



# *Final Value Analysis Study Report*



## *D-1 Salmon Creek Bridge and Albion River Bridge Replacement Projects*

**1-MEN-1 EA 40140K (PM 42.4-43.4)**

**1-MEN-1 EA 40110K (PM 43.4-44.2)**

**Contract No. 53A0160**

**Task Order No. 873**

***October 2013***



***Prepared by***

**Value Management Strategies, Inc.**



***"Value Leadership"***

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Date: October 30, 2013

To: Sebastian Cohen, Project Manager, Salmon Creek  
Frank Demling, Project Manager, Albion River

Subject: Final VA Study Report (Task Order No. 873)  
***D-1 Salmon Creek Bridge and Albion River Bridge  
Replacement Projects***

Value Management Strategies, Inc. is pleased to submit this Final VA Study Report for the referenced project. This report summarizes the results and events of the study conducted June 25 to 27 and July 16 to 18, 2013 at District 1 offices in Eureka, California. The Final VA Report documents the review edits and the decisions taken at the October 24, 2013 Implementation Meeting.

It was a pleasure working with District 1 on this project, and I look forward to the next one. If you have any questions or comments concerning this preliminary report, please do not hesitate to contact me at (916) 224-9812 or email [george@vms-inc.com](mailto:george@vms-inc.com).

Sincerely,

VALUE MANAGEMENT STRATEGIES, INC.

A handwritten signature in black ink, appearing to read "George Hunter", written in a cursive style.

George Hunter, PE, PMP, CVS-Life  
VA Study Team Leader

Copy: (4/PDF) Addressees  
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# **VA STUDY SUMMARY REPORT**

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***FINAL RESULTS***

# **VA Study Summary Report – Final Results**

## **Salmon Creek Bridge and Albion River Bridge Replacement Projects**

1-MEN-1  
EA 40140K  
EA 40110K  
(PM 42.4-43.4)  
(PM 43.4-44.2)



Figure 1: Existing Salmon Creek Bridge



Figure 2: Existing Albion River Bridge

A Value Analysis (VA) study, sponsored by Caltrans and facilitated by Value Management Strategies, Inc., was conducted for Salmon Creek Bridge and Albion River Bridge Replacement Projects located in the vicinity of Albion, California. The VA study was conducted in District 1 offices in Eureka from June 25 to 27 and July 16 to 18, 2013. This *VA Study Summary Report – Final Results* provides an overview of the project, key findings, and the accepted and rejected alternatives developed by the VA team.

### **PROJECT SUMMARY**

#### ***Salmon Creek Bridge Replacement Project***

PSR Alternative 2B consists of an east alignment with a concrete arch structure type. The east side alignment coincides with a 700- to 720-foot-long replacement structure that is 131 to 138 feet high, located on a 1,000-foot vertical sag curve. The proposed centerline, at the location of the Salmon Creek Bridge, is 50 feet offset east and parallels the existing bridge alignment. This alternative will allow two traffic lanes to remain open during most of the construction. The structure type for PSR 2B is a 5-span, cast-in-place concrete arch. This design alternative was used as the baseline project as it is neutral in environmental impacts, has less right-of-way impacts, and appears the most cost effective.

Total project costs for all elements of the Salmon Creek Bridge Replacement project are currently estimated at \$43,909,000, and the construction duration is estimated for two years.

#### ***Albion River Bridge Replacement Project***

PSR Alternative 1C consists of a west alignment with a concrete arch structure type. The west side alignment is located west and clear of the existing Albion River Bridge. The replacement structure

associated with this alignment is 1,020 feet long and 139 to 151 feet high. This alternative allows two traffic lanes to remain open during most of the construction.

To the north of the structure, the Albion River North Side Road (PM 43.93) at-grade intersection will be relocated to PM 44.03 to accommodate the replacement structure, and includes proposed metal beam guard rail (MBGR), and Americans with Disabilities Act (ADA) access to the east pedestrian walkway. The Albion Little River Road (PM 43.96) at-grade intersection with Route 1 will be relocated to intersect Albion River North Side Road. The private driveway access at PM 44.00 will be relocated to intersect Albion River North Side Road. The structure type for PSR 1C is a 10-span, cast-in-place concrete arch. This design alternative was used as the baseline concept as it has the least environmental and right-of-way impacts, better aesthetics, and appears the most cost-effective.

Total project costs for all elements of the Albion River Bridge Replacement project are currently estimated at \$38,376,000, and the construction duration is estimated for three years.

## **PROJECT PURPOSE AND NEED**

The Salmon Creek and Albion River Bridges and their respective approaching alignments have a number of structural and geometric deficiencies. The Salmon Creek structure has a sufficiency rating of 49.7 percent and the Structure Replacement and Improvements Needs Report (STRAIN) Urgency Factor for replacement is two years. The Albion River structure has a sufficiency rating of 68.20 percent and the STRAIN Urgency Factor for replacement is two years.

The purpose of these projects is to replace the functionally obsolete and structurally deficient structures with structures that will improve geometrics and structural integrity to ensure uninterrupted traffic movements in the event of vehicular breakdown, seismic event, or other catastrophic failure. There is no interim seismic retrofit work that can reduce the geometric and structural deficiencies of the existing structures.

## **VA STUDY TIMING**

The VA study was conducted in the middle of the PA&ED phase, which is targeted for completion at the end of the 2014 calendar year. The latest target date for both projects is a Ready to List (RTL) in May 2016.

## **VA STUDY OBJECTIVES**

The objectives of the VA study were to:

- Review structure types
- Review alignments
- Review shoulder widths
- Review project impacts with a goal to reduce impacts
- Ensure maintainability of the structures

## KEY PROJECT ISSUES

The items listed below are the key drivers, constraints, or issues being addressed by the project and considered during this VA study to identify possible improvements.

### ***Salmon Creek Bridge***

- The structure is fracture-critical due to a lack of redundancy in the steel deck truss and the steel floor beam members.
- The project will upgrade the shoulder widths to 8 feet right to meet standards on the bridges and 4 feet on land; it will also feature a 5-foot-wide pedestrian path (barrier-separated) on the west side only.
- The project proposes to improve the 800-foot vertical sag curve with low point in the middle of the bridge; the proposed design improves, but does not meet, current design standards for sight distance. This sag contains grades that exceed the maximum allowable grades – a mandatory design exception.
- Southbound traffic uses the sag as a passing distance (more available sight distance than the rest of the corridor).
- If the project were to use the west alignment, it would create a long through-cut on the slopes on both the north and south sides of the bridge. The south side cut on the west alignment could impact a gated community of homes called Pacific Reefs.
- The area had significant historical use (lumber operations). This is a known site for possible archaeological impacts.
- The existing bridge requires an investment of \$2,500,000 for painting every five years.

### ***Albion River Bridge***

- The project will upgrade the shoulder widths to 8 feet right to meet standards and will have a Class 1 bike path (barrier-separated) that is 5 feet wide.
- The following design exceptions are required in the baseline concept:
  - 4-foot shoulder widths (DIB79-03) between PM 43.3 - PM 44.2, for the portions on land only. The standard shoulder width is 8 feet.
  - Stopping Sight Distance (Section 201.1 - Table 201.1) at PM 44.01- PM 44.02 and PM 44.09- PM 44.12.
- There is an existing 275-foot horizontal curve on the existing alignment just north of the existing bridge.

- The structure requires painting every 5 years, at an estimated cost of \$350,000.
- East alignment cannot support an arch structure type on a curvilinear alignment.
- The existing bridge is an Albion landmark.
- The existing truss span is fracture-critical due to a lack of redundancy of the 2-girder truss system.
- The existing bridge is a Douglas fir wood truss structure that incorporates a recycled steel deck truss that spans the main channel.
- The existing wood structure has been treated with hazardous chemicals.

## EVALUATION OF BASELINE CONCEPTS

During the course of the VA study, a number of analytical tools and techniques were applied to develop a better understanding of the baseline concept. A major component of this analysis was Value Metrics which seeks to assess the elements of cost, performance, time, and risk as they relate to project value. These elements required a deeper level of analysis, the results of which are detailed in the *Project Analysis* section of this report. The key performance attributes identified for the project are listed in the table, “Performance Attributes.”

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### Performance Attributes-

Environmental Impacts  
 Operations  
 Maintainability  
 Construction Impacts

---

Below is a summary of the major observations and conclusions identified during the evaluation of the baseline design concept which led the VA team to develop the alternatives and recommendations presented in this report.

### ***Salmon Creek Bridge Replacement***

The baseline concept is represented by PSR Alternative 2B. This design alternative was selected with an east side alignment and the 5-span, reinforced concrete arch spandrel with CIP box girder superstructure type. The east alignment avoids, compared to the west alignment, a commercial property, and has no more or less natural environment impacts, particularly in regards to the sensitive species. The east alignment could be closer to the old Route 1 abutments; however, the exact locations of these abutments were not made known to the VA team. Therefore, the VA team only studied east side alignments.

A 5-foot-wide pedestrian walkway will be located on the west side (only), separated by a barrier from the roadbed. The traveled lanes and shoulders will be 12 feet and 8 feet wide, respectively. There is a sag vertical curve that does not meet current Caltrans standards near the middle of the bridge. The baseline design’s sag grades are -4% and +7% – 5% is the mandatory, maximum standard profile grade according to the Highway Design Manual (HDM) for rural highways, rolling terrain. The length of the east side realignment is 0.9-mile (PM 42.4-43.3).

## **Albion River Bridge Replacement Project**

The baseline concept was selected with a west side alignment and a 10-span, reinforced concrete arch spandrel with CIP box girder superstructure type. The bridge passes over a flat developed area occupied by a privately owned RV park, which lies to the west of the existing bridge. The west alignment was chosen as it would reduce the impacts to the use of the RV park and other properties. This alignment stays further away from the access into/out of the marina. Therefore, the VA team only studied the west side alignment.

The proposed alignment at the north end of the bridge will correct a low-speed horizontal curve. The pedestrian walkways will be placed on both sides of the proposed bridge, separated by a barrier from the roadbed. The traveled lanes and shoulders on the bridge will be 12 feet and 8 feet wide, respectively. The shoulder width off the bridge (on land) is proposed to be 4 feet wide and requires an approved design exception from HQ Design. The length of the east side realignment is 0.9-mile (PM 43.3-44.2).

The key focus for the VA study was to investigate ways to improve the environmental review and approval process, particularly as the existing Albion River Bridge is a community icon.

### **FINAL VA STUDY RESULTS – SALMON CREEK BRIDGE REPLACEMENT PROJECT**

The VA study resulted in the acceptance of two enhancements to the Salmon Creek Bridge Replacement Project’s baseline concept, which is currently the Technically Preferred Alternative (TPA) being advanced into design. These VA alternatives include:

- VA Alternative 2.0, “Fill in the coastal trail between the two bridges”
- VA Alternative 3.0, “Flatten the profile slopes at Salmon Creek to balance the earthwork”

This saves a nominal cost to the project, but increases the project performance of the TPA, mostly by reducing its associated environmental impacts.

The following describes the accepted alternatives along with their initial cost and/or life-cycle cost (LCC) savings, change in schedule, and performance that were validated by the Project Development Team (PDT) after the VA study. Please note that because the cost data depicted below represent *savings*, a number in parentheses represents a cost *increase*. The rejected alternatives, and their respective reasons for rejection, are also discussed on the following pages.

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<b>Alternative No. and Description</b>	<b>Initial Cost Savings</b>	<b>LCC Savings</b>	<b>Change in Schedule</b>	<b>Performance Change</b>
<b>2.0 Fill in the coastal trail between the two bridges</b>	<b>(\$100,000)</b>	<b>\$0</b>	<b>No change</b>	<b>+16 %</b>

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This VA alternative fills in the coastal trail system between the two bridges: a recreational benefit to the region. This alternative should be presented as a mitigation strategy in support of the California Coastal Commission's mission statement.

Alternative No. and Description	Initial Cost Savings	LCC Savings	Change in Schedule	Performance Change
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3.0 Flatten the profile slopes at Salmon Creek to balance the earthwork

\$210,000

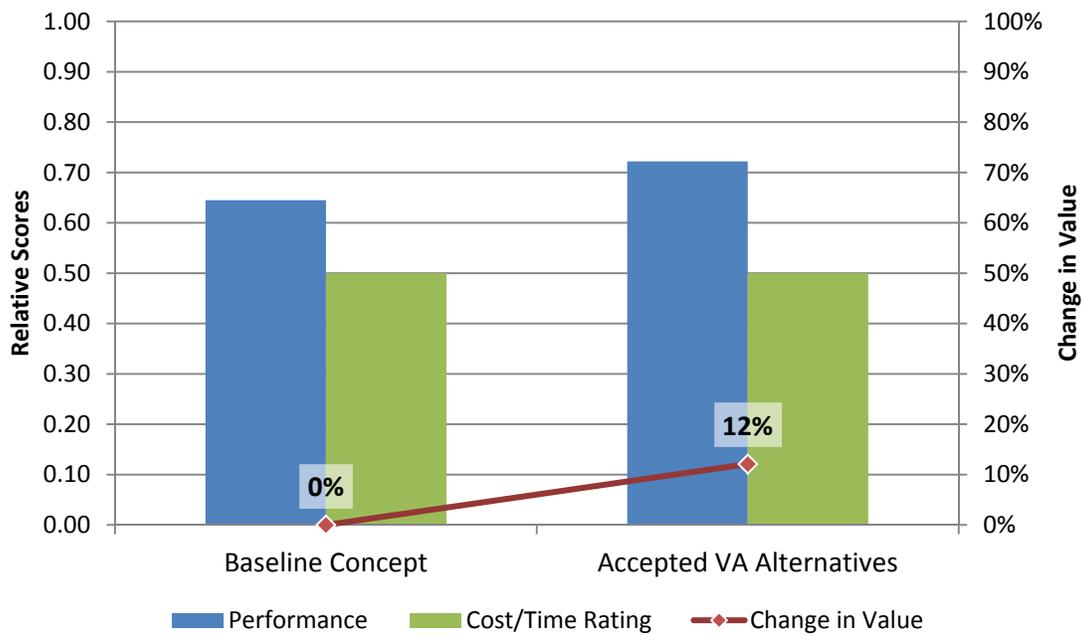
\$0

No change

+2 %

This alternative would bring the sag profile on the Salmon Creek Bridge to HDM standards, lengthen the bridge and thereby balance the earthwork.

### Comparison of Value – Salmon Creek Bridge Replacement Project Baseline Concept and Accepted VA Alternatives



### Net Effect of Accepted VA Alternatives – Salmon Creek Bridge Replacement Project

Accepted VA Alternatives	Initial Cost Savings	LCC Savings	Change in Schedule	Performance Change	Value Change
2.0, 3.0	\$110,000	\$0	No change	+12 %	+12 %

### ADDITIONAL VA STUDY RESULTS

The study resulted in the following additional benefits to the project:

- VA Alternative 4.3, “Salmon: Build on-alignment (east) carrying two lanes; carrying pedestrians” as a non-TPA project alternative to be included and evaluated in the Environmental Document.

- Two other non-TPA project alternatives are under consideration (“Further Study Needed”) by the Project Development Team:
  - VA Alternative 1.1, “Provide a community path for coastal access by purchasing land from the Albion Headlands’ property owners”
  - VA Alternative 1.2, “Add a belvedere to the bridge”

See Appendix C for detailed information and comments made during the Preliminary VA Report review and during the Implementation Meeting held October 24, 2013. The rejected alternatives, and their respective reasons for rejection, are also discussed in Appendix C.

## FINAL VA STUDY RESULTS – ALBION RIVER BRIDGE REPLACEMENT PROJECT

The VA study resulted in the acceptance of two enhancements to the Albion River Bridge Replacement Project’s baseline concept that is currently the TPA being advanced into design. These VA alternatives include:

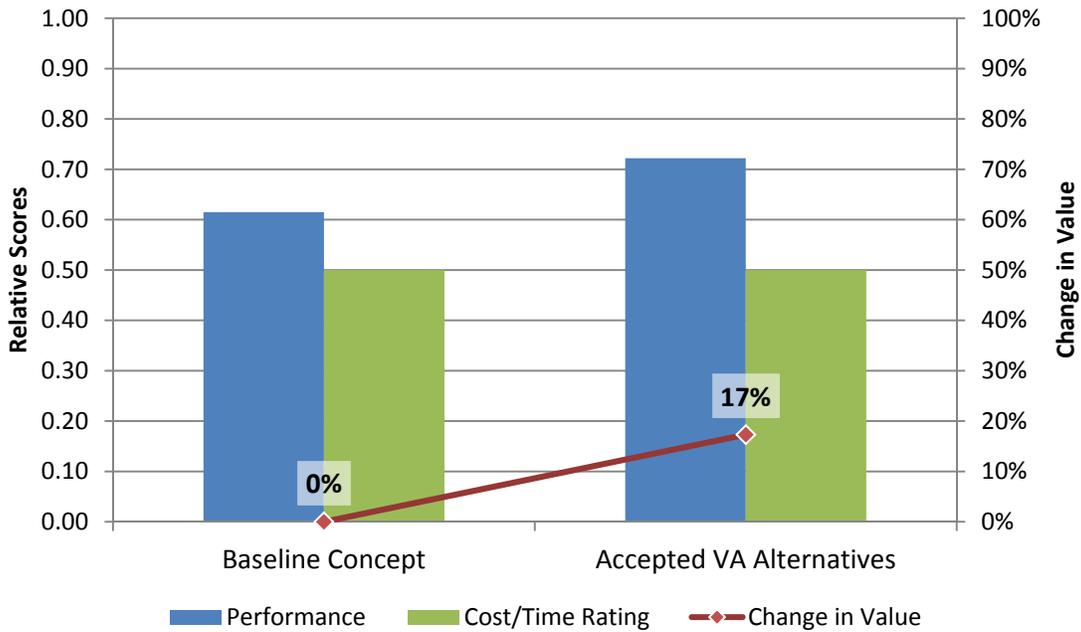
- VA Alternative 6.0, “Fill in the coastal trail between the two bridges”
- VA Alternative 8.0, “Improve stopping sight distance at the north end of the Albion Bridge project”

This study adds some nominal cost to the project, but increases the project performance of the TPA by reducing its associated environmental impacts.

The following describes the accepted alternatives along with their initial cost and/or LCC savings, change in schedule, and performance that were validated by the PDT after the VA study. Please note that because the cost data depicted below represent *savings*, a number in parentheses represents a cost *increase*.

Alternative No. and Description	Initial Cost Savings	LCC Savings	Change in Schedule	Performance Change
<b>6.0 Fill in the coastal trail between the two bridges</b>	<b>(\$100,000)</b>	<b>\$0</b>	<b>No change</b>	<b>+17 %</b>
<p>The proposed trail could be recognized as part of the coastal trail system. In addition to the benefit this trail would have to the community of Albion, the “filling in the gap” supports the California Coastal Commission's mission statement.</p>				
<b>8.0 Albion: Improve stopping sight distance at the north end of the Albion Bridge Replacement project</b>	<b>\$0</b>	<b>\$0</b>	<b>No change</b>	<b>+2 %</b>
<p>This concept was developed to address a non-standard condition. It also provides opportunities to improve the viewscape for the vehicle occupants and an opportunity to create a small vista point.</p>				

**Comparison of Value – Albion River Bridge Replacement Project  
Baseline Concept and Accepted VA Alternatives**



**Net Effect of Accepted VA Alternatives – Albion River Bridge Replacement Project**

Accepted VA Alternatives	Initial Cost Savings	LCC Savings	Change in Schedule	Performance Change	Value Change
6.0, 8.0	(\$100,000)	\$0	No change	+17 %	+17 %

*Note: Because the cost data depicted above represent savings, a number in parentheses represents a cost increase.*

**ADDITIONAL FINAL VA STUDY RESULTS**

The study resulted in the following additional benefits to the project:

- Two VA alternatives were accepted as a non-TPA project alternatives to be included and evaluated in the Environmental Document:
  - VA Alternative 5.4, “Use the existing Albion River Bridge for non-motorist use and narrow the width of new bridge”
  - VA Alternative 9.3, “Build on-alignment (west) carrying two lanes of traffic and pedestrians”
- Five other non-TPA project alternatives are under consideration (“Further Study Needed”) by the project development team:

- VA Alternative 5.1, “Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners”
- VA Alternative 5.2, “Add vista point for northbound lanes; incorporate north side abutment and portion of deck”
- VA Alternative 5.3, “Add belvederes to the bridge”
- VA Alternative 7.0, “Purchase the RV park in lieu of paying for temporary construction easement”
- VA Alternative 9.1, “Retrofit, widen, and rehabilitate the existing Albion Bridge”

See Appendix C for detailed information and comments made during the Preliminary VA Report review and during the Implementation Meeting held October 24, 2013. The rejected alternatives, and their respective reasons for rejection, are also discussed in Appendix C.

## VA TEAM

### VA Study Team

Name	Organization	Title
Kelly Holden	Caltrans, HQ	Structure Design
Jeff Sims	Caltrans, HQ	Structure Design
Frank Cullinan	Caltrans, District 1	Structure Construction
Gene Leo	Caltrans, District 1	Structure Construction
Rick Mayberry	Caltrans, District 1	Structure Construction
Gary Woodard	Caltrans, District 1	Structure Construction
Tom Phillips	Caltrans, District 1	Roadway Design
Andre Guimaraes	Caltrans, District 1	Roadway Design
Kevin Waxman	Caltrans, District 1	Right of Way
Paul Hailey	Caltrans, District 1	Traffic Ops
Christine Lan	Caltrans, District 1	Environmental
Jennifer Olah	Caltrans, North Region	Environmental

### Key Project Contacts

Name	Organization	Title
Charlie Fielder	Caltrans, District 1	District Director
Sebastian Cohen	Caltrans, District 1	Project Manager - Salmon Creek Bridge
Frank Demling	Caltrans, District 1	Project Manager - Albion River Bridge

<b>Name</b>	<b>Organization</b>	<b>Title</b>
Liza Walker	Caltrans, Northern Region	Environmental
Adele Pommerenck	Caltrans, Northern Region	Environmental
Dana York Walker	Caltrans	Environmental (Salmon Creek PDT/Albion River Bridge VA)
Kevin Espinoza	Caltrans, Northern Region	North Region VA Coordinator

# **VALUE ANALYSIS ALTERNATIVES**

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The results of this study are presented as individual alternatives to the baseline concept. Each alternative consists of a summary of the baseline concept, a description of the suggested change, a listing of its advantages and disadvantages, a cost comparison, change in performance and value, discussion of schedule and risk impacts (if applicable), and a brief narrative comparing the baseline concept with the alternative concept. (Please refer to the *Project Analysis* section of this report for an explanation of how the performance attributes and value are calculated.) Sketches, calculations, and performance attribute ratings are also presented where applicable. The cost comparisons reflect a comparable level of detail as in the baseline estimate. A life-cycle benefit-cost analysis for major alternatives is included where appropriate.

The VA alternative documents in this section are presented as written by the team during the VA study. While they may have been edited from the *Preliminary VA Study Report* to correct errors or better clarify the alternatives, they have not been edited to reflect the implementation dispositions, presented on the Implementation Action forms. These forms can be found following the Summary of Performance Improvements.

## PROPOSED VA ALTERNATIVES

### *Salmon Creek Bridge Replacement Project*

Alternative No. and Description	Initial Cost Savings	LCC Savings	Change in Schedule	Change in Performance	Change in Value
<b>1.1</b> Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners	(\$100,000)	\$0	No change	+16 %	+16 %
<b>1.2</b> Add a belvedere to the bridge	(\$60,000)	\$0	No change	+2 %	+1 %
<b>2.0</b> Fill in the coastal trail between the two bridges	(\$100,000)	\$0	No change	+16 %	+16 %
<b>3.0</b> Flatten the profile slopes at Salmon Creek to balance earthwork	\$210,000	\$0	No change	+7 %	+8 %
<b>4.1</b> Retrofit, widen, and rehabilitate the existing Salmon Creek bridge	(\$50,000)	(\$32,394,000)	+0.5 year	-29 %	-38 %
<b>4.2</b> Build on existing centerline using a detour that uses existing roads/detour	(\$8,620,000)	\$0	+1 year	-36 %	-51 %
<b>4.3</b> Build on-alignment (east) carrying two lanes of traffic and pedestrians	(\$7,600,000)	\$0	+2 years	-1 %	-32%

### ***Albion River Bridge Replacement Project***

<b>Alternative No. and Description</b>	<b>Initial Cost Savings</b>	<b>LCC Savings</b>	<b>Change in Schedule</b>	<b>Change in Performance</b>	<b>Change in Value</b>
<b>5.1</b> Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners	(\$100,000)	\$0	No change	+17 %	+16 %
<b>5.2</b> Add vista point for northbound lanes; incorporate north side abutment and portion of deck	(\$340,000)	(\$604,000)	No change	+7 %	+7 %
<b>5.3</b> Add belvederes to the bridge	(\$130,000)	\$0	No change	+4 %	+4 %
<b>5.4</b> Use the existing Albion River Bridge for non-motorist use and narrow the width of new bridge	(\$2,490,000)	\$0	No change	+9 %	+6 %
<b>6.0</b> Fill in the coastal trail between the two bridges	(\$100,000)	\$0	No change	+17 %	+16 %
<b>7.0</b> Purchase the RV park in lieu of paying for temporary construction easement	(\$900,000)	\$0	No change	+5 %	+4 %
<b>8.0</b> Improve stopping sight distance at the north end of the Albion Bridge project	\$0	\$0	No change	+2 %	+2 %
<b>9.1</b> Retrofit, widen, and rehabilitate the existing Albion Bridge	(\$1,830,000)	(\$14,332,000)	+0.5 year	-30 %	-38 %
<b>9.2</b> Build on existing centerline using a detour that uses existing roads/detour	(\$7,600,000)	\$0	+1 year	-30 %	-45 %
<b>9.3</b> Build on-alignment (west) carrying two lanes of traffic and pedestrians	(\$19,150,000)	\$0	-2 years	-1 %	-38 %

## OTHER CONSIDERATIONS

The VA team identified the following observations and design suggestions, relatively general in nature, for consideration by the Project Development Team (PDT).

### ***Idea FM-2: Albion & Salmon: Provide maintenance pullout areas at the ends of the bridges***

Maintenance pullouts allow for convenient access to the bridges by maintenance crews without the need for lane closures. Maintenance pullouts also serve as informal turnouts for slow-moving vehicles and safer parking for disabled vehicles as opposed to the surrounding narrow shoulders. These pullouts can be unpaved so as not to increase the impervious surface.

#### **EXAMPLE LOCATION OF POSSIBLE PULLOUT**



***Idea FM-3: Consider Type 80 concrete barrier in lieu of steel rails***

Consider the following advantages/disadvantages related to the Type 80 concrete barrier as compared to steel rails:

- Type 80 concrete barrier requires steel bicycle railing, so there is still going to be steel (possible rust issues) on the bridge EOD.
- Type 80 concrete barrier will take longer to form, place, and perform surface finish as compared to merely installing the steel railing... and then the steel bicycle railing must be installed.
- Type 80 concrete barriers have fewer openings as compared to the open steel railing.
- Consider consistency with other bridges in the area.

*Preliminary Report Review Comments:* Steel railing takes significant time due to fit-up

***Idea FM-5: Type 80 concrete barrier with timber architectural treatment***

Consider the following issues related to using Type 80 concrete barrier with timber architectural treatment:

- Many varieties of architectural treatment have previously been employed (the local community may in fact want something besides wood grain).
- Requires additional effort and expense over plain surface finish.

***Idea FM-8: Consider a bridge sacrificial wearing surface***

Consider the following options for the sacrificial wearing surface (extra cover):

- Portland cement concrete
- Polyester concrete

It is undesirable to use asphalt surfacing on concrete bridge decks, as it tends to retain water in contact with the concrete due primarily to sporadic adhesion of the asphalt to the concrete. Water infiltrates into the concrete deck and commences corroding the reinforcement. Proximity to salt water requires use of epoxy-coated reinforcement and high cement content in all exposed concrete elements. Additional “cover” on the wearing surface may be the best alternative, as it does not introduce other materials which may require special handling and, therefore, higher expense. Also in favor of a bit of extra cover is the fact that it can be incorporated into the deck placement with no additional operations or procedures required.

*Preliminary Report Review Comments:* However, it should be noted that there are concerns related to the prevention of visual inspection of the bridge deck as the extra cover could allow significant corrosion deterioration to occur without detection.

**Idea FM-10: Reconfigure the Salmon Creek Bridge drain system**

Consider changing the profile to allow deck drains over the embankment. See the following calculations.

STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION  
**QUANTITY CALCULATIONS**  
 DC-CEM-4801 (OLD HC-52 REV. 11/92)7541-3520-0

SHEET 1 OF     

JOB STAMP <i>Salmon Creek</i>	ITEM <i>Drain System</i>	FILE NO.
LOCATION <i>Bridge Deck</i>	SEGREGATION <input type="checkbox"/> YES <input type="checkbox"/> NO	DATE <i>9 JUL 13</i>
CALC. BY <i>Gary Woodard</i>	CHK. BY	DATE

Find low point on the bridge  
 Existing on Tangent Section - NO Horizontal Curve  
 1000' VC  
 BVC EVC

	- .07	+ .031
	35+14.84	45+14.84
	154.95'	135.45'

$$r = (.031 - -.07) / 1000$$

$$r = .101 / 1000$$

$$r = .000101$$

$$y = y_0 + g_1 x + \frac{1}{2} r x^2$$

low point at zero slope

$$y' = g_1 + r x$$

set  $y' = 0$

$$0 = -.07 + .000101 x$$

$$.07 = .000101 x$$

$$x = .07 / .000101$$

$$x = 693.07'$$

$$35+14.84 + 693.07 = \underline{\underline{STA 42+07.91}}$$

BB 37+50.00 (one proposed new alternative)

$$42+07.91 - 3750 = 457.91$$

POSTED BY \_\_\_\_\_ DATE \_\_\_\_\_ POSTED TO \_\_\_\_\_

Low Point on bridge directly above creek channel

## QUANTITY CALCULATIONS

DC-CEM-4801 (OLD HC-52 REV. 11/92)7541-3520-0

SHEET 2 OF

JOB STAMP Salmon Creek	ITEM Drain System	FILE NO.
	LOCATION Bridge Deck	SEGREGATION <input type="checkbox"/> YES <input type="checkbox"/> NO
	CALC. BY Gary Woodard	DATE 9 JUL 13
	CHK. BY	DATE

Find low point on Salmon Creek Bridge using revised profile.

USE BVC & EVC from sheet 1 as PVI's.

Grade between PVI's

	PVI <sub>1</sub>	PVI <sub>2</sub>
STA	35+14.84	45+14.84
ELEV	154.95	135.45

"rise over run"

$$(135.45 - 154.95) / (45+14.84 - 35+14.84) = -.0195$$

VC<sub>1</sub>

$$g_1 = .07$$

$$g_2 = -.0195$$

Length of curve given as "100"

$$-.0195 - .07 = .0505 \text{ or } 505 \text{ feet}$$

BVC,  $\equiv$  PVI<sub>1</sub> -  $\frac{1}{2}$  expressed as STATION

$$BVC = 35+14.84 - 505/2 \quad \text{EVC: } 40+19.84$$

$$STA \text{ BVC} = 32+62.34$$

$$STA \text{ EVC} = 37+67.34$$

Elevation at BVC,

$$y = y_0 + mx$$

$$y = 154.95 + (.07)(505/2) = 172.625$$

POSTED BY

DATE

POSTED TO

Elevation at EVC,  $y = 154.95 - (.0195)(505/2)$   
 $y = 150.03$

## QUANTITY CALCULATIONS

DC-CEM-4801 (OLD HC-52 REV. 11/92/7541-3520-0)

SHEET 3 OF

JOB/STAMP Salmon Creek	ITEM Drain System	FILE NO.
	LOCATION Bridge Decks	SEGREGATION <input type="checkbox"/> YES <input type="checkbox"/> NO
	CALC. BY Gay Woodard	DATE 9 JUL 13
	CHK. BY	DATE

VC<sub>2</sub>

$g_1 = -.0195$        $g_2 = +.031$

$\Delta g = .031 - -.0195 = .0505$

"10V" parameter  $\rightarrow$  length of curve 505'

BVC<sub>2</sub>       $45+14.84 - 505/2 = 42+62.34$

EVC<sub>2</sub>       $45+14.84 + 505/2 = 47+67.34$

Elevation at BVC<sub>2</sub>

$y = y_0 + g x$

$y = 135.45 + .0195(505/2)$

$y = 140.37'$

Sag VC

$y = y_0 + g_1 x + \frac{1}{2} r x^2$

low point at  $y' = 0$

$y' = g_1 + r x$

$0 = -.0195 + \left[ \frac{.031 - -.0195}{505} \right] x$

$.0195 / .0001 = x$

$x = 195' \rightarrow$  STA 44+57.34

with revised profile, low point on deck

POSTED BY is over the north bank. POSTED TO

Constant Grade from Evc<sub>2</sub> to Bvc<sub>2</sub>40+19.84  $\rightarrow$  42+62.34

JOB STAMP  
 Salmon Creek

ITEM	Elevation Change	FILE NO.
LOCATION	Bridge Deck	SEGREGATION <input type="checkbox"/> YES <input type="checkbox"/> NO
CALC BY	Gary Woodard	DATE
CHK BY		DATE

Existing low point on deck

STA 42+07.91

ELEV

$$y = y_0 + g_1x + \frac{1}{2}rx^2$$

$$y = 154.95 - .07(693.07) + \frac{1}{2}(.000101)693.07^2$$

$$y = 154.95 - 48.51 + 24.26$$

$$y = 130.70'$$

Revised Profile, low point on deck

BVC<sub>2</sub> ELEV aka "y<sub>0</sub>" : 140.37

$$y = y_0 + g_1x + \frac{1}{2}rx^2$$

$$y = 140.37 - .0195(195) + \frac{1}{2}(.0001)195^2$$

$$y = 140.37 - 3.80 + 1.90$$

$$y = 138.47$$

Revised Profile raises the low point and shifts it northward.

'New' elevation at low point on existing bridge using revised VCs :

$$y = y_0 + mx$$

$$y = 150.03 - .0195(4207.91 - 4019.74)$$

$$y = 150.03 - 3.67$$

$$y = 146.36$$

POSTED BY

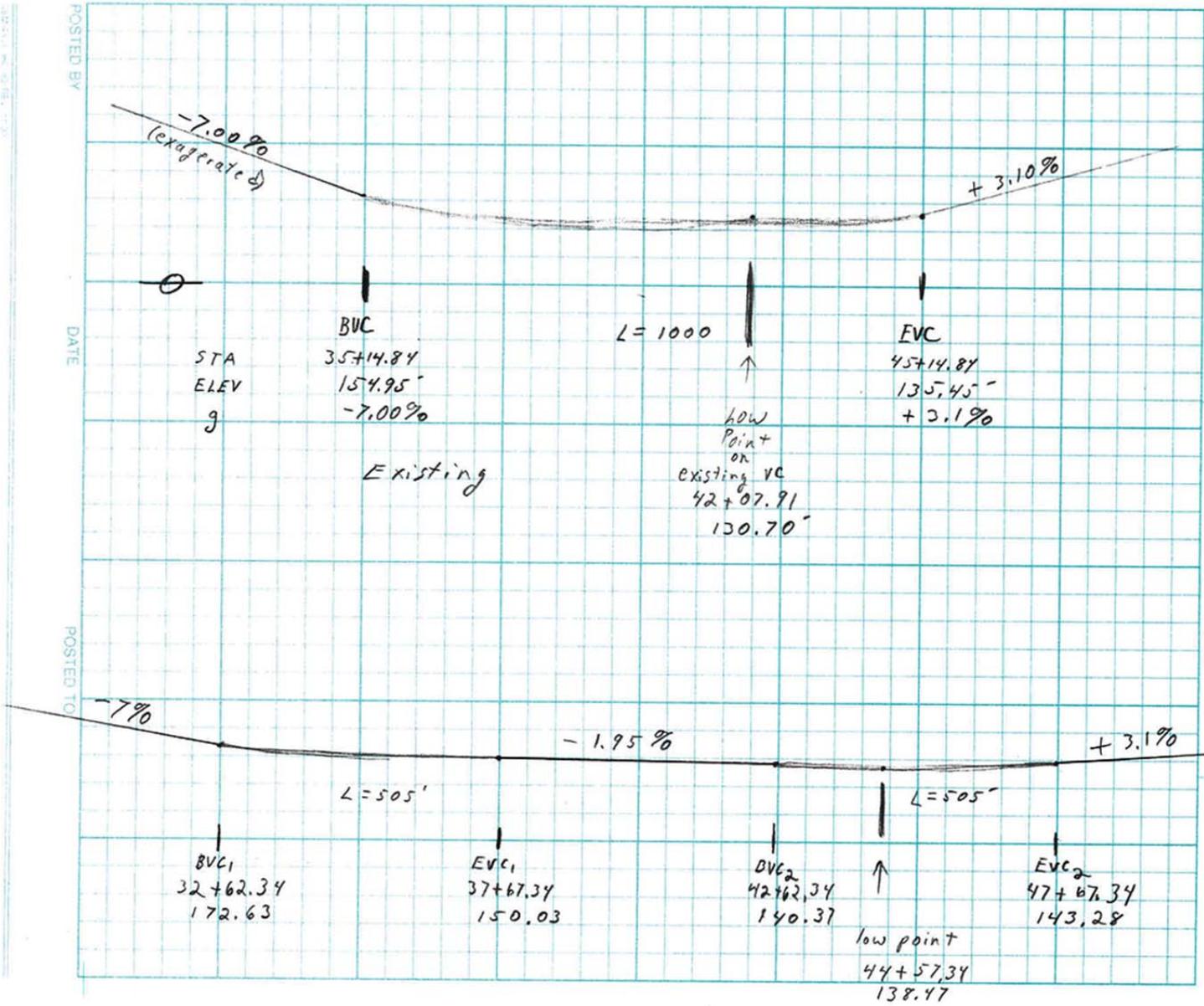
DATE

POSTED TO

$$\Delta EL \quad 146.36 - 130.70 = 15.66'$$

Salmon Creek Bridge

JOB STAMP  
 ITEM: Proposed Revised Profile  
 LOCATION: Station  
 CALC BY: Gary Woodard  
 CHECK BY: [blank]  
 FILE NO.: 1 OF  
 SEGREGATION:  YES  NO  
 DATE: 9 JUL 13



***Idea MACOID-2: Reuse Albion River Bridge's existing steel truss section***

This topic requires the following considerations:

- Dismounting it from its current position will require heavy-lift capacity, either a very large crane(s) or a purpose-built 'elevator' system.
- Considering the condition of the steel truss section and the fact that it is being replaced in part due to degradation and section loss, what might be the State's liability if it was allowed to be used elsewhere?
- Every member would have to be checked for fractures, which is time-consuming and possibly expensive; if many defects are revealed, it would be unusable.
- Sell it for scrap and let the buyer remove it. That might work at Salmon Creek Bridge as well.

***Idea MBI-2: Albion & Salmon: Incorporate bat houses to the underside of the bridge***

If appropriate, bat houses could be utilized as a mitigation measure for the Albion River and Salmon Creek Bridge projects. Further studies are needed to determine if bats are utilizing the Albion River and Salmon Creek Bridges (bats have not been found on the Albion Bridge), and if found, which species of bats are present and what type of roost is present at the bridge(s). If bats are using these bridges, habitat would be lost both temporarily during construction and permanently (depending on the bridge design chosen). If appropriate, constructing bat houses could help to minimize these impacts.

*Preliminary Report Review Comments: Do not recommend bat houses on the Albion River Bridge as beach area below is open to the public.*

***Ideas MBI-3, MBI-4, and MBI-5: Albion & Salmon: Early identification of mitigation properties***

Clearing mitigation properties during PA&ED would minimize potential schedule delays later on in the project schedule. These properties/mitigation strategies could also be discussed with the appropriate resource agencies earlier in the process, further minimizing potential project delays. Further studies are needed to determine the mitigation needs of these projects, and what properties/mitigation strategies would be appropriate.

***Idea MBI-7: Identify right of way for detention basins in the PA&ED***

Conduct early coordination with Stormwater/Water Quality staff to determine the appropriate water quality BMPs, both temporary and permanent. If areas potentially to be used for water treatment (swales, ditches, etc.) are studied by Environmental during PA&ED, project delays later on in the schedule could be avoided, or at least minimized.

***Ideas MVA-1, MVA-2, MVA-3: Albion Navigation Channel requirements***

Identify the navigational channel and the vertical clearance required based on the requirement of the largest vessel using the river to specify the construction phase vertical clearance requirements and permanent vertical clearance in consultation with the U.S. Coast Guard.

*Preliminary Report Review Comments: Albion River Bridge is of specific concern; however, Salmon Creek Bridge is also under Coast Guard authority.*

***Idea MVI-2: Albion Bridge lighting***

Consider adding decorative lighting and sidewalk lighting on this bridge.

***Idea MVI-3: Albion & Salmon: Distinguish the shoulder from travel way***

Consider colorizing the concrete where appropriate to distinguish the travel lane and shoulders.

***Ideas MVI-4, SW-18: Salmon & Albion: Texture treatments***

Consider adding texture treatments that represent the relevant community/nature/historical features at each location. Also, at the Albion Bridge, consider providing architectural treatment that references the old bridge on the CIP box bridge.

***Idea MVA-4: In-water work windows***

Ensure that the in-water work windows are well represented in the construction schedule and have consideration for the Advertisement/Award dates.

### Risk Identification List and Mitigation Strategies

Risk No.	Type	Risk Category	Risk Name	Risk Description	Probability	Impact	Risk Response Strategy(s)
1	Threat	Environmental	Coastal Development Permit Approval	The Coastal Commission may not accept any of the salient features of the project: Shoulder Width, alignment, bridge rail, biological mitigation plan. This may expand to other, related permitting agencies, cities. This may cause project delays and increased mitigation costs. This generally happens post-PA&ED, generally just prior to RTL. Redesign is usually the impact of this risk. Additional public input may be required.	Very High	High Schedule/ Moderate Costs	Include a Community Advisory Board and include the Community Signature Line on the Coastal Commission permit application/plans sets.
2	Threat	Design	Community Opposition	The community input may cause additional design options to be vetted and developed to the extent that it delays the PA&ED approval. In the worst case, this could lead to lawsuits. This is mostly applicable to the Albion River Bridge.	Moderate	Low	Develop a collaborative approach with the Community: <ol style="list-style-type: none"> <li>1. Community Advisory Board.</li> <li>2. Develop project newsletter.</li> <li>3. Carry out design workshops with the community to build consensus.</li> <li>4. Build models to showcase and allow the community to understand.</li> <li>5. Be proactive.</li> <li>6. Don't personalize the project.</li> </ol>
3	Threat	Design	Right-of-Way Approval	There is a risk that non-compliant property owners request a CTC hearing that would delay or change the right-of-way approval. Albion Bridge has the greater risk impact.	Low	Moderate Schedule Delay	Accept this risk.
4	Threat	Design	Funding Window	There is a risk that the funding window is not met in the 4-year SHOPP funding cycle in the [assume] 2015/2016 fiscal year (end of the fiscal year is June 30). This risk has greatest application to Albion (due to PA&ED and ROW process).	Moderate	Moderate	Update the schedule that is reasonable and doable that identifies the correct resources to complete the project on time. Prioritize work to keep the projects on track.
5	Threat	Design	Traffic Corridor Delay	There is a risk that the corridor delay (Highway 128 to Highway 20) could impact the project. This works in combination with other projects – it might require that this project be delayed in order to comply.	Low	Low	<ol style="list-style-type: none"> <li>1. Consider offline alternatives and carry two lanes of traffic for peak hour timeframes.</li> <li>2. Carry out a community outreach to inform of the impacts to traffic (radio broadcasts, CMS, HAR, etc.).</li> <li>3. Have management review the award and duration of the various projects to avoid the corridor traffic delay.</li> </ol>
6	Threat	Design	Adequate ROW Acquisition Time	The timeframe from the PA&ED/geometric approval to the beginning of ROW negotiation/acquisition will be very tight and will make finalizing ROW very difficult to achieve. For example, property impact delays are already being experienced for the environmental studies (access is being denied). Applies mostly to Albion River Bridge.	High	High Schedule Impacts	<ol style="list-style-type: none"> <li>1. Albion &amp; Salmon: Maintain a window between Approval of PA&amp;ED and ROW certification as estimated in the Right of Way Data Sheet.</li> <li>2. Albion &amp; Salmon: Use third party ROW agents to balance workload on District 1 ROW agents.</li> <li>3. Albion &amp; Salmon: Carry out an advance ROW appraisal of key properties (Appraisal At-Risk).</li> </ol>

Risk No.	Type	Risk Category	Risk Name	Risk Description	Probability	Impact	Risk Response Strategy(s)
7	Threat	Design	Environmental Document Approval Delay	The time to complete the PA&ED is very tight; the compressed schedule to complete the necessary assessments may cause a delay to the deliver the project. Applies mostly to Albion Bridge.	Low Salmon Creek/ Moderate Albion	High Schedule Impacts	Albion & Salmon: Carry out constant and early coordination with the regulatory agencies for the review of the technical studies.
8	Threat	Construction	Threatened Species Construction Windows	There is a risk that the current working days scheduled for these projects will be impacted by the construction windows imposed by threatened species: Fish spawning, migratory birds, bats, etc. Applies equally to Albion River and Salmon Creek.	High	Moderate	<ol style="list-style-type: none"> <li>1. Albion &amp; Salmon: Ensure that the construction schedule represents the presence of all the relevant species works windows.</li> <li>2. Albion &amp; Salmon: Consider award dates that minimize the impacts to the project schedules associated with these threatened-species work windows.</li> </ol>
9	Threat	Construction	Construction Duration/Completion	There is risk that the two-year and three-year construction duration is not doable for Salmon Creek and Albion River Bridges, respectively. There are claims and delays associated with this risk.	Low	Moderate	Albion & Salmon: See above risks that help the impact thereof.
10	Threat	Design	Community/Environmental Cost Impacts	The current estimates show approximately \$3.7 million (for both bridges) for Mitigation Acquisition and Credits. No specific funding is identified for Biological Mitigation.	Moderate	Moderate	Albion & Salmon: Identify mitigation costs and schedule impacts based on historic information. Identify sample/characteristic projects that can provide the historic information. Develop the mitigation costs associated with the various project alternatives.

## SUMMARY OF PERFORMANCE IMPROVEMENTS

The following information is required by the Caltrans HQ VA Program to enable reporting of performance to the FHWA. Only the six standard Caltrans performance attributes, shown in the table below, are to be documented. Caltrans does not require reporting of the performance of any other attributes utilized in this study.

### Summary of Proposed VA Alternative Performance Improvements

<b>Alt. No.</b>	<b>Mainline Operations</b>	<b>Local Operations</b>	<b>Maintainability</b>	<b>Environmental Impacts</b>	<b>Construction Impacts</b>	<b>Project Schedule</b>
1.1				Improved		
1.2				Improved		
2.0				Improved		
3.0				Improved		
4.1						
4.2						
4.3						
5.1				Improved		
5.2				Improved		
5.3				Improved		
5.4				Improved	Improved	
6.0				Improved		
7.0				Improved	Improved	
8.0			Improved			
9.1						
9.2						
9.3						Improved

## Summary of Accepted VA Alternative Performance Improvements

<b>Alt. No.</b>	<b><i>Mainline Operations</i></b>	<b><i>Local Operations</i></b>	<b><i>Maintainability</i></b>	<b><i>Environmental Impacts</i></b>	<b><i>Construction Impacts</i></b>	<b><i>Project Schedule</i></b>
2.0				Improved		
3.0				Improved		
6.0				Improved		
8.0			Improved			

## VA ALTERNATIVE 1.1 (SALMON CREEK BRIDGE)

**Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners**

---

<b>Initial Cost Savings:</b>	(\$100,000)
<b>LCC Savings:</b>	\$0
<b>Change in Schedule:</b>	No change
<b>Performance Change:</b>	+16 %
<b>Value Change:</b>	+16 %

**Description of Baseline Concept:** There are no plans for a community path through the Albion Headlands.

**Description of Alternative Concept:** Identify a third party to maintain a coastal trail. Negotiate easement from landowners for public access from Highway 1 to the coast within the boundaries of the Albion Headlands.

### **Advantages:**

- Community support for project
- Garners support from the Coastal Commission
- Provides a mitigation strategy to enhance coastal access – a Coastal Commission objective

### **Disadvantages:**

- Additional investment in project
- Additional Environmental Study Limits (ESL)
- Increases landowner negotiation requirements

**Discussion:** This concept would only be viable if a third party were to participate as the owner/manager, and this may entail an endowment to that party. This third party, for example, could be the Mendocino Land Trust or local public agencies. The Albion Headlands owners have interest in developing the land. The additional trail suggested in this VA alternative may be seen as a benefit to the community and the landowners. This strategy should be presented as a mitigation strategy to improve coastal access for both bridges.

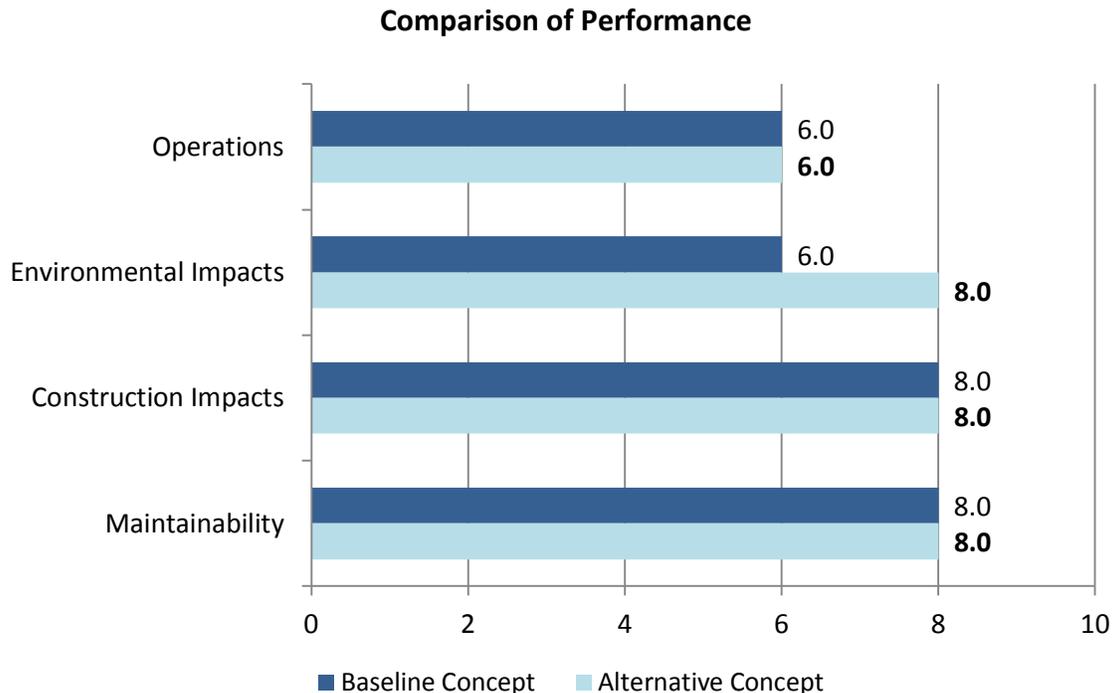
**Technical Review Comments:** The technical reviewers agree that collaborating with the local community and anticipating the Coastal Commission amenities improves the Environmental Document process.

**Project Management Considerations:** The costs established are rough and should be verified. Also investigate if an endowment would make this option more viable.

**Discussion of Schedule Impacts:** No impact.

## VA ALTERNATIVE 1.1 (SALMON CREEK BRIDGE)

Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners



### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	The addition of this amenity will improve the recreational value of the Albion community, enhancing socio-economic conditions via tourism. The coastal access enhancement is a typical objective of the Coastal Commission.
Operations	No change from the baseline concept, PSR Alternative 2B.
Maintainability	No change in the project's maintainability in that the third party would maintain the path.
Construction Impacts	No change from the baseline concept, PSR Alternative 2B.

## VA ALTERNATIVE 1.1 (SALMON CREEK BRIDGE)

Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners

VA Alternative Concept Sketch



### Assumptions and Calculations:

- Assumed land value is \$65,000/acre. The assumed trail area is assumed half acre.
- Assume Trail Grading requires 3,500 LF at \$15/LF.
- Assume Trail Signing, Misc. Amenities = \$60,000 cost.

The costs indicated above are for the full trail system. Assume that half of the above costs of providing the trail are apportioned between the Salmon Creek and Albion River Bridge Replacement Projects.

## VA ALTERNATIVE 1.1 (SALMON CREEK BRIDGE)

Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners

### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>ROADWAY ITEMS</b>							
Trail Grading (Apportioned in Halves)	LF			\$ -	1,750	\$ 15	\$ 26,250
Trail Signing, Misc Amenties (Apportioned in Halves)	LS			\$ -	0.5	\$ 60,000	\$ 30,000
				\$ -			\$ -
<b>ROADWAY SUBTOTAL</b>				\$ -			\$ 56,250
<b>ROADWAY MARK-UP</b>	49.0%			\$ -			\$ 27,563
<b>ROADWAY TOTAL</b>				\$ -			\$ 83,813
<b>RIGHT-OF-WAY ITEMS</b>							
Right-of-Way Acquisition	ACRE			\$ -	0.3	\$ 65,000	\$ 16,250
<b>RIGHT-OF-WAY TOTAL</b>				\$ -			\$ 16,250
<b>TOTAL</b>				\$0			\$100,063
<b>TOTAL (Rounded)</b>				\$0			\$100,000
						<b>SAVINGS</b>	<b>(\$100,000)</b>

## VA ALTERNATIVE 1.2 (SALMON CREEK BRIDGE)

### Add a belvedere to the bridge

---

<b>Initial Cost Savings:</b>	(\$60,000)
<b>LCC Savings:</b>	\$0
<b>Change in Schedule:</b>	No change
<b>Performance Change:</b>	+2 %
<b>Value Change:</b>	+1 %

**Description of Baseline Concept:** The proposed design does include pedestrian pathways, but does not include belvederes.

**Description of Alternative Concept:** Add a belvedere near the middle of the proposed bridge. The Salmon Creek Bridge belvedere would be located along the southbound pedestrian pathway.

#### Advantages:

- Enhances the use of the pedestrian pathway
- Promotes the viewscape available on the bridges
- Encourages community support of the baseline alternative
- Possible California Coastal Commission mitigation measure
- Can be interpreted as a mitigation measure for the loss of the old bridge
- Provides an opportunity to have community kiosks/interpretive signs/community information for pedestrians

#### Disadvantages:

- Increases costs
- Diminishes the clean profile line of the bridge
- Noise and wind may discourage the use of the belvedere

**Discussion:** This is one of several alternatives that can be considered as a mitigation measure for the removal of the existing bridge. Both bridges, the Albion River and the Salmon Creek, have community identities. The replacement of the bridges proposed in the baseline concepts impact the community. (It should be noted that the community significance of the existing Salmon Creek Bridge is not as compelling as that of the Albion River Bridge.)

**Technical Review Comments:** The technical reviewers agree that collaborating with the local community and anticipating the Coastal Commission amenities improves the Environmental Document process.

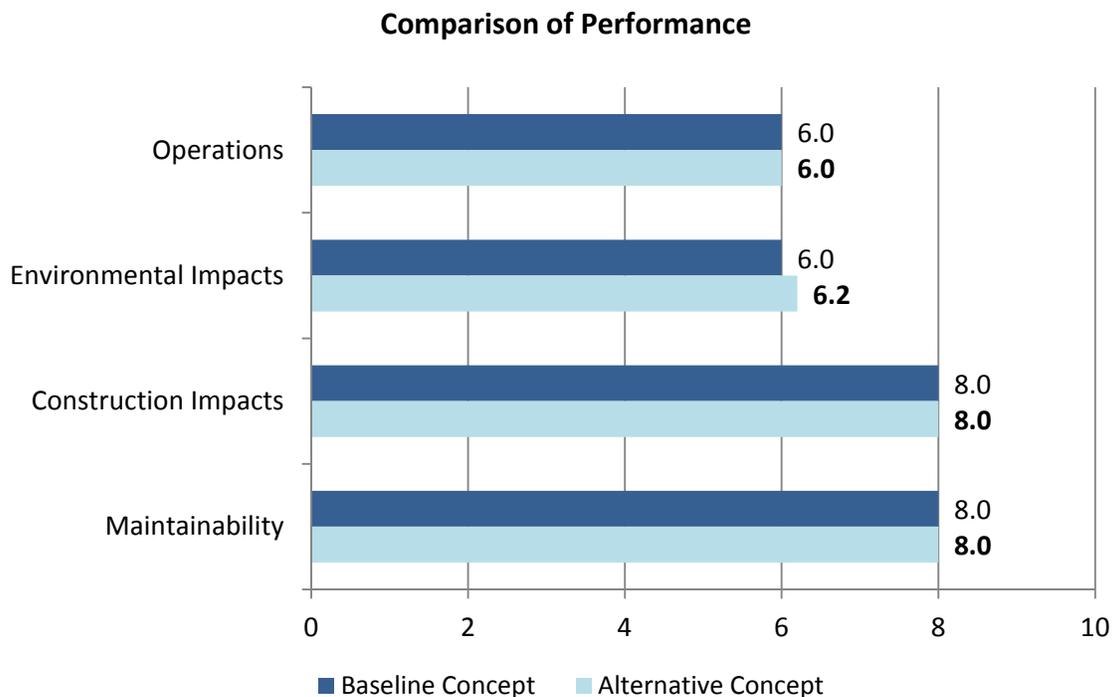
**Project Management Considerations:** Consider this option with other viewscape enhancements.

**Discussion of Schedule Impacts:** No change to the project schedule is anticipated.

**Discussion of Risk Impacts:** No significant secondary risks associated with this VA alternative.

## VA ALTERNATIVE 1.2 (SALMON CREEK BRIDGE)

### Add a belvedere to the bridge



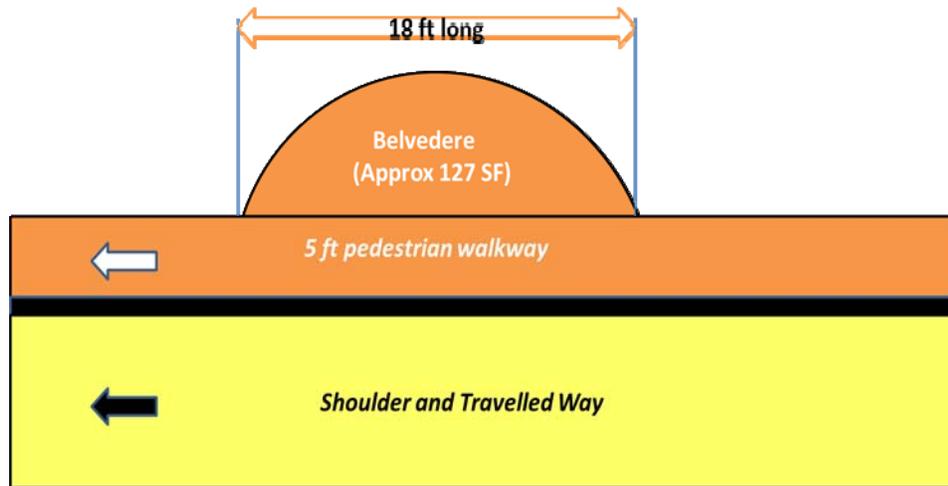
### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	This feature improves the scenic value inherent in this location and increase the community value provided in the proposed bridge replacement designs. (A belvedere at this location has less value than at the Albion River Bridge.)
Operations	No change from the baseline concept, PSR Alternative 2B.
Maintainability	No significant change from the baseline concept, PSR Alternative 2B.
Construction Impacts	No change from the baseline concept, PSR Alternative 2B.

## VA ALTERNATIVE 1.2 (SALMON CREEK BRIDGE)

### Add a belvedere to the bridge

VA Alternative Concept Sketch



TYPICAL BELVEDERE LAYOUT

#### Assumptions and Calculations:

- The proposed size of the belvedere would be a half circle 18 feet in diameter.
- One belvedere at 127 SF would be located near the middle span of the bridge along the southbound direction on the bridge.

#### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>STRUCTURE ITEMS</b>							
Salmon Creek Belvedere (SB)	SF			\$ -	127	\$ 500	\$ 63,500
				\$ -			\$ -
<b>STRUCTURE SUBTOTAL</b>				\$ -			\$ 63,500
<b>STRUCTURE MARK-UP (included above)</b>				\$ -			\$ -
<b>STRUCTURE TOTAL</b>				\$ -			\$ 63,500
<b>TOTAL</b>							\$63,500
<b>TOTAL (Rounded)</b>							\$60,000
						<b>SAVINGS</b>	<b>(\$60,000)</b>

## VA ALTERNATIVE 2.0 (SALMON CREEK BRIDGE)

### Fill in the coastal trail between the two bridges

---

<b>Initial Cost Savings:</b>	(\$100,000)
<b>LCC Savings:</b>	\$0
<b>Change in Schedule:</b>	No change
<b>Performance Change:</b>	+16 %
<b>Value Change:</b>	+16 %

**Description of Baseline Concept:** The current bridge projects provide pedestrian access on the bridge, but not off the bridges.

**Description of Alternative Concept:** This concept would connect the pedestrian paths on the bridges with a trail in between. Placing it on the west side would be more logical as the pedestrian path on Salmon Creek Bridge is only on the west side (has views to the ocean). This trail could become part of the California Coastal Trail system. Identify the responsible entity to take ownership of the operations and maintenance of the proposed trail.

#### **Advantages:**

- Supports the California Coastal Trail (fills in gaps)
- Anticipates the amenities to be requested by the California Coastal Commission

#### **Disadvantages:**

- Additional investment
- Increases the ESL

**Discussion:** The additional trail that could be recognized as part of the California Coastal Trail system suggested in this alternative may be seen as a benefit to the region. This alternative should be presented as a mitigation strategy in support of the Coastal Commission's mission statement.

**Technical Review Comments:** The technical reviewers agree that collaborating with the local community and anticipating the Coastal Commission amenities improves the Environmental Document process.

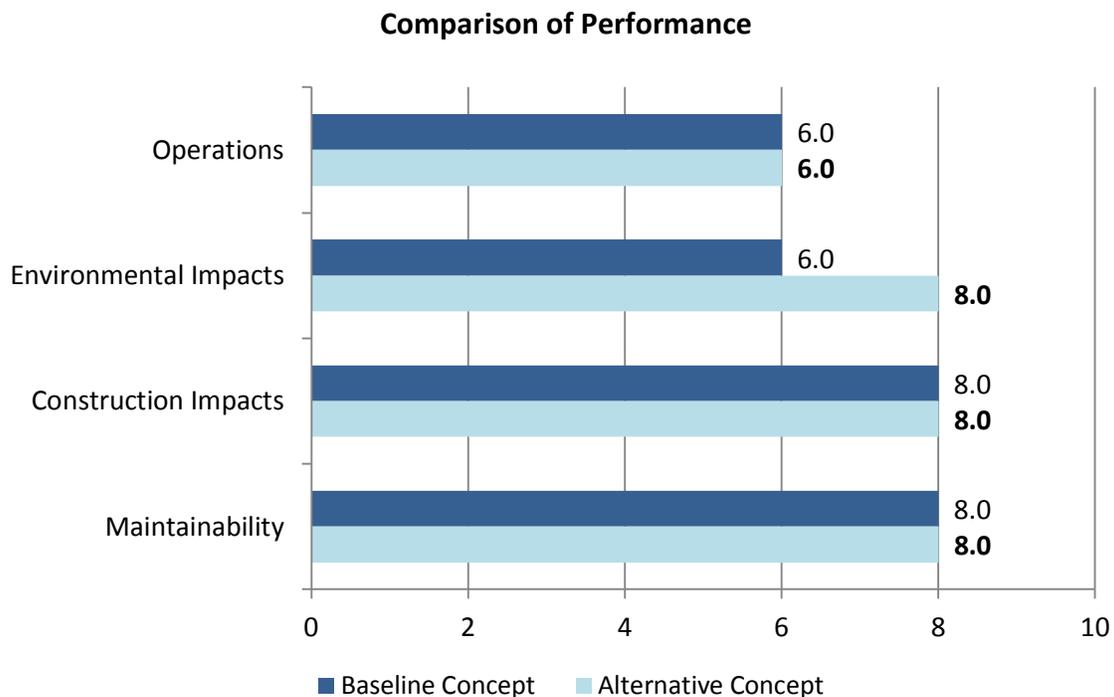
**Project Management Considerations:** Establish the following:

- Benefits in reducing the Environmental Document's schedule and effort,
- Discuss timing of presenting to the benefactors, and
- Review the possible funding requirements.

**Discussion of Schedule Impacts:** This alternative would reduce the pre-construction schedule. (Note, however, that the value metrics for this project only identifies construction schedule impacts.)

## VA ALTERNATIVE 2.0 (SALMON CREEK BRIDGE)

### Fill in the coastal trail between the two bridges



### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	The addition of this amenity will improve the recreational value of the Albion River/Salmon Creek community; potential to enhance the socio-economic regional conditions via tourism. The “filling in” of coastal trail gaps is an enhancement typically desired by the Coastal Commission.
Operations	No change from the baseline concept, PSR Alternative 2B.
Maintainability	The coastal trail is typically "adopted" by third parties; assumes that this will be the case on this alternative.
Construction Impacts	No change from the baseline concept, PSR Alternative 2B.

## VA ALTERNATIVE 2.0 (SALMON CREEK BRIDGE)

Fill in the coastal trail between the two bridges

### VA Alternative Concept Sketch



#### Assumptions and Calculations:

- 6,000 ft long at \$15/LF.
- \$60,000 for Misc. Amenities (signing, fencing, etc.).
- Assume half-acre of right of way required at \$100,000/acre.

#### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>ROADWAY ITEMS</b>							
Trail Grading	LF			\$ -	6,000	\$ 15	\$ 90,000
Trail Signing, Misc Amenities	LS			\$ -	1	\$ 60,000	\$ 60,000
				\$ -			\$ -
<b>ROADWAY SUBTOTAL</b>				\$ -			\$ 150,000
<b>ROADWAY MARK-UP</b>	49.0%			\$ -			\$ -
<b>ROADWAY TOTAL</b>				\$ -			\$ 150,000
<b>RIGHT-OF-WAY ITEMS</b>							
Right-of-Way Acquisition	AC			\$ -	0.5	\$ 100,000	\$ 50,000
				\$ -			\$ -
<b>RIGHT-OF-WAY TOTAL</b>				\$ -			\$ 50,000
<b>TOTAL</b>				\$0			\$200,000
<b>TOTAL (Rounded)</b>				\$0			\$200,000
						<b>TOTAL SAVINGS</b>	<b>(\$200,000)</b>
						<b>APPORTIONED SAVINGS (SALMON)</b>	<b>(\$100,000)</b>

## VA ALTERNATIVE 3.0 (SALMON CREEK BRIDGE)

### Flatten the profile slopes at Salmon Creek to balance the earthwork

---

<b>Initial Cost Savings:</b>	\$210,000
<b>LCC Savings:</b>	\$0
<b>Change in Schedule:</b>	No change
<b>Performance Change:</b>	+7 %
<b>Value Change:</b>	+8 %

**Description of Baseline Concept:** The existing profile of the baseline concept consisted of a -7% north slope and a +3% south slope. The length of the bridge is 700 feet. The current slopes do not conform to the Highway Design Manual (HDM) mandatory maximum slopes.

**Description of Alternative Concept:** The existing profile of the baseline concept consisted of a -5.0 % north slope and a +4.2 % south slope. Lengthening of the bridge by 100 feet is required to land the abutment near the original ground elevation; the south side of the bridge would receive the lengthening. The alternative slopes abide by the HDM mandatory maximum slopes.

#### **Advantages:**

- Reduces the amount of excavation, which reduces the volume of spoils
- Meets mandatory design standards for grade
- Reduces impacts to the natural environment (sensitive resources) near the location of the baseline concept's abutment area

#### **Disadvantages:**

- Additional costs
- Longer structure

**Discussion:** The HDM indicates that in rolling terrain, the maximum grade should be 5%. The baseline concept had +7% and -6% coming in/out of the sag over Salmon Creek. This alternative would bring the design into standards, lengthen the bridge and thereby balance the earthwork.

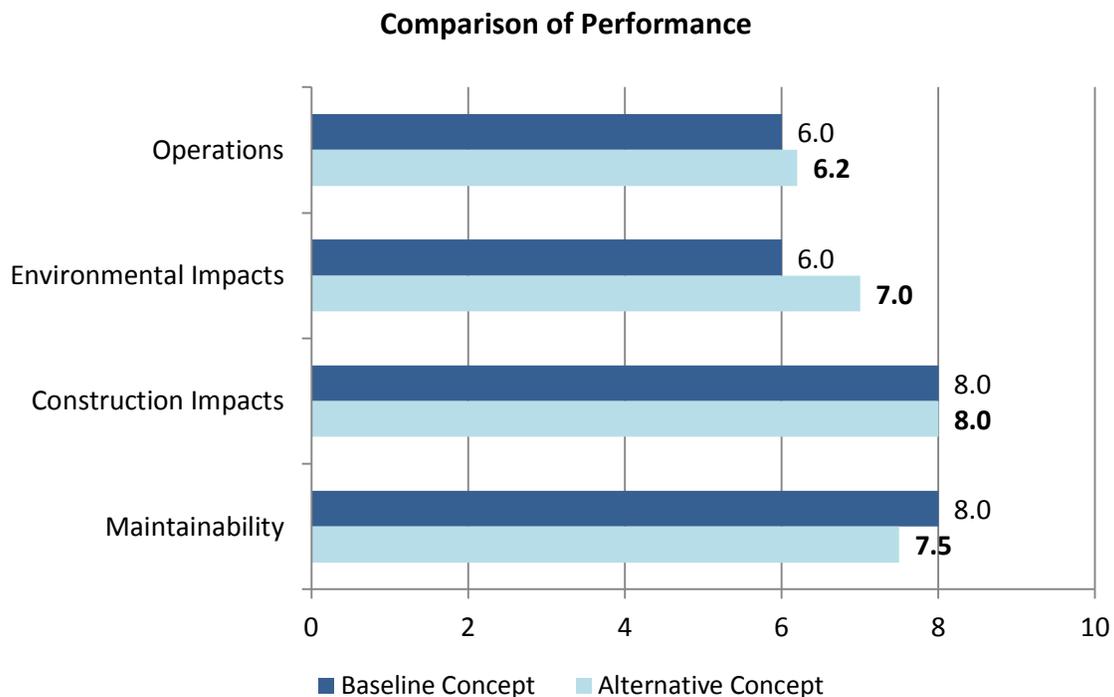
**Technical Review Comments:** None noted.

**Project Management Considerations:** Review, and if favorable, implement into the project concept.

**Discussion of Schedule Impacts:** No significant change in project schedule when implementing this VA alternative.

## VA ALTERNATIVE 3.0 (SALMON CREEK BRIDGE)

### Flatten the profile slopes at Salmon Creek to balance the earthwork



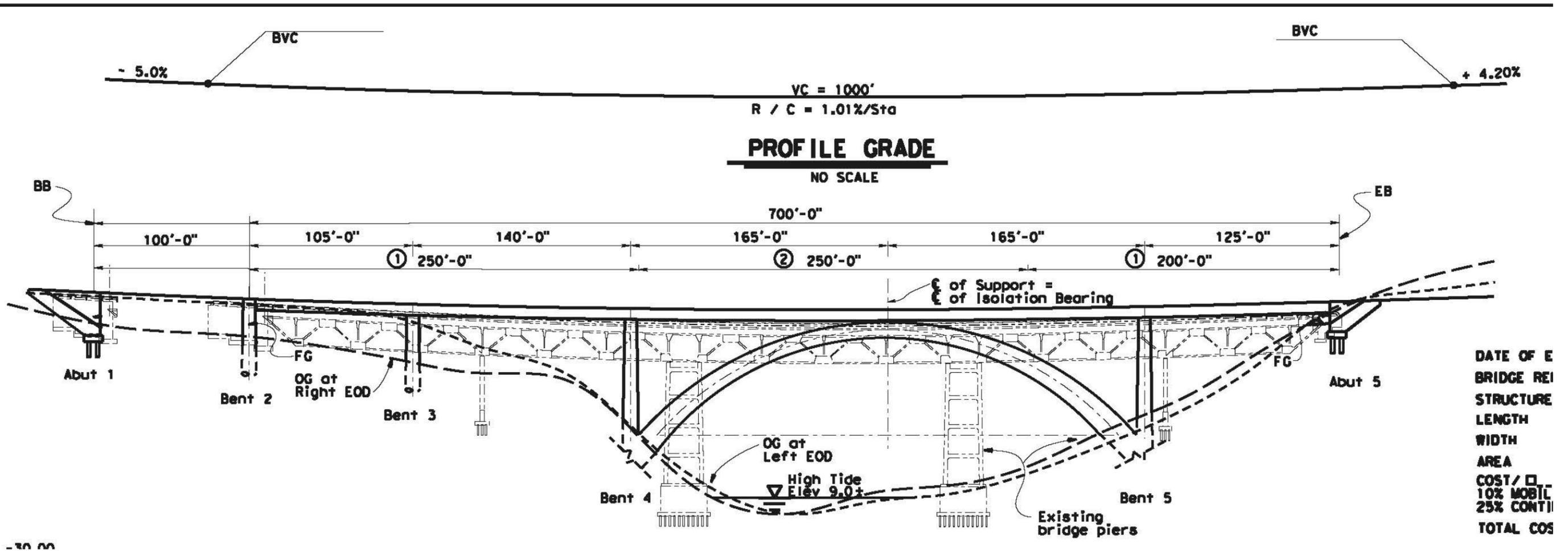
### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	Reduces the impacts of high value vegetation in the vicinity of the baseline concept's south abutment by moving the abutment further south.
Operations	Lower grades should reduce speed loss for heavy vehicles. Increases sag (headlight) stopping sight distance.
Maintainability	Nominally more deck area to maintain.
Construction Impacts	No change from the baseline concept, PSR Alternative 2B.

**VA ALTERNATIVE 3.0 (SALMON CREEK BRIDGE)**

Flatten the profile slopes at Salmon Creek to balance the earthwork

**Baseline Concept Sketch**



100

## VA ALTERNATIVE 3.0 (SALMON CREEK BRIDGE)

Flatten the profile slopes at Salmon Creek to balance the earthwork

### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>ROADWAY ITEMS</b>							
Increased Bridge Area	SF			\$ -	4,967	\$ 500	\$ 2,483,500
Imported Borrow	CY	175,000	\$ 30	\$ 5,250,000	87,500	\$ 30	\$ 2,625,000
				\$ -			\$ -
<b>ROADWAY SUBTOTAL</b>				\$ 5,250,000			\$ 5,108,500
<b>ROADWAY MARK-UP</b>	49.0%			\$ 2,572,500			\$ 2,503,165
<b>ROADWAY TOTAL</b>				\$ 7,822,500			\$ 7,611,665
<b>TOTAL</b>				\$7,822,500			\$7,611,665
<b>TOTAL (Rounded)</b>				\$7,820,000			\$7,610,000
						<b>SAVINGS</b>	<b>\$210,000</b>

## VA ALTERNATIVE 4.1 (SALMON CREEK BRIDGE)

### Retrofit, widen, and rehabilitate the existing Salmon Creek Bridge

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<b>Initial Cost Savings:</b>	(\$50,000)
<b>LCC Savings:</b>	(\$32,394,000)
<b>Change in Schedule:</b>	+0.5 year
<b>Performance Change:</b>	-29 %
<b>Value Change:</b>	-38 %

**Description of Baseline Concept:** PSR Alternative 2B consists of an arch with pre-stressed box superstructure, south approach spans 100 feet, and 150-foot RC box girder. There is a 350-foot concrete arch main span, north end approach 150-foot RC box girder. The roadbed consists of two 12-foot lanes and 8-foot shoulders, one 5-foot sidewalk, see-through type barriers, and a barrier between pedestrian and vehicle traffic.

**Description of Alternative Concept:** Widen and rehabilitate the existing structure to include the same widths as the baseline concept: 8-foot shoulders and one 5-foot sidewalk. Widen the superstructure with steel truss girders attached to existing truss. Replace the existing bridge deck with new deck and barriers. Leave in place the existing substructure elements. Support the existing bridge and widening on new piers. Widen existing abutments.

#### Advantages:

- Maintains existing alignment
- Maintains existing truss appearance
- Reduces right-of-way impacts
- Substructure work can be accomplished with minimal impacts to traffic

#### Disadvantages:

- Increases cost of construction
- Increases maintenance costs
- Does not meet maximum grade design standard
- No pedestrian access during Stage 1 construction of the deck
- One-lane traffic during construction of the deck - both stages
- High life-cycle costs
- Only defers full replacement of bridge
- High risk to scope, schedule, and cost creep if condition of bridge is worse than anticipated
- High risk during construction if actual condition of bridge proves repair to be unsafe
- Alignment unchanged and would be substandard
- Construction access on both sides of the bridge required

**Discussion:** This alternative investigates the cost, schedule, and performance impacts of a rehabilitated structure with same roadbed and non-motorized widths as the baseline concept.

**Technical Review Comments:** None noted.

**Project Management Considerations:** Review, and if favorable, implement into project concept under consideration to take forward into PA&ED. Perform a detailed life-cycle cost analysis (LCCA)

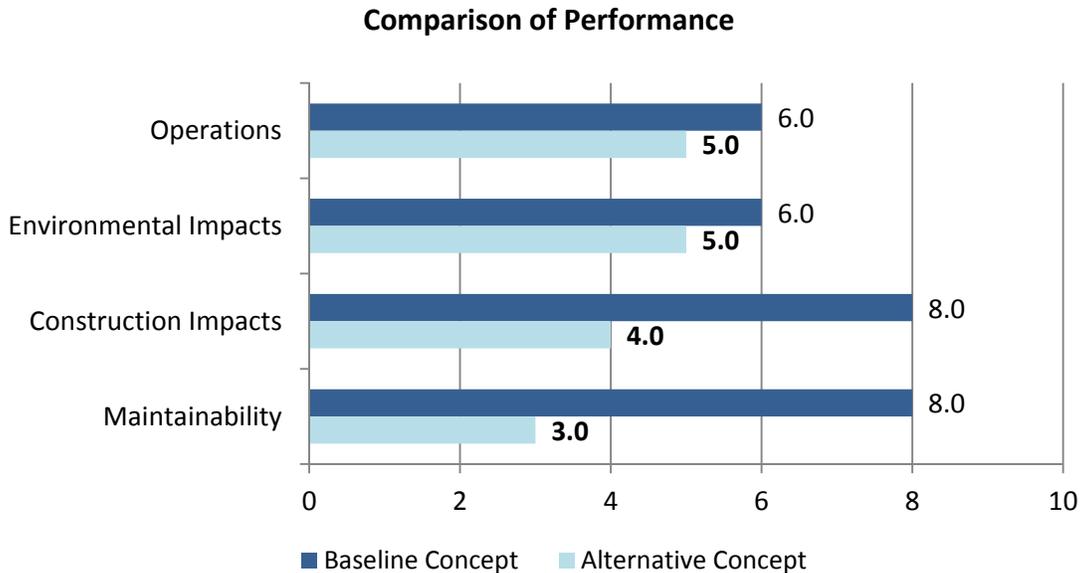
## VA ALTERNATIVE 4.1 (SALMON CREEK BRIDGE)

### Retrofit, widen, and rehabilitate the existing Salmon Creek Bridge

and a Roadway User Cost study associated with the rehab alternative vs. offline build alternatives. The remaining service life of the existing bridge is assumed to be 40 years. If the life span is actually shorter, the LCCA would worsen for the rehab alternative.

**Discussion of Schedule Impacts:** The one-way traffic control will increase the superstructure reconstruction schedule (as opposed to the baseline concept superstructure). The foundation and structure are being added, therefore no construction duration savings on this aspect, as compared to the baseline concept. Assume the superstructure construction will lead to a 6-month increase in duration.

**Discussion of Risk Impacts:** High risk to scope, schedule, and cost creep if condition of bridge is worse than anticipated. High risk during construction if actual condition of bridge proves repair to be unsafe.



### Performance Assessment

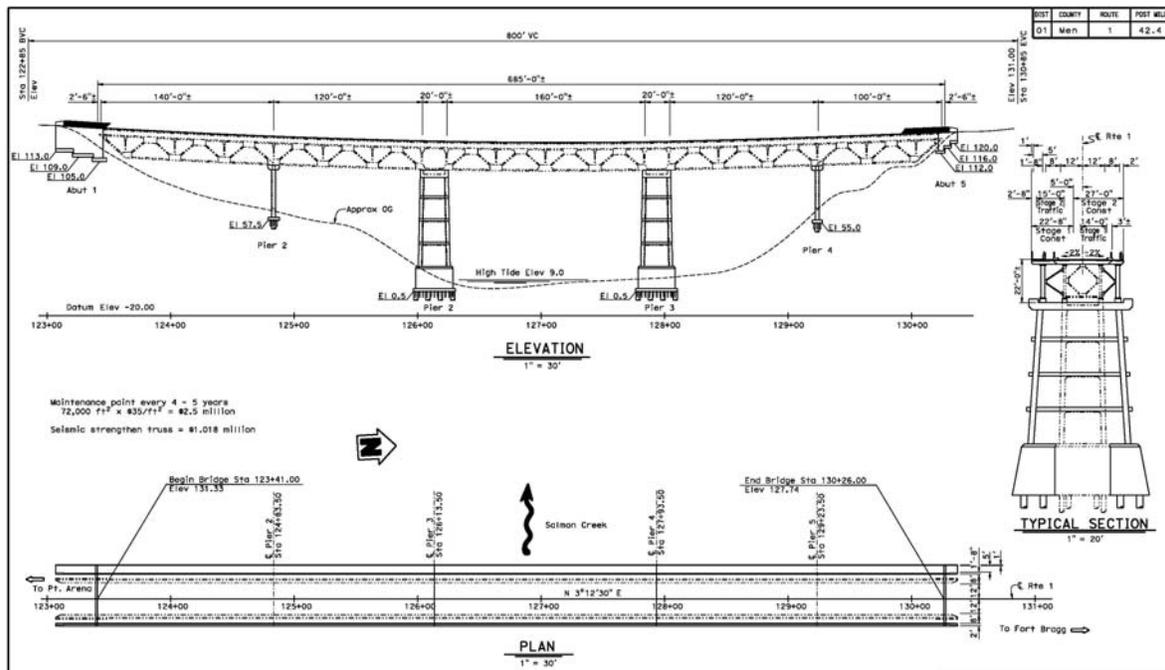
Performance Attribute	Rationale for Change in Performance
Environmental Impacts	Retaining the existing bridge would improve the cultural/community context of this project. (Note, however, that the community context of this bridge is not as significant at this location as it is at Albion River.) The footprint impacts, especially those associated with the approaches, would pose no significant change in environmental impacts to this project. The future replacement required with this option (at approximately year 40) will have future, greater footprint impacts that make this alternative, over a longer horizon, a less attractive option from an environmental standpoint.

# VA ALTERNATIVE 4.1 (SALMON CREEK BRIDGE)

## Retrofit, widen, and rehabilitate the existing Salmon Creek Bridge

Performance Attribute	Rationale for Change in Performance
Operations	The vertical curve proposed in the baseline concept will not be changed in this alternative, which retains the lower sight distance values. Maintenance of steel truss (painting) will require long periods of traffic impacts.
Maintainability	The service life of the existing structure would be less than half of the baseline concept. Painting of the steel truss will be required every 5 years.
Construction Impacts	This alternative will impact the traveling public to a much larger degree over the baseline concept (replacing offline) as it requires that the project be built under traffic. It will require one-way traffic control over a longer overall construction duration.

VA Alternative Concept Sketch



### Assumptions and Calculations:

- Existing truss needs seismic retrofit only.
- Ongoing maintenance costs for painting of truss estimated at \$45/SF.
- Cost to retrofit existing truss members is estimated at \$1,222,000 (Unit prices from SM&I Peer Review Fact Sheet of 8/15/07.)

# VA ALTERNATIVE 4.1 (SALMON CREEK BRIDGE)

## Retrofit, widen, and rehabilitate the existing Salmon Creek Bridge

### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>ROADWAY ITEMS</b>							
Approach Roadway	LS	1	\$ 13,791,000	\$ 13,791,000	1	\$ 11,000,000	\$ 11,000,000
<b>ROADWAY SUBTOTAL</b>				\$ 13,791,000			\$ 11,000,000
<b>ROADWAY MARK-UP</b>	0.0%			\$ -			\$ -
<b>ROADWAY TOTAL</b>				\$ 13,791,000			\$ 11,000,000
<b>STRUCTURE ITEMS</b>							
Arch Bridge	LS	1	\$ 27,000,000	\$ 27,000,000			
Str Excav (Bridge)	CY				1,400	\$ 150	\$ 210,000
Str Backfill (Bridge)	CY				700	\$ 95	\$ 66,500
CIDH Concrete Piling - 10'dia	LF						\$ -
Furnish Piling HP 14x89	LF				1,080	\$ 75	\$ 81,000
Drive Piles HP 14x89	EA				27	\$ 1,750	\$ 47,250
Str Conc, Bridge	CY				1,224	\$ 1,300	\$ 1,591,200
Str Conc, Bridge Footing	CY				1,022	\$ 750	\$ 766,500
Bar Reinforcing Steel (Bridge)	LB				1,744,000	\$ 1	\$ 1,744,000
Concrete Barrier	LF				860	\$ 190	\$ 163,400
Concrete Barrier	LF				860	\$ 250	\$ 215,000
Metal Railing	LF				860	\$ 140	\$ 120,400
Bridge Deck Drainage System	LB				1,300	\$ 8.70	\$ 11,310
Str Excav (Pier Column)	CY				600	\$ 1,600	\$ 960,000
Str Conc (Pier Column)	CY				600	\$ 560	\$ 336,000
Trestle	SF				7,200	\$ 35	\$ 252,000
Seismic Retrofit of Existing Truss	LS				1	\$ 1,222,000	\$ 1,222,000
Paint Existing Truss Girders	SF				72,000	\$ 42	\$ 3,024,000
Paint New Truss Girders	SF				72,000	\$ 42	\$ 3,024,000
Joint Seal Type B	LF				300	\$ 80	\$ 24,000
Clean Joint Seal	LF				300	\$ 21	\$ 6,300
Approach Slab R	CY				110	\$ 800	\$ 88,000
Remove concrete bridge deck	SF				381	\$ 315	\$ 120,015
3'-0" CIDH Piles	LS				3,840	\$ 240	\$ 921,600
Furnish Structural Steel	LB				1,218,000	\$ 3	\$ 3,654,000
Erect Structural Steel	LB				1,218,000	\$ 1.50	\$ 1,827,000
Drill and Bond	LF					\$ 44	
Approach Slab Type R	LS				110	\$ 970	\$ 106,700
<b>STRUCTURE SUBTOTAL</b>							\$ 20,582,175
<b>TRO 5%</b>	5.00%						\$ 1,029,109
<b>Sub-Total</b>							\$ 21,611,284
<b>MOBILIZATION</b>	11.11%						\$ 2,401,014
<b>Sub-Total</b>							\$ 24,012,297
<b>CONTINGENCY 25%</b>	25.00%						\$ 6,003,074
<b>STRUCTURE TOTAL</b>				\$ 27,000,000			\$ 30,015,372
<b>RIGHT-OF-WAY ITEMS</b>							
Right-of-Way Acquisition	LS	1	\$ 1,135,596	\$ 1,135,596	1	\$ 967,700	\$ 967,700
Project Development & Permit Fees	LS	1	\$ 9,000	\$ 9,000	1	\$ 9,000	\$ 9,000
Title and Escrow Fees	LS	1	\$ 9,600	\$ 9,600	1	\$ 12,000	\$ 12,000
<b>RIGHT-OF-WAY TOTAL</b>				\$ 1,154,196			\$ 988,700
<b>ENVIRONMENTAL MITIGATION ITEMS</b>							
Mitigation	LS	1	\$ 1,980,000	\$ 1,980,000	1	\$ 1,980,000	\$ 1,980,000
				\$ -			\$ -
<b>TOTAL</b>				\$43,925,196			\$43,984,072
<b>TOTAL (Rounded)</b>				\$43,930,000			\$43,980,000
					<b>SAVINGS</b>		<b>(\$50,000)</b>



## VA ALTERNATIVE 4.2 (SALMON CREEK BRIDGE)

### Build on existing centerline using a detour that uses existing roads/detour

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<b>Initial Cost Savings:</b>	(\$8,620,000)
<b>LCC Savings:</b>	\$0
<b>Change in Schedule:</b>	+1 year
<b>Performance Change:</b>	-36 %
<b>Value Change:</b>	-51 %

**Description of Baseline Concept:** PSR Alternative 2B consists of an arch with pre-stressed box superstructure, south approach spans 100 feet, and 150-foot RC box girder. There is a 350-foot concrete arch main span, north end approach 150-foot RC box girder. The roadbed consists of two 12-foot lanes and 8-foot shoulders, one 5-foot sidewalk, see-through type barriers, and a barrier between pedestrian and vehicle traffic.

**Description of Alternative Concept:** This alternative replaces the existing bridge, generally on the same alignment, but will include an upgrade to the vertical curve on the bridge. Traffic during construction will be carried on a detour. The temporary bridge will be a low-level crossing of the Salmon Creek. The detour route will generally follow a previously abandoned highway alignment.

#### Advantages:

- Maintains existing alignment
- Minimizes permanent environmental and right-of-way impacts

#### Disadvantages:

- Major temporary environmental and right-of-way impacts
- Major impacts to both Highway 1 traffic and local traffic
- Substandard alignment that limits the design speed into the 10 to 20 mph threshold
- Temporary bridge that may impact navigation
- Additional construction duration
- Additional design effort for temporary bridge
- Existing bridge components to be left in place may conflict with new bridge components
- Impacts property owners adjacent to detour
- Out-of-the-way vehicular and non-motorist travel
- Increased ESL
- Extensive environmental mitigation needed
- Coast Guard permits and requirements associated with the temporary crossing will be more onerous

**Discussion:** This alternative preserves the existing nature of the highway and has the least change in alignment of any alternative. The detour route will represent a major inconvenience to users for an extended period of time.

**Technical Review Comments:** May need to address ADA requirements for pedestrians on the detour.

**Project Management Considerations:** Significant marketing to the public is needed to justify the need to impact the local stakeholder residential streets; may need to consider other long-term

## VA ALTERNATIVE 4.2 (SALMON CREEK BRIDGE)

### Build on existing centerline using a detour that uses existing roads/detour

benefit to them. Validate costs attached and request Right of Way and Environmental to perform a better cost basis for right of way and environmental cost impacts associated with this VA alternative. Evaluate if this is a viable alternative to carry forward.

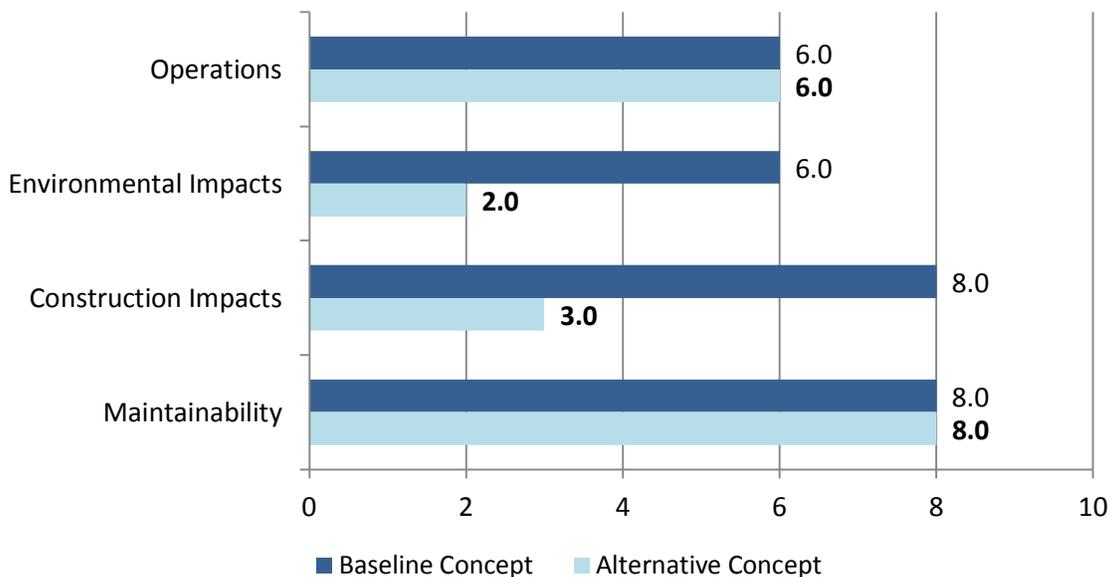
**Discussion of Schedule Impacts:** A small, relatively simple temporary bridge would not significantly increase design time. The detour route work could possibly occur outside the construction window for the permanent bridge.

The construction duration will be extended by approximately one year:

- Upgrade existing roadway/new temp bridge over the river: 1 year
- Remove the existing Salmon Creek Bridge: 1 year
- Build new bridge: 2 years
- *Total of 4 years (versus baseline's 3 years)*

**Discussion of Risk Impacts:** Coastal Commission may not grant approval for detour route.

**Comparison of Performance**



**Performance Assessment**

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	Detour route to handle Route 1 traffic will impact a larger footprint than building the offline new bridge concept (the baseline). The temporary roadway and bridge will encroach into the riparian habitat of Salmon Creek. This option has even more impact at Salmon Creek than at Albion River because of the large amount of virgin land impacted by the temporary road.

## VA ALTERNATIVE 4.2 (SALMON CREEK BRIDGE)

### Build on existing centerline using a detour that uses existing roads/detour

Performance Attribute	Rationale for Change in Performance
Operations	No change from the baseline concept (PSR Alternative 2B).
Maintainability	No change from the baseline concept (PSR Alternative 2B).
Construction Impacts	Community impacts are adverse for the duration of the detour – approximately 3 years. These include the inconvenience and temporary impacts of the Route 1 detour.

#### VA Alternative Concept Sketch



**Assumptions and Calculations:** The cost assumptions for the right-of-way acquisition (permanent and temporary) and the environmental mitigation were difficult for the VA team to assess. The VA team suspects that the cost for right of way and environmental mitigation may be higher.

## VA ALTERNATIVE 4.2 (SALMON CREEK BRIDGE)

Build on existing centerline using a detour that uses existing roads/detour

### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>ROADWAY ITEMS</b>							
Approach Roadway	LS	1	\$ 13,791,000	\$ 13,791,000	1	\$ 14,571,000	\$ 14,571,000
Detour Roadway	LS			\$ -	1	\$ 6,000,000	\$ 6,000,000
Temporary Bridge	LF			\$ -	400	\$ 2,035	\$ 814,000
				\$ -			\$ -
<b>ROADWAY SUBTOTAL</b>				\$ 13,791,000			\$ 21,385,000
<b>ROADWAY MARK-UP</b>	0.0%			\$ -			\$ -
<b>ROADWAY TOTAL</b>				\$ 13,791,000			\$ 21,385,000
<b>STRUCTURE ITEMS</b>							
Bridge		1	\$ 25,450,000	\$ 25,450,000	1	\$ 25,450,000	\$ 25,450,000
				\$ -			
<b>STRUCTURE SUBTOTAL</b>				\$ 25,450,000			\$ 25,450,000
<b>STRUCTURE MARK-UP (included above)</b>				\$ -			\$ -
<b>STRUCTURE TOTAL</b>				\$ 25,450,000			\$ 25,450,000
<b>RIGHT-OF-WAY ITEMS</b>							
Right-of-Way Acquisition	LS	1	\$ 1,637,000	\$ 1,637,000	1	\$ 3,270,000	\$ 3,270,000
Mitigation	LS	1	\$ 2,854,000	\$ 2,854,000	1	\$ 3,980,000	\$ 3,980,000
Project Development & Permit Fees	LS	1	\$ 12,900	\$ 12,900	1	\$ 9,000	\$ 9,000
Title and Escrow Fees	LS	1	\$ 13,800	\$ 13,800	1	\$ 12,800	\$ 12,800
<b>RIGHT-OF-WAY TOTAL</b>				\$ 4,517,700			\$ 7,271,800
<b>ENVIRONMENTAL MITIGATION ITEMS</b>							
Mitigation	LS	1	\$ 2,854,000	\$ 2,854,000	1	\$ 3,980,000	\$ 3,980,000
<b>TOTAL</b>				\$49,466,700			\$58,086,800
<b>TOTAL (Rounded)</b>				\$49,470,000			\$58,090,000
						<b>SAVINGS</b>	<b>(\$8,620,000)</b>

## VA ALTERNATIVE 4.3 (SALMON CREEK BRIDGE)

### Build on-alignment (east) carrying two lanes of traffic and pedestrians

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Initial Cost Savings:	(\$7,600,000)
LCC Savings:	\$0
Change in Schedule:	+2 years
Performance Change:	-1 %
Value Change:	-32 %

**Description of Baseline Concept:** PSR Alternative 2B consists of an arch with pre-stressed box superstructure, south approach spans 100 feet, and 150-foot RC box girder. There is a 350-foot concrete arch main span, north end approach 150-foot RC box girder. The roadbed consists of two 12-foot lanes and 8-foot shoulders, one 5-foot sidewalk, see-through type barriers, and a barrier between pedestrian and vehicle traffic.

**Description of Alternative Concept:** This VA alternative proposes to have the new centerline as close to the existing centerline as possible and maintain two lanes of traffic and pedestrians during construction. This concept will include an upgrade to the vertical curve on the north end of the bridge.

#### Advantages:

- Potentially reduces right-of-way costs
- Minimizes need for cuts/fills

#### Disadvantages:

- Increases impacts to local traffic
- Increases construction working days
- Increases construction costs
- Aesthetics impacted

**Discussion:** This alternative modified the PSR alternative to include the ability to carry two lanes of traffic. This alternative would more closely preserve the existing alignment of the highway – a consideration for some of the permitting agencies. Compared to the baseline, this alternative is more expensive and will take longer to build.

**Technical Review Comments:** None noted.

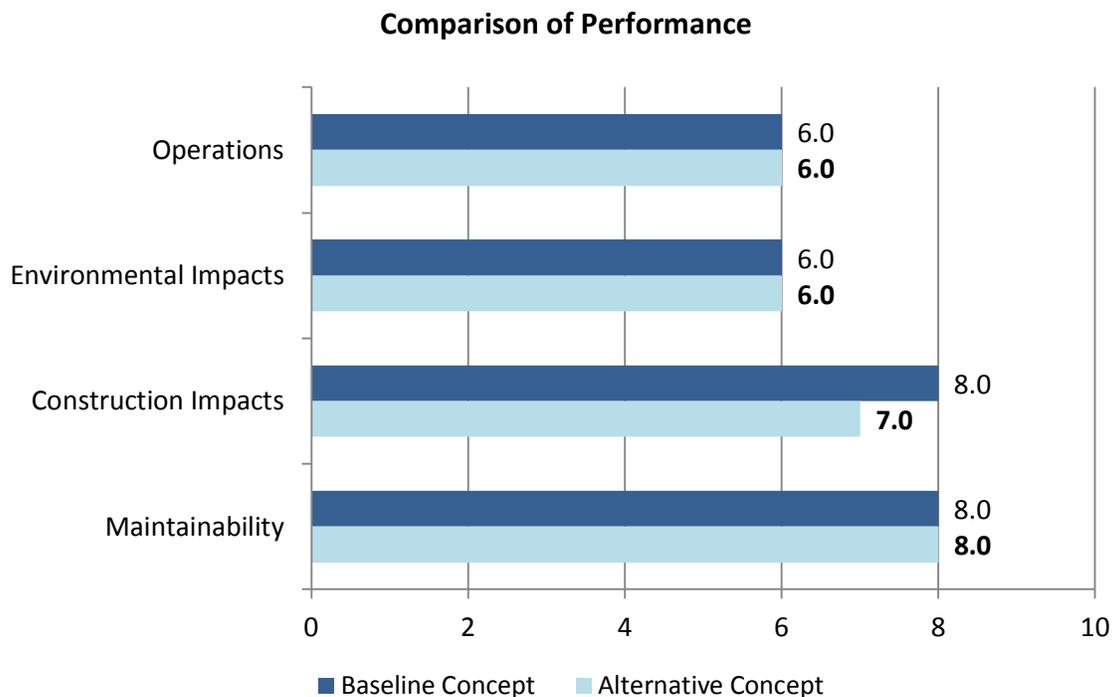
**Project Management Considerations:** Evaluate if this is a viable alternative to carry forward. Verify the costs, especially the roadway costs, which are based on very rough assumptions.

**Discussion of Schedule Impacts:** The additional design time required of this alternative would delay the beginning of construction by 6 months. Furthermore, the construction duration would be an additional 1.5 years, resulting in a 2-year net increase in schedule.

**Discussion of Risk Impacts:** Maintaining the pedestrian walkway could cause growth in construction costs and working days. The longer design duration could impact the fund availability.

## VA ALTERNATIVE 4.3 (SALMON CREEK BRIDGE)

### Build on-alignment (east) carrying two lanes of traffic and pedestrians



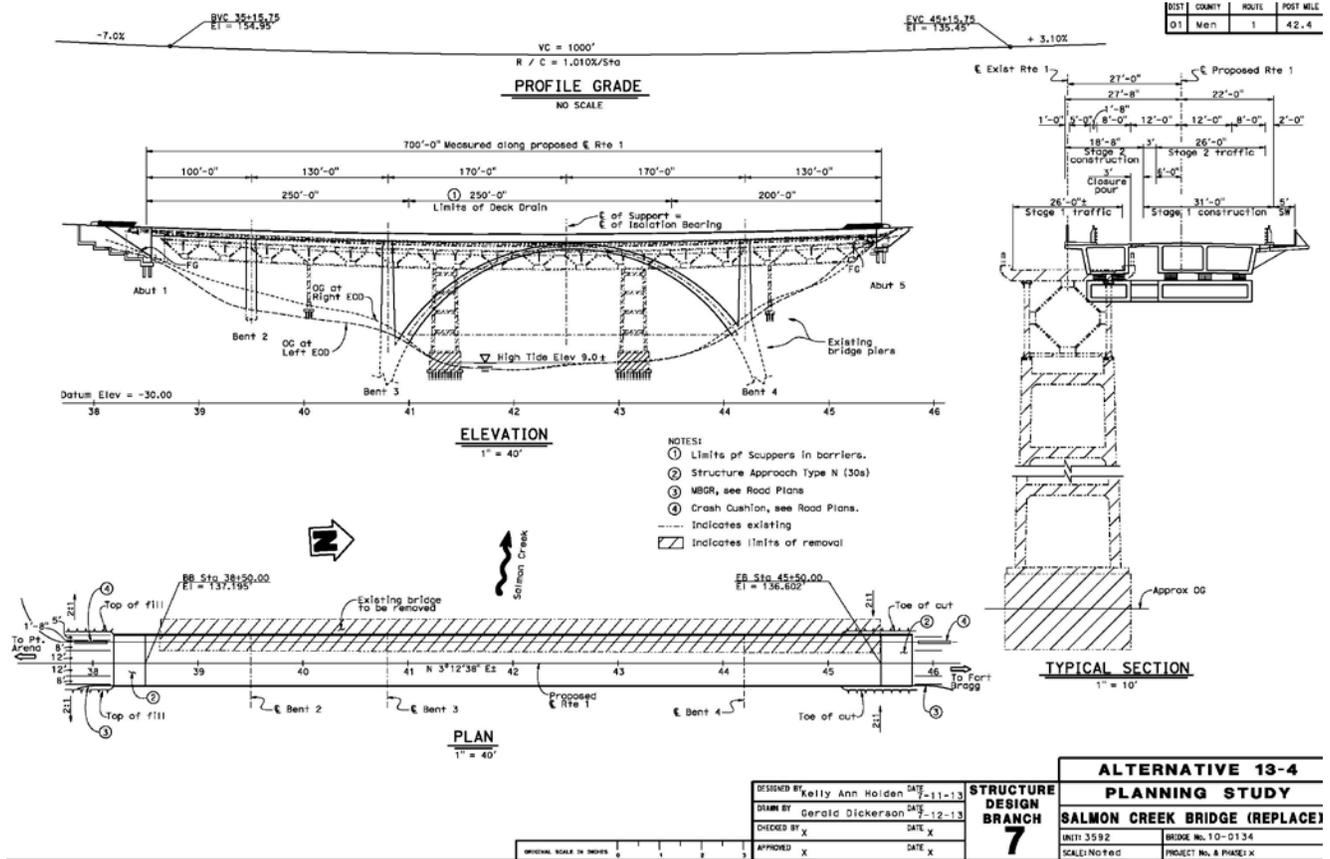
### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	No change from the baseline. The footprint impact – especially that associated with the approaches – would have no significant change over the baseline concept.
Operations	No change from the baseline concept (PSR Alternative 2B).
Maintainability	No change from the baseline concept (PSR Alternative 2B).
Construction Impacts	The construction traffic impacts will be greater over a longer timeframe. The traffic will be shoe-horned between barriers and will require two shifts: Existing-Stage 1, Stage 1-Stage 2, Stage 2-Final Configuration. This is one additional shift over the baseline concept. Temporary shoring would be required due to grade separation of adjacent lanes.

# VA ALTERNATIVE 4.3 (SALMON CREEK BRIDGE)

Build on-alignment (east) carrying two lanes of traffic and pedestrians

## VA Alternative Concept Sketch



### Assumptions and Calculations:

The alternative roadway costs are based on the PSR estimates for PSR Alternative 4A, 4B, estimated to be \$14,571,000.

## VA ALTERNATIVE 4.3 (SALMON CREEK BRIDGE)

Build on-alignment (east) carrying two lanes of traffic and pedestrians

### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>ROADWAY ITEMS</b>							
Approach Roadway	LS	1	\$ 13,791,000	\$ 13,791,000	1	\$ 14,571,000	\$ 14,571,000
				\$ -			\$ -
<b>ROADWAY SUBTOTAL</b>				\$ 13,791,000			\$ 14,571,000
<b>ROADWAY MARK-UP (Included above)</b>				\$ -			\$ -
<b>ROADWAY TOTAL</b>				\$ 13,791,000			\$ 14,571,000
<b>STRUCTURE ITEMS</b>							
Bridge	LS	1	\$ 27,000,000	\$ 27,000,000	1	\$ 35,100,000	\$ 35,100,000
				\$ -			\$ -
<b>STRUCTURE SUBTOTAL</b>				\$ 27,000,000			\$ 35,100,000
<b>STRUCTURE MARK-UP (included above)</b>				\$ -			\$ -
<b>STRUCTURE TOTAL</b>				\$ 27,000,000			\$ 35,100,000
<b>RIGHT-OF-WAY ITEMS</b>							
Right-of-Way Acquisition	LS	1	\$ 1,637,000	\$ 1,637,000	1	\$ 1,237,000	\$ 1,237,000
Project Development & Permit Fees	LS	1	\$ 12,900	\$ 12,900	1	\$ 9,000	\$ 9,000
Title and Escrow Fees		1	\$ 13,800	\$ 13,800	1	\$ 12,800	\$ 12,800
<b>RIGHT-OF-WAY TOTAL</b>				\$ 1,663,700			\$ 1,258,800
<b>ENVIRONMENTAL MITIGATION ITEMS</b>							
Mitigation	LS	1	\$ 2,854,000	\$ 2,854,000	1	\$ 1,980,000	\$ 1,980,000
				\$ 2,854,000			\$ 1,980,000
<b>TOTAL</b>				\$45,308,700			\$52,909,800
<b>TOTAL (Rounded)</b>				\$45,310,000			\$52,910,000
						<b>SAVINGS</b>	<b>(\$7,600,000)</b>

## VA ALTERNATIVE 5.1 (ALBION BRIDGE)

**Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners**

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<b>Initial Cost Savings:</b>	(\$100,000)
<b>LCC Savings:</b>	\$0
<b>Change in Schedule:</b>	No change
<b>Performance Change:</b>	+17 %
<b>Value Change:</b>	+16 %

**Description of Baseline Concept:** There are no plans for a community path through the Albion Headlands.

**Description of Alternative Concept:** Negotiate easement from landowners for public access from Highway 1 to the coast within the boundaries of the Albion Headlands lands. This concept would only be viable if a third party were to participate as the owner/manager. This may entail an endowment to the third party. This third party, for example, could be the Mendocino Land Trust or local public agencies.

### **Advantages:**

- Community support for project
- Garners support from the Coastal Commission
- Provides a mitigation strategy to enhance coastal access – a Coastal Commission objective

### **Disadvantages:**

- Additional investment in project
- Additional Environmental Study Limits (ESL)
- Increases landowner negotiation requirements

**Discussion:** The proposed community path for coastal access is one of several alternatives that may serve as mitigation for the removal of the existing bridge. The Albion Headlands owners have interest in developing the land. The additional trail suggested in this alternative may be seen as a benefit to the community and the landowners. This strategy should be presented as a mitigation strategy to improve coastal access for both bridges.

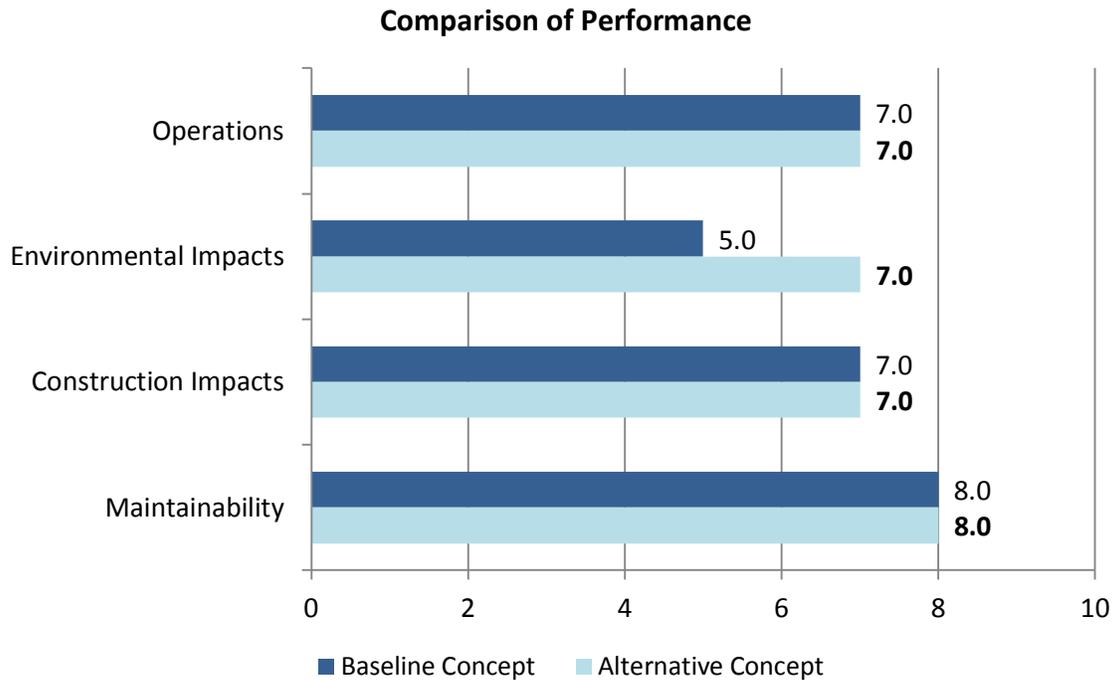
**Technical Review Comments:** The technical reviewers agree that collaborating with the local community and anticipating the Coastal Commission amenities improves the Environmental Document process.

**Project Management Considerations:** The costs established are rough and should be verified. Also, investigate if an endowment would make this option more viable.

**Discussion of Schedule Impacts:** No impact.

## VA ALTERNATIVE 5.1 (ALBION BRIDGE)

Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners



### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	The addition of this amenity will improve the recreational value of the Albion community, enhancing socio-economic conditions via tourism. The coastal access enhancement is a typical objective of the Coastal Commission.
Operations	No change from the baseline concept, PSR Alternative 1C.
Maintainability	No change in the project's maintainability in that the third party would maintain the path.
Construction Impacts	No change from the baseline concept, PSR Alternative 1C.

## VA ALTERNATIVE 5.1 (ALBION BRIDGE)

Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners

VA Alternative Concept Sketch



### Assumptions and Calculations:

- Assumed land value is \$65,000/acre. The assumed trail area is assumed half acre.
- Assume Trail Grading requires 3,500 LF at \$15/LF.
- Assume Trail Signing, Misc. Amenities = \$60,000 cost.

The costs indicated above are for the full trail system. Assume that half of the above costs of providing the trail are apportioned between the Salmon Creek and Albion River Bridge Replacement Projects.

## VA ALTERNATIVE 5.1 (ALBION BRIDGE)

Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners

### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>ROADWAY ITEMS</b>							
Trail Grading (Apportioned in Halves)	LF			\$ -	1,750	\$ 15	\$ 26,250
Trail Signing, Misc Amenties (Apportioned in Halves)	LS			\$ -	0.5	\$ 60,000	\$ 30,000
				\$ -			\$ -
<b>ROADWAY SUBTOTAL</b>				\$ -			\$ 56,250
<b>ROADWAY MARK-UP</b>	49.0%			\$ -			\$ 27,563
<b>ROADWAY TOTAL</b>				\$ -			\$ 83,813
<b>RIGHT-OF-WAY ITEMS</b>							
Right-of-Way Acquisition	ACRE			\$ -	0.3	\$ 65,000	\$ 16,250
<b>RIGHT-OF-WAY TOTAL</b>				\$ -			\$ 16,250
<b>TOTAL</b>				\$0			\$100,063
<b>TOTAL (Rounded)</b>				\$0			\$100,000
						<b>SAVINGS</b>	<b>(\$100,000)</b>

## VA ALTERNATIVE 5.2 (ALBION BRIDGE)

### Add vista point for northbound lanes; incorporate north side abutment and portion of deck

Initial Cost Savings:	(\$340,000)
LCC Savings:	(\$604,000)
Change in Schedule:	No change
Performance Change:	+7 %
Value Change:	+7 %

**Description of Baseline Concept:** There is no current vista point available to look out over the valley.

**Description of Alternative Concept:** Retain the north abutment and short section of the existing structure to use as a lookout/vista point in lieu of dismantling the entire structure, possibly with interpretive/historical information. Tie the north abutment into the county road, north of Albion River Bridge.

#### **Advantages:**

- Maintains some of the original bridge for historic purposes
- Retains portion of bridge in support of community identity associated with the old bridge
- Encourages community support of the baseline alternative
- Possible Coastal Commission mitigation
- Could improve the review and approval from State Historic Preservation Office (SHPO)
- Can be interpreted as a mitigation measure for the loss of the old bridge – an aspect of community identity

#### **Disadvantages:**

- Additional investment required
- Requires long-term maintenance
- Requires rehabilitation of retained section
- Security of site is required
- Requires safety railing
- Structural integrity must be ensured

**Discussion:** The proposed vista point is one of several alternatives that may serve as mitigation for the removal of the existing bridge. This concept retains a portion of the Albion River Bridge structure to use as a scenic overlook, avoiding a more expensive option of rehabilitating and maintaining the entire structure in support of the community ties to the existing bridge. This approach, using a portion of the abandoned bridge, has been used on other projects in this District. To ensure security of the site, lighting should be provided.

The bridge is considered historic. SHPO will need to be contacted and a "Findings of Effect" document must be submitted. Also, 4F consultation will be required with SHPO. The timeframe associated with this review could take up to 42 months. The proactive measures in this alternative could be presented to SHPO to gain SHPO support for the project.

## VA ALTERNATIVE 5.2 (ALBION BRIDGE)

### Add vista point for northbound lanes; incorporate north side abutment and portion of deck

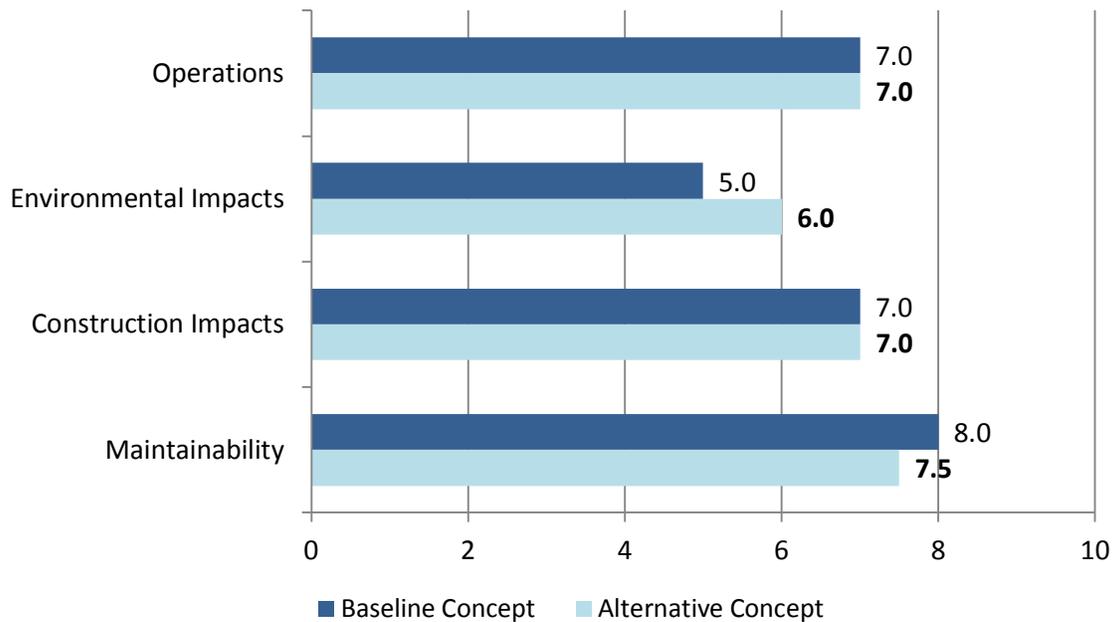
**Technical Review Comments:** The technical reviewers agree that collaborating with the local community and anticipating the Coastal Commission amenities improves the Environmental Document process.

**Project Management Considerations:** This alternative's propensity for community consensus should be further investigated. Need to decide whether Caltrans maintains the vista point or if it could be relinquished to another entity for Coastal Commission mitigation credit. Consensus with California Coastal Commission on the scope of the partial rehabilitation could require some effort. Management may not support retaining the structure; and finding an entity willing and with resources to which the structure can be relinquished would have to be pursued.

**Discussion of Schedule Impacts:** If this is presented as a mitigation strategy and creates community buy-in, it will likely reduce the probability of delays in approvals for the Environmental Document. (Note, however, that the value metrics for this project only identifies construction schedule impacts.)

**Discussion of Risk Impacts:** May present an opportunity to accelerate the SHPO/4F and Community Impacts review timeframes.

Comparison of Performance



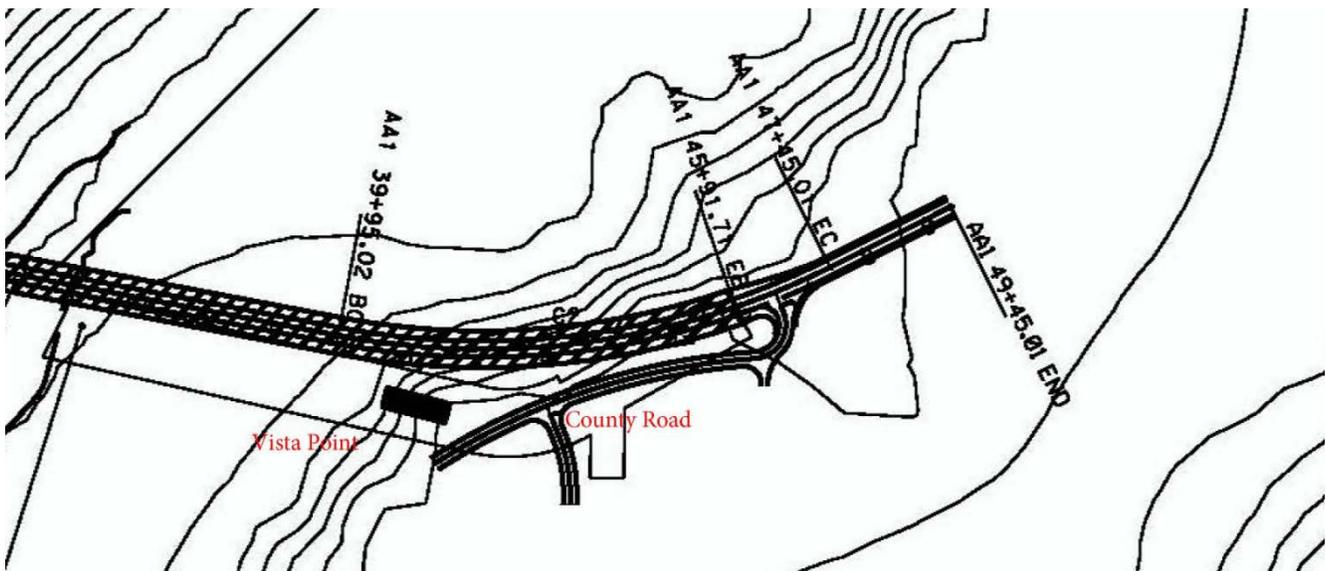
## VA ALTERNATIVE 5.2 (ALBION BRIDGE)

**Add vista point for northbound lanes; incorporate north side abutment and portion of deck**

### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	Reduces the impact of removal of the old bridge with its historical and community context.
Operations	No change from the baseline concept, PSR Alternative 1C.
Maintainability	Increased maintenance associated with the retained portion of bridge (e.g., lighting, trash and other cleanup requirements).
Construction Impacts	No change from the baseline concept, PSR Alternative 1C.

VA Alternative Concept Sketch



**Assumptions and Calculations:** Assume 50 feet of old bridge is retained, which is approximately 5% of entire bridge length. Assume rehab cost is proportional. Subtract 5% of dismantling cost from the dismantling estimate. Baseline concept cost is unchanged, minor roadway cost for approach to old bridge.

## VA ALTERNATIVE 5.2 (ALBION BRIDGE)

Add vista point for northbound lanes; incorporate north side abutment and portion of deck

### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>ROADWAY ITEMS</b>							
HMA-A	TON			\$ -	90	\$ 140	\$ 12,600
							\$ -
<b>ROADWAY SUBTOTAL</b>							\$ 12,600
<b>ROADWAY MARK-UP</b>	49.0%			\$ -			\$ 6,174
<b>ROADWAY TOTAL</b>				\$ -			\$ 18,774
<b>STRUCTURE ITEMS</b>							
Ped Railing	LF	2,220	\$ 65	\$ 144,300	180	\$ 65	\$ 11,700
Structure Rehabilitation	LS				1	\$ 450,000	\$ 450,000
							\$ -
<b>STRUCTURE SUBTOTAL</b>				\$ 144,300			\$ 461,700
<b>STRUCTURE MARK-UP (included above)</b>				\$ -			\$ -
<b>STRUCTURE TOTAL</b>				\$ 144,300			\$ 461,700
<b>TOTAL</b>				\$144,300			\$480,474
<b>TOTAL (Rounded)</b>				\$140,000			\$480,000
						<b>SAVINGS</b>	<b>(\$340,000)</b>

### Life-Cycle Cost Estimates

Life-Cycle Period	75	Years	Real Discount Rate	3.50%	BASELINE	ALTERNATIVE		
<b>A. INITIAL COST</b>					\$140,000	\$480,000		
Service Life - Baseline	75	Years	<b>INITIAL COST SAVINGS:</b>			\$ (340,000)		
Service Life - Alternative	75	Years						
<b>B. SUBSEQUENT ANNUAL COSTS</b>								
1. Maintenance and Inspection of Vista Point						\$ 10,000		
<b>Total Subsequent Annual Costs:</b>					\$ -	\$ 10,000		
<b>Present Value Factor (P/A):</b>					26.407	26.407		
<b>PRESENT VALUE OF SUBSEQUENT ANNUAL COSTS (Rounded):</b>					\$ -	\$ 264,000		
<b>C. SUBSEQUENT SINGLE COSTS</b>				Year	Amount	PV Factor (P/F)	Present Value	Present Value
						1.00000	\$ -	
						1.00000		\$ -
<b>PRESENT VALUE OF SUBSEQUENT SINGLE COSTS (Rounded):</b>					\$ -	\$ -		
<b>D. TOTAL SUBSEQUENT ANNUAL AND SINGLE COSTS (B+C)</b>					\$ -	\$ 264,000		
<b>E. TOTAL SUBSEQUENT COSTS SAVINGS:</b>						\$ (264,000)		
<b>F. TOTAL PRESENT VALUE COST (A+D)</b>					\$ 140,000	\$ 744,000		
<b>TOTAL LIFE-CYCLE SAVINGS:</b>						\$ (604,000)		

## VA ALTERNATIVE 5.3 (ALBION BRIDGE)

### Add belvederes to the bridge

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<b>Initial Cost Savings:</b>	(\$130,000)
<b>LCC Savings:</b>	\$0
<b>Change in Schedule:</b>	No change
<b>Performance Change:</b>	+4 %
<b>Value Change:</b>	+4 %

**Description of Baseline Concept:** The proposed design does include pedestrian pathways, but does not include belvederes.

**Description of Alternative Concept:** Consider a belvedere near the middle of the proposed bridge, located along both the southbound and northbound pedestrian pathways.

#### Advantages:

- Enhances the use of the pedestrian pathway
- Promotes the viewscape available on the bridges
- Encourages community support of the baseline alternative
- Possible California Coastal Commission mitigation measure
- Can be interpreted as a mitigation measure for the loss of the old bridge – an aspect of community identity
- Provides an opportunity to have community kiosks/interpretive signs/community information for pedestrians

#### Disadvantages:

- Increases costs
- Diminishes the clean profile line of the bridge
- Noise and wind may discourage the use of the belvedere

**Discussion:** The addition of belvederes is one of several alternatives that may serve as mitigation for the removal of the existing bridge.

**Technical Review Comments:** The technical reviewers agree that collaborating with the local community and anticipating the Coastal Commission amenities improves the Environmental Document process.

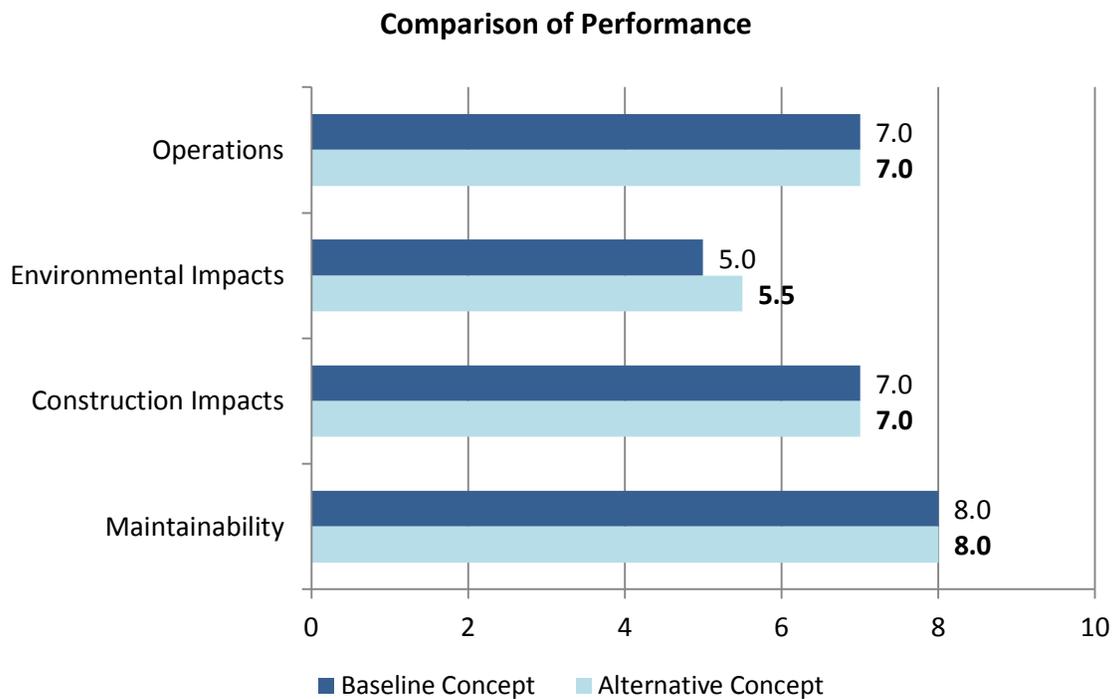
**Project Management Considerations:** Consider this option with other viewscape enhancements.

**Discussion of Schedule Impacts:** No change to the project schedule is anticipated.

**Discussion of Risk Impacts:** No significant secondary risks associated with this VA alternative.

## VA ALTERNATIVE 5.3 (ALBION BRIDGE)

### Add belvederes to the bridge



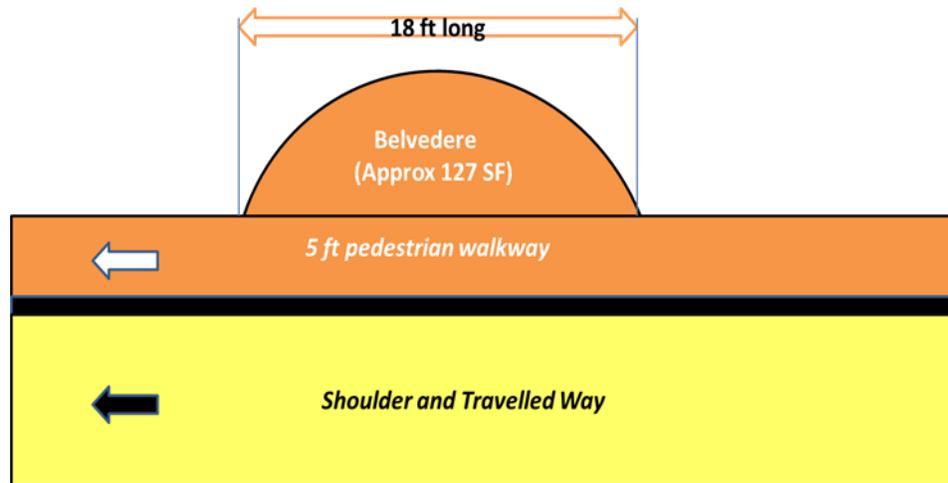
### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	This feature improves the scenic value inherent in this location and increase the community value provided in the proposed bridge replacement designs. (The belvederes would likely have more benefit at the Albion River Bridge location than at the Salmon Creek Bridge.)
Operations	No change from the baseline concept, PSR Alternative 1C.
Maintainability	No significant change from the baseline concept, PSR Alternative 1C.
Construction Impacts	No change from the baseline concept, PSR Alternative 1C.

## VA ALTERNATIVE 5.3 (ALBION BRIDGE)

### Add belvederes to the bridge

VA Alternative Concept Sketch



TYPICAL BELVEDERE LAYOUT

#### Assumptions and Calculations:

- The proposed size of the belvedere would be a half circle 18 feet in diameter.
- Two belvederes at 127 SF would be located near the middle span of the bridge. These would be located along the southbound and northbound directions on the new Albion River Bridge.

#### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>STRUCTURE ITEMS</b>							
Albion Bridge 2 Belvederes (NB/SB)	SF			\$ -	254	\$ 500	\$ 127,000
				\$ -			\$ -
<b>STRUCTURE SUBTOTAL</b>				\$ -			\$ 127,000
<b>STRUCTURE MARK-UP (included above)</b>				\$ -			\$ -
<b>STRUCTURE TOTAL</b>				\$ -			\$ 127,000
<b>TOTAL</b>				\$0			\$127,000
<b>TOTAL (Rounded)</b>				\$0			\$130,000
						<b>SAVINGS</b>	<b>(\$130,000)</b>

## VA ALTERNATIVE 5.4 (ALBION BRIDGE)

### Use the existing Albion River Bridge for non-motorist use and narrow the width of new bridge

<b>Initial Cost Savings:</b>	(\$2,490,000)
<b>LCC Savings:</b>	\$0
<b>Change in Schedule:</b>	No change
<b>Performance Change:</b>	+9 %
<b>Value Change:</b>	+6 %

**Description of Baseline Concept:** The baseline concept builds a new Albion River Bridge on the west side of the existing bridge, with 8-foot shoulders and 5-foot pedestrian walkways on each side.

**Description of Alternative Concept:** Use the existing Albion Bridge as a pedestrian bridge and remove pedestrian walkways from the new bridge. Relinquish the pedestrian bridge to local government.

#### **Advantages:**

- Proposed, new structure will be narrower with better viewscape over the bridge rail for vehicle occupants
- Cost savings from reduction in deck area
- Preserves historic bridge
- Provides scenic viewpoint/accessible landmark for Albion area
- "Connects" north and south Albion for non-motorized use
- Has potential to be consensus-builder between Caltrans/local residents/California Coastal Commission
- Reduces conflicts between vehicular and non-motorist traffic

#### **Disadvantages:**

- Bridge requires rehabilitation, including center truss-span replacement
- Bridge requires significant yearly maintenance
- Pedestrian bridge will have shorter design life than new bridge - must ultimately replace the pedestrian bridge at the end of its service life
- Complications associated with relinquishment: negotiation of relinquishment agreement, establishing the entity to whom it would be relinquished

**Discussion:** The use of the existing Albion Bridge for non-motorist use is one of four alternatives that may serve as mitigation for the removal of the existing bridge. The VA alternative concept reduces the cost of the new structure by removing walkways, and uses that money to rehab the existing historic structure into a pedestrian/bicycle path. Walkways at either end of the new structure will connect northbound non-motorist traffic to the pedestrian bridge on the east side.

**Technical Review Comments:** None noted.

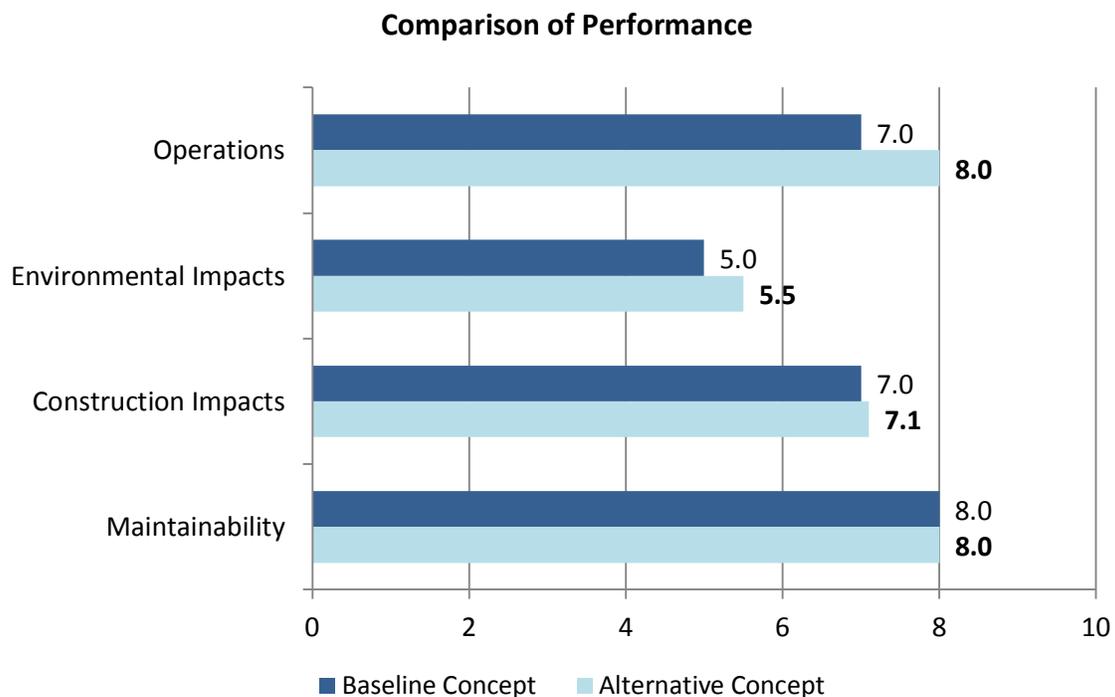
**Project Management Considerations:** This alternative requires the participation of an entity to relinquish to, or a long-term Caltrans funding source for maintenance. This alternative could find local and Coastal Commission support.

## VA ALTERNATIVE 5.4 (ALBION BRIDGE)

### Use the existing Albion River Bridge for non-motorist use and narrow the width of new bridge

**Discussion of Schedule Impacts:** Has potential to accelerate schedule if California Coastal Commission and locals buy into this proposal. Has potential to decelerate schedule if long-term maintenance/relinquishment becomes problematic. Assume no change in schedule.

**Discussion of Risk Impacts:** This concept has the risk of tying Caltrans to the long-term maintenance of the existing bridge, the security, etc., associated with trying to relinquish the bridge. A strong agreement with some kind of "teeth" would be needed to consider this concept with a third party; for example, the local government takes over the repair and maintenance of the relinquished facility.



### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	Larger permanent footprint on the RV park with the bridge decks of the existing proposed bridge. Retains the community identity associated with the existing bridge. The viewscape associated with the arch is impacted by the existing structure and vice versa.
Operations	Reduced conflicts between non-motorist and vehicular traffic.
Maintainability	If existing bridge is relinquished as planned, no significant change.
Construction Impacts	Less spoils and their associated haul.

## VA ALTERNATIVE 5.4 (ALBION BRIDGE)

Use the existing Albion River Bridge for non-motorist use and narrow the width of new bridge

### VA Alternative Concept Sketches

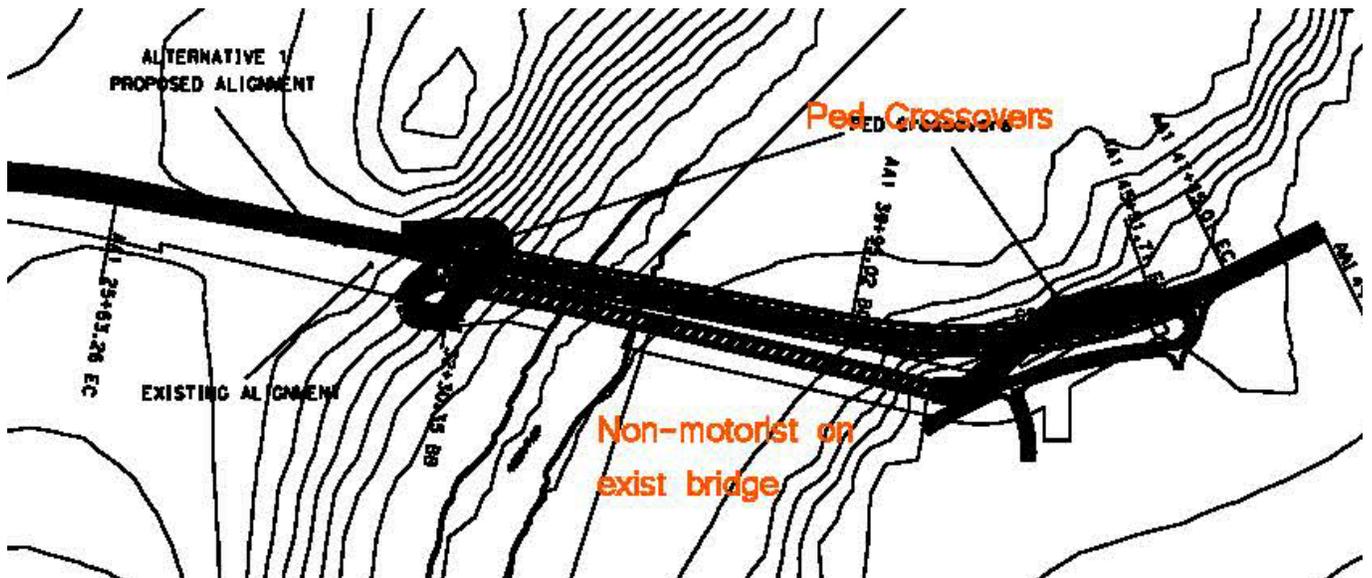


FIGURE 1: LAYOUT OF VEHICLE AND NON-MOTORIST BRIDGES

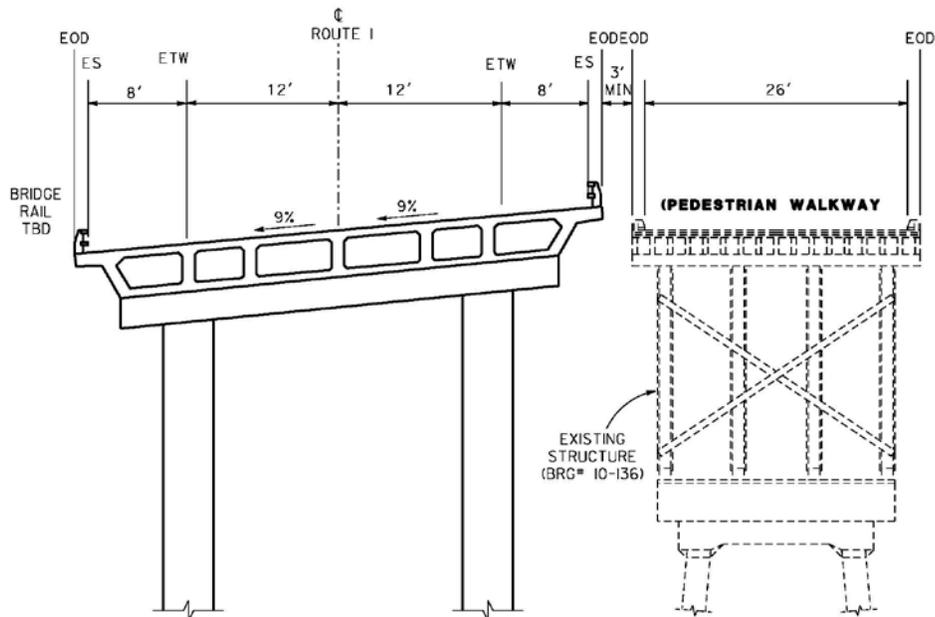


FIGURE 2: TYPICAL SECTION OF VEHICLE AND NON-MOTORIST BRIDGES

#### Assumptions and Calculations:

- The VA alternative uses structures estimate for bridge rehab, calculates cost reduction for reduced deck area using square foot cost.
- Costs of walkways under the bridge are a rough estimation - more design work would be needed to get more accurate costs.

## VA ALTERNATIVE 5.4 (ALBION BRIDGE)

### Use the existing Albion River Bridge for non-motorist use and narrow the width of new bridge

- Life-cycle cost basis – i.e., the cost to maintain the bridge – was not calculated; as it was assumed that this option would be considered if a third party takes over the maintenance responsibilities.

#### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>ROADWAY ITEMS</b>							
Earthwork	CY			\$ -	2,496	\$ 25	\$ 62,400
				\$ -			\$ -
<b>ROADWAY SUBTOTAL</b>				\$ -			\$ 62,400
<b>ROADWAY MARK-UP</b>		49.0%		\$ -			\$ 30,576
<b>ROADWAY TOTAL</b>				\$ -			\$ 92,976
<b>STRUCTURE ITEMS</b>							
Rehab Existing Structure	LS				1	\$ 5,349,000	\$ 5,349,000
Discount for reduced Structure Width (\$270/sf)	LS	1	\$ 3,000,000	\$ 3,000,000			\$ -
<b>STRUCTURE SUBTOTAL</b>				\$ 3,000,000			\$ 5,349,000
<b>STRUCTURE MARK-UP (included above)</b>							\$ -
<b>STRUCTURE TOTAL</b>				\$ 3,000,000			\$ 5,349,000
<b>TOTAL (Rounded)</b>				\$3,000,000			\$5,490,000
						<b>SAVINGS</b>	<b>(\$2,490,000)</b>

## VA ALTERNATIVE 6.0 (ALBION BRIDGE)

### Fill in the coastal trail between the two bridges

---

<b>Initial Cost Savings:</b>	(\$100,000)
<b>LCC Savings:</b>	\$0
<b>Change in Schedule:</b>	No change
<b>Performance Change:</b>	+17 %
<b>Value Change:</b>	+16 %

**Description of Baseline Concept:** The current bridge projects provide pedestrian access on the bridges, but not off the bridges.

**Description of Alternative Concept:** This concept would connect the pedestrian paths on the bridges with a trail in between. Placing it on the west side would be more logical as the pedestrian path on Salmon Creek Bridge is only on the west side (has views to the ocean). This trail could become part of the California Coastal Trail system. Identify the responsible entity to take ownership of the operations and maintenance of the proposed trail.

#### **Advantages:**

- Supports the California Coastal Trail (fills in gaps)
- Anticipates the amenities to be requested by the California Coastal Commission

#### **Disadvantages:**

- Additional investment
- Increases the ESL

**Discussion:** The proposed trail could be recognized as part of the coastal trail system. In addition to the benefit this trail would have to the Albion community, the "filling in the gap" supports the California Coastal Commission's mission statement.

**Technical Review Comments:** The technical reviewers agree that collaborating with the local community and anticipating the Coastal Commission amenities improves the Environmental Document process.

**Project Management Considerations:** Establish the following:

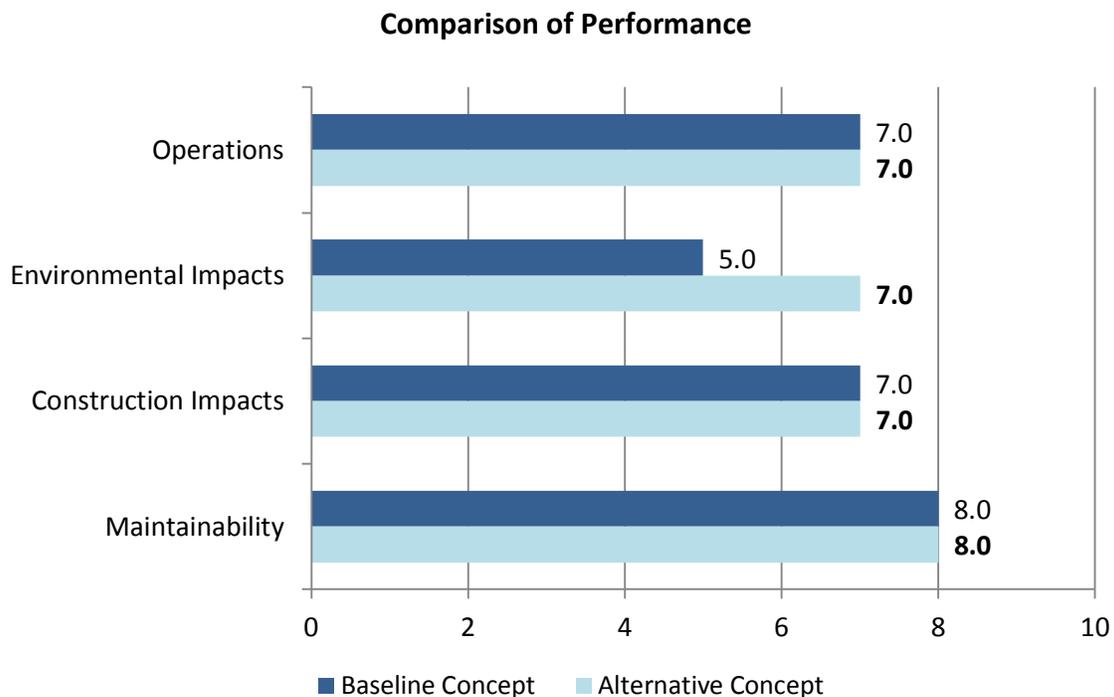
- Benefits in reducing the Environmental Document's schedule and effort,
- Discuss timing of presenting to the benefactors, and
- Review the possible funding requirements.

**Discussion of Schedule Impacts:** This alternative would reduce pre-construction schedule; however, the value metrics system for this project only identifies construction schedule impacts.

**Discussion of Schedule Impacts:** This alternative would reduce the pre-construction schedule. (Note, however, that the value metrics for this project only identifies construction schedule impacts.)

## VA ALTERNATIVE 6.0 (ALBION BRIDGE)

### Fill in the coastal trail between the two bridges



### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	The addition of this amenity will improve the recreational value of the Albion River/Salmon Creek community; potential to enhance the socio-economic regional conditions via tourism. The “filling in” of coastal trail gaps is an enhancement typically desired by the Coastal Commission.
Operations	No change from the baseline concept, PSR Alternative 1C.
Maintainability	The coastal trail is typically "adopted" by third parties; assumes that this will be the case on this alternative.
Construction Impacts	No change from the baseline concept, PSR Alternative 1C.

## VA ALTERNATIVE 6.0 (ALBION BRIDGE)

Fill in the coastal trail between the two bridges

### VA Alternative Concept Sketch



#### Assumptions and Calculations:

- 6,000 ft long at \$15/LF.
- \$60,000 for Misc. Amenities (signing, fencing, etc.).
- Assume half-acre of right of way required at \$100,000/acre.

#### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>ROADWAY ITEMS</b>							
Trail Grading	LF			\$ -	6,000	\$ 15	\$ 90,000
Trail Signing, Misc Amenities	LS			\$ -	1	\$ 60,000	\$ 60,000
				\$ -			\$ -
<b>ROADWAY SUBTOTAL</b>				\$ -			\$ 150,000
<b>ROADWAY MARK-UP</b>		49.0%		\$ -			\$ -
<b>ROADWAY TOTAL</b>				\$ -			\$ 150,000
<b>RIGHT-OF-WAY ITEMS</b>							
Right-of-Way Acquisition	AC			\$ -	0.5	\$ 100,000	\$ 50,000
				\$ -			\$ -
<b>RIGHT-OF-WAY TOTAL</b>				\$ -			\$ 50,000
<b>TOTAL</b>				\$0			\$200,000
<b>TOTAL (Rounded)</b>				\$0			\$200,000
						<b>TOTAL SAVINGS</b>	<b>(\$200,000)</b>
						<b>APPORTIONED SAVINGS (ALBION)</b>	<b>(\$100,000)</b>

## VA ALTERNATIVE 7.0 (ALBION BRIDGE)

### Purchase the RV park in lieu of paying for temporary construction easement

---

Initial Cost Savings:	(\$900,000)
LCC Savings:	\$0
Change in Schedule:	No change
Performance Change:	+5 %
Value Change:	+4 %

**Description of Baseline Concept:** The current scheme is to acquire temporary construction easements for three years.

**Description of Alternative Concept:** The alternative scheme is to purchase the RV park under the bridge, currently for sale, to use for environmental mitigation. The operations of the marina should not be impacted. This marina is critical for boating operations between Fort Bragg to Point Arena.

#### Advantages:

- Provides potential for environmental mitigation
- Eliminates the requirements for temporary construction easement
- Less conflict between land use and construction operations
- Eliminates the probability of the 3-year Temporary Construction Easement (TCE) negative financial impacts to the RV park business
- Could eliminate or reduce the need for the septic tank and/or water contamination
- Provides the opportunity to plan for a mix of natural environmental/built environment uses

#### Disadvantages:

- Additional investment required
- Impacts to the county tax base

**Discussion:** The use of the complete parcel should be studied and restrictions on use should be imposed, such as the portions nearest the marina and portions near the residences on the hill. Use for environmental mitigation also may fall under these restrictions.

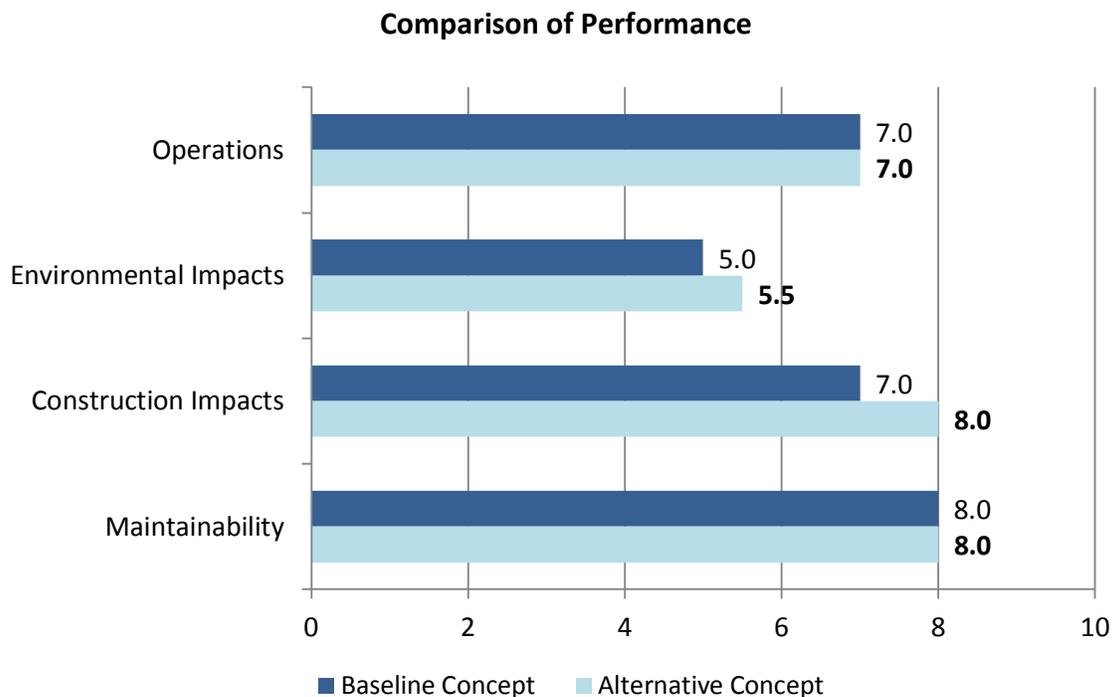
**Technical Review Comments:** None noted.

**Project Management Considerations:** The area needed for environmental mitigation and area that can be retained for RV usage should be studied. The use, even if limited, for RV usage is a tourist draw for the region. Also, explore a partial acquisition that could coexist with a reduced RV park, temporary construction operations, and environmental mitigation mix-match.

**Discussion of Schedule Impacts:** No significant change.

## VA ALTERNATIVE 7.0 (ALBION BRIDGE)

### Purchase the RV park in lieu of paying for temporary construction easement



### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	Identifies a mitigation site that can be used to mitigate the environmental impacts associated with the Albion River/Salmon Creek Bridge projects. It offers an opportunity to resell a portion of the land, improve the quality of the built portion of the area, and increase the attraction of the site. The mitigation plan at this time is unknown.
Operations	No change from the baseline concept, PSR Alternative 1C.
Maintainability	No change from the baseline concept, PSR Alternative 1C.
Construction Impacts	Less disruption to the construction operations. Reduces the likelihood of complaints by the RV park owners that may impact the contractor and resulting working day delays.

#### Assumptions and Calculations:

- Assume \$100,000/acre (acquisition).
- TCEs are \$100,000/year to compensate for business loss.

## VA ALTERNATIVE 7.0 (ALBION BRIDGE)

Purchase the RV park in lieu of paying for temporary construction easement

### Initial Cost Estimates

<i>CONSTRUCTION ELEMENT</i>		<i>BASILINE CONCEPT</i>			<i>ALTERNATIVE CONCEPT</i>		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>RIGHT-OF-WAY ITEMS</b>							
Right-of-Way Acquisition	ACRE			\$ -	10	\$ 120,000	\$ 1,200,000
TCE/Business Loss	YR	3	\$ 100,000	\$ 300,000			\$ -
				\$ -			\$ -
<b>RIGHT-OF-WAY TOTAL</b>				\$ 300,000			\$ 1,200,000
<b>TOTAL</b>				\$300,000	\$1,200,000		
<b>TOTAL (Rounded)</b>				\$300,000	\$1,200,000		
						<b>SAVINGS</b>	<b>(\$900,000)</b>

## VA ALTERNATIVE 8.0 (ALBION BRIDGE)

### Improve stopping sight distance at the north end of the Albion Bridge project

---

Initial Cost Savings:	\$0
LCC Savings:	\$0
Change in Schedule:	No change
Performance Change:	+2 %
Value Change:	+2 %

**Description of Baseline Concept:** The baseline concept has sight distance that does not meet current Caltrans standards on the northwest corner of the Albion Bridge for southbound traffic in that the sight distance is impeded by a cut slope.

**Description of Alternative Concept:** Flatten the cut slope to remove the sight restriction. Consider increasing the amount of cut (and perhaps provide a flat area to be used as a vista point, the complementary area suggested in VA Alternative 5.2, but in the opposite direction).

#### Advantages:

- Eliminates sight distance restriction
- Increases viewscape of new bridge and ocean

#### Disadvantages:

- Increases earthwork
- Removes trees (eucalyptus, non-native)

**Discussion:** This concept was developed to address a non-standard condition. It also provides opportunities to improve the viewscape for the vehicle occupants. A review of the site (via Google Earth) indicates that the cut side is not very large. It appears that the new, west alignment will remove the sight distance restriction. This alternative may serve more to ensure that the sight distance restriction is removed. (A question raised by the VA team is whether this obstruction is actually due to the trees more than the bank?) Also, this VA alternative takes the opportunity to increase the available viewscales (bridge and ocean) and allows for the consideration of another southbound vista point.

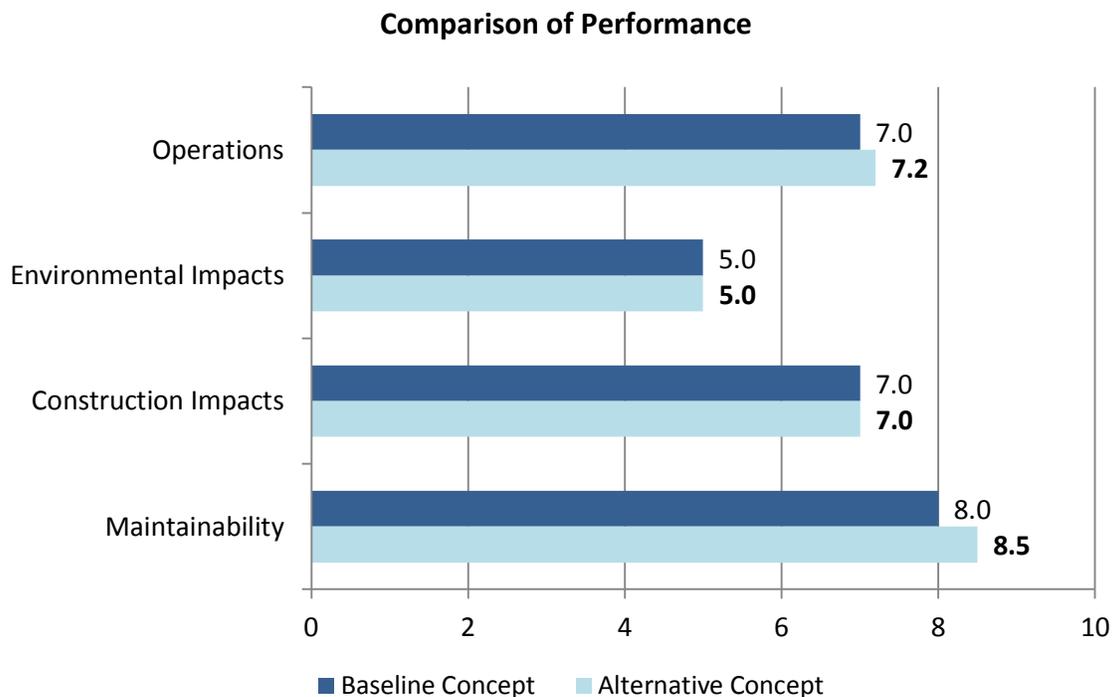
**Technical Review Comments:** None noted.

**Project Management Considerations:** Review, and if favorable, implement into the project concept.

**Discussion of Schedule Impacts:** No significant impacts to the project schedule.

## VA ALTERNATIVE 8.0 (ALBION BRIDGE)

### Improve stopping sight distance at the north end of the Albion Bridge project



### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	Eucalyptus tree removal has a negative visual impact, but offers the opportunity to introduce native species in their place.
Operations	Improve operations as the sight distance restriction is removed for southbound traffic.
Maintainability	Removing the eucalyptus trees nominally reduces the maintenance requirements. It should be noted that native species trees may be required as replacement, outside of the clear recovery zone.
Construction Impacts	No significant change from the baseline concept, PSR Alternative 1C.



## VA ALTERNATIVE 9.1 (ALBION BRIDGE)

### Retrofit, widen, and rehabilitate the existing Albion Bridge

---

Initial Cost Savings:	(\$1,830,000)
LCC Savings:	(\$14,332,000)
Change in Schedule:	+0.5 year
Performance Change:	-30 %
Value Change:	-38 %

**Description of Baseline Concept:** The baseline concept replaces the existing bridge with a new reinforced concrete spandrel arch on a new, parallel alignment to the west of the existing alignment.

**Description of Alternative Concept:** This alternative proposes seismically retrofitting and widening the existing bridge to provide two 12-foot lanes with 8-foot shoulders. This VA alternative will also feature widening on each side to accommodate 5-foot pedestrian walkways.

#### Advantages:

- Maintains existing centerline
- Preserves an historical resource (the existing bridge)

#### Disadvantages:

- Low-speed horizontal curve retained
- High long-term, or life-cycle, costs
- Only defers full replacement of bridge
- Retrofit will not increase load-carrying capacity of bridge
- Annual maintenance costs are increased
- High risk to scope, schedule, and cost creep if condition of bridge is worse than assumed
- High risk during construction if actual condition of bridge proves repair to be unsafe
- Alignment unchanged and would be substandard

**Discussion:** This alternative investigates the cost, schedule, and performance impacts of a rehabilitated structure with same roadbed and non-motorized widths as the baseline concept. The PDT had developed a version of this alternative, but did not have the same width as the baseline concept. In order to compare this concept with the baseline concept, the roadbed widths should be on an "apples to apples" basis. Environmentally, it has the least impact of all "build" alternatives. The future maintenance cost is high and the non-standard curve at the north end of the bridge would not be eliminated.

**Technical Review Comments:** None noted.

**Project Management Considerations:** Review, and if favorable, implement into project concept under consideration to take forward into PA&ED. Perform a detailed life-cycle cost analysis (LCCA) and a Roadway User Cost study associated with the rehab alternative vs. offline build alternatives. The remaining service life of the existing timber bridge is assumed to be 40 years. If the life span is actually shorter, the LCCA would worsen for the rehab alternative.

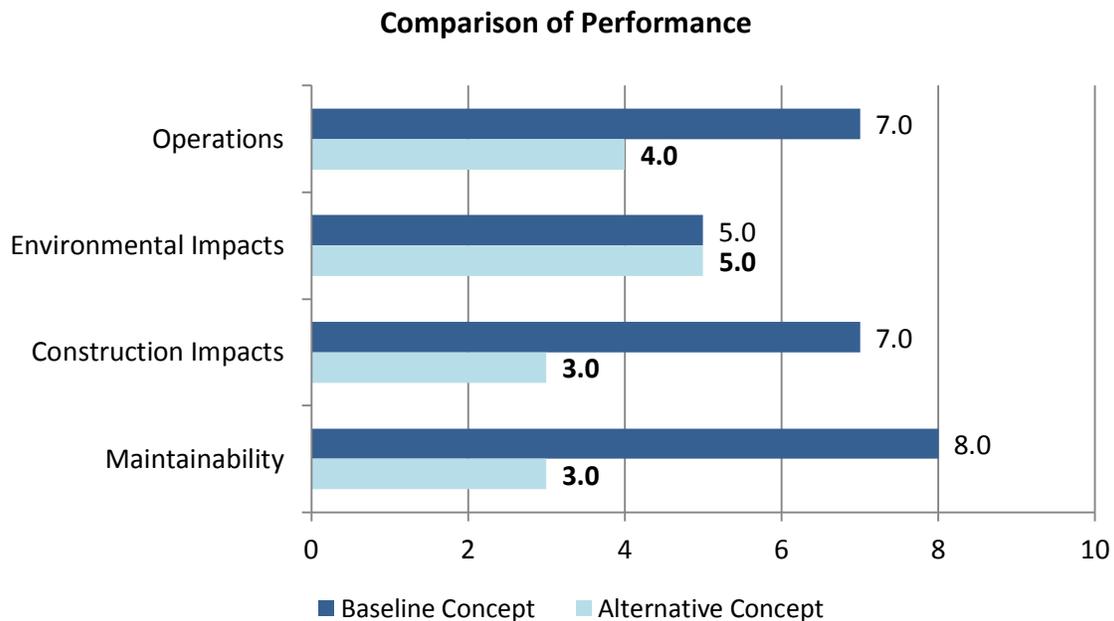
## VA ALTERNATIVE 9.1 (ALBION BRIDGE)

### Retrofit, widen, and rehabilitate the existing Albion Bridge

**Discussion of Schedule Impacts:** The more refined member data needed during design poses major impacts to the schedule that delays the construction and completion of the Albion Replacement Bridge. An exact determination of which members will be replaced is required prior to beginning design. At this point, assume no change to design schedule, but this should be verified.

The one-way traffic control will increase the superstructure reconstruction schedule (as opposed to the baseline concept superstructure). The foundation and structure are being added, therefore no construction duration savings on this aspect, as compared to the baseline concept. Assume the superstructure construction will lead to a 6-month increase in duration.

**Discussion of Risk Impacts:** Working on an existing bridge is inherently risky, since assumptions need to be made during design. Since a timber truss has so many discrete components that require a field assessment for structural soundness, the risk is elevated.



### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	Retains the existing bridge and replicating the look with the widened portions would improve the cultural/community context of this project. The footprint impact associated with the approaches would have no significant change. However, the retrofit alternative would have larger permanent footprint impacts associated with the piers under the structure (as opposed to less piers in the baseline concept); this would have more impact on the land use under the structure.

## VA ALTERNATIVE 9.1 (ALBION BRIDGE)

### Retrofit, widen, and rehabilitate the existing Albion Bridge

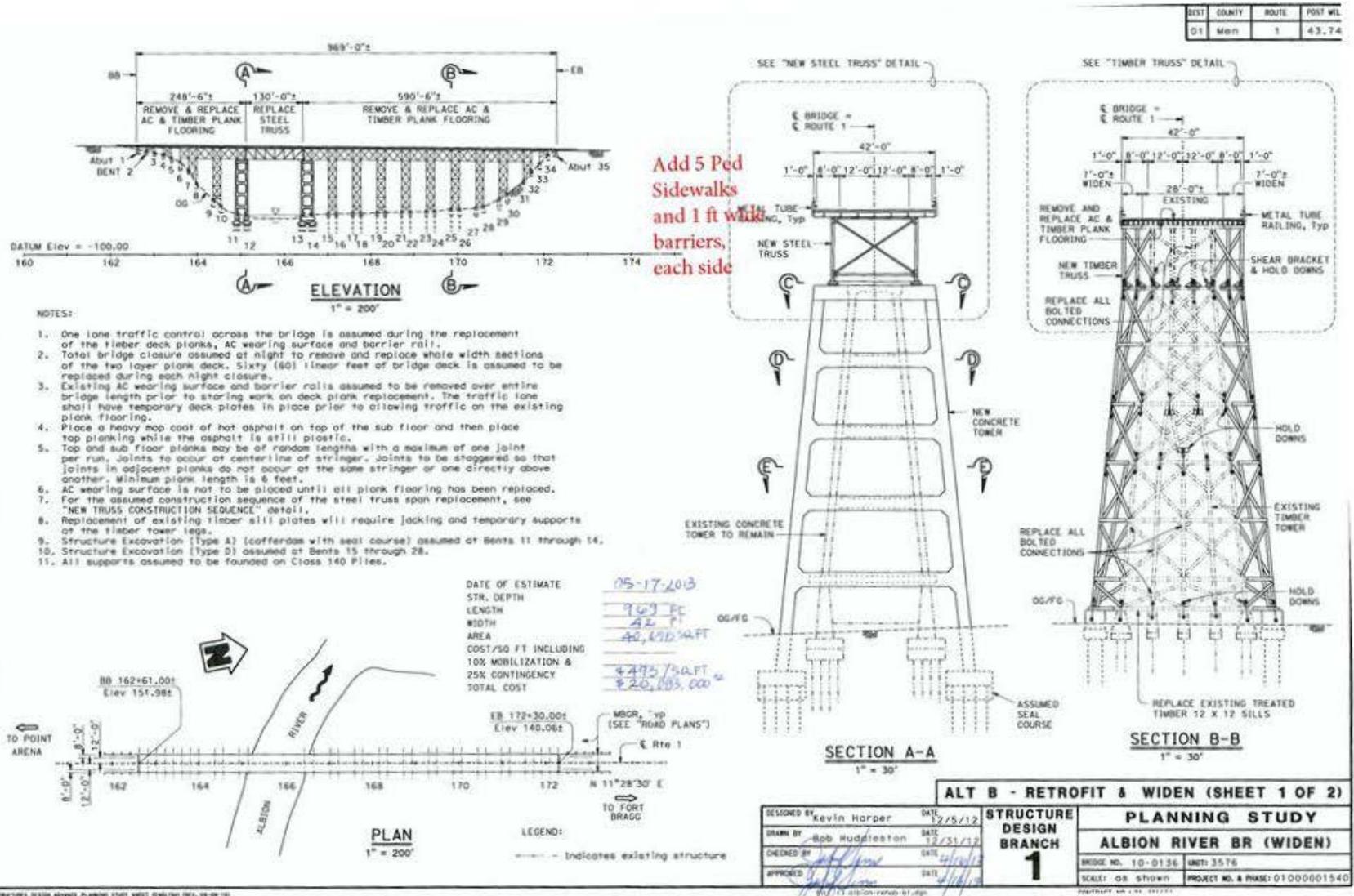
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Performance Attribute	Rationale for Change in Performance
Operations	The horizontal curve on Albion River Bridge will restrict the stopping sight distance to an approximately 28.5 mph design speed. This will impact the operations of the north end of the bridge. The remainder of the corridor has low speed curves as well.
Maintainability	The service life of the existing structure would be approximately half of the baseline concept. Also, the painting and bolt tightening operations required for the existing bridge are considered “added maintenance” to the baseline concept.
Construction Impacts	The project would be built under traffic. This approach will impact the traveling public to a much larger degree over the baseline concept (that replaces the bridge offline). It will require one-way traffic control.

# VA ALTERNATIVE 9.1 (ALBION BRIDGE)

## Retrofit, widen, and rehabilitate the existing Albion Bridge

### VA Alternative Concept Sketch



## VA ALTERNATIVE 9.1 (ALBION BRIDGE)

### Retrofit, widen, and rehabilitate the existing Albion Bridge

#### Assumptions and Calculations:

- Refer to the Feasibility Study for cost figures.
- The Feasibility Study figures were increased proportionately to include the 8' shoulders, plus the 5' sidewalks plus barrier.
- The alternative roadway costs are based on the PSR estimates for PSR Alternative 3A, 3B. That cost is estimated to be \$13,250,000. This is approx. \$3 million more due to the realignment of the county road, retaining walls and other roadway impacts.

#### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>ROADWAY ITEMS</b>							
Roadway Costs	LS	1	\$ 10,306,000	\$ 10,306,000	1	\$ 13,250,000	\$ 13,250,000
				\$ -			\$ -
<b>ROADWAY SUBTOTAL</b>				\$ 10,306,000			\$ 13,250,000
<b>ROADWAY MARK-UP (Included above)</b>				\$ -			\$ -
<b>ROADWAY TOTAL</b>				\$ 10,306,000			\$ 13,250,000
<b>STRUCTURE ITEMS</b>							
Structure Costs	LS	1	\$ 26,933,000	\$ 26,933,000	1	\$ 25,821,000	\$ 25,821,000
				\$ -			\$ -
<b>STRUCTURE SUBTOTAL</b>				\$ 26,933,000			\$ 25,821,000
<b>STRUCTURE MARK-UP (included above)</b>				\$ -			\$ -
<b>STRUCTURE TOTAL</b>				\$ 26,933,000			\$ 25,821,000
<b>TOTAL</b>					\$37,239,000		\$39,071,000
<b>TOTAL (Rounded)</b>					\$37,240,000		\$39,070,000
						<b>SAVINGS</b>	<b>(\$1,830,000)</b>

## VA ALTERNATIVE 9.1 (ALBION BRIDGE)

### Retrofit, widen, and rehabilitate the existing Albion Bridge

#### Life-Cycle Cost Estimates

Life-Cycle Period	75	Years	Real Discount Rate	3.50%	BASELINE	ALTERNATIVE
<b>A. INITIAL COST</b>					\$37,240,000	\$39,070,000
Service Life - Baseline	75	Years	<b>INITIAL COST SAVINGS:</b>			
Service Life - Alternative	40	Years				\$ (1,830,000)
<b>B. SUBSEQUENT ANNUAL COSTS</b>						
1. Bolt Tightening, applied for 40 years						\$ 100,000
2. Painting Existing Truss of the Timber Bridge, applied for 40 years						\$ 50,000
3. Painting Costs - Concrete Barriers (New Bridge) applied for 40 years					\$ 5,000	
<i>The above (Items 1 through 3) differentiate the baseline vs alternative annualized costs until the rehabbed bridge is replaced.</i>						
<b>Total Subsequent Annual Costs:</b>					\$ 5,000	\$ 150,000
<b>Present Value Factor (P/A):</b>					21.355	21.355
<b>PRESENT VALUE OF SUBSEQUENT ANNUAL COSTS (Rounded):</b>					\$ 107,000	\$ 3,203,000
<b>C. SUBSEQUENT SINGLE COSTS</b>			<b>Year</b>	<b>Amount</b>	<b>PV Factor (P/F)</b>	<b>Present Value</b>
Replace Existing Bridge- Service Life Expend			40	\$37,240,000	0.25257	\$ 9,405,799
					1.00000	\$ -
<b>PRESENT VALUE OF SUBSEQUENT SINGLE COSTS (Rounded):</b>					\$ -	\$ 9,406,000
<b>D. TOTAL SUBSEQUENT ANNUAL AND SINGLE COSTS (B+C)</b>					\$ 107,000	\$ 12,609,000
<b>E. TOTAL SUBSEQUENT COSTS SAVINGS:</b>						\$ (12,502,000)
<b>F. TOTAL PRESENT VALUE COST (A+D)</b>					\$ 37,347,000	\$ 51,679,000
<b>TOTAL LIFE-CYCLE SAVINGS:</b>						\$ (14,332,000)

*Note: This analysis does not include the road user cost caused by the one-way traffic control and queues.*

## VA ALTERNATIVE 9.2 (ALBION BRIDGE)

### Build on existing centerline using a detour that uses existing roads/detour

---

Initial Cost Savings:	(\$7,600,000)
LCC Savings:	\$0
Change in Schedule:	+1 year
Performance Change:	-30 %
Value Change:	-45 %

**Description of Baseline Concept:** The baseline concept replaces the existing bridge with a new reinforced concrete spandrel arch on a new, parallel alignment to the west of the existing alignment.

**Description of Alternative Concept:** This alternative replaces the existing bridge generally on the same alignment, but will include an upgrade to the horizontal curve on the north end of the bridge. Traffic during construction will be carried on the old road (Highway 1 prior to the construction of the existing bridge), which now serves as an access road to the marina/RV park across the river. The temporary bridge will be a low-level crossing of the Albion River and adjacent wetlands. The roadway will need to be widened; select curves would need to be flattened.

#### Advantages:

- Right-of-way costs potentially lower
- Minimizes need for cuts/fills
- Reduces long-term environmental impact

#### Disadvantages:

- Major impacts to both Highway 1 traffic and local traffic
- Substandard alignment that limits the design speed into the 10 to 20 mph threshold
- Temporary bridge that may impact navigation
- Additional construction duration
- Additional design effort for temporary bridge
- Existing bridge components to be left in place may conflict with new bridge components
- Impacts property owners adjacent to detour
- Out-of-the-way vehicular and non-motorist travel
- Increased ESL
- Extensive environmental mitigation needed
- Coast Guard permits and requirements associated with the temporary crossing will be more onerous

**Discussion:** This alternative was developed as a means to investigate the impacts of replacing the bridge with the minimal amount of alignment/footprint changes. Maintaining the existing alignment is a common alternative analysis requested by the permitting agencies. The proposed detour will have heavy impacts on the traveling public and the community for an extended period of time.

**Technical Review Comments:** May need to address American Disabilities Act (ADA) requirements for pedestrians on the detour.

## VA ALTERNATIVE 9.2 (ALBION BRIDGE)

### Build on existing centerline using a detour that uses existing roads/detour

**Project Management Considerations:** Significant marketing to the public is needed to justify the need to impact the local stakeholder residential streets; may need to consider other long-term benefit to them. Validate costs attached and request Right of Way and Environmental to perform a better cost basis for right of way and environmental cost impacts associated with this VA alternative. Evaluate if this is a viable alternative to carry forward.

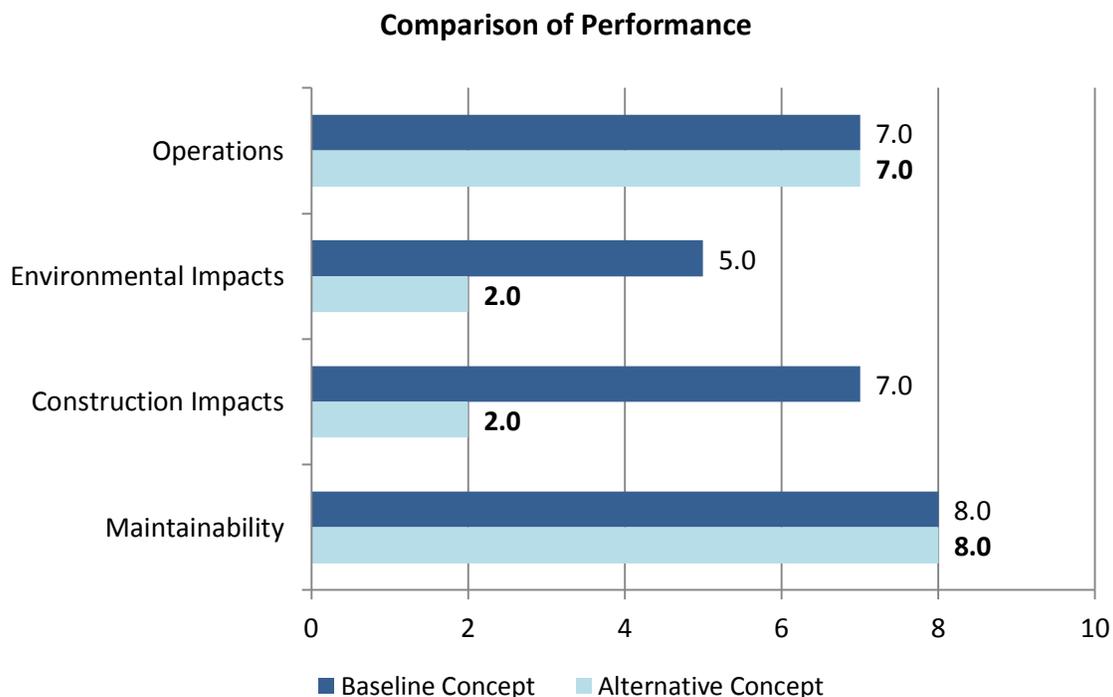
**Discussion of Schedule Impacts:** Minor impacts to schedule. A small, relatively simple, low-level temporary bridge would not significantly increase design time. The detour route work could possibly occur outside the construction window for the permanent bridge.

The construction duration will be extended by approximately one year:

- Upgrade existing roadway/new temporary bridge over the river: 1 year
- Remove the existing Albion River Bridge: 1 year
- Build new bridge: 2 years
- *Total of 4 years (versus baseline's 3 years)*

This is one more year of construction duration as compared to the baseline concept.

**Discussion of Risk Impacts:** The major risks with this alternative are associated with the detour route. Safety may be compromised. The full impact to local traffic may not be realized until the route is used for a period of time. The true impact may be intolerable for local traffic and the contract would need to be changed to make it tolerable.



## VA ALTERNATIVE 9.2 (ALBION BRIDGE)

### Build on existing centerline using a detour that uses existing roads/detour

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#### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	Improving the local roadway to handle Route 1 traffic will impact a larger footprint than building the offline new bridge concepts (i.e., the baseline). The temporary bridge approach fills will encroach into the riparian habitat of the Albion River. There are impacts to local fisheries associated with the temp crossing.
Operations	No change to highway operations from the baseline concept, PSR Alternative 1C.
Maintainability	Ultimately, no change from the baseline concept, PSR Alternative 1C.
Construction Impacts	Community impacts are adverse for the duration of the detour, approximately 3 years. These include the inconvenience and temporary impacts of routing Route 1 traffic through the community.

# VA ALTERNATIVE 9.2 (ALBION BRIDGE)

Build on existing centerline using a detour that uses existing roads/detour

### VA Alternative Concept Sketch



## VA ALTERNATIVE 9.2 (ALBION BRIDGE)

### Build on existing centerline using a detour that uses existing roads/detour

#### Assumptions and Calculations:

The cost assumptions for the right-of-way acquisition (permanent and temporary) and the environmental mitigation were difficult for the VA team to assess. The VA team suspects that the cost for right of way and environmental mitigation may be higher. At this point in time, the VA team made a rough estimate of \$2 million cost add each for right of way and environmental mitigation (total \$4 million cost add).

The alternative roadway costs are based on the PSR estimates for PSR Alternative 3A, 3B. That cost is estimated to be \$13,250,000. This is approx. \$3 million more due to the realignment of the county road, retaining walls, and other roadway impacts.

#### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>ROADWAY ITEMS</b>							
Approach Roadway	LS	1	\$ 10,306,000	\$ 10,306,000	1	\$ 13,250,000	\$ 13,250,000
Detour Roadway & Upgrades	MILE			\$ -	0.5	\$ 2,000,000	\$ 1,000,000
Temporary Bridge	LF			\$ -	250	\$ 2,035	\$ 508,750
Temp Bridge Demo	LS			\$ -	1	\$ 150,000	\$ 150,000
Local Rehabilitation	LF			\$ -	3,000	\$ 333	\$ 1,000,000
				\$ -			\$ -
<b>ROADWAY SUBTOTAL</b>				\$ 10,306,000			\$ 15,908,750
<b>ROADWAY MARK-UP (Included above)</b>				\$ -			\$ -
<b>ROADWAY TOTAL</b>				\$ 10,306,000			\$ 15,908,750
<b>RIGHT-OF-WAY ITEMS</b>							
Permanent and Temp Acquisition	LS				1	\$ 1,000,000	\$ 1,000,000
<b>RIGHT-OF-WAY TOTAL</b>				\$ -			\$ 1,000,000
<b>ENVIRONMENTAL MITIGATION ITEMS</b>							
Mitigation	LS				1	\$ 1,000,000	\$ 1,000,000
<b>TOTAL</b>				\$10,306,000			\$17,908,750
<b>TOTAL (Rounded)</b>				\$10,310,000			\$17,910,000
						<b>SAVINGS</b>	<b>(\$7,600,000)</b>

## VA ALTERNATIVE 9.3 (ALBION BRIDGE)

### Build on-alignment (west) carrying two lanes of traffic and pedestrians

---

Initial Cost Savings:	(\$19,150,000)
LCC Savings:	\$0
Change in Schedule:	-2 years
Performance Change:	-1 %
Value Change:	-38 %

**Description of Baseline Concept:** The baseline concept replaces the existing bridge with a new reinforced concrete spandrel arch on a new, parallel alignment to the west of the existing alignment.

**Description of Alternative Concept:** This alternative proposes to have the new centerline as close to the existing centerline as possible and maintain two lanes of vehicular traffic and pedestrians during construction. This concept will include an upgrade to the horizontal curve on the north end of the bridge.

#### Advantages:

- Right-of-way costs potentially reduced
- Minimizes need for cuts/fills

#### Disadvantages:

- Increases impacts to local traffic (1 more shift during stage construction)
- Increases construction working days
- Increases construction costs
- Aesthetics impacted, especially the rib

**Discussion:** This alternative investigates the cost, schedule, and performance impacts of a staged, half-width structure with same roadbed and non-motorized widths as the baseline concept. The PSR alternative was modified by the VA team to include the ability to carry two lanes of traffic. The alignment associated with this alternative would more closely preserve the existing alignment of the highway – a consideration for some of the permitting agencies. Compared to the baseline, this alternative is more expensive and will take longer to build.

**Technical Review Comments:** None noted.

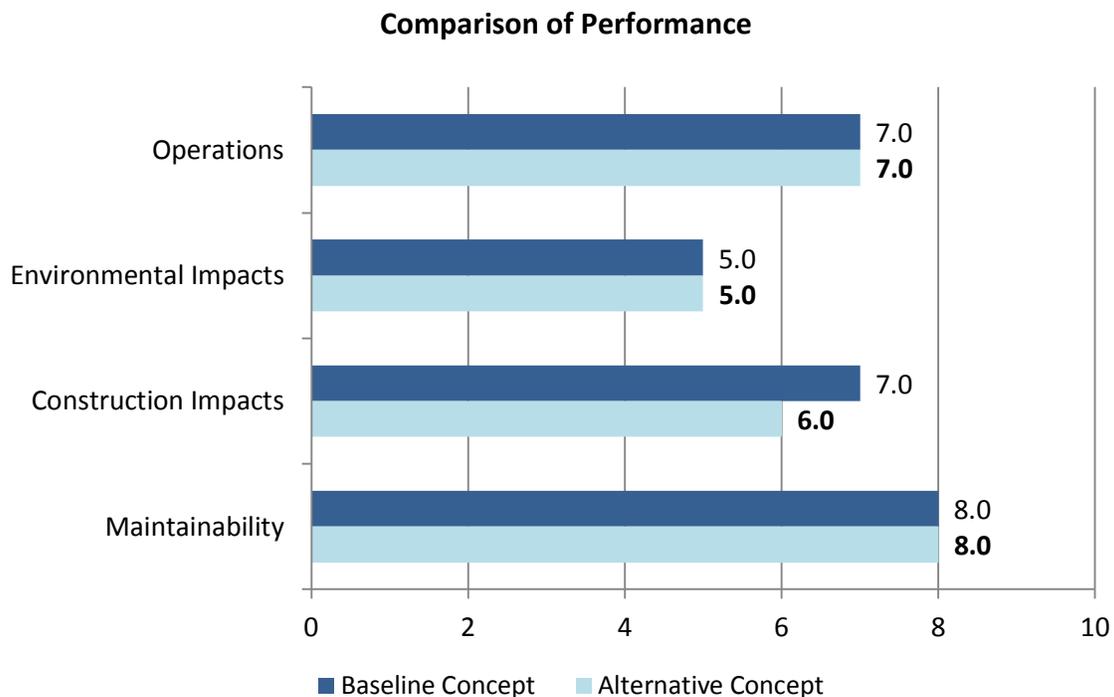
**Project Management Considerations:** Evaluate if this is a viable alternative to carry forward. Verify the costs, especially the roadway costs, which are based on very rough assumptions.

**Discussion of Schedule Impacts:** The additional design time required of this alternative would delay the beginning of construction by 6 months. Furthermore, the construction duration would be an additional 1.5 years, resulting in a 2-year net increase in schedule.

**Discussion of Risk Impacts:** Maintaining the pedestrian walkway could cause growth in construction costs and working days. The longer design duration could impact the fund availability.

## VA ALTERNATIVE 9.3 (ALBION BRIDGE)

### Build on-alignment (west) carrying two lanes of traffic and pedestrians



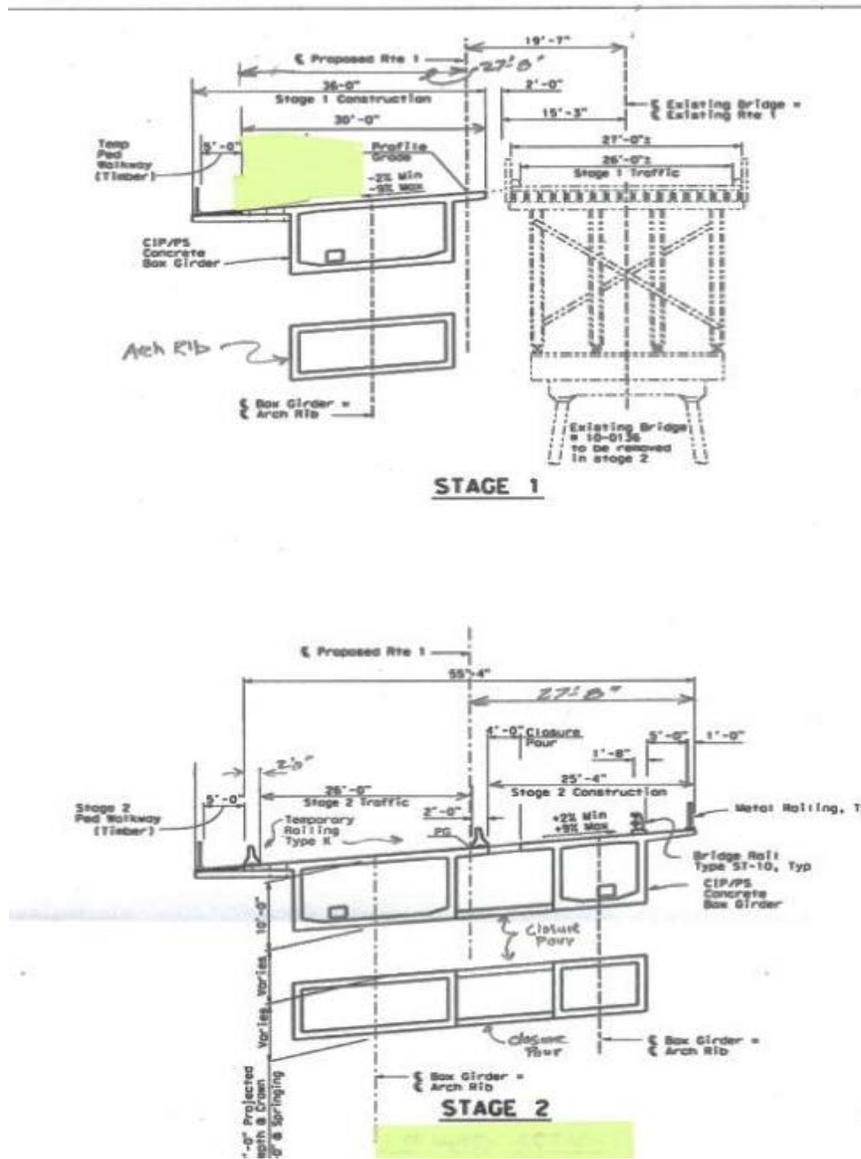
### Performance Assessment

Performance Attribute	Rationale for Change in Performance
Environmental Impacts	No change from the baseline. The footprint impact – especially that associated with the approaches – would have no significant change over the baseline concept.
Operations	No change from the baseline concept, PSR Alternative 1C.
Maintainability	No change from the baseline concept, PSR Alternative 1C.
Construction Impacts	The construction traffic impacts will be greater than baseline. The traffic will be shoe-horned between barriers and will require two shifts: Existing-Stage 1, Stage 1-Stage 2, Stage 2-Final Configuration. This is one additional shift over the baseline concept. Also, equipment on the top abutment slopes for much of the construction operations.

# VA ALTERNATIVE 9.3 (ALBION BRIDGE)

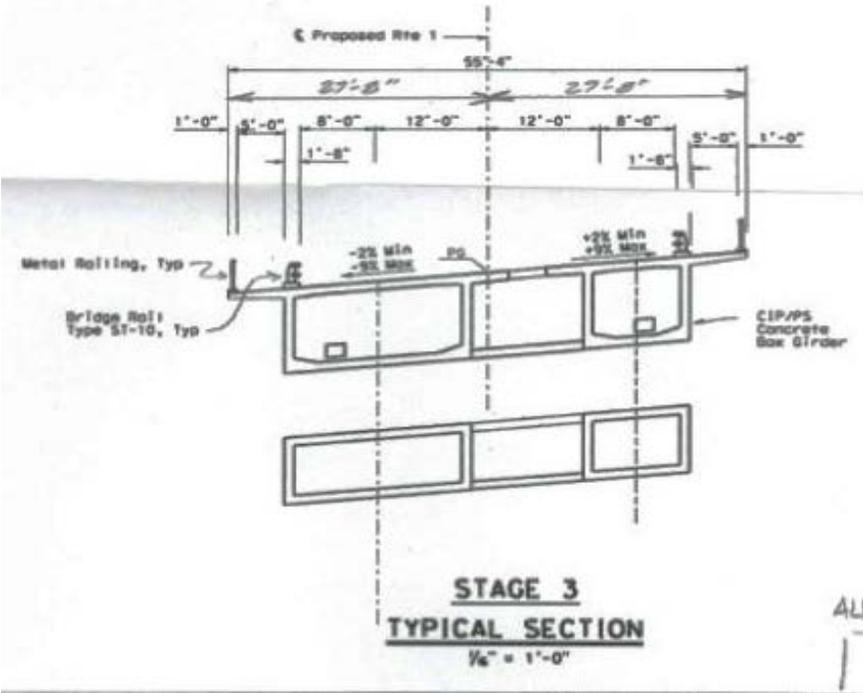
Build on-alignment (west) carrying two lanes of traffic and pedestrians

## VA Alternative Concept Sketches



**VA ALTERNATIVE 9.3 (ALBION BRIDGE)**

**Build on-alignment (west) carrying two lanes of traffic and pedestrians**



## VA ALTERNATIVE 9.3 (ALBION BRIDGE)

### Build on-alignment (west) carrying two lanes of traffic and pedestrians

**Assumptions and Calculations:** The alternative roadway costs are based on the PSR estimates for PSR Alternative 3A, 3B. That cost is estimated to be \$13,250,000. This is approx. \$3 million more due to the realignment of the county road, retaining walls and other roadway impacts.

#### Initial Cost Estimates

CONSTRUCTION ELEMENT		BASELINE CONCEPT			ALTERNATIVE CONCEPT		
Description	Unit	Qty	Cost/Unit	Total	Qty	Cost/Unit	Total
<b>ROADWAY ITEMS</b>							
Approach Roadway	LS	1	\$ 10,306,000	\$ 10,306,000	1	\$ 13,250,000	\$ 13,250,000
				\$ -			\$ -
<b>ROADWAY SUBTOTAL</b>				\$ 10,306,000			\$ 13,250,000
<b>ROADWAY MARK-UP (included above)</b>				\$ -			\$ -
<b>ROADWAY TOTAL</b>				\$ 10,306,000			\$ 13,250,000
<b>STRUCTURE ITEMS</b>							
Bridge	LS	1	\$ 26,933,000	\$ 26,933,000	1	\$ 44,474,000	\$ 44,474,000
<b>STRUCTURE SUBTOTAL</b>				\$ 26,933,000			\$ 44,474,000
<b>STRUCTURE MARK-UP (included above)</b>				\$ -			\$ -
<b>STRUCTURE TOTAL</b>				\$ 26,933,000			\$ 44,474,000
<b>RIGHT-OF-WAY ITEMS</b>							
Right-of-Way Acquisition	LS	1	\$ 1,176,000	\$ 1,176,000	1	\$ 750,000	\$ 750,000
Project Development Permit Fees	LS	1	\$ 12,500	\$ 12,500	1	\$ 12,500	\$ 12,500
Title and Escrow Fees	LS	1	\$ 16,000	\$ 16,000	1	\$ 16,000	\$ 16,000
<b>RIGHT-OF-WAY TOTAL</b>				\$ 1,188,500			\$ 762,500
<b>ENVIRONMENTAL MITIGATION ITEMS</b>							
Mitigation	LS	1	\$ 2,417,000	\$ 2,417,000	1	\$ 1,500,000	\$ 1,500,000
				\$ -			\$ -
<b>TOTAL</b>				\$40,844,500			\$59,986,500
<b>TOTAL (Rounded)</b>				\$40,840,000			\$59,990,000
						<b>SAVINGS</b>	<b>(\$19,150,000)</b>

# PROJECT INFORMATION

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# PROJECT INFORMATION

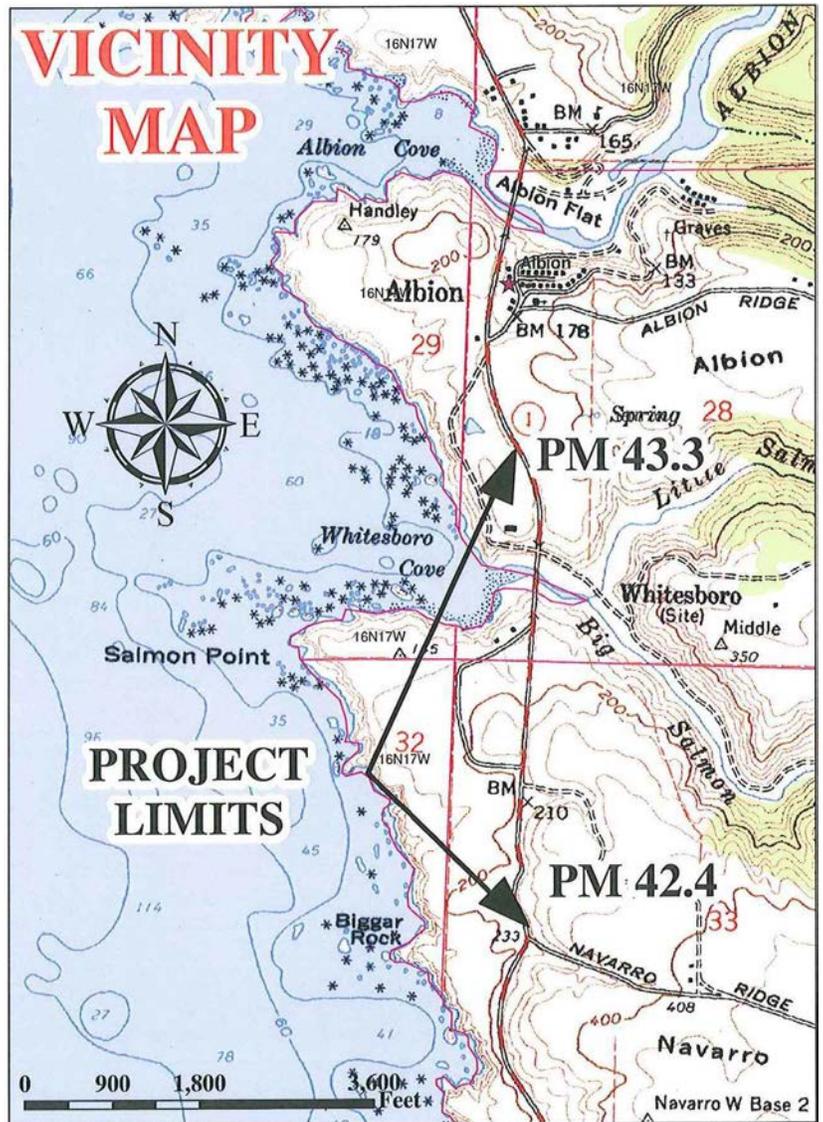
## BACKGROUND

### *Salmon Creek Bridge Replacement Project*

The Salmon Creek Bridge Project is located on State Route 1 in Mendocino County, from PM 42.4 to PM 43.3, near Albion, 2.2 miles north of the SR 128 junction.

The existing facility within the project limits is a two-lane conventional highway and was most recently paved with open-graded asphalt concrete (OGAC) in 2001. The posted speed limit is 50 mph. The vertical profile consists of an 800-foot vertical sag curve with the low point located near the bridge's center. Approaching grades consist of a -7.00% north-aspect grade entering from the south and a 6.00% percent south-aspect grade exiting to the north. The structure is located on a tangent.

The structure is fracture-critical due to a lack of redundancy of the steel deck truss and steel floor beam members and is designated as Structurally Deficient due to the condition of the deck and Functionally Obsolete due to deck geometry.





## Salmon Creek Bridge Replacement Baseline Concept

The baseline concept, PSR Alternative 2B, consists of an east alignment with a concrete arch structure type. The east side alignment coincides with a 700- to 720-foot-long replacement structure that is 131 to 138 feet high, located on a 1,000-foot vertical sag curve. The proposed centerline, at the location of the Salmon Creek Bridge, is 50 feet offset east and parallels the existing bridge alignment. This alternative will allow two traffic lanes to remain open during most of the construction. The structure type for PSR 2B is a 5-span, cast-in-place concrete arch. This design alternative was used as the baseline project as it is neutral in environmental impacts, has less right-of-way impacts, and appears the most cost effective.

The following summarizes the cost for the Salmon Creek Bridge Replacement project costs:

Roadway	\$13.8 Million
Structures	\$19.3 Million
Construction Subtotal	\$33.0 Million
<u>Right of Way</u>	<u>\$3.1 Million</u>
<i>Total</i>	<i>\$36.2 Million</i>

The construction duration is estimated at two seasons. The following is the project schedule.

<u>HQ Milestones</u>	<u>Delivery Date</u>
Begin Environmental	09/01/10
Circulate DED	06/01/14
PA&ED	10/01/14
Project PS&E	07/01/16
Right of Way Certification	01/01/17
Ready to List	01/15/17
Approve Contract	07/15/17
Contract Acceptance	08/01/19
End Project	08/01/19

The following pages are key project drawings and cost estimate associated with the Salmon Creek Bridge Replacement baseline concept.

# ALTERNATIVE 2

## 01-40140K-MEN-1 PM 42.4/ 43.3

### SALMON CREEK BRIDGE REPLACEMENT



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
1	MEN	1	42.4 / 43.3	2	4

REGISTERED CIVIL ENGINEER DATE	
PLANS APPROVAL DATE	

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN SHEET.



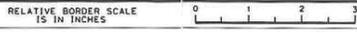
	EGL
	EXISTING R/W BOUNDARY
	ARM LINES
	SECTION LINES
	ALTERNATIVE 2
	CUT LINE
	FILL LINE
	PROPOSED TOE
	PROPOSED FEE

CURVE	DELTA	RADIUS	DESIGN SPEED	LENGTH	PC	PVI	PNT	PT	TO BE ADJUSTED
12336001	100.00	100.00	10.00	10.00	10.00	10.00	10.00	10.00	0.00
12336002	100.00	100.00	10.00	10.00	10.00	10.00	10.00	10.00	0.00

**DESIGN STUDY ONLY**

**PROJECT LAYOUTS**

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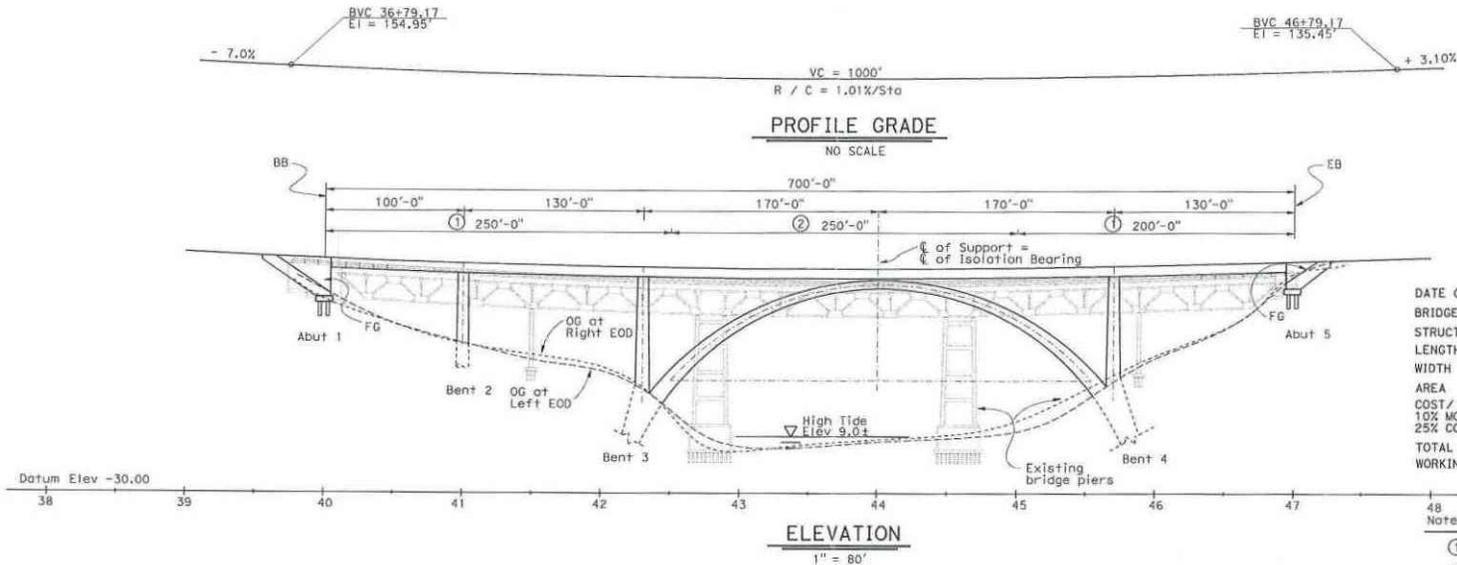
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DGN FILE => \$REQUEST

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LAST MODIFIED DATE PLOTTED => DATE  
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DIST	COUNTY	ROUTE	POST MILE
01	Men	1	

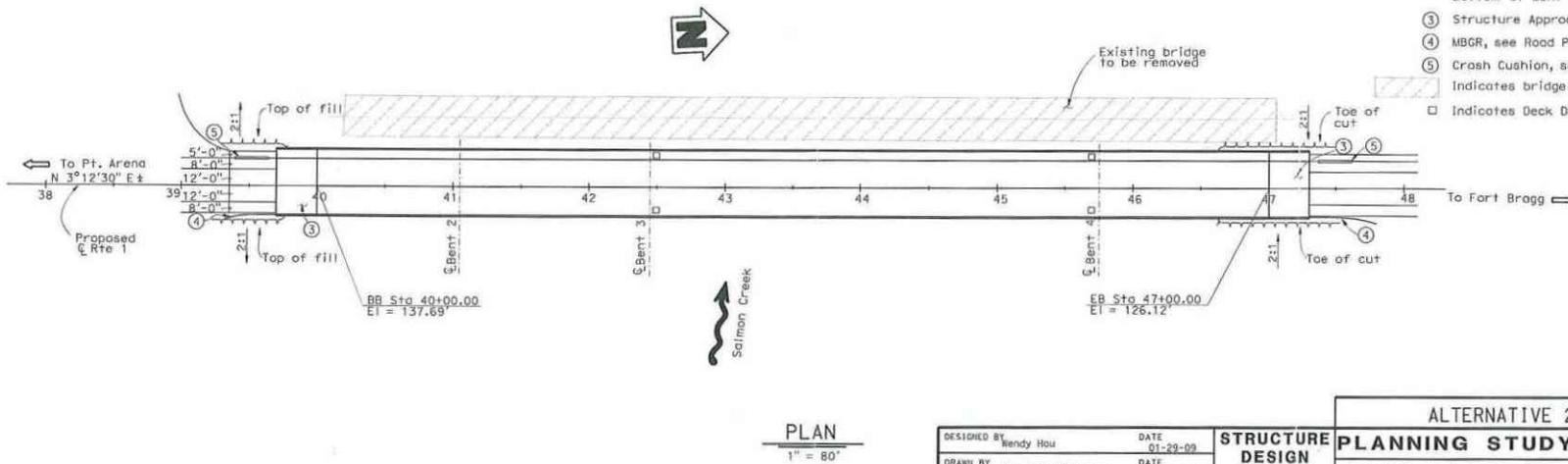
To get to the Caltrans web site,  
go to: <http://www.dot.ca.gov>



DATE OF ESTIMATE	5-12-2009
BRIDGE REMOVAL	= \$822,000
STRUCTURE DEPTH	= 6'-9"
LENGTH	= 700'-0"
WIDTH	= 49.67'
AREA	= 34,769 SQFT
COST/□ INCLUDING 10% MOBILIZATION & 25% CONTINGENCY	= \$752.45
TOTAL COST	= \$26,984,000
WORKING DAYS	= 280

Notes :

- ① Limits of scuppers in barriers.
  - ② Limits of Deck Drain Type D-3. Drain pipe to discharge at bottom of Bent 3.
  - ③ Structure Approach Type N (30S)
  - ④ MBGR, see Road Plans
  - ⑤ Crash Cushion, see Road Plans.
- ▨ Indicates bridge removal
- Indicates Deck Drain Type D-3



DESIGNED BY	Wendy Hou	DATE	01-29-09
DRAWN BY	Y Feng/G Dickerson	DATE	05-14-09
CHECKED BY	X	DATE	X
APPROVED	David Soon	DATE	05-18-09

**STRUCTURE  
DESIGN  
BRANCH**  
**7**

ALTERNATIVE 2B	
<b>PLANNING STUDY 1 OF 2</b>	
<b>SALMON CREEK BRIDGE (REPLACE)</b>	
BRIDGE NO. 10-0134	CU 01
SCALE: As noted	EA 40140k

DIST	COUNTY	ROUTE	POST MILE
01	Men	1	

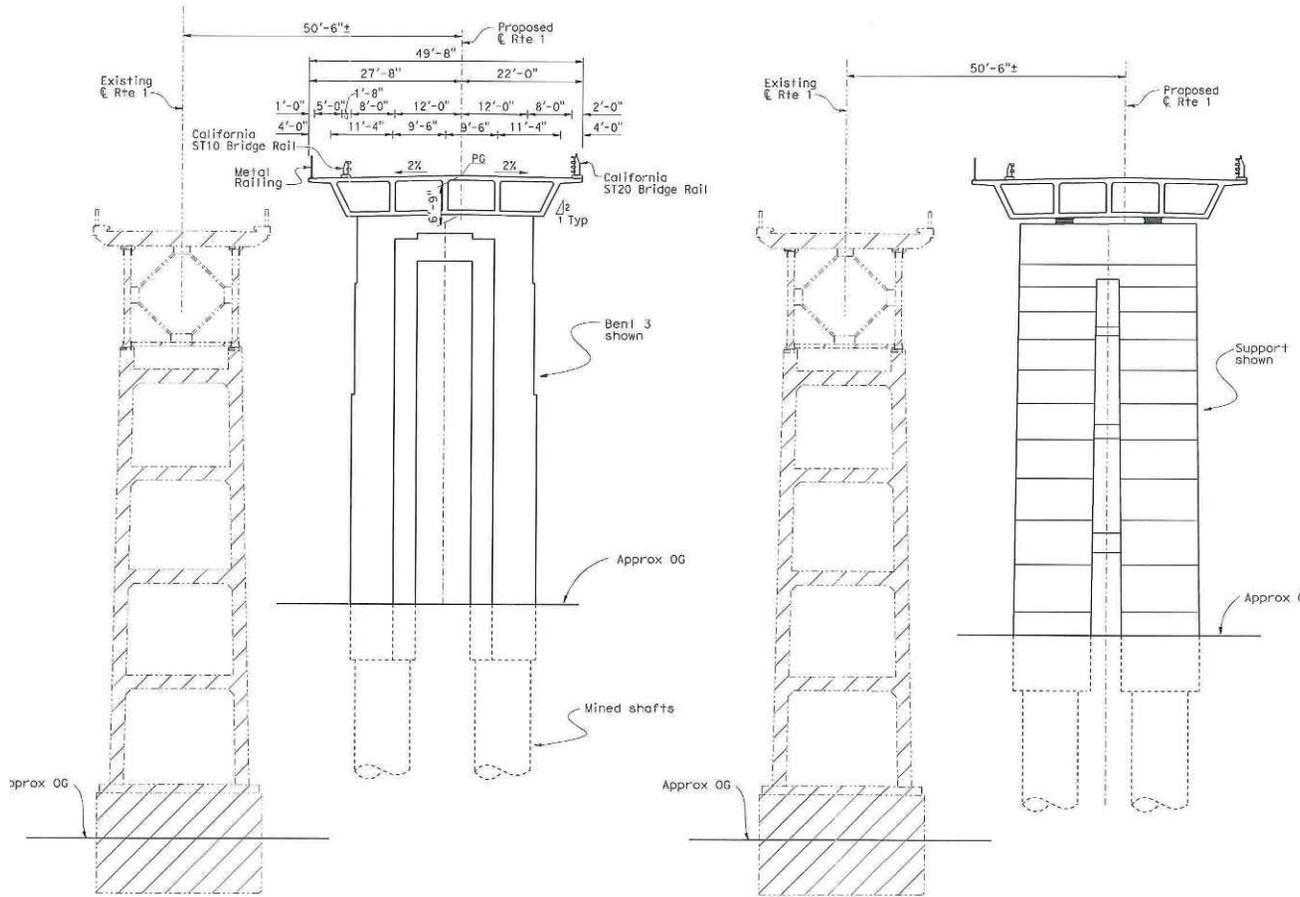
Go to the Caltrans web site,  
go to: <http://www.dot.ca.gov>

Design Assumptions:

- Hydraulic information was based on "Preliminary Hydraulic Report (PHR) for Salmon Creek (Br. No. 10-0134)" memo dated Nov. 24, 2008.
  - High Tide elevation is assumed to be 9.0' based of the 1949 bridge As-Builts.
  - 050 and 0100 water surface elevations (WSE) are 8.4' and 9.2', respectively. The WSEs were based on provided contour & not measured channel cross-section. 050 and 0100 WSEs calculated from measured channel cross-section will be required for the final design of the replacement bridge.
- Foundation information was based on the "Structure Preliminary Geotechnical Report" memo dated Dec. 11, 2008.
  - Assumed foundation types:
    - Abutments - driven steel "H" piles.
    - Piers - 8' to 10' diameter CIDH shafts founded in bedrock.
  - A settlement period may be required for new approach embankments.
- Deck drainage discharge shall be at least 20' from the limits of the creek at high tide.
- The listed assumed environmental restrictions were taken from the (nearby) Noyo River Bridge (replacement) project (EA 01-378004).
  - Work in Salmon Creek from June 1st to October 15th only, due to fish spawning.
- Limits of removal:
  - Abutment 1 and Abutment 6 remove existing structure to 3 feet below finish grade.
  - Pier 2,3,4, and 5 remove to bottom of footing. All piles to stay in place.
- Cast-in-place construction supported on falsework. Maximum falsework high will be approximately 130 feet at Salmon Creek. A wooden trestle will be built across Salmon Creek to support falsework.
- Telephone lines and power line are present on the east side of the existing structure. These utilities may require relocation.

Notes:

- Indicates existing
- ▨ Indicates limits of removal



**TYPICAL SECTION A**  
1" = 20'

**TYPICAL SECTION B**

1" = 20'

DESIGNED BY	Wandy Hou	DATE	01-27-09
DRAWN BY	YingJue Feng	DATE	01-27-09
CHECKED BY	X	DATE	X
APPROVED	David Soon	DATE	05-18-09

**STRUCTURE  
DESIGN  
BRANCH  
7**

ALTERNATIVE 2B	
<b>PLANNING STUDY 2 OF 2</b>	
<b>SALMON CREEK BRIDGE (REPLACE)</b>	
BRIDGE NO. 10-0134	CU 01
SCALE: AS NOTED	EA 40140k

Project Study Report-Cost Estimate



01-MEN-01

PM 42.4/43.3

EA 01-40140K

HA21 PROGRAM / 20.10.201.110

**SALMON CREEK BRIDGE REPLACEMENT PROJECT**

**ALTERNATIVE 2:  
EAST-SIDE REPLACEMENT BRIDGE CONSTRUCTED CLEAR OF EXISTING  
SALMON CREEK BRIDGE**

PROJECT DESCRIPTION:

LIMITS: The Salmon Creek Bridge is located on State Route 1 in Mendocino County, from PM 43.00 to PM 43.13, near Albion, 2.7 miles north of the Route 128 junction. Limits of work are between PM 42.4 and 43.3.

PROPOSED IMPROVEMENT (SCOPE): Project proposes to replace the Salmon Creek Bridge (#10-0134) east of the existing structure. Also included in this project is realignment, shouldering widening, culvert replacement, and drainage work.

SUMMARY OF ESTIMATED COST (2009)

	<u>2A</u>	<u>2B</u>	<u>2C</u>	<u>2D</u>
TOTAL ROADWAY ITEMS	\$13,791,000	\$13,791,000	\$13,791,000	\$13,791,000
TOTAL STRUCTURE ITEMS	\$19,253,000	\$26,984,000	\$27,075,000	\$22,895,000
SUBTOTAL CONSTRUCTION COSTS	\$33,044,000	\$40,775,000	\$40,866,000	\$36,686,000
TOTAL RIGHT OF WAY ITEMS	\$3,134,000	\$3,134,000	\$3,134,000	\$3,134,000
TOTAL PROJECT CAPITAL OUTLAY COSTS	\$36,178,000	\$43,909,000	\$44,000,000	\$39,820,000
CALL	\$36,200,000	\$44,000,000	\$44,000,000	\$39,900,000

Reviewed by District Program Manager \_\_\_\_\_ Date \_\_\_\_\_

Approved by Project Manager \_\_\_\_\_ Date \_\_\_\_\_

**I. ROADWAY ITEMS**

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost
Clearing & Grubbing	1	LS	\$500,000	\$500,000
Roadway Excavation	175,547	CY	\$25	\$4,388,672
<b>Subtotal Earthwork</b>				<b>\$4,888,672</b>

Section 2 Pavement Structural Section	Quantity	Unit	Unit Price	Item Cost
Hot Mix Asphalt - Type A	4,600	TON	\$85	\$391,000
OGFC	1,600	TON	\$105	\$168,000
Aggregate Base (Class 2)	8,300	CY	\$50	\$415,000
Pavement Reinforcing Fabric	3,500	SQYD	\$2	\$7,000
Cold Plane AC	1,000	SQYD	\$4	\$4,000
Obiterate Surfacing	10,100	SQYD	\$10	\$101,000
<b>Subtotal Pavement Structural Section</b>				<b>\$1,086,000</b>

Section 3 Drainage	Quantity	Unit	Unit Price	Item Cost
Install / Modify / Replace Culvert	7	EA	\$45,000	\$315,000
<b>Subtotal Drainage</b>				<b>\$315,000</b>

Section 4 Specialty Items	Quantity	Unit	Unit Price	Item Cost
Progress Schedule (Critical Path)	1	LS	\$10,000	\$10,000
Erosion Control and Highway Planting	1	LS	\$390,000	\$390,000
Prepare Storm Water Pollution Prevention Plan	1	LS	\$10,000	\$10,000
Construction Site BMP Items	1	LS	\$1,100,000	\$1,100,000
Transition Railing (Type WB)	4	EA	\$5,000	\$20,000
Terminal Section (Type C)	4	EA	\$250	\$1,000
Construction Access	3	LS	\$199,000	\$199,000
Incentive for Asphalt Concrete (QC/QA) (4% of HMA)	1	LS	\$22,360	\$22,360
<b>Subtotal Specialty Items</b>				<b>\$1,752,360</b>

Section 5 Traffic Items	Quantity	Unit	Unit Price	Item Cost
Thermoplastic Striping (4")	28,934	FT	\$1.40	\$40,508
Pavement Marker (Retroreflective)	343	EA	\$10.00	\$3,432
Portable Changeable Message Sign (PCMS)	2	EA	\$6,500	\$13,000
Relocate Roadside Sign	1	LS	\$20,000	\$20,000
Remove Roadside Sign	1	LS	\$15,000	\$15,000
Install Roadside Sign	1	LS	\$20,000	\$20,000
Construction Area Signs	1	LS	\$50,000	\$50,000
<b>Subtotal Traffic Items</b>				<b>\$161,940</b>

Traffic Additions (Added in "TOTAL SECTIONS 1 thru 5)				
Traffic Control System	1	LS	(6% Item Subtotal)	\$492,300
Maintain Traffic	1	LS	(7% Item Subtotal)	\$574,300

<b>SUBTOTAL</b>	<b>\$8,203,972</b>
<b>TOTAL SECTIONS 1 thru 5</b>	
	<b>\$9,270,572</b>

Section 6 Minor Items	Quantity	Unit	Unit Price	Item Cost
			$\$9,270,572 \times (5\%) =$	\$463,529
(Subtotal Sections 1 thru 5)				\$9,270,572
<b>TOTAL MINOR ITEMS</b>				<b>\$463,529</b>

Section 7 Roadway Mobilization	Quantity	Unit	Unit Price	Item Cost
			$\$9,734,101 \times (10\%) =$	\$973,410
(Subtotal Sections 1 thru 6)				\$9,734,101
<b>TOTAL ROADWAY MOBILIZATION</b>				<b>\$973,410</b>

Section 8 Roadway Additions	Quantity	Unit	Unit Price	Item Cost
Supplemental Work			$\$9,734,101 \times (5\%) =$	\$486,705
(Subtotal Sections 1 thru 6)				\$9,734,101
Contingencies			$\$9,734,101 \times (25\%) =$	\$2,433,525
(Subtotal Sections 1 thru 6)				\$9,734,101
	<b>\$ Per Hour</b>	<b>Hours Per Day</b>	<b>Work Days</b>	
COZEEP setups @ \$100 per Hour Working 10 Hour Days	\$100	10	84	\$84,000
*Estimated at 30% of total Structure workingdays				
Construction Office			RE Office (\$2200/month for 36 months)	\$79,200
(Subtotal Sections 1 thru 6)				\$9,734,101

<b>TOTAL ROADWAY ADDITIONS (Sections 7 &amp; 8)</b>	<b>\$4,056,840</b>
<b>TOTAL ROADWAY ITEMS</b>	
	<b>\$13,791,000</b>

**II. STRUCTURES ITEMS**

<b>Existing Structure:</b>				
Bridge Name	Salmon Creek Bridge (#10-0134)			
Structure Type	(309/302) Steel Deck Truss/Steel Beam Spans			
<b>Replacement Structure:</b>				
Width (out to out) - (ft)	2A 49.7	2B 49.7	2C 49.7	2D 49.7
Length (begin to end bridge) - (ft)	700.0	700.0	700.0	700.0
Total Area - (SF)	34,767	34,767	34,767	34,767
Footing Type (pile/spread)	TBD	TBD	TBD	TBD
Demolition (calculated at ** per SF)	\$822,000.00	\$822,000.00	\$822,000.00	\$822,000.00
Construction Cost per SF (preliminary)	\$530	\$753	\$755	\$635
<b>Total Structure Cost =</b>	<b>\$18,431,000</b>	<b>\$26,162,000</b>	<b>\$26,253,000</b>	<b>\$22,073,000</b>
	<b>SUBTOTAL STRUCTURES ITEMS</b>	<b>\$19,253,000</b>	<b>\$26,984,000</b>	<b>\$27,075,000</b>
	<b>(Sum of Total Cost for Structures)</b>			

Railroad Related Costs:	NA			
	<b>SUBTOTAL RAILROAD ITEMS</b>			<b>\$0</b>

<b>TOTAL STRUCTURES ITEMS</b>	<b>\$19,253,000</b>	<b>\$26,984,000</b>	<b>\$27,075,000</b>	<b>\$22,895,000</b>
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**III. RIGHT OF WAY ITEMS**

A. Acquisition, including excess lands,	\$1,135,596
B. Mitigation acquisition & credits	\$1,980,000
C. Project Development Permit Fees	\$9,000
D. Utility Relocation (State share)	\$0
E. Relocation Assistance (RAP)	\$0
F. Clearance/Demolition	\$0
G. Title and Escrow Fees	\$9,600

<b>TOTAL RIGHT OF WAY ITEMS</b>	<b>\$3,134,000</b>
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H. Construction Contract Work	
Brief Description of Work: East-side bridge replacement, realignment, shouldering widening, culvert replacement, and drainage work	
Right of Way Branch Cost Estimate for Work	\$0

Anticipated Date of Right of Way Certification N/A  
(Date to which Values are Escalated)

Estimate Prepared By: Johnathon Jackson

Phone # 707-441-2059

## ***Albion River Bridge Replacement Project***

This project proposes to replace the Albion River Bridge (No. 10-0136). The PDT developed three alignment alternatives. Each alignment alternative includes multiple structure-type options. PSR Alternative 1 would be constructed west of the existing alignment, PSR Alternative 2 would be east of the existing alignment, and PSR Alternative 3 would replace the existing bridge in stages close to the existing alignment. All design alternatives consist of construction of a new bridge, AC overlay, new structural section off the existing centerline, new structural section at locations where the vertical profile is raised or lowered to accommodate an improved vertical curvature. Retaining walls are proposed at various locations to avoid impacts to property and environmentally sensitive areas.

For more information on the Albion River Bridge Replacement Alternatives developed by the PDT in the PSR see Appendix B.

### **Albion River Replacement Baseline Concept**

The baseline concept, PSR Alternative 1C, consists of a west alignment with a concrete arch structure type. The west side alignment is located west and clear of the existing Albion River Bridge. The replacement structure associated with this alignment is 1,020 feet long and 139 to 151 feet high. This alternative allows two traffic lanes to remain open during most of the construction.

To the north of the structure, the Albion River North Side Road (PM 43.93) at-grade intersection will be relocated to PM 44.03 to accommodate the replacement structure, and includes proposed metal beam guard rail (MBGR), and Americans with Disabilities Act (ADA) access to the east pedestrian walkway. The Albion Little River Road (PM 43.96) at-grade intersection with Route 1 will be relocated to intersect Albion River North Side Road. The private driveway access at PM 44.00 will be relocated to intersect Albion River North Side Road. The structure type for PSR 1C is a 10-span, cast-in-place concrete arch. This design alternative was used as the baseline concept as it has the least environmental and right-of-way impacts, better aesthetics, and appears the most cost-effective.

The following summarizes the cost for the Salmon Creek Bridge Replacement project costs:

Roadway	\$10.3 Million
Structures	\$25.5 Million
Construction Subtotal	\$35.8 Million
<u>Right of Way</u>	<u>\$2.6 Million</u>
<i>Total</i>	<i>\$38.4 Million</i>

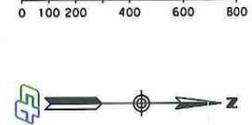
The construction duration is estimated at three seasons. The following is the project schedule.

<b>HQ Milestones</b>	<b>Delivery Date</b>
Begin Environmental	10/01/10
Circulate DED	10/01/13
PA&ED	02/01/14
Project PS&E	12/01/15

<b>HQ Milestones</b>	<b>Delivery Date</b>
Right of Way Certification	04/01/16
Ready to List	04/15/16
Approve Contract	10/01/16
Contract Acceptance	11/01/19

The following pages are key project drawings, cost estimate and project schedule associated with the Albion River Bridge Replacement baseline concept.

# ALTERNATIVE 1 01-40110K-MEN-1 PM 43.3/44.2 ALBION RIVER BRIDGE REPLACEMENT



DATE	DATE	DATE	TOTAL PROJECT	NO. SHEETS
1	MEN	1	43.3 / 44.2	1 / 3
REGISTERED CIVIL ENGINEER DATE				
PLANS APPROVAL DATE				
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN SHEET.</small>				

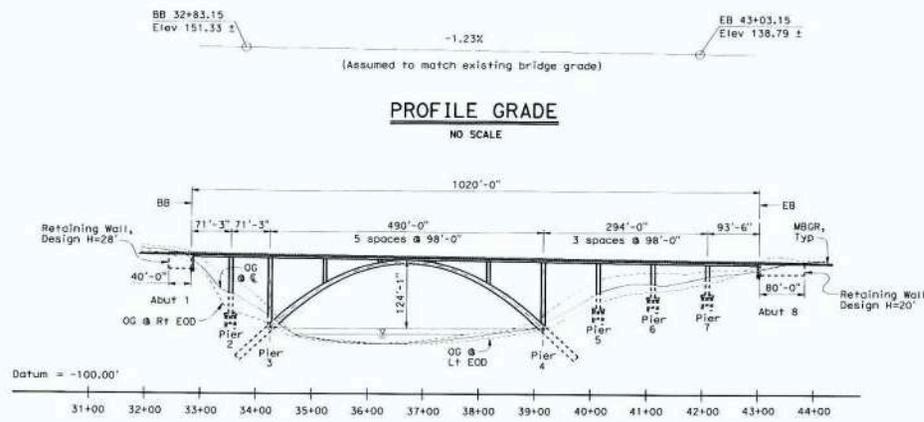


**DESIGN STUDY ONLY**

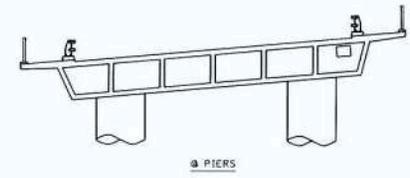
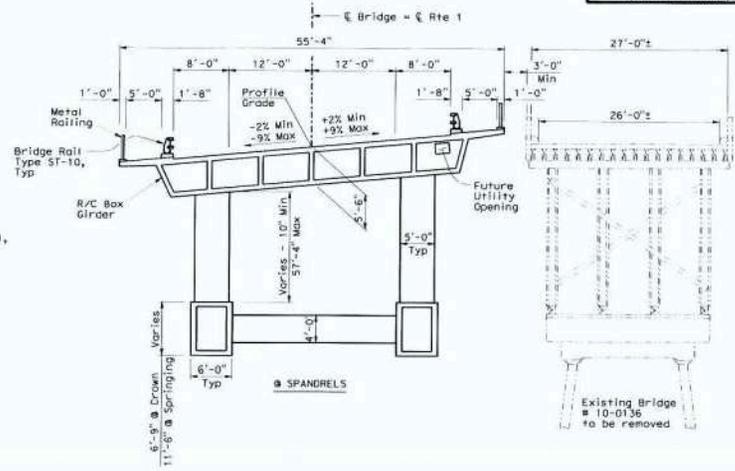
**PROJECT LAYOUTS**

DIST	COUNTY	ROUTE	POST MILE
D1	MEN	1	43.74

To get to the Caltrans web site, go to: <http://www.dot.ca.gov>



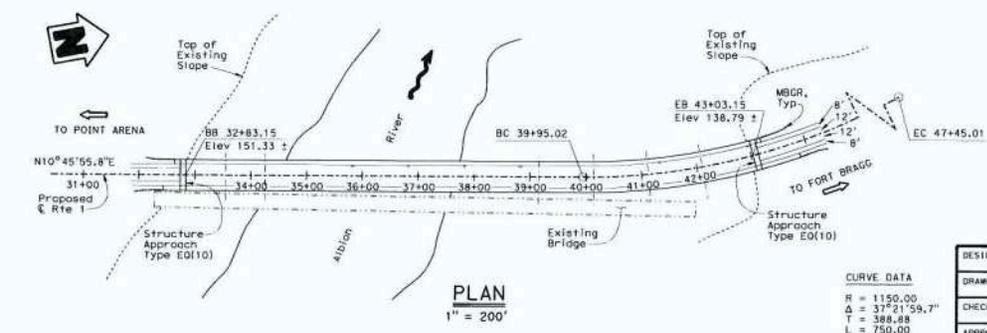
- Notes:**
- 24" CIDH Piles, 60 ft (45 ton) assumed @ Abutments
  - 36" C155 Piles, 100 ft (200 ton) assumed @ Piers
  - Rock voids and fracture density assumed to be low enough that ground water can be controlled at the arch mined shaft foundations.
  - Traveled way deck drainage carried through Pier 5 & Abutment 8. Sidewalk drainage utilizes scuppers and drop-through Drains.
- Legend:**
- - - Indicates Existing Structure
  - - - Indicates Deck Drain Type D-3 (traveled way drainage system)



**TYPICAL SECTION**  
1/8" = 1'-0"

*5-12-13*

Date of Estimate	<i>4-27-09</i>
Str. Depth	Box = 5.5 ft, Arch = 6.75 to 11.5 ft
Length	1020 ft
Width	55'-4"
Area	56,440 ft <sup>2</sup>
Cost/sq ft including	<i>451/sq ft</i>
10% Mobilization &	<i>4,459,125</i>
25% Contingency	<i>1,254,143.80</i>
Total Cost	<i>4,254,663.00</i>



**CURVE DATA**

R = 1150.00
Δ = 37°21'59.7"
T = 388.88
L = 750.00

DESIGNED BY	Daniel Sessions	DATE	12/30/08
DRAWN BY	Bob Huddleston	DATE	1/7/09
CHECKED BY	Kevin Harper	DATE	2/4/09
APPROVED	Jeff Sims	DATE	2/4/09

**STRUCTURE DESIGN BRANCH 1**

<b>ALTERNATIVE 1C</b>	
<b>PLANNING STUDY</b>	
<b>ALBION RIVER BR (REPLACE)</b>	
BRIDGE NO. 10-136	CU 01
SCALE: AS SHOWN	EA 40110K

Project Study Report-Cost Estimate



01-MEN-01

PM 43.3/44.2

EA 01-40110K

HA21 PROGRAM / 20.10.201.110

**ALBION RIVER BRIDGE REPLACEMENT PROJECT**

**ALTERNATIVE 1:  
WEST-SIDE REPLACEMENT BRIDGE CONSTRUCTED CLEAR OF EXISTING  
ALBION RIVER BRIDGE**

**PROJECT DESCRIPTION:**

LIMITS: The Albion River Bridge is located on State Route 1 in Mendocino County, from PM 43.74 to PM 43.92, in Albion, 3.4 miles north of the Route 128 junction. Limits of work are between PM 43.3 and 44.2.

PROPOSED IMPROVEMENT (SCOPE): Project proposes to replace the Albion River Bridge (#10-0136) west of the existing structure. Also included in this project is realignment, shouldering widening, culvert replacement, and drainage work.

**SUMMARY OF ESTIMATED COST (2009)**

	<u>1A</u>	<u>1B</u>	<u>1C</u>	<u>1D</u>
TOTAL ROADWAY ITEMS	\$10,306,000	\$10,306,000	\$10,306,000	\$10,306,000
TOTAL STRUCTURE ITEMS	\$31,765,000	\$45,474,000	\$26,933,000	\$34,390,000
SUBTOTAL CONSTRUCTION COSTS	\$42,071,000	\$55,780,000	\$37,239,000	\$44,696,000
TOTAL RIGHT OF WAY ITEMS	\$2,607,000	\$2,607,000	\$2,607,000	\$2,607,000
TOTAL PROJECT CAPITAL OUTLAY COSTS	\$44,678,000	\$58,387,000	\$39,846,000	\$47,303,000
CALL	\$44,700,000	\$58,400,000	\$39,900,000	\$47,400,000

Reviewed by District Program Manager \_\_\_\_\_ Date \_\_\_\_\_

Approved by Project Manager \_\_\_\_\_ Date \_\_\_\_\_

**5-21-13 APS Update - Alt 1C**

Roadway	\$10,306,000
Structures	\$25,463,000
Subtotal Construction	\$35,769,000
Total Right of Way Items	\$2,607,000
Total Project Capital Outlay Costs	\$38,376,000

**I. ROADWAY ITEMS**

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost
Clearing & Grubbing	1	LS	\$500,000	\$500,000
Roadway Excavation	50,288	CY	\$25	\$1,257,190
			<b>Subtotal Earthwork</b>	<b>\$1,757,190</b>

Section 2 Pavement Structural Section	Quantity	Unit	Unit Price	Item Cost
Hot Mix Asphalt - Type A	4,900	TON	\$85	\$416,500
OGFC	2,000	TON	\$105	\$210,000
Aggregate Base (Class 2)	8,100	CY	\$50	\$405,000
Pavement Reinforcing Fabric	4,500	SQYD	\$2	\$9,000
Cold Plane AC	800	SQYD	\$4	\$3,200
Obiterate Surfacing	7,700	SQYD	\$10	\$77,000
			<b>Subtotal Pavement Structural Section</b>	<b>\$1,120,700</b>

Section 3 Drainage	Quantity	Unit	Unit Price	Item Cost
Install / Modify / Replace Culvert	4	EA	\$45,000	\$180,000
			<b>Subtotal Drainage</b>	<b>\$180,000</b>

Section 4 Specialty Items	Quantity	Unit	Unit Price	Item Cost
Progress Schedule (Critical Path)	1	LS	\$10,000	\$10,000
Erosion Control and Highway Planting	1	LS	\$390,000	\$390,000
Prepare Storm Water Pollution Prevention Plan	1	LS	\$10,000	\$10,000
Construction Site BMP Items	1	LS	\$1,955,000	\$1,955,000
Retaining Wall (Type 1)	1	LS	\$238,000	\$238,000
Transition Railing (Type WB)	4	EA	\$5,000	\$20,000
Terminal Section (Type C)	4	EA	\$250	\$1,000
Construction Access	5	LS	\$238,000	\$238,000
Incentive for Asphalt Concrete (QC/QA) (4% of HMA & OGFC)	1	LS	\$25,060	\$25,060
			<b>Subtotal Specialty Items</b>	<b>\$2,887,060</b>

Section 5 Traffic Items	Quantity	Unit	Unit Price	Item Cost
Thermoplastic Striping (4")	30,915	FT	\$1.40	\$43,281
Thermoplastic Pavement Marking	328	SQFT	\$8.00	\$2,624
Pavement Marker (Retroreflective)	381	EA	\$10.00	\$3,806
Portable Changeable Message Sign (PCMS)	2	EA	\$6,500	\$13,000
Relocate Roadside Sign	1	LS	\$20,000	\$20,000
Remove Roadside Sign	1	LS	\$15,000	\$15,000
Install Roadside Sign	1	LS	\$20,000	\$20,000
Construction Area Signs	1	LS	\$50,000	\$50,000
			<b>Subtotal Traffic Items</b>	<b>\$167,711</b>

Traffic Additions (Added in "TOTAL SECTIONS 1 thru 5)	Quantity	Unit	Unit Price	Item Cost
Traffic Control System	1	LS	(6% Item Subtotal)	\$366,800
Maintain Traffic	1	LS	(7% Item Subtotal)	\$427,900

**SUBTOTAL \$6,112,661**

<b>TOTAL SECTIONS 1 thru 5</b>	<b>\$6,907,361</b>
--------------------------------	--------------------

Section 6 Minor Items	Quantity	Unit	Unit Price	Item Cost
			$\$6,907,361 \times (5\%) =$	\$345,368
			(Subtotal Sections 1 thru 5)	\$6,907,361
			<b>TOTAL MINOR ITEMS</b>	<b>\$345,368</b>

Section 7 Roadway Mobilization	Quantity	Unit	Unit Price	Item Cost
			$\$7,252,729 \times (10\%) =$	\$725,273
			(Subtotal Sections 1 thru 6)	\$7,252,729
			<b>TOTAL ROADWAY MOBILIZATION</b>	<b>\$725,273</b>

Section 8 Roadway Additions	Quantity	Unit	Unit Price	Item Cost
Supplemental Work			$\$7,252,729 \times (5\%) =$	\$362,636
			(Subtotal Sections 1 thru 6)	\$7,252,729
Contingencies			$\$7,252,729 \times (25\%) =$	\$1,813,182
			(Subtotal Sections 1 thru 6)	\$7,252,729
COZEEP setups @ \$100 per Hour Working 10 Hour Days	\$ Per Hour	Hours Per Day	Work Days	\$72,000
*Estimated at 30% of total Structure Type 1A workingdays	\$100	10	72	
Construction Office		RE Office (\$2200/month for 36 months)		\$79,200
			(Subtotal Sections 1 thru 6)	\$7,252,729

**TOTAL ROADWAY ADDITIONS (Sections 7 & 8) \$3,052,292**

<b>TOTAL ROADWAY ITEMS</b>	<b>\$10,306,000</b>
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**II. STRUCTURES ITEMS**

<b>Existing Structure:</b>				
Bridge Name	Albion River Bridge (#10-0136) Replacement			
Structure Type	(309/702) Steel Deck Truss/Wood Stringer and Beam			
<b>Replacement Structure:</b>				
	<b>1A</b>	<b>1B</b>	<b>1C</b>	<b>1D</b>
Width (out to out) - (ft)	55.3	55.3	55.3	55.3
Length (begin to end bridge) - (ft)	1,020	1,020	1,020	\$1,020
Total Area - (SF)	56,440	56,440	56,440	\$56,440
Footing Type (pile/spread)	Spread with CISS Pile	Spread with CISS Pile	Spread with CISS Pile	Spread with CISS Pile
Demolition (calculated at \$46.12 per SF)	\$1,017,375.00	\$1,017,375.00	\$1,017,375.00	\$1,017,375
Construction Cost per SF (preliminary)	\$545	\$788	\$459	\$591
<b>Total Structure Cost =</b>	<b>\$30,747,365</b>	<b>\$44,456,201</b>	<b>\$25,914,840</b>	<b>\$33,372,369</b>
<b>SUBTOTAL STRUCTURES ITEMS</b>	<b>\$31,764,740</b>	<b>\$45,473,576</b>	<b>\$26,932,215</b>	<b>\$34,389,744</b>
<b>(Sum of Total Cost for Structures)</b>				

Railroad Related Costs:	NA			
<b>SUBTOTAL RAILROAD ITEMS</b>				<b>\$0</b>

<b>TOTAL STRUCTURES ITEMS</b>	<b>\$31,765,000</b>	<b>\$45,474,000</b>	<b>\$26,933,000</b>	<b>\$34,390,000</b>
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**III. RIGHT OF WAY ITEMS**

A. Acquisition, including excess lands,	\$846,779
B. Mitigation acquisition & credits	\$1,740,000
C. Project Development Permit Fees	\$9,000
D. Utility Relocation (State share)	\$0
E. Relocation Assistance (RAP)	\$0
F. Clearance/Demolition	\$0
G. Title and Escrow Fees	\$11,350

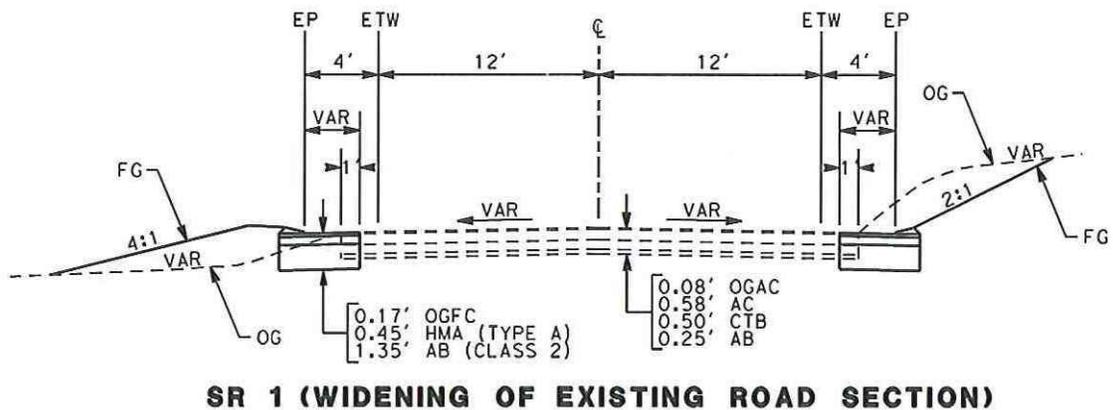
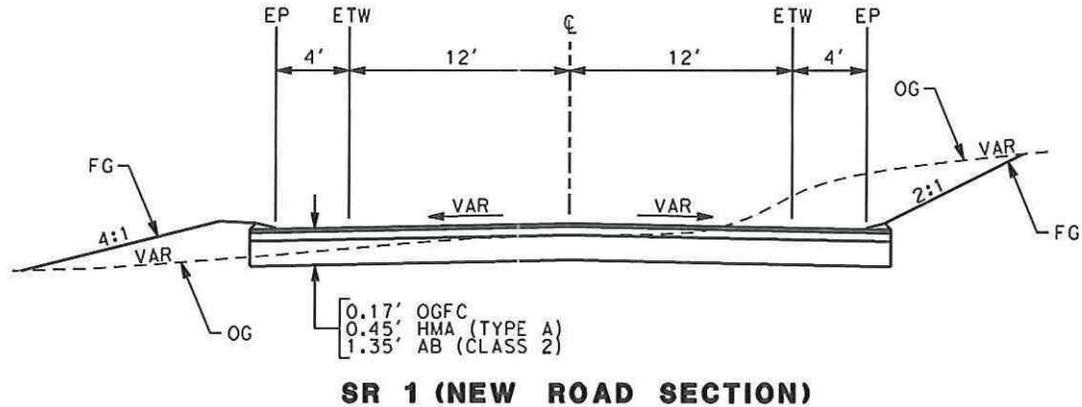
<b>TOTAL RIGHT OF WAY ITEMS</b>	<b>\$2,607,000</b>
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<b>H. Construction Contract Work</b>	
Brief Description of Work: West-side bridge replacement, realignment, shouldering widening, culvert replacement, and drainage work	
Right of Way Branch Cost Estimate for Work	\$0

Anticipated Date of Right of Way Certification (Date to which Values are Escalated) N/A

## Common Highway Features

Both bridges will carry 8-foot shoulder structure widths (per HDM geometric requirements), similar aesthetically pleasing open barriers and sidewalks across the bridges. The Pacific Coast Trail is considered part of this portion of Highway 1.



Between the north Salmon Creek Bridge and the South Albion River Bridge approaches, the Spring Grove Road (PM 43.50) at-grade intersection will be shifted southwest due to a proposed 2,000-foot horizontal curve between PM 43.36 and 43.62 in the realigned roadway. The potential of shifting the intersection with Spring Grove Road to the south will be reviewed at the next stage of the project in order to improve the skew of the existing intersection.

## PROJECT DESIGN EXCEPTIONS

Listed as follows are the design exceptions at the time of the VA study.

### Mandatory Design Exceptions – Salmon Creek Bridge

The following mandatory design exceptions have been executed:

- Shoulder widths (DIB 79-03) between PM 42.4 and 43.3

### **Mandatory Design Exceptions – Albion River Bridge**

The following mandatory design exceptions have been executed:

- Shoulder widths (DIB 79-03) between PM 43.3 and 44.2
- Stopping Sight Distance (Section 201.1-Table 201.1) at PM 44.01/44.02 and 44.09/44.12

### **Advisory Design Exceptions – Salmon Creek Bridge**

- None

### **Advisory Design Exceptions – Albion River Bridge**

- None

## **INFORMATION PROVIDED TO THE VA TEAM**

The following project documents were provided to the VA team for their use during the study:

- (Salmon) 01-40140K PSR approved 8-26-09
- (Albion) 01-40110K PSR approved 8-26-09
- Albion Rehab Feasibility Transmittal 5-21-13
- Albion Replacement APS Pricing Update 5-21-13
- Structure Maintenance and Investigations Bridge Inspection Records Information System

*Note: The information presented in this section of the report may have been excerpted either in part or in full from the documents/information provided to the VA team listed above.*

# PROJECT ANALYSIS

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# PROJECT ANALYSIS

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## SUMMARY OF ANALYSIS

The following analysis tools were used to study the project:

- Key Project Factors
- Cost Model
- Function Analysis
- Value Metrics
- Risk Analysis

## KEY PROJECT FACTORS

The first day of the VA study included meetings with the project stakeholders and a site visit. The following summarizes key project issues and site visit observations identified during these sessions.

### Project Issues

#### *Salmon Creek Bridge Replacement Project*

The following are some of the issues and concerns associated with the Salmon Creek Bridge Replacement project:

#### **Miscellaneous:**

- RTL for both bridges by May 2016.

#### **Non-Motorized Features:**

- Route 1 has seasonally high bicycle traffic volumes during the summer months.
- The project will upgrade the shoulder widths to 8 feet right to meet standards and will have a 5-foot-wide pedestrian path (barrier-separated) on the west side only.

#### **Roadway Features:**

- The structure types under consideration at this time include:
  - A. CIP box
  - B. Arch with longer spans
  - C. Arch with extra vertical member (“horns”)
  - D. Arch with multiple spans

- The alignment types under consideration at this time include:
  - Alignment 1 – New alignment west (Options 1A, 1B, 1C, 1D)
  - Alignment 2 – New alignment east (Options 2A, 2B, 2C, 2D)
  - Alignment 3 – Half-width on the west (3A, 3B)
  - Alignment 4 – Half-width on the east (4A, 4B)
- PDT requested that the VA team consider all alignments with the CIP box and an arch.
- The vertical sag curve at PM 42.56, the vertical crest curve at PM 42.56, and the vertical crest curve at PM 42.99/43.14 do not meet current Caltrans standards for stopping sight distance.
- The project proposes to improve the 800-foot vertical sag curve with low point in the middle of the bridge; the proposed design improves, but does not meet current Caltrans design standards for sight distance.
- The project will replace an existing 650-foot non-standard radius curve with a standard curve.
- The project will have a Class 1 bike path (barrier-separated) that is 5 feet wide (west side only).
- Off the bridge, the roadway approaches will carry 4-foot shoulders.
- The current ADT (2007) is 3,100 and the peak hour volumes are 430.
- The 2036 ADT and project peak volumes are 5,350 and 740, respectively.
- The 20-year DH Truck percentage is 5.0.
- The 20-year TIS is 9.0 and 5.5 for travel way and shoulder, respectively.
- There are 8 existing culverts that will need to be replaced.
- Southbound traffic uses the sag as a passing distance (more available sight distance than the rest of the corridor).
- If the project were to use the west alignment, it would create a long through-cut on the slopes on both the north and south sides of the bridge. The south side cut on the west alignment could impact a gated community of homes called Pacific Reefs. Using the east alignment impacts a weekend cabin in the northeast quadrant.
- Access under the north abutment (Spring Grove Road) goes under the bridge.
- Access can be made to the south abutment and the south side of the bridge in general (east side alignment).
- There are wetlands on both east and west sides.
- There are two rare plants on the east side, but could be also on the west side.
- The area had a lot of previous use (lumber operations). This is a known site for possible archaeological impacts.

### **Structural Issues:**

- The current structure length and width are 685 feet and 26 feet, respectively; the new width will be 55'-4" out-out.
- The existing bridge was built in 1950 as a 7-span, steel deck, Warren Truss with steel beam spans over tower bents with a cast-in-place reinforced concrete deck.
- The structure is fracture-critical due to a lack of redundancy in the steel deck truss and the steel floor beam members.
- The existing structure requires full removal of the existing coating system every 4 to 5 years at an estimated cost of \$2,500,000.
- None of the structure types have bents in the water
- Arch need to be optimized

### ***Albion River Bridge Replacement Project***

The following are some of the issues and concerns associated with the Albion River Bridge Replacement project:

### **Non-Motorized Operations:**

- Route 1 has seasonally high bicycle traffic volumes during the summer months.
- The project will upgrade the shoulder widths to 8 feet right to meet standards and will have a 5-foot-wide pedestrian path (barrier-separated). The total width of the structure will be 55'-4" (out-out).

### **Roadway Features:**

- The baseline concept (Alternative 1C) will reconstruct on the west side (10-span open spandrel concrete arch)
  - RV Park lies to the east side of bridge
  - Ties on the northern end impact realignment of the County Road
- The structure options include:
  - Box Girder (CIP, prestressed)
  - Arch Substructure with RC box superstructure
- The project alignments identified in the PSR include:
  - Alignment 1 – West Alignment (Options 1A, 1B, 1C, 1D)
    - Alternatives 1A: 4-Span, Haunched, CIP Post-Tensioned Concrete Box Girder, \$29.1 M

- Alternative 1B: 4-Span, Haunched, CIP Prestressed Transversely, Post-Tensioned Longitudinally- Concrete Segmental Box Girder, \$45.6 M
- Alternative 1C: 11-Span Open Spandrel Concrete Arch , \$25.5 M
- Alternative 1D: 4-Span Open Spandrel Concrete Arch , \$33.2 M
- Alignment 2 – East Alignment (Options 2A, 2B)
  - Alternative 2A: 3-Span Haunched, CIP Prestressed Concrete Box Girder, \$27.9 M
  - Alternative 2B: 3-Span Haunched, CIP Prestressed Transversely, Post-Tensioned Longitudinally Concrete Segmental Box Girder, \$43.7 M
- Alignment 3 – On Existing Alignment (West ) (Options 3A, 3B)
  - Alternative 3A: 4-Span Haunched, CIP Prestressed Concrete Box Girder, \$35.3M
  - Alternative 3B: Staged 4-Span Concrete Arch, \$44.5 M
- The project will have a Class 1 bike path (barrier-separated) that is 5 feet wide.
- Off the bridge, the roadway approaches will carry 4-foot shoulders.
- The current ADT (2007) is 3,100 and the peak hour volumes are 430 vph.
- The 20-year DH Truck percentage is 5.0.
- The 20-year TIS is 9.0 and 5.5 for travel way and shoulder, respectively.
- There are 8 existing culverts that will need to be replaced. Three smaller culverts are proposed for modifications.
- Spring Grove Road (PM43.50) intersection will be relocated due to the horizontal curve between PM 43.26 to PM 43.62.
- The Albion Little River Road (PM43.96) at-grade intersection will be relocated to intersect Albion River North Side Road.
- The private driveway at PM 44.00 will be relocated to intersect Albion River North Side Road.
- Retaining wall is required (170 feet long, 12 feet high) at PM 42.5 t 43.54.
- The following design exceptions have been required:
  - Shoulder Widths (DIB79-03) between PM 43.3 - PM 44.2,
  - Stopping Sight Distance (Section 201.1 - Table 201.1) at PM 44.01- PM 44.02 and PM 44.09- PM 44.12
- Two-way left-turn pocket storage will be improved at PM 43.4 to 43.69 with a storage increase from 360 feet to 435 feet.

- The collision rate within the project limits is above the statewide average (F&I). Many of these are related to improper turn, rear-end, broadside, and overturn. Three of the hit objects are at PM 43.95 (hitting outside of curve signs).
- There is an existing 275-foot horizontal curve on the existing alignment.
- The two existing intersections do not meet current Caltrans standards for corner sight distance.
- The Albion River Bridge (PM 43.73/43.93) is located on tangent with a 1.23% grade-line sloping north.
- Low-flow channel favors the south side of the bridge.
- Community is interested in having an arch bridge.
- RV park is for sale (may be available for construction staging) and can be used for mitigation and possible State Park.
- The existing main span truss is from an old bridge that had been located on the south fork of the Feather River (Butte County), though its age is unknown.
- There are 11 timber approach spans on the south end, 22 timber spans on the north end, and a single -span steel riveted deck truss on reinforced concrete towers over the Albion River.

#### **Structural Features:**

- East alignment cannot support an arch structure type.
- Vertical clearance for navigation (124 feet desirable).
- The structure requires painting every 5 years at an estimated cost of \$350,000.
- The existing structure has deficient rails.
- The existing bridge is an Albion community identity feature.
- The retention of the existing structure from a competing highway bridge alternative to a complementary pedestrian/bike path has been studied and costed out.
- The existing structure is fracture critical due to a lack of redundancy of the steel deck truss and floor beams
- Existing bridge is a DF wood truss structure that incorporates a recycled steel deck truss that spans the main channel.
- Every year bolts are being tightened for two weeks.

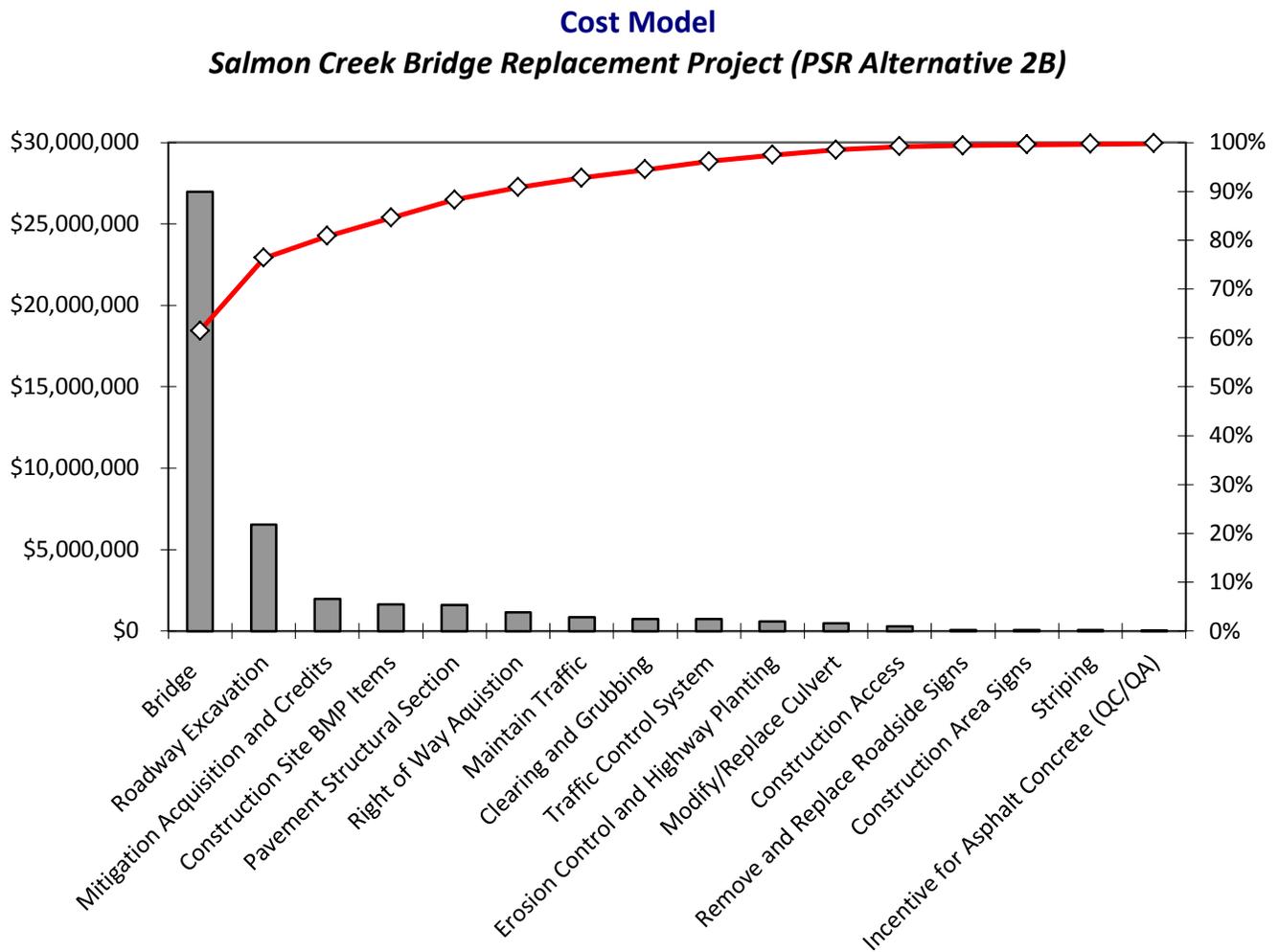
#### **Site Visit**

A site visit was conducted remotely via Google Earth in order to visually assess the project site conditions.

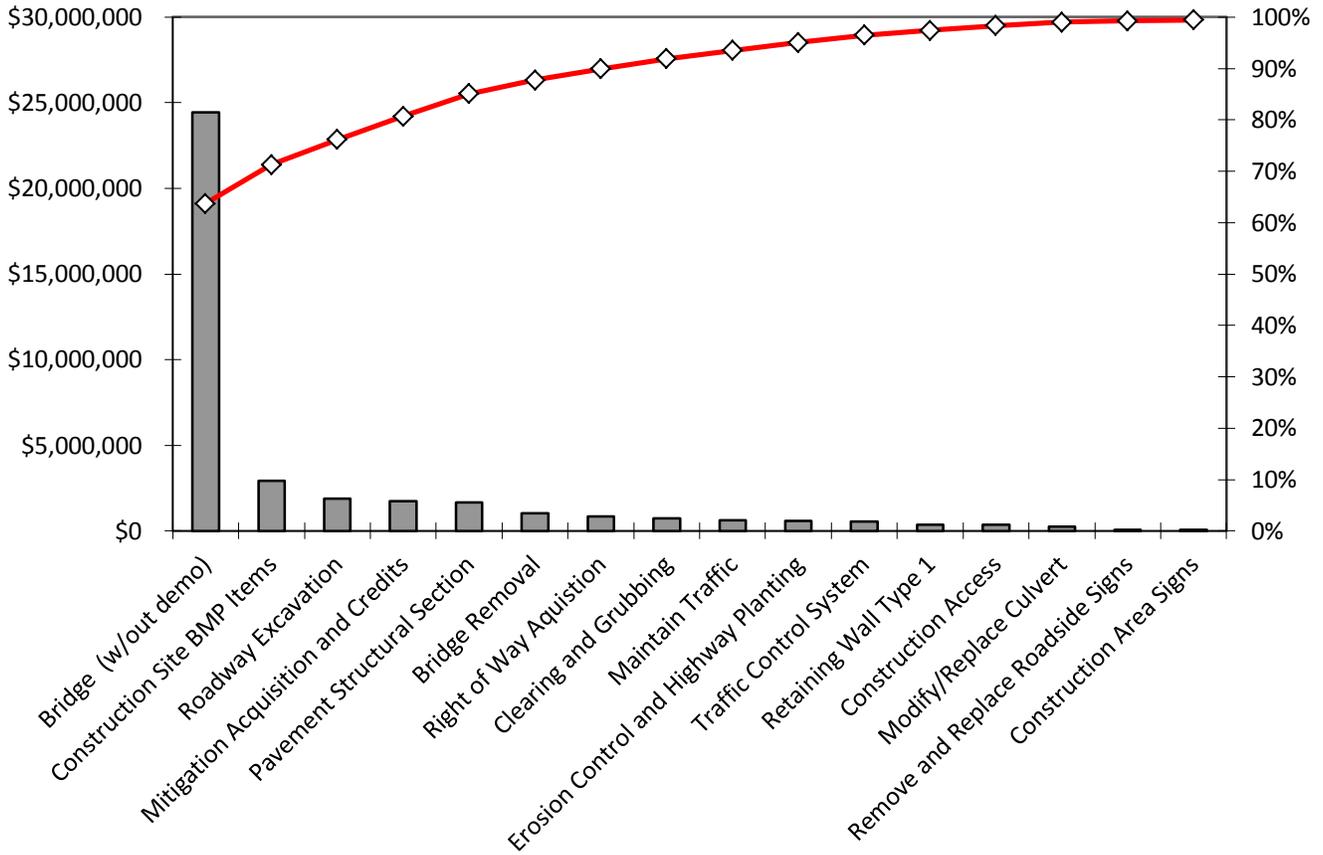
## COST MODEL

The VA team leader prepared cost models from the cost estimates presented in the *Project Information* section of this report. The models are organized to identify major construction elements or trade categories, the original estimated costs, and the percent of total project cost for the significant cost items.

The cost models clearly showed the cost drivers for the project and were used to guide the VA team during the VA study.



**Cost Model**  
**Albion River Bridge Replacement Project (PSR Alternative 1C)**

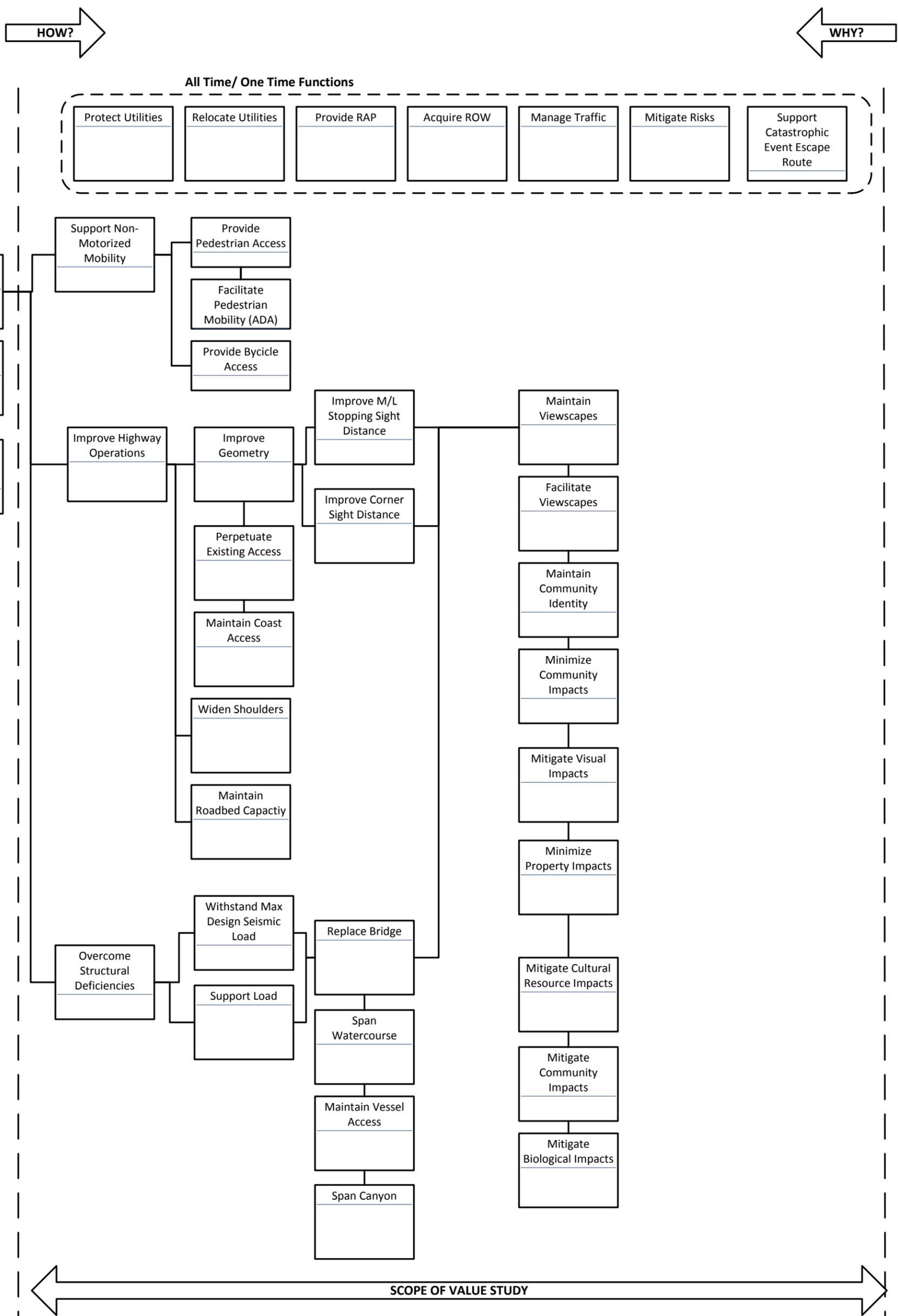


**FUNCTION ANALYSIS**

Function analysis was performed and a Function Analysis System Technique (FAST) Diagram was produced, which revealed the key functional relationships for the project. This analysis provided a greater understanding of the total project and how the project’s performance, cost, time, and risk characteristics are related to the various functions identified.

The FAST diagram arranges the functions in logical order so that when read from left to right, the functions answer the question, “How?” If the diagram is read from right to left, the functions answer the question, “Why?” Functions connected with a vertical line are those that happen at the same time as, or are caused by, the function at the top of the column (a “When?” relationship).

# FAST Diagram – Salmon Creek Bridge and Albion River Bridge Replacement Projects



**LEGEND**

<p><b>Schedule Impact</b></p> <p>Red = High Orange = Medium Yellow = Low Green = None</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>Function (Verb+Noun)</p> <p>Cost</p> <p style="background-color: #90EE90; display: inline-block; padding: 2px;">\$1.50</p> <p>Performance</p> </div> <p><b>Cost - \$ Millions</b></p> <p><b>Performance Influence</b></p>	<p><b>Risk Level</b></p> <p>Red = High Yellow = Medium Green = Low</p>
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## VALUE METRICS

Value Methodology (VM) has traditionally been perceived as an effective means for reducing project costs. This paradigm only addresses one part of the value equation, oftentimes at the expense of the role that VM can play with regard to improving project performance. Project costs are fairly easy to quantify and compare; performance is not.

Project performance must be properly defined and agreed to by the stakeholders at the beginning of the VA study. The performance requirements and attributes developed are then used throughout the study to identify, evaluate, and document alternatives. This process, Value Metrics, emphasizes the interrelationship between the elements of performance, cost, and time and can be quantified and compared in terms of how they contribute to overall value. The basic equation for value is:

$$Value = \frac{Performance}{Cost + Time}$$

Value Metrics provides a standardized means of identifying, defining, evaluating, and measuring performance. Once this has been achieved and costs for all VA alternatives have been developed, measuring value is very straightforward.

The following pages describe the steps in the Value Metrics process.

### Define Performance Requirements

Performance requirements represent essential, non-discretionary aspects of project performance. Any concept that fails to meet the project's performance requirements, regardless of whether it was developed during the project's design process or during the course of the VA study, cannot be considered as a viable solution. Concepts that do not meet a performance requirement cannot be considered further unless such shortcomings are addressed through the VA study process in the form of VA alternatives. It should be noted that in some cases, a performance requirement may also represent the minimum acceptable level of a performance attribute. The following performance requirements were selected for this project.

Performance Requirement	Definition
Highway Design Standards	Any deviation from the Caltrans Highway Design Manual must be approvable by the District's Design Reviewer.
Structural Design Standards	Any structure on the project must comply with current seismic design standards and meet the Load Resistance Design Factor.
Environmental Review Process	Any concept or design modification considered must comply with state and federal environmental law and be compatible with the environmental review process.
Critical Project Milestones	Several critical schedule milestones must be met in order to meet legislative and/or funding requirements. These include RTL by January 15, 2017 for the Salmon Creek Bridge Replacement Project.

## Define Performance Attributes and Scales

Performance attributes represent those aspects of a project’s scope that may possess a range of potential values. For example, an attribute called “Environmental Impacts” may have a range of acceptable values for a project ranging from 1 acre to 20 acres of wetlands mitigation. It is clear that a concept that offered 15 acres of mitigation would perform at a higher level than one that offered 5 acres, but both would meet the project’s need and purpose, and their values (i.e., the relationship between performance and cost) could be rationally compared. The following performance attributes were selected for this project.

### Environmental Impacts

An assessment of the permanent impacts to the environment, including ecological (i.e., flora, fauna, air quality, water quality, visual, noise); socioeconomic impacts (i.e., environmental justice); impacts to cultural, recreational, and historic resources. Also considered under this attribute are drainage and hydraulic issues.

Rating	Label	Description
0.0	Unacceptable	The environmental impacts are severe and the project does not comply with state and/or federal environmental laws.
2.0	Poor	The project introduces environmental impacts that are both significant in number and impact that require extensive mitigation.
4.0	Fair	The project introduces many new environmental impacts that will require extensive mitigation.
6.0	Good	The project introduces some new environmental impacts that can be addressed through standard and accepted mitigation approaches.
8.0	Very Good	The project introduces no new environmental impacts.
10.0	Excellent	The project improves upon the existing environmental conditions while introducing no new environmental impacts.

### Operations

An assessment of traffic operations on the mainline facility and approaches associated with the new facility to be replaced. It also measures the ability to provide for non-motorist use. Operational considerations include level of service relative to the 20-year traffic projections, as well as geometric considerations such as design speed, sight distance, lane widths, shoulder widths, and bike and pedestrian lane/path widths.

Rating	Label	Description
0.0	Unacceptable	Very poor level of traffic operations in terms of LOS and access and accommodations for non-motorized mobility.

Rating	Label	Description
2.0	Poor	Poor level of traffic operations in terms of LOS and access and accommodations for non-motorized mobility.
4.0	Fair	Fair level of traffic operations in terms of LOS and access and accommodations for non-motorized mobility.
6.0	Good	Good level of traffic operations in terms of LOS and access and accommodations for non-motorized mobility.
8.0	Very Good	High level of traffic operations in terms of LOS and access and accommodations for non-motorized mobility.
10.0	Excellent	Highest level of traffic operations in terms of LOS and access and accommodations for non-motorized mobility.

### Maintainability

An assessment of the long-term maintainability of the transportation facility(s). Maintenance considerations include the overall durability, longevity, and maintainability of pavements, structures, and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.

Rating	Label	Description
0.0	Unacceptable	The anticipated level of maintenance for the project will be extreme and unacceptably high.
2.0	Poor	The project is expected to require maintenance that far exceeds the norm for a facility of its kind.
4.0	Fair	The highway facility is expected to require greater than normal maintenance due to existing site conditions or materials selection.
6.0	Good	The project provides a satisfactory level of maintainability and is typical of a highway facility of this kind statewide.
8.0	Very Good	The project provides a high level of maintainability. The facility utilizes many low maintenance features and is better than average in terms of expected maintenance.
10.0	Excellent	The project provides the highest possible level of maintainability and far exceeds expectations when compared to comparable facilities statewide. Examples are the use of long-life pavement, low maintenance water quality facilities, low maintenance structures, etc.

### Construction Impacts

An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours, and delays; impacts to businesses and residents relative to access, visual, noise,

vibration, dust, and construction traffic; environmental impacts related to water quality, air quality, soil erosion, and local flora and fauna.

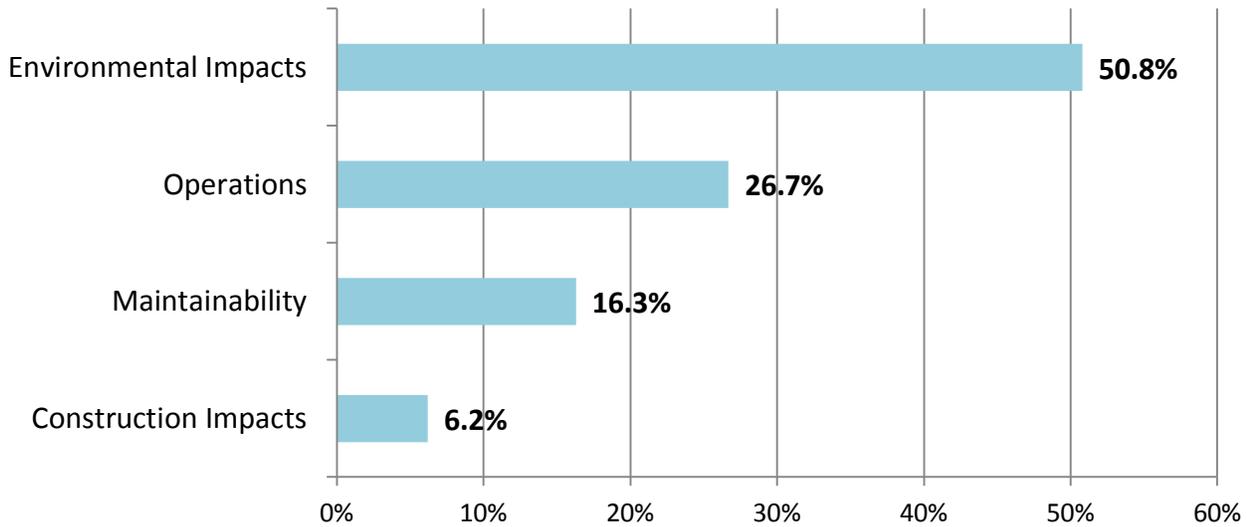
Rating	Label	Description
0.0	Unacceptable	Temporary traffic and/or environmental impacts will be severe and create impacts that are unacceptable to the public.
2.0	Poor	Temporary traffic impacts will be extensive, lengthy, and very disruptive. Temporary environmental impacts will require extraordinary mitigation measures and create major inconveniences to the public.
4.0	Fair	Temporary traffic impacts will be significant and be much greater than what would normally be anticipated for similar projects. Temporary environmental impacts will be more significant in nature and require greater mitigation measures and/or inconveniences to the public.
6.0	Good	There will be some nighttime lane closures and/or temporary ramp closures. There will be some minor to moderate temporary environmental impacts. Impacts will be fairly "typical" for this type of project and can be handled through normal processes and procedures.
8.0	Very Good	There will be some minor temporary traffic and/or environmental impacts expected during construction. Impacts will be less than typical.
10.0	Excellent	There will be no temporary traffic or environmental impacts during construction.

### Prioritize Performance Attributes

The performance attributes of a project are seldom of equal importance. Therefore, a systematic approach must be utilized in order to determine their relative importance in meeting the project's need and purpose.

Once the performance attributes were defined and their scales developed, the Project Team and stakeholders prioritized them based on their relative importance to the project. The Analytic Hierarchy Process (AHP) was utilized in the prioritization process. The performance attributes were systematically compared in pairs, asking the question: "An improvement to which attribute will provide the greatest benefit relative to the project's need and purpose?" Participants were then asked to indicate their priorities and the relative intensities of their preferences. The chart below provides the results of this analysis and includes the complete breakdown of the priorities, expressed as a percentage of the whole.

## Performance Attribute Prioritization – Salmon Creek Bridge and Albion River Bridge Replacement Projects



### Measure Performance of Baseline Concept: Salmon Creek Bridge Replacement

The project team and stakeholders evaluated the performance of the Baseline Concept relative to the scales identified previously. The information below reflects the performance ratings and associated rationale for each attribute.

#### Environmental Impacts

Rating: **6.0**

#### Rationale:

- **Biology:** Wetlands, rare plants, birds, etc. (Formal consultation with USFW and NOA fisheries required.) Some right-of-way impacts; condemnation may be required for some land takes required. The east alignment has advantages over the west alignment as the old abutment lies to the west of the existing bridge (previous disturbance to the natural environment). In general, the approval of the coastal development permit will be hard to achieve.
- **Cultural Resources:** Mitigable resources (old saw mill not likely to be impacted).
- **Community Impacts:** Property on the west side will be avoided; however, there is also a residence on the east (north abutment) that will be impacted by the east alignment.

#### Operations

Rating: **6.0**

**Rationale:** The baseline concept will provide:

- 8-foot shoulders that can handle disabled vehicles and bicyclists.
- 5-foot-wide, grade-separated path in only one direction supports pedestrian mobility. Geometric improvements include upgrading the horizontal and vertical curves.

- Maintains road to the north of the bridge.

### **Maintainability**

Rating: **8.0**

**Rationale:** The project will provide brand new service life for the structure, pavement, and drainage facility in the vicinity of Salmon Creek Bridge and approaches. Maintenance requirement for arch bridge seems comparable to CIP boxes.

### **Construction Impacts**

Rating: **8.0**

**Rationale:** The project will be built off-line, thereby minimizing the impacts to the traveling public. Two lanes of traffic will be carried during construction activities. Cranes will impact the use under the bridge. There is good access under the north abutment and under the bridge (via Spring Grove Road). Access can be built to the south abutment/south side of the bridge in general that is well served via the east side alignment.

### **Measure Performance of Baseline Concept: Albion River Bridge Replacement**

The project team and stakeholders evaluated the performance of the Baseline Concept relative to the scales identified previously. The information below reflects the performance ratings and associated rationale for each attribute.

### **Environmental Impacts**

Rating: **5.0**

#### **Rationale:**

- Biology Impacts: Wetlands, rare plants, birds, etc. (Formal consultation with USFW and NOA fisheries required). In general, coastal development permit will be hard to achieve.
- Cultural Resources:
  - The west side alignment has less impact than the east alignment on the northern bluffs (old saw mill site).
  - The replacement of this bridge will trigger mitigation measures as the bridge is eligible for the National Register.
- Community Impacts
  - Community will like a bridge that is unique and has an identity.
  - There will be socio-economic impacts to the built community, particularly the marina (boat docks)/RV park.

### **Operations**

Rating: **7.0**

**Rationale:** The baseline concept will provide 8-foot shoulders, 5-foot-wide grade-separated paths in both directions to support pedestrian mobility. The wider shoulder will handle disabled vehicles and

bicycles. Geometric improvements include upgrading the existing alignment’s tight horizontal curve. The concept maintains the access to the county road and the access road to the RV park north of Albion (two intersections consolidated into a single one).

**Maintainability**

Rating: **8.0**

**Rationale:** The project will provide brand new service life for the structure, pavement, and drainage facility in the vicinity of Albion River Bridge and approaches. Maintenance requirement for arch bridge seems comparable to CIP boxes.

**Construction Impacts**

Rating: **7.0**

**Rationale:** The project will be built off-line, thereby minimizing the impacts to the traveling public. Two lanes of traffic will be carried during the construction activities. The construction operations will be complicated as staging/laydown area will not be allowed under the bridge. Access to the boat docks will be impacted and the RV park may be temporarily impacted during construction. The west side has fewer impacts than the east side as the use of the bridge lies mostly to the east of the existing bridge.

**Measure Performance of VA Alternatives**

The VA team prepared performance assessments of each of the VA alternatives during the Development Phase of the VA study. For each VA alternative, the VA team rated its performance using the previously defined scale for each performance attribute. The rationale for any change in performance as compared to the Baseline Concept was recorded. Please refer to the individual performance assessments for each VA alternative as presented in the *Value Analysis Alternatives* section of this report.

**Define VA Strategies: Salmon Creek Bridge Replacement Project**

The VA team identified one or more VA strategies for consideration. VA strategies reflect different combinations of complimentary VA alternatives. The VA strategies are summarized in the table below.

**Summary of VA Strategies**  
***Salmon Creek Bridge Replacement Project***

Strategy Description	Initial Cost Savings	LCC Savings	Change in Schedule	Change in Performance	Value Change
Salmon Creek Strategy 1: <i>Retrofit, widen, and rehabilitate;</i> <i>Add enhancements</i> VA Alternatives 1.1, 2.0, 4.1	(\$250,000)	(\$32,394,000)	+½ year	+3 %	-10 %

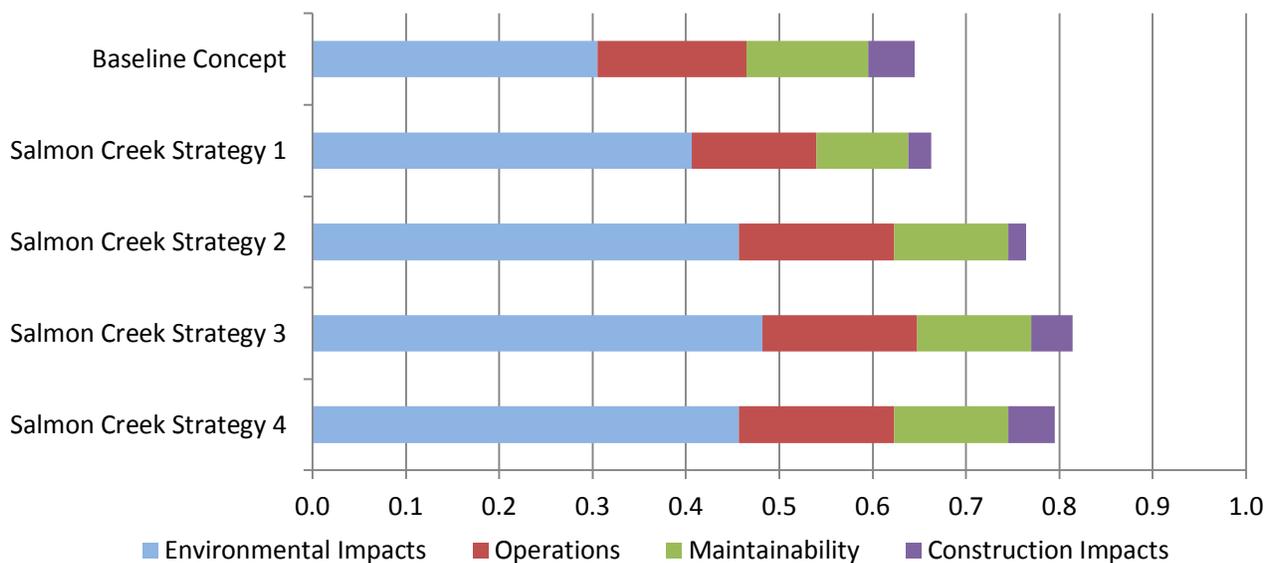
Strategy Description	Initial Cost Savings	LCC Savings	Change in Schedule	Change in Performance	Value Change
Salmon Creek Strategy 2: <i>Build on existing centerline using detour; Add enhancements</i> VA Alternatives 1.1, 2.0, 3.0, 4.2	(\$8,610,000)	\$0	+1 year	+18 %	-14 %
Salmon Creek Strategy 3: <i>Build on-alignment (east) carrying two lanes of vehicle and pedestrians; Add enhancements</i> VA Alternatives 1.1, 2.0, 3.0, 4.3	(\$7,590,000)	\$0	+2 years	+26 %	-23 %
Salmon Creek Strategy 4: <i>Baseline concept with enhancements</i> VA Alternatives 1.1, 2.0, 3.0	\$10,000	\$0	No change	+23 %	+23 %

Note: Because the cost data depicted above represent savings, a number in parentheses represents a cost increase.

### Compare Performance –Baseline Concept and VA Strategies: Salmon Creek Bridge Replacement Project

The VA team considered the combined effect of all VA alternatives for each VA strategy. The total performance scores reflect the performance rating for each attribute multiplied by its overall priority (weight) expressed using a ratio scale. A total performance score of “1” would indicate the highest level of desired performance (i.e., “ideal” performance). The chart below compares the total performance scores for the Baseline Concept and the VA strategies.

**Comparison of Performance**



## **Rating Rationale for VA Strategies: Salmon Creek Bridge Replacement Project**

The rating rationale for the performance of the Baseline Concept was presented previously in this section. The rating rationale for the VA strategies that were developed by the VA team is provided below.

### **Salmon Creek Strategy 1: Retrofit, Widen, and Rehabilitate; Add Enhancements (VA Alternatives 1.1, 2.0, 4.1)**

#### ***Environmental Impacts***

Rating: **8.0**

**Rationale:** VA Alternative 1.1 provides a community path for coastal access. This amenity improves the recreational value of the Albion community and has the potential to improve regional socio-economics by promoting local tourism. Coastal access is an amenity that is typically requested by the California Coastal Commission for highway projects in the vicinity of the coast.

VA Alternative 2.0 fills in the coastal trail between the two bridge sites, also improving the recreational value and promoting local tourism. This portion of Highway 1 is considered part of the Coastal Trail and “filling in” the Coastal Trails enhancements are typically requested by the California Coastal Commission for highway projects co-located with the trail.

VA Alternative 4.1 retains the existing bridge, improving the cultural/community context of this project. However, the community context of this bridge is not as significant at this location as at Albion. The footprint impact, especially that associated with the approaches, would have no significant change over the baseline concept. However, a future replacement is required of this option (at approximately year 40), and the future footprint impacts are greater if one considers a longer horizon. Overall, therefore, the VA team evaluates this option as having greater environmental impacts than the baseline concept.

#### ***Operations***

Rating: **5.0**

**Rationale:** VA Alternative 4.1 will not change the vertical profile as proposed in the baseline concept. The frequent repainting of the steel truss required in this VA alternative will have frequent, long periods of post-construction traffic impacts.

#### ***Maintainability***

Rating: **6.0**

**Rationale:** The community path and the coastal trail associated with VA Alternative 1.1 and 2.0 will be maintained by third parties. VA Alternative 4.1 maintains the use of the existing structure. The reuse of the existing structure’s rehabilitated service life would be less than half of the baseline concept. Also, the existing structure requires painting of the steel truss every 5 years.

### ***Construction Impacts***

Rating: **4.0**

**Rationale:** VA Alternative 4.1 requires building the project under traffic, which will impact the traveling public to a much larger degree than the baseline concept (which employs offline replacement). It will require one-way traffic control over a longer overall construction duration.

### **Salmon Creek Strategy 2: Build on Existing Centerline Using Detour; Add Enhancements (VA Alternatives 1.1, 2.0, 3.0, 4.2)**

### ***Environmental Impacts***

Rating: **9.0**

**Rationale:** VA Alternative 1.1 provides a community path for coastal access. This amenity improves the recreational value of the Albion community and has the potential to improve regional socio-economics by promoting local tourism. Coastal access is an amenity that is typically requested by the California Coastal Commission for highway projects in the vicinity of the coast.

VA Alternative 2.0 fills in the coastal trail between the two bridge sites, also improving the recreational value and promoting local tourism. This portion of Highway 1 is considered part of the Coastal Trail and “filling in” the Coastal Trails enhancements are typically requested by the California Coastal Commission for highway projects co-located with the trail.

VA Alternative 3.0 reduces the impacts to high-value vegetation on the south abutment (baseline concept location) by moving the abutment further south.

VA Alternative 4.2 would require improving the local roadway to handle Route 1 traffic. This will impact a larger footprint than building the new offline bridge concepts (such as suggested in the baseline concept). The temporary roadway and bridge will encroach on the riparian habitat of Salmon Creek. This option has even more impact at Salmon Creek because of the large amount of virgin land impacted by the temporary road.

### ***Operations***

Rating: **6.2**

**Rationale:** VA Alternative 3.0 will flatten the grades associated with the sag vertical curve across the bridge, thereby increasing the sag sight distance (headlight) and reducing the associated heavy vehicle speed loss.

### ***Maintainability***

Rating: **7.5**

**Rationale:** The community path and the Coastal Trail, associated with VA Alternatives 1.1 and 2.0 will be maintained by third parties. VA Alternative 3.0 will have nominally more deck area to maintain.

### ***Construction Impacts***

Rating: **3.0**

**Rationale:** VA Alternative 4.2 will impose severe and adverse community impacts for the duration of the detour, approximately 3 years.

### **Salmon Creek Strategy 3: Build On-Alignment (East) Carrying Two Lanes of Vehicle Traffic and Pedestrians; Add Enhancements (VA Alternatives 1.1, 2.0, 3.0, 4.3)**

### ***Environmental Impacts***

Rating: **9.5**

**Rationale:** VA Alternative 1.1 provides a community path for coastal access. This amenity improves the recreational value of the Albion community and has the potential to improve regional socio-economics by promoting local tourism. Coastal access is an amenity that is typically requested by the California Coastal Commission for highway projects in the vicinity of the coast.

VA Alternative 2.0 fills in the coastal trail between the two bridge sites, also improving the recreational value and promoting local tourism. This portion of Highway 1 is considered part of the Coastal Trail and “filling in” the Coastal Trails enhancements are typically requested by the California Coastal Commission for highway projects co-located with the trail.

VA Alternative 3.0 reduces the impacts to high-value vegetation on the south abutment (baseline concept location) by moving the abutment further south.

Alternative 4.3 has no significant change with respect to the footprint impact, especially that associated with the approaches.

### ***Operations***

Rating: **6.2**

**Rationale:** VA Alternative 3.0 will flatten the grades associated with the sag vertical curve across the bridge, thereby increasing the sag sight distance (headlight) and the reducing the associated heavy vehicle speed loss.

### ***Maintainability***

Rating: **7.5**

**Rationale:** The community path and the coastal trail, associated with VA Alternatives 1.1 and 2.0 will be maintained by third parties. VA Alternative 3.0 will have nominally more deck area to maintain.

### ***Construction Impacts***

Rating: **7.0**

**Rationale:** VA Alternative 4.3 will have construction traffic impacts that are greater over a longer timeframe when compared to the baseline concept. The traffic will be shoe-horned between barriers and will require two shifts: Existing-Stage 1, Stage 1-Stage 2, Stage 2-Final Configuration. This is one

additional shift over the baseline concept. Temporary shoring would be required due to grade separation of adjacent lanes.

### **Salmon Creek Strategy 4: Baseline Concept with Enhancements (VA Alternatives 1.1, 2.0, 3.0)**

#### ***Environmental Impacts***

Rating: **9.0**

**Rationale:** VA Alternative 1.1 provides a community path for coastal access. This amenity improves the recreational value of the Albion community and has the potential to improve regional socio-economics by promoting local tourism. Coastal access is an amenity that is typically requested by the California Coastal Commission for highway projects in the vicinity of the coast.

VA Alternative 2.0 fills in the coastal trail between the two bridge sites, also improving the recreational value and promoting local tourism. This portion of Highway 1 is considered part of the Coastal Trail and “filling in” the Coastal Trails enhancements are typically requested by the California Coastal Commission for highway projects co-located with the trail.

VA Alternative 3.0 reduces the impacts to high-value vegetation on the south abutment (baseline concept location) by moving the abutment further south.

#### ***Operations***

Rating: **6.2**

**Rationale:** VA Alternative 3.0 will flatten the grades associated with the sag vertical curve across the bridge, thereby increasing the sag sight distance (headlight) and the reducing the associated heavy vehicle speed loss.

#### ***Maintainability***

Rating: **7.5**

**Rationale:** The community path and the coastal trail, associated with VA Alternatives 1.1 and 2.0 will be maintained by third parties. VA Alternative 3.0 will have nominally more deck area to maintain.

#### ***Construction Impacts***

Rating: **8.0**

**Rationale:** No significant change.

### **Compare Value**

The cost and time (i.e., schedule) elements were compared and normalized for the Baseline Concept and the VA strategies using the following tables. These tables illustrate how cost and time (schedule) scores were derived. In this comparison, a lower score is desirable as the project will benefit from lower costs and a shorter schedule.

Strategies	Cost	Score
Baseline Concept	\$43,909,000	0.186
Salmon Creek Strategy 1	\$44,159,000	0.187
Salmon Creek Strategy 2	\$52,519,000	0.223
Salmon Creek Strategy 3	\$51,499,000	0.218
Salmon Creek Strategy 4	\$43,899,000	0.186
<b>TOTAL</b>	<b>\$235,985,000</b>	<b>1.000</b>

Strategies	Time	Score
Baseline Concept	2 years	0.148
Salmon Creek Strategy 1	2.5 years	0.185
Salmon Creek Strategy 2	3 years	0.222
Salmon Creek Strategy 3	4 years	0.296
Salmon Creek Strategy 4	2 years	0.148
<b>TOTAL</b>	<b>162 months</b>	<b>1.000</b>

Project Management indicated the following preferences in considering trade-offs between cost and time:

Relative Importance	
COST	38.00 %
TIME	62.00 %

Once relative scores for performance cost and time have been derived, the next step is synthesizing a value index for the Baseline Concept and each of the VA strategies. This is achieved by applying the following algorithm for value:

- V = Value
- f = Function
- P = Performance
- C = Cost
- t = Time
- α = Risk

$$V_f(P, C, t)_{total} = \frac{\sum_{n=1}^{\infty} P_n \cdot \alpha}{\sum_{n=1}^{\infty} [(C_n \cdot \alpha) + (t_n \cdot \alpha)]}$$

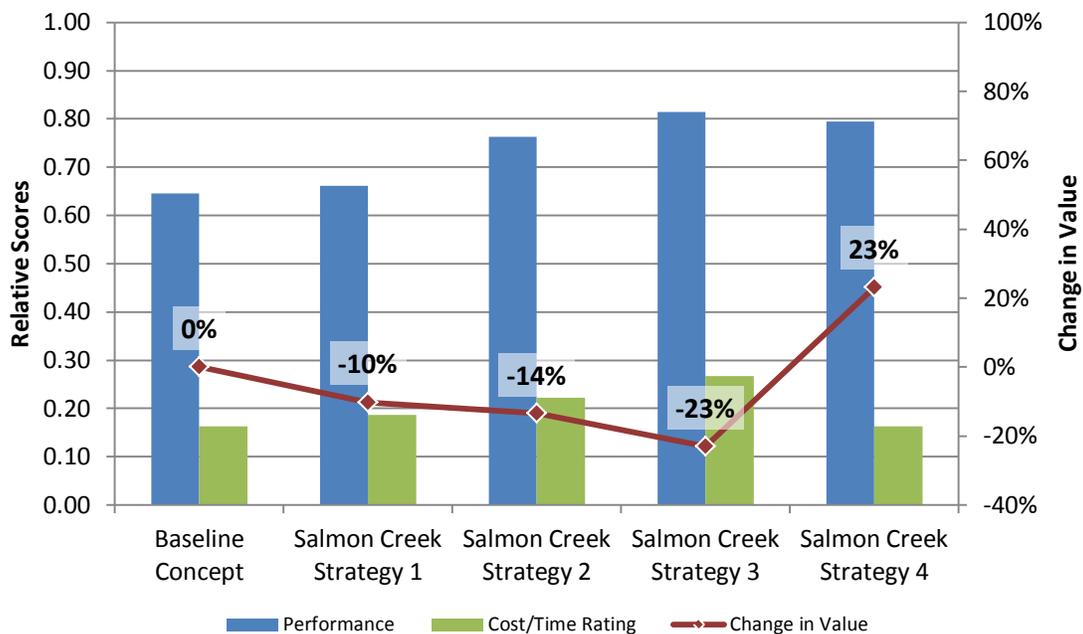
A Value Matrix was prepared which facilitated the comparison of competing strategies by organizing and summarizing this data into a tabular format. The performance scores for each strategy were

divided by the total cost/time scores for each strategy to derive a value index. The value indices for the VA strategies are then compared against the value index of the Baseline Concept and the difference is expressed as a percent ( $\pm\%$ ) deviation.

**Value Matrix**  
**Baseline Concept & Salmon Creek Bridge VA Strategies**

Strategies	Performance Score	Change in Performance	Cost/Time Score	Net Change	Value Index	Change in Value
Baseline Concept	0.645	---	0.163	---	3.968	---
Salmon Creek Strategy 1	0.662	+3 %	0.186	+14 %	3.563	-10 %
Salmon Creek Strategy 2	0.763	+18 %	0.222	+37 %	3.433	-14 %
Salmon Creek Strategy 3	0.814	+26 %	0.267	+64 %	3.052	-23 %
Salmon Creek Strategy 4	0.795	+23 %	0.163	0 %	4.888	+23 %

**Comparison of Value - Baseline Concept and Salmon Creek VA Strategies**



**Define VA Strategies - Albion River Bridge Replacement Project**

The VA team identified one or more VA strategies for consideration. VA strategies reflect different combinations of complimentary VA alternatives. The VA strategies are summarized in the table below.

## Summary of VA Strategies – Albion River Bridge Replacement Project

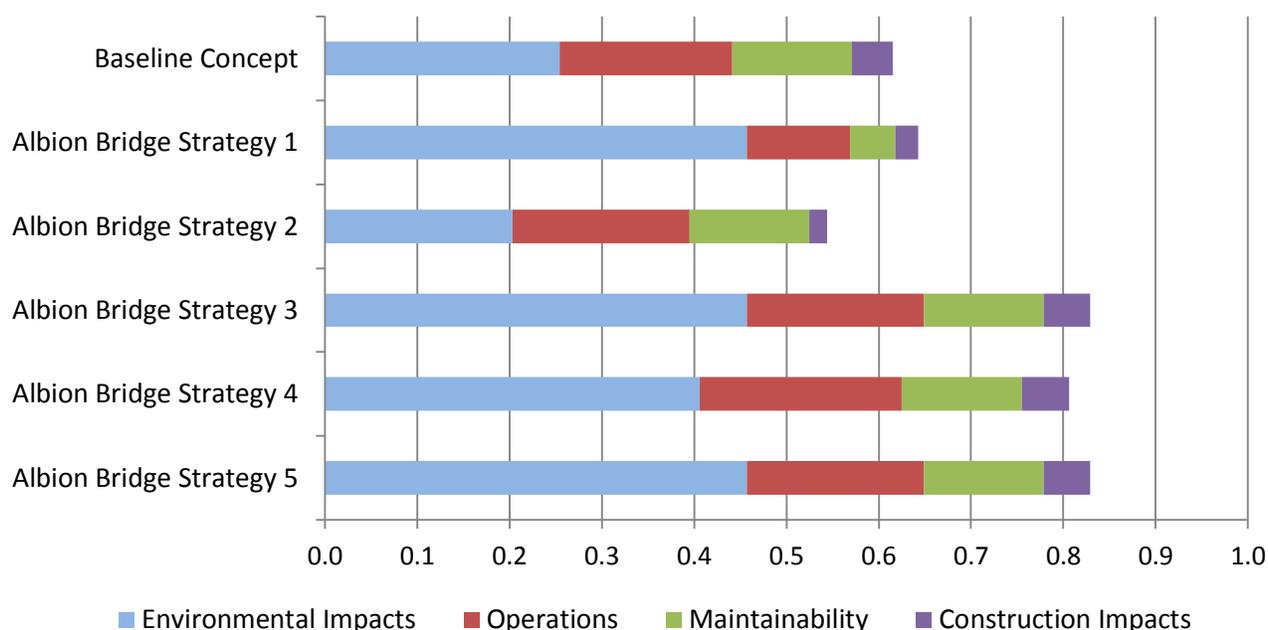
Strategy Description	Initial Cost Savings	LCC Savings	Change in Schedule	Change in Performance	Value Change
Albion Bridge Strategy 1: <i>Retrofit, widen, and rehabilitate; Add enhancements</i> VA Alternatives 5.1, 6.0, 7.0, 8.0, 9.1	(\$2,930,000)	(\$14,332,000)	+½ year	+5 %	-8 %
Albion Bridge Strategy 2: <i>Build on existing centerline; Add enhancements</i> VA Alternatives 5.1, 6.0, 7.0, 8.0, 9.2	(\$87,000,000)	\$0	+1 year	-11 %	-55 %
Albion Bridge Strategy 3: <i>Build on-alignment carrying two lanes of vehicular traffic and pedestrians; Add enhancements</i> VA Alternatives 5.1, 6.0, 7.0, 8.0, 9.3	(\$20,250,000)	\$0	+2 years	+35 %	-17 %
Albion Bridge Strategy 4: <i>Use the existing bridge for non- motorist use; Add enhancements</i> VA Alternatives 5.4, 6.0, 7.0, 8.0	(\$3,490,000)	\$0*	No change	+31 %	+27 %
Albion Bridge Strategy 5: <i>Baseline concept with enhancements</i> VA Alternatives 5.1, 6.0, 7.0, 8.0	(\$1,100,000)	\$0	No change	+35 %	+34 %

*\*This strategy includes VA Alternative 5.4, which assumes that maintenance of the retained existing bridge will be the responsibility of a third party.*

### Compare Performance –Baseline Concept and VA Strategies: Albion River Bridge Replacement

The VA team considered the combined effect of all VA alternatives for each VA strategy. The total performance scores reflect the performance rating for each attribute multiplied by its overall priority (weight) expressed using a ratio scale. A total performance score of “1” would indicate the highest level of desired performance (i.e., “ideal” performance). The chart below compares the total performance scores for the Baseline Concept and the VA strategies.

## Comparison of Performance



### Rating Rationale for VA Strategies: Albion River Bridge Replacement Project

The rating rationale for the performance of the Baseline Concept was presented previously in this section. The rating rationale for the VA strategies that were developed by the VA team is provided below.

#### Albion Bridge Strategy 1: Retrofit, Widen and Rehabilitate; Add Enhancements (VA Alternatives 5.1, 6.0, 7.0, 8.0, 9.1)

##### *Environmental Impacts*

Rating: **9.0**

**Rationale:** VA Alternative 5.1 provides a community path for coastal access. This amenity improves the recreational value of the Albion community and has the potential to improve regional socio-economics by promoting local tourism. Coastal access is an amenity that is typically requested by the California Coastal Commission for highway projects in the vicinity of the coast.

VA Alternative 6.0 fills in the coastal trail between the two bridge sites, also improving the recreational value and promoting local tourism. This portion of Highway 1 is considered part of the Coastal Trail and “filling in” the Coastal Trails enhancements are typically requested by the California Coastal Commission for highway projects co-located with the trail.

VA Alternative 7.0 suggests purchasing the RV park and use portions of the parcel as a mitigation site to mitigate the environmental impacts associated with the projects. This option provides an opportunity to resell portion of the land and improve the quality of the built portion of the area and create a more appealing site.

VA Alternative 8.0 would remove the existing eucalyptus trees to create a temporary negative visual impact but offers the opportunity to introduce native species in their place.

VA Alternative 9.1 would retrofit, widen, and rehabilitate the existing Albion River Bridge, providing the opportunity to retain the existing bridge while replicating the look on the widened portions. This would improve the cultural/community context of this project by retaining the existing structure. Furthermore, the approaches would have little to no impact. On the other hand, the retrofit alternative would have larger permanent footprint impact under the bridge as the existing bridge piers are more numerous and occupy more space than the baseline concept's piers. However, as a future replacement is required of this option at approximately year 40, will have future greater impacts, especially to the built environment underneath the bridge. If a longer horizon is used to evaluate this strategy, it appears that overall this option as has greater environmental impacts than the baseline concept.

### ***Operations***

Rating: **4.2**

**Rationale:** VA Alternative 8.0 reduces the sight distance restriction for southbound traffic.

VA Alternative 9.1 retains the horizontal curve on Albion River Bridge, restricting the operating speed to less than 30 mph on the approach portions at the north end of the bridge. It should be noted that the rest of the Highway 1 corridor has similar low speed curves throughout the region.

### ***Maintainability***

Rating: **3.0**

**Rationale:** VA Alternative 5.1's community path for coastal access and VA Alternative 6.0's coastal trail suggest a third party operator, and would therefore not require any maintenance by Caltrans.

VA Alternative 8.0 would remove the existing eucalyptus trees, reducing maintenance efforts.

Alternative 9.1 would retrofit, widen, and rehabilitate the existing Albion River Bridge. The service life of the existing structure would be approximately half that of the baseline concept. Also, the painting and bolt tightening operations of the existing bridge are required until such time that the existing bridge is replaced.

### ***Construction Impacts***

Rating: **4.0**

**Rationale:** VA Alternative 7.0 creates less conflicts and disruption between the RV park operations and construction operations. For example, it reduces the likelihood of complaints by the RV park owners that may impact the contractor and result in working day delays.

VA Alternative 9.1 requires the project to be built under traffic, which will impact the traveling public to a much larger degree over the baseline concept (which calls for replacing the bridge offline). The construction would take place under one-way traffic control.

## **Albion Bridge Strategy 2: Build on Existing Centerline Using Detour; Add Enhancements (VA Alternatives 5.1, 6.0, 7.0, 8.0, 9.2)**

### ***Environmental Impacts***

Rating: **4.0**

**Rationale:** VA Alternative 5.1 provides a community path for coastal access. This amenity improves the recreational value of the Albion community and has the potential to improve regional socio-economics by promoting local tourism. Coastal access is an amenity that is typically requested by the California Coastal Commission for highway projects in the vicinity of the coast.

VA Alternative 6.0 fills in the coastal trail between the two bridge sites, also improving the recreational value and promoting local tourism. This portion of Highway 1 is considered part of the Coastal Trail and “filling in” the Coastal Trails enhancements are typically requested by the California Coastal Commission for highway projects co-located with the trail.

VA Alternative 7.0 suggests purchasing the RV park and use portions of the parcel as a mitigation site to mitigate the environmental impacts associated with the projects. This option provides an opportunity to resell portion of the land and improve the quality of the built portion of the area and create a more appealing site.

VA Alternative 8.0 would remove the existing eucalyptus trees to create a temporary negative visual impact but offers the opportunity to introduce native species in their place.

VA Alternative 9.2 would require improving the local roadway to handle Route 1 traffic. This will impact a larger footprint than building the new offline bridge concepts (such as suggested in the baseline concept). The temporary bridge approach fills will encroach on the riparian habitat of the Albion River and there would be negative impacts to local fisheries associated with the temporary crossing of the river.

### ***Operations***

Rating: **7.2**

**Rationale:** VA Alternative 8.0 reduces the sight distance restriction for southbound traffic.

### ***Maintainability***

Rating: **8.0**

**Rationale:** No significant change from the baseline concept, PSR Alternative 1C, although VA Alternative 8.0 would remove the existing eucalyptus trees, reducing maintenance efforts.

### ***Construction Impacts***

Rating: **3.0**

**Rationale:** VA Alternative 7.0 creates less conflicts and disruption between the RV park operations and the construction operations. For example, it reduces the likelihood of complaints by the RV park owners that may impact the contractor and result in working day delays.

VA Alternative 9.2 causes adverse community impacts for the duration of the detour – approximately 3 years. These include the inconvenience and temporary impacts of routing Route 1 traffic through the community.

### **Albion Bridge Strategy 3: Build On-Alignment Carrying Two Lanes of Vehicular Traffic and Pedestrians; Add Enhancements (VA Alternatives 5.1, 6.0, 7.0, 8.0, 9.3)**

#### ***Environmental Impacts***

Rating: **9.0**

**Rationale:** VA Alternative 5.1 provides a community path for coastal access. This amenity improves the recreational value of the Albion community and has the potential to improve regional socio-economics by promoting local tourism. Coastal access is an amenity that is typically requested by the California Coastal Commission for highway projects in the vicinity of the coast.

VA Alternative 6.0 fills in the coastal trail between the two bridge sites, also improving the recreational value and promoting local tourism. This portion of Highway 1 is considered part of the Coastal Trail and “filling in” the Coastal Trails enhancements are typically requested by the California Coastal Commission for highway projects co-located with the trail.

VA Alternative 7.0 suggests purchasing the RV park and use portions of the parcel as a mitigation site to mitigate the environmental impacts associated with the projects. This option provides an opportunity to resell portion of the land and improve the quality of the built portion of the area and create a more appealing site.

VA Alternative 8.0 would remove the existing eucalyptus trees to create a temporary negative visual impact but offers the opportunity to introduce native species in their place.

VA Alternative 9.3 would build on-alignment, to the west, carrying two-lanes of vehicular traffic and pedestrians. This option would have little to no footprint impact. This is especially true of the footprint associated with the approaches.

#### ***Operations***

Rating: **7.2**

**Rationale:** VA Alternative 8.0 reduces the sight distance restriction for southbound traffic.

#### ***Maintainability***

Rating: **8.0**

**Rationale:** No change from the baseline concept, PSR Alternative 1C.

### ***Construction Impacts***

Rating: **8.0**

**Rationale:** VA Alternative 7.0 creates less conflicts and disruption between the RV park operations and the construction operations. For example, it reduces the likelihood of complaints by the RV park owners that may impact the contractor and result in working day delays.

VA Alternative 9.3 would have greater construction traffic impacts than baseline. The traffic will be shoe-horned between barriers and will require two shifts: Existing-Stage 1, Stage 1-Stage 2, Stage 2-Final Configuration. This is one additional shift over the baseline concept. Also, this requires equipment on the top abutment slopes for much of the construction operations.

### **Albion Bridge Strategy 4: Use the Existing Bridge for Non-Motorist Use; Add Enhancements (VA Alternatives 5.4, 6.0, 7.0, 8.0)**

#### ***Environmental Impacts***

Rating: **8.0**

**Rationale:** VA Alternative 5.4 uses the existing Albion Bridge for non-motorist use and narrows up the width of the new bridge. This option creates a larger permanent footprint over the RV park associated with deck of the existing + proposed bridge. It retains the community identity associated with the existing bridge. The viewscape associated with the arch is impacted by the existing structure and vice versa.

VA Alternative 6.0 fills in the coastal trail between the two bridge sites, also improving the recreational value and promoting local tourism. This portion of Highway 1 is considered part of the Coastal Trail and “filling in” the Coastal Trails enhancements are typically requested by the California Coastal Commission for highway projects co-located with the trail.

VA Alternative 7.0 suggests purchasing the RV park and use portions of the parcel as a mitigation site to mitigate the environmental impacts associated with the projects. This option provides an opportunity to resell portion of the land and improve the quality of the built portion of the area and create a more appealing site.

VA Alternative 8.0 would remove the existing eucalyptus trees to create a temporary negative visual impact but offers the opportunity to introduce native species in their place.

#### ***Operations***

Rating: **8.2**

**Rationale:** VA Alternative 5.4 reduces conflicts between non-motorist and vehicular traffic by segregating traffic, while Alternative 8.0 reduces the sight distance restriction for southbound traffic.

### ***Maintainability***

Rating: **8.0**

**Rationale:** No significant change from the baseline concept, PSR Alternative 1C, although VA Alternative 8.0 would remove the existing eucalyptus trees, reducing maintenance efforts.

### ***Construction Impacts***

Rating: **8.1**

**Rationale:** VA Alternative 5.4 creates less spoil and therefore less construction impacts associated with their haul.

VA Alternative 7.0 creates less conflicts and disruption between the RV park operations and the construction operations. For example, it reduces the likelihood of complaints by the RV park owners that may impact the contractor and result in working day delays.

### **Albion Bridge Strategy 5: Baseline Concept with Enhancements (VA Alternatives 5.1, 6.0, 7.0, 8.0)**

### ***Environmental Impacts***

Rating: **9.0**

**Rationale:** VA Alternative 5.1 provides a community path for coastal access. This amenity improves the recreational value of the Albion community and has the potential to improve regional socio-economics by promoting local tourism. Coastal access is an amenity that is typically requested by the California Coastal Commission for highway projects in the vicinity of the coast.

VA Alternative 6.0 fills in the coastal trail between the two bridge sites, also improving the recreational value and promoting local tourism. This portion of Highway 1 is considered part of the Coastal Trail and “filling in” the Coastal Trails enhancements are typically requested by the California Coastal Commission for highway projects co-located with the trail.

VA Alternative 7.0 suggests purchasing the RV park and use portions of the parcel as a mitigation site to mitigate the environmental impacts associated with the projects. This option provides an opportunity to resell portion of the land and improve the quality of the built portion of the area and create a more appealing site.

VA Alternative 8.0 would remove the existing eucalyptus trees to create a temporary negative visual impact but offers the opportunity to introduce native species in their place.

### ***Operations***

Rating: **7.2**

**Rationale:** VA Alternative 8.0 would remove the existing eucalyptus trees. This would create a temporary negative visual impact, but offers the opportunity to introduce native species.

### **Maintainability**

Rating: **8.0**

**Rationale:** No significant change from the baseline concept, PSR Alternative 1C, although VA Alternative 8.0 would remove the existing eucalyptus trees, reducing maintenance efforts.

### **Construction Impacts**

Rating: **8.0**

**Rationale:** VA Alternative 7.0 creates less conflicts and disruption between the RV park operations and the construction operations. For example, it reduces the likelihood of complaints by the RV park owners that may impact the contractor and result in working day delays.

### **Compare Value**

The cost and time (i.e., schedule) elements were compared and normalized for the Baseline Concept and the VA strategies using the following tables. These tables illustrate how cost and time (schedule) scores were derived. In this comparison, a lower score is desirable as the project will benefit from lower costs and a shorter schedule.

<b>Strategies</b>	<b>Cost</b>	<b>Score</b>
Baseline Concept	\$38,376,000	0.111
Albion Bridge Strategy 1	\$41,306,000	0.120
Albion Bridge Strategy 2	\$125,376,000	0.363
Albion Bridge Strategy 3	\$58,626,000	0.170
Albion Bridge Strategy 4	\$41,866,000	0.121
Albion Bridge Strategy 5	\$39,476,000	0.114
<b>TOTAL</b>	<b>\$345,026,000</b>	<b>1.000</b>

<b>Strategies</b>	<b>Time</b>	<b>Score</b>
Baseline Concept	3 years	0.140
Albion Bridge Strategy 1	3.5 years	0.163
Albion Bridge Strategy 2	4 years	0.186
Albion Bridge Strategy 3	5 years	0.233
Albion Bridge Strategy 4	3 years	0.140
Albion Bridge Strategy 5	3 years	0.140
<b>TOTAL</b>	<b>258 months</b>	<b>1.000</b>

Project Management indicated the following preferences in considering trade-offs between cost and time:

Relative Importance	
COST	38.0 %
TIME	62.0 %

Once relative scores for performance cost and time have been derived, the next step is synthesize a value index for the Baseline Concept and each of the VA strategies. This is achieved by applying the following algorithm for value:

- V = Value
- f = Function
- P = Performance
- C = Cost
- t = Time
- α = Risk

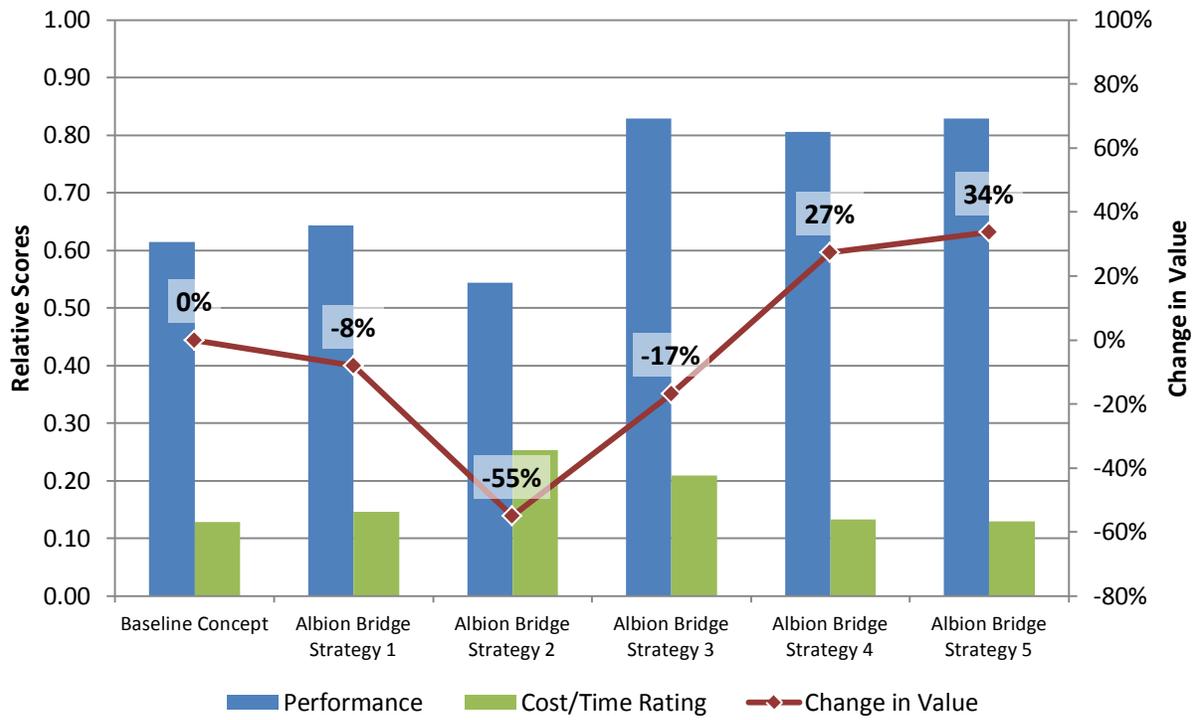
$$V_f(P, C, t)_{total} = \frac{\sum_{n=1}^{\infty} P_n \cdot \alpha}{\sum_{n=1}^{\infty} [(C_n \cdot \alpha) + (t_n \cdot \alpha)]}$$

A Value Matrix was prepared which facilitated the comparison of competing strategies by organizing and summarizing this data into a tabular format. The performance scores for each strategy were divided by the total cost/time scores for each strategy to derive a value index. The value indices for the VA strategies are then compared against the value index of the Baseline Concept and the difference is expressed as a percent (±%) deviation.

**Value Matrix**  
**Baseline Concept & Albion Bridge VA Strategies**

Strategies	Performance Score	Change in Performance	Cost/Time Score	Net Change	Value Index	Change in Value
Baseline Concept	0.615	---	0.129	---	4.774	---
Albion Bridge Strategy 1	0.643	+5 %	0.146	+14 %	4.391	-8 %
Albion Bridge Strategy 2	0.544	-11 %	0.253	+97 %	2.148	-55 %
Albion Bridge Strategy 3	0.829	+35 %	0.209	+62 %	3.973	-17 %
Albion Bridge Strategy 4	0.806	+31 %	0.133	+3 %	6.077	+27 %
Albion Bridge Strategy 5	0.829	+35 %	0.130	+1 %	6.381	+34 %

### Comparison of Value – Baseline Concept and Albion Bridge VA Strategies



## Rating Rationale for Accepted VA Alternatives: Salmon Creek Bridge Project

The rating rationale for the performance of the Baseline Concept was presented previously in this section. The rating rationale for the accepted VA alternatives that were developed by the VA team is provided below.

### Accepted VA Alternatives

#### *Environmental Impacts*

Rating: **7.5**

**Rationale:** VA Alternative 2.0 fills in the coastal trail between the two bridge sites, also improving the recreational value and promoting local tourism. This portion of Highway 1 is considered part of the Coastal Trail and “filling in” the Coastal Trails enhancements are typically requested by the California Coastal Commission for highway projects co-located with the trail. VA Alternative 3.0 reduces the impacts to high-value vegetation on the south abutment (baseline concept location) by moving the abutment further south.

#### *Operations*

Rating: **6.2**

**Rationale:** VA Alternative 3.0 will flatten the grades associated with the sag vertical curve across the bridge, thereby increasing the sag sight distance (headlight) and reducing the associated heavy vehicle speed loss.

#### *Maintainability*

Rating: **7.8**

**Rationale:** VA Alternative 3.0 will have nominally more deck area to maintain.

#### *Construction Impacts*

Rating: **8.0**

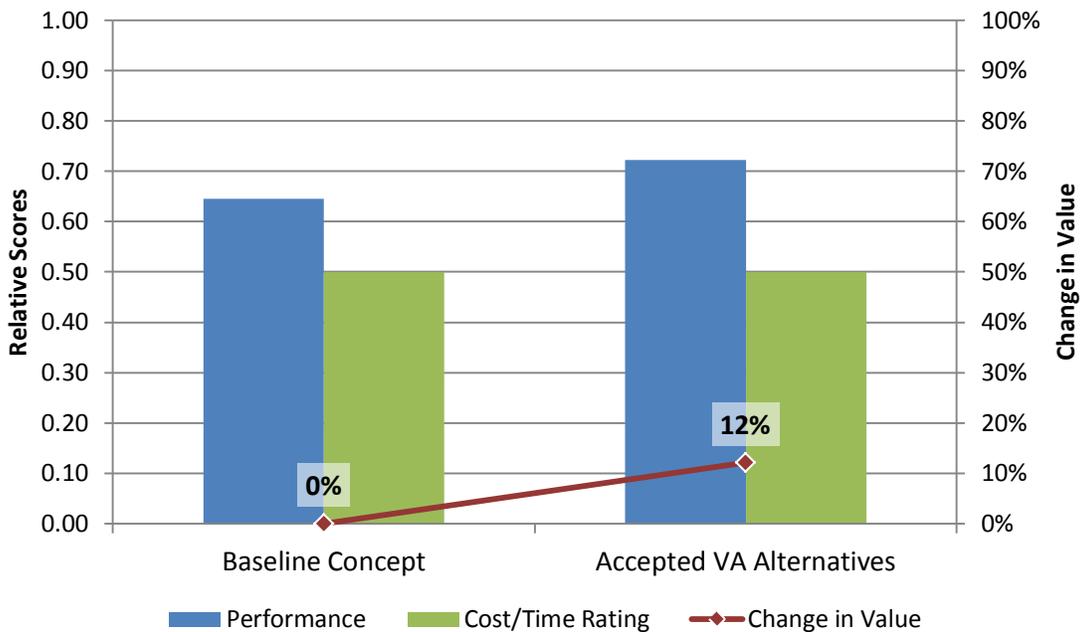
**Rationale:** No change.

### Value Matrix

#### *Baseline Concept & Salmon Creek Accepted VA Alternatives*

Strategies	Performance Score	Net Change	Cost/Time Score	Net Change	Value Index	Change in Value
Baseline Concept	0.645	---	0.500	---	1.290	---
Accepted VA Alternatives	0.722	+12 %	0.500	0 %	1.446	+12 %

## Comparison of Value – Baseline Concept and Salmon Creek Accepted VA Alternatives



### Rating Rationale for Accepted VA Alternatives: Albion River Bridge Project

The rating rationale for the performance of the Baseline Concept was presented previously in this section. The rating rationale for the accepted VA alternatives that were developed by the VA team is provided below.

#### Accepted VA Alternatives

##### **Environmental Impacts**

Rating: **7.0**

**Rationale:** VA Alternative 6.0 fills in the coastal trail between the two bridge sites, also improving the recreational value and promoting local tourism. This portion of Highway 1 is considered part of the Coastal Trail and “filling in” the Coastal Trails enhancements are typically requested by the California Coastal Commission for highway projects co-located with the trail. VA Alternative 8.0 would remove the existing eucalyptus trees to create a temporary negative visual impact but offers the opportunity to introduce native species in their place.

##### **Operations**

Rating: **7.2**

**Rationale:** VA Alternative 8.0 reduces the sight distance restriction for southbound traffic in the vicinity of the eucalyptus trees on the north approaches of the Albion River Bridge.

**Maintainability**

Rating: **8.0**

**Rationale:** No significant change, although VA Alternative 8.0 would remove the existing eucalyptus trees, reducing maintenance efforts.

**Construction Impacts**

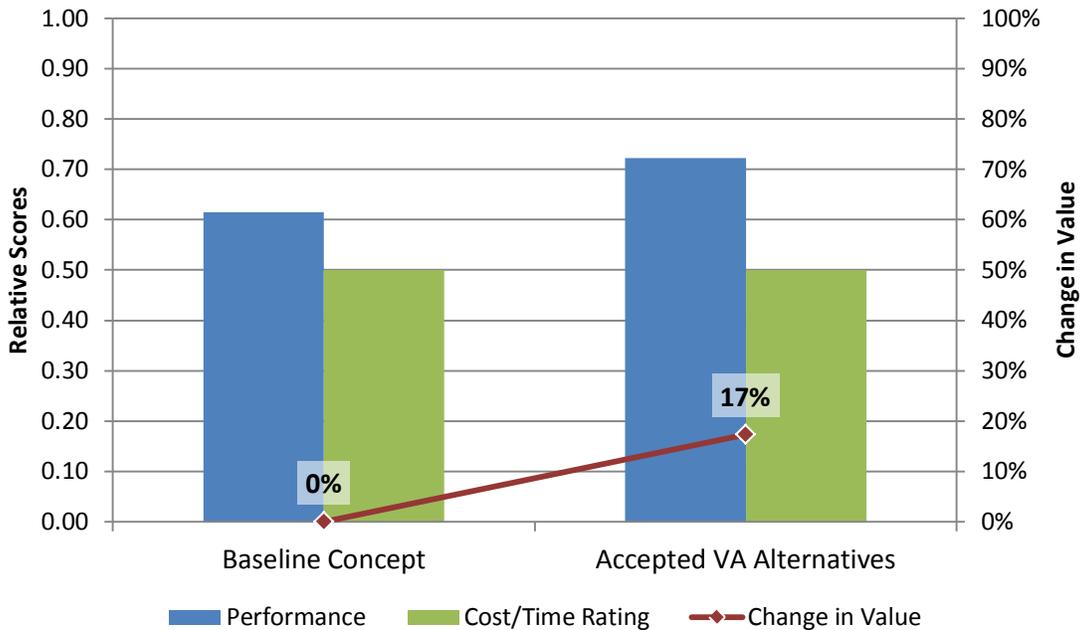
Rating: **7.0**

**Rationale:** No change.

**Value Matrix**  
**Baseline Concept & Albion Bridge Accepted VA Alternatives**

Strategies	Performance Score	Net Change	Cost/Time Score	Net Change	Value Index	Change in Value
Baseline Concept	0.615	---	0.500	---	1.230	---
Accepted VA Alternatives	0.722	+17 %	0.500	0 %	1.443	+17 %

**Comparison of Value - Baseline Concept and Albion Bridge Accepted VA Alternatives**



**RISK ANALYSIS**

A qualitative risk analysis was performed to summarize the risks related to the project performance, cost, and time (schedule). The VA team generated a Risk Identification List of 10 potential risks to the project as identified on the following pages, as well as several ideas to mitigate these risks, also shown in the following table.

## Risk Identification List and Mitigation Strategies

Risk No.	Type	Risk Category	Risk Name	Risk Description	Probability	Impact	Risk Response Strategy(s)
1	Threat	Environmental	Coastal Development Permit Approval	The Coastal Commission may not accept any of the salient features of the project: Shoulder Width, alignment, bridge rail, biological mitigation plan. This may expand to other, related permitting agencies, cities. This may cause project delays and increased mitigation costs. This generally happens post-PA&ED, generally just prior to RTL. Redesign is usually the impact of this risk. Additional public input may be required.	Very High	High Schedule/ Moderate Costs	Include a Community Advisory Board and include the Community Signature Line on the Coastal Commission permit application/plans sets.
2	Threat	Design	Community Opposition	The community input may cause additional design options to be vetted and developed to the extent that it delays the PA&ED approval. In the worst case, this could lead to lawsuits. This is mostly applicable to the Albion River Bridge.	Moderate	Low	Develop a collaborative approach with the Community: <ol style="list-style-type: none"> <li>1. Community Advisory Board.</li> <li>2. Develop project newsletter.</li> <li>3. Carry out design workshops with the community to build consensus.</li> <li>4. Build models to showcase and allow the community to understand.</li> <li>5. Be proactive.</li> <li>6. Don't personalize the project.</li> </ol>
3	Threat	Design	Right-of-Way Approval	There is a risk that non-compliant property owners request a CTC hearing that would delay or change the right-of-way approval. Albion Bridge has the greater risk impact.	Low	Moderate Schedule Delay	Accept this risk.
4	Threat	Design	Funding Window	There is a risk that the funding window is not met in the 4-year SHOPP funding cycle in the [assume] 2015/2016 fiscal year (end of the fiscal year is June 30). This risk has greatest application to Albion (due to PA&ED and ROW process).	Moderate	Moderate	Update the schedule that is reasonable and doable that identifies the correct resources to complete the project on time. Prioritize work to keep the projects on track.
5	Threat	Design	Traffic Corridor Delay	There is a risk that the corridor delay (Highway 128 to Highway 20) could impact the project. This works in combination with other projects – it might require that this project be delayed in order to comply.	Low	Low	<ol style="list-style-type: none"> <li>1. Consider offline alternatives and carry two lanes of traffic for peak hour timeframes.</li> <li>2. Carry out a community outreach to inform of the impacts to traffic (radio broadcasts, CMS, HAR, etc.).</li> <li>3. Have management review the award and duration of the various projects to avoid the corridor traffic delay.</li> </ol>
6	Threat	Design	Adequate ROW Acquisition Time	The timeframe from the PA&ED/geometric approval to the beginning of ROW negotiation/acquisition will be very tight and will make finalizing ROW very difficult to achieve. For example, property impact delays are already being experienced for the environmental studies (access is being denied). Applies mostly to Albion River Bridge.	High	High Schedule Impacts	<ol style="list-style-type: none"> <li>1. Albion &amp; Salmon: Maintain a window between Approval of PA&amp;ED and ROW certification as estimated in the Right of Way Data Sheet.</li> <li>2. Albion &amp; Salmon: Use third party ROW agents to balance workload on District 1 ROW agents.</li> <li>3. Albion &amp; Salmon: Carry out an advance ROW appraisal of key properties (Appraisal At-Risk).</li> </ol>

Risk No.	Type	Risk Category	Risk Name	Risk Description	Probability	Impact	Risk Response Strategy(s)
7	Threat	Design	Environmental Document Approval Delay	The time to complete the PA&ED is very tight; the compressed schedule to complete the necessary assessments may cause a delay to the deliver the project. Applies mostly to Albion Bridge.	Low Salmon Creek/ Moderate Albion	High Schedule Impacts	Albion & Salmon: Carry out constant and early coordination with the regulatory agencies for the review of the technical studies.
8	Threat	Construction	Threatened Species Construction Windows	There is a risk that the current working days scheduled for these projects will be impacted by the construction windows imposed by threatened species: Fish spawning, migratory birds, bats, etc. Applies equally to Albion River and Salmon Creek.	High	Moderate	<ol style="list-style-type: none"> <li>1. Albion &amp; Salmon: Ensure that the construction schedule represents the presence of all the relevant species works windows.</li> <li>2. Albion &amp; Salmon: Consider award dates that minimize the impacts to the project schedules associated with these threatened-species work windows.</li> </ol>
9	Threat	Construction	Construction Duration/Completion	There is risk that the two-year and three-year construction duration is not doable for Salmon Creek and Albion River Bridges, respectively. There are claims and delays associated with this risk.	Low	Moderate	Albion & Salmon: See above risks that help the impact thereof.
10	Threat	Design	Community/Environmental Cost Impacts	The current estimates show approximately \$3.7 million (for both bridges) for Mitigation Acquisition and Credits. No specific funding is identified for Biological Mitigation.	Moderate	Moderate	Albion & Salmon: Identify mitigation costs and schedule impacts based on historic information. Identify sample/characteristic projects that can provide the historic information. Develop the mitigation costs associated with the various project alternatives.

# IDEA EVALUATION

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# IDEA EVALUATION

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The ideas generated by the VA team were carefully evaluated, and project-specific attributes were applied to each idea to assure an objective evaluation.

## PERFORMANCE ATTRIBUTES

The following are key performance attributes identified for this project and used to assist the VA team in evaluating the ideas:

- Environmental Impacts
- Operations
- Maintainability
- Construction Impacts

The VA team enlisted the assistance of the stakeholders and project team (when available) to develop these attributes so that the evaluation would reflect their specific requirements.

## EVALUATION PROCESS

The VA team generated and evaluated ideas on how to perform the various project functions using other approaches. The idea list was grouped by function or major project element. Each idea was evaluated with respect to the functional requirements of the project. Performance, cost, time, and risk may also have been considered during this evaluation.

Once each idea was fully evaluated, it was given a total rating number. This is based on a scale of 1 to 7, as indicated by the rating index described in the *Value Analysis Process* section of this report. Ideas rated 4 to 7 were developed further and those that were found to have the greatest potential for value improvement are documented in the *Value Analysis Alternatives* section of this report. The rationale for why ideas that were rated highly but were not developed as alternatives is documented later in this section.

## IDEA SUMMARY

All of the ideas that were generated during the Speculation Phase using brainstorming techniques were recorded on the following pages. Ideas received an idea code based on the function statement under which it was brainstormed. The following table indicates the functions related to each idea code.

Idea Code	Related Function
FM	Facilitate Maintenance
IMSSD	Improve Mainline Stopping Sight Distance
MACOID	Maintain Community Identity
MBI	Mitigate Biological Impacts

Idea Code	Related Function
MICOIM	Minimize Community Impacts
MR	Mitigate Risks
MVA	Maintain Vessel Access
MVI	Mitigate Visual Impacts
PPA	Provide Pedestrian Access
SW	Span Watercourse
WS	Widen Shoulders

A detailed idea evaluation summary is also included. This summary includes additional information related to how each idea improves or degrades the elements of performance, cost, time (schedule), and risk. Only those elements where the idea differs from the baseline concept are included in this summary.

## IDEA SUMMARY LIST

Idea Code and Description	Rating
FM-1: Albion & Salmon: Add a under a bridge traveler system to facilitate bridge maintenance	DIS
FM-2: Albion & Salmon: Provide maintenance pullout areas at the ends of the bridge	DS
FM-3: Albion & Salmon: Consider Type 80 (see through) concrete rails in lieu of steel rails at edge of shoulder	DS
FM-4: Albion & Salmon: Add timber rails on the bridges at end of shoulder	DIS
FM-5: Albion & Salmon: Make a concrete bridge rail (Type 80) with timber architectural treatments at the edge of shoulder	DS
FM-6: Albion & Salmon: Use weathered steel for steel bridge rails at the edge of shoulder	DIS
FM-7: Albion & Salmon: Consider a precast deck panel to work in conjunction with the remainder of the superstructure	DIS
FM-8: Albion & Salmon: Incorporate a sacrificial wearing surface that can be milled and replaced with ease	DS
FM-9: Albion & Salmon: Consider rural ditches in lieu of underground storm drain system	ABD
FM-10: Salmon: Identify the system to drain the low point on the bridge, including the drainage basins to treat the bridge runoff underneath the bridge	DS
FM-11: Salmon & Albion: Add bioswales along the bridge approaches	DS
FM-12: Salmon: Consider a siphon a system to get the bridge runoff past the low point on the bridge	DIS

<b>Idea Code and Description</b>	<b>Rating</b>
FM-13: Salmon: Capture upstream roadway runoff before it gets to the bridge	ABD
FM-14: Salmon: Covered Bridge with Walkway on type	DIS
FM-15: Albion and Salmon: For arch structure types - provide a catwalk on the rib	DIS
IMSSD-1: Albion: Eliminate the S-curves (straighten)	DIS
IMSSD-2: Albion: Build a temp bridge and then place the permanent bridge on existing alignment	DEV
IMSSD-3: Albion: Build on east alignment	DEV
IMSSD-4: Albion: Flatten the horizontal curves	DIS
IMSSD-5: Albion: Close bridge and use an alternative route to construct on existing alignment	DIS
IMSSD-6: Albion: Use On-Alignment (east)	DIS
IMSSD-7: Albion: Use On-Alignment (west)	DEV
IMSSD-8: Salmon: Increase width	DIS
IMSSD-9: Salmon: Build on west alignment	DEV
IMSSD-10: Salmon: Close bridge and detour traffic to construct on existing alignment	DIS
IMSSD-11: Salmon: Use On-Alignment (east)	DEV
IMSSD-12: Salmon: Use On-Alignment (west)	DEV
IMSSD-13: Cross Salmon Creek at its narrowest point (near the beachfront)	DIS
IMSSD-14: Salmon Creeks: Raise the elevation of the low point in the sag and flatten the slopes to reduce approach grades for the sag at Salmon Falls	DEV
IMSSD-15: Salmon Creek: Optimize the profile at Salmon Creek to balance the earthwork	DEV
IMSSD-16: Salmon Creek: Move the low point off the bridge	DIS
IMSSD-17: Cut back the slope that is impeding stopping sight distance at the north end of the Albion Bridge Replacement project	DEV
IMSSD-18: Albion: Build on west alignment	DEV
IMSSD-19: Albion: Build on east	DIS
IMSSD-20: Salmon: Build a temp bridge and then place the permanent bridge on existing alignment	DIS
IMSSD-21: Salmon: Build on East Alignment	DEV
MACOID-1: Albion: Add an information kiosk at/on/near the bridges (see PP-1)	DS
MACOID-2: Albion: Move and reuse the existing truss section to a new location	DS

Idea Code and Description	Rating
MACOID-3: Albion: Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners	DEV
MACOID-4: Albion: Add vista point on the road (possibly using the abandoned, existing road) that look down into Albion- possibly at the old abutments (or 50 ft of the old bridge)	DEV
MACOID-5: Albion: Relinquish the use one of the existing piers on the abandoned bridge -use as a lookout tower.	DIS
MBI-1: Salmon Creek: Drain runoff on the approaches with treatment prior to entering the creek	ABD
MBI-2: Albion & Salmon: Incorporate bat houses to the underside of the bridge	DS
MBI-3: Albion & Salmon: Identify candidate property to mitigate anticipated impacts (include in the Environmental Document)	DS
MBI-4: Albion & Salmon: Combine the Headlands Path and the environmental mitigation property (candidate property) (Combine with MBI-3)	DS
MBI-5: Albion & Salmon: Identify candidate property to mitigate anticipated impacts between the bridges pathway (see PP-7)	DS
MBI-7: Identify right of way for detention basins in the PA&ED	DS
MBI-8: Set up mitigation banks for wetlands by over-purchasing land (i.e. Headlands)	DIS
MBI-9: Albion & Salmon: Use a common mitigation strategy for both bridges	DIS
MICOIM-1: Albion: In lieu of temporary construction easement- buy out the RV park (currently for sale)	DEV
MICOIM-2: Albion: Eligible on the National Historic Register; carry out early and constant communication with SHPO to ensure that the schedule of the project is not impacted by the Bridge Removal process	ABD
MR-10: Albion& Summary: Identify mitigation costs and schedule impacts based on historic information. Identify sample, characteristic projects that can provide the historic information. Develop the mitigation costs associated with the various project alternatives.	DS
MR-1a: Include a Community Advisory Board and include the Community Signature Line on the Coastal Commission permit application/ Plans Sets	DS
MR-2a: Develop a collaborative approach with the Community: a) Community Advisory Board b) Develop project newsletter c) Carry out design workshops with the community to be build consensus d) Build Models to showcase and allow the community to understand e) Be proactive	DS
MR-3a: Accept this risk	DS

Idea Code and Description	Rating
MR-4a: Update the schedule that is reasonable and doable that identified the correct resources to complete the project on time. Prioritize work to keep the projects on track	DS
MR-5a: Consider offline alternatives and carry two lanes of traffic for peak hour timeframes	DS
MR-5b: Carry out a community outreach to inform of the impacts to traffic (radio broadcasts, CMS, HAR, etc.)	DS
MR-5c: Have management review the award and duration of the various projects to avoid the corridor traffic delay	DS
MR-6a: Albion & Salmon: Maintain a window between the Approval of PA&ED to the ROW certification as estimated in the Right of Way Data Sheet	DS
MR-6b: Albion & Salmon: Use third party ROW agents to balance workload on District 1 ROW agents	DS
MR-6c: Albion & Salmon: Carry out an advanced ROW appraisal of key properties (Appraisal At-Risk)	DS
MR-7a: Albion & Salmon: Carry out constant and early coordination with the regulatory agencies for the review of the technical studies	DS
MR-8a: Albion & Salmon: Ensure that the construction schedule represents the presence of all the relevant species works windows	DS
MR-8b: Albion & Salmon: Consider award dates the minimize the impacts to the project schedules associated with these threatened species work windows	DS
MR-9a: Albion & Salmon: See above risks that help the impact thereof	DS
MVA-1: Albion: Identify the navigational channel and identify the vertical clearance required based on that requirement	DS
MVA-2: Albion: Identify the largest ship to use the river to nail down the vertical clearance requirements	DS
MVA-3: Albion: Identify the navigational requirements during construction	DS
MVI-1: Albion and Salmon: Add belvederes to the bridge	DEV
MVI-2: Albion: Add decorative lighting and sidewalk lighting	DS
MVI-3: Albion & Salmon: Colorize the concrete	DS
MVI-4: Salmon & Albion: Add texture treatments that represent the relevant community/ nature / historical features at each location	DS
MVI-5: Salmon & Albion: Plexiglas inside/ See through outside barriers	DIS
MVI-6: Albion & Salmon: Use CIP box girder with false arches	DIS
MVI-7: Albion & Salmon: Add Plexiglas deck for the pedestrian path on the bridge	DIS
PPA-1: Albion & Salmon: Add belvederes mid span on the bridges	DIS

Idea Code and Description	Rating
PPA-2: Albion: Add a pedestrian crossing on each end of the bridge (goes under, near the abutment)	DIS
PPA-3: Albion: Add an elevator to provide access to the flat area under the bridge	DIS
PPA-4: Albion: Work out a Cooperative Agreement with Mendocino County DPW to provide a pathway on the North abutment slope to provide access to/from bridge to the RV area	DIS
PPA-5: Albion & Salmon: Use 10 ft shared, protected ped/bike access and 4 ft shoulder	DIS
PPA-6: Albion & Salmon: Place 16 ft sidewalk under the bridge; 8' shoulder	DIS
PPA-7: Albion & Salmon: Add off the bridge separated pedestrian pathways to connect and support the use of the pedestrian pathways on the bridges	DEV
PPA-8: Salmon Creek: Add the pedestrian walkway on both sides	DIS
PPA-9: Use the existing Albion Bridge as a ped bridge	DEV
SW-1: Salmon Creek: Optimize the concrete arch spans concrete arch superstructure type/ arch type	ABD
SW-2: Salmon & Albion: Use the walkway under the bridge to support the structure and to minimize the width of the bridge (bottom level)> similar to a Tee Shape	DIS
SW-3: Albion: Replace the existing Albion with similar structure type (wood or wood-looking Trestle) but with widened roadbed and non-motorist facilities.	DIS
SW-4: Salmon/Albion: Use CIP/Prestressed Box Girder	DEV
SW-5: Salmon/Albion: Consider a CIP segmental, post-tensioned box superstructure	DIS
SW-6: Salmon/Albion: Consider a precast segmental, post-tensioned box superstructure	DIS
SW-7: Salmon/Albion: Consider Precast Arch Members in lieu of CIP	DIS
SW-8: Salmon/Albion: Make provisions for a casting yard onsite	DIS
SW-9: Salmon/Albion: Steel superstructure	DIS
SW-10: Salmon & Albion: Hybrid Structure: Main Span (Arch & RC Box Superstructure) and Approach Structure (Prestressed Box Superstructure - i.e. longer spans)	ABD
SW-11: Salmon & Albion: Include a maintenance traveler system to facilitate maintenance (especially high bays)	DIS
SW-12: Albion River: Design navigational vertical clearance in the vicinity of the low flow channel location	DIS
SW-13: Albion: Encapsulate the old bridge under the new bridge (two outside piers with box girder bridge (keep old bridge for non-motorist use)	DIS
SW-14: Albion River: Retrofit, widen and rehab the existing bridge	DEV

<b>Idea Code and Description</b>	<b>Rating</b>
SW-15: Albion: Replace with similar looking bridge (wood)	DIS
SW-16: Design a bridge contest.	DIS
SW-17: Albion: Replace with similar looking bridge (concrete)	DIS
SW-18: Albion: CIP Box Bridge with architectural treatment that references the old bridge (see other DS Suggestions)	DS
SW-19: Salmon: Retrofit, widen and rehab the existing bridge	DEV
SW-20: Salmon: Use the existing bridge as falsework (raise profile)	DIS
SW-21: Salmon: Use a box culvert	DIS
SW-22: Salmon: Use an arch culvert	DIS
SW-23: Albion: Single tower SAS suspension bridge	DIS
SW-24: Albion: Consider a cable-stayed bridge structure	DIS
SW-25: Albion: Tied Arch Bridge Structure	DIS
SW-26: Albion & Salmon: Use an on-alignment option that carries two lanes of traffic and ped traffic	DEV
SW-27: Albion: Consider an arch structure with less piers	DIS
SW-28: Albion & Salmon: Build on alignment using a detour that uses existing roads/detours	DIS
SW-29: Albion: Build on existing centerline using a detour (high temp bridge)	DIS
SW-30: Albion: Build on existing centerline using a detour (high temp bridge)	DIS
SW-31: Albion: Build on existing centerline using a detour that uses existing roads/detour	DEV
SW-32: Albion: Build on-alignment (west) carrying two-lanes; carrying peds	DEV
SW-33: Salmon: Retrofit, widen and rehab the existing bridge	DIS
SW-34: Salmon: Build on existing centerline using a detour (high temp bridge)	DIS
SW-35: Salmon: Build on existing centerline using a detour that uses existing roads/detour	DEV
SW-36: Salmon: Build on-alignment (east) carrying two lanes; carrying peds)	DEV
SW-37: Albion & Salmon: Consider a precast segmental box in lieu of CIP segmental box both	DIS
WS-1: Albion & Salmon Bridge and Roadway Approaches: No shoulders	DIS
WS-2: Albion & Salmon Bridge and Roadway Approaches: Use constant 4 ft shoulder	DIS
WS-3: Albion & Salmon Bridge and Roadway Approaches: Use 6 ft shoulders	DIS

Idea Code and Description	Rating
WS-4: Albion & Salmon Bridge and Roadway Approaches: Use 6 ft shoulders and 4 ft shoulders	DIS
WS-5: Albion & Salmon Bridge and Roadway Approaches: Use 8 ft shoulders throughout	DIS
WS-6: Roadway Approaches: Use 4 ft paved shoulders / 4 ft unpaved	DIS
WS-7: Roadway Approaches: Use 2 ft paved shoulders / 4 ft unpaved	DIS
SW-38: Albion: 4-span haunched CIP prestressed concrete box girder	DIS
SW-39: Albion: 4-span open spandrel concrete arch	DIS
SW-40: Albion: On-alignment (west side), 4-span haunched, CIP prestressed concrete box girder	DIS
SW-41: Albion: On-alignment, west side, stage 4 span concrete arch	DIS
SW-42: Salmon Creek: New alignment on the east with haunched, CIP Box	DIS
SW-43: Salmon Creek: New alignment with 16 spans	DIS
SW-44: Salmon Creek: Staged alternative - On-alignment (CIP box) or arch	4

*DEV: Develop [as a VA Alternative]*

*DS: Design Suggestion*

*ABD: Already Being Done [in the Baseline Concept]*

*DIS: Dismissed*

## DETAILED IDEA EVALUATION SUMMARY

**FM-1: Albion & Salmon: Add a under a bridge traveler system to facilitate bridge maintenance** Overall Rating: **DIS**

Attributes	Rating	Comments
Maintainability	Improved	

*General comments:* Snipper Trucks can do the job, creates additional bridge items to maintain

**FM-2: Albion & Salmon: Provide maintenance pullout areas at the ends of the bridge** Overall Rating: **DS**

*General comments:* None. None.

**FM-3: Albion & Salmon: Consider Type 80 (see through) concrete rails in lieu of steel rails at edge of shoulder** Overall Rating: **DS**

---

*General comments:* Consider as part of the early evaluation of rail types

---

**FM-4: Albion & Salmon: Add timber rails on the bridges at end of shoulder** Overall Rating: **DIS**

---

*General comments:* Consider as part of the early evaluation of rail types

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**FM-5: Albion & Salmon: Make a concrete bridge rail (Type 80) with timber architectural treatments at the edge of shoulder** Overall Rating: **DS**

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<i>Attributes</i>	<i>Rating</i>	<i>Comments</i>
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Environmental Impacts	Improved	
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*General comments:* Consider as part of the early evaluation of rail types

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**FM-6: Albion & Salmon: Use weathered steel for steel bridge rails at the edge of shoulder** Overall Rating: **DIS**

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*General comments:* This would negate the ability to provide color to the railing

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**FM-7: Albion & Salmon: Consider a precast deck panel to work in conjunction with the remainder of the superstructure** Overall Rating: **DIS**

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*General comments:* Would delete the top slab as part of the superstructure structural system

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**FM-8: Albion & Salmon: Incorporate a sacrificial wearing surface that can be milled and replaced with ease** Overall Rating: **DS**

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*General comments:* Consider polyester concrete

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**FM-9: Albion & Salmon: Consider rural ditches in lieu of underground storm drain system** Overall Rating: **ABD**

---

*General comments:* None.

---

**FM-10: Salmon: Identify the system to drain the low point on the bridge, including the drainage basins to treat the bridge runoff underneath the bridge** Overall Rating: **DS**

*General comments:* None.

**FM-11: Salmon & Albion: Add bioswales along the bridge approaches** Overall Rating: **DS**

*General comments:* None.

**FM-12: Salmon: Consider a siphon a system to get the bridge runoff past the low point on the bridge** Overall Rating: **DIS**

*General comments:* None.

**FM-13: Salmon: Capture upstream roadway runoff before it gets to the bridge** Overall Rating: **ABD**

*General comments:* None.

**FM-14: Salmon: Covered bridge with walkway on type** Overall Rating: **DIS**

*General comments:* None.

**FM-15: Albion and Salmon: For arch structure types - provide a catwalk on the rib** Overall Rating: **DIS**

*General comments:* Safety concern.....nuisance

**IMSSD-1: Albion: Eliminate the S-curves (straighten)** Overall Rating: **DIS**

<i>Attributes</i>	<i>Rating</i>	<i>Comments</i>
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Environmental Impacts	Degraded	
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*General comments:* It stray substantially off the existing route, the current alignments meet design. It would cost more money (more cut), would impact a residential area, would be more likely to impact the environment (biological impacts).

**IMSSD-2: Albion: Build a temp bridge and then place the permanent bridge on existing alignment**

Overall Rating:  
**DEV**

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<i>Attributes</i>	<i>Rating</i>	<i>Comments</i>
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Environmental Impacts	Improved	
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*General comments:* Would have the least amount of new highway footprint

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**IMSSD-3: Albion: Build on east alignment**

Overall Rating:  
**DEV**

*General comments:* None.

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**IMSSD-4: Albion: Flatten the horizontal curves**

Overall Rating:  
**DIS**

*General comments:* The current design abides by the HDM and the project's design speed

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**IMSSD-5: Albion: Close bridge and use an alternative route to construct on existing alignment**

Overall Rating:  
**DIS**

*General comments:* Impacts all of Albion community and regional travelers (out of direction).

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**IMSSD-6: Albion: Use On-Alignment (east)**

Overall Rating:  
**DIS**

*General comments:* Not preferably going west impacts less of the RV park development- no real reason to go east.

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**IMSSD-7: Albion: Use On-Alignment (west)**

Overall Rating:  
**DEV**

*General comments:* None.

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**IMSSD-8: Salmon: Increase width**

Overall Rating:  
**DIS**

*General comments:* None.

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**IMSSD-9: Salmon: Build on west alignment**Overall Rating:  
**DEV**

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*General comments:* None.

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**IMSSD-10: Salmon: Close bridge and detour traffic to construct on existing alignment**Overall Rating:  
**DIS**

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*General comments:* None.

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**IMSSD-11: Salmon: Use On-Alignment (east)**Overall Rating:  
**DEV**

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*General comments:* None.

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**IMSSD-12: Salmon: Use On-Alignment (west)**Overall Rating:  
**DEV**

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<i>Attributes</i>	<i>Rating</i>	<i>Comments</i>
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*General comments:* None.

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**IMSSD-13: Cross Salmon Creek at its narrowest point (near the beachfront)**Overall Rating:  
**DIS**

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*General comments:* Not permissible via permits

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**IMSSD-14: Salmon Creeks: Raise the elevation of the low point in the sag and flatten the slopes to reduce approach grades for the sag at Salmon Falls**Overall Rating:  
**DEV**

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*General comments:* Depending on the profile details: may increase the cuts on the north and south side of Salmon Creek bridge, will impact more wetlands, will require more retaining walls. It may be more beneficial to flatten the south side slope.

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**IMSSD-15: Salmon Creek: Optimize the profile at Salmon Creek to balance the earthwork**Overall Rating:  
**DEV**

---

*General comments:* May be good to do in conjunction with ISMSSD-14

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**IMSSD-16: Salmon Creek: Move the low point off the bridge**

Overall Rating:  
**DIS**

---

*General comments:* Not technically feasible.

---

**IMSSD-17: Cut back the slope that is impeding stopping sight distance at the north end of the Albion Bridge Replacement project**

Overall Rating:  
**DEV**

---

*General comments:* None.

---

**IMSSD-18: Albion: Build on west alignment**

Overall Rating:  
**DEV**

---

*General comments:* None.

---

**IMSSD-19: Albion: Build on east**

Overall Rating:  
**DIS**

---

*General comments:* The impact to the community does not seem to warrant any alignments on the east.

---

**IMSSD-20: Salmon: Build a temp bridge and then place the permanent bridge on existing alignment**

Overall Rating:  
**DIS**

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*General comments:* See other ideas that explain this in more detail

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**IMSSD-21: Salmon: Build on East Alignment**

Overall Rating:  
**DEV**

---

*General comments:* None.

---

**MACOID-1: Albion: Add an information kiosk at/on/near the bridges (see PP-1)**

Overall Rating:  
**DS**

---

*General comments:* None.

---

**MACOID-2: Albion: Move and reuse the existing truss section to a new location**

Overall Rating:  
**DS**

---

*General comments:* None.

---

**MACOID-3: Albion: Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners**

Overall Rating:  
**DEV**

---

*General comments:* None.

---

**MACOID-4: Albion: Add vista point on the road (possibly using the abandoned, existing road) that look down into Albion- possibly at the old abutments (or 50 ft of the old bridge)**

Overall Rating:  
**DEV**

---

*General comments:* None.

---

**MACOID-5: Albion: Relinquish the use one of the existing piers on the abandoned bridge -use as a lookout tower.**

Overall Rating:  
**DIS**

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*General comments:* This idea would be difficult to implement- the access to the tower would be difficult to design and maintain. The location of the towers would also be on east of the existing blocking the view from the proposed tower.

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**MBI-1: Salmon Creek: Drain runoff on the approaches with treatment prior to entering the creek**

Overall Rating:  
**ABD**

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*General comments:* None.

---

**MBI-2: Albion & Salmon: Incorporate bat houses to the underside of the bridge**

Overall Rating:  
**DS**

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*General comments:* There may be some possible bats at Albion.

---

**MBI-3: Albion & Salmon: Identify candidate property to mitigate anticipated impacts (include in the Environmental Document)**

Overall Rating:  
**DS**

---

*General comments:* None.

---

**MBI-4: Albion & Salmon: Combine the Headlands Path and the environmental mitigation property (candidate property) (Combine with MBI-3)** Overall Rating: **DS**

---

*General comments:* None.

---

**MBI-5: Albion & Salmon: Identify candidate property to mitigate anticipated impacts between the bridges pathway (see PP-7)** Overall Rating: **DS**

---

*General comments:* None.

---

**MBI-7: Identify right of way for detention basins in the PA&ED** Overall Rating: **DS**

---

*General comments:* None.

---

**MBI-8: Set up mitigation banks for wetlands by overpurchasing land (i.e. Headlands?)** Overall Rating: **DIS**

---

*General comments:* Can be very expensive, Coastal impacts

---

**MBI-9: Albion & Salmon: Use a common mitigation strategy for both bridges** Overall Rating: **DIS**

---

*General comments:* May be difficult for different timelines. If one project is not approved this would make it difficult.

---

**MICOIM-1: Albion: In lieu of temporary construction easement- buy out the RV park (currently for sale)** Overall Rating: **DEV**

---

*General comments:* What uses can be provided by the additional land?  
What to do with any long-term tenants?  
Explore further.

---

**MICOIM-2: Albion: Eligible on the National Historic Register; carry out early and constant communication with SHPO to ensure that the schedule of the project is not impacted by the Bridge Removal process** Overall Rating: **ABD**

---

*General comments:* None.

---

**MR-10: Albion& Summary: Identify mitigation costs and schedule impacts based on historic information. Identify sample, characteristic projects that can provide the historic information. Develop the mitigation costs associated with the various project alternatives.**

Overall Rating:  
**DS**

---

*General comments:* None.

---

**MR-1a: Include a Community Advisory Board and include the Community Signature Line on the Coastal Commission permit application/ Plans Sets**

Overall Rating:  
**DS**

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*General comments:* None.

---

**MR-2a: Develop a collaborative approach with the Community: a) Community Advisory Board b) Develop project newsletter c) Carry out design workshops with the community to be build consensus d) Build Models to showcase and allow the community to understand e) Be proactive f) don't personalize the project**

Overall Rating:  
**DS**

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*General comments:* None.

---

**MR-3a: Accept this risk**

Overall Rating:  
**DS**

---

*General comments:* None.

---

**MR-4a: Update the schedule that is reasonable and doable that identified the correct resources to complete the project on time. Prioritize work to keep the projects on track.**

Overall Rating:  
**DS**

---

*General comments:* None.

---

**MR-5a: Consider offline alternatives and carry two lanes of traffic for peak hour timeframes**

Overall Rating:  
**DS**

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*General comments:* None.

---

**MR-5b: Carry out a community outreach to inform of the impacts to traffic (radio broadcasts, CMS, HAR, etc.)**

Overall Rating:  
**DS**

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*General comments:* None.

---

**MR-5c: Have management review the award and duration of the various projects to avoid the corridor traffic delay** Overall Rating: **DS**

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*General comments:* None.

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**MR-6a: Albion & Salmon: Maintain a window between the Approval of PA&ED to the ROW certification as estimated in the Right of Way Data Sheet** Overall Rating: **DS**

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*General comments:* None.

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**MR-6b: Albion & Salmon: Use third party ROW agents to balance workload on District 1 ROW agents** Overall Rating: **DS**

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*General comments:* None.

---

**MR-6c: Albion & Salmon: Carry out an advanced ROW appraisal of key properties (Appraisal At-Risk)** Overall Rating: **DS**

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*General comments:* None.

---

**MR-7a: Albion & Salmon: Carry out constant and early coordination with the regulatory agencies for the review of the technical studies** Overall Rating: **DS**

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*General comments:* None.

---

**MR-8a: Albion & Salmon: Ensure that the construction schedule represents the presence of all the relevant species works windows** Overall Rating: **DS**

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*General comments:* None.

---

**MR-8b: Albion & Salmon: Consider award dates the minimize the impacts to the project schedules associated with these threatened species work windows** Overall Rating: **DS**

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*General comments:* None.

---

**MR-9a: Albion & Salmon: See above risks that help the impact thereof.**

Overall Rating:  
**DS**

---

*General comments:* None.

---

**MVA-1: Albion: Identify the navigational channel and identify the vertical clearance required based on that requirement**

Overall Rating:  
**DS**

---

*General comments:* Need channel surveys

---

**MVA-2: Albion: Identify the largest ship to use the river to nail down the vertical clearance requirements**

Overall Rating:  
**DS**

---

*General comments:* None.

---

**MVA-3: Albion: Identify the navigational requirements during construction**

Overall Rating:  
**DS**

---

*General comments:* None.

---

**MVI-1: Albion and Salmon: Add belvederes to the bridge**

Overall Rating:  
**DEV**

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*General comments:* None.

---

**MVI-2: Albion: Add decorative lighting and sidewalk lighting**

Overall Rating:  
**DS**

---

*General comments:* Sidewalk lighting will require meeting warrants

---

**MVI-3: Albion & Salmon: Colorize the concrete**

Overall Rating:  
**DS**

---

*General comments:* None.

---

**MVI-4: Salmon & Albion: Add texture treatments that represent the relevant community/ nature / historical features at each location**

Overall Rating:  
**DS**

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*General comments:* None.

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**MVI-5: Salmon & Albion: Plexiglas inside/ See through outside barriers**

Overall Rating:  
**DIS**

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*General comments:* The value of this may not warrant the maintenance demands. Also this may not be of much value to the community.

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**MVI-6: Albion & Salmon: Use CIP box girder with false arches**

Overall Rating:  
**DIS**

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*General comments:* Will not save money...

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**MVI-7: Albion & Salmon: Add Plexiglas deck for the pedestrian path on the bridge**

Overall Rating:  
**DIS**

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*General comments:* Maintenance demands not worth the visual benefit, over time the Plexiglas will not be "see-through"

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**PPA-1: Albion & Salmon: Add belvederes mid span on the bridges**

Overall Rating:  
**DIS**

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*General comments:* See others

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**PPA-2: Albion: Add a pedestrian crossing on each end of the bridge (goes under, near the abutment)**

Overall Rating:  
**DIS**

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*General comments:* This idea, although on the surface appears to provide a better connection between the northbound and southbound pedestrian movement, would probably only deliver marginal usage

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**PPA-3: Albion: Add an elevator to provide access to the flat area under the bridge**

Overall Rating:  
**DIS**

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*General comments:* None.

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**PPA-4: Albion: Work out a Cooperative Agreement with Mendocino County DPW to provide a pathway on the North abutment to provide access to/from bridge to the RV area**

Overall Rating:  
**DIS**

---

*General comments:* The use of the road in lieu of the proposed pathway on the northwest side of the Albion Bridge would be the most logical path to use. The fact that the road is in place indicates that connecting the pedestrians to this road would be the best approach. The northwest pathway, proposed, would also be very circuitous and carve up the steep slope located in that location.

---

**PPA-5: Albion & Salmon: Use 10 ft shared, protected ped/bike access and 4 ft shoulder**

Overall Rating:  
**DIS**

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*General comments:* Apportioning the roadbed width in favor of less shoulder width is not supported by the Design Reviewer.

---

**PPA-6: Albion & Salmon: Place 16 ft sidewalk under the bridge; 8' shoulder**

Overall Rating:  
**DIS**

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*General comments:* Security Issues.

---

**PPA-7: Albion & Salmon: Add off the bridge separated pedestrian pathways to connect and support the use of the pedestrian pathways on the bridges**

Overall Rating:  
**DEV**

---

*General comments:* None.

---

**PPA-8: Salmon Creek: Add the pedestrian walkway on both sides**

Overall Rating:  
**DIS**

---

*General comments:* None.

---

**PPA-9: Use the existing Albion Bridge as a ped bridge**

Overall Rating:  
**DEV**

---

*General comments:* None.

---

**SW-1: Salmon Creek: Optimize the concrete arch spans concrete arch superstructure type/ arch type**

Overall Rating:  
**ABD**

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*General comments:* None.

---

**SW-2: Salmon & Albion: Use the walkway under the bridge to support the structure and to minimize the width of the bridge (bottom level)> similar to a T shape** Overall Rating: **DIS**

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*General comments:* Security issues.

---

**SW-3: Albion: Replace the existing Albion with similar structure type (wood or wood-looking Trestle) but with widened roadbed and non-motorist facilities.** Overall Rating: **DIS**

---

*General comments:* None.

---

**SW-4: Salmon/Albion: Use CIP/prestressed box girder** Overall Rating: **DEV**

---

*General comments:* None.

---

**SW-5: Salmon/Albion: Consider a CIP segmental, post-tensioned box superstructure** Overall Rating: **DIS**

---

*General comments:* Double the costs.

---

**SW-6: Salmon/Albion: Consider a precast segmental, post-tensioned box superstructure** Overall Rating: **DIS**

---

*General comments:* Way too expensive.

---

**SW-7: Salmon/Albion: Consider precast arch members in lieu of CIP** Overall Rating: **DIS**

---

*General comments:* Probably twice the costs, transportation complexity, no economy of scale, more impact to the RV park.

---

**SW-8: Salmon/Albion: Make provisions for a casting yard onsite** Overall Rating: **DIS**

---

*General comments:* None.

---

**SW-9: Salmon/Albion: Steel superstructure**

Overall Rating:  
**DIS**

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*General comments:* Coastal environment makes steel members undesirable.

---

**SW-10: Salmon & Albion: Hybrid Structure: Main span (arch & RC box superstructure) and approach structure (prestressed box superstructure - i.e. longer spans)**

Overall Rating:  
**ABD**

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*General comments:* None.

---

**SW-11: Salmon & Albion: Include a maintenance traveler system to facilitate maintenance (especially high bays)**

Overall Rating:  
**DIS**

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*General comments:* None.

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**SW-12: Albion River: Design navigational vertical clearance in the vicinity of the low flow channel location**

Overall Rating:  
**DIS**

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*General comments:* See others covering this topic

---

**SW-13: Albion: Encapsulate the old bridge under the new bridge (two outside piers with box girder bridge (keep old bridge for non-motorist use)**

Overall Rating:  
**DIS**

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*General comments:* None.

---

**SW-14: Albion River: Retrofit, widen and rehab the existing bridge**

Overall Rating:  
**DEV**

---

*General comments:* None.

---

**SW-15: Albion: Replace with similar looking bridge (wood)**

Overall Rating:  
**DIS**

---

*General comments:* See others

---

**SW-16: Design a bridge contest.**

Overall Rating:  
**DIS**

---

*General comments:* None.

---

**SW-17: Albion: Replace with similar looking bridge (concrete)**

Overall Rating:  
**DIS**

---

*General comments:* See others

---

**SW-18: Albion: CIP box bridge with architectural treatment that references the old bridge (see other DS Suggestions)**

Overall Rating:  
**DS**

---

*General comments:* None.

---

**SW-19: Salmon: Retrofit, widen and rehab the existing bridge**

Overall Rating:  
**DEV**

---

*General comments:* None.

---

**SW-20: Salmon: Use the existing bridge as falsework (raise profile)**

Overall Rating:  
**DIS**

---

*General comments:* None.

---

**SW-21: Salmon: Use a box culvert**

Overall Rating:  
**DIS**

---

*General comments:* None.

---

**SW-22: Salmon: Use an arch culvert**

Overall Rating:  
**DIS**

---

*General comments:* None.

---

**SW-23: Albion: Single tower SAS suspension bridge**

Overall Rating:  
**DIS**

---

*General comments:* Too expensive.

---

**SW-24: Albion: Consider a cable-stayed bridge structure**

Overall Rating:  
**DIS**

*General comments:* Too expensive .

**SW-25: Albion: Tied arch bridge structure**

Overall Rating:  
**DIS**

*General comments:* Steel required, used when you need to support above in lieu of from below, visual impact not desirable.

**SW-26: Albion & Salmon: Use an on-alignment option that carries two lanes of traffic and ped traffic.**

Overall Rating:  
**DEV**

*General comments:* None.

**SW-27: Albion: Consider an arch structure with less piers**

Overall Rating:  
**DIS**

*General comments:* The relationship between the superstructure depth and the span ratios will be developed by Structures during type selection.

**SW-28: Albion & Salmon: Build on alignment using a detour that uses existing roads/ detours**

Overall Rating:  
**DIS**

<i>Attributes</i>	<i>Rating</i>	<i>Comments</i>
Environmental Impacts	Degraded	

*General comments:* The impacts to the natural and built environment would be worse. Using the existing road system would route through the community of Albion who are opposed to this. The value of the habitat is generally speaking better in the lower reaches of the valley. The temporary facility will cause more impact than a permanent east or west alignment.

**SW-29: Albion: Build on existing centerline using a detour (high temp bridge)**

Overall Rating:  
**DIS**

*General comments:* The temp high bridge in conjunction with proposed structure on the existing centerline would create double the footprint impact. This negates the intended benefit.

**SW-30: Albion: Build on existing centerline using a detour (high temp bridge)**

Overall Rating:  
**DIS**

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*General comments:* See SW-29

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**SW-31: Albion: Build on existing centerline using a detour that uses existing roads/  
detour**

Overall Rating:  
**DEV**

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*General comments:* None.

---

**SW-32: Albion: Build on-alignment (west) carrying two-lanes; carrying peds**

Overall Rating:  
**DEV**

---

*General comments:* None.

---

**SW-33: Salmon: Retrofit, widen and rehab the existing bridge**

Overall Rating:  
**DIS**

---

*General comments:* Previous idea covers this topic

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**SW-34: Salmon: Build on existing centerline using a detour (high temp bridge)**

Overall Rating:  
**DIS**

---

*General comments:* None.

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**SW-35: Salmon: Build on existing centerline using a detour that uses existing roads/  
detour**

Overall Rating:  
**DEV**

---

*General comments:* None.

---

**SW-36: Salmon: Build on-alignment (east) carrying two lanes; carrying peds)**

Overall Rating:  
**DEV**

---

*General comments:* None.

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**SW-37: Albion & Salmon: Consider a precast segmental box in lieu of CIP segmental box both** Overall Rating: **DIS**

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*General comments:* Concrete batch plant and casting yard would be difficult to gain environmental permits in this environment. The CIP segmental boxes were used in three similar projects: Devil's Slide, Confusion Hill, Antler's. None of these were challenged with CRIPs by the contractors. This concept would be even less viable at Salmon as there is no "flat area" to cast at. Similar permitting issues.

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**WS-1: Albion & Salmon Bridge and Roadway Approaches: No shoulders** Overall Rating: **DIS**

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*General comments:* None.

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**WS-2: Albion & Salmon Bridge and Roadway Approaches: Use constant 4 ft shoulder** Overall Rating: **DIS**

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*General comments:* None.

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**WS-3: Albion & Salmon Bridge and Roadway Approaches: Use 6 ft shoulders** Overall Rating: **DIS**

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*General comments:* None.

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**WS-4: Albion & Salmon Bridge and Roadway Approaches: Use 6 ft shoulders and 4 ft shoulders** Overall Rating: **DIS**

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*General comments:* None.

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**WS-5: Albion & Salmon Bridge and Roadway Approaches: Use 8 ft shoulders throughout** Overall Rating: **DIS**

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*General comments:* None.

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**WS-6: Roadway Approaches: Use 4 ft paved shoulders / 4 ft unpaved** Overall Rating: **DIS**

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*General comments:* None.

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**WS-7: Roadway Approaches: Use 2 ft paved shoulders / 4 ft unpaved**

Overall Rating:  
**DIS**

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*General comments:* None.

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**SW-38: Albion: 4-span haunched CIP prestressed concrete box girder**

Overall Rating:  
**DIS**

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*General comments:* The arch structure type is less expensive, significantly more aesthetic and more likely to gain approval from the Locals and the Regulatory Agencies, such as SHPO, CCC, etc.

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**SW-39: Albion: 4-span open spandrel concrete arch**

Overall Rating:  
**DIS**

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*General comments:* The 10-span was chosen for the VA study as the baseline concept. The 10-span is less expensive- yet does appear to impair the views across it.

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**SW-40: Albion: On-alignment (west side), 4-span haunched, CIP prestressed concrete box girder**

Overall Rating:  
**DIS**

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*General comments:* This alternative was not considered a viable solution as with some minor widening (including some temp widening) it can be modified to carry 2-lanes of traffic during construction and pedestrians. This places the bridge typical on "apples-apples" basis for evaluation. See other VA ideas for this modification, suggested. The concept as it stands does not carry much merit as a viable structure strategy.

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**SW-41: Albion: On-alignment, west side, stage 4 span concrete arch**

Overall Rating:  
**DIS**

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*General comments:* can be modified to carry 2-lanes of traffic during construction and pedestrians. This places the bridge typical on "apples-apples" basis for evaluation. See other VA ideas for this modification, suggested. The concept as it stands does not carry much merit as a viable structure strategy.

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**SW-42: Salmon Creek: New alignment on the east with haunched, CIP Box**

Overall Rating:  
**DIS**

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*General comments:* The arch structure type is less expensive, significantly more aesthetic and more likely to gain approval from the Locals and the Regulatory Agencies, such as SHPO, CCC, etc.

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**SW-43: Salmon Creek: New alignment with 16 spans**

Overall Rating:  
**DIS**

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*General comments:* The baseline case chosen was the 5-span; the 16-span configuration dilutes the aesthetic value of the arch structure type. Although, it is priced cheaper- it has a large risk for contract growth associated with the unforeseen subsurface issues/ impacts associated with the large number of footings.

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**SW-44: Salmon Creek: Staged Alternative - On-alignment (CIP Box) or arch**

Overall Rating:  
**4**

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*General comments:* Can be modified to carry 2-lanes of traffic during construction and pedestrians. This places the bridge typical on "apples-apples" basis for evaluation. See other VA ideas for this modification, suggested. The concept as it stands does not carry much merit as a viable structure strategy.

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# VALUE ANALYSIS PROCESS

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The Caltrans VA process involves 16 activities needed to accomplish a VA study, organized in three parts: Pre-study, VA Study, and Report. Integral to Caltrans' VA process is the Value Metrics process. Value Metrics offers the cornerstone of the Caltrans VA process by providing a systematic and structured means of considering the relationship of a project's performance and cost as they relate to value.

Value Analysis has traditionally been perceived as an effective means for reducing project costs. This paradigm only addresses one part of the value equation, oftentimes at the expense of the role that VA can play with regard to improving project performance. Project costs are fairly easy to quantify and compare; performance is not.

Project performance must be properly defined and concurred by the stakeholders at the beginning of the VA study. The performance attributes and requirements developed are then used throughout the study to identify, evaluate, and document alternatives. This process, Value Metrics, emphasizes the interrelationship between cost and performance and can be quantified and compared in terms of how they contribute to overall value.

Value Metrics provides a standardized means of identifying, defining, evaluating, and measuring performance. Once this has been achieved, and costs for all VA alternatives have been developed, measuring value is straightforward.

Value Metrics can improve VA studies by:

- Building consensus among project stakeholders (especially those holding conflicting views)
- Developing a better understanding of a project's goals and objectives as they relate to purpose and need
- Developing a baseline understanding of how the project is meeting performance goals and objectives
- Identifying areas where project performance can be improved through the VA process
- Developing a better understanding of an alternative concept's effect on project performance
- Developing a deeper understanding of the relationship between performance and cost in determining value
- Using value as the basis for selecting the best project or design concept

The following provides an overview of the Caltrans approach to VA. The Caltrans VA Study Activity Chart at the end of this narrative identifies the steps in each activity, which are detailed as follows.

## PRE-STUDY

Meaningful and measurable results are directly related to the pre-study work performed. Depending on the type of study, all or part of the following information needs to be determined during the pre-study phase:

- Clear definition of the current situation and study objectives
- Identification of study team members
- Identification of project stakeholders
- Definition of how stakeholders are impacted by the project
- Identification of key issues and concerns
- Identification of project's performance requirements and attributes
- Status of project cost estimate
- Project data gathered to be distributed to VA team

In preparation for the VA study, the team leader confers with owners and stakeholders to outline the VA process, initiate data gathering, refine project scope and objectives, structure the scope and team members and technical specialists, and finalize study plans. Specific deliverables are provided.

Following the initial planning meeting, the team leader reviews the data collected for the project and develops a cost model. The team leader also consults with the technical specialists to prepare them for the VA study.

## VA STUDY

The VA Job Plan guides the VA team in their search to enhance value in the project or process. Caltrans follows a seven-phase VA Job Plan:

1. Information Phase
2. Function Phase
3. Speculation Phase
4. Evaluation Phase
5. Development Phase
6. Presentation Phase
7. Implementation Phase

### Information Phase

At the beginning of the VA study, the design team presents a more detailed review of the design and the various systems. This includes an overview of the project and its various requirements, which

further enhances the VA team's knowledge and understanding of the project. The project team also responds to questions posed by the VA team.

The project's performance requirements and attributes are discussed, and the performance of the baseline concept is evaluated.

## Function Phase

Key to the VA process is the function analysis techniques used during the Function Phase. Analyzing the functional requirements of a project is essential to assuring an owner that the project has been designed to meet the stated criteria and its need and purpose. The analysis of these functions in terms cost, performance, time, and risk is a primary element in a VA study, and is used to develop alternatives. This procedure is beneficial to the VA team, as it forces the participants to think in terms of functions and their relative value in meeting the project's need and purpose. This facilitates a deeper understanding of the project.

## Speculation Phase

The Speculation Phase involves identifying and listing creative ideas. During this phase, the VA team participates in a brainstorming session to identify as many means as possible to provide the necessary project functions. Judgment of the ideas is not permitted in order to generate a broad range of ideas.

The idea list includes all of the ideas suggested during the study. These ideas should be reviewed further by the project team, since they may contain ideas that are worthy of further evaluation and may be used as the design develops. These ideas could also help stimulate additional ideas by others.

## Evaluation Phase

The purpose of the Evaluation Phase is to systematically assess the potential impacts of ideas generated during the Speculation Phase relative to their potential for value improvement. Each idea is evaluated in terms of its potential impact to performance, cost, time, and risk. Once each idea is fully evaluated, it is given a total rating number. This is based on a scale of 1 to 7, as indicated by the following rating index:

7 = Major Value Improvement 6 = Moderate Value Improvement 5 = Minor Value Improvement 4 = Possible Value Improvement	These ratings represent the subjective opinion of the VA team regarding the potential benefits of the concepts in order to prioritize them for development.
3 = Minor Value Degradation	Concept results in a minor cost or performance improvement at the expense of the other.
2 = Moderate Value Degradation	Concept reduces cost but creates an unacceptable degradation to performance.
1 = Major Value Degradation	Concept is not technically feasible or does not meet project need and purpose.

Ideas rated 4 to 7 are developed further and those found to have the greatest potential for value improvement are documented in the *VA Alternatives* section of this report. The rationale for why ideas were rated highly but not developed as alternatives is documented in the *Idea Evaluation* section of the report.

## **Development Phase**

During the Development Phase, the highly rated ideas are expanded and developed into VA alternatives. The development process considers the impact to performance, cost, time, and risk of the alternative concepts relative to the baseline concept. This analysis is prepared as appropriate for each alternative, and the information may include a performance assessment, initial cost and life-cycle cost comparisons, schedule analysis, and an assessment of risk. Each alternative describes the baseline concept and proposed changes and includes a technical discussion. Sketches and calculations are also prepared for each alternative as appropriate.

## **Presentation Phase**

The VA study concludes with a preliminary presentation of the VA team's assessment of the project and VA alternatives. The presentation provides an opportunity for the owner, project team, and stakeholders to preview the alternatives and develop an understanding of the rationale behind them.

## **Implementation Phase**

After the stakeholders have had an opportunity to review the alternatives identified by the VA team, the team leader conducts an implementation meeting to discuss the alternatives and resolve appropriate action for each VA alternative. If necessary, any other VA report edits requested by the representatives are also made by the VA team leader and a final report is issued.

This implementation meeting helps to ensure that savings or process improvements are not lost due to lack of communication, and that those VA alternatives that are accepted are properly integrated into the project design.

## **VA REPORT**

### **Preliminary Report**

Following the completion of the VA study, the team leader compiles the information developed during the VA study into the *Preliminary Value Analysis Study Report*. This report, documenting viable alternatives, is provided to the customer within the timeframe requested (usually within two weeks). The preliminary report also contains a *VA Study Summary Report – Preliminary Findings*, designed to highlight critical elements of the VA study, including detailed documentation of VA alternatives, in a concise manner for the use of parties without the opportunity to review the report in its entirety. More details can be found in the complete preliminary report, which consists of the following documentation: Executive Summary, VA Alternatives, Project Information, Project Analysis, Idea Evaluation, and VA Process.

## **Written Report – VA Implementation Action Memo**

If the disposition of all VA alternatives cannot be determined at the Implementation Meeting, then a *VA Implementation Action Memo* is submitted. This memo states which alternatives are accepted, which are rejected and the rationale for rejection, and which VA alternatives are conditionally accepted with further study required. For these alternatives, the memo states what action must be completed so that a decision can be made as to the disposition of this VA alternative, when that action is expected to be completed, and who is responsible to complete this action. If all VA alternatives are either accepted or rejected then this memo is not required.

## **Written Report – Final Report**

Once all VA alternatives have been either accepted or rejected, the team leader updates the *Preliminary Value Analysis Study Report* to show the final results of the study in a *Final Value Analysis Study Report*. In addition, a Value Analysis Study Summary Report (VASSR) is sent to Caltrans HQ to permit easy documentation into the Caltrans Annual Report to FHWA.

The following Caltrans VA Study Activity Chart describes each activity.

# CALTRANS VALUE ANALYSIS JOB PLAN & STUDY ACTIVITY CHART

<b>PREPARATION</b>	<b>INITIATE STUDY</b> 1 <ul style="list-style-type: none"> <li>➤ Identify study project</li> <li>➤ Identify study roles and responsibilities</li> <li>➤ Define study goals</li> <li>➤ Select team leader</li> <li>➤ Prepare draft Study Charter</li> </ul>	<b>ORGANIZE STUDY</b> 2 <ul style="list-style-type: none"> <li>➤ Conduct Pre-Study Meeting</li> <li>➤ Select team members</li> <li>➤ Identify stakeholders, decision-makers, and technical reviewers</li> <li>➤ Identify data collection</li> <li>➤ Select study dates</li> <li>➤ Determine study logistics</li> <li>➤ Update VA Study Charter</li> <li>➤ Identify and define performance requirements</li> </ul>	<b>PREPARE DATA</b> 3 <ul style="list-style-type: none"> <li>➤ Collect and distribute data</li> <li>➤ Develop construction cost models</li> <li>➤ Develop highway user benefit / life cycle cost (LCC) model (if required)</li> </ul>		
	<b>VA STUDY WORKSHOP</b>	<b>INFORM TEAM</b> 4 <ul style="list-style-type: none"> <li>➤ Review study activities and confirm reviewers</li> <li>➤ Present design concept</li> <li>➤ Present stakeholders' interests</li> <li>➤ Review project issues and objectives</li> <li>➤ Discuss Design Exceptions</li> <li>➤ Rate performance of baseline concept</li> <li>➤ Visit project site</li> </ul>	<b>ANALYZE FUNCTIONS</b> 5 <ul style="list-style-type: none"> <li>➤ Analyze project data</li> <li>➤ Expand project functions</li> <li>➤ Prepare FAST diagram</li> <li>➤ Determine functional cost drivers and performance</li> <li>➤ Assess Risk (if needed)</li> </ul>	<b>CREATE IDEAS</b> 6 <ul style="list-style-type: none"> <li>➤ Focus on functions</li> <li>➤ List all ideas</li> <li>➤ Apply creativity and innovation techniques (group and individual)</li> </ul>	<b>EVALUATE IDEAS</b> 7 <ul style="list-style-type: none"> <li>➤ Apply key performance attributes to rate idea</li> <li>➤ List advantages and disadvantages</li> <li>➤ Consider cost impacts</li> <li>➤ Rank all ideas</li> <li>➤ Assign alternatives for development</li> </ul>
		<b>DEVELOP ALTERNATIVES</b> 8 <ul style="list-style-type: none"> <li>➤ Develop alternative concepts</li> <li>➤ Prepare sketches and calculations</li> <li>➤ Measure performance</li> <li>➤ Estimate costs, LCC benefits/costs</li> </ul>	<b>CRITIQUE ALTERNATIVES</b> 9 <ul style="list-style-type: none"> <li>➤ VA Alternatives Technical Review</li> <li>➤ VA Alternatives Team Consensus Review</li> <li>➤ Identify mutually exclusive groups of alternatives</li> <li>➤ Identify VA strategies</li> <li>➤ Validate performance</li> </ul>	<b>PRESENT ALTERNATIVES*</b> 10 <ul style="list-style-type: none"> <li>➤ Present findings</li> <li>➤ Document feedback</li> <li>➤ Confirm pending reviews</li> </ul> <p><i>*Interim presentation of study findings</i></p>	
<b>DETERMINE DISPOSITION</b>	<b>DOCUMENT VA STUDY</b> 11 <ul style="list-style-type: none"> <li>➤ Document process and study findings</li> <li>➤ Develop and Distribute VA Study Summary Report - Preliminary Findings and VA Study Preliminary Report</li> <li>➤ Distribute electronic report to HQ VA Branch</li> </ul>	<b>ASSESS ALTERNATIVES**</b> 12 <ul style="list-style-type: none"> <li>➤ Review Study Summary Report</li> <li>➤ Assess alternatives for project acceptance</li> <li>➤ Prepare draft implementation dispositions</li> </ul> <p><i>**Activities performed by PDT, Technical Reviewers, and Stakeholders</i></p>	<b>RESOLVE ALTERNATIVES</b> 13 <ul style="list-style-type: none"> <li>➤ Review implementation dispositions</li> <li>➤ Conduct Implementation Meeting</li> <li>➤ Resolve implementation actions with decision-makers and stakeholders</li> <li>➤ Document VA Alternative Disposition</li> <li>➤ Develop Implementation Action Memo (if Conditionally Accepted (CA) Alternatives remain)</li> </ul>	<b>FINALIZE ALTERNATIVES</b> 14 <ul style="list-style-type: none"> <li>➤ VA Team Leader follow up with PM on CA Alternatives</li> <li>➤ Resolve Conditionally Accepted Alternatives</li> <li>➤ Develop Implementation Plan with PM</li> <li>➤ Design Manager Sign off on VA Implementation Plan Authorization</li> <li>➤ Final presentation of study results (if needed)</li> </ul>	
	<b>REPORTING RESULTS</b>	<b>PUBLISH RESULTS</b> 15 <ul style="list-style-type: none"> <li>➤ Document process and study results</li> <li>➤ Incorporate all comments and implementation plan</li> <li>➤ Distribute Final VA Study Report in PDF format</li> <li>➤ Submit VA Study Summary Report (VASSR) and two-page summary to HQ VA for FHWA Auditing</li> <li>➤ Include Implementation Plan Authorization in Final VA Report</li> </ul>			



**Final VA Study Agenda**  
**Salmon Creek & Albion River Bridge Replacement Projects**  
 Project Location: District 1, Albion, CA

**WORKSHOP LOCATION: ROOM 59, DISTRICT 01 OFFICES, 1656 UNION AVENUE EUREKA CA 95501**

*Note: The shaded areas below indicate when participation from the [key project stakeholders](#), [design team](#) and [technical reviewers](#) are required. The remaining time will be work time for the VA team.*

**WEEK 1**

**JUNE 25, 2013**

**TUESDAY**

8:30	<b>Kick-Off Meeting</b> <ul style="list-style-type: none"> <li>• Welcome</li> <li>• Introductions</li> <li>• VE Overview and Schedule</li> <li>• VE Study Objectives</li> </ul>	VA Team Leader
9:00	<b>Presentation Of Design Concept</b> <ul style="list-style-type: none"> <li>• Project Purpose and Need</li> <li>• Basic Design Features</li> <li>• Funding</li> <li>• Cost / Schedule</li> </ul>	Design Team/ Key Stakeholders
9:30	<b>Discussion</b> <ul style="list-style-type: none"> <li>• Identify Key Project Issues</li> <li>• Identify Key Project Risks</li> <li>• VE Team Q&amp;A to Design Team and Stakeholders</li> </ul>	VA Team/Design Team/ Key Stakeholders
10:00	<b>Break</b>	
10:15	<b>Project Performance</b> <ul style="list-style-type: none"> <li>• Identify Key Project Requirements</li> <li>• Identify Key Project Attributes</li> <li>• Determine Baseline Performance</li> <li>• Determine Attribute Priorities</li> </ul>	VA Team/Design Team/ Key Stakeholders
12:00	<b>Adjourn Kickoff Meeting</b>	
12:00	<b>Lunch</b>	
1:00	<b>Remote Site Visit</b>	VA Team/ PM
2:30	<b>Review Of Project Information</b> <ul style="list-style-type: none"> <li>• Recap of site visit</li> <li>• Review of cost model</li> <li>• Review of schedule</li> <li>• Review of performance assessment</li> <li>• Review of risk information</li> </ul>	VA Team
3:00	<b>Project Analysis:</b> <ul style="list-style-type: none"> <li>• Function Analysis, Risk Analysis, Conflict/</li> </ul>	VA Team

Constraint Analysis

**JUNE 26, 2013**

**WEDNESDAY**

8:00 Project Analysis (continued)  
9:00 Team Brainstorming  
12:00 Lunch  
1:00 Team Brainstorming (Cont)  
4:30 Adjourn

**JUNE 27, 2013**

**THURSDAY**

8:00 Evaluation of Ideas  
12:00 Lunch  
1:00 Team Assignments for Development  
2:00 Review Alternative Development Process  
3:00 Research and Refine Ideas  
4:30 Adjourn

**WEEK 2**

**JULY 16, 2013**

**TUESDAY**

8:00 Prepare for Technical Review Meeting  
9:00 *Review of VA Alternatives* *Technical Reviewers*  
10:00 Develop and Document Alternatives  
12:00 Lunch  
1:00 Develop and Document Alternatives (Cont)  
4:30 Adjourn

**JULY 17, 2013**

**WEDNESDAY**

8:00 Performance Assessment

**JULY 18, 2013**

**THURSDAY**

8:00 Group Review and Ranking of VA Alternatives/Strategy; Presentation Preparation  
11:00 Finalize Alternatives and Prepare Presentation  
12:00 Lunch  
11:00 Finalize Alternatives and Prepare Presentation  
2:00 *Presentation of VA Alternatives Meeting (Presentation of VA Study Results to Management and Stakeholders)*  
4:00 Adjourn

**VIDEO CONFERENCING INFORMATION:**

June 25, 8:30 am – 12:00 pm (Kickoff)

Phone Bridge No. 1-866-875-5909, Participant Code 1990838

July 16, Tuesday 9:00 am- 10:00 am (Technical Review Meeting)

Phone Bridge No. 1-866-875-5909, Participant Code 1990838

July 18, Thursday 2:00 pm- 4:00 pm (VA presentation)

Phone Bridge No. 1-866-875-5909, Participant Code 1990838

MEETING ATTENDEES  
Salmon Creek & Albion Creek Bridges Replacement

2013								NAME	POSITION/ROLE	ORGANIZATION	PHONE/CELL	EMAIL
June												
Pre	25	26	27	28	29	30	IMPL					
X	X							George Hunter	Team Leader	VMS	(916) 224-9812	George@vms-inc.com
X	X							<del>Misty Silke</del>				
X	X							Liza Walker				
X	X						X	Frank Deming	PROJECT MANAGER		(607) 445-6554	FRANK.DEMING@dot.ca.gov
X	X						X	Sebastian Cole	PM - Salmon	CT	441 3979 496 4096	499 6847 (Pers Cell) Sebastian.Cohen@dot.ca.gov
X								Gean Janssen	HYDRAULICS	CT	441-2037	
X		X						Eric Lund	Design	CT	445-6407	
X		X						Evelyn Plessinger	Traffic Safety	CT	441-3915	
X	X						X	Cindy Graham	Const.	CT	498-2122	
X	X						X	Adele Pommeroy	ENV	CT	530 741-4215	
X	X						X	Liza Walker	ENV	CT	530 741 4195	
✓	X							Naghi Ghafari	Design	CT	530 -741-4162	
	X							CHARLIE NARWOLD	GEOTECH	CT	707 445- 6036	
	X							Reid Buell	Geotech Foundations	CT	(916) 227-1012	
	X							John L. Thorne	" "	"	916 227-1034	
	X							Bill Bertucci	" "	"	916 203,7992	
4	X	X	X	X	X	X		Tom Phlips	Design	CT	707 445 7864	

\* Deming participated Charlie Fields PI Diach 1/18/13 Pres

**MEETING ATTENDEES**  
**Salmon Creek & Albion Creek Bridges Replacement**

2013								IMPL	NAME	POSITION/ROLE	ORGANIZATION	PHONE/CELL	EMAIL
Pre	4	5	6	7	8	9	June						
	X							William Bertucci	Eng Geologist / design	OSDN-E	916 203-7992	william_bertucci@dot.ca.gov	
↳	X	X	X	X	X	X		Kevin Waxman	Right of Way	CT	707 445-6438	Kevin_waxman@dot.ca.gov	
	X							Jerilyn Riordan	PPM / PMSO	CT	707 441 4667	jerilyn_riordan@dot.ca.gov	
↳	X	X	X	X	X	X		JEFF SIMS	Sr. Bridge Eng	CT	(916) 227-8497	jeff.sims@dot.ca.gov	
↳	X	X	X	X	X	X		Kelly Holden	" " "	CT	(416) 227-8498	Kelly.holden@dot.ca.gov	
↳	X	X	X	X	X	X		Paul Hailey	Traffic Ops	CT			
↳	X	X	X					Gary Woodard	for Frank Callinan	OSL			
↳	X	X	X					Rick Mayberry	for Steve Harvey	OSL	707 499 4594	rick_mayberry@dot.ca.gov	
↳	X	X	X					Christine Lan	Environ. Coord.	CT	707 441 5898	christine.lan@dot.ca.gov	
↳	X	X	X	X	X	X		Andre Guimarães	EI DESIGN ROADWAY	CT	707-445-5308 cell 707-5011625	Andre_Guimaraes@dot.ca.gov	
↳				X	X	X		Jennifer Olah	ENV Biologist			jennifer_olah@dot.ca.gov	
	X	X	X	X	X	X		GENE LEO	CONSTRUCTION	CALTROP CORP	707-775-9823	gleo@caltrop.com	
				X				Minde Kadsuntie	Structural Design	CT			
				X				John Huang	Geotech				
				X				Jim DeLuca	Dir Design				

↳ ~~Adelle~~ Fremle Callinan Structural Construction CT

\* Technical Review Gene

# APPENDIX A

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## 1. INTRODUCTION

This project proposes to replace the Salmon Creek Bridge (No. 10-0134). There are four alignment alternatives. Each alignment alternative includes multiple structure type options. Alternative 1 would be constructed west of the existing alignment and Alternative 2 east of the existing alignment. Alternatives 3 and 4 would be constructed west and east of the existing alignment, respectively, and in stages close to the existing alignment. All alternatives consist of construction of a new bridge, asphalt concrete overlay, new structural section off the existing centerline, new structural section at locations where the vertical profile is raised or lowered to accommodate an improved vertical curvature. Retaining walls are proposed at various locations to avoid impacts to property and provide improved stopping sight distance.

See the Cost Estimate in Attachment E for specific work items included in this project. It is proposed that this project be funded from the 210.110 Bridge Rehabilitation Program in the 2010 SHOPP cycle as a long lead project. The total cost including right of way is \$59,300,000 (2016/2017 fiscal year).

<b>Project Limits</b> (Dist., Co., Rte., PM)	1 - Men -1 – 42.4/43.3
<b>Number of Alternatives:</b>	4 plus the “no build” alternative
<b>Programmed or Proposed Capital Construction Costs</b>	\$55 million (2016/2017 fiscal year)
<b>Programmed or Proposal Capital Right of Way Costs:</b>	\$4.3 million (2016/2017 fiscal year)
<b>Funding Source:</b>	201.110 Bridge Rehabilitation Program
<b>Type of Facility</b> (conventional, expressway, freeway):	Conventional Highway
<b>Number of Structures:</b>	1 bridge
<b>Anticipated Environmental Determination/Document</b>	IS/ND — CEQA EA/FONSI — NEPA
<b>Legal Description</b>	In Mendocino County near Albion from 2.2 miles north of the Route 128 junction to 0.2 miles north of Salmon Creek
<b>Project Category</b>	Bridge Replacement

It is recommended that the cost associated with Alternative 4 (structure type 4B) be programmed into the 2010 SHOPP. A project report will serve as approval of the “selected” alternative.

## **2. BACKGROUND**

The Salmon Creek Bridge Project is located on State Route 1 in Mendocino County, from PM 42.4 to PM 43.3, near Albion, 2.2 miles north of the Route 128 junction. See Attachment A for a Vicinity Map.

The existing facility, within the project limits is a two-lane conventional highway and was most recently paved with OGAC in 2001. The posted speed limit is 50 mph. The vertical profile consists of an 800-foot vertical sag curve with the low point located near the bridge’s center. Approaching grades consist of a -7.00 percent north-aspect grade entering from the south and a 6.00 percent south-aspect grade exiting to the north. The structure is located on a tangent.

## **3. PURPOSE AND NEED STATEMENT**

### **Need:**

The Salmon Creek Bridge and approaching alignment have a number of structural and geometric deficiencies. The structure has a Sufficiency Rating of 49.70 percent and the Structure Replacement and Improvement Needs Report (STRAIN) Urgency Factor for replacement is two years.

### **Purpose:**

The purpose of this project is to replace this functionally obsolete and structurally deficient structure with one that will improve geometrics and structural integrity, to ensure uninterrupted traffic movements in the event of a vehicular breakdown, seismic event or other catastrophic failure. There is no interim seismic retrofit work that can reduce the geometric and structural deficiencies of the existing structure.

## **4. EXISTING FACILITY, DEFICIENCIES, AND TRAFFIC DATA**

A description of the existing structure and approaching Route 1, along with existing facility deficiencies and traffic data, are included in the following section.

**4A. ROADWAY GEOMETRIC INFORMATION**

Facility	Minimum Project Curve Radius	Through Traffic Lanes			Paved Shoulder Width		Median	Shoulder is a Bicycle Lane	Bicycle Route
		No. of Lanes	Lane Width	Type	Left	Right	Width	(Y/N)	(Y/N)
Existing	650-feet	2	11-12 ft	-	1-4 ft	1-4 ft	N/A	Y	Y
Proposed Alt. 1	850-feet	2	12 ft	-	4 ft	4 ft	N/A	Y	Y
Proposed Alt. 2	1,000-feet	2	12 ft	-	4 ft	4 ft	N/A	Y	Y
Proposed Alt. 3	1,000-feet	2	12 ft	-	4 ft	4 ft	N/A	Y	Y
Proposed Alt. 4	1,000-feet	2	12 ft	-	4 ft	4 ft	N/A	Y	Y
Standard	850-feet	-	12 ft	-	8 ft	8 ft	N/A	Y	Y

The project location is a curvilinear two-lane conventional highway that follows the coastline. Route 1 is functionally classified as a rural minor arterial. Within the project limits lane widths are between 11 and 12 feet and shoulder widths are between 1 and 4 feet in both directions.

**4B. GEOMETRIC DEFICIENCIES**

The radial curve at PM 42.56 does not meet current design standards for superelevation transition length and curvature. In addition, the vertical sag curve at PM 42.54, the vertical crest curve at PM 42.56, and the vertical crest curve at PM 42.99/43.14 do not meet current design standards for stopping sight distance.

**4C. PEDESTRIAN/NON-MOTORIZED FACILITIES**

In accordance with the Americans with Disabilities Act of 1990 (ADA) and Section 4450 of the California Government Code, ADA standards apply to this project and design should adhere to Design Information Bulletin (DIB) 82-03. Appropriate project records should document the fact that necessary review and approvals have been obtained.

Route 1 is legislatively designated as the "Pacific Coast Bike Route". The Route Concept Report for the route identifies a need to provide shoulder widening improvements to accommodate non-motorized traffic within the project area. Route 1 has seasonally high bicycle traffic volumes during the summer months. Most bicycle

traffic along this section of Route 1 consists of long-distance touring in the south bound direction.

#### 4D. STRUCTURES INFORMATION

The Salmon Creek Bridge (PM 43.00/43.13) is located on a tangent with a vertical profile that consists of an 800-foot vertical sag curve with the low point located at the bridge's center. The structure has a length and width of 685 and 26 feet, respectively, and has two 12-foot lanes and 1-foot shoulders. See Table 4.D.1 for more information.

Structure	Net Width			Replace Bridge	Work Identified in STRAIN	Replace Bridge Approach Rail
Name/No.	Existing	Standard	Proposed	(Y or N)	(Y or N)	(Y or N)
No. 10-0134 Salmon Creek Bridge	26 ft	40 ft	57 ft	Y	Y	Y

Structure	Shoulder Width			Proposed Pedestrian Walkway		
Name/No.	Existing	Standard	Proposed	Number	Width	Traffic Barrier
No. 10-0134 Salmon Creek Bridge	1 ft	8 ft	8 ft	1	5 ft	Y

The bridge was built in 1950 and is comprised of a 7-span steel deck Warren truss with steel beam spans over tower bents with a cast-in-place reinforced concrete deck. See Table 4.D.2 for a list of work performed on the existing structure.

Construction Year	Work Performed
1950	Construction
1951	Modifications
1961	Rail Revisions
1981	Repair
1985	Earthquake Upgrade
1990	Deck Rehabilitation
2000	Earthquake Restrainer
2001	Deck Treatment OGAC Overlay
2004	Paint

Both ends of the structure are preceded by north and south facing Narrow Bridge warning signs. The structure is listed in the STRAIN Report, and is identified in the Bridge Inspection Reports as having need of rehabilitation, upgrade, and seismic retrofit. See Attachment F for the most recent Bridge Inspection Report.

#### 4E. STRUCTURAL DEFICIENCIES

The structure is fracture critical due to a lack redundancy of the steel deck truss and steel floor beam members and is designated as Structurally Deficient due to the condition of the deck and Functionally Obsolete due to deck geometry. The Peer Review Fact Sheet (dated 08/15/07) recommends stripping the existing paint coat to allow for fracture critical inspection. The structure currently requires full removal of the existing coating system and repainting every 4 to 5 years at an estimated cost of \$2,500,000, and was last painted in 2004/2005. The horizontal beam on the left side of tower 3-4 has severe section loss, and various members throughout both trusses have minor section loss. The existing rail has been recommended for replacement because it currently does not meet standards. The cost for this work is unknown because replacing the existing rail with a standard rail may require extensive deck rehabilitation, possible replacement of the deck, and additional substructure work to accommodate the increased load to the substructure. These costs are very preliminary and are likely to be much higher after a full structural assessment is done.

To reduce potential seismic vulnerability, strengthening of the steel truss members will need to be performed at an estimated cost of \$1,100,000. There are several work recommendations to repair spalls and delaminations in the deck and substructure at an estimated cost of \$90,000. The additional cost needed to rehabilitate, maintain, and provide geometric improvements is discussed in the Alternatives section.

#### 4F. VEHICLE TRAFFIC DATA AND COLLISION HISTORY

Current and forecasted traffic data is listed in Table 4.F.1.

Table 4.F.1. Traffic Data			
Annual ADT			
2007	2016	2026	2036
3,100	3,800	4,570	5,350
Peak Hour			
2007	2016	2026	2036
430	530	640	740
20-Year Directional %			60
20-Year DH Truck %			5.0
10-Year TI			8.0
20-Year TI			9.0
10-Year TI (shoulder)			5.0
20-Year TI (shoulder)			5.5

Collision details for Route 1 from PM 42.4 to 43.4 between October 1, 2004 and March 30, 2008 are listed in Table 4.F.2.

Men 1	Total Collisions	Type of Collision			Primary Collision Factors	
		Fatal	Injuries	PDO	Speeding	Other Violations
PM 42.4/43.4	2	0	1	1	1	1

*PDO = Property Damage Only PCF = Primary Collision Factor*

Collision rates for Route 1 from PM 42.4 to 43.4 between October 1, 2004 and March 30, 2008 are listed in Table 4.F.3.

Men 1	Actual			Average		
	Fatal	F+I	Total	Fatal	F+I	Total
PM 42.4/43.4	0.000	0.25	0.49	0.033	0.63	1.36

*F+I = Fatal + Injury Note: Rates are in collision per million vehicle miles (MVM)*

There have been 2 collisions on this segment of highway 1 over a three-and-a-half year period. The total collision rate for this segment of Route 1 is less than half the state wide average for similar facilities.

## 5. CORRIDOR AND SYSTEM COORDINATION

The Transportation Concept Report (TCP) of September 2003 outlines the Facility Concept, from the Route 128 junction (PM 40.3) to Little River (PM 48.0), and states that this segment should remain a two-lane conventional highway. The Annual Average Daily Traffic (AADT) and Peak Hour Average Daily Traffic is 3,100 and 430, respectively, as of 2007. The Coastal Act and the Local Coastal Plan indicates that the Rehabilitation Strategy for this segment of State Route 1 is to widen the roadway portion of this segment to a 32-foot width.

## 6. ALTERNATIVES

Project alternatives consist of four “build” alternatives and one “no build” alternative. Table 6.1 summarizes estimated costs for all “build” alternatives.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Total Roadway Items	17.1	17.2	17.8	18.1
Total Structure Items*	35.7	33.7	36.9	36.9
Subtotal Construction Costs	52.8	50.9	54.7	55
Total Right of Way Items	4.7	4.5	4.7	4.3
Total Project Capital Outlay Costs	57.5	55.4	59.4	59.3
<i>*Structure items assumes structure types 1C, 2C, 3B &amp; 4B for Alternatives 1, 2, 3, &amp; 4, respectively</i>				
<i>Note: Costs in millions of dollars</i>				

### 6A. ALTERNATIVE DESCRIPTIONS

The following “build” alternatives are being evaluated to replace the Salmon Creek Bridge. All proposed replacement structures consist of two 12-foot travel lanes, two 8-foot shoulders, and a 5-foot pedestrian walkway (with barrier) on the west side of the structure. Two 4-foot shoulders are proposed for the approach roadway. Typical Sections, Project Layouts, and Structures Advance Planning Studies (APS) are included as Attachments B, C, and D, respectively.

All alternatives consist of ADA improvements, asphalt concrete overlays, new structural section off the existing centerline, new structural section at locations where the vertical profile is raised or lowered to accommodate improved vertical curvature. Details of new structural section are provided in the Preliminary Materials Recommendation and are included as Attachment G.

All alternatives provide paved access from the west-side pedestrian walkway to the roadway shoulder in compliance with DIB 82-03.

Seven culverts are proposed for modification or replacement within project limits. Details of culvert work will be determined during the PA& ED phase of the project. In addition to culvert modification and replacement, the project proposes other drainage improvements which include overside drains, rock slope protection, ditches, ac dikes.

See Table 6.A.1 for locations of potential culvert work.

PM	Diameter (in) (existing)	Length (ft) (existing)	Type (existing)
42.53	24	56	CSP
42.54	24	38	RCP
42.56	18	52	RCP
42.63	36	105	RCP
42.85	18	40	RCP
42.95	18	42	RCP
43.00	100 (total height) 96 (total width)	Width of Bridge	Animal Crossing Box Culvert
43.13	18	65	RCP

#### 6A1. ALTERNATIVE 1 – WEST ALIGNMENT (1A, 1B, 1C, 1D)

The scope of work for Alternative 1 includes replacement of the Salmon Creek Bridge, two retaining walls, and all the scope indicated in the Alternative Descriptions section. This alignment is located west and clear of the existing Salmon Creek Bridge. The replacement structure is 770 to 800 feet long, 131 to 141 feet high, and is located on a 1,000-foot vertical sag curve. This alternative will likely allow two traffic lanes to remain open during most of the construction. The proposed centerline for Alternative 1, at the location of the Salmon Creek Bridge, is 53 feet offset west and parallels the existing bridge alignment.

To the south of the existing structure, the Nonella Lane (PM 42.69) at-grade intersection and the private driveway access at PM 42.66 will be shifted west due to a proposed 10,000-foot horizontal curve between PM 42.61 and 42.79 in the realigned roadway. The Pacific Reefs Road (PM 42.96) at-grade intersection will be shifted west also due to realignment of the roadway.

Two retaining walls are proposed for this alternative. A 160-foot long, 4-foot to 30-foot high retaining wall is proposed between PM 42.96 and 42.99 on the west side of the roadway to avoid impacts to the adjacent property. A 570-foot long, 4-foot to 10-foot high retaining wall is proposed between PM 43.18 and 43.28 on the west side of the roadway to provide a pullout area and standard stopping sight distance for the horizontal curve.

Four structure types were proposed for this alignment (1A, 1B, 1C, and 1D) as shown in Table 6.A.1.1.

Alternative	Structure Type	Total Structure Cost (millions of dollars)
1A	4-Span Haunched Cast-in-Place Prestressed Concrete Box Girder	31.5
1B	5-Span Cast-in-Place Concrete Arch	38.0
1C	3-Span Cast-in-Place Concrete Arch	35.7
1D	20-Span Cast-in-Place Reinforced Concrete Slab on Open Spandrel Concrete Arch	31.7

*Note: Total structure costs includes structure and demolition costs  
Escalated values are calculated at 3.5% for 5.0 years*

The total cost for Alternative 1, assuming programming structure 1C, is \$57.5 million (2016/2017 fiscal year), which includes \$17.1 million for roadway items, \$35.7 million for structures items, and \$4.7 million for right of way items. A cost estimate for Alternative 1 is included as Attachment E.

## 6A2. ALTERNATIVE 2 – EAST ALIGNMENT (2A, 2B, 2C, 2D)

The scope of work for Alternative 2 includes replacement of the Salmon Creek Bridge and all the scope indicated in the Alternative Descriptions section. This alignment is located east and clear of the existing Salmon Creek Bridge. The replacement structure is 700 to 720 feet long, 131 to 138 feet high, and is located on a 1,000-foot vertical sag curve. This alternative will allow two traffic lanes to remain open during most of the construction. The proposed centerline for Alternative 2, at the location of the Salmon Creek Bridge, is 50 feet offset east and parallels the existing bridge alignment.

To the south of the existing structure, the Nonella Lane (PM 42.69) at-grade intersection and the private driveway access at PM 42.66 will be shifted east due to a proposed 6,000-foot horizontal curve between PM 42.44 and 42.55 in the realigned roadway. The Pacific Reefs Road (PM 42.96) at-grade intersection will be shifted east also due to realignment of the roadway.

Four structure types were proposed for this alignment (2A, 2B, 2C, and 2D) as shown in Table 6.A.2.1.

Alternative	Structure Type	Total Structure Cost (millions of dollars)
2A	3-Span Haunched Cast-in-Place Prestressed Concrete Box Girder	24.0
2B	5-Span Cast-in-Place Concrete Arch	33.6
2C	3-Span Cast-in-Place Concrete Arch	33.7
2D	20-Span Cast-in-Place Reinforced Concrete Slab on Open Spandrel Concrete Arch	28.5

*Note: Total structure costs includes structure and demolition costs  
Escalated values are calculated at 3.5% for 5.0 years*

The total cost for Alternative 2, assuming programming structure 2C, is \$55.4 million (2016/2017 fiscal year), which includes \$17.2 million for roadway items, \$33.7 million for structures items, and \$4.5 million for right of way items. A cost estimate for Alternative 2 is included as Attachment E.

### 6A3. ALTERNATIVE 3 – WEST ON EXISTING ALIGNMENT (3A, 3B)

The scope of work for Alternative 3 includes replacement of the Salmon Creek Bridge, one retaining wall, and all the scope indicated in the Alternative Descriptions section. This alignment is located somewhat west and on the existing Salmon Creek Bridge. The proposed replacement structure will be constructed in stages, and is 700 feet long, 131 to 137 feet high, and is located on a 1,000-foot vertical sag curve. This alternative will require one-way reversible traffic for three seasons for the second stage of construction. The proposed centerline for Alternative 3, at the location of the Salmon Creek Bridge, is 17 feet offset west and parallels the existing bridge alignment.

To the south of the existing structure, the Nonella Lane (PM 42.69) at-grade intersection and the private driveway access at PM 42.66 will be shifted west due to a proposed 10,000-foot horizontal curve between PM 42.54 and 42.72 in the realigned roadway. The Pacific Reefs Road (PM 42.96) at-grade intersection will be shifted west also due to realignment of the roadway.

One retaining wall is proposed for this alternative. A 550-foot long, 4-foot to 10-foot high retaining wall is proposed between PM 43.18 and 43.28 on the west side of the roadway to provide a pullout area and standard stopping sight distance for the horizontal curve.

Two structure types were proposed for this alignment (3A and 3B) as shown in Table 6.A.3.1

Alternative	Structure Type	Total Structure Cost (millions of dollars)
3A	Staged 3-Span Haunched Cast-in-Place Prestressed Concrete Box Girder	30.2
3B	Staged 5-Span Cast-in-Place Concrete Arch	36.9

*Note: Total structure costs includes structure and demolition costs  
Escalated values are calculated at 3.5% for 5.0 years*

The total cost for Alternative 3, assuming programming structure 3B, is \$59.4 million (2016/2017 fiscal year), which includes \$17.8 million for roadway items, \$36.9 million for structures items, and \$4.7 million for right of way items. A cost estimate for Alternative 3 is included as Attachment E.

#### 6A4. ALTERNATIVE 4 – EAST ON EXISTING ALIGNMENT (4A, 4B)

The scope of work for Alternative 4 includes replacement of the Salmon Creek Bridge and all the scope indicated in the Alternative Descriptions section. This alignment is located somewhat east and on the existing Salmon Creek Bridge. The proposed replacement structure will be constructed in stages, and is 700 feet long, 131 to 138 feet high, and is located on a 1,000-foot vertical sag curve. This alternative will require one-way reversible traffic for three seasons for the second stage of construction. The proposed centerline for Alternative 4, at the location of the Salmon Creek Bridge, is 23 feet offset east and parallels the existing bridge alignment.

To the south of the existing structure, the Nonella Lane (PM 42.69) at-grade intersection and the private driveway access at PM 42.66 will be shifted east due to a proposed 10,000-foot horizontal curve between PM 42.46 and 42.64 in the realigned roadway. The Pacific Reefs Road (PM 42.96) at-grade intersection will be shifted east also due to realignment of the roadway.

Two structure types were proposed for this alignment (4A and 4B) as shown in Table 6.A.4.1

Alternative	Structure Type	Total Structure Cost (millions of dollars)
4A	Staged 3-Span Haunched Cast-in-Place Prestressed Concrete Box Girder	30.2
4B	Staged 5-Span Cast-in-Place Concrete Arch	36.9
<i>Note: Total structure costs includes structure and demolition costs Escalated values are calculated at 3.5% for 5.0 years</i>		

The total cost for Alternative 4, assuming programming structure 4B, is \$59.3 million (2016/2017 fiscal year), which includes \$18.1 million for roadway items, \$36.9 million for structures items, and \$4.3 million for right of way items. A cost estimate for Alternative 4 is included as Attachment E.

#### 6A4. NO BUILD ALTERNATIVE

The “no build” alternative was also considered, but did not meet the purpose and need of the project.

#### 6B. FUTURE STUDIES

At a public informational meeting on May 7<sup>th</sup>, 2009 several of those attending indicated a preference for rehabilitating the existing structure on its current alignment rather than replacement on another alignment. At the next phase of the project the design team will review the feasibility, cost, and service life of rehabilitating the existing structure as compared to the cost of constructing a new bridge. Non-redundancy of the existing structure will pose a challenge for the design team when reviewing the feasibility of rehabilitating the existing structure.

#### 6C. DESIGN EXCEPTIONS

The following mandatory design exceptions have been executed:

- Shoulder widths (DIB 79-03) between PM 42.4 and 43.3

#### 6D. AGENCY INVOLVEMENT

Various permits and approvals will be necessary after Project Approval and Environmental Document (PA&ED), and will likely involve California Department of Fish and Game (1602 Streambed Alteration Permit), U. S. Army Corps of Engineers (Section 404), U. S. Coast Guard (Section 15 Nationwide Permit),

California Regional Water Quality Control Board (Section 401), U.S. Fish and Wildlife Service (Section 7), National Marine Fisheries, and a California State Coastal Commission Development Permit. The County of Mendocino will also be involved in the project as it relates to the overlay of Spring Grove Road.

#### **6E. HAZARDOUS WASTE**

A November 14, 2008 Initial Site Assessment (ISA) indicates that a Preliminary Site Investigation (PSI) including a structural survey will be required for the existing structure. See Attachment H for a copy of the ISA. It is estimated that it will take 3 to 5 months to complete the site investigation and prepare the final report. The final report should be completed during the PA&ED phase of the project.

#### **6F. GEOTECHNICAL**

The Office of Geotechnical Design North evaluated the site conditions and geology on November 24, 2008, which included review of the As-Built Plans, Bridge Inspection Reports, available geologic literature mapping, the Geotechnical Design bridge file, and Log of Test Borings (LOTBs).

The site consists of sandstone, shale, and conglomerate sedimentary rocks. Ground water is expected to be at river level and may fluctuate due to seasonal fluctuations and tidal influence. The potential for surface rupture at the site due to fault movement of the controlling San Andreas/North fault, located about 5.6 miles southwest of the site, is insignificant as there are no known faults projecting towards or passing directly through the project site. Due to a lack of detailed granular soil characteristics, a detailed liquefaction analysis was not performed. There is a moderate to high liquifaction potential in the upper loose granular layers during a seismic event. Peak Bedrock Acceleration is estimated at 0.5g. A future subsurface investigation will need to be completed prior to final seismic design recommendations, which should be requested by the Office of Bridge Design North during the PA&ED phase of the project.

#### **6G. DISPOSAL SITE AND IMPORTED BORROW DISPOSAL**

Material disposal is anticipated for all “build” alternatives. One optional disposal site that could be used for excess project material is the Beacon disposal site located on Route 1 at PM 33.8.

#### **6H. HIGHWAY PLANTING**

The Landscape Architectural Assessment Sheet (LAAS) prepared for this project indicates that revegetation is required, and highway planting is not warranted (see Attachment I). The LAAS recommends highway aesthetic treatment and will require further evaluations during PA&ED.

## **6I. STORM WATER COMPLIANCE**

A Storm Water Data Report has been prepared for this project and is included in Attachment J. The disturbed areas will be primarily from the road access and construction equipment pad, excavation for bridge pier footings and abutments, removal of existing bridge pier footings and abutments, and roadway fill and excavation. This project is not located within an urban MS4 area.

Salmon Creek is not a 303(d) listed waterbody. The North Coast Regional Water Quality Control Board has jurisdiction in the project area. Given that the project will increase the impervious surface in the project area, treatment best management practices (BMPs) will be required to address pollutant loading and hydromodification. Environmental recommends that scuppers be eliminated from the bridge if at all possible, if not, the scuppers should drain to land rather than the active channel. Off site treatment could be required if treatment BMPs are not feasible on site. The need for additional Right of Way should be evaluated early during project development so that there is adequate space for incorporation of treatment BMPs. If Caltrans is unable to commit to placement of treatment BMPs during the PA/ED phase, the additional sources of polluted runoff should be identified as an impact that would require mitigation to a less than significant level. A water quality study should be prepared.

## **6J. PRELIMINARY FLOODPLAIN ANALYSIS**

On November 18, 2008, a Floodplain Analysis and Floodplain Evaluation Report Summary (FERS) was prepared for the proposed project. The project is located in FEMA Designated Zone A with a 1% annual chance of flooding except for the bridge abutments, which are located in Zone C, "Areas of minimal flooding".

The total increased impervious surface area within project limits ranges from 1.5 acres to 2.2 acres. The maximum increase of impervious surface area is 0.03% of the total Salmon Creek watershed area. Thus, it is not anticipated that the project will impact the 100 year floodplain. Once the final bridge design is complete, further evaluation of the existing and proposed in-water structures should be performed to determine if the 100-year floodplain will be affected by the project.

## **6K. RIGHT OF WAY**

A Right of Way Data Sheet was prepared for the project and is included in Attachment K. See Table 6.K.1 for a summary of Right of Way item costs for all "build" alternatives.

Right of Way Item	Right of Way Item Cost			
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Acquisition (Including Excess Lands)	\$1,769,893	\$1,636,811	\$1,783,168	\$1,394,822
Mitigation Acquisition & Credits	\$2,853,907	\$2,853,907	\$2,853,907	\$2,853,907
Project Development Permit Fees	\$12,972	\$12,972	\$12,972	\$12,972
Utility Relocation (State Share)	0	0	0	0
Relocation Assistance (RAP)	0	0	0	0
Clearance/Demolition	0	0	0	0
Title and Escrow Fees	\$1,153	\$13,837	\$18,449	\$17,296
Construction Contract Work	0	0	0	0
<b>Total</b>	<b>\$4.7 million</b>	<b>\$4.5 million</b>	<b>\$4.7 million</b>	<b>\$4.3 million</b>

*Note: Escalated value is calculated at 5.0% for 4.5 years*

Right of Way lead time will require a minimum of 17 months after submitting appraisal maps, utility conflict maps, and the necessary environmental clearance has been obtained. In addition, a minimum of 14 months will be required after submitting the last appraisal map for certification.

## 6L. UTILITY INVOLVEMENT

Overhead electrical and telephone lines/poles are in conflict with this project. Utility relocation will be required and the proposed location of utilities is alternative dependant. PG&E notes that acquisition of additional land rights will need to be executed for relocation of utility facilities. See Table 6.L.1 for a list of potential conflicting utilities for all “build” alternatives.

Type	PM	Offset	Alt 1	Alt 2	Alt 3	Alt 4
Lines/Pole	42.69	LT	X	X	X	X
Lines/Pole	42.71	LT	X	X	X	X
Lines/Pole	42.76	LT	X		X	X
Lines/Pole	42.84	LT	X		X	
Lines/Pole	41.87	LT	X		X	
Lines/Pole	42.92	LT	X		X	
Lines/Pole	42.97	RT		X		X
Lines/Pole	42.98	RT	X	X	X	X
Lines/Pole	43.00	RT	X	X	X	X
Lines/Pole	43.14	RT		X		X
Lines/Pole	43.15	LT	X		X	X

Lines/Pole	43.17	RT		X	X	X
Lines/Pole	43.20	LT	X		X	
Lines/Pole	43.21	RT		X		X
Lines/Pole	43.23	LT	X	X	X	
Lines/Pole	43.24	RT		X	X	X
Lines/Pole	43.26	RT	X	X	X	X
Lines/Pole	43.28	LT	X	X	X	X
Lines/Pole	43.35	LT	X	X	X	X

#### **6M. SALVAGING AND RECYCLING OF HARDWARE AND OTHER NON-RENEWABLE RESOURCES**

Measures to salvage and recycle materials will be determined during the PS&E phase of this project. Possible items for salvage include drainage grates, corrugated steel pipe (CSP), and metal beam guardrail (MBGR) materials.

#### **6N. RECYCLED MATERIALS**

No asphalt recycling is planned for this project. See Attachment G for a copy of the Preliminary Materials Recommendation.

#### **6O. CONSEQUENCES OF THE NO-BUILD OPTION**

In the event the “no-build” alternative is chosen the existing structure will continue to deteriorate and no geometric improvement would be made.

#### **6P. COMMUNITY INVOLVEMENT**

A public informational meeting was held on May 7, 2009 in the town of Mendocino, CA. Public comments from the meeting are summarized below.

Locals are concerned that traffic handling could affect their mobility. The community suggested one-way traffic control should be maintained at all times or construction of a temporary detour bridge across the channel should be used during construction.

### **7. TRAFFIC MANAGEMENT AND CONSTRUCTION STAGING**

A Transportation Management Plan [April 3, 2009 (TMP)] was prepared for this project. See Attachment L for a copy of the TMP. One-way traffic control shall be in accordance with the Caltrans Standard Plan T-13. The TMP indicates that a minimum 14-foot-wide

roadway to accommodate vehicular traffic is required at all times. Bicycles will be accommodated through the work zone by providing a 4-foot paved shoulder. The District Permits Engineer will be notified by the Resident Engineer upon receipt of notice that the roadway width for direction of travel will be less than 16 feet.

Traffic control measures in the California Manual on Uniform Traffic Control Devices (MUTCD 6D) will be incorporated to accommodate disabled pedestrians through the work zone. The maximum length of one-way traffic control closure is 1,700 feet.

The construction durations for Alternatives 1 (west) and 2 (east) are anticipated to be three seasons, which is comprised of two seasons for construction of the replacement structure and one season for demolition of the existing structure. The construction duration for Alternatives 3 (west on existing alignment) and 4 (east on the existing alignment) are anticipated to be five seasons, which is comprised of two seasons for construction of half of the replacement structure, one season for demolition of the existing structure, and two seasons for construction of the remaining half of the replacement structure. Three seasons of one-way traffic control is anticipated for Alternatives 3 and 4.

## **8. ENVIRONMENTAL DETERMINATION/DOCUMENT**

In order to identify environmental issues, constraints, costs and resource needs, the North Region Office of Environmental Planning Branch (M-3) prepared a Preliminary Environmental Analysis Report (PEAR) for the project (see Attachment M for a copy). Preliminary studies consisted of field surveys and a review of records and databases. Based on current information, it is anticipated that the environmental document is an Initial Study/Negative Declaration pursuant to the California Environmental Quality Act (CEQA) and a Routine Environmental Assessment/Finding of No Significant Impact (FONSI) pursuant to the National Environmental Policy Act (NEPA).

Potential impacts requiring further study include:

- Biological Resources
- Cultural Resources
- Community Impacts
- Water Quality
- Hazardous Waste
- Visual Quality
- Floodplain Hydrology Report
- Geotechnical Study and Report

Permission to enter permits will be necessary to enter properties for environmental surveys. It is estimated that completion of the environmental process will require up to 48

months from the submittal date of the Environmental Study Request, which is currently scheduled for September 2010. It should be noted that because of unforeseen delays and issues that may occur during coordination with federal resource agencies, the time required to attain environmental approval could change considerably. A matrix identifying resources needed to complete environmental studies is included.

Field surveys for sensitive plant and wildlife species must be conducted between February 15 and August 15. Formal consultation and/or coordination with the California Fish and Game, Army Corp of Engineers and the Regional Water Quality Control Board permits could take up to 12 months to obtain.

It will take between 6-15 months to comply with Section 106 of the National Historic Preservation Act, if required. If archaeological resources are identified and found to be eligible for National Historic listing, the schedule for completing Section 106, the timeline could be extended another two years.

A Water Quality Analysis is needed and coordination with the State Resources Control Board may be required. A Visual Impact Assessment will be required to determine impacts to scenic resources.

## **9. FUNDING**

### **9A. COST ESTIMATE**

It is proposed that this project be funded from the 210.110 Bridge Rehabilitation Program in the 2010 SHOPP cycle as a long lead project. Additional alternatives may be added in the next phase of the project, and no alternative has been selected. However, Alternative 4 (east on existing alignment) incorporating structure type 4B will be used for programming purposes. A cost estimate for each alternative is included as Attachment E.

### **9B. PROJECT SUPPORT**

A Programming Sheet has been prepared for this project and is included as Attachment N.

**9C. PROJECT SCHEDULE**

<b>HQ Milestones</b>	<b>Delivery Date</b>
Begin Environmental	09/01/10
Circulate DED	06/01/14
PA & ED	10/01/14
Project PS&E	07/01/16
Right of Way Certification	01/01/17
Ready to List	01/15/17
Approve Contract	07/15/17
Contract Acceptance	08/01/19
End Project	08/01/19

**10. FHWA COORDINATION**

No FHWA action is required for this project.

**11. VALUE ANALYSIS**

Since the construction plus support cost for this project exceeds \$25 million, a Value Analysis will need to be performed for this project during the PA&ED phase

**12. FIELD REVIEW ROSTER**

<b>NAME</b>	<b>UNIT</b>	<b>TELEPHONE</b>	<b>DATES</b>
Jeffrey Pimentel	Advance Planning	(707) 445-6358	Jan. 2009
Valency Langtry	Advance Planning	(707) 445-5208	July 2008
Johnathon Jackson	Advance Planning	(707) 441-2059	July 2008 & Jan. 2009
Fernando Manzanera	Hydraulics	(707) 445-5322	Oct. 2008
Brett Benson	Right of Way	(707) 445-6691	Feb. 2009

## **APPENDIX B**

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## 1. INTRODUCTION

This project proposes to replace the Albion River Bridge (No. 10-0136). There are three alignment alternatives. Each alignment alternative includes multiple structure type options. Alternative 1 would be constructed west of the existing alignment, Alternative 2 would be east of the existing alignment, and Alternative 3 would replace the existing bridge in stages close to the existing alignment. All alternatives consist of construction of a new bridge, asphalt concrete overlay, new structural section off the existing centerline, new structural section at locations where the vertical profile is raised or lowered to accommodate an improved vertical curvature. Retaining walls are proposed at various locations to avoid impacts to property and environmentally sensitive areas.

See the Cost Estimate in Attachment E for specific work items included in this project. It is proposed that this project be funded from the 210.110 Bridge Rehabilitation Program in the 2010 SHOPP cycle as a long lead project. The total cost including right of way is \$54,500,000 (2015/2016 fiscal year).

<b>Project Limits</b> (Dist., Co., Rte., PM)	1 - Men -1 - 43.3/44.2
<b>Number of Alternatives:</b>	3 plus the "no-build" alternative
<b>Programmed or Proposed Capital Construction Costs</b>	\$50.9 million (2015/2016 fiscal year)
<b>Programmed or Proposed Capital Right of Way Costs:</b>	\$3.6 million (2015/2016 fiscal year)
<b>Funding Source:</b>	201.110 Bridge Rehab Program
<b>Type of Facility</b> (conventional, expressway, freeway):	Conventional Highway
<b>Number of Structures:</b>	1
<b>Anticipated Environmental Determination/Document</b>	IS/ND - CEQA EA/FONSI - NEPA
<b>Legal Description</b>	In Mendocino County near Albion from 3.0 miles north of the Route 128 junction to 0.2 miles north of Albion River
<b>Project Category</b>	Bridge Replacement

It is recommended that the cost associated with Alternative 1 (structure type 1A) be programmed into the 2010 SHOPP. A project report will serve as approval of the "selected" alternative.

## **2. BACKGROUND**

The Albion River Bridge Project is located on State Route 1 in Mendocino County, from PM 43.3 to PM 44.2, in Albion, 3.4 miles north of the State Route 128 junction. See Attachment A for a Vicinity Map.

The existing highway facility within the project limits is a two-lane conventional highway and was most recently paved with Open-Graded Asphalt Concrete (OGAC) in 2001. The existing alignment follows the coastline and is curvilinear. The posted speed limit for this two-lane conventional highway is 50 mph. The advisory speed on the structure and for the curve on the north end of the structure is 30 mph. The grade on the bridge is 1.23% and the alignment is located on a tangent. The curve north of the structure has an approximate 275-foot radius (28.5 mph design speed) and a 200-foot length. The close proximity of this curve does not allow for development of standard superelevation transition without modifying the curve.

## **3. PURPOSE AND NEED STATEMENT**

### **Need:**

The Albion River Bridge and approaching alignment have a number of structural and geometric deficiencies. The structure has a Sufficiency Rating of 68.20 percent and the Structure Replacement and Improvement Needs Report (STRAIN) Urgency Factor for replacement is two years.

### **Purpose:**

The purpose of this project is to replace this functionally obsolete and structurally deficient structure with one that will improve geometrics and structural integrity to ensure uninterrupted traffic movements in the event of a vehicular breakdown, seismic event, or other catastrophic failure.

## **4. EXISTING FACILITY, DEFICIENCIES, AND TRAFFIC DATA**

A description of the existing structure and approaching Route 1, along with existing facility deficiencies and traffic data, are included in the following section.

#### 4A. ROADWAY GEOMETRIC INFORMATION

Facility	Minimum Project Curve Radius	Through Traffic Lanes			Paved Shoulder Width		Median	Shoulder is a Bicycle Lane	Bicycle Route
		No. of Lanes	Lane Width	Type	Left	Right	Width	(Y/N)	(Y/N)
Existing	275-feet	2	11-12 ft	-	0-4 ft	0-4 ft	N/A	Y	Y
Proposed Alt. 1	1,150-feet	2	12 ft	-	4 ft	4 ft	N/A	Y	Y
Proposed Alt. 2	1,150-feet	2	12 ft	-	4 ft	4 ft	N/A	Y	Y
Proposed Alt. 3	1,150-feet	2	12 ft	-	4 ft	4 ft	N/A	Y	Y
Standard	850-feet	-	12 ft	-	8 ft	8 ft	N/A	Y	Y

The project location is a curvilinear two-lane conventional highway that follows the coastline. Route 1 is functionally classified as a rural minor arterial. Within the project limits lane widths are between 11 and 12 feet, and shoulder widths are between 0 and 4 feet in both directions.

#### 4B. GEOMETRIC DEFICIENCIES

The Albion River Bridge is on the STRAIN Report as Functionally Obsolete due to a non-standard deck width. Also, the radial curve at PM 43.94 does not meet current design standards for superelevation transition length and standards for curvature. The intersecting roads, Albion River North Side Road and Albion Little River Road, do not meet current design standards for corner sight distance. The vertical profile from PM 44.01 to 44.16 does not meet design standards for stopping sight distance.

#### 4C. PEDESTRIAN/NON-MOTORIZED FACILITIES

In accordance with the Americans with Disabilities Act of 1990 (ADA) and Section 4450 of the California Government Code, ADA standards apply to this project and design should adhere to Design Information Bulletin (DIB) 82-03. Appropriate project records should document the fact that necessary review and approvals have been obtained.

Route 1 is legislatively designated as the "Pacific Coast Bike Route". The Route Concept Report for the route identifies a need to provide shoulder widening improvements to accommodate non-motorized traffic within the project area. Route 1

has seasonally high bicycle traffic volumes during the summer months. Most bicycle traffic along this section of Route 1 consists of long-distance touring in the south bound direction.

#### 4D. STRUCTURES INFORMATION

The Albion River Bridge (PM 43.74/43.93) is located on a tangent with a 1.23-percent gradeline sloping north. The structure has a length and width of 969 feet and 26 feet, respectively. The existing 34 span Bridge has 12-foot lanes and 1-foot shoulders. The bridge was built in 1944 and is comprised of timber stringer spans on timber A-frame deck trusses with 11 timber approach spans on timber tower bents at the south end, 22 timber approach spans on timber tower bents at the north end, and a single-span steel riveted steel deck truss on reinforced concrete tower bents over the Albion River. See Table 4.D.1 for more information.

Structure Name/No.	Net Width			Replace Bridge (Y or N)	Work Identified in STRAIN (Y or N)	Replace Bridge Approach Rail (Y or N)
	Existing	Standard	Proposed			
No. 10-0136 Albion River Bridge	26 ft	40 ft	54 ft	Y	Y	Y

Structure Name/No.	Shoulder Width			Proposed Pedestrian Walkway		
	Existing	Standard	Proposed	Number	Width	Traffic Barrier
No. 10-0136 Albion River Bridge	1 ft	8 ft	8 ft	2	5 ft	Y

The Douglas Fir wood truss structure incorporates a recycled steel deck truss that spans the main channel. This truss is from an old bridge that had been located on the South Fork of the Feather River, in Butte County, approximately 1.5 miles downstream of Bidwell Bar. However, the age of the steel truss is not known.

See Table 4.D.2 for a list of work performed on the existing structure.

Construction Year	Work Performed
1944	Construction
1960	Inspection Walkway
1961	Truss Span Revisions
1978	Repair
1979	Guardrail
1997	AC Surfacing
2001	OGAC Overlay

Both ends of the structure are preceded by north and south-facing Narrow Bridge warning signs. There are two north and south-facing 30 mph warning signs at the north end of the bridge and one south facing 30 mph sign on the structure. The structure is listed on the STRAIN Report, and is identified in the Bridge Inspection Reports as having need of rehabilitation, upgrade, and seismic retrofit. See Attachment F for the most recent Bridge Inspection Report.

#### **4E. STRUCTURAL DEFICIENCIES**

The structure is fracture critical due to a lack of redundancy of the steel deck truss and floor beam members and is designated as Functionally Obsolete due to deck geometry. The Peer Review Fact Sheet (dated 08/15/07) recommends stripping the existing paint coat to allow for fracture critical inspection. The cost for this work is not known at this time. The structure currently requires painting every 5 years at an estimated cost of \$350,000 for full preparation and paintwork. The structure has deficient rails and they are recommended for replacement at an estimated cost of \$1,100,000. However, upgrading the rail to current standards is not feasible without replacing the deck and modifying the superstructure. The cost for the superstructure modification is currently unknown at this time, but would be expected to be significant due to the extra load that would need to be supported by the substructure.

To reduce potential seismic vulnerability, strengthening of the steel truss members will need to be performed at an estimated cost of \$1,300,000. Replacement of the bolted connections and hardware throughout the timber sub-structure, and replacement of the top left horizontal timber element located between the number 15 and 16 bents will cost an estimated \$1,500,000. Additional work that may be needed to rehabilitate, maintain, and provide geometric improvements is discussed in the Alternatives section.

#### 4F. VEHICLE TRAFFIC DATA AND COLLISION HISTORY

Current and forecasted traffic data for Route 1 from PM 43.34 to 44.01 is listed in Table 4.F.1.

Annual ADT			
2007	2016	2026	2036
3,100	3,800	4,570	5,350
Peak Hour			
2007	2016	2026	2036
430	530	640	740
20-Year Directional %			60
20-Year DH Truck %			5.0
10-Year TI			8.0
20-Year TI			9.0
10-Year TI (shoulder)			5.0
20-Year TI (shoulder)			5.5

Collision details for Route 1 from PM 43.13 to 44.20 between October 1, 2004 and March 30, 2008 are listed in Table 4.F.2.

Men 1	Total Collisions	Type of Collision			Primary Collision Factors				
		Fatal	Injury	PDO	Speeding	Improper Turn	Other Violations	Failure to Yield	Influence of Alcohol
PM 43.13/44.20	12	0	3	9	5	3	1	2	1

*PDO = Property Damage Only PCF = Primary Collision Factor*

Collision rates for Route 1 from PM 43.13 to 44.20 between October 1, 2004 and March 30, 2008 are listed in Table 4.F.3.

Men 1	Actual			Average		
	Fatal	F+I	Total	Fatal	F+I	Total
PM 43.13/44.20	0.000	0.82	3.27	0.038	0.75	1.54

*F+I = Fatal + Injury Note: Rates are in collision per million vehicle miles (MVM)*

There have been 12 collisions on this segment of highway 1 over a three-and-a-half year period. The total collision rate for this segment of Route 1 is more than twice the state wide average for similar facilities. Types of collisions include “hit object”, “improper turn”, “rear end”, “broadside”, and “overturn”. Three of the “hit object” type of collisions occurred at the horizontal curve located at PM 43.95, and involved the vehicle hitting one of the signs located on the outside of the curve.

## 5. CORRIDOR AND SYSTEM COORDINATION

The Transportation Concept Report (TCP) of September 2003 outlines the Facility Concept, from the Route 128 junction (PM 40.3) to Little River (PM 48.0), and states that this segment should remain a two-lane conventional highway. The Annual Average Daily Traffic (AADT) and Peak Hour Average Daily Traffic is 3,100 and 430, respectively, as of 2007. The Coastal Act and the Local Coastal Plan indicates that the Rehabilitation Strategy for this segment of State Route 1 is to widen the roadway portion of this segment to a 32-foot width.

## 6. ALTERNATIVES

Project alternatives consist of three “build” alternatives, one rehabilitation alternative and one “no-build” alternative. Table 6.1 summarizes estimated costs for all “build” alternatives.

	Alternative 1	Alternative 2	Alternative 3
Total Roadway Items	12.5	14.5	16.0
Total Structure Items*	38.4	33.1	50.1
Subtotal Construction Costs	50.9	47.6	66.1
Total Right of Way Items	3.6	6.1	4.0
Total Project Capital Outlay Costs	54.5	53.7	70.1
<i>*Structure items assumes structure types 1A, 2A, &amp; 3A for Alternatives 1, 2, &amp; 3, respectively</i>			
<i>Note: Costs in millions of dollars</i>			

### 6A. ALTERNATIVE DESCRIPTIONS

The following “build” alternatives are being evaluated to replace the Albion River Bridge. All proposed replacement structures consist of two 12-foot travel lanes, two 8-foot shoulders, and two 5-foot pedestrian walkways (with barrier) on the east and west sides of the structure. Two 4-foot shoulders are proposed for the approach roadway. Typical Sections, Project Layouts, and Structures Advance Planning Studies (APS) are included as Attachments B, C, and D, respectively.

All alternatives consist of ADA improvements, asphalt concrete overlays, new structural section off the existing centerline, new structural section at locations where the vertical profile is raised or lowered to accommodate improved vertical curvature. Details of new structural section are provided in the Preliminary Materials Recommendation and are included as Attachment G.

All alternatives improve the existing two-way left turn pocket storage length at PM 43.40/43.69 from approximately 360 feet to 435 feet as specified by HDM Section 405.2B. In addition, all alternatives provide paved access from the east-side and

west-side pedestrian walkways to the roadway shoulder in compliance with DIB 82-03.

Three culverts are proposed for modification or replacement within project limits. Details of culvert work will be determined during the PA& ED phase of the project. In addition to culvert modification and replacement, the project proposes other drainage improvements which include overside drains, rock slope protection, ditches, ac dikes, and replacement of existing drainage inlet covers. See Table 6.A.1 for locations of potential culvert work.

PM	Diameter (in) (existing)	Length (ft) (existing)	Type (existing)
43.36	18	65	RCP
43.73	18	42	RCP
44.03	24	65	RCP

#### 6A1. ALTERNATIVE 1 – WEST ALIGNMENT (1A, 1B, 1C, 1D)

The scope of work for Alternative 1 includes replacement of the Albion River Bridge, one retaining wall, and all the scope indicated in the Alternative Descriptions section. This alignment is located west and clear of of the existing Albion River Bridge. The replacement structure is 1,020 feet long and 139 feet to 151 feet high. This alternative will allow two traffic lanes to remain open during most of the construction.

To the south of the existing structure, the Spring Grove Road (PM 43.50) at-grade intersection will be shifted southwest due to a proposed 2,000-foot horizontal curve between PM 43.36 and 43.62 in the realigned roadway. The potential of shifting the intersection with Spring Grove Road to the south will be reviewed at the next stage of the project in order to improve the skew of the existing intersection. The Albion Ridge Road (PM 43.55) at-grade intersection and driveway access from PM 43.55 to 43.57 will be shifted west.

To the north of the structure, the Albion River North Side Road (PM 43.93) at-grade intersection will be relocated to PM 44.03 to accommodate the replacement structure, and includes proposed metal beam guard rail, and ADA access to the east pedestrian walkway. The Albion Little River Road (PM 43.96) at-grade intersection with Route 1 will be relocated to intersect Albion River North Side Road. The private driveway access at PM 44.00 will be relocated to intersect Albion River North Side Road.

One retaining wall is proposed for this alternative. A 170-foot long, 12-foot high retaining wall is proposed between PM 42.51 and 43.54 on the west side of the roadway to avoid impacts to the adjacent pond located to the north of Spring Grove Road.

Four structure types were proposed for this alignment (1A, 1B, 1C, and 1D) as shown in Table 6.A.1.1.

Alternative	Structure Type	Total Structure Cost (millions of dollars)
1A	4 Span Haunched Cast-in-Place Prestressed Concrete Box Girder	38.4
1B	4 Span Haunched Cast-in-Place Prestressed Concrete Segmental Box Girder	55.0
1C	11-Span Open Spandrel Concrete Arch	32.6
1D	4-Span Open Spandrel Concrete Arch	41.6

*Note: Total structure costs includes structure and demolition costs*

The total cost for Alternative 1, assuming programming structure 1A, is \$54.5 million (2015/2016 fiscal year), which includes \$12.5 million for roadway items, \$38.4 million for structures items, and \$3.6 million for right of way items. A cost estimate for Alternative 1 is included as Attachment E.

## 6A2. ALTERNATIVE 2 – EAST ALIGNMENT (2A, 2B)

The scope of work for Alternative 2 includes replacement of the Albion River Bridge, three retaining walls, and all the scope indicated in the Alternative Descriptions section. This alignment is located east and clear of the existing Albion River Bridge. The replacement structure is 1,040 feet long and 140 feet to 153 feet high. This alternative will allow two traffic lanes to remain open during most of the construction.

To the south of the existing structure, the Spring Grove Road (PM 43.50) at-grade intersection will be shifted southwest due to a proposed 1,900-foot horizontal curve between PM 43.35 and 43.69 in the realigned roadway. The potential of shifting the intersection with Spring Grove Road to the south will be reviewed at the next stage of the project in order to improve the skew of the existing intersection. The Albion Ridge Road (PM 43.55) at-grade intersection and driveway access from PM 43.55 to 43.57 will be shifted west.

To the north of the structure, the Albion Little River Road (PM 43.96) at-grade intersection will be shifted south due to a proposed 1,150-foot horizontal curve between PM 43.78 and 43.98 in the realigned roadway. The Albion River North

Side Road (PM 43.93) at-grade intersection with Route 1 will be relocated to intersect Albion Little River Road.

Three retaining walls are proposed for this alternative. A 150-foot long, 12-foot high retaining wall is proposed between PM 43.51 and 43.54 on the west side of the roadway to avoid impacts to the adjacent pond located to the north of Spring Grove Road. A 490-foot long, 4-foot to 24-foot high retaining wall is proposed between PM 43.63 and 43.72 on the east side of the roadway to avoid impacts to the adjacent residential structures located on East Lane. A 345-foot long, 4-foot to 30-foot high retaining wall is proposed along the north-east side of Albion River North Side Road to avoid impacts to large trees on the north-east cut slope.

Two structure types were proposed for this alignment (2A and 2B) as shown in Table 6.A.2.1

Alternative	Structure Type	Total Structure Cost (millions of dollars)
2A	3 Span Haunched Cast-in-Place Prestressed Concrete Box Girder	33.1
2B	3 Span Haunched Cast-in-Place Prestressed Concrete Segmental Box Girder	50.9

*Note: Total structure costs includes structure and demolition costs*

The total cost for Alternative 2, assuming programming structure 2A, is \$53.7 million (2015/2016 fiscal year), which includes \$14.5 million for roadway items, \$33.1 for structures items, and \$6.1 million for right of way items. A cost estimate for Alternative 2 is included as Attachment E.

### 6A3. ALTERNATIVE 3 – WEST ON EXISTING ALIGNMENT (3A, 3B)

The scope of work for Alternative 3 includes replacement of the Albion River Bridge, two retaining walls, and all the scope indicated in the Alternative Descriptions section. This alignment is located somewhat west and on the existing Albion River Bridge. The replacement structure is to be constructed in stages, and is 940 to 943 feet long and 140 feet to 151 feet high. This alternative will require one-way reversible traffic for three seasons for the second stage of construction. The proposed centerline for Alternative 3 is 15 feet offset west at the south end of the structure and parallels the existing bridge alignment before deviating to the west.

To the south of the existing structure, the Spring Grove Road (PM 43.50) at-grade intersection will be shifted southwest due to a proposed 1,950-foot horizontal curve between PM 43.35 and 43.63 in the realigned roadway. The potential of

shifting the intersection with Spring Grove Road to the south will be reviewed at the next stage of the project in order to improve the skew of the existing intersection. The Albion Ridge Road (PM 43.55) at-grade intersection and driveway access at PM 43.55 to 43.57 will be shifted west.

To the north of the structure, the Albion Little River Road (PM 43.96) at-grade intersection will be shifted northwest due to a proposed 1,150-foot horizontal curve between PM 43.87 and 44.03 in the realigned roadway. The Albion River North Side Road (PM 43.93) at-grade intersection with Route 1 will be relocated to intersect Albion Little River Road.

Two retaining walls are proposed for this alternative. A 165-foot long, 12-foot high retaining wall is proposed between PM 43.51 and 43.54 on the west side of the roadway to avoid impacts to the adjacent pond located to the north of Spring Grove Road. A 345-foot long, 4-foot to 30-foot high retaining wall is proposed along the north-east side of Albion River North Side Road to avoid impacts to large trees on the north-east cut slope.

Two structure types were proposed for this alignment (3A and 3B) as shown in Table 6.A.3.1

Alternative	Structure Type	Total Structure Cost (millions of dollars)
3A	4 Span Staged Haunched Cast-in-Place Prestressed Concrete Box Girder	50.1
3B	Staged 4-Span Concrete Arch	58.2

*Note: Total structure costs includes structure and demolition costs*

The total cost for Alternative 3, assuming programming structure 3A, is \$70.1 million (2015/2016 fiscal year), which includes \$16.0 million for roadway items, \$50.1 million for structures items, and \$4.0 million for right of way items. A cost estimate for Alternative 3 is included as Attachment E.

#### 6A4. FUTURE STUDIES - REHABILITATION

At a public informational meeting on May 7<sup>th</sup>, 2009 several of those attending indicated a preference for rehabilitating the existing structure on the current alignment rather than replacement on another alignment. At the next phase of the project the design team will review the feasibility, cost, and service life of rehabilitating the existing structure as compared to the cost constructing a new bridge. Non-redundancy of the existing structure will pose a challenge for the design team when reviewing the feasibility of rehabilitating the existing structure.

## **6A5. NO BUILD ALTERNATIVE**

The “no build” alternative was also considered, but did not meet the purpose and need of the project.

## **6B. DESIGN EXCEPTIONS**

The following mandatory design exceptions have been executed:

- Shoulder widths (DIB 79-03) between PM 43.3 and 44.2
- Stopping Sight Distance (Section 201.1 – Table 201.1) at PM 44.01/44.02 and 44.09/44.12

## **6C. AGENCY INVOLVEMENT**

Various permits and approvals will be necessary after Project Approval and Environmental Document (PA&ED), and will likely involve California Department of Fish and Game (1602 Streambed Alteration Agreement), U. S. Army Corps of Engineers (Section 404), California Regional Water Quality Control Board (Section 401), California State Coastal Commission Development Permit, and a Section 106 consultation with the State Historic Preservation Office. The County of Mendocino will need to be involved with the project as it relates to reconstruction and overlay of Albion River North Side Road and Albion Little River Road.

## **6D. HAZARDOUS WASTE**

A November 14, 2008 Initial Site Assessment (ISA) indicates that a Preliminary Site Investigation (PSI) including a structural survey will be required for the existing structure. See Attachment H for a copy of the ISA. It is estimated that it will take 3 to 5 months to complete the site investigation and prepare the final report. The final report should be completed during the PA&ED phase of the project.

## **6E. GEOTECHNICAL**

The Office of Geotechnical Design North evaluated the site conditions and geology on November 24, 2008, which included review of the As-Built Plans, Bridge Inspection Reports, available geologic literature mapping, the Geotechnical Design bridge file, and Log of Test Borings (LOTBs).

The site consists of sandstone, shale, and conglomerate sedimentary rocks. Ground water is expected to be at river level and may fluctuate due to seasonal fluctuations and tidal influence. The potential for surface rupture at the site due to fault movement of the controlling San Andreas/North fault, located about 5.7 miles

southwest of the site, is insignificant as there are no known faults projecting towards or passing directly through the project site. There is a moderate to high liquefaction potential in the upper loose granular layers during a seismic event. Peak Bedrock Acceleration is estimated at 0.5g. A future subsurface investigation will need to be performed prior to final seismic design recommendations, which should be requested by the Office of Bridge Design North during the PA&ED phase of the project.

#### **6E1. VERTICAL BRIDGE SUPPORT PILING RECOMMENDATIONS**

Cast-In Steel Shell (CISS) piles with rock sockets are preliminarily recommended for the bents/piers in deep alluvial/marine deposit areas. Cast-In Drill Hole (CIDH) piles at the bent/piers are primarily recommended in shallow soil areas. Driven pipe or H-piles may be preliminarily considered on slopes in deep soil areas.

#### **6E2. ARCHED BRIDGE SUPPORT PILING RECOMMENDATIONS**

Inclined mined shafts are preliminarily recommended as an alternate to support the arch span. For vertical supported spans with an arch span, the piles noted in section 6F1 are preliminarily recommended.

#### **6E3. ABUTMENT PILING RECOMMENDATIONS**

At the abutments for both structure types, 24-inch CIDH piles are preliminarily recommended in hard soil or shallow bedrock areas. Alternative W-pipe piles or H-piles may be used depending on the strength and depth of soils discovered during a subsequent subsurface investigation.

Final foundation recommendations for the bridge will require a field investigation. The bridge site for the proposed west-side alternatives locate new north abutments closer to active surficial sliding occurring on the west slope. A slope stability evaluation is recommended below the proposed bridge abutments.

#### **6F. DISPOSAL SITE AND IMPORTED BORROW DISPOSAL**

Material disposal is anticipated for all "build" alternatives. One optional disposal site that could be used for excess project material is the Beacon disposal site located on Route 1 at PM 33.8.

## **6G. HIGHWAY PLANTING**

The Landscape Architectural Assessment Sheet (LAAS) prepared for this project indicates that revegetation is required, and highway planting is not warranted (see Attachment I). The LAAS recommends highway aesthetic treatment and will require further evaluations during PA&ED.

## **6H. STORM WATER COMPLIANCE**

A Storm Water Data Report has been prepared for this project and is included in Attachment J. The disturbed areas will be primarily from the road access and construction equipment pad, excavation for bridge pier footings and abutments, removal of existing bridge pier footings and abutments, and roadway fill and excavation. This project is not located within an urban MS4 area.

The Albion River is 303(d) listed for sediment. The North Coast Regional Water Quality Control Board has jurisdiction in the project area. Given that the project will increase the impervious surface in the project area, treatment best management practices (BMPs) will be required to address pollutant loading and hydromodification. Environmental recommends that scuppers be eliminated from the bridge if at all possible, if not, the scuppers should drain to land rather than the active channel. Off site treatment could be required if treatment BMPs are not feasible on site. The need for additional Right of Way should be evaluated early during project development so that there is adequate space for incorporation of treatment BMPs. If Caltrans is unable to commit to placement of treatment BMPs during the PA/ED phase, the additional sources of polluted runoff should be identified as an impact that would require mitigation to a less than significant level. A water quality study should be prepared.

## **6I. PRELIMINARY FLOODPLAIN ANALYSIS**

On November 18, 2008, a Floodplain Analysis and Floodplain Evaluation Report Summary (FERS) was prepared for the proposed project. The project is located in FEMA Designated Zone A with a 1% annual chance of flooding except for the bridge abutments, which are located in Zone C, "Areas of minimal flooding".

The total increased impervious surface area within project limits ranges from 1.3 acres to 2.1 acres. The maximum increase of impervious surface area is 0.008% of the total Albion River watershed area. Thus, it is not anticipated that the project will impact the 100 year floodplain. Once the final bridge design is complete, further evaluation of the existing and proposed in-water structures should be performed to determine if the 100-year floodplain will be affected by the project.

**6J. RIGHT OF WAY**

A Right of Way Data Sheet was prepared for the project and is included in Attachment K. See Table 6.K.1 for a summary of Right of Way item costs for all “build” alternatives.

Right of Way Item	Right of Way Item Cost		
	Alternative 1	Alternative 2	Alternative 3
Acquisition (Including Excess Lands)	\$1,176,153	\$3,554,748	\$1,554,139
Mitigation Acquisition & Credits	\$2,416,814	\$2,417,460	\$2,417,460
Project Development Permit Fees	\$12,501	\$12,504	\$12,504
Utility Relocation (State Share)	0	0	0
Relocation Assistance (RAP)	0	\$3,473	0
Clearance/Demolition	0	\$27,787	0
Title and Escrow Fees	\$15,765	\$14,866	\$14,658
Construction Contract Work	0	0	0
<b>Total</b>	<b>\$3.6 million</b>	<b>\$6.1 million</b>	<b>\$4.0 million</b>

Demolition of the campground manager’s residential structure is necessary for an east-side alignment scenario. Relocation of the Albion River Campground manager will be required for Alternative 2.

Right of Way lead time will require a minimum of 17 months after submitting appraisal maps, utility conflict maps, and the necessary environmental clearance has been obtained. In addition, a minimum of 14 months will be required after submitting the last appraisal map for certification.

**6K. UTILITY INVOLVEMENT**

Overhead electrical and telephone lines/poles are in conflict with this project. Utility relocation will be required and the proposed location of utilities is alternative dependant. PG&E notes that acquisition of additional land rights will need to be executed for relocation of utility facilities. See Table 6.L.1 for a list of potential conflicting utilities for all “build” alternatives.

Type	PM	Offset	Alt 1	Alt 2	Alt 3
Lines/Pole	43.49	LT	X	X	X
Lines/Pole	43.56	LT	X	X	X
Lines/Pole	43.67	RT		X	X
Lines/Pole	43.70	RT		X	X
Lines/Pole	43.75	RT		X	
Lines/Pole	43.93	RT	X	X	X
Lines/Pole	43.95	RT	X	X	
Lines/Pole	43.99	RT	X	X	X
Lines/Pole	44.03	RT	X	X	X
Lines/Pole	44.07	RT	X	X	X
Lines/Pole	44.10	RT	X	X	X
Lines/Pole	44.13	RT	X	X	X

#### **6L. SALVAGING AND RECYCLING OF HARDWARE AND OTHER NON-RENEWABLE RESOURCES**

Measures to salvage and recycle materials will be determined during the PS&E phase of this project. Possible items for salvage include drainage grates, corrugated steel pipe (CSP), and metal beam guardrail (MBGR) materials.

#### **6M. RECYCLED MATERIALS**

No asphalt recycling is planned for this project. See Attachment G for a copy of the Preliminary Materials Recommendation.

#### **6N. CONSEQUENCES OF THE NO-BUILD OPTION**

In the event the “no-build” alternative is chosen the existing structure will continue to deteriorate and no geometric improvement would be made.

#### **6O. COMMUNITY INVOLVEMENT**

A public informational meeting was held on May 7, 2009 in the town of Mendocino, CA. Public comments from the meeting are summarized below.

The public wishes to keep the existing bridge for the following reasons: historical significance, for use as a pedestrian/bike facility, for possible incorporation into the California Coastal Trail, and for future train use. Some members of the public prefer to upgrade and rehabilitate the existing structure, which includes the following items: widen bridge to include pedestrian/bike facility and only replace the steel main span.

If replacement is necessary, the majority of the local community desires a west-side alternative to minimize visual impacts and impacts to residential property. The public prefers an arched structure type.

Locals are concerned that traffic handling could affect their mobility. The community suggested one-way traffic control should be maintained at all times or construction of a temporary detour bridge across the channel should be used during construction.

The community is concerned with the safety of the existing alignment and made the following comments: reduce the 50 mph speed limit, remove the south-facing 50 mph sign at PM 43.72, and relocate the 30 mph advisory sign on existing bridge at PM 43.82 to provide more advance notice of approaching curve.

## **7. TRAFFIC MANAGEMENT AND CONSTRUCTION STAGING**

A Transportation Management Plan [April 1, 2009 (TMP)] was prepared for this project. See Attachment L for a copy of the TMP. One-way traffic control shall be in accordance with the Caltrans Standard Plan T-13. The TMP indicates that a minimum 14-foot-wide roadway to accommodate vehicular traffic is required at all times. Bicycles shall be accommodated through the work zone by providing a 4-foot paved shoulder. The District Permits Engineer shall be notified by the Resident Engineer upon receipt of notice that the roadway width for direction of travel will be less than 16 feet.

Traffic control measures in the California Manual on Uniform Traffic Control Devices (MUTCD 6D) shall be incorporated to accommodate disabled pedestrians through the work zone. The maximum length of one-way traffic control closure is 2,500 feet.

The construction durations for Alternatives 1 (west) and 2 (east) are anticipated to be three seasons, which is comprised of two seasons for construction of the replacement structure and one season for demolition of the existing structure. The construction duration for Alternative 3 (west on existing alignment) is anticipated to be five seasons, which is comprised of two seasons for construction of half of the replacement structure, one season for demolition of the existing structure, and two seasons for construction of the remaining half of the replacement structure. Three seasons of one-way traffic control is anticipated for Alternative 3.

## **8. ENVIRONMENTAL DETERMINATION/DOCUMENT**

In order to identify environmental issues, constraints, costs and resource needs, a Preliminary Environmental Analysis Report (PEAR) was prepared for the project (see Attachment M for a copy). Preliminary studies consisted of field surveys and a review of records and databases. Based on current information, it is anticipated that the environmental document is an Initial Study/Negative Declaration pursuant to the California Environmental Quality Act (CEQA) and a Routine Environmental

Assessment/Finding of No Significant Impact (FONSI) pursuant to the National Environmental Policy Act (NEPA).

### **8A1. CULTURAL RESOURCES**

The area has a high sensitivity for archaeological resources. If it is determined that buried cultural resources are likely; a phase II evaluation is required, which would take between 18 months to three years. A Phase III data recovery will be required before construction.

All of the alternatives will impact the historic bridge. A “finding of effects” document will be submitted to the State Historic Preservation Office (SHPO) This will require consultation with the SHPO, which could take from one to two years. The possible need for a Memorandum of Agreement could add from 12 to 18 months. Since the bridge is historic, it is a 4(f) resource. A 4(f) evaluation and coordination with the SHPO is required, which could take from 12 to 18 months.

### **8A2. NATURAL RESOURCES**

Field survey schedules to identify special status plants should be determined based on the known blooming periods of these species. Surveys to determine the presence of nesting birds and bats should be conducted during the nesting season (February 15 through August 31). Section 7 consultation is required for federally Threatened and Endangered species, consultation could take up to one year or more to complete.

The delineation of wetlands and other waters should be conducted in the spring. Additionally, impacts to the jurisdictional wetlands or waters of the U.S. existing within the project area will need to be quantified and a Wetland Delineation Report will need to be prepared. Permits from the U.S. Army Corps of Engineers and the Regional Water Quality Control Board will be required for any impacts to jurisdictional areas. It is anticipated that these permits will take 9-16 months to obtain.

The delineation of coastal wetlands should be conducted in the spring concurrently with the delineation of wetlands and waters of the U.S. These impacts will need to be quantified and addressed in the California Coastal Development Permit. Additional mitigation may be required under the California Coastal Act.

### **8A3. NATURAL RESOURCES**

The visual quality along the existing alignment is highly scenic and the final project design should minimize the effect on the visual setting. This section of

Route 1 has been found 'Eligible' for scenic highway designation on the California Scenic Highway System.

#### **8A4. PERMITS TO ENTER**

Permission to enter properties will be necessary.

### **9. FUNDING**

#### **9A. COST ESTIMATE**

It is proposed that this project be funded from the 210.110 Bridge Rehabilitation Program in the 2010 SHOPP cycle as a long lead project. Additional alternatives may be added in the next phase of the project, and no alternative has been selected. However, Alternative 1 (west) incorporating structure type 1A will be used for programming purposes. A cost estimate for each alternative is included as Attachment E.

#### **9B. PROJECT SUPPORT**

A Programming Sheet has been prepared for this project and is included as Attachment N.

#### **9C. PROJECT SCHEDULE**

<b>HQ Milestones</b>	<b>Delivery Date</b>
Begin Environmental	10/01/10
Circulate DED	10/01/13
PA & ED	02/01/14
Project PS&E	12/01/15
Right of Way Certification	04/01/16
Ready to List	04/15/16
Approve Contract	10/01/16
Contract Acceptance	11/01/19
End Project	11/01/19

### **10. FHWA COORDINATION**

No FHWA action is required for this project.

### **11. VALUE ANALYSIS**

Since the construction plus support cost for this project exceeds \$25 million, a Value Analysis will need to be performed for this project during the PA&ED phase

## Memorandum

*Flex your power!  
Be energy efficient!*

**To:** LENA ASHLEY  
OFFICE OF DESIGN NORTH  
DESIGN BRANCH E-3  
EUREKA

**Date:** May 21, 2013

**File:** 01-MEN-1-43.3/44.1  
01-401101  
Albion River Br. #10-0136  
Bridge Replacement

**From:** JEFF SIMS *CSJ 5/21/2013*  
Bridge Design Branch 1  
Structure Design  
Division of Engineering Services MS 9-4/81

**Subject:** Advance Planning Study Pricing Update

Attached is the Advance Planning Study pricing update for the Albion River Bridge replacement alternatives that were studied in 2009 (see the APS Transmittal memo from Jeff Sims to Ilene Poindexter dated April 27, 2009).

The estimated construction costs, including 10% mobilization and 25% contingencies, for the Albion River Bridge replacement alternatives are as follows:

<u>Bridge Alternative</u>	<u>Estimated Cost</u>	<u>Estimated Working Days</u>
1A	\$29,058,000	240
1B	\$45,629,000	260
1C	\$25,463,000	240
1D	\$33,172,000	250
2A	\$27,869,000	260
2B	\$43,727,000	280
3A	\$35,272,000	510
3B	\$44,474,000	550

The estimated costs above do not include the cost of removing the existing bridge, which is estimated at \$1,230,700.

The estimated costs above also do not include the cost of temporary railing.

The following table summarizes the projected total structure cost based on a variable escalation rate. The escalated structure cost is provided for informational purposes only and does not replace annual cost updates as required by Department policy.

Years Beyond Midpoint	Escalated Cost Alt. 1A	Escalated Cost Alt. 1B	Escalated Cost Alt. 1C	Escalated Cost Alt. 1D	Escalated Cost Alt. 2A	Escalated Cost Alt. 2B	Escalated Cost Alt. 3A	Escalated Cost Alt. 3B
1	\$29,058,000	\$45,629,000	\$25,463,000	\$33,172,000	\$27,869,000	\$43,727,000	\$35,272,000	\$44,474,000
2	\$29,610,000	\$46,496,000	\$25,947,000	\$33,802,000	\$28,399,000	\$44,558,000	\$35,942,000	\$45,319,000
3	\$30,409,000	\$47,751,000	\$26,648,000	\$34,715,000	\$29,166,000	\$45,761,000	\$36,912,000	\$46,543,000
4	\$31,352,000	\$49,231,000	\$27,474,000	\$35,791,000	\$30,070,000	\$47,180,000	\$38,056,000	\$47,986,000
5	\$32,167,000	\$50,511,000	\$28,188,000	\$36,722,000	\$30,852,000	\$48,407,000	\$39,045,000	\$49,234,000

This Advance Planning Study and associated cost estimate is based on the following assumptions:

1. Abutments are supported on multiple 24”diameter cast-in-drilled-hole (CIDH) concrete piles (service state compression = 90 kip/pile, Length = 60 ft/pile)
2. Pier footings are supported on multiple 36”diameter cast-in-steel Shell (CISS) concrete piles (service state compression = 400 kip/pile, Length = 100 ft/pile) for the box girder options on alternatives 1 & 2, and 5’-0” diameter CISS concrete piles (service state compression = 3600 kip/pile) for alternative 3A.
3. For the arch bridge options, the foundation rock voids and fracture density are assumed to be low enough that ground water can be controlled in the mined shaft excavations. Further exploration will be required by Geotechnical Services to determine if this assumption is valid.
4. The deck drainage between the ST-10 traffic barriers is carried in pipes with assumed outlet locations shown on the plan sheets. Drainage of the sidewalk area is assumed to be by scuppers on the left sidewalk and drop-through drains on the right sidewalk. On the two segmental bridge alternatives (Alt 1B and Alt 2B) the only locations where deck drains can fit are at the closures and end portion of span 3 that is cast on falsework. On alternative 1B we were unable to keep the drainage flow from encroaching approximately 6 inches into the lane. If this is not acceptable, possible solutions could be to use scuppers, change the profile grade, or use a wider shoulder.
5. The working day estimates are considered to be a preliminary level of accuracy and without regard to specific information related to construction scheduling, procurement of material, permits, environmental constraints, or specific seasonal work. Standard 8 hours/day, and 5-day weeks are assumed.

LENA ASHLEY - Design North

5/21/13

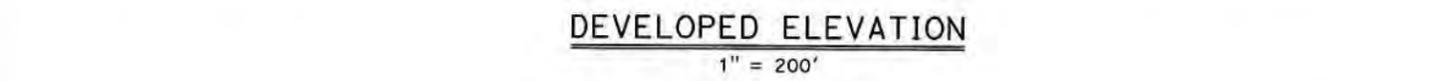
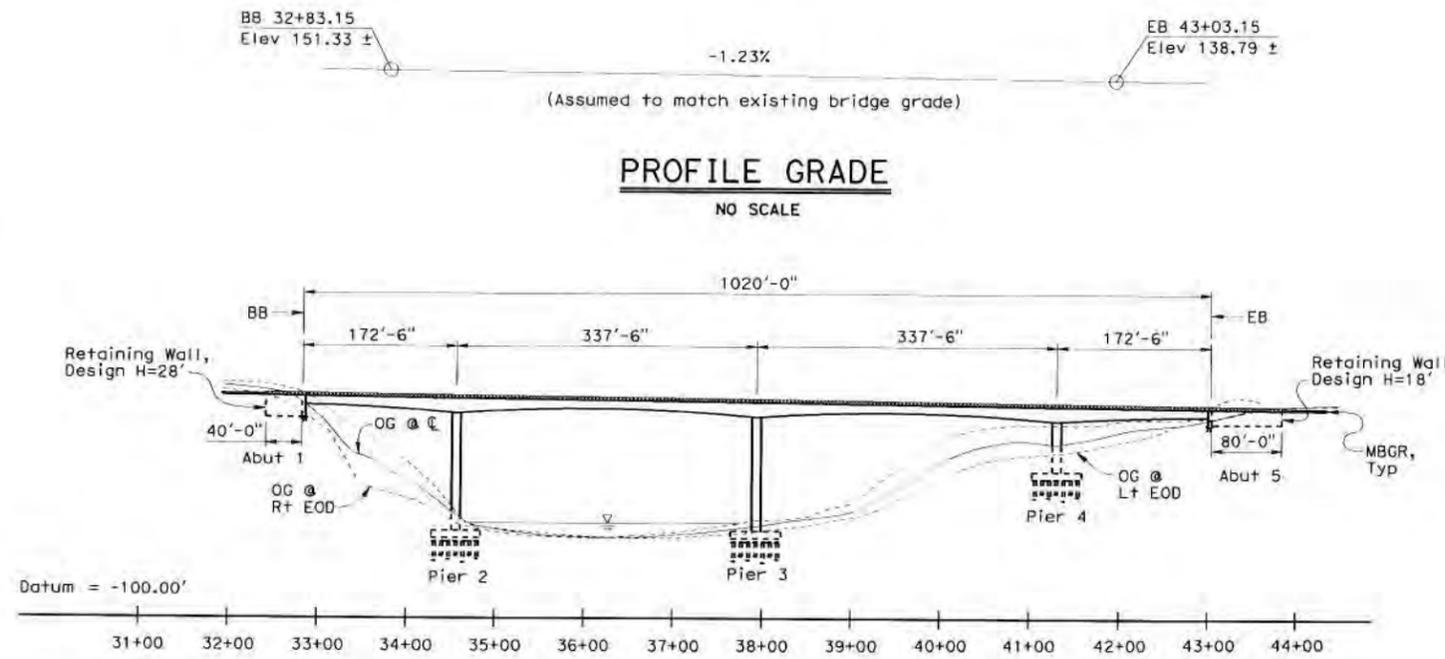
Page 3

If you have any questions or if you need additional information regarding this study, please contact Kevin Harper at (916) 227-8156 or Jeff Sims at (916) 227- 8497.

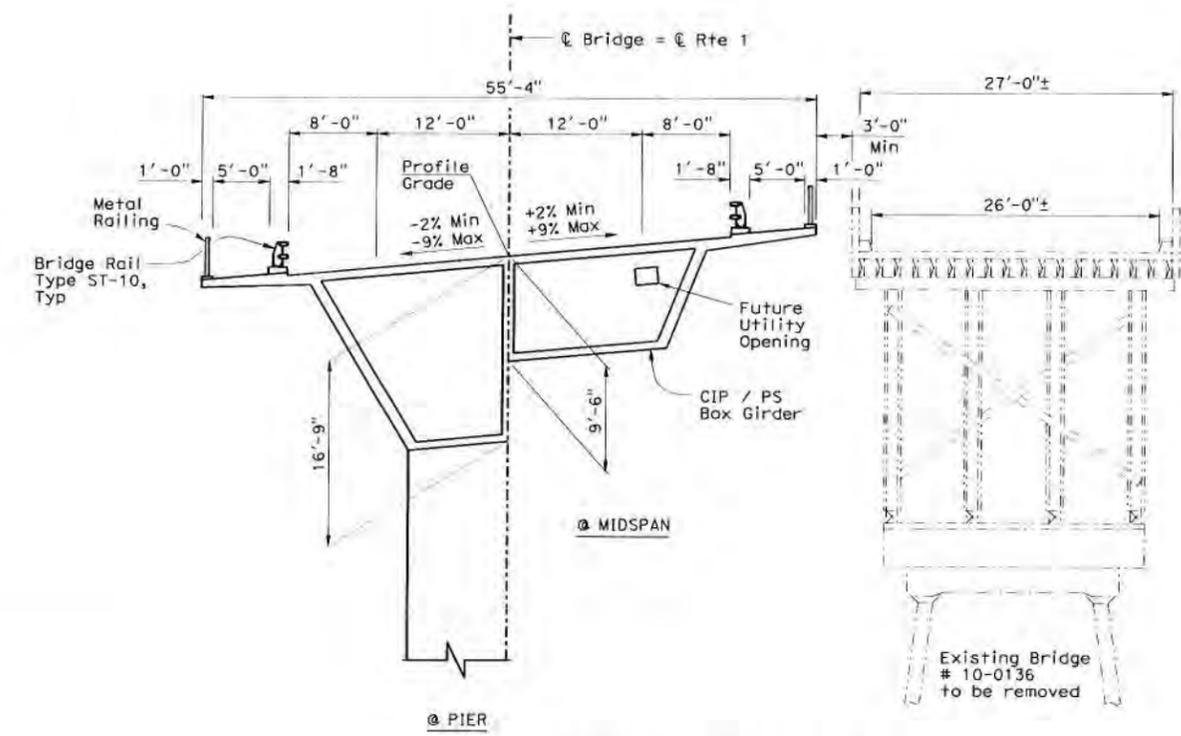
#### Attachments

- c: ETaddese, Project Liason Engineer MS 9-5/11G
- EKurani, Bridge Design Office Chief MS 9-4/11G
- MAMini, Technical Liaison Engineer MS 9-1/5C FM2
- JChavez, Structure Aesthetics Branch Chief MS 9-3/1H
- PWhitfield, Structure Maintenance & Investigations MS 9-1/9I
- KWall, HA21 Program Coordinator MS 9-1/9I
- JBabcock, Structure Construction MS 9-2/11H
- RBibbens, Geotechnical Services MS 5
- SNG, Structure Hydraulics & Hydrology MS 9-1/2I

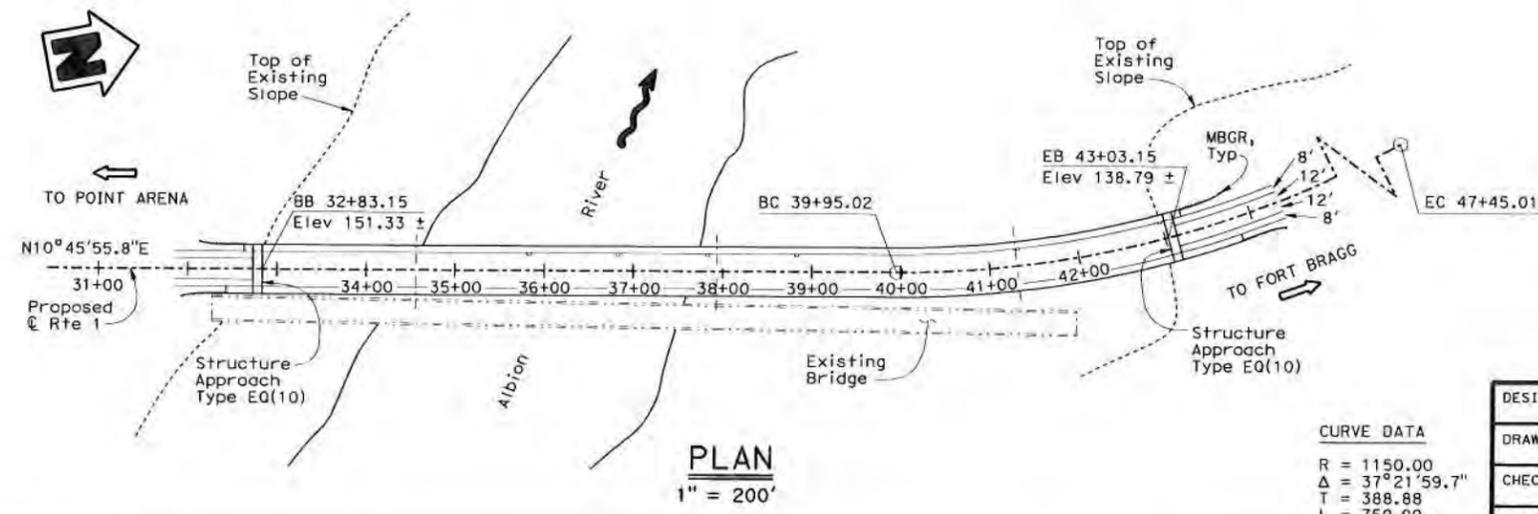
DIST.	COUNTY	ROUTE	POST MILE
01	MEN	1	43.74
To get to the Caltrans web site, go to: <a href="http://www.dot.ca.gov">http://www.dot.ca.gov</a>			



- Notes:**
- 24" CIDH Piles, 60 ft (45 ton) assumed @ Abutments
  - 36" CISS Piles, 100 ft (200 ton) assumed @ Piers
  - Traveled way deck drainage carried through Abutment 5. Sidewalk drainage utilizes scuppers and drop-through Drains
  - Seal course concrete and Type A Excavation assumed @ Piers 2 & 3
- Legend:**
- Indicates Existing Structure
  - Indicates Deck Drain Type D-3 (traveled way drainage system)



TYPICAL SECTION  
1/16" = 1'-0"



**CURVE DATA**

R = 1150.00  
 Δ = 37° 21' 59.7"  
 T = 388.88  
 L = 750.00

Date of Estimate: 4-27-09 5-17-13

Str. Depth: Varies

Length: 1020 ft

Width: 55'-4"

Area: 56,440 ft<sup>2</sup>

Cost/sq ft including 10% Mobilization & 25% Contingency: \$545/sq ft

Total Cost: \$30,747,400

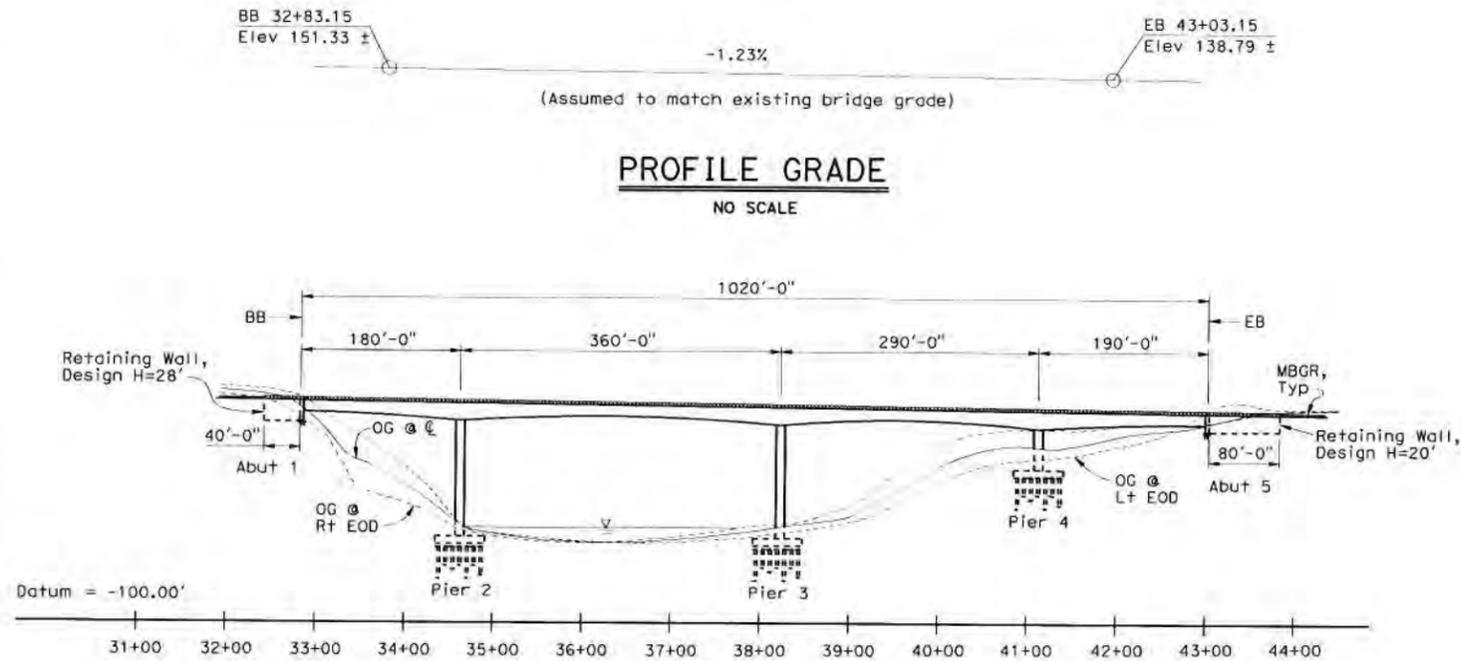
DESIGNED BY	Daniel Sessions	DATE	12/30/08
DRAWN BY	Bob Huddleston	DATE	12/30/08
CHECKED BY	Kevin Harper	DATE	2/4/09
APPROVED	Jeff Sims	DATE	2/4/09

**STRUCTURE DESIGN BRANCH 1**

<b>ALTERNATIVE 1A</b>	
<b>PLANNING STUDY</b>	
<b>ALBION RIVER BR (REPLACE)</b>	
BRIDGE NO. 10-136	CU 01
SCALE: AS SHOWN	EA 40110K

DIST.	COUNTY	ROUTE	POST MILE
01	MEN	1	43.74

To get to the Caltrans web site, go to: <http://www.dot.ca.gov>

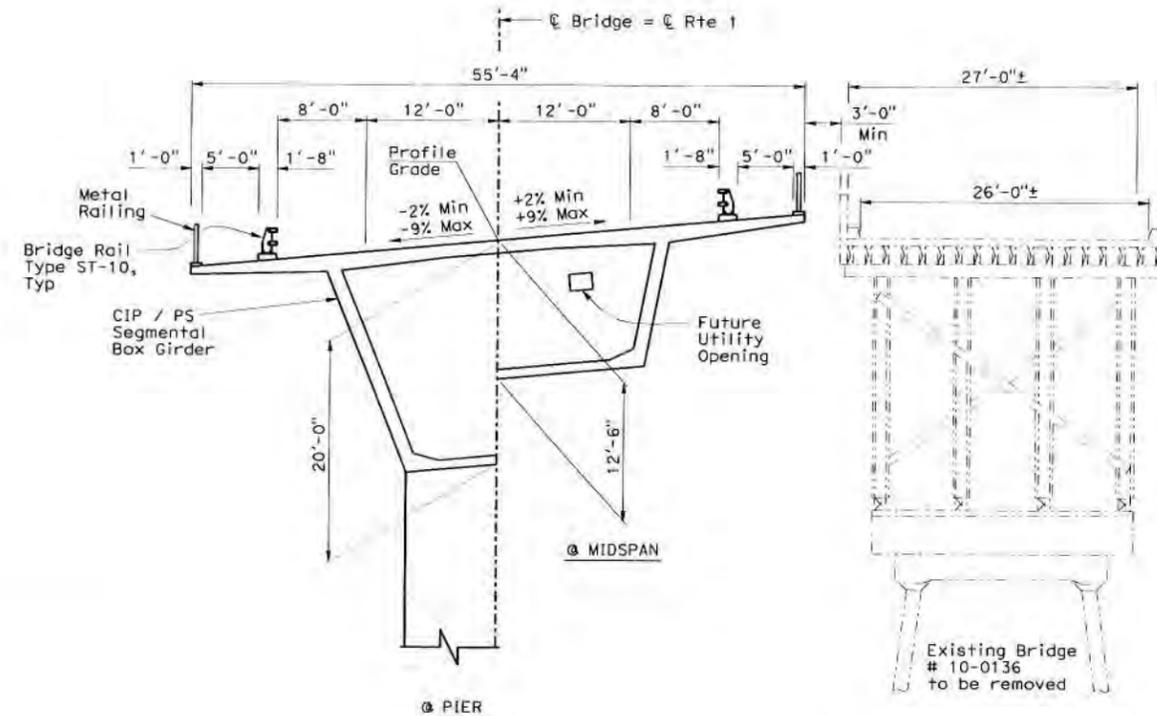


Notes:

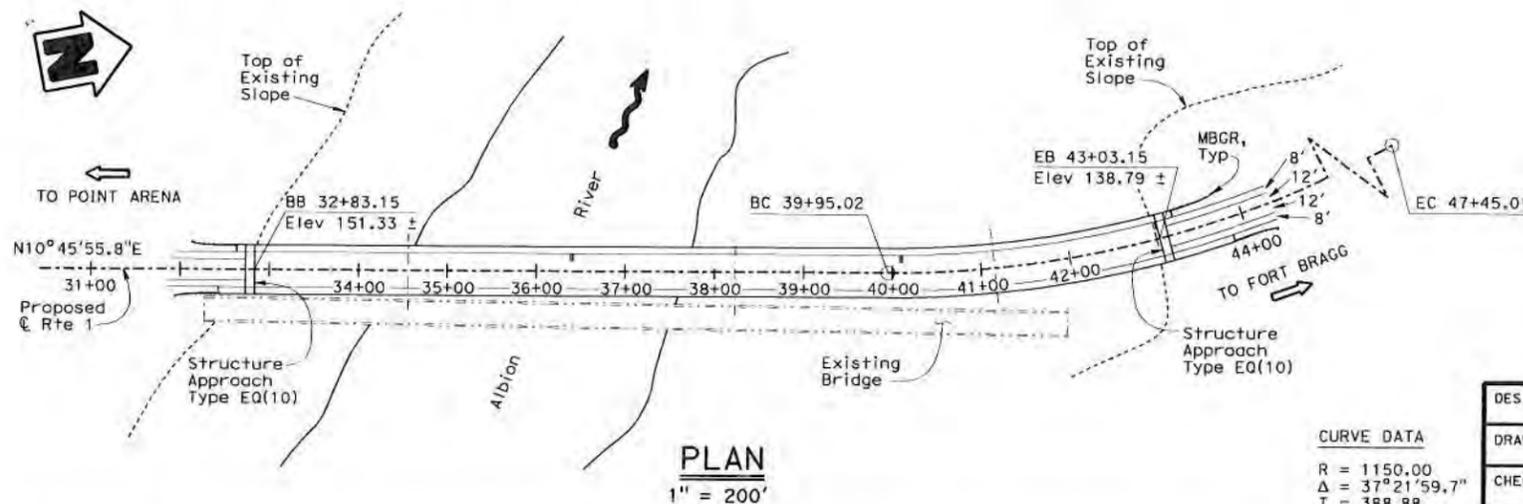
- 24" CIDH Piles, 60 ft (45 ton) assumed @ Abutments
- 36" CISS Piles, 100 ft (200 ton) assumed @ Piers
- Bridge assumed to be constructed segmentally by the balanced cantilever method
- Traveled way deck drainage carried through Abutment 5 (drainage flow encroaches 6" into lane). Sidewalk drainage utilizes scuppers and drop-through drains
- Seal course concrete and Type A Excavation assumed @ Piers 2 & 3

Legend:

- Indicates Existing Structure
- ⊥ Indicates Deck Drain, Type C (traveled way drainage system)



TYPICAL SECTION  
1/16" = 1'-0"



CURVE DATA

R = 1150.00
Δ = 37°21'59.7"
T = 388.88
L = 750.00

Date of Estimate	4-27-09, 5-17-13
Str. Depth	Varies
Length	= 1020 ft
Width	= 55'-4"
Area	= 56,440 ft <sup>2</sup>
Cost/sq ft including	4808/sq ft
10% Mobilization &	8758/cbft
25% Contingency	445,629,000
Total Cost	445,629,000

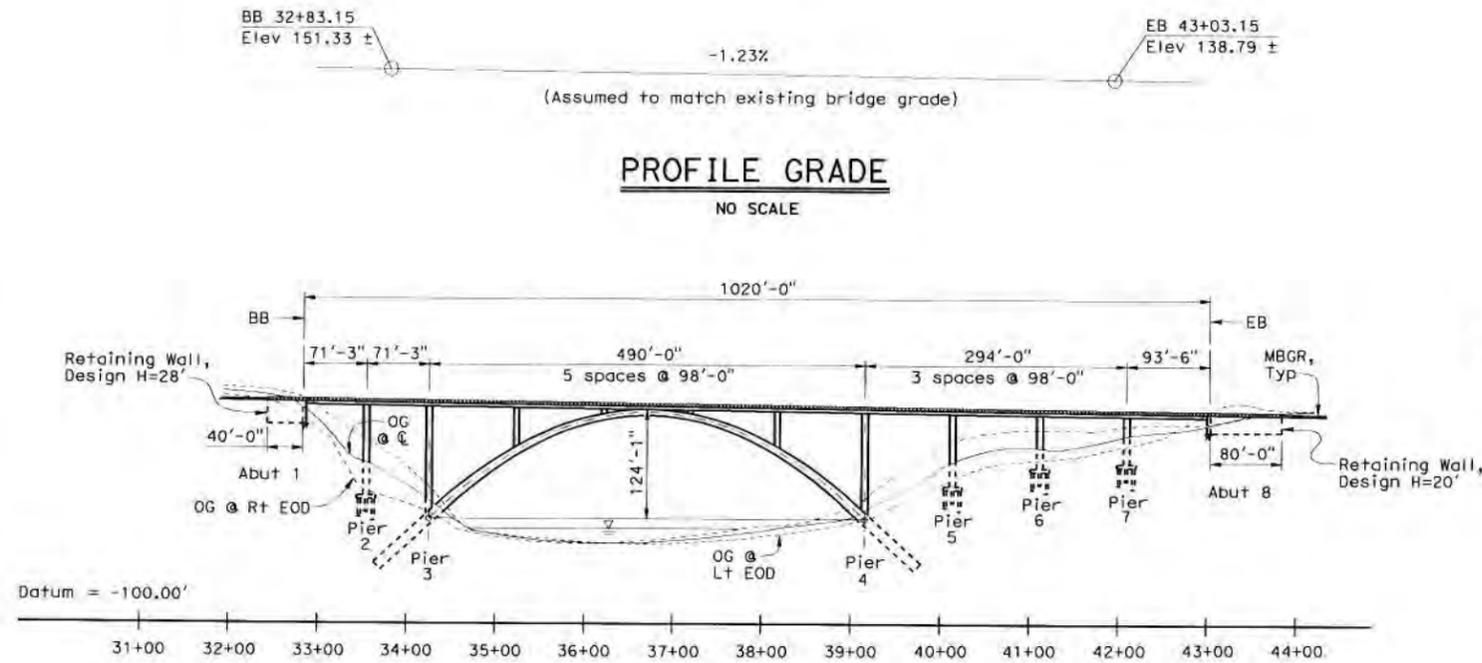
DESIGNED BY	Daniel Sessions	DATE	12/30/08
DRAWN BY	Bob Huddleston	DATE	1/6/09
CHECKED BY	Kevin Harper	DATE	2/4/09
APPROVED	Jeff Sims	DATE	2/4/09

**STRUCTURE DESIGN BRANCH 1**

ALTERNATIVE 1B	
PLANNING STUDY	
ALBION RIVER BR (REPLACE)	
BRIDGE NO. 10-136	CU 01
SCALE: AS SHOWN	EA 40110K

DIST	COUNTY	ROUTE	POST MILE
01	MEN	1	43.74

To get to the Caltrans web site, go to: <http://www.dot.ca.gov>

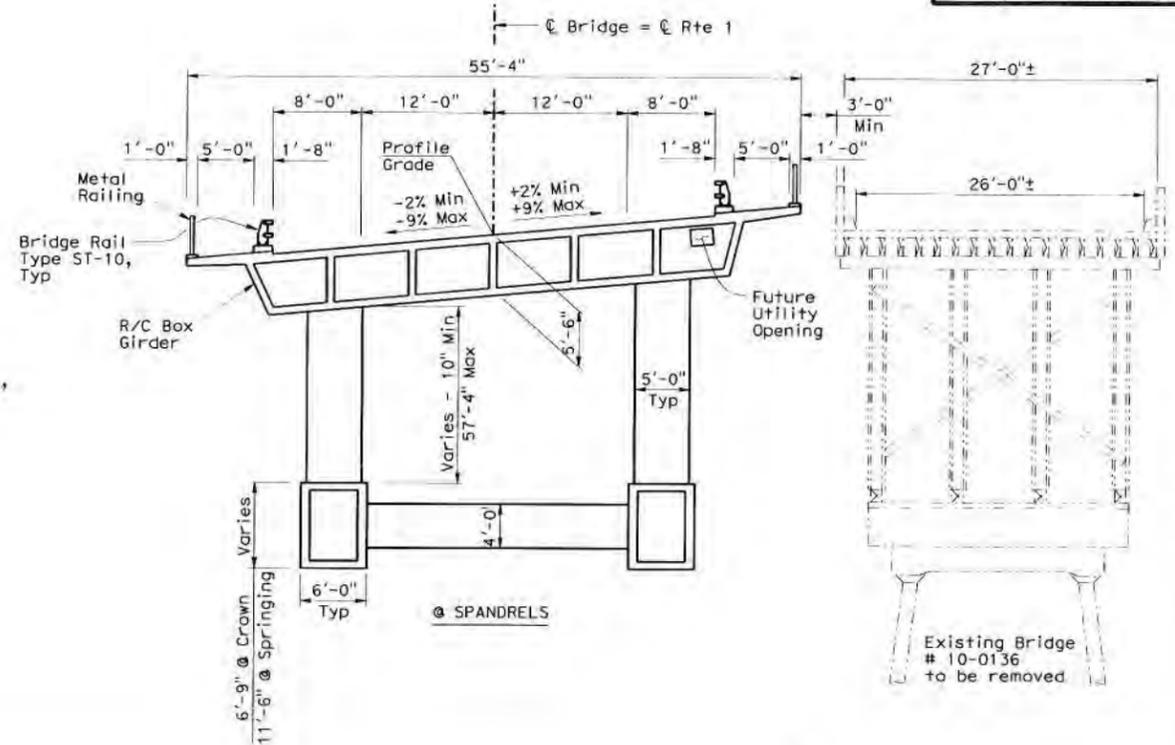


Notes:

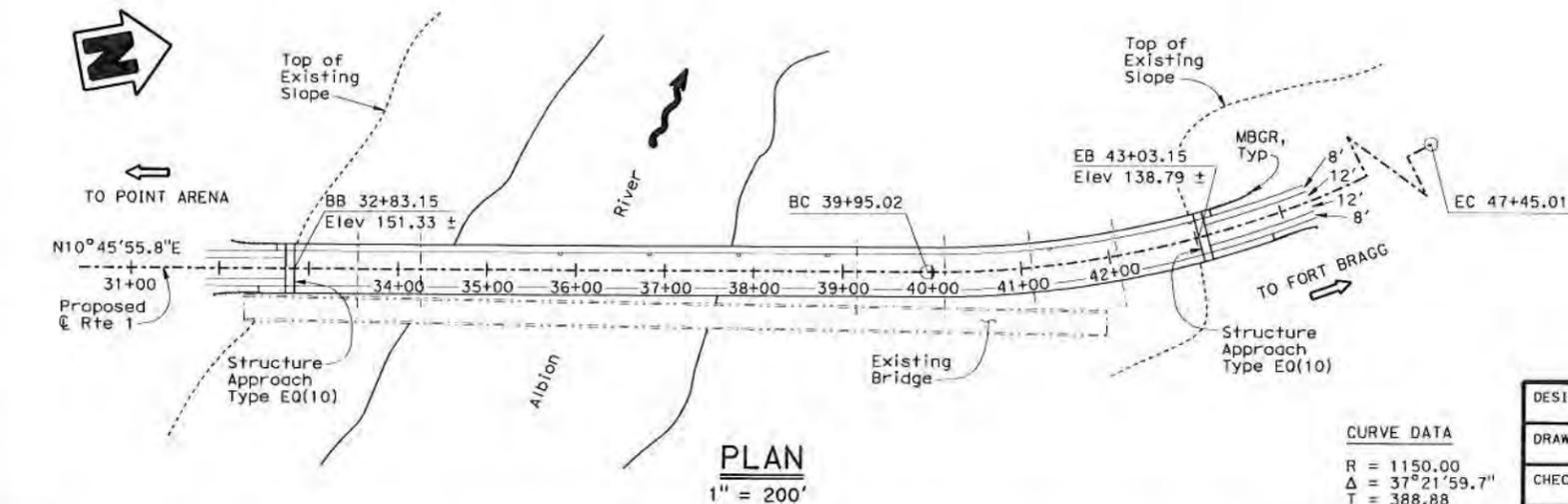
- 24" CIDH Piles, 60 ft (45 ton) assumed @ Abutments
- 36" CISS Piles, 100 ft (200 ton) assumed @ Piers
- Rock voids and fracture density assumed to be low enough that ground water can be controlled at the arch mined shaft foundations.
- Traveled way deck drainage carried through Pier 5 & Abutment 8. Sidewalk drainage utilizes scuppers and drop-through Drains

Legend:

- Indicates Existing Structure
- Indicates Deck Drain Type D-3 (traveled way drainage system)



TYPICAL SECTION  
1/16" = 1'-0"



CURVE DATA

R = 1150.00
Δ = 37°21'59.7"
T = 388.88
L = 750.00

DESIGNED BY Daniel Sessions	DATE 12/30/08
DRAWN BY Bob Huddleston	DATE 1/7/09
CHECKED BY Kevin Harper	DATE 2/4/09
APPROVED Jeff Sims	DATE 2/4/09

**STRUCTURE DESIGN BRANCH 1**

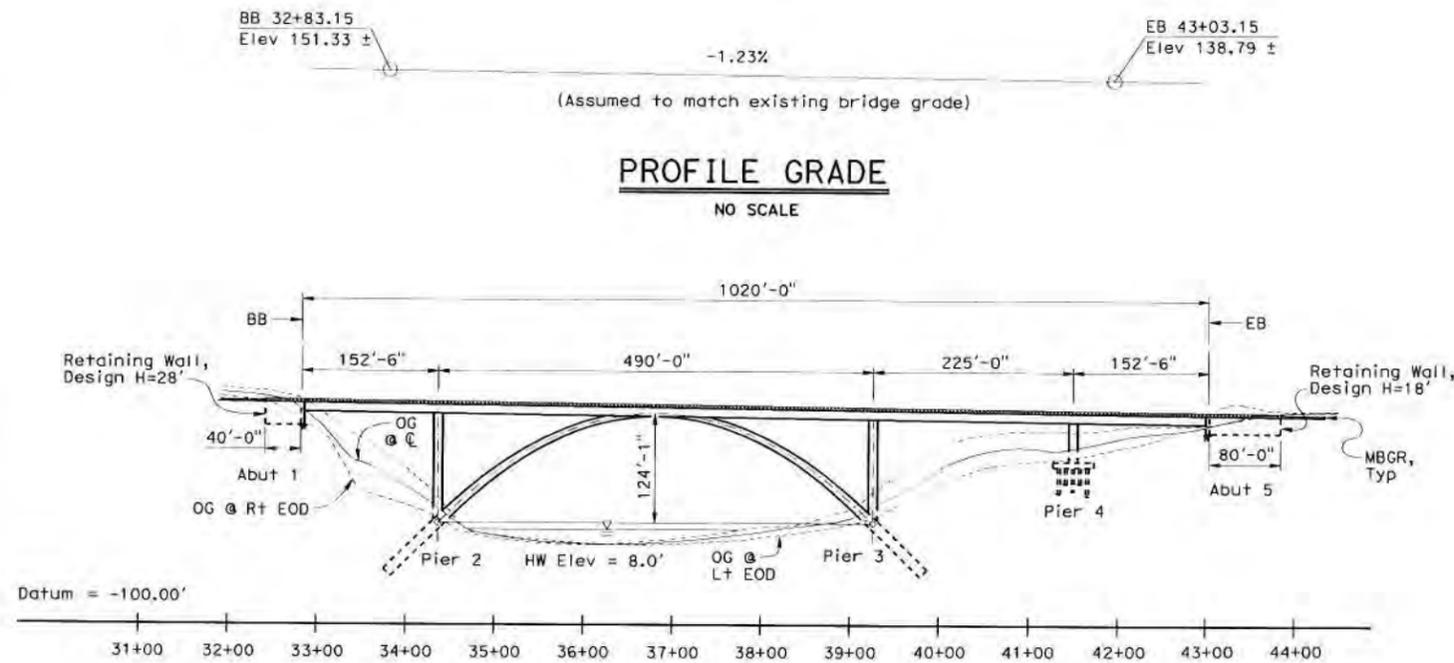
5-17-13

Date of Estimate	4-27-09
Str. Depth	Box = 5.5 ft, Arch = 6.75 to 11.5 ft
Length	1020 ft
Width	55'-4"
Area	56,440 ft <sup>2</sup>
Cost/sq ft including	451/sq ft
10% Mobilization &	4459/sq ft
25% Contingency	425,414,800
Total Cost	425,463,000

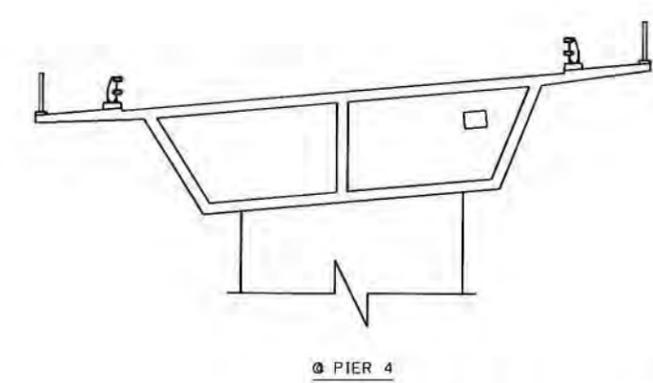
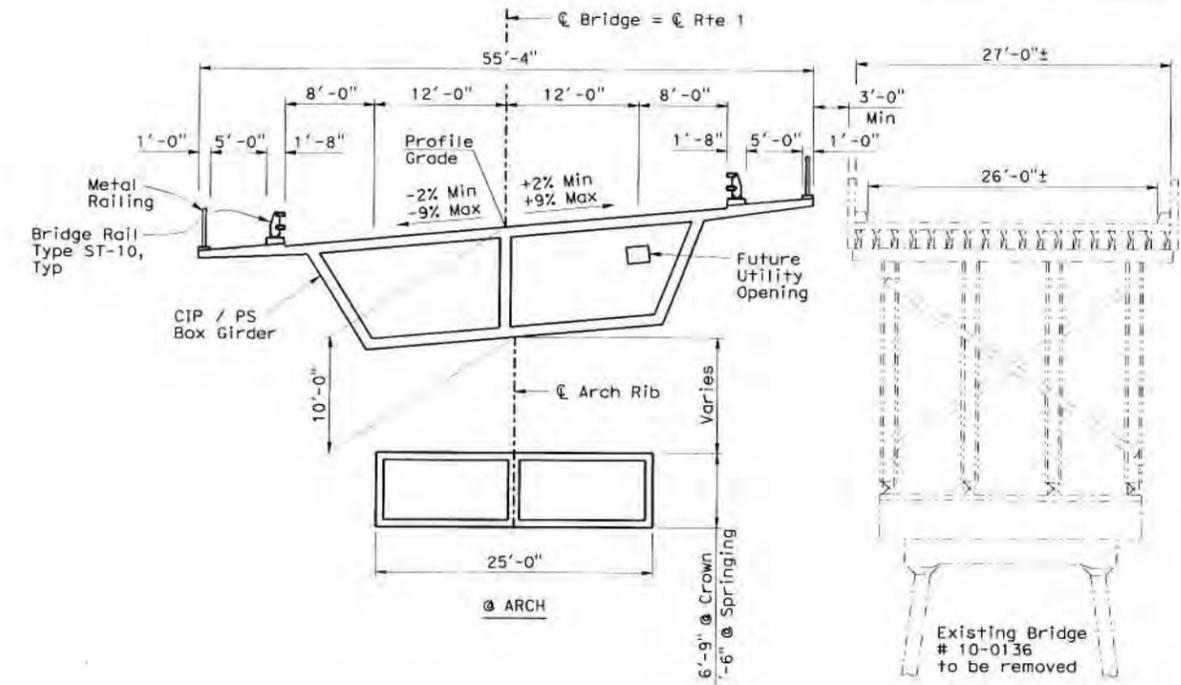
ALTERNATIVE 1C	
PLANNING STUDY	
ALBION RIVER BR (REPLACE)	
BRIDGE NO. 10-136	CU 01
SCALE: AS SHOWN	EA 40110K

DIST.	COUNTY	ROUTE	POST MILE
01	MEN	1	43.74

To get to the Caltrans web site, go to: <http://www.dot.ca.gov>



- Notes:
- 24" CIDH Piles, 60 ft (45 ton) assumed @ Abutments
  - 36" CISS Piles, 100 ft (200 ton) assumed @ Piers
  - Traveled way deck drainage carried through Abutment 5. Sidewalk drainage utilizes scuppers and drop-through Drains
  - Rock voids and fracture density assumed to be low enough that ground water can be controlled at the arch mined shaft foundations
- Legend:
- Indicates Existing Structure
  - Indicates Deck Drain Type D-3 (traveled way drainage system)



TYPICAL SECTION  
1/16" = 1'-0"

5-17-13

Date of Estimate: 4-27-09

Str. Depth: Box = 10.0 ft, Arch = 6.75 to 11.5 ft

Length: 1020 ft

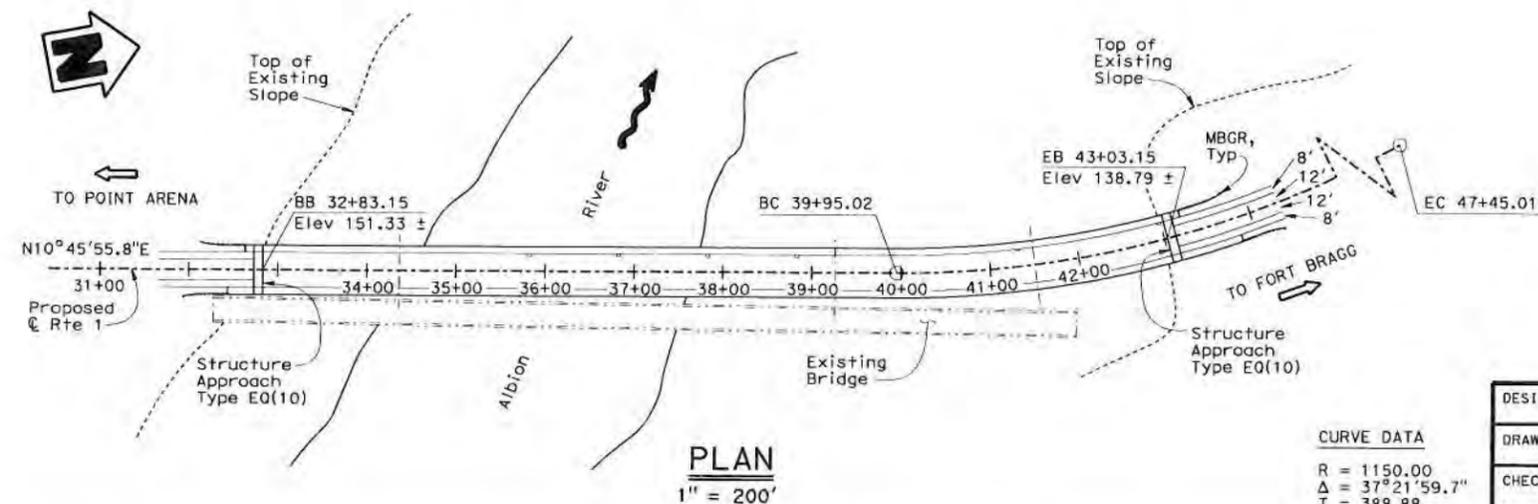
Width: 55'-4"

Area: 56,440 ft<sup>2</sup>

Cost/sq ft including: \$588/sq ft

10% Mobilization & 25% Contingency: \$591/sq ft

Total Cost: \$33,172,000



CURVE DATA

R = 1150.00

Δ = 37°21'59.7"

T = 388.88

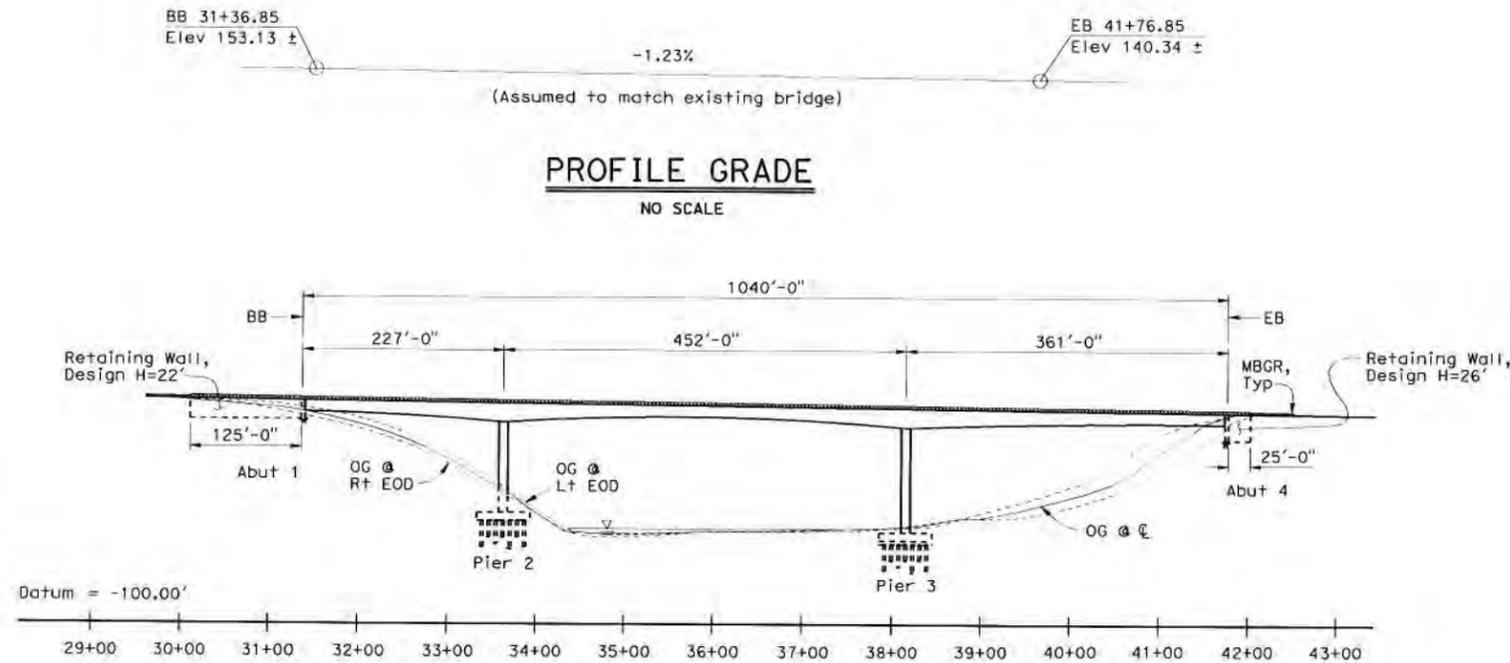
L = 750.00

DESIGNED BY	Daniel Sessions	DATE	12/30/08
DRAWN BY	Bob Huddleston	DATE	1/8/09
CHECKED BY	Kevin Harper	DATE	2/4/09
APPROVED	Jeff Sims	DATE	2/4/09

STRUCTURE DESIGN BRANCH 1

ALTERNATIVE 1D	
PLANNING STUDY	
ALBION RIVER BR (REPLACE)	
BRIDGE NO. 10-136	CU 01
SCALE: AS SHOWN	EA 40110K

DIST.	COUNTY	ROUTE	POST MILE
01	MEN	1	43.74
To get to the Caltrans web site, go to: <a href="http://www.dot.ca.gov">http://www.dot.ca.gov</a>			



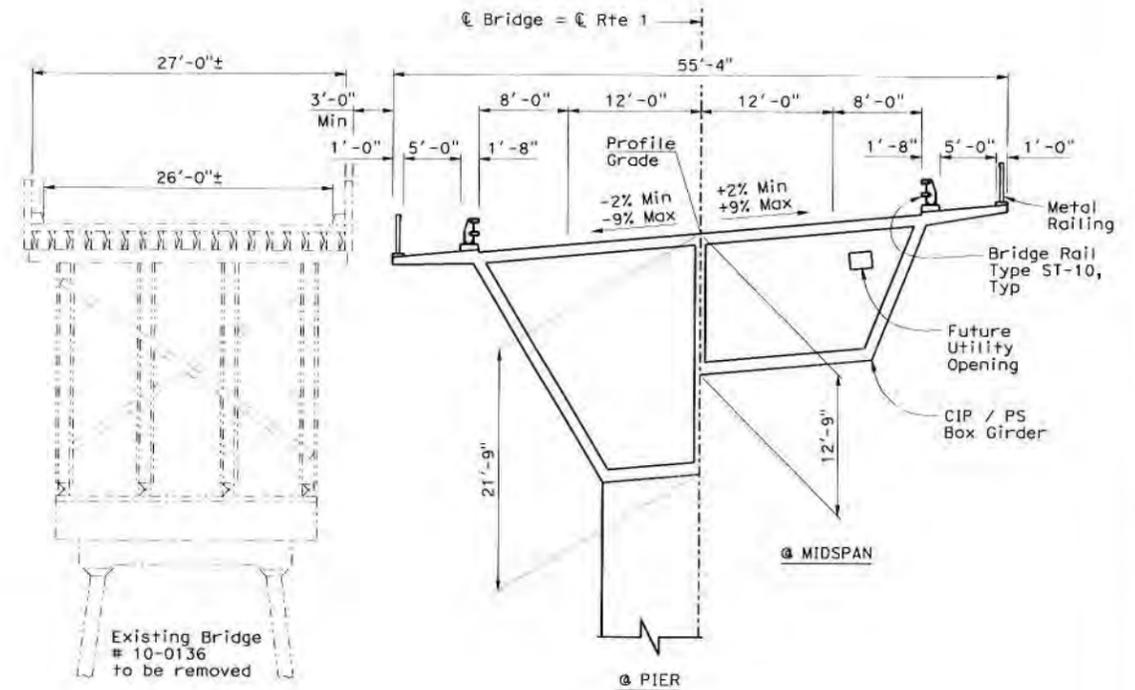
**DEVELOPED ELEVATION**  
1" = 200'

**Notes:**

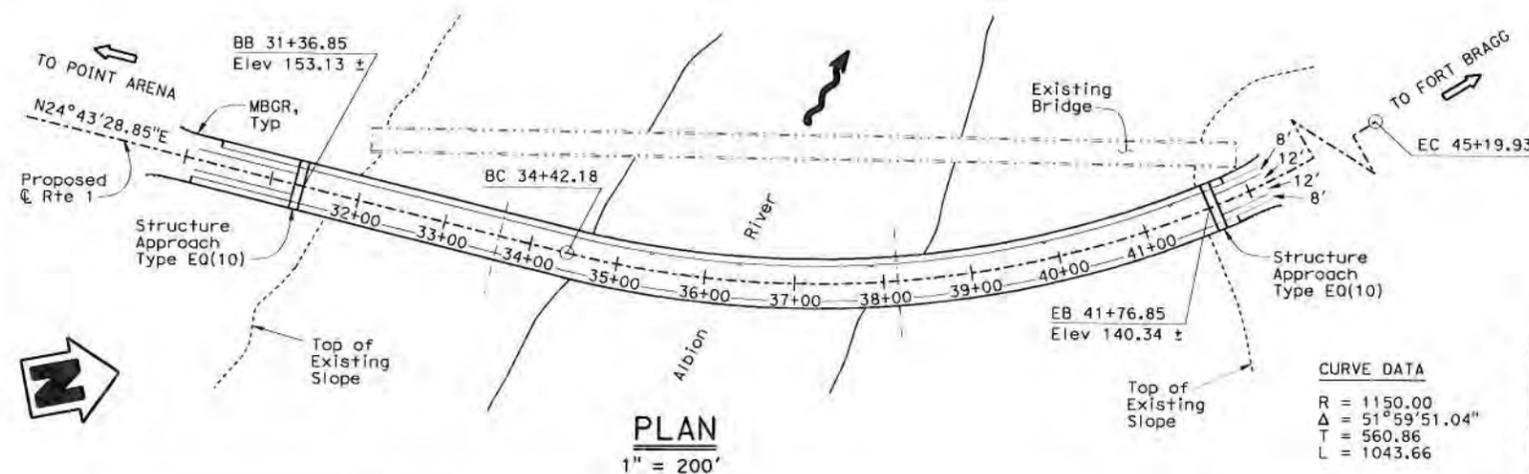
- 24" CIDH Piles, 60 ft (45 ton) assumed @ Abutments
- 36" CISS Piles, 100 ft (200 ton) assumed @ Piers
- Traveled way deck drainage carried through Abutment 4. Sidewalk drainage utilizes scuppers and drop-through Drains
- Type D Excavation assumed @ Pier 2
- Seal Course concrete and Type A Excavation assumed @ Pier 3

**Legend:**

- Indicates Existing Structure
- - - Indicates Deck Drain Type D-3 (traveled way drainage system)



**TYPICAL SECTION**  
1/16" = 1'-0"



**CURVE DATA**

R = 1150.00
Δ = 51°59'51.04"
T = 560.86
L = 1043.66

Date of Estimate	4-27-09
Str. Depth	Varies
Length	1040 ft
Width	55'-4"
Area	57,547 ft <sup>2</sup>
Cost/sq ft including 10% Mobilization & 25% Contingency	\$ 458 / sq ft # 484 / sq ft
Total Cost	\$ 26,378,000
	\$ 27,869,000

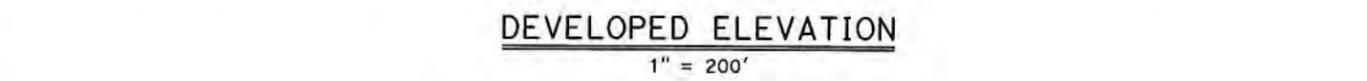
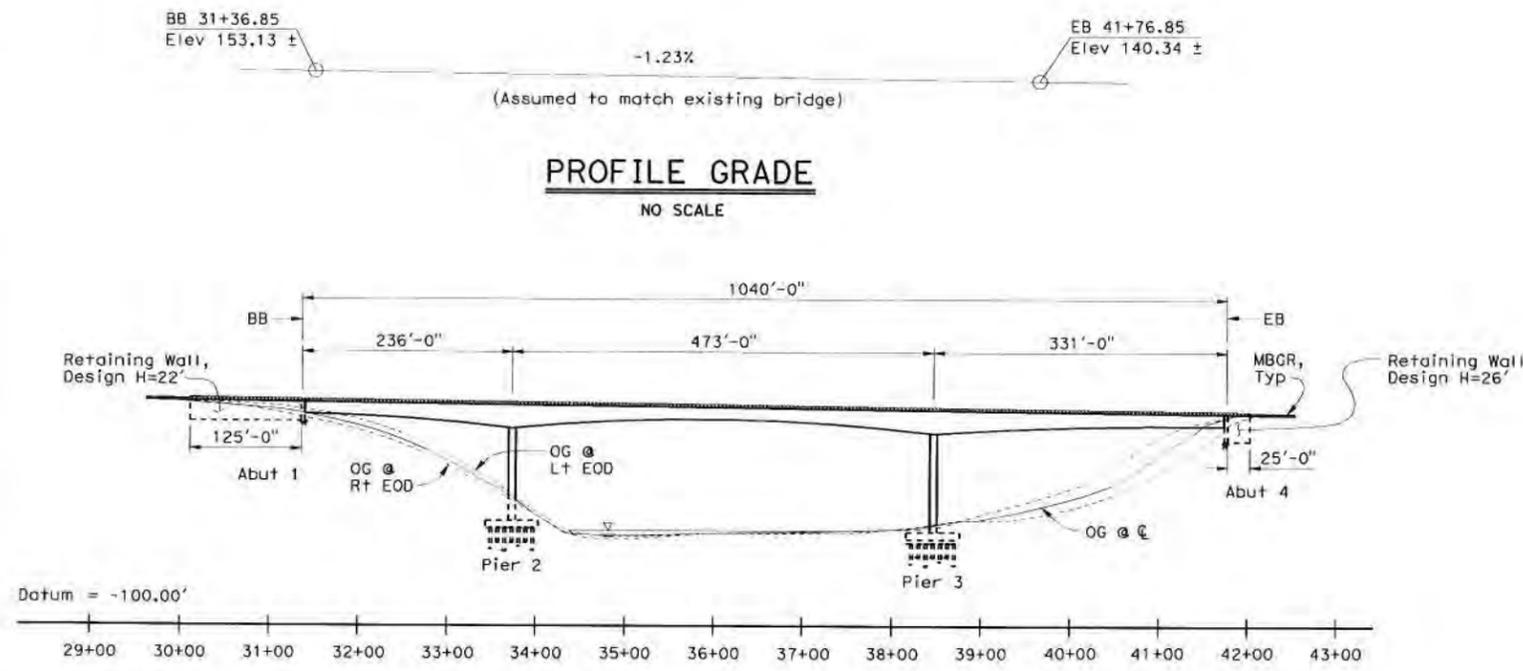
DESIGNED BY	Daniel Sessions	DATE	12/30/08
DRAWN BY	Bob Huddleston	DATE	1/26/09
CHECKED BY	Kevin Harper	DATE	2/4/09
APPROVED	Jeff Sims	DATE	2/4/09

**STRUCTURE DESIGN BRANCH 1**

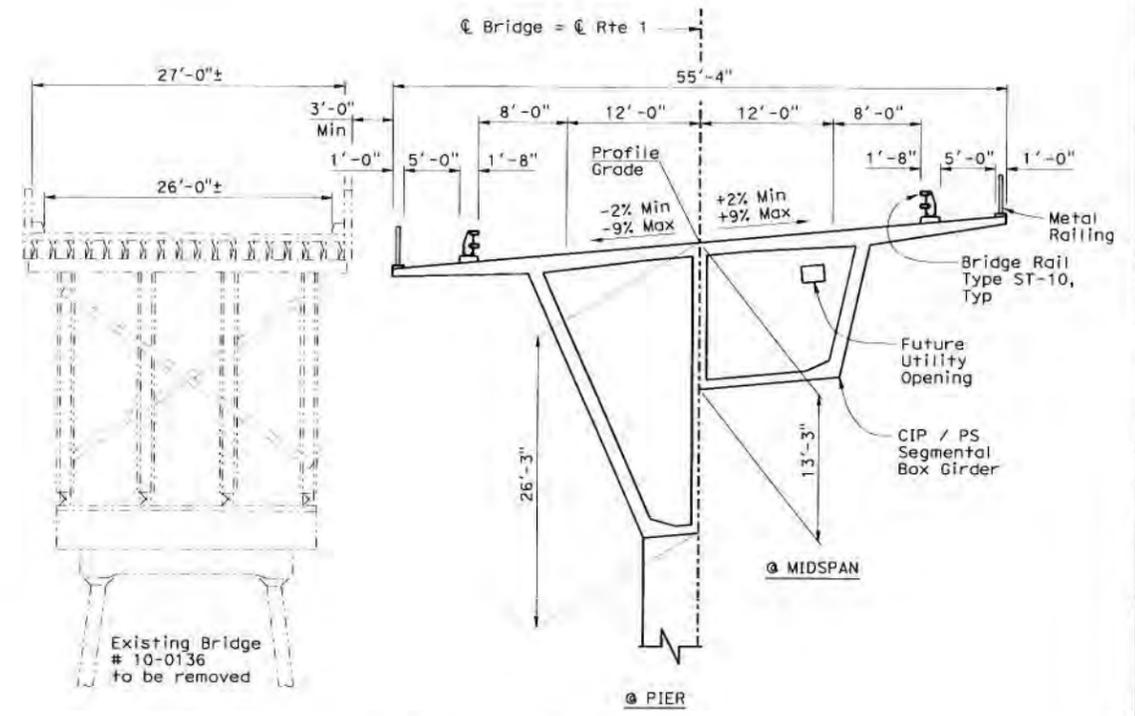
<b>ALTERNATIVE 2A</b>	
<b>PLANNING STUDY</b>	
<b>ALBION RIVER BR (REPLACE)</b>	
BRIDGE NO. 10-136	CU 01
SCALE: AS SHOWN	EA 40110K

DIST.	COUNTY	ROUTE	POST MILE
01	MEN	1	43.74

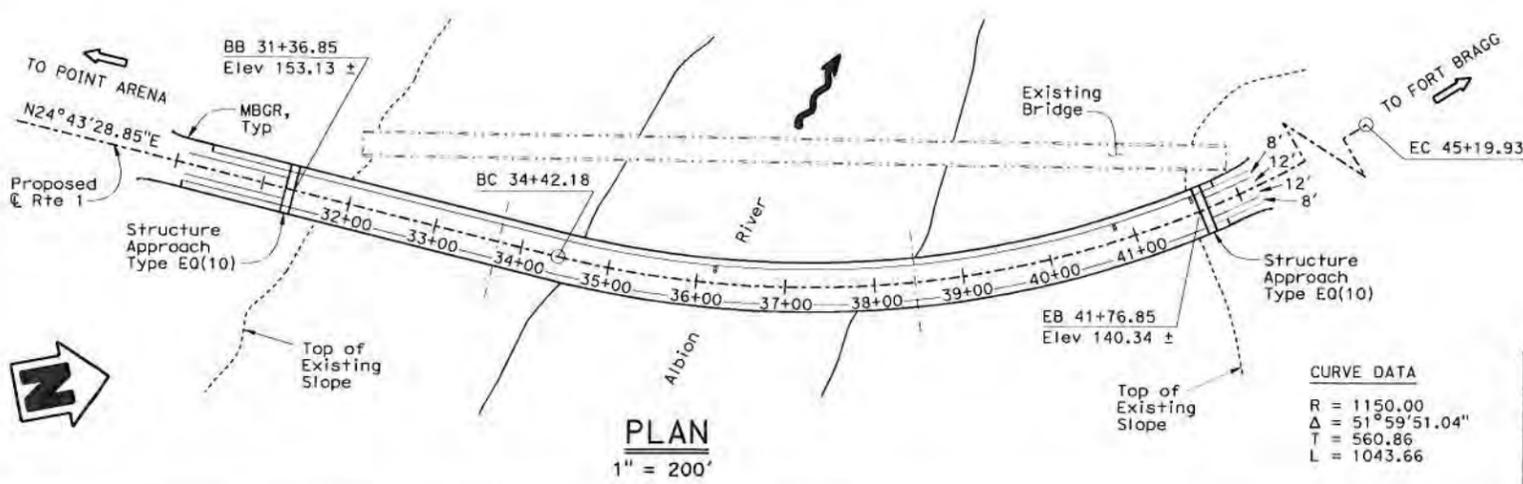
To get to the Caltrans web site, go to: <http://www.dot.ca.gov>



- Notes:**
- 24" CIDH Piles, 60 ft (45 ton) assumed @ Abutments
  - 36" CISS Piles, 100 ft (200 ton) assumed @ Piers
  - Bridge assumed to be constructed segmentally by the balanced cantilever method
  - Traveled way deck drainage carried through Abutment 4. Sidewalk drainage utilizes scuppers and drop-through Drains
  - Type D Excavation assumed @ Pier 2
  - Seal Course concrete and Type A Excavation assumed @ Pier 3
- Legend:**
- Indicates Existing Structure
  - Indicates Deck Drain, Type C (traveled way drainage system)



TYPICAL SECTION  
1/16" = 1'-0"



**CURVE DATA**

R = 1150.00
Δ = 51°59'51.04"
T = 560.86
L = 1043.66

Date of Estimate	5-17-13
Str. Depth	4-27-09
Length	= 1040 ft
Width	= 55'-4"
Area	= 57,546 ft <sup>2</sup>
Cost/sq ft including 10% Mobilization & 25% Contingency	# 719/sq ft + # 760/sq ft
Total Cost	# 41,260,900
	# 43,727,000

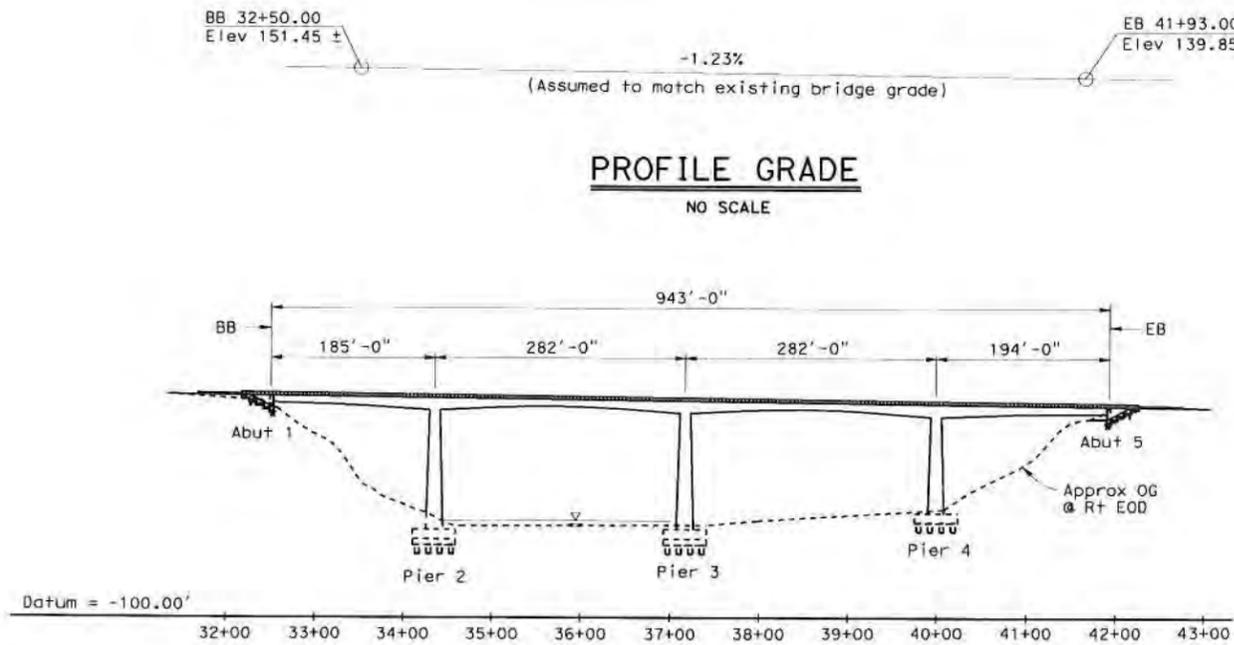
DESIGNED BY	Daniel Sessions	DATE	12/30/08
DRAWN BY	Bob Huddleston	DATE	1/26/09
CHECKED BY	Kevin Harper	DATE	2/4/09
APPROVED	Jeff Sims	DATE	2/4/09

**STRUCTURE DESIGN BRANCH 1**

ALTERNATIVE 2B	
PLANNING STUDY	
ALBION RIVER BR (REPLACE)	
BRIDGE NO. 10-136	CU 01
SCALE: AS SHOWN	EA 40110K

DIST.	COUNTY	ROUTE	POST MILE
01	MEN	1	43.74

To get to the Caltrans web site, go to: <http://www.dot.ca.gov>



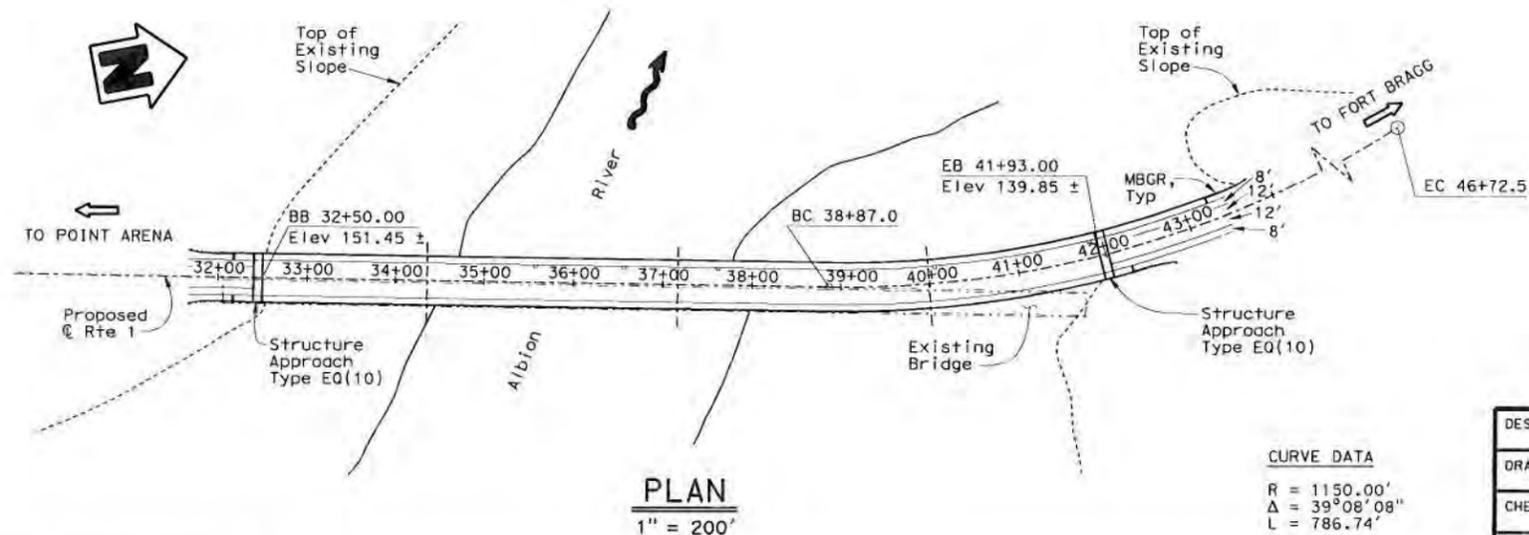
**DEVELOPED ELEVATION**  
1" = 200'

**Notes:**

- 24" CIDH Piles (45 ton) assumed @ Abutments
- 5'-0" CISS concrete piles (1800 ton) assumed @ Piers
- Traveled way deck drainage carried through Abutment 5. Sidewalk drainage utilizes scuppers and drop-through Drains.
- Seal Course concrete and Type A Excavation assumed @ Piers 2 & 3
- Type D Excavation assumed @ Pier 4

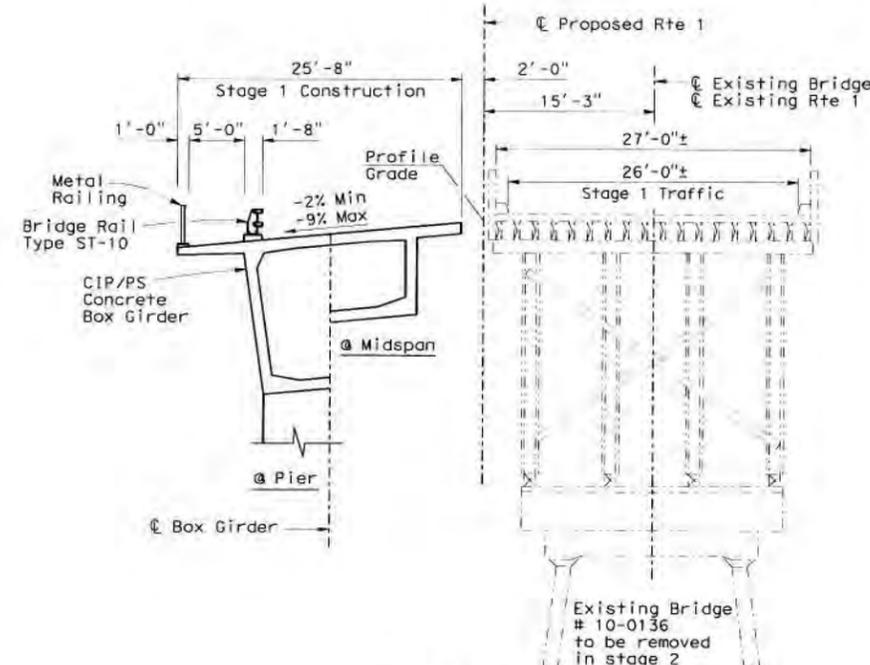
**Legend:**

- Indicates Existing Structure
- Indicates Deck Drain Type D-3 (traveled way drainage system)

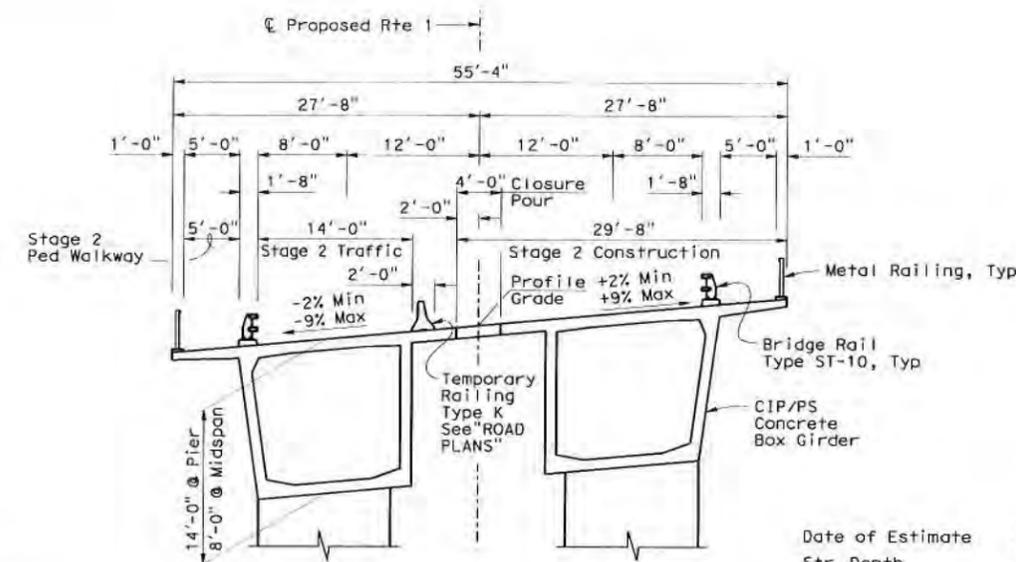


**PLAN**  
1" = 200'

**CURVE DATA**  
R = 1150.00'  
Δ = 39°08'08"  
L = 786.74'



**STAGE 1**



**STAGE 2**  
**TYPICAL SECTION**  
1/16" = 1'-0"

Date of Estimate	5-17-13
Str. Depth	4-82.09
Length	Varies
Width	943.00 ft
Area	55'-4"
Cost/sq ft including	52,179 ft <sup>2</sup>
10% Mobilization &	
25% Contingency	\$ 40,271,700
Total Cost	\$ 35,272,000

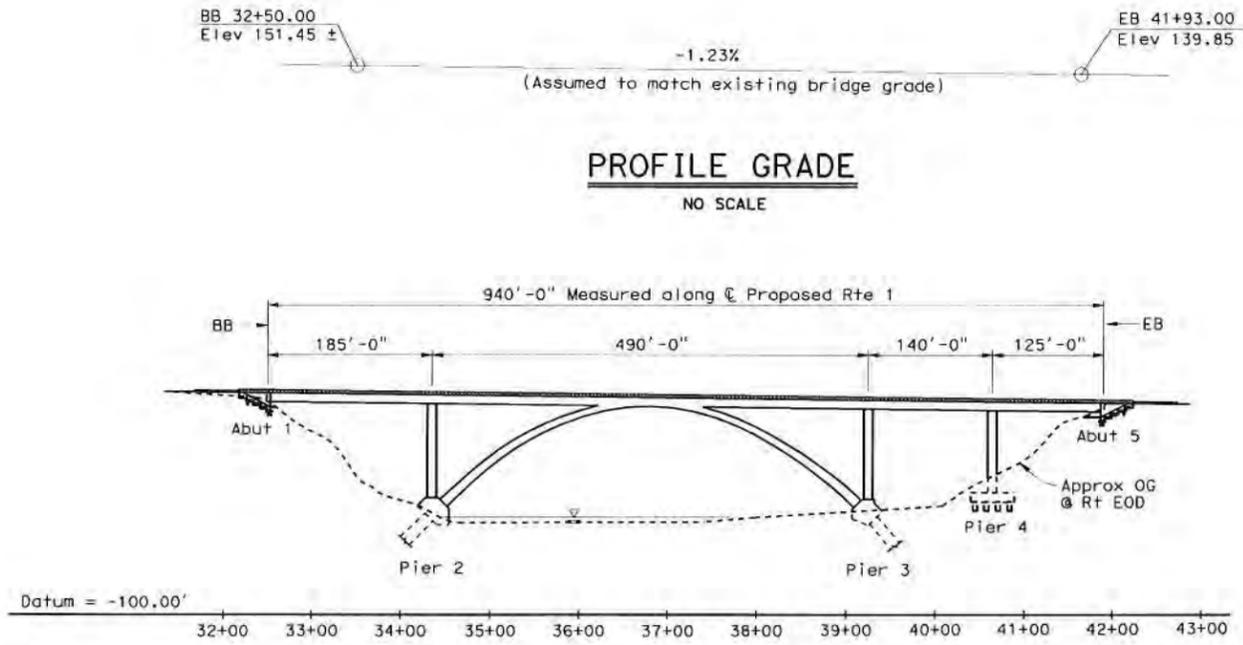
DESIGNED BY	Kevin Harper	DATE	03/10/09
DRAWN BY	Jie Tang	DATE	03/10/09
CHECKED BY		DATE	
APPROVED	Jeff Sims	DATE	

**STRUCTURE DESIGN BRANCH 1**

ALTERNATIVE 3A	
<b>PLANNING STUDY</b>	
<b>ALBION RIVER BR (REPLACE)</b>	
BRIDGE NO. 10-136	CU 01
SCALE: AS SHOWN	EA 40110K

DIST.	COUNTY	ROUTE	POST MILE
01	MEN	1	43.74

To get to the Caltrans web site, go to: <http://www.dot.ca.gov>



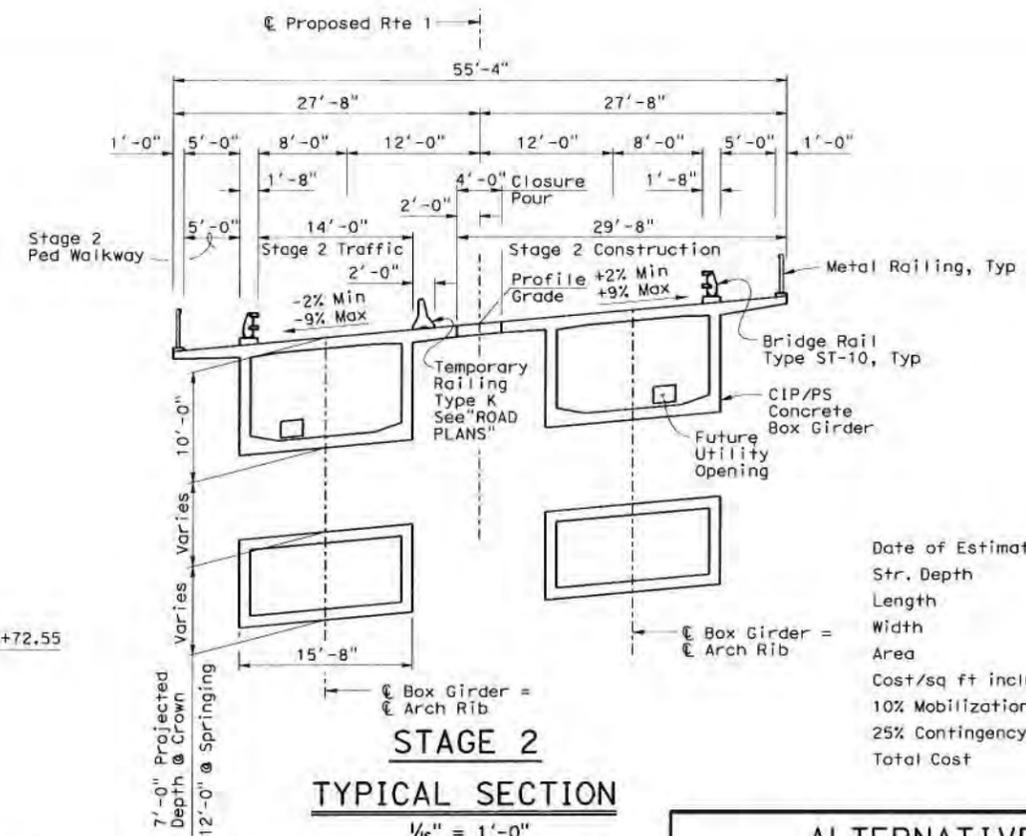
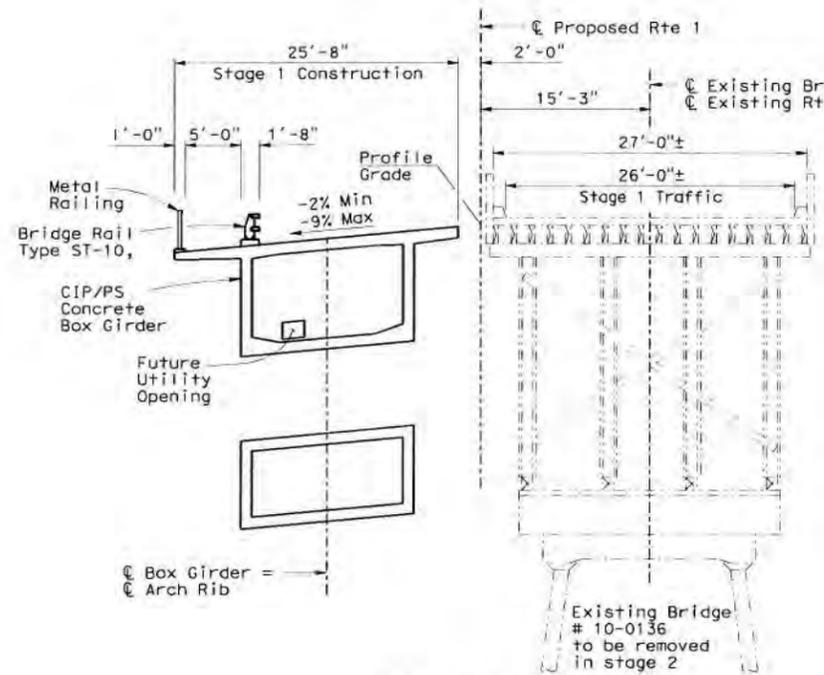
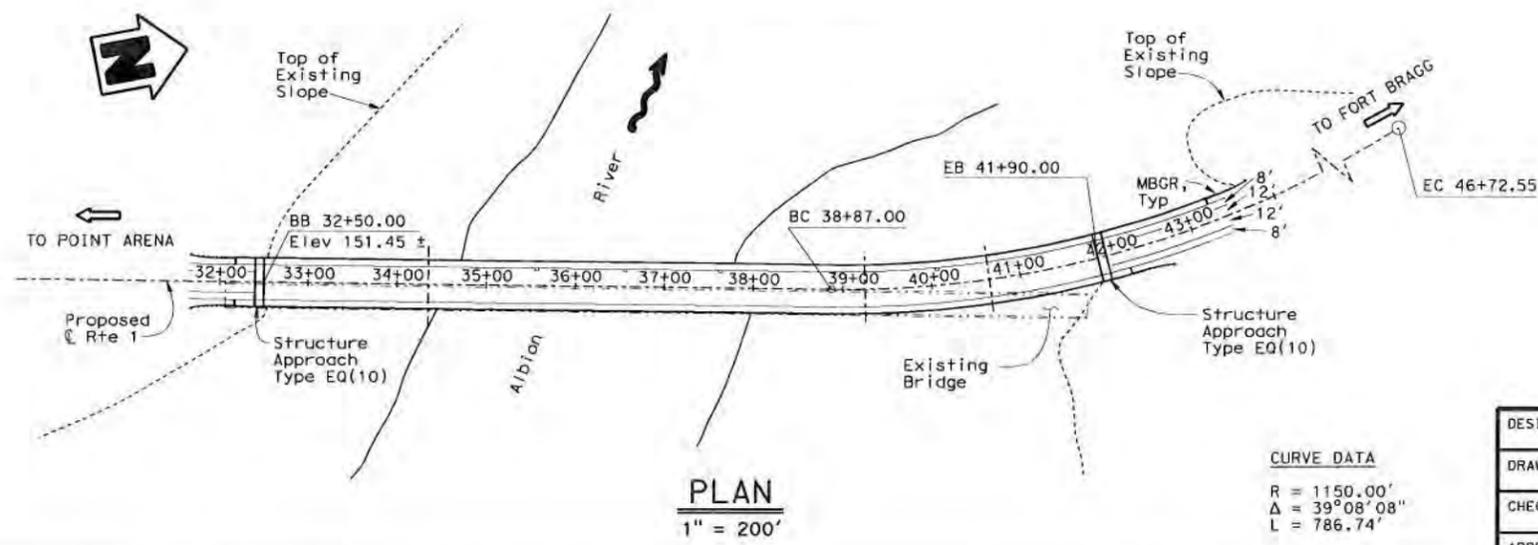
**DEVELOPED ELEVATION**  
1" = 200'

**Notes:**

- 24" CIDH Piles (45 ton) assumed @ Abutments
- 5'-0" CISS concrete piles (1800 ton) assumed @ Pier 4
- 13'-0" X 17'-0" X 80' deep mined shafts assumed @ arch Rib foundation (Pier 2 & 3)
- Rock voids and fracture density assumed to be low enough that ground water can be controlled at the arch mined shaft foundations.
- Type D Excavation assumed @ Pier 4
- Traveled way deck drainage carried through Abutment 5. Sidewalk drainage utilizes scuppers and drop-through Drains.

**Legend:**

- Indicates Existing Structure
- Indicates Deck Drain Type D-3 (traveled way drainage system)



Date of Estimate 5-17-13  
4-27-09

Str. Depth = Varies

Length = 940.00 ft

Width = 55'-4"

Area = 52,013 ft<sup>2</sup>

Cost/sq ft including 10% Mobilization & 25% Contingency = \$ 44,474.00

DESIGNED BY Kevin Harper	DATE 03/17/09
DRAWN BY Jie Tang	DATE 03/17/09
CHECKED BY	DATE
APPROVED Jeff Sims	DATE

**STRUCTURE DESIGN BRANCH 1**

ALTERNATIVE 3B	
<b>PLANNING STUDY</b>	
<b>ALBION RIVER BR (REPLACE)</b>	
BRIDGE NO. 10-136	CU 01
SCALE: AS SHOWN	EA 40110K

# APPENDIX C

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## APPENDIX C – IMPLEMENTATION ACTION SUMMARY

The following charts respectively summarize the implementation action taken by the PDT for the Salmon Creek Bridge Replacement Project and the Albion River Bridge Replacement Project. For the nomenclature used in these tables, see page C-2.

### *Implementation Action Summary: Salmon Creek Bridge Replacement*

Alt No	A/TPA	FSN/TPA	A/Non-TPA	FSN/Non-TPA	Reject	Validated Accepted Alternatives Reporting (TPA Only)		
						Validated Saving (TPA only)	Validate Schedule	Validated Performance
1.1				x				
1.2				x				
2.0	x					(\$100,000)	no change	16%
3.0	x					\$210,000	no change	7%
4.1					x			
4.2					x			
4.3			x					

### *Implementation Action Summary: Albion River Bridge Replacement*

Alt No	A/TPA	FSN/TPA	A/Non-TPA	FSN/Non-TPA	Reject	Validated Accepted Alternatives Reporting (TPA Only)		
						Validated Saving (TPA only)	Validate Schedule	Validated Performance
5.1				x				
5.2				x				
5.3				x				
5.4			x					
6.0	x					(\$100,000)	no change	17%
7.0				x				
8.0	x					\$0	0	2%
9.1				x				
9.2					x			
9.3			x					

## IMPLEMENTATION ACTION TERMINOLOGY

The implemented alternatives are categorized into two project alternative types to be considered in the Environmental Document:

- 1- **TPA (Technically Preferred Alternative):** The TPA is the currently preferred alternative. At this time, the TPA is being pursued in an “Advanced Design” concurrently with the development of the Environmental Document. *(Note: The TPA was defined by PDT, prior to the start of the VA study. The TPA is also referred to as the baseline concept throughout the VA Study Report.)*
- 2- **Non-TPA:** This is a project alternative that is to be included and evaluated in the Environmental Document that competes with the TPA.

The following describes the five types of VA alternative implementation dispositions used on this study.

- **Accept/TPA:** Accept and incorporate the VA alternative into the Technically Preferred Alternative (TPA). *The intent of the VA alternative in this case would be to improve or enhance the original TPA concept conceived by the PDT.*
- **FSN/TPA:** Further study is needed to determine if the VA alternative can be incorporated into the Technically Preferred Alternative (TPA).
- **Accept/Non-TPA:** Accept as a non-TPA project alternative (or incorporate into some other non-TPA).
- **FSN/Non-TPA:** Further study needed for consideration as a non-TPA project alternative.
- **Reject:** Do not consider as a project alternative, of any kind, in the Environmental Document. May be added to the “Considered but Withdrawn” section of the Environmental Document.

## **VA ALTERNATIVE IMPLEMENTATION ACTION COMMENTS**

### **SALMON CREEK BRIDGE REPLACEMENT PROJECT**

#### **Alternative 1.1 Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners**

Disposition: **FSN/Non-TPA**

During the implementation meeting, the following key comments were made by the participants:

- The Sierra Club is opposed to the development of the Headlands. The landowners are not allowing the State access to these lands at this point in time.
- Further study required – this must be vetted out with the permitting agencies and land owners.
- This concept could be used to mitigate for the loss of viewshed.

During the report review, the following written comments were made by individual report reviewers:

- There are acquisition risks if this is not "required" for the project.
- Positive for public, but concerned that Caltrans is going beyond mission-enhancing access at the expense of the property owners.
- The community coastal path is a good idea as it would provide a long swath of publically accessible coastline. However, further study would be needed to identify any cultural resources along the path alignment. If the community path became part of this project, then the Area of Potential Effect (APE) or the projects study limits for cultural resources would need to change to reflect the path alignment, and the PA&ED schedule may need to be revised to account for this new project element. Design of the path should be flexible enough to navigate around any cultural resources found along the proposed alignment. Failure to do so could potentially result in having to implement mitigation of an archaeological site due to the mitigation strategy for removal of the existing bridges and in support of the Coastal Commission's mission statement. This could also cause significant political controversy with local Native American tribes. There is potential for Caltrans to generate some positive public feeling toward the agency through this project. There could be some potential for some public interpretation about the history of this area, if adequately funded.
- Agree with this in concept. Can the length of the bridge be offset with more fill, or would this make it less desirable and increase environmental impacts? I think more study is needed, but I basically agree with this feature.

#### **Alternative 1.2 Add a belvedere to the bridge**

Disposition: **FSN/Non-TPA**

During the implementation meeting, the following key comments were made by the participants:

- There may be concerns with users jumping over the barriers to get to the other belvedere.
- Some impact to view and shading below bridge.
- Questionable if the proposed belvedere would have much use. Noisy environment.

- Would only be valuable if the California Coastal Commission and the community ask for this concept. Aesthetics of the bridge may be compromised.

During the report review, the following written comments were made by individual report reviewers:

- If we get mitigation credit, this may be effective.
- Could add or significantly detract from structure aesthetics. Little value to the public due to wind and noise exposure.
- We should definitely pursue this as an added feature for context sensitivity.

### **Alternative 2.0 Fill in the coastal trail between the two bridges**

Disposition: **A/TPA**

During the report review, the following written comments were made by individual report reviewers:

- Does this require R/W acquisition of any kind?
- Reasonable addition to work scope that helps to provide pedestrian access along highway.
- The community coastal path is a good idea as it would provide a long swath of publically accessible coastline. However, further study would be needed to identify any cultural resources along the path alignment. If the community path became part of this project, then the Area of Potential Effect (APE) or the projects study limits for cultural resources would need to change to reflect the path alignment and the PA&ED schedule may need to alter to account for this new project element. Design of the path should be flexible enough to navigate around any cultural resources found along the proposed alignment. Failure to do so could potentially result in having to implement mitigation of an archaeological site due to the mitigation strategy for removal of the existing bridges and in support of the Coastal Commission's mission statement. This could also cause significant political controversy with local Native American tribes. A historic-era cultural resource has been recorded on this property, but the current path alignment is far enough to the north that the site should not become an issue.
- There is potential for Caltrans to generate some positive public feeling toward the agency through this project. There could be some potential for some public interpretation about the history of this area - if adequately funded.
- We should definitely pursue this as an added feature for context sensitivity

### **Alternative 3.0 Flatten the profile slopes at Salmon Creek to balance the earthwork**

Disposition: **A/TPA**

During the implementation meeting, the following key comments were made by the participants:

- Could also help with water quality improvements.

During the report review, the following written comments were made by individual report reviewers:

- Meets design standards, but requires more acquisition.
- Brings better roadway geometry, sight distance and possible cost savings.

- Cultural Resources will need to have more information/design about this proposed element (such as width of the grading) as it may impact culturally sensitive areas previously unaffected by the bridge design. Subsequently, this could increase the level of cultural resource compliance document and the time needed to complete studies.
- I agree with this in concept. Can the length of the bridge be offset with more fill, or would this make it less desirable and increase environmental impacts? I think more study is needed, but basically I agree with this feature.

#### **Alternative 4.1 Retrofit, widen, and rehabilitate the existing Salmon Creek bridge**

Disposition: **Reject**

During the implementation meeting, the following key comments were made by the participants:

- The existing Salmon Creek Bridge is not eligible for the National Historical Register.
- This alternative is not a viable alternative – it retains the high cost of maintenance, it would have large impacts on the traveling public (requires one-lane traffic control) over a longer construction period. Furthermore, it only defers the eventual replacement of the bridge to a later date. Consider for inclusion in the Environmental Document’s “Considered but Withdrawn” section.

During the report review, the following written comments were made by individual report reviewers:

- Too cost prohibitive and not a long-lasting solution.
- Too expensive with respect to LCC. Would create significant maintenance hardship.
- Not a viable alternative for many reasons.

#### **Alternative 4.2 Build on existing centerline using a detour that uses existing roads/detour**

Disposition: **Reject**

During the report review, the following written comments were made by individual report reviewers:

- Makes a minimal footprint impact.
- Too damaging to existing lands at Salmon Creek. Damaging to quiet neighborhood of Albion.
- Area near Salmon Creek Bridge is a known archaeological resource. Construction of detours through this area poses a significant risk to the resource, thereby increasing the likelihood of significant mitigation measures for the archaeology. Before Cultural Resources could finish our studies, adequate bridge design and description would need to be generated – potential for extending PA&ED and requiring high level of cultural compliance document and SHPO consultation/concurrence.
- Not advantageous enough to be a viable alternative concept.

### **Alternative 4.3 Build on-alignment (east) carrying two lanes of traffic and pedestrians**

Disposition: **A/Non-TPA**

During the report review, the following written comments were made by individual report reviewers:

- Building half width is more expensive and takes longer. It may not be the best alternative, but it should be considered as a viable alternative.
- Cost prohibitive and not a long-lasting solution.
- Too expensive with respect to life-cycle costing. Would create significant maintenance hardship.

## **ALBION RIVER BRIDGE REPLACEMENT**

### **Alternative 5.1 Provide a community path for coastal access by purchasing land from the Albion Headlands' property owners**

Disposition: **FSN/Non-TPA**

During the implementation meeting, the following key comments were made by the participants:

- This would mitigate for the loss of the historical bridge and loss of viewshed.
- This concept would need to be vetted with owners and permitting agencies.

During the report review, the following written comments were made by individual report reviewers:

- There are acquisition risks if this is not "required" for the project.
- Positive for public, but concerned that Caltrans is going beyond mission-enhancing access at the expense of the property owners.
- Consider only if this concept would count towards mitigation with the Coastal Commission. If not, too costly.
- This option could potentially mitigate for the biological impacts of this project and benefit the community of Albion, both local residents and tourism. Since Caltrans has been unable to obtain permission to enter these parcels, this option may be difficult and likely expensive to acquire these parcels. A plan would be needed for maintenance for the path – it would likely have to be performed by an organization other than Caltrans. Endowment money may be needed for future maintenance. This alternative would not offset mitigation required for removal of the existing Albion River Bridge. Cultural sites could be present and will need to be surveyed and, if found, avoided. If it is determined that this alternative benefits the community, TEA funds could be used for this activity.

### **Alternative 5.2 Add vista point for northbound lanes; incorporate north side abutment and portion of deck**

Disposition: **FSN/Non-TPA**

During the implementation meeting, the following key comments were made by the participants:

- Does not offset the mitigation for the removal of the bridge.
- Beneficial for the SHPO process, but does not expedite SHPO review. The SHPO requirements are difficult to predict.
- This concept may help gain community and permitting agency support.

During the report review, the following written comments were made by individual report reviewers:

- If mitigation credit is received, pursuing this concept may be effective.
- Seems reasonable and within scope of project. Provides enhancement without taking from private owners.
- Not visually appealing; do not think it would be utilized. If there is enough public support, should study further.

- This would potentially be a positive alternative for the community of Albion, both for local residents and for tourism, and could help offset the loss of the old bridge.
- This option might require the addition of several parking spaces.
- This alternative would not offset mitigation required for removal of the existing Albion River Bridge.
- While beneficial to the process, the reuse of a portion of the existing bridge would not expedite the SHPO review process.
- If it is determined that this alternative benefits the community, TEA funds could be used for this activity.

### **Alternative 5.3 Add belvederes to the bridge**

Disposition: **FSN/Non-TPA**

During the implementation meeting, the following key comments were made by the participants:

- There may be concerns with users jumping over the barriers to get to the other belvedere.
- The impact of the view and shading under the bridge will need to be evaluated.
- Questionable use? Noisy environment.
- Could put on the west side only (not visible for most of the Albion community).
- This concept would only be valuable if the California Coastal Commission and the community want it.
- SHPO interpretation on this topic needed.

During the report review, the following written comments were made by individual report reviewers:

- Only pursue if mitigation credits can be received.
- Could add or significantly detract from structure aesthetics. Little value to the public due to wind and noise exposure.
- Do not think it would be utilized; may be visually unattractive when viewing bridge from below.
- This would potentially be a positive alternative for the community of Albion, both for local residents and for tourism, and would help offset the loss of the old bridge. This option might require the addition of several parking spaces. This alternative would not offset mitigation required for removal of the existing Albion River Bridge.

### **Alternative 5.4 Use the existing Albion River Bridge for non-motorist use and narrow the width of new bridge**

Disposition: **Accept/Non-TPA**

During the report review, the following written comments were made by individual report reviewers:

- If mitigation credit is received, pursuing this concept may be effective.
- Nice concept, but liability and maintenance costs are beyond State's, and likely also local, ability. If existing bridge must be closed, State would need to incorporate pedestrian access on new bridge.
- Cost of maintenance would disrupt viewshed of the new bridge.

- This option would retain the existing bridge, to which the community of Albion is very attached. This option would likely be expensive - an organization other than Caltrans would have to maintain the existing bridge. The existing bridge would likely have to be improved for ADA compliance. This alternative would offset mitigation required for removal of the existing Albion River Bridge. Indirect effects (such as visual, vibration from pile driving for adjacent new bridge, setting, etc.) to the existing bridge would still need to be considered in a Finding of Effect (FOE). Consideration of this alternative is required for both the Section 4(f) documentation (i.e., need to include consideration and documentation of prudent and feasible avoidance alternatives AND of all possible measures to minimize harm to the bridge) and the FOE.

### **Alternative 6.0 Fill in the coastal trail between the two bridges**

Disposition: **Accept/TPA**

During the report review, the following written comments were made by individual report reviewers:

- Nice concept, but liability and maintenance costs are beyond State's, and likely also local, ability. If existing bridge must be closed, State would need to incorporate pedestrian access on new bridge.
- If it is determined that this alternative benefits the community, TEA funds could be used for this activity.

### **Alternative 7.0 Purchase the RV park in lieu of paying for temporary construction easement**

Disposition: **FSN/Non-TPA**

During the implementation meeting, the following key comments were made by the participants:

- Purchasing the park outright would result in loss of use by the public that may be opposed by the California Coastal Commission.
- Need to further vet with the public, land owners, and permitting agencies.

During the report review, the following written comments were made by individual report reviewers:

- Compare expenses – this option could be cost effective.
- This concept could be valuable to sell or donate to preserving beachfront for public use without infringing on private ownership - that is, if the owner is willing to sell.
- Good opportunity for possible mitigation. Use site for our purposes during construction and sell back any land not needed.
- A portion of this parcel could potentially be used for biological mitigation (non-native plant removal/dune restoration). Only a portion of the parcel could be used for mitigation – access to the boat launch would need to remain. Long-term users of the campground may be displaced. The parcel is basically a historic period archaeological site (the former Albion Saw Mill). Use of this area as a TCE may require evaluation of the site and potential effects. An issue regarding this alternative concerns disposal of the parcel following construction. This activity would represent a project subject to NEPA/CEQA. We would have to evaluate the entire site, assess potential effects, consult with SHPO, and perhaps develop a MOA.

### **Alternative 8.0 Improve stopping sight distance at the north end of the Albion Bridge project**

Disposition: **Accept/TPA**

During the report review, the following written comments were made by individual report reviewers:

- Improves view from vehicles.
- Within scope of work, adds value with little cost.
- Yes, should be considered.
- This alternative would offset mitigation required for removal of the existing Albion River Bridge. Effects of retrofitting, widening, and rehabilitating the existing bridge would still need to be considered in an FOE. Consideration of this alternative is required for both the Section 4(f) documentation (i.e., need to include consideration and documentation of prudent and feasible avoidance alternatives AND of all possible measures to minimize harm to the bridge) and the FOE.

### **Alternative 9.1 Retrofit, widen, and rehabilitate the existing Albion Bridge**

Disposition: **FSN/Non-TPA**

During the implementation meeting, the following key comments were made by the participants:

- Should be considered as an evaluated alternative in the Draft Environmental Document to address the historical structure loss as part of the SHPO process and to address community concerns.

During the report review, the following written comments were made by individual report reviewers:

- Too costly and not a long-term solution.
- Too expensive including LCC. Expands the scarcely available maintenance dollars.
- Can be eliminated based on cost and LCC.
- This alternative would offset mitigation required for removal of the existing Albion River Bridge. Effects of retrofitting, widening, and rehabilitating the existing bridge would still need to be considered in a FOE. Consideration of this alternative is required for both the Section 4(f) documentation (i.e., need to include consideration and documentation of prudent and feasible avoidance alternatives AND of all possible measures to minimize harm to the bridge) and the FOE.

### **Alternative 9.2 Build on existing centerline using a detour that uses existing roads/detour**

Disposition: **Reject**

During the implementation meeting, the following key comments were made by the participants:

- Not viable from construction traffic, impact to the community. The detour does not even appear to be constructible (steep bluff on one side and homes on the other approach). May not be able to provide a two-lane detour and huge community opposition.
- Place in the “Considered but Withdrawn” section of the Environmental Document.

During the report review, the following written comments were made by individual report reviewers:

- Minimum footprint impacts.
- Too damaging to existing lands at Salmon Creek. Damaging to quiet neighborhood of Albion.
- The existing County roads would need to be improved in order to be used for a detour. The roads are currently narrow, especially south of the Albion River. The south side road also passes through a residential area/community of Albion. This option would require an increase to the ESL with additional environmental studies. The road improvements would impact biological resources (US Army Corps and/or coastal wetlands), as well as the community of Albion. The temporary bridge crossing Albion River would need to be high enough to allow the passage of boat traffic. Potential cultural sites could be within the increased ESL.

**Alternative 9.3 Build on-alignment (west) carrying two lanes of traffic and pedestrians**

Disposition: **Accept/Non-TPA**

During the implementation meeting, the following key comments were made by the participants:

- Needs to be a project alternative that is included in the Environmental Document.

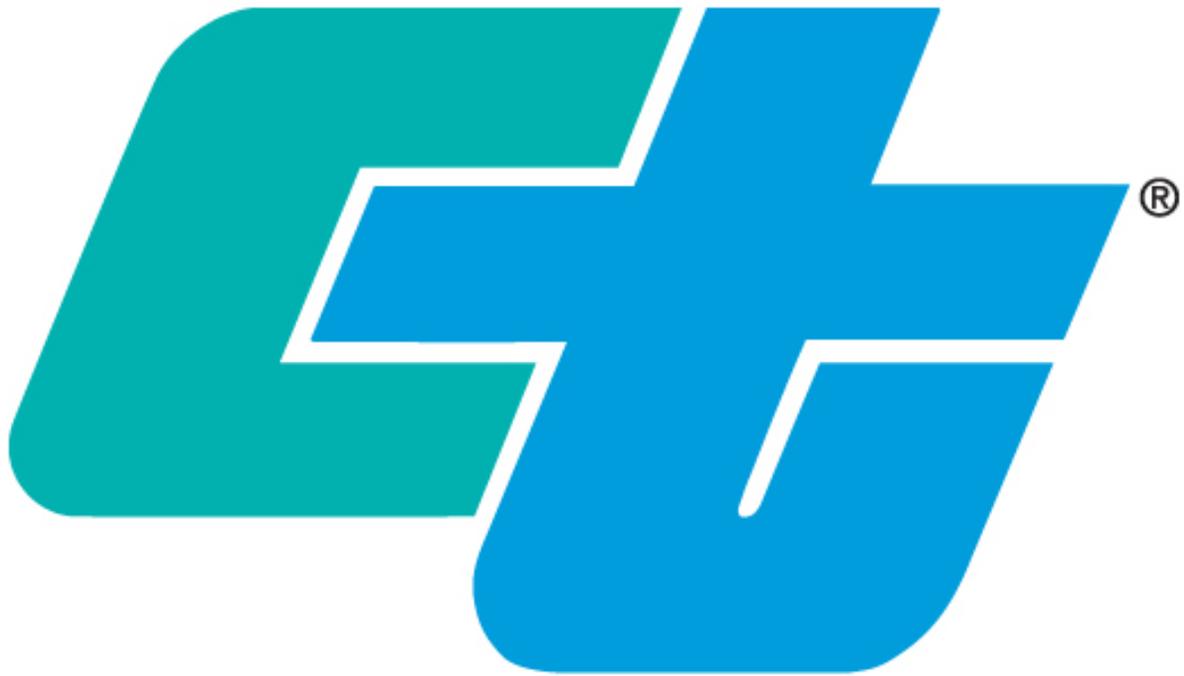
During the report review, the following written comments were made by individual report reviewers:

- Longer build time, but stays with existing highway alignment.
- Little, if any, benefit. Congestion and increased safety risks during construction. Longer construction duration, more expensive.
- This alternative was studied in the PSR and should not be eliminated at this point.

## **IMPLEMENTATION MEETING PARTICIPANTS**

An implementation meeting was held on October 24, 2013 via video conferencing at the Sacramento, Marysville and Eureka VCT conference rooms. The following individuals participated in the meeting:

- Frank Demling, Project Manager, Albion River Bridge Replacement, Caltrans District 1
- Mark Sobota, Design Senior (Design E1), Caltrans North Region
- Lena Ashley, Caltrans District 1
- Eric Lund, Design, Caltrans District 1
- Tom Phillips, Design, Caltrans District 1
- Trevor Goff, Caltrans District 1
- Christine Lan, Environmental Coordinator, Caltrans District 1
- Jerilynn Riordan, Assistant Project Manager/PRSM Subject Matter Expert, Caltrans District 1
- Thomas Wood, Engineering Services, representing the North Region VA Coordinator (Kevin Espinoza, previously Naghi Ghafari), Caltrans North Region
- Adele Pommerenck, Environmental Senior, Caltrans North Region
- Jennifer Osmondson, Environmental Biologist, Caltrans North Region
- Cassandra Pitts, Environmental Community Impacts, Caltrans North Region
- Liza Walker, Environmental Project Coordinator, Caltrans North Region
- George Hunter, VA Study Team Leader, Value Management Strategies, Inc.



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