

I STREET BRIDGE DECK CONVERSION FOR ACTIVE TRANSPORTATION PROJECT FEASIBILITY STUDY



I STREET BRIDGE

Final Feasibility Study for Bridge Deck Conversion to Active Transportation Use

West Sacramento, CA



Client Review Draft

March 29, 2019

WSP Project No. 187320A

Prepared for:

City of West Sacramento
Department of Public Works
Engineering Division



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Introduction



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Introduction

The I Street Bridge is a historic movable swing railroad bridge built across the Sacramento River in 1911 by Southern Pacific Railway. It continues to be used for vehicle, pedestrian and bicycle crossings on the top deck and train crossings on the bottom deck. As a part of the new C Street Bridge Project, vehicle traffic and the approach structures to the bridge upper deck will be removed from the existing structure.

The City of West Sacramento in cooperation with the City of Sacramento are completing a Feasibility Study for the I Street Bridge Deck Conversion For Active Transportation Project (Project). The Feasibility Study will analyze converting the vehicular portion of upper deck of the existing I Street Bridge for bicycle and pedestrian use only.

Project Description

The I Street Bridge Deck Conversion For Active Transportation Project proposes to maintain and improve active transportation use on the upper deck of the existing I Street Bridge once vehicle traffic is removed as a part of the new C Street Bridge Project. As a part of the C Street Bridge Project, the existing roadway approach ramps to the C Street Bridge from I Street and Jibboom Street in Sacramento and from C Street in West Sacramento are proposed to be demolished. This Project will consider saving a portion of each structure on each end of the existing I Street Bridge to accommodate access points for pedestrians and bicyclists.

Access to the elevated structure is proposed to be via a combination of ADA compliant ramps, stairways and possible elevators on both sides of the Sacramento River. Depending on funding availability, Project improvements may be phased. The initial phase would provide ADA access on both sides of the river and would likely consist of one set of ADA ramp at each end of the bridge.

Project Objectives

The purpose of the Feasibility Study is to perform a field condition assessment, identifying deficiencies and safety concerns that needs to be addressed to meet current design standards for pedestrian and bicycle use. In addition, the Feasibility Study is to identify project right-of-way impacts and permitting requirements.

Description of I Street Bridge

The I Street Bridge (Bridge No. 22C0153), constructed in 1911, carries two vehicular lanes, one in each direction and pedestrian sidewalks along both sides on an upper deck. It also carries two active railroad tracks on a lower deck. The main structure is comprised of 2 – 170 foot long spans, two cantilevered 195 foot swing spans and another 110 foot long span. The total structure length of 840 feet is comprised of a steel through truss on reinforced concrete foundations with reinforced concrete top deck slab. Sidewalks are 5 ft wide on each side with an 18 ft travel way width and no shoulders. The sidewalk curbs are protected against damage due to frequent vehicle collision or rubbing with longitudinal angle irons.

The approach structure from the City of West Sacramento (Bridge No. 22C0154), constructed in 1958, carries two vehicular lanes, one in each direction and pedestrian sidewalks along both sides of the structure from the upper deck level of the I Street Bridge to street level at C Street in West Sacramento. The structure is comprised of 11 spans of varying length between 25 ft and 54 feet with a total structure length of 554 feet. The structure is a reinforced concrete deck on simple span composite steel plate girders supported by reinforced concrete columns and abutment on concrete piles. The structure underwent a seismic retrofit in 1998-2000.

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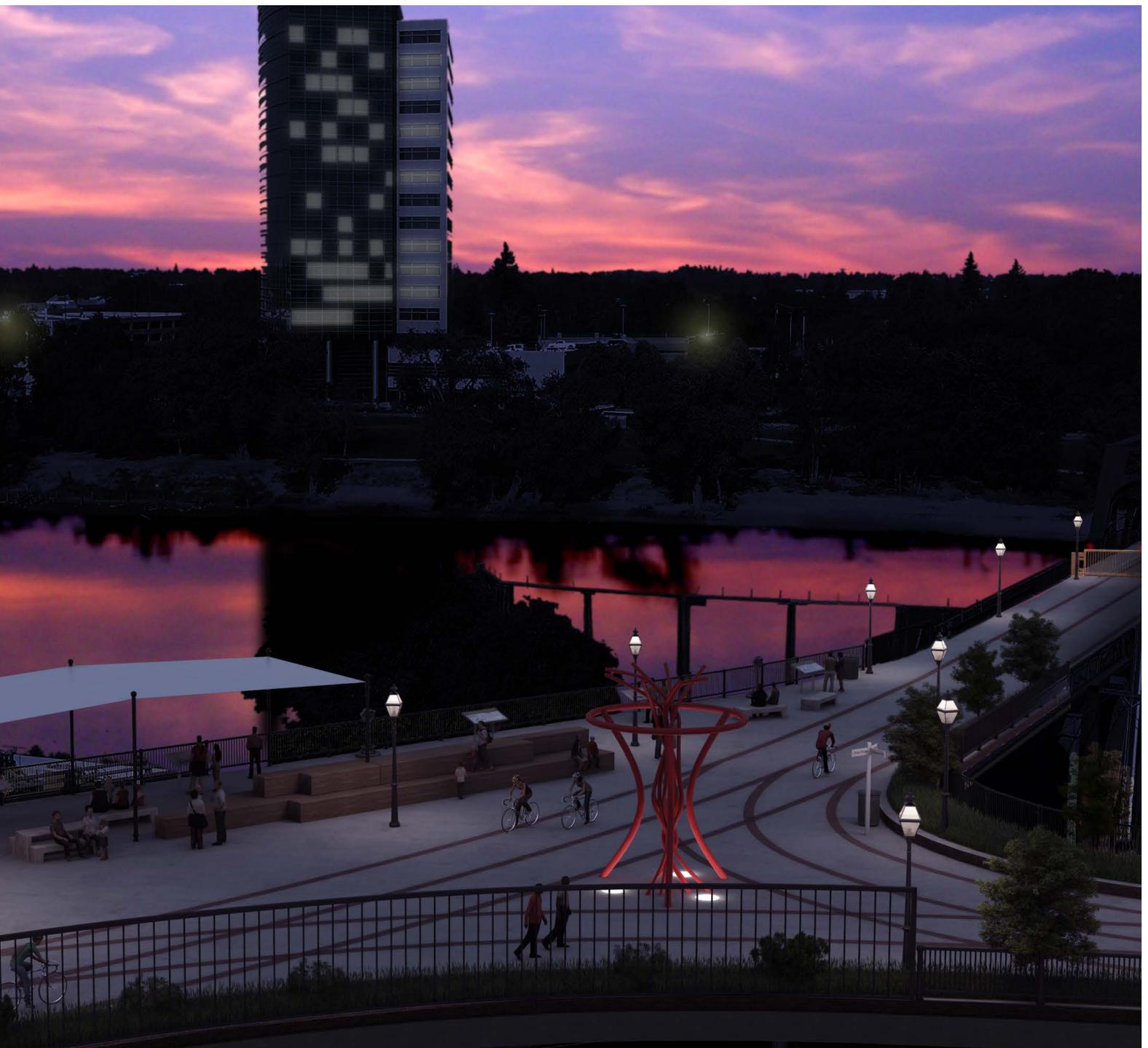
The approach structures from the City of Sacramento are comprised of several structures that have been added to the existing structure constructed in 1936 (Bridge No. 24C0364L – along I Street, Bridge No. 24C006 along Jibboom Street). The main existing structure is comprised of a reinforced concrete deck on steel stringers with steel frame bents on treated timber piles. A secondary structure (Bridge No. 24C0364R) was added to the south side of this structure comprised of a mix of cast-in-place reinforced T beams and precast drop in reinforced T beams as well as a cast-in-place reinforced concrete box girder supported on reinforced concrete columns on pile footings.

Study Process

The Feasibility Study was assembled using the following process:

1. Stakeholder input on the project was sought on an on-going basis through meetings with City of West Sacramento and City of Sacramento, meetings with Project Steering Committee, meetings with Union Pacific Railroad and Public Outreach Meetings.
2. Project Design Criteria and applicable standards were developed
 - a. This criterion will be used during this phase as well as later phases of design to set geometric design criteria as well as applicable reference standards.
3. Existing bridge deck reviewed for maintenance issues and ADA required improvements
 - a. Caltrans Bridge Inspection Reports for the upper deck of the I Street Bridge and portions of the approach ramps proposed to remain were reviewed and confirmed through in-field reconnaissance.
4. Alternatives Development
 - a. Approach ramp alignment alternatives were developed including ramp geometry, right-of-way impacts, possible utility conflicts and possible stairway and elevator locations.
5. Presentation and selection of preferred alternatives by Project Delivery and oversight Team
6. In addition to the alternative development process, the following items were examined:
 - a. Mixed-use improvements were considered including hardscape and lightweight landscape alternatives for the upper deck of the existing I Street Bridge and the portions of the approach ramps proposed to remain.
 - b. Preliminary Scour Assessment
 - c. Cultural Resources and Environmental Assessment
 - d. Permitting Agency Requirements
 - e. Bridge Ownership and Maintenance Responsibilities

Community Participation



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Community Participation

This project had two prong approach to community participation. At the onset of the project steering committee was formed with members from both Cities providing direction and feed back to the project team.

In addition, a public outreach event was planned in the form of Lantern Festival for the project. This event purpose was both celebrate the uniqueness of the project site as well as gather public input on the project elements and emanates.

Steering Committee

A steering committee was formed to provide input on the project from various stakeholders. Representatives of the committee are provided below.

Katy Jacobson – City of West Sacramento Community Investment Manager
Chris Dougherty – City of West Sacramento Senior Transportation Analyst
Jesse Gothan – City of Sacramento Public Works Supervising Engineer
Megan Johnson – City of Sacramento Public Works Associate Civil Engineer
Greg Tayler – City of Sacramento Public Works Supervising Architect
Jody Ulich – City of Sacramento CCS Director
Dustin Hollingsworth – City of Sacramento CCS Facilities and Real Property Superintendent
Dan Goodwater – City of Sacramento CCS Facilities and Real Property Superintendent
Leslie Wisniewski – City of Sacramento CCS Admin Officer

The steering committee was involved in planning, direction and provided regular feedback on the findings of the study. Through their input and guidance, project was developed and feasibility study was completed.

Local Community Outreach

The community outreach took the form of a Lantern Festival that was held on March 23, 2019 on the I Street Bridge project site. As part of the festival preparation, two lantern building workshop was held that was attended by public. At the event site, there were many displays at either end of the project that solicited input from public in the form of voting. Over 3000 people attended the vent and 99.5% of the responders were supportive of the project. Other inputs on place making opportunities, approach ramps, stairs, public art and modes of travel were discussed with public and input was solicited.

The I Street Lantern Festival Summary Report is included in the Appendix **F** of this report.

Design Criteria



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Design Criteria

The Design Criteria and Basis of Design Report to be used for the I Street Bridge Deck Conversion Project including any future phases is included in **Appendix A**. If any criteria cannot be met due to environmental, right-of-way, utility or other constraints, exceptions will need to be documented and submitted for approval.

The Design Criteria Report includes a list of applicable design guidelines that will be followed during design as well as manuals used to develop the project specific design criteria to be used as the basis of design for the Project. The geometric design criteria is summarized below in Table 1.

Table 1: Project Specific Geometric Design Criteria

Criteria	Project Criteria			Use
	Max or Min	Criteria for Pedestrians Only	Criteria for Mixed-use (Bicycle/Ped)	
Hand Rail Height	Max	38 in [ADA 505.4]	-	36 in
	Min	34 in [ADA 505.4]	-	
Existing Curb Height to Remain	Max	8 in [AASHTO BDS 13.11.2]	-	6 in
Ramp Landings Requirement		At top & bottom of each ramp run Intermediate is required if change in direction [ADA 405.7]	-	Top, bottom and intermediate
Ramp Landing Width	Min	To equal width of widest ramp run or 60 in if change in direction [ADA 405.7.2]	-	60 in
Ramp Landing Length	Min	60 in [ADA 405.7.3]	-	60 in
Ramp Rise	Max	30 in before landing for grades steeper than 5% [ADA 405.6]	-	30 in with landing
Ramp Grade	Max	5% continuous or 8.33% with landings [ADA 402.2, 405.2] 7.5% with landings [City of West Sac SD 208]	-	4.75% continuous or 7.5% with landings
Ramp Width	Min	36 in (3 ft) [ADA 403.5.1]	8 ft [AASHTO GBF 5.2.1, 5.2.10]	10 ft
Overhead Clearance	Min	80 in (6.7 ft) [ADA 307.4]	8 ft [AASHTO GBF 5.2.1]	8 ft

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Ramp Cross Slope	Max	2.0833% [ADA 403.3, 405.3] 1.75% [City of West Sac SD 208]	2% [AASHTO GBF 5.2.1]	1% Recommended by AASHTO on mixed-use paths
	Min	1% [ADA 403.3, 405.3]	1% [City of West Sac]	
Bicycle Design Speed		-	12 mph [AASHTO BGF 5.2.4]	12 mph
Bike Railing Height	Min	-	42 in [AASHTO GBF 5.2.10]	42 in
Ramp Radius Curvature	Min	-	27 ft [AASHTO GBF 5.2.5]	27ft
Lighting	Min	-	0.5 foot-candles [AASHTO GBF 5.2.12] 1.4 foot-candles [AASHTO RLDG Table 3-5a]	1.4 foot-candles
Stairway Width	Min	44 in [CCR 3231 (b) (1)]	-	8 ft
Stair Height	Min	4 in [CCR 3231 (c) (1)]	-	4 in
	Max	7.5 in [CCR 3231 (c) (1)]	-	7.5 in
	Variance	3/8 in [CCR 3231 (c) (1)]	-	3/8 in
Tread Depth	Min	10 in [CCR 3231 (c) (1)]	-	11 in
Stairway Landing Length	Min	4 ft [CCR 3231 (f)]	-	4 ft
Stairway Rise	Max	12 ft [CCR 3231 (f)]	-	12 ft
Elevator Landing	Min	48 in X 30 in [ADA 407]	-	48 in X 48 in
Clear Path of Travel	Min	-	12-14 ft [AASHTO GBF, NACTO Guide]	10 ft

Existing Bridge Condition Assessment



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Existing Bridge Condition Assessment

As a part of the Feasibility Study, an assessment of the existing bridges was performed to determine the feasibility of converting the I Street Bridge from traffic use to pedestrian and bicycle use only. As part of the field assessment, ADA ramp connection points to the existing bridge were evaluated. In addition, any safety hindrance for the future bridge use was identified. The WSP team conducted a field reconnaissance of the existing I Street Bridge deck and approach spans on the West Sacramento and Sacramento side of the river.

On the I Street Bridge, the reconnaissance was limited to reviewing and quantifying reported conditions identified in the Caltrans Bridge Inspection Report, dated January 1, 2012. The data gathered from this assessment included photos, location, detailed measurements where feasible, description of possible repair type, notes, sketches, and preliminary quantities of reported work recommendations in the Caltrans Bridge Inspection Report.

On the approaches, the reconnaissance was limited to reviewing feasibility of implementing partial demolition of the existing approaches. This data was then utilized to make recommendations regarding repairs, safety improvements and connections to access ramps. The detailed results are included in the I Street Existing Condition Report included in **Appendix B**. An abbreviated summary table of the findings is included below in Table 2.

A cost estimate was prepared for construction to address the needs given in the above tables and is included in the Existing Condition Report. The total construction cost to address the described deficiencies is estimated to be \$3.4 million.

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Table 2: Summary of Existing Condition Report Recommendations

Repair Element	Repair Strategy
I Street Bridge (Br. No. 22C0153)	
Pedestrian Railing	 <p>Complete replacement of the pedestrian railing with like railing offset from the edge of bridge deck is recommended. Continuous railing along the length of the bridge will address existing railing base plate connection issues, gaps in railings at maintenance access locations and provide new interface for new movable blockades.</p> <p>Spot repair or replacement of failed, cracked, bent or missing elements is recommended at a minimum.</p>
Sidewalk	 <p>Patch the existing sidewalk at locations with significant cracking and at locations with heavily damaged or spalled concrete is recommended.</p>
Curb	 <p>Removal of all existing angle irons followed by repair of the curb is recommended</p>

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<p>Deck</p>		<p>Recommended to remove the existing asphalt concrete pavement allowing visual inspection of and repairs to the concrete deck top including sealing of the deck surface followed by a polyester concrete overlay of at least ¾ inch thickness.</p> <p>Patching of spalled asphalt pavement and concrete pavement and sealing with methacrylate is recommended at a minimum to eliminate potential trip points and protect concrete deck beneath asphalt concrete.</p>
<p>Joints</p>		<p>Sidewalk joint protection is recommended to be added to the sidewalk. Repairs to the sidewalk curb at the joint are required to protect the upper deck superstructure.</p>
<p>Movable Blockades</p>		<p>Replacement of existing movable blockades with more robust pedestrian gate blockades on each side of the swing span is required to meet current standards.</p>

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<p>Upper Deck End of Girder Connection</p>		<p>Detailed inspection of girder is required. Girder may require repairs such as strengthening with doubler plates or replacement.</p>
<p>Upper Deck Exterior Girder</p>		<p>The girder should be analyzed to determine if it is adequate without composite interaction with the concrete above it.</p> <p>The crack should be injected with epoxy to bond the concrete to the steel girder and seal the crack preventing further moisture intrusion.</p>
<p>Lighting</p>		<p>Additional light features are recommended.</p>

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<p>Deck Drainage</p>		<p>Installation of a deck drainage system may be required by environmental permits.</p>
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C Street Approach Ramp (Br. No. 22C0154)

<p>Pedestrian Railing</p>		<p>Railing is required to be replaced to meet current standards. Additionally, 8-foot fences are typically placed on railroad crossings.</p>
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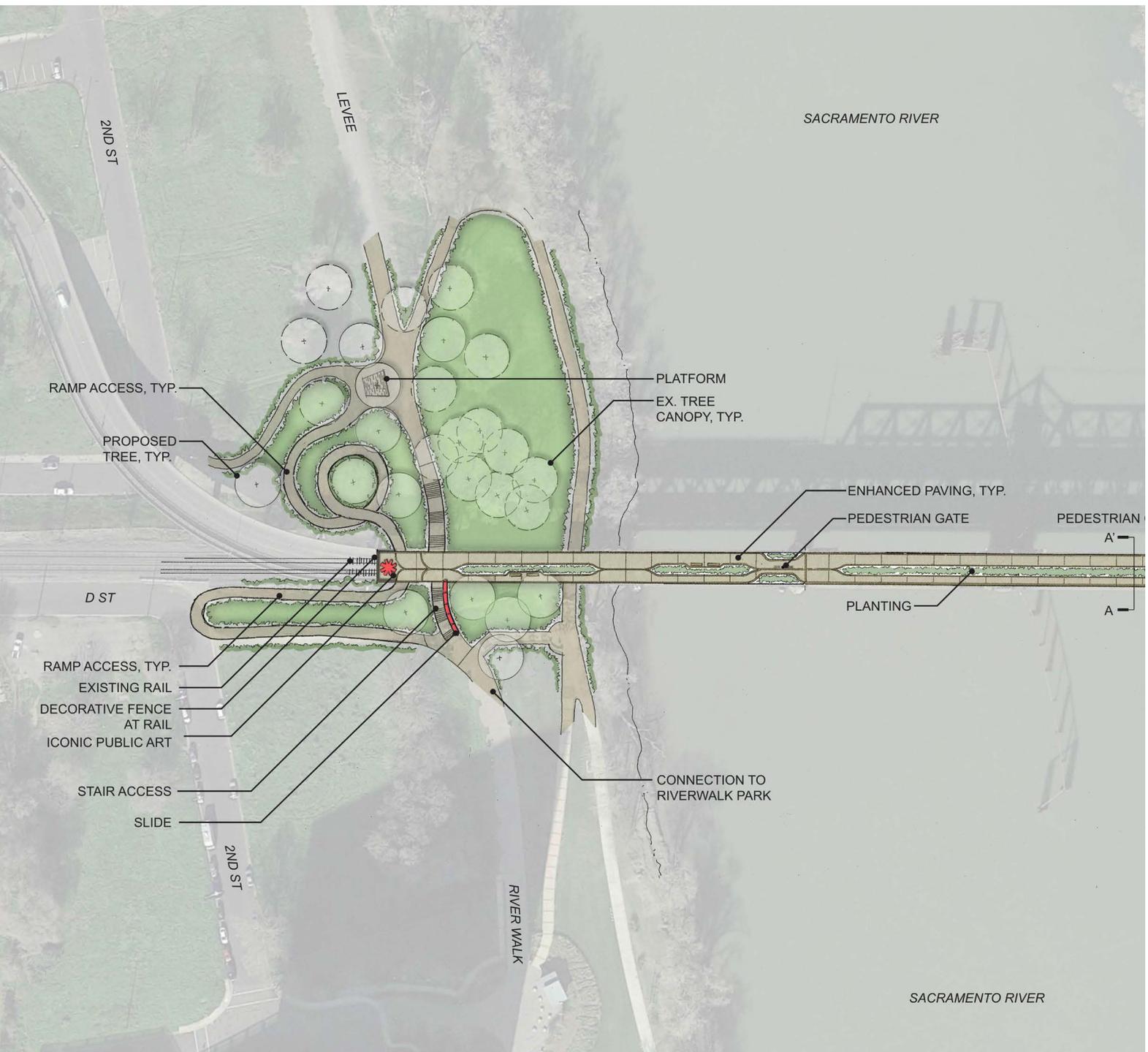
<p>Sidewalk, Deck & Joints</p>		<p>Sealing of the deck surface is recommended.</p>
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Jibboom Street Approach Ramp (Br. No. 24C0006), I Street Approach Ramp (Br. No. 24C0364L) and J Street Ramp (Br. No. 24C0364R)		
Pedestrian Railing		<p>Repair or replacement of damaged railing sections is recommended. Recommend increasing railing height. Additionally, 8-foot fence are typically placed on railroad crossings.</p>
Sidewalk, Deck and Joints		<p>Modifications to sidewalk or deck to reduce curb height to 8 inches maximum are required to meet current standards.</p>

Alternatives Development



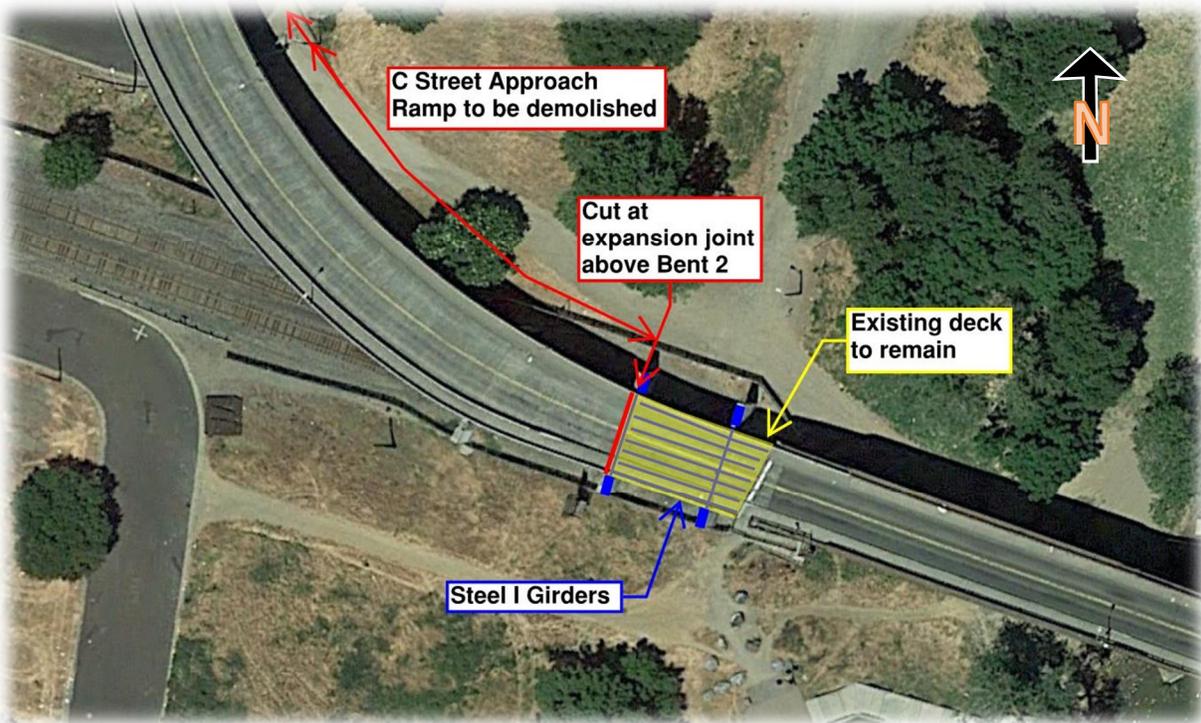
Alternatives Development

Existing Approach Ramps

As a part of the I Street Bridge Replacement Project, the approach roadway ramps to the upper deck of the I Street Bridge are currently planned to be demolished. A part of this project is reviewing the feasibility of keeping portions of these approach ramps. Doing so will accomplish several goals including eliminating the need for construction of new structures over railroad right-of-way by tying new ramps into portions of the existing ramps and the creation of usable space for bicyclists and pedestrians.

During the site reconnaissance, the existing structures were reviewed for possible partial demolition to accomplish the above goals. Figures 1 and 2 below show the portions of approach ramps that are proposed to remain on the West Sacramento and Sacramento sides respectively. These will create raised platforms that stairways and pedestrian ramps can attach to and span over the active railroad tracks.

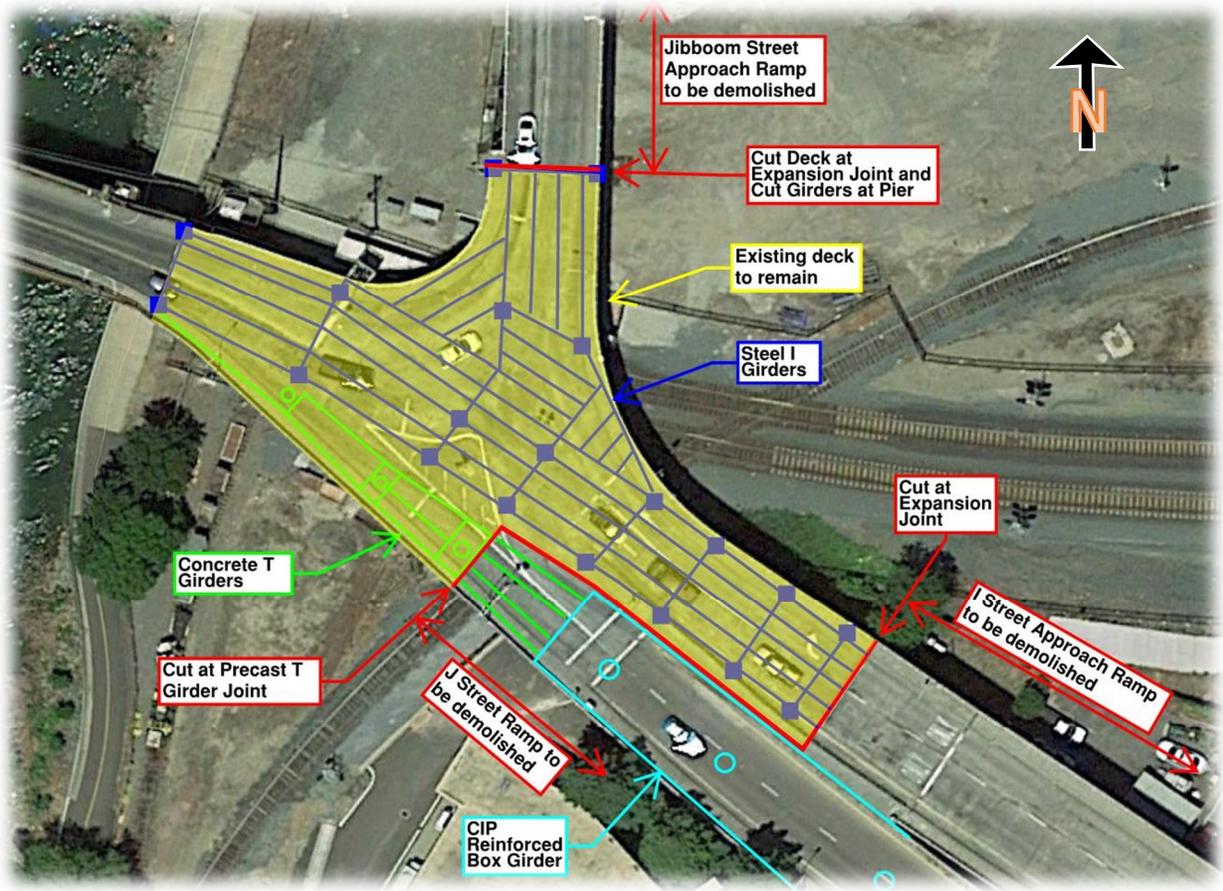
Figure 1: West Sacramento Approach Ramp Proposed to Remain



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Figure 2: Sacramento Approach Ramp Proposed to Remain



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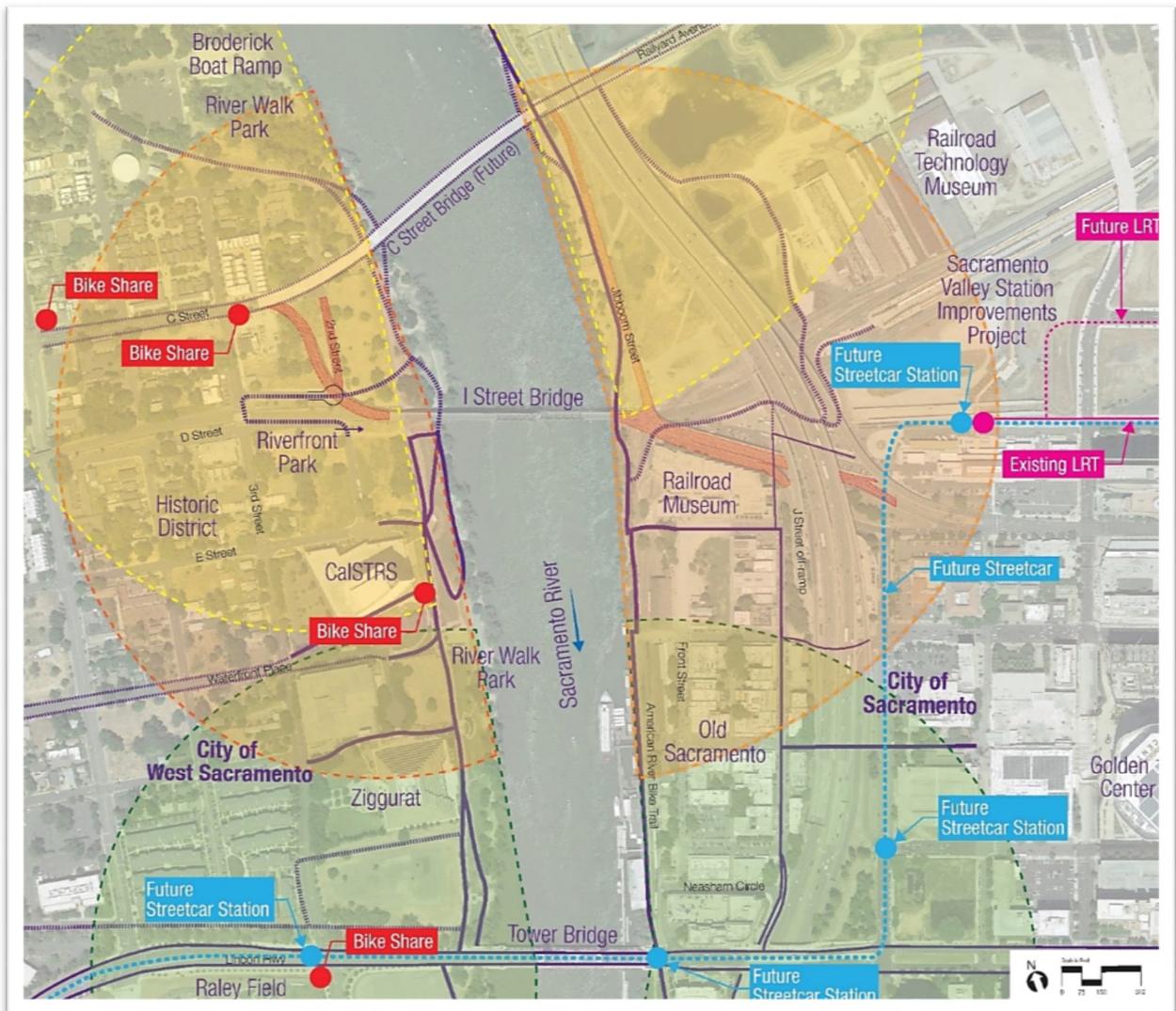


Approach Ramp Alignment Alternatives

An analysis of alternatives considered for the approach ramps to the I Street Bridge upper deck on the West Sacramento and Sacramento sides was performed. Various parameters were reviewed on each side of the river that include user connectivity to existing pathways and travel routes for both bicyclists and pedestrians for both commuting and recreational use, right-of-way, utility, levee and railroad impacts and construction costs. A destination and connectivity map is shown below in Figure 4. This shows the points of interest along with existing and planned bicycle paths. These destinations and pathways were considered when laying out the approach ramp alignments to insure proper compatibility with the existing pedestrian and bicycle network.

The I Street Bridge serves as an important link between West Sacramento's Historic District, CalSTRS and Ziggurat and Sacramento's Sacramento Valley Station. Old Sacramento and Railroad museum for pedestrian travel as shown in Figure 3. The I Street Bridge will also have the opportunity to better serve bicycle traffic between the Washington District of West Sacramento and Downtown Sacramento.

Figure 3: Destination and Connectivity Map



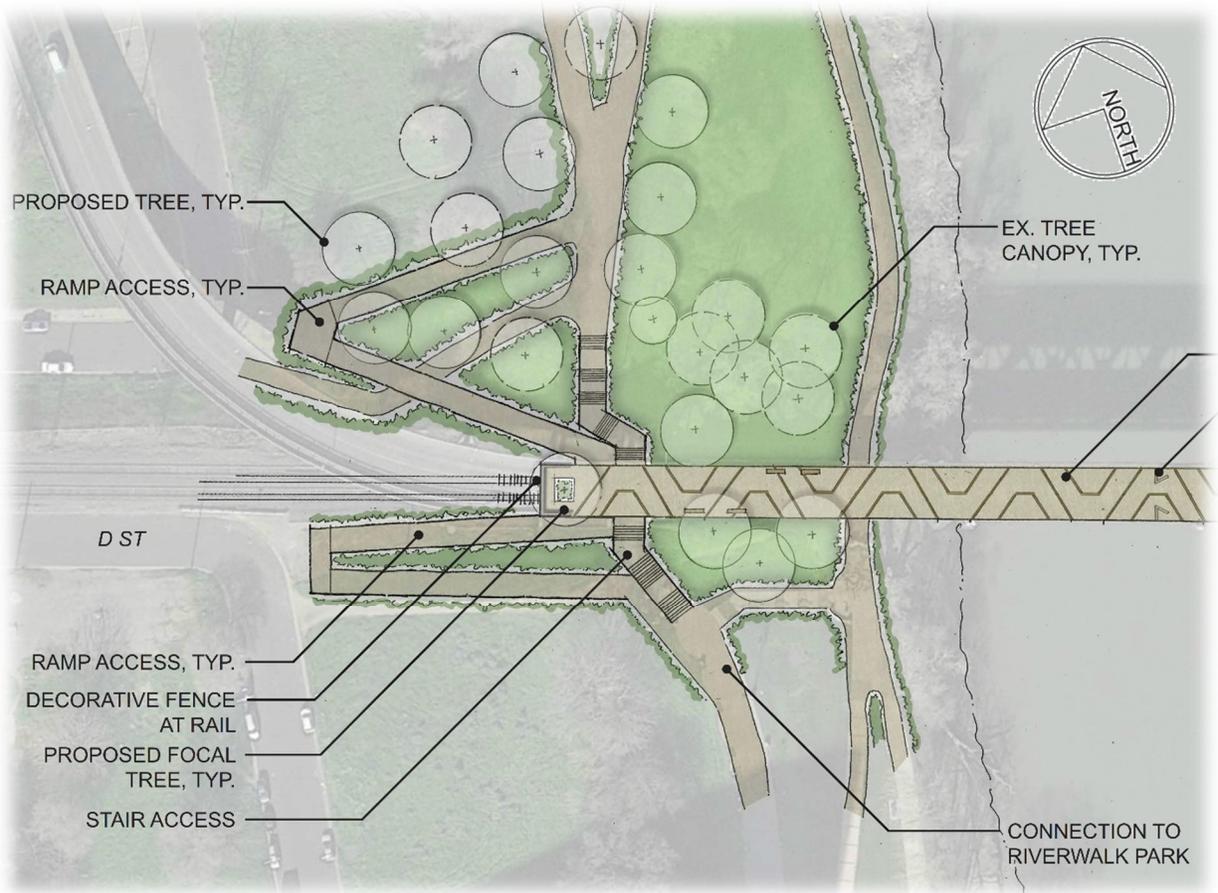
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The following approach ramp alignment alternatives were developed and presented to the Project Delivery Team.

Alt. 1 – West Sacramento Tight Switchbacks – This alternative provides series of steep ramps (at 7.5%) with landings and 90° turns to provide quickest route from top of deck to top of levee on the west side of the river. On both sides, the ramp terminates on top of the levee near the I Street bridge. Stairways are also accommodated on both sides of the bridge. See Figure 4 below and detailed Exhibit I and II in **Appendix C**. The objective of this alternative is to minimize impacts to the adjacent right-of-way and provide connections to existing and planned facilities on both sides of the railroad tracks. The use of tangent ramp segments allows the use of prefabricated steel bridge systems. Stairways on both sides along with short ramps provides good pedestrian access for both commuters and recreational users but the tight ramp turns are less bicycle friendly. Additionally, there is a likely utility conflict on the north side of the railroad tracks with an overhead PG&E electric line. This line would need to be relocated. This alternative avoids any impacts within the railroad right-of-way by connecting all elements to a portion of the existing approach ramp proposed to remain. Ramp and stairway foundations may penetrate the levee prism but are expected to be acceptable. Elevators were deemed to not be feasible directly adjacent to the proposed portion of the approach ramp to remain due to being located within the levee prism. Elevators, if implemented, would need to be placed close to 2nd street where they would be outside of the levee prism.

Figure 4: West Sacramento Approach Ramp Alignment Alternative 1

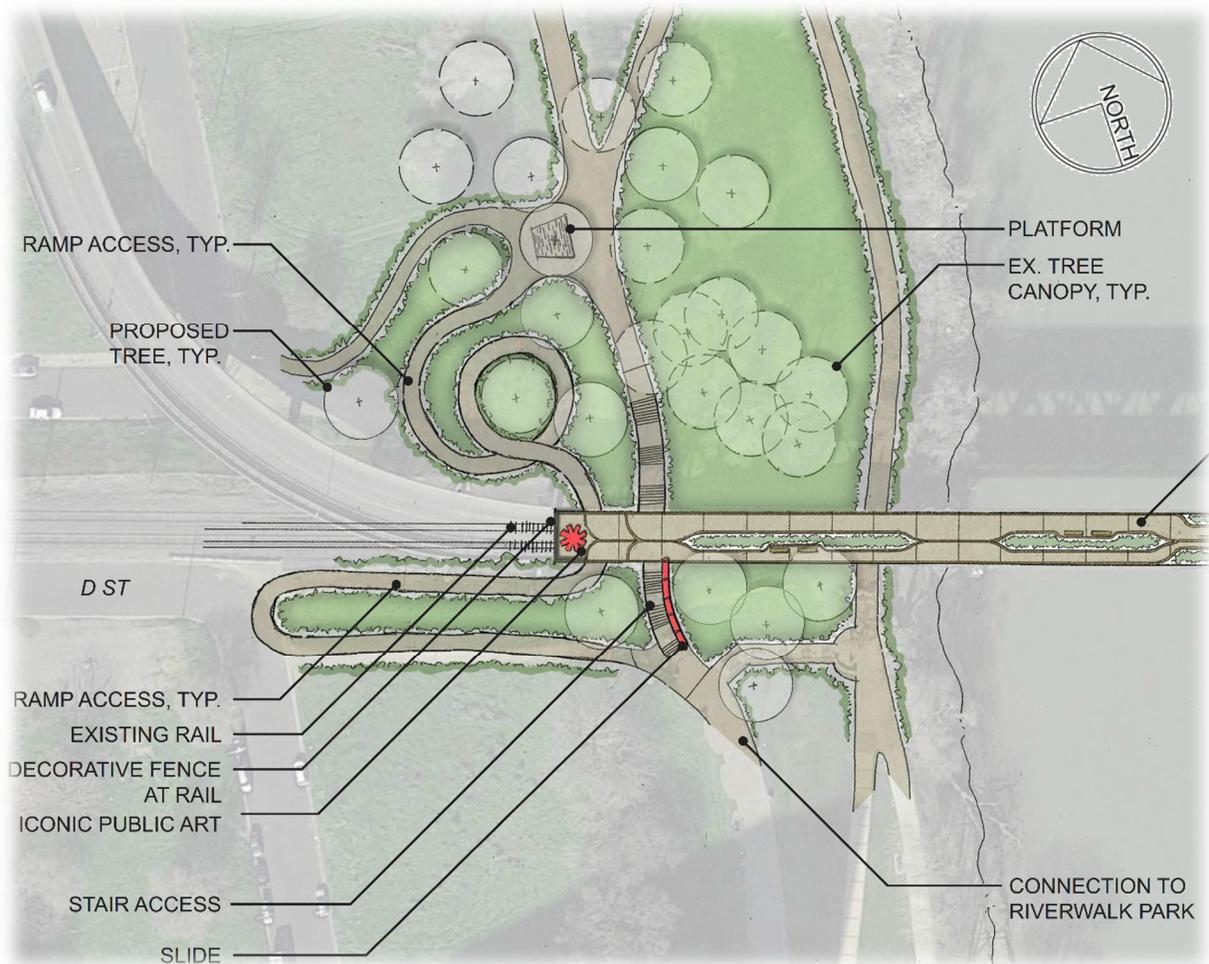


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Alt. 2 – West Sacramento Curved Ramps – This alternative provides a constant grade ramp (at ~4.75%) with curved turns to provide a smooth pathway from top of deck to top of levee on the west side of the river. On both sides, the ramp terminates on top of the levee near the I Street bridge. The use of highly curved ramps will necessitate the use of cast-in-place concrete slabs or specialized steel structures. Stairways are also included on both sides of the bridge. See Figure 5 below and detailed Exhibit III and IV in **Appendix C**. The objective of this alternative is to provide a more bicycle friendly facility while maintaining pedestrian connectivity and to create an enhanced user experience on the north side of the railroad tracks. This is accomplished by twisting the north ramp through an existing tree canopy. This alternative has higher right-of-way impacts than alternative 1, primarily on the north side of the railroad tracks. However, also avoids impacts within the railroad right-of-way by connecting to a portion of the approach ramp proposed to remain. The north side ramp may also conflict with the overhead PG&E electric line. Ramp and stairway foundations may penetrate the levee prism but are expected to be acceptable. Elevators were deemed to not be feasible directly adjacent to the proposed portion of the approach ramp to remain due to being located within the levee prism.

Figure 5: West Sacramento Approach Ramp Alignment Alternative 2

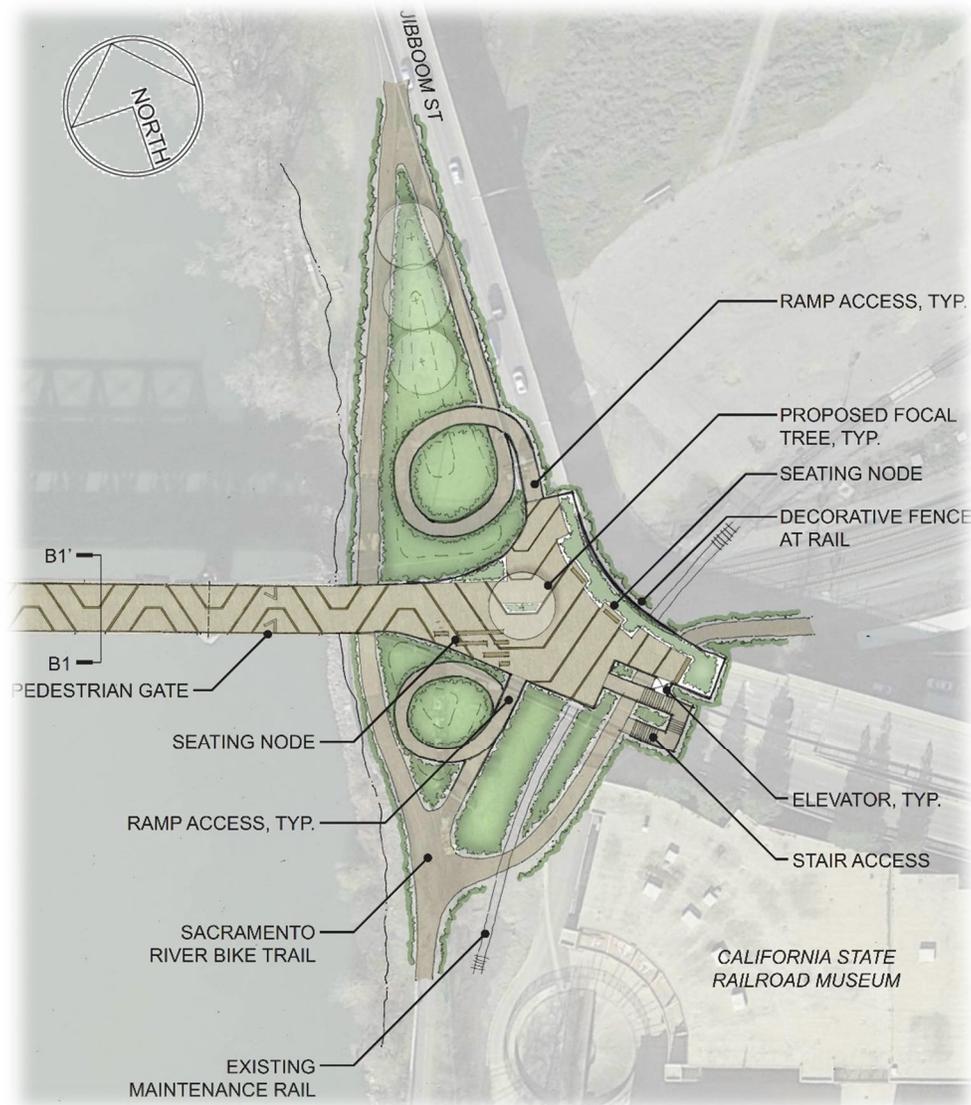


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Alt. 3 – Sacramento River Trail Connections – This alternative provides a double set of loop ramps on both sides of the I Street bridge that tie into the Sacramento River Trail on the east side of the river. The ramps descend at a constant grade (4.75%). The use of circular loop ramps will necessitate the use of cast-in-place concrete slabs or specialized steel structures. Pedestrian stairways are included on the south and north sides of the bridge leading users to a future pedestrian pathway that will allow pedestrians to access Old Sacramento or the Sacramento Valley Station on the south side and to the river trail leading toward the future Power House Science Center on the north side. See Figure 6 below and detailed Exhibit V and VI in **Appendix C**. This alternative requires the California State Railroad Museum to relocate its maintenance spur track to allow the south loop ramp placement. This alternative avoids impacts within the railroad right-of-way by connecting to existing portions of the approach ramps proposed to remain. There is an existing underground fiber optic line running parallel to the I Street bridge on the north side that will need to be avoided by the north loop ramp foundations. These ramps provide good connectivity to bicycle users recreationally using the Sacramento River Trail and pedestrians accessing Old Sacramento or the Sacramento Valley Station.

Figure 6: Sacramento Approach Ramp Alignment Alternative 3

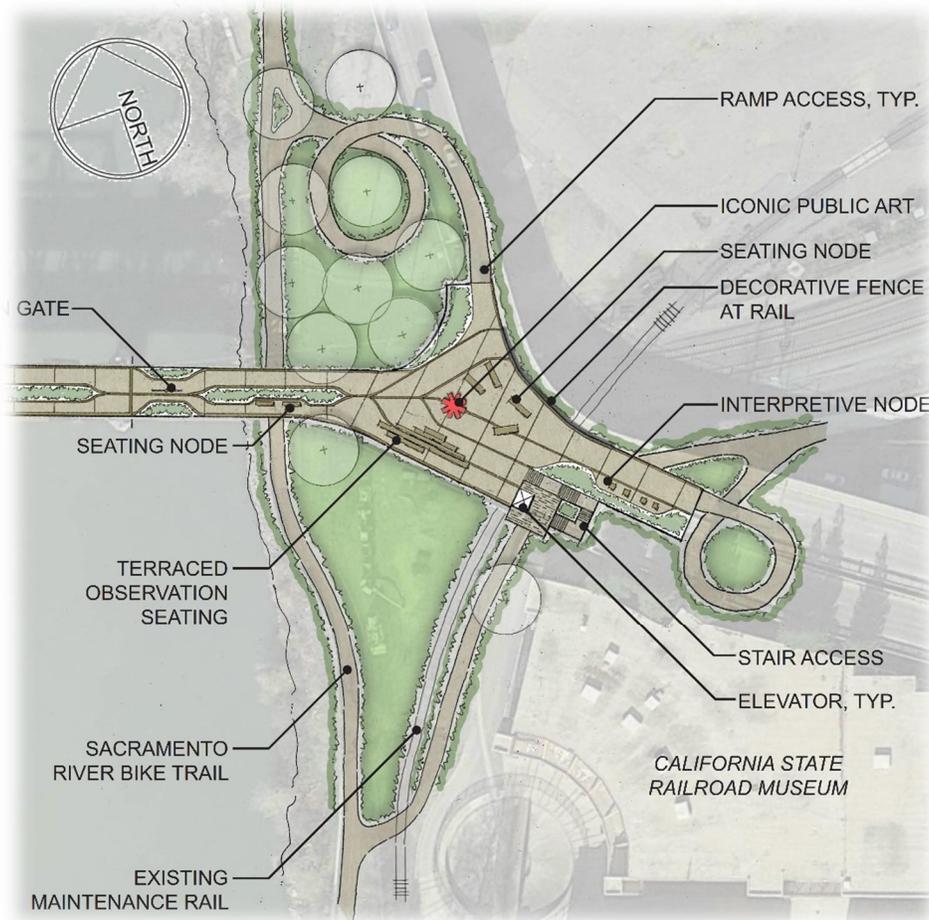


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Alt. 4 – Sacramento 2nd & H Street Connection to River Trail – This alternative provides a double set of loop ramps on both sides of the I Street bridge on the east side of the river. The north ramp ties into the Sacramento River Trail and the south ramp ties into a pedestrian pathway that takes users towards the existing 2nd Street and future location of the 2nd Street and H Street extension. The ramps descend at a constant grade (4.75%). The use of circular loop ramps will necessitate the use of cast-in-place concrete slabs or specialized steel structures. Pedestrian stairways are included on the south and north sides of the bridge leading users to a future pedestrian pathway that will allow pedestrians to access Old Sacramento or the Sacramento Valley Station on the south side and to the river trail leading toward the future Powerhouse Science Center on the north side. See Figure 7 below and detailed Exhibit V and VII in **Appendix C**. This alternative avoids direct impacts to the California State Railroad Museum, however, will need to be coordinated with the possible future railroad museum expansion. This alternative also avoids impacts within the railroad right-of-way by connecting to existing portions of the approach ramps proposed to remain. There is an existing underground fiber optic line running parallel to the I Street bridge on the north side that will need to be avoided by the north loop ramp foundations. These ramps provide good connectivity to bicycle users recreationally using the Sacramento River Trail as well as commuters to and from downtown Sacramento. The placement of the loop ramp on the south side of the I Street Bridge leading bicyclists towards 2nd Street acknowledges current bicycle use along 2nd Street through Old Sacramento as through bicyclists use this route to avoid the mix of cobblestone, boardwalk and gravel streets in Old Sacramento along the riverfront. This alternative still provides connectivity to pedestrians accessing Old Sacramento or the Sacramento Valley Station.

Figure 7: Sacramento Approach Ramp Alignment Alternative 4



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Stairways are proposed in addition to ramp at all access points to provide a more direct route for pedestrians. These will help to reduce pedestrian traffic on ramps that will be trafficked by bicycles reducing the risk of collisions. Stairways will also have runner rails placed on them making bicycle transport up and down stairways easier for those bicyclists inclined to take the stairs rather than bike up or down a ramp. Figure 8 below shows an example staircase.

Figure 8: Pedestrian Staircase with Bicycle Runner Rails.



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Right-Of-Way Impacts

Table 3 shows the expected ROW impacts for the various alignment alternatives. As shown in Table 3, Alternative 2 is expected to have significantly larger right-of-way impacts than Alternative 1. Alternatives 3 and 4 are expected to have similar right-of-way impacts. As noted previously, none of the alternatives will be interacting with Union Pacific right-of-way in anyway by connecting ramps to existing portions of approach ramps proposed to remain. Right-of-way impacts are shown in the detailed exhibits included in **Appendix C**.

Table 3: Right-Of-Way Impacts

Alternative	APN	Owner	TCE (acre)	Acquisition (acre)
Alt. 1 West Sacramento Tight Switchbacks	010-373-001	Fat Frank's Inc	0.150	0
	010-373-012	City of West Sacramento	0.026	0.001
	010-372-001	Overhouse Rev Trust Etal.	0.092	0.183
	Total =		0.268	0.184
Alt. 2 West Sacramento Curved Ramps	010-373-001	Fat Frank's Inc	0.150	0
	010-373-012	City of West Sacramento	0.026	0.001
	010-372-001	Overhouse Rev Trust Etal.	0.070	0.150
	010-372-002	Overhouse Rev Trust Etal.	0.200	0.400
	Total =		0.446	0.551
Alt. 3 Sacramento River Trail Connections	002-0010-056	Downtown Railyard Venture LLC	0.12	0.50
	006-0011-006	State of California	0.25	0.25
	Total =		0.37	0.75
Alt. 4 Sacramento 2nd & H St Connection to River Trail	002-0010-056	Downtown Railyard Venture LLC	0.12	0.50
	006-0011-006	State of California	0.15	0.30
	Total =		0.27	0.80

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Existing Utility Conflicts

Utility mapping requests were sent to various local utility owners. Responses were received from the following owners and existing utilities mapped to identify potential conflicts. Known utilities are shown on the detailed exhibits included in **Appendix C**.

- AT&T
- City of West Sacramento
- Comcast
- Kinder Morgan
- CenturyLink
- MCI
- PG&E
- Qwest
- Sprint

The following potential utility conflicts were noted and should be considered and studied during final design.

- Overhead electric PG&E line along the north side of the existing C Street approach ramp to the I Street bridge may be in conflict with proposed elevated ramp structures on the north side of the I Street Bridge for both Alternatives 1 and 2. It is anticipated that this line will need to be relocated or raised due to anticipated unavoidable conflicts with any elevated ramp on the north side of the I Street Bridge on the West Sacramento side of the river. The location of this line is shown in the detailed exhibits in Appendix C.
- Underground telephone MCI line along both sides of the railroad track on both the Sacramento and West Sacramento sides of the river will need to be avoided with proposed elevated ramp structure foundations for all Alternatives. It is anticipated that the design of the approach ramps will be able to be adjusted to avoid any conflicts with this line.
- Underground fiber optic CenturyLink line along the north side of the railroad right-of-way will need to be avoided with proposed elevated ramp structure foundations on the north side and east of the I Street Bridge for all Alternatives. It is anticipated that the design of the approach ramps will be able to be adjusted to avoid any conflicts with this line.

Based upon potential existing utility conflicts, there is no apparent advantage to selecting one alternative over another.

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Preliminary Cost Estimate

Planning level construction cost estimates were prepared for the various ramp alternatives and are shown in Table 4 below. These costs include contingencies appropriate for this stage in the project. As shown in the cost estimate below, Alternative 1 is expected to cost slightly less than Alternative 2. Alternatives 3 and 4 are expected to have equal costs.

Table 4: Ramp Alternatives Preliminary Cost Estimate (2018 Dollars)

Alternative	Ramp Location	Ramp Area (SF)	Unit Cost (\$/SF)	Cost
Alt. 1 West Sacramento Tight Switchbacks	South Side (prefabricated steel truss)	4,000	\$ 560	\$ 2,240,000
	North Side (prefabricated steel truss)	4,500	\$ 560	\$ 2,520,000
	Total =			\$ 4,760,000
Alt. 2 West Sacramento Curved Ramps	South Side (cast-in-place concrete slab)	5,000	\$ 490	\$ 2,450,000
	North Side (cast-in-place concrete slab)	5,500	\$ 490	\$ 2,695,000
	Total =			\$ 5,145,000
Alt. 3 Sacramento River Trail Connections	South Side (cast-in-place concrete slab)	6,000	\$ 490	\$ 2,940,000
	North Side (cast-in-place concrete slab)	6,000	\$ 490	\$ 2,940,000
	Total =			\$ 5,880,000
Alt. 4 Sacramento 2nd St & H St Connection to River Trail	East Side (cast-in-place concrete slab)	6,000	\$ 490	\$ 2,940,000
	North Side (cast-in-place concrete slab)	6,000	\$ 490	\$ 2,940,000
	Total =			\$ 5,880,000

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Alternative Selection

The Project Delivery Team reviewed the approach ramp alignment alternatives and selected Alternative 2 on the West Sacramento side as well as Alternative 4 on the Sacramento side as their preliminary preferred alternatives:

- Alternative 2 West Sacramento Curved Ramps was selected based upon similar connectivity as Alternative 1 but providing a much more enhanced user experience. The enhanced experience was determined to outweigh the larger expected impacts and costs of Alternative 2.
- Alternative 4 Sacramento 2nd St & H St Connection to River Trail was selected based upon preferring to provide connectivity towards downtown Sacramento, the Sacramento Valley Station and the known bike route through Old Sacramento along 2nd Street. This alternative also avoids impact to the California State Railroad Museum railroad maintenance spur line.

Mixed-Use Improvements



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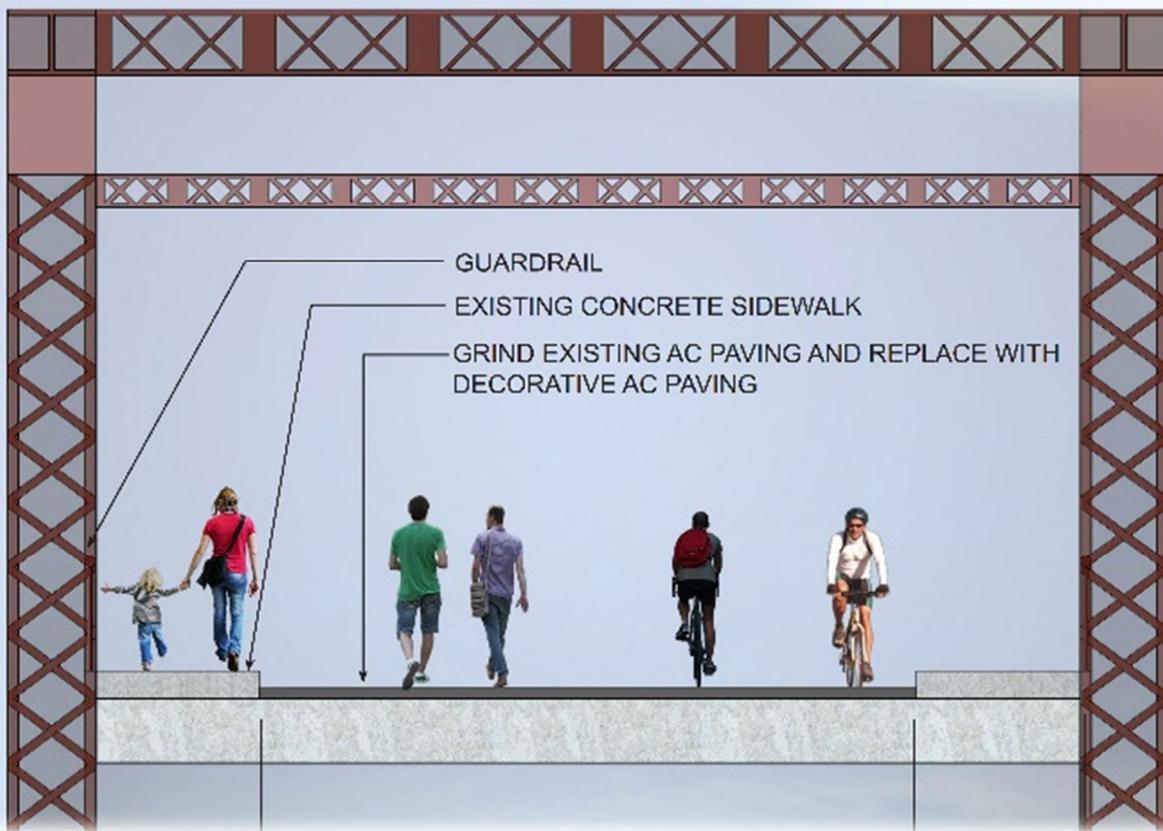


Mixed-Use Improvements

Mixed-use improvements were examined for the upper deck of the I Street Bridge and portions of approach ramps proposed to remain. The primary purposes of potential improvements are to improve user safety and enhance user movement across the I Street Bridge.

Base case improvements on the I Street Bridge consist of addressing the needs noted in the Existing Condition Report. This includes repairing/replacing the hand railing, patching concrete spalls in the sidewalk, removing the curb rub rail, enhancing the lighting system for public safety and making repairs to the bridge deck. This is shown in Figure 9 below.

Figure 9: Base Case Improvements on I Street Bridge Upper Deck

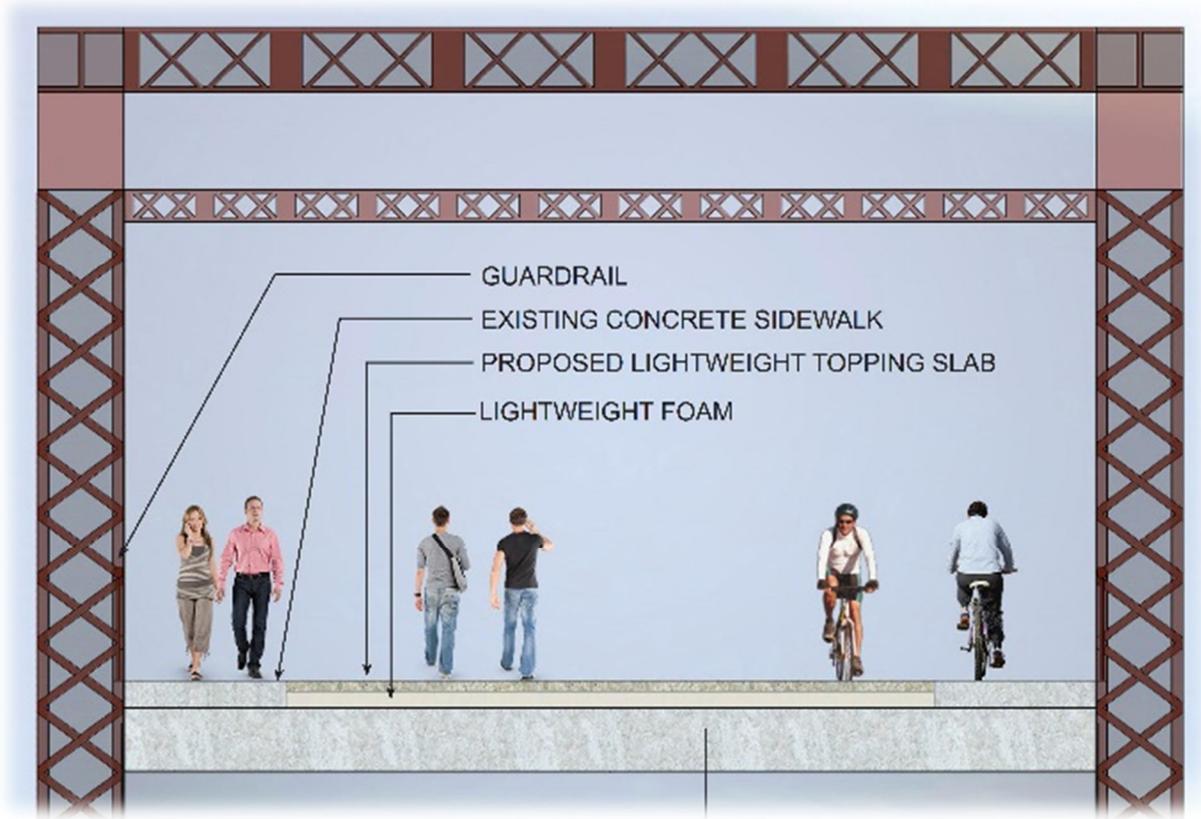


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Secondary improvements to the upper deck will seek to further enhance mixed-use movement across the I Street Bridge through raising the bridge deck to the level of the sidewalks to create a continuously level surface. Due to added weight restrictions on the movable span, a lightweight foam filler with a lightweight topping slab would be used that would replace removed asphalt pavement. This is shown in Figure 10 below.

Figure 10: Secondary Improvements to the I Street Bridge Upper Deck



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To further encourage through movement of pedestrians and cyclists across the I Street Bridge, portions of the bridge deck may be proposed to be used for lightweight landscaping. This would narrow the pathways encouraging users to quickly move from one end of the bridge to the other. This would also help to separate bicycle traffic from walking pedestrians removing potential conflicts and expediting user movement. Use of this lightweight landscaping would be highly limited on the movable span and would be required to match weight of landscaping to the weight of removed asphalt pavement. This is shown in Figure 11 below.

Figure 11: Added Improvements to the I Street Bridge Upper Deck



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On the portions of the approach ramps proposed to remain, base improvements are the same as those for the I Street Bridge and consist of addressing the needs identified in the Existing Condition Report. These include improving non-standard railing and curb heights, sealing decks and providing 8 ft fencing along deck edges over tracks.

Mixed-used enhancements are also proposed including features to draw users from one end of the bridge to the other to further encourage user movement across the I Street Bridge. These might take the form of public works of art or statues located on the approach spans on either end of the bridge. Additional features would seek to help guide various user types to and from different destinations and access points including access ramps and stairways connecting to the remaining approach ramps. Benches for seating are also proposed.

Additionally, these raised platforms can have various pedestrian and bicycle amenities placed on them such as benches and minor landscaping. A concept of such a landscaped space on the Sacramento side is shown in Figures 12-14 below. The raised platform on the Sacramento side has additional potential to be interconnected with future developments such as a direct connection to the roof of the railroad museum or direct access into the 2nd or 3rd floor of a new development on the north side of the I Street Bridge.

Figure 12: Enhanced Sacramento Approach Ramp



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Figure 13: Close up of Seating and Viewing Opportunities on the Sacramento Approach Ramp



Figure 14: Close up of Art Piece Drawing Users Across the I Street Bridge



Preliminary Scour Assessment



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Preliminary Scour Assessment

A preliminary scour assessment was performed to evaluate scour potential associated with the existing bridge structure supports. Scour depths were calculated based upon Log of Materials from the original bridge as-builts. The Log of Materials shows the existing structure supports being embedded in a layer of large cobbles. Soils above this layer are expected to be susceptible to scour, however the large cobble layer is anticipated to limit scour depths at the bridge. Verification of the presence of the large cobble layer should be done during a later design phase and the scour depths and elevations confirmed. The scour potential should be investigated during the design phase with more accurate channel bed information. The complete Scour Assessment is included in **Appendix D**.

Cultural Resources Assessment



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Cultural Resources Assessment

A cultural resources assessment was performed to review cultural resources (archaeological and historic) on and around the Project site. As a part of this assessment, recent cultural studies for the I Street Bridge Replacement Project were reviewed. These studies include most of the area to be affected by the upper deck conversion project. Based upon these previous studies and surveys conducted by ICF in 2016 for the I Street Bridge Replacement Project, there are two identified architectural resources as eligible for or listed in the National Register of Historic Places and California Register of Historical Resources. These are the I Street Bridge and the Sacramento River East Levee. One archaeological resource was also identified by the previous survey as eligible for inclusion in the National Register of Historic Places: the Pioneer Flour Mill wharf. This consists of 518 pilings associated with the Pioneer Flour Mill and are located on the east bank of the Sacramento River immediately north and south of the I Street Bridge. Also as a part of the I Street Bridge Replacement Project, the Native American Heritage Commission was contacted to request the identification of any areas of concern within the bridge replacement project Area of Potential Effect that may be listed in the Sacred Lands File and to provide a list of Native American representatives who may have interest in the project. The Native American Heritage Commission indicated that there were no recorded cultural resources within the project limits. The Yocha Dehe Wintun Nation and the United Auburn Indian Community of the Auburn Rancheria stated that there is a potential tribal cultural property in the area as well as archaeological sites on both sides of the river. The complete cultural resources assessment is included in the Cultural Resources Assessment and Environmental Constraints Report included in **Appendix E**.

Environmental Constraints Assessment



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Environmental Constraints Assessment

An environmental constraints assessment was performed to review environmental constraints for the Project site and the expected environmental regulatory processes that would be required for the Project implementation. A number of environmental topics were identified that will require consideration during future design and environmental review of the I Street Bridge Deck Conversion Project. These topics include the following and are discussed in more detail in the Cultural Resources Assessment and Environmental Constraints Report included in **Appendix E**.

- Aesthetics – primarily due to temporary construction equipment
 - Air Quality – primarily due to temporary construction equipment
 - Biological Resources – including the possible presence of the following species and sensitive habitat
 - Valley Elderberry Longhorn Beetle
 - Western Pond Turtle
 - Swainson’s Hawk
 - White-Tailed Kite
 - Purple Martin
 - Pallid Bat
 - Western Red Bat
 - Sacramento River Winter-Run Chinook Salmon*
 - Central Valley Spring-Run Chinook Salmon*
 - Central Valley Fall and Late-Fall Chinook Salmon*
 - Central Valley Steelhead*
 - North American Green Sturgeon*
 - Delta Smelt*
 - Longfin Smelt*
 - Sacramento Splittail*
 - Pacific Lamprey*
 - River Lamprey*
 - Cottonwood Riparian Habitat
 - Heritage Trees
- * These species are unlikely to be affected by the project due to no proposed in-water work.
- Community Impacts
 - Hazardous Waste and Materials – including the possible presence of the following:
 - Recognized Environmental Conditions
 - Asbestos-Containing Materials
 - Lead-Containing Paints
 - Aerially-Deposited Lead
 - Lead
 - Chromium
 - Hydrology and Water Quality – due to added impervious surface areas and land-disturbing activities
 - Noise – primarily due to temporary construction equipment
 - Utilities and Emergency Services

It is anticipated that the appropriate CEQA document for the Project would be an Initial Study/Mitigated Negative Declaration, and the appropriate NEPA document would be a Categorical Exclusion supported by technical studies. While there are several resources within the anticipated Project area that could be affected by the Project, it is likely that existing regulatory processes, in combination with Project-specific mitigation measures, would reduce potential impacts to less-than-significant levels.

Regulatory Compliance and Permitting



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Regulatory Compliance and Permitting

The anticipated permits and the regulatory processes that are expected to apply to the project include Section 7 or Section 10 consultation with the US Fish and Wildlife Service under the Endangered Species Act (ESA); Streambed Alteration Agreement; tree permit and dewatering permit from the City of West Sacramento; tree permit and dewatering permit from the City of Sacramento; Section 106 and AB 52 compliance for historic properties and tribal cultural resources, respectively. Project implementation would also require adherence to the two MS4 permits for Sacramento and West Sacramento and preparation of a transportation management plan and could require air quality permits related to ACMs, LCPs, and ADL.

The project site is adjacent to the Old Sacramento State Historic Park boundary. Depending on the final project area, a portion may be adjacent to, or within, the State Park boundary. The project would be evaluated for consistency with the 2014 Old Sacramento State Historic Park General Plan and Environmental Impact Report.

Coordination and permitting from the West Sacramento Area Flood Control Agency (WSAFCA) and the Sacramento Area Flood Control Agency (SAFCA) will be required for any work impacting the levee on the West Sacramento side and Sacramento side of the river respectively. Any in channel work will need to get approval from the Central Valley Flood Protection Board

Bridge Ownership and Maintenance Responsibility



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Bridge Historic Baseline Report, Ownership and Maintenance Responsibility

According to an unverified article regarding the history of the I Street Bridge, in 1869 Southern Pacific Railroad Company's ("SP") predecessor built a bridge across the Sacramento River from the Washington area in Yolo County to the City of Sacramento. The bridge was the first bridge over the river to contain railroad tracks. In 1878, SP rebuilt the bridge. In 1893, SP, with the counties of Sacramento and Yolo, began the construction of a new joint bridge for railroad and highway use. The new bridge was completed in 1895 and was called the "Red Bridge." We do not have a copy of the agreement between the parties for joint use of the Red Bridge.

In 1910, the Red Bridge was replaced with a new bridge structure further north on the river. This bridge is now known as the I Street Bridge and provides for rail travel on the lower deck and vehicular and pedestrian travel on the upper deck. There are approach ramps on both sides of the bridge for vehicles to enter onto the upper bridge deck. There are also sidewalks for pedestrian traffic.

The I Street Bridge was also built by joint written agreement between SP and the counties of Yolo and Sacramento (the "1910 Agreement"). The 1910 Agreement states that SP leases the overhead structure (upper deck) and approaches to Sacramento County for a certain rental rate to be paid on an annual basis for a period of 7 years. Once the rents were fully paid, Sacramento County was to receive from SP, for \$1.00 in consideration, an easement for using the overhead structure and approaches for as long as the new railroad bridge was used for railroad purposes. (1910 Agreement, p. 5-6, § 6.) The easement grant was to be placed in escrow with California National Bank upon Sacramento County's first payment, and the grant was to be released to Sacramento County upon full payment. (1910 Agreement, p. 6, § 6.)

In the same agreement, SP agreed to sell a grant of easement to Yolo County, which payment was to be made in two installment payments. The easement grant was to be placed in escrow with the Bank of Woodland upon Yolo County's first installment payment, and the grant was to be released to Sacramento County upon full payment. (1910 Agreement, p. 6, § 6.) The easement grants to both counties included the right, easement, and privilege of using the overhead structure and approaches of the new bridge for the same purposes for which the overhead structure and approaches of the "present bridge" were used. (1910 Agreement, p. 6, 8, § 6.)¹

In 1954, the same parties, along with the State of California, entered into an agreement acknowledging that the upper deck became part of the state highway system as State Route 50, and memorializing the new rights and responsibilities of the parties (the "1954 Agreement"). In the agreement, the State agreed to design, and SP agreed to construct and install electrically-operated gates together with necessary signals and other devices to control vehicular and pedestrian traffic. The 1954 Agreement acknowledges that the 1910 Agreement provided that SP would grant the counties an easement to use the upper deck and approaches for highway purposes for as long as the life of the bridge is used for railroad purposes. (1954 Agreement, p. 2.) The agreement states that both SP and the counties have performed their respective duties and obligations under the 1910 Agreement (which would include all required payments), and that the 1910 Agreement was in full force and effect.

The 1954 Agreement also references a June 1, 1936 agreement ("1936 Agreement") between the State, the railroad and the City of Sacramento, and granted the City of Sacramento the right to construct new approaches to the upper deck on the east side of the river, together with a connection at Jibboom Street. Because the new Jibboom Street connection and east approach to the upper deck became part of State Route

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50, and therefore a part of the State Highway System, full possession and control of the upper deck and approaches passed to the Department of Public Works of the State.

In 1981, the State relinquished the upper deck to Yolo County and the City of Sacramento, respectively, which was memorialized in a March 1981 untitled agreement between SP's successor, Southern Pacific Transportation Company, the state, Yolo County, and the City of Sacramento (the "1981 Agreement"). The 1981 Agreement refers to the I Street Bridge as a "combined railroad and highway swing drawbridge, with a lower deck for railroad traffic and an upper deck and approaches thereto for highway traffic." (1981 Agreement, p.1, § 2.) It states that the railroad owns, maintains and operates all of the bridge, including the approaches, except that the City of Sacramento "owns, maintains and operates the approaches to said upper deck located in the City of Sacramento" because of their construction of the new approach and Jibboom Street connection. With the incorporation of the City of West Sacramento, the City of West Sacramento assumed ownership of the approach on the west side of the river from Yolo County.

The 1981 Agreement states that if the upper deck of the I Street Bridge ceases to be used as a public highway for any reason, it shall revert to the railroad as stated in the 1910 Agreement and the obligations and rights of the City of Sacramento and County of Yolo shall cease. (West Sacramento is the successor to Yolo County.) This is different from the language in the 1910 Agreement which states that the easement for the overhead structure and approaches could be used for as long as the new railroad bridge was used for railroad purposes.

Uses of the I Street Bridge today include vehicular and bicycle traffic, as well as pedestrian traffic. The upper deck is improved with raised sidewalks specifically for pedestrian use. The vehicular and pedestrian approaches to the upper deck lie within rights-of-way owned by the cities.

Once completed, the new replacement bridge will cross the Sacramento River between the Sacramento Railyards and the West Sacramento Washington neighborhood. It will provide a new bicycle, pedestrian, and automobile crossing. The funding requires that vehicle traffic be relocated to the new bridge. If the cities do not protect access to the upper deck, the lower deck of the existing I Street Bridge will continue to be used by the railroad and the upper deck will be closed to vehicular traffic.

If the cities demolish the vehicle approach viaducts leading to the upper deck and reconstruct new approaches, ramps, and stairs for pedestrian and bicycle use on the existing city-owned right-of-way easements, easement rights to the upper deck will continue. By reserving a portion of the existing city owned approaches adequate for attaching the new bicycle/pedestrian ramps the cities will not need Union Pacific permits to attach the ramps.

Under Section 23 of the Streets and Highways Code, the term "'highway' includes bridges, culverts, curbs, drains, and all works incidental to highway construction, improvement, and maintenance." (emphasis added). The West Sacramento City Attorney has completed review and analysis of the Cities' public highway easement rights and found that the easement is inclusive of public travel on foot, bicycle and vehicle.

In summary, West Sacramento and the City of Sacramento should legally be able to use the upper deck of the I Street Bridge for pedestrian and other non-vehicle traffic after the deck is closed to vehicles. This is not only consistent with likely uses of bridge prior to 1910, but also with California law on the use of public highways.

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Regulatory and Railroad Approvals

It is anticipated that the cities will need a form of approval from the California Public Utility Commission (CPUC) and Union Pacific; and, potentially West Sacramento approaches could require a Central Valley Flood Protection Board approval (depending on the landing locations and foundations). The CPUC will consider new approach ramps and elimination of vehicles an alteration of an existing rail crossing.

Authority to modify an existing public rail crossing is typically granted through the General Order 88-B authorization process which results in an authorization from the Rail Crossings and Engineering Branch and does not require a formal CPUC hearing. The City must first conduct a diagnostic meeting with Union Pacific and the CPUC to identify all the requirements before applying to the CPUC.

The Deck Conversion Project proposes to save a portion of each city owned structure on each end of the existing I Street Bridge to create raised platforms that new stairways and pedestrian ramps can attach to and span over the active railroad tracks. This strategy or approach minimizes new crossings over railroad right of way associated with new ramps. The intersection platform in the city of Sacramento is well outside of the railroad right of way; and, no further railroad permission will be needed. West Sacramento will need Union Pacific consent to relocate the existing overhead easement.

Additionally, the Feasibility Project Team focused on designing to avoid any connection to the main structure or interference with rail facilities. The ramp and access alternatives were developed to stay outside of railroad right of way, except for an unavoidable relocation of a UP aerial easement on the West Sacramento side.

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Appendix A – Design Criteria and Basis of Design Report

Appendix B – Existing Condition Report

Appendix C – Ramp Alignment Alternative Exhibits

Appendix D – Preliminary Scour Assessment

Appendix E – Cultural Resources Assessment and Environmental Constraints Report

Appendix F – I Street Lantern Festival Summary Report

Appendix A – Design Criteria and Basis of Design Report



I STREET BRIDGE DECK CONVERSION PROJECT

Design Criteria and Basis of Design Report for Active Transportation Use

West Sacramento, CA



Client Review Draft

March 9th, 2018

WSP Project No. 187320A

Prepared for:

City of West Sacramento

Department of Public Works

Engineering Division

Prepared by:

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Introduction

The I Street Bridge is a historic swing railroad bridge built across the Sacramento River in 1911 by Southern Pacific Railway. It continues to be used for vehicle crossings on the top deck and train crossings on the bottom deck. As part of the new C Street Bridge Project, vehicle traffic and the approach structures to the bridge upper deck will be removed from the existing structure.

The City of West Sacramento in cooperation with the City of Sacramento are completing a Feasibility Study for the I Street Bridge Deck Conversion For Active Transportation Project (Project). The Feasibility Study will analyze converting the upper deck of the existing I Street Bridge from a vehicle use to a bicycle and pedestrian only use.

The I Street Bridge Deck Conversion For Active Transportation Project proposes to maintain and improve active transportation use on the upper deck of the existing I Street Bridge once vehicle traffic is removed as a part of the new C Street Bridge Project. As a part of the C Street Bridge Project, the existing roadway approach ramps to the C Street Bridge from I Street and Jibboom Street in Sacramento and from C Street in West Sacramento are proposed to be demolished. This Project will consider saving a portion of each structure on each end of the existing I Street Bridge to accommodate access points for pedestrians and bicyclists.

Access to the elevated structure is proposed to be via a combination of ADA compliant ramps, stairways and possible elevators on both sides of the Sacramento River. Depending on funding, Project improvements may be phased. The initial phase would be required to provide ADA access on both sides of the river and would likely consist of one set of ADA ramp at each end of the bridge.

Project Design Criteria

This document provides the design criteria to be used for the Project. If any criteria cannot be met due to environmental, right-of-way, utility or other constraints, exceptions will need to be documented and submitted for approval.

Table 1 lists the applicable design guidelines that will be followed during design. The manuals were also used to develop the project specific criteria.

Table 1: Design Standards

Data Category/Source	Date
<i>City of West Sacramento Standard Details (City of West Sac SD)</i>	2015
<i>City of Sacramento Standard Specifications & Standard Drawings (City of Sacramento SD)</i>	2007
<i>ADA Standards for Accessible Design (ADA)</i>	2010
<i>California Code of Regulations Title 8 (CCR)</i>	
<i>Guide for the Development of Bicycle Facilities, American Association of State Highway and Transportation Officials (AASHTO GBF)</i>	2012
<i>AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges (AASHTO GSPB)</i>	2015
<i>AASHTO LRFD Bridge Design Specification, 8th Edition and the California Amendments (AASHTO BDS)</i>	2018
<i>AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals, 6th Edition (AASHTO HSLTS)</i>	2013

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<i>AASHTO Roadway Lighting Design Guide (AASHTO RLDG)</i>	2005
<i>Highway Design Manual, California Department of Transportation (HDM)</i>	2017
<i>Caltrans Seismic Design Criteria, Version 1.7 (SDC)</i>	2013
<i>California Manual on Uniform Traffic Control Devices (California MUTCD), Caltrans</i>	2012
<i>NACTO Shared Use Path Accessibility Guidelines</i>	2011

Table 2 list the project specific design criteria to be used as the basis of design for the I Street Bridge Deck Conversion for Active Transportation Project.

Table 2: Project Specific Design Criteria

Criteria	Project Criteria			Desired
	Max or Min	Criteria for Pedestrians Only	Criteria for Mixed-use (Bicycle/Ped)	
Hand Rail Height	Max	38 in [ADA 505.4]		36 in
	Min	34 in [ADA 505.4]		
Existing Curb Height to Remain	Max	8 in [AASHTO BDS 13.11.2]		6 in
Ramp Landings Requirement		At top & bottom of each ramp run Intermediate is required if change in direction [ADA 405.7]		Top, bottom and intermediate
Ramp Landing Width	Min	To equal width of widest ramp run or 60 in if change in direction [ADA 405.7.2]		60 in
Ramp Landing Length	Min	60 in [ADA 405.7.3]		60 in
Ramp Rise	Max	30 in before landing for grades steeper than 5% [ADA 405.6]		30 in with landing
Ramp Grade	Max	5% continuous or 8.33% with landings [ADA 402.2, 405.2] 7.5% with landings [City of West Sac SD 208]		4.75% continuous or 7.5% with landings
Ramp Width	Min	36 in (3 ft) [ADA 403.5.1]	8 ft [AASHTO GBF 5.2.1, 5.2.10]	10 ft
Overhead Clearance	Min	80 in (6.7 ft) [ADA 307.4]	8 ft [AASHTO GBF 5.2.1]	8 ft

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Ramp Cross Slope	Max	2.0833% [ADA 403.3, 405.3] 1.75% [City of West Sac SD 208]	2% [AASHTO GBF 5.2.1]	1% Recommended by AASHTO on mixed-use paths
	Min	1% [ADA 403.3, 405.3]	1% [City of West Sac]	
Bicycle Design Speed			12 mph [AASHTO BGF 5.2.4]	12 mph
Bike Railing Height	Min		42 in [AASHTO GBF 5.2.10]	42 in
Ramp Radius Curvature	Min		27 ft [AASHTO GBF 5.2.5]	27ft
Lighting	Min		0.5 foot-candles [AASHTO GBF 5.2.12] 1.4 foot-candles [AASHTO RLDG Table 3-5a]	1.4 foot-candles
Stairway Width	Min	44 in [CCR 3231 (b) (1)]		8 ft
Stair Height	Min	4 in [CCR 3231 (c) (1)]		4 in
	Max	7.5 in [CCR 3231 (c) (1)]		7.5 in
	Variance	3/8 in [CCR 3231 (c) (1)]		3/8 in
Tread Depth	Min	10 in [CCR 3231 (c) (1)]		11 in
Stairway Landing Length	Min	4 ft [CCR 3231 (f)]		4 ft
Stairway Rise	Max	12 ft [CCR 3231 (f)]		12 ft
Elevator Landing	Min	48 in X 30 in [ADA 407]		48 in X 48 in
Clear Path of Travel	Min		12-14 ft [AASHTO GBF, NACTO Guide]	10 ft

General Signage

Signage should be clear, legible and well-placed, providing users with information they need in a timely manner. Signage should have a minimum vertical clearance of 4 feet and a maximum vertical clearance of 5 feet. Horizontal clearance from the edge of the trail shall be a minimum of 3 feet and a maximum of 6 feet. Spatial constraints may make it difficult to achieve these minimum standards. Character height on signage depends on the distance from which the user needs to read the sign, but ADA specifies that uppercase characters shall be no less than 3 inches tall. If characters smaller than 3 inches are to be used, height should be based on viewing distance per ADA 28 CFR Section 36, 4.30.3. Any characters less than 3 inches high shall also meet the tactile requirement (raised a minimum of 1/32"). A preferred maximum character height of 3 inches is recommended, for this project, in order to maintain reasonable sign sizes. Illumination levels on the sign surface shall be in the range of 10 to 30 foot-candles.

Interpretive Signage

Interpretive signage to be setback a minimum of 24 inches from the edge of the trail. The height of the sign should be no less than 36 inches and no more than 42 inches. A Braille strip should be located on the outer edge of any interpretive sign.

Bicycle Facilities

Elements of the bridge design, such as expansion joints or drainage grates, may cause obstacles for bicyclists. The clear path of travel for cyclists should be free of sudden surface changes or other hazards.

As noted in Table 2, the minimum width of two-directional shared use trails is 10 feet, but 12-14 foot widths are recommended in urban areas. A centerline stripe should be included along the bridge and connecting paths.

Bike channels should be provided on all stairways, as stairs often provide the most direct path for vertical access. Bike channels are an addition to, but not replacement of, ramps or switchbacks.

Bridge Structural Elements

Bridge components will be designed in accordance with the AASHTO LRFD Guide Specifications for Design of Pedestrian Bridges, 2009 within interim revisions, and the AASHTO LRFD Bridge Design Specifications, 8th Edition, September 2017 with California Amendments where applicable.

Pedestrian Live Load: 90 psf per AASHTO GSPB Section 3.1

Maintenance or Emergency Vehicle Load: H5 for ramps 10 ft or less in width; H10 for ramps greater than 10 ft in width per AASHTO GSPB Table 3.2-1

Appendix B – Existing Condition Report



I STREET BRIDGE

Existing Condition Report for Bridge Deck Conversion to Active
Transportation Use

West Sacramento, CA



Client Review Draft

November 21, 2017

WSP Project No. 187320A

Prepared for:

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INTRODUCTION

The I Street Bridge is a historic movable swing railroad bridge built across the Sacramento River in 1911 by Southern Pacific Railway. It continues to be used for vehicle crossings on the top deck and train crossings on the bottom deck. As a part of the new C Street Bridge Project, vehicle traffic and the approach structures to the bridge upper deck will be removed from the existing structure.

The City of West Sacramento in cooperation with the City of Sacramento are completing a Feasibility Study for the I Street Bridge Deck Conversion For Active Transportation Project (Project). The Feasibility Study will analyze converting the upper deck of the existing I Street Bridge from a vehicle use to a bicycle and pedestrian only use.

DESCRIPTION OF I STREET BRIDGE

The I Street Bridge (Bridge No. 22C0153), constructed in 1911, carries two vehicular lanes, one in each direction and pedestrian sidewalks along both sides on an upper deck. It also carries two active railroad tracks on a lower deck. The main structure is comprised of 2 – 170 foot long spans, two cantilevered 195 foot swing spans and another 110 foot long span. The total structure length of 840 feet is comprised of a steel through truss on reinforced concrete foundations with reinforced concrete top deck slab. Sidewalks are 5 ft wide on each side with an 18 ft travel way width and no shoulders. The sidewalk curbs are protected against damage due to frequent vehicle collision or rubbing with longitudinal angle irons.

The approach structure from the City of West Sacramento (Bridge No. 22C0154), constructed in 1958, carries two vehicular lanes, one in each direction and pedestrian sidewalks along both sides of the structure from the upper deck level of the I Street Bridge to street level at C Street in West Sacramento. The structure is comprised of 11 spans of varying length between 25 ft and 54 feet with a total structure length of 554 feet. The structure is a reinforced concrete deck on simple span composite steel plate girders supported by reinforced concrete columns and abutment on concrete piles. The structure underwent a seismic retrofit in 1998-2000.

The approach structures from the City of Sacramento are comprised of several structures that have been added to the existing structure constructed in 1936 (Bridge No. 24C0364L – along I Street, Bridge No. 24C006 along Jibboom Street). The main existing structure is comprised of a reinforced concrete deck on steel stringers with steel frame bents on treated timber piles. A secondary structure (Bridge No. 24C0364R) was added to the south side of this structure comprised of a mix of cast-in-place reinforced T beams and precast drop in reinforced T beams as well as a cast-in-place reinforced concrete box girder supported on reinforced concrete columns on pile footings.

SCOPE OF ASSESSMENT

The assessment of the existing bridges focused on the upper deck of the I Street Bridge as well as the end portions of the approach structures that connect with the I Street Bridge. Pedestrian/ bicyclist safety features were the primary items surveyed including sidewalk cracking, lighting, pedestrian railing and movable blockades. Additional items included joint seals, bridge deck cracking and review of approach structure superstructure systems for feasibility of partial demolition.

WSP staff performed a field review of the existing I Street Bridge upper deck on November 6th, 2017 and examined pedestrian safety features.

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FINDINGS, DISCUSSION, AND RECOMMENDATIONS

I Street Bridge (Br. No. 22C0153)

Pedestrian Railing:

The primary item of investigation was the handrailing along both sides of the bridge. Shown in Figure 1, the existing handrailing is approximately 53 inches tall and is comprised of hollow round HSS top cords with square interior pickets and flab bars spanning between hollow round HSS posts. Posts are spaced at approximately 10 feet 4 inches on center. Posts are mounted to the sidewalk or truss structure via a base plate and two anchor bolts. The exact post spacing, height and configuration varies along the bridge length. This railing meets current AASHTO LRFD Bridge Design Specification standards for railing height and opening size.



Figure 1. Typical Pedestrian Railing mounted to Truss Member

Various parts of the railing have undergone previous repairs, the primary item of which being the post to base plate connection. As shown in Figure 2, this connection is cracked or fully sheared in numerous posts. Several repair strategies have been implemented over the years including rewelding of the connection or replacement of the post and base plate. Despite these failures, sometimes in several adjacent posts, the railing is relatively sold in nature. Part of this is due to braces that have been added to some of the posts as shown in Figure 3. Locations where the post to base plate connection has been rewelded were found to show cracking of the welds as shown in Figure 4. Locations where the post and base plate were replaced have not shown any cracking as shown in Figure 5.



Figure 2. Typical Sheared Pedestrian Railing Post to Base Plate Connection

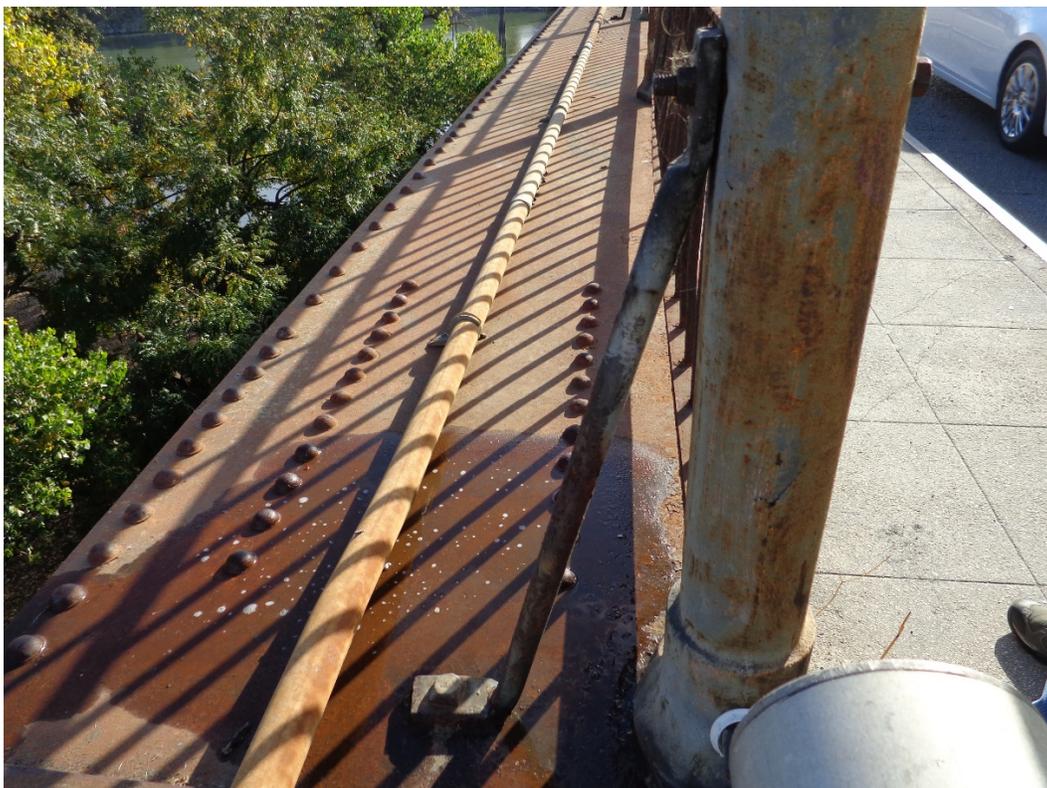


Figure 3. Typical Pedestrian Railing Post Brace



Figure 4. Cracking of Repaired Pedestrian Railing Post to Base Plate Connection



Figure 5. Replaced Pedestrian Railing Post to Base Plate Connection

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In addition to the post to base plate connection failures, there were various locations where the vertical slats have been damaged, bent or are missing as shown in Figure 6 or where the horizontal plate to post connections have failed as shown in Figure 7.



Figure 6. Damaged and Missing Pedestrian railing Vertical Slats

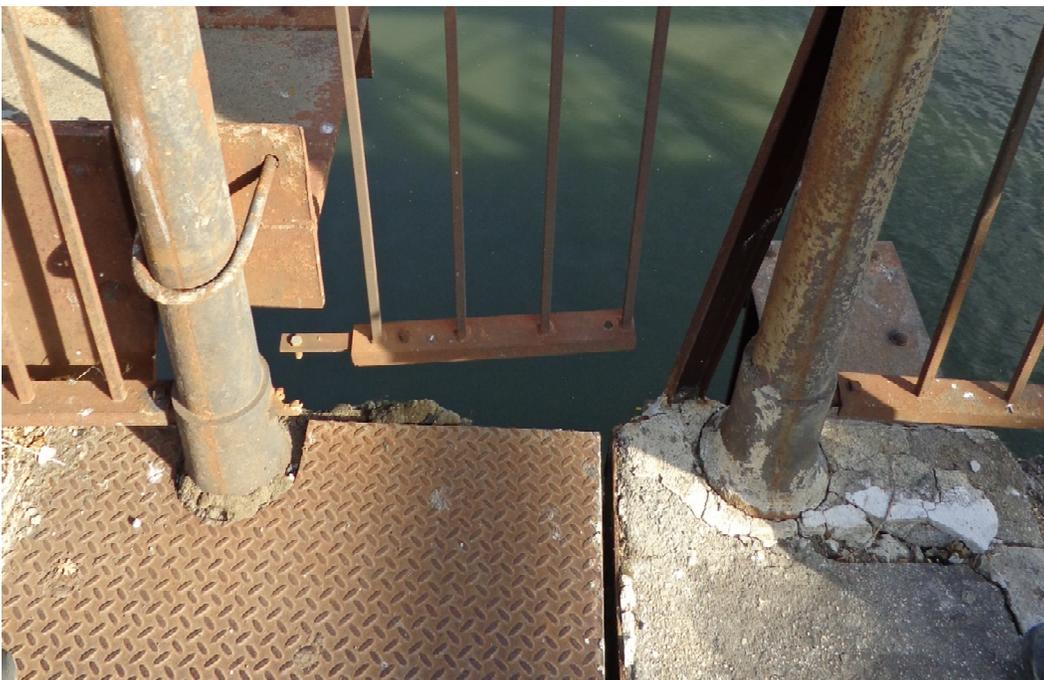


Figure 7. Failed Pedestrian Railing Horizontal Plate to Post connection

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Note that there are several locations where there are intentional gaps in the railing at the movable blockades or at access points to machinery landings as shown in Figures 8 and 9. These gaps do not meet AASHTO requirements nor do the platform railings that can be accessed by these gaps in railings.



Figure 8. Typical Railing Opening for Movable Blockade



Figure 9. Typical Railing Opening for Maintenance Platform Access

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Approximately 40 failed post-to base plate connections were observed in the field though more may be found with a more in depth inspection. 3 damaged or missing vertical slat locations were observed in the field. Approximately 5 failed railing horizontal plate to post connections observed in the field though more may be found with a more in depth inspection. The pedestrian railing repair strategies that may be considered for the I Street Bridge Deck Conversion Project include:

Spot Repair and Replacement – Repairing the post to base plate connections through rewelding of the base plates to posts where cracking is observed. Note that several posts will need to be replaced as they are beyond repair. Repairing the horizontal plate to post connections through a welded attachment plate. Repairing the damaged and missing vertical slats through straightening of bent slats and replacement of missing slats. Spot repairs can be continued periodically over the remaining service life of the bridge. This is the minimum level of repair recommended and should be implemented on a regular basis to insure railing structural integrity.

Spot Replacement – Replacing failed or cracked post to base plate connections with new posts and base plates where cracking is observed. Replacing failed connection plates of horizontal plate to post connections through a new welded attachment plate. Replacement of sections of railing with damaged or missing vertical slats. Spot replacement can be continued periodically over the remaining service life of the bridge. This level of repair would help to prevent cracking of rewelded members as shown above in Figure 4.

Complete Replacement – Complete replacement of the pedestrian railing with like railing would provide the most long-lasting approach through full removal and replacement. This would also be expected to be the most expensive option however, minimal/no railing repairs would be expected to be required in the near future and complete replacement would insure no overlooked items. A replacement railing would be recommended to be placed inset from the edge of deck to eliminate anchor bolt edge concerns. This would have the added benefit of simplifying the railing through eliminating conflicts with truss members reducing the railing cost.

Railing Openings – Closing off the railing openings at maintenance access points should be accomplished with locking gates that provide proper gap closure and height requirements. Railing openings at movable blockades is further discussed later in this report.

Sidewalk and Bridge Deck:

The existing sidewalk and bridge deck were observed during the field walk of the bridge. The sidewalk was found to have areas of minor cracking and spalling of repaired surfaces as shown in Figure 10. The sidewalk curb was found to be damaged sporadically for the length of the bridge with various segments of the angle iron missing or damaged as shown in Figure 11. Additionally, there were several locations where the exterior edge of sidewalk had completely failed and was missing as shown in Figure 12. The sidewalk curb on the south west corner is also heavily damaged where it frames into the joint at the end of the bridge as shown in Figure 13.

Based upon a review of the I Street Bridge as-builts and field observations, there is no deck surface beneath the sidewalk, however, the entire sidewalk could be removed and replaced at an elevation level with the existing roadway deck.



Figure 10. Sidewalk Cracking and Patch Failure



Figure 11. Damaged or Missing Curb Angle Iron



Figure 12. Failed Edge of Sidewalk



Figure 13. Damaged Curb at Southwest corner of Bridge

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Most of the I Street bridge deck is covered with a thin layer of asphalt pavement that prevented direct inspection of the bridge deck. This asphalt pavement is heavily cracked and spalling in some areas as shown in Figure 14. The I Street Bridge has one short segment of concrete pavement at its western end which has patches of spalled material as shown in Figure 15.

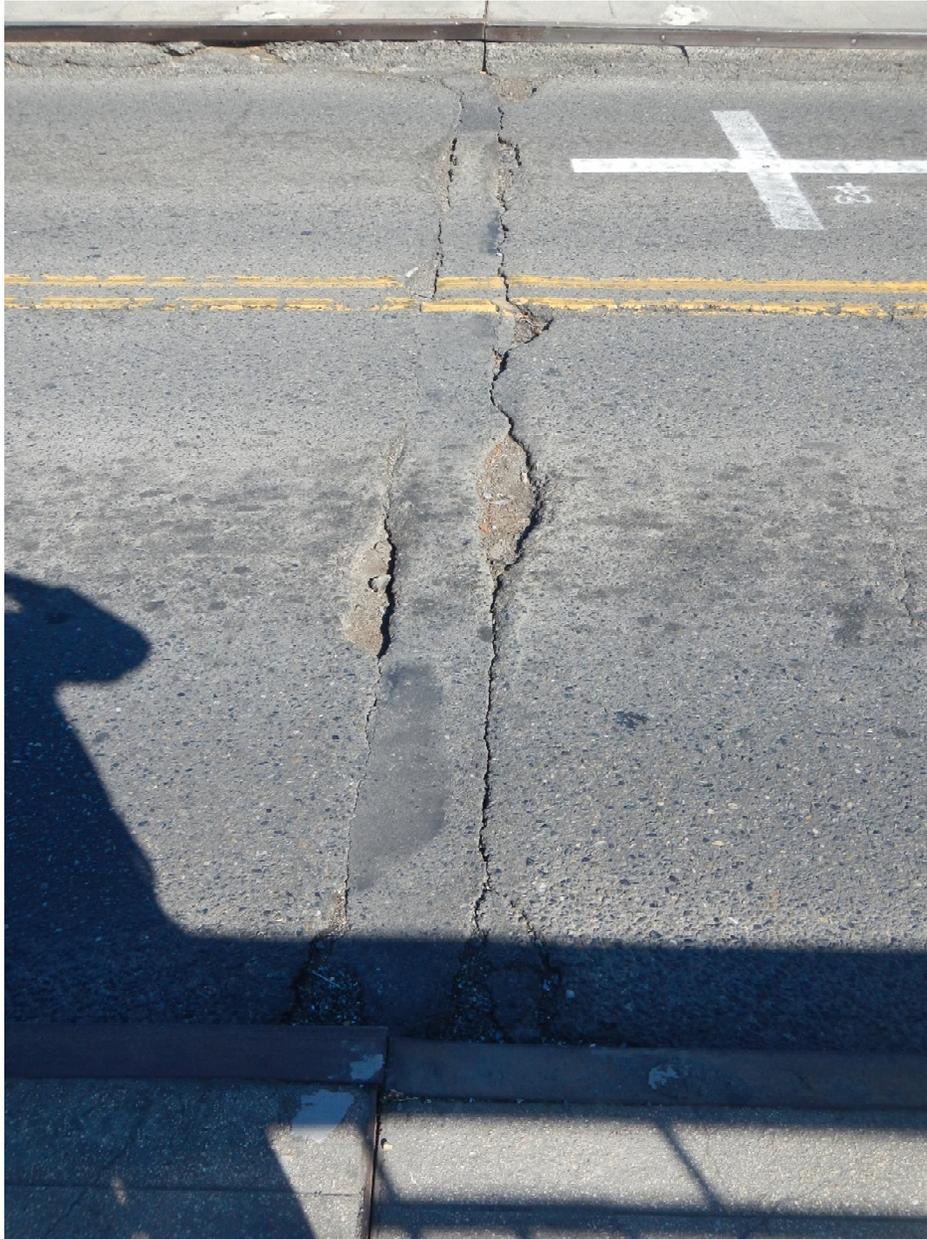


Figure 14. Asphalt Pavement Cracking and Spalling



Figure 15. Concrete Pavement Cracking and Spalling

Approximately 5% of the sidewalk has significant cracking that may require repair. Approximately 30% of the curb is damaged or has a missing angle iron. 4 sidewalk locations with heavily damaged or spalled concrete were observed. Approximately 10% of the deck has significant cracking or spalling of the asphalt concrete that may require repair. The sidewalk and deck repair strategies that may be considered for the I Street Bridge Deck Conversion Project include:

Sidewalk Spot Repair – Patch the existing sidewalk at locations with significant cracking and at locations with heavily damaged or spalled concrete.

Curb Repair – Removal of vehicle traffic from the roadway will eliminate the need for protective angle irons along the curbs. Due to the deteriorated state of the angle irons as well as to increase pedestrian and bicycle safety, removal of all existing angle irons followed by repair of the curb concrete is recommended. This will eliminate possible catch, trip, slip or cut points on the existing angle irons.

Deck Repair – Due to the existing asphalt concrete layer, review of the existing concrete bridge deck was not possible. The existing asphalt concrete pavement can be left as is, or removed and replaced. Removal of the asphalt concrete pavement would allow review of and repairs to the concrete deck top including sealing of the deck surface followed by an asphalt concrete overlay of at least ¾ inch thickness. Patching of spalled asphalt pavement and concrete pavement is recommended at a minimum to eliminate potential trip points.

Jooints:

All bridge deck joints were viewed and appear to be in good working condition. The only apparent deficiency is that the south sidewalk lacks joint protection at the west end of the bridge leading to damage

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to the sidewalk and curb as shown in Figure 13 above. Sidewalk joint protection should be added to the sidewalk in combination with repairs to the sidewalk curb mentioned above.

Movable Blockades:

The existing movable blockades were constructed in 1958 to replace the original manually operated swing gates. They were reviewed in their upright position for possible issues and effectiveness at preventing pedestrian traffic from crossing them when the bridge is moving. A more in depth review should be conducted including during their operation or downward position. Three different blockades are present on each side of the bridge with an advanced warning blockade, a primary blockade and a final blockade. Only the primary blockade, as shown in Figure 16, would have any real effectiveness in preventing pedestrian passage, however, none of the existing blockades meet current safety standards. Placement of a more robust pedestrian gate on each side of the swing span is required. Figure 17 shows a recently installed swing pedestrian gate on Tower Bridge. A similar gate will be required at this bridge. Permanent fencing may be extended across a portion of the deck width to reduce the required movable gate opening. Additionally, implementation of a new gate system will allow proper fencing off of current openings at the existing movable blockades. New advance warning systems should also be installed to warn pedestrians of bridge opening allowing adequate time to exit the swing span.



Figure 16. Primary Swing Span Movable Blockade (in Upright Position)



Figure 17. Tower Bridge Pedestrian Swing Gate

Existing Staircase:

The existing staircase on the southwest corner of the I Street Bridge do not meet current code requirements for railing or horizontal step length. The stairs should therefore be demolished and replaced with ADA compliant ramps and, if desired, accompanying staircases that meet current code.

Upper Deck Superstructure:

The upper deck superstructure was viewed from below where accessible; primarily on the southwest corner adjacent to the existing stairway to the River Walk.

The girder under the southwest end of the sidewalk was observed to have severe longitudinal cracking in the side face concrete as shown in Figure 18. Based upon field observation and review of available as-built plans for the upper deck, the exterior girders are steel girders encased in concrete. The steel girders extend to only approximately the mid height of the girder. The lower portion of the concrete encasing the steel girder acts as a stiffening and protective element for the steel girder. The longitudinal cracking observed probably indicates delamination of the concrete from the top of the steel girder. This delamination will cause the girder to not act as a composite element and the steel beam will carry all loading on its own. This may result in a reduced girder capacity depending upon the sectional nature of the beam prior to the longitudinal cracking. The girder should be analyzed to determine if it is adequate without composite interaction with the concrete above it. The crack should be injected with epoxy to bond the concrete to the steel girder and seal the crack preventing further moisture intrusion.

The end span on the west side was observed to have severe spalling of the concrete and severe deterioration of the 1st interior steel girder where it connects to the end diaphragm as shown in Figure 19.

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A more detailed examination of the exposed girder should be conducted as section loss and failure of the connecting bolts appears possible. This appears to be due to water leaking onto the end of the girder from the top deck due to the above mentioned damaged concrete curb at the south west corner of the bridge. Repair of the curb and placement of additional joint protection should prevent further spalling and section loss. Depending upon the state of the girder, the girder may require repairs such as strengthening with doubler plates or replacement.

A more thorough investigation of the underside of the upper deck is recommended and may result in the identification of additional items requiring repair. A boom lift or “cherry picker” may be used to inspect the exterior portions of the upper deck superstructure without intruding upon the railroad track usage below. Inspection of the underside of the central deck and girders would require doing so from the railroad tracks on the lower deck.



Figure 18. Exterior Girder Longitudinal Cracking



Figure 19. Damaged Steel Girder

Lighting:

Limited pedestrian lighting was observed on the bridge. Additional light features are recommended to improve visibility and safety.

Deck Drainage:

The existing I street bridge has no drainage features and water currently is allow to drain directly into the Sacramento River. Improvements to the bridge may require implementation of a drainage system.

C Street Approach Ramp (Br. No. 22C0154)

WSP staff walked the existing C Street Approach Ramp on November 6th, 2017 and examined pedestrian safety features as well as examined it from beneath to determine possible methods of partial demolition.

Pedestrian Railing:

The existing railing is comprised of a concrete barrier with a single tubular member above it for a total height of 36 inches as shown in Figure 20. This railing does not meet current pedestrian railing standards and should be upgraded as a part of the project. Additionally, 8 foot fence heights are usually used over railroads. Based on as-built plans review, removal of the sidewalks and replacement of barriers is feasible without significant impacts to the deck.



Figure 20. C Street Approach Ramp Pedestrian Railing

Sidewalk, Deck and Joints:

The top of sidewalk, deck and joints were observed to have minor cracking. Examination of the deck from below indicated that some of the cracks go all the way through the deck as indicated by rust stains and shown in Figure 21. Sealing of the deck surface is recommended to prevent further water seepage through the deck onto the steel girders. Joints appear to be intact.

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Figure 21. C Street Approach Ramp Deck Cracking

Strategies for Partial Demolition:

The superstructure system for the C Street Approach Ramp was reviewed from below for possible strategies to partially demolish the existing structure and leave one or more spans adjacent to the I Street Bridge in place for connection to a pedestrian ramp and possible park type amenities. The superstructure girders were observed to be comprised of single span girders pinned at one end with roller connections at the opposite end as shown in Figures 22 and 23. Based upon this configuration, it would be possible to leave in place as many spans as desired during demolition. The new end of bridge would require pedestrian railing and the end bent would require analysis to insure adequacy due to the new unbalanced load that would be placed on it with girders on only one side. Figure 24 shows suggested limits of the C Street Approach Ramp to be left in place.



Figure 22. C Street Approach Ramp Girder Pinned End



Figure 23. C Street Approach Ramp Girder Roller End

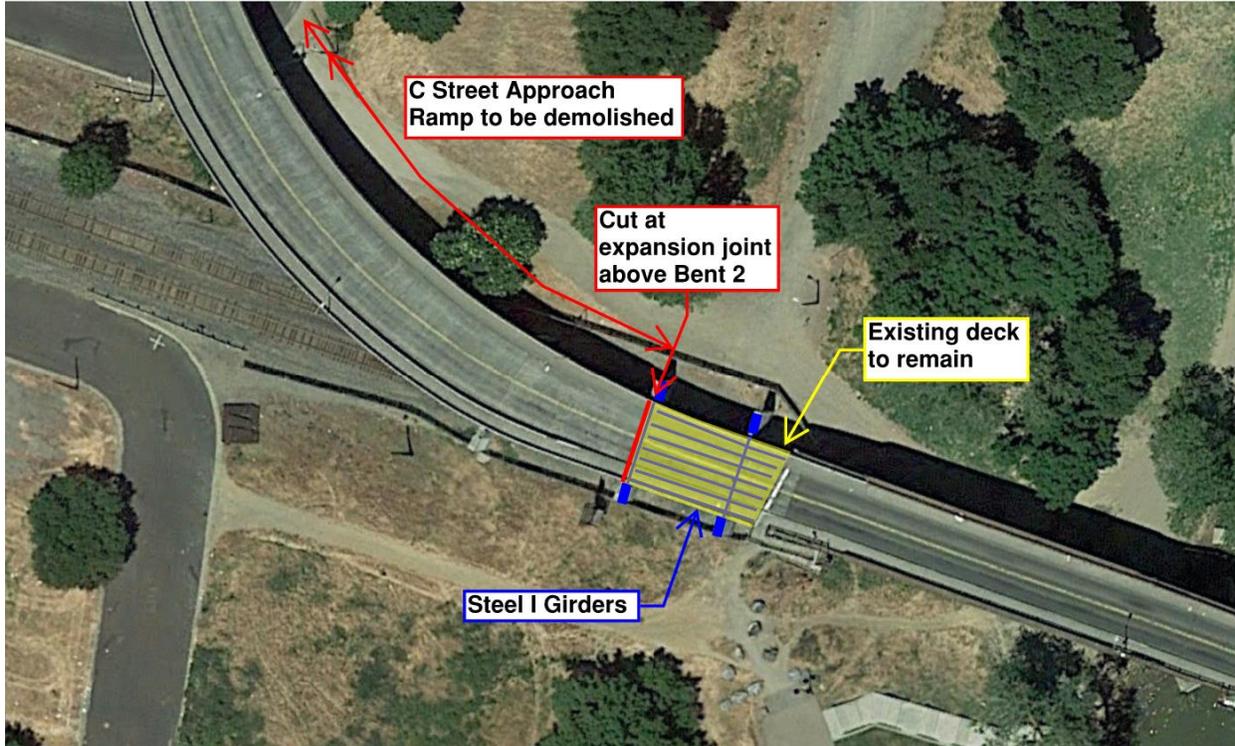


Figure 24. C Street Approach Ramp Proposed Limits to Be Left in Place

Jibboom Street Approach Ramp (Br. No. 24C0006), I Street Approach Ramp (Br. No. 24C0364L) and J Street Ramp (Br. No. 24C0364R)

WSP staff walked the existing Jibboom Street, I Street and J Street Approach Ramp structures on November 6th, 2017 and examined pedestrian safety features as well as examined it from beneath to determine possible methods of partial demolition.

Pedestrian Railing:

The existing railing along the Jibboom Street and I Street Approach Ramps are comprised of round HSS sections with vertical slats painted all white with a total height above sidewalk of approximately 47 inches as shown in Figure 25. This railing meets current AASHTO LRFD Bridge Design Specifications for pedestrian and bicycle railing height and opening standards although often railing heights of 54 inches are used for bicycle railings and fence heights up to 8 feet are used over railroads.

The railing was found to be in good condition except for several locations where the vertical slats and even top and bottom chords were bent due to apparent vehicle collision as shown in Figure 26. These sections should be repaired or replaced.

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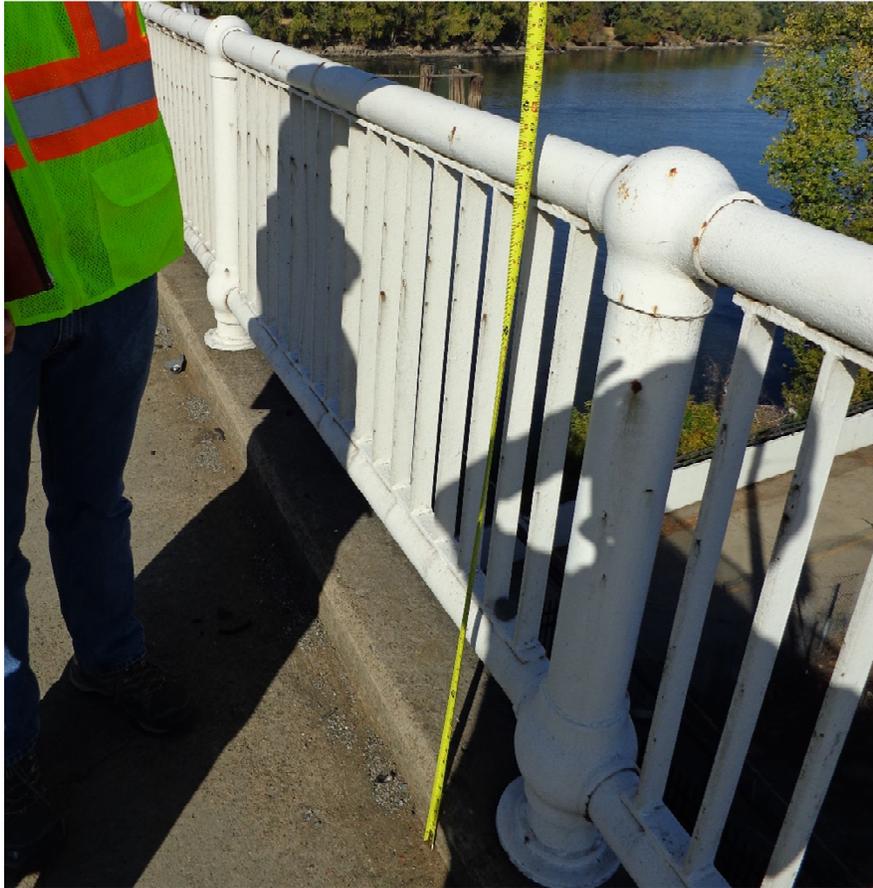


Figure 25. Jibboom Street and I Street Approach Ramps Typical Pedestrian Railing



Figure 26. Damaged Jibboom Street and I Street Approach Ramp Pedestrian Railing

The existing railing along the J Street Ramp is comprised of two tubular members on top of a concrete barrier with a total height of 42 inches as shown in Figure 27. This railing meets current AASHTO LRFD Bridge Design Specification pedestrian and bicycle railing height and opening standards although often railing heights of 48 inches are used for pedestrian railing and 54 inches for bicycle railings and fence heights up to 8 feet are used over railroads.

The railing was found to be in good condition and no repairs or improvements would be necessary.

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Figure 27. J Street Ramp Pedestrian Railing

Sidewalk, Deck and Joints:

The top of sidewalk, deck and joints were observed to have minor cracking and spalls. The underside of the deck was observed from outside of railroad right-of-way to the extent possible and none of the cracks were observed to go all the way through the deck as indicated by lack of water stains or rusting of girder rust stains. Joints appear to be intact.

The sidewalk was observed to be approximately 12 inches maximum in height at the intersection of Jibboom Street and I Street on the north side. Modifications to the sidewalk are recommended to reduce the sidewalk clear height to 8 inches maximum to meet current AASHTO LRFD Bridge Design Specifications for maximum sidewalk curb height. Based upon as-builts, the sidewalk can be removed without major impacts to the bridge deck.

Existing Staircase:

The existing staircase on the west side of the Jibboom Street Approach ramp do not meet current code requirements for railings. It is recommended that the stairs be removed and replaced with ADA compliant ramps and, if desired, accompanying stairs that meet current requirements.

Strategies for Partial Demolition:

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The superstructure system for the Jibboom Street, I Street and J Street Approach Ramps were reviewed from below for possible strategies to partially demolish the existing structures and leave one or more spans adjacent to the I Street Bridge in place for connection to a pedestrian ramp and possible park type amenities.

The Jibboom Street and I Street ramps are comprised of a single superstructure at their intersection with continuous and pinned supported girders between bents. Expansion roller connections are present and present a logical terminus for partial demolition of the structure as shown in Figure 28. Analyses would need to be performed to verify the end bent adequacy given the new unbalanced loads that they would be subjected to with partial demolition of the superstructure.

The J Street Ramp is comprised of two different structures: one a widening of the I Street Approach Ramp with a mix of precast and cast-in-place T beams and a second, separate reinforced concrete box girder as shown in Figure 29 and 30 respectively. Based upon the span configuration and hinge location, complete removal of the reinforced concrete box girder as well as the first span of precast T girder up to the precast girder joint as shown in Figure 31 is recommended at a minimum. The rest of the cast-in-place and precast T beam superstructure may be left in place or removed depending up the project needs. Analysis of the last remaining bent would need to be performed to verify its adequacy given the new unbalanced loads that it would be subjected to with partial demolition of the superstructure.

The proposed limits of structure to remain are shown in Figure 32. Railing will need to be added to the new edge of deck locations.



Figure 28. Jibboom Street and I Street Approach Ramp Expansion Bearing



Figure 29. J Street Approach Ramp Cast-in-Place and Precast T Girders



Figure 30. J Street Approach Ramp Reinforced Concrete Box and T Beam Interface



Figure 31. J Street Ramp Precast Girder Joint

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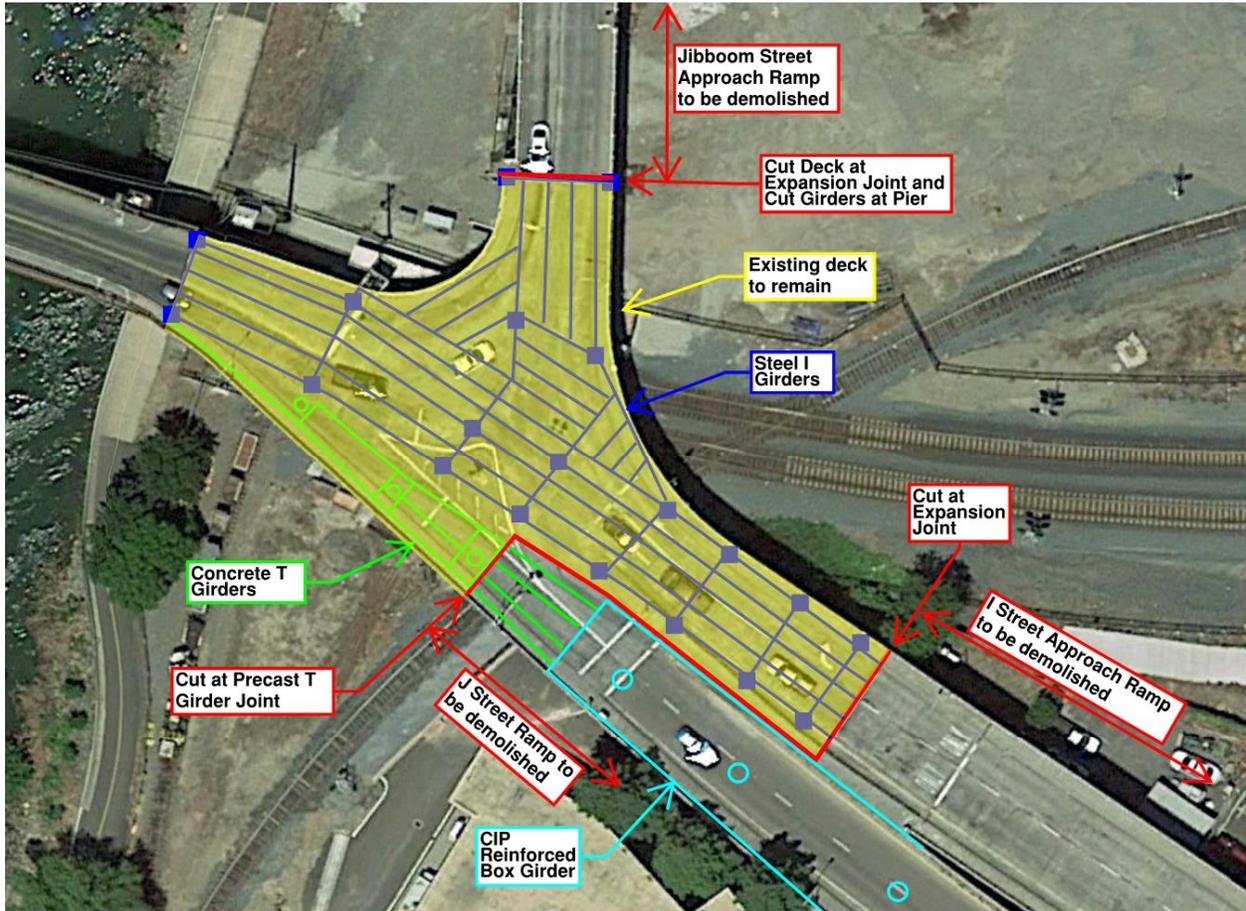


Figure 32. Proposed Portion of Jibboom Street, I Street and J Street Ramps to Remain

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SUMMARY OF RECOMMENDATIONS

A summary of the WSP Team’s recommendations for repair options are summarized below.

Repair Element	Photo	Repair Strategy
I Street Bridge (Br. No. 22C0153)		
Pedestrian Railing		<p>Complete replacement of the pedestrian railing with like railing offset from the edge of bridge deck is recommended. Continuous railing the length of the bridge will eliminate existing railing base plate connection issues, gaps in railings at maintenance access locations and provide new interface for new movable blockades.</p> <p>Spot repair or replacement of failed, cracked, bent or missing elements is recommended at a minimum.</p>
Sidewalk		<p>Patch the existing sidewalk at locations with significant cracking and at locations with heavily damaged or spalled concrete is recommended.</p>
Curb		<p>Removal of all existing angle irons followed by repair of the curb is recommended</p>

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<p>Deck</p>		<p>Recommended to remove the existing asphalt concrete pavement allowing review of and repairs to the concrete deck top including sealing of the deck surface followed by an asphalt concrete overlay of at least ¾ inch thickness.</p> <p>Patching of spalled asphalt pavement and concrete pavement is recommended at a minimum to eliminate potential trip points and protect concrete deck beneath asphalt concrete.</p>
<p>Joints</p>		<p>Sidewalk joint protection is recommended to be added to the sidewalk. Repairs to the sidewalk curb at the joint are required to protect the upper deck superstructure.</p>
<p>Movable Blockades</p>		<p>Replacement of existing movable blockades with more robust pedestrian gate blockades on each side of the swing span is required to meet current standards.</p>

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<p>Upper Deck End of Girder Connection</p>		<p>Detailed inspection of girder is required. Girder may require repairs such as strengthening with doubler plates or replacement.</p>
<p>Upper Deck Exterior Girder</p>		<p>The girder should be analyzed to determine if it is adequate without composite interaction with the concrete above it.</p> <p>The crack should be injected with epoxy to bond the concrete to the steel girder and seal the crack preventing further moisture intrusion.</p>
<p>Lighting</p>		<p>Additional light features are recommended.</p>

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<p>Deck Drainage</p>	 A photograph showing a close-up view of a bridge deck's drainage system. A large, white, cylindrical pipe runs along the edge of the deck, supported by a metal railing. In the background, a city skyline is visible under a clear sky.	<p>Installation of a deck drainage system may be required by environmental permits.</p>
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C Street Approach Ramp (Br. No. 22C0154)		
<p>Pedestrian Railing</p>		<p>Railing is required to be replaced to meet current standards. Additionally, 8-foot fences are typically placed on railroad crossings.</p>
<p>Sidewalk, Deck & Joints</p>		<p>Sealing of the deck surface is recommended.</p>

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Jibboom Street Approach Ramp (Br. No. 24C0006), I Street Approach Ramp (Br. No. 24C0364L) and J Street Ramp (Br. No. 24C0364R)		
Pedestrian Railing		<p>Repair or replacement of damaged railing sections is recommended. Recommend increasing railing height. Additionally, 8-foot fence are typically placed on railroad crossings.</p>
Sidewalk, Deck and Joints		<p>Modifications to sidewalk or deck to reduce clear height to 8 inches maximum are required to meet current standards.</p>

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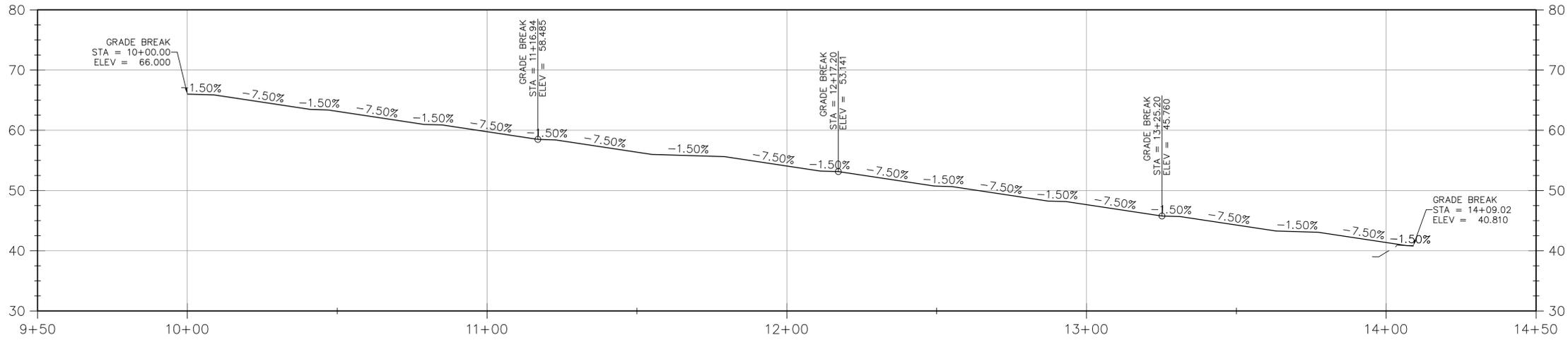
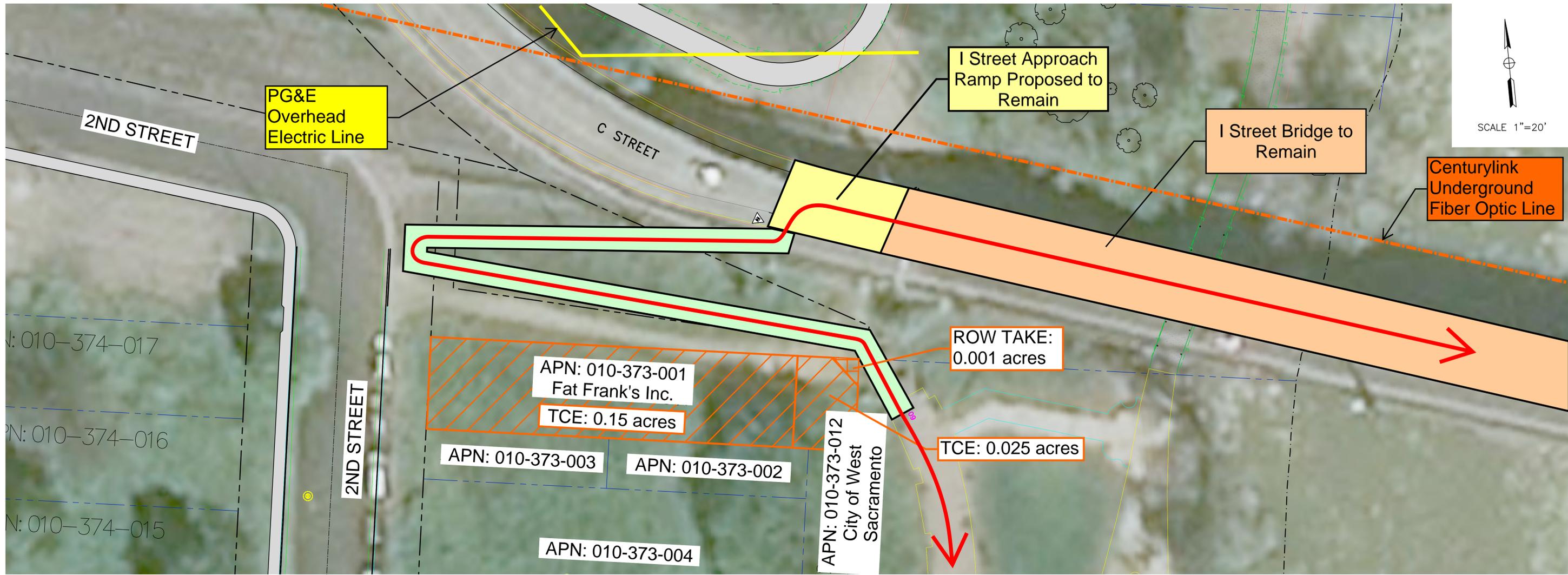
Cost Estimate

A preliminary cost estimate was prepared for the items listed above and is shown in the table below. The total cost for repairs and other required improvements to the upper deck of the I Street Bridge and the portions of the approach ramps proposed to remain is approximately \$3.4 million. Note that this cost does not include girder inspection or repairs as these items are potentially the responsibility of BNSF.

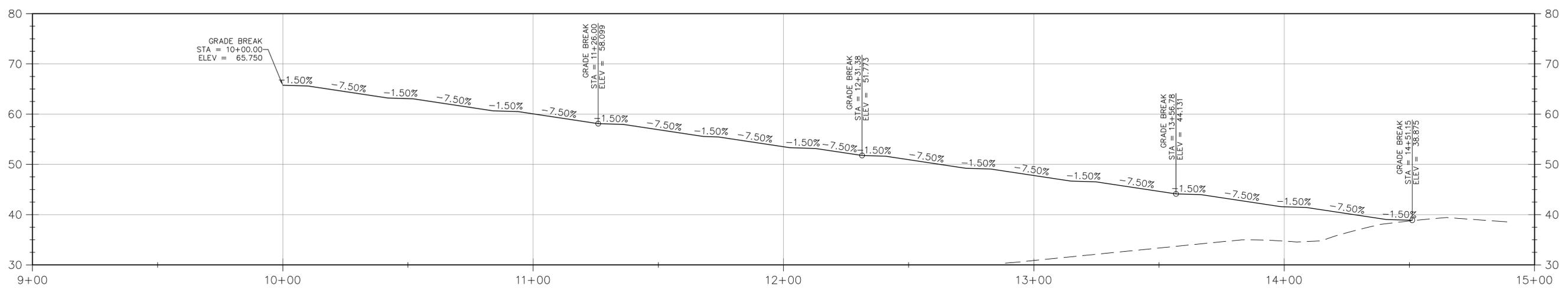
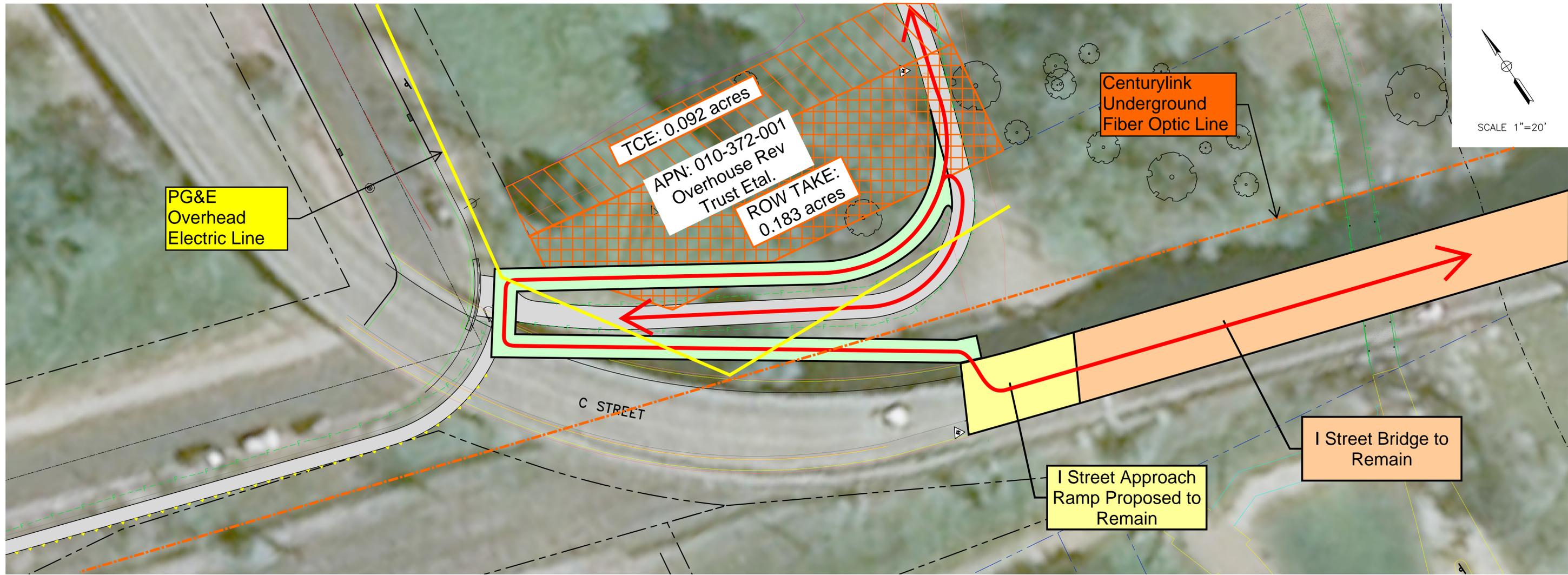
BRIDGE GENERAL PLAN ESTIMATE _____ **OR** _____ **PLANNING ESTIMATE** X

STRUCTURE		BR. NO.		RCVD BY		ESTIMATING GROUP	
I Street Bridge-Deck Rehabilitation		22C0153				IN	
TYPE		DISTRICT	CO	RTE	PM	OUT	
Steel bridge with composite girder		3	Sac				
CONTRACT ITEMS		UNIT	QUANTITY	PRICE	AMOUNT		
600001	PUBLIC SAFETY PLAN	LS	1	\$7,500.00	\$7,500.0		
DECK							
600029	REMOVE ASPHALT CONCRETE SURFACING	SQFT	15,300	\$10.00	\$153,000.0		
600041	FURNISH POLYESTER CONCRETE OVERLAY	CF	2,550	\$100.00	\$255,000.0		
600043	PLACE POLYESTER CONCRETE OVERLAY	SQFT	15,300	\$20.00	\$306,000.0		
780440	STAIN AND SEAL CONCRETE	SQFT	15,300	\$5.00	\$76,500.0		
600033	REMOVE UNSOUND CONCRETE	CF	255	\$450.00	\$114,750.0		
600011	RAPID SETTING CONCRETE (PATCH)	CF	255	\$250.00	\$63,750.0		
600037	PREPARE CONCRETE BRIDGE DECK SURFACE	SQFT	15,300	\$100	\$1,530,000.0		
600045	TREAT BRIDGE DECK	SQFT	15,300	\$100	\$1,530,000.0		
600047	FURNISH BRIDGE DECK TREATMENT MATERIAL	GAL	75	\$100.00	\$7,500.0		
SIDEWALK AND CURB							
5XXXX	REMOVE CURB ANGLE	LF	1530	\$3.00	\$4,590.0		
600013	REPAIR SPALLED SURFACE AREA (SIDEWALK AND CURB)	SQFT	425	\$185.00	\$78,625.0		
600033	REMOVE UNSOUND CONCRETE	CF	89	\$450.00	\$39,975.0		
750501	MISCELLANEOUS METAL (BRIDGE)	LB	34	\$50.00	\$1,700.0		
RAILING							
839779	REMOVE METAL RAILING	LF	1700	\$15.00	\$25,500.0		
839514	HANDRAILING	LF	1700	\$300.00	\$510,000.0		
MISCELLANEOUS							
750501	MISCELLANEOUS METAL (BRIDGE)	LB	9	\$50.00	\$450.0		
770090	LIGHTING (STREET)	LS	1	\$250,000.00	\$250,000.0		
83XXXX	MOVABLE BARRIER	EA	4	\$50,000.00	\$200,000.0		
APPROACH SPANS							
600037	PREPARE CONCRETE BRIDGE DECK SURFACE	SQFT	1000	\$100	\$100,000.0		
600045	TREAT BRIDGE DECK	SQFT	1000	\$100	\$100,000.0		
600047	FURNISH BRIDGE DECK TREATMENT MATERIAL	GAL	12	\$100.00	\$1,200.0		
833XXX	PEDESTRIAN RAILING	LF	700	\$300.00	\$210,000.0		
833033	CHAIN LINK RAILING (TYPE 7 MODIFIED)	LF	150	\$200.00	\$30,000.0		
SUB TOTAL					\$2,407,266.7		
MOBILIZATION					\$240,726.6		
SUB TOTAL BRIDGE ITEMS					\$2,647,993.4		
CONTINGENCIES 30 %					\$794,398.0		
GRAND TOTAL					\$3,442,391.4		
FOR BUDGET PURPOSES - SA' (\$146 per FT2)					\$3,442,000.0		

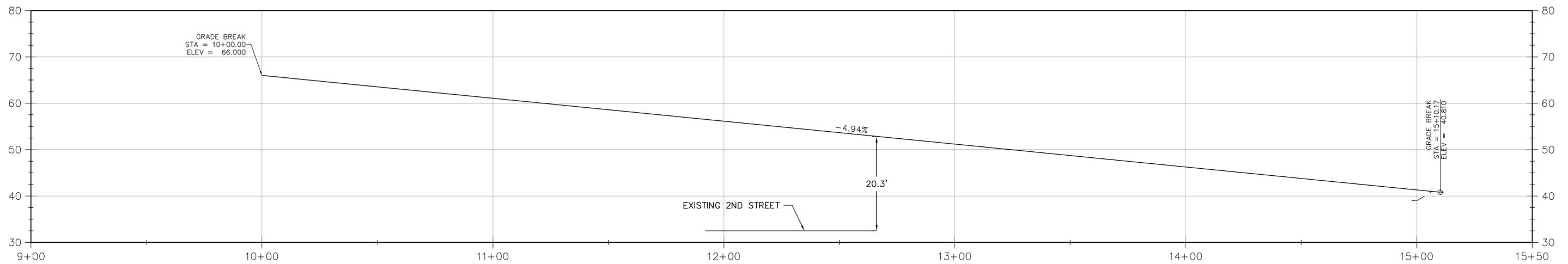
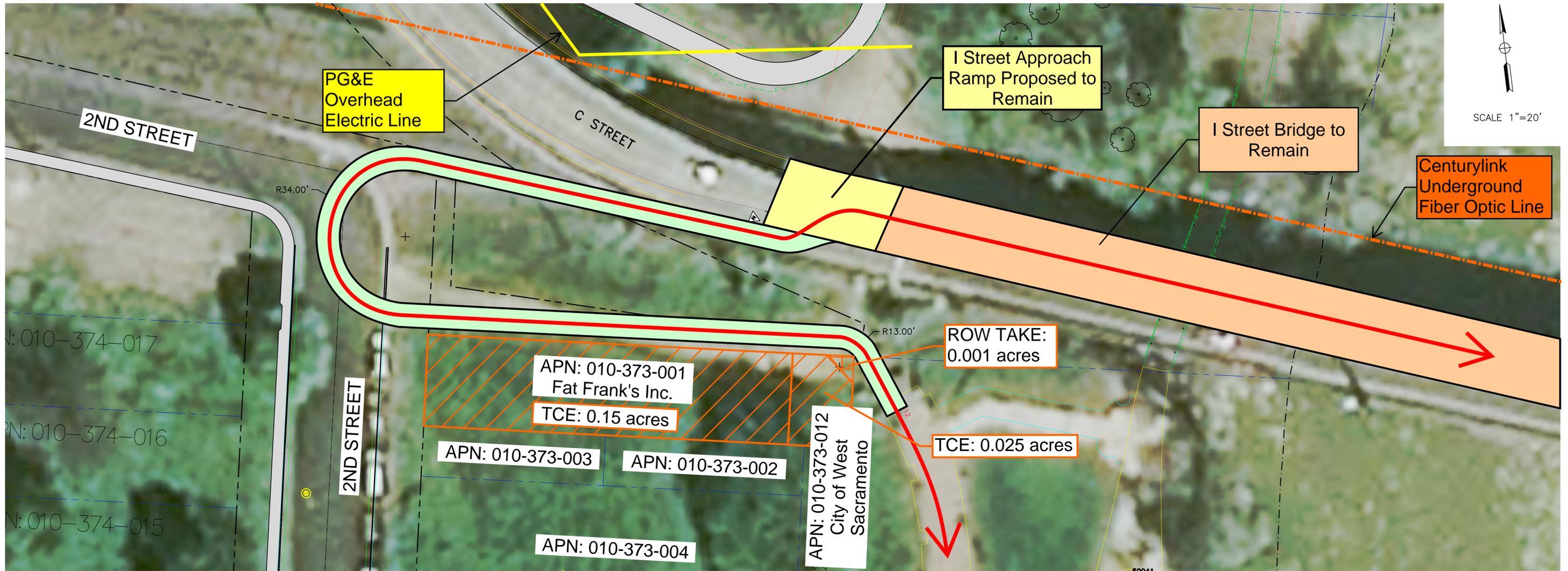
Appendix C – Ramp Alignment Alternative Exhibits



**I STREET BRIDGE DECK CONVERSION
ALT-1 SOUTH SWITCHBACK**

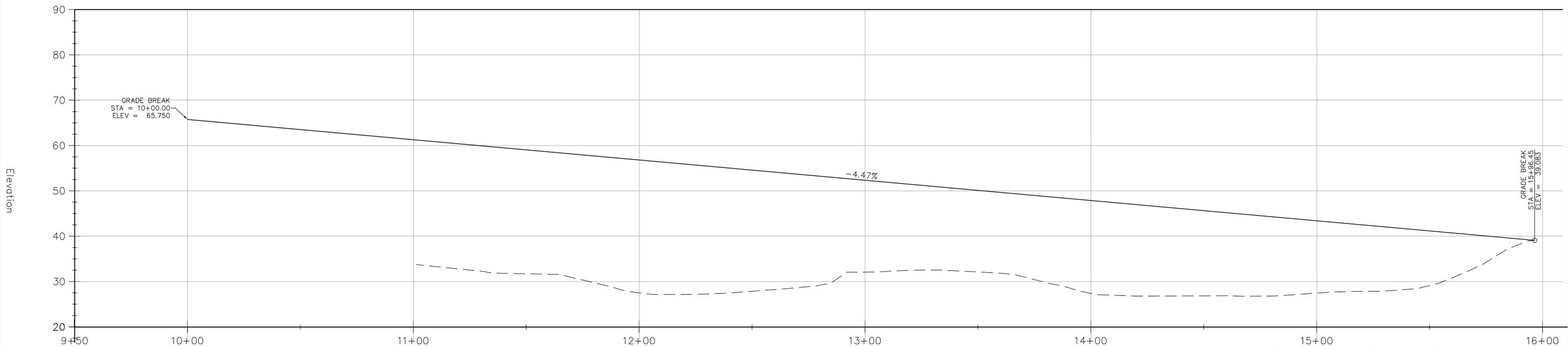
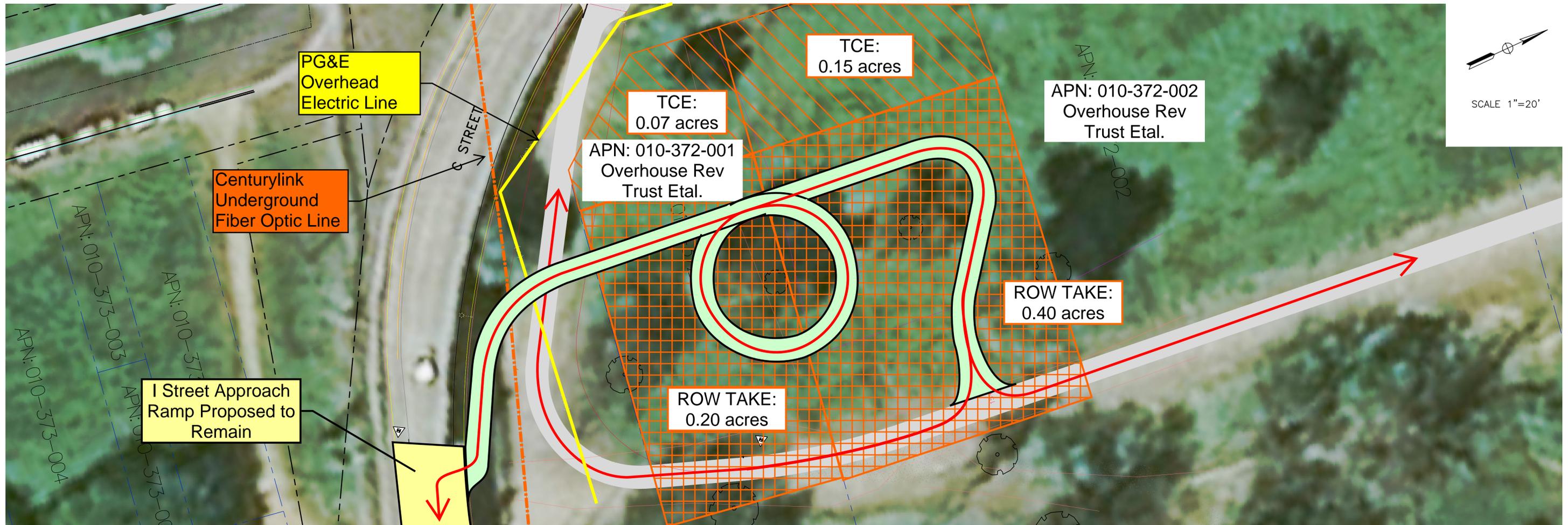


**I STREET BRIDGE DECK CONVERSION
ALT-1 NORTH SWITCHBACK**



**I STREET BRIDGE DECK CONVERSION
ALT-2 SOUTH CURVED SWITCHBACK**





**I STREET BRIDGE DECK CONVERSION
ALT-2 NORTH CURVED SWITCHBACK**

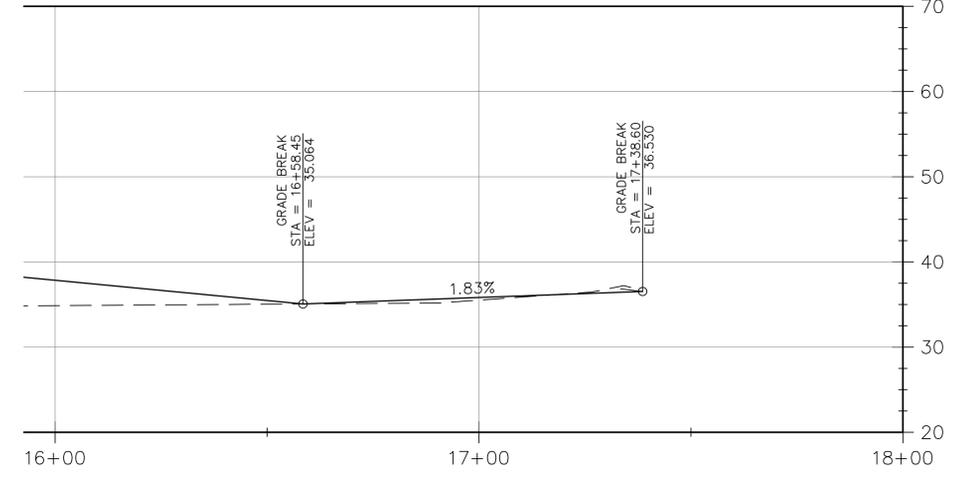
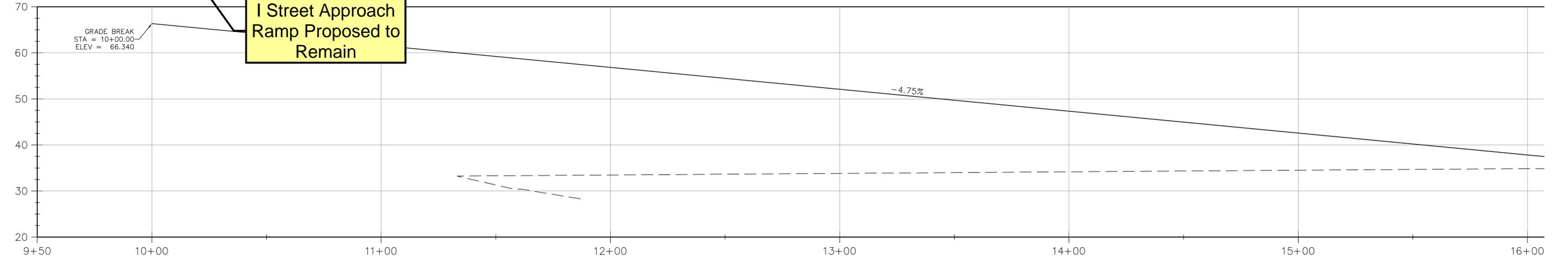
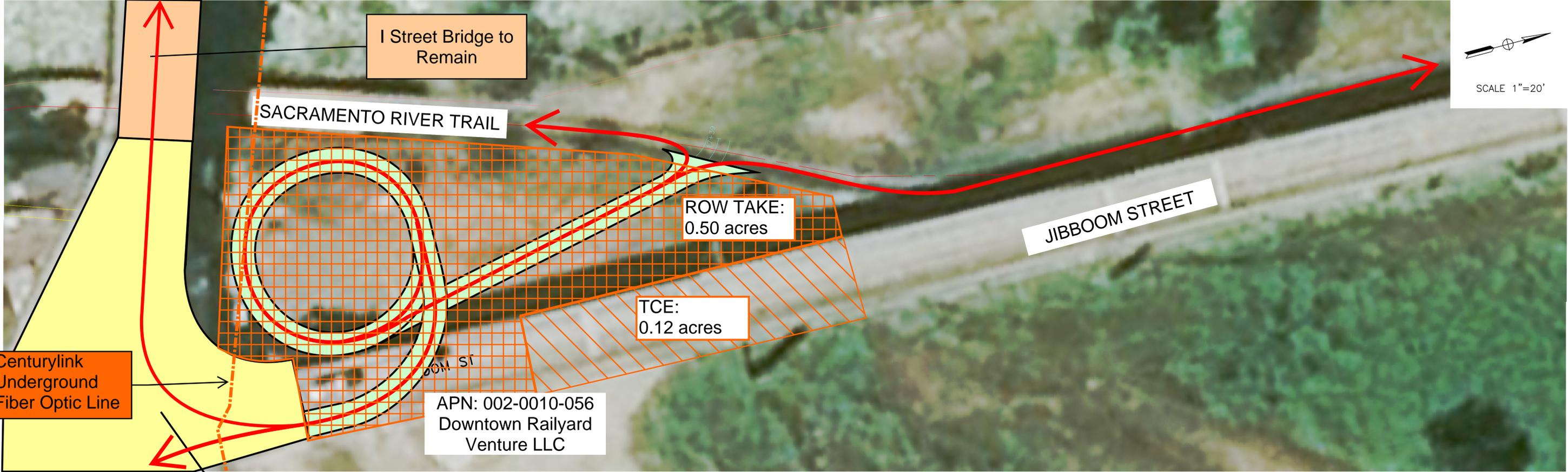
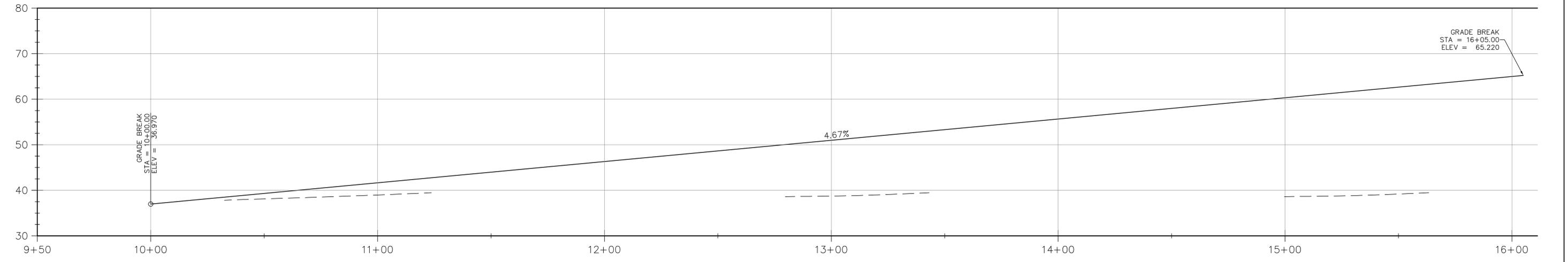
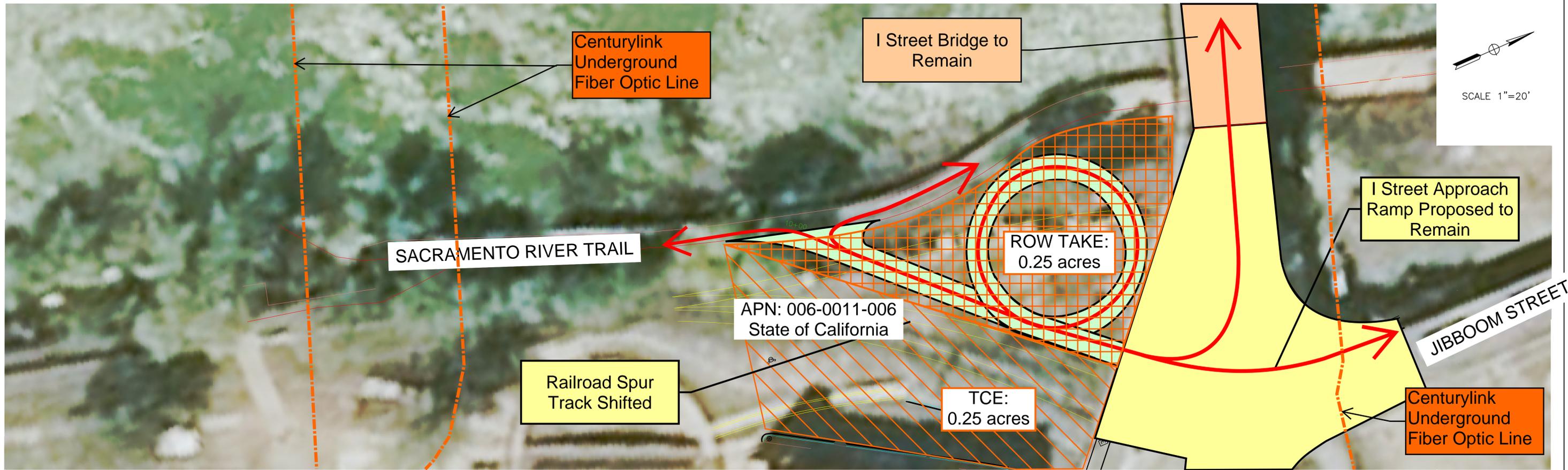
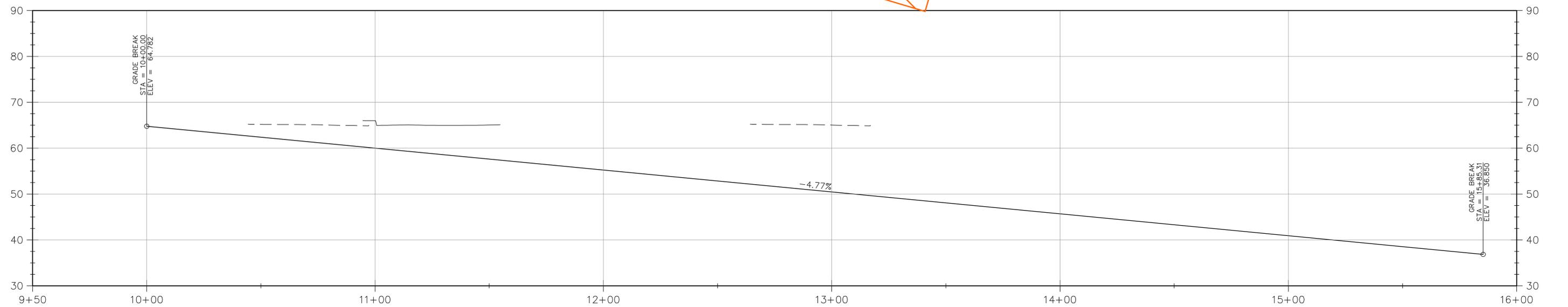
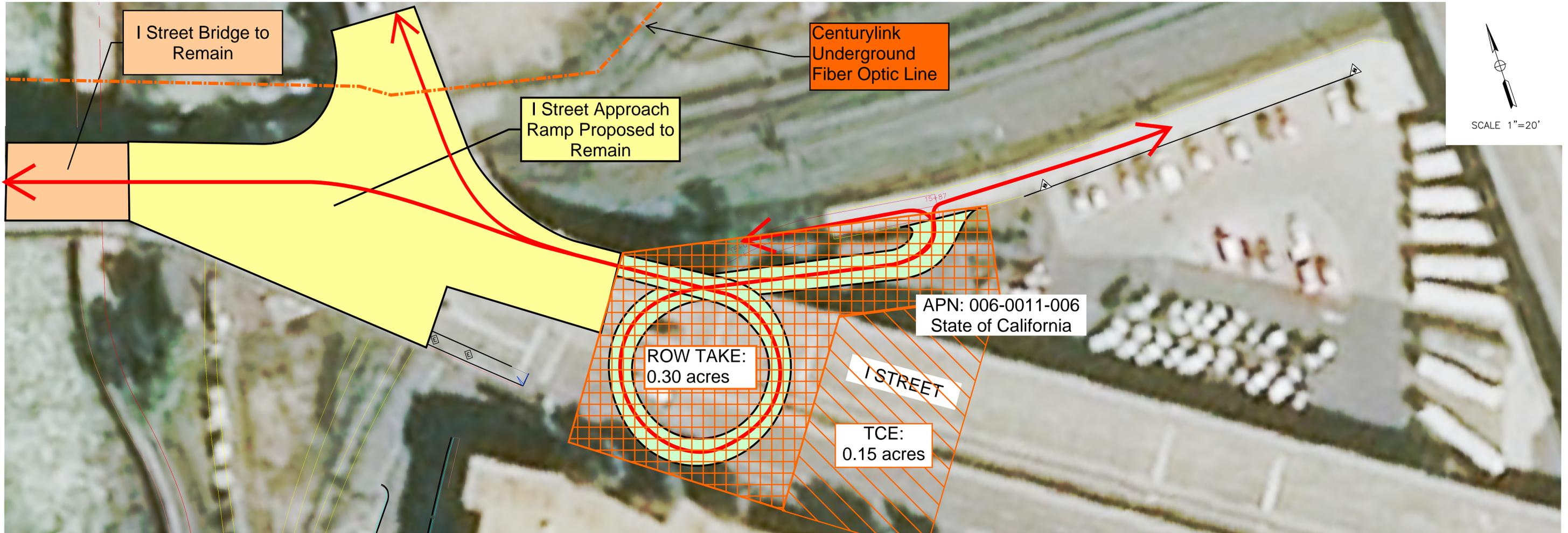


EXHIBIT V



I STREET BRIDGE DECK CONVERSION
ALT 3 - SOUTH LOOP





I STREET BRIDGE DECK CONVERSION
ALT 4 - EAST LOOP

Appendix D – Preliminary Scour Assessment



Draft Technical Memorandum

Date: May 4, 2017
To Ali Seyedmadani and Marshall Moore – WSP
From: Wana Chiu and Han-Bin Liang – WRECO
Project: I Street Bridge Deck Conversion For Active Transportation Project for the City of West Sacramento
Subject: Preliminary Scour Assessment

INTRODUCTION

The I Street Bridge is a historic movable swing railroad bridge built across the Sacramento River in 1911 by Southern Pacific Railway. It continues to be used for vehicle crossings on the top deck and train crossings on the bottom deck. As a part of the new C Street Bridge Project, vehicle traffic and the approach structures to the bridge upper deck will be removed from the existing structure.

The City of West Sacramento in cooperation with the City of Sacramento are completing a Feasibility Study for the I Street Bridge Deck Conversion For Active Transportation Project (Project). The Feasibility Study will analyze converting the upper deck of the existing I Street Bridge from a vehicle use to a bicycle and pedestrian only use.

Project Description

The I Street Bridge Deck Conversion For Active Transportation Project proposes to maintain and improve active transportation use on the upper deck of the existing I Street Bridge once vehicle traffic is removed as a part of the new C Street Bridge Project. As a part of the C Street Bridge Project, the existing roadway approach ramps to the C Street Bridge from I Street and Jibboom Street in Sacramento and from C Street in West Sacramento are proposed to be demolished. This Project will consider saving a portion of each structure on each end of the existing I Street Bridge to accommodate access points for pedestrians and bicyclists.

Access to the elevated structure is proposed to be via a combination of Americans with Disabilities Act (ADA) compliant ramps, stairways and possible elevators on both sides of the Sacramento River. Depending on funding, Project improvements may be phased. The initial phase would be required to provide ADA access on both sides of the river and would likely consist of one set of ADA ramp at each end of the bridge.

STUDY PURPOSE

The purpose of this study is to evaluate the scour potential associated with the existing bridge structure supports. Project improvements will occur within the bridge superstructure. No work is planned to occur within the channel or within the levees. The Project location is shown in Figure 1.

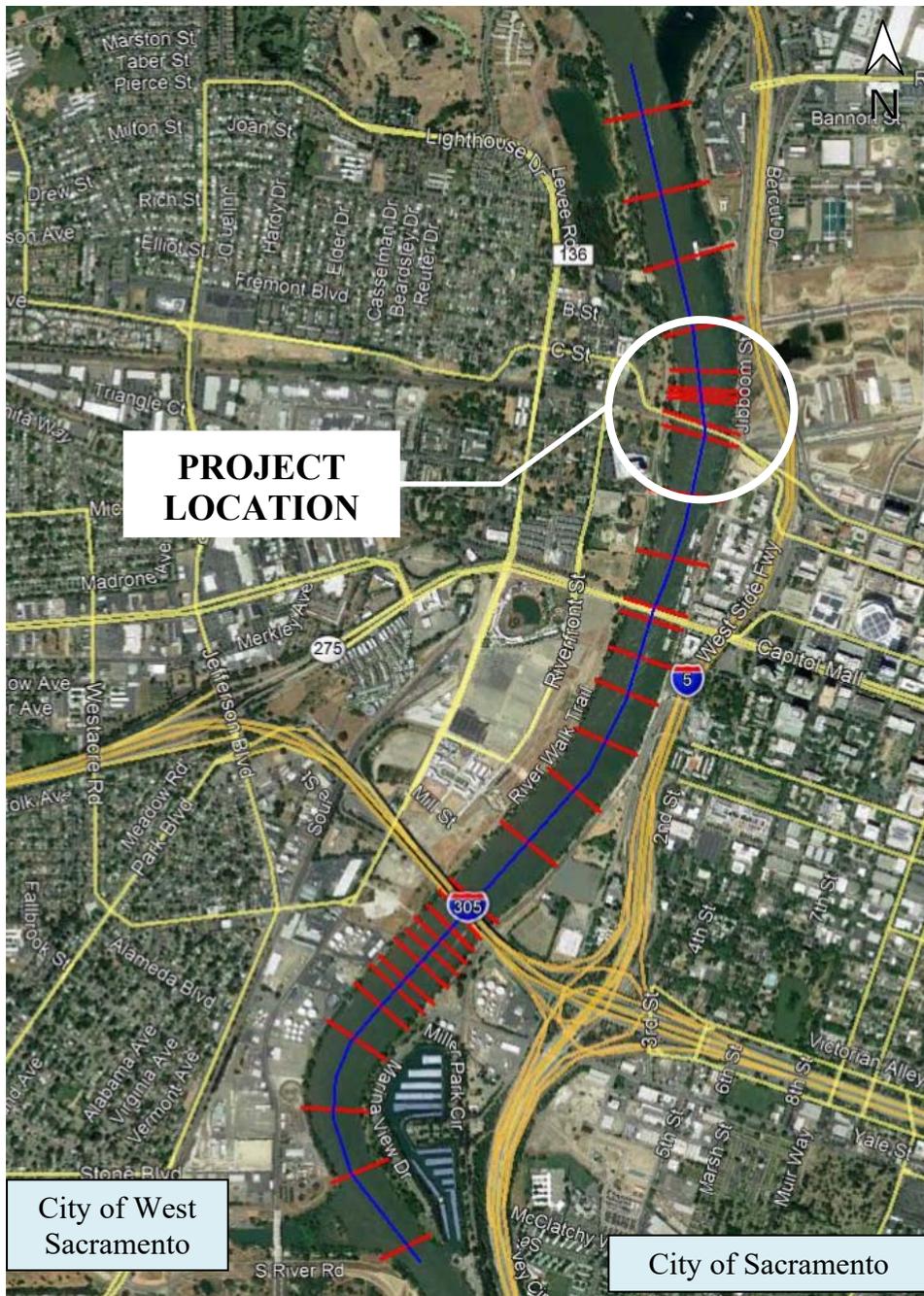


Figure 1. Project Location and HEC-RAS Plan Overview

DESIGN STANDARDS

The evaluation of potential scour at the existing bridge followed the criteria described in the FHWA’s *Hydraulic Engineering Circular No. 18 (HEC-18)*, “Evaluating Scour at Bridges” (Fifth Edition). The evaluation of potential scour was based on hydraulic characteristics of the 100-year design discharge. The total scour was estimated based upon the cumulative effects of the long-term bed elevation change, general (contraction) scour, and local scour. The life expectancy of the bridge was considered in determining the long-term bed elevation change of the waterway; it was based on an assumed 50-year design life for a retrofit bridge.

Elevations used in this study reference the North American Vertical Datum of 1988 (NAVD 88) unless otherwise specified.

HYDROLOGY AND HYDRAULICS

The peak flows for Sacramento River used in the analysis were obtained from the Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) for Sacramento County and the West Sacramento Levee Improvements Program (WSLIP) and are presented in Table 1. The higher flow rate of 135,600 cubic feet per second (cfs) from the WSLIP was adopted for the analyses for this Project.

Table 1. Sacramento River Flows at the Project Site

Flow Profile	Flow (cfs)
100-year from WSLIP	135,600
100-year from FEMA FIS at I Street Bridge	120,000

The hydraulic analyses were performed for the existing and proposed conditions using the USACE’s Hydrologic Engineering Centers River Analysis System (HEC-RAS) modeling software, Version 5.0.3. Cross sections of the Sacramento River were developed using digital elevation model (DEM) data from the San Francisco Bay and Sacramento-San Joaquin Delta DEM (Wang, R. & Ateljevich, E. 2012). The cross section locations are identified in Figure 1. A river reach of approximately 3 miles (mi) in length was generated using the DEM data, which encompasses the I Street bridge (at the Project site) and the downstream Tower Bridge and I-80 bridge. The bridges were modeled using as-built information. The upstream face of the existing I Street bridge is shown in Figure 2.

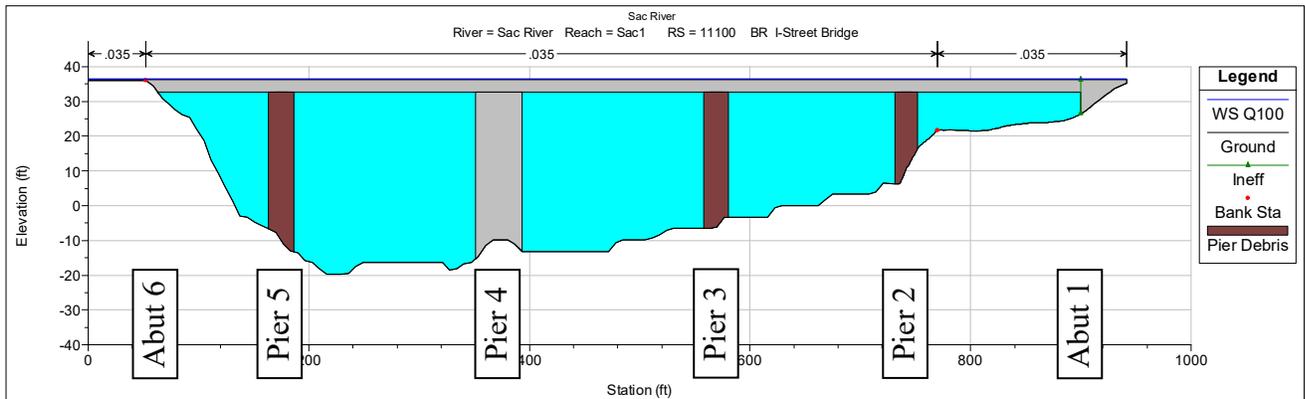


Figure 2. Existing I Street Bridge Cross Section (Facing Downstream/South)

PRELIMINARY SCOUR ANALYSIS

A preliminary scour assessment was performed for the existing bridge using log of materials information from the existing bridge contract plan set. The calculated scour depths inherently assume that the channel bed material is erodible. Subsurface information is used to determine the scour situation applicable to the Project. While there is not a clear division between cohesive and cohesionless soils, soils are divided into these two groups for the purposes of analyzing scour. Per HEC-18, a rule of thumb is that soils with 10% fines will exhibit some cohesion and soils with 35% fines will be dominated by cohesion. In general, the threshold for cohesive bed materials is a median grain size diameter that is 0.2 mm or less. Because there is currently limited channel and soil information available for the Project, scour was analyzed for the existing bridge using the cohesive and cohesionless equations.

Total scour is the sum of long-term degradation, general (contraction) scour, and local scour.

Long-Term Bed Elevation Change

Aggradation at the bridge site is a result of the deposition of material eroded from the channel. Degradation at the bridge site is a result of scouring of the channel due to sediment deficit. Only degradation is accounted for in scour calculations. The long-term bed elevation changes (long-term bed degradation) are typically based on historical channel data at the bridge site.

The historical channel data at the bridge site were reviewed, and the stream measurements that were recorded in the Caltrans BIRs were compared to assess the long-term bed elevation changes. Historical stream measurements were taken at three of the piers at the existing bridge and were included in the 1989, 1994, 2000, 2005, 2009, 2011, and 2014 underwater BIRs. The underwater inspection covers submerged elements of the substructure. Pier 2 is accessible during periods of low water, and was not inspected during the underwater inspection. In the BIRs, Pier 2 is the western pier (right-most pier when facing the downstream/south direction), and Pier 4 is the swing pier.

Figure 3 shows a comparison of the historical measurements taken over the 25-year-period. The comparison of the historical stream measurements indicates an overall trend of degradation. For a design life of 50-years, the long-term channel bed degradation was projected to be 7.7 ft.

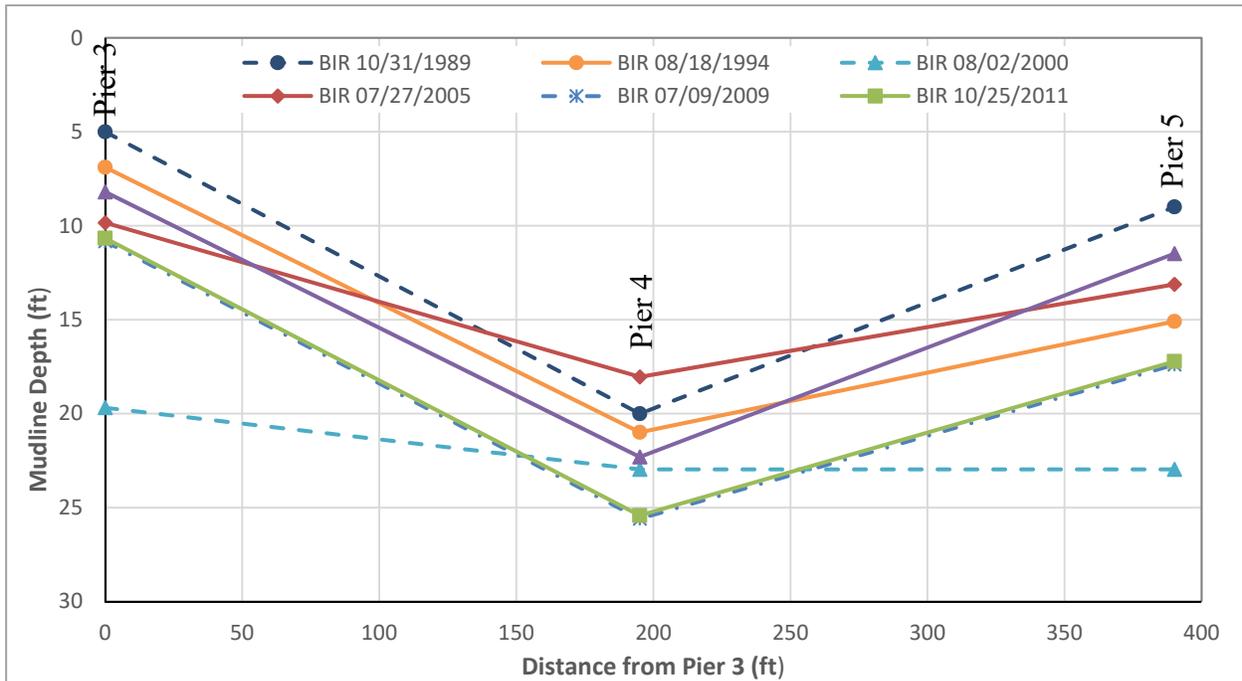


Figure 3. Historical Stream Measurements

General (Contraction) Scour

Contraction scour occurs when the flow area of a stream is reduced by: 1) the natural contraction of the stream channel; 2) by a bridge structure; or 3) the overbank flow forced back to the channel by roadway embankments at the roadway approach to a bridge. From the continuity equation, a decrease in flow area results in an increase in average velocity and bed shear stress through the contraction. Hence, there is an increase in erosive forces in the contraction section, and more bed material is removed from the contracted reach than is transported into the reach. This increase in transport of bed material from the reach lowers the natural bed elevation. As the bed elevation is lowered, the flow area increases. Thus, the velocity and shear stress decrease until relative equilibrium is reached; i.e., the quantity of bed material that is transported into the reach is equal to that removed from the reach, or the bed shear stress is decreased to a value such that no sediment is transported out of the reach. Contraction scour, in a natural channel or at a bridge crossing, involves removal of material from the bed across all or most of the channel width (FHWA 2012).

Based on the cohesive scour equation, the contraction scour was estimated to be 10.1 ft. Based on the cohesionless scour equation, the contraction scour was estimated to be 13.1 ft.

Local Scour

Abutment Scour

Abutment scour occurs when the bridge abutments block approaching flow. Abutment scour is commonly evaluated using either the Froehlich or HIRE live-bed scour equations. The HIRE equation is applicable when the ratio of the projected abutment length (the L parameter) to the flow depth (the y_1 parameter) is greater than 25. The Froehlich equation is applicable when the ratio of the projected abutment length to the flow depth is less than 25. Both equations assume that the bed material around bridge abutment is erodible during the design storm event.

Abutment scour was not evaluated for the southeast abutment because the abutment is located on or behind the paved path where scour would not be expected. The Froehlich equation was used to analyze the scour at the northwest abutment because the ratio of the projected abutment length to the flow depth was less than 25. The scour was calculated to be 7.7 ft.

Pier Scour

Pier scour is caused by the formation of vortices (known as a horseshoe vortex) at the pier base. The horseshoe vortex results from the pileup of water on the upstream surface of the pier and subsequent acceleration of the flow around the base of the pier.

The scour depths at the piers were estimated based on the pier design (shape and dimensions), flow characteristics (flow rate, local flow velocity at each pier, and local flow depth at each pier). The local pier scour was analyzed using the cohesive and cohesionless scour equations, and the results of the analysis are presented in Table 2 assuming the channel bed characteristics.

Table 2. Local Pier Scour Depths

Pier No.	Pier Scour Depth (ft)	
	Cohesive	Cohesionless
2	11.7	9.4
3	15.7	16.9
4	38.6	33.7

Total Scour

The total scour depth is the sum of the long-term bed elevation change, contraction scour, and local scour depths. The total and component scour depths are presented in Table 3 based on the cohesive channel bed material and Table 4 based on the cohesionless channel bed material. In the tables, the calculated scour elevation is also presented, which is the elevation of the predicted scour assuming the channel bed consistently exhibits the same characteristics for the calculated depth of scour.

Table 3. Summary of Total Scour Depths and Calculated Scour Elevations for Cohesive Channel Bed Material

Bridge Component	Reference Elevation (ft NAVD 88)	Long-Term Bed Elevation Change (ft)	Contraction Scour Depth (ft)	Local Scour Depth (ft)	Total Scour Depth (ft)	Calculated Scour Elevation (ft NAVD 88)
Abutment 1 (Northwest)	26.5*	7.7	10.1	7.7	25.6	0.9
Pier 2	-19.7**	7.7	10.1	11.7	29.5	-49.2
Pier 3	-19.7**	7.7	10.1	15.7	33.5	-53.2
Pier 4	-19.7**	7.7	10.1	38.6	56.5	-76.2
Pier 5	-19.7**	7.7	10.1	17.3	35.2	-54.8
Abutment 6 (Southeast)	-	-	-	-	-	-

Notes: * Elevation references the finished grade elevation at Abutment 1.
 ** Elevation references the channel thalweg elevation.

Table 4. Summary of Total Scour Depths and Calculated Scour Elevations for Cohesionless Channel Bed Material

Bridge Component	Reference Elevation (ft NAVD 88)	Long-Term Bed Elevation Change (ft)	Contraction Scour Depth (ft)	Local Scour Depth (ft)	Total Scour Depth (ft)	Calculated Scour Elevation (ft NAVD 88)
Abutment 1 (Northwest)	26.5*	7.7	13.1	7.7	28.6	-2.1
Pier 2	-19.7**	7.7	13.1	9.4	30.2	-49.9
Pier 3	-19.7**	7.7	13.1	16.9	37.8	-57.4
Pier 4	-19.7**	7.7	13.1	33.7	54.5	-74.2
Pier 5	-19.7**	7.7	13.1	19.9	40.7	-60.4
Abutment 6 (Southeast)	-	-	-	-	-	-

Notes: * Elevation references the finished grade elevation at Abutment 1.
 ** Elevation references the channel thalweg elevation.

Per WRECO’s discussions with the WSP bridge and geotechnical engineers, the total scour depths presented in Table 3 and Table 4 are likely conservative. Based on the Log of Materials, the channel bed has a layer of material identified as “large cobbles” (see Figure 4). The large cobbles should help to reduce, or limit, the scour at the bridge. In the final design phase, the scour depths and elevations should be verified. Soil samples and borings should be complete to determine the gradation of the channel bed material and to identify and verify the presence of a large cobble layer.

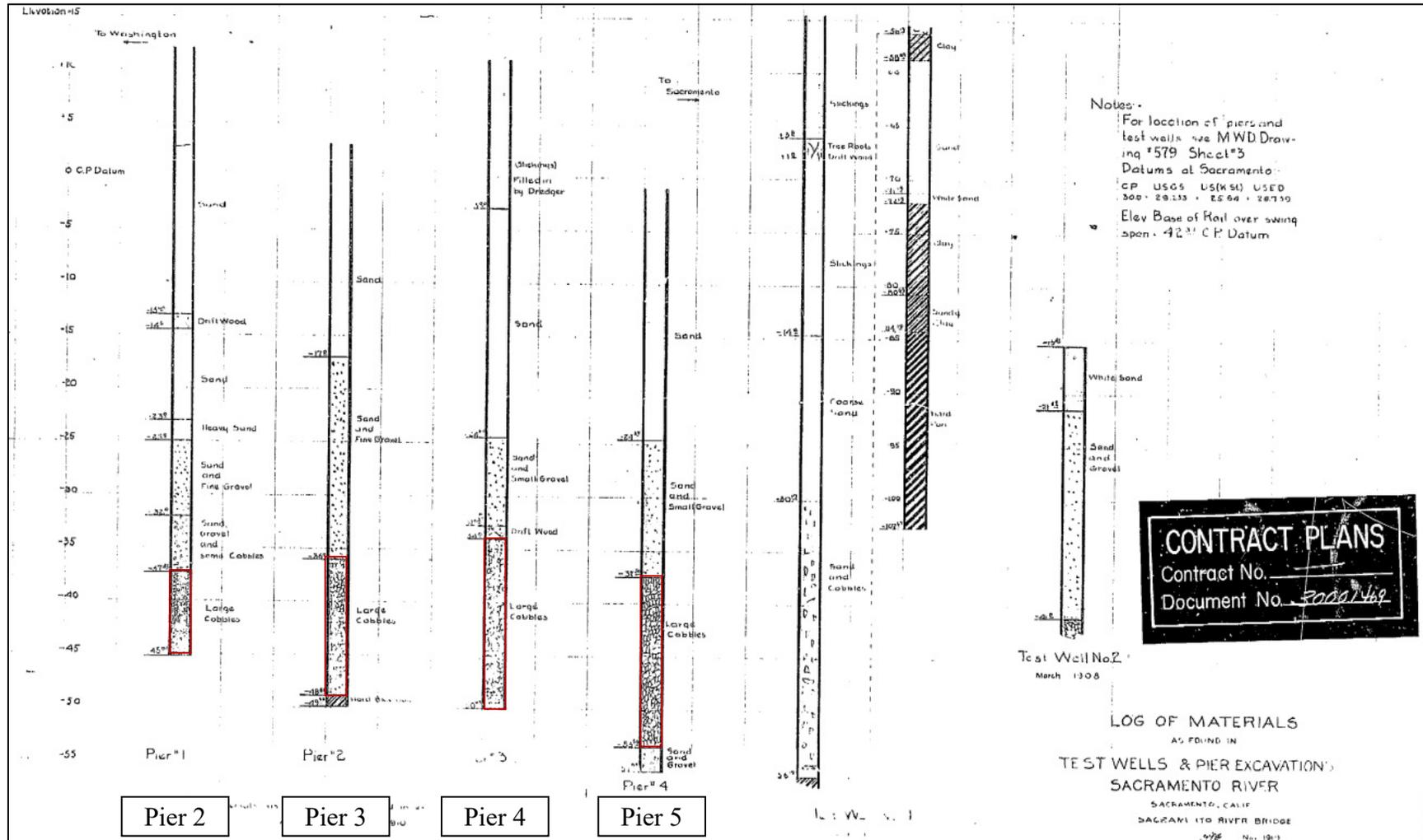


Figure 4. Log of Materials

Source: Sacramento Calif 1910

The Log of Materials (Figure 4) is based upon the CP Datum. The elevation of the base of rail over the swing span is also identified as $42.3 \pm$ based on the CP Datum. For these preliminary analyses, it was assumed that the CP Datum is the National Geodetic Vertical Datum of 1929 (NGVD 29), but this information should be verified during the design phase when surveys are complete. A conversion of 2.54 ft was applied to the elevations in the Log of Materials to convert to NAVD 88.

An empirical graph (Figure 5) from the National Engineering Handbook (United States Department of Agriculture [USDA] 2007) provides a range for the scour depth of different median diameters of soil particles that can be used for preliminary design in the absence of more detailed information. The empirical graph was based on measurements within streams with “generally straight reaches, free of features like bedrock, bridge piers, or large boulders that might cause local scour.” Based on the empirical graph, the mean scour depth for cobbles is approximately 1 ft and the maximum scour depth for cobbles is approximately 8 feet.

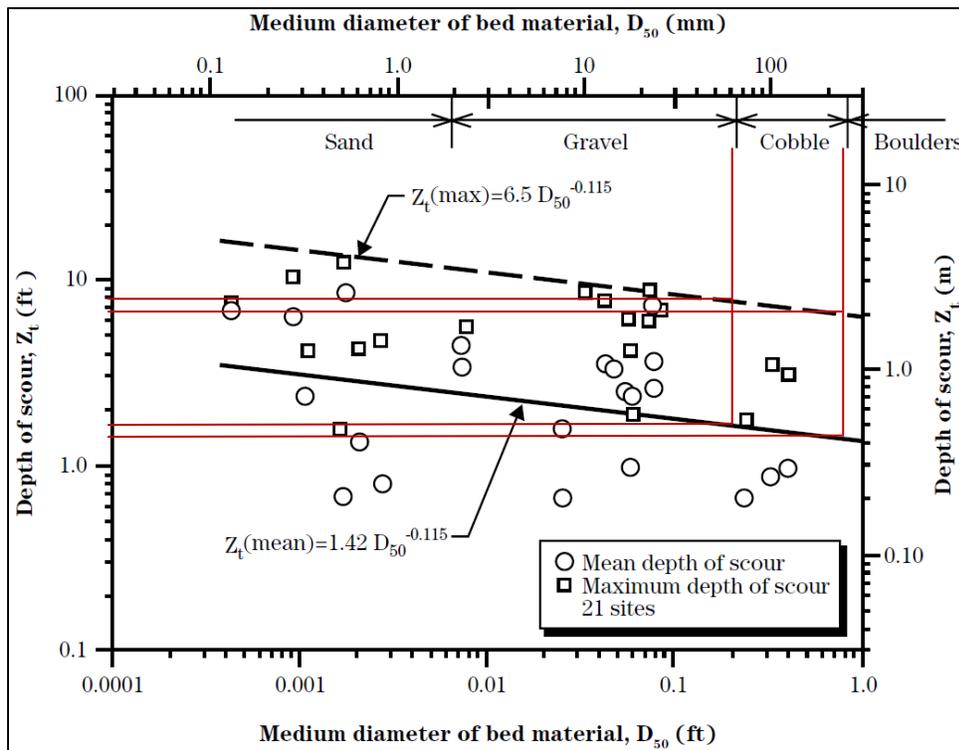


Figure 5. Empirical Graph Relating Scour Depth to Median Grain Size
 Source: USDA 2007

According to a Caltrans memorandum dated October 23, 2015, “Scour Data Table on Foundation Plan,” a scour data table should also present a long-term scour elevation based upon the long-term bed degradation and contraction scour depths, and a short term depth based upon the local scour depth. The scour elevations for the piers were based upon the thalweg elevation of the channel, which is -19.7 ft at the bridge based on available information. The scour elevation for the abutment was based upon the local elevation of the channel at the abutment assuming the channel does not

experience significant lateral migration. The local channel elevation at the northwest abutment is 26.5 ft. The scour data table is presented in Table 5 based on the cohesive channel bed material and Table 6 based on the cohesionless channel bed material. The long-term scour elevation for the piers is presented as 8 ft below the top of the cobble layer elevation as shown in the Log of Materials assuming the cobble layer will limit the progression of scour. The scour potential should be investigated during the design phase with more accurate channel bed information.

Table 5. Scour Data Table for Cohesive Channel Bed Material

Support Number	Calculated Long-Term (Degradation and Contraction) Scour Elevation (ft NAVD 88)	Short-Term (Local) Scour Depth (ft)
Abutment 1	8.7	7.7
Pier 2	-42.9*	11.7**
Pier 3	-42.4*	15.7**
Pier 4	-39.5*	38.6**
Pier 5	-43.0*	17.3**
Abutment 6	-	-

Notes: *This elevation is 8 ft below the starting elevation of the large cobble layer, which has a low erodibility.
 **Actual short-term scour would be limited by the cobble layer.

Table 6. Scour Data Table for Cohesionless Channel Bed Material

Support Number	Calculated Long-Term (Degradation and Contraction) Scour Elevation* (ft NAVD 88)	Short-Term (Local) Scour Depth (ft)
Abutment 1	5.6	7.7
Pier 2	-42.9*	9.4**
Pier 3	-42.4*	16.9**
Pier 4	-39.5*	33.7**
Pier 5	-43.0*	19.9**
Abutment 6	-	-

Notes: *This elevation is 8 ft below the starting elevation of the large cobble layer, which has a low erodibility.
 **Actual short-term scour would be limited by the cobble layer.



REFERENCES

- Federal Emergency Management Agency. (October 20, 2016). *Flood Insurance Study. Sacramento County, California and Incorporated Areas*. Flood Insurance Study Number 06067CV001C.
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- Wang, R. & Ateljevich, E. (2012). A Continuous Surface Elevation Map for Modeling (Chapter 6). In *Methodology for Flow and Salinity Estimates in the Sacramento-San Joaquin Delta and Suisun Marsh, 23rd Annual Progress Report to the State Water Resources Control Board*. California Department of Water Resources, Bay-Delta Office, Delta Modeling Section. (<http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/modelingdata/DEM.cfm>)

Appendix E – Cultural Resources Assessment and Environmental Constraints Report

Memo



455 Capitol Mall, Suite 300
Sacramento, CA 95814
916.444.7301

Date: May 18, 2018

To: Ali Seyedmadani and Marshall Moore, WSP

From: Curtis Alling, Francisca Ruger, Cori Resha, and Alta Cunningham; Ascent Environmental

Project: I Street Bridge Deck Conversion for Active Transportation Project for the City of West Sacramento

Subject: **Cultural Resources Assessment and Environmental Constraints**

1.1 INTRODUCTION

The I Street Bridge is a historic, movable swing railroad bridge built across the Sacramento River in 1911 by Southern Pacific Railway. It continues to be used for vehicle crossings on the top deck and train crossings on the bottom deck. As a part of the new C Street Bridge Project, vehicle traffic and the approach structures to the bridge upper deck will be removed from the existing structure.

The City of West Sacramento, in cooperation with the City of Sacramento, is completing a Feasibility Study for the I Street Bridge Deck Conversion for Active Transportation Project (Project). The Feasibility Study will analyze converting the upper deck of the existing I Street Bridge from motor vehicle use to a bicycle and pedestrian-only use.

This Cultural Resources Assessment and Environmental Constraints memo includes a discussion of cultural resources (archaeological and historic) on and around the Project site. It also includes an environmental constraints analysis of the Project site and the expected environmental regulatory processes that would be required for Project implementation.

1.2 PROJECT DESCRIPTION

The I Street Bridge Deck Conversion for Active Transportation Project proposes to maintain and improve active transportation use on the upper deck of the existing I Street Bridge once vehicle traffic is removed as a part of the new C Street Bridge Project. As a part of the C Street Bridge Project, the existing roadway approach ramps to the C Street Bridge from I Street and Jibboom Street in Sacramento and from C Street in West Sacramento are proposed to be demolished. This Project will consider saving a portion of each structure on each end of the existing I Street Bridge to accommodate access points for pedestrians and bicyclists.

Access to the elevated structure is proposed to be via a combination of Americans with Disabilities Act (ADA)-compliant ramps, stairways, and possible elevators on both sides of the Sacramento River. Depending on

funding, Project improvements may be phased. The initial phase would be required to provide ADA access on both sides of the river and would likely consist of one set of ADA ramps at each end of the bridge.

1.2.1 Project Objectives

The purpose of the Feasibility Study is to perform a field condition assessment, identifying deficiencies and safety concerns that need to be addressed to meet current design standards for pedestrian and bicycle use. In addition, the Feasibility Study is to identify project right-of-way impacts and permitting requirements.

1.2.2 Description of I Street Bridge

The I Street Bridge (Bridge No. 22C0153), constructed in 1911, carries two vehicular lanes, one in each direction and pedestrian sidewalks along both sides on an upper deck. It also carries two active railroad tracks on a lower deck. The main structure comprises two 170-foot long spans, two cantilevered 195-foot swing spans and another 110-foot long span. The total structure length of 840 feet is comprised of a steel through truss on reinforced concrete foundations with reinforced concrete top deck slab. Sidewalks are 5 feet wide on each side with an 18-foot travel way width and no shoulders. The sidewalk curbs are protected against damage due to frequent vehicle collision or rubbing with longitudinal angle irons.

The approach structure from the City of West Sacramento (Bridge No. 22C0154), constructed in 1958, carries two vehicular lanes, one in each direction and pedestrian sidewalks along both sides of the structure from the upper deck level of the I Street Bridge to street level at C Street in West Sacramento. The structure is comprised of 11 spans of varying length between 25 ft and 54 feet with a total structure length of 554 feet. The structure is a reinforced concrete deck on simple span composite steel plate girders supported by reinforced concrete columns and abutment on concrete piles. The structure underwent a seismic retrofit in 1998-2000.

The approach structures from the City of Sacramento consist of several structures that have been added to the existing structure constructed in 1936 (Bridge No. 24C0364L – along I Street, Bridge No. 24C006 along Jibboom Street). The main existing structure is comprised of a reinforced concrete deck on steel stringers with steel frame bents on treated timber piles. A secondary structure (Bridge No. 24C0364R) was added to the south side of this structure comprised of a mix of cast-in-place reinforced T beams and precast drop in reinforced T beams as well as a cast-in-place reinforced concrete box girder supported on reinforced concrete columns on pile footings.

1.3 CULTURAL RESOURCES ASSESSMENT

Recent cultural resources studies for the I Street Bridge Replacement Project included most of the area to be affected by the Project. Small areas not covered by these studies include an area along the west bank of the Sacramento River, south of the I Street Bridge adjacent to the Riverwalk, and the east bank of the Sacramento River, south of the I Street Bridge. The area of potential effect (APE) for the I Street Bridge Replacement Project consisted of both an archaeological APE and an architectural APE; however, the term APE is used generally to refer to both the archaeological and architectural APE.

The I Street Bridge spans the Sacramento River, with the western side located in the City of West Sacramento in Yolo County and the eastern side located in the City of Sacramento in Sacramento County. Two different California Historical Resources Information System (CHRIS) repositories cover the I Street Bridge. The North Central Information Center (NCIC) contains records for the Sacramento County portion of the Project, and the Northwest Information Center (NWIC) contains records for the Yolo County portion. The records searches identified five previously recorded cultural resources located within the APE. Of these

resources, all are historic period—two are archaeological resources and three are built environment resources. Additionally, a buried urban landscape district, the Raised Streets and Hollow Sidewalks District (P-34-002358), which includes historic-era brick bulkheads and retaining walls that support the streets downtown, exists between I Street between 3rd and 5th Streets, outside the I Street Bridge Replacement Project's APE.

A survey of the built environment in the architectural APE was conducted on September 27, 2014, and April 4, 2015. An intensive archaeological pedestrian survey of all accessible portions of the archaeological APE was conducted on April 10 and 13, 2015. The results were documented in two reports:

Archaeological Survey Report for the I Street Bridge Replacement Project (ICF International 2016a) and *Historical Resources Evaluation Report for the I Street Bridge Replacement Project* (ICF International 2016b).

1.3.1 Architectural Resources

Based on the previous survey (ICF International 2016b), nine architectural/built environment resources were identified within the I Street Bridge Replacement Project APE. Two resources were identified as eligible for or listed in the National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR). The remaining seven resources were found ineligible for listing in the NRHR or CRHR and are not considered historical resources for the purposes of the California Environmental Quality Act (CEQA). The two resources identified as eligible for listing are described below.

I STREET BRIDGE

The I Street Bridge, constructed in 1911, is a double-deck, steel-swing bridge extending from Sacramento to West Sacramento. The bridge was listed in the NRHP in 1982 (NRHP #82002233) and has significance under NRHP and CRHR Criterion A/1 in the area of transportation as the oldest bridge in the state that carries main line traffic across a major crossing. The bridge also has significance under NRHP and CRHR Criterion C/3 in the area of engineering. The I Street Bridge holds an important place in the history of swing bridge design, helping to prove that a center pier design could be used for very long and heavy railroad bridges. The bridge is also listed in the CRHR and is a historical resource for the purposes of CEQA. A condition to the I Street Bridge Replacement Project is proposed to require the development of an interpretive panel to be installed in Old Sacramento to document the vehicular uses of this bridge.

SACRAMENTO RIVER EAST LEVEE

The second resource within the Project area is a segment of the Sacramento River East Levee (P-34-000490). Although portions of the Sacramento River East Levee have been previously evaluated under the primary number P-34-000490, the portion in the I Street Bridge Replacement Project's APE is a newly recorded segment. The subject segment is approximately 35 feet tall and 1,835 feet in length, extending north from the I Street Bridge to a point just south of the Gauging Station. The subject segment is eligible for listing in the NRHP and the CRHR at the local level of significance under Criterion A/1 as a physical representation of the precedent set for flood control management in California between 1850 and 1911, more specifically flood control management policy and development in the Sacramento Valley. The levee segment is a historical resource for the purposes of CEQA.

1.3.2 Archaeological Resources

Based on the previous survey (ICF International 2016a), one resource was identified as eligible for inclusion in the NRHP for the purposes of the I Street Bridge Deck Conversion for Active Transportation Project. The Pioneer Flour Mill wharf (CA-SAC-658H) consists of 518 pilings associated with the Pioneer Flour Mill, which

began operation in 1853. These pilings are located on the east bank of the Sacramento River immediately north and south of the I Street Bridge. It is possible that CA-SAC-658H will be outside the area affected by the I Street Bridge Deck Conversion for Active Transportation Project. This would require confirmation once the Project site boundary is finalized and an APE is developed. During the 2015 pedestrian survey, a previously unrecorded feature was found in the I Street Bridge Replacement Project APE, consisting of a raised concrete foundation and loading ramp located on the east bank of the Sacramento River.

Because portions of the I Street Bridge Replacement Project APE were not accessible, Caltrans is preparing a programmatic agreement (PA) specific to the I Street Bridge Replacement Project to ensure that identification and evaluation of archaeological properties within the APE, and any resolution of adverse effects on those properties, is completed. The PA will have as an attachment an Archaeological Resources Management Plan which will include a detailed protocol for identification, evaluation, and treatment of any adversely affected historic properties, protocols for archaeological monitoring, and evaluation and treatment of any unanticipated discoveries that may be encountered during implementation.

NATIVE AMERICAN COORDINATION

On April 7, 2015, the Native American Heritage Commission (NAHC) was contacted to request the identification of any areas of concern within the I Street Replacement Project APE that may be listed in the NAHC's Sacred Lands File (SLF) and to provide a list of Native American representatives who may have interest in the Project. NAHC sent the results on April 28, 2015, stating that the SLF contains no record of any cultural resources within or near the APE. The response also listed 16 Native American representatives who may be interested in the Project.

Notification of the 16 tribes in June 2015 resulted in a site visit (November 2016) with the Yocha Dehe Wintun Nation and the United Auburn Indian Community of the Auburn Rancheria (UAIC). UAIC representative Tristan Evans stated that UAIC knows of a potential Tribal Cultural Property (TCP) in or near the APE on both sides of the Sacramento River, as well as an archaeological site in or near the APE on both sides of the Sacramento River. The environmental document for the I Street Bridge Replacement Project concluded with the development of a project-specific PA, which includes ongoing consultation efforts with Native American groups and will require preparation of an Archaeological Resource Management Plan (ARMP). The ARMP will specify that a qualified archaeologist and a Native American monitor will be retained to monitor all initial ground disturbing activities (e.g., vegetation removal, grading, excavation, bridge construction). Similar coordination would be conducted for the Project.

1.4 ENVIRONMENTAL CONSTRAINTS AND CONSIDERATIONS

Preliminary review of existing conditions and existing reports for the Project site identified a number of environmental topics that will require consideration during future design and environmental review of the Project. These topics are discussed below. Following the discussion of environmental constraints, this report identifies anticipated future environmental permits and processes that would be required for Project implementation.

1.4.1 Environmental Constraints

AESTHETICS

The environmental impact report/environmental assessment (EIR/EA) prepared for the I Street Bridge Replacement Project noted that there are no roadways within or near the Project area designated in federal or state plans as a scenic highway or route worthy of protection for maintaining and enhancing scenic viewsheds (City of Sacramento and Caltrans 2017:2.6-7). Project construction activities would introduce heavy equipment and construction vehicles to the Project area on both sides of the Sacramento River. While

the construction equipment would be visible to residents, motorists, and trail users in the area, these impacts would be temporary. While the footprint and design of the Project alternatives differ in terms of the shape and slope of bicycle and pedestrian ramps, the impacts of each would be substantially similar.

AIR QUALITY

Construction of the Project would require construction equipment, which would emit potential air pollutants. As such, the anticipated construction emissions would need to be modeled to determine whether Project construction could exceed any applicable air quality thresholds of significance. During operation, the Project would serve bicycle and pedestrian users and the only vehicular use that could be associated with the Project would be maintenance vehicles. Because the Project would likely require only periodic maintenance, it is not expected that vehicle emissions would need to be modeled for the operational scenario.

BIOLOGICAL RESOURCES

Recent records searches and field surveys indicate the following species are likely to be present in the Project vicinity: valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), western pond turtle (*Actinemys marmorata*), Swainson's hawk (*Buteo swainsoni*), white-tailed kite (*Elanus leucurus*), purple martin (*Progne subis*), pallid bat (*Antrozous pallidus*), and western red bat (*Lasiurus blossevillii*) could be adversely affected by Project implementation. Several special-status fish species, including Sacramento River winter-run, Central Valley spring-run, and Central Valley fall- and late fall-run Chinook salmon (*Oncorhynchus tshawytscha*); Central Valley steelhead (*O. mykiss*); North American green sturgeon (*Acipenser medirostris*); Delta smelt (*Hypomesus transpacificus*); longfin smelt (*Spirinchus thaleichthys*); Sacramento splittail (*Pogonichthys macrolepidotus*); Pacific lamprey (*Entosphenus tridentata*); and river lamprey (*Lampetra ayresi*) could occur within the portion of the Sacramento River present in the Project area. It is unlikely that the project would result in in-water construction work; therefore, it is unlikely that fish in the Sacramento River would be adversely affected by Project implementation. If scour countermeasures are constructed in the future, potential effects to fish species would require additional study and agency coordination. Project implementation could also result in impacts to sensitive habitat on the Project area, such as the cottonwood riparian habitat and heritage trees.

COMMUNITY IMPACTS

A preliminary evaluation of the Project plans indicates that the Project would be consistent with a variety of policies related to land use, traffic and circulation, and recreation within the two affected jurisdictions, the cities of Sacramento and West Sacramento. The Project would be consistent with goals and policies encouraging multimodal access, choices, and river crossings in Sacramento's 2035 General Plan (2015) and West Sacramento's General Plan 2035 (2016). As noted below, under Cultural Resources, the project site is adjacent to the Old Sacramento State Historic Park boundary. Depending on the final project area, a portion may be adjacent to, or within, the State Park boundary. The project would be evaluated for consistency with the 2014 Old Sacramento State Historic Park General Plan and Environmental Impact Report.

CULTURAL RESOURCES

In addition to the resources identified above in the archaeological assessment, there are historic resources near and adjacent to the potential project site, including the National Historic Landmark Old Sacramento Historic District, an historic district possessing national, state, and local significance. The Old Sacramento Historic District consists of multiple city blocks bounded on the west by the Sacramento River, on the south by Capitol Mall, on the east by the Interstate 5 right-of-way, and on the north by the south edge of the I Street Bridge access ramp. The Old Sacramento State Historic Park, which encompasses most of the northern portion of the National Historic Landmark Old Sacramento Historic District, is maintained by the California State Parks systems. While it is expected that the majority of the project would be constructed in areas of

previous disturbance related to the existing bridge and approach ramps and other recent urban development, the potential for project-related earth-disturbing activities to inadvertently damage known and previously undocumented historic and archaeological resources would likely require site-specific historic and archaeological evaluations.

HAZARDOUS WASTE AND MATERIALS

The EIR prepared for the I Street Bridge Replacement Project included an initial site assessment (ISA) that identified recognized environmental conditions (RECs), historical recognized environmental conditions (HRECs), and potential RECs that may be present within and/or adjacent to the Project limits (Blackburn Consulting 2016:i).

On the West Sacramento side of the Project, there are two parcels (APNs 010-371-001 and 010-372-002) that were evaluated in the Blackburn report. These parcels were determined to have a low REC risk with the potential for discovery of a leach field, septic tank, and/or buried heating oil tanks (Blackburn Consulting 2016:ii). Three additional parcels on the West Sacramento side (APNs 010-373-001, 010-373-011, and 010-373-012) could be temporarily or permanently disturbed by the Project. As these parcels were not included in the ISA prepared for the I Street Bridge Replacement Project EIR, they would need to be evaluated to determine whether there are any RECs on these parcels.

On the Sacramento side, Project elements north of the I Street Bridge would be on parcels included in the ISA as part of Site X, Sacramento Station Study Area (Blackburn Consulting 2016:Figure 2c). South of the bridge, two parcels (APNs 006-0011-006 and 006-0011-009) that could be impacted by the Project were included in the ISA as Site U (Blackburn Consulting 2016:Figure 2c). Depending on the location of ramps, the Project may be required to evaluate these parcels to determine whether there are any RECs on these parcels.

As part of the I Street Bridge Replacement Project EIR, testing was conducted for asbestos-containing materials (ACMs) and lead-containing paint (LCP). Sample testing revealed ACMs present in the railing gaskets and the fastener sealants of the west roadway approach and the southeast roadway approach (City of Sacramento and Caltrans 2017:2.12-4). The LCP survey investigated existing paints and applied coatings associated with the existing bridge and determined that silver and black paint on the metal bridge structure and white paint on the metal northeast approach were LCPs (City of Sacramento and Caltrans 2017:2.12-4). In addition, the gasket located at the base of the light boxes on the northeast approaches was determined to be pure lead (City of Sacramento and Caltrans 2017:2.12-4).

Aerially-deposited lead (ADL) can be found in the surface and near-surface soils along nearly all roadways because of the historical use of tetraethyl lead in motor vehicle fuels. Areas of primary concern are soils along routes that have had high vehicle emissions from large traffic volumes or congestion during the period when leaded gasoline was in use (generally prior to 1986). Shoulder soils along urban and heavily travelled rural highways are commonly above the soluble threshold limit concentration criteria. ADL could be encountered during construction and grading activities in Sacramento and West Sacramento at the bridge approaches (City of Sacramento and Caltrans 2017:2.12-5).

Yellow and white traffic striping and markings are located across the existing I Street Bridge. Caltrans studies have determined that yellow/white thermoplastic striping and painted markings may contain elevated concentrations of lead and chromium, depending on the age of the striping (manufactured before 2005) and painted markings (manufactured before 1997). Disturbing either yellow or white pavement markings by grinding or sandblasting can expose workers to lead and/or chromium. (City of Sacramento and Caltrans 2017:2.12-5)

Given the potential for construction workers to be exposed to ACMs, LCPs, ADL, and lead and/or chromium, the Project would be required to develop and implement plans to address construction worker health and safety. Additionally, Caltrans' standard special provisions require sampling and testing of yellow/white traffic

striping scheduled for removal to determine whether lead or chromium is present. All aspects of the Project associated with removal, storage, transportation, and disposal would be required to be conducted in strict accordance with appropriate regulations of the California Health and Safety Code. The stripes would be disposed of at a Class 1 disposal facility. (City of Sacramento and Caltrans 2017:2.12-18).

HYDROLOGY AND WATER QUALITY

While the Project would take advantage of the existing bridge deck and portions of the existing approach structures, additional impervious surfaces would be added in the form of pedestrian and bicycle ramps and stairs. While minor, the addition of impervious surfaces would have the potential to increase runoff volume in the Sacramento River. The Project would be required to comply with all applicable requirements related to protection of water quality.

Under the State Water Resources Control Board's Construction General Permit (Order 2009-0009-DWQ), the Project would be required to incorporate an approved Stormwater Pollution Prevention Plan (SWPPP) that describes post-construction measures, site design measures, Low Impact Development (LID) measures, and other permanent erosion control elements found in the Sacramento Stormwater Quality Partnership's Stormwater Quality Improvement Plan (SQIP), and the City of West Sacramento's Stormwater Management Program (SWMP). Project construction is not expected to replace or add more than one acre of impervious surface. If the Project would involve more than 1 acre of newly created or replaced impervious area, permanent treatment Best Management Practices (BMPs) would need to be considered. Treatment BMPs could include bioretention areas and vegetated swales. In addition, erosion and sediment control BMPs such as drainage swales, geotextile, slope drains, mulch, stream bank stabilization, and sediment traps would be implemented to control any runoff from the Project site.

Construction of the Project would involve land-disturbing activities, stockpiling, and equipment use and storage. These activities have the potential to violate water quality standards or waste discharge requirements if sediment- or contaminant-laden runoff from work areas enters storm drains or other pathways leading to receiving waters, or if fuel or other construction chemicals are accidentally spilled or leaked into the water. Sources of sediment include earthwork, excavation, embankment or fill construction, uncovered or improperly covered stockpiles, unstabilized slopes, and construction equipment not properly maintained. The delivery, handling, and storage of construction materials and wastes as well as the use of heavy construction equipment could result in accidental spills of hazardous materials, which could enter the groundwater aquifer or nearby surface waters.

Two different municipal separate storm sewer system (MS4) permits would apply to the Project: Sacramento County MS4 Permit for the City of Sacramento (Sacramento County MS4 Permit; NPDES No. CAS082597; Order No. R5-2015-0023) and State Water Board's Small MS4 Permit for the City of West Sacramento (Statewide Phase II MS4 Permit; NPDES Order No. 2013-001-DWQ; General Permit No. CAS000004). These permits regulate the storm water and non-storm water discharges associated with Project construction activities and discharges within the jurisdiction of each permit.

NOISE

Project construction activities would include heavy equipment and construction vehicles. Sacramento City Code Section 8.68.080D exempts construction equipment noise between the hours of 7 a.m. and 6 p.m., Monday through Saturday, and between 9 a.m. and 6 p.m. on Sunday. Excessively loud construction equipment operated during non-exempted hours could be reported to the City as a nuisance. The City of West Sacramento specifies maximum non-transportation interior and exterior noise levels by land use during daytime (7 a.m. till 10 p.m.) and nighttime (10 p.m. till 7 a.m.) as detailed in Municipal Code Section 17.32. As the two alternatives do not differ significantly in location, it is anticipated that noise restrictions during construction would be the same for either alternative.

UTILITIES AND EMERGENCY SERVICES

While the location of utility lines and connections within the Project site is unknown, it is anticipated that the Project could require the relocation of existing utilities or installation of new facilities. Utilities affected could include water, sewer, gas, electric, and communications facilities in areas adjacent to the Project site. While future work associated with the I Street Bridge Replacement Project may relocate some existing utilities, the I Street Bridge Deck Conversion Project may need to relocate or install new utilities to serve the Project.

While the I Street Bridge Replacement Project would relocate vehicle traffic from the existing I Street Bridge to the new river crossing north of the bridge, the Project area would be adjacent to existing roadways. Because the presence of construction equipment within or near the Project area could potentially interfere with existing roadway operations, it is likely that the affected jurisdictions would require preparation of a traffic management plan (TMP) to provide for continued traffic circulation such that emergency vehicle access would not be impeded (see description under Anticipated Permits and Regulatory Processes, below).

1.4.2 Anticipated Permits and Regulatory Processes

The following discussions address the anticipated permits and the regulatory processes that are expected to apply to the project. These include Section 7 or Section 10 consultation with the US Fish and Wildlife Service under the Endangered Species Act (ESA); Streambed Alteration Agreement; tree permit and dewatering permit from the City of West Sacramento; tree permit and dewatering permit from the City of Sacramento; Section 106 and AB 52 compliance for historic properties and tribal cultural resources, respectively. Project implementation would also require adherence to the two MS4 permits for Sacramento and West Sacramento and preparation of a transportation management plan and could require air quality permits related to ACMS, LCPs, and ADL.

BIOLOGICAL RESOURCES

US Fish and Wildlife Service

Valley elderberry longhorn beetle

Construction of the West Sacramento ramp could result in direct loss of blue elderberry (*Sambucus nigra caerulea*) shrubs which are suitable habitat for valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), a threatened species under the ESA.

- ▲ Impacts to elderberry shrubs should be avoided as outlined in USFWS *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (USFWS 2017). However, if elderberry shrubs cannot be avoided, compliance with the ESA and consultation with USFWS is required and may involve acquiring an incidental take permit through Section 10, or a take exemption through Section 7 of the ESA.
- ▲ Mitigation for impacts to elderberry shrubs may include transplanting the shrubs, purchasing credits at a USFWS-approved conservation bank, providing on-site mitigation, or establishing and protecting habitat for valley elderberry longhorn beetle, pursuant to authorization by USFWS.

California Department of Fish and Wildlife

Cottonwood riparian habitat

Project implementation could result in permanent and temporary effects to cottonwood riparian habitat adjacent to the West Sacramento ramp.

- ▲ The Project applicant will notify California Department of Fish and Wildlife (CDFW) before commencing any activity within the bed, bank, or riparian corridor of any waterway. If activities trigger the need for a

Streambed Alteration Agreement, the proponent will obtain an agreement from CDFW before Project approval. The Project applicant will conduct construction activities in accordance with the agreement, including implementing reasonable measures in the agreement necessary to protect the fish and wildlife resources, when working within the bed or bank of waterways that function as a fish or wildlife resource or in riparian habitats associated with those waterways.

- ▲ The Project applicant will compensate for permanent loss of riparian habitat at a minimum of a 1:1 ratio through contributions to a CDFW approved wetland mitigation bank or through the development and implementation of a Compensatory Stream and Riparian Mitigation and Monitoring Plan for creating or restoring in-kind habitat in the surrounding area. If mitigation credits are not available, stream and riparian habitat compensation will include establishment of riparian vegetation on currently unvegetated bank portions of streams affected by the Project and enhancement of existing riparian habitat through removal of nonnative species, where appropriate, and planting additional native riparian plants to increase cover, continuity, and width of the existing riparian corridor along streams in the Project area and surrounding areas. Construction activities and compensatory mitigation will be conducted in accordance with the terms of a streambed alteration agreement as required under Section 1602 of the Fish and Game Code.

City of West Sacramento

Heritage Tree Removal

Project implementation could result in the removal of trees identified as Heritage Trees under the West Sacramento Tree Preservation Ordinance. A Heritage Tree is defined as any living tree with a diameter of 24 inches or more, or any living native oak (*Quercus* sp.) with a diameter of 16 inches or more.

- ▲ If heritage trees are planned for removal, the Project applicant will acquire a tree permit from the City of West Sacramento prior to Project implementation, and all conditions of the permit will be implemented.

City of Sacramento

Heritage Tree Removal

Project implementation could result in the removal of trees identified as Heritage Trees under the Sacramento City Heritage Tree Ordinance. A Heritage Tree is defined as any tree with a diameter of 32 inches or more; any native oak species, California buckeye (*Aesculus californica*), or California sycamore (*Platanus racemosa*) with a diameter of 11.5 inches or greater; or any tree, grove of trees, or woodland trees designated by resolution of the city council to be of special value.

- ▲ If heritage trees are planned for removal, the Project applicant will acquire a tree permit from the City of Sacramento prior to Project implementation, and all conditions of the permit will be implemented.

Preconstruction Surveys

Preconstruction surveys for sensitive natural resources would be required prior to commencement of Project construction, including:

- ▲ Aquatic feature delineation to determine if the aquatic features (e.g., riparian habitat) are subject to USACE, RWQCB, or CDFW jurisdiction (One survey prior to construction activities, upon completion of design plans);
- ▲ Elderberry longhorn beetle (One survey prior to construction activities, upon completion of design plans);
- ▲ Western pond turtle (One survey 48 hours prior to construction activities);

- ▲ Swainson’s hawk (Six surveys conducted between February and July, following *Recommended Timing and Methodology for Swainson’s Hawk Nesting Surveys in California’s Central Valley* [Swainson’s Hawk Technical Advisory Committee 2000]);
- ▲ Other nesting birds (including purple martin) and raptors (One survey conducted between March and June, no more than two weeks prior to construction activities);
- ▲ Special-status bats (One survey no more than two weeks prior to construction activities);
- ▲ Tree survey by a certified arborist (One survey prior to construction activities, upon completion of design plans).

COMMUNITY IMPACTS

City of Sacramento

Project approval by the Sacramento City Council.

City of West Sacramento

Project approval by the West Sacramento City Council.

CULTURAL RESOURCES

Assuming the use of federal funds from the Federal Highway Administration (FHWA), the I Street Bridge Deck Conversion for Active Transportation Project will be subject to state and federal environmental review requirements. Accordingly, Project documentation will need to be prepared in compliance with both CEQA and the National Environmental Policy Act (NEPA). The City of West Sacramento is the lead agency under CEQA, with the City of Sacramento as a responsible agency, and Caltrans is the lead agency under NEPA. The FHWA’s other responsibilities for environmental review, consultation, and any other action required in accordance with applicable Federal laws for this Project will be carried out by Caltrans under its assumption of responsibility pursuant to 23 United States Code 327.

The National Historic Preservation Act (NHPA) of 1966, as amended, sets forth national policy and procedures for historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for listing in the NRHP. Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and to allow the Advisory Council on Historic Preservation (ACHP) the opportunity to comment on those undertakings, following regulations issued by the ACHP (36 Code of Federal Regulations [CFR] 800). On January 1, 2014, the First Amended Section 106 PA among FHWA, the ACHP, the California State Historic Preservation Officer (SHPO), and Caltrans went into effect for Caltrans Projects, both state and local, with FHWA involvement. The PA implements the ACHP’s regulations, 36 CFR 800, streamlining the Section 106 process and delegating certain responsibilities to Caltrans. The FHWA’s responsibilities under the PA have been assigned to Caltrans as part of the Surface Transportation Project Delivery Program (23 United States Code [USC] 327).

Historic properties may also be covered under Section 4(f) of the U.S. Department of Transportation Act, which regulates the “use” of land from historic properties (in Section 4(f) terminology—historic sites).

CEQA requires the consideration of cultural resources that are historical resources and tribal cultural resources, as well as “unique” archaeological resources. California Public Resources Code (PRC) Section 5024.1 established the CRHR and outlined the necessary criteria for a cultural resource to be considered eligible for listing in the CRHR and, therefore, a historical resource. Historical resources are defined in PRC Section 5020.1(j). In 2014, Assembly Bill 52 (AB 52) added the term “tribal cultural resources” to CEQA, and AB 52 is commonly referenced instead of CEQA when discussing the process to identify tribal cultural resources (as well as identifying measures to avoid, preserve, or mitigate effects to them). Defined in PRC

Section 21074(a), a tribal cultural resource is a CRHR or local register eligible site, feature, place, cultural landscape, or object which has a cultural value to a California Native American tribe. Tribal cultural resources must also meet the definition of a historical resource. Unique archaeological resources are referenced in PRC Section 21083.2.

The Project will likely require additional site-specific cultural resource surveys that comply with Section 106 requirements. Once the Project area is finalized and an APE is developed in consultation with the SHPO, the APE will need to be compared against the APE for the I Street Bridge Replacement Project. If there are areas for the current Project that were not covered by the previous cultural resource reports, additional surveys will be required. Additionally, depending on timing of the Project, new surveys could be necessary—CHRIS record searches and cultural resource surveys are considered to have expired after 5 years. If additional surveys are required and areas are not accessible, a PA could be required, similar to the one described above that was developed for the I Street Bridge Replacement Project.

Consultation with the SHPO would be required for any modifications to the I Street Bridge. The existing NRHP-nomination was drafted in 1982 and does not include character-defining features or contributing elements. An updated NRHP-nomination form could be required by the SHPO; additionally, consultation with the SHPO could result in parties agreeing that the replacement of certain elements would not result in an adverse effect to the I Street Bridge. Future research for the Deck Conversion Project should determine if an updated nomination form has been prepared.

Native American consultation is required for both NEPA (Federally-recognized tribes under Section 106) and CEQA (California-recognized under AB 52).

HAZARDOUS WASTE AND MATERIALS

Initial Site Assessment

An evaluation and records search for hazardous materials sites would likely be required for parcels not previously evaluated under the I Street Bridge Replacement Project.

Develop and Implement Plans to Address Worker Health and Safety

The project proponent will develop and implement the necessary plans and measures required by Caltrans and federal and state regulations, including a health and safety plan, BMPs, and/or an injury and illness prevention plan. The plans will be prepared and implemented to address worker safety when working with potentially hazardous materials, including potential ACMs, LCPs, lead or chromium in traffic stripes, ADL, and other construction-related materials within the right-of-way during any soil-disturbing activity.

Conduct Sampling, Testing, Removal, Storage, Transportation, and Disposal of Yellow/White Traffic Striping

As required by Caltrans' standard special provisions, the construction contractor will sample and test yellow/white traffic striping scheduled for removal to determine whether lead or chromium is present. All aspects of the Project associated with removal, storage, transportation, and disposal will be in strict accordance with appropriate regulations of the California Health and Safety Code. The stripes will be disposed of at a Class 1 disposal facility.

HYDROLOGY AND WATER QUALITY

Stormwater Pollution Prevention Plan

As required by the Construction General Permit, the applicant would be required to prepare a SWPPP demonstrating the Project features are designed to protect water quality.

Municipal Separate Storm Sewer System Permits

Project construction activities would be required to adhere to the MS4 permits for the applicable jurisdictions.

City of Sacramento

Construction dewatering permit from the City of Sacramento.

City of West Sacramento

Construction dewatering permit from the City of West Sacramento.

UTILITIES AND EMERGENCY SERVICES

Transportation Management Plan

Prior to construction, the Project proponent would prepare a Transportation Management Plan (TMP) for each jurisdiction affected. Implementation of a TMP would minimize disruptions to traffic and to emergency services during construction and ensure that construction would not create major delays. A TMP is a program of activities for alleviating or minimizing work-related traffic delays by applying traditional traffic handling practices as well as innovative strategies.

1.4.3 Anticipated Environmental Approval

It is anticipated that the appropriate CEQA document for the Project would be an Initial Study/Mitigated Negative Declaration, and the appropriate NEPA document would be a Categorical Exclusion supported by technical studies. While there are several resources within the anticipated Project area that could be affected by the Project, it is likely that existing regulatory processes, in combination with Project-specific mitigation measures, would reduce potential impacts to less-than-significant levels.

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Acronyms/Abbreviations

AB 52	Assembly Bill 52
ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
ACM	Asbestos-containing materials
ADL	Aerially-deposited lead
APE	area of potential effect
APN	Assessor's parcel number
ARMP	Archaeological Resource Management Plan
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
CRHR	California Register of Historical Resources
EA	Environmental Assessment
EIR	Environmental Impact Report
ESA	Endangered Species Act
FHWA	Federal Highway Administration
HRECs	historical recognized environmental conditions
ISA	initial site assessment
LCP	lead-containing paint
LID	Low Impact Development
MS4	municipal separate storm sewer system
NAHC	Native American Heritage Commission
NCIC	North Central Information Center
NEPA	National Environmental Policy Act
NRHP	National Register of Historic Places
NWIC	Northwest Information Center
PA	programmatic agreement
PRC	Public Resources Code
Project	I Street Bridge Deck Conversion for Active Transportation Project
RECs	recognized environmental conditions
SHPO	State Historic Preservation Officer
SLF	Sacred Lands File
SQIP	Stormwater Quality Improvement Plan
SWMP	Stormwater Management Program
SWPPP	Stormwater Pollution Prevention Plan
TCP	Tribal Cultural Property
TMP	traffic management plan
TMP	Transportation Management Plan
UAIC	United Auburn Indian Community of the Auburn Rancheria

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Appendix F – I Street Bridge Lantern Festival Summary Report



CONNECTING COMMUNITIES

I STREET BRIDGE DECK

LANTERN FESTIVAL

SUMMARY REPORT





About the I Street Bridge Deck Feasibility Study

The existing I Street Bridge, built in 1912, provides a critical regional and national railroad line for freight and passenger rail. The top deck of the bridge provides a critical connection between the cities of Sacramento and West Sacramento for motorists, cyclists and pedestrians. However, its current poor condition causes traffic congestion during commute hours and unsafe conditions for cyclists and pedestrians. The Cities of Sacramento and West Sacramento have begun the process to bring a new bridge across the Sacramento River upstream of the existing I Street Bridge.



Now the cities of West Sacramento and Sacramento are studying how to transform the upper deck of the existing I Street Bridge to serve pedestrians and bicyclists and to evaluate the possibility of creating active public spaces at the approaches.



The I Street Lantern Festival

On Saturday, March 23 the cities of West Sacramento and Sacramento held a lantern festival and walk across the I Street Bridge. The purpose of event was to demonstrate how once the bridge no longer is a structure for motor vehicle conveyance, then it can be transformed into a structure that convey not only pedestrians and cyclists, but can build community by getting people out of cars and enjoying a wonderful public space on the Sacramento River.

The lantern festival provided a way for people to celebrate the Chinese community's contributions to the Transcontinental Railroad and to discuss with the project team how to create a bicycle and pedestrian bridge and active public space. At two key locations (start and terminus of the lantern walk) exhibits were displayed which illustrated a variety of public space amenities and multi-modal options on the bridge. Community members provided their input about how they envision using the bridge in the future, opportunities to create placemaking, bridge lighting, shared spaces on the bridge for those walking and biking, bridge approach amenities, and ramp and stair options.

Lantern Festival Components

Lantern Creation Workshops

In preparation for the festival, the Cities partnered with two local artists (Robin Hill, UC Davis art professor and Robert Ortbal, Sacramento State art professor) to lead two lantern creation workshops. The workshops were held for five hours on two Saturday's leading up to the festival, March 2 and Saturday, March 9 in open-studio formats.



More than 250 community members from both West Sacramento and Sacramento attended to create their own lanterns, which they brought to the festival and carried as they walked across the bridge.

Lantern Festival Components

The Lantern Festival



The lantern festival began at 7:00 p.m. with speeches from West Sacramento Mayor Pro Tem Quirina Orozco, Sacramento Mayor Darrell Steinberg, Senator Dr. Richard Pan, and Assemblymember Kevin McCarty. The Sacramento Mandarins drumline kicked off the lantern walk at 7:30 p.m., and were followed by the Teng Fei Lion Dance Group. Community members joined the lantern walk behind the two entertainment groups while carrying their LED-lit lanterns along the route. The lantern walk began in West Sacramento, at the base of the I Street Bridge in a small empty parking lot and led to the I Street Bridge.



To demonstrate what a transformation of the upper deck could be like, the Cities strung hundreds of LED-lit lanterns across the top of the I Street Bridge and lit the sides of the structure with red and gold colored LED lights. Cultural art displays by Chinese artist Zhi Lin were hung along the bridge's rails, and included watercolor sketches of the landscape along the route of the first transcontinental railroad. Additional historical displays were also hung along the rails, and included historical photographs of and information about the thousands of Chinese laborers who helped construct the transcontinental railroad.



The lantern walk route ended at the intersection of I Street and Jibboom Street, just past the bridge, and included a parklet for community members to experience what it might be like to have a seating area on the bridge's approaches. The parklet included pop-up chairs, tables, games, and a rotating projection art installation by artist Zhi Lin, titled "Chinaman's Chance on Promontory Summit." Kado's Asian Grill food truck was stationed across from the parklet, for community members to enjoy a meal or light snack while learning more about the study and watching continued performances by the Sacramento Mandarins and Teng Fei Lion Dance Group.



At the start and end locations of the lantern walk, community members talked to project team members about the study and provided their input while also enjoying additional performances by the entertainment groups until 9:00 p.m.

Approximately 3,000 community members attended the lantern festival and participated in the lantern walk across the bridge.

Key Findings

Thousands of community members were able to envision the existing I Street Bridge as a community builder at the festival; the majority of participants stayed throughout the entire duration of the event. As one community member said,

“A lantern festival in the evening to showcase the bike/ped options in the region is so beautiful, especially over the water... we have the energy of all these people who are happy to be outside on a cold night to participate and give their opinion.”

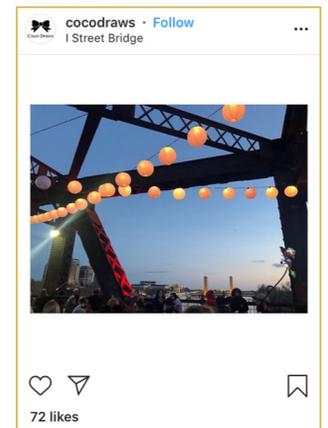
99.5%
of all respondents supported the study

Hundreds of people used the event as an opportunity to take photographs and videos for social media, to help inform the community at large.

Community members also discussed the study with project team members and submitted their thoughts on comment cards. Approximately 99.5% of all respondents supported the study. When one community member was asked to share her thoughts about the project, she responded, “I think this project will help promote the active transportation goals of the region... and I think that’s great.”

Several hundred community members provided their input about different elements of the study through a series of interactive board displays. An overview of their input is summarized in the graphs below.

In the future, the upper deck of the I Street Bridge (where motorists currently travel) may be converted to allow for only bicyclists and pedestrians.



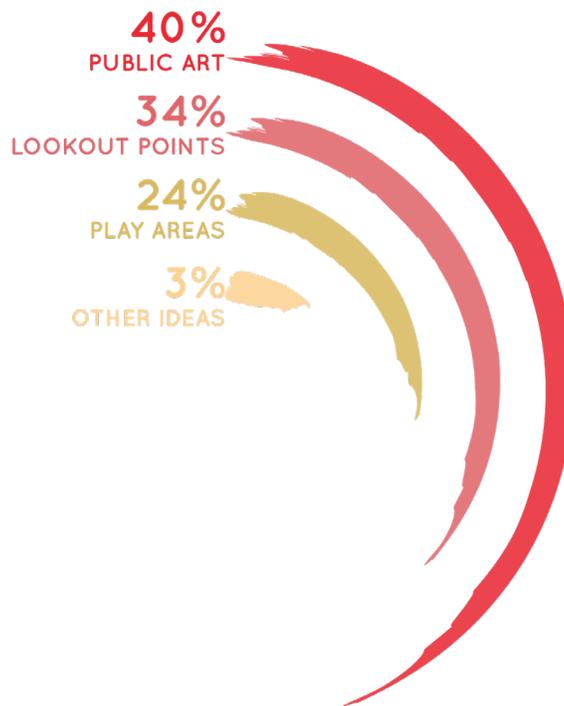
Key Findings

How would you envision your use of the upper deck?

341 attendees responded to this question.

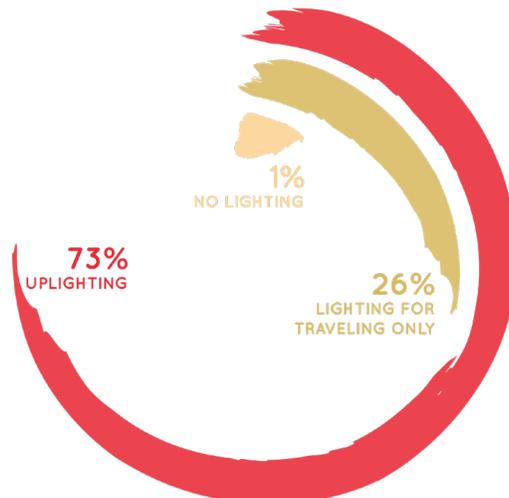


There are many opportunities to create placemaking along the upper deck. **Let us know your thoughts about the ideas below, and then share your ideas!** 461 attendees responded to this question.



What should the project team consider when planning for lighting on the bridge?

345 attendees responded to this question.



What should the project team consider when planning for pedestrian and bicyclist travel on the bridge?

226 attendees responded to this question.



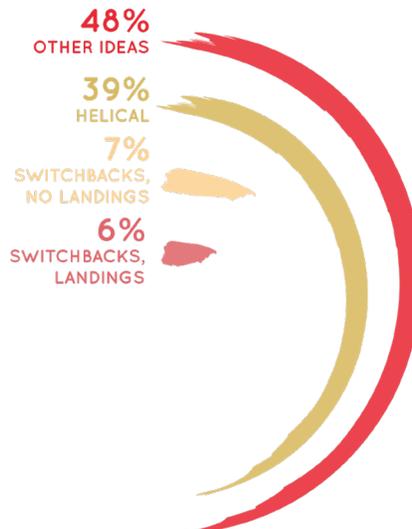
What should the project team consider when planning for amenities on the bridge approaches?

460 attendees responded to this question.



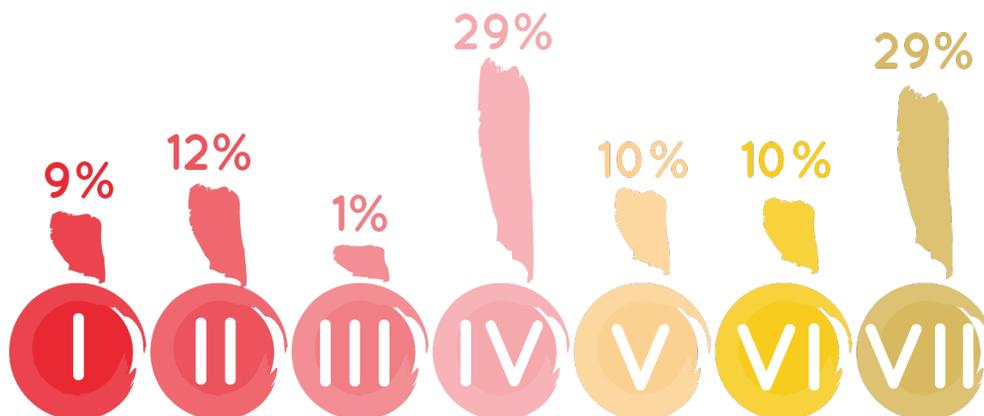
What should the project team consider when planning for the bridge's ramps?

376 attendees responded to this question.



What should the project team consider when planning for stairs on the bridge's approaches?

660 attendees responded to this question.

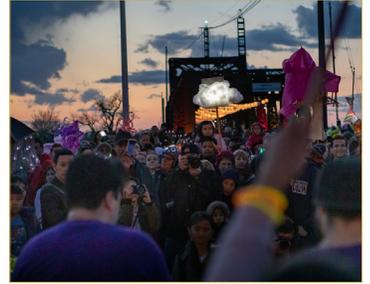


Notification

Community members were notified about the I Street Bridge Lantern Festival through traditional print flyers, digital flyers, email blasts, personal calls and emails, regional community event calendars and websites, local news outlets, and social media channels including Facebook, Instagram, NextDoor, and Twitter. Local school districts, after-school programs, community destinations, community-based organizations, and individual community members shared promotional materials for the festival as well. Below is a list of organizations and communication channels which shared information about the event:

- 101.5 Radio
- ABC 10 News
- Bounce Spot after-school program
- Capital Yards
- Capitol Bowl
- City of Sacramento
- City of Sacramento City Express Blog
- City of Sacramento Mayor Darrell Steinberg
- City of West Sacramento
- Club West Sacramento
- Daily Democrat
- Devil May Care Ice Cream
- Downtown SacGrid
- Drakes the Barn
- Edible Pedal
- Fox 40 News
- La Crosta Pizza Bar
- Lighthouse Market and Deli
- Ray Mata's Barber Shop
- Sacramento Area Bicycle Advocates (SABA)
- Sacramento City Councilmember Jay Schenirer
- Sacramento City Councilmember Rick Jennings
- Sacramento Railyards
- Sacramento4Kids
- Sactown Magazine
- SacTRU
- Sal's Tacos
- Two Trees Digital Marketing
- Verge Center for the Arts
- West Sacramento Burgers and Brew
- West Sacramento Center: Sacramento City College
- West Sacramento Chamber of Commerce
- West Sacramento Community Center
- West Sacramento Mommies Group
- Westside Identity Coffee
- YMCA Bridgeway Elementary
- Yolo County Children's Alliance
- Young Planners Group Sacramento (YPG)





CONNECTING COMMUNITIES LANTERN FESTIVAL



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