Q 500         AF7.60         C 283.48         C 297.64         C 2019.15         0.001916         5.68         109.52         C 888.40         0.039           Upger Truckee Ri         1703.68         Q 10         2118.00         C 267.42         C 292.47         C 294.66         C 239.35         4.59         C 853.3         206.56         0.044           Upger Truckee Ri         1703.68         Q 100         5169.00         C 267.42         C 297.40         C 237.42         C 294.60         C 238.41         0.002551         5.25         1071.75         358.08         0.444           Upger Truckee Ri         1670.11         Q 10         2118.00         C 267.60         C 294.42         C 294.75         0.00430         5.78         547.35         179.19         0.53           Upger Truckee Ri         1670.11         Q 100         547.00         C 287.60         C 294.42         C 297.72         0.003916         5.78         547.35         179.19         0.53           Upger Truckee Ri         1670.11         Q	Upper Truckee Ri	1819.07	Q 50	4072.00	6288.48	6295.62		6295.94	0.001830	4.57	986.80	342.25	0.36
Upger Tuckee Ri         1619.0.2         6300         8476.00         6288.46         6297.69         6298.45         0.00119         5.66         1995.32         686.10         0.333           Upger Tuckee Ri         1730.86         0.25         314.00         6237.42         6239.37         6234.00         0.00345         4.43         603.94         197.65         0.43           Upger Tuckee Ri         1730.86         0.50         4472.00         6237.42         6296.86         6234.37         0.00255         4.57         383.06         0.44         0.43           Upger Tuckee Ri         1770.86         0.500         4876.00         6237.42         6293.35         6273.73         0.002551         6.77         173.86         0.43           Upger Tuckee Ri         1670.11         0.10         211.80         6237.42         6239.42         6237.47         0.00320         5.78         647.33         0.055           Upger Tuckee Ri         1670.11         0.50         447.00         6237.62         6239.42         6239.42         0.00226         6.52         184.50         33.56         0.55           Upger Tuckee Ri         1670.11         0.50         477.00         6237.42         6239.42         0.00326	Upper Truckee Ri	1819.07	Q 100	5169.00	6288.48	6296.29		6296.64	0.001843	4.94	1235.19	419.74	0.37
Upper Truckee Ri         1730.86         0         12118.00         6227.42         6233.73         6234.00         0.003492         4.20         503.04         187.65         0.45           Upper Truckee Ri         1730.86         0.50         477.00         627.42         6294.66         6234.98         0.002893         4.56         685.33         209.96         0.43           Upper Truckee Ri         1730.86         0.500         847.00         6227.42         6296.02         6258.44         0.002893         5.28         1071.75         398.08         0.43           Upper Truckee Ri         1670.11         0.10         22118.00         6227.42         6297.40         6237.37         0.004300         5.78         547.35         0.0244           Upper Truckee Ri         1670.11         0.50         427.00         6227.80         6294.22         6295.55         0.004471         615         697.29         251.83         0.55           Upper Truckee Ri         1670.11         0.50         8476.00         6228.70         6294.52         60.004271         619.84         144.50         838.66         0.55           Upper Truckee Ri         1666.41         0.10         5169.00         6228.40         6294.51         0.00424	Upper Truckee Ri	1819.07	Q 500	8476.00	6288.48	6297.69		6298.15	0.001918	5.86	1995.32	688.10	0.39
Upper Truckee Ri         1730.86         0.25         3140.00         6297.42         692.46         6.694.98         0.002253         4.55         655.33         209.96         0.43           Upper Truckee Ri         1730.86         0.100         5169.00         6287.42         6295.83         6.695.73         0.002253         5.25         1071.75         385.06         0.44           Upper Truckee Ri         1670.11         0.10         2518.00         6287.42         6293.35         6293.75         0.002551         6.17         173.06         627.55         0.44           Upper Truckee Ri         1670.11         0.10         251.80         6287.60         6294.22         6294.75         0.004383         5.06         416.56         0.58         0.55           Upper Truckee Ri         1670.11         0.00         6287.60         6294.62         6295.50         0.00438         5.06         6.52         81.00         33.66         0.55           Upper Truckee Ri         1670.11         0.00         627.60         6295.80         6294.22         0.002456         6.52         81.00         33.66         0.55           Upper Truckee Ri         1606.41         0.00         6287.60         6297.42         6297.42	Upper Truckee Ri	1730.86	Q 10	2118.00	6287.42	6293.73		6294.00	0.003492	4.20	503.94	187.65	0.45
Upper Truckee Ri         1730 88         0 40         4072 00         6227.42         6295.50         6297.57         0.00295         4.91         6800.00         294.44         0.43           Upper Truckee Ri         1730.88         0 500         6476.00         6287.42         6298.42         6297.33         0.002551         6.17         1733.60         627.55         0.44           Upper Truckee Ri         1670.11         0 10         2116.00         6287.60         6293.35         6293.75         0.004363         5.68         416.98         138.87         0.52           Upper Truckee Ri         1670.11         0 50         4072.00         6287.60         6294.22         6295.50         0.004363         5.68         416.98         138.87         0.55           Upper Truckee Ri         1670.11         0 50         6296.50         6295.50         0.004365         5.52         891.90         335.66         0.055         0.004365         6.52         891.90         335.66         0.055         0.004365         6.52         891.90         335.66         0.055         0.004365         6.52         891.90         335.66         0.055         0.004365         6.52         891.90         335.66         0.055         0.004365         <	Upper Truckee Ri	1730.86	Q 25	3140.00	6287.42	6294.66		6294.98	0.002953	4.59	685.93	206.96	0.43
Upper Truckee Ri         1730.88         Q 100         5169.00         6227.42         6297.42         6297.43         0.002593         5.25         1071.75         358.08         0.43           Upper Truckee Ri         1870.11         Q 10         2118.00         6287.42         6297.40         6287.53         0.002551         6.17         1733.60         627.55         0.44           Upper Truckee Ri         1870.11         Q 25         3140.00         6287.60         6294.22         6295.50         0.004433         5.06         417.91         0.035           Upper Truckee Ri         1870.11         Q 50         4472.00         6287.60         6295.55         0.004471         6.19         997.29         251.83         0.055           Upper Truckee Ri         1670.11         Q 500         4476.00         6289.59         6297.72         0.00316         7.45         1445.09         0.330.0         0.55           Upper Truckee Ri         1606.41         Q 10         2118.00         6289.59         6297.72         0.002454         4.90         652.42         0.044.91         6244.82         0.044.91         6244.82         0.044.91         6244.82         0.0264.5         6.52         146.330         0.044         149.67 <td< td=""><td>Upper Truckee Ri</td><td>1730.86</td><td>Q 50</td><td>4072.00</td><td>6287.42</td><td>6295.36</td><td></td><td>6295.73</td><td>0.002695</td><td>4.91</td><td>860.60</td><td>294.44</td><td>0.43</td></td<>	Upper Truckee Ri	1730.86	Q 50	4072.00	6287.42	6295.36		6295.73	0.002695	4.91	860.60	294.44	0.43
Upper Truckee Ri         1730.86         0.500         9476.00         6287.42         6287.40         6287.93         0.002551         6.17         1733.80         627.55         0.44           Upper Truckee Ri         1670.11         Q 10         2118.00         6287.60         6293.35         6.633.75         0.004303         5.08         416.96         138.87         0.52           Upper Truckee Ri         1670.11         Q 50         427.65         6244.22         6294.72         0.00430         5.78         547.35         177.19         0.055           Upper Truckee Ri         1670.11         Q 50         6287.60         6295.65         0.004296         6.52         981.90         33.66         0.055           Upper Truckee Ri         1670.11         Q 500         6287.60         6296.95         0.004296         6.52         981.90         335.66         0.055           Upper Truckee Ri         1606.41         Q 10         2118.00         6286.90         6293.52         0.002454         4.59         653.02         0.0438         0.0438         0.0438         0.0438         0.0438         0.0438         0.0438         0.0438         0.0438         0.0438         0.0438         0.044         0.0438         0.0438	Upper Truckee Ri	1730.86	Q 100	5169.00	6287.42	6296.02		6296.44	0.002593	5.25	1071.75	358.08	0.43
Upper Truckee Ri         1670.11         0         0         6287.60         6287.60         6287.75         0.00438         5.06         416.96         138.87         0.025           Upper Truckee Ri         1670.11         0.55         3140.00         6287.60         6294.25         6294.75         0.00430         5.78         547.35         179.19         0.53           Upper Truckee Ri         1670.11         0.50         4072.00         6287.60         6256.56         6296.22         0.00471         6.19         697.29         251.83         0.55           Upper Truckee Ri         1670.11         0.500         6287.60         6256.56         6296.22         0.000316         7.48         1445.09         533.66         0.055           Upper Truckee Ri         1606.41         0.10         2118.00         6288.50         6294.12         6294.51         0.00254         4.20         507.67         140.88         0.38           Upper Truckee Ri         1606.41         0.500         447.00         6286.50         6297.41         6297.49         0.00254         4.52         1897.15         577.80         0.44           Upper Truckee Ri         1606.41         0.500         6287.14         6293.39         0.002546	Upper Truckee Ri	1730.86	Q 500	8476.00	6287.42	6297.40		6297.93	0.002551	6.17	1733.60	627.55	0.44
Upper Truckee Ri         1670.11         Q 10         22118.00         6223.76         C629.75         0.004381         5.08         416.96         138.87         0.022           Upper Truckee Ri         1670.11         Q 50         4072.00         6287.60         6294.42         6296.52         0.004216         6.19         697.29         251.83         0.655           Upper Truckee Ri         1670.11         Q 100         5169.00         6228.760         6266.66         6297.72         0.004296         6.52         891.90         335.66         0.555           Upper Truckee Ri         1606.41         Q 10         2118.00         6288.69         6293.52         0.00216         7.45         0.400216         7.45         1445.09         658.24         204.98         0.41           Upper Truckee Ri         1606.41         Q 50         4072.00         6288.90         6294.80         6295.80         0.002646         4.49         658.24         204.98         0.41           Upper Truckee Ri         1606.41         Q 500         4707.00         6286.90         6295.49         0.002646         6.44         1017.39         340.35         0.44           Upper Truckee Ri         1606.41         Q 500         471.4         6293.													
Upper Truckee Ri         1670.11         Q 25         3140.00         6227.60         6224.23         6224.25         0.004300         5.78         547.35         179.19         0.33           Upper Truckee Ri         1670.11         Q 100         5169.00         6227.60         6229.58         0.004270         6.52         891.90         335.66         0.55           Upper Truckee Ri         1670.11         Q 100         5169.00         6227.60         6296.66         6297.72         0.004396         6.52         891.90         335.66         0.55           Upper Truckee Ri         1606.41         Q 10         218.00         6228.69         6293.25         6293.25         0.002564         4.59         6582.42         204.48         0.41           Upper Truckee Ri         1606.41         Q 50         4072.00         6226.59         6294.80         0.002564         6.52         813.83         271.80         0.43           Upper Truckee Ri         1606.41         Q 500         4470.00         6285.90         6293.49         0.002845         5.22         1597.73         0.44           Upper Truckee Ri         1653.35         Q 10         2118.00         6287.14         6293.39         0.002286         5.27         634.62	Upper Truckee Ri	1670.11	Q 10	2118.00	6287.60	6293.35		6293.75	0.004383	5.08	416.96	138.87	0.52
Upper Truckee Ri         1670.11         0.50         4072.00         6227.60         6224.92         6225.50         0.004471         6.19         687.29         251.83         0.55           Upper Truckee Ri         1670.11         0.500         8476.00         62287.60         6239.25         6292.22         0.003916         7.45         1445.09         538.03         0.55           Upper Truckee Ri         1606.41         0.20         2118.00         6228.59         6293.22         0.002546         4.20         507.67         140.88         0.033           Upper Truckee Ri         1606.41         0.40         0.4072.00         6228.59         6293.24         0.002546         4.52         81.93         271.80         0.431           Upper Truckee Ri         1606.41         0.400         6286.90         6228.49         6225.56         0.002546         6.52         81.933         271.80         0.431           Upper Truckee Ri         1606.41         0.400         6286.90         6293.49         6293.59         0.002556         6.52         81.933         271.80         0.431           Upper Truckee Ri         1630.35         0.10         6287.14         6293.00         0.00258         4.44         491.67         144	Upper Truckee Ri	1670.11	Q 25	3140.00	6287.60	6294.23		6294.75	0.004300	5.78	547.35	179.19	0.53
Upper Truckee Ri         1670.11         Q 100         5169.00         6227.50         6227.50         6229.22         0.003916         7.45         1445.09         333.66         0.55           Upper Truckee Ri         1606.41         Q 100         2118.00         6228.50         6293.25         6293.22         0.003916         7.45         1445.09         533.03         0.55           Upper Truckee Ri         1606.41         Q 500         4072.00         6228.50         6293.25         0.002454         4.20         552.2         140.08         0.034           Upper Truckee Ri         1606.41         Q 100         5169.00         6286.30         6294.42         6295.58         0.002254         5.52         131.83         271.80         0.43           Upper Truckee Ri         1606.41         Q 100         5169.00         6286.39         6293.39         6293.48         0.002285         5.27         1597.15         577.60         0.48           Upper Truckee Ri         1553.35         Q 100         5169.00         6287.14         6293.09         6293.38         0.002285         5.27         53.462         201.15         0.44           Upper Truckee Ri         1553.35         Q 50         474.00         6285.71         6	Upper Truckee Ri	1670.11	Q 50	4072.00	6287.60	6294.92		6295.50	0.004471	6.19	697.29	251.83	0.55
Upper Truckee Ri         1670.11         Q 500         8476.00         6287.60         6296.60         6297.72         0.003916         7.46         1445.09         553.03         0.055           Upper Truckee Ri         1606.41         Q 10         2118.00         6228.50         6293.25         6293.45         0.002545         4.99         655.24         20.49.8         0.0011         4.99         655.24         20.49.8         0.0014         4.99         655.24         20.49.8         0.0014         4.99         655.2         113.83         27.10         0.43.3           Upper Truckee Ri         1606.41         Q 100         5169.00         6286.90         6295.44         0.002544         6.000254         6.000254         6.000254         6.000254         1197.15         340.35         0.044           Upper Truckee Ri         1553.35         Q 100         2118.00         6228.74         6293.49         6293.39         0.002286         5.27         634.62         210.15         0.044           Upper Truckee Ri         1553.35         Q 100         518.00         6287.14         6294.61         6295.33         0.002286         5.27         634.62         210.15         0.044           Upper Truckee Ri         1553.35 <td< td=""><td>Upper Truckee Ri</td><td>1670.11</td><td>Q 100</td><td>5169.00</td><td>6287.60</td><td>6295.58</td><td></td><td>6296.22</td><td>0.004296</td><td>6.52</td><td>891.90</td><td>335.66</td><td>0.55</td></td<>	Upper Truckee Ri	1670.11	Q 100	5169.00	6287.60	6295.58		6296.22	0.004296	6.52	891.90	335.66	0.55
Upper Truckee Ri         1006.41         0         1         0         6283.35         6293.25         6293.35         0.002865         5.27         634.62         210.15         0.44	Upper Truckee Ri	1670.11	Q 500	8476.00	6287.60	6296.96		6297.72	0.003916	7.45	1445.09	538.03	0.55
Opper Truckee Ri         1600.41         Q 10         2/18.00         6263.32         0.002/160         4.20         307.67         140.88         0.38           Upper Truckee Ri         1606.41         Q 50         4072.00         6228.90         6294.12         6294.51         0.002/164         4.99         658.24         204.98         0.41           Upper Truckee Ri         1606.41         Q 500         6276.60         6296.42         6295.26         0.002/64         6.04         1017.39         304.03         0.44           Upper Truckee Ri         1653.35         Q 10         2118.00         6287.74         6293.94         6293.93         0.002/85         5.27         634.62         210.15         0.44           Upper Truckee Ri         1553.35         Q 50         4072.00         6287.14         6293.94         6293.30         0.002/85         5.27         634.62         210.15         0.44           Upper Truckee Ri         1553.35         Q 500         6287.14         6293.94         6297.32         0.002/86         5.78         796.62         291.68         0.46           Upper Truckee Ri         1658.35         Q 500         8476.00         6287.14         6296.67         6297.32         0.002/86         5.	Line of Trucket Di	4000.44	0.40	0140.00	0000.00	0000.05		0000 50	0.000400	4.00	507.07	4.40.00	0.00
Opper Truckee Ri         1600-41         Q.25         3140.00         6228-50         6224.51         0.002424         4.495         683-24         204.95         0.41           Upper Truckee Ri         1606.41         Q.100         5189.00         6228.50         6229.52         0.00255         5.52         813.83         271.80         0.43           Upper Truckee Ri         1606.41         Q.100         5189.00         6228.50         6292.52         0.00255         5.52         813.83         271.80         0.43           Upper Truckee Ri         1553.35         Q.10         2118.00         6287.14         6293.94         6293.38         0.002585         5.27         634.62         210.15         0.44           Upper Truckee Ri         1553.35         Q.50         4072.00         6287.14         6296.67         6297.32         0.002855         5.57         796.62         291.68         0.46           Upper Truckee Ri         1553.35         Q.500         827.71         6297.32         0.002895         5.78         796.62         291.68         0.46           Upper Truckee Ri         1468.88         Q.100         5189.00         6287.14         6292.72         6297.32         0.002402         5.30         415.77 <td>Upper Truckee Ri</td> <td>1606.41</td> <td>0.05</td> <td>2118.00</td> <td>6286.90</td> <td>6293.25</td> <td></td> <td>6293.52</td> <td>0.002196</td> <td>4.20</td> <td>507.67</td> <td>140.88</td> <td>0.38</td>	Upper Truckee Ri	1606.41	0.05	2118.00	6286.90	6293.25		6293.52	0.002196	4.20	507.67	140.88	0.38
Upper Truckee Ri         1606.41         Q 50         4072.00         6226.50         6294.80         6258.26         0.002554         5.52         813.83         271.80         0.43           Upper Truckee Ri         1606.41         Q 100         5169.00         6226.50         6.002564         6.04         1017.39         340.35         0.44           Upper Truckee Ri         1553.35         Q 10         2118.00         6227.14         6293.39         0.002588         4.44         491.67         144.37         0.41           Upper Truckee Ri         1553.35         Q 50         4072.00         6287.14         6293.39         0.002588         6.44         491.67         144.37         0.41           Upper Truckee Ri         1553.35         Q 50         4072.00         6287.14         6293.52         6293.50         0.002586         6.24         1022.93         371.34         0.47           Upper Truckee Ri         1553.35         Q 500         8476.00         6287.14         6292.68         6293.10         0.002266         6.24         1022.93         371.34         0.47           Upper Truckee Ri         1468.88         Q 10         2118.00         6286.70         6293.40         6294.04         0.004703         6.1		1606.41	Q 25	3140.00	6286.90	6294.12		6294.51	0.002454	4.99	658.24	204.98	0.41
Upper Truckee Ri         1606.41         Q 100         5169.00         6285.90         6295.44         6295.88         0.002645         6.04         107.39         340.35         0.48           Upper Truckee Ri         1653.35         Q 10         2118.00         6287.49         0.002845         7.25         1597.15         577.80         0.48           Upper Truckee Ri         1553.35         Q 25         3140.00         6287.14         6293.34         6294.36         0.002855         5.27         634.62         210.15         0.44           Upper Truckee Ri         1553.35         Q 50         4072.00         6287.14         6295.27         6295.33         0.002856         6.24         1022.93         371.34         0.47           Upper Truckee Ri         1553.35         Q 100         5169.00         6287.14         6296.67         6297.32         0.002842         7.15         1734.71         618.10         0.48           Upper Truckee Ri         1468.88         Q 10         2118.00         6286.70         6292.48         6.00470.3         6.19         539.78         1712.27         0.56           Upper Truckee Ri         1468.88         Q 50         4072.00         6286.70         6294.04         0.004703         6	Upper Truckee Ri	1606.41	Q 50	4072.00	6286.90	6294.80		6295.26	0.002554	5.52	813.83	271.80	0.43
Upper Truckee Ri         1606.41         Q 500         8476.00         6296.79         6297.79         6297.79         0.00285         7.25         1597.15         577.80         0.48           Upper Truckee Ri         1553.35         Q 10         2118.00         6287.14         6293.39         0.002858         4.44         491.67         144.37         0.41           Upper Truckee Ri         1553.35         Q 50         4072.00         6287.14         6293.39         0.002865         5.27         634.62         210.15         0.44           Upper Truckee Ri         1553.35         Q 500         6287.14         6295.71         6295.83         0.002869         5.78         796.62         291.88         0.46           Upper Truckee Ri         1553.35         Q 500         8476.00         6287.14         6296.67         6297.32         0.002842         7.15         1734.71         618.10         0.48           Upper Truckee Ri         1468.88         Q 10         2118.00         6286.70         6294.84         0.004703         6.19         533.78         172.27         0.56           Upper Truckee Ri         1468.88         Q 50         4072.00         6284.70         6294.44         0.004703         6.19         533.78<	Upper Truckee Ri	1606.41	Q 100	5169.00	6286.90	6295.44		6295.98	0.002604	6.04	1017.39	340.35	0.44
Upper Truckee Ri         1553.35         Q 10         2118.00         6287.14         6293.09         6293.39         0.002588         4.44         491.67         144.37         0.41           Upper Truckee Ri         1553.35         Q 25         3140.00         6287.14         6293.94         6294.36         0.002585         5.27         634.62         210.15         0.44           Upper Truckee Ri         1553.35         Q 500         4072.00         6287.14         6295.27         6295.30         0.002965         6.24         1022.93         371.34         0.47           Upper Truckee Ri         1553.35         Q 500         8476.00         6287.14         6296.67         6297.32         0.002842         7.15         1734.71         618.10         0.48           Upper Truckee Ri         1468.88         Q 10         2118.00         6286.70         6293.40         0.004703         6.19         539.78         172.27         0.56           Upper Truckee Ri         1468.88         Q 50         4470.00         6286.70         6294.40         0.004703         6.19         539.78         172.27         0.56           Upper Truckee Ri         1468.88         Q 50         8476.00         6286.70         6294.47         0.004	Upper Truckee Ri	1606.41	Q 500	8476.00	6286.90	6296.79		6297.49	0.002845	7.25	1597.15	577.80	0.48
1111       11111       11111       11111	Upper Truckee Ri	1553.35	Q 10	2118 00	6287 14	6293.09		6293 39	0.002588	4 44	491 67	144.37	0.41
Opper Truckee Ri         153.35         Q 50         4707.200         62294.61         6229.63         0.002269         6.78         796.62         291.68         0.46           Upper Truckee Ri         1553.35         Q 500         8476.00         6287.14         6295.67         6292.68         6293.10         0.004209         5.30         415.77         143.98         0.51           Upper Truckee Ri         1468.88         Q 50         4072.00         6286.70         6292.48         6293.10         0.004209         5.30         415.77         143.98         0.51           Upper Truckee Ri         1468.88         Q 50         4072.00         6286.70         6294.67         6295.49         0.004703         6.19         539.78         172.27         0.56           Upper Truckee Ri         1468.88         Q 50         4072.00         6286.70         6294.67         6292.78         0.0004713	Lipper Truckee Pi	1553.35	0.25	3140.00	6297 14	6203.08		6204.26	0.002008	5.27	-51.07 631.62	210.15	0.41
Opper Truckee Ri         1553.55         Q 100         5169.00         6287.14         6295.27         6295.83         0.002926         6.24         1022.93         371.34         0.47           Upper Truckee Ri         1553.35         Q 500         8476.00         6287.14         6296.67         6297.32         0.002926         6.24         1022.93         371.34         0.47           Upper Truckee Ri         1468.88         Q 10         2118.00         6286.70         6292.28         6293.46         6294.04         0.004209         5.30         415.77         143.98         0.51           Upper Truckee Ri         1468.88         Q 25         3140.00         6286.70         6294.41         6294.42         0.004703         6.19         539.78         172.27         0.56           Upper Truckee Ri         1468.88         Q 500         4072.00         6286.70         6294.67         6295.49         0.004703         6.19         539.78         172.27         0.56           Upper Truckee Ri         1468.88         Q 500         8476.00         6286.70         6294.67         6295.49         0.004980         7.52         810.22         340.49         0.60           Upper Truckee Ri         1465.86         Q 500         84	Upper Truckee Ri	1553.35	0.50	4072.00	6297 14	6204 64		6205 10	0.002095	5.27	706.60	210.15	0.44
Opper House N         100.00         0.00         100.00         0.00         0.000	Upper Truckee Ri	1553.35	0.100	5160.00	6207.14	6205 27		6205.10	0.002909	5.78	1022 02	231.08	0.40
Opper Truckee Ri         1468.88         Q 10         2118.00         6286.70         6297.20         00.004209         5.30         415.77         143.98         0.51           Upper Truckee Ri         1468.88         Q 25         3140.00         6286.70         6293.46         6294.04         0.004209         5.30         415.77         143.98         0.51           Upper Truckee Ri         1468.88         Q 50         4072.00         6286.70         6293.46         6294.04         0.004703         6.19         539.78         177.2.27         0.56           Upper Truckee Ri         1468.88         Q 500         5169.00         6286.70         6294.67         6295.49         0.004703         6.79         657.70         204.79         0.57           Upper Truckee Ri         1468.88         Q 500         8476.00         6286.70         6292.49         0.004802         8.66         1341.49         457.41         0.61           Upper Truckee Ri         1407.56         Q 10         2118.00         6287.09         6292.49         6292.29         6292.49         0.01016         7.44         328.64         146.35         0.78           Upper Truckee Ri         1407.56         Q 100         5169.00         6287.09         629	Upper Truckee Ri	1553.35	0.500	8476.00	6287 14	6206 67		6207 22	0.002820	7 15	172/ 71	618 10	0.47
Upper Truckee Ri         1468.88         Q 10         2118.00         6286.70         6292.68         6293.10         0.004209         5.30         415.77         143.98         0.51           Upper Truckee Ri         1468.88         Q 25         3140.00         6286.70         6293.46         6293.40         0.004209         5.39.78         172.27         0.56           Upper Truckee Ri         1468.88         Q 50         4072.00         6286.70         6294.40         0.004703         6.79         657.70         204.79         0.57           Upper Truckee Ri         1468.88         Q 100         5169.00         6286.70         6294.67         6295.49         0.004980         7.52         810.22         340.49         0.60           Upper Truckee Ri         1468.88         Q 100         2118.00         6287.09         6291.91         6292.69         0.010016         7.44         328.64         146.35         0.78           Upper Truckee Ri         1407.56         Q 50         4072.00         6287.09         6292.29         6293.56         0.011777         8.82         416.05         158.61         0.86           Upper Truckee Ri         1407.56         Q 50         4072.00         6287.09         6292.27         629	opper muckee KI	1000.00	2 300	0470.00	0207.14	0290.07		0281.32	0.002042	1.15	1/04./1	010.10	0.40
Opper Truckee Ri         1468.88         Q 25         3140.00         6286.70         6293.46         6293.40         0.004209         5.30         415.77         143.88         0.51           Upper Truckee Ri         1468.88         Q 25         3140.00         6286.70         6293.46         6294.04         0.004703         6.19         539.78         172.27         0.56           Upper Truckee Ri         1468.88         Q 100         5169.00         6286.70         6294.10         6294.78         0.004703         6.19         557.70         204.79         0.57           Upper Truckee Ri         1468.88         Q 500         8476.00         6286.70         6294.67         6295.49         0.004980         7.52         810.22         340.49         0.60           Upper Truckee Ri         1407.56         Q 10         2118.00         6286.70         6292.49         6292.59         60.010177         8.82         416.05         158.61         0.86           Upper Truckee Ri         1407.56         Q 25         3140.00         6287.09         6292.59         6293.50         0.011777         8.82         416.05         158.61         0.86           Upper Truckee Ri         1407.56         Q 100         5169.00         6287.	Lipper Truckoo Bi	1/68 99	0.10	2110.00	6306 70	6203.60		6202 40	0.004200	E 20	A1E 77	1 / 2 0 0	0.54
Opper Truckee Ri         1400.00         C20         010000         0200.70         0203.70         0203.70         0004703         0.19         039.76         172.27         0.05           Upper Truckee Ri         1468.88         Q 100         5169.00         6286.70         6294.40         0.004703         6.79         657.70         204.79         0.57           Upper Truckee Ri         1468.88         Q 500         8476.00         6286.70         6294.67         6295.49         0.004703         6.75         810.22         340.49         0.60           Upper Truckee Ri         1468.88         Q 500         8476.00         6286.70         6291.91         6292.00         0.004802         8.66         1341.49         457.41         0.61           Upper Truckee Ri         1407.56         Q 10         2118.00         6287.09         6292.99         6292.52         6293.66         0.011777         8.82         416.05         158.61         0.86           Upper Truckee Ri         1407.56         Q 500         8470.00         6287.09         6292.92         6293.64         6293.69         0.011642         10.14         637.14         222.38         0.89           Upper Truckee Ri         1407.56         Q 100         5169.	Upper Truckee RI	1400.00	0.25	2110.00	6206.70	6202.08		6204.04	0.004209	5.30	410.// E20.70	143.98	0.51
Opper Truckee Ri         1406.00         0 30         4472.00         6286.70         6294.67         6.094.73         6.7.9         657.70         204.79         0.57           Upper Truckee Ri         1468.88         Q 100         5169.00         6286.70         6294.67         6295.49         0.004913         6.7.9         657.70         204.79         0.57           Upper Truckee Ri         1468.88         Q 500         8476.00         6286.70         6294.67         6295.49         0.004980         7.52         810.22         340.49         0.60           Upper Truckee Ri         1407.56         Q 10         2118.00         6287.09         6292.49         6292.69         0.010016         7.44         328.64         1465.35         0.78           Upper Truckee Ri         1407.56         Q 50         4072.00         6287.09         6292.29         6293.56         0.01177         8.82         416.05         158.61         0.86           Upper Truckee Ri         1407.56         Q 500         8476.00         6287.09         6292.29         6293.269         0.011642         10.14         637.14         222.38         0.89           Upper Truckee Ri         1407.56         Q 500         8476.00         6287.09         6	Upper Truckee RI	1400.00	0.50	4070.00	0200.70	6204.40		6204.04	0.004703	0.19	009.78	112.21	0.00
Opper Truckee Ri         1406.60         Q 100         5109.00         6206.70         6296.47         6293.49         0.004960         7.52         610.22         340.49         0.00           Upper Truckee Ri         1468.88         Q 500         8286.70         6299.47         6299.49         0.004960         7.52         610.22         340.49         0.00           Upper Truckee Ri         1407.56         Q 10         2118.00         6287.09         6291.91         6292.29         6293.56         0.01016         7.44         328.64         146.35         0.78           Upper Truckee Ri         1407.56         Q 50         4072.00         6287.09         6292.49         6292.29         6293.56         0.011777         8.82         416.05         158.61         0.86           Upper Truckee Ri         1407.56         Q 50         4072.00         6287.09         6292.72         6293.56         0.011777         8.82         416.05         158.61         0.86           Upper Truckee Ri         1407.56         Q 100         5169.00         6287.09         6292.57         6295.27         6295.27         0.01253         9.73         503.88         186.78         0.90           Upper Truckee Ri         1407.56         Q 10<	Upper Truckee Ri	1400.88	0.100	4072.00	0280.70	6294.10		6205.40	0.004713	0.79	01.70	204.79	0.57
Upper Truckee Ri         1408.88         Q 500         8476.00         6286.70         6296.70         6297.00         0.004802         866         1341.49         457.41         0.61           Upper Truckee Ri         1407.56         Q 10         2118.00         6287.09         6291.91         6292.69         0.010016         7.44         328.64         146.35         0.78           Upper Truckee Ri         1407.56         Q 25         3140.00         6287.09         6292.49         6292.29         6293.56         0.011777         8.82         416.05         158.61         0.86           Upper Truckee Ri         1407.56         Q 50         4072.00         6287.09         6292.29         6293.56         0.011777         8.82         416.05         158.61         0.86           Upper Truckee Ri         1407.56         Q 100         5169.00         6287.09         6292.29         6293.50         0.011642         10.14         637.14         222.38         0.88           Upper Truckee Ri         1407.56         Q 100         5189.00         6287.09         6295.27         6295.27         6295.27         6295.27         6295.27         6295.27         6295.27         6295.27         0.008641         1.45         470.16         0		1468.88	Q 100	5169.00	6286.70	6294.67		6295.49	0.004980	7.52	810.22	340.49	0.60
Upper Truckee Ri         1407.56         Q 10         2118.00         6287.09         6291.91         6292.69         0.010016         7.44         328.64         146.35         0.78           Upper Truckee Ri         1407.56         Q 25         3140.00         6287.09         6292.49         6292.29         6293.56         0.011777         8.82         416.05         158.61         0.86           Upper Truckee Ri         1407.56         Q 50         4072.00         6287.09         6292.99         6292.72         6294.27         0.012593         9.73         503.88         186.78         0.90           Upper Truckee Ri         1407.56         Q 100         5169.00         6287.09         6292.72         6294.27         0.012593         9.73         503.88         186.78         0.90           Upper Truckee Ri         1407.56         Q 100         5169.00         6287.09         6295.27         6296.58         0.008664         10.46         1188.95         470.16         0.80           Upper Truckee Ri         1353.2         Q 10         2118.00         6286.88         6292.03         6292.97         0.008637         8.15         447.61         168.14         0.75           Upper Truckee Ri         1353.2         Q 50	Upper Truckee Ri	1468.88	Q 500	8476.00	6286.70	6296.01		6297.00	0.004802	8.66	1341.49	457.41	0.61
Upper Truckee Ri         1407.56         Q 25         3140.00         6287.09         6292.49         6292.29         6293.56         0.011777         8.82         416.05         158.61         0.86           Upper Truckee Ri         1407.56         Q 50         4072.00         6287.09         6292.29         6293.264         6293.264         6293.29         0.011777         8.82         416.05         158.61         0.86           Upper Truckee Ri         1407.56         Q 100         5169.00         6287.09         6293.27         6294.27         0.012593         9.73         503.88         186.78         0.90           Upper Truckee Ri         1407.56         Q 100         5169.00         6287.09         6295.27 </td <td>Upper Truckee Ri</td> <td>1407.56</td> <td>Q 10</td> <td>2118.00</td> <td>6287.09</td> <td>6291.91</td> <td></td> <td>6292.69</td> <td>0.010016</td> <td>7.44</td> <td>328.64</td> <td>146.35</td> <td>0.78</td>	Upper Truckee Ri	1407.56	Q 10	2118.00	6287.09	6291.91		6292.69	0.010016	7.44	328.64	146.35	0.78
Upper Truckee Ri         1407.56         Q 50         4472.00         6287.09         6292.99         6292.79         6294.27         0.01533         9.73         503.88         188.078         0.90           Upper Truckee Ri         1407.56         Q 500         547.00         6287.09         6292.99         6292.79         6294.27         0.012533         9.73         503.88         188.078         0.90           Upper Truckee Ri         1407.56         Q 500         8476.00         6287.09         6295.27         6296.27         6296.58         0.008664         10.46         1188.95         470.16         0.80           Upper Truckee Ri         1353.2         Q 10         2118.00         6286.88         6292.03         6292.97         0.008637         8.15         447.61         168.14         0.75           Upper Truckee Ri         1353.2         Q 50         4072.00         6286.88         6292.25         6292.16         6293.60         0.012062         9.83         485.37         175.76         0.89           Upper Truckee Ri         1353.2         Q 100         5169.00         6286.88         6292.79         6294.32         0.012527         10.58         585.47         197.16         0.92           Upper Trucke	Upper Truckee Ri	1407.56	Q 25	3140.00	6287 09	6292 49	6292 20	6293 56	0.011777	8.82	416.05	158 61	00 A& 0
Upper Truckee Ri         1407.56         Q 100         5169.00         6287.09         6293.64         6293.60         6294.99         0.011642         10.14         637.14         222.38         0.89           Upper Truckee Ri         1407.56         Q 500         8476.00         6287.09         6293.64         6293.64         6294.99         0.011642         10.14         637.14         222.38         0.89           Upper Truckee Ri         1407.56         Q 500         8476.00         6287.09         6295.27         6296.58         0.008664         10.46         1188.95         470.16         0.80           Upper Truckee Ri         1353.2         Q 10         2118.00         6286.88         6292.03         6292.97         0.008637         8.15         447.61         168.14         0.75           Upper Truckee Ri         1353.2         Q 50         4072.00         6286.88         6292.25         6292.97         0.008637         8.15         447.61         168.14         0.75           Upper Truckee Ri         1353.2         Q 50         4072.00         6286.88         6292.79         6294.32         0.01262         9.83         485.37         175.76         0.89           Upper Truckee Ri         1353.2         Q 10	Upper Truckee Ri	1407.56	Q 50	4072.00	6287 00	6202.40	6292 72	6204 27	0.012503	0.72	503.88	186.79	0.00
Upper Truckee Ri         1353.2         Q 50         8476.00         6286.88         6292.23         6292.27         0.008664         10.14         222.38         0.089           Upper Truckee Ri         1353.2         Q 10         2118.00         6286.88         6292.03         6292.27         0.005329         6.21         390.47         155.26         0.58           Upper Truckee Ri         1353.2         Q 25         3140.00         6286.88         6292.03         6292.97         0.008663         8.15         447.61         168.14         0.75           Upper Truckee Ri         1353.2         Q 50         4072.00         6286.88         6292.03         6292.97         0.008637         8.15         447.61         168.14         0.75           Upper Truckee Ri         1353.2         Q 50         4072.00         6286.88         6292.03         6292.97         0.008637         8.15         447.61         168.14         0.75           Upper Truckee Ri         1353.2         Q 100         5169.00         6286.88         6292.79         6292.97         0.01262         9.83         485.37         175.76         0.89           Upper Truckee Ri         1353.2         Q 100         5169.00         6286.88         6292.79	Upper Truckee Ri	1407.56	Q 100	5169.00	6287 00	6292.39	6293.60	6204.27	0.012000	10 1/	637 14	222 38	0.30
Upper Truckee Ri         1353.2         Q 10         2118.00         6286.88         6292.03         6292.23         0.005329         6.21         390.47         155.26         0.58           Upper Truckee Ri         1353.2         Q 25         3140.00         6286.88         6292.03         6292.97         0.008637         8.15         447.61         168.14         0.75           Upper Truckee Ri         1353.2         Q 50         4072.00         6286.88         6292.25         6292.16         6293.60         0.012062         9.83         485.37         175.76         0.89           Upper Truckee Ri         1353.2         Q 500         8476.00         6286.88         6292.79         6292.30         0.012062         9.83         485.37         175.76         0.89           Upper Truckee Ri         1353.2         Q 500         8476.00         6286.88         6292.79         6294.32         0.012062         9.83         485.37         197.16         0.92           Upper Truckee Ri         1353.2         Q 500         8476.00         6286.88         6292.42         6295.96         0.010291         11.04         1038.86         433.66         0.86	Upper Truckee Ri	1407.56	Q 500	8476.00	6287.09	6295.04	6295 27	6296 58	0.008664	10.14	1188.95	470 16	0.09
Upper Truckee Ri         1353.2         Q 10         2118.00         6286.88         6291.68         6292.23         0.005329         6.21         390.47         155.26         0.58           Upper Truckee Ri         1353.2         Q 25         3140.00         6286.88         6292.03         6292.97         0.008637         8.15         447.61         168.14         0.75           Upper Truckee Ri         1353.2         Q 50         4072.00         6286.88         6292.25         6292.16         6293.60         0.012062         9.83         485.37         175.76         0.89           Upper Truckee Ri         1353.2         Q 100         5169.00         6286.88         6292.79         6292.79         6294.32         0.012062         9.83         485.37         175.76         0.89           Upper Truckee Ri         1353.2         Q 100         5169.00         6286.88         6292.79         6294.32         0.012267         10.58         585.47         197.16         0.92           Upper Truckee Ri         1353.2         Q 500         8476.00         6286.88         6294.42         6295.96         0.010291         11.04         1038.86         433.66         0.86	- FF Hadido Hi			00	0201.00	0200.21	0200.27	0200.00	0.00004	.00			0.00
Upper Truckee Ri         1353.2         Q 25         3140.00         6286.88         6292.03         6292.97         0.008637         8.15         447.61         168.14         0.75           Upper Truckee Ri         1353.2         Q 50         4072.00         6286.88         6292.25         6292.16         6293.60         0.012062         9.83         485.37         175.76         0.89           Upper Truckee Ri         1353.2         Q 100         5169.00         6286.88         6292.79         6292.42         0.012052         10.58         585.47         197.16         0.92           Upper Truckee Ri         1353.2         Q 500         6286.88         6292.49         6294.42         6295.96         0.010291         11.04         1088.66         433.66         0.89           Upper Truckee Ri         1353.2         Q 500         6286.88         6294.42         6295.96         0.010291         11.04         1038.86         433.66         0.88	Upper Truckee Ri	1353.2	Q 10	2118.00	6286.88	6291.68		6292.23	0.005329	6.21	390.47	155.26	0.58
Upper Truckee Ri         1353.2         Q 50         4072.00         6286.88         6292.25         6293.60         0.012062         9.83         485.37         175.76         0.89           Upper Truckee Ri         1353.2         Q 100         5169.00         6286.88         6292.79         6292.79         6294.32         0.012062         9.83         485.37         175.76         0.89           Upper Truckee Ri         1353.2         Q 500         8476.00         6286.88         6292.42         6294.42         6295.96         0.01291         11.04         1038.86         433.66         0.86           Upper Truckee Ri         1353.2         Q 500         8476.00         6286.88         6294.42         6294.42         6295.96         0.010291         11.04         1038.86         433.66         0.86	Upper Truckee Ri	1353.2	Q 25	3140.00	6286.88	6292.03		6292.97	0.008637	8.15	447.61	168.14	0.75
Upper Truckee Ri         1353.2         Q 100         5169.00         6286.88         6292.79         6294.32         0.012527         10.58         585.47         197.16         0.92           Upper Truckee Ri         1353.2         Q 500         8476.00         6286.88         6294.42         6295.96         0.010291         11.04         1038.86         433.66         0.86           Upper Truckee Ri         Arm         Control         Contro         Contr	Upper Truckee Ri	1353.2	Q 50	4072.00	6286.88	6292.25	6292.16	6293.60	0.012062	9.83	485.37	175.76	0.89
Upper Truckee Ri         1353.2         Q 500         8476.00         6286.88         6294.42         6295.96         0.010291         11.04         1038.86         433.66         0.86	Upper Truckee Ri	1353.2	Q 100	5169.00	6286.88	6292.79	6292.79	6294.32	0.012527	10.58	585.47	197.16	0.92
	Upper Truckee Ri	1353.2	Q 500	8476.00	6286.88	6294.42	6294.42	6295.96	0.010291	11.04	1038.86	433.66	0.86

HEC-RAS Plan: SB\_UT\_STEADY FLOW River: UPPER TRUCKEE RI Reach: Upper Truckee Ri (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)	
Upper Truckee Ri	1274.44	Q 10	2118.00	6287.22	6291.58		6291.77	0.003776	3.56	594.75	303.33	0.45
Upper Truckee Ri	1274.44	Q 25	3140.00	6287.22	6292.01		6292.30	0.004457	4.31	728.97	316.21	0.50
Upper Truckee Ri	1274.44	Q 50	4072.00	6287.22	6292.37		6292.73	0.004880	4.82	844.12	330.57	0.53
Upper Truckee Ri	1274.44	Q 100	5169.00	6287.22	6292.75		6293.19	0.005157	5.32	971.62	342.41	0.56
Upper Truckee Ri	1274.44	Q 500	8476.00	6287.22	6293.73		6294.38	0.005212	6.44	1318.63	360.48	0.59
Upper Truckee Ri	1231.69	Q 10	2118.00	6287.17	6290.95	6290.86	6291.44	0.018461	5.63	376.38	318.36	0.91
Upper Truckee Ri	1231.69	Q 25	3140.00	6287.17	6291.43		6291.97	0.013346	5.89	533.09	329.94	0.82
Upper Truckee Ri	1231.69	Q 50	4072.00	6287.17	6291.80		6292.40	0.011288	6.20	657.29	332.53	0.78
Upper Truckee Ri	1231.69	Q 100	5169.00	6287.17	6292.19		6292.86	0.010114	6.57	786.21	334.94	0.76
Upper Truckee Ri	1231.69	Q 500	8476.00	6287.17	6293.19		6294.08	0.008415	7.53	1126.15	346.80	0.73
Upper Truckee Ri	1171.71	Q 10	2118.00	6286.77	6290.60		6290.84	0.005046	3.93	538.65	294.47	0.51
Upper Truckee Ri	1171.71	Q 25	3140.00	6286.77	6291.11		6291.43	0.005245	4.53	693.87	316.08	0.54
Upper Truckee Ri	1171.71	Q 50	4072.00	6286.77	6291.51		6291.89	0.005287	4.94	824.26	331.07	0.55
Upper Truckee Ri	1171.71	Q 100	5169.00	6286.77	6291.92		6292.37	0.005284	5.37	962.11	340.42	0.56
Upper Truckee Ri	1171.71	Q 500	8476.00	6286.77	6292.98		6293.61	0.005134	6.36	1333.09	358.11	0.58
Upper Truckee Ri	1130.51	Q 10	2118.00	6285.82	6290.45		6290.63	0.004214	3.46	612.22	352.76	0.46
Upper Truckee Ri	1130.51	Q 25	3140.00	6285.82	6290.98		6291.22	0.003880	3.91	802.51	361.24	0.46
Upper Truckee Ri	1130.51	Q 50	4072.00	6285.82	6291.39		6291.68	0.003716	4.27	952.72	363.48	0.47
Upper Truckee Ri	1130.51	Q 100	5169.00	6285.82	6291.82		6292.16	0.003666	4.67	1106.74	365.81	0.47
Upper Truckee Ri	1130.51	Q 500	8476.00	6285.82	6292.90		6293.40	0.003608	5.62	1509.57	384.53	0.49
Upper Truckee Ri	1043.49	Q 10	2118.00	6285.72	6290.04	6289.10	6290.26	0.004408	3.72	568.97	304.20	0.48
Upper Truckee Ri	1043.49	Q 25	3140.00	6285.72	6290.57	6289.59	6290.85	0.004407	4.26	736.53	321.13	0.50
Upper Truckee Ri	1043.49	Q 50	4072.00	6285.72	6290.98	6289.91	6291.32	0.004406	4.68	872.65	344.02	0.51
Upper Truckee Ri	1043.49	Q 100	5169.00	6285.72	6291.39	6290.26	6291.80	0.004400	5.13	1015.19	348.22	0.52
Upper Truckee Ri	1043.49	Q 500	8476.00	6285.72	6292.45	6291.08	6293.04	0.004401	6.16	1408.27	405.17	0.54

<u>Appendix B</u>

PHOTO INVENTORY

## Project Area Photographs – west of the Upper Truckee River



Photo Pt #05

Photo Pt #06





## Project Area Photographs – west of the Upper Truckee River



CIP #95117











## Project Area Photographs – west of the Upper Truckee River



Photo Pt #45

Photo Pt #47



Photo Pt #46

Photo Pt #48

## Project Area Photographs – west of the Upper Truckee River





Photo Pt #53 Photo Pt #54


### San Bernardino Class 1 Bike Trail Project

### Project Area Photographs – west of the Upper Truckee River





### San Bernardino Class 1 Bike Trail Project

# Project Area Photographs – west of the Upper Truckee River



2018/04/30

Photo Pt #69

## San Bernardino Class 1 Bike Trail Project <u>CIP 95117</u> Project Area Photographs – east of the Upper Truckee River





Photo Pt #74



## San Bernardino Class 1 Bike Trail Project <u>CIP 95117</u> Project Area Photographs – east of the Upper Truckee River





Photo Pt #79



## San Bernardino Class 1 Bike Trail Project CIP 95117 Project Area Photographs – east of the Upper Truckee River











## San Bernardino Class 1 Bike Trail Project <u>CIP 95117</u> Project Area Photographs – east of the Upper Truckee River







Photo Pt #92



Appendix C

DRAFT FEASIBILITY REPORT COMMENTS AND RESPONSES

	San Bernardino Class 1 Bike Trail Project						
		Comme	nts During Development of Feasibility Report				
#	Date	Communication	Questions/Comments/Concerns				
1	11/12/2018	phone call	I'm concerned about the County impacting my property, specifically, will the County need an easement through my parcel to install the proposed bike facility? Answer: No. If your property is situated along W or E San Bernardino Ave, the existing County road right-of-way will be sufficient to install the proposed Class 3 Bike Route (signage and pavement markings on the roadway). Example below.				
			CHO BIKE ROUTE				
			Why was <b>Alternative 3</b> developed? This alignment looks so much longer.				
2	12/5/2018	public meeting open discussion	Answer: This alignment was developed to take advantage of the top of bank elevation on each side of the river. The top of bank elevations at this location are somewhat equal, therefore minimizing the length of the proposed bridge crossing.				
	12/5/2018	public meeting open discussion	Will the bridge elevation be designed to clear the river's 100-year storm event?				
3			How about 500-year?				
•			Answer: The bridge elevation and the 100-year storm event will be part of the design criteria.				
			What will be the environmental impacts to the river?				
4	12/5/2018	public meeting open discussion	Answer: The abutment design and location will be located such that they avoid negative impacts to the river. Opportunities do exist, as part of the project, to address some of the environmental concerns related to streambank erosion and other negative impacts to the river.				
			What will the bridge look like?				
5	12/5/2018	public meeting open discussion	Answer: The bridge will be similar to the Sawmill Bike Path Bridge at the intersection of Sawmill Road and US Highway 50, however, height and length will vary. The bridge is classified as a pre-manufactured steel truss bridge with a weathering steel finish.				
		public meetina	There are existing parking spots in Tahoe Paradise Park near the clubhouse. What impacts are there when the bike route goes through this area?				
6	12/5/2018	open discussion	Answer: Impacts to parking spots will be minimized and further evaluated during the design phase.				

	San Bernardino Class 1 Bike Trail Project								
		Comme	nts During Development of Feasibility Report						
#	Date	Communication	Questions/Comments/Concerns						
7	12/5/2018	public meeting open discussion	Please provide clarification of the different classes of bike path through the proposed alignment. Answer: See below from the public meeting's presentation.						
8	12/5/2018	public meeting open discussion	<ul><li>Will E San Bernardino Ave need to be repaved or widened to accommodate the Class 3 Bike Route?</li><li>Answer: No. The County is constantly re-evaluating conditions of its roadways. Any repaving of E San Bernardino Ave will be independent of this project.</li></ul>						
9	12/5/2018	public meeting open discussion	Are there any plans to improve the intersection at Apache Ave and US Highway 50 in Meyers? Are there plans for Apache Ave to improve bike/pedestrian access? Answer:Yes to both questions. They will be part of a future County project(s).						

	San Bernardino Class 1 Bike Trail Project Comments During Development of Feasibility Report							
#	Date	Communication	Questions/Comments/Concerns					
10	12/5/2018	public meeting open discussion	What is the plan, if any, for the potential of parking at the end of W San Bernardino? Answer: The project does not plan on designating this area for parking. However, vehicles are allowed to park within the public right-of-way, exceptions are during active snow removal operations.					
11	12/5/2018	public meeting open discussion	Has the County been in coordination with State Parks relative to its plans to install a bridge over the river near the golf course? Answer:Yes. State Parks is part of the project development team and technical advisory committee. State Parks will coordinate with the County as appropriate.					
12	12/5/2018	5/2018 public meeting open discussion How does this project relate to or interact with the State Parks golf cours project? Answer: The County's project is independent of the State Parks' project a golf course						
13	12/5/2018	public meeting       What are the plans for snow removal?         public meeting       Answer: When complete, the project will be added to the County's pathway system for winter snow removal operations.						
14	12/5/2018	public meeting open discussion	Will there be a layer of snow for cross-country skiers or other winter activities? Answer: This will be weather dependent. The pathway will be open year-round for public use.					
15	12/5/2018	public meeting open discussion	Has there been a cost comparison or cost/benefit analysis for the various alternatives? What about the "do-nothing" alternative. Answer: A preliminary cost comparison will be included in the Final Feasibility Report. A "do-nothing" alternative was not identified in the Draft Feasibility Report because this does not meet the goals and objectives of the project. Furthermore, keeping the existing conditions as-is is not consistent with the Meyers Area Plan and the Lake Tahoe Basin's Active Transportation Plan.					
16	12/5/2018	public meeting open discussion	Comment: Many expressed that safety as a bicyclist is a huge benefit as it relates to the current route towards US Highway 50, if the park is the final destination.					
17	12/5/2018	public meeting open discussion	How will the project affect the "walking score" related to real estate values? Answer: The County is unfamiliar with a "walking score". There is no quantifiable data or value to obtain this score. Real estate values are subject to the current market of which the County has no control.					
18	12/5/2018	public meeting open discussion	Are there any considerations for solar lighting along the pathway? Answer: The project currently does not contemplate installation of any lighting along the path's alignment.					
19	12/5/2018	public meeting open discussion	Will any trees have to be removed? Answer: Yes. All three alternatives show potential for trees being removed to construct the pathway. The number of trees to be removed depends on the preferred alternative alignment.					

	San Bernardino Class 1 Bike Trail Project Comments During Development of Feasibility Report							
#	Date	Communication	Questions/Comments/Concerns					
20	12/5/2018	public meeting open discussion	Is the entire project within a stream environment zone (SEZ) area, and if not, where is the SEZ area? Answer: Reference is made to Figure 8 of the Draft Feasibility Report wherein the exhibit shows the SEZ boundary as Land Capability 1a, High Hazard Lands.(Disclaimer:The SEZ boundary has not been verified. A request for Land Capability Verification was submitted to the Tahoe Regional Planning Agency on May 15, 2018.)					
21	12/5/2018	2018 public meeting open discussion Answer: Outside expertise will be consulted to understand the impacts of removing debris in the Upper Truckee River.						
22	212/5/2018public meeting open discussionWill the bridge be able to support a fire truck?Answer: In the case of a single steering axle fire truck weighing 24 this will exceed the weight limit of a shared use path bridge. The p will be rated to handle a standard H-10 truck, or 20,000 pounds.							
23	12/5/2018	public meeting comment form	<ol> <li>Snow removal an issue, Park/ E San Bernardino Ave side</li> <li>Bridge needs lighting</li> <li>Prefer Alternative #1</li> </ol>					
24	12/5/2018	public meeting comment form	I'm totally delighted to have a new bridge across the Upper Truckee River. I ride a bicycle often. I prefer not to sneak across the river on the 6th hole of the gold course. I'm not interested in the W San Bernardino Ave however. I need to head towards the big meadow with the Amacker barn to get back to View Cir. Hope I can find a dirt path.					
25	12/12/2018	Tahoe agency meeting	Based on the Project Development Team meeting on 12/12/18, Alternative 3 seems preferable. New land disturbance would be minimized due to the current access road, and a single span bridge may be more economically fesible. If the sheet pile protecting STPUD's supply line is removed, a grade control structure would likely be necessary.					

	San Bernardino Class 1 Bike Trail Project								
		Comme	nts During Development of Feasibility Report						
#	Date	Communication	Questions/Comments/Concerns						
7	12/5/2018	public meeting open discussion	Please provide clarification of the different classes of bike path through the proposed alignment. Answer: See below from the public meeting's presentation.						
8	12/5/2018	public meeting open discussion	<ul><li>Will E San Bernardino Ave need to be repaved or widened to accommodate the Class 3 Bike Route?</li><li>Answer: No. The County is constantly re-evaluating conditions of its roadways. Any repaving of E San Bernardino Ave will be independent of this project.</li></ul>						
9	12/5/2018	public meeting open discussion	Are there any plans to improve the intersection at Apache Ave and US Highway 50 in Meyers? Are there plans for Apache Ave to improve bike/pedestrian access? Answer:Yes to both questions. They will be part of a future County project(s).						

	San Bernardino Class 1 Bike Trail Project Comments During Development of Feasibility Report							
#	Date	Communication	Questions/Comments/Concerns					
10	12/5/2018	public meeting open discussion	What is the plan, if any, for the potential of parking at the end of W San Bernardino? Answer: The project does not plan on designating this area for parking. However, vehicles are allowed to park within the public right-of-way, exceptions are during active snow removal operations.					
11	12/5/2018	public meeting open discussion	Has the County been in coordination with State Parks relative to its plans to install a bridge over the river near the golf course? Answer:Yes. State Parks is part of the project development team and technical advisory committee. State Parks will coordinate with the County as appropriate.					
12	12/5/2018	5/2018 public meeting open discussion How does this project relate to or interact with the State Parks golf cours project? Answer: The County's project is independent of the State Parks' project a golf course						
13	12/5/2018	public meeting       What are the plans for snow removal?         public meeting       Answer: When complete, the project will be added to the County's pathway system for winter snow removal operations.						
14	12/5/2018	public meeting open discussion	Will there be a layer of snow for cross-country skiers or other winter activities? Answer: This will be weather dependent. The pathway will be open year-round for public use.					
15	12/5/2018	public meeting open discussion	Has there been a cost comparison or cost/benefit analysis for the various alternatives? What about the "do-nothing" alternative. Answer: A preliminary cost comparison will be included in the Final Feasibility Report. A "do-nothing" alternative was not identified in the Draft Feasibility Report because this does not meet the goals and objectives of the project. Furthermore, keeping the existing conditions as-is is not consistent with the Meyers Area Plan and the Lake Tahoe Basin's Active Transportation Plan.					
16	12/5/2018	public meeting open discussion	Comment: Many expressed that safety as a bicyclist is a huge benefit as it relates to the current route towards US Highway 50, if the park is the final destination.					
17	12/5/2018	public meeting open discussion	How will the project affect the "walking score" related to real estate values? Answer: The County is unfamiliar with a "walking score". There is no quantifiable data or value to obtain this score. Real estate values are subject to the current market of which the County has no control.					
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19	12/5/2018	public meeting open discussion	Will any trees have to be removed? Answer: Yes. All three alternatives show potential for trees being removed to construct the pathway. The number of trees to be removed depends on the preferred alternative alignment.					

	San Bernardino Class 1 Bike Trail Project Comments During Development of Feasibility Report							
#	Date	Communication	Questions/Comments/Concerns					
20	12/5/2018	public meeting open discussion	Is the entire project within a stream environment zone (SEZ) area, and if not, where is the SEZ area? Answer: Reference is made to Figure 8 of the Draft Feasibility Report wherein the exhibit shows the SEZ boundary as Land Capability 1a, High Hazard Lands.(Disclaimer:The SEZ boundary has not been verified. A request for Land Capability Verification was submitted to the Tahoe Regional Planning Agency on May 15, 2018.)					
21	12/5/2018	Will the river debris be addressed? Will the river debris be addressed? Other discussion open discussion Answer: Outside expertise will be consulted to understand the impacts of removing debris in the Upper Truckee River.						
22	12/5/2018	public meeting open discussion	Will the bridge be able to support a fire truck? Answer: In the case of a single steering axle fire truck weighing 24,000 pound, this will exceed the weight limit of a shared use path bridge. The proposed bridge will be rated to handle a standard H-10 truck, or 20,000 pounds.					
23	12/5/2018	public meeting comment form	<ol> <li>Snow removal an issue, Park/ E San Bernardino Ave side</li> <li>Bridge needs lighting</li> <li>Prefer Alternative #1</li> </ol>					
24	12/5/2018	public meeting comment form	I'm totally delighted to have a new bridge across the Upper Truckee River. I ride a bicycle often. I prefer not to sneak across the river on the 6th hole of the gold course. I'm not interested in the W San Bernardino Ave however. I need to head towards the big meadow with the Amacker barn to get back to View Cir. Hope I can find a dirt path.					
25	12/12/2018	Tahoe agency meeting	Based on the Project Development Team meeting on 12/12/18, Alternative 3 seems preferable. New land disturbance would be minimized due to the current acces road, and a single span bridge may be more economically fesible. If the sheet pile protecting STPUD's supply line is removed, a grade control structure would likely be necessary.					

Appendix D

ALTERNATIVE ROM CONSTRUCTION ESTIMATES

San Bernardino Class 1 Bike Trail Project Alternative Rough Order of Magnitude (ROM) Preliminary Construction Cost Estimate								
	ALTERNATIVE 1							
ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT OF MEASURE	UN (in	NIT PRICE ITEM TOTA		M TOTAL Figures)	
1	Mobilization	1	LS	\$	60,000	\$	60,000	
2	Traffic Control	1	LS	\$	10,000	\$	10,000	
3	Sweeping	100	DAY	\$	250	\$	25,000	
4	Trench and Excavation Safety	1	LS	\$	10,000	\$	10,000	
5	Install & Maintain Temporary BMPs	1	LS	\$	30,000	\$	30,000	
6	Clearing & Grubbing	1	LS	\$	25,000	\$	25,000	
7	Tree Removal	10	EA	\$	1,000	\$	10,000	
8	Roadway Excavation	675	CY	\$	50	\$	33,733	
9	Class 2 Aggregate Base	181	CY	\$	200	\$	36,200	
10	Hot Mix Asphalt (Type A)	364	TON	\$	150	\$	54,648	
11	Structure Excavation (Bridge)	100	CY	\$	200	\$	20,000	
12	Structure Backfill (Bridge)	120	CY	\$	150	\$	18,000	
13	Import Borrow	815	CY	\$	50	\$	40,750	
14	Structural Concrete, Bridge Footing	50	CY	\$	1,200	\$	60,000	
15	Structural Concrete, Bridge	100	CY	\$	1,500	\$	150,000	
16	Bar Reinforcing Steel (Bridge)	9,500	LB	\$	3	\$	28,500	
17	Prefabricated Steel Truss Bridge	1	LS	\$	500,000	\$	500,000	
18	18" Plastic Pipe	80	LF	\$	200	\$	16,000	
19	18" Steel Flared End Section	4	EA	\$	1,000	\$	4,000	
20	Rock Slope Protection	436	CY	\$	150	\$	65,400	
21	Tubular Steel Railing	1	LS	\$	15,000	\$	15,000	
22	Furnish Single Sheet Aluminum Sign	57	SQFT	\$	100	\$	5,650	
23	Roadsign Sign - One Post	16	EA	\$	300	\$	4,800	
24	Paint Traffic Stripe (1-Coat)	1,214	LF	\$	2	\$	2,429	
25	Pavement Markings	230	SQFT	\$	2	\$	460	
26	Revegetation	1	LS	\$	30,000	\$	30,000	
		Subtotal		\$		1,	255,570	
	Conting	jency (20%)		\$			251,115	
		Total		\$		1,	506,685	

Construction Management (25%) \$ 376,672

#### CON PHASE GRAND TOTAL \$ 1,883,357

San Bernardino Class 1 Bike Trail Project Alternative Rough Order of Magnitude (ROM) Proliminary Construction Cost Estimate									
ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT OF MEASURE	UN (in	NIT PRICE ITEM TOTA in Figures) (in Figures		M TOTAL Figures)		
1	Mobilization	1	LS	\$	60,000	\$	60,000		
2	Traffic Control	1	LS	\$	10,000	\$	10,000		
3	Sweeping	100	DAY	\$	250	\$	25,000		
4	Trench and Excavation Safety	1	LS	\$	10,000	\$	10,000		
5	Install & Maintain Temporary BMPs	1	LS	\$	30,000	\$	30,000		
6	Clearing & Grubbing	1	LS	\$	25,000	\$	25,000		
7	Tree Removal	15	EA	\$	1,000	\$	15,000		
8	Roadway Excavation	675	CY	\$	50	\$	33,733		
9	Class 2 Aggregate Base	181	CY	\$	200	\$	36,200		
10	Hot Mix Asphalt (Type A)	364	TON	\$	150	\$	54,648		
11	Structure Excavation (Bridge)	100	CY	\$	200	\$	20,000		
12	Structure Backfill (Bridge)	120	CY	\$	150	\$	18,000		
13	Import Borrow	815	CY	\$	50	\$	40,750		
14	Structural Concrete, Bridge Footing	50	CY	\$	1,200	\$	60,000		
15	Structural Concrete, Bridge	100	CY	\$	1,500	\$	150,000		
16	Bar Reinforcing Steel (Bridge)	9,500	LB	\$	3	\$	28,500		
17	Prefabricated Steel Truss Bridge	1	LS	\$	500,000	\$	500,000		
18	18" Plastic Pipe	80	LF	\$	200	\$	16,000		
19	18" Steel Flared End Section	4	EA	\$	1,000	\$	4,000		
20	Rock Slope Protection	436	CY	\$	150	\$	65,400		
21	Tubular Steel Railing	1	LS	\$	15,000	\$	15,000		
22	Furnish Single Sheet Aluminum Sign	57	SQFT	\$	100	\$	5,650		
23	Roadsign Sign - One Post	16	EA	\$	300	\$	4,800		
24	Paint Traffic Stripe (1-Coat)	1,214	LF	\$	2	\$	2,429		
25	Pavement Markings	230	SQFT	\$	2	\$	460		
26	Revegetation	1	LS	\$	30,000	\$	30,000		
		Subtotal		\$		1,	260,570		
Contingency (20%) \$							252,115		
		Total		\$		1,	512,685		

Construction Management (25%) \$ 378,172

#### CON PHASE GRAND TOTAL \$ 1,890,857

San Bernardino Class 1 Bike Trail Project Alternative Rough Order of Magnitude (ROM) Preliminary Construction Cost Estimate								
	ALTERNATIVE 3							
ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT OF MEASURE	UN (in	IIT PRICE ITEM TOTA Figures) (in Figures		M TOTAL Figures)	
1	Mobilization	1	LS	\$	58,000	\$	58,000	
2	Traffic Control	1	LS	\$	10,000	\$	10,000	
3	Sweeping	100	DAY	\$	250	\$	25,000	
4	Trench and Excavation Safety	1	LS	\$	10,000	\$	10,000	
5	Install & Maintain Temporary BMPs	1	LS	\$	30,000	\$	30,000	
6	Clearing & Grubbing	1	LS	\$	25,000	\$	25,000	
7	Tree Removal	20	EA	\$	1,000	\$	20,000	
8	Roadway Excavation	792	CY	\$	50	\$	39,600	
9	Class 2 Aggregate Base	212	CY	\$	200	\$	42,400	
10	Hot Mix Asphalt (Type A)	428	TON	\$	150	\$	64,152	
11	Structure Excavation (Bridge)	100	CY	\$	200	\$	20,000	
12	Structure Backfill (Bridge)	120	CY	\$	150	\$	18,000	
13	Import Borrow	815	CY	\$	50	\$	40,750	
14	Structural Concrete, Bridge Footing	50	CY	\$	1,200	\$	60,000	
15	Structural Concrete, Bridge	100	CY	\$	1,500	\$	150,000	
16	Bar Reinforcing Steel (Bridge)	9,500	LB	\$	3	\$	28,500	
17	Prefabricated Steel Truss Bridge	1	LS	\$	425,000	\$	425,000	
18	18" Plastic Pipe	80	LF	\$	200	\$	16,000	
19	18" Steel Flared End Section	4	EA	\$	1,000	\$	4,000	
20	Rock Slope Protection	436	CY	\$	150	\$	65,400	
21	Tubular Steel Railing	1	LS	\$	15,000	\$	15,000	
22	Furnish Single Sheet Aluminum Sign	57	SQFT	\$	100	\$	5,650	
23	Roadsign Sign - One Post	16	EA	\$	300	\$	4,800	
24	Paint Traffic Stripe (1-Coat)	1,426	LF	\$	2	\$	2,851	
25	Pavement Markings	230	SQFT	\$	2	\$	460	
26	Revegetation	1	LS	\$	35,000	\$	35,000	
		Subtotal		\$		1,	215,563	
	Conting	jency (20%)		\$			243,113	
		Total		\$		1,	458,676	

Construction Management (25%) \$ 364,670

CON PHASE GRAND TOTAL \$ 1,823,346