Attachment E

Right of Way Data Sheet

State of California - Department of Transportation

DATASHEET DISTRIBUTION LIST

EA: 0F2800
PROJECT NO.: 01 1500 0099
LOCATION: 01-DN-101-PM 12.7/16.5
ALTERNATE: ALT X (1 of 2)
DATE: December 11, 2023

	Documents Included		
	Parcel Worksheet	Resource Hour Request	Cover Letter
	Mitigation Worksheet		Right of Way Datasheet
	Mitigation & Permit Estimate		
	Utility Information Sheet		
	Railroad Information Sheet		
	USA Lands Information Sheet		
	Real Property Services Information Sheet		

Send Original to:			
JAIME MATTEOLI Design Engineer			**X**
Attention: **TODD LARK** Project Engineer			**X**

Send Copies to:			
RON GARTON Right of Way Engineering			**X**
Steve Croteau Environmental Senior			**X**
Kellie Eldridge Environmental Coordinator			**X**
JAIME MATTEOLI Project Manager		**X**	**X**
REBECCA LAW Assistant Project Manager		**X**	**X**
JOHN BALLANTYNE North Region Right of Way Division Chief	**X**	**X**	**X**
TADJ RATAJCZAK Assistant Chief, Eureka/Redding RW Office	**X**	**X**	**X**
JEREMIAH JOYNER RW Project Delivery, Eureka RW Office	**X**	**X**	**X**
YVONNE BECKER RW Project Coordination	**X**	**X**	**X**
TRACIE WYNAND Planning & Management	**X**	**X**	**X**
KELLY DARBY Estimator	**X**	**X**	**X**
BRYAN REYNOLDS Utilities	**X**	**X**	**X**
BRYAN REYNOLDS Railroads			
KELLY DARBY Mitigation	**X**	**X**	**X**
APRIL REYNOLDS Real Property Services			
CHRIS MARSHALL USA Lands			

Order of Documents

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2. Resource Hour Request
3. Cover Letter
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8. Mitigation Worksheet
9. Parcel Worksheets
10. Real Property Services Information Sheet (If Applicable)
11. USA Lands Infromation Sheet (If Applical

State of California
Department of Transportation

CALIFORNIA STATE TRANSPORTATION AGENCY

MEMORANDUM

Making Conservation
A California Way of Life.

To: JAIME MATTEOLI
Design Engineer
Department of Transportation

Attention: TODD LARK
Project Engineer

Date: December 11, 2023

File: 01-DN-101-PM 12.7/16.5
EFIS No.: 01 1500 0099
EA: 0F2800
Alternate: ALT X (1 of 2)

From: TADJ RATAJCZAK
NR Right of Way District Division Chief,
Project Delivery
Eureka/Redding

Subject: CURRENT ESTIMATED RIGHT OF WAY COSTS

Project Description: In Del Norte County from Wilson Creek Bridge to 3.8 miles North of Wilson Creek Bridge.

Alternate Description: ALT X - Realign highway, Construct underground drainage system & retaining walls

We have completed an estimate of the right of way costs for the above referenced project based on information received from you on December 5, 2023 . Final Environmental information delivered 12/11/2023 in coordination with project management.

Right of Way Lead Time will require a minimum of 15 months after receipt of appraisal maps, utility conflict maps, environmental clearances (HMDD) and Certificate of Sufficiency (COS). A minimum of 12 months prior to certification will be required from receipt of the last map revision. Shorter lead times may require additional support resources and may adversely affect delivery of Right of Way Certification.

For: TADJ RATAJCZAK
Assistant Chief
North Region Right of Way
EUREKA/REDDING

Attachments:
Right of Way Data Sheet

cc. Jaime Matteoli

State of California - Department of Transportation
RIGHT OF WAY DATASHEET

EA: 0F2800
PROJECT NO.: 01 1500 0099
LOCATION: 01-DN-101-PM 12.7/16.5
Description: Repair Slides; Construct Bypass In Del Norte County from Wilson Creek Bridge to 3.8 miles North of Wilson Creek Bridge.

ALTERNATE: ALT X (1 of 2)
DATE: 12/11/2023
Datasheet Type: Revision

1. Right of Way Cost Estimate:

	Current Value Future Use	Escalation Rate	Escalated Value
A. Total Acquisition Cost	$305,813	5%	$421,147
B. Appraisal Fees Estimate	$0	N/A	$0
C. Mitigation Acquisition & Credits	$105,088,477	5%	$144,721,708
D. Project Development Permit Fees	$184,217	5%	$253,693
Subtotal	$105,578,507		$145,396,548
E. Utility Relocation (State's Share)	$0		$0
(Owner's Share: $0)			
F. Relocation Assistance (RAP)	$0		$0
G. Clearance/Demolition	$1,000,000	5%	$1,377,142
H. Title & Escrow	$0		$0
I. Total Estimated Right of Way Cost	$106,578,507	**Rounded**	**$146,774,000** *
J. Construction Contract Work	$0		

2. Current Date of Right of Way Certification July 1, 2030

3. Parcel Data:

Type		Dual/Appr	Utilities		Railroad	
X	0		U4 - 1	0	C&M Agreement	0
A	2		- 2	0	Service Contract	0
B	1		- 3	0	Easements	0
C	0	0	- 4	0	Rights of Entry	0
D	0	0	U5 - 7	5	Clauses	0
RR	0		- 8	0		
Total	**3**		- 9	0		

Excess 0

Areas:		Mitigation		Misc. R/W Work	
R/W	48.93 AC	Impacts	2	RAP Displacees	N/A
TCE	N/A	Parcels	1	Clear/Demo	N/A
Excess	N/A	Credits	1	Permit to Enters	N/A
Mitigation	2 Ac.			Condemnation	0
				USA Involvement	No

4. Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).

Three State Park parcels involved.

5. Are any properties acquired for this project expected to be rented, leased, or sold?

Yes _____ No **X**

6. Are RAP displacements required?

Yes _____ No **X**

No. of single family N/A No. of business/nonprofit N/A

No. of multi-family N/A No. of farms N/A

Based on Draft/Final Relocation Impact Statement/Study dated N/A

N/A Sufficient replacement housing will be available without last resort housing.

N/A Sufficient replacement housing will not be available without last resort housing.

7. Is there an effect on assessed valuation?

Yes _____ No **X** Not Significant _____

8. Are there any items of Construction Contract Work?

Yes _____ No **X**

There is no Construction Contract Work associated with the project.

9. Are utility facilities or rights of way affected?

Yes _____ No **X** Phase 4 Capital **$0**

Names of Utility Companies requiring verification only.

Pacific Power (Electric), Frontier Communication (Communication), Charter Communication (Communication), County of Del Norte (Water/Sewer)

Names of Utility Companies with conflicts.

None anticipated

Additional information concerning Utility Involvement on this project.

No conflicts anticipated. As additional information becomes available this estimate may need to be revised.

10. Are railroad facilities or rights of way affected?

Yes _____ No **X** Phase 4 Capital **$0**

11. Are USA Lands or Rights Affected?

Yes _____ No **X** Phase 4 Capital **$0**

Agencies Involved:

US Forest Service _____	BLM _____	Army Corps of Engineers _____
National Parks _____	BIA _____	Vetrans Administration _____
US Fish & Wildlife _____	GSA _____	_____

Rights or Permissions to acquire:

Easement _____	Special Use Permit _____	Courtesy Letter _____
Right of Way Grant _____	Cooperative Work Agreement _____	Cost Recovery _____
Mineral Agreement _____	Letter of Concurrence _____	Timber Sale _____
		_____

12. Is an RE Office required for the project?

Yes **X** No _____

Type of RE Office

Modular **X** Move In _____

13. Were any previously unidentified sites with hazardous waste and/or material found?

Yes _____ None Evident **X**

14. Are there material borrow and/or disposal sites required?

No **X** Optional _____ Mandatory _____

15. Are there potential relinquishments and/or abandonments?

Yes _____ No **X**

16. Are there any existing and/or potential airspace sites?

Yes _____ No **X**

17. What type of mitigation is required for the project?

Mitigation details to be determined.

18. Is it anticipated that Caltrans will perform all Right of Way work?

Yes **X** No _____

19. Indicate the anticipated Right of Way schedule and lead time requirements.

Right of Way Lead Time will require a minimum of **15** months after we receive first appraisal maps, utility conflict maps, necessary environmental clearances and freeway agreements have been approved and obtained. Additionally a minimum of **12** months will be required after receiving the last appraisal map to Right of Way for certification.

20. Assumptions and limiting Conditions: (Check boxes that apply.)

* Mapping provides insufficient detail to determine the limits of the right of way required.
* Transportation facilities have not been sufficiently designed to determine the damages to any of the remainder parcels affected by the project.
* Additional right of way requirements are anticipated, but are not defined due to the preliminary nature of the early design requirements.
* Design will secure necessary encroachment permits from local agencies.
* Project permits are not required for the project.
* Utility lead time begins after PA&ED is met and Utility Conflict Maps have been received.
* Requested lead time provides sufficient time to acquire Resolutions of Necessity if condemnations are required.
* Requested lead time provides insufficient time to acquire Orders of Possession if condemnations are required.

Evaluation Prepared By:

Right of Way Kelly Darby KELLY DARBY Date 12/12/2023

Reviewed By

RW Project Coordinator YVONNE BECKER Date 12/12/2023

I have personally reviewed this Right of Way Data Sheet and all supporting information. I certify that the probable Highest and Best Use, estimated values, escalation rates and assumptions are reasonable and proper, subject to the limiting conditions set forth, and I find this Data Sheet to be complete and current.

JEREMIAH JOYNER
Senior Right of Way Agent
Project Delivery Branch
Eureka

12/12/2023
Date

For: TADJ RATAJCZAK
Assistant Chief
North Region Right of Way
Eureka/Redding

12/12/2023
Date

State of California - Department of Transportation

DATASHEET DISTRIBUTION LIST

EA: 0F2800
PROJECT NO.: 01 1500 0099
LOCATION: 01-DN-101-PM 12.7/16.5
ALTERNATE: ALT F (2 of 2)
DATE: December 11, 2023

	Documents Included		
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	Mitigation Worksheet		Right of Way Datasheet
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	Utility Information Sheet		
	Railroad Information Sheet		
	USA Lands Information Sheet		
	Real Property Services Information Sheet		

Send Original to:			
JAIME MATTEOLI Design Engineer			**X**
Attention: **TODD LARK** Project Engineer			**X**

Send Copies to:			
RON GARTON Right of Way Engineering			**X**
Steve Croteau Environmental Senior			**X**
Kellie Eldridge Environmental Coordinator			**X**
JAIME MATTEOLI Project Manager		**X**	**X**
REBECCA LAW Assistant Project Manager		**X**	**X**
JOHN BALLANTYNE North Region Right of Way Division Chief	**X**	**X**	**X**
TADJ RATAJCZAK Assistant Chief, Eureka/Redding RW Office	**X**	**X**	**X**
JEREMIAH JOYNER RW Project Delivery, Eureka RW Office	**X**	**X**	**X**
YVONNE BECKER RW Project Coordination	**X**	**X**	**X**
TRACIE WYNAND Planning & Management	**X**	**X**	**X**
KELLY DARBY Estimator	**X**	**X**	**X**
BRYAN REYNOLDS Utilities	**X**	**X**	**X**
BRYAN REYNOLDS Railroads			
KELLY DARBY Mitigation	**X**	**X**	**X**
APRIL REYNOLDS Real Property Services			
CHRIS MARSHALL USA Lands	**X**	**X**	**X**

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State of California
Department of Transportation

CALIFORNIA STATE TRANSPORTATION AGENCY

MEMORANDUM

Making Conservation
A California Way of Life.

To: JAIME MATTEOLI
Design Engineer
Department of Transportation

Attention: TODD LARK
Project Engineer

Date: December 11, 2023

File: 01-DN-101-PM 12.7/16.5
EFIS No.: 01 1500 0099
EA: 0F2800
Alternate: ALT F (2 of 2)

From: TADJ RATAJCZAK
NR Right of Way District Division Chief,
Project Delivery
Eureka/Redding

Subject: CURRENT ESTIMATED RIGHT OF WAY COSTS

Project Description: In Del Norte County from Wilson Creek Bridge to 3.8 miles North of Wilson Creek Bridge.

Alternate Description: ALT F - Realign highway, Construct tunnel, bridge, operations, and maintenance center

We have completed an estimate of the right of way costs for the above referenced project based on information received from you on December 5, 2023 . Final environmental information delivered 12/11/2023 in coordination with project management.

Right of Way Lead Time will require a minimum of 36 months after receipt of appraisal maps, utility conflict maps, environmental clearances (HMDD) and Certificate of Sufficiency (COS). A minimum of 36 months prior to certification will be required from receipt of the last map revision. Shorter lead times may require additional support resources and may adversely affect delivery of Right of Way Certification.

FOR: TADJ RATAJCZAK
Assistant Chief
North Region Right of Way
EUREKA/REDDING

Attachments:
Right of Way Data Sheet

cc. Jaime Matteoli

State of California - Department of Transportation
RIGHT OF WAY DATASHEET

EA: 0F2800
PROJECT NO.: 01 1500 0099
LOCATION: 01-DN-101-PM 12.7/16.5
Description: Repair Slides; Construct Bypass In Del Norte County from Wilson Creek Bridge to 3.8 miles North of Wilson Creek Bridge.

ALTERNATE: ALT F (2 of 2)
DATE: 12/11/2023
Datasheet Type: Revision

1. Right of Way Cost Estimate:

	Current Value Future Use	Escalation Rate	Escalated Value
A. Total Acquisition Cost	$94,688	5%	$130,398
B. Appraisal Fees Estimate	$0	N/A	$0
C. Mitigation Acquisition & Credits	$210,088,477	5%	$289,321,571
D. Project Development Permit Fees	$184,217	5%	$253,693
Subtotal	$210,367,382		$289,705,661
E. Utility Relocation (State's Share)	$0		$0
(Owner's Share: $0)			
F. Relocation Assistance (RAP)	$0		$0
G. Clearance/Demolition	$1,000,000	5%	$1,377,142
H. Title & Escrow	$0		$0
I. Total Estimated Right of Way Cost	$211,367,382	**Rounded**	**$291,083,000** *
J. Construction Contract Work	$0		

2. Current Date of Right of Way Certification July 1, 2030

3. Parcel Data:

Type		Dual/Appr	Utilities		Railroad	
X	0		U4 - 1	0	C&M Agreement	0
A	1		- 2	0	Service Contract	0
B	1		- 3	0	Easements	0
C	0	0	- 4	0	Rights of Entry	0
D	0	0	U5 - 7	5	Clauses	0
RR	0		- 8	0		
Total	**2**		- 9	0		

Excess 0

Areas:		Mitigation		Misc. R/W Work	
R/W	67.93 AC	Impacts	2	RAP Displacees	N/A
TCE	N/A	Parcels	1	Clear/Demo	N/A
Excess	N/A	Credits	1	Permit to Enters	N/A
Mitigation	2 Ac.			Condemnation	0
				USA Involvement	Yes

4. Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).

Three State Park and USA land APNs involving acquisition (2 parcels) and relinquishment.

5. Are any properties acquired for this project expected to be rented, leased, or sold?

Yes _____ No **X**

6. Are RAP displacements required?

Yes _____ No **X**

No. of single family N/A No. of business/nonprofit N/A

No. of multi-family N/A No. of farms N/A

Based on Draft/Final Relocation Impact Statement/Study dated N/A

N/A Sufficient replacement housing will be available without last resort housing.

N/A Sufficient replacement housing will not be available without last resort housing.

7. Is there an effect on assessed valuation?

Yes _____ No **X** Not Significant _____

8. Are there any items of Construction Contract Work?

Yes _____ No **X**

There is no Construction Contract Work associated with the project.

9. Are utility facilities or rights of way affected?

Yes _____ No **X** Phase 4 Capital **$0**

Names of Utility Companies requiring verification only.

Pacific Power (Electric), Frontier Communication (Communication), Charter Communication (Communication), County of Del Norte (Water/Sewer)

Names of Utility Companies with conflicts.

None Anticipated

Additional information concerning Utility Involvement on this project.

No conflicts anticipated. As additional information becomes available, this estimate may need to be revised.

10. Are railroad facilities or rights of way affected?

Yes ____ No **X** Phase 4 Capital **$0**

11. Are USA Lands or Rights Affected?

Yes **X** No ____ Phase 4 Capital **$0**

Agencies Involved:

US Forest Service ____	BLM ____	Army Corps of Engineers ____
National Parks X	BIA ____	Vetrans Administration ____
US Fish & Wildlife ____	GSA ____	____

Rights or Permissions to acquire:

Easement X	Special Use Permit ____	Courtesy Letter ____
Right of Way Grant ____	Cooperative Work Agreement ____	Cost Recovery ____
Mineral Agreement ____	Letter of Concurrence ____	Timber Sale ____
		____

12. Is an RE Office required for the project?

Yes **X** No ____

Type of RE Office

Modular **X** Move In ____

13. Were any previously unidentified sites with hazardous waste and/or material found?

Yes ____ None Evident **X**

14. Are there material borrow and/or disposal sites required?

No **X** Optional ____ Mandatory ____

15. Are there potential relinquishments and/or abandonments?

Yes **X** No ____

Relinquishment is on Alt F only

16. Are there any existing and/or potential airspace sites?

Yes ____ No **X**

17. What type of mitigation is required for the project?

Mitigation details to be determined.

18. Is it anticipated that Caltrans will perform all Right of Way work?

Yes **X** No _____

19. Indicate the anticipated Right of Way schedule and lead time requirements.

Right of Way Lead Time will require a minimum of **36** months after we receive first appraisal maps, utility conflict maps, necessary environmental clearances and freeway agreements have been approved and obtained. Additionally a minimum of **36** months will be required after receiving the last appraisal map to Right of Way for certification.

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* Requested lead time provides insufficient time to acquire Orders of Possession if condemnations are required.

Evaluation Prepared By:

Right of Way Kelly Darby Date 12/12/2023
KELLY DARBY

Reviewed By

RW Project Coordinator Yvonne Becker Date 12/12/2023
YVONNE BECKER

I have personally reviewed this Right of Way Data Sheet and all supporting information. I certify that the probable Highest and Best Use, estimated values, escalation rates and assumptions are reasonable and proper, subject to the limiting conditions set forth, and I find this Data Sheet to be complete and current.

JEREMIAH JOYNER
Senior Right of Way Agent
Project Delivery Branch
Eureka

12/12/2023
Date

For: TADJ RATAJCZAK
Assistant Chief
North Region Right of Way
Eureka/Redding

12/12/2023
Date

Attachment F

Draft Environmental Impact Report/ Environmental Impact Statement and Draft Section 4(f) Evaluation

Draft EIR/EIS Not Attached

Attachment G

Materials Report

State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

M e m o r a n d u m

Serious drought.
Help save water!

To: Andre Guimaraes, Branch Chief
Design E3

Date: August 16, 2023

File: 01-DN-101
PM 12.7/16.5
EA: 01-0F280
EFIS: 0115000099
Last Chance Grade
Permanent
Restoration

Attn: Todd Lark
Design E3

From: Tai Aqua Morgan Marbet
Materials Engineering
Eureka Materials Lab
North Region Construction- West Area

Subject: **Materials Recommendation**

In response to a request for an updated materials recommendation from your office dated June 16, 2023, the following information is provided. The Department's Document Retrieval System (DRS) and the Materials Laboratory's project history files were reviewed for previous work within and adjacent to this project's limits. No field review was performed at this time. Structural section design for Alternative X & F is based on an assumed soil classification **CL** with modulus of elasticity of **12ksi** (R-value of **20)** gained by using Subgrade Enhancement Geosynthetics (SEG). The structural section strategies are a 20-year and a 40-year design life for asphalt pavements and a 40-year design life for concrete pavement. Traffic index was provided by District 1, Office of Transportation Analytics, Forecasting & Modeling. Please request an updated materials recommendation based on soil testing and field review when this project enters the next phase of project development.

Existing Structural Section

A review of the as built files, and the Department's Ground Penetrating Radar (iGPR) plot indicates an existing structural section thickness ranging from approximately 0.75 foot to 2.30 feet of Hot Mix Asphalt (HMA), placed over base layer of multiple types, and thickness; 0.67 foot of Cement Treated Base (CTB), over 0.50 foot to 2.00 feet of

aggregate base, and aggregate subbases. Numerous emergency projects; slide and slipout repairs, and storm damage repairs has been implemented throughout the existing roadway history within this project's limits. Currently a landslide repair project is in construction within this project limits (Project number 01-0L040, PM12.0/16.5). A CAPM project (01-0J210) is programmed for the year 2025 and proposes to overlay the existing pavement with a 0.20 foot of Rubberized Hot Mix Asphalt- Gap Graded (RHMA-G). Also, a restoration and SPGA wall project is programmed for the year 2027 (Project number 01-0K140, PM12.6/13.2).

Rubberized HMA

Estimated quantities of Rubberized HMA (RHMA) will be more than 1,000 tons; therefore, this project shall be required to use Rubberized HMA (RHMA) following the guidelines in the *Crumb Rubber Usage in Hot Mix Asphalt Pavements* memo signed in February 2015, by K. Sutliff and S. Takigawa, and Section 631.5 of the Highway Design Manual. If the stage construction operations require less than 1,000 tons of RHMA per stage, or if there is any constructability issue in using RHMA in the structural section, please send us a request so we will evaluate and make changes on the HMA type accordingly.

Shoulders

For a new or reconstructed shoulder, Highway Design Manual (HDM) Section 613.5(2)(b) states that the shoulder shall be designed to match the Traffic Index of the adjacent traffic lane if any of the following condition exists: the shoulder width is less than 5 feet, the median width is 14 feet or less, or on roads with less than two lanes in direction of travel and there is a sustained grade of over 4 percent without a truck climbing lane. If the shoulder width is equal to or greater than 5 feet wide, the TI of the shoulder should match the TI of the traffic lane for the first two feet and the remaining shoulder width TI should be no less than 2% of the projected ESAL of the adjacent lane TI. Both strategies for traveled way and shoulder are presented below for consideration; however, the Designer may elect to use the traveled way structural section for shoulder for the ease of construction.

New Structural Sections Alternatives X & F

In order to perform a Life Cycle Cost Analysis (LCCA) we provide two strategies, a 20-year design life strategy and a 40-year design life for the flexible pavement. The rigid pavement minimum design life is 40 years.

Alternative F

Based on the document provided with the materials request memo by Design E2, this alternative proposes a 5,600 foot long tunnel that departs US101 at PM 14.06 and reconnects with US 101 at PM 15.56. For the pavements outside of tunnel (and approach slabs) an asphalt pavement with a 20-year and 40-year design life structural section strategies for traveled way and shoulder similar to Alternative X is provided below. A rigid (concrete) pavement with a 40-year design life is provided for the tunnel and the approach slabs.

Alternative X

Based on the preliminary plans provided with the materials request memo by Design E3, Alternative X would involve reengineering a 1.6-mile-long portion of the existing roadway. This alternative would include a series of retaining walls, underground drainage features, and strategic eastward retreats to minimize the risk of landslides. A 20-year and 40-year design life structural section strategies for traveled way and shoulder are provided below and can be used as a new structural section for the pavement within this new roadway alignment.

Traveled Way (20 Year Design Life)

Based on an assumed soil classification of **CL** with improved modulus of elasticity **12.0 ksi** and R-value of **20** (gained by using subgrade enhancement geosynthetics (SEG)) and a 20-year traffic index of **9.5**, the following structural section strategies are recommended for traveled way. Each strategy is structurally equivalent. Strategy 3 should only be applied under special circumstances. Subgrade soil classification CL requires a minimum AB depth of 0.5’ or equivalent.

Strategy	RHMA-G	HMA-A	AB (Cl-2)	AS (Cl-2)	SEG
1	0.20’	0.40’	0.55’	0.50’	YES
2	0.20’	0.40’	0.75’	------	YES
3	0.20’	0.50’	------	------	YES

Shoulder (20 Year Design Life)

The following structural section strategies are recommended for shoulders greater than five feet in width; and, are based on an assumed soil classification of **CL** with improved modulus of elasticity **12.0 ksi** and R-value of **20** (gained by using subgrade enhancement geosynthetics (SEG)) and a 20-year Shoulder Traffic Index of **6.0**. Each strategy is structurally equivalent. Strategy 3 should only be applied under special circumstances.

Subgrade soil classification CL requires a minimum AB depth of 0.5' or equivalent. Aggregate depths should match the grading plane of the adjacent travelled way.

Strategy	RHMA-G	HMA-A	AB (Cl-2)	AS (Cl-2)	SEG
1	0.20'	0.20'	0.55'	0.50'	YES
2	0.20'	0.20'	0.75'	------	YES
3	0.20'	0.20'	------	------	YES

Traveled Way (40-Year Design life)

The following structural section strategy is recommended for traveled way within this projects limits and is based on an assumed soil classification of **CL** with improved modulus of elasticity **12.0 ksi** and R-value of **20** (gained by using subgrade enhancement geosynthetic (SEG)) and a 40-year Traffic Index of **10.0**. The 40-year design life structural section provided below is designed in accordance to Section 633.1(3)(e) of HDM. Strategy 3 should only be applied under special circumstances. Subgrade soil classification CL requires a minimum AB depth of 0.5' or equivalent.

Strategy	RHMA-G	HMA-A	AB (Cl-2)	AS (Cl-2)	SEG
1	0.20'	0.45'	0.55'	0.50'	YES
2	0.20'	0.45'	0.75'	------	YES
3	0.20'	0.55'	------	------	YES

Shoulder (40-Year Design Life)

The following structural section strategies are recommended for shoulders greater than five feet in width; and, are based on an assumed soil classification of **CL** with improved modulus of elasticity **12.0 ksi** and R-value of **20** gained by using subgrade enhancement geosynthetic (SEG)) and a 40-year Shoulder Traffic Index of **6.5**. Each strategy is structurally equivalent. Strategy 3 should only be applied under special circumstances. Subgrade soil classification CL requires a minimum AB depth of 0.5' or equivalent. Aggregate depths should match the grading plane of the adjacent travelled way.

Strategy	RHMA-G	HMA-A	AB (Cl-2)	AS (Cl-2)	SEG
1	0.20'	0.20'	0.55'	0.50'	YES
2	0.20'	0.20'	0.75'	------	YES
3	0.20'	0.25'	------	------	YES

Rigid Pavement for Tunnels (40-Years Design Life)

Structural section for pavements in tunnels should be Portland Cement Concrete (PCC) surface with broomed or tined finish for traction. The following structural section strategy is recommended for traveled way and shoulder for the pavement in the tunnel and approach slabs, and is selected based on assumed soil type II, North Coast climate region and a 40-year Traffic Index of **10** from Section 623.1 of the Highway Design Manual.

0.75' Jointed Plain Concrete Pavement (JPCP)
1.00' AB (Class-2)

Overlay Existing Pavement

After completion of constructing of new roadway alignment, the existing pavement surface at the beginning and end of the construction is likely to have wear and tear due to construction activities. For the length of the existing pavement to remain, affected by construction activities, it is recommended to grind 0.15 foot of existing pavement surface and overlay with 0.15 foot of RHMA-G from edge of pavement to edge of pavement to provide a fresh surface to receive pavement delineation.

ALT Pipe

Based on historic pH and resistivities test values for soils at each drainage location, and the Departments Altpipe tool, proposed thickness of each pipe were developed and are listed in "Attachment A." The recommended minimum thickness for APC are intended for a 50-year design life. Historic pH values indicate corrosive pH levels pH < 5.0 in multiple areas. Soil testing for each culvert location will be required at the next phase of project development.

Notes:

- Local or imported borrow used to construct embankment, must meet a minimum modulus of elasticity of 12 ksi (R-value of 20) when placed within 4 feet of finished grade.

- For structural sections designed to last 20 years, the alternative to use full depth HMA should be considered for special situations only. This would include, but not be limited to, narrow widening, shallow utilities coverage, or reducing traffic control periods due to less overall construction time.

Material Specifications

- Rubberized Hot Mix Asphalt – Gap Graded (RHMA-G): Shall conform to Section 39 of the 2023 Standard Specifications. The estimated unit weight of RHMA-G is 150 lbs/ft^3.

- Hot Mix Asphalt Type- A (HMA-A): Shall conform to Section 39 of the 2023 Standard Specifications. The estimated unit weight of HMA-A is 155 lbs/ft^3.

- Asphalt Binder: For "**North Coast**" climate region shall be **PG 64-16** for both RHMA-G, and HMA-A. The estimated percentage of asphalt to be added per total weight of mixture (Superpave) is **7.5%** for RHMA-G and **5.5%** for HMA-A.

- Paint Binder (Tack Coat): Shall conform to Section 39 of the 2023 Standard Specifications.

- Jointed Plain Concrete Pavement (JPCP): Shall conform to Section 40 of the 2023 Standard Specifications.

- Aggregate Base (AB): Shall be Class 2, conforming to Section 26 of the Standard Specifications.

- Aggregate Subbase (AS): Shall be Class 2, conforming to Section 25 of the 2023 Standard Specifications.

- Asphalt Concrete Dike: The aggregate gradation, asphalt binder grade, and minimum asphalt binder content for dikes shall conform to Section 39-2.01B(11) of the 2023 Standard Specifications.

- Shoulder Backing: Shall conform to Section 19-9 of the 2023 Standard Specifications.

- Subgrade Enhancement Geosynthetics (SEG): Shall be Class B-2 or class B-3 conforming to Section 96-1.02O of the 2023 Standard Specifications.

If you have any questions, please call Matthew Rooney at (707) 496-4366.

Attachments:

TM: mr

cc: T. Lark (ec)
A. Guimaraes (ec)
Lab files (Orig.)

Attachment A

Alternate Pipe Culvert Thicknesses

Alternatives "X & F"

01-HUM-101-PM 12.7/16.5

01-0F280

Drainage System No.	Culverts Under Roadway: Recommended Minimum Thicknesses for 50 Year Service Life								Down Drains 25 Yr. Service Life	Comments
	Post Mile	Pipe Size	Galvanized Corrugated Steel Pipe[1]	Galvanized, Polymeric Sheet Coated CSP[1]	Corrugated Aluminium Pipes[1]	Corrugated PVC Pipe[2]	Corrugated HDPE-TypeS[2]	Reinforced Concrete Pipe[3]	Galvanized Corrugated Steel Pipe[1]	
HUM-101										
1	13.03	18"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
2	13.12	24"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
3	13.17	24"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
4	13.24	24"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
5	13.26	18"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
6	13.31	12"	0.079	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
7	13.36	24"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
8	13.42	24"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Modify Existing 2' CMP
9	13.51	24"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
10	13.57	24"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
11	13.62	24"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
12	13.67	24"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
13	13.73	24"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
14	13.84	24"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
15	13.87	24"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
16	13.97	24"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
17	14.04	18"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified)
18	14.08	18"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Modify Existing 1.5' CMP
19	14.22	30"	0.109	0.079	0.06	Yes	Yes	Yes	----------	Modify Existing 2.5' CMP
20	14.28	n/a	----------	----------	----------	----------	----------	----------	----------	Unlined Swale
21	14.35	24"	0.1090	0.0790	0.06	Yes	Yes	Yes	----------	Modify Existing 2' CPP
22	14.46	6"	n/a	n/a	n/a	n/a	n/a	n/a	----------	Modify Existing .50' CMP (Alt Pipe Min. Diameter = 12")
23	14.56	24"	0.0790	0.0790	0.06	Yes	Yes	Yes	----------	Modify Existing 2' CMP
24	14.65	24"	n/a	n/a	n/a	Yes	Yes	Yes	----------	Modify Existing 2' CMP (pH 4.9)
25	14.73	24"	0.064	0.064	0.06	Yes	Yes	Yes	----------	Modify Existing 2' CMP
26	14.75	18"	0.064	0.064	0.06	Yes	Yes	Yes	----------	Modify Existing 1.5' CMP
27	14.88	20.4"	0.064	0.064	0.06	Yes	Yes	Yes	----------	Modify Existing 1.7' CMP
28	14.96	18"	0.064	0.064	0.06	Yes	Yes	Yes	----------	Modify Existing 1.5' HDPE
29	15.02	18"	0.064	0.064	0.06	Yes	Yes	Yes	----------	Modify Existing 1.5' CMP
30	15.03	24"	n/a	n/a	n/a	Yes	Yes	Yes	----------	Drainage Worksheet (No work specified) (pH 4.4)
31	15.06	24"	0.109	0.109	0.06	Yes	Yes	Yes	----------	Modify Existing 2' CMP
32	15.15	18"	n/a	0.109	0.06	Yes	Yes	Yes	----------	Modify Existing 1.5' CMP
33	15.31	18"	n/a	n/a	n/a	Yes	Yes	Yes	----------	Modify Existing 1.5' HDPE (pH 4.95)
34	15.38	18"	n/a	0.109	0.06	Yes	Yes	Yes	----------	Modify Existing 1.5' CMP
35	15.54	24"	.079	0.064	0.06	Yes	Yes	Yes	----------	Modify Existing 2' HDPE
36	15.6	24"	.079	0.064	0.06	Yes	Yes	Yes	----------	Existing 2' HDPE
37	15.65	30"	.079	0.064	0.06	Yes	Yes	Yes	----------	Modify Existing 2.5' HDPE
38	15.76	36"	0.064	0.064	0.06	Yes	Yes	Yes	----------	Exisitng 3' Steel

Notes:
(1) Corrugated Metal Pipe shall conform to Section 66 of the 2023 Standard Specifications
(2) Plastic Pipe shall conform to Section 64 of the 2023 Standard specifications.
(3) Reinforced Concrete Pipe shall conform to Section 65 of the 2023 Standard Specifications.
(4) Concrete for RCP at this location shall comply with Section 90-1.02H Concrete in Corrosive
(5) Welded Steel Pipe (WSP) shall comply with the Section 70 of the 2023 Standard Specifications. Refer table in Section 79-1.02C(1) For minimum wall thickness for differer

Attachment H

Transportation Management Plan Data Sheet

State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

DRAFT TRANSPORTATION MANAGEMENT PLAN UPDATE

To: TODD LARK
Project Engineer
NR Design E3

Date: August 15, 2023
File: DN-101-12.7/16.5
EA: 01-0F280
EFIS: 01 1500 0099

From: PAUL HAILEY, Chief
District 1 Work Zone Operations

Last Chance Grade Permanent Restoration

Project Information

Location:	In Del Norte County, from 0.0 to 3.8 miles north of the Wilson Creek Bridge (#01-0005).
Type of Work:	Develop a long-term solution to roadway failures at Last Chance Grade. Alternative X plans to realign the existing alignment, construct walls and construct drainage systems. Alternative F plans to realign the existing alignment, construct a tunnel, construct a bridge at the north tunnel portal and construct an O/M Center.
Anticipated Traffic Control:	Reversing control with flagging or a temporary signal system (TSS) Passing lane closures
Estimated Max Delay:	30 minutes from 8pm-7am 15 minutes from 7am-8pm
Peak Hour Traffic Vols:	10pm-5am: 125 vph 5am-7am; 8pm-10pm: 250 vph 7am-8pm: 700 vph
WZ Speed Limit Reduction:	A work zone speed limit reduction is required unless an exception is on file (form CEM-1301).
Working Days:	2,000 days
Target PAED Date:	November 17, 2025
Target RTL Date:	September 2, 2030
D1 Traffic/TMP Mgr:	Paul Hailey (707) 496-1562
TMP Contact:	Jamie Lusk (707) 498-1594

Anticipated Traffic Impacts

Significant traffic impacts are not anticipated provided the following recommendations and requirements are incorporated into the project. In conformance with Deputy Directive-60, District Lane Closure Review Committee (DLCRC) approval is not required for projects with a maximum anticipated traffic delay of 30 minutes. If it is determined that an operation will cause greater than 30 minutes of delay, DLCRC approval is required.

Lane Requirements

- See Chart K1 "Conventional Highway Lane Requirements" for lane closure hour restrictions.

- See Chart F "Lane Closure Restrictions for Designated Holidays" for lane closure day restrictions.

Public Notice

- Contact the Transportation Permits Branch at least 15 business days before implementing proposed changes in vertical clearances, horizontal clearances (including shoulders) or both. This requirement provides notification to annual permit holders regarding new/temporary restrictions.

- Contact the District Public Information Office at (707) 445-6444 at least 10 business days before the start of construction.

- Each closure must be entered in the Lane Closure System (LCS).

  - Planned lane closures are required to be reported in LCS which are communicated to the public through Quickmap.

  - Lane closures are required to be statused daily in LCS which allows for real time information to be communicated to the public through Quickmap.

- The Resident Engineer must provide information to residents and businesses regarding lane closure requirements that may impact commerce and travel adjacent to the work area.

- Notify the following local authorities at least 10 business days before placing any lane closures:

Authority	Contact Info	Remarks
County of DN Emergency Services	(707) 464-7255	Regarding temp. traffic control and potential delays.
Pelican Bay State Prison	(707) 465-9040	Notify the guard and medical staff regarding temp. traffic control and potential delays.
DN Unified School District Office	(707) 464-6141	Regarding impacts to district schools.

Bicyclist Accommodation

- This section of Route 101 is part of the Pacific Coast Bike Route. Bicyclists must be accommodated through the work zone.

- Bicycle regulatory or warning signs must be included to alert road users of potential motorist/bicyclist conflicts.

- During reversing control using flaggers, bicyclists must be instructed to join the vehicle queue.

- During reversing control using a temporary signal system:

  a) The R4-11 sign (BICYCLES MAY USE FULL LANE) must be placed prior to the temporary signal system zone.

  b) All red timing must be adjusted to facilitate bicyclists through the lane closure or

  c) Install a push button that adjusts red timing to facilitate bicyclists through the lane closure.

- During lane reduction traffic control, bicyclists must be provided space adjacent to the open traffic lane to traverse through the work zone.

Traffic Control

- One reversing control lane closure is allowed within the project limits. Passing lane closures may be needed to help facilitate reversing control.

- Reversing control with flagging must be in conformance with the Caltrans Standard Plan T13 "TRAFFIC CONTROL SYSTEM WITH REVERSIBLE CONTROL ON TWO LANE CONVENTIONAL HIGHWAYS".

  - A minimum of 10 ft of paved roadway must be open for use by public traffic.

  - Advance flagger placement must be in conformance with the Caltrans Standard Plan T13A "TRAFFIC CONTROL SYSTEM TWO LANE CONVENTIONAL HIGHWAYS".

    a) Provide advance flaggers during hours of daylight.

    b) A PCMS may be used in place of an advance flagger during hours of darkness.

  - Provide additional flaggers at all intersections and driveways within the traffic control area.

    a) The C36(CA) sign (TRAFFIC CONTROL-WAIT AND FOLLOW TRAFFIC) may be used in place of an additional flagger.

    b) The C37(CA) sign (TRAFFIC CONTROL-WAIT AND FOLLOW PILOT CAR) must be used when a pilot car is used.

- Do not place portable transverse rumble strip arrays or C45(CA) signs for reversing control. Use advance warning sign distance "C" between signs W20-1 and W20-4.

- In accordance with TOPD 21-03 and Automated Flagger Assistance Device (AFAD) Guidelines, AFADs are not recommended due to insufficient shoulder widths (less than 7 ft) throughout the majority of the project. Due to the inconsistent available shoulder widths, consider including supplemental funds in the Maintain Traffic item to cover any incidental use.

- If a work zone speed reduction is implemented, lane closures must also be in conformance with Caltrans Standard Plan T22 "TRAFFIC CONTROL SYSTEM FOR CONSTRUCTION WORK ZONE SPEED LIMIT REDUCTION ON TWO LANE CONVENTIONAL HIGHWAYS".

- Consider reversing control using a temporary signal system.

  - The maximum temporary signal system length from 7am-8pm is 3,300 ft.

  - Impacts to private driveways and/or side roads need to be investigated. Although it is preferred to not signalize driveways and /or side roads, if a 3-phase signal is needed any existing unpaved surfaces may be an issue.

  - A temporary signal system must provide an adequate parking location for a signal-maintenance vehicle. This pull-off location will allow proper access of the signal controller and the generator.

  - During the use of a temporary signal system, 12-inch flashing beacons must be installed on the three advance construction signs (W20-1, W20-4, and W3-3) as shown in the 2014 CA MUTCD Figure 6H-12 Typical Application 12 "Lane Closure on a Two-Lane Road Using Traffic Control Signals". Also, include either the W1-4L warning sign or the W1-4R warning sign to guide the traveling public back into their lane.

- Work that requires a passing lane closure on a multilane facility must be in conformance with Caltrans Standard Plan T10 "TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON FREEWAYS AND EXPRESSWAYS".

  - A minimum of 1 paved lane in each direction of travel must be open for use by public traffic.

  - A minimum of 5 ft between the edge of traveled way and the devices used for the lane closure must be maintained to allow bicycle passage.

  - If a work zone speed limit reduction is implemented, lane closures must also be in conformance with Caltrans Standard Plan T18 "TRAFFIC CONTROL SYSTEM CONSTRUCTION WORK ZONE SPEED LIMIT REDUCTION ON FREEWAYS AND EXPRESSWAYS.

- When no active construction activities are occurring and temporary road conditions are in place that impact traffic, consider implementing a work zone speed limit reduction.

- Keep the full width of the traveled way open to traffic when no active construction activities are occurring in the traveled way or within 6 ft of the traveled way.

- Portable Changeable Message Signs (PCMSs) are required to notify the public of closures related to this project.

  - Place PCMSs at the locations shown and in advance of the 1st warning sign for each stationary lane closure.

  - Start displaying the PCMS message 15 minutes before closing the lane.

  - The minimum height of the PCMS must be 7 ft.

- Maintain access to businesses, side roads and residences. When work or traffic queues extend through an intersection, additional traffic control will be required at the intersection.

- The project engineer should assess the need for Construction Zone Enhanced Enforcement Program (COZEEP) funding. Consult with the area construction engineer or resident engineer to determine which specific construction operations should use COZEEP. For guidance regarding COZEEP use criteria, see the CA DOT Construction Manual Section 2-215C.

Project Coordination

Currently, there are no projects anticipated having closures within this project's work limits. Construction dates analyzed were 4/14/2031 through 10/14/2039. If this project's construction schedule needs to change, please consider the following project's construction schedules:

Contract No	Location	Const Season	Type of Work	Est Delay
01-0K1404	DN-101-12.6/13.2	2027/2028	Construct wall	Minimal
01-0K6904	DN-101-10.8/15.8	2028/2029	Rehabilitate culverts	10 minutes
01-0K9504	DN-101-15.6/16.2	2025/2028	Improve super elevation	10 minutes
01-0M1204	DN-101-18.4/19.3	2026/2027	Improve super elevation	15 minutes
01-0M2504	DN-101-0.0/46.5	2024/2026	Install fiber optic cable	15 minutes

TMP Elements Needed for Cost Estimate

Item Code	Item	Unit	Minimum Cost
014105	Alternative Temporary Crash Cushion TL-3[1]	EA	TBD
010413	Portable Radar Speed Feedback Sign Systems[2]	LS	TBD
013804	Stationary Impact Attenuator Vehicle[3]	DAY	$750/IAV-day
066062	COZEEP Contract[4]	LS	$130/officer-hr
066063	Traffic Management Plan – Public Information	LS	$25,000
066070	Maintain Traffic[5]	LS	TBD
120090	Construction Area Signs	LS	TBD
120100	Traffic Control System[5]	LS	TBD
120320	Temporary Barrier System[6]	LF	TBD
128601	Temporary Signal Systems[7]	LS	TBD
128652	Portable Changeable Message Sign[8]	LS	TBD

[1]A temporary crash cushion may be needed at the end of a temporary barrier system.
[2]Include the PRSFSS item if a work zone speed limit reduction will be implemented. For item estimating guidance see Caltrans Standard Plans T18 and T22.
[3]Consider including an IAV(s) when workers on are on foot within 15 ft of traffic that is not separated by a temporary barrier system.
[4]Consult Construction for number of hours; 2 officers required during hours of darkness.
[5]For item estimating guidance see the Flagging Guidelines at https://construction.onramp.dot.ca.gov/bid-item-guidelines.
[6]Temporary barrier system may be needed for construction staging, traffic handling or worker safety.
[7]Consult Traffic Electrical for further details.
[8]Need a minimum of 2 PCMS for public notice (1 for each direction of travel).

Contingency Plan

The Contractor must prepare a contingency plan for reopening closures to public traffic. The Contractor must submit the contingency plan for a given operation to the Engineer within 1 working day of the Engineer's request. Contingencies for unanticipated delays, emergencies, etc. must be coordinated between the Engineer and the Contractor.

CC: JMatteoli
Traffic Safety
PIO

Chart K1
Conventional Highway Lane Requirements

County: Del Norte	Route/Direction: 101/NB, SB	PM: 12.7/16.5

Closure limits:

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	
Fridays	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	
Saturdays	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	
Sundays	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	

Legend:

1	Provide at least one 11 ft through traffic lane for use by both directions of travel (Reversing Control). The maximum lane closure length is 9,100 ft.
2	Provide at least one 11 ft through traffic lane for use by both directions of travel (Reversing Control). The maximum lane closure length is 3,300 ft.

REMARKS:

1. Passing lanes may need to be closed to help facilitate reversing traffic control.
2. If a passing lane is closed, offset the lane closure devices 5 ft from the lane line to provide space for bicyclists.
3. If closing a portion of a passing lane, maintain a minimum 0.5 miles of length or close the entire passing lane.

Chart F
Lane Closure Restrictions for Designated Holidays

Thu	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri	Sat	Sun
xx	**H** xx	xx	xx							
	xx	**H** xx	xx							
	xx	xx	**H** xx	xx						
	xx	xx	xx	**H** xx						
				xx	**H** xx					
					xx	**H** xx				
						xx	**H** xx	xx	xx	xx

Legend:

	Refer to lane requirement charts
xx	Except during the use of a temporary signal system, the full width of the traveled way must be open for use by traffic.
H	Designated Holiday

Attachment I

Risk Tool

Project Information

Checkpoint:	PA&ED	*Project Manager:*	Jaime Matteoli
Date:	2023-11-21	*Program:*	2018 (SHOPP)
EA:	01-0F280	*Capital Costs:*	$1,466,725,000
EFIS ID:		*Support Costs:*	$602,214,000
Project Nickname:	Last Chance Grade - Alternative X	*Total Costs:*	$2,068,939,000
County/Route/PM:	DN/101/12.0-15.5	*RTL Target:*	2030-09-02

Calculated Risk Reserve

Last Run Date:

Project Phase	Confidence Level	Resource Hours	Reserve $'s	Confidence Level	Schedule Reserve
0 (PA&ED)	50%	-	$0	50%	days
1 (PS&E)	40%	-	$0	50%	days
2 (RW Sup)	50%	-	$0	50%	days
3 (Con Sup)	50%	-	$0	50%	days
4 (Con Cap)	50%	-	$0		-
9 (RW Cap)	50%	-	$0		-
Project Total		-	$ -		days

Risk Register

version 2.02 03/01/2023

Risk Identification			Phase	Initial Risk Assessment		Risk Response		Residual Risk		Risk Status	
				Initial Risk Probability		Response Strategy		Residual Risk Probability			
RISK ID # / Status / Type / RiBS Sub Category	Risk Statement: "As a result of <root cause>, <uncertain event> may occur, which would lead to <effect on objective(s)>." / Risk Trigger / Risk Owner	Proactive Response (prior to risk occuring) / Response if Risk Occurs		Cost Impact ($k)	Schedule Impact	Cost Impact ($k)	Schedule Impact	Cost Impact ($k) (Y indicates Residual Risk will be included in Reserve Calculations)	Schedule Impact (Y indicates Residual Risk will be included in Reserve Calculations)	Risk Assumptions and Status	Date Risk Identified / Anticipated Resolution Date / Date Last Updated
1	GEOTECHNICAL DISCOVERIES ALTER SCOPE: Because of the complexity and magnitude of the geologic instability, geotech investigations could lead to discoveries that fundamentally alter project scope(alternative eliminated, increased scope, or new possible alternative come to light) resulting in major cost increases and delays to perform rework or to extend studies and preliminary engineering.	Caltrans is working closely with our partners to facilitate the environmental process for the geotechnical drilling and to reduce risk of delays to this process. The public engagement and partnership efforts will mitigate this risk.		4 - High (51-70%)		Mitigate		3 - Moderate (31-50%)		Geotechnical Investigations are being performed in stages and will be performed throughout the first few years of the environmental phase. All of the project alternatives are located in areas of active or historic landslides. The Geotechnical team will not be certain that project alternatives meet the purpose and need of the project until these investigations have been completed.	2023-08-28
Active			0-PA&ED	$5000 - $10000	90 - 180 days	$4,455		$6067 - $12132 Y	90 - 180 days Y		
Threat			1-PS&E	<$6000	90 - 180 days	$1,221		$0 - $5940 Y	90 - 180 days Y		2024-09-30
STR: Geotechnical	Geotechnical Reports		2-RW Sup								
			3-Con Sup		30 - 90 days				30 - 90 days Y		2023-12-04
	Jaime Matteoli		4-Con Cap	<$2500				$0 - $63930 Y			
			9-RW Cap								
2	FUNDING UNCERTAINTY: As a result of Federal and State funding uncertainty, funding shortfall for future phases (PS&E, ROW and Construction) may occur, which will lead to impacts on cost and schedule.	Caltrans will work closely with funding partners and elected officials to manage funding needs and communicate needs and risks to the CTC and public at large.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		The project will be funded by phase. Currently there is full funding of $50M programmed for 0 phase. This project costs well above what is typical for SHOPP Permanent Restoration Program. Achieving full funding for each phase will be a challenge and may require special action on the part of the State or Federal governments. Stops and starts would require rework and other inefficiencies.	2023-08-28
Active			0-PA&ED	$2500 - $5000	30 - 90 days	$1,551		$0 - $3466 Y	30 - 90 days Y		
Threat			1-PS&E	<$6000	90 - 180 days	$1,139		$0 - $4950 Y	90 - 180 days Y		2030-09-02
PPM: Funding	Federal or State funding for future phases is delayed or denied		2-RW Sup								
			3-Con Sup								
			4-Con Cap								2023-12-04
	Jaime Matteoli		9-RW Cap								
3	TRIBAL COORDINATION: Because of the unique project location within State and National Park Boundaries and within tribal boundaries or ancestral territories of four federally-recognized tribes, if a proper, respectful, and open relationship is not maintained with tribal governments, the project would be delayed and support costs would increase.	Caltrans will continue positive engagement with tribal governments before and after any Programmatic Agreement is signed.		1 - Very Low (1-10%)		Mitigate		1 - Very Low (1-10%)		Caltrans cultural team is facilitating a cultural resource working group with tribal governments and State and National Parks that is proactively working toward a Programmatic Agreement on this project.	2023-08-28
Active			0-PA&ED	<$2500	0 - 30 days	$33		$0 - $5199 Y	0 - 30 days Y		
Threat			1-PS&E								2025-11-17
ENV: ArchaeologIcal & Cultural	Programmatic agreement not signed		2-RW Sup								
			3-Con Sup								
			4-Con Cap								2023-12-04
	Tim Keefe, Archaeologist		9-RW Cap								

Risk Identification			Phase	Initial Risk Assessment		Risk Response		Residual Risk		Risk Status	
RISK ID # / Status / Type / RiBS Sub Category	Risk Statement "As a result of <root cause>, <uncertain event> may occur, which would lead to <effect on objective(s)>." / Risk Trigger / Risk Owner	Proactive Response (prior to risk occuring) / Response if Risk Occurs		Initial Risk Probability		Response Strategy		Residual Risk Probability		Risk Assumptions and Status	Date Risk Identified / Anticipated Resolution Date / Date Last Updated
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4	ENVIRONMENTAL DOCUMENT INADEQUACIES: If inadequacies are discovered in project documents, agency coordination, or public engagement, major project delays and cost increases could result.	Caltrans will pursue all resources available to increase awareness and skill in these critical activities by (1) utilizing the statewide public engagement contract and (2) procuring engagement services via on-call or project		3 - Moderate (31-50%)				2 - Low (11-30%)		Currently, the history or agency coordination and public engagement has been positive. However, there is a high likelihood that some difficulties emerge during the environmental process, resulting in conflict with local partners who then garner support from national/international organizations, that affect project cost and schedule. The project is in a uniquely sensitive location and the potential impacts are uniquely severe. An estimated 13 agencies will have influence on the project environmental document or permits and a number of interest groups, some with opposing objectives, will be engaged in ground truthing all	2023-08-28
Active			0-PA&ED	<$2500	30 - 90 days	$1,023		$0 - $5546 Y	30 - 90 days Y		2024-09-30
Threat		Assess allegations and determine if additional surveys and documentation needed in consultation with Caltrans Legal	1-PS&E	<$6000	90 - 180 days	$1,023		$0 - $5280 Y	90 - 180 days Y		
ENV: Biological	Environmental Milestones		2-RW Sup								2023-12-04
	Jaime Matteoli		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
5	LITIGATION If NGOs file lawsuits on this project, major delays and cost increases would occur.	The PDT will continue to engage the stakeholders and partners with a high level of openness, transparency, and accountability. Maintaining stakeholder/partner support and understanding their needs is paramount to		2 - Low (11-30%)		Active Acceptance		2 - Low (11-30%)		Caltrans projects with much smaller environmental impacts are currently delayed because of lawsuits by local, national or international NGOs.	2023-08-28
Active			0-PA&ED	<$2500	90 - 180 days			$0 - $3466 Y	90 - 180 days Y		2026-03-30
Threat			1-PS&E								
ENV: Archaeological & Cultural	Environmental Milestones		2-RW Sup								2023-12-04
	Jaime Matteoli		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
7	MITIGATION COSTS AND SCHEDULE (Redwood National and State Park) Because the mitigation estimates are highly uncertain and the potential environmental impacts are significant, there could be new discoveries about mitigation requirements that greatly increase cost and schedule.	The PDT will continue to engage the stakeholders and partners to seek out off-system partner opportunities and on-system improvements.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		The current mitigation cost estimates are preliminary and based on historic percentages. More information and coordination is needed to develop accurate mitigation cost estimates	2023-08-28
Active			0-PA&ED	$2500 - $5000	30 - 90 days	$1,337		$0 - $4333 Y	30 - 90 days Y		2025-11-17
Threat			1-PS&E								
PPM: Schedule and Delivery	Cost Estimate Updates		2-RW Sup								2023-12-04
	Jaime Matteoli		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
9	DESIGN REVISION BASED ON DED PUBLIC COMMENTS As a result of the impacts to late successional trees, public comment on the Draft EIR/S may occur, which would lead to reducing impacts to the trees by revising the design alternative.	Project team to continue and maintaining the public outreach program to inform on the project activities and decisions made beyond the Environmental Phase. Look for opportunities to reach out to the public all the way through the		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)			2023-08-28
Active			0-PA&ED	<$2500	>180 days	$132		$0 - $6621 Y	30 - 90 days Y		2024-03-30
Threat			1-PS&E								
PPM: Public Engagement	Community impacts to the information received on the tree impact		2-RW Sup								2023-12-04
	Jaime Matteoli		3-Con Sup								
			4-Con Cap								
			9-RW Cap								

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Type											
RiBS Sub Category	Risk Trigger	Response if Risk Occurs									Date Last Updated
	Risk Owner										
10	DED PUBLIC COMMENTS FROM NATIONAL/INTERNATIONAL ENV ORGS: As a result of the impacts to late successional trees, public comment from national and international environmental organizations (such as UNESCO) on the Draft EIR/S may occur, which would lead to reducing impacts to the trees by revising the design alternative.			3 - Moderate (31-50%)		Active Acceptance		3 - Moderate (31-50%)			2023-09-06
Active			0-PA&ED	<$2500	>180 days			$0 - $3466 Y	180 - 360 days Y		
Threat			1-PS&E								2024-03-30
PPM: Public Engagement	Community and outside of the region negatively reacts to the information on the tree impact		2-RW Sup								
			3-Con Sup								2023-12-04
	Jaime Matteoli		4-Con Cap								
			9-RW Cap								
11	SPOIL DISPOSAL SITE TRIGGER RECIRCULATION: As a result of late identification of disposal site for excess spoils, additional environmental impacts may occur, which would lead to recirculation of the DED or supplemental environmental analysis.	Project team to look into opportunities including reaching out to ROW team.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		Additional environmental clearance may be needed depending on the new location of the disposal site.	2023-09-06
Active			0-PA&ED	<$2500	>180 days	$33		$0 - $3466 Y	180 - 360 days Y		
Threat		Caltrans to develop & assess disposal site options.	1-PS&E								2024-07-31
ENV: Hazardous Waste	Environmental Milestones		2-RW Sup		0 - 30 days				0 - 30 days Y		
			3-Con Sup								2023-12-04
	Jaime Matteoli		4-Con Cap								
			9-RW Cap	<$5330				$0 - $2000 Y			
12	GEOTECHNICAL CHANGES DURING FINAL DESIGN As a result of additional information gathered (such as geotechnical field data about the location of the slip/failure plane), scope or design changes post Final EIR/S may occur, which could lead to supplemental environmental documentation and additional design effort.			2 - Low (11-30%)		Active Acceptance		2 - Low (11-30%)		Secondary risk to the Risk #1 wherein this risk triggers scope refinement / changes to the preferred alignment resulting in recirculation of Final EIR/S or supplemental environmental documentation during PS&E phase. Model as secondary risk to Risk #1. Worst case scenario we add another $100,000,000 drainage tunnel	2023-09-06
Active			0-PA&ED								
Threat			1-PS&E	<$6000	>180 days			$0 - $5775 Y	180 - 360 days Y		2027-06-30
DSN: Roadway Design	Geotechnical Reports during PS&E		2-RW Sup								
			3-Con Sup		0 - 30 days				0 - 30 days Y		2023-12-04
	Jaime Matteoli		4-Con Cap	$2500 - $5000				$0 - $53250 Y			
			9-RW Cap								
13	DESIGN EXCEPTION APPROVAL As a result of design of the alternative to minimize the environmental footprint and impact, the approval of the various design exceptions may not occur, which would lead to design revisions and potentially additional environmental impacts.	Pre-submittals and design workshops with Caltrans help mitigate design exceptions		3 - Moderate (31-50%)		Mitigate		1 - Very Low (1-10%)		Design exception tables have been submitted to Caltrans with the DPR. Final approval will occur with the preferred alternative with the FPR. Alternative "X" has a design speed of 35 mph, nonstandard horizontal and vertical curves, and nonstandard superelevation runoff.	2023-09-06
Active			0-PA&ED	<$2500	30 - 90 days			$0 - $3465 Y	30 - 90 days Y		
Threat			1-PS&E	<$6000	30 - 90 days			$0 - $2277 Y	30 - 90 days Y		2024-06-30
DSN: Roadway Design	Submittal of DED		2-RW Sup								
			3-Con Sup								2023-12-04
	Jaime Matteoli		4-Con Cap								
			9-RW Cap								

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RiBS Sub Category	Risk Trigger	Response if Risk Occurs									Date Last Updated
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14	CHANGE IN ALT X WALL DESIGN ELEMENTS As a result of potential changes of the design elements (quantities, alignment, wall type, wall height, fire resistant wall facade) of the retaining walls, additional environmental impacts may occur, which would lead to a partial or full recirculation of the DED.			3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)			2023-09-07
			0-PA&ED	<$2500				$0 - $3466 Y			
Active			1-PS&E								2024-06-30
Threat			2-RW Sup								
STR: Structure Design	Submittal of DED		3-Con Sup								2023-12-04
			4-Con Cap								
	Jaime Matteoli		9-RW Cap								
15	LACK OF GEOTECH DATA FOR DRAINAGE GALLERY TUNNELS As a result of the lack of or limited geotechnical data for the design of the drainage gallery tunnels, a significant design revision of the underground drainage system may occur, which could lead to changes in capital costs or long-term maintenance costs for the project or could cause predicted	Perform geotechnical studies early during PS&E.		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		Borings and additional ground water data are needed for the design of drainage gallery tunnels. The later the data is received, there could be impacts to the design.	2023-09-07
			0-PA&ED								
Active			1-PS&E	<$6000	90 - 180 days			$0 - $1650 Y	30 - 90 days Y		2025-11-17
Threat			2-RW Sup								
STR: Geotechnical	Geotechnical data collection and reports		3-Con Sup		Insignificant						2023-12-04
			4-Con Cap	<$2500				$0 - $53250 Y			
	Jaime Matteoli		9-RW Cap								
18	CONSTRUCTABILITY OF DRAINAGE GALLERIES & DRAINS As a result of difficult ground conditions and difficult access, construction of the drainage gallery tunnels, shafts, and radial drain pipes extending upward into the landslide mass could take longer than expected and could lead to significant cost increases for the project.	Consideration of procurement strategies for construction (i.e. CMGC) as well as construction packaging (i.e. pilot program)		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		Current assumptions include the following: 1. Three 30-ft dia vertical shafts; 2. Three 12-ft dia drainage gallery tunnels constructed using TBMs; 3. Six-inch drain pipes penetrating upward from drainage galleries and constructed from within the drainage galleries. The number, length and diameter of the drainage gallery tunnels may be revised with additional geotechnical and groundwater information.	2023-09-07
			0-PA&ED								
Active			1-PS&E	<$6000	90 - 180 days			$0 - $1584 Y	90 - 180 days Y		2030-09-02
Threat			2-RW Sup								
CNS: Structural Construction	Constructability assessment		3-Con Sup	<$21560	90 - 180 days			$0 - $103 Y	90 - 180 days Y		2023-12-04
			4-Con Cap	<$2500				$0 - $53250 Y			
	Jaime Matteoli		9-RW Cap								
19	COMPLEX GEOLOGY TRIGGER ADD'L ENV IMPACTS: As a result of the complexity of the various landslides and geology of the Last Chance Grade Slide Complex, the potential for greater than anticipated impacts to groundwater may occur, which would lead to additional environmental and vegetation impacts.			3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)			2023-09-07
			0-PA&ED								
Active			1-PS&E	<$6000	0 - 30 days			$0 - $21579 Y	0 - 30 days Y		2027-12-31
Threat			2-RW Sup								
ENV: Biological	Differing Site Conditions during Construction		3-Con Sup		30 - 90 days				30 - 90 days Y		2023-12-04
			4-Con Cap	<$2500				$0 - $53250 Y			
	Jaime Matteoli		9-RW Cap								

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20	LANDSLIDE MOVEMENTS DURING DESIGN BIDDING, OR CONSTRUCTION As a result of landsliding or accelerated earthflow movement, repair and redesign of work in progress may occur, which will lead to impacts on cost and schedule.	Consideration of procurement strategies for construction (i.e. CMGC) as well as construction packaging (i.e. pilot program); Continue proactive monitoring and evaluation of site conditions. Prepare contingency designs for		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		Hours/Costs are based on the magnitude of the Feb 2021 slide	2023-09-07
Active			0-PA&ED								
Threat		Delay procurement until design is revised to consider new site conditions. Redesign to accommodate differing site conditions and Issue a change order to the contractor.	1-PS&E	Insignificant	Insignificant	$660					2030-09-02
			2-RW Sup								
CNS: Survey	Landslide movements impacting last topographic survey used for PS&E phase		3-Con Sup	<$21560	90 - 180 days	$248		$0 - $411 Y	30 - 90 days Y		2023-12-04
			4-Con Cap	$2500 - $5000				$0 - $53250 Y			
	Jaime Matteoli		9-RW Cap								
34	ENDANGERED SPECIES DURING PA&ED If federal and/or state regulators designate a new threatened or endangered species during PA&ED that may be present in the project area that is not accounted for in biological surveys, additional environmental surveys and analysis could be required.	The surveys are comprehensive in scope and, upon obtaining species lists for the area, cover the entire footprint 5 times (1x vegetation mapping; 3 x botanical surveys; 1 x tree surveys) as well as at certain areas for wildlife, wetlands,		2 - Low (11-30%)		Active Acceptance		2 - Low (11-30%)		Change in federal and state regulations.	2023-09-27
Active			0-PA&ED								
Threat		Conduct appropriate surveys and analyses; supplemental environmental documentation if needed.	1-PS&E	<$6000	>180 days			$0 - $495 N	180 - 360 days N		2027-12-31
			2-RW Sup								
ENV: Biological	Issuance of new regulations from Federal and/or State regulators		3-Con Sup								2023-12-04
			4-Con Cap								
	Steve Croteau/ District 1		9-RW Cap								
37	ENVIRONMENTAL RE-EVALUATION TRIGGERED As a result of selection of an alternative before field investigations and constructability evaluations are suitably complete, it could be necessary to revisit alternative analysis or develop measures to mitigate constructability obstacles, increasing cost and schedule.	Perform supplemental geotechnical investigations and interdisciplinary constructability reviews. Wait until field studies and constructability evaluations are completed before recommending a preferred alternative.		4 - High (51-70%)		Mitigate		4 - High (51-70%)		Construction access for tunnel equipment and materials would add to the schedule due to the extreme terrain; need to look at the schedule to the challenges.	2023-09-27
Active			0-PA&ED								
Threat		Reassess alternatives selection after field studies and constructability evaluations are completed. Develop mitigation measures for construction obstacles	1-PS&E	<$6000	30 - 90 days			$0 - $21579 Y	30 - 90 days Y		2025-06-30
			2-RW Sup								
DSN: Roadway Design	Selection of preferred alternative prior to completion of field studies and constructability assessment		3-Con Sup								2023-12-04
			4-Con Cap								
	Jamie Matteoli		9-RW Cap								
38	LIMITED STAGING AREAS & HAUL ROUTES As a result of limited areas available for staging operations and limited haul routes, possible means and methods for construction could be restricted for Alternative X, potentially increasing project cost and extending schedule.	Explore variety of feasible means and methods for construction. Develop alternative construction sequencing plans for limited staging areas.		5 - Very High (>70%)		Mitigate		2 - Low (11-30%)		Project has identified potential staging areas and assessed construction haul routes.	2023-09-28
Active			0-PA&ED								
Threat		Conduct focused constructability reviews and/or workshops to review constructability and incorporate findings in Phase 1 - PS&E construction documents.	1-PS&E	<$6000	30 - 90 days	$693		$0 - $10298 Y	30 - 90 days Y		2027-06-30
			2-RW Sup	>$200	0 - 30 days			$181 - $756 Y	0 - 30 days Y		
CNS: Structural Construction	Constructability assessment report identifies difficulty due to limited staging & haul routes		3-Con Sup	<$21560	30 - 90 days			$0 - $14799 Y	30 - 90 days Y		2023-12-04
			4-Con Cap	<$2500				$0 - $53250 Y			
	John Litzinger		9-RW Cap								

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53	CHANGING WETLAND DELINEATION As a result of an extreme storm event causing changes to the existing wetland at the north end of Alt X, changes in delineation may occur, which will lead to impacts on scope, cost and schedule.	If the risk happens the design would be updated to accommodate the wetland changes.		2 - Low (11-30%)		Active Acceptance		2 - Low (11-30%)		The wetland has been delineated in the Federal and State Wetland Delineation reports. Alt X alignment passes adjacent to the wetland	2023-09-28
Active			0-PA&ED	<$2500	30 - 90 days			$0 - $3466 Y	30 - 90 days Y		
Threat			1-PS&E	<$6000	30 - 90 days			$0 - $1650 Y	30 - 90 days Y		2025-11-17
DSN: Stormwater	Storm event causing changes to the wetland		2-RW Sup								
			3-Con Sup	<$21560	90 - 180 days			$0 - $1540 Y	90 - 180 days Y		2023-12-04
	John Litzinger		4-Con Cap	<$2500				$0 - $53250 Y			
			9-RW Cap								
55	ACCESS RESTRICTIONS FOR GEOTECH INVESTIGATIONS Due to access restrictions, insufficient geotech data is collected to allow the selected alternative to advance from conceptual to procurement-level design, causing high contingency costs in bids and/or delays in project funding because of perceived risks.	Increase effort during early PS&E to obtain geotech access and data collection, investigate other methods for obtaining geotech information.		4 - High (51-70%)		Active Acceptance		4 - High (51-70%)		The project conceptual design is based on the geotechnical data gathered so far. There will need to be additional borings prior to procurement and final design to confirm or revise the assumed conditions.	2023-09-28
Active			0-PA&ED								
Threat		Proceed with PS&E phase without geotech explorations and based on best available data, or delay start of PS&E until geotech work is complete.	1-PS&E	<$6000	0 - 30 days			$0 - $21580 N	0 - 30 days N		2028-04-30
STR: Geotechnical	Unable to collect Geotech during PS&E Phase due to Access		2-RW Sup	>$200	0 - 30 days			$181 - $756 N	0 - 30 days N		
			3-Con Sup		30 - 90 days				30 - 90 days N		2023-12-04
	Mala Ciancia		4-Con Cap	<$2500				$0 - $53250 N			
			9-RW Cap								
57	GEOTECH INVESTIGATIONS ASSOCIATED WITH DRAINAGE GALLERIES If the currently planned geotechnical investigations for drainage galleries prove to be insufficient, early procurement of the TBM may not be possible, due to uncertainty in the drainage galleries configuration.	Increase effort during early PS&E to obtain geotech data. Develop flexible construction methodologies and contingency designs.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		The drainage galleries' design has been selected based on drainage and maintenance requirements, and is considered feasible based on existing TBM technology. Without sufficient geotechnical information, contractors might employ inappropriate equipment and methods for excavation and support of the shafts and the drainage gallery tunnels and for installation of the drain pipes.	2023-09-28
Active			0-PA&ED								
Threat		Proceed with PS&E phase without geotech explorations and based on best available geotech data, or delay start of PS&E until geotech work is complete.	1-PS&E	<$6000	0 - 30 days	$611		$0 - $21580 Y	0 - 30 days Y		2030-09-02
CNS: Structural Construction	Insufficient Geotechnical Investigations for Drainage Galleries		2-RW Sup	>$200	0 - 30 days	$378		$181 - $756 Y	0 - 30 days Y		
			3-Con Sup	<$21560	>180 days			$0 - $1540 Y	180 - 360 days Y		2023-12-04
	Jaime Matteoli, PM		4-Con Cap	<$2500				$0 - $53250 Y			
			9-RW Cap								
58	TBM PROCUREMENT As a result of a TBM manufacturer delay, an extended procurement time may occur, which will lead to impacts on schedule.	Conduct geotechnical investigations early in PS&E to allow for TBM procurement prior to completion of design. Prepare separate early TBM procurement package.		3 - Moderate (31-50%)		Mitigate		1 - Very Low (1-10%)		The drainage galleries' design has been selected based on drainage and maintenance requirements, and is considered feasible based on existing TBM technology.	2023-09-28
Active			0-PA&ED								
Threat		Delay the award of construction and/or contractor NTP until after delivery of TBM.	1-PS&E	Insignificant	Insignificant	$248					2030-09-02
CNS: Structural Construction	Delivery date for TBM is later than anticipated contractor NTP		2-RW Sup								
			3-Con Sup	<$21560	>180 days			$0 - $376 Y	180 - 360 days Y		2023-12-04
	Jaime Matteoli, PM		4-Con Cap								
			9-RW Cap								

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	Risk Owner										
59	UNIDENTIFIED UTILITIES As a result of unidentified utilities, changes to design may occur, which will lead to impacts on scope, cost and schedule.	The project has identified existing electric and drainage lines in the project area. Coordination has begun with Pacific Power. Existing drainage culverts are owned by Caltrans and will be modified according to the project design.		1 - Very Low (1-10%)		Active Acceptance		1 - Very Low (1-10%)		The project is located in a national park, so the discovery of unidentified utilities is unlikely. As-builts and ground surveys have not identified any utilities beyond those previously mentioned to date. However, if an unknown utility is encountered during construction, it will need to be tested/identified and relocated/protected-in-place.	2023-09-28
Active			0-PA&ED								2030-09-02
Threat		Develop utility relocation plans and relocate during construction	1-PS&E								
DSN: Utility	Unknown utility is encountered during construction		2-RW Sup								2023-12-04
	Jaime Matteoli, PM		3-Con Sup	<$21560	30 - 90 days			$0 - $342 Y	30 - 90 days Y		
			4-Con Cap	<$2500				$0 - $53250 Y			
			9-RW Cap								
60	ARCHAEOLOGICAL DISCOVERIES: As a result of archaeologic discoveries during design or construction, it has potential to cause delays due to design changes or cost/schedule impacts during construction.	An Archaeological Study Report is in progress. It will identify any sensitive sites to be avoided.		2 - Low (11-30%)		Mitigate		2 - Low (11-30%)		The project area has known archaeological sites. If the Archaeological Study Report identifies additional site(s) that were not previously known, it may require design changes. Furthermore, if archaeological evidence is found during construction, it would trigger large cost and schedule impacts.	2023-09-28
Active			0-PA&ED								2025-11-17
Threat			1-PS&E	<$6000	30 - 90 days			$0 - $21580 Y	30 - 90 days Y		
ENV: Archaeologlcal & Cultural	Environmental Technical Studies		2-RW Sup								2023-12-04
	Tim Keefe / District 1		3-Con Sup		30 - 90 days				30 - 90 days Y		
			4-Con Cap	<$2500				$0 - $56030 Y			
			9-RW Cap								
61	HIGHER GROUNDWATER INTRUSION THAN ANTICIPATED DURING CONSTRUCTION Due to groundwater intrusion flooding may occur during construction, resulting in repair or redesign which will lead to impacts on cost and schedule.	During PS&E, add construction measures in the contract documents to protect against or mitigate flooding. Incorporate flood control measures in design. Include allowance in contract for storm damage.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		The project is in a high-rainfall area and flooding is a possibility. There are creeks in the project area. The Alt X outfall is near the coast. Storm damage could affect existing retaining walls or walls under construction, and drainage galleries under construction.	2023-09-28
Active			0-PA&ED								2030-09-02
Threat		Implement repair or redesign and take steps to minimize possibility of recurrence. Support construction to address any repairs to permanent works or land due to flooding damage.	1-PS&E	Insignificant	Insignificant	$182					
CNS: Structural Construction	Storm related damage occurs during construction		2-RW Sup								2023-12-04
	Jaime Matteoli, PM		3-Con Sup	<$21560	30 - 90 days			$0 - $1848 Y	90 - 180 days Y		
			4-Con Cap	<$2500				$0 - $56030 Y			
			9-RW Cap								
40	EXCESSIVE GROUND MOVEMENTS DURING CONSTRUCTION As a result of unanticipated ground conditions encountered during construction or use of inappropriate tunneling methods, excessive ground movements could cause damage to new or existing project structures or environmental resources, adding to cost and schedule.	Sequence construction work to avoid impacts (e.g. drainage galleries are constructed first and then wait for a season to continue with other activities.). Develop flexible construction methodologies and contingency designs. Pre-		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		Additional geotechnical investigations are planned for Fall 2023, but additional subsurface information will be needed for characterization of ground conditions for tunneling. Even after additional geotechnical data are collected for preliminary engineering and final design, conditions encountered during construction may differ from those assumed, especially in this complex geologic setting.	2023-09-28
Active			0-PA&ED								2030-09-02
Threat		Perform root-cause analysis and revise construction methodology to prevent recurrence.	1-PS&E	Insignificant	Insignificant	$116					
STR: Geotechnical	Construction activity causes damage to existing or new structures or environmental resources.		2-RW Sup								2023-12-04
	Raymond Sandiford		3-Con Sup	<$21560	30 - 90 days	$205		$0 - $21560 Y	30 - 90 days Y		
			4-Con Cap	<$2500				$0 - $53250 Y			
			9-RW Cap								

Risk Identification			Phase	Initial Risk Assessment		Risk Response		Residual Risk		Risk Status	
RISK ID #	Risk Statement "As a result of <root cause>, <uncertain event> may occur, which would lead to <effect on objective(s)>."	Proactive Response (prior to risk occuring)		Initial Risk Probability		Response Strategy		Residual Risk Probability		Risk Assumptions and Status	Date Risk Identified
Status				Cost Impact ($k)	Schedule Impact	Cost Impact ($k)	Schedule Impact	Cost Impact ($k) (Y indicates Residual Risk will be included in Reserve Calculations)	Schedule Impact (Y indicates Residual Risk will be included in Reserve Calculations)		Anticipated Resolution Date
Type											
RiBS Sub Category	Risk Trigger	Response if Risk Occurs									Date Last Updated
	Risk Owner										
25	As a result of potential disconnect and gaps in the alignment screening process, final alignment alternatives may be selected prematurely during PO-B1 study phase which will lead to reintroduction of alternatives previously screened out.	In the scope for PO-C, prepare geotech report and materials report based before the task to interpret and analyze the data from PO-B2				Mitigate				PO-B1 study for AA screening phase is based on qualitative evaluation of pre-existing geotechnical data, and due to timing it does not benefit from detailed analysis of data (still being collected) during the ongoing PO-B2 investigation. Future findings from analysis of PO-B2 data might be cause for change(s) in current AA screening results.	2023-09-27
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
DSN: Roadway Design	Geotechnical investigation during PO-B2		2-RW Sup								2023-12-04
	Dina Potter		3-Con Sup								
49	Various nonstandard design features (reverse curves, superelevation runoff, etc.) are required for some of the alternatives. Delays in approval from Caltrans HQ on Design Standard Decision Document for non-standard design features would impact completion of further design.	Prepare Design Standard Decision Document and submit Caltrans HQ for approval.	4-Con Cap								
Retired			9-RW Cap								
Threat						Mitigate				Alternative "X" has a design speed of 35 mph, nonstandard horizontal and vertical curves, and nonstandard superelevation runoff. Alternative "F" has a reverse curve and some existing nonstandard horizontal curves in the southern part of the alignment (where only shoulder work is taking place). Nonstandard design features have been discussed with Caltrans project team.	2023-09-28
DSN: Roadway Design	Design Standard Decision Document		0-PA&ED								
	Jaime Matteoli, PM		1-PS&E	Insignificant							
54	Caltrans initiative to install Middle Mile Broadband around the state is ongoing. Design should be able to accommodate this initiative if the segment is selected as a location for improvements.	Project should consider broadband requirements during final design and be prepared to install if requested.	2-RW Sup								2023-12-04
Retired			3-Con Sup								
Threat			4-Con Cap								
DSN: Utility	Utility Coordination		9-RW Cap								
	Jaime Matteoli, PM										
29	Due to remoteness and dense canopy, which prevent clear connection to satellites for GPS measurements, measurement deviations are greater than client desires, even with use of equipment collecting data with sub-centimeter accuracy, as requested by D1 for trees.	Conduct equipment test comparing two GPS systems and document use of best available technology available in spring 2021 and equipment specifications. Explore the option to work with third parties and				Active Acceptance				Issues include access to GPS equipment with acceptable accuracy. Note: Internal Consultant team risk. Can this risk not be resolved by setting up a tolerance level within the environmental document and communicating the same to CT and other stakeholders?	2023-09-27
Retired			0-PA&ED								
Threat			1-PS&E	Insignificant							
CNS: Survey	Environmental field surveys		2-RW Sup	Insignificant							2023-12-04
	Maggie Townsley (ICF)		3-Con Sup								
			4-Con Cap								
			9-RW Cap								

Risk Identification			Phase	Initial Risk Assessment		Risk Response		Residual Risk		Risk Status	
RISK ID #	Risk Statement "As a result of <root cause>, <uncertain event> may occur, which would lead to <effect on objective(s)>."	Proactive Response (prior to risk occuring)		Initial Risk Probability		Response Strategy		Residual Risk Probability		Risk Assumptions and Status	Date Risk Identified
Status				Cost Impact ($k)	Schedule Impact	Cost Impact ($k)	Schedule Impact	Cost Impact ($k) (Y indicates Residual Risk will be included in Reserve Calculations)	Schedule Impact (Y indicates Residual Risk will be included in Reserve Calculations)		Anticipated Resolution Date
Type											
RiBS Sub Category	Risk Trigger	Response if Risk Occurs									Date Last Updated
	Risk Owner										
33	Following commencement of fieldwork, client provides change in desired methodology for conducting fieldwork.	District 1 Env and Consultant Env collaborated during method development in late 2020/early 2021, including field demonstration & discussion in Feb 2021 for key resources (vegetation mapping, trees).				Mitigate				The scopes for PO-B1A1 and PO-C are based on direction received to date and/or comments from D1 staff. Changes to this direction after the start of fieldwork could require re-work of fieldwork resulting in delays and cost overruns.	2023-09-27
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
CNS: Survey	Field survey period (Feb-Sept 2021)		2-RW Sup								2023-12-04
	Steve Croteau/ District 1		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
46	The alternative X run within national park land and do not have on-site disposal areas identified. The material would need to be off-hauled. If suitable disposal site(s) for excavated material cannot be found within the expected distance from the site, the project will incur longer haul routes and increased disposal costs.	Coordination is needed to identify opportunities for off-site disposal.				Mitigate				Soil testing needs to be performed to verify that material does not contain hazardous materials. Off-haul costs are about 3x on-site disposal cost. Limited options for disposal in Crescent City.	2023-09-28
Retired			0-PA&ED								
Threat			1-PS&E	Insignificant							
CNS: Structural Construction	Soil Testing, Availability and cost of off-site disposal sites		2-RW Sup								2023-12-04
	Jaime Matteoli, PM		3-Con Sup	Insignificant							
			4-Con Cap								
			9-RW Cap								
28	As a result of tight PA/ED schedule and progressing too fast during alternatives analysis study phase, steps may get missed in the PA/ED phase which will lead to rework and, if deemed necessary, will significantly jeopardize schedule, and add to budget expenditures.	Any revisions to current alternatives would be part of Final ED and addressing comments from public circulation of Draft ED.				Mitigate				The consultant team is seeking further clarification from Caltrans on the PA/ED process to clarify the various process steps, interdependencies, and timeline to ensure PA/ED completion within allotted timeframe. Team is aware that permit approvals for field work can take >1year.	2023-09-27
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
PPM: Schedule and Delivery	Public comments to draft ED		2-RW Sup								2023-12-04
	Jaime Matteoli		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
35	Caltrans does not conclude or determine that the project is non-capacity increasing, thus changing key assumptions to several technical reports (including but not limited to air quality, community impacts, and noise).	The traffic analysis being prepared by Caltrans will determine whether the project increases capacity.				Active Acceptance				The consultant team assumes that Caltrans will make a determination in 2021 that the project is not capacity increasing. The scopes of work for several technical studies have been based on this assumption.	2023-09-27
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
ENV: Air Quality	PO-C scope		2-RW Sup								2023-12-04
	Jaime Matteoli, PM		3-Con Sup								
			4-Con Cap								
			9-RW Cap								

Risk Identification			Phase	Initial Risk Assessment		Risk Response		Residual Risk		Risk Status	
RISK ID #	Risk Statement "As a result of <root cause>, <uncertain event> may occur, which would lead to <effect on objective(s)>."	Proactive Response (prior to risk occuring)		Initial Risk Probability		Response Strategy		Residual Risk Probability			Date Risk Identified
Status				Cost Impact ($k)	Schedule Impact	Cost Impact ($k)	Schedule Impact	Cost Impact ($k) (Y indicates Residual Risk will be included in Reserve Calculations)	Schedule Impact (Y indicates Residual Risk will be included in Reserve Calculations)	Risk Assumptions and Status	Anticipated Resolution Date
Type											
RiBS Sub Category	Risk Trigger	Response if Risk Occurs									Date Last Updated
	Risk Owner										
39	As a result of limited available geotechnical information, contingency plans could need to be developed to address possible unanticipated adverse ground conditions that could be encountered in construction, increasing scope and cost.	Perform supplemental geotechnical investigations and explore contingency plans for construction approach.				Avoid					2023-09-28
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E	Insignificant							
STR: Geotechnical	Geotechnical Baseline Report		2-RW Sup								2023-12-04
	Raymond Sandiford		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
56	As a result of unanticipated changes in groundwater flow and/or chemistry caused by construction, methods for tunneling and other construction could require modification, increasing cost and causing delays.	The project design may continue to evolve in PS&E and pre-construction to account for new information discovered at those phases.				Active Acceptance				The project has been designed based on the geotechnical data gathered so far. There will need to be additional borings prior to construction to confirm these conditions.	2023-09-28
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E	Insignificant							
STR: Geotechnical	Geotech data		2-RW Sup								2023-12-04
	Mala Ciancia		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
6	Understanding the underlying geologic conditions is critical to validating and refining the project alternatives. If environmental clearance of this work is delayed, any geologic discoveries would occur later in the process and the delays to schedule would be compounded.	Caltrans is working closely with our partners to facilitate the environmental process for the geotechnical drilling and to reduce risk of delays to this process. The public engagement and partnership efforts will mitigate this risk.		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		Caltrans plans to perform geotechnical investigations in phases. Drilling will occur in 2018, 2019, and 2020.	2023-08-28
Retired			0-PA&ED	$2500 - $5000	30 - 90 days	$1,238		$0 - $5546 Y	30 - 90 days Y		
Threat			1-PS&E								
STR: Geotechnical	Geotechnical Permit Applications		2-RW Sup								2023-12-04
	Jaime Matteoli		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
8	As a result of removing the C Alternatives from further environmental study, we run the risk that we may need to add them back into consideration at a further date. This would lead to considerable delay in PAED and additional costs to the project.	The PDT will continue to review the other alternatives, and if necessary add the C Alternatives back into consideration. The sooner this happens (if necessary) the lower the impact to schedule.		1 - Very Low (1-10%)		Active Acceptance		1 - Very Low (1-10%)		The current information suggests that the C Alternatives do not add benefits over other alternatives that are currently under consideration	2023-08-28
Retired			0-PA&ED	Insignificant				$0 - $3466 Y	30 - 90 days Y		
Threat			1-PS&E								
STR: Structure Design	Geologic Reviews of other alternatives		2-RW Sup								2023-12-04
	Jason Meyer, Environmental		3-Con Sup								
			4-Con Cap								
			9-RW Cap								

Risk Identification			Phase	Initial Risk Assessment		Risk Response		Residual Risk		Risk Status	
RISK ID #	Risk Statement "As a result of <root cause>, <uncertain event> may occur, which would lead to <effect on objective(s)>."	Proactive Response (prior to risk occuring)		Initial Risk Probability		Response Strategy		Residual Risk Probability		Risk Assumptions and Status	Date Risk Identified
Status				Cost Impact ($k)	Schedule Impact	Cost Impact ($k)	Schedule Impact	Cost Impact ($k) (Y indicates Residual Risk will be included in Reserve Calculations)	Schedule Impact (Y indicates Residual Risk will be included in Reserve Calculations)		Anticipated Resolution Date
Type											
RiBS Sub Category	Risk Trigger	Response if Risk Occurs									Date Last Updated
	Risk Owner										
26	Risk due to insufficient subsurface data (including hydrogeologic / groundwater) necessary in order complete the overall PA/ED work. Approval by Caltrans management of geotechnical exploration work for 2021(Autumn) to early 2022 season is not certain.					Active Acceptance				There is plan for ~9 exploration points during the 2021-2022 season (a.k.a. Phase 5). Staff from Caltrans management and environmental groups may not be in agreement with the proposed GI field work. Most are on Green Diamond's land.	2023-09-27
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
STR: Geotechnical	Permits/ clearance for GI exploration work		2-RW Sup								2023-12-04
	Brian O'Neil		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
21	As a result of a potential large seismic event after construction, a catastrophic landslide on the slip/failure plane occurs, which leads to the drainage gallery system being rendered inoperable.			3 - Moderate (31-50%)		Passive Acceptance		3 - Moderate (31-50%)			2023-09-07
Retired			0-PA&ED								
Threat			1-PS&E								
STR: Geotechnical	Seismic Event		2-RW Sup								2023-12-04
	Jaime Matteoli		3-Con Sup								
			4-Con Cap	Insignificant							
			9-RW Cap								
22	Due to lack of supporting design information (surveying, hydraulics, geotechnical, drainage) delays to the preliminary structures design effort may occur which may lead to schedule impacts.	Postpone the start of the preliminary structures design submittal until the supporting design information is available. Perform geotechnical analysis resulting from the boring program.		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		Supporting design information is available at the beginning of the design effort. Preliminary structures design work does not commence until the supporting design information is available. Notes: Is it a concern on why we are designing preliminary structures at this early stage if the further information will be available at a later stage?	2023-09-27
Retired			0-PA&ED								
Threat			1-PS&E	Insignificant							
STR: Structure Design	Supporting design information (surveying, hydraulics, drainage, geotechnical) not available.		2-RW Sup								2023-12-04
	Moe Amini		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
24	Changes to the roadway alignments could result in design changes to structures (tunnels, bridges, walls) design which would affect scope, design schedule, and design budget for structures work.	1. Redesign the preliminary structures to accommodate roadway realignment. Request time extension and additional budget if needed. 2. Env team to coordinate with Eng to support design with constraints info so Eng has early				Active Acceptance				Roadway alignments will not change once the structures have been laid out and preliminary structures design effort commences. Similarly, any changes to the footprint would require repeat of environmental field surveys. Assumptions for PO-B1 Amendment 1 and PO-C have specific assumptions about acreages and which alternatives will be carried forward into the fieldwork and technical report phases.	2023-09-27
Retired			0-PA&ED								
Threat			1-PS&E	Insignificant							
STR: Structure Design	Change in roadway alignment(s) or project footprint		2-RW Sup								2023-12-04
	Moe Amini / Maggie Townsley (ICF)		3-Con Sup								
			4-Con Cap								
			9-RW Cap								

Risk Identification			Phase	Initial Risk Assessment		Risk Response		Residual Risk		Risk Status	
RISK ID #	Risk Statement "As a result of <root cause>, <uncertain event> may occur, which would lead to <effect on objective(s)>."	Proactive Response (prior to risk occuring)		Initial Risk Probability		Response Strategy		Residual Risk Probability			Date Risk Identified
Status				Cost Impact ($k)	Schedule Impact	Cost Impact ($k)	Schedule Impact	Cost Impact ($k) (Y indicates Residual Risk will be included in Reserve Calculations)	Schedule Impact (Y indicates Residual Risk will be included in Reserve Calculations)	Risk Assumptions and Status	Anticipated Resolution Date
Type											
RiBS Sub Category	Risk Trigger	Response if Risk Occurs									Date Last Updated
	Risk Owner										
27	Geotechnical deliverables scoped for PO-C such as SPGRs, PGDR(s), etc. will have gaps and insufficient technical data for Civil/Structural engineering designers to rely on since PO-B2 data may not be fully processed in time.	Continue to collect monitoring data.				Active Acceptance				Uncertain if Caltrans intends the PO-C scope to include detailed technical analysis of data collected during PO-B2, plus periodic data (groundwater, inclinometers, rain gauges, etc.) still being collected throughout 2021 from newly installed instrumentation which was a large financial investment.	2023-09-27
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E	Insignificant							
STR: Geotechnical	Finalization of PO-C scope to include detailed technical analysis of data collected during PO-B2		2-RW Sup								2023-12-04
	Brian O'Neil		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
41	DIFFERING SITE CONDITIONS DURING CONSTRUCTION: As a result of unanticipated ground conditions, groundwater conditions, portal conditions, or slope conditions encountered during construction, changes in tunneling methods, increased extent of ground improvement, or additional slope stabilization measures could be required, increasing cost,	Prepare comprehensive Geotechnical Baseline Report to document site conditions assumed for construction. Develop unit pricing for changed conditions to be implemented as conditions are encountered.		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		Even after additional geotechnical data are collected for preliminary engineering and final design, conditions encountered during construction may differ from those assumed, especially in this complex geologic setting.	2023-09-28
Retired			0-PA&ED								
Threat		Document conditions encountered and actions taken during construction	1-PS&E								
STR: Structures Hydraulics	Differing Site Conditions than GBR		2-RW Sup								2023-12-04
	Raymond Sandiford		3-Con Sup	<$21560	30 - 90 days			$0 - $1197 Y	30 - 90 days Y		
			4-Con Cap	<$2500				$0 - $53250 Y			
			9-RW Cap								
43	As a result of unstable slopes at tunnel portals, more stabilization measures could be required than anticipated, increasing cost and causing delays.	Perform supplemental geotechnical investigations				Mitigate				Additional geotechnical investigations are planned for Fall 2023, but additional subsurface information will be needed to estimate the extent of ground improvement required for tunnels and portal areas.	2023-09-28
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
STR: Geotechnical	Geotechnical Baseline Report		2-RW Sup								2023-12-04
	Raymond Sandiford		3-Con Sup	Insignificant							
			4-Con Cap								
			9-RW Cap								
42	As a result of unanticipated adverse ground conditions, tunnel and portal areas could require more grouting or other ground improvement than estimated, increasing costs and potentially adversely affecting environment.	Perform supplemental geotechnical investigations				Mitigate				Additional geotechnical investigations are planned for Fall 2023, but additional subsurface information will be needed to estimate the extent of ground improvement required for tunnels and portal areas.	2023-09-28
Retired			0-PA&ED								
Threat			1-PS&E	Insignificant							
STR: Geotechnical	Geotechnical Baseline Report		2-RW Sup								2023-12-04
	Raymond Sandiford		3-Con Sup								
			4-Con Cap	Insignificant							
			9-RW Cap								

Risk Identification			Phase	Initial Risk Assessment		Risk Response		Residual Risk		Risk Status	
RISK ID #	Risk Statement "As a result of <root cause>, <uncertain event> may occur, which would lead to <effect on objective(s)>."	Proactive Response (prior to risk occuring)		Initial Risk Probability		Response Strategy		Residual Risk Probability			Date Risk Identified
Status				Cost Impact ($k)	Schedule Impact	Cost Impact ($k)	Schedule Impact	Cost Impact ($k) (Y indicates Residual Risk will be included in Reserve Calculations)	Schedule Impact (Y indicates Residual Risk will be included in Reserve Calculations)	Risk Assumptions and Status	Anticipated Resolution Date
Type											
RiBS Sub Category	Risk Trigger	Response if Risk Occurs									Date Last Updated
	Risk Owner										
52	There is marbled murrelet habitat located in the project area. While the project will minimize impacts to old growth trees, there may be indirect impacts associated with construction, vibration, noise, etc.	The team will incorporate avoidance and mitigation measures to reduce impacts on species. Caltrans currently reviewing proposed measures				Mitigate				Marbled murrelet is an endangered species known to inhabit the project area. The primary habitat is in the old growth trees.	2023-09-28
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
ENV: Biological	Environmental Technical Studies		2-RW Sup								2023-12-04
	Maggie Townsley (ICF)		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
51	Old growth redwoods are located in the project area. This alternative has the possibility of discovering protected trees that were not captured in survey resulting in direct and indirect impacts.	The team will use the best available data from the arborists and surveyors to avoid as many trees as possible. There will be avoidance and mitigation measures to decrease indirect impacts on trees. Caltrans and other agencies to review		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		The design has avoided the largest trees, but there are smaller trees that will be removed in Alternative F. Alternative X has the possibility for indirect impacts.	2023-09-28
Retired			0-PA&ED								
Threat			1-PS&E	Insignificant	30 - 90 days				30 - 90 days Y		
ENV: Biological	Environmental Technical Studies		2-RW Sup								2023-12-04
	Maggie Townsley (ICF)		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
48	Alternative X is near the DeMartin Site. The DeMartin Site approaches a few feet to the east of the existing U.S. 101 alignment at its nearest point.	Caltrans to negotiate with stakeholders and resource agencies to allow construction.				Mitigate				The design has incorporated geometry to avoid disturbing the site. This includes a reverse curve from 1000' to 1000'. This needs to be approved in the DSDD.	2023-09-28
Retired			0-PA&ED								
Threat			1-PS&E	Insignificant							
ENV: Archaeologlcal & Cultural	Cultural		2-RW Sup								2023-12-04
	Jaime Matteoli, PM		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
36	Conclusion of the Section 4(f) analysis (preparation of 3 deliverables) is delayed due to: 1) the consultant team unable to obtain list of cultural resources from Caltrans that could also be Section 4(f) properties; 2) Caltrans consultation with outside agencies is delayed beyond schedule assumptions.	Coordinate with the Cultural Team to provide information in time to meet the Env schedule.				Mitigate				The consultant team assumes (as reflected in the project schedule) that items 1 and 2 will be completed within anticipated timeframes. The consultant team does not have control over these timeframes, however.	2023-09-27
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
ENV: Archaeologlcal & Cultural	1) Provision of cultural site info; 2) consultation		2-RW Sup								2023-12-04
	Steve Croteau/ District 1		3-Con Sup								
			4-Con Cap								
			9-RW Cap								

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RISK ID #	Risk Statement "As a result of <root cause>, <uncertain event> may occur, which would lead to <effect on objective(s)>."	Proactive Response (prior to risk occuring)		Initial Risk Probability		Response Strategy		Residual Risk Probability		Risk Assumptions and Status	Date Risk Identified
Status				Cost Impact ($k)	Schedule Impact	Cost Impact ($k)	Schedule Impact	Cost Impact ($k) (Y indicates Residual Risk will be included in Reserve Calculations)	Schedule Impact (Y indicates Residual Risk will be included in Reserve Calculations)		Anticipated Resolution Date
Type											
RiBS Sub Category	Risk Trigger	Response if Risk Occurs									Date Last Updated
	Risk Owner										
23	UNKNOWN PHYSICAL CONSTRAINTS IMPACT DESIGN: Due to potential discovery of unknown physical constraints (environmental, geotechnical, topographical), changes to the design (preliminary structures, walls) may be needed to avoid the constraints which will lead to delays in design schedule and increased budget.	Review the project for physical constraints, obtain and incorporate as-built information into the APS documents.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		Assume no physical constraints exist that would prohibit typical structure layout. Example of physical constraint - Bio surveys identify constraints that affect the design, access, disposal sites, haul roads, survey results provide feedback on the areas affected permanently or temporarily by design features.	2023-09-27
Retired			0-PA&ED								
Threat		Redesign the preliminary structures to accommodate the constraint. Request time extension and additional budget if needed.	1-PS&E	Insignificant	30 - 90 days				30 - 90 days Y		
STR: Structure Design	Discovery of physical constraint		2-RW Sup								2023-12-04
	Moe Amini		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
50	Dewatering elements for Alt X may potentially go beyond Alt X ESL until the project obtain more Geotech data and concept design.	Obtain additional Geotech data and further develop concept design.				Mitigate				Risk will be further confirmed following availability of Geotech data and concept design.	2023-09-28
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E	Insignificant							
STR: Geotechnical	Geotech data		2-RW Sup								2023-12-04
	Mala Ciancia		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
62	LANDSLIDE DURING CONSTRUCTION As a result of Construction-period land sliding or accelerated earthflow movement, repair and redesign on work in progress may occur, which will lead to impacts on cost and schedule.	Construction measures to avoid/protect against landslide		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		The project is in a known landslide area.	2023-09-28
Retired			0-PA&ED								
Threat		Support construction to address any repairs to permanent works or land due to landslide damage	1-PS&E								2025-11-17
CNS: Structural Construction	Landslides during Construction		2-RW Sup								
	Jaime Matteoli, PM		3-Con Sup	<$21560	90 - 180 days	$258		$0 - $1848 Y	90 - 180 days Y		2023-12-04
			4-Con Cap								
			9-RW Cap								

Project Information

Checkpoint:	PA&ED	*Project Manager:*	Jaime Matteoli
Date:	2023-11-16	*Program:*	2018 (SHOPP)
EA:	01-0F280	*Capital Costs:*	$3,323,982,000
EFIS ID:		*Support Costs:*	$602,214,000
Project Nickname:	Last Chance Grade - Alternative F	*Total Costs:*	$3,926,196,000
County/Route/PM:	DN/101/12.0-15.5	*RTL Target:*	2030-09-02

Calculated Risk Reserve

Last Run Date:

Project Phase	Confidence Level	Resource Hours	Reserve $'s	Confidence Level	Schedule Reserve
0 (PA&ED)	60%	-	$0	60%	days
1 (PS&E)	60%	-	$0	60%	days
2 (RW Sup)	60%	-	$0	60%	days
3 (Con Sup)	60%	-	$0	60%	days
4 (Con Cap)	60%	-	$0		-
9 (RW Cap)	60%	-	$0		-
Project Total		-	$ -		days

Risk Register

version 2.02 03/01/2023

Risk Identification			Phase	Initial Risk Assessment		Risk Response		Residual Risk		Risk Status	
				Initial Risk Probability		Response Strategy		Residual Risk Probability			
RISK ID # / Status / Type / RiBS Sub Category	Risk Statement: "As a result of <root cause>, <uncertain event> may occur, which would lead to <effect on objective(s)>." / Risk Trigger / Risk Owner	Proactive Response (prior to risk occuring) / Response if Risk Occurs		Cost Impact ($k)	Schedule Impact	Cost Impact ($k)	Schedule Impact	Cost Impact ($k) (Y indicates Residual Risk will be included in Reserve Calculations)	Schedule Impact (Y indicates Residual Risk will be included in Reserve Calculations)	Risk Assumptions and Status	Date Risk Identified / Anticipated Resolution Date / Date Last Updated
1	GEOTECHNICAL DISCOVERIES ALTER SCOPE: As a result of complexity and magnitude of the geologic instability, future geotechnical investigations could lead to discoveries that fundamentally alter this alternative resulting in increased scope, cost increases and major delays to perform rework or to extend studies and preliminary engineering.	Caltrans is working closely with our partners to facilitate the environmental process for the geotechnical drilling and to reduce risk of delays to this process. The public engagement and partnership efforts will mitigate this risk.		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		Geotechnical Investigations are being performed in stages and will be performed throughout the environmental as well as final design phase. Alternative F is located in areas of active or historic landslides. The Geotechnical team will not be certain that this project alternative can continue to meet the purpose and need of the project until all investigations are completed.	2023-08-28
Active			0-PA&ED	$5000 - $10000	90 - 180 days	$4,455		$6067 - $12132 Y	90 - 180 days Y		2024-09-30
Threat			1-PS&E	<$6000	90 - 180 days	$1,221		$0 - $5940 Y	90 - 180 days Y		
STR: Geotechnical	Geotechnical Reports		2-RW Sup								2023-12-04
	Jaime Matteoli		3-Con Sup		30 - 90 days				30 - 90 days Y		
			4-Con Cap	<$2500				$0 - $156270 Y			
			9-RW Cap								
2	FUNDING UNCERTAINTY: As a result of Federal and State funding uncertainty, funding shortfall for future phases (PS&E, ROW and Construction) may occur, which will lead to impacts on cost and schedule.	Caltrans will work closely with funding partners and elected officials to manage funding needs and communicate needs and risks to the CTC and public at large.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		The project will be funded by phase. Currently there is full funding of $50M programmed for 0 phase. This project costs well above what is typical for SHOPP Permanent Restoration Program. Achieving full funding for each phase will be a challenge and may require special action on the part of the State or Federal governments. Stops and starts would require rework and other inefficiencies.	2023-08-28
Active			0-PA&ED	$2500 - $5000	30 - 90 days	$1,551		$0 - $3466 Y	30 - 90 days Y		2030-09-02
Threat			1-PS&E	<$6000	90 - 180 days	$1,139		$0 - $4950 Y	90 - 180 days Y		
PPM: Funding	Federal or State funding for future phases is delayed or denied		2-RW Sup								2023-12-04
	Jaime Matteoli		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
3	TRIBAL COORDINATION: Because of the unique project location within State and National Park Boundaries and within tribal boundaries or ancestral territories of four federally-recognized tribes, if a proper, respectful, and open relationship is not maintained with tribal governments, the project would be delayed and support costs would increase.	Caltrans will continue positive engagement with tribal governments before and after any Programmatic Agreement is signed.		1 - Very Low (1-10%)		Mitigate		1 - Very Low (1-10%)		Caltrans cultural team is facilitating a cultural resource working group with tribal governments and State and National Parks that is proactively working toward a Programmatic Agreement on this project.	2023-08-28
Active			0-PA&ED	<$2500	0 - 30 days	$33		$0 - $5199 Y	0 - 30 days Y		2025-11-17
Threat			1-PS&E								
ENV: ArchaeologIcal & Cultural	Programmatic Agreement Not Signed		2-RW Sup								2023-12-04
	Tim Keefe, Archaeologist		3-Con Sup								
			4-Con Cap								
			9-RW Cap								

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4	ENVIRONMENTAL DOCUMENT INADEQUACIES: If inadequacies are discovered in project documents, agency coordination, or public engagement, major project delays and cost increases could result.	Caltrans will pursue all resources available to increase awareness and skill in these critical activities by (1) utilizing the statewide public engagement contract and (2) procuring engagement services via on-call or project		3 - Moderate (31-50%)				2 - Low (11-30%)		The project is in a uniquely sensitive location and the potential impacts are uniquely severe. An estimated 13 agencies will have influence on the project environmental document or permits and a number of interest groups including NGOs, some with opposing objectives, will be engaged in ground truthing all documents and public records. Currently, the history or agency coordination and public engagement has been positive. However, there is a high likelihood that some difficulties emerge during the environmental process, resulting in conflict with local partners who then garner support from national/international organizations, that	2023-09-28
Active			0-PA&ED	<$2500	30 - 90 days	$1,023		$0 - $2470 N	30 - 90 days N		
Threat		Assess allegations and determine if additional surveys and documentation needed in consultation with Caltrans Legal	1-PS&E	<$6000	>180 days	$1,023		$0 - $21580 N	90 - 180 days Y		2024-09-30
ENV: Biological	Environmental Milestones		2-RW Sup								
			3-Con Sup								2023-12-04
			4-Con Cap								
	Jaime Matteoli		9-RW Cap								
7	NEW DISCOVERIES MITIGATION COSTS & SCHEDULE (Redwood National & State Park) Because the mitigation estimates are highly uncertain and the potential environmental impacts are significant, there could be new discoveries about mitigation requirements that greatly increase cost and schedule.	The PDT will continue to engage the stakeholders and partners to seek out off-system partner opportunities and on-system improvements.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		The current mitigation cost estimates are preliminary and based on historic percentages. More information and coordination is needed to develop accurate mitigation cost estimates.	2023-09-28
Active			0-PA&ED	$2500 - $5000	30 - 90 days	$1,337		$2470 - $4930 Y	30 - 90 days Y		
Threat			1-PS&E								2025-11-17
PPM: Schedule and Delivery	Cost Estimate Updates		2-RW Sup								
			3-Con Sup								2023-12-04
			4-Con Cap								
	Jaime Matteoli		9-RW Cap								
9	DESIGN REVISIONS BASED ON DED PUBLIC COMMENTS As a result of the impacts to late successional trees, extensive public comment on the Draft EIR/S may occur, which would lead to reducing impacts to the trees by revising the design alternative.	Project team to continue and maintaining the public outreach program to inform on the project activities and decisions made beyond the Environmental Phase. Look for opportunities to reach out to the public all the way through the		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		Potential for extensive public comments to the DED resulting in additional time to respond to comments as well as further analysis required to address comments.	2023-09-28
Active			0-PA&ED	<$2500	>180 days	$132		$0 - $2470 Y	180 - 360 days Y		
Threat			1-PS&E								2024-03-30
PPM: Public Engagement	Community Impacts to Information Received on Tree Impact		2-RW Sup								
			3-Con Sup								2023-12-04
			4-Con Cap								
	Jaime Matteoli		9-RW Cap								
10	DED PUBLIC COMMENTS FROM NATIONAL/INTERNATIONAL ENV ORGS: As a result of the impacts to late successional trees, public comment from national and international environmental organizations (such as UNESCO) on the Draft EIR/S may occur, which would lead to reducing impacts to the trees by revising the design alternative.			3 - Moderate (31-50%)		Active Acceptance		3 - Moderate (31-50%)		Potential for delays to either DED or Final Environment Document.	2023-09-28
Active			0-PA&ED	<$2500	>180 days			$0 - $2470 Y	180 - 360 days Y		
Threat			1-PS&E								2024-03-30
PPM: Public Engagement	Community and outside of the region negatively reacts to the information on the tree impact.		2-RW Sup								
			3-Con Sup								2023-12-04
			4-Con Cap								
	Jaime Matteoli		9-RW Cap								

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Type											
RiBS Sub Category	Risk Trigger	Response if Risk Occurs									Date Last Updated
	Risk Owner										
11	SPOIL DISPOSAL SITE TRIGGER RECIRCULATION: As a result of late identification of a disposal site for excess spoils, additional environmental impacts may occur, which would lead to recirculation of the DED or supplemental environmental analysis.	Project team to look into opportunities including reaching out to ROW team.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		Additional environmental clearance may be needed once a disposal site is identified.	2023-09-28
			0-PA&ED	<$2500	>180 days	$33		$0 - $2470 Y	180 - 360 days Y		
Active			1-PS&E								2024-07-31
Threat		Caltrans to develop & assess disposal site options.	2-RW Sup		0 - 30 days				0 - 30 days Y		
ENV: Air Quality	Environmental Milestones		3-Con Sup								2023-12-04
			4-Con Cap								
	Jaime Matteoli		9-RW Cap	<$10550				$0 - $10550 Y			
12	GEOTECH CHANGES DURING FINAL DESIGN: As a result of additional information gathered (such as geotechnical field data about the location of the slip/failure plane), scope or design changes post Final EIR/S may occur, which could lead to supplemental environmental documentation and additional design effort.			3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		Secondary risk to the Risk #1 wherein this risk triggers scope refinement / changes to the preferred alignment resulting in recirculation of Final EIR/S or supplemental environmental documentation during PS&E phase. Model as secondary risk to Risk #10.	2023-09-28
			0-PA&ED								
Active			1-PS&E	<$6000	>180 days			$0 - $21579 Y	180 - 360 days Y		2027-06-30
Threat			2-RW Sup								
DSN: Roadway Design	Geotechnical Reports during PS&E		3-Con Sup		0 - 30 days				0 - 30 days Y		2023-12-04
			4-Con Cap	<$2500				$0 - $156270 Y			
	Jaime Matteoli		9-RW Cap								
13	DESIGN EXCEPTION APPROVAL As a result of design of the alternative to minimize the environmental footprint and impact, the approval of the various design exceptions may not occur, which would lead to design revisions and potentially additional environmental impacts.	Provided pre-submittal to Caltrans for approval; Conducted design workshop with CT District and HQ to discuss and obtain approval on identified design exceptions.		3 - Moderate (31-50%)		Mitigate		1 - Very Low (1-10%)		Specific concerns include design exceptions for both portals (south and north). Design exception tables have been submitted with DPR. Final approval will occur with the preferred alternative with the FPR.	2023-09-06
			0-PA&ED	<$2500	30 - 90 days			$0 - $2500 Y	30 - 90 days Y		
Active			1-PS&E	<$6000	30 - 90 days			$0 - $2277 Y	30 - 90 days Y		2024-06-30
Threat			2-RW Sup								
DSN: Roadway Design	Submittal of DED		3-Con Sup								2023-12-04
			4-Con Cap								
	Jaime Matteoli		9-RW Cap								
14	EDAS NOT ACCEPTED RESULTING IN RECIRCULATION As a result of EDAS not accepted as a method for handling earth flow at the south portal, it would result in having to redesign the south portal and potential for environmental recirculation.	Bring peer-review panel early on to review the EDAS concept and recommend acceptance or rejection of the EDAS		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		If EDAS is not used, then the South Portal location needs to move south and requires a longer tunnel alignment. This may cause long delay as it may impact the DeMartin site that requires additional environmental analysis.	2023-09-28
			0-PA&ED								
Active			1-PS&E	$12000 - $24000	>180 days		180 days	$21581 - $4315(Y	180 - 360 days Y		2024-09-30
Threat		If EDAS is rejected, remove EDAS from design and move the portal location further to the south.	2-RW Sup								
STR: Structure Design	Rejection of EDAS concept		3-Con Sup	Insignificant	30 - 90 days				30 - 90 days Y		2023-12-04
			4-Con Cap	<$2500				$0 - $156270 Y			
	Jaime Matteoli		9-RW Cap								

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15	LIMITED ACCESS FOR VERTICAL BORINGS Due to current plan limiting access for vertical borings along the Alternative F alignment, limited geotechnical data may be available for design of the tunnel, resulting in a more conservative design which could lead to a changes in capital costs/schedule.	Following selection of the alignment, look into performing limited environmental clearance for geotechnical investigations. Coordinate with Parks on access and associated mitigations. Obtain additional geotechnical data, especially in		4 - High (51-70%)		Mitigate		2 - Low (11-30%)		Vertical borings along the Alt F alignment are needed for design of the tunnel. The sooner the data are available, the sooner the design can be confirmed or revised. If data become available for critical areas, it may be possible to modify the alignment to reduce environmental impact. If the data are not available, a 'worst case' condition will need to be assumed to ensure the project can be constructed safely.	2023-09-28
Active			0-PA&ED	Insignificant	Insignificant	$366					
Threat		Obtain permissions/agreements and perform Geotechnical Borings along the Alternative F Alignment at Phase 1-PS&E.	1-PS&E	<$6000	90 - 180 days			$0 - $21580 Y	90 - 180 days Y		2025-06-30
STR: Geotechnical	Phase 0-PA&ED phase completed without having performed geotechnical borings along tunnel alignment.		2-RW Sup								
			3-Con Sup								2023-12-04
			4-Con Cap								
	Jaime Matteoli		9-RW Cap								
18	EDAS CONSTRUCTABILITY CHALLENGES: As a result of the unique and novel design of the EDAS for the earth flow at the South Portal, its construction may not be considered feasible, requiring a design change and cost increase.	Early involvement of peer review expert panel to evaluate EDAS design.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		Potential for higher cost impacts due to relocating South Portal further south resulting in the longer tunnel. This would also incur schedule impacts for additional environmental analysis.	2023-09-28
Active			0-PA&ED								
Threat		Revise Alternative F design with relocated South Portal	1-PS&E	<$6000	30 - 90 days			$0 - $21579 Y	30 - 90 days Y		2027-06-30
CNS: Structural Construction	PS&E Phase Design Report		2-RW Sup								
			3-Con Sup		30 - 90 days				30 - 90 days Y		2023-12-04
			4-Con Cap	<$2500				$0 - $156270 Y			
	Jaime Matteoli		9-RW Cap								
19	LAND SLIDE MOVEMENTS DURING DESIGN, BID OR CONSTRUCTION: As a result of land sliding or accelerated earthflow movements (along the overall alignment F and North Portal) between the time of the design, bidding, and construction phases, changes to the existing conditions may occur, which would result in a change in the design and additional change	Consideration of procurement strategies for construction (i.e. CMGC) as well as construction packaging (i.e. pilot program); Continue proactive monitoring and evaluation of site conditions. Prepare contingency designs for		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		It is now assumed that the Alt F tunnel alignment is behind the basal failure surface. Shallow slides and increased rate of earth flow movement could affect stability and design of portal and bridge structures.	2023-09-28
Active			0-PA&ED								
Threat		Delay procurement until design is revised to consider new site conditions. Redesign to accommodate differing site conditions and Issue a change order to the contractor.	1-PS&E	Insignificant		$239					2030-09-02
STR: Geotechnical	Site Conditions change from last topographic survey used for PS&E phase		2-RW Sup								
			3-Con Sup	<$21560	90 - 180 days			$0 - $21560 Y	30 - 90 days Y		2023-12-04
			4-Con Cap	<$2500				$0 - $156270 Y			
	Jaime Matteoli		9-RW Cap								
22	TRAFFIC/BUSINESS IMPACTS DURING CONSTRUCTION: As a result of major construction activities, several traffic impacts & road closures may be planned which would result in significant impact to business & public during construction phase. Comments from the public may require alternative construction sequencing or site logistics to minimize traffic	Caltrans and the DED to clearly identify the anticipated level of road closures during construction. Plan possible alternate haul routes or detours in advance, including road improvements if necessary. Develop alternative		2 - Low (11-30%)		Mitigate		2 - Low (11-30%)		Project site has limited road access	2023-09-28
Active			0-PA&ED	<$2500	30 - 90 days			$0 - $2470 Y	30 - 90 days Y		
Threat		Active public outreach with estimated durations of closures and early community involvement.	1-PS&E								2024-06-30
CNS: Structural Construction	Public Comment on DED		2-RW Sup								
			3-Con Sup								2023-12-04
			4-Con Cap								
	Jaime Matteoli		9-RW Cap								

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23	COMPLEX TUNNEL PROJECT REQUIRE HIGHER CONTINGENCY Due to this being one of the longest highway tunnel project in state, it introduces significant risks not seen on other CT projects (i.e., market conditions, availability of tunnel contractors, unforeseen ground conditions, etc.) that may require a much higher cost premium resulting in higher	Research other tunnel projects planned within the region. Coordinate construction of the LCG project with other planned projects if possible. Engage in early and active contractor outreach and involvement. Caltrans to explore alternative		4 - High (51-70%)		Mitigate		3 - Moderate (31-50%)		Assume that there will be multiple concurrent tunnel construction projects in the northern California region.	2023-09-28
Active			0-PA&ED								
Threat		Develop favorable contracting terms or incentives to motivate bidders.	1-PS&E								2030-09-02
CNS: Structural Construction	Contractor bids exceed project budget		2-RW Sup								
			3-Con Sup	<$21560	90 - 180 days			$0 - $21560 Y	90 - 180 days Y		2023-12-04
			4-Con Cap	<$2500				$53250 - $10650 Y			
	Jaime Matteoli		9-RW Cap								
24	DESIGN PROCUREMENT IMPACTING SCHEDULE: As a result of the time needed for typical procurement of design phase services, an alternate procurement process may be needed to maintain the project schedule, resulting in different construction approach or different allocation of risks.	Evaluate pros and cons of various alternative procurement methods for LCG.		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		Assuming that procurement will be a lengthy process.	2023-09-28
Active			0-PA&ED	<$2500	Insignificant			$0 - $2470 Y			
Threat		Develop favorable contract terms to consider interests of Owner and stakeholders.	1-PS&E	<$6000	30 - 90 days			$0 - $27927 Y	30 - 90 days Y		2025-03-30
PPM: Consultant Services	Procurement Phase		2-RW Sup								
			3-Con Sup								2023-12-04
			4-Con Cap								
	Jaime Matteoli		9-RW Cap								
37	ENDANGERED SPECIES DURING PA&ED If federal and/or state regulators designate a new threatened or endangered species during PA&ED that may be present in the project area that is not accounted for in biological surveys, additional environmental surveys and analysis could be required.	The surveys are comprehensive in scope and, upon obtaining species lists for the area, cover the entire footprint 5 times (1x vegetation mapping; 3 x botanical surveys; 1 x tree surveys) as well as at certain areas for wildlife,		2 - Low (11-30%)		Active Acceptance		2 - Low (11-30%)		Change in federal and/or state regulations.	2023-09-28
Active			0-PA&ED								
Threat		Conduct appropriate surveys and analyses; supplemental environmental documentation if needed.	1-PS&E	<$6000	>180 days			$0 - $495 N	180 - 360 days N		2027-12-31
ENV: Biological	Issuance of new regulations from Federal and/or State regulators		2-RW Sup								
			3-Con Sup								2023-12-04
			4-Con Cap								
	Steve Croteau/ District 1		9-RW Cap								
40	ENVIRONMENTAL RE-EVALUATION TRIGGERED As a result of selection of an alternative prior to lack of thorough field investigations & constructability evaluations, alternative analysis may be revisited or additional measures to mitigate constructability obstacles may be needed, increasing cost and schedule.	Perform supplemental geotechnical investigations and interdisciplinary constructability reviews. Wait until field studies and constructability evaluations are completed before recommending a preferred alternative.		4 - High (51-70%)		Mitigate		4 - High (51-70%)		Construction access for the F alignment tunnel equipment and materials would add to the schedule due to the extreme terrain; need to look at the schedule due to the challenges.	2023-09-28
Active			0-PA&ED								
Threat		Reassess alternatives selection after field studies and constructability evaluations are completed. Develop mitigation measures for construction obstacles	1-PS&E	<$6000	30 - 90 days			$0 - $21579 Y	30 - 90 days Y		2025-06-30
CNS: Structural Construction	Selection of preferred alternative prior to completion of thorough field studies & constructability evaluations.		2-RW Sup								
			3-Con Sup								2023-12-04
			4-Con Cap								
	Jamie Matteoli		9-RW Cap								

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RiBS Sub Category	Risk Trigger	Response if Risk Occurs									Date Last Updated
	Risk Owner										
41	LIMITED STAGING AREAS & HAUL ROUTES As a result of limited areas available for staging operations and limited haul routes, possible means and methods for construction could be restricted for Alternative F, potentially increasing project cost and extending schedule.	Explore variety of feasible means and methods for construction. Develop alternative construction sequencing plans for limited staging areas.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		Project has identified potential staging areas and assessed construction haul routes.	2023-09-28
			0-PA&ED								
Active			1-PS&E	<$6000	30 - 90 days			$0 - $21580 Y	30 - 90 days Y		2027-06-30
Threat		Conduct focused constructability reviews and/or workshops to review constructability and incorporate findings in Phase 1 - PS&E construction documents.	2-RW Sup								
CNS: Structural Construction	Constructability assessment report does not fully address staging, haul routes, means and methods.		3-Con Sup	<$21560	90 - 180 days			$0 - $21560 Y	90 - 180 days Y		2023-12-04
			4-Con Cap	<$2500				$0 - $138190 Y			
	John Litzinger		9-RW Cap								
43	EXCESSIVE GROUND MOVEMENTS DURING CONSTRUCTION As a result of unanticipated ground conditions encountered during construction or use of inappropriate tunneling methods, excessive ground movements could cause damage to new or existing project structures or environmental resources, adding to cost and schedule.	Perform supplemental geotechnical investigations. Sequence construction work to avoid impacts		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		Additional geotechnical investigations are planned for Fall 2023, but additional subsurface information will be needed for characterization of ground conditions for tunneling. Even after additional geotechnical data are collected for preliminary engineering and final design, conditions encountered during construction may differ from those assumed, especially in this complex geologic setting.	2023-09-28
			0-PA&ED								
Active			1-PS&E								2030-09-02
Threat		Perform root-cause analysis and revise construction methodology to prevent recurrence.	2-RW Sup								
STR: Geotechnical	Differing Site Conditions		3-Con Sup		30 - 90 days				30 - 90 days Y		2023-12-04
			4-Con Cap	<$2500				$0 - $156270 Y			
	Raymond Sandiford		9-RW Cap								
44	DIFFERING SITE CONDITIONS DURING CONSTRUCTION: As a result of unanticipated ground conditions, groundwater conditions, portal conditions, or slope conditions encountered during construction, changes in tunneling methods, increased extent of ground improvement, or additional slope stabilization measures could be required,	Prepare comprehensive Geotechnical Baseline Report to document site conditions assumed for construction. Develop unit pricing for changed conditions to be implemented as conditions are encountered.		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		Even after additional geotechnical data are collected for preliminary engineering and final design, conditions encountered during construction may differ from those assumed, especially in this complex geologic setting.	2023-09-28
			0-PA&ED								
Active			1-PS&E								2030-09-02
Threat		Document conditions encountered and actions taken during construction	2-RW Sup								
STR: Structures Hydraulics	Differing Site Conditions than GBR		3-Con Sup	<$21560	30 - 90 days			$0 - $28371 Y	30 - 90 days Y		2023-12-04
			4-Con Cap	<$2500				$0 - $138190 Y			
	Raymond Sandiford		9-RW Cap								
49	UNAVAILABLE DISPOSAL SITES: Because Alternative F has no on-site disposal areas identified, excavated material would need to be off-hauled. Late identification of suitable disposal sites within the expected distance from the site would result in increased disposal costs due to longer haul routes.	Coordination is needed to identify opportunities for off-site disposal. Consider alternative uses for excavated material and alternative transport methods.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		Soil testing needs to be performed to verify that material does not contain hazardous materials. Off-haul costs are about 3x on-site disposal cost. Limited options for disposal in Crescent City.	2023-09-28
			0-PA&ED								
Active			1-PS&E	<$6000	0 - 30 days			$0 - $21580 Y	0 - 30 days Y		2028-04-30
Threat		Perform Testing, Confirm Disposal Site Availability. Obtain advance commitment for off-site disposal site and cost.	2-RW Sup								
ENV: Hazardous Waste	Soil Testing, Availability and cost of off-site disposal sites		3-Con Sup	<$21560	30 - 90 days			$0 - $28371 Y	30 - 90 days Y		2023-12-04
			4-Con Cap	<$2500				$0 - $156270 Y			
	Jaime Matteoli, PM		9-RW Cap								

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55	CHANGING WETLAND DELINEATION As a result of extreme storm event causing delineation to existing wetland at the north end crossed by a new bridge in Alt F, additional environmental impacts and changes in scope, cost and schedule.	The project design is currently using a single-span bridge avoids the most severe impacts to the wetland. If the risk occur, the team will revise design to incorporate avoidance and mitigation measures to reduce further impacts on the		2 - Low (11-30%)		Active Acceptance		2 - Low (11-30%)		The wetland has been delineated in the Federal and State Wetland Delineation reports. The bridge will reduce the impact on the largest part of the wetland. However, minor channels that feed the wetland will need to be moved into underground culverts.	2023-09-28
Active			0-PA&ED	<$2500	30 - 90 days			$0 - $2500 Y	30 - 90 days Y		2025-11-17
Threat		Revise design to address impacts	1-PS&E	<$6000	30 - 90 days			$0 - $1650 Y	30 - 90 days Y		
DSN: Stormwater	Storm Event Causing Changes to the Wetland		2-RW Sup								
			3-Con Sup	<$21560	90 - 180 days			$0 - $1540 Y	90 - 180 days Y		2023-12-04
	John Litzinger / Rodney Pimentel		4-Con Cap	<$2500				$0 - $53250 Y			
			9-RW Cap								
56	PACIFIC POWER UPGRADES REQUIRE ADDITIONAL ROW / ENVIRONMENTAL Due to this alternative requiring major upgrade to the existing Pacific Power lines running from Crescent City to Klamath, there is risk of additional ROW or Environmental required and untimely upgrades resulting in additional cost and delays.	Caltrans will continue design coordination with Pacific Power through PA/ED, PS&E, and construction. Agreement will need to be reached for design and cost sharing.		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		Initial discussions with Pacific Power have been productive and they are aware of the project. If Alternative F is selected, further coordination, design, and cost sharing needs to occur. There will be 10+ miles of new poles and conductor to be installed on Pacific Power Project Right-of-way. Risk of cost and schedule delays if Pacific Power project is delayed.	2023-09-28
Active			0-PA&ED								
Threat			1-PS&E	<$6000	30 - 90 days			$0 - $21580 Y	30 - 90 days Y		2028-04-30
ROW: R/W Utilities	Utility Coordination		2-RW Sup	$100 - $200	90 - 180 days			$90 - $180 Y	90 - 180 days Y		
			3-Con Sup								
	Jaime Matteoli, PM		4-Con Cap								2023-12-04
			9-RW Cap	$2500 - $21100				$10550 - $21100 Y			
58	ACCESS RESTRICTIONS FOR GEOTECH INVESTIGATIONS As a result of access restrictions, insufficient geotechnical data is collected to allow the selected alternative to advance from conceptual design to procurement-level design, causing high contingency costs in bids and/or delays in project funding because of perceived risks.	The project design may continue to evolve in PS&E and pre-construction to account for new information discovered at those phases.		4 - High (51-70%)		Active Acceptance		4 - High (51-70%)		The project conceptual design is based on the geotechnical data gathered so far. There will need to be additional borings prior to procurement and final design to confirm or revise the assumed conditions.	2023-09-28
Active			0-PA&ED								
Threat		Quantify trade-offs in risk vs. explorations to support geotechnical investigations for tunneling.	1-PS&E								2028-04-30
STR: Geotechnical	Access not Granted for Geotech Investigations		2-RW Sup								
			3-Con Sup		30 - 90 days				30 - 90 days N		2023-12-04
	Mala Ciancia		4-Con Cap	<$2500				$0 - $138190 N			
			9-RW Cap								
61	UNIDENTIFIED UTILITIES As a result of unidentified utilities, changes to design may occur resulting in change to underground construction or require relocation.	The project has identified existing electric and drainage lines in the project area. Coordination has begun with Pacific Power. Existing drainage culverts are owned by Caltrans and will be modified according to the project design.		2 - Low (11-30%)		Active Acceptance		2 - Low (11-30%)		The project is located in a national park, so the discovery of unidentified utilities is unlikely. As-builts and ground surveys have not identified any utilities beyond those previously mentioned to date. However, if an unknown utility is encountered during construction, it will need to be tested/identified and relocated/protected-in-place.	2023-09-28
Active			0-PA&ED								
Threat		Develop utility relocation plans and relocate during construction.	1-PS&E								2030-09-02
DSN: Utility	Unknown utility is encountered during construction		2-RW Sup								
			3-Con Sup	<$21560	30 - 90 days			$0 - $342 Y	30 - 90 days Y		
	Jaime Matteoli, PM		4-Con Cap	<$2500				$0 - $53250 Y			2023-12-04
			9-RW Cap								

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62	ARCHAEOLOGICAL DISCOVERIES: As a result of archaeologic discoveries during design or construction, it has potential to cause delays due to design changes or cost/schedule impacts during construction.	An Archaeological Study Report is in progress. It will identify any sensitive sites to be avoided.		2 - Low (11-30%)		Mitigate		2 - Low (11-30%)		The project area has known archaeological sites. If the Archaeological Study Report identifies additional site(s) that were not previously known, it may require design changes. Furthermore, if archaeological evidence is found during construction, it would trigger large cost and schedule impacts.	2023-09-28
			0-PA&ED								
Active			1-PS&E	<$6000	30 - 90 days			$0 - $21580 Y	30 - 90 days Y		2025-11-17
Threat			2-RW Sup								
ENV: ArchaeologIcal & Cultural	Environmental Technical Studies		3-Con Sup		30 - 90 days				30 - 90 days Y		2023-12-04
			4-Con Cap	<$2500				$0 - $138190 Y			
	Tim Keefe / District 1		9-RW Cap								
63	HIGHER GROUNDWATER INTRUSION THAN ANTICIPATED DURING CONSTRUCTION Due to groundwater intrusion, flooding may occur during construction resulting in impact to tunnel portal approaches, requiring repair or redesign which will lead to additional cost and schedule.	During PS&E, add construction measures in the contract documents to protect against or mitigate flooding. Incorporate flood control measures in design.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		The project is in a high-rainfall area and flooding is a possibility. There are creeks in the project area.	2023-09-28
			0-PA&ED								
Active			1-PS&E	Insignificant	Insignificant	$264					2030-09-02
Threat		Implement repair or redesign and take steps to minimize possibility of recurrence. Support construction to address any repairs to permanent works or land due to flooding damage.	2-RW Sup								
CNS: Structural Construction	Flooding Occurs During Construction		3-Con Sup	<$21560	30 - 90 days			$0 - $21560 Y	30 - 90 days Y		2023-12-04
			4-Con Cap	<$2500				$0 - $138190 Y			
	Jaime Matteoli, PM		9-RW Cap								
28	As a result of potential disconnect and gaps in the alignment screening process, final alignment alternatives may be selected prematurely during PO-B1 study phase which will lead to reintroduction of alternatives previously screened out.	In the scope for PO-C, prepare Geotech report and materials report based before the task to interpret and analyze the data from PO-B2				Mitigate				PO-B1 study for AA screening phase is based on qualitative evaluation of pre-existing geotechnical data, and due to timing it does not benefit from detailed analysis of data (still being collected) during the ongoing PO-B2 investigation. Future findings from analysis of PO-B2 data might be cause for change(s) in current AA screening results.	2023-09-28
			0-PA&ED	Insignificant							
Retired			1-PS&E								
Threat			2-RW Sup								
DSN: Roadway Design	Geotechnical investigation during PO-B2		3-Con Sup								2023-12-04
			4-Con Cap								
	Dina Potter		9-RW Cap								
39	Conclusion of the Section 4(f) analysis (preparation of 3 deliverables) is delayed due to: 1) the consultant team unable to obtain list of cultural resources from Caltrans that could also be Section 4(f) properties; 2) Caltrans consultation with outside agencies is delayed beyond schedule assumptions.	Coordinate with the Cultural Team to provide information in time to meet the Env schedule.				Mitigate				The consultant team assumes (as reflected in the project schedule) that items 1 and 2 will be completed within anticipated timeframes. The consultant team does not have control over these timeframes, however.	2023-09-28
			0-PA&ED	Insignificant							
Retired			1-PS&E								
Threat			2-RW Sup								
ENV: ArchaeologIcal & Cultural	1) Provision of cultural site info; 2) consultation		3-Con Sup								2023-12-04
			4-Con Cap								
	Steve Croteau/ District 1		9-RW Cap								

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51	Alternative "F" is near the DeMartin Site. The DeMartin Site approaches a few feet to the east of the existing U.S. 101 alignment at its nearest point. This is on a curve where work is occurring on Alt F.	Caltrans to negotiate with stakeholders and resource agencies to allow construction.				Mitigate				The design has incorporated geometry to avoid disturbing the site. This includes a reverse curve from 1000' to 1000'. This needs to be approved in the DSDD.	2023-09-28
Retired			0-PA&ED								
Threat			1-PS&E	Insignificant							
ENV: ArchaeologIcal & Cultural	Cultural		2-RW Sup								2023-12-04
	Jaime Matteoli, PM		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
53	Old growth redwoods are located in the project area. Alternative F has the possibility for discovery of protected trees that were not captured in survey which could change impact calculations in DEIS.	The team will use the best available data from the arborists and surveyors to avoid as many trees as possible. There will be avoidance and mitigation measures to decrease indirect impacts on trees. Caltrans and other agencies to				Mitigate				The design has avoided the largest trees, but there are smaller trees that will be removed in Alternative F.	2023-09-28
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
ENV: Biological	Environmental Technical Studies		2-RW Sup								2023-12-04
	Maggie Townsley (ICF)		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
54	There is marbled murrelet habitat located in the project area. While the project will minimize impacts to old growth trees, there may be indirect impacts associated with construction, vibration, noise, etc.	The team will incorporate avoidance and mitigation measures to reduce impacts on species. Caltrans currently reviewing proposed measures				Mitigate				Marbled murrelet is an endangered species known to inhabit the project area. The primary habitat is in the old growth trees.	2023-09-28
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
ENV: Biological	Environmental Technical Studies		2-RW Sup								2023-12-04
	Maggie Townsley (ICF)		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
5	Caltrans projects with much smaller environmental impacts are currently delayed because of lawsuits by local, national or international NGOs. If NGOs file lawsuits on this project, major delays and cost increases would occur.	The PDT will continue to engage the stakeholders and partners with a high level of openness, transparency, and accountability. Maintaining stakeholder/partner support and understanding their needs is paramount to		2 - Low (11-30%)						Some NGOs may file a lawsuit if any cutting of old growth redwoods or significant damage to old growth redwoods is proposed in the preferred alternatives.	2023-08-28
Retired			0-PA&ED	<$2500	90 - 180 days	$182		$0 - $3466 Y	90 - 180 days Y		
Threat			1-PS&E								
ENV: Biological	Environmental Milestones		2-RW Sup								2023-12-04
	Jaime Matteoli		3-Con Sup								
			4-Con Cap								
			9-RW Cap								

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57	Caltrans initiative to install Middle Mile Broadband around the state is ongoing. Design should be able to accommodate this initiative if the segment is selected as a location for improvements.	Project should consider broadband requirements during final design and be prepared to install if requested.				Mitigate				The project design incorporates a standard shoulder where the broadband conduit can be installed, including in the tunnel.	2023-09-28
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E	Insignificant							
DSN: Utility	Utility Coordination		2-RW Sup								2023-12-04
	Jaime Matteoli, PM		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
20	As a result of continued slide/ground movement at South Portal between the time of the design, bidding, and construction phases, changes to the existing conditions may occur, which would result in a change in the design of the South Portal.	Caltrans to confirm the importance of the structures and design criteria.		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		Impact of this risk is geographically constrained to the South Portal area.	2023-09-07
Retired			0-PA&ED								
Threat			1-PS&E								
STR: Geotechnical	Differing Site Conditions during construction		2-RW Sup								2023-12-04
	Jaime Matteoli		3-Con Sup	Insignificant		$0		$0 - $1	Y		
			4-Con Cap								
			9-RW Cap								
25	Due to lack of supporting design information (surveying, hydraulics, geotechnical, drainage) delays to the preliminary structures (tunnels, bridges, walls) design effort may occur which may lead to schedule impacts.	Postpone the start of the preliminary structures design submittal until the supporting design information is available. Perform geotechnical analysis resulting from the boring program.				Mitigate				Supporting design information is available at the beginning of the design effort. Preliminary structures design work does not commence until the supporting design information is available. Notes: Is it a concern on why we are designing preliminary structures at this early stage if the further information will be available at a later stage?	2023-09-25
Retired			0-PA&ED								
Threat			1-PS&E	Insignificant							
STR: Structure Design	Supporting design information (surveying, hydraulics, drainage, geotechnical) not available.		2-RW Sup								2023-12-04
	Moe Amini		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
27	Changes to the roadway alignments could result in design changes to structures (tunnels, bridges, walls) design which would affect scope, design schedule, and design budget for structures work.	Redesign preliminary structures to accommodate roadway realignment. Request time extension and additional budget if needed.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		Roadway alignments will not change once the structures have been laid out and preliminary structures design effort commences. Similarly, any changes to the footprint would require repeat of environmental field surveys. Assumptions for PO-B1 Amendment 1 and PO-C have specific assumptions about acreages and which alternatives will be carried forward into the fieldwork and technical report phases.	2023-09-25
Retired			0-PA&ED	Insignificant							
Threat		Redesign the preliminary structures when the roadway alignment is finalized and approved.	1-PS&E								
STR: Structure Design	Change in roadway alignment(s) or project footprint		2-RW Sup								2023-12-04
	Moe Amini		3-Con Sup								
			4-Con Cap								
			9-RW Cap								

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29	Risk due to insufficient subsurface data (including hydrogeologic / groundwater) necessary in order complete the overall PA/ED work. Approval by Caltrans management of geotechnical exploration work for 2021(Autumn) to early 2022 season is not certain.					Active Acceptance				There is plan for ~9 exploration points during the 2021-2022 season (a.k.a. Phase 5). Staff from Caltrans management and environmental groups may not be in agreement with the proposed GI field work. Most are on Green Diamond's land.	2023-09-25
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
STR: Geotechnical	Permits/ clearance for GI exploration work		2-RW Sup								2023-12-04
	Brian O'Neil		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
30	Geotechnical deliverables scoped for PO-C such as SPGRs, PGDR(s), etc. will have gaps and insufficient technical data for Civil/Structural engineering designers to rely on since PO-B2 data may not be fully processed in time.	Continue to collect monitoring data. Hold off on submitting PO-C reports until the PO-B2 data is collected and incorporated.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		Uncertain if Caltrans intends the PO-C scope to include detailed technical analysis of data collected during PO-B2, plus periodic data (groundwater, inclinometers, rain gauges, etc.) still being collected throughout 2021 from newly installed instrumentation which was a large financial investment.	2023-09-25
Retired			0-PA&ED								
Threat		Revise PO-C reports, if needed, to include PO-B2 findings.	1-PS&E	Insignificant							
STR: Geotechnical	Finalization of PO-C scope documents do not include detailed technical analysis of data collected during PO-B2		2-RW Sup								2023-12-04
	Brian O'Neil		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
32	Due to remoteness and dense canopy, which prevent clear connection to satellites for GPS measurements, measurement deviations are greater than client desires, even with use of equipment collecting data with sub-centimeter accuracy, as requested by D1 for trees.	Conduct equipment test comparing two GPS systems and document use of best available technology available in spring 2021 and equipment specifications. Explore the option to work with third parties and				Active Acceptance				Issues include access to GPS equipment with acceptable accuracy. Note: Internal Consultant team risk. Can this risk not be resolved by setting up a tolerance level within the environmental document and communicating the same to CT and other stakeholders?	2023-09-25
Retired			0-PA&ED								
Threat			1-PS&E								
CNS: Survey	Environmental field surveys		2-RW Sup								2023-12-04
	Karin Lilienbecker/ ICF		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
33	As a result of changes in design footprint expansion may occur which will have an impact to the schedule. Note: Combined with risk #27 above.	Env is coordinating with Eng to support design with constraints info so Eng has early view of feasible areas for disposal, access, haul. If areas are finalized before the PO-B1 amendment cost estimate is finalized, risk is				Mitigate				Environmental team is mobilizing in February 2021 for field surveys based on the current footprint. Any changes to the footprint would require repeat of environmental field surveys. Assumptions for PO-B1 Amendment 1 and PO-C have specific assumptions about acreages and which alternatives will be carried forward into the fieldwork and technical report phases.	2023-09-25
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
PPM: Schedule and Delivery	Revision of footprint provided by Engineering to Env on 1/13/21		2-RW Sup								2023-12-04
	John Litzinger/ HNTB		3-Con Sup								
			4-Con Cap								
			9-RW Cap								

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34	As a result of delays in obtaining permission, reaching remote off-road areas or COVID-19 restrictions, fieldwork may be delayed which will impact completion of technical report.	Env is setting up a sufficiently large team (requiring CSU approval for staff additions) to manage internal issues.				Mitigate				Timing of field work, including compressing durations, is considered in the PAED schedule to meet the required tech report schedule (D1 accepts the TRs NLT 12/31/21). If field work is delayed, the consequences are that a) Env team does not meet the required tech report schedule (D1 accepts TRs NLT 12/31/21) and/or b) some field survey windows for plants are missed.	2023-09-25
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
ENV: Permits	Fieldwork already delayed as Caltrans D1 decided to start the fieldwork to April 2021		2-RW Sup								2023-12-04
	Karin Lilienbecker/ ICF		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
35	As a result of rotating staff within the large survey team during survey effort (Feb-Sept), crews could deviate from the original method over time which may result in inconsistency of field measurements and impact survey quality.	Several measures planned to reduce the risk of method deviation: 1. The methods will be rewritten into "how to" instructions which will be provided to the field teams electronically and in hard copy. 2. Daily tailgates to highlight				Mitigate				Members of the survey team are being identified.	2023-09-25
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E	Insignificant							
CNS: Survey	Onset of surveys		2-RW Sup								2023-12-04
	Karin Lilienbecker/ ICF		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
36	Following commencement of fieldwork, client provides change in desired methodology for conducting fieldwork.	District 1 Env and Consultant Env collaborated during method development in late 2020/early 2021, including field demonstration & discussion in Feb 2021 for key resources (vegetation mapping, trees).				Mitigate				The scopes for PO-B1A1 and PO-C are based on direction received to date and/or comments from D1 staff. Changes to this direction after the start of fieldwork could require re-work of fieldwork resulting in delays and cost overruns.	2023-09-28
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
CNS: Survey	Field survey period (Feb-Sept 2021)		2-RW Sup								2023-12-04
	Steve Croteau/ District 1		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
38	Caltrans does not conclude or determine that the project is non-capacity increasing, thus changing key assumptions to several technical reports (including but not limited to air quality, community impacts, and noise).	The traffic analysis being prepared by Caltrans will determine whether the project increases capacity.				Active Acceptance				The consultant team assumes that Caltrans will make a determination in 2021 that the project is not capacity increasing. The scopes of work for several technical studies have been based on this assumption.	2023-09-28
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
ENV: Air Quality	PO-C scope		2-RW Sup								2023-12-04
	Jaime Matteoli, PM		3-Con Sup								
			4-Con Cap								
			9-RW Cap								

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RiBS Sub Category	Risk Trigger	Response if Risk Occurs									Date Last Updated
	Risk Owner										
42	As a result of limited available geotechnical information, contingency plans could need to be developed to address possible unanticipated adverse ground conditions that could be encountered in construction, increasing scope and cost.	Perform supplemental geotechnical investigations and explore contingency plans for construction approach. Quantify trade-offs in risk vs exploration to support geotechnical investigations for tunneling.		4 - High (51-70%)		Mitigate		3 - Moderate (31-50%)		It is now assumed that the Alt F tunnel alignment is behind the basal failure surface and the ground conditions will be suitable for SEM construction, that groundwater inflows will be easily controllable, and that the need for ground improvement and additional slope stabilization will be limited. Different conditions could be encountered during construction.	2023-09-28
Retired			0-PA&ED	Insignificant							
Threat		Define range of possible adverse ground conditions. Solicit contractor input.	1-PS&E	Insignificant							
STR: Geotechnical	Geotechnical Baseline Report		2-RW Sup								2023-12-04
	Raymond Sandiford		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
45	As a result of unanticipated adverse ground conditions, tunnel and portal areas could require more grouting or other ground improvement than estimated, increasing costs and potentially adversely affecting environment.	Perform supplemental geotechnical investigations				Mitigate				Additional geotechnical investigations are planned for Fall 2023, but additional subsurface information will be needed to estimate the extent of ground improvement required for tunnels and portal areas.	2023-09-28
Retired			0-PA&ED								
Threat			1-PS&E	Insignificant							
STR: Geotechnical	Geotechnical Baseline Report		2-RW Sup								2023-12-04
	Raymond Sandiford		3-Con Sup								
			4-Con Cap	Insignificant							
			9-RW Cap								
46	As a result of unstable slopes at tunnel portals, more stabilization measures could be required than anticipated, increasing cost and causing delays.	Perform supplemental geotechnical investigations				Mitigate				Additional geotechnical investigations are planned for Fall 2023, but additional subsurface information will be needed to estimate the extent of ground improvement required for tunnels and portal areas.	2023-09-28
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
STR: Geotechnical	Geotechnical Baseline Report		2-RW Sup								2023-12-04
	Raymond Sandiford		3-Con Sup	Insignificant							
			4-Con Cap								
			9-RW Cap								
59	Ground conditions at the proposed Alt F South Portal differ from those assumed for design, requiring more extensive and more costly EDAS construction than anticipated. As a result of unanticipated changes in groundwater flow and/or chemistry caused by construction, methods for tunneling and other construction could require modification,	The project design may continue to evolve in PS&E and pre-construction to account for new information discovered at those phases.				Active Acceptance				The project has been designed based on the geotechnical data gathered so far. There will need to be additional borings prior to construction to confirm these conditions.	2023-09-28
Retired			0-PA&ED								
Threat			1-PS&E								
CNS: Structural Construction	Geotech data		2-RW Sup								2023-12-04
	Mala Ciancia		3-Con Sup	Insignificant							
			4-Con Cap	Insignificant							
			9-RW Cap								

Risk Identification			Phase	Initial Risk Assessment		Risk Response		Residual Risk		Risk Status	
RISK ID #	Risk Statement "As a result of <root cause>, <uncertain event> may occur, which would lead to <effect on objective(s)>."	Proactive Response (prior to risk occuring)		Initial Risk Probability		Response Strategy		Residual Risk Probability			Date Risk Identified
Status				Cost Impact ($k)	Schedule Impact	Cost Impact ($k)	Schedule Impact	Cost Impact ($k) (Y indicates Residual Risk will be included in Reserve Calculations)	Schedule Impact (Y indicates Residual Risk will be included in Reserve Calculations)	Risk Assumptions and Status	Anticipated Resolution Date
Type											
RiBS Sub Category	Risk Trigger	Response if Risk Occurs									Date Last Updated
	Risk Owner										
60	SEM construction planned for Alt F tunnel and cross passages is more difficult than anticipated due to adverse ground conditions, causing schedule delays and cost increases. As a result of unanticipated changes in groundwater flow and/or chemistry caused by construction, methods for	The project design may continue to evolve in PS&E and pre-construction to account for new information discovered at those phases.				Active Acceptance				The project has been designed based on the geotechnical data gathered so far. There will need to be additional borings prior to construction to confirm these conditions.	2023-09-28
Retired			0-PA&ED								
Threat			1-PS&E								
CNS: Structural Construction	Geotech data		2-RW Sup								2023-12-04
	Mala Ciancia		3-Con Sup	Insignificant							
			4-Con Cap	Insignificant							
			9-RW Cap								
8	As a result of removing the C Alternatives from further environmental study, we run the risk that we may need to add them back into consideration at a further date. This would lead to considerable delay in PAED and additional costs to the project.	The PDT will continue to review the other alternatives, and if necessary add the C Alternatives back into consideration. The sooner this happens (if necessary) the lower the impact to schedule.		1 - Very Low (1-10%)		Active Acceptance		1 - Very Low (1-10%)		The current information suggests that the C Alternatives do not add benefits over other alternatives that are currently under consideration.	2023-09-28
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
STR: Structure Design	Geologic Reviews of other alternatives		2-RW Sup								2023-12-04
	Jason Meyer, Environmental		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
31	As a result of tight PA/ED schedule and progressing too fast during alternatives analysis phase, steps may get missed in the PA/ED phase which will lead to rework and, if deemed necessary, will significantly jeopardize schedule, and add to budget expenditures.	Any revisions to current alternatives would be part of Final ED and addressing comments from public circulation of Draft ED.				Mitigate				The consultant team is seeking further clarification from Caltrans on the PA/ED process to clarify the various process steps, interdependencies, and timeline to ensure PA/ED completion within allotted timeframe. Team is aware that permit approvals for field work can take >1year.	2023-09-28
Retired			0-PA&ED	Insignificant							
Threat			1-PS&E								
PPM: Schedule and Delivery	Public comments to draft ED		2-RW Sup								2023-12-04
	Jaime Matteoli		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
52	Various nonstandard design features (reverse curves, superelevation runoff, etc.) are required for some of the alternatives. Delays in approval from Caltrans HQ on Design Standard Decision Document for non-standard design features would impact completion of further design.	Prepare Design Standard Decision Document and submit Caltrans HQ for approval.				Mitigate				Alternative "F" has a reverse curve and some existing nonstandard horizontal curves in the southern part of the alignment (where only shoulder work is taking place). Nonstandard design features have been discussed with Caltrans project team.	2023-09-28
Retired			0-PA&ED								
Threat			1-PS&E	Insignificant							
DSN: Roadway Design	Design Standard Decision Document		2-RW Sup								2023-12-04
	Jaime Matteoli, PM		3-Con Sup								
			4-Con Cap								
			9-RW Cap								

Risk Identification			Phase	Initial Risk Assessment		Risk Response		Residual Risk		Risk Status	
RISK ID #	Risk Statement "As a result of <root cause>, <uncertain event> may occur, which would lead to <effect on objective(s)>."	Proactive Response (prior to risk occuring)		Initial Risk Probability		Response Strategy		Residual Risk Probability		Risk Assumptions and Status	Date Risk Identified
Status				Cost Impact ($k)	Schedule Impact	Cost Impact ($k)	Schedule Impact	Cost Impact ($k) (Y indicates Residual Risk will be included in Reserve Calculations)	Schedule Impact (Y indicates Residual Risk will be included in Reserve Calculations)		Anticipated Resolution Date
Type											
RiBS Sub Category	Risk Trigger	Response if Risk Occurs									Date Last Updated
	Risk Owner										
26	UNKNOWN PHYSICAL CONSTRAINTS IMPACT DESIGN: Due to potential discovery of unknown physical constraints (environmental, geotechnical, topographical), changes to the design (preliminary structures, tunnels, bridges, walls) may be needed to avoid the constraints which will lead to delays in design schedule and increased budget.	Review the project for physical constraints, obtain and incorporate as-built information into the APS documents.		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		Assume no physical constraints exist that would prohibit typical structure layout. Example of physical constraint - Bio surveys identify constraints that affect the design, access, disposal sites, haul roads, survey results provide feedback on the areas affected permanently or temporarily by design features.	2023-09-28
Retired			0-PA&ED								
Threat		Redesign the preliminary structures to accommodate the constraint. Request time extension and additional budget if needed.	1-PS&E	Insignificant	30 - 90 days				30 - 90 days Y		
STR: Structure Design	Discovery of physical constraint		2-RW Sup								2023-12-04
	Moe Amini		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
6	CLEARANCE FOR GEOTECH INVESTIGATIONS: Clearance for geotechnical investigations outside the cleared environmental footprint would delay investigations and the resulting geologic information, causing compounded delays in design completion and schedule.	Following selection of Alt F, Caltrans to work with partners to facilitate the environmental process to get early start of geotechnical drilling and to reduce risk of delays to this process. The public engagement and partnership efforts will		5 - Very High (>70%)		Mitigate		3 - Moderate (31-50%)		Geotechnical investigations already conducted for PA&ED phase so no longer a risk for this phase. Caltrans plans to perform additional geotechnical investigations in PS&E phases. Understanding the underlying geologic conditions is critical to validating and refining project Alternative F	2023-09-28
Retired			0-PA&ED								
Threat		Seek ways to obtain geotechnical data from cleared environmental footprint	1-PS&E	Insignificant	>180 days	$578			180 - 360 days Y		
STR: Geotechnical	Geotechnical Permit Applications		2-RW Sup								2023-12-04
	Jaime Matteoli		3-Con Sup								
			4-Con Cap								
			9-RW Cap								
64	LANDSLIDES DURING CONSTRUCTION: As a result of construction-period landsliding or accelerated earthflow movement affects work in progress and necessitates repair and/or re-design.	Construction measures to avoid/protect against landslide		3 - Moderate (31-50%)		Mitigate		2 - Low (11-30%)		The project is in a known landslide area.	2023-09-28
Retired			0-PA&ED								
Threat		Support construction to address any repairs to permanent works or land due to landslide damage	1-PS&E	Insignificant	0 - 30 days	$249			0 - 30 days Y		2025-11-17
CNS: Structural Construction	Landslides during Construction		2-RW Sup								
			3-Con Sup	Insignificant	30 - 90 days				30 - 90 days Y		2023-12-04
	Jaime Matteoli, PM		4-Con Cap								
			9-RW Cap								
21	POWER NEEDS FOR CONSTRUCTION As a result of additional power needs to support the Alt F project, significant upgrades to the power infrastructure is required by Pacific Power that would result in additional impact to the environmental process.	Caltrans to confirm the importance of the structures and design criteria.		3 - Moderate (31-50%)		Mitigate		3 - Moderate (31-50%)		Upgrade of power infrastructure would have major environmental repercussions for the LCG project as this power upgrade may require upgrades to their 15-20 long ROW. Upgrade costs are included in the current budget estimate.	2023-09-28
Retired			0-PA&ED								
Threat			1-PS&E								2024-06-30
ROW: R/W Utilities	Findings from Pacific Power Study		2-RW Sup	Insignificant							
			3-Con Sup								2023-12-04
	Jaime Matteoli		4-Con Cap								
			9-RW Cap								

Attachment J

Life-Cycle Cost Analysis

Table 5: US 101 Mainline Results

Total Cost	Alternative 1: 40-year Flexible (HMA w/ RHMA)		Alternative 2: 40-year rigid (JPCP)	
	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	$3,578	$26	$6,686	$48
Present Value	$2,555	$20	$6,374	$26
EUAC	$103	$1	$257	$1
Lowest Present Value Agency Cost	Alternative 1: 40-yr flexible (HMA w/RHMA)			
Lowest Present Value User Cost	Alternative 1: 40-yr flexible (HMA w/RHMA)			

Conclusion and Recommendations

The 40-year flexible (HMA w/RHMA) alternative was incorporated into the project plans and cost estimate for the entirety of Alternative X, and for at-grade sections of Alternative F. The 40-year rigid (JPCP) alternative must be used for the limits of the Alternative F tunnel.

Attachment K

Traffic Index (TI) Data

Traffic Index Data

The below traffic index data was provided in the Project Study Report dated June 30, 2016 and used in the Materials Report, Life Cycle Cost Analysis, and environmental studies. The opening year is 2031 and the forecast year is 2051. A Traffic Operations Analysis Report was not developed. There is no change in forecast volumes between Build and No Build alternatives.

Year	Annual ADT	Peak Hour	Other data	
2014	4,200	640	Directional %	60
2015	4,210	640	DH Truck %	8.0
2031	4,410	670	10-yr. TI	9.0
2041	4,540	690	20-yr. TI	9.5
2051	4,670	710		

Source: Caltrans, Project Study Report, June 2016

Attachment L

SHOPP Project Output

SHOPP Project - Accomplishment - Performance Measures - Benefits

District: 01 **Tool ID:** 16494 **Project ID:** 0115000099 **EA:** 0F280 **Co-Rte-PM:** DN-101-12.50/16.30 (Primary Location) View/Print PIR (Performance) Report

☑ Bridge B ☑ Pavement P ☐ Drainage ☐ Facilities ☑ Signs and Lighting ☐ Mobility ☐ Roadside ☑ Complete Streets ☑ Sustainability /Climate Change ☐ Advance Mitigation /Mitigation ☑ Major Damage & Betterments ☑ Green-house Gases ☑ Relinquishment

Performance & Accomplishments (PRG)

	ActID	Activity Detail	Performance Objective	Unit of Measurement	Quantity	Pre-Good	Pre-Fair	Pre-Poor	New	Post-Good	Post-Fair	Post-Poor	HQ Program Review - Agree with District?	HQ Comment	Review Date	Performance Change Date After Review	Comment
1	A03	Bridge Rail (201.112)	Bridge Rail Replacement and Upgrade	Linear Feet	4244.000				4244.000								
2	A08	Number of Bridges	No Performance Objective in the SHSMP	Each	2.000												
3	B22	Asphalt Pavement Major Rehab	Pavement Class I	Lane Miles	10.331		10.331			10.331							new alignment
4	E55	Proactive Safety Vehicles	Proactive Safety	Annual Fatal & Serious Injury Collisions	0.001			0.001		0.001							new bridge with rail
5	H32	Is any Location Within the Project Limits Ped/Bike Accessible?	No Performance Objective in the SHSMP	Yes/No	Yes												Yes
6	H55	Justification for Complete Streets Not Applicable	Major Dmg	1,2,3													
7	I02	Roadway Adapted to Address Climate Change Threats/Vulnerability	No Performance Objective in the SHSMP	Centerline Miles	3.200			3.200		3.200							
8	M02	Permanent Restoration (201.131)	Major Damage (Permanent Restoration)	Locations	1.000			1.000		1.000							Drainage work to be added later after alternative is selected in 2024
9	N04	Defer	No Performance Objective in the SHSMP	-													not a CE/CE
10	R01	Relinquishments	Relinquishments	Centerline Miles	9.300			9.300		9.300							

(Last Saved - 03/13/23 @ 1:32 PM by Kirsten Thuresson)

Programming Performance Summary (All Locations)

Program Code	Activity Category	Asset Class	Asset	Performance Value	Performance Measure	Unit	Pre-Good	Pre-Fair	Pre-Poor	Pre-Total	Post Good	New	Post Good+New	Post-Fair	Post-Poor	Post-Total
201.131	Major Damage - Permanent Restoration		Other Program Objectives	1.0	Location(s)	Location(s)	0.0	0.0	1.0	1.0	1.0	0.000	1.0	0.0	0.0	1.0

Notes:

1. The crosswalk for reporting performance in the "Programming Performance Summary" was developed to assist the districts on performance reporting requirements for CTC and PCRs. For discrepancies or errors, please notify AM Tool admins via e-mail at CT-TAM@dot.ca.gov.
2. The data summarized in the table represents the performance reported or to be reported in CTIPS.
3. Programming only requires the breakdown of Good, Fair and Poor for Primary and Supplementary Asset Classes.
4. Reporting of bridge pre and post conditions may contain errors if the project RTL is before 2024/25.
5. Reporting drainage pre-total and post good may differ whenever projects contain abandoned/removed culverts as the culvert no longer exists at post construction, is deleted from the pre-total value for posting of the post good value, and gets deleted from the statewide CIP inventory database.
6. Reactive Safety projects will temporally use the same performance outputs of Safety Improvement projects. When the reporting requirements for CTC changes, the logic in the AM Tool will change.
7. During the transition to the new Proactive Safety objective, the performance output for projects with a primary activity category of Proactive Safety (under program codes 015, 112, or 235) will continue to be presented here in the units of measure corresponding to the activities historically reported to date. A change in units to "Annual Fatal and Serious Injury Collisions" for future programming requests is being planned.

Attachment M

Programming Sheet

Programming Sheet with Risk and OE

AMS ID: 0115000099 EA: 01-0F280 COUNTY: DN ROUTE: 101 POSTMILE: 12.7/16.5

Project Manager:	MATTEOLI, JAIME C	PM Assistant:	LAW, REBECCA L	Project Nickname:	LAST CHANCE GRADE Permanent				
Project Description - Long:	IN DEL NORTE COUNTY FROM WILSON CREEK BRIDGE TO 3.8 MILES NORTH OF WILSON CREEK BRIDGE								
Work Description - Long:	REPAIR SLIDES; CONSTRUCT BYPASS								
PPNO:	1112	Program:	shopp	RPT:	No	Funding Candidate:	No	PROGRAM YR:	2031	Working Days:	783
Open for Time:	Yes	Subprogram:	Major Damage Restoration	CT Status:	APL	RMP:		RMP Date:	
10 Yr SHOPP:	No	AADD:	Yes	Dist Category:	SHOPP LONG	FED Aid Eligible:			

MS	MS Description	MS Date	
M000	ID NEED	05/05/2015	(A)
M010	APPROVE PID	06/30/2016	(A)
M015	PROG PROJ	06/01/2018	(A)
M020	BEGIN ENVIRO	08/28/2019	(A)
M030	NOP	11/05/2021	(A)
M035	NOI	11/05/2021	(A)
M040	BEGIN PROJ	05/01/2019	(A)
M120	CIRC DPR & DED EXT	12/15/2023	(T)
M200	PA&ED	11/17/2025	(T)
M215	BEGIN STRUC	01/02/2026	(T)
M221	RECEIVE COMPLETE	04/16/2026	(T)
M224	R/W REQTS	08/19/2024	(T)
M225	REGULAR R/W	04/14/2025	(T)
M275	GENERAL PLANS	04/16/2026	(T)
M377	PS&E TO DOE	03/15/2029	(T)
M378	DRAFT STRUC PS&E	02/15/2030	(T)
M380	PROJ PS&E	04/15/2030	(T)
M410	R/W CERT	07/01/2030	(T)
M460	RTL	09/02/2030	(T)
M470	FUND ALLOCATION	10/16/2030	(T)
M480	HQ ADVERT	12/02/2030	(T)
M495	AWARD	04/14/2031	(T)
M500	APPROVE CONTRACT	06/16/2031	(T)
M600	CONTRACT ACCEPT	10/14/2039	(T)
M700	FINAL REPORT	10/14/2040	(T)
M800	END PROJ EXP	10/14/2041	(T)
M900	FINAL PROJ	07/14/2043	(T)

Env Doc: EIR, EIS

Capital Cost Estimates ($k)

	Amount $k	EST Date
Roadway	397000	11/14/23
Structures	1587000	11/14/23
Const Total	1984000	
ROW	211000	12/12/23
Total	2195000	

Risk & Operating Expense Budget

	Risk Bud. ($k)	OE ($k)
Phase 0 - PAED	$0	$0
Phase 1 - PS&E	$0	$0
Phase 2 - RW	$0	$0
Phase 3 - Con	$0	$0
Phase 4 - Con Cap	$0	$0
Phase 9 - RW Cap	$0	$0
Total	$0	$0

Note: For Phase 0, 1, 2 and 3, only enter Risk Budget amount if not already entered in PRSM Workplan.

Funding Info ($k)

Fund Source	PA&ED	PS&E	ROW	CON	ROW CAP	CON CAP
4050201.131	0	0	0	0	75	0
2010201.131	50000	0	0	0	0	0
Total:	**50,000**	**0**	**0**	**0**	**75**	**0**

Alternative F

	Capital Cost Est.($k)
FY Mid M500-M600	2036
CC Escalation %:	3.80%
CC Escalated $:	3,103,916
ROW CAPITAL:	291,000
TOTAL:	3,394,916

Capital escalation calculated by PM

PROJECT SUPPORT COSTS ($k)

Phase Esc. Rate	PRIOR ACT $	FY23/24 ETC (0.00%)	FY24/25 (3.50%)	FY25/26 (3.50%)	FY26/27 (3.50%)	FY27/28 (3.50%)	Future (3.50%)	Total	Sup/Cap %
0	**32,993**	**8,627**	**5,714**	**2,666**	**0**	**0**	**0**	**50,000**	**1.47%**
1	**0**	**0**	**0**	**17,471**	**25,798**	**38,512**	**38,219**	**120,000**	**3.54%**
2	**0**	**0**	**0**	**70**	**118**	**172**	**640**	**1,000**	**0.03%**
3	**0**	**0**	**0**	**0**	**0**	**0**	**431,214**	**431,214**	**12.70%**
							TOTAL SUPPORT COSTS:	602,214	17.74%
							TOTAL PROJECT COSTS:	3,997,130	

PROJECT SUPPORT PYs

	Division	PRIOR ACT PYS	2023 ETC PYs	2024 ETC PYs	2025 ETC PYs	2026 ETC PYs	2027 ETC PYs	Future ETC PYs	Total ETC PYs
01	ADMN	0.75	0.00	0.02	0.02	0.02	0.02	0.30	1.13
01	MTCE	0.02	0.00	0.04	0.03	0.02	0.02	0.01	0.14
01	PPM	4.87	0.00	1.07	1.16	1.21	1.22	6.15	15.68
01	TPLN	1.79	0.00	0.07	0.17	0.24	0.24	21.85	24.36
01	TROP	0.11	0.00	0.04	0.07	0.09	0.09	0.36	0.76
01	**TOTALS :**	7.54	0.00	1.24	1.45	1.58	1.59	28.67	42.07
	Division	PRIOR ACT PYS	2023 ETC PYs	2024 ETC PYs	2025 ETC PYs	2026 ETC PYs	2027 ETC PYs	Future ETC PYs	Total ETC PYs
03	CONS	0.20	0.10	0.97	0.58	0.29	0.29	118.19	120.61
03	ENVM	20.20	7.49	5.17	5.88	6.40	6.42	136.81	188.37
03	ESRV	0.79	0.46	0.25	0.57	0.88	0.88	8.71	12.54
03	PHSO	0.00	15.83	0.78	0.49	0.00	0.00	0.00	17.09
03	PRJD	2.39	0.24	4.64	6.63	9.10	9.12	17.20	49.32
03	RWLS	0.44	0.01	0.06	0.13	0.15	0.15	0.83	1.78
03	SURV	2.70	0.00	0.37	0.76	0.87	0.88	3.82	9.40
03	TO11	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0.41
03	TO2	0.00	0.00	0.09	0.06	0.00	0.00	0.00	0.14
03	TPLN	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03

Programming Sheet with Risk and OE

AMS ID: 0115000099 EA: 01-0F280 COUNTY: DN ROUTE: 101 POSTMILE: 12.7/16.5

	Division	PRIOR ACT PYS	2023 ETC PYs	2024 ETC PYs	2025 ETC PYs	2026 ETC PYs	2027 ETC PYs	Future ETC PYs	Total ETC PYs
03	**TOTALS :**	26.75	24.54	12.33	15.10	17.69	17.74	285.56	399.69
	Division	PRIOR ACT PYS	2023 ETC PYs	2024 ETC PYs	2025 ETC PYs	2026 ETC PYs	2027 ETC PYs	Future ETC PYs	Total ETC PYs
04	ENVP	0.07	0.05	0.00	0.00	0.00	0.00	0.00	0.11
04	**TOTALS :**	0.07	0.05	0.00	0.00	0.00	0.00	0.00	0.11
	Division	PRIOR ACT PYS	2023 ETC PYs	2024 ETC PYs	2025 ETC PYs	2026 ETC PYs	2027 ETC PYs	Future ETC PYs	Total ETC PYs
44	EMGT	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.02
44	**TOTALS :**	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.02
	Division	PRIOR ACT PYS	2023 ETC PYs	2024 ETC PYs	2025 ETC PYs	2026 ETC PYs	2027 ETC PYs	Future ETC PYs	Total ETC PYs
53	O113	4.99	0.00	0.00	0.00	0.00	0.00	0.00	4.99
53	**TOTALS :**	4.99	0.00	0.00	0.00	0.00	0.00	0.00	4.99
	Division	PRIOR ACT PYS	2023 ETC PYs	2024 ETC PYs	2025 ETC PYs	2026 ETC PYs	2027 ETC PYs	Future ETC PYs	Total ETC PYs
59	BDSN	2.31	0.00	4.15	6.32	6.08	6.10	17.79	42.75
59	GS	12.83	0.00	0.49	168.05	272.71	273.46	457.12	1,184.67
59	METS	0.00	0.00	0.00	0.09	0.14	0.15	19.16	19.54
59	OSQM	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02
59	PPM	0.09	0.00	0.07	0.04	0.01	0.01	0.25	0.48
59	SCON	0.07	0.00	0.11	0.16	0.15	0.15	167.12	167.75
59	SES	0.57	0.00	0.33	1.24	1.70	1.71	7.69	13.24
59	T	0.00	0.00	0.00	0.00	0.00	0.00	24.00	24.00
59		0.00	0.00	0.00	0.00	0.00	0.00	683.23	683.23
59	**TOTALS :**	15.87	0.00	5.15	175.90	280.79	281.58	1,376.37	2,135.68
	Division	PRIOR ACT PYS	2023 ETC PYs	2024 ETC PYs	2025 ETC PYs	2026 ETC PYs	2027 ETC PYs	Future ETC PYs	Total ETC PYs
		56.77	0.00	0.00	0.00	0.00	0.00	0.00	56.77
	TOTALS :	56.77	0.00	0.00	0.00	0.00	0.00	0.00	56.77
PROJECT TOTALS:		112.00	24.59	18.73	192.45	300.06	300.91	1,690.60	2,639.33

Comments: 0115000099

Attachment N

Draft Highway Planting Design Concept

LAST CHANCE GRADE PERMANENT RESTORATION PROJECT

DRAFT HIGHWAY PLANTING DESIGN CONCEPT

CALIFORNIA DEPARTMENT OF TRANSPORTATION

DISTRICT 1, DEL NORTE COUNTY, U.S. HIGHWAY 101

POST MILES 12.7 TO 16.5

EA 01-0F280 / EFIS 0115000099

June 2023

Caltrans
CALIFORNIA DEPARTMENT OF TRANSPORTATION

DRAFT HIGHWAY PLANTING DESIGN CONCEPT

California Department of Transportation

District 1, Del Norte County, U.S. Highway 101

Post Miles 12.7 to 16.5

EA 01-0F280 / EFIS 0115000099

June 2023

Prepared By: _____ Date: 6/9/23

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CHAPTER 1. PROJECT DESCRIPTION

The Last Chance Grade Permanent Restoration Project is located on a section of U.S. Highway 101 (U.S. 101) known as Last Chance Grade (LCG) in southern Del Norte County, California. It is approximately 10 miles south of Crescent City between post miles (PM) 12.7 and 16.5.

The purpose of the project is to develop a long-term solution to the instability and potential roadway failure at LCG. The project would consider alternatives that provide a more reliable connection, reduce maintenance costs, and protect the economy, natural resources, and cultural landscapes.

A long-term sustainable solution at LCG is needed to address:

- Economic ramifications of a long-term failure and closure
- Risk of delay/detour to the traveling public
- Increasing maintenance and emergency project costs
- Increases in the frequency and severity of large storm events caused by climate change

The LCG Permanent Restoration Project proposes two build alternatives—Alternative X and Alternative F—in addition to the No-Build Alternative.

Alternative X would involve reengineering a 1.6-mile-long section of the existing highway to minimize the risk of landslides. Main project components would include an underground drainage system, a series of retaining walls, and strategic eastward retreats.

Alternative F would involve constructing a 6,000-foot-long (1.1 mile) tunnel to the east of the existing highway to avoid the most intense areas of known landslides and geologic instability. Main components would include a tunnel and its portals, a bridge, and an Operations Maintenance Center (OMC).

Geotechnical investigations would be needed for both Alternative X and Alternative F to inform project design.

Under the No-Build Alternative, no work would be done on the existing highway; existing conditions would persist, including the continuation of emergency repairs and enhanced maintenance.

CHAPTER 2. PLANTING PLAN

2.1. Introduction

The purpose of this *Highway Planting Design Concept* is to forecast restorative planting needs within the LCG project area. Revegetation of disturbed areas resulting from project construction is key to reestablishing the natural and scenic setting of the U.S. 101 corridor. This concept provides an early and comprehensive assessment of the replanting needs associated with both build alternatives and the forecasted cost for each.

2.2. Alternative F

2.2.1 Background

Alternative F would involve construction of an approximately 1.1-mile-long tunnel that would bypass an existing segment of U.S. 101. In addition to the proposed tunnel, key project elements are tunnel portals, tunnel approaches (including a proposed bridge connecting to the north tunnel portal), and an OMC. The roadbed for the bypassed highway segment would be removed after traffic is diverted onto the new highway alignment.

2.2.2 Restorative Planting

Under Alternative F, three landscape restoration types are proposed (Figures 1B to 1D and Table 1). Each type is discussed within this section.

Table 1. Alternative F Restorative Planting Costs

Seeding Type	Acreage	Cost/Acre	Total Cost
Type A	17.25	$150,000	$2,587,500
Type B	0.31	$1,307,369	$405,285
Type C	0.88	$300,000	$264,000
Total	18.44		$3,256,785

Landscape Restoration Type A

Landscape Restoration Type A assumes a cost of $150,000 per acre. This cost includes: site preparation, soil testing and remediation, topsoil placement, and installation of seed mixes, shrubs, and trees. All proposed seeding and plantings would be comprised of native species. Expectations for watering, cultivating, warranty, and replacement would be determined

during the project's plans, specifications, and estimates (PS&E) phase; therefore, they are not included in this estimated cost.

Type A would be applied in the following locations.

- **OMC**. Three disturbed areas at the OMC would require revegetation: a stormwater best management practice (BMP) (Station 30+00 to 32+10), the cleared and graded hillside behind the proposed OMC (Station 33+50 to 36+00), and a cleared and graded area for a new transformer and power line (Station 24+15 to 31+00).
- **South Tunnel Portal**. Three disturbed areas would require revegetation at the south tunnel portal: the cleared and graded area for the realigned U.S. 101 approach to the south tunnel portal (Station 43+40 to 53+80), the proposed staging area southwest of the tunnel portal (Station 52+00 to 53+80), and the cleared and graded hillside for the cut-and- cover portion of the proposed tunnel (Station 53+80 to 59+00).
- **Original Highway Roadbed.** An existing segment of U.S. 101 would be bypassed by the proposed tunnel (Station 41+00 to 122+50). Within this area, highway pavement and roadbed would be removed, soil would be amended, and topsoil would be placed prior to revegetation.

Landscape Restoration Type B

Landscape Restoration Type B assumes a cost of $1,307,369 per acre. This cost includes the installation of native plantings on the green roof of the OMC. This cost includes topsoil placement and installation of the native seed mix. The OMC would be located on the south end of the project on the east side of U.S. 101 (Stations 302+00 to 304+60).

Landscape Restoration Type C

Landscape Restoration Type C assumes a cost of $300,000 per acre. This cost includes: site preparation, soil testing and remediation, topsoil placement, and installation of seed mixes, shrubs, and trees. All proposed seeding and planting would be native materials. Expectations for watering, cultivating, warranty, and replacement would be determined in the project's PS&E phase; therefore, they are not included in this estimated cost.

Restorative Alternative C would be applied to the following locations:

- **North Tunnel Portal**. Clearing and grading would be required to construct the tunnel portal and retaining walls associated with the north portal (Station 115+30 to 120+00 and Station 121+50 to 124+80).

- **OMC**. An area between the proposed OMC and the existing alignment of U.S. 101 would be revegetated to help screen the facility from highway users (Station 31+80 to 34+80).

2.3. Alternative X

2.3.1 Background

Alternative X would reengineer a 1.6-mile-long section of the existing U.S. 101 to minimize the risk of landslides. The main project elements would include an underground drainage system, retaining walls (including one multi-tiered segment), and realignment of the highway eastward.

2.3.2 Restorative Planting

Under Alternative X, only one landscape restoration type is proposed. Type A assumes a cost of $150,000 per acre. This cost includes: site preparation, soil testing and remediation, topsoil placement, and installation of seed mixes, fertilizers, shrubs, and trees. All proposed seeding and plantings would be comprised of native species. Expectations for watering, cultivating, warranty, and replacement would be determined in the project's PS&E phase; therefore, they are not included in this estimated cost.

Restoration planting is proposed for the following locations (Figures 1E to 1F). Costs associated with replanting are provided in Table 2.

- **Drainage Gallery Access Road**. Areas disturbed by construction of the access road for the proposed drainage gallery would require landscape restoration (Station 439+59 to 444+30).
- **Highway Realignment**. The highway alignment would shift to the east to avoid active landslide areas. The old alignment's pavement and roadbed material would be removed, and these areas would be revegetated (Station 450+00 to 510+60).
- **Retaining Walls**. Terraces between proposed retaining walls would require revegetation (Station 499+50 to 503+50). Proposed vegetation would need to consider inspection and maintenance needs for the retaining walls.

Table 2. Alternative X Restorative Planting Costs

Seeding Type	Acreage	Cost/Acre	Total Cost
Type A	7.67	$150,000	$1,150,500

NOTES:

1. ASSUME STANDARD CALTRANS RESTORATION COST FOR LANDSCAPE RESTORATION TYPE "A".

2. ASSUME $30.00/SF FOR LANDSCAPE RESTORATION TYPE "B".

3. ASSUME STANDARD RESTORATION COST x2 FOR LANDSCAPE RESTORATION TYPE "C".

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	DN	101	12.7/16.5		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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

HNTB CORPORATION
2101 WEBSTER St
SUITE 1400
OAKLAND, CA 94612

PLANTING QUANTITIES - ALTERNATIVE F

TYPE	AREA (ACRES)
A	17.25
B	0.31
C	0.88

PLANTING QUANTITIES - ALTERNATIVE X

TYPE	AREA (ACRES)
A	7.67
B	0.00
C	0.00

PLANTING QUANTITIES

NO SCALE

PQ-1

REVISED BY | DATE REVISED
CALCULATED/DESIGNED BY | CHECKED BY
CONSULTANT FUNCTIONAL SUPERVISOR
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

BORDER LAST REVISED 7/2/2010 | USERNAME => BJSTR, DGN FILE => BREQUEST | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0000 | PROJECT NUMBER & PHASE 00000000001 | DATE PLOTTED => AUG 1 00-00-00 TIME PLOTTED => 07:14

Figure 1A. Planting Plan Quantities Tables

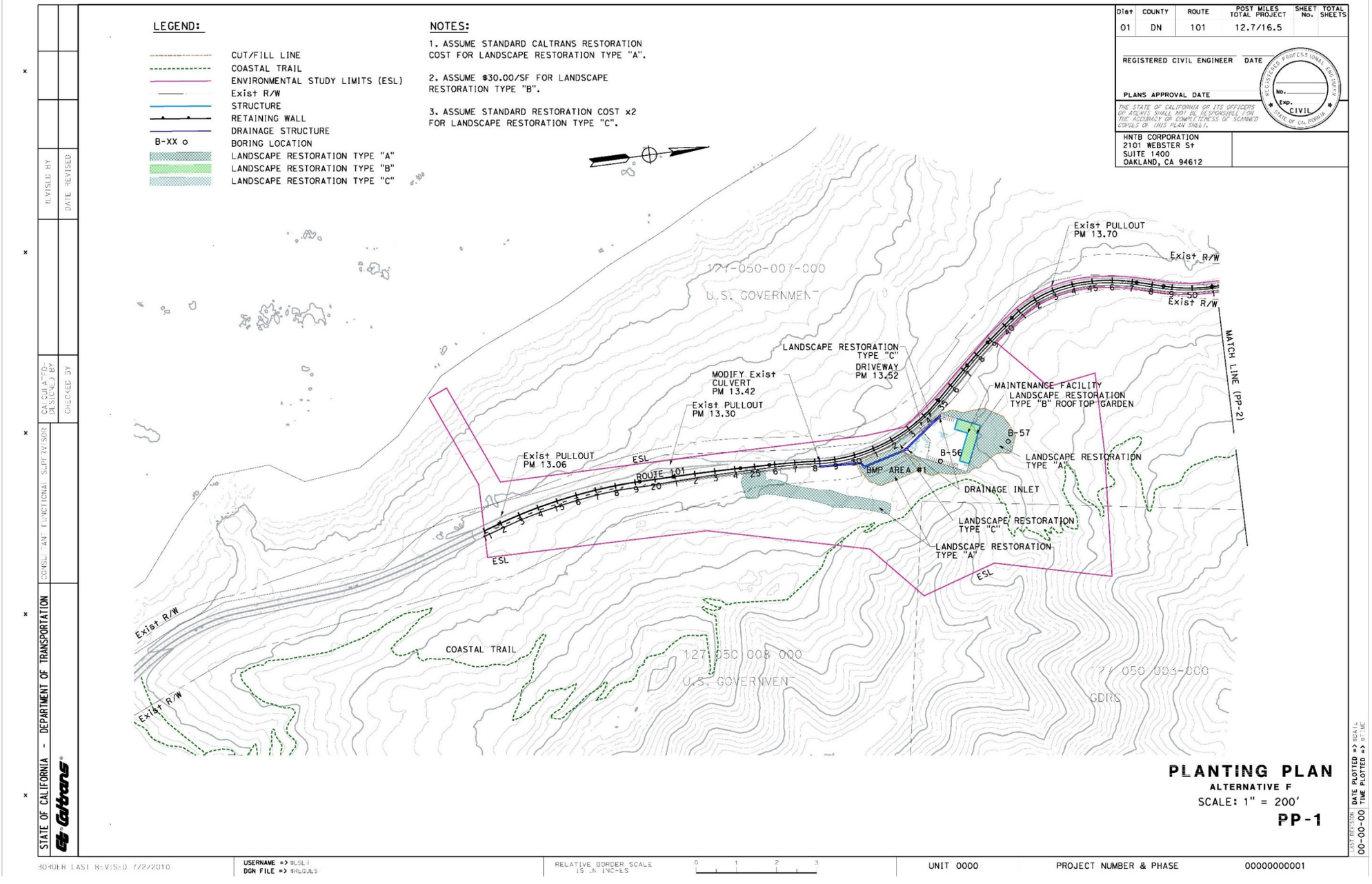

Figure 1B. Planting Plan Alternative F

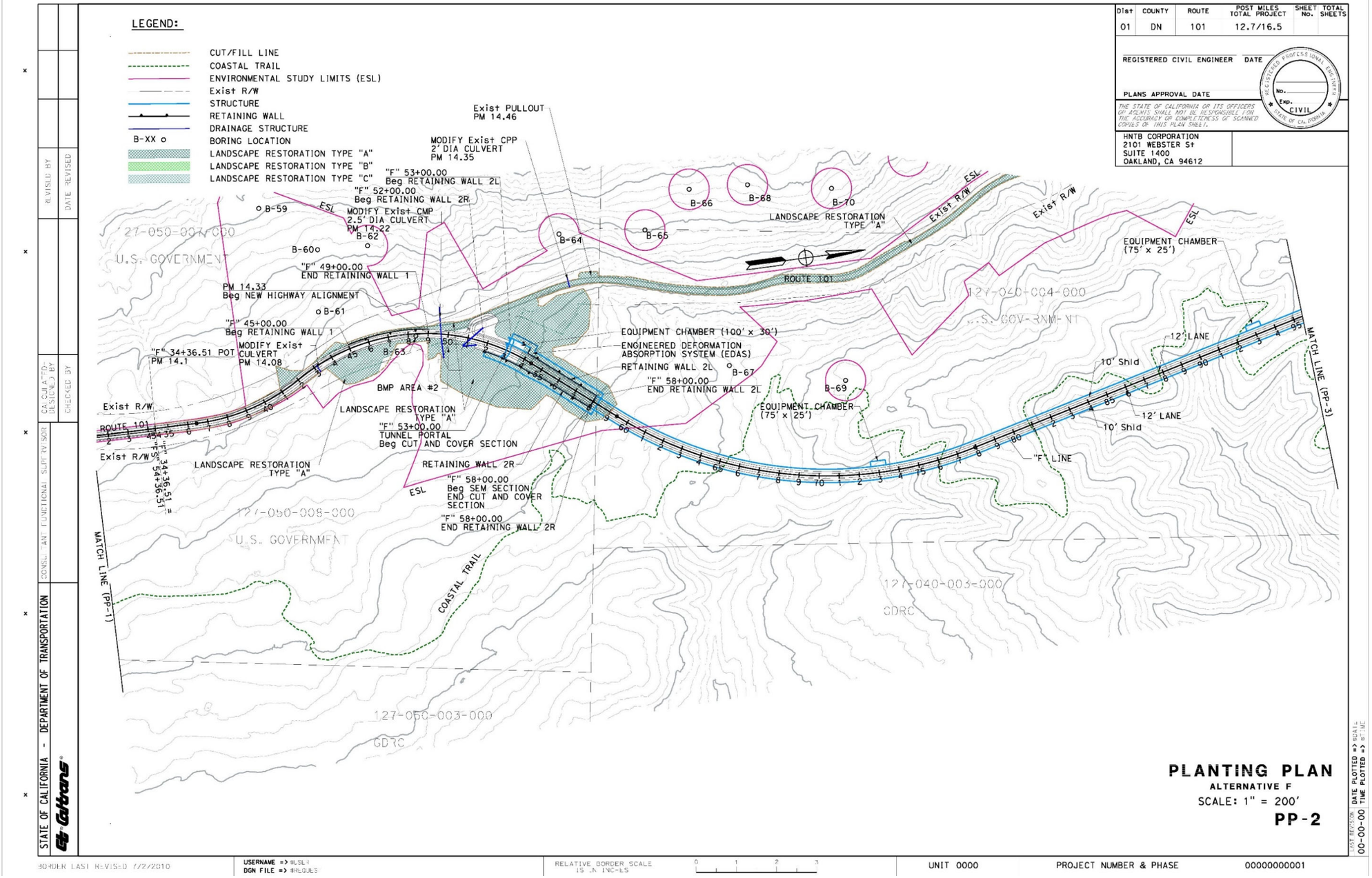

Figure 1C. Planting Plan Alternative F

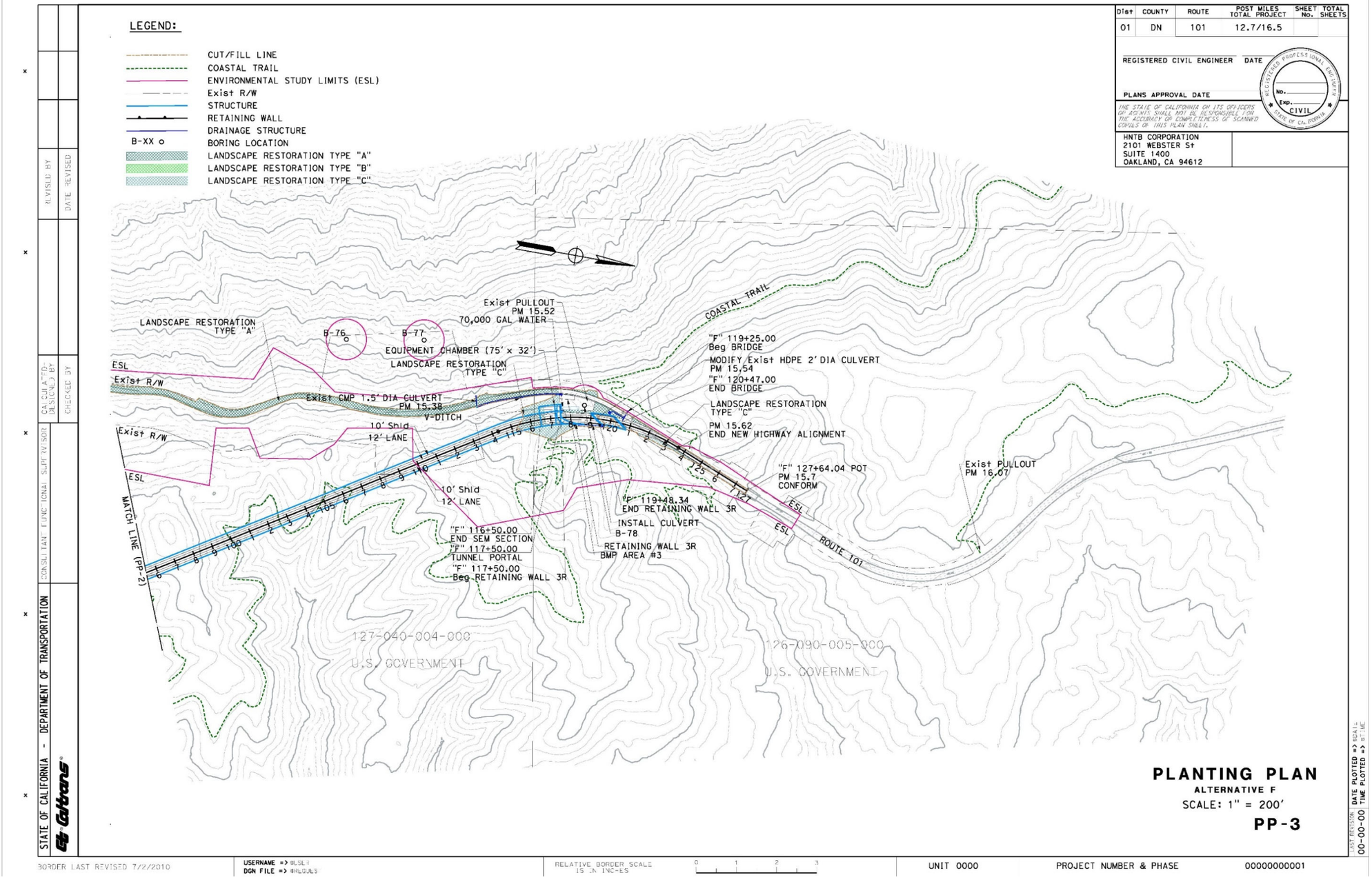

Figure 1D. Planting Plan Alternative F

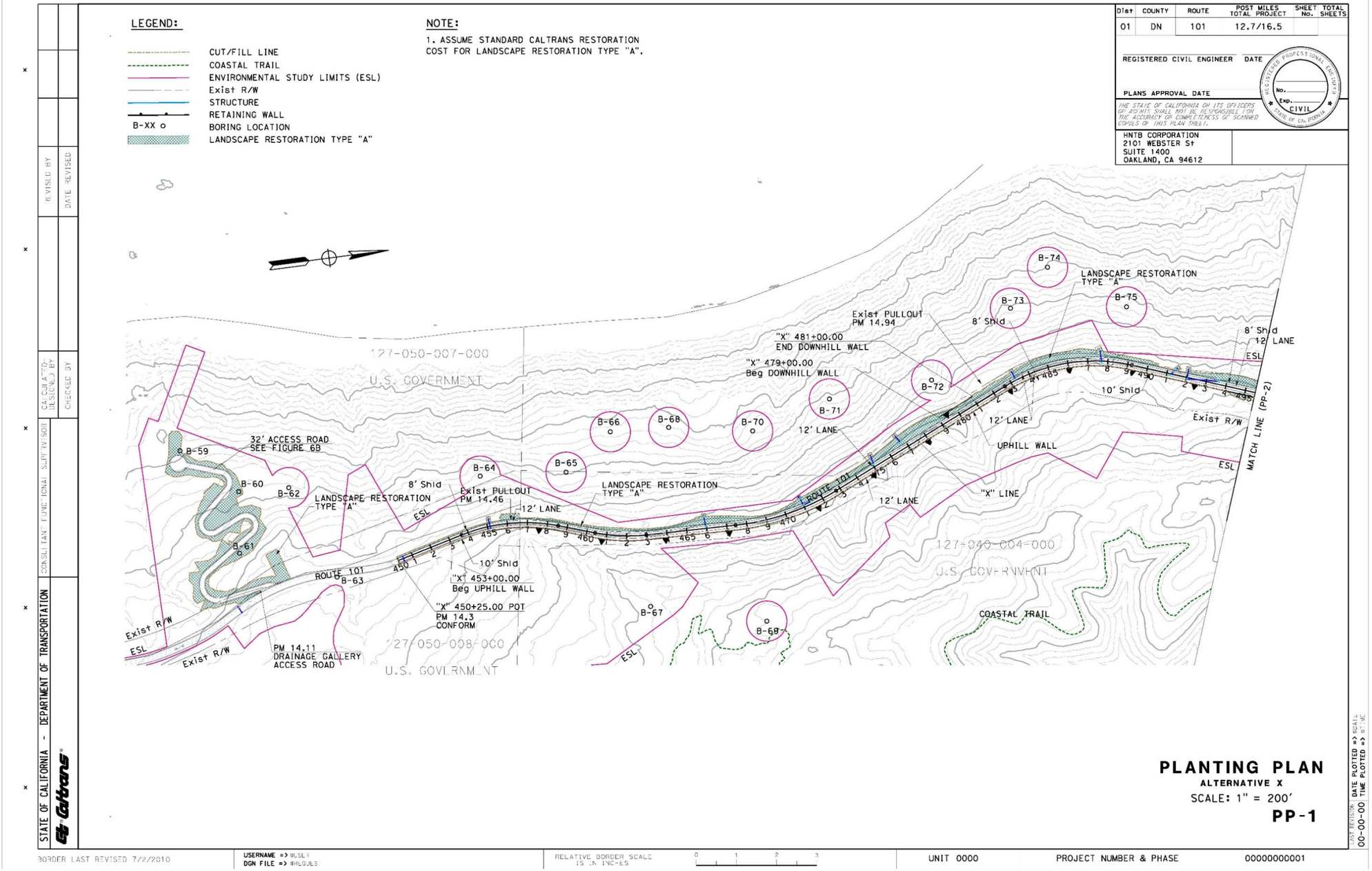

Figure 1E. Planting Plan Alternative X

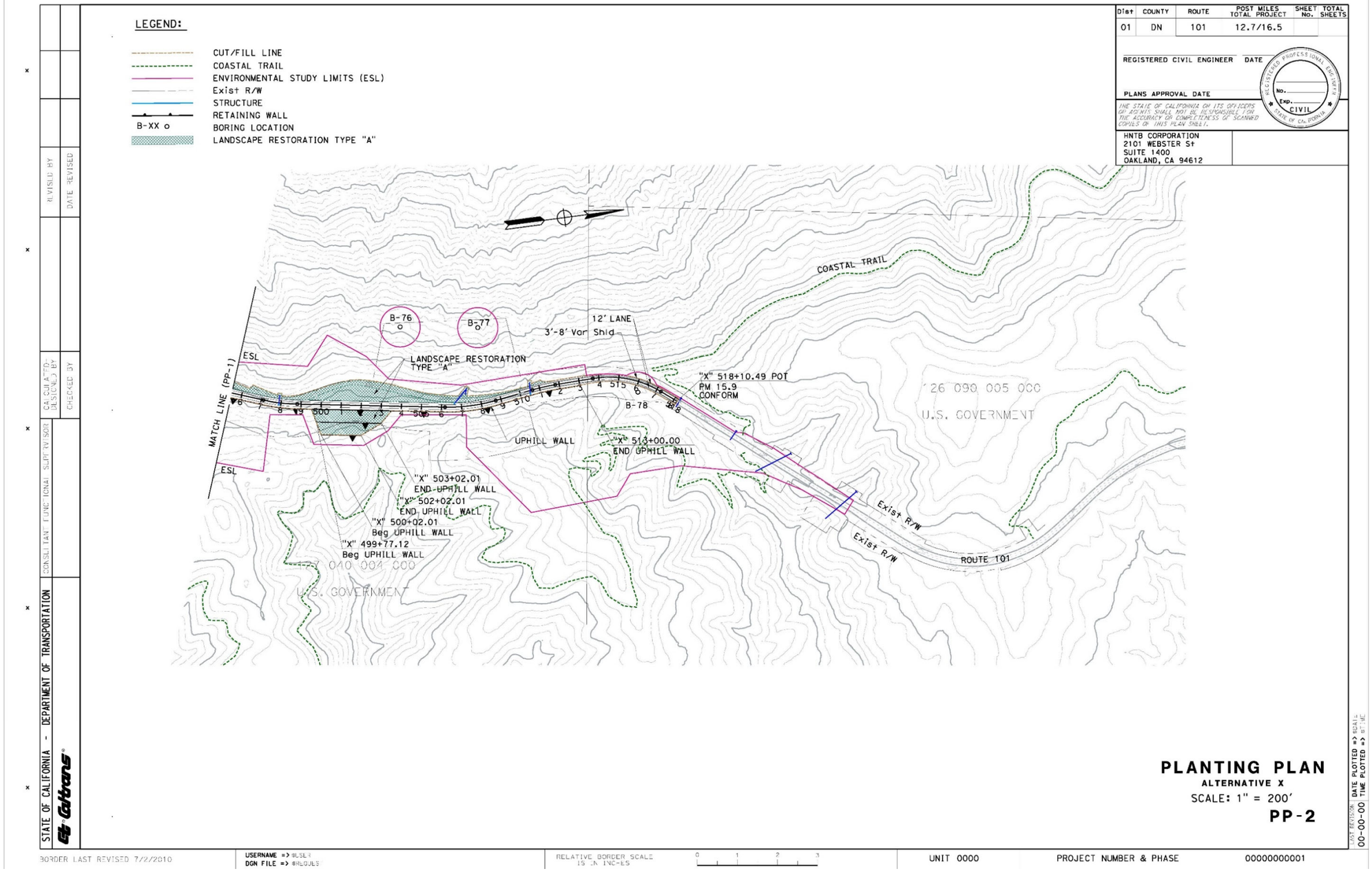

Figure 1F. Planting Plan Alternative X

CHAPTER 3. NEXT STEPS

A more comprehensive planting plan would be developed during the project's PS&E phase. This planting plan would provide sufficient information for detailed cost estimating and construction. The planting plan would reflect environmental commitments generated in the project's final environmental document and from any regulatory agency permits.

Considerations for the PS&E planting plan include, but are not limited to:

- **Alternative F**
  - Comply with any biological mitigation requirements, in particular any requirements related to the clearing of mature redwoods near the proposed north tunnel portal.
  - Consider slope stabilization requirements for the newly graded slopes near the OMC and north/south tunnel portals.
- **Alternative X**
  - Protect existing (and scenic) coastal views from U.S. 101 by maintaining periodic views of the ocean to the west, and ensure these views are not blocked by proposed revegetation.
  - Facilitate maintenance operations on retaining wall terraces by proposing vegetation that would not hinder access/operations.
- **Both Alternative F and X**
  - Consider clear zone restrictions along the highway.
  - Select native and regionally appropriate plant species for seed mixes and woody plantings (trees and shrubs).
  - Detail the required plant establishment period (PEP), including warranties, length of monitoring and watering period, and monitoring protocols.
  - Identify short- and long-term maintenance needs for invasive species and noxious weeds.