

Arlington Avenue Bridges Project

Feasibility Study

Final

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Prepared for

Regional Transportation Commission of Washoe County

In cooperation with

City of Reno

Prepared by

Jacobs *in conjunction with*  **Stantec**



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Acronyms and Abbreviations

BUILD	Better Utilizing Investments to Leverage Development
cfs	cubic feet per second
CIP	cast-in-place
CLOMR	Conditional Letter of Map
CS-N1	Clear Span Concept: Underdeck Arch
CS-N2	Clear Span Concept: Rigid Frame
CS-N3	Clear Span Concept: Tied Arch
CTWCD	Carson-Truckee Water Conservancy District
CWA	Clean Water Act
EB-NS1	Elevated Bridge Concept: Precast Concrete Girders
EB-NS2	Elevated Bridge Concept: Cast-in-Place Concrete Box
EB-NS3	Elevated Bridge Concept: Steel I-Girders
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FY	Fiscal Year
HEC-RAS	Hydrologic Engineering Center (HEC) in Davis, California, developed River Analysis System (RAS) to aid hydraulic engineers in channel flow analysis and floodplain determination.
KTMB	Keep Truckee Meadows Beautiful
LOS	level of service
LWCF	Land and Water Conservation Funds
MBTA	Migratory Bird Treaty Act
NDEP	Nevada Division of Environmental Protection
NDOT	Nevada Department of Transportation
NDSL	Nevada Division of State Lands
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act of 1966
NLT	Nevada Land Trust
NOFO	Notice of Funding Opportunity
NRHP	National Register of Historic Places
PEL	Planning and Environmental Linkages
Project	Arlington Avenue Bridges Project
RTC	Regional Transportation Commission of Washoe County

Arlington Bridges Feasibility Study

RTP	Regional Transportation Plan
SP-N1	Single Pier Concept: Precast Concrete Girders
SP-N2	Single Pier Concept: Cast-in-Place Concrete Box
SP-N3	Single Pier Concept: Steel I-Girders
SWG	Stakeholder Working Group
TAC	Technical Advisory Committee
TRFMA	Truckee River Flood Management Authority
USACE	United States Army Corps of Engineers
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1. Introduction and Study Background

Spanning the Truckee River in the Riverwalk District of downtown Reno, Nevada (Figure 1), the Arlington Avenue Bridges are identified as Nevada Department of Transportation (NDOT) bridges B-1531 (south) and B-1532 (north). The two bridges were built in 1921 (north) and 1938 (south) and rehabilitated in 1967. The north bridge is a concrete tee beam bridge that measures 122 feet long and 76 feet wide, with its largest span measuring 40 feet. The south bridge is a rigid frame structure with a clear span of 48 feet and a width of 60 feet. The bridges are located at an approximate latitude/longitude of +39.52464, -119.81667 / 39°31'29" North, 119°49'00" West, and universal transverse Mercator (UTM) coordinate of Zone 11N / 257891 East / 4378787 North.



Figure 1. Project Location

Both bridges are structurally deficient and need to be replaced, as shown in the Regional Transportation Commission of Washoe County's (RTC's) 2040 Regional Transportation Plan (RTP) adopted in 2017 and amended in 2018; and RTC's recently approved and adopted 2050 RTP. The goal of the Feasibility Study is to reduce the range of possible bridge types and aesthetic themes through engineering analysis and public outreach.

1.1 Purpose and Need

The purpose and need statement describes the intention of the Arlington Avenue Bridges Project (Project) and states the problems the Project will address. Ultimately, it sets the stage for developing and evaluating possible improvement alternatives but is not mode-specific or biased toward a particular solution. Additional factors considered in evaluating potential alternatives must include input from resource agencies, local governments, and the public; cost; and impacts to the human and natural environment. A purpose and need statement is used in Planning and Environmental Linkages (PEL) and National Environmental Policy Act of 1969 (NEPA) studies to articulate and focus on the specific problems to be addressed.

The purpose of the Project is to address the deteriorating condition of the bridge structures, provide community access to the Truckee River and Wingfield Park, and improve the hydraulic capacity of the Truckee River during flood events.

Existing transportation needs for the Project include the following:

- Responding to structural deficiencies of the existing bridges
 - Both of the existing bridges are categorized as structurally deficient by NDOT, meaning that the structures have damage or wear that, if not addressed, could become worse over time, leading to failure. The north bridge is also listed as scour critical (instability of the bridge foundation due to erosion of material around the bridge piers or abutments) because of the two piers located in the river channel. From the inspection reports, the bridges are deteriorating with exposed rebar and spalling concrete, as depicted in Figure 2. In addition, shear and flexural cracks are developing throughout the structural elements. While the deterioration is not critical to the bridge structure, the inspection reports recommend rehabilitation or replacement of the structure.



Figure 2. North Bridge (Number B1532), Spalling and Exposed Rebar

- Due to their deteriorated condition, NDOT is inspecting these bridges annually, which is more frequent than the standard two-year inspection cycle required by Federal Highway Administration (FHWA).

- Improving pedestrian, bicycle, transit, and traffic safety in the area of Wingfield Park
 - Wingfield Park is a high pedestrian and multi-modal user area. However, much of the existing bicycle and pedestrian infrastructure on and adjacent to the bridges is not compliant with the Americans with Disabilities Act of 1990 (ADA). There are mid-block crosswalks as well as transit stops located in the park between the two bridges. These locations either lack lighting or are no longer compliant with current lighting codes.
 - The existing railing on the edge bridges overlooking the river is sub-standard.
 - A review of the crash data indicates that, over the past five years, one non-serious crash involving a pedestrian and a motor vehicle, and one non-serious crash involving a bicycle occurred in the project area.
- Providing sufficient hydraulic capacity of the Truckee River during flood events
 - Following the floods of 1997 and 2005, additional analysis has occurred to the bridges across the Truckee River in Downtown Reno. Some of this analysis was completed as a part of the TRAction Visioning Project Report (City of Reno 2009). New modeling completed by the Truckee River Flood Management Authority and the Carson Truckee Water Conservancy District have better defined the water surface elevation during flood events. There has been a focus to reduce the number of features that restrict or impede the flow of water. Typical features that can impede flows can include bridges, piers, walls, slopes, and debris. The existing north bridge has two piers located in the river channel requiring the City of Reno maintenance staff to remove the debris during flood events to ensure water passes below the bridge and in the channel. The removal of debris is done from above with maintenance equipment parked on the bridge deck. The existing south bridge is a clear span bridge.
- Respond to regional and community plans
 - Several projects in the area and along the Truckee River have resulted in a patchwork of improvements that create a disjointed and inconsistent network of amenities. The City of Reno has approved the *Downtown Action Plan (2017)* and is reviewing and finalizing general design criteria and specifications for downtown streetscapes aimed at providing a framework for consistent downtown improvement strategies. Arlington Avenue is within these downtown plan areas and does not currently conform to some of the proposed strategies.
 - The TRAction Report called for the replacement of the existing Arlington Avenue Bridges because they did not meet the flood design criteria used as part of that report. The report called for the installation of a single 450-foot long bridge spanning the park, but it also noted that this concept would result in significant vehicular and pedestrian access changes to the park.
 - The City of Reno has completed an update to the city's Master Plan called *ReImagine Reno (2020)*. The bridges and Wingfield Park are located within the Riverwalk District and along the Truckee River Greenway Corridor. Greenway corridors are intended to protect the natural features of the area and allow pedestrians, bicyclists, and other recreational users to access a variety of public spaces. The master plan identifies the Truckee River as the most important greenway corridor in the city and calls for design elements to accommodate access along the river for community events and festivals throughout the year.
 - The Truckee River Flood Management Authority, whose goal is to create a more flood-resilient community, has developed a project plan aimed at reducing damage resulting from floods. One of the components of the Flood Management Authority's Plan is called the "Downtown Reach." Several individual projects have been identified for the Downtown Reach that are related to the protection of the bridges and the replacement or construction of floodwalls upstream and downstream of the project area.

1.2 Purpose of this Feasibility Study

This Feasibility Study for the Project presents the results of technical analysis, and public and technical input received from the community, stakeholders, and technical advisory meetings. This study summarizes the development and screening of conceptual bridge alternatives that address the Project's purpose and need. This study helps inform the project scope and limits for subsequent environmental and preliminary engineering phases of work and presents order-of-magnitude construction costs for each alternative considered. (Appendix B1)

1.3 Study Background and Context

Numerous community-level plans have been developed that have helped form the planning context for the Project. These plans help—or have helped—to guide or direct redevelopments or improvements, including engineering requirements, design themes, and environmental considerations. Prior planning studies include the 2009 City of Reno TRAction Visioning Project Report, 2017 City of Reno Downtown Action Plan, One Truckee River Management Plan (NLT and KTMB 2016), 2020 ReImagine Reno: The City of Reno Master Plan, and the 2019 City of Reno Downtown Streetscape Design Manual. These plans and their relationship to the Project are summarized in the following paragraphs.

1.3.1 City of Reno TRAction Visioning Project (2009)

The City of Reno TRAction Visioning Project was an element of the Truckee River Flood Management Project's Master Plan to evaluate flood protection and safety along the Truckee River Corridor through downtown Reno. The TRAction Visioning Project represented one step in defining the city's needs and opportunities and the constraints that exist for implementing any improvements. The study identified aesthetic and architectural themes and treatments for four downtown bridges—Sierra Street, Virginia Street, Center Street, and Lake Street crossings—plus the upstream bridges at Arlington Avenue and Booth Streets. Primary assumptions included the consideration of the “look and feel” of these six downtown bridges, and the following design criteria:

- All new bridges were assumed to have a single center pier.
- Four flood scenarios:
 - 50-year flood (13,684 cubic feet per second [cfs]) with a 2-foot freeboard¹ (clearance between the lowest point of the bottom of the bridge deck and the highest point of the water surface elevation)
 - 74-year flood (16,400 cfs) (approximate historical flood event of year 2005) with 2-foot freeboard
 - 100-year flood (20,676 cfs) with 2-foot freeboard
 - 100-year flood (20,676 cfs) with United States Army Corps of Engineers (USACE) required 4-foot freeboard to comply with USACE risk and uncertainty requirements for bridges to allow certification to FEMA flood protection level.

Information from the City of Reno TRAction Visioning Project study produced a new steady-state hydraulic model², which indicated that the downtown bridges serve as physical barriers during high river flows and would need to be replaced with structures that pass significantly higher river flows to prevent flooding in

¹ This 2-foot freeboard requirement was a result of the assumption that debris would accumulate along the bridge superstructure if the water surface elevation encroached closer than 2 feet from the bottom of the bridge

² This 2009 Hydraulic Model has since been superseded.

the downtown area. Alternatives evaluated but eliminated during the study included upstream detention, diversion channels, dredging, river widening, and debris fields. The study showed that even during the lowest flood design (50-year flood design plus 2 feet of freeboard), water comes out of the channels and floods the Wingfield Park island area between the Arlington Avenue Bridges created with the bifurcation of the Truckee River. The study evaluated the following alternatives for the Arlington Avenue Bridges:

- **Reconstruct at same locations to the current level of flood protection:** This least costly alternative would only replace the two existing bridges with a minimal amount of approach road reconstruction. Both existing bridges are considered structurally deficient and eligible for replacement under the Federal Highway Bridge Replacement and Rehabilitation Program. The bridges may require some increase in elevation to keep flood waters within the channel. Some park areas continue to flood during all four flood scenarios; this is a result of the lower elevation of some of the park island within the river bifurcation compared to the outer bank elevations and the elevation of the Arlington Avenue bridges and Arlington Avenue roadway through the middle of the park. The amphitheater is approximately the same elevation as the roadway and isn't impacted by flood waters.
- **Reconstruct with one single bridge that extends between both riverbanks:** This alternative includes construction of a single 450-foot-long six-span bridge that crosses over both existing river channels and the park. Pedestrians using the park would pass under the bridge. The bridge would be 82 feet wide and include four lanes³ of traffic with a sidewalk on both sides.

The study concluded that bridge replacement would be required, underdeck bridge supports are preferred, and reconstruction at their current location and elevation would not meet any flood design criteria and was not considered an acceptable alternative. Reconstruction with a single bridge extending between both banks was considered the acceptable alternative. Planning-level cost estimates⁴ included in the study ranged from \$19,000,000 to \$21,250,000 (based on the square foot method) for the 74- and 100-year flood designs.

1.3.2 City of Reno Downtown Action Plan (2017)

The *City of Reno Downtown Action Plan* (Downtown Action Plan) identifies priorities for downtown improvements to guide the City of Reno and the community for the next five to seven years. The plan is to be used to advance community goals for the downtown area and addresses:

- Connectivity throughout downtown to the University of Nevada Reno and the Truckee River
- Pedestrian friendliness of downtown
- Creating a clean, safe, and vibrant downtown
- The excess of weekly motels with substandard living conditions as well as blighted properties
- Homeless and transient population
- Downtown property values

The Downtown Action Plan included a market assessment to evaluate the demand and feasibility of real estate market activity downtown and identify order-of-magnitude opportunities and barriers related to development. The assessment concluded that deteriorating conditions in downtown, along with other factors, pushed demand for development to areas outside of the study area (Figure 3) and were summarized as follows:

- Housing demand within central Reno is growing; however, the downtown study area has not yet captured this demand.

³ This Study was completed prior to Arlington Avenue being restriped with only two lanes of traffic with dedicated bicycle lanes and left turn lane. Arlington Avenue will not be changed back to a four-lane facility.

⁴ Cost Estimate represents year 2009 dollars and price market conditions

- Demographic compositions within the study area are moving in diverging directions, which is an indication of the differences in market conditions within and outside the study area.
- The housing market in Reno has rebounded from the economic recession, and there is increasing demand for new housing, especially multifamily rental housing.
- Demand for retail is strong and growing in the influence area and has been driven by food and beverage establishments.
- Office demand in downtown is low, and there has been little new office development in the past decade.
- Visitation patterns in Reno are shifting, as visitation to Reno grows, while gaming revenues continue to decline.

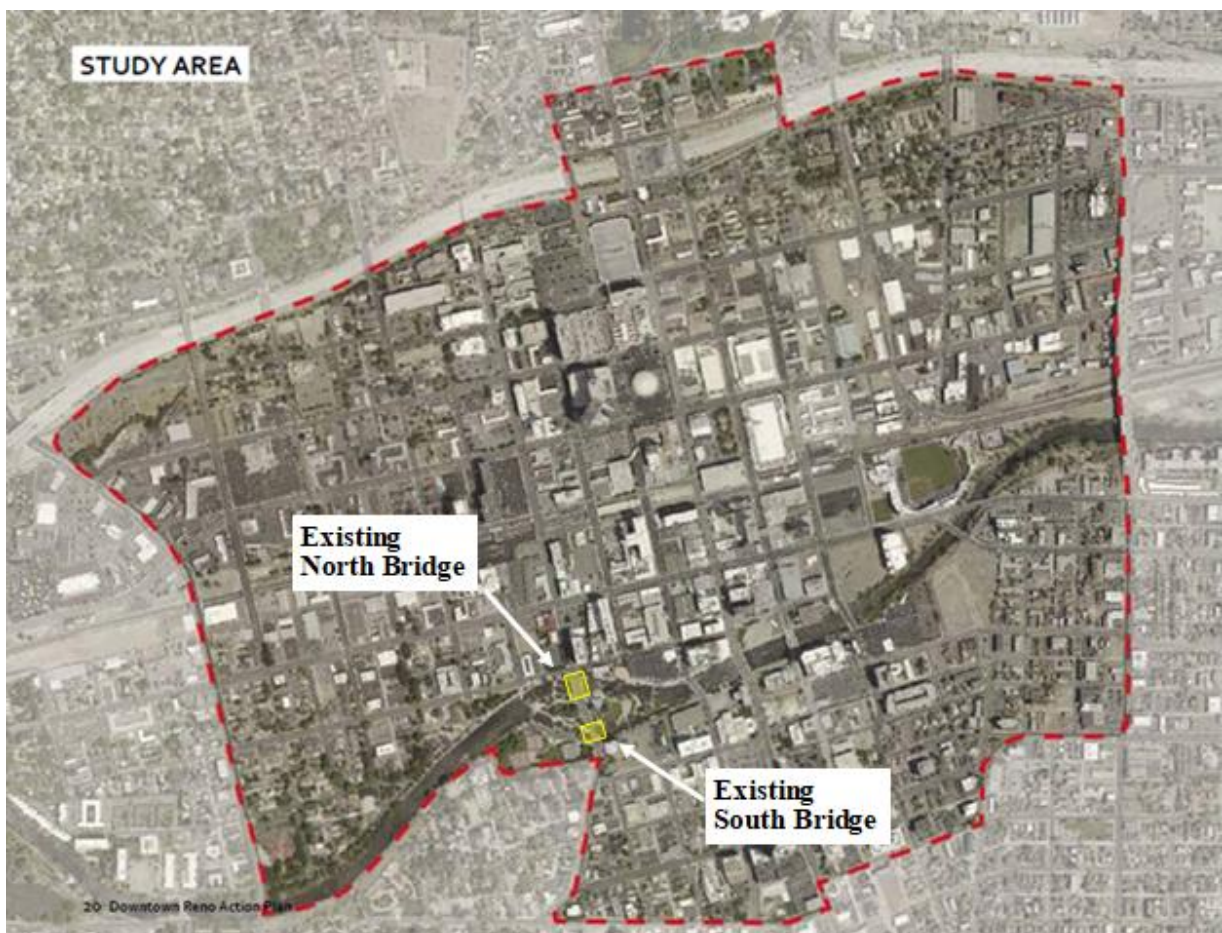


Figure 3. Market Assessment Study Area

Source: City of Reno 2017.

1.3.3 One Truckee River Management Plan (2016)

The One Truckee River Initiative is a new collaboration of public and private partners working together to realize a Truckee River that flows clear and clean; quenches our thirst; sustains the river's natural ecology, cultural resources, and wildlife; and connects residents and visitors to unparalleled opportunities for recreation and regeneration.

- The *One Truckee River Management Plan* is One Truckee River's first step toward making that shared vision a reality (NLT and KTMB 2016). Four primary goals and over 140 strategies and action items are identified that must be implemented or coordinated to achieve the One Truckee River vision. Numerous stakeholders participated during the 18-month long process to develop the plan. Phase One covers the more urban stretch of the river from West McCarran in Reno to Vista Boulevard in Sparks.

The plan's primary goals are to:

- 1) Protect water quality and ecosystem health
- 2) Create and sustain a safe, beautiful, and accessible river
- 3) Build an aware community
- 4) Ensure the sustainable management of the river

1.3.4 ReImagine Reno: The City of Reno Master Plan (2020)

The City of Reno uses *ReImagine Reno* as a multi-year, community-based Master Plan that reflects the ideas, values, and desires of the community consistent with plans, policies, and initiatives that are either in-place or underway. The plan will also assist with guiding decision-making, short-term actions, and longer-term initiatives and strategies to achieve the communities' vision. *ReImagine Reno* was divided into two phases, with Phase I centered around community outreach to obtain consensus about community vision, current and future trends, and an assessment of the previous Master Plan to determine what has worked well and needs to be revisited. Community outreach continued during Phase II and resulted in development of the updated Master Plan.

The plan notes that the Arlington Avenue Bridges are in the Riverwalk District, which serves as a focal point within the Downtown Regional Center and highlights the importance of the Truckee River as a major resource and amenity for the community. *ReImagine Reno* specifies the following criteria within the Riverwalk District:

- **Density and Intensity:**
 - Nonresidential and mixed-use development should provide a minimum floor area ratio of 1.0.
 - Multifamily development should provide a minimum density of 21 units per acre.
- **Mix of Uses:**
 - A mix of office, employment, residential, retail, restaurant, and cultural facilities will be supported.
 - Pedestrian-oriented uses should be concentrated along the Truckee River esplanade.
- **Truckee River Frontage:**
 - Buildings and public spaces adjacent to the Truckee River should be designed in accordance with the Downtown Riverfront Design Guidelines, focusing on:
 - Activating and enhancing Truckee River frontage with places for people to gather and recreate
 - Maintaining safe and adequate passage for police and fire protection
 - Maintaining the capacity of the floodway
 - Reinforcing the character, form, and function of the Riverfront esplanade

- **Transitions:**
 - A transition in the height and intensity of development should be provided south of the Truckee River where the Riverfront District abuts adjacent central neighborhoods.
- **Pedestrian/Bicycle Connectivity:**
 - Provide direct pedestrian and bicycle connections between uses and major destinations.
 - Emphasize improvements on north/south connections to and from Midtown and the Truckee River.
 - Emphasize east/west connection improvements to and from adjacent central neighborhoods.
 - Seek opportunities to enhance pedestrian and bicycle connections across the Truckee River.
- **Parking:**
 - Do not permit the addition of new surface parking along the Truckee River.
 - Utilize shared parking where feasible to decrease the amount of on-site parking needed.
 - Encourage the use of alternative transportation modes.
- **Streetscape Character:**
 - Prioritize undergrounding of utilities and incorporating streetscape enhancements, wayfinding signage, sidewalk repairs, and public art.
 - Prioritize other improvements that enhance streetscape character, functionality, and safety.

1.3.5 City of Reno Downtown Streetscape Design Manual (2019)

In 1996, the City of Reno Redevelopment Agency created the *Redevelopment District No 1. Streetscape Master Plan* in an effort to “improve upon the image of the downtown in general.” The plan was subsequently re-evaluated and updated in 2007. The new *2019 Downtown Streetscape Design Manual* is a minor revision that essentially reconfigures the 2007 version into a more succinct and user-friendly document with updated construction details based on industry standards and the vision of community stakeholders.

The primary purpose of the *Downtown Streetscape Design Manual* is to create a physical environment that is conducive to positive public activity, including both daily and special events. In an urban community, the streetscape typically includes sidewalks, utility boxes, lighting fixtures, trees and shrubs, benches, decorative elements/art, bike lanes, and transit stops. A portion of downtown Reno, including the Arlington Avenue Bridges, is also frequently used for special events; therefore, streetscaping may also include non-typical elements, such as power pedestals, in-street bollards, and related special event infrastructure.

All of the standards and regulations in the *Downtown Streetscape Design Manual* were evaluated against the following value statements:

- Principle 1.0: Development standards should be clear and easy to understand.
- Principle 2.0: The development standards must be implementable.
- Principle 3.0: There must be a balance between initial cost and long-term maintenance.
- Principle 4.0: Design standards should be unique but also consistent.
- Principle 5.0: There must be equitable sharing of costs.
- Principle 6.0: Streetscape infrastructure should benefit as many people as possible.
- Principle 7.0: Trees and other vegetation are important to the long-term success of downtown.
- Principle 8.0: Design standards should support and implement the community vision.

The City of Reno Department of Public Works is responsible for approving all improvements within a public right-of-way but may at times delegate some or all of its responsibilities to other departments or entities. The streetscape standards shall apply to both sides of any section of public street or right-of-way, designated on Figure 4, with the exception of bridges. Bridges shall be designed and improved in a style that is complimentary to the design standards contained in the study and to other bridges in the downtown area. The specific downtown streetscape standards include:

- Sidewalks shall have a minimum 6-foot-wide unrestricted pedestrian travel way at all points. Street furniture, light poles, hydrants, utility boxes, and any other elements or features shall be designed and installed in such a way as to preserve the minimum 6-foot-wide unrestricted pedestrian travel way.
- Sidewalks shall be finished in solid color concrete with a jointing pattern as set forth in the *Standard Details for Public Works Construction*.
- Landscaping shall be selected and installed in accordance with the appropriate design details contained in the Streetscape Design Standards.
- Street trees shall be selected from the approved City of Reno street tree list.
- Irrigation equipment servicing street trees and related landscaping shall be installed in a location readily accessible to City of Reno maintenance personal.
- Trees and tree wells shall be generally centered between, and in line with, streetlights, which are generally installed at intervals of 20 to 30 feet.
- Streetlights shall be generally installed at intervals of 50 to 60 feet and in line with tree wells.
- Street furniture and significant art features shall be installed in accordance with the appropriate design details based on location, available installation space, street function, and other site-specific factors.
- A streetscape configuration shall be generally consistent for the entire length of the block.

Additionally, several concepts and proposals were researched and discussed during the 2019 update but require additional consideration before adopting. These concepts included technology (e.g., smart streetlights), special events (e.g., expanded outdoor dining areas called "Streateries", parklets), placemaking (e.g., unique art integration), tree list revisions, suspended paving, and alternate soil treatments.

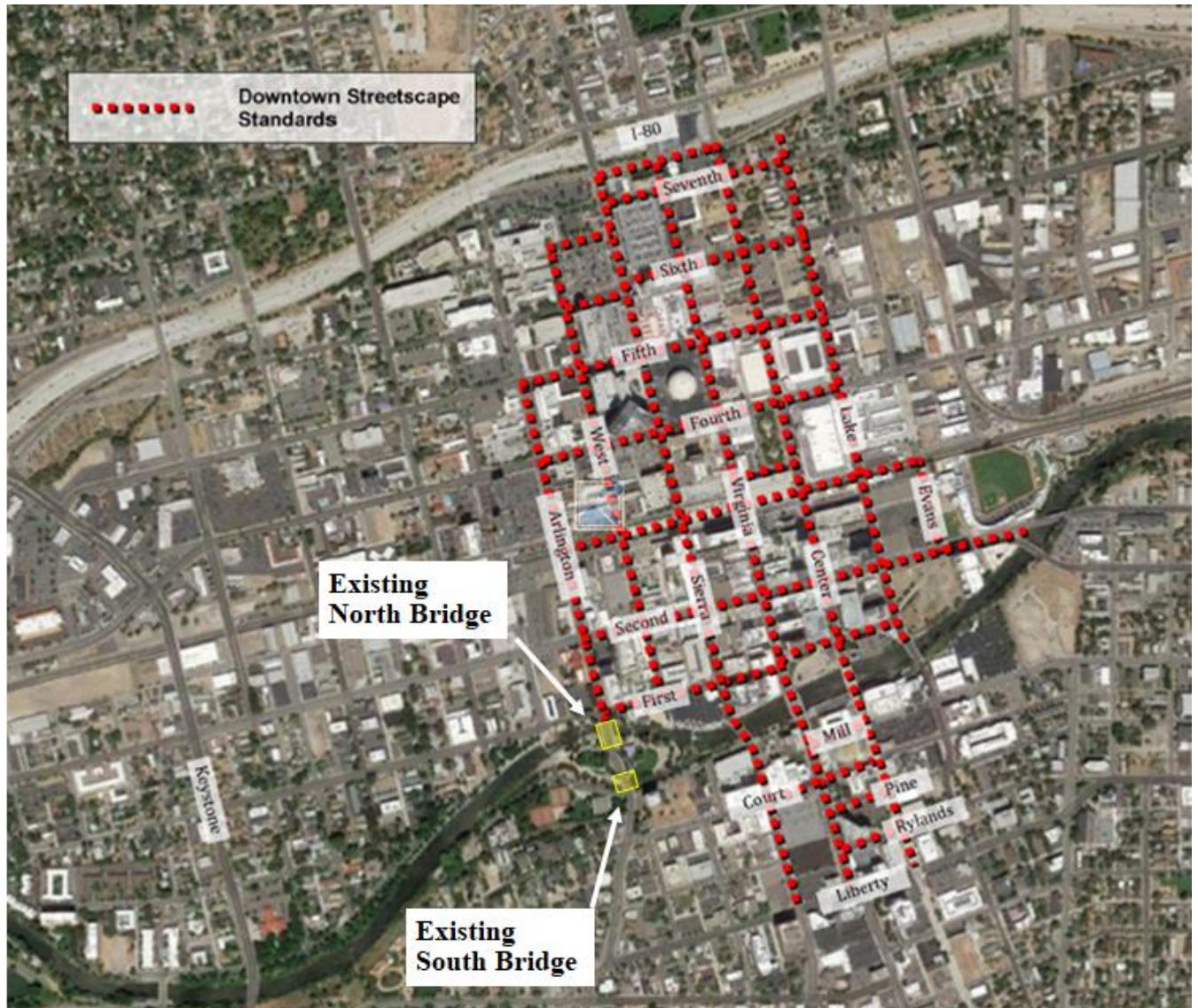


Figure 4. Downtown Streetscape Design Standards Map

Source: City of Reno 2019.

1.4 Planning and Environmental Linkages

RTC selected the PEL approach to guide this study. As part of this PEL approach, the study team developed a purpose and need statement, evaluated improvements, and recommended potential projects for RTC to evaluate further. The team also solicited public and agency input on the process and study findings. A PEL approach was used because it represents a collaborative and integrated approach that uses the information, analysis, and products developed during planning to inform the environmental review process.

This PEL study serves as the foundation for future NEPA studies that will be undertaken for the recommended alternatives. Therefore, products from this study may be carried forward into the NEPA process.

This PEL Study also aims to identify potential alternatives in advance of secured construction funding, positioning RTC Washoe to accelerate the environmental analysis and save time in implementing projects when construction funds are identified.

- Defining and developing alternatives
- Determining project costs, funding, financing, and delivery options
- Engaging with local corridor communities, regional travelers, and other interested stakeholders about issues and priorities
- Identifying significant environmental constraints that may influence design options and/or delay project development with lengthy environmental reviews
- Supporting an efficient transition to NEPA processes, final design, and construction once funding is identified

The PEL study follows FHWA and NDOT PEL guidance (NDOT 2019) regarding the integration of transportation planning and the NEPA process; this guidance encourages the use of planning studies to provide information for incorporation into future NEPA documents (23 Code of Federal Regulations [CFR] 450). FHWA promotes the use of PEL studies, largely to integrate environmental issues and public involvement with project planning and shorten the time required to take projects from planning to implementation. The PEL checklist is provided in Appendix A.

2. Corridor Conditions

Technical memoranda prepared for the study are summarized below and provided in Appendix B. In addition, supplemental information compiled and analyzed during the feasibility study process also are summarized below.

2.1 Structural Condition

The City of Reno owns the Arlington Avenue Bridges, but NDOT performs the inspections. The standard frequency for bridge inspections is biennially (every two years), but due to their deteriorated condition, NDOT is inspecting these bridges annually. During inspection, each bridge component is evaluated on function, and assigned a condition rating ranging from 9 to 0, where 9 is the best rating possible ("excellent condition") and 0 is the worst ("failed condition"). The inspection also includes the assignment of an overall condition rating, representing the overall condition of the deck, superstructure, and substructure.

The Sufficiency Rating is used by FHWA as a numerical indicator of a bridge's sufficiency to remain in service. The Sufficiency Rating is based upon a 1 to 100 scale (100 being the best), and is calculated using a formula which incorporates four factors:

- Structural Adequacy and Safety (55 percent)
- Serviceability (30 percent)
- Essentiality for Public Use (15 percent)
- Special Reductions (up to 13 percent)

Bridges categorized as structurally deficient or functionally obsolete, with a sufficiency rating of less than 50.0, may qualify for replacement using federal Highway Bridge Program (HBP) funds; those bridges with a Sufficiency Rating of 80.0 or less are eligible for rehabilitation.

The condition of the Arlington Avenue Bridges is presented in NDOT's April 2018 bridge inspection reports and summarized in Tables 1 and 2. During the NEPA analysis, the 2020 bridge inspection reports will be reviewed to determine if the sufficiency rating of the bridges are decreasing.

Table 1. Bridge B-1531 Conditions (South Arlington Avenue Bridge)

Category	Rating	Notes
Overall Condition	Poor	None
Superstructure Condition	Poor	4 out of 9; Advanced deterioration
Substructure Condition	Satisfactory	6 out of 9; minor deterioration
Deck Condition	Poor	4 out of 9; Advanced deterioration
Sufficiency Rating	55.5	out of 100; structurally deficient; not functionally obsolete

Table 2. Bridge B-1532 Conditions (North Arlington Avenue Bridge)

Category	Rating	Notes
Overall Condition	Poor	None
Superstructure Condition	Fair	5 out of 9; Minor Section Loss
Substructure Condition	Poor	4 out of 9; Advanced deterioration
Deck Condition	Poor	4 out of 9; Advanced deterioration
Sufficiency	54.5	out of 100; structurally deficient; not functionally obsolete

As depicted in Tables 1 and 2, most of the inspection categories are rated as poor. In addition, the FHWA Sufficiency Rating is close to 50.0. Based on these two inspection ratings, it was determined that replacement of the two structures is warranted.

2.2 Traffic

The Traffic Analysis Technical Memorandum (Appendix B2) presents findings related to travel demand modeling and the traffic operations analysis conducted for the Arlington Avenue Bridges, approaches, and intersections north and south of the Truckee River. In the early 2000s, Arlington Avenue, which provides vehicle access to Wingfield Park, was reduced to two lanes (one lane in each direction) and a center two-way left-turn lane and dedicated bike lanes were added. The speed limit through Wingfield Park was reduced to 25 miles per hour, with an additional reduction to 15 miles per hour at the flashing pedestrian signed crosswalk. In 2015, the average daily traffic volume on Arlington Avenue was approximately 13,500 trips.

Roadway conditions are rated on a scale that assigns performance grades from A to F, with A being excellent and F being extremely poor. This measure of congestion is called Level of Service (LOS) and is determined for the peak travel hour within a day—typically during either the morning or afternoon commute times. Figure 5 depicts graphically the different levels of service.

The traffic analysis reviewed the 2015, 2040 and 2050 travel demand models to determine the lane configuration modelled for the Arlington Avenue Bridges. All three models have a two-lane (one lane in each direction) segment coded, which corresponds to the existing lane configuration of the bridges. The NDOT count station ID 0310546 (located on Arlington Avenue, 100 feet north of West 2nd Street) recorded a daily traffic volume of approximately 13,500 vehicles in 2015, equivalent to LOS D or E. Future 2050 traffic volumes of 18,000 vehicles per day corresponds to an approximate growth rate of 0.8 percent; which is reasonable for a mature urban area, which is equivalent to LOS F.

In the next phases of NEPA documentation, more detailed traffic operation analyses are recommended, including an analysis of the Arlington Avenue corridor at least one signalized intersection past the bridges. A Synchro/HCS analysis of the intersections for horizon years 2030, 2040, and 2050 is recommended to identify the timeframe if/when the automobile traffic operation (on and around the bridge) worsen to LOS F. If appropriate, potential improvements are to be evaluated to alleviate the LOS F conditions.

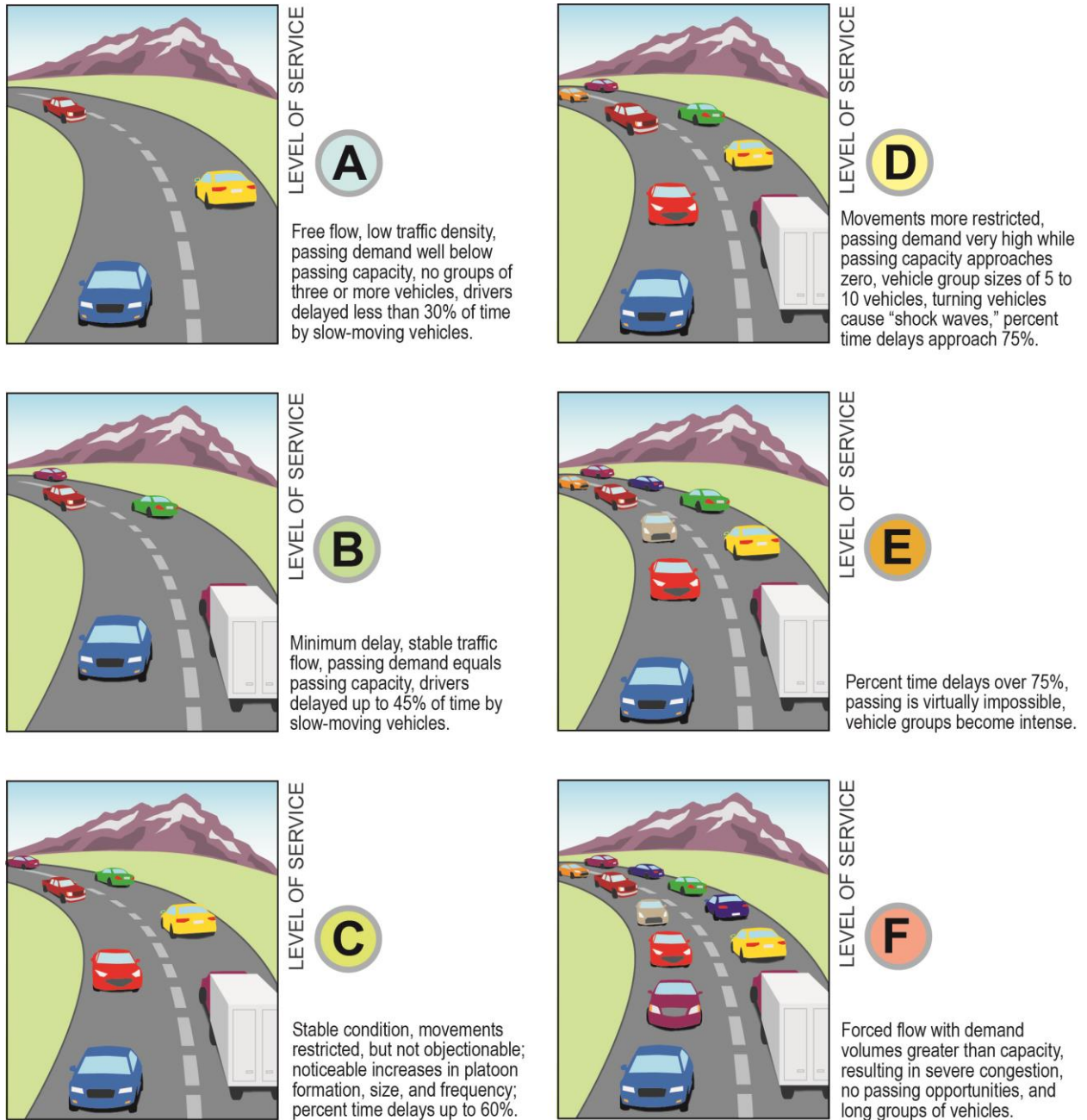


Figure 5. Levels of Service

2.3 Pedestrian, Bicycle, and Transit Uses

Sidewalks, crosswalks, and dedicated bike lanes are located along Arlington Avenue and along the adjacent street network (Appendix B3). In addition to the six path connection locations along Arlington Avenue to the park, the island of Wingfield Park can be accessed by way of three pedestrian bridges that cross the Truckee River. At-street crosswalks are located at the northern end of the north bridge at the intersection of W. First Street and at the southern end of the south bridge at Island Avenue. There is also an existing pathway that passes under the southern end of the north bridge.

Dedicated bicycle lanes begin at W. First Avenue and continue south along Arlington Avenue and Skyline Boulevard for 4 miles until its terminus with McCarran Boulevards.

RTC Transit Route 6 runs along Arlington Avenue between Plumb Lane and Fourth Street. There are two transit stops located in Wingfield Park between the two bridges, one northbound and one southbound. The average ridership is a combined deboarding and onboarding total of approximately 12 people at each stop throughout the week. Special events such as Artown during the month of July increase ridership using these transit stops.

2.4 Environmental Resources

This section briefly summarizes existing conditions for key resources identified in the project area, which include river hydraulics, historic/prehistoric resources, Section 4(f) resources, Section 6(f) resources, wildlife, wetlands and Waters of the United States, and hazardous materials.

2.4.1 River Hydraulics

The Truckee River Flood Management Authority (TRFMA) maintains a hydraulic model of the Truckee River for their flood project. The Arlington Avenue Bridges are not a part, nor have they ever been a part, in TRFMA's flood project. As such, TRFMA will not require specific water surface elevations or impose specific flood mitigation requirements, aside from not worsen the existing conditions.

The baseline of the hydrology and hydraulics are HEC-RAS 5.0.3 models distributed by Carson-Truckee Water Conservancy District (CTWCD) dated June 21, 2018. This HEC-RAS model extends from Keystone Avenue downstream to just beyond Glendale Avenue. Any hydrology, hydraulics, new adjacent development, LiDAR data or water surface elevation (WSEL) changes after June 21, 2018, including updates to the Glendale Weir were not incorporated into the model. The one exception is the construction of the Whitewater Kayak Park in 2004, which was incorporated into the CTWCD model provided to Jacobs. The complete hydraulic report is attached in Appendix B4.

A Section 408 permit is required as this Project alters the USACE Civil Works Project. The Section 408 permit will go through the local sponsor, which is the CTWCD. The CTWCD requires analysis for 14,000 cfs for this location of the Truckee River.

Local design standards, including both NDOT and the Truckee Meadows Regional Drainage Manual, have criteria for 2 feet of freeboard during the 100-year flood event, when possible. During final design, the agencies will agree upon the freeboard requirement to use, as was done for the recently constructed Virginia Street Bridge, which had a Project specific design requirement of 1 foot of freeboard during the 100-year storm event.

Therefore, the new structures must be analyzed for both the CTWCD-required 14,000 cfs scenario, and the 100-year flood scenario to ensure both conditions are met. As the Project continues to develop, the design elements of the bridges will inform the freeboard discussion and incorporate the necessary engineering requirements.

2.4.2 Historic/Prehistoric Resources

Historic properties are protected under Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) and other statutes, as well as Section 4(f) as amended and codified in the U.S. Department of Transportation (USDOT) Act of 1966, 49 U.S. Code (USC) 303 (c). Section 106 of the NHPA requires federal agencies to consider the effects that their undertakings have on historic properties, which are those properties that are included in, or eligible for, the National Register of Historic Places (NRHP). This review process ensures that federal agencies identify any potential conflicts between their undertakings and historic preservation and resolve any conflicts in the public interest. Under this feasibility study, a preliminary desktop review of available cultural resources data was conducted for the project area (Appendix B5). The research included review of available data sets to identify cultural resources and surveys completed within the project area, historic U.S. Geological Survey topographic maps and aerial imagery, and recent street view photographs.

The desktop review indicated that numerous cultural studies have been completed in the vicinity of the project area. Those studies focused on the built environment; no studies were performed for archaeological sites possibly due to the urban nature of the project area. Five previously evaluated cultural resources are located in the project area, and include the South Arlington Avenue Bridge, Winfield Park, North Arlington Avenue Bridge, Wingfield Park Dam, and Truckee River Retaining Walls. All five resources have been previously determined as not eligible for the NRHP. No prehistoric or archaeological resources have been identified in the immediate project area and pedestrian archaeological surveys are unlikely to identify any previously unrecorded resources given the high degree of development in the area.

2.4.3 Section 4(f) and 6(f) Resources

Park and recreational resources are protected by Section 4(f) of the USDOT Act of 1966 or by Section 6(f) of the Land and Water Conservation Act. Section 4(f) governs the use of land from publicly owned parks, recreation areas, wildlife and waterfowl refuges, and public or private historic sites. Several recreational properties under the City of Reno's jurisdiction are located within 0.25 mile of the project area:

- Barbara Bennett Park, Neighborhood Park, 400 Island Avenue
- Bicentennial Park, Neighborhood Park, 10 Ralston Street
- Downtown Plaza, Pocket Park, 10 N. Virginia Street
- Fulton Corner, Pocket Park, W. 1st Street and Arlington Avenue
- Lunsford Triangle, Pocket Park, Riverside Drive and Washington Street
- Powning Park, Pocket Park, 150 S. Virginia Street
- Reno Whitewater Park, Sports Complex, Truckee River
- Truckee River Greenbelt/Riverside Drive Park, Neighborhood Park, 650 Riverside Drive
- Truckee River Trail, Hiking Trail, Riverside Drive to Lake Street
- West Street Plaza, Pocket Park, 220 W. 1st Street
- Wingfield Park, Neighborhood Park, 2 S. Arlington Avenue

Section 6(f) requires that the conversion of lands or facilities acquired or improved with Land and Water Conservation Funds (LWCF) be coordinated with the U.S. Department of Interior. Only one property within 0.25 mile of the Project is listed as having used LWCF funding, the Truckee River Greenbelt located along the north shore of the Truckee River from Booth Street to Ralston Street. However, according to the City of Reno Parks Department Parks Manager, no LWCF funds were used on properties within the project area.

During the NEPA analysis, a review of Section 4(f) and Section 6(f) resources will be conducted to determine if there are additional resources that should be considered and assess potential impacts to the identified resources. (Appendix B6)

2.4.4 Wildlife and Aquatic Resources

A desktop review of publicly available data pertaining to special-status species (i.e., state- or federally listed endangered, threatened, or candidate species) and aquatic resources was conducted (Appendix B6). A review of the Nevada Natural Heritage Program biological species observation dataset and the United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) database was conducted to assess the potential presence of special-status species and sensitive habitats, as well as species protected under the Migratory Bird Treaty Act (MBTA). This review identified 11 state- or federally protected special-status species with some potential to occur within or adjacent to the project area, but no state- or federally listed species were observed during the July 2019 field visit

Results of the desktop review identified 11 state or federally protected special-status species with some potential to occur within 2 miles of the project area. No state or federally listed species were observed within the project area during the field evaluation; however, suitable habitats for Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) and Cui-ui sucker (*Chasmistes cujus*), which are federally listed fish species, is present within the entire Truckee River. Additionally, suitable nesting habitat for birds subject to federal protection under the MBTA was found to be present within the project area. No nesting bird activity was observed during the site evaluation, and nesting birds identified near the project area are expected to be acclimated to disturbance from adjacent commercial and residential activities.

The Truckee River is approximately 193 feet wide west of the Project, breaking into two waterways approximately 105 feet wide to the north and 49 feet wide to the south, combining into one 230-foot wide waterway east of the project area. The Truckee River is highly modified in the project area, with most of the banks fully cemented or rip rap/cement filled. Suitable habitats for the following special-status species were observed within and adjacent to the project area:

- Suitable nesting habitat for birds subject to the MBTA occurs within and adjacent to the project area, although no nesting bird activity was observed during the July 2019 survey.
- Nesting birds identified near the project survey area are expected to be acclimated to disturbance from pedestrian activity on the bridges, and adjacent commercial and residential activities.
- The Truckee River was originally home to the Lahontan cutthroat trout and cui-ui sucker, and potential project impacts would be addressed with a biological assessment submitted to the United States Fish and Wildlife Service (USFWS) for review and approval.

Additional details regarding environmental resources, including survey requirements, special-status species, and recommendations are presented in the Environmental Resources Technical Memorandum in Appendix B7.

2.4.5 Wetlands and Waters of the United States

In support of anticipated permitting requirements, a review of United States Geological Survey (USGS) topographic maps, USGS National Hydrography Dataset, and USFWS National Wetlands Inventory maps was conducted to assess the presence of mapped aquatic resources in the vicinity of the project area. A field evaluation of the project area was conducted to identify water resources, including potential wetlands.

The Truckee River, although highly modified within the project area (most of the river banks are fully cemented or rip rap/cement fill) is a USACE-regulated aquatic resource as it is a Traditional Navigable Water, and thus is subject to regulation under Clean Water Act (CWA) Section 404. No potential wetlands were identified within the project area.

As part of the CWA permit process, the RTC will need to analyze the Project's potential impacts upon water resources, biological, and cultural resources (i.e. Wetland Delineation, Biological Assessment, and Cultural Resources Report) to support the USACE Endangered Species Act and NHPA consultation.

2.4.6 Land Use

The Project is not expected to change existing or future land use in the area. Existing land uses are expected to remain the same in the future, as downtown mixed-use properties will continue to dominate the surrounding area. The Project will continue to support and provide access to the recreational areas along the river. (See Appendix B8).

2.4.7 Hazardous Materials

A hazardous materials screening assessment of the project area was conducted. The assessment included a site reconnaissance and records review to identify hazardous substances or petroleum products potentially present in the project area. Hazardous materials concerns include the potential presence of contaminated soil at a possible staging area (291 Court Street), and concerns related to the potential presence of asbestos and lead-based paint in existing bridges, foundations, and abutments. As the Project moves forward, materials management may be warranted if project-related soil disturbance is proposed where existing contamination has been identified. In addition, asbestos and lead surveys would be completed on the existing bridge structures prior to demolition. For additional details on hazardous materials potentially present in the project area, refer to the Hazardous Materials Technical Memorandum in Appendix B9.

3. Alternatives Development and Screening Process

As part of this feasibility study, RTC conducted planning, engineering, and outreach efforts between December 2018 and April 2021. These efforts built on the goals, objectives, need, and purpose identified in the project kick-off, agency, stakeholder, and community meetings. Presentation materials prepared for these meetings and meeting summaries are provided in Appendix E.

Bridge alternatives for the north bridge that were presented and discussed during the December 19, 2019 public meeting/open house and the February 6, 2020 Stakeholder Working Group (SWG) Meeting #1 included five alternatives: 1) a Single Pier, 2) a Clear Span, 3) an Underdeck Arch, 4) a Tied Arch, and 5) an Elevated Bridge. During these meetings, the bridge alternatives/concepts were presented for input and consideration, but discussions about possible differences between engineering requirements or environmental considerations did not occur because those details had not yet been developed and evaluated. The underdeck arch and tied arch concepts are variants of the clear span alternative, but with different above- and below- deck superstructure features. These five alternatives were carried forward into the Technical Advisory Committee (TAC-1) and TAC-2 meetings held on July 15 and August 31, 2020, respectively. Renderings of each alternative are provided in Appendix C.

The purpose of the July 15, 2020 TAC-1 meeting was to present and gain consensus on the permitting and regulatory requirements for the Project, which were discussed as environmental and engineering design constraints and criteria during SWG-1. During the TAC-1 meeting, which 20 people attended, the permitting and regulatory requirements were determined to be generally similar between the alternatives, with a few exceptions. The Tied Arch (Alternative 4) and Elevated Bridge (Alternative 5) were determined to be more challenging in terms of permitting (Section 404) and viewshed impacts, and they imposed additional restrictions on required maintenance (bridge and river/park) and river access for debris/sediment removal. TAC-1 members did not score the alternatives. There was discussion during the meeting specific to the federal funding in the Project and the potential federal agency touch points during the permitting phase of the projects, specifically Section 401 and 404 permits.

During the TAC-1 meeting, it was determined that FHWA would be the lead agency for this study and NDOT would sign the PEL checklist. Additionally, it was determined that the RTC would be the permittee for the USACE Sections 408 and 404, Nevada Division of Environmental Protection (NDEP) Section 401, working-in-waterways and groundwater discharge permits, and the construction contractor will be responsible for preparing, submitting, and complying with the RTC stormwater permit as the permittee. An evaluation of historical significance of the bridges was also discussed. The bridges were evaluated for historical significance as part of a Nevada statewide survey and concurred with by the Nevada State Historic Preservation Office (SHPO) as not meeting the criteria for listing on the NRHP.

Bridge and roadway elements were the focus of the August 31, 2020 TAC-2 meeting. The purpose of the meeting was to discuss bridge and roadway elements, explain evaluation attributes, review alternative-specific qualitative attributes and concept evaluations and concept scoring results, and recommend alternatives to carry forward. The RTC prepared and submitted preliminary meeting materials to TAC-2 members prior to the meeting, which included 1) a blank score card for member review, completion and return; 2) qualitative attribute guidelines to assist with scoring; and 3) concept evaluation sheets for the five initial alternatives. The score card defined eight attributes for screening plus undefined attributes "Y" and "Z" for reviewer-specific input.

During this meeting, the five initial alternatives were further refined by bridge type that resulted in a total of nine concepts being evaluated for the north bridge during the TAC-2 meeting. These concepts included three Single Pier Concepts (precast concrete girders, cast-in-place concrete box, and steel I-girders), three

Clear Span Concepts (underdeck arch, rigid frame, and tied arch), and three Elevated Bridge Concepts (precast concrete girders, cast-in-place concrete box, and steel I-girders). A crosswalk table showing the original five alternatives and the nine concepts evaluated during the TAC-2 meeting is shown on Table 3.

Table 3. Bridge Alternative/Concept Crosswalk

Bridge Concept	Alternative-Specific Descriptions		
	Single Pier	Clear Span	Elevated
Precast Concrete Girders	✓		✓
Cast-In-Place Concrete Box	✓		✓
Steel I-Girders	✓		✓
Underdeck Arch		✓	
Rigid Frame		✓	
Tied Arch		✓	

The qualitative attributes that were summarized included construction cost, construction schedule, cost risk, existing infrastructure impact, maintenance and inspection access, long-term maintenance cost, environmental and river recreation impacts, bridge aesthetics, and undefined attributes "Y" and "Z." The reviewer guidelines were provided to assist with scoring the attributes for each bridge type. The concept evaluation sheets included things to consider when scoring the concepts (e.g., span lengths, pier versus clear span, superstructure thickness, etc.), and scoring was based on a numeric scale of 1 (ranked poorly) to 10 (ranked excellent).

TAC-2 members used the undefined attributes "Y" and "Z" to identify three additional attributes for consideration, including 1) permitting and ancillary impacts to park (scope creep), 2) crime prevention through environmental design, and 3) homeless camps/graffiti/illicit activity. The results of the qualitative screening analysis conducted during the TAC-2 meeting, including the additional attributes mentioned above, are summarized in the following section.

Held on November 5, 2020, the purpose of the SWG-2 meeting was to review recommendations from the TAC-1 and TAC-2 meetings and to solicit stakeholder input and consensus on these prior discussions, and to recommend alternatives/concepts to carry forward for additional analysis. The recommended bridge concepts being carried forward were presented as follows:

- Single Pier Precast Concrete Girders
 - Fewer obstructions in the river
 - Falsework not required for superstructure construction
- Single Pier Cast-In-Place (CIP) Concrete Box
 - Fewer obstructions in the river
 - Falsework required for superstructure construction
- Clear Span Rigid Frame
 - No obstructions in the river
 - Falsework required for superstructure construction

Included with the SWG-2 presentation materials were plan, elevation, and typical section views for each of the three concepts being carried forward to assist participants with visualizing the different aspects of the concepts. At the conclusion of the SWG-2 meeting, participants agreed with the scoring and evaluation of concepts, and the concepts to carry forward for further analysis. The group discussed a variety of topics from potential designs to reduce graffiti, potential traffic impacts during construction, permitting challenges, and potential aesthetic designs.

The SWG-3 meeting, see Appendix E, focused on project aesthetics. A summary of the process and how the aesthetics coordinate with the Downtown Streetscape Standards is provided in Appendix F.

3.1 Level 1 Qualitative Screening Analysis

The scoring summaries received for the TAC-2 meeting were evaluated, looking at the high and low scoring result for the eight attributes for each concept. The total score for a concept was determined by adding the average score from each reviewer. The added "Y" and "Z" attributes mentioned above were not included in the scoring because 1) only one TAC member suggested that they be included, and 2) their addition to the overall scoring summary would have made only a subtle difference in how the concepts were scored. The concepts were ranked highest (ranked excellent) to lowest (ranked poorly) based on their total score. The averaged totals from the scoring results were calculated as follows:

- Rigid frame, clear span - 58
- Single pier concepts and underdeck arch - 40s to low 50s
- Elevated bridge concepts - mid- to low-30s

In summary, the rigid frame Clear Span Concept was ranked higher than the single pier and Underdeck Arch Concepts, and all three Elevated Bridge Concepts scored consistently lower than the other concepts. Individual scorecard rankings for design options for the three concepts listed above are summarized below and shown in Table 5.

- Rigid frame concepts - consistently high end (except one each 2, 3, 4, and 5)
- Single pier concepts - some 1s, 2s, 3s, and 4s
- Elevated bridge concepts - near the bottom, but with some 7s, 8s and 9s

Table 4. Level 1 Qualitative Screening Analysis Results

		Score	Rank
North Bridge	<i>Single Pier Concept</i>		
	SP-N1 Precast Concrete Girders	50	2
	SP-N2 Cast-in-Place Concrete Box	46	4
	SP-N3 Steel I-Girders	45	5
	<i>Clear Span Concept</i>		
	CS-N1 Underdeck Arch	47	3
	C2-N2 Rigid Frame	58	1
C2-N3 Tied Arch	38	6	
North & South Bridges	<i>Elevated Bridge Concept</i>		
	EB-NS1 Precast Concrete Girders	36	7
	EB-NS2 Cast-in-Place Concrete Box	34	8
	EB-NS3 Steel I-Girders	33	9

For the range of individual attribute results, the average score for construction costs, schedule, and cost risks were ranked very well for the clear span (rigid frame) and fair for the Single Pier Concepts, with the Elevated Bridge Concepts scoring the lowest. A similar trend was noted for the existing infrastructure impacts, maintenance and inspection access, and long-term maintenance costs. There was a fair amount of range in the scoring for environmental impacts, recreation impacts, and bridge aesthetics, but the averages were consistent with the overall ranking of the concepts.

It was determined that the individual scores were consistent with the averages, and scores with the three added attributes were higher because they were mathematically added to those concepts, but the overall ranking was unchanged except for the reversal of concepts 3 and 4. In summary, it was concluded that no further consideration would be given to all three Elevated Bridge Concepts, the clear span underdeck and Tied Arch concepts, and the single pier steel I-girder concepts. The analysis, based on the discussion from the group, determined that the clear span rigid frame, single pier precast concrete girder, and cast-in-place concrete box would be carried forward into the feasibility study for more detailed analysis.

3.2 Level 2 Quantitative Screening Analysis:

The Level 1 screening process resulted in two bridge types, the single pier and the clear span to be carried forward for further analysis.

3.2.1 Single Pier

The Single Pier concept (for the North Bridge) provides many advantages:

- Park access across Arlington Avenue is maintained. There are currently six locations, three on either side, to access the park from the sidewalk along Arlington Avenue between Island Avenue and First Street. The single pier concept allows the roadway elevation to remain close to the existing elevation and preserves these six access points. In contrast, the elevated bridge concept would raise Arlington Avenue approximately 10 feet between the two bridges, cutting off these six access points.
- Park functionality is maintained. With minimal changes to the roadway elevation, there will not be large intrusive fill slopes impacting the available park space. In addition, there are many special events when Arlington Avenue is closed to vehicular traffic and pedestrians and vendors occupy the roadway area and allow free movement throughout the park amenities on either side of the roadway. In contrast, the elevated bridge concept would raise Arlington Avenue approximately 10 feet between the bridges, and the resulting fill slopes would impact as wide as 40 feet on both sides of the roadway.
- At the southern abutment of the north bridge, there is an existing path underneath the bridge. The single pier bridge type allows maximum head room without raising the profile of the roadway.
- The single pier support allows a thinner deck section and maximizes clearance under the bridge, in conjunction with reducing the number of piers from two to one, improving hydraulics to obtain the required freeboard.
- The single pier support provides additional strength that allows for increased sidewalk widths or river overlooks.
- River and park viewsheds are maintained. Minimal changes to the roadway elevation preserve viewsheds from one side of the park to the other, and from the bridges and roadway to the river.
- Reducing the number of piers from two to one at the north bridge increases the river viewshed under the north bridge.

- Although not intuitive as an advantage, the single pier will allow for the collection of debris during flood events and the opportunity to remove it before going downstream to other pinch-points where the river narrows, or other locations where removal cannot be accomplished, or cause damage.
- Similar look to the existing north bridge which has two piers.
- Preliminary cost estimates put the single pier bridge type in the \$17 million to \$35 million range, the cheapest alternative.

The disadvantages of the Single Pier concept include:

- The pier will require special construction considerations.
- This single pier surface may also be prone to graffiti.

3.2.2 Clear Span

The Clear Span concept (for north and south bridges) also provides many advantages:

- Similar to the single span concept, park access across Arlington Avenue is maintained. There are currently eight locations, four on either side, to access the park from the sidewalk along Arlington Avenue between Island Avenue and First Street. The clear span concept requires the roadway elevation to be raised slightly but preserves these eight access points.
- Park functionality is maintained. With minimal changes to the roadway elevation, there will not be large intrusive fill slopes impacting the available park space. In addition, there are many special events when Arlington Avenue is closed to vehicular traffic, and pedestrians and vendors occupy the roadway area and allow free movement throughout the park amenities on either side of the roadway.
- The clear span maximizes the available hydraulic area under the bridge will minimize the need for profile adjustments; however, this will be offset with the increased deck thickness.
- River and park viewsheds are maintained. Minimal changes to the roadway elevation preserve viewsheds from one side of the park to the other, and from the bridges and roadway to the river.
- Maintaining a clear span bridge for the south bridge will preserve the local hydraulics within the river at this location and not have any adverse impacts to the hydraulics of the Kayak Park Course, just upstream of the south bridge.
- The clear span provides unobstructed views of the river.
- Preliminary cost estimates put the clear span bridge type in the \$18 million to \$39 million range.

The disadvantages of the Clear Span (for the north bridge) concept include:

- At the southern abutment of the north bridge, there is an existing pedestrian path underneath the bridge. The clear span bridge type requires a thicker deck section overall than the single pier, and also an extra thicker section at the bridge abutments, which will impact the available head room under the bridge and require the roadway profile to be raised accordingly.
- Without pier support, to provide additional strength for increased sidewalk widths or river overlooks, the deck thickness becomes even thicker, and at some point, impossible.
- Although not intuitive as a disadvantage, without a pier to collect debris during flood events, there is no opportunity to remove it before going downstream to other pinch-points where the river narrows, or other locations where removal cannot be accomplished, and cause damage.

When comparing the positive and negative attributes of the single pier vs the clear span, the preferred bridge type for the north bridge is the Single Pier. The south bridge will remain a clear span with a superstructure that matches what is chosen for the north bridge (i.e. cast-in-place, or precast). This is

supported by the public as seen in the results of the survey questions asked in conjunction with the second public meeting presentation recording posted on the website for 30 days.

The Single Pier and Clear Span concepts are feasible. However, based on the level 2 screening criteria and the public input, the Single Pier alternative for the north bridge and a comparable single-span precast or cast-in-place alternative for the south bridge will be recommended for further design and consideration in NEPA.

3.3 Roadway and Pedestrian Concepts

Development of alternatives and concepts for the Arlington Avenue Bridges Feasibility Study were developed to meet the purpose and need of the Project. The Arlington Avenue Bridges Feasibility Study identifies transportation focused purpose elements. Concepts that were developed but did not meet purpose and need elements were not considered viable and deemed not recommended and eliminated from further consideration in the alternatives development process.

3.3.1 Additional Path Under South Bridge

One element that was suggested for further analysis during the NEPA process as engineering and design advances, is the addition of a path under the northern end of the south bridge. Improving hydrologic flow of the Truckee River was identified as one purpose of this Project. The addition of a multi-use path closer to the Truckee River and the necessary infrastructure to provide safety to the users of the path would conflict with this purpose. The addition of a path that could flood seasonally is a negative to pedestrian safety and access. The additional infrastructure, columns, or supports could also create a snag point that could disrupt debris flows in a flood event. The additional infrastructure (longer bridge, additional walls) will increase construction costs, and may impact constructability. Because of these constraints, path concepts will need further vetting in the NEPA process.

3.4 Constructability Review

For each alternative during level 2 screening, constructability was reviewed. Constructability is an important consideration in capital projects because it helps refine cost estimates and inform potential environmental impacts from design requirements.

Construction of a clear span structure would avoid the need to construct a pier within the middle of the river. However, the large deck thickness, nearly twice as thick as the deck section needed for the single pier alternate, and reduction of overhead clearance of the clear span structure are considered more significant issues than constructing a pier in the river.

For the single pier bridge, there are two options for design: either a cast-in-place concrete box girder or precast concrete girders. Choosing between them will come down to weighing aesthetics, cost, and construction risk. Environmental and long-term maintenance considerations are essentially equal.

The cast-in-place box girder may be preferred aesthetically (cleaner lines in a river setting, less of a "highway bridge" look), but there's more risk in construction because it requires temporary falsework in the river channel. During the construction of the Center Street Bridge, approximately ¼-mile downstream, a flood event occurred during construction when falsework was in the river. A cast-in-place box girder bridge is typically more economical to build than a precast girder bridge. A cast-in-place box girder bridge is feasible for the Arlington Avenue Bridges if preferred aesthetically, but it may make it a two-season project (build the abutments and pier in season one, wait for season two to put falsework in the channel to

build the superstructure and reduce the risk for falsework being washed out). A precast girder bridge could reasonably be built in a single season because it requires no falsework.

The decision to go with a cast-in-place box girder or precast girders will be made during the next phase (preliminary engineering and environmental clearance) with public and stakeholder input. The decision may come down to a tradeoff between a less costly and more aesthetically pleasing bridge versus the inconvenience of having the Arlington Avenue Bridges closed for 2 years instead of 1 year.

3.5 Cost Estimate

Order of magnitude cost estimates were developed for design and construction of each bridge alternative discussed above, including adjoining roadway improvements. The cost estimates focused on the major bid items and project soft costs. They included order of magnitude costs of all major bridge replacement components, including street transitions, floodwall replacement, traffic, utilities, modifications of surrounding properties and accesses, sidewalks, and streetscape items. Table 5 summarizes the range of project costs for each of the three bridge concepts as well as the Elevated Bridge Alternative for a comparison to the maximum cost alternative. Depending on the alternative concept chosen in the environmental/preliminary engineering phase, actual project costs should fall within these ranges. The engineering estimate, including cost buildups for equipment, materials and labor, cost implications, and assumptions for each concept are provided in Appendix D. As Table 5 shows, the three single span and clear span bridge alternatives have relatively similar costs.

Table 5. Order of Magnitude Project Cost Ranges

	Single Pier-Opt. 1 Precast Girder		Single Pier-Opt. 2 Cast-In-Place Box		Clear Span-Opt. 2 Rigid Frame		Elevated Bridge CIP Box	
	-30%	+50%	-30%	+50%	-30%	+50%	-30%	+50%
Preconstruction - Design/Permits	\$1,544,000	\$3,308,000	\$1,544,000	\$3,308,000	\$1,544,000	\$3,308,000	\$1,817,000	\$3,893,000
Mobilization	\$2,349,000	\$5,034,000	\$2,349,000	\$5,034,000	\$2,380,000	\$5,099,000	\$2,384,000	\$5,109,000
Environmental	\$690,000	\$1,479,000	\$690,000	\$1,479,000	\$651,000	\$1,395,000	\$735,000	\$1,575,000
Earthwork	\$1,364,000	\$2,924,000	\$1,361,000	\$2,917,000	\$1,361,000	\$2,917,000	\$1,422,000	\$3,046,000
Structural	\$3,422,000	\$7,333,000	\$2,937,000	\$6,293,000	\$3,847,000	\$8,244,000	\$5,409,000	\$11,592,000
Roadway	\$903,000	\$1,934,000	\$526,000	\$1,126,000	\$523,000	\$1,122,000	\$1,127,000	\$2,415,000
Aesthetics	\$308,000	\$660,000	\$282,000	\$605,000	\$309,000	\$663,000	\$387,000	\$829,000
Drainage	\$719,000	\$1,541,000	\$658,000	\$1,411,000	\$721,000	\$1,546,000	\$903,000	\$1,934,000
Utilities/Electrical	\$257,000	\$550,000	\$235,000	\$504,000	\$258,000	\$552,000	\$322,000	\$691,000
Traffic Control	\$822,000	\$1,761,000	\$753,000	\$1,613,000	\$824,000	\$1,767,000	\$1,031,000	\$2,210,000
Landscaping	\$154,000	\$330,000	\$141,000	\$302,000	\$155,000	\$331,000	\$645,000	\$1,381,000
Signing/Striping	\$205,000	\$440,000	\$188,000	\$403,000	\$206,000	\$442,000	\$258,000	\$553,000
Contingency- Detail Scope	\$3,184,000	\$6,824,000	\$2,916,000	\$6,249,000	\$3,195,000	\$6,846,000	\$4,110,000	\$8,807,000
Project Management/Construction Management	\$2,122,000	\$4,548,000	\$1,948,000	\$4,174,000	\$2,129,000	\$4,563,000	\$2,724,000	\$5,837,000
TOTAL	\$18,043,000	\$38,666,000	\$16,528,000	\$35,418,000	\$18,103,000	\$38,795,000	\$23,274,000	\$49,872,000

Notes:

Order of Magnitude (Accuracy Range: -30% / +50%).

Includes North and South Bridges and Roadway in-between

3.6 Local, State, and Federal Funding

Federal transportation legislation (Fixing America's Surface Transportation Act – FAST Act) requires that the 2040 RTP be based on a financial plan that demonstrates how the program of projects can be paid for and implemented. RTC funds its projects through a mix of local, state, and federal funding. The allowable use for the various funding sources is limited by statute, regulation, or state constitutional provisions.

3.6.1 Local and State Funding

Regional funding sources include fuel tax, general funds from the local agencies, sales and use tax, and other revenue such as regional road impact fees (RRIF) paid by private developments, and the Truckee River Flood Project. In 2008, Washoe County voters approved the indexing of fuel taxes to keep pace with inflation.

State funding sources include gas tax, special fuel (diesel) tax, vehicle registration fees, motor carrier fees, driver's license fees, and petroleum cleanup funds. The majority of state funding is applicable to street and highway projects.

Competitive Highway Bridge Program

The Competitive Highway Bridge Program (HBP) is a discretionary competitive grant program that was last funded in FY 2018. NDOT administers federal HBP funding at the state level, and the program provides funds for highway bridge replacement and rehabilitation projects on public roads. No information is currently available on whether this program will be funded under the Biden administration and if so, when a NOFO is likely to be issued.

3.6.2 Federal Funding

The primary funding source provided by the federal government is the Highway Trust Fund (HTF). Federal motor fuel taxes are the major source of income into the HTF. Other funding comes from Congressional appropriations or from transfers from the general fund to the HTF.

The Fixing America's Surface Transportation (FAST) Act, signed into law on December 4, 2015, provides long-term funding for surface transportation infrastructure planning and investment. The FAST Act authorized \$305 billion for fiscal year 2016 through 2020 and was extended one more year through September 30, 2021. FAST Act programs generally available to the RTC for the Arlington Avenue Bridge Project are described below. Generally, federal funding programs require a state or local contribution of funds toward the cost of a project, which is referred to as matching funds. The typical match for street and highway programs is five percent. The FAST Act also provides for competitive grants such as RAISE Grants, formerly known as BUILD grants, that the RTC competes for on a national level.

Surface Transportation Program

The Surface Transportation Program (STP) is the common name for the Surface Transportation Block Grant (STBG) program. It is a federal aid program administered by the FHWA. The program provides "flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road...". No information is currently available on the continuation of this program under the Biden Administration.

Competitive Highway Bridge Program

The Competitive Highway Bridge Program is a discretionary competitive grant program that was last funded in FY 2018. It is FHWA-administered, and the program provides funds for highway bridge replacement and rehabilitation projects on public roads. No information is currently available on whether this program will be funded under the Biden administration and if so, when a NOFO is likely to be issued.

Transportation Infrastructure Finance and Innovation Act

The Transportation Infrastructure Finance and Innovation Act program provides credit assistance for qualified projects of regional and national significance. So, it is not a grant program. Eligible projects include highway and bridges and eligible applicants include state and local governments, special districts, and private entities. No information is currently available on the continuation of this program under the Biden administration.

Rebuilding American Infrastructure with Sustainability and Equity (RAISE)

The Rebuilding American Infrastructure with Sustainability and Equity (RAISE) is a discretionary grant program that funds investments in roads, rail, transit and port projects to achieve national objectives. The program was previously known as the Better Utilizing Investments to Leverage Development (BUILD) and before that as the Transportation Investment Generating Economic Recovery (TIGER). About \$8.9 billion has been allocated by Congress to fund 12 rounds of National Infrastructure Investments targeting projects that have a significant local or regional impact. RAISE can provide capital funding directly to any public entity, including municipalities, counties, port authorities, tribal governments, MPOs, or others in contrast to traditional Federal.

The U.S. Dept of Transportation (DOT) published a Notice of Funding Opportunity (NOFO) for \$1 billion in FY 2021 RAISE grant funding. The grant applications are due on July 12, 2021 at 5 pm Eastern and have maximum grant award of \$25 million and limits the maximum that any single State can receive to \$100 million, per the appropriations act. The funding also includes up to \$30 million for planning projects which includes at least \$10 million to Areas of Persistent Poverty.

There are other smaller programs, but the new administration may change how these programs are administered or get rid of them and replace them with other programs. The Biden Administration’s focus on climate changes is likely to change the requirements under any existing federal funding program.

3.6.3 Total Funding

The total anticipated revenues (based on year of expenditure (YOE) dollars) for complete street funding from 2017 through 2040 is shown in Table 6. Public Transportation Funding revenues are not included. No new funding sources were considered for the timeframe covered through year 2040.

Table 6. Revenue Projections identified in the RTC 2040 Regional Transportation Plan

Revenue Source	Anticipated Revenue
Federal	\$1.167 billion
State	\$1.228 billion
Regional	\$3.138 billion
Other Revenues (Private)	\$268 million

Source: RTC 2018.

4. Potential Impacts

This section describes potential impacts from the Project. Impacts would vary based on which alternative is selected.

4.1 Traffic

Once constructed, the Arlington Avenue Bridges would not result in traffic changes on residential streets north and south of the bridge. The Project would not increase roadway capacity and therefore would not induce traffic, meaning, draw additional traffic to the improved road. During construction, short-term traffic impacts would result from the closure of northbound and southbound Arlington Avenue at Court Street to the south and W. 1st Street to the north, with detours over the Truckee River occurring at Keystone Avenue to the west and the one-way southbound Sierra Street / one-way northbound Center Street couplet or Virginia Street to the east.

4.2 Environmental Resources

The Project is not likely to result in significant impacts to the key resources identified in the project area, which include river hydraulics, historic/prehistoric resources, Section 4(f) and Section 6(f) resources, wildlife, wetlands and Waters of the United States, and hazardous materials.

No NRHP-eligible resources have been previously identified within the project area. It is recommended that cultural surveys and Section 106 consultation be conducted under a future National Environmental Policy Act of 1969 (NEPA) study to identify previously unevaluated resources and determine their NRHP eligibility and project effects.

Minor impacts to five recreational Section 4(f) resources are anticipated, as described below:

- Barbara Bennett Park: During construction, pedestrian access would remain open, but vehicle access to designated parking areas on Island Avenue could be limited. If vehicular access can remain open, no Section 4(f) use is anticipated.
- Bicentennial Park: A temporary easement is anticipated during construction and the remaining features and attributes of the park would not be affected. Depending on the duration of the impact, either a Temporary Occupancy Exception or a *de minimis* use of the property is anticipated.
- Truckee River Walk, which is part of the Tahoe-Pyramid Trail linking Lake Tahoe to Pyramid Lake: This linear feature is anticipated to be closed during construction. Trail access would remain open with only the trail in the immediate vicinity of the Project being impacted. However, through the use of a trail detour, a Section 4(f) use could likely be avoided.
- Truckee River Whitewater Park: Two construction phasing options are currently considered. Construction of both bridges at the same time would require complete closure of recreational river access near the bridges for the safety of recreational users, likely resulting in a *de minimis* use of the park because it would be reopened after construction. The second option is to construct one bridge at a time, diverting flow to one channel at a time, allowing continued recreational use of a single channel during construction. Full river access would be restored upon construction completion. Although this method would likely result in a Section 4(f) use of the park, it would provide continued access for recreational users during construction.
- Wingfield Park: Non-Construction Vehicular access to the park is likely to be eliminated or extremely limited during construction because of full and/or partial closures along Arlington Avenue. During construction, park impacts would likely be limited to temporary easements; however, park features are

not anticipated to be permanently impacted. These impacts would likely result in either a Temporary Occupancy Exception or a *de minimis* use of the property.

There would be no conversion of resources protected under Section 6(f) because there are no properties within the project area that were developed with LWCF funds.

In most cases, the alternatives carried forward and evaluated as part of this feasibility study exhibit identical environmental considerations and there would be little difference in the level of environmental impact between each of the alternatives. Alternatives Single Pier – Precast Concrete Girders and Single Pier – Cast-in-Place Concrete Box could have slightly greater impacts on the aquatic resources (e.g., the Truckee River) because the pier would be constructed and installed in the river channel. However, these impacts would be mitigated during construction and monitoring would occur to evaluate the effectiveness of the mitigation activities. For other resources, no substantial difference exists between the alternatives.

4.3 Environmental Permits Required

Based on the project-specific research conducted and input received from agency partners and stakeholders, federal and state permits will be required for the Project. Because aquatic resources (e.g., the Truckee River) would be impacted, federal permits for CWA Sections 404 (dredge and fill) and 408 (alteration of a public work) will be issued through the USACE. An encroachment permit will be required from NDSL. The NDEP will require a construction stormwater permit, CWA Section 401 water quality certification, working-in-waterways permit, and a groundwater discharge permit.

The permit determination process is shown on Figure 6. The permitting timeline for the USACE permits is expected to be approximately 18-21 months for the Section 404 permit and 18-21 months for the Section 408 permit. The Section 404 permit consultation should be initiated at 30 percent design to provide adequate time for USACE to review plans and specs.

Flowchart 1: Permit Determination Process

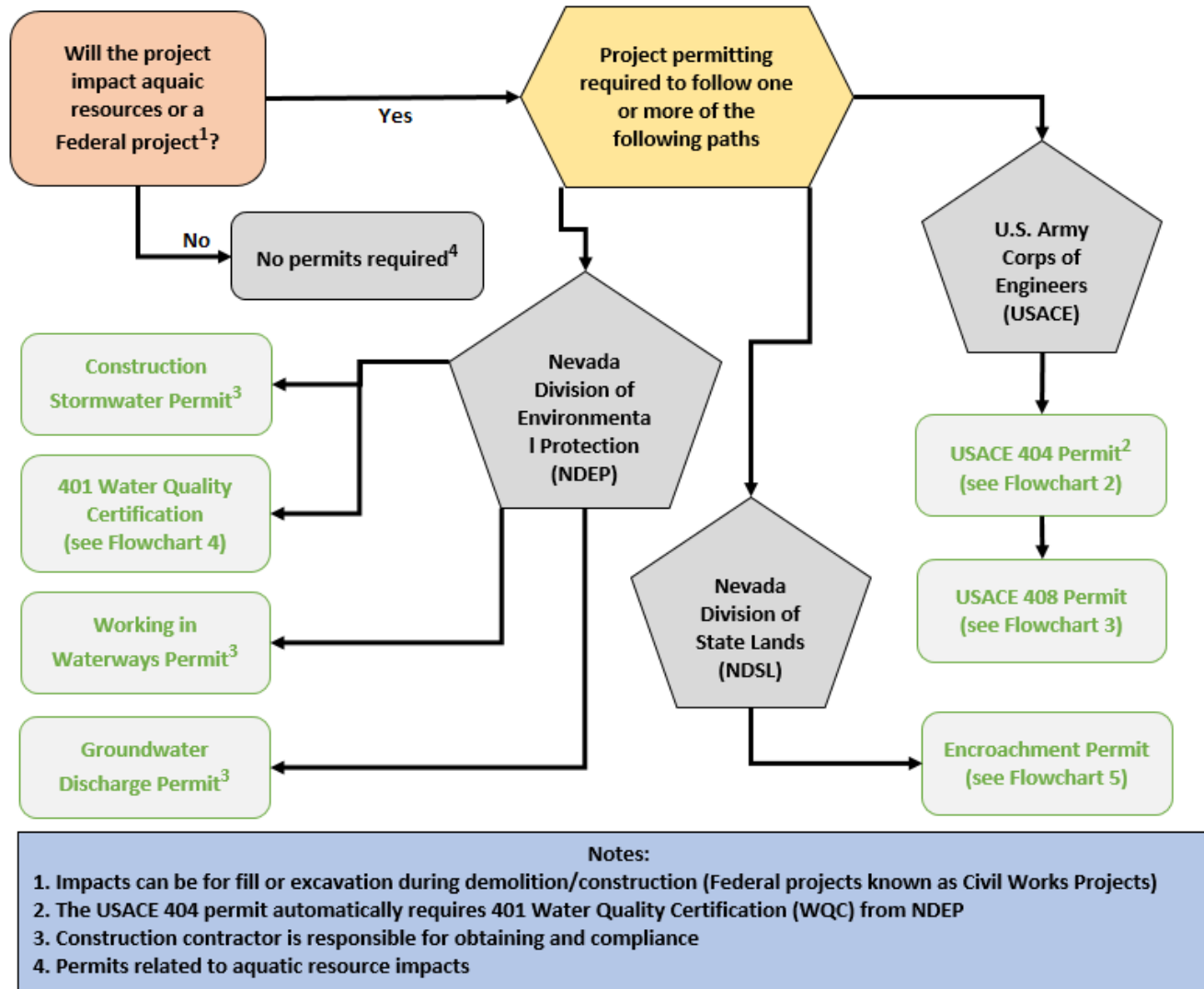
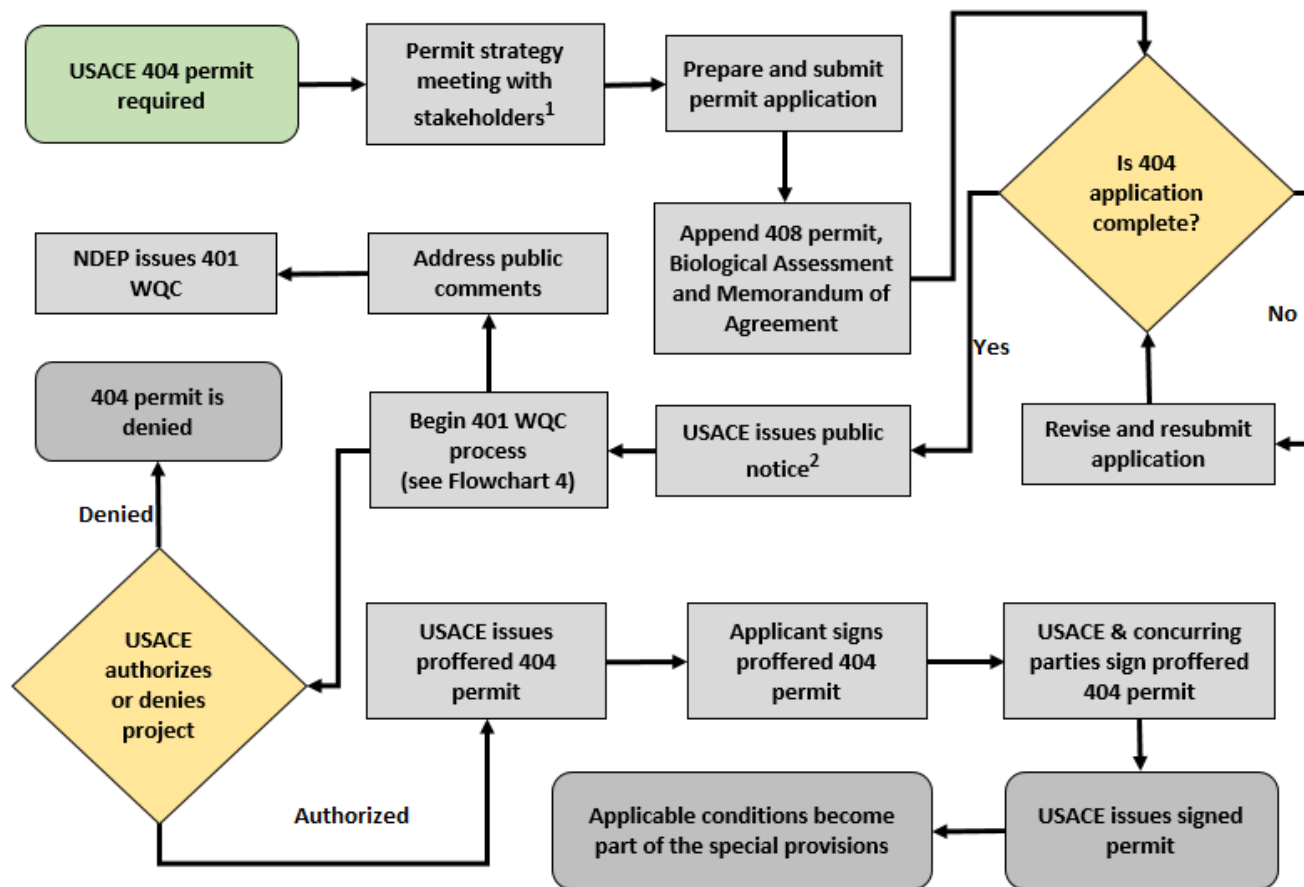


Figure 6a. Permit Determination Process – Flowchart 1

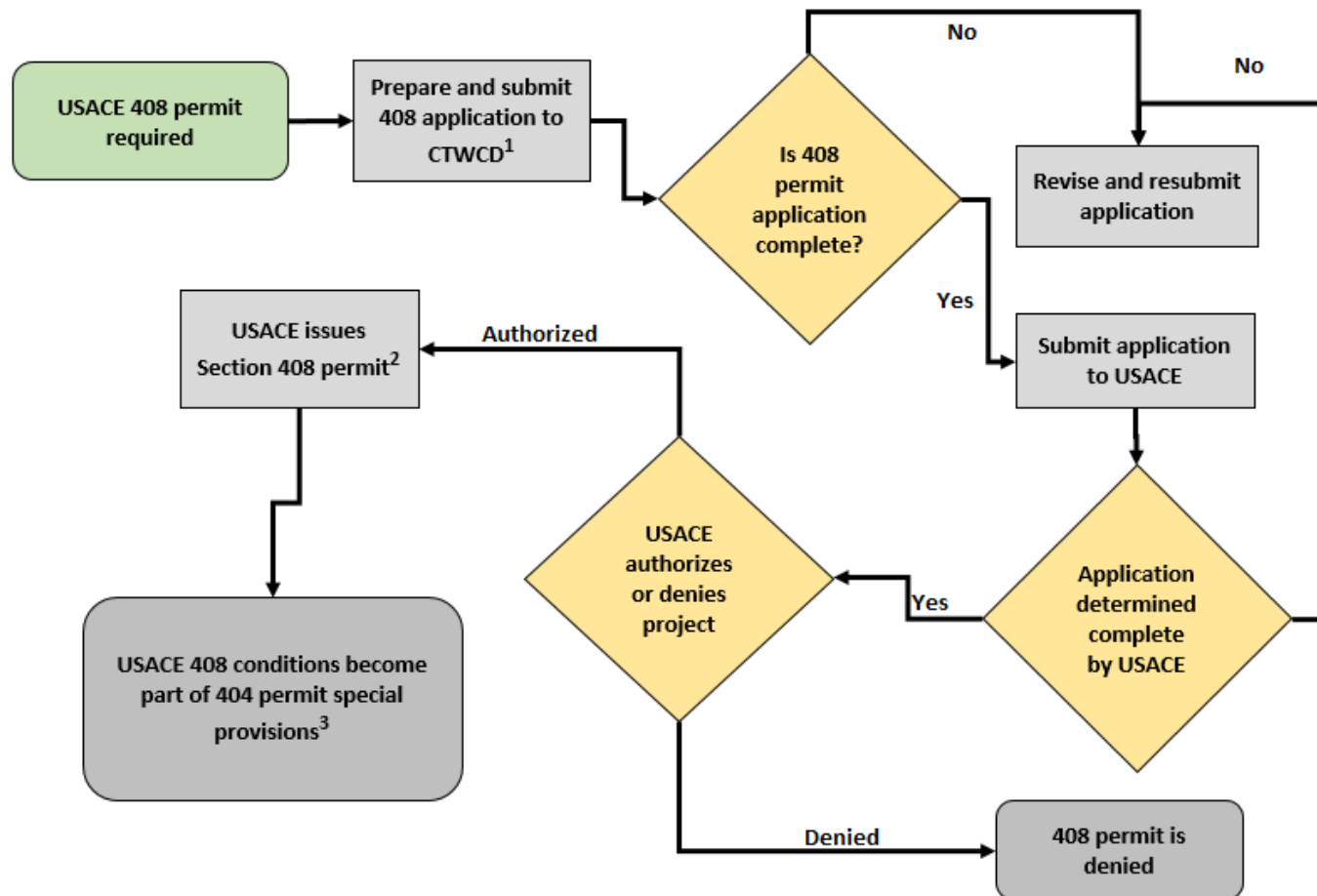
Flowchart 2: Army Corps of Engineers (USACE) 404 General Permit Process



Notes:
 1. Lead agency is FHWA - application submitted by Washoe Regional Transportation Commission (Washoe RTC)
 2. The USACE will consult separately with Native American tribes

Figure 6b. Permit Determination Process – Flowchart 2

Flowchart 3: U.S. Army Corps of Engineers (USACE) 408 Permit Process

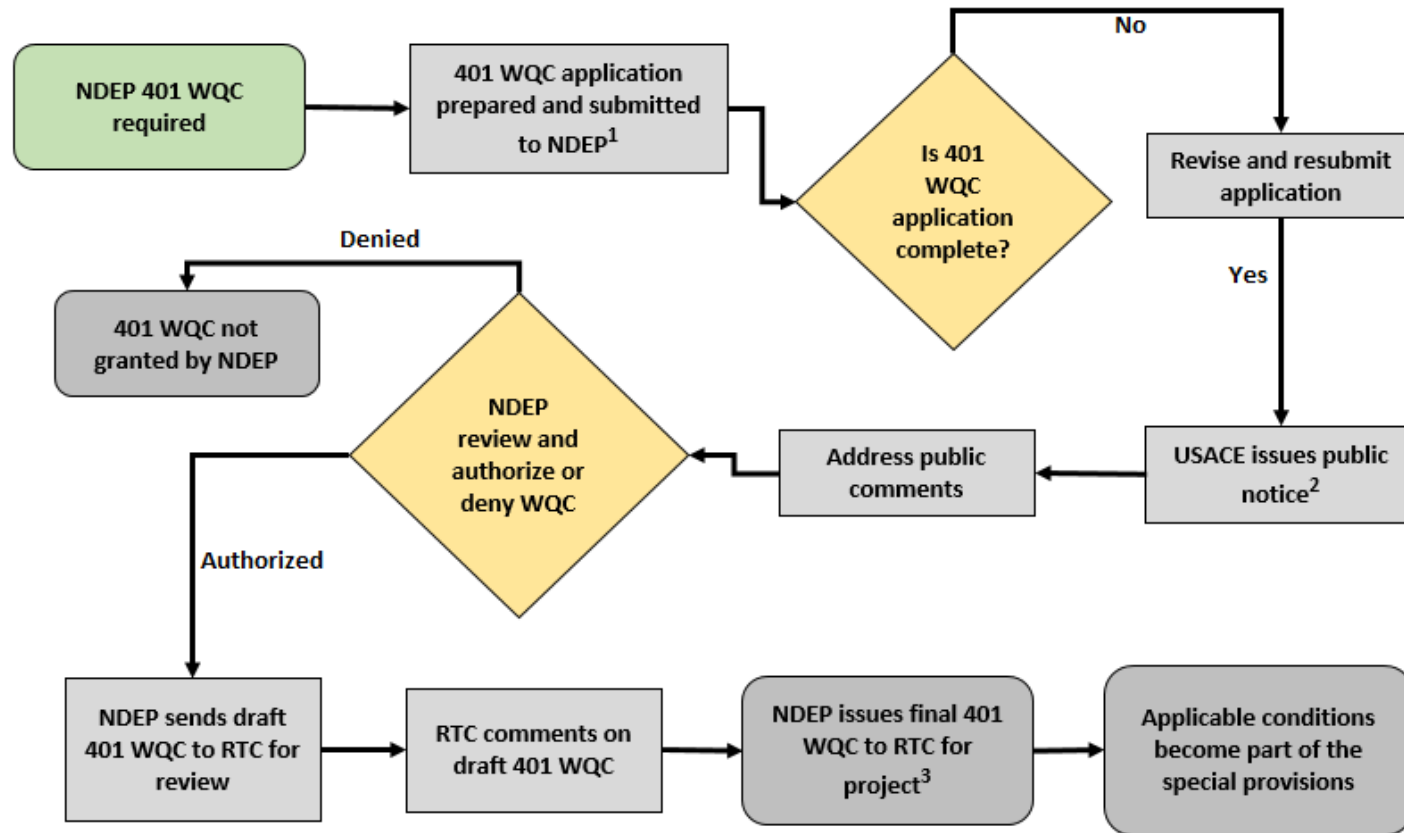


Notes:

1. Carson Truckee Water Conservancy District (may include Sections 7 and 106 consultations)
2. Signed by applicant (Washoe RTC) and including agreed-upon conditions
3. RTC must receive 408 approval prior to receiving the 404 permit from USACE

Figure 6c. Permit Determination Process – Flowchart 3

Flowchart 4: Nevada Division of Environmental Protection (NDEP) 401 Water Quality Certification (WQC) Process

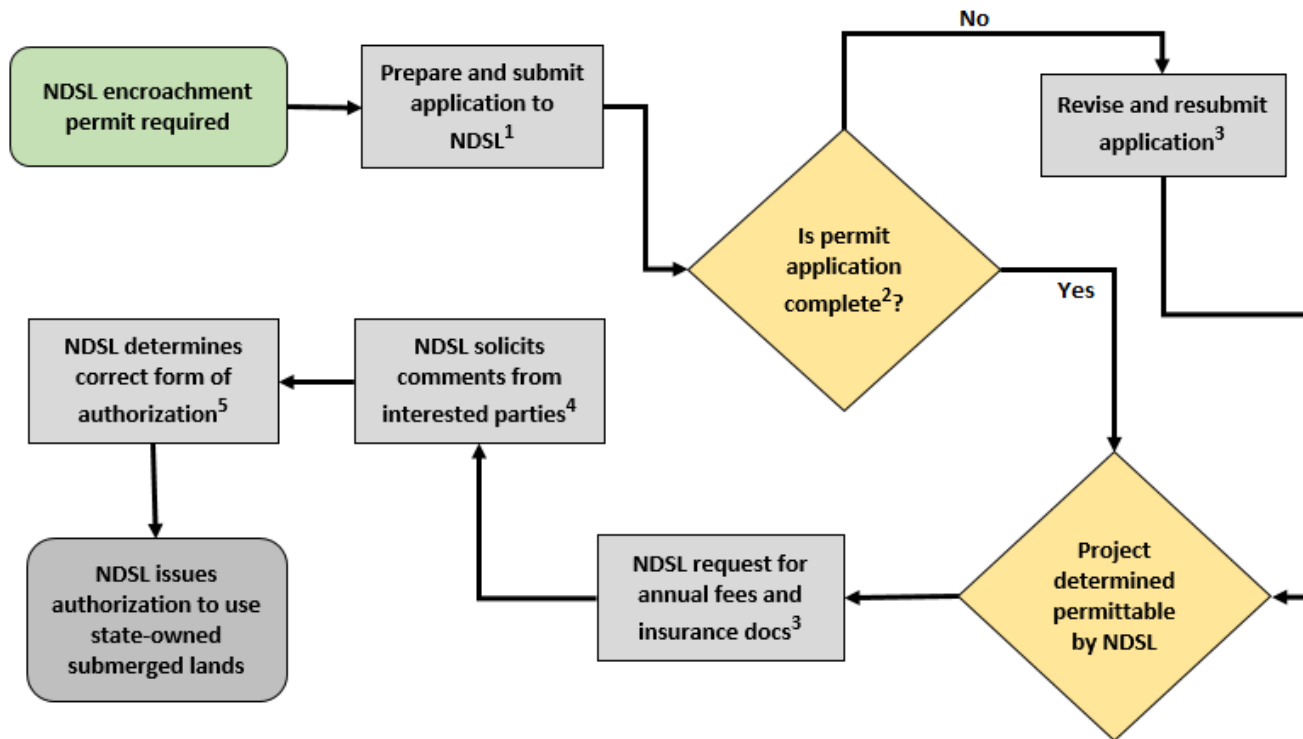


Notes:

1. Combined 404 and 401 application submitted by Washoe RTC concurrently to USACE and NDEP
2. Issue public notice of 404 (see Flowchart 2) to initiate 401 WQC process with NDEP
3. Permittee's (Washoe RTC) mitigation plan must be approved before final 401 WQC issued

Figure 6d. Permit Determination Process – Flowchart 4

Flowchart 5: Nevada Division of State Land (NDSL) Encroachment Permit Process



- Notes:**
1. Application for authorization to use state-owned submerged lands (other than Lake Tahoe)
 2. Application includes site plan, surveyed legal descriptions, attachments (including USACE and NDEP permits) and checklist
 3. Submit within 30 business days
 4. Application submitted for 30-day review and comment period
 5. Forms of authorization include permit, license or easement

Figure 6e. Permit Determination Process – Flowchart 5

5. Outreach Conducted for this Study

5.1 Overview

Stakeholder workshops and public outreach held during the feasibility study phase included updates and information sharing with key stakeholders, elected officials, and the general public. Key stakeholder meetings included focus groups such as the City of Reno, RTC TAC, RTC CMAC, USACE, CTWCD, FHWA, TRFMA, utilities, and adjacent property owners. Information presented and comments received at the SWG, TAC, and public meetings are summarized in Appendix E.

5.2 Key Findings

Informational workshops with agencies, stakeholder working group, and technical advisory committees were held to present, evaluate, discuss, and receive comments on the conceptual bridge alternatives, bridge type-specific environmental requirements, and preliminary aesthetic themes. **Table 7** summarizes these meetings.

During the February 24, 2021 Reno City Council Meeting the question was raised if large-scale improvements to Wingfield Park could be included with the Arlington Avenue Bridge Project. Appendix G contains a letter Reno City Council from the RTC stating that any park improvements should proceed under their own scope of work and managed by the City of Reno.

Table 7. Informational Workshops

Stakeholder	Meeting Date	Notes and Key Takeaways
TRFMA	March 6, 2019	Not part of flood project; 100-year water surface elevation (4,502 feet above mean sea level); debris removal beneath bridge important; provide hydraulic modeling to guide design.
FHWA/NDOT	March 25, 2019	Bridges not historic; programmatic agreement with the Nevada State Historic Preservation Office not required; Section 408 permit required; use NDOT PEL Checklist.
USACE	April 23, 2019	Involvement with Section 404 and 408 permits; USACE will consult separately with tribes under Section 106.
RTC Board	May 20, 2019	Presented Project's Purpose and Need; reviewed project scope, process, and approach.
Reno City Council	November 13, 2019	Bridge replacement included in 2040 RTP; agreed with public participation approach and process; confirmed stakeholder list and process.
RTC TAC	December 4, 2019	Provide update on the Arlington Avenue Feasibility Study. Defined process, stakeholder working group members, and notification of Public kick-off meeting.
SWG Meeting 1	February 6, 2020	Summarized project background; introduced federal agency roles and responsibilities; developed engineering and environmental design constraints and criteria.

Table 7. Informational Workshops

Stakeholder	Meeting Date	Notes and Key Takeaways
USACE	February 11, 2020	Confirmed members for TAC-1 meeting. RSIC and other tribal concerns were evaluated, focused on cultural aspects. Pyramid Paiute tribe concerns are related to water quality and quantity. The Truckee River is a traditional cultural property.
TAC Meeting 1	July 15, 2020	FHWA is the lead agency; confirmed permitting and regulatory requirements; 18-month Sections 408/404 review/permitting schedule; Tied Arch and elevated concepts challenging due to permitting issues.
TAC Meeting 2	August 31, 2020	Prepared and submitted alternatives scoring packets based on SWG-1 input; developed nine concepts from three major design themes; scored individually; scores reviewed and approved as a group and consensus achieved.
SWG Meeting 2	November 5, 2020	Discussed bridge concepts for the Project; reviewed and discussed recommendations from both TAC meetings; recommended alternatives to carry forward for additional analysis.
SWG Meeting 3	December 15, 2020	Discussed aesthetic themes for the Project; recommended bridge concepts; sought guidance on design element analysis and bridge appearance.
RTC Board	2/19/2021	Update on feasibility study and timeline.
Reno City Council	2/24/2021	Update on feasibility study and timeline.
RTC TAC	4/1/2021	Provided an update to the group on the status of finalizing the feasibility study. There were no concerns about the alternative presented (Single Pier) to carry forward for additional analysis.
RTC CMAC	4/7/2021	Provided an update to the group on the status of finalizing the feasibility study. Comments received included stressing the importance of pedestrian access, connectivity, and facilities for bicyclists. Additional comments highlighted Wingfield Park and its importance to the community.

A community open house was hosted at the McKinley Arts and Culture Center (925 Riverside Drive, Reno, Nevada 89503) on December 12, 2019. The open house was attended by approximately 44 community and project members. During the public meeting/open house, public comments received included questions or statements about bridge types, aesthetic details, additional elements, and needs or challenges for the Project, as well as a series of other miscellaneous comments. The number of comments for these general categories are summarized in **Table 8**. Additionally, commenters also voiced concerns about impacts to Wingfield Park, Barbara Bennett Park, and adjoining businesses during and after construction and addressing flood-related issues, including debris and sediment removal from the river and the importance of accommodating all modes of transportation.

Table 8. Summary of Public Meeting Comments From December 12, 2019 Open House

Category	Sub-Category	Number of Comments	Notes
Bridge Type	Elevated	10	In favor (4) and opposed (6)
	Clear Span	5	In favor (4) and opposed (1)
	Other	12	Function first, not cookie cutter
Aesthetic Details		14	Artistic, unique, tie into park setting
Other	Additional Elements	13	Consider growth, traffic, cost, pedestrian friendly, park access
	Needs/Challenges	17	
	Miscellaneous	7	Growth, emergency vehicles, river/park access, demolition and construction impacts,
Total		78	

Comments received from agencies supported and reinforced the public's input on incorporating multi-modal design elements, ensuring access to the river and park for maintenance, and facilitating debris/sediment removal from the river. The bridge cross-sections described above are intended to address these concerns. Additional input focused on balancing the bridge's architectural features with funding constraints; the need to consider traffic performance metrics, such as LOS, pedestrian safety and functionality; and the desire to be consistent with regional transportation planning and community goals and objectives regarding the downtown streetscape.

Due to social distancing requirements resulting from the COVID-19 pandemic, the second public meeting was a pre-recorded presentation posted on the RTC's website in March 2021 and is still available for viewing at <https://youtu.be/yAKUvzU8e0c>. An accompanying survey was available for 30 days during March 2021. To inform the public where to access the presentation and accompanying survey, postcard flyers were mailed to the surrounding public and stakeholders, and an email sent to the project specific email list. In addition, the RTC promoted the presentation on their social media websites, and the local news channels.

In total, there were 353 survey responses and 16 individual public comments. A complete list of survey results and comments may be found in Appendix E7.

Three specific survey questions that show a majority are in favor of the single pier alternative for the north bridge and support of the proposed Art Deco aesthetic theme are:

Question: Do you agree with eliminating the Underdeck Arch, Tied Arch, and Elevated Bridge Alternatives?

Response: 75.8% Yes 12.5% Unsure 11.7% No

Question: Do you agree with RTC's recommendation of the Single Pier Bridge (for the north bridge)?

Response: 65.6% Yes 28.7% No 5.7% Unsure

Question: Do you agree with the Art Deco aesthetic theme to meld old and new?

Response: 82.0% Yes 10.7% Indifferent 7.3% No

In support of the public, stakeholder, and agency comments received at the various workshops, the NDOT PEL Questionnaire and Checklist were completed to document the linkage between planning and potential environmental concerns, and to inform the NEPA process. Following the PEL process can assist with identifying issues, and it supports agency, stakeholder, and public understanding of the Project's scope, purpose and need, as well as engineering/environmental constraints and criteria. The completed PEL Questionnaire and Checklist is provided in Attachment A. As indicated in NDOT's November 2012 guidance, the PEL Questionnaire and Checklist support the PEL process and serves the following dual objectives:

- Provide guidance to transportation planners on the level of detail needed to ensure that information collected, and decisions made during the transportation planning study can be used during the NEPA process for a proposed transportation project.
- Provide the future NEPA study team with documentation on the outcomes of the transportation planning process, including the history of decisions made and the level of detailed analysis undertaken.

6. Next Steps

The feasibility study phase is complete. The results from the feasibility study may be used in the NEPA analysis with approval from NDOT and FHWA. The subsequent NEPA timeline will be determined once the proposed Project enters into the formal NEPA phase and it is determined whether an environmental assessment or categorical exclusion is required. An overview of the project development schedule is shown in Figure 7a. The final design and permitting phases are anticipated to be completed by early 2025, with construction commencing in the second quarter of 2025. Figure 7b. shows an accelerated schedule with construction beginning mid-2024 necessary to be competitive for Federal grant funds.

Figure 7a. Project Development Schedule

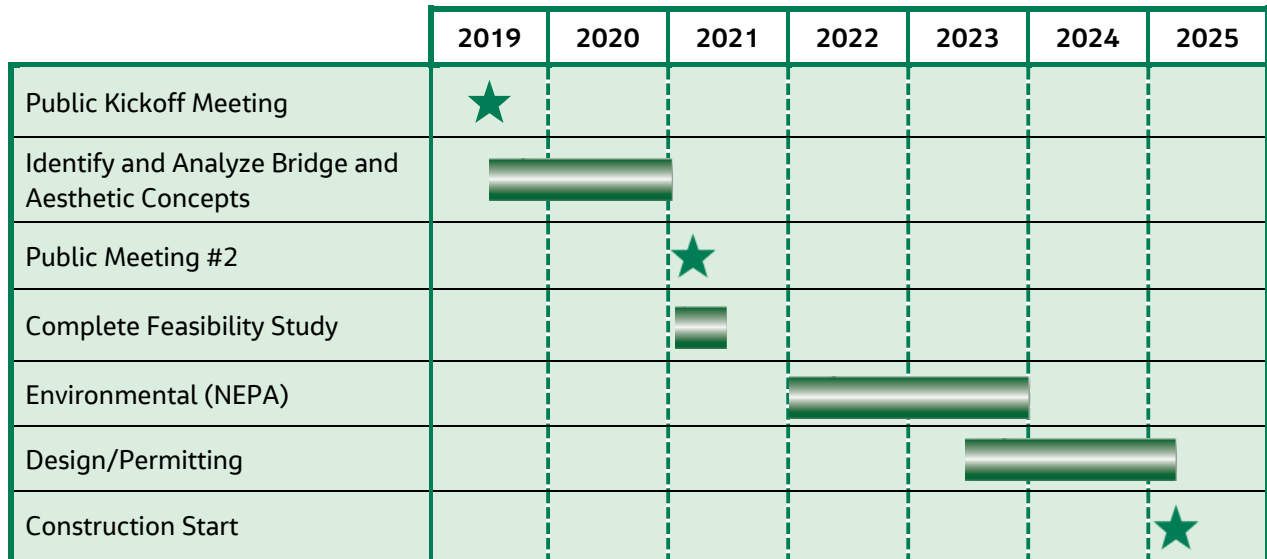
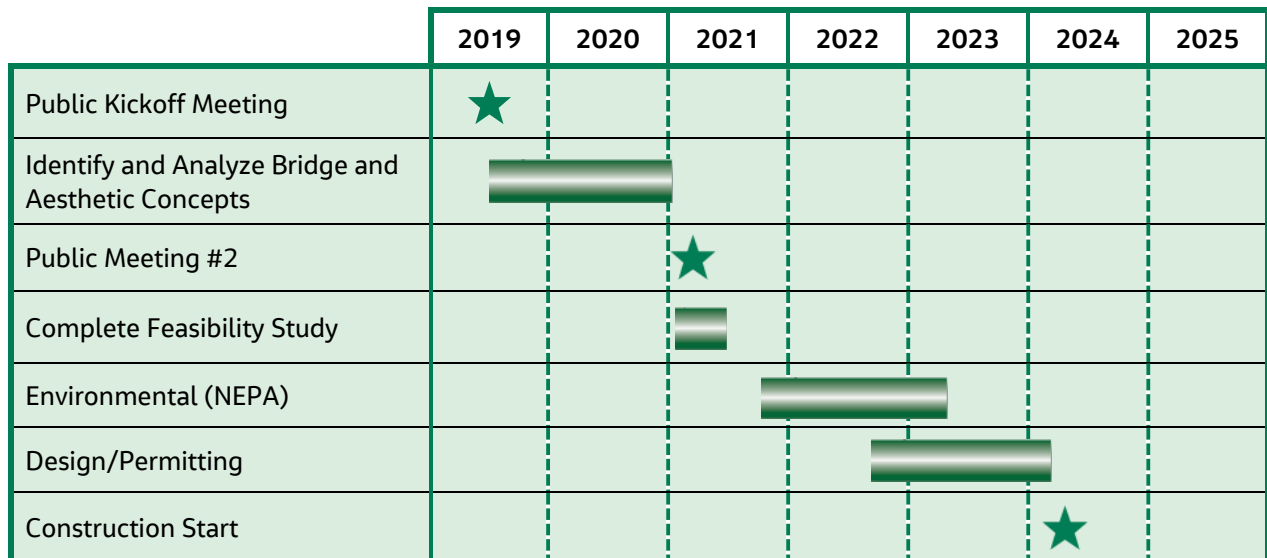


Figure 7b. Project Development Accelerated Schedule



6.1 Key Actions for Next Phase

To support an efficient and informed decision-making process of the preferred bridge type, determination of aesthetic design elements, and local connections, the subsequent project phases should include the following:

- **Close Coordination between transportation, planning, and environmental disciplines.** Close coordination with the USACE, CTWCD, City of Reno, and property owners/development interests should include:
 - A comprehensive traffic analysis to inform land use decisions and support the Project’s purpose and need.
 - A robust outreach process to include the continued SWG and TAC member involvement to ensure affected property owner and key agency participation.
 - Integration of flood protection requirements and coordination of preliminary design with CTWCD, TRFMA, and City of Reno.
- **Regulatory coordination to facilitate environmental approvals.** Solidifying decision points and agency input on remaining technical issues will be key to facilitating environmental approvals and informing the next phase. These include:
 - Confirmation of the Section 408 and 404 requirements established by USACE.
 - Coordination with CTWCD on encroachment permits and mitigation of impacts.
 - Proactive analysis of impacts, geotechnical, and hydraulics/scour issues to form a detailed project description.
- **Potential Design Additions.** During the next phase of design and NEPA analysis, additional concepts from stakeholders and agency input throughout the Feasibility Study process will be evaluated for inclusion in the Project. These elements will require further design and environmental analysis to determine if they meet the requirements. These additional concepts include:
 - Wider sidewalks to accommodate the large number of pedestrians that visit Wingfield Park, especially during special events including the month long Artown performances and the Reno River Festival.
 - A path under the south bridge to reduce the number of at grade vehicle-pedestrian and vehicle-bicycle conflicts.
 - Narrowing the roadway by minimizing lane widths as appropriate while maintaining dedicated bicycle lanes, transit stop locations, and dedicated left turn and right turn lanes.
 - Maintenance access to the river to accommodate sediment and debris removal.
 - Revised/Additional access to the Wingfield Park Amphitheater to create a more inviting setting and increase usability especially during high pedestrian-generating special events.
 - Protection of park landscaping, minimizing the removal of mature trees
 - Proposed pedestrian lighting to enhance safety and create a more inviting setting
 - Details of aesthetic elements including light fixtures, patterning and stain color of flood walls, and other aesthetic features need to be determined and acceptable to stakeholders and agencies, while protecting aquatic species.
 - Constructability of the bridges, including dewatering approach, duration of construction, and phasing of construction.

6.2 Anticipated National Environmental Policy Act Process

FHWA, in coordination with NDOT, will determine the future NEPA class of action for the Project. Based on the Project’s potential for impacts as defined by NEPA, discussions with FHWA and NDOT environmental

staff, and considering the information provided in this report, it is not expected that an Environmental Impact Statement (EIS) will be needed. Instead, this Project is expected to require an Environmental Assessment (EA) or Categorical Exclusion (CatEx) for NEPA compliance. FHWA will be the lead federal agency for the NEPA, NHPA, CWA, and emergency alert system compliance. Because this study took a PEL approach, the environmental analysis was conducted at a planning level, based on existing mapping and data resources. The future NEPA study will ensure the requirements for an EA are met, even if a CatEx is determined for compliance, and will involve more detailed analyses for environmental resources that could be impacted by the Project. The PEL checklist in Appendix A provides details on future environmental analysis required or recommended.

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