

Last Chance Grade Permanent Restoration Project

Alternatives Analysis Report

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PM 12.0/15.5



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1 Introduction

“Last Chance Grade”, the section of United States Highway 101 (US 101) that extends from Wilson Creek to nine miles south of Crescent City in Del Norte County (post miles [PM] 12.0 to 15.5) (Figure 1), has been progressively sliding towards the Pacific Ocean since the roadway was first constructed. Due to the continual movement, ongoing construction and maintenance activities are necessary to keep the highway open to the traveling public. In order to find a long-term sustainable solution, the California Department of Transportation (Caltrans) has studied multiple alternative alignments and design options for the Last Chance Grade (LCG) Permanent Restoration Project.

The purpose of this report is to provide a summary of how the alternative alignments were developed, including screening, stakeholder outreach and participation, performance measure applications, analysis results, and the identification of the alternatives that will be carried forward for environmental review in the Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) to be prepared in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

2 Project Purpose and Need

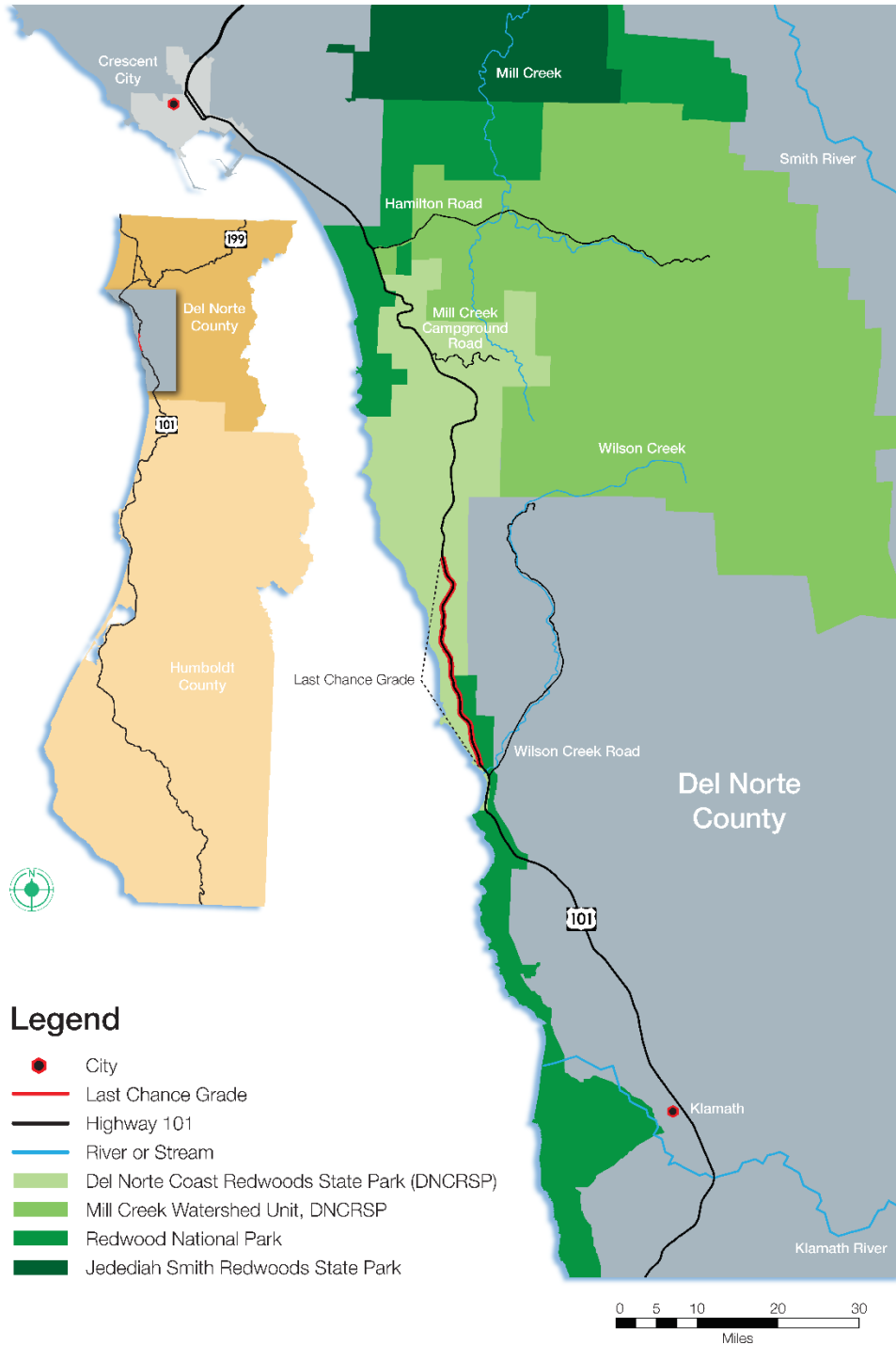
The purpose of the project is to develop a permanent solution to the instability and potential roadway failure at LCG. The project would consider alternatives that provide a more reliable connection and reduce maintenance costs while protecting the economy, natural resources, and cultural landscapes.

Landslides and road failures at LCG have been an ongoing problem for decades. A geologic study in 2000 conducted for Caltrans by the California Geological Survey mapped over 200 historical and active landslides (both deep-seated and shallow) within the corridor between Wilson Creek and Crescent City. Over the years, Caltrans has conducted a considerable number of construction projects and maintenance activities in the LCG area in order to keep the roadway open. Since 1981, landslide mitigation projects, including retaining walls, drainage improvements, and roadway repairs have cost over \$54 million (\$33 million Emergency Response Projects, \$21 million Non-Emergency Response Projects). A long-term sustainable solution at LCG is needed for many reasons, including the following:

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

Figure 1. Project Location

LOCATION MAP



3 Project Stakeholders and Working Group Workshops

Close coordination and collaboration with local, regional, and state partners is imperative for this project, as US 101 is a critical route, and there are various sensitive resources within the project area. This close coordination began in March 2014 when Caltrans established the LCG Partnership to create an active, working relationship with the agencies and groups that have management responsibilities for lands and resources that could be directly impacted by any realignment of the highway. In coordination with the LCG Partnership, four stakeholder Working Groups were created that include federal, state, and local governments, federally and non-federally recognized tribes, private sector industry groups, NGOs, and other concerned citizen groups. A list of participant organizations from each Working Group is provided in the LCG Fact Sheet (Attachment A).

- *Congressman Huffman’s Stakeholder Working Group*: Representatives from local governments, Tribal groups, businesses, agencies, and environmental groups.
- *LCG Partners Working Group*: Stakeholders with land ownership and land management responsibilities.
- *Cultural Resources Working Group*: Stakeholders with responsibility for and expertise in cultural resource management and preservation.
- *Biological Resources Working Group*: Stakeholders with responsibilities for and expertise in natural resource management and permitting.

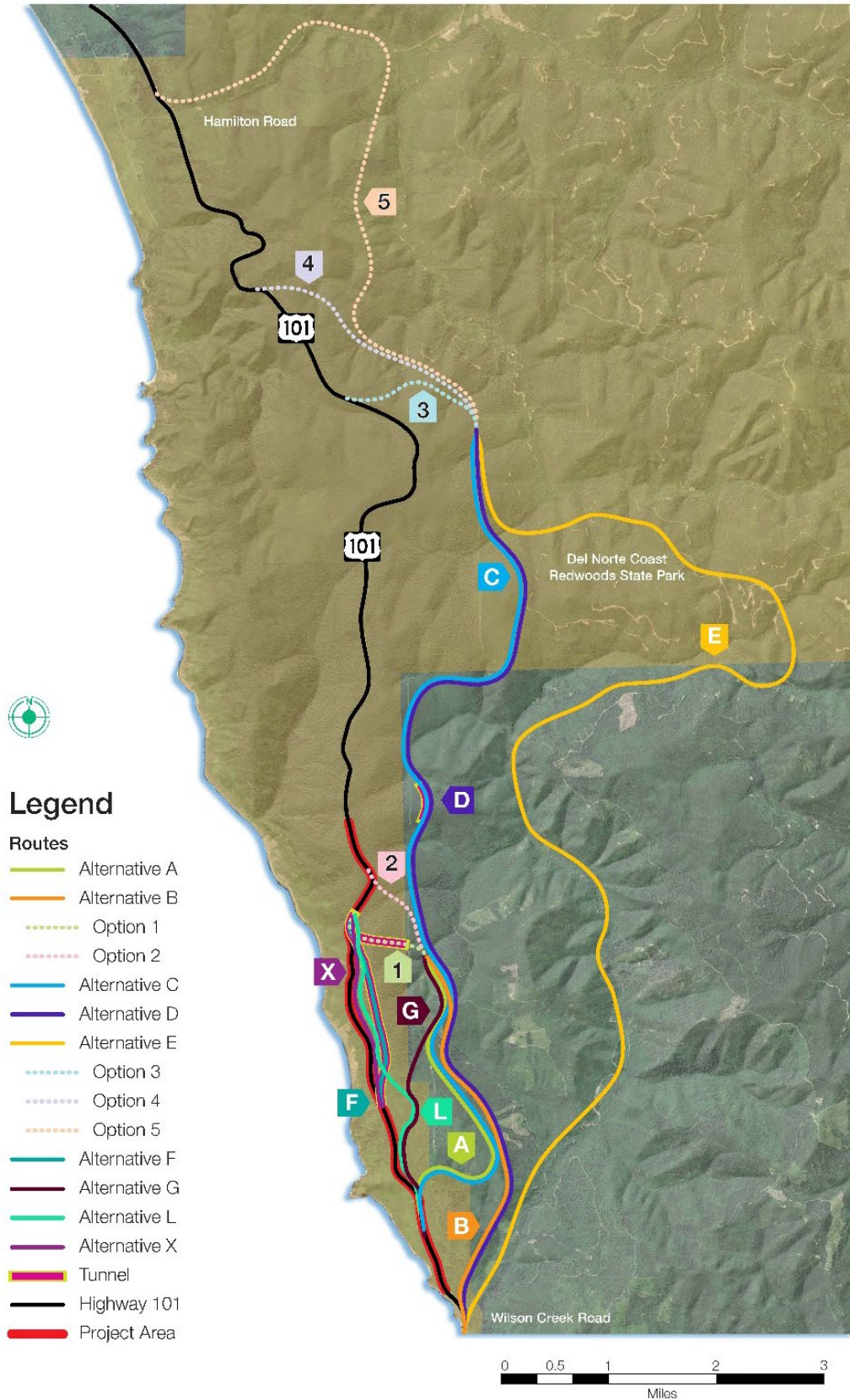
4 Alternatives Development and Evaluation (2015 – 2019)

Caltrans, in coordination with LCG Partnership stakeholders, completed preliminary engineering, economic, geotechnical, and environmental studies to identify potential long-term solutions for the project. The early planning and design efforts listed below¹ examined a broad range of design options and rejected options (Figure 2, Table 4) that would not meet the project purpose and need.

- 2015 Engineered Feasibility Study considered fourteen alternatives and rejected eight
- 2016 Project Study Report considered six alternatives
- 2018 Expert-based Risk Assessment added two alternatives
- 2018 Value Analysis Study Report rejected three alternatives
- 2019 Project Study Report Addendum added two alternatives

¹ The LCG project reports referenced herein are available on the LCG Project website’s document library: www.lastchancegrade.com.

Figure 2. Alternatives Evaluated During 2015-2019 Planning Efforts



The 2015 Engineered Feasibility Study considered 14 alternatives to minimize or avoid the risk of roadway failure and reduce ongoing maintenance costs, while considering environmental and cultural factors. The study developed the alternatives using design criteria based on constructability, adherence to design standards, and impacts to the environment and sensitive resources. Based on the results of this study, eight alternatives were eliminated, and the remaining six recommended for further study:

2015 Engineered Feasibility Study	
Alternatives Considered	Recommended for Study
A1: Rudisill Road to LCG Tunnel	A1: Rudisill Road to LCG Tunnel
A2: Rudisill Road to Damnation Trailhead	A2: Rudisill Road to Damnation Trailhead
B1: Wilson Creek Bridge to LCG Tunnel	
B2: Wilson Creek Bridge to Damnation Trailhead	
C3: Rudisill Road to South of Mill Creek Access	C3: Rudisill Road to South of Mill Creek Access
C4: Rudisill Road to North of Mill Creek Access	C4: Rudisill Road to North of Mill Creek Access
C5: Rudisill Road to Hamilton Road	C5: Rudisill Road to Hamilton Road
D3: Wilson Creek Bridge to South of Mill Creek Access	
D4: Wilson Creek Bridge to North of Mill Creek Access	
D5: Wilson Creek Bridge to Hamilton Road	
E3: Wilson Creek Road to South of Mill Creek Access	
E4: Wilson Creek Road to North of Mill Creek Access	
E5: Wilson Creek Road to Hamilton Road	
F: Tunnel Bypass	F: Tunnel Bypass

The 2016 Project Study Report (PSR) performed a more detailed analysis and refinement of the six alternatives recommended by the Engineered Feasibility Study.

In 2018, the Geotechnical Expert-based Risk Assessment estimated the risks of the alignments with respect to cost, mobility, and closure for up to a 50-year project life. The analysis included two additional alternatives: Alternative X, an alignment approximately along the existing highway to determine whether a lower cost alternative with less right of way needs may be feasible, and Alternative L as a possible improvement to Alternative X from a geotechnical perspective.

2018 Geotechnical Expert-based Risk Assessment	
Alternatives Considered	Recommended for Study
A1: Rudisill Road to LCG Tunnel	A1: Rudisill Road to LCG Tunnel
A2: Rudisill Road to Damnation Trailhead	A2: Rudisill Road to Damnation Trailhead
C3: Rudisill Road to South of Mill Creek Access	C3: Rudisill Road to South of Mill Creek Access
C4: Rudisill Road to North of Mill Creek Access	C4: Rudisill Road to North of Mill Creek Access
C5: Rudisill Road to Hamilton Road	C5: Rudisill Road to Hamilton Road
F: Tunnel Bypass	F: Tunnel Bypass
	L: Upslope Realignment from Rudisill Road to South of Damnation Trailhead
	X: End-to-End Re-engineering On Alignment

The 2018 Value Analysis Study analyzed the eight alternatives from the 2015 Engineered Feasibility Study and 2018 Expert-based Risk Assessment and provided possible cost,

schedule, and/or performance improvement recommendations. The 2018 Value Analysis Study recommended removing three alternatives (C3, C4, and C5) from further consideration due to environmental effects.

2018 Value Analysis Study	
Alternatives Considered	Recommended for Study
A1: Rudisill Road to LCG Tunnel	A1: Rudisill Road to LCG Tunnel
A2: Rudisill Road to Damnation Trailhead	A2: Rudisill Road to Damnation Trailhead
C3: Rudisill Road to South of Mill Creek Access	
C4: Rudisill Road to North of Mill Creek Access	
C5: Rudisill Road to Hamilton Road	
F: Tunnel Bypass	F: Tunnel Bypass
L: Upslope Realignment from Rudisill Road to South of Damnation Trailhead	L: Upslope Realignment from Rudisill Road to South of Damnation Trailhead
X: End-to-End Re-engineering On Alignment	X: End-to-End Re-engineering On Alignment

In 2019, Caltrans issued an addendum to the 2016 PSR to describe the changes to the project’s scope, alignments, and design concepts. In the addendum, two new eastern alignment alternatives were added to reduce the longer, “S-curve” portions of the A alignments.

2019 PSR Addendum	
Alternatives Considered	Recommended for Study
A1: Rudisill Road to LCG Tunnel	A1: Rudisill Road to LCG Tunnel
A2: Rudisill Road to Damnation Trailhead	A2: Rudisill Road to Damnation Trailhead
F: Tunnel Bypass	F: Tunnel Bypass
	G1: Retreat from Rudisill Road to LCG Tunnel
	G2: Retreat from Rudisill Road to Damnation Trailhead
L: Upslope Realignment from Rudisill Road to South of Damnation Trailhead	L: Upslope Realignment from Rudisill Road to South of Damnation Trailhead
X: End-to-End Re-engineering On Alignment	X: End-to-End Re-engineering On Alignment

5 Alternatives Considered During Screening Process (2020 – 2021)

Based on the results of the alternatives development and evaluation process described above, the seven Build Alternatives from the 2019 PSR Addendum were identified for further analysis and refinement. Figure 3 shows the location of the alternatives, and Table 1 contains a summary of each alternative. Additional information is provided in the January 2020 LCG Fact Sheet (Attachment A).

Figure 3. Alternatives Considered During 2020/2021 Screening Process



Table 1. Alternatives Considered during 2020/2021 Screening Process

Alternative	Description	Construction Length (miles)	Estimated Footprint Size (acres)	Estimated Capital Cost (\$ Millions) ^a
A1	Departs US 101 at PM 13.47, heading inland, and reconnects with US 101 at PM 15.56. A1 includes a 2,425-foot-long tunnel that begins inland and ends near PM 15.56.	3.4 miles	359.9 acres	\$1,078M
A2	Follows Alternative A1 for the initial 2.3 miles where it then continues northward, reconnecting to US 101 at PM 15.92. A2 does not include a tunnel.	3.5 miles	371.6 acres	\$690M
F	Constructs a 5,600-foot-long tunnel. Departs US 101 at PM 14.06 and reconnects with US 101 at PM 15.56.	1.5 miles	15.4 acres	\$930M
G1	Departs US 101 at PM 13.47, and reconnects with US 101 at PM 15.56. Shares the same southern alignment as Alternative L (below) and the same northern alignment as Alternative A1. Includes the same 2,425-foot-long tunnel alignment as A1.	3.0 miles	348.7 acres	\$880M
G2	Follows Alternative G1 for the initial 2.4 miles and reconnects to US 101 at PM 15.92. Shares the same northern alignment as Alternative A2. Alternative G2 does not include a tunnel.	3.1 miles	359.5 acres	\$520M
L	Departs the existing alignment at PM 13.47, remains upslope of the existing alignment, and reconnects to US 101 at PM 15.56.	2.2 miles	167.5 acres	\$360M
X	Maintains the existing US 101 alignment with segments of realignment and a dewatering component to improve the stability of the slide.	1.1 miles	35.7 acres	\$220M

^a These estimated capital costs are taken from the Alternatives Analysis process in February 2021.

6 Alternatives Screening Process

Caltrans held workshops with the Working Groups in December 2020, March 2021, and April 2021 to present the alternatives screening methodology, receive input on the process used to assess the alternatives, and provide a transparent and defensible process for eliminating alternatives. Working Group members provided constructive input on the alternatives, evaluation methodologies, and performance measures.

Working Group meeting presentations and summaries are provided in Attachment B. The Alternative Screening Process and summary of the results are described below.

Screening alternatives is a process of comparing and evaluating alternatives to determine which options are technically feasible, responsive to the region's unique geotechnical conditions, and cost-effective, while respecting important natural and cultural resources. Screening adds value to the preliminary engineering and environmental phase because it:

- Assesses the range of possible alternatives,
- Identifies the technically and economically feasible alternatives for further detailed study in the environmental document,
- Saves time and resources by narrowing the footprint area for detailed studies,
- Reduces the area and extent of ground-disturbing studies for selection of the final alternative, and
- Provides higher level of certainty and a lowered risk of schedule delay in the environmental phase.

Step 1. Identify Performance Measures and Screening Methodology

The first step in the screening process was to identify performance measures to use to evaluate alternatives. These measures were developed based on the project purpose and the consensus-based list of values and benefits contained in the December 2015 *Huffman Stakeholder Group Consensus White Paper*¹. The performance measures focus on measurable criteria, such as probability of long-term closure, using available data. The initial sixteen performance measures are listed in the Workshop #1 presentation materials (Attachment B1).

During Workshop #1 in December 2020, the identified performance measures were presented to each Working Group; group members then suggested additions and refinements. For example, the Biological Resources Working Group encouraged the use of tree counts over reporting acreage by forest/habitat type alone. The Working Groups also considered how to weight the performance measures, identified risks to project success, and discussed the relative importance of performance measures. See the Workshop #1 summary in Attachment B1 for more information.

After Workshop #1, Caltrans revised the list of performance measures and their measurable criteria, established a weighting method for the performance measures, and recognized “core factors” — performance measures that were consistently acknowledged as most important by all Working Groups. Core factors include cost to build, cost to mitigate, and tree impacts.

Step 2. Apply Weighted Performance Measures to Alternatives

During the next step in the screening process, Caltrans collected and analyzed data and applied the weighted performance measures to each Build Alternative. Preliminary results of the alternatives analysis were presented to the Working Groups in March 2021, at Workshop #2 (Attachment B2).

Data Sources - Sources of information used to evaluate the alternatives included qualitative assessments, engineering assessments, geographic information system (GIS) analyses, and field inspections of the potential project locations.

Qualitative Assessment - Qualitative performance measures were developed to describe the alternative alignments, including constructability, traffic mobility, geotechnical risks, cost to maintain, and cost to mitigate for environmental effects. Metrics for qualitative assessments included general scales (e.g., high, medium, low) and percentages/probabilities.

Engineering Assessment - Engineering assessments were provided for a number of measures that could be readily quantified at this stage of project development, such as project length, travel time, construction duration, capital costs, cut/fill material balance, and key features of the alignment.

GIS Analysis - The bulk of the analysis was performed using GIS data to assess impacts to sensitive habitats, aquatic resources (i.e., streams), wildlife connectivity, edge effects, and recreational facilities (e.g., trails and campgrounds). A memo describing the environmental constraints mapping and associated data sources is provided in Attachment C. Attachment C also displays sample maps used in the analysis.

Field Inspections - Experienced engineers, biologists, and environmental analysts conducted field reviews of the potential alternatives to identify conditions not visible in aerial photos or on maps. Most notably, sample plots within mapped vegetation communities in the project area were used to identify tree sizes and densities. These plots were extrapolated using aerial photo interpretation to estimate the number and size of trees to be potentially affected by each alternative. Refer to Workshop #2 presentation materials in Attachment B2 for estimated tree removal results.

Core Factors and Performance Measure Weighting - To normalize the metrics across performance measures, Caltrans applied a normalizing scale, which allowed for the comparison of data with different units. In other words, performance measures ranked high, medium, and low could be compared to measures reported in acres. The measures were normalized to a scale of 1 to 5, with 1 representing the lowest level of impact, least amount of time, lowest cost, etc., and 5 representing the highest level of impact, most amount of time, highest cost.

Weighting of core factors was developed based on input from the Working Groups and the Caltrans team. A weighting factor of 1 to 5 was applied to each performance measure, with 5 being given to the measures deemed most important. The performance measures and their associated weight are shown in Table 2.

To determine the effects of weighting on the ranking of alternatives, a sensitivity analysis was conducted to compare various scenarios of normalizing and weighting performance measures. For example, the weight of core factors was doubled or tripled, weighting was eliminated, weighting was adjusted for operational factors, or just the natural or core factors were used. The analysis concluded that the weighting did not produce substantially different results in alternative ranking.

Once the performance measures were normalized and weighted, the numbers were multiplied to receive a final score, and determine the ranking of alternatives. For example, the normalized score for trees for each alternative was multiplied by the factor weight of 5 for a final score for each alternative. Normalized scores, weighted scores, and results are displayed in Attachment D.

Table 2. Performance Measures and Weighting Factors

Performance Measure	Factor Weight	Performance Measure	Factor Weight
CORE FACTORS		NATURAL FACTORS - VEGETATION	
Trees	5	Red Alder	3
Cost to construct	5	Coastal Scrub/Grassland	3
Cost of mitigation	5	New edges in National and State Parks	3
OPERATIONAL FACTORS		New edges in Green Diamond land	1
Road closure potential	4	Logged and other young conifer/redwood lands	2
Cost to maintain (relative to existing)	1	NATURAL FACTORS - WILDLIFE	
Traffic mobility	3	Marbled murrelet occupied habitat	4
CONSTRUCTION FACTORS		Marbled murrelet designated critical habitat	2
Footprint size	4	Marten core habitat	3
Time to construct	3	Northern spotted owl suitable habitat	4
Cut/fill deposited within project area	4	Potential to disrupt wildlife connectivity	3
Cut/fill to be deposited offsite	4	NATURAL FACTORS – AQUATIC	
Trail relocation potential	2	New tributary crossings	3
		Wilson Creek watershed disturbance	1

Preliminary Analysis Results

The preliminary results of the alternatives analysis were presented at Workshop #2 (Attachment B2 and Table 3): alternatives F (Tunnel Bypass) and X (Re-Engineered Existing Alignment) scored and ranked best overall.

- Alternative F consistently scored in the top two for all categories of performance measures (i.e., core factors, operational factors, construction factors, and natural factors).
- Alternative X scored in the top two for all categories except in operational factors, where it ranked in the bottom two.
- Alternative G1 and G2 consistently scored worse than the other alternatives except in operational factors, where the G alternatives outperformed Alternatives X and L.
- Alternative A1 and A2 ranked fourth and third overall; the A alternatives performed well in operational factors.
- Alternative L ranked fifth overall, performing worst in operational factors.

The sensitivity analysis showed that rankings remained essentially stable until/unless weightings were significantly increased beyond the 1 to 5 scale.

Table 3. Alternatives Analysis Results Summary

Performance Measure Category	Weighted Scores by Alternative							Possible Score Range (Lowest = Best)
	X	L	F	A1	A2	G1	G2	
Core Factors (Trees, Construction and Mitigation Costs)	35	55	45	55	55	65	55	15 - 75
Operational Factors	40	40	8	8	8	24	24	8 - 40
Construction Factors (Time to Construct, Cut/Fill Volumes, etc.)	35	55	31	59	55	59	59	17 - 85
Natural Resource Factors (Animals, Vegetation, Aquatic)	42	86	38	94	94	110	110	32 - 160
All Factors	152	236	122	216	212	258	248	72 - 360
Alternatives Ranking (1-7) for All Factors	2	5	1	4	3	7	6	n/a

Step 3. Request Stakeholder Concurrence of Alternatives Ranking

In April 2021, all Working Groups met in one session for Workshop #3. Results of the analyses recommended eliminating Alternatives A1, A2, G1, G2, and L from further study and carrying forward Alternatives X and F for further refinement.

- Alternatives F and X performed best during the alternatives analysis. By moving forward with these alternatives, there would be fewer environmental impacts (including less tree removal), study cost would be reduced, and the area required for assessment would be reduced, shortening the project schedule by one year.
- Alternatives G1 and G2 ranked worst overall and were eliminated because they have a longer construction duration and larger project footprint, resulting in substantially higher environmental impacts than Alternatives X or F.
- Alternatives A1 and A2 ranked fourth and third overall, but were also eliminated for their substantially higher environmental impacts than Alternatives X or F.
- Alternative L, ranked fifth overall, was also eliminated based on core and natural resource factors, combined with geotechnical risks.

Workshop #3 gave stakeholders an opportunity to provide feedback on the process and on the final determination on what alternatives to move forward into the draft environmental document. Polling results from the meeting (Attachment B3) indicated there was general support for the

recommendation to proceed with further study of Alternatives F and X, and to remove Alternatives L, A1, A2, G1 and G2 from further study at this time. There was concern voiced related to narrowing the field to only two build alternatives, based on perceptions that Alternatives F and X are not feasible, are too expensive, and/or lack popular support. However, the majority of stakeholders expressed trust in the process and satisfaction with progress made.

7 Results: Alternatives Carried Forward and Eliminated from Further Evaluation

Alternatives F (Tunnel Bypass) and X (Re-Engineered Existing Alignment) will be carried forward as the Build Alternatives for further study in the draft environmental document.

2021 Alternatives Analysis	
Alternatives Considered	Recommended for Study
A1: Rudisill Road to LCG Tunnel	
A2: Rudisill Road to Damnation Trailhead	
F: Tunnel Bypass	F: Tunnel Bypass
G1: Retreat from Rudisill Road to LCG Tunnel	
G2: Retreat from Rudisill Road to Damnation Trailhead	
L: Upslope Realignment from Rudisill Road to South of Damnation Trailhead	
X: End-to-End Re-engineering On Alignment	X: End-to-End Re-engineering On Alignment

Other alternatives considered during the project development and alternatives screening process have been eliminated. See Table 4 for a summary of the alternatives eliminated from further analysis, including the rationale for elimination, and refer to Attachment D for detailed results of the Alternative Analysis performance measure analysis.

Table 4. Alternatives Considered but Rejected from Further Study

Alternative	Description	Justification for Eliminating this Alternative	Source Document ¹
A1	Rudisill Road to LCG Tunnel	Alternatives A1 and A2 had a longer construction duration and larger project footprint than Alternatives X or F, resulting in substantially higher environmental impacts. For these reasons, these alternatives were rejected.	Alternatives Analysis 2021
A2	Rudisill Road to Damnation Trailhead		
B1	Wilson Creek Bridge to LCG Tunnel	Alternatives B1 and B2 had greater habitat and cultural landscape impacts, larger construction footprint, and more earthmoving than Alternatives A1 and A2, without added value. For these reasons, these alternatives were rejected.	Engineered Feasibility Study 2015
B2	Wilson Creek Bridge to Damnation Trailhead		
C3	Rudisill Road to South of Mill Creek Access	Alternatives C3, C4, and C5 had the greatest project footprints and substantial old growth redwood and wildlife impacts. For these reasons, these alternatives were rejected.	Value Analysis Study 2018
C4	Rudisill Road to North of Mill Creek Access		
C5	Rudisill Road to Hamilton Road		
D3	Wilson Creek Bridge to South of Mill Creek Access	Alternatives D3, D4, and D5 had greater potential impacts on habitat and cultural landscapes than the C alternatives, without added value. For these reasons, these alternatives were rejected.	Engineered Feasibility Study 2015
D4	Wilson Creek Bridge to North of Mill Creek Access		
D5	Wilson Creek Bridge to Hamilton Road		
E3	Wilson Creek Road to South of Mill Creek Access	The E alternatives had larger habitat impacts than the C and D alternatives, with no advantage over those other alternatives. The E alternatives also added additional travel time and had greatest potential barrier to wildlife connectivity and watershed integrity. For these reasons, these alternatives were rejected.	Engineered Feasibility Study 2015
E4	Wilson Creek Road to North of Mill Creek Access		
E5	Wilson Creek Road to Hamilton Road		
G1	Retreat from Rudisill Road to LCG Tunnel	Alternatives G1 and G2 had a longer construction duration and larger project footprint than Alternatives X or F, resulting in substantially higher environmental impacts. Alternatives G1 and G2 also had a "medium" geotechnical risk. For these reasons, these alternatives were rejected.	Alternatives Analysis 2021
G2	Retreat from Rudisill Road to Damnation Trailhead		
L	Upslope Realignment from Rudisill Road to South of Damnation Trailhead	Alternative L had a "medium" geotechnical risk and a larger project footprint than Alternatives F or X, resulting in higher environmental impacts and impacts to parklands. For these reasons, this alternative was rejected.	Alternatives Analysis 2021

¹ The LCG project reports referenced are available for review on the LCG Project website's document library: www.lastchancegrade.com.

8 Value Analysis 2021

Based on the results of the 2020-2021 screening process, Caltrans conducted a Value Analysis (VA) that focused on evaluating improvements to Alternatives F and X for potential further refinement. The VA was conducted on July 7-9 and July 13-15, 2021, and included design, tunnel, and dewatering experts, as well as representatives from State Parks and the National Park Service. The VA developed five (5) recommendations for Alternative X, three (3) recommendations for Alternative F, and one (1) recommendation that would merge Alternatives X and F (Table 5). These recommendations included concepts for dewatering the landslides, scheduled daily road closures during construction, construction phase procurement strategies, and providing for an on-site construction staging area to facilitate construction of the north portal, in addition to other recommendations. Review and consideration of the VA alternatives by Caltrans Executive staff resulted in the decision to carry forward some of these refined design options. Table 5 summarizes these refined alternatives and rationale for rejecting or carrying them forward.

Table 5. Summary of Value Analysis Results

VA Alternative	Description	Determination
X-1: Construct a drainage gallery in stable ground below the slip surfaces	Construct several horizontal drain collection tunnels about 9 feet in diameter. This alternative also includes drainage wells that radially fan upward and convey water from the slope. It eliminates the tributary tunnels and vertical drainage wells in the baseline design.	Retained for Further Study. The drainage gallery alternative will be developed as part of the process of refining Alternative X.
X-2: Implement one 4-hour and one 2-hour full closure daily	This VA alternative proposes to implement two full closures daily (one 4-hour and one 2-hour closure) to reduce the project construction duration by approximately three months. The main benefit of this VA alternative would be to provide unobstructed use of the project site.	Rejected. Although the temporary closures could reduce the construction schedule by approximately 3 months, the temporary impacts to local economy and quality of life override schedule benefits.
X-3: Use separate contract for retaining wall construction and for global dewatering	Two separate contractors would be used: one for the retaining wall work and a second for subsurface drainage work. This alternative results in a reduction in contractor overhead, which is estimated at 1% of the total project cost.	Retained for Further Study. The concept of separate contracts should be considered as this approach could result in cost savings. This option should be studied in refining both Alternative X and Alternative F.
X-4: Construct subdrains with multiple lines above proposed retaining walls	This idea would supplement the construction of subdrains with multiple connecting lines in the slopes above the retaining walls. These lines would intercept water before it can cause localized slides and/or recharge of the groundwater. The main benefit of this VA alternative is to reduce the water pressure on the retaining walls in order to improve slope stability.	Retained for Further Study. The subdrain features are expected to reduce geotechnical risk.
X-5: Narrow the retaining wall terrace width from 60feet to 20 feet	This idea suggests reducing the terrace width to 20 feet in order to keep a stable slope. This will narrow the project's footprint. The 60-foot width proposed in the original project plans may be too wide. This idea requires geotechnical analysis.	Retained for Further Study. This option could narrow the project's footprint, reducing environmental impacts, saving costs, and shortening construction duration.

<p>F-1: Construct a smaller single-bore tunnel with one egress corridor</p>	<p>This VA alternative proposes to construct a smaller single-bore tunnel and include one egress corridor in lieu of two egress corridors. It would reduce the external diameter to 60 feet and the crown to 32 feet above the roadway. The main benefit of this VA alternative is to save excavation costs, as it would eliminate one egress tunnel and its related costs.</p>	<p>Retained for Further Study. The single-bore option would be studied as a cost-saving tunnel design. However, the twin-bore tunnel would remain the default option for Alternative F.</p>
<p>F-2: Extend and realign south portal tunnels to span poor geological soil conditions</p>	<p>Realign the south portal tunnels further east by approximately 75 feet and extend their length by 500 feet to avoid unstable geologic conditions that the baseline design involves.</p>	<p>Retained for Further Study. This optional tunnel design will be developed within the current footprint of environmental studies as part of the process of refining Alternative F.</p>
<p>F-3: Provide an additional one-acre staging area by the north portal</p>	<p>The baseline design does not show the details of the north portal staging area. This VA alternative proposes to reconfigure the north portal area to provide an additional construction staging area, which would help facilitate construction and provide significant time savings. At the time of the VA study there were too many unknowns to accurately quantify cost impacts for this idea.</p>	<p>Rejected. The staging area would create excessive impacts to State Parks so was rejected; however, the team would investigate using the existing passing lane north of the portal location as an additional staging area.</p>
<p>C-1: Construct 9,800-foot single-bore tunnel for NB traffic and rehabilitate existing US-101 for SB traffic</p>	<p>This VA alternative proposes to combine elements of Alt. X and Alt. F to construct a single-bore tunnel for NB US-101 traffic and rehabilitate the existing US-101 alignment for SB traffic. This rehabilitation of US-101 would also include accommodations for cyclists and pedestrians.</p>	<p>Rejected. Although this approach would meet the purpose and need, it would result in environmental impacts from both Alternative X and F. The environmental impacts outweigh the cost and schedule benefits of this hybrid alternative.</p>

ATTACHMENT A
LAST CHANCE GRADE 2020 FACT SHEET



LAST CHANCE GRADE Fact Sheet

The Last Chance Grade (LCG) Project is a collaborative effort to find a permanent solution to instability and roadway failure on a 3-mile segment of US Highway 101 in Del Norte County, extending from Wilson Creek to 9 miles south of Crescent City.

To be successful, the LCG project requires close coordination and collaboration among local, regional, and state partners. We have assembled a diverse group of stakeholders to analyze potential alternatives for the highway. Because the project area is located within a UNESCO World Heritage site, contains old-growth redwoods, and protected animal and plant species, we must be diligent in our approach to each alternative. A complete, thorough, and inclusive process now can help ensure the efficient implementation of the chosen alternative in the future.

CURRENT FUNDING

\$50M

is funded to complete the Project Approval and Environmental Document (PA&ED) phase.

\$4.5M

has been spent on the environmental and Geotech studies.

SCHEDULE

2018–2026

Environmental Document process initiated (8 years)

- Ground surveys
- Botanical studies (2 years)
- Geotechnical studies
- Wetland delineations
- US Fish and Wildlife Service Biological Assessment and Biological Opinion
- National Marine Fisheries Service (NMFS) Biological Assessment and Biological Opinion
- Traffic studies
- Other studies and analysis
- CEQA/NEPA Public Workshops and Comment period

2026–2031


Design and Permitting Phase

2031–2039

Construction Phase

QUICK FACTS

A 2018 regional economic study estimated that a full one-year closure of Last Chance Grade would cost the region hundreds of millions of dollars, including:

 \$236M in travel costs	 \$417M in foregone trips
 3,800 jobs lost	 \$456M in reduced business output

An emergency closure of the current highway would require a




320 MILE (6 HOUR)

detour between Eureka (Humboldt County) and Crescent City.

Since 1997, Caltrans has spent approximately **\$85M** maintaining the existing alignment and may need to spend up to **\$35M** more for existing needs.

 **COMPLETED** Phase 1 geotechnical investigations of alternatives in the fall of 2018.

 **BEGAN** Phase 2 analyses in the summer of 2019.



PROJECT ALTERNATIVES

The Last Chance Grade project is developing seven build alternatives that are described below. Here are a few key points about the alternatives:

- Construction capital costs range from roughly \$295M to \$1.1B.
- Each alignment has at least some impacts to old growth redwood trees, cultural resources and/or protected species.
- All build alternatives are located within a UNESCO World Heritage Site.

A 1 ALTERNATIVE A1
 Departs from US 101 at PM 13.47, heading inland, and reconnects with 101 at PM 15.56. A1 includes a 2,425 ft. tunnel near PM 15.56.
ESTIMATED CAPITAL COST:
 \$672M

A 2 ALTERNATIVE A2
 Follows Alternative A1 for the initial 2.3 miles and reconnects to existing US 101 at PM 15.92. A2 does not include a tunnel, but it passes through a section of old growth forest.
ESTIMATED CAPITAL COST:
 \$300M

G 1 ALTERNATIVE G1
 Shares the same northern alignment as Alternative A1 (including the tunnel) and the same southern alignment as Alternative L below.
ESTIMATED CAPITAL COST:
 \$672M

G 2 ALTERNATIVE G2
 Shares the same northern alignment as Alternative A2 and the same southern alignment as Alternative L below. It also passes through a section of old growth forest.
ESTIMATED CAPITAL COST:
 \$295M

F ALTERNATIVE F
 Includes construction of a 5,600 ft. tunnel, departing US 101 at PM 14.24 and reconnecting at PM 15.56.
ESTIMATED CAPITAL COST:
 \$1.1B

L ALTERNATIVE L
 Retreats up to 650 feet inland from the current alignment. The alignment includes cuts, structures, surface and subsurface drainage, and a resilient roadway prism.
ESTIMATED CAPITAL COST:
 \$300M

X ALTERNATIVE X
 Retains the existing alignment, with two areas that straighten curves and one that retreats approximately 130 feet inland for geotechnical stability and longevity.
ESTIMATED CAPITAL COST:
 \$300M

PROJECT INFORMATION

EA	01-0F280
EFIS	0115000099
Location	DN 101 PM 12.0/15.5
Project Description	Del Norte County from Wilson Creek Bridge to 3.8 miles north of Wilson Creek Bridge

PROJECT PARTNERS

The Last Chance Grade Project is a collaborative effort between Caltrans and its many partners. Together, we are working to find the most viable and least impactful alternative. A list of current Last Chance Grade project partners is provided below.

COLLABORATIVE GROUPS

● Congressman Huffman's Stakeholder Group

Along with Caltrans, the group includes representatives from local government, tribal groups, businesses, agencies, and environmental groups who provide feedback to all the partners involved.

■ Last Chance Grade Partners

The members of this group all have land ownership and land management responsibilities.

▲ Biological Resources Working Group

These members have responsibilities for natural resource management and permitting.

◆ Cultural Resources Sub-Working Group

These members have responsibilities for cultural resources management and permitting.

CITIZEN GROUPS

Crescent City-Del Norte Chamber of Commerce	●
Environmental Protection Information Center (EPIC)	●
Friends of Del Norte	●
Last Chance Grade Advisory Committee	●
Save the Redwoods League	●

ELECTED OFFICIALS

Assembly Member Jim Wood, 2nd District	
Congressman Jared Huffman	●
Congressman Peter DeFazio, 4th District Oregon	
State Senator Mike McGuire, 2nd District	

GOVERNMENT AGENCIES

California Highway Patrol	●
Caltrans	● ▲ ■ ◆
City of Crescent City	●
Crescent City Harbor Commission	
Curry County (OR)	●
Del Norte County	●
Del Norte Local Transportation Commission (DNLTC)	●
Federal Highway Administration (FHWA) Sacramento	
FHWA Geotech, Colorado	
Humboldt County	●
Humboldt County Association of Governments	●

LAND MANAGERS

California Department of Parks and Recreation	● ▲ ■ ◆	ROE, Scientific Investigation Permit, 4f
Green Diamond Resource Co.	● ■	Permit to Enter (PTE)
National Park Service	● ▲ ■ ◆	ARPA Permit, 4f, ROE, Scientific Collection Permit

LOCAL BUSINESSES

C. Renner Petroleum	●
Rumiano Cheese	●

RESOURCE & PERMITTING AGENCIES

Army Corps of Engineers	▲	404 Permit
California Coastal Commission	▲	Coastal Development Permit
California Department of Fish and Wildlife	▲	1600 Permit, CESA Consultation
NOAA Fisheries (NMFS)	▲	ESA Consultation
North Coast Regional Water Quality Control Board	▲	401 Permit, NEPA
United States Environmental Protection Agency (EPA)	▲	401 Permit, NEPA
US Fish and Wildlife	▲	ESA Consultation

TRIBES

Elk Valley Rancheria	● ▲ ■ ◆
Resighini Rancheria	■ ◆
Tolowa Dee-ni' Nation	● ▲ ■ ◆
Tolowa Nation	◆
Yurok Tribe	● ▲ ■ ◆

ATTACHMENT B

**WORKING GROUP MEETING MATERIALS AND
SUMMARIES**

B1. Workshop 1 Series – December 2020

B2. Workshop 2 Series – March 2021

B3. Workshop 3 Combined Meeting – April 2021

B1. Workshop 1



Last Chance Grade Alternatives Assessment Workshop #1 December 2020 Summary of Results

Prepared by:



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December 2020

I. Introduction

Workshop Purpose and Format

As part of the ongoing process to select a safe, reliable long-term alternative at Last Chance Grade in on U.S. Highway 101 in Del Norte County, California, Caltrans is currently considering whether any of the seven remaining build alternatives can be eliminated from further study and which will be moved forward into the EIR/EIS process. To that end, they are developing an alternatives analysis tool based upon criteria and related performance measures for each of the project's major objectives. Caltrans hosted the first in a series of three workshops designed to solicit and refine Last Chance Grade stakeholder input on the methodology and criteria. The full process will be as follows:

- **Workshop 1:** Purpose—get stakeholder input on the initial proposed methodology and criteria used to select the alternatives. The Workshop 1 series was completed December 14-17, 2020.
- **Workshop 2:**
 - Prior to Workshop 2, the project team will refine the methodology, considering all criteria and measurements suggested by the stakeholders during Workshop 1. They will take into account the data needed to achieve a metric, whether another metric could serve as a proxy, and if the criteria or metric is of significance to differentiate one alternative from another. They will then apply it to the remaining alternatives.
 - Workshop 2 Purpose—discuss results of initial application of methodology; discuss potential further refinements to methodology and criteria. The Workshop 2 series will be scheduled for the week of March 15, 2021.
- **Workshop 3:**
 - Prior to Workshop 3, the project team will complete the alternatives analysis using the refined criteria and methodology.
 - Workshop 3 Purpose—share results of final alternatives analysis as completed using refined criteria and methodology. The Workshop 3 series will be scheduled in late April 2021.

The same workshop was held four times for the benefit of each of the four Last Chance Grade working groups. These include:

- Cultural Resources Working Group: Members have responsibilities for cultural resources management and permitting.
- Biological Resources Working Group: Members have responsibilities for natural resource management and permitting.
- Last Chance Grade Partners: Members have land ownership and land management responsibilities.
- Congressman Huffman's Stakeholder Group: Along with Caltrans, the group includes representatives from local government, tribal groups, businesses, agencies, and environmental groups who provide feedback to all the partners involved.

Some organizations are members of more than one working group. Participants belonging to multiple groups were welcomed to participate in multiple meetings if their schedule permitted. However, if they preferred to limit their attendance, they were encouraged to choose the group or groups wherein they'd most like to share their viewpoints.

The workshops, held via Zoom, were designed to be interactive. Participants viewed a presentation reviewing the alternatives analysis process, timeline, project need and purpose, history of alternative selection, and proposed criteria and performance measures for five major objectives of the alternatives analysis process. The presentation is attached as Appendix A, "Workshop Materials."

The presentation provided context for how criteria will be used to evaluate alternatives both in the current and future stages of the project. Caltrans is hoping to identify criteria that can be measured, for which there is adequate data, and that represent comprehensive objectives. Not all criteria may be used for evaluating which alternatives move forward in the EIR/EIS. Some might be used in future steps of the alternatives analysis. It was also noted that weighting the different criteria is not crucial at this point since the preferred alternative is not being selected at this point; it is only necessary to determine which alternatives will be removed from consideration prior to the EIR/EIS process.

Following the presentation, they were asked to review and discuss the suggested criteria and metrics for each objective, considering the following:

- Do these criteria reflect what is valued?
- Are there any gaps or duplicates?
- Do the performance measures quantify what is important to assess this criteria?
- Should any of these be weighted much higher than others?

Participants used a combination of the Zoom Chat feature and spoken discussion to provide input. Their comments, along with information from the project team in response to their questions, were recorded on a digital whiteboard. The full digital whiteboards are reproduced in Appendix B, "Workshop Results."

Following the discussion, participants were asked to respond to a series of polling questions gauging their level of support. First, they were asked to identify their level of support for the overall alternatives analysis process as described during the workshop (highly supportive, somewhat supportive, neutral, somewhat unsupportive, or do not support). Then they were asked to identify to what degree they supported the revisions as discussed for each objective and associated criteria (highly supportive, somewhat supportive, neutral, somewhat unsupportive, or not supportive – revisions do not address my concerns). It was emphasized that this was not intended to be a binding vote, but simply a way to get a sense of the general level of support for the revisions that were discussed. The polling results are also included in Appendix B.

Workshop Attendance

In addition to Caltrans District 1 and project team staff, the following organizations were represented at the four workshops:

<p>Cultural Resources Working Group</p> <ul style="list-style-type: none"> ▪ California State Parks ▪ National Park Service / Redwood National Park 	<p>Partner Working Group</p> <ul style="list-style-type: none"> ▪ California State Parks ▪ Elk Valley Rancheria ▪ Green Diamond Resource Company ▪ Redwood National Parks ▪ Tolowa Dee-Ni' Nation ▪ Yurok Tribe
<p>Biological Resources Working Group</p> <ul style="list-style-type: none"> ▪ California Coastal Commission ▪ California Department of Fish and Wildlife ▪ California State Parks ▪ Elk Valley Rancheria ▪ National Oceanic and Atmospheric Administration ▪ National Park Services ▪ State Water Resources Control Board ▪ Tolowa Dee-Ni' Nation ▪ US Army Corps of Engineers ▪ US Environmental Protection Agency ▪ US Fish and Wildlife Service 	<p>Huffman Stakeholder Group</p> <ul style="list-style-type: none"> ▪ Crescent City-Del Norte Chamber of Commerce ▪ Del Norte County Board of Supervisors ▪ Del Norte Local Transportation Commission ▪ Environmental Protection Information Center (EPIC) ▪ Friends of Del Norte ▪ Green Diamond Resource Company ▪ Humboldt County Association of Governments ▪ Humboldt County Board of Supervisors ▪ Office of Representative Jared Huffman ▪ Redwood National Parks ▪ Resighini Rancheria ▪ Save the Redwoods League

II. Key Findings

A high-level summary of stakeholders' consensus across all workshops regarding each objective and the overall methodology is provided below.

A. Objective: Long-Term Safe, Reliable Roadway

- It is crucial to consider economic and social impacts on the communities for both of the criteria to be considered for this objective.

Criteria: Road Closure

- All groups are comfortable with this metric and agreed that it makes sense.
- Avoiding long-term road closure is extremely important to preserve access to schools, businesses, tribal offices, and public safety / health services.
- What is the duration of closure used in the metric? It might be useful to differentiate short-term and long-term closures.
- Closures should be kept as brief as possible, ideally less than one week; longer than that is a significant concern.

Criteria: Traffic Mobility

- All groups agreed that they had no concerns regarding this as a useful metric.

- This criteria is key to identifying the most sustainable alternative that will avoid the likelihood of lane reduction and the associated impact on travel time. The frequency of traffic mobility impact is important to consider. An additional performance metric might be the percentage of time that lane reductions would be likely. This impacts the ongoing maintenance and economic objectives as well.
- Consider whether alternatives are in landslide areas since most lane reductions occur due to landslides. This metric is related to natural resources impacts due to associated sediment which may impact watersheds.

B. Objective: Reduce Maintenance Costs

Criteria: Maintenance Cost

- All groups agreed this was a good and important performance measure to be used moving forward.
- A baseline for benchmarking should be set based on current maintenance costs.
- Maintenance cost is also affected by the traffic mobility criterion for the Long-Term Safe, Reliable Roadway objective.

C. Objective: Protect the Economy

- “Protect the economy” seems like an odd way to characterize the objective; it’s more related to feasibility of the project and responsible stewardship of resources.

Criteria: Capital Costs

- All groups agreed that this is a useful and straightforward metric.
- Consider adding the duration of construction as a metric.

Criteria: Mitigation Costs

- Important to focus on mitigation, which may be a make-or-buy for the process. More mitigation creates less litigation, which may equal quicker implementation.
- Crucial to ensure that this metric will not be used to avoid the full cost of mitigation, and therefore incentivize doing minimal mitigation, which would externalize the cost onto the environment.
- Consider how to measure mitigation costs beyond fiscal concerns, including socioeconomic, environmental and cultural impacts. Some alternatives may include extra mitigation costs or challenges due to impacts such as old growth tree loss that are difficult to assign a dollar amount to or to mitigate. It may be necessary to consider how remaining resources might help mitigate for the loss of natural resources.
- Consider avoiding cultural resources to greatest extent possible rather than mitigation.
- Additional costs that should be included in calculating mitigation costs include: purchase of off-site land to mitigate for loss of wetlands; the cost of monitoring any mitigation; removing or creating new uses for the existing roadway, and maintenance costs for these new uses.

Criteria: Litigation Costs

- An important consideration that is complex to predict or adequately estimate. How will litigation costs be gauged (based on historic cases or on projections)? Ranking alternatives as high / medium / low risk for litigation may be a sufficiently meaningful criterion for this objective.
- In addition to the cost of the litigation itself, delays caused by litigation would also escalate construction costs over passing years, increase time for project completion and therefore affect project feasibility as well.
- Mitigation and litigation may not be mutually exclusive. Although there are other criteria that may determine or influence litigation, must consider that minimal mitigation may cause the project to wind up in court; substantial mitigation planned at the start (as possible under the CEQA process) will help avoid litigation delays.
- Continuing the current inclusive, trusted process, with good communications, meaningful consultations with tribes, making and fulfilling front-end agreements (where geology allows) may help avoid litigation. All stakeholders want a project that happens sooner rather than later and works for all.

D. Objective: Protect Natural Resources

- Need to specify considering impacts on water / aquatic resources. Criteria might include number of stream crossings; cut-and-fill volumes and associated risk of sedimentation; potential to fill wetlands. Must also consider impact on aquatic habitats, whether directly, through downstream impacts, or through risk of sediment delivery to stream system from watercourse crossings. This is a complex measure that is influenced by many factors.
- Consider amounts of cut and fill material to be deposited within project area or moved elsewhere, and the associated impacts including environmental, wildlife habitat and connectivity, edge effects, construction traffic and air quality.
- Natural resources fall under cultural resources for tribes. Must consider each impacted area's significance to tribes and its link to cultural resource value.

Criteria: Trees/Forests

- Should measure acres directly impacted.
- This criteria also affects habitat for plants and animal species.

Performance Measure: Old growth redwood forest (acres)

- This criteria will be the biggest driver of controversy that could derail the project. It will also be a primary metric for habitat and other impacts.
- Impacts and a qualitative assessment of the old growth redwood forest to be impacted must be considered beyond just acreage. This includes size of trees (since the public is responsive to big trees regardless of age); whether the acres are continuous; long-term impacts to the health of trees located along the edges of new roads; effects on water quality and habitat; and loss of carbon sequestration. Characteristics of old growth forest that are lost or impacted will need to be compared to any candidate "old growth" forest that may be considered as mitigation habitat. It will likely be necessary to measure and assess every tree.

- Old growth redwood wood from removed trees should be given to the tribes.

Performance Measures: Young growth / mixed forest (acres); Mature mixed coniferous forest (acres); Other types, i.e. coastal scrub (acres)

- How is the distinction between young and mature forest defined?
- Mixing forest type and habitat types is confusing; suggest capturing “mature forest” in habitat acres only.

Criteria: Habitat

- Important to consider impacts on multiple species, both animals and plants, particularly sensitive species; might be missing something by focusing only on specific protected species. Consider whether some umbrella species can be identified to capture habitats that are essential to many different species.
- Environmentally sensitive habitat areas must be protected. Will need to make qualitative assessments beyond just acreage to determine habitat value for different species. Mitigation may include adding protections such as purchasing lands with similar habitats.

Performance Measure: Marbled murrelet habitat (acres); Northern spotted owl habitat (acres)

- No comments specific to these performance measures.

Performance Measure: Marten/fisher habitat (acres)

- These two species have different habitat requirements, so they should be considered in separate performance measures.

Criteria: Wildlife Connectivity

- Connectivity is an important criteria.
- Consider the ability of each alternative to incorporate migration corridors or wildlife crossing features, and its impacts on permeability for wildlife movement, which may vary across species. Also remember to consider water habitat connectivity.

Criteria: Recreational Resources

- Important to maintain access and connectivity to these resources. Include consideration of impacts to amenities such as vista points and parking lots and to tribal / culturally valuable routes.
- This criterion is easily mitigated, providing many opportunities to improve access and recreational facilities, leaving the impacted resources better than before.

E. Objective: Protect Cultural Resources

Criteria: Cultural Resources

- Determining impacts on cultural resources requires close coordination with the tribes within the cultural resources working group.

- Not all sites have equal value, and their value is influenced by many factors. Possible approaches include categorizing or ranking sites by high / medium / low risk but must go deeper than standard archeological information to assess ethnographic significance. Tribal input is required to clarify how they assign cultural resource values, which may include holistic significance of sites and how sites relate to one another; access and connectivity to sites and cultural trails; mythological connections to specific locations; cultural significance of natural resources (e.g., plant species, fisheries). May not be able to specify precise considerations of cultural value.
- Again, this is strongly related to mitigation and its potential costs. High / medium / low assessment of risk may not provide enough detail to assess mitigation. Consider avoiding cultural resource impacts as much as possible rather than mitigation.

F. Comments on Overall Process and Methodology

- The “big nasties” that are most likely to be controversial and “blow up” the project—e.g., impacts to old growth redwoods—must be heavily weighted as drivers for decision making. Doing so may help clearly eliminate some alternatives.
- Consider the most sustainable alignment with least resource impacts, but must factor in cost to build, since a low-impact but very high-cost alternative might not be feasible.
- Concerned about the lack of updated information regarding the geotechnical risks; it’s difficult to assess criteria, impacts and needs or eliminate alternatives without this.
- Additional metrics and criteria suggested included:
 - Consider time needed to adjust if running into complications once project is started. This will impact several of the objectives and associated criteria, including traffic mobility and capital costs.
 - Consider how well alternatives would accommodate multi-modal travel (e.g., bike travel), as this relates to equity.
- Questions asked regarding: when the number of alternatives for further may be reduced; getting more information on other working groups’ activities and input; opportunities for accelerating process.

G. Polling on Level of Support

The level of support for the overall process as described was neutral or greater across all four workshops, with the exception of a single “somewhat unsupportive” response from the Huffman Stakeholder group. There were no responses of “do not support.” In each case, the percentage of those who were either highly or somewhat supportive was greater than the percentage of those who were neutral. The highest level of agreement was among Partner group members, who were 100% highly supportive.

The level of support for the revisions to objectives as discussed for participants across all four groups was much the same: neutral or greater, with the exception of a single “somewhat unsupportive” response for revisions discussed to the Objective: Protect the Economy from the Huffman Stakeholder group. There were no responses of “not supportive – revisions do not address my concerns.” In all cases, the percentage of those who were either highly or somewhat supportive was equal to or greater than the percentage of those who were

neutral. Again, the highest level of agreement was among Partner group members, who were 100% highly supportive of the revisions discussed for all five objectives.

Appendix A: Workshop Materials



Alternatives Assessment – Workshop #1
Cultural Resources Working Group
Monday, December 14, 2020
1:00 p.m. – 3:00 p.m.

Biological Resources Working Group
Tuesday, December 15, 2020
1:00 p.m. – 3:00 p.m.

Partner Working Group
Wednesday, December 16, 2020
9:00 p.m. – 11:00 a.m.

Huffman Stakeholder Group
Thursday, December 17, 2020
1:00 p.m. – 3:00 p.m.

Topic	Speaker	Discussion Tool
I. Welcome and Introductions	Joan Chaplick, MIG Jaime Matteoli, Caltrans	
II. Alternatives Analysis Process and Input	Jaime Matteoli	
III. Project Need, Purpose and History of Alternatives	Jaime Matteoli	
IV. Proposed Methodology and Criteria	Dina Potter, HNTB	Chat and Raise Hands
V. Review of Criteria by Objective	Joan Chaplick, MIG All participants	Chat and Raise Hands
VI. Level of Support for Criteria by Objective	Joan Chaplick, MIG All participants	Polling, Chat and Raise Hands
VII. Next Steps and Closing Comments	Jaime Matteoli	



LAST CHANCE GRADE

Alternatives Analysis Methodology
Workshop 1

December 2020

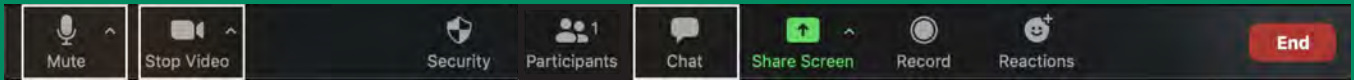


Meeting Purpose



- Get stakeholder input on the process for assessing the alternatives
- Conduct a transparent and defensible process
- In today's meeting, we will:
 - Describe the approach and methodology
 - Get your input on the criteria and performance metrics that will be used
 - Gauge the level of support for the process and the comments we have discussed

Virtual participation on Zoom



1 Audio & Video

Computer

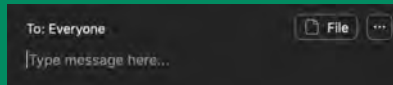
- Use the toolbar

Phone

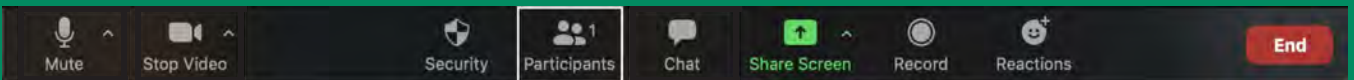
- Access dial-in number
- Use *9 to raise hand

2 Chat

- Click on the chat and type your comments and questions
- We'll take comments throughout the workshop



Virtual participation on Zoom



Participants

- Select icon on the toolbar to open the participants' window
- Select 'Raise Hand' button

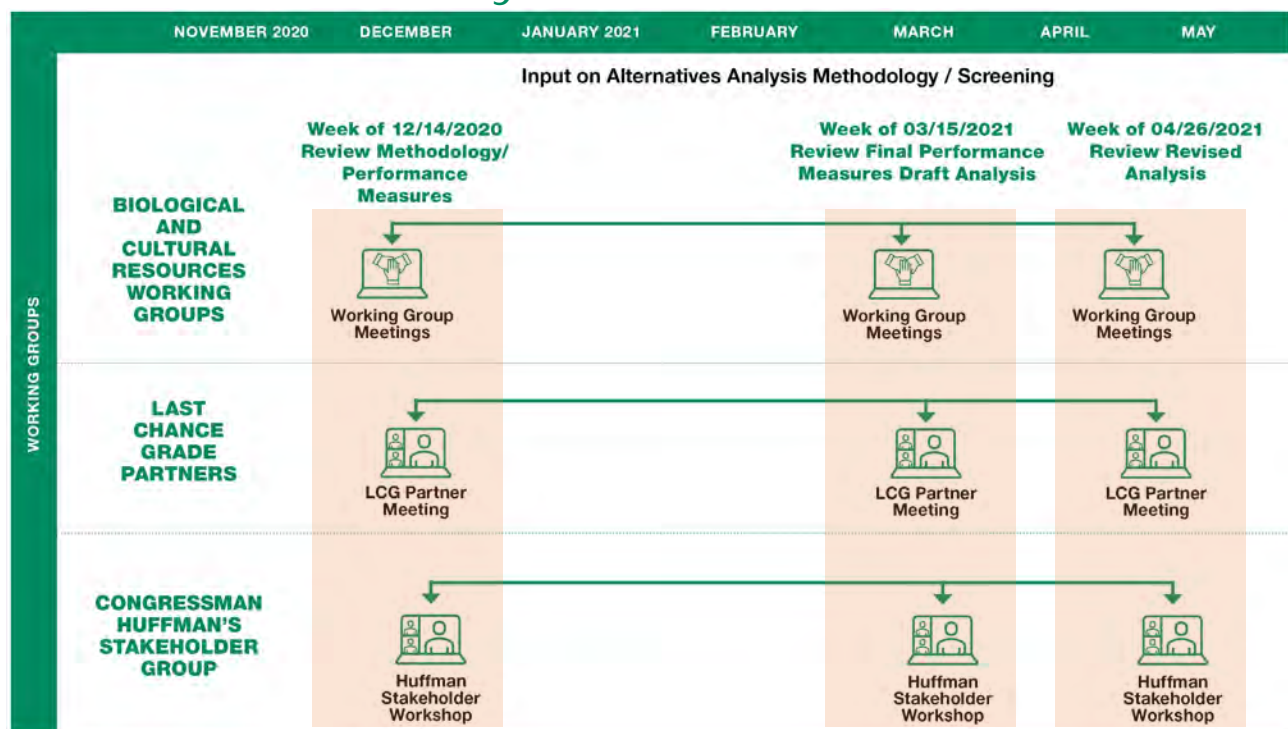


Workshop Agenda + Input Opportunities



- Welcome and Introductions
- Alternatives analysis process and input
 - *Questions via chat*
- Project need, purpose, and history of alternatives
 - *Questions via chat*
- Proposed criteria and proposed performance measures
 - *Discussion and comments via chat, with digital note taking*
- Review of criteria based on objectives
 - *Discussion and comments via chat, with digital note taking*
 - *Polling on level of agreement with proposed revisions*
- Summary and Next Steps

Alternatives Analysis Process



Project Timeline



ENVIRONMENTAL PHASE

DESIGN PHASE

CONSTRUCTION



Project Need



Landslides and road failure at LCG have been an ongoing problem for decades. A long-term sustainable solution at LCG is needed for the following reasons:

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



Project Purpose

The purpose of this project is to develop a long-term solution to the instability and potential roadway failure at LCG.

The project will consider alternatives that:

- Provide a more **reliable connection**,
- Reduce **maintenance costs**, and
- Protect the **economy, natural resources, and cultural resources**.



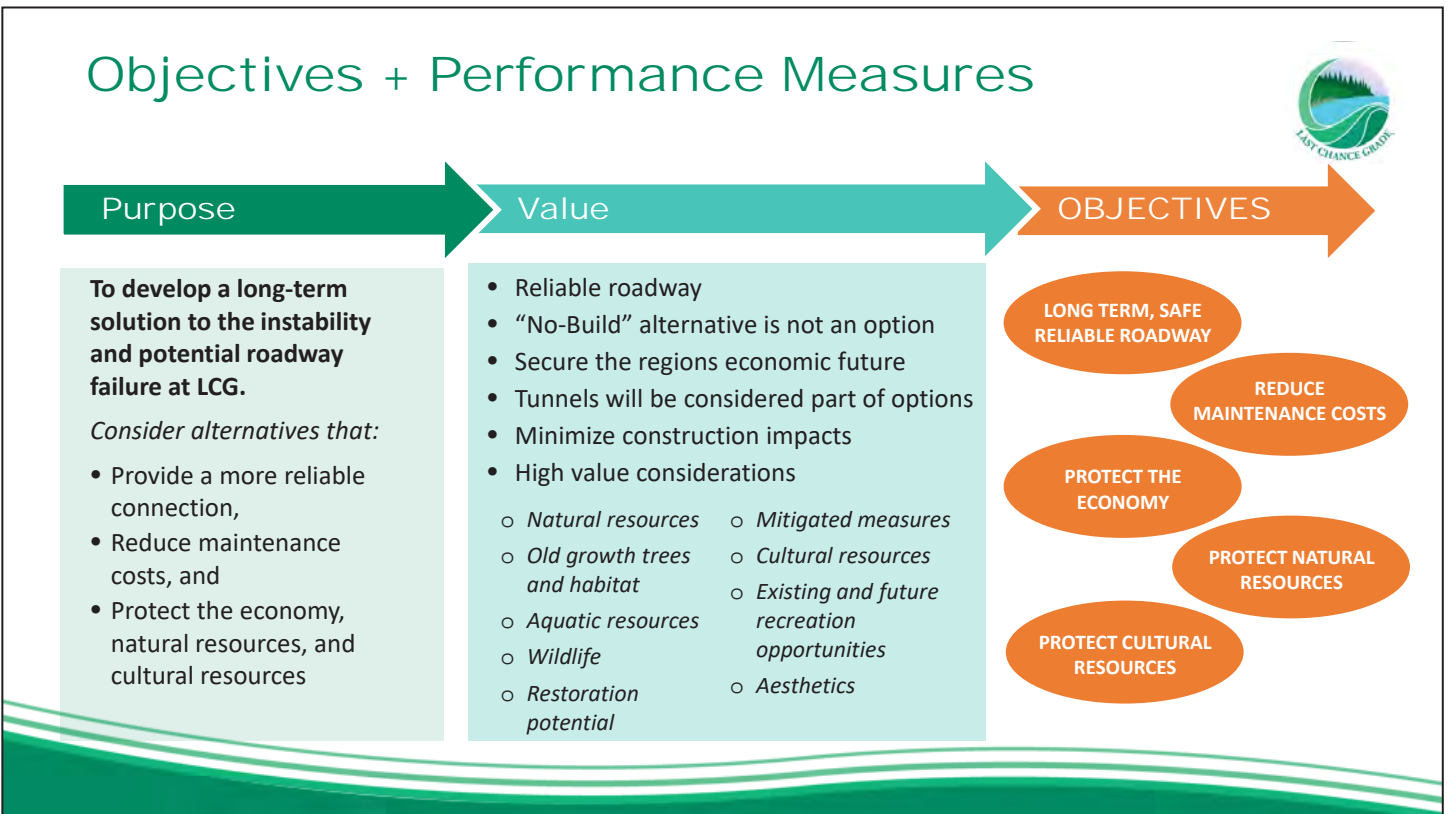
Sunday night on LCG



History of Alternatives

- 2015 Feasibility Study considered 14 alternatives and rejected eight
- 2016 Project Study Report considered six alternatives
- 2018 Risk Assessment added alternatives L and X
- 2018 Value Analysis rejected alternatives C3, C4 and C5
- 2019 Project Study Report Addendum added alternatives G1 and G2
- 2020 Seven build alternatives will be assessed and evaluated





Long-Term Safe, Reliable Roadway

Criteria	Performance Measure	How Measured
Road closure	Probability of long-term closure	Expert-based risk assessment including probability of deep ground displacement
Traffic mobility	Probability of lane reduction and mobility impact	Expert-based risk assessment including probability of unmitigable landslide activity / hydrogeological changes

Reduce Maintenance Costs

Criteria	Performance Measure	How Measured
Maintenance cost	Probability of increased maintenance costs	Expert-based risk assessment including probability of unmitigable earth movement

Protect the Economy

Criteria	Performance Measure	How Measured
Capital costs	Construction cost (millions)	Engineers' Order of Magnitude estimate
Mitigation costs	Mitigation cost range (high / medium / low)	Expert environmental estimate with historical cost data
Litigation costs	Risk of litigation (millions)	Risk based on costs of delay and level of potential controversy

Protect Natural Resources

Criteria	Performance Measure	How Measured
Trees / Forests	Old growth redwood forest (acres)	Aerials / field review information
	Mature mixed coniferous forest (acres)	
	Young growth / mixed forest (acres)	
	Other types, i.e., coastal scrub (acres)	
Habitat	Marbled murrelet habitat (acres)	Aerials / existing reports
	Marten/fisher habitat (acres)	
	Northern spotted owl habitat (acres)	
Wildlife connectivity	New habitat islands generated (acres)	Aerials
Recreational resources	Number and type of sites / trails affected	Aerials / LiDAR

Protect Cultural Resources

Criteria	Performance Measure	How Measured
Cultural resources	Expert assessment of risk	Record search and pedestrian survey

Discussion of Criteria and Performance Measures by Objective



- Review the suggested criteria and metrics for each objective

Consider the following:

- Do these criteria reflect what is valued?
- Are there any gaps or duplicates?
- Do the performance measures quantify what is important to assess this criteria?
- Should any of these be weighted much higher than others?



Discussion

Polling on Overall Methodology



- What is your level of support for the overall process that has been described today?
 - Highly supportive
 - Somewhat supportive
 - Neutral
 - Somewhat unsupportive
 - Do not support

Polling on Each Objective



- *The poll is anonymous and is not a binding vote. Its purpose is intended as a way to gauge general support for the comments that were discussed.*
- To what degree do you support the revisions as discussed?
- Levels of Support:
 - Highly supportive
 - Somewhat supportive
 - Neutral
 - Somewhat unsupportive
 - Not supportive - revisions do not address my concerns

Next Steps and Next Meeting



- Meeting format is being replicated with all four groups
- Project Team will collectively review feedback and refine the methodology accordingly
- Project Team will apply the refined methodology will be applied to the alternatives and present the results for discussion at the next meeting
- Next workshop will be scheduled during the week of March 15



Cultural Resources Working Group - 12.14.2020 Alternatives Assessment Workshop #1

Overall Methodology

Caltrans asks: will we need more collaboration / information meeting prior to March workshop?
 Maybe yes, it may depend on the participation of Tribes in the next few meetings. Will the results be shared and from all the meetings? (Caltrans response: Yes)
 Of value, cannot move forward without tribes' participation
 Do think it would be valuable.
 Would be valuable ✓

General Comments / Questions

Add socioeconomic costs beyond just fiscal?
 Close coordination with tribes is necessary

Long-Term Safe, Reliable Roadway

Criteria	Performance Measure	How Measured
Road closure	Probability of long-term closure	Expert-based risk assessment including probability of deep ground displacement
Traffic mobility	Probability of lane reduction and mobility impact	Expert-based risk assessment including probability of geomorphic landslide activity / hydrogeological changes

Criteria: Road closure
Performance Measure: Probability of long-term closure

No concerns about this particular performance measure.
 Yes, comfortable with this metric
 Thumbs up

Criteria: Traffic mobility
Performance Measure: Probability of lane reduction and mobility impact

No concerns with Traffic Mobility as performance measure

Reduce Maintenance Costs

Criteria	Performance Measure	How Measured
Maintenance cost	Probability of increased maintenance costs	Expert-based risk assessment including probability of unmitigated earth movement

Criteria: Maintenance cost
Performance Measure: Probability of increased maintenance costs

maintenance costs should be a performance measure moving forward
 Thumbs up ✓✓

Protect the Economy

Criteria	Performance Measure	How Measured
Capital costs	Construction cost (millions)	Engineers' Order of Magnitude estimate
Mitigation costs	Mitigation cost range (high / medium / low)	Expert environmental estimate with historical cost data
Litigation costs	Risk of litigation (millions)	Risk based on costs of delay and level of potential controversy

Criteria: Capital costs
Performance Measure: Construction cost (millions)

Looks good, thumbs up

Criteria: Mitigation costs
Performance Measure: Mitigation cost range (high / medium / low)

no concerns. However I'm waiting for some other indirect costs to see if they are considered later
 Includes socioeconomic costs beyond fiscal concerns
 This is just environmental?
 Response: Could include ROW, utilities, but largely cost of mitigating environmental impacts

Thumbs up, Looks good
 Add socioeconomic costs beyond just fiscal?
 If adding a new metric, consider how to mitigate
 Also includes cost of cultural mitigation

Criteria: Litigation costs
Performance Measure: Risk of litigation (millions)

No comments

Protect Natural Resources

Criteria	Performance Measure	How Measured
Trees / Forests	Old growth redwood forest (acres) Mature mixed coniferous forest (acres) Young growth / mixed forest (acres) Other types, i.e., coastal scrub (acres) Marbled murrelet habitat (acres)	Aerials / field review / information
Habitat	Marten/fisher habitat (acres) Northern spotted owl habitat (acres) New habitat islands generated (acres)	Aerials / existing reports / Aerials
Wildlife connectivity	Number and type of sites / trails affected	Aerials / USAR

Criteria: Trees / Forests
Performance Measure: Old growth redwood forest (acres)

Just by acres? Or by trees?
 Suggest potentially doing so by tree; an individual tree can be a habitat for species
 Depends on the situation

What is the definition of old growth?
 Size of individual trees needs to be captured; public is responsive to big trees regardless of age
 Add DBH or some kind of measure

Caltrans: Have tree counts w/diameters for some areas
 Don't have count for Green Diamond, will count every tree during environmental process

By adding "other types" you seem to cover all types

Criteria: Trees / Forests
Performance Measure: Mature mixed coniferous forest (acres)

No comments

Criteria: Trees / Forests
Performance Measure: Other types, i.e. coastal scrub (acres)

No comments

Criteria: Trees / Forests
Performance Measure: Young growth / mixed forest (acres)

No comments

Criteria: Wildlife connectivity
Performance Measure: New habitat island generated (acres)

No comments

Criteria: Habitat

Consider changing measurements on habitat from acres to trees
 Or both trees and acres depending on what about plant communities not trees, wetlands, etc...
 Again, plants may be cultural resources as well

Criteria: Recreational resources
Performance Measure: Number and type of sites / trails affected

Will any new opportunities be added?
 This seems to speak to existing sites / trails only
 Road originally created for tourists, need to consider those resources

Protect Cultural Resources

Criteria	Performance Measure	How Measured
Cultural resources	Expert assessment of risk	Record search and pedestrian survey

Criteria: Cultural Resources
Performance Measure: Expert Assessment of Risk

Possible approach: preliminary info, 22 sites and 18 isolates
 Not all sites have equal value by size, significance, etc.
 Project in D9: had to do least risk analysis with ranking/scoring system for site types
 Chart created by Jay King, D9
 Categories per amount / type of artifacts, complexity, etc.
 Historic more difficult to quantify
 Tribes may object to sites being ranked
 Rankings may be too subjective, but sites do not have equal value
 May be able to look at acreage
 Find way to assess potential mitigation, cost, timeline, etc.

Like idea of categorizing or ranking sites, but need tribes involved to discuss
 Need to know how tribes assign value and how the sites relate to each other
 Need feedback from tribes on cultural significance of plant populations
 Consider how visual attributes of resources are affected
 Ethnographic studies assessing indirect effects to resources
 E.g., mythological connections to specific locations
 Must consider beyond bounds of alignments
 Who considers these resources valuable and how are they valuable?
 Go deeper than standard archeological info and consider it

Caltrans: Is it reasonable to take all info and assign a high / medium / low value?
 A matter of building relationship among committee, clear and open communication
 Will take some work and creativity to get there; can only be achieved through consistent open communication
 Group has been doing well so far
 Agreed on working well as group, understanding issues holistically
 Still in midst of collecting info; values identified will change
 In process of developing understanding, work in progress

Another approach: use sensitivity model developed in D9
 Takes distance to water, slope, geology, etc. into account
 Only a few areas are high sensitivity by that metric
 Fairly easy GIS analysis; also useful for finding deposits during construction
 Could be helpful with pre-contact archeological info
 Other types of sites that need to be gauged; harder to determine types of risks

HNTB: How would ranking approach work best?
 Create chart and submit to tribes or start from scratch?
 How much detail to go into?
 Participant responses: hard to state what works best; tribal partners need to speak for themselves
 Requires close coordination with tribes
 Have follow-up conversations if necessary
 Leads back to mitigation and potential costs for cultural mitigation
 May be more detailed than just 3 categories
 Overlap between environmental and cultural mitigation



Biological Resources Working Group - 12.15.2020 Alternatives Assessment Workshop #1

Long-Term Safe, Reliable Roadway

Criteria	Performance Measure	How Measured
Road closure	Probability of long-term closure	Expert based risk assessment including probability of deep ground displacement
Traffic mobility	Probability of lane reduction and mobility impact	Expert based risk assessment including probability of any/multiple landslides/ hydrogeologic changes

Criteria: Road closure
Performance Measure: Probability of long-term closure

acceptable no questions or comments | No comment from several people | Consider community impacts – economic and social | Road closures usually mean slides & sediment potentially impacts to waters

Criteria: Traffic mobility
Performance Measure: Probability of lane reduction and mobility impact

Consider community impacts | Otherwise no comments

Reduce Maintenance Costs

Criteria	Performance Measure	How Measured
Maintenance cost	Probability of increased maintenance costs	Expert based risk assessment including probability of unmitigated earth movement

Criteria: Maintenance cost
Performance Measure: Probability of increased maintenance costs

No comments

Protect the Economy

Criteria	Performance Measure	How Measured
Capital costs	Construction cost (millions)	Engineer/ Order of Magnitude estimate
Mitigation costs	Mitigation cost range (high / medium / low)	Expert environmental estimate with historical cost data
Litigation costs	Risk of litigation (millions)	Risk based on costs of delay and level of potential controversy

Criteria: Capital costs
Performance Measure: Construction cost (millions)

What is the cost of doing nothing? | Caltrans: addressed in no build alternative heavily considered, not a sustainable path forward

Criteria: Litigation costs
Performance Measure: Risk of litigation (millions)

Can you adequately estimate cost of litigation? | Caltrans: comes down to judgement of legal teams and estimate of those costs | Should be adequate for the purpose of screening alternatives to carry forward | Example: project with smaller impact held up 15 years | Even if an alternative is supported, and it may come from anywhere due to World Heritage Site designation | This may impact A2 and G2 alternatives in particular

Never heard of using litigation potential as a decision criteria should not be considered in the analysis matrix. An alternative is complex thing to try to predict. | Delay would also escalate construction costs over passing years | Litigation is an important consideration.

Protect Natural Resources

Criteria	Performance Measure	How Measured
Trees / Forests	Old growth redwood forest (acres) Mature mixed coniferous forest (acres) Young growth / mixed forest (acres) Other types, i.e., coastal scrub (acres) Marbled murrelet habitat (acres)	Aerials / field review information
Habitat	Marten/fisher habitat (acres) Northern spotted owl habitat (acres)	Aerials / existing reports
Wildlife connectivity	New habitat islands generated (acres)	Aerials
Recreational resources	Number and type of sites / trails affected	Aerials / LIDAR

Criteria: Trees / Forests
Performance Measure: Old growth redwood forest (acres)

Caltrans: considering elevations A2 and G2 which cut into old growth | Consider the number of trees already being treated along the edge that may be in or be damaged or be lost due to old growth forest | The category will be the largest one in the assessment and the conditional difference provided by these forests | Agree, you need a metric to assess value of the conditional difference provided by these forests | Loss of carbon sequestration from trees removed | Edge effect if putting in a highway adjacent to old growth or other forest type | Removal of old growth redwoods will be the primary reason for a MAEL, M2, and mature Redwoods a resource you can't mitigate for an invaluable resource | Agree, old growth impacts prior the highest risk to the project | Areas of old growth forest are the most sensitive and should be considered an endangered habitat | Will need to be compared for the purpose of screening alternatives to carry forward | Even if an alternative is supported, and it may come from anywhere due to World Heritage Site designation | This may impact A2 and G2 alternatives in particular

A qualitative assessment for the old growth is important to many levels. | Also affects water quality, habitat, etc. - important aspect to look at | Can aerial surveys and estimates be done based on maps? | Caltrans: yes, we have aerials and tree counts in some areas, others would require on-the-ground surveys. | Caltrans: hoping that acreage will serve as measurement to help screen | Does group feel that tree diameters are needed? | It may come down to measuring every tree | HWB: that's the plan, question is whether now or later | Caltrans: in support of using tree counts for old growth only? | Both are important - acre and individual trees

Does the assessment get down to the level of individual trees? | and the contiguous rest of the acres. | Caltrans: can't answer how but could consider - possibly more qualitatively | Area descriptions (i.e. not tree counts) in the non old growth forest types should be suitable for this exercise. | Can tree counts in old growth and mixed forest be estimated from mapping resources? | Caltrans: somewhat can estimate tree diameters through LIDAR but diameter and tree height require on-ground | Related to loss of carbon sequestration from loss of temperate rain forest due to climate change

Criteria: Trees / Forests
Performance Measure: Mature mixed coniferous forest (acres)

We should discuss how you are defining young and mature forests. What is the difference between these two? | Caltrans: Young forest is Green Diamond area | Mature forest in park east of road, landslide area | Old growth never cut, outside landslides is different habitat - that's mature forest | I would suggest not mixing forest type and habitat type. | Agree, you need a metric to assess value of the conditional difference provided by these forests

Criteria: Habitat
Performance Measure: Marbled murrelet habitat (acres)

No comments specific to this measure

Criteria: Habitat
Performance Measure: Northern spotted owl habitat (acres)

No comments specific to this measure

Criteria: Habitat
Performance Measure: Marten/fisher habitat (acres)

Martens and fishers: I have different habitat requirements | Is the value of this habitat respected or mitigated for? | Will have vastly different impacts for the overall conservation of these species. | For these reasons, they should really be considered separate performance measures. | Fishers aren't listed in NW CA

Criteria: Wildlife connectivity
Performance Measure: New habitat island generated (acres)

Wildlife connectivity: measure probability of number of animals that may be hit on each alternative | Wildlife connectivity ability of each alternative to incorporate migration corridors into the design | For connectivity alternatives, we also have greater or lesser impact to the permeability of each alternative for wildlife movement. | New habitat islands created increases permeability of alternatives if they are connected across species. | For example, an alternative that can incorporate wildlife crossing features versus one that doesn't will have less impact on connectivity and get represented by the alternative. | A tunnel versus a surface road is probably the greatest contrast for connectivity represented by the alternative. | Agree with everything said re. habitat connectivity above | Agree no wildlife connectivity, and also remember fish habitat and stream connectivity | Caltrans: appreciated, some things are difficult to quantify. | Need expert assessment on level of impact for these, e.g. connectivity

Criteria: Recreational resources
Performance Measure: Number and type of sites / trails affected

This may be controversial, but the recreational infrastructure (Dufur Creek Campground and the Coastal Trail that may be developed) or have to be moved to not necessarily important, it is only marginally important. They are not replaceable, could be modified. | Disregard my comment on Mill Creek Campground - those alternatives have already been dropped

Protect Cultural Resources

Criteria	Performance Measure	How Measured
Cultural resources	Expert assessment of risk	Record search and pedestrian survey

Criteria: Cultural Resources
Performance Measure: Expert Assessment of Risk

Caltrans: must be sensitive to tribal preferences for information sharing | No comments on cultural resources - should be handled in that working group. | As long as the tribes' comments are addressed, the Corps has no comments on cultural resources.

Thank you for your comments Jaime. No further comments from Elk Valley. | Consider fisheries value to tribes and cultural resources.

Overall Methodology

Group has captured "the big nasties" | Need to be drivers for decision making | Weighting some of these criteria can get us most of the way | Caltrans: hope to use expert-based qualitative judgments | Remember: worst case is just studying all 7 build alternatives - more expensive and time | Hoping that presentation of results will help eliminate some alternatives

General Comments / Questions

Not sure where to mention multi-modal issues as they relate to equity and the coastal bike trail. How would a tunnel accommodate these modes of travel?



Partner Working Group - 12.16.2020 Alternatives Assessment Workshop #1

Overall Methodology

Are these criteria and measures for each alternative route? Answer: yes

criteria, most sustainable alignment, least resource impacts

If assessing impacts of each alternative, what area is being assessed: footprint - ROW or cumulative impacts for each alt?

Caltrans response for this tool, just looking at footprint/ direct construction & long term impact

In environmental phase, must look at bigger picture

Need your help to determine critical criteria

yes, should focus on protection with realistic expectations based on cost to build. A no impact billion dollar project might not be feasible. :-)

On front end, based on geology, then look at impacts with regard to cultural & natural resources, activities, etc.

General Comments / Questions

I think this was very supportive, thank you very much

Long-Term Safe, Reliable Roadway

Criteria	Performance Measure	How Measured
Road closure	Probability of long-term closure	Expert based risk assessment including probability of deep ground displacement
Traffic mobility	Probability of lane reduction and mobility impact	Expert based risk assessment including probability of unmitigable landslide activity / hydrogeological changes

Criteria: Road closure
Performance Measure: Probability of long-term closure

Need a sustainable route

Looks good ✓

This is a really important, especially for schoolchildren, businesses, tribal offices in CC and Klamath

Plus safety, access to hospitals

agree with these thoughts re importance of sustainable route for access

Criteria: Traffic mobility
Performance Measure: Probability of lane reduction and mobility impact

Consider frequency of traffic impact

Fine - is this a measure of alternative as built? Caltrans response: yes, will be assessing each and comparing

Are they in landslide area and therefore still prone to possibility of lane reduction?

Modeling what was done in expert based risk assessment, probability of event w/ in time periods

So baseline for existing route would be 100% on this metric, correct?

Caltrans response: yes, no build as a baseline

Is there a related metric of what percentage of time when there would be a lane reduction?

Caltrans response: Believe it's still in same number but will have to clarify

The goes to ongoing maintenance and long term costs. Most sustainable route again. Look to avoid closures and possibility for roadways once it's built

We do not want to shift the route and in ten years be back to tens of millions to maintain the new route after all the resource impacts to change the location

completely agree re prior comments, also an impact on travel time for the community of Klamath for essential services such as school, food, health care etc.

Don't want to be back in this same position we are in now where travel times are high

agree with thoughts re most sustainable route

Where is limit if running into complications once project is started?

Caltrans response: Good question, haven't considered for this effort

Any alternatives have that risk. Considering litigation risk, for instance

Can build time for changing conditions into time to build metric

No cap to time for repairing existing location. Have not experienced lack of emergency funds

On construction, will document risk of changing conditions and apply for more \$ if needed

Reduce Maintenance Costs

Criteria	Performance Measure	How Measured
Maintenance cost	Probability of increased maintenance costs	Expert based risk assessment including probability of unmitigable earth movement

Criteria: Maintenance cost
Performance Measure: Probability of increased maintenance costs

This is a good measure

want to reduce maintenance costs especially in light of resource impacts associated with a new alignment

Seems fine but needs to be benchmarked against current maintenance costs

Response: would be benchmark used; have lots of data

Criteria: Traffic mobility
Performance Measure: Probability of lane reduction and mobility impact

Good with me, super-important for Caltrans

Nothing at this time

No comments

Protect the Economy

Criteria	Performance Measure	How Measured
Capital costs	Construction cost (millions)	Engineers' Order of Magnitude estimate
Mitigation costs	Mitigation cost range (high / medium / low)	Expert environmental estimate with national cost data
Litigation costs	Risk of litigation (millions)	Risk based on costs of delay and level of potential controversy

Criteria: Mitigation costs
Performance Measure: Mitigation cost range (high / medium / low)

Count on 20% of project cost for mitigation

Avoid cultural resources as much as possible rather than mitigation

What will happen to the existing 101? Will there be a cost to take it down?

Response: still uncertain; part of mitigation potential

May use as recreational resource. Varies from alternative to alternative

What maintenance costs are needed for these new uses?

Criteria: Litigation costs
Performance Measure: Risk of litigation (millions)

Agreed upon actions on the front end, stick to decisions where geology allows, continue communications and we should not have litigation

I agree, also keeping local tribes included in the process and having real meaningful consultation will help with not having litigation

Litigation and mitigation costs may not be mutually exclusive; costs for one may reduce other

How will you gauge litigation costs? Based on historic cases or just projections?

Response: Historic #'s and looking at costs to repair this road, e.g. \$10M per year

Or could make high / medium / low determination of risk. #'s are estimated

Believe this can be ranked as H / M / L risk - a meaningful criterion for this objective

Criteria: Capital costs
Performance Measure: Construction cost (millions)

No comments at this time from most

Are mitigation costs rolled into this criteria? Response: no, they're separate

Is "sustainable" interpreted as reliability or sustainability for the use of resources?

Response: will consider whether it's sustainable and costs of maintaining

Add duration of construction?

Protect Natural Resources

Criteria	Performance Measure	How Measured
Trees / Forests	Old growth redwood forest (acres)	Aerials / field review information
Habitat	Mature mixed coniferous forest (acres)	Aerials / field review information
	Young growth / mixed forest (acres)	Aerials / field review information
	Other types, i.e., coastal scrub (acres)	Aerials / field review information
	Marbled murrelet habitat (acres)	Aerials / existing reports
	Martins/Flyer habitat (acres)	Aerials / existing reports
	Northern spotted owl habitat (acres)	Aerials / existing reports
Wildlife connectivity	New habitat island generated (acres)	Aerials
Recreational resources	Number and type of sites / trails affected	Aerials / LIDAR

Agree on avoidance, not mitigation for both cultural and natural resource impacts

Criteria: Trees / Forests
Performance Measure: Young growth / mixed forest (acres)

Criteria: Trees / Forests
Performance Measure: Mature mixed coniferous forest (acres)

Criteria: Trees / Forests
Performance Measure: Other types, i.e. coastal scrub (acres)

Criteria: Habitat
Performance Measure: Number and type of sites / trails affected

Question: Where will the old growth logs be going? Local Tribes?

Response: have not yet considered; big question requiring work with parks and tribes

we have talked about in the cultural resource group, could be part of mitigation

We've discussed it and noted the desire of tribes to be provided any old growth

Suggest give to tribes to create artworks to be displayed

Parks have agreements re old growth wood, will honor

Elk Valley is absolutely interested in obtaining redwood resources if when available

Other items Caltrans is considering related to that suggestion are aesthetic project treatments to highlight tribal ancestral connections

Adding reaching out to Tribal Natural Resources to see what they have been doing and how they can assist the project

Should already be staff from tribes in those groups

Proposed: create category for # of stream crossings

Can more deeply investigate water impacts in later stages

Stick to aquatic resource impacts as a criterion; stream crossings are a specific metric, not a major category

May also be influenced by other factors re. water

This is a multi-dimensional consideration

Amount of fill may be a factor; for instance, broaden the metric to be multi-dimensional

Must consider more than just # of crossings

Agreed, must take into consideration

Like idea of adding this performance measure; agree more complex than just # of crossings

Criteria: Wildlife connectivity
Performance Measure: New habitat island generated (acres)

Good to see this metric, nothing to add

connectivity will be critical for any alternative

Criteria: Recreational resources
Performance Measure: Number and type of sites / trails affected

Access to these resources must be considered; connectivity for humans to be considered along w/ wildlife

Agreed, performance measure is looking at existing

Criteria: very easily mitigated; many opportunities to improve access and recreational opportunity in project area

Therefore almost beside the point

Agreed with both; add an element of tribal access

Some tribal routes already impacted; those areas still accessed, even if pre-contact

Agree, accessibility was one of the opportunities prioritized with the Prairie Creek bypass

Important; consider impacts to visit points, parking areas, etc.

Don't just provide another opportunity for people to trash area

Opportunity to include that important; level of area gets through magnitude of potential impact

More than just road going through

Protect Cultural Resources

Criteria	Performance Measure	How Measured
Cultural resources	Expert assessment of risk	Record search and pedestrian survey

Criteria: Cultural Resources
Performance Measure: Expert Assessment of Risk

Question: Where will the old growth logs be going? Local Tribes?

Caltrans response: have not yet considered; big question requiring work with parks and tribes

we have talked about in the cultural resource group, could be part of mitigation

We've discussed it and noted the desire of tribes to be provided any old growth

Parks have agreements re old growth wood, will honor

Elk Valley is absolutely interested in obtaining redwood resources if when available

Suggest give to tribes to create artworks to be displayed

Other items Caltrans is considering related to that suggestion are aesthetic project treatments to highlight tribal ancestral connections

Redwood to tribes could fall under mitigation ✓

Natural resources fall under cultural for tribes

Can look at an area based on what it contains but must consider significance for tribes, link to cultural resource value

Agreed re protecting access for humans; add an element of tribal access

Some tribal routes already impacted; those areas still accessed, even if pre-contact

Agree, accessibility was one of the opportunities prioritized with the Prairie Creek bypass

Important; consider impacts to visit points, parking areas, etc.

Don't just provide another opportunity for people to trash area

Opportunity to include that important; level of area gets through magnitude of potential impact

More than just road going through

Elk Valley would appreciate continued consultation as they were unavailable for Cultural Resources Group Monday

Tribes don't distinguish between sites; need to take oral histories, traditional cultural landscapes, etc. into account

Factors on a larger scale and how individual sites play into context of tribes

Impact to cultural resources and properties very important criterion to tribes

Hard to break resources down into individual sites

Consider having a cultural monitor on hand

Caltrans, acknowledge and will be key to project; link to Amanda from Tribes who knows details of how work proceed

Appreciate tribe's trust in the process

Caltrans doing a good job reaching out to all, treating with sensitivity and respect

Agree with what was said, but consider from a tribal perspective, but also consider holistic significance of area, connection to other areas

Consider how areas relate to each other re. access, etc.

May not be able to specify precise considerations

Have big picture in mind, not just from a material perspective, informed by tribes



Huffman Stakeholder Group - 12.17.2020 Alternatives Assessment Workshop #1

Overall Methodology

Seems we're always behind on info, would be more effective if we had info prior to meetings (e.g. geotechnical)

Long-Term Safe, Reliable Roadway

Criteria	Performance Measure	How Measured
Road closure	Probability of long-term closure	Expert-based risk assessment including probability of deep ground displacement
Traffic mobility	Probability of lane reduction and mobility impact	Expert-based risk assessment including probability of unmitigable landslide activity / hydrogeological changes

These 2 criteria and metrics make sense.

Criteria: Road closure
Performance Measure: Probability of long-term closure

Makes sense ✓ No comment These 2 criteria and metrics make sense. What is the duration of the "closure" used in the metric? They make sense, just wondering. Caltrans: not certain, but think approximately a week used in study - will get back to you This seems appropriate and straight forward Might be good to differentiate short term closure and long term

Caltrans asks: Does a week make sense? I would be concerned of long term of more than 1 week Short term 1 week or less long term longer than 1 week is there a way to keep closure to part of a day period? Caltrans response: yes, if construction closure, may be longer if not under our control

Criteria: Traffic mobility
Performance Measure: Probability of lane reduction and mobility impact

This seems less important than long-term closure. We have lived with this as the "normal" for a while now. Not ideal, but not the worst

Reduce Maintenance Costs

Criteria	Performance Measure	How Measured
Maintenance cost	Probability of increased maintenance costs	Expert-based risk assessment including probability of unmitigable earth movement

Criteria: Maintenance cost
Performance Measure: Probability of increased maintenance costs

No comment This seems like a smart criteria/performance measure. We can seemingly keep the current road open but the long-term upkeep costs are jumping up

Increased from what? Not sure if increase is the right way to phrase, but having maintenance costs a consideration is key Caltrans: We will estimate and compare the future maintenance costs for each alternative. The current maintenance costs will serve as a baseline. using that as as baseline makes sense

Protect Cultural Resources

Criteria	Performance Measure	How Measured
Cultural resources	Expert assessment of risk	Record search and pedestrian survey

Criteria: Cultural Resources
Performance Measure: Expert Assessment of Risk

Where are cultural trails included? Caltrans: developed list at other meetings, will share Will tap tribal knowledge, must rely on that as most important input Sharing only what tribes are comfortable sharing

I will wait to learn more from what came from the CR group. Thanks Huffman group out of the loop on this criteria

Protect the Economy

Criteria	Performance Measure	How Measured
Capital costs	Construction cost (millions)	Engineers' Order of Magnitude estimate
Mitigation costs	Mitigation cost range (high / medium / low)	Expert environmental estimate with historical cost data
Litigation costs	Risk of litigation (millions)	Risk based on costs of delay and level of potential controversy

These seem weird to group under "protect the economy"

Criteria: Capital costs
Performance Measure: Construction cost (millions)

This seems more related to feasibility of the project, so if the costs are too high then the likelihood of project completion is more difficult Capital costs are straightforward. Question for Jaime, is there any requirement for local government contributions? Caltrans response: not that we're aware of

Criteria: Mitigation costs
Performance Measure: Mitigation cost range (high / medium / low)

Could occur to sway one alt higher than another: for Caltrans to declare cost of mitigation has exceeded some degree of possibility Could choose to limit mitigation, important not to assume we'll use this to avoid full cost of mitigation That would externalize cost onto the environment Caltrans response: will put thought into that Mitigation process important, old growth redwoods hardest to overcome Should rethink this measure, hadn't considered that project success would be based on mitigation cost Incentivizes doing as little mitigation as possible However, haven't given this angle much thought, different ways to look at it

Agree that mitigation will be make-or-break, must put in forefront, not have it be elephant in room It is something we must take seriously, understand what it means to each chosen route Hoping to see what comes out of geo studies, hope that helps us eliminate some alts Mitigation is a big focus, how to measure cost of mitigation? Possibly use other Caltrans projects as benchmarks More mitigation creates less litigation which equals sooner implementation

How would you put a dollar amount on mitigation? For example, if different # of tree, would you use an amount per tree? How would you apply? Caltrans: noted that an old growth tree is not mitigatable; will do our best to determine H / M / L ...since you can't compare apples to oranges, if spending too much to mitigate, consider spending more to avoid impact instead Don't want to minimize value of old growth, but many old growth redwoods. May need to move beyond attitude of protecting one specific plant or tree Consider what else can be done to mitigate

Criteria: Litigation costs
Performance Measure: Risk of litigation (millions)

I think risk of litigation could be both a financial cost but also a cost of time for project completion Caltrans: yes, discussing cost of greater time to complete project Mitigation is going to determine litigation That is the quote of the day Mitigation and litigation may not be mutually exclusive Revelation that alternatives have different attributes needing mitigation, so those will be weighed Agree in part that mitigation could influence litigation but it is only one criteria (As someone who has sued Caltrans)

Good point that this cost is less about dollars than about time and project feasibility. Important point, perhaps most important. Value Congressman Huffman's process All of us want a project that happens sooner than later and works for all This will be the tipping point, if only bottom-line mitigation will wind up in court If we come up with substantial mitigation right at the start, can avoid delay Not sure how we do that through CEQA process, but can proceed differently from usual

Protect Natural Resources

Criteria	Performance Measure	How Measured
Trees / Forests	Old growth redwood forest (acres)	Aerials / field review information
Habitat	Marbled murrelet habitat (acres)	Aerials / existing reports
Wildlife connectivity	New habitat islands generated (acres)	Aerials
Recreational resources	Number and type of sites / trails affected	Aerials / LIDAR

Criteria: Trees / Forests
Performance Measure: Old growth redwood forest (acres)

Old growth can be harmed by adjacent effects, not just by cutting. For instance, on Hwy 101 along Ave of Giants show tree die off due to the changes in ground water flow and ambient moisture availability. That area is a 4 lane highway and many old growth trees have died back 50-100 feet. Dead tops abound. Mitigation process important, old growth redwoods hardest to overcome Old growth redwood is going to be the key to this project.

Criteria: Trees / Forests
Performance Measure: Mature mixed coniferous forest (acres)

Criteria: Trees / Forests
Performance Measure: Young growth / mixed forest (acres)

Criteria: Trees / Forests
Performance Measure: Other types, i.e. coastal scrub (acres)

No specific comments on these measures I had a similar thought. In addition to acres, measures of success could be based on hydrologic function and forest ecosystem function Agree with adding an aquatic criteria as discussed yesterday (sedimentation into streams).

Criteria: Habitat
Performance Measure: Habitat continuity/performance is an important, albeit harder to quantify, criteria

Habitat continuity/performance is an important, albeit harder to quantify, criteria Some of the mitigation options may include adding protections to some of these habitats. i.e., such as a purchase of lands from GDRC that have Murrelet habitat in temporary protection that if added to the park would be more permanent protection.

I think considerations of water (stormwater runoff, erosion, stream alteration, etc.) should be included. Also wondering why sensitive plants aren't a consideration? I realize there are many areas of NR that could be included, but these seem key HNTB: We are calculating cut and fill; not certain where it's going but important to consider and evaluate Great point about the spill disposal sites. If we look regionally there may be projects in need of some fill. The trick will be timing so that when we need to dispose there are areas ready to accept the fill.

Criteria: Wildlife connectivity
Performance Measure: New habitat island generated (acres)

Habitat continuity/performance is an important, albeit harder to quantify, criteria Glad to see connectivity in there

Criteria: Recreational resources
Performance Measure: Number and type of sites / trails affected

new access can be more thoughtfully planned and make it better so that the highway isn't a "wall" for recreation and habitat connectivity both. These two criteria makes sense to me but I'm curious what measuring wildlife connectivity with acres look like. Generating new habitat islands would not guarantee increased wildlife habitat connectivity.

Where are cultural trails included? Caltrans: developed list at other meetings, will share

On recreational access I think everyone's assumption is that the project can mitigate to improve whatever is impacted and leave it better than before Opportunity to create new recreational opportunities / enhance access to this resource

General Comments / Questions

Late coming to this group, playing catch-up. Still have same alts; when will we drill down? Caltrans: hopefully by 3rd series of meetings Hope to get stakeholder buy-in; building tool to help us narrow down What are other groups working on? When will we hear their thoughts? Caltrans: did exact process 4 times; you will all see all whiteboards Will ramp up communication about all 4 working groups Last summer, Huffman mentioned trying to accelerate process Caltrans: this is part of it; could speed up if we eliminate alternatives

Project in 1980s planned with more embankment than excavation; oppty for slides and slips. Started looking for disposal sites right away so were ready when needed That said, big determinant is what's going on with geotechnical Have been drilling for 4 months; haven't heard anything Huge unknown: need the data, might eliminate alts or rise to the top; need that info soon

HNTB: taking longer than expected; still struggling to confirm info, should finish in January Caltrans: won't have complete info until we complete geotech but will consider all information in assessing risks in first two performance measures You're right; geotech will determine footprint Hoping we would be able to identify routes that won't work; hope that will tell us more

Caltrans update on geotech: team has embarked on aggressive investigation as of late September Hoping to complete by January or February "Staggering" breadth of investigation; all hands on deck getting it completed In data collection mode; just starting to interpret Will do laboratory testing, analysis, etc. and then be able to provide info Have been working with consultant team to ensure that every piece of data is correlated to geotech risk Very selective about boring locations Results in early 2021

I appreciate comments on the geotechnical work. Usually projects are designed to balance cut and fill best as possible because hauling stuff off site, especially if it's a long ways away, is very expensive. How does that element work on this project? I was surprised to not see the power line right of way as an alternative given from the aerial it looks like a good cut and fill balance with construction in already logged and reaped areas Caltrans: not an option considered; could be grade issues ICF: interesting observation; must consider if worth quick study to consider maximum grades, component structures There is a lot of undulation along the line. If on east side of ridge, must determine where to cut back to west side

Last Chance Grade Working Group Alternative Workshop 1 - Polling Results

1. Overall Methodology: What is your level of support for the overall process that has been described today?	Highly supportive		Somewhat supportive		Neutral		Somewhat		Do not support		Total #
	%	#	%	#	%	#	%	#	%	#	
Cultural Resources Working Group	33%	2	50%	3	17%	1	0%	0	0%	0	6
Biological Resources Working Group	46%	6	23%	3	31%	4	0%	0	0%	0	13
LCG Partners	100%	6	0%	0	0%	0	0%	0	0%	0	6
Huffman Stakeholder Group	50%	5	40%	4	0%	0	10%	1	0%	0	10

2. Objective: Long-Term Safe, Reliable Roadway - To what degree do you support the revisions as discussed for the Objective: Long-Term Safe, Reliable Roadway?	Highly supportive		Somewhat supportive		Neutral		Somewhat unresponsive		Not supportive - revisions do not address my concerns		Total #
	%	#	%	#	%	#	%	#	%	#	
Cultural Resources Working Group	33%	2	17%	1	50%	3	0%	0	0%	0	6
Biological Resources Working Group	56%	9	25%	4	19%	3	0%	0	0%	0	16
LCG Partners	100%	6	0%	0	0%	0	0%	0	0%	0	6
Huffman Stakeholder Group	33%	3	44%	4	22%	2	0%	0	0%	0	9

3. Objective: Reduce Maintenance Costs - To what degree do you support the revisions as discussed for the Objective: Reduce Maintenance Costs?	Highly supportive		Somewhat supportive		Neutral		Somewhat unresponsive		Not supportive - revisions do not address my concerns		Total #
	%	#	%	#	%	#	%	#	%	#	
Cultural Resources Working Group	33%	2	17%	1	50%	3	0%	0	0%	0	6
Biological Resources Working Group	36%	5	43%	6	21%	3	0%	0	0%	0	14
LCG Partners	100%	6	0%	0	0%	0	0%	0	0%	0	6
Huffman Stakeholder Group	22%	2	33%	3	44%	4	0%	0	0%	0	9

4. Objective: Protect the Economy - To what degree do you support the revisions as discussed for the Objective: Protect the Economy?	Highly supportive		Somewhat supportive		Neutral		Somewhat unresponsive		Not supportive - revisions do not address my concerns		Total #
	%	#	%	#	%	#	%	#	%	#	
Cultural Resources Working Group	0%	0	50%	3	50%	3	0%	0	0%	0	6
Biological Resources Working Group	21%	3	50%	7	29%	4	0%	0	0%	0	14
LCG Partners	100%	6	0%	0	0%	0	0%	0	0%	0	6
Huffman Stakeholder Group	25%	2	50%	4	13%	1	13%	1	0%	0	8

5. Objective: Protect Natural Resources - To what degree do you support the revisions as discussed for the Objective: Protect Natural Resources?	Highly supportive		Somewhat supportive		Neutral		Somewhat unsupportive		Not supportive - revisions do not address my concerns		Total #
	%	#	%	#	%	#	%	#	%	#	
Cultural Resources Working Group	0%	0	50%	3	50%	3	0%	0	0%	0	6
Biological Resources Working Group	27%	4	47%	7	27%	4	0%	0	0%	0	15
LCG Partners	100%	6	0%	0	0%	0	0%	0	0%	0	6
Huffman Stakeholder Group	38%	3	25%	2	38%	3	0%	0	0%	0	8

6. Objective: Protect Cultural Resources - To what degree do you support the revisions as discussed for the Objective: Protect Cultural Resources?	Highly supportive		Somewhat supportive		Neutral		Somewhat unsupportive		Not supportive - revisions do not address my concerns		Total #
	%	#	%	#	%	#	%	#	%	#	
Cultural Resources Working Group	0%	0	100%	6	0%	0	0%	0	0%	0	6
Biological Resources Working Group	33%	4	33%	4	33%	4	0%	0	0%	0	12
LCG Partners	100%	6	0%	0	0%	0	0%	0	0%	0	6
Huffman Stakeholder Group	63%	5	0%	0	38%	3	0%	0	0%	0	8

B2. Workshop 2

Last Chance Grade Permanent Restoration Project Alternatives Analysis Methodology Workshop #2 Summary of Results

Submittal #029
April 2021



EA# 01-0F280
Project EFIS# 0115000099
Del Norte County, U.S. 101,
PM 12.0/15.5



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Appendices

- A: Workshop Agenda and Presentation
- B: Alternatives Analysis Process – Additional Information
- C: Workshop Attendance, Polling, and Whiteboard Results

I. Introduction

Workshop Purpose and Format

The Last Chance Grade (LCG) Permanent Restoration Project is a project proposed by the California Department of Transportation (Caltrans) to find a permanent solution to the instability and roadway failure on a 3-mile segment of U.S. Highway 101 in Del Norte County. As part of the process in selecting a safe and reliable long-term solution to this problem, Caltrans is conducting an alternatives analysis to determine if any of the seven build alternatives can be eliminated from further study. An alternatives analysis tool is being developed based on criteria and performance measures for the project's major objectives, which include providing a long-term safe and reliable roadway, reducing maintenance costs, and protecting the economy and natural and cultural resources.

Caltrans is hosting a series of workshops to solicit and refine LCG stakeholder input on the methodology and criteria. The purpose of each round of workshops is as follows:

- **Workshop Round 1:** Present initial alternatives analysis methodology and obtain initial stakeholder input. Based on stakeholder input, consider data needed to achieve each metric, determine whether another metric could serve as a proxy, or if the metric is useful in differentiating one alternative from another.
- **Workshop Round 2:** Discuss initial alternatives analysis results and recommended alternatives for further study using refined methodology and criteria. Assess further refinements to methodology and criteria based on stakeholder input.
- **Workshop Round 3:** Share the results of the final alternative analysis results and alternatives for further study completed using the refined criteria and methodology.

The structure of the process was to conduct the same workshop with each of the four working groups. These groups include:

- Cultural Resources Working Group: Members have responsibilities for cultural resources management.
- Biological Resources Working Group: Members have responsibilities for natural resource management and permitting.
- Last Chance Grade Partners: Members have land ownership and land management responsibilities.
- Congressman Huffman's Stakeholder Group: Members include representatives from local governments, tribal groups, businesses, agencies, and environmental groups who provide feedback to all the partners involved.

The first workshop of this series was conducted with each of the four working groups between December 14 and 17, 2020. Participants identified the metrics of greatest importance and identified additional metrics for consideration. The results of the workshops were documented in a summary report, dated February 2021, that was provided to workshop participants.

During the second round of workshops, which was again conducted with each of the four working groups between March 1 and 4, 2021, the project team presented the results of the

initial alternatives analysis using the refined methodology based on stakeholder input, an assessment of each alternative, and solicited stakeholder input on these results.

Workshop 3 will be scheduled in April 2021 and will most likely be convened as one workshop for all four working groups.

Some organizations are members of more than one working group and were welcome to participate in multiple meetings; however, if they were limited on time, they were encouraged to choose the group(s) in which they'd most like to share their views.

The workshops, three of which were held via Zoom and one using Webex, were designed to be interactive. Participants viewed a presentation (Appendix A) on the alternatives analysis process, purpose, and timeline, the value of screening alternatives prior to further study, highlights of the findings from Workshop 1, and preliminary results of the alternatives assessment.

The presentation explained the process whereby the alternatives were assessed. The analysis criteria and performance metrics were refined and grouped into categories based on stakeholder input during the initial round of workshops. These categories included:

- Core factors identified as most important across all working groups. These included major trees including old growth redwoods, construction costs, and mitigation costs, and were weighted most heavily in the analysis.
- Operational factors: road closure potential and cost to maintain
- Construction factors: time to construct, cut and fill amounts, etc.
- Natural resource factors: impacts on animals, vegetation, and waters

It should be noted that that two types of criteria and performance metrics were removed from consideration as part of the assessment tool. Metrics related to cultural resources were removed since the suggested metrics did not appropriately describe the resources and the resources will be discussed in greater detail during direct communications with Native American tribes in the area. There is also close alignment of cultural resources and natural resources. The performance metrics related to the risk of litigation were also removed. The project team found the metrics were highly speculative and did not speak to impacts which is the focus of the current assessment.

The Project Team developed numeric-based metrics and identified high, medium, and low risk ranges with corresponding color-coding in red, yellow, and green. The lowest scores, coded green, were considered most desirable in terms of each of the metrics. The performance of each alternative was assessed based on the metrics and assigned weighting. The team also varied the assigned weights for the metrics and tested the results to demonstrate how weighting variations could change the score. However, in several scenarios tested, while the scoring changed, the rank order by performance did not. Of the seven build scenarios currently under

consideration, Alternatives F and X consistently ranked highest; the A1 and A2 alternatives ranked strong in terms of operational factors but in the middle of the pack for all other factors; and Alternatives G1 and G2 consistently ranked low.

For more information on the alternatives, see the presentation reproduced in Appendix A. The proposed alignment maps and matrix showing how scores were assigned based on various combinations of factors and information on how the criteria were assessed are included in Appendix B.

The team demonstrated that based on the evaluation matrix, alternatives X and F scored higher and were likely to be carried forward for further study and the other alternatives dropped from consideration.

Upon stakeholder request, the project team provided more detailed information regarding the assessment process and results, including: how the criteria and performance metrics were refined; details regarding data collection methods; specific examples of how weighting variations would affect the results; maps showing construction and resource impact footprints for the different alternatives; and a chart comparing estimated tree removal counts by type for each of the alternatives.

Following the presentation, participants were asked to provide feedback, as well as ask any questions they might have regarding the alternatives assessment process and preliminary results.

Participants used the videoconferencing chat feature and spoken discussion to provide input. Their comments, along with information from the project team in response to their questions, were recorded on a digital whiteboard (Appendix B). Note that project information as represented in the digital whiteboard comments is not necessarily complete or presented with full context; it is intended to show the types of questions and comments shared and include a summarized record of the project team's responses to stakeholder questions and comments.

Following the discussion, participants were asked to identify their level of support for the alternatives assessment process and recommendations as discussed. Options for levels of support included: highly supportive, somewhat supportive, neutral, somewhat unsupportive, or do not support. It was emphasized that this was not intended to be a binding vote, but simply a way to get a sense of the general level of support for the process as discussed. The polling results are also included in Appendix B.

-  RUDISILL ROAD TO LCG TUNNEL
-  RUDISILL ROAD TO DAMNATION TRAILHEAD
-  RETREAT FROM RUDISILL ROAD TO LCG TUNNEL
-  RETREAT FROM RUDISILL ROAD TO DAMNATION TRAILHEAD
-  LCG TUNNEL PARALLEL TO EXISTING ALIGNMENT
-  UPSLOPE REALIGNMENT
-  ON ALIGNMENT IMPROVEMENTS

Workshop Attendance

In addition to Caltrans District 1 and project team staff, the following organizations were represented at the four workshops:

<p>Cultural Resources Working Group</p> <ul style="list-style-type: none"> ▪ California State Parks ▪ Elk Valley Rancheria ▪ Redwood National and State Parks ▪ Resighini Rancheria ▪ Tolowa Dee-Ni' Nation ▪ Tolowa Nation 	<p>Partner Working Group</p> <ul style="list-style-type: none"> ▪ California State Parks ▪ Elk Valley Rancheria ▪ Redwood National and State Parks ▪ Tolowa Dee-Ni' Nation
<p>Biological Resources Working Group</p> <ul style="list-style-type: none"> ▪ California Coastal Commission ▪ California State Parks ▪ National Park Service ▪ Resighini Rancheria ▪ State Water Resources Control Board ▪ US Army Corps of Engineers ▪ US Environmental Protection Agency ▪ US Fish and Wildlife Service 	<p>Huffman Stakeholder Group</p> <ul style="list-style-type: none"> ▪ California State Parks ▪ Crescent City ▪ Crescent City-Del Norte Chamber of Commerce ▪ Del Norte County Board of Supervisors ▪ Del Norte Local Transportation Commission ▪ Environmental Protection Information Center (EPIC) ▪ Friends of Del Norte ▪ Green Diamond Resource Company ▪ Humboldt County Association of Governments ▪ Humboldt County Board of Supervisors ▪ Office of Representative Jared Huffman ▪ Redwood National and State Parks ▪ Resighini Rancheria

II. Key Findings

A. Results of the Alternatives Analysis

The following summarizes the preliminary results of the alternatives assessment that was shared with the participants.

The initial application of the criteria and performance metrics yielded the following assessment of each of the alternatives. The Project Team developed numeric metrics and identified ranges (high, medium, and low) with corresponding colors red, yellow, and green. High scores correlated with high impacts and were coded red. Scores in the medium range were coded yellow and low scores, considered most desirable, were coded green.

The project team assessed the performance of each alternative. The team also assigned weights and tested the results to demonstrate how weighting could influence the final score. The team looked at a variety of scenarios that changed the final scores but there were few modifications that resulted in a change in the rankings. The alternatives are listed in rank order of performance from lowest (or best performing) to highest (or worst performing).

Alternative X – Re-Engineering along Generally Current Alignment

Alternative X was developed at the request of the Federal Highway Administration (FHWA). FHWA wanted to make sure that Caltrans had given full consideration to a holistic effort to reengineer a roadway generally along the current alignment to increase long-term stability through large-scale dewatering, walls and other structures, terracing, alignment retreat in specific locations and other improvements. To date, most repairs and improvements made to Last Chance Grade have been in reaction to earth movement. Alternative X had positive performance on most of the criteria and performance metrics. For example, Alternative X has by far the lowest construction cost and the smallest project footprint, limiting potential impacts. However, Alternative X performed relatively poorly on the operations metrics, eliciting concerns from some working group participants. Caltrans responded to such concerns by noting its successful implementation of dewatering activities at other locations and intention to further develop and refine this alternative prior to the environmental document.

Alternative F – LCG Tunnel

Alternative F includes approximately one mile of tunnel that runs generally parallel to the existing alignment to greatly reduce potential impacts to natural and cultural resources including old growth trees. Limited geotechnical studies support the feasibility of this alternative. While Alternative F is the second highest cost alternative (scoring poorly), Alternative F has lower resource and construction impacts and performs well on operation metrics. Alternative F's relatively lower environmental impacts also correlate with reduced mitigation costs.

Alternative L – Upslope Realignment

Alternative L is an alignment that would be located upslope of the existing roadway. The intention of Alternative L was to achieve a higher level of stability relative to the existing roadway. Recent geotechnical analysis revealed unanticipated results that the desired level of stability would likely not be achieved. The poor performance on the related metrics, along with the substantial impacts created by cutting a new path through current park land, resulted in a higher than expected score on this alternative and potential for it to be removed from consideration. While no formal decision was made, there were no voiced objections to removing Alternative L from further study.

Alternatives A – East Side Realignment (A1 Short Tunnel, A2 Long Bridge)

A1 and A2 go to the east of the ridge above Last Chance Landslides. A1 includes a short section of tunnel to rejoin US 101 on the north and A2 includes a long bridge to rejoin US 101 on the north. Both have significant cuts and fills creating a very large footprint that would require significant soil disposal and other construction impacts, which strongly impact environmental resources. While A1 performs well on operations, A1 is mostly located in current park land resulting in poor scores in related metrics. There were no voiced objections to removing the A alternatives from further study.

Alternatives G – West Side Realignment (G1 Short Tunnel, G2 Long Bridge)

Alternatives G1 and G2 are just east of the ridge above the Last Chance Grade Landslides in Redwood National Park and Del Norte Coast Redwood State Park. These were the two lowest performing alternatives across all metrics. Like alternatives A1 and A2, these have a large project footprint and thus substantial construction impacts. G1 and G2 were consistently scored medium and high in the metrics; the alternatives did not receive a "green" rating on any of the

performance metrics. There were no objections voiced in response to a suggestion to drop the two alternatives from further consideration.

B. Overall Assessment Process

A summary of stakeholders' comments from across the four workshops is provided below. The project team will consider all comments received in preparation for the final workshop.

Participants were largely satisfied with the detail included in the analysis and expressed confidence or satisfaction with the analysis process. Some expressed their appreciation for the rigor used in the process and how clearly it was explained during the workshop. Some found the maps and charts very useful, adding considerably to their understanding of the impacts and footprints of each alternative and their ability to provide useful feedback. Some participants were surprised by the initial results, but the explanation and additional information led to a change of opinion regarding the perceived impacts of particular alternatives.

- There were requests for more detailed information, including:
 - A complete summary of the information in the preliminary analysis;
 - Maps that clearly show the position of the most likely alternatives and associated structures, as well as potential new edges;
 - An overall timeline of the project including what studies are ongoing and which are scheduled to begin soon;
 - More specific information regarding natural resources metrics and mitigation (see below); and
 - A copy of the analyses and presentation slides.
- Overall, participants supported reducing the list of alternatives to be studied to increase efficiency, decrease costs and lessen the time needed for analyses. However, they noted the importance of including an analysis of the alternatives eliminated from further study in the environmental document. This will help clarify to the public why they are no longer being studied / considered, as well as satisfying the requirements of some permit evaluation processes.
- Although most felt that the rankings of the alternatives were consistent with their expectations, some were surprised that various alternatives ranked either higher or lower than they expected.
- Comments and questions about the metrical analysis and ranking process included:
 - It is important to note the concerns expressed even when they did not change the score for the metrics or alternatives.
 - Did any of the scoring take engineering feasibility into account?
 - How did climate change resiliency – specifically, planning for extreme weather events – figure into these metrics?
- Working Group participants responded positively to a proposal by Caltrans that Workshop 3 should be convened as one large meeting rather than four separate stakeholder group meetings. They also asked that information used in the alternatives analysis process be sent to all working group members.

- Participants expressed their appreciation for Caltrans' ongoing work to identify a long-term solution while keeping the current road open during landslide repairs. Several noted that they find Caltrans very open to stakeholder input and appreciate their willingness to provide project information. They appreciate the dialogue between stakeholders with a variety of perspectives and consider that reducing the alternatives to be studied to a manageable number is a great accomplishment.

C. Comments on Specific Metrics

Operations

- Some participants elevated the importance of operations as a metric, especially given closures due to the recent rock and landslides, emphasizing that the entire purpose of the project is to keep the road open and safe. Although there was agreement that it is crucial to avoid or mitigate impacts to the environment, they questioned whether the risk of road closure should be considered among the core factors and/or weighted more heavily.

Cultural Resources

- Participants expressed some concern that cultural resources were eliminated as a metric because those resources are an important consideration in the selection of an alternative. They were pleased that the project team considers these resources to be a key concern and will present detailed information for discussion at tribal council meetings, as well as performing ethnographic interviews with tribes, in the very near future. Tribal input is paramount in the consideration of impacts to cultural resources.
- Tribal participants explained that natural resources and cultural resources overlap, even though the law defines them separately. Some stakeholders were curious to know whether the value of natural resources metrics would be increased if their cultural value were integrated.
- It was appreciated that traditional cultural properties and gathering areas were mentioned, since resources of significance include more than those discovered through archeological activities. The value of cultural resources cannot be determined by prioritizing them based on the number or location of artifacts or other specific metrics.
- It is an ongoing challenge to share cultural knowledge with young people given the loss of access to resources caused by growing population and other existing impacts. It is therefore crucial to avoid further impacts as much as possible.
- Recommendations for providing information to tribal councils included:
 - Provide a breakdown of details for the natural resource metrics.
 - Visuals such as maps are very helpful; they should include topographic and landscape details to clarify how the alternatives are situated in the landscape.
 - For tribal council presentations only, document the general location of tribal cultural resources on maps.
 - Information should be sent out prior to the council meetings.
 - Operational measures must also be discussed as closures have had a profound impact on tribal government.

Natural Resources

- Concerns and questions expressed regarding impacts to trees included:
 - Knowing approximately how many trees are likely to be removed per alternative will help stakeholders give better feedback on the assessments.
 - Trees should be documented regardless of size as they are still valuable resources—both natural and cultural.
 - People were curious to know whether trees come down during slides, rather than just resulting from construction impacts. The video of trees sliding down the ridge during the current slide was a great illustration that trees are indeed impacted by landslides.
 - Heavy winds often create blow-overs after logging. Has the possibility of blow-overs on the ridgeline or new edges created by construction been considered among the impacts?
- Other natural resources related concerns and questions included:
 - Have the impacts of the alternatives on all animals been considered, studied and documented?
 - Is there any flat land that could be offered as a new state park or other recreational asset, possibly as a source of revenue?

Mitigation

- Stakeholders wanted to know more about Caltrans' plans for mitigation, including methods, locations, and costs. Specific questions included:
 - Were construction costs weighted similarly to an equivalent amount in mitigation costs?
 - Were the number of acres considered in relation to the cost of mitigation?
 - Is Caltrans considering the acquisition of offsite lands to assist in mitigation, and have those costs been factored into the analysis?

D. Highest Ranking Alternatives

Stakeholders were generally comfortable with the designation of alternatives X and F as the highest ranking, particularly because they seem the least impactful. While many were satisfied with the recommendation to limit further study to these two alternatives, some concern was expressed for limiting further study to only two build alternatives, especially given doubts about Alternative X and whether these two alternatives will be accepted by the public (see below for more details).

Alternative X

- Stakeholders requested a better understanding of Alternative X, including:
 - How distinct is this alternative from the current alignment; what distinguishes it from simply continuing to repair the current road?
 - How long it will take to obtain additional data to assess its feasibility and compare it to the better studied alternatives?
 - How well does it perform in terms of the operations metrics? Will it require closing the roadway during construction?

- If dewatering is potential mitigation for slope instability, should it be part of the ongoing process of road repair already? How does dewatering affect erosion and does it lower the risk of slope instability?
- Do the estimated costs for alternative X include funding for current repairs?
- Some were uncomfortable with the high ranking of Alternative X and that all but one other build alternative may be eliminated from study without knowing whether X is feasible. It may be difficult to get popular support for this option because many people are frustrated with the never-ending repairs on the existing road, and have difficulty believing that Alternative X is different from just continuing to fix the existing road. It is likely that many will object to anything being done on the current alignment.
- Information provided in the workshop makes the distinction clear and clarifies why Alternative X is being considered, but this needs to be carefully explained to stakeholders and the broader public. Recommendations for doing so include:
 - Present X with well-considered messaging. Characterize it as a proactive, holistic, global solution that addresses root causes, and emphasize that it is a new build. Focus on the lack of tree impacts and cost savings from discontinuing study of the alternatives with much larger footprints.
 - Present the alternatives that are top performers first and those that perform less well last.
 - Use visuals to convey the message, such as an aerial view with an outline to give a better idea of how it will look that can be played on a loop at the opening of meetings.
 - If people call for bringing the “A” alternatives back online for study, be prepared to clarify how they perform less well as demonstrated by metrics. Demonstrate that they provide no more advantage for the larger cost and impacts.

Alternative F

- Some were surprised by the high ranking of Alternative F, and that its cost and impacts were lower than expected; many expected it to be recommended for elimination from study. Satisfaction was expressed that it ranked high given its comparatively low impacts and good performance on operations metrics.
- Concerns and questions included:
 - Has Alternative F been determined to be viable, given the geotechnical and safety concerns? Curious to know what kept it in consideration.
 - How far underground will the tunnel be in relation to the forested landscape (both surface and roots)?
 - What is the extent of tree impacts at the tunnel portals?
 - Has a bike lane been considered in the tunnel?
- Suggestion that many members of the public are not in favor of this alternative. Public comfort with the alternative may include:
 - Explain that more certainty has been gained about the stability of the tunnel due to completed and ongoing studies; note how it reduces impacts on the surface.

- Consider using music or sound effects in the tunnel to help relieve stress and claustrophobia (e.g., I-5 bridge outside Eugene which plays a melody as you cross).
- Turn the tunnel into an amenity through the addition of art installations or other features.

E. Lower Ranking Alternatives

Alternatives A1 and A2

- Stakeholders were mostly satisfied with the idea of removing these alternatives from further study, given their large footprints, significant construction and natural resource impacts, and overlap with tribal lands.

Alternative L

- Some stakeholders were surprised that L did not rank more highly. They had hoped that its location upslope from the current alignment would provide more geologic stability. They had not understood that L has an entirely new footprint and would have significant natural resource impacts, including a large number of old growth redwoods.

Alternatives G1 and G2

- Stakeholders agreed that eliminating the G alternatives from further study or consideration is logical based on the analysis and prior discussion. They do not seem viable due to their large scale, high impacts, and poor performance in the metrical analysis.

III. General Findings

Participant comments and feedback from the four workshops indicated there was general support for the criteria and performance metrics used and the rigor of the analysis applied to the assessment that identified Alternative X and F as the two highest performing. Given the substantial difference in performance between X and F and the remaining alternatives, participants appeared open to the recommendation to drop the other five alternatives from further study. There was concern voiced related to studying X given the history of the roadway, current slide activity and little information known about its viability. Should X prove not to be viable, the process would have only one build alternative which features a tunnel.

IV. Polling on Level of Support

Before the close of each meeting, participants were asked to identify their level of support for the refined criteria and initial alternatives assessment. The polling was not considered a binding vote but was intended as feedback on the direction provided to the project team.

The level of support for the overall process as described was neutral or greater across all four workshops, except for a single “somewhat unsupportive” response from Congressman Huffman’s Stakeholder Working Group. There were no responses of “do not support.” The Cultural Resources Working Group had the highest percentage of those who were neutral (43%); in all other groups, the percentage of those who were either highly or somewhat supportive was greater than the percentage of those who were neutral. The highest level of

agreement was among members of the LCG Partners Working Group, with 100% highly supportive.

When asked to comment on responses that were less than supportive, stakeholders replied as follows:

- So much of the discussion, particularly in relation to cultural resources, rests on tribal input rather than on metrical analysis.
- As a relative newcomer to the group, currently just listening and learning.

Appendix A: Workshop Materials



Alternatives Analysis Methodology – Workshop #2

Cultural Resources Working Group

Monday, March 1, 2021

10:00 a.m. – 12:00 p.m.

Biological Resources Working Group

Tuesday, March 2, 2021

3:00 p.m. – 5:00 p.m.

Partner Working Group

Wednesday, March 3, 2021

3:00 p.m. – 5:00 p.m.

Huffman Stakeholder Group

Thursday, March 4, 2021

3:00 p.m. – 5:00 p.m.

Workshop Objectives:

- Review how the results from Workshop #1 were integrated into the process of the alternatives analysis.
- Get agreement on the process for evaluating the alternatives.
- Get agreement on the results of the assessment and the alternatives to be fully studied.

Topic	Speaker	Discussion Tool
Welcome and Agenda Review	Jaime Matteoli, Caltrans Joan Chaplick, MIG	Chat and Raise Hands
Highlights of the findings from Alternatives Analysis Workshop #1	Joan Chaplick, MIG	Chat and Raise Hands
Overview of revisions to the criteria and performance metrics	Dina Potter, HNTB John Cook, ICF	Chat and Raise Hands
Presentation and discussion of the initial application of criteria and performance metrics	John Cook, ICF Joan Chaplick, MIG All participants	Chat and Raise Hands
Level of Support for Process to Date	Joan Chaplick, MIG All participants	Polling, Chat and Raise Hands
Next Steps and Closing Comments	Jaime Matteoli	Chat and Raise Hands





Virtual participation on Zoom

1 Audio & Video

Computer

- Use the toolbar

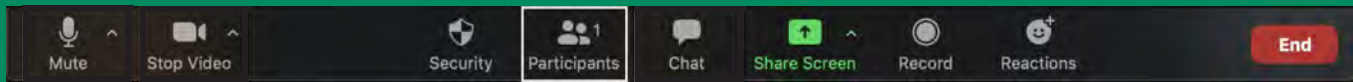
Phone

- Access dial-in number
- Use *9 to raise hand

2 Chat

- Click on the chat and type your comments and questions
- We'll take comments throughout the workshop

Virtual participation on Zoom



Participants

- Select icon on the toolbar to open the participants' window
- Select 'Raise Hand' button



Purpose



Purpose of the Alternatives Analysis

- Assess the alternatives and advance those that best meet the project objectives to be further studied in the environmental document

Purpose of Today's Workshop

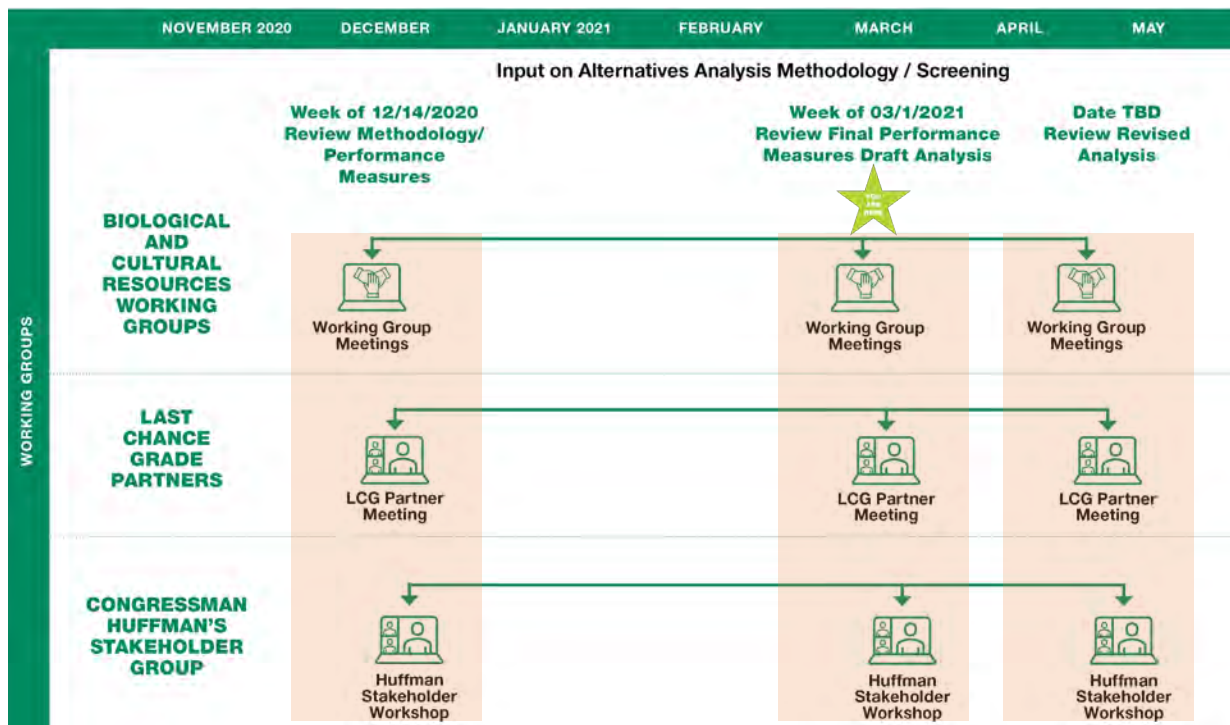
- Get agreement on how the alternatives are assessed by providing input on the criteria and performance measures and potential weighting
- Review and discuss the results of the assessment
- **Explore the best alternatives** to carry forward into the environmental document

Value of Screening Alternatives



- Save time and resources – reduce footprint to be studied and cost of studies, select final alternative sooner
- Reduces extent of ground-disturbing studies
- Recognize alternatives that don't perform well when assessed based on these metrics
- Design and study resources go further, allowing for more in-depth work
- Provides higher level of certainty, lowered risk of schedule delay

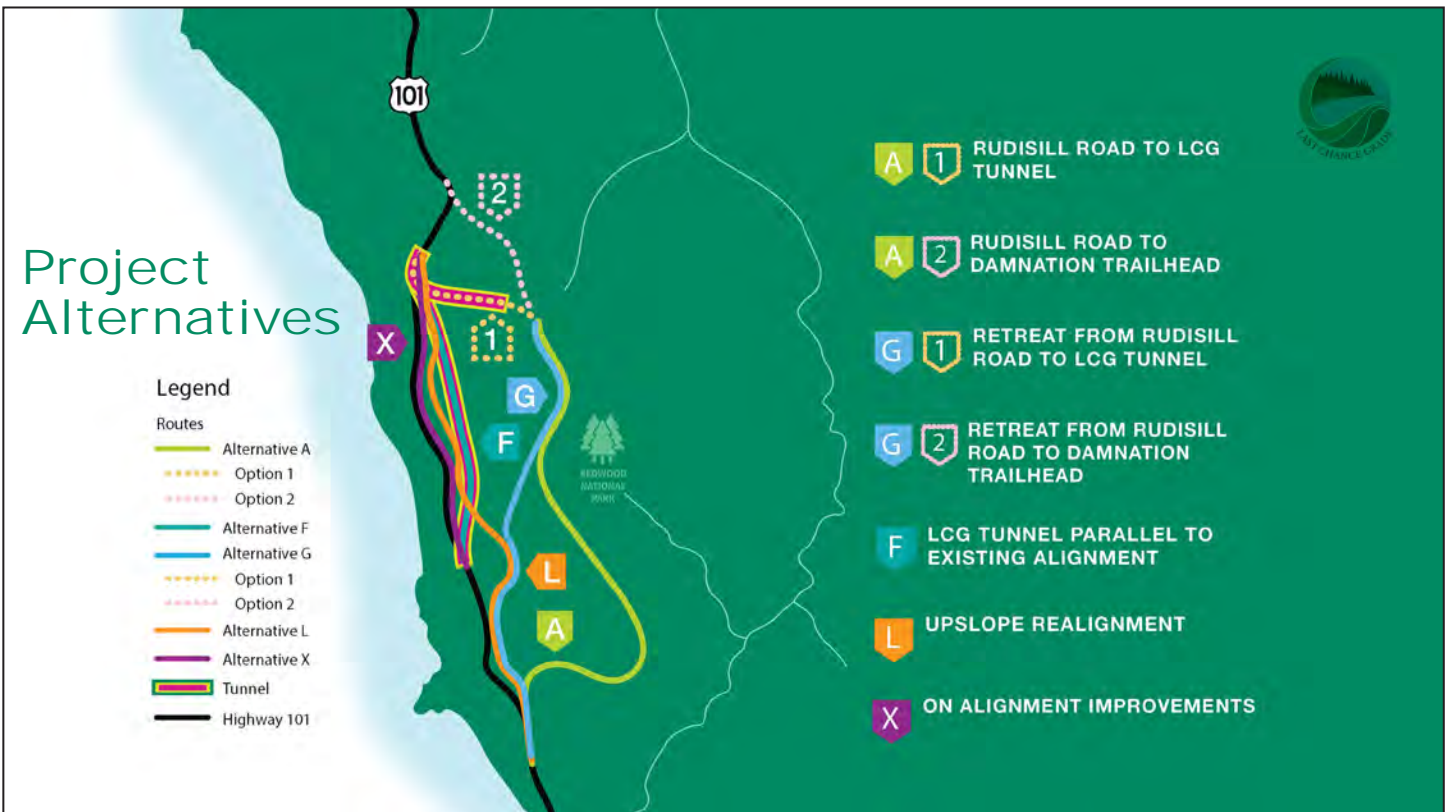
Alternatives Analysis Process



Agenda



- Highlights of the Findings from Workshop #1
- Revisions to the Criteria and Performance Metrics
- Discussion of the Results of the Initial Application of the Criteria & Performance Metrics
- Levels of Support for Process to Date
- Next Steps and Closing Comments





Workshop 1

Highlights of Findings

Highlights of Results of Workshop #1



- Assessed five objectives, 11 criteria with 16 performance measures
- Identified the core factors that seemed most important across groups
- Removed criteria and performance metrics related to cultural resources
- Removed litigation as a performance metric; focus of assessment is impacts
- Refined and added metrics related to natural resources



Preliminary Results of Alternatives Assessment

Preliminary Results of Alternatives Assessment



- F and X rise to the top when looking at **all** factors
 - F consistently ranks in top 2
 - X strong except in Operations
- G Alternatives consistently rank low
- A Alts rank strong in Operations but middle of pack for all other factors

- Core Factors (Major Trees, Construction Costs, Mitigation Cost)

X	L	F	A1	A2	G1	G2
1	3	2	3	3	7	3

- Operational Factors (Road Closure Potential, Cost to Maintain)

X	L	F	A1	A2	G1	G2
6	6	1	1	1	4	4

- Construction Factors (Time to Construct, Cut and Fill, etc)

X	L	F	A1	A2	G1	G2
2	3	1	5	3	5	5

- Natural Resource Factors (Animals, Vegetation, Waters)

X	L	F	A1	A2	G1	G2
2	3	1	4	4	6	6

- All Factors Together

X	L	F	A1	A2	G1	G2
2	5	1	4	3	7	6



Discussion

Polling on Overall Process in Today's Workshop



- *The poll is anonymous and is not a binding vote. It is intended as a way to gauge general support for the process that has been discussed.*
- What is your level of support for the alternatives assessment process as discussed today?
 - Highly supportive
 - Somewhat supportive
 - Neutral
 - Somewhat unsupportive
 - Do not support

Next Steps and Next Meeting



- Meeting format is being replicated with all four groups
- Project Team will collectively review feedback and update the analysis
- Project Team will recommend to the groups the alternatives that will be included in the impact analysis
- Project Team will seek agreement with the groups on the alternatives

LAST CHANCE GRADE

Alternatives Analysis Methodology
Workshop 2

March 2021



How We Responded to the Comments and Requested Revisions



- Looked at the availability of the data
- Considered if the requested data is needed now (at the alternatives stage) or would it be more definitive during the impact analysis
- Looked at the criteria and metrics in the context of other metrics- collectively what do they tell us about the alternative

Methodology

- Working Group feedback informed:

- Refinements/Additions to factors

- Grouping of factors

- Core Factors

Cost to construct, millions	X	L	F	A1	A2	G1	G2
Weighted Score	\$220	\$360	\$930	\$1,078	\$690	\$880	\$520
Cost to Construct Score	1	1	5	5	3	5	3

- Weighting of Factors

- Scoring System

- Core Factors: weighted most heavily (5 out of 5)

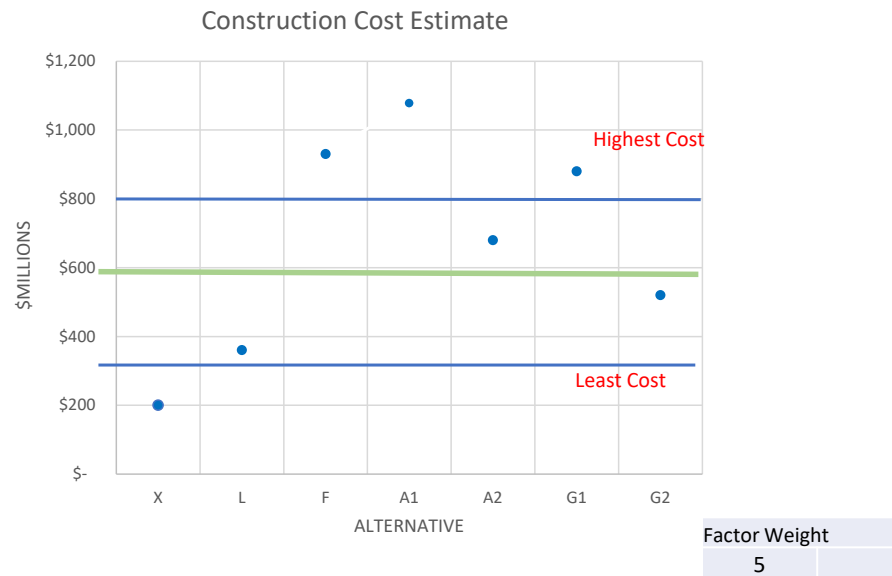
- Others: Weights assigned by staff, based on Working Group feedback

Core Factors

- Trees - Areas predominantly:
 - Redwoods
 - Old Growth
 - Mature (Slide Compromised)
 - Green Diamond Marbled Murrelet preserve area
 - Other Mature Conifers
- Cost to build
- Cost to mitigate

Example: Cost to Construct

- District 1 identified Construction Cost as one of many important performance measures
- Working Group Round 1 Meetings – broad agreement cost is “make or break”
- District 1 elevated cost to a “Core Factor”
- Scoring/Weighting
 - **Score**
 - Costs for each alternative compared against each other
 - **Lowest** cost → Lowest (best) score (1 on scale of 1 to 5)
 - **Middle** Cost → 3 on scale of 1-5
 - **Highest** cost → Highest (worst) score (5 on scale of 1 to 5)
 - **Weight**
 - “Core Factors” have heaviest possible weight (5 on scale of 1 to 5)
 - **Weighted Score** = Score X Weight
 - Best Possible = 5
 - Worst Possible = 25



	X	L	F	A1	A2	G1	G2
Cost to construct, millions	\$220	\$360	\$930	\$1,078	\$690	\$880	\$520
Score	1	1	5	5	3	5	3
Weighted Score	5	5	25	25	15	25	15

Alternatives Ranking Matrix

CORE FACTORS	X	L	F	A1	A2	G1	G2	Factor Weight	Equalized Factor Weight
Trees (Sum of all Redwoods (incl GDRC MAMU Preserve) + Other Mature Conifers - acres)	13.9	72.5	1.6	2.3	4.7	4.9	7.2	5	3
Weight	3	5	1	1	3	3	3		
<i>Tree Score (Weight Score X Factor Weight)</i>	15	25	5	5	15	15	15		
Cost to construct, millions	\$220	\$360	\$930	\$1,078	\$690	\$880	\$520	5	3
Weighted Score	1	1	5	5	3	5	3		
Cost to Construct Score	5	5	25	25	15	25	15		
Cost of Mitigation	Medium	Very High	Medium	Very High	Very High	Very High	Very High	5	3
Weight	3	5	3	5	5	5	5		
Cost of Mitigation Score	15	25	15	25	25	25	25		
Total Score, Core Factors	35	55	45	55	55	65	55		
<i>Best Possible Core Factors Score</i>									
	15								
<i>Worst Possible Core Factors Score</i>									
	75								
Ranking, Just the Core Factors	1	3	2	3	3	7	3		

Key:

Green / low number - Best; Red / high number - Worst

GDRC = Green Diamond Resource Company

MAMU = marbeled murrelet (protected species)

Alternatives Ranking Matrix, Page 2

OPERATIONAL FACTORS	X	L	F	A1	A2	G1	G2	Factor Weight	Equalized Factor Weight
Road Closure Potential	H	H	L	L	L	M	M	4	3
Weight	5	5	1	1	1	3	3		
Road Closure Potential Score	20	20	4	4	4	12	12		
Cost to maintain (relative to existing)	H	H	L	L	L	M	M	1	3
Weight	5	5	1	1	1	3	3		
Cost to maintain Score	5	5	1	1	1	3	3		
Traffic Mobility	H	H	L	L	L	M	M	3	3
Weight	5	5	1	1	1	3	3		
Traffic Mobility Score	15	15	3	3	3	9	9		
	X	L	F	A1	A2	G1	G2		
Total Score, Operational Factors	40	40	8	8	8	24	24		
<i>Best Possible Operational Score</i>									
	8								
<i>Worst Possible Operational Score</i>									
	40								
Ranking, Just Operational Factors	6	6	1	1	1	4	4		

Key:

Green / low number - Best; Red / high number - Worst

Alternatives Ranking Matrix, Page 3

CONSTRUCTION FACTORS	X	L	F	A1	A2	G1	G2	Factor Weight	Equalized Factor Weight
Footprint Size (acres)	35.7	167.5	15.4	359.9	371.6	348.7	359.5	4	3
Weight	1	3	1	5	5	5	5		
Footprint Size Score	4	12	4	20	20	20	20		
Time to Construct (years)	3.5	3.5	7	5	3	5	3	3	3
Weight	3	3	3	3	3	3	3		
Time to Construct score	9	9	9	9	9	9	9		
CY of cut/fill deposited within project area	0	0	0	6.8M	7.1M	5.6M	5.9M	4	3
Weight	1	1	1	5	5	5	5		
CY cut/fill deposited on site score	4	4	4	20	20	20	20		
CY of cut/fill to be deposited offsite	400K	2.4M	650K	0	0	0	0	4	3
Weight	3	5	3	1	1	1	1		
CY cut/fill deposited off site score	12	20	12	4	4	4	4		
Trail Relocation Potential (number of trail intersections)	3	7	2	4	2	3	3	2	3
Weight	3	5	1	3	1	3	3		
Trail Relocation Score	6	10	2	6	2	6	6		
Total Score, Construction Factors	35	55	31	59	55	59	59		
<i>Best Possible Construction Score</i>									
	17								
<i>Worst Possible Construction Score</i>									
	85								
Ranking, Just Construction Factors	2	3	1	5	3	5	5		

Key:

Green / low number - Best; Red / high number - Worst

CY = Cubic yards

Alternatives Ranking Matrix, Page 4

NATURAL FACTORS	X	L	F	A1	A2	G1	G2	Factor Weight	Equalized Factor Weight
Other Vegetation-Related Natural Factors (Excludes Redwoods and Mature Conifers - see Core Issues)									
Red Alder (Parks + GDRC)	12.3	61.1	8.0	69.4	69.4	102.9	103.2	3	3
Weight	1	3	1	3	3	5	5		
Red Alder Score	3	9	3	9	9	15	15		
Coastal Scrub/Grassland (Parks + GDRC)	2.5	19.7	0.5	6.0	6.0	23.2	23.4	3	3
Weight	1	5	1	1	1	5	5		
Coast Scrub/Grassland	3	15	3	3	3	15	15		
New Edges - Natl + State Parks (miles)	1.4	2.7	1.7	0.8	0.5	2.2	1.9	3	3
Weight	1	5	3	1	1	3	3		
New Edges - Natl + State Parks	3	15	9	3	3	9	9		
New Edges - GDRC	0.0	0.0	0.0	2.2	2.5	1.0	1.3	1	3
Weight	1	1	1	5	5	3	3		
New Edges - GDRC	1	1	1	5	5	3	3		
Other Green Diamond Land (e.g., logged 2000-2010, logged 2010-2020, other conifer young, and young redwood)	0	0	0	273.3	282.9	192	200.2	2	3
Weight	1	1	1	5	5	5	5		
Other Green Diamond Land Score	2	2	2	10	10	10	10		
	X	L	F	A1	A2	G1	G2		
Combined Score, Other Vegetation-Related Natural Factors	12	42	18	30	30	52	52		
Best Possible Other Vegetation Score									
	12								
Worst Possible Other Vegetation Score									
	60								
Vegetation Factors - Ranking	1	5	2	3	3	6	6		

Key:

Green / low number - Best; Red / high number - Worst

GDRC = Green Diamond Resource Company

Alternatives Ranking Matrix, Page 5

NATURAL FACTORS (continued)	X	L	F	A1	A2	G1	G2	Factor Weight	Equalized Factor Weight
Wildlife-Related Natural Factors									
MAMU <i>occupied</i> habitat	0.0	0.0	0.0	0.4	0.4	0.4	0.4	4	3
Weight	1	1	1	1	1	1	1		
MAMU occupied habitat score	4	4	4	4	4	4	4		
MAMU <i>designated critical habitat</i> (acres)	57.2	137.7	13.7	7.60	10.0	54.8	57.1	2	3
Weight	3	5	1	1	1	3	3		
MAMU critical habitat score	6	10	2	2	2	6	6		
Marten <i>Core</i> habitat (acres)	17.2	36.6	2.4	44.70	56.9	46.1	56.2	3	3
Weight	3	3	1	3	3	3	3		
Marten core habitat score	9	9	3	9	9	9	9		
Potential to Disrupt Wildlife Connectivity (Rating)	Low (1.5)	Low (2)	Low (1.0)	High (4.5)	High (5)	High (3.5)	High (4)	3	3
Weight	1	1	1	5	5	5	5		
Wildlife Connectivity Score	3	3	3	15	15	15	15		
NSO suitable habitat (acres)	14.0	72.5	3.9	146.6	152.5	72.6	79.2	4	3
Weight	1	3	1	5	5	3	3		
NSO suitable habitat score	4	12	4	20	20	12	12		
Combined Score, Wildlife-Related Natural Factors	X	L	F	A1	A2	G1	G2		
Best Possible Wildlife Score	26	38	16	50	50	46	46		
16.0									
Worst Possible Wildlife Score									
80									
Ranking: Wildlife Factors	2	3	1	6	6	4	4		

Key:

Green / low number - Best; Red / high number - Worst

MAMU = marbled murrelet (protected species)

NSO = northern spotted owl (protected species)

Alternatives Ranking Matrix, Page 6

NATURAL FACTORS (continued)	X	L	F	A1	A2	G1	G2	Factor Weight	Equalized Factor Weight
Waters-Related Factors									
New Tributary Crossings	0	1	0	7	8	5	7	3	3
Weight	1	1	1	3	3	3	3		
New Tributary Crossings Score	3	3	3	9	9	9	9		
Wilson Creek Watershed disturbance (acres)	1	66.2	4.5	159	177.6	83.6	91.2	1	3
Weight	1	3	1	5	5	3	3		
Wilson Creek watershed disturbance score	1	3	1	5	5	3	3		
	X	L	F	A1	A2	G1	G2		
Combined Natural Factors (Vegetation + Wildlife + Waters)	42	86	38	94	94	110	110		
Best Possible Natural Factors Score									
	32								
Worst Possible Natural Factors Score									
	160								
Ranking: All Natural Factors	2	3	1	4	4	6	6		

Key:

Green / low number - Best; Red / high number - Worst

Alternatives Ranking Matrix, Page 7

	X	L	F	A1	A2	G1	G2
ALL FACTORS COMBINED - WEIGHTED	152	236	122	216	212	258	248
Best Possible Score							
72							
Worst Possible Score							
360	X	L	F	A1	A2	G1	G2
Ranking All Factors Combined, Weighted	2	5	1	4	3	7	6
	X	L	F	A1	A2	G1	G2
ALL FACTORS COMBINED - ALL FACTORS WEIGHTED EQUALLY (3)	147	225	105	207	201	243	237
Best Possible Score							
72							
Worst Possible Score							
360	X	L	F	A1	A2	G1	G2
Ranking: All Factors Equal Weight	2	5	1	4	3	7	6
Core Factors + Natural Factors	77	141	83	149	149	175	165
Best Possible Score							
47.0							
Worst Possible Score							
235							
Ranking: Just Core Factors + Natural Factors	1	3	2	4	4	7	6

Key:

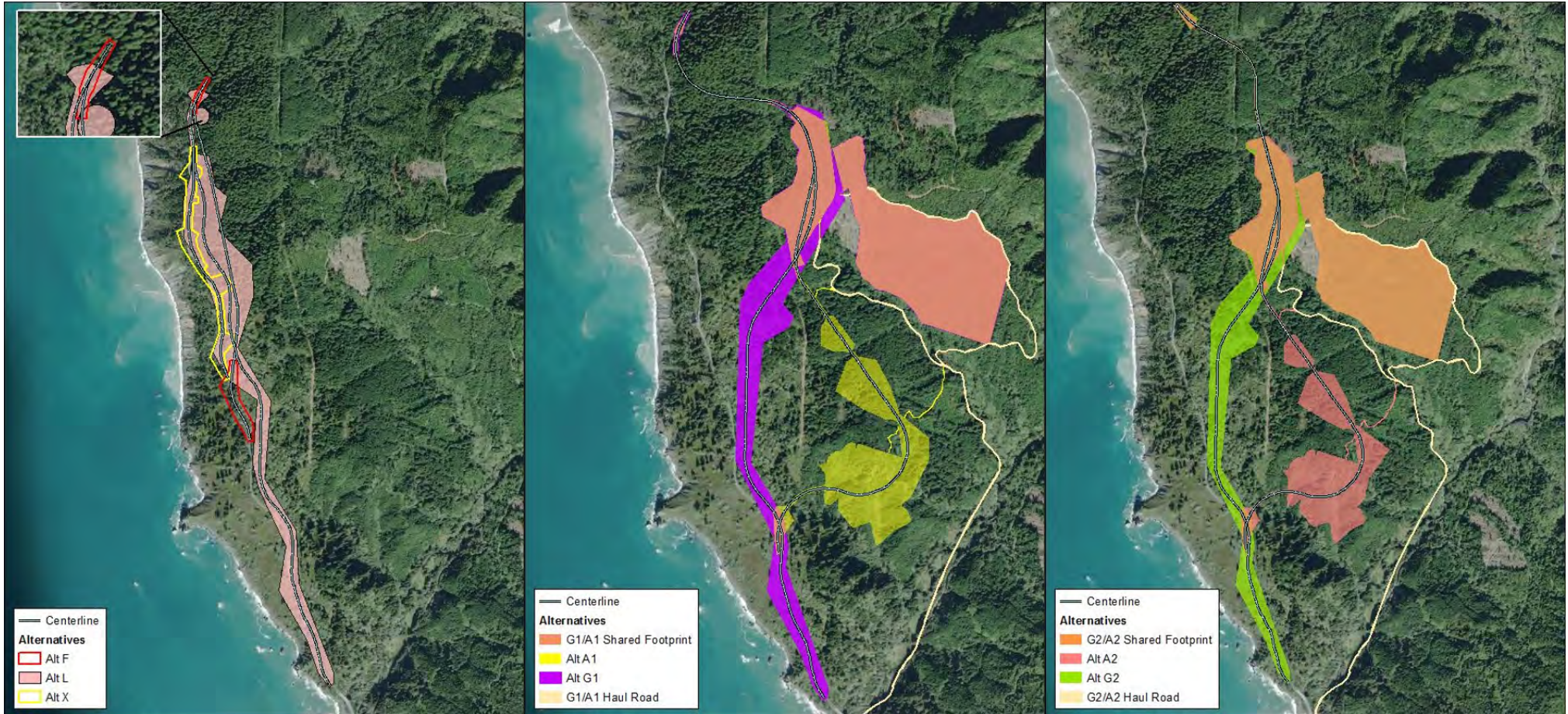
Green / low number - Best; Red / high number - Worst

Alternatives Maps: Proposed Alignments Overview

"West Side"
X (Yellow), F (Red), and L (Peach)

A1 and G1

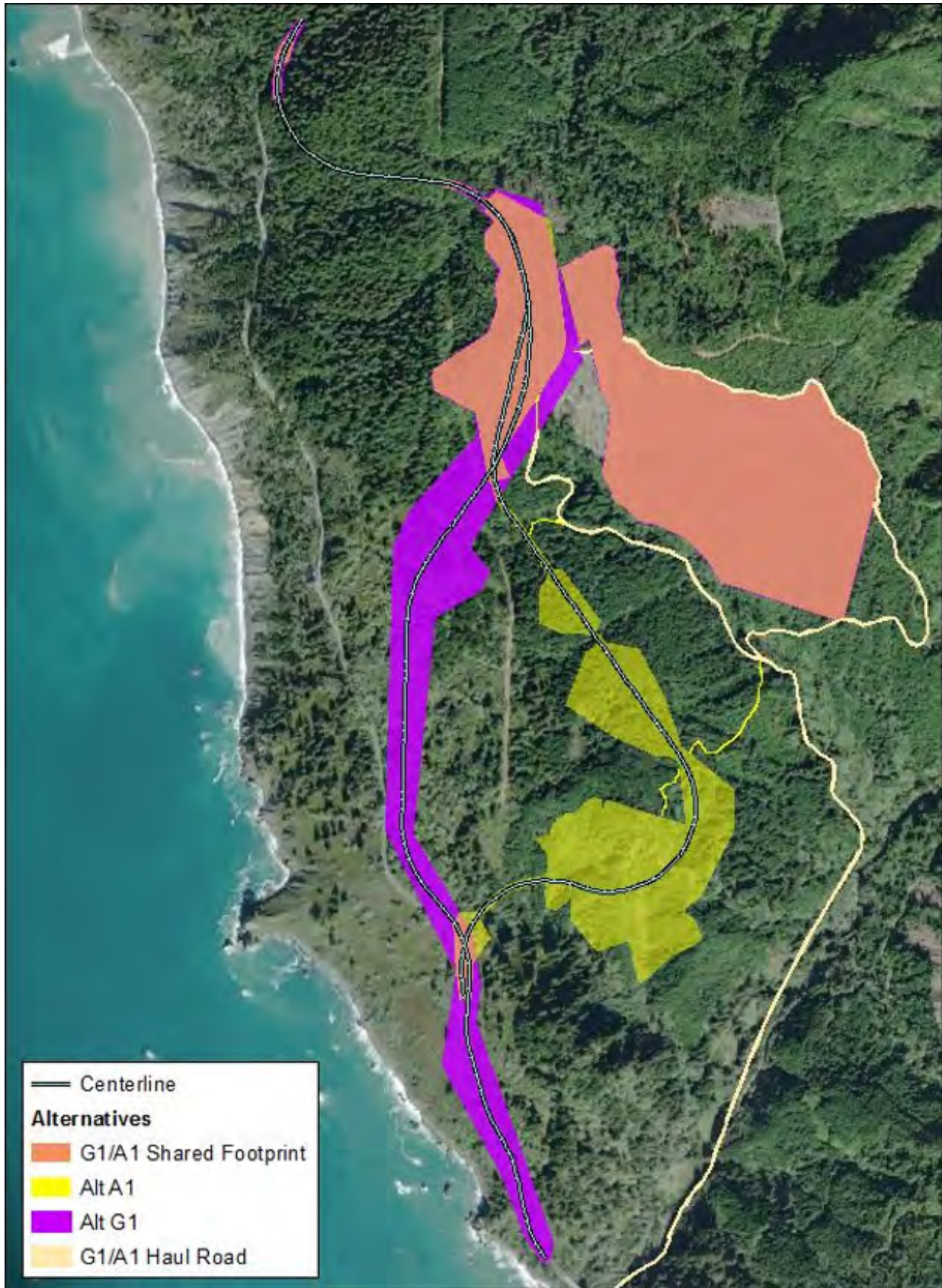
A2 and G2



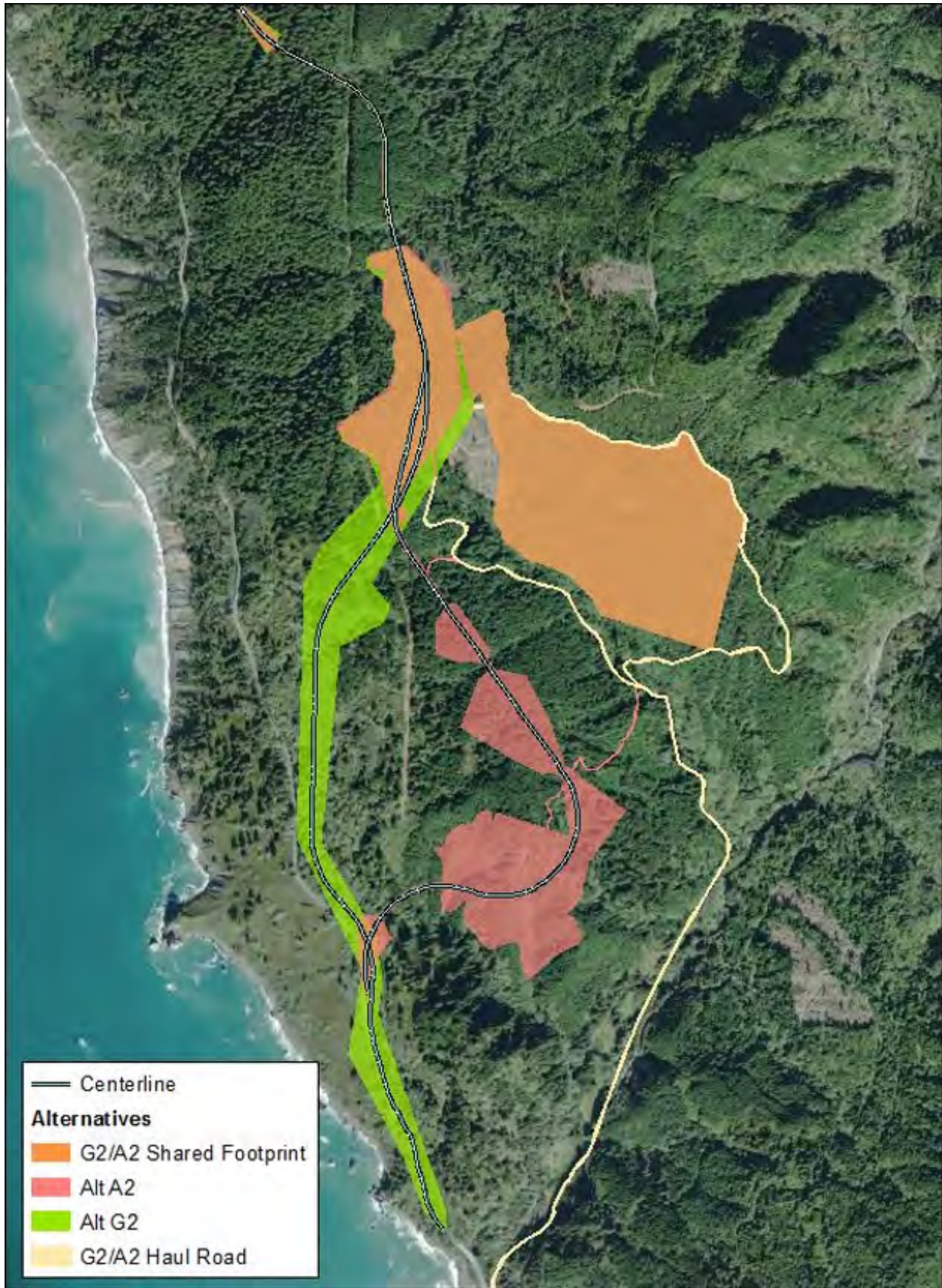
"West Side"
X (Yellow), F (Red), and L (Peach)



A1 and G1



A2 and G2



Appendix C: Workshop Attendance, Polling and Whiteboard Results

**Last Chance Grade Permanent Restoration Project
Alternatives Analysis Methodology – Workshop #2
Record of Working Group Invitations and Attendance**

Cultural Resources Working Group Monday, March 1, 2021, 10:00 a.m. – 12:00 p.m.	
Attended	Invited, Did Not Attend
Stakeholders	
<p><u>California State Parks</u></p> <ul style="list-style-type: none"> • Greg Colins, Cultural Resources Program Manager, North Coast Redwoods District <p><u>Elk Valley Rancheria</u></p> <ul style="list-style-type: none"> • Dale Miller, Chairman • Crista Stewart, Tribal Historic Preservation Officer (THPO) • Richard Warner, Vice-Chairman, Transportation <p><u>National Park Service / Redwood National & State Parks</u></p> <ul style="list-style-type: none"> • Karin Grantham, Chief, Resource Management and Science • Kevin McCardle, Historical Landscape Architect • Saylor Moss, Chief of Planning and Compliance <p><u>Resighini Rancheria</u></p> <ul style="list-style-type: none"> • Kathy Dowd, THPO, Councilperson • Megan Van Pelt, Executive Director <p><u>Tolowa Dee-ni' Nation</u></p> <ul style="list-style-type: none"> • Leann Babcock, Chair • Amanda O'Connell, Tribal Historic Preservation Officer (THPO) <p><u>Tolowa Nation</u></p> <ul style="list-style-type: none"> • Charlene Storr, North Coast Director 	<p><u>California State Parks</u></p> <ul style="list-style-type: none"> • Amber Barton, Associate State Archaeologist <p><u>Elk Valley Rancheria</u></p> <ul style="list-style-type: none"> • Kevin Mealue, Cultural Resource Specialist (Att. 3/3) <p><u>Resighini Rancheria</u></p> <ul style="list-style-type: none"> • Shaunna McCovey, Director of Natural Resources & Governmental Affairs <p><u>Tolowa Dee-ni' Nation</u></p> <ul style="list-style-type: none"> • Karin Levy, Cultural Resource Specialist • Marvin Richards, Senior Tribal Council <p><u>Tolowa Nation</u></p> <ul style="list-style-type: none"> • Max Keyes, Chairman • Raja Storr <p><u>Yurok Tribe</u></p> <ul style="list-style-type: none"> • Don Barnes, Director, Office of Self-Governance • Rosie Clayburn, Tribal Historic Preservation Officer (THPO) • Grant Klopmeyer, Transportation Planner • Brandi Natt, Transportation (no longer works for Yurok Tribe) • Samantha Reid, Cultural Resource Specialist
Project Staff	
<p><u>Caltrans District 1 Staff</u></p> <ul style="list-style-type: none"> • Steven Croteau, Senior Environmental Planner, North Region Environmental • Tim Keefe, Senior Environmental Planner • Alexis Kelso, Project Planning Liaison • Jaime Matteoli, Last Chance Grade Project Manager • Whitney Petrey, District 1 Native American Coordinator, North Region • Stacey Zolnoski, Associate Environmental Planner / Archaeologist <p><u>Project Team (Consultants)</u></p> <p><u>HNTB</u></p> <ul style="list-style-type: none"> • Dina Potter, Project Manager • John Litzinger, Group Director / Senior Project Manager <p><u>ICF</u></p> <ul style="list-style-type: none"> • John Cook, Environmental Planning Principal <p><u>MIG</u></p> <ul style="list-style-type: none"> • Joan Chaplick, Public Engagement Manager • Maria Mayer, Senior Project Associate 	<p><u>Caltrans District 1 Staff</u></p> <ul style="list-style-type: none"> • Sara Atchley-Thomas, District Native American Liaison • Alexandra Thiel, Environmental Planning, Biologist (Att. 3/2) <p><u>Project Team (Consultants)</u></p> <p><u>ICF</u></p> <ul style="list-style-type: none"> • Karin Lilienbecker, Environmental Manager <p><u>Area West Environmental</u></p> <ul style="list-style-type: none"> • Aimee Dour-Smith (Att. 3/2)

Biological Resources Working Group
Tuesday, March 2, 2021, 3:00 – 5:00 p.m.

Attended	Invited, Did Not Attend
Stakeholders	
<p><u>California Coastal Commission</u></p> <ul style="list-style-type: none"> • Tamara Gedik, Coastal Program Analyst • Amber Leavitt, Transportation Program Analyst • Bob Merrill, North Coast Director <p><u>California State Parks</u></p> <ul style="list-style-type: none"> • Lathrop Leonard, Forester I • Keith Slauson, Wildlife Program Leader • Carol Wilson, Environmental Scientist <p><u>National Park Service / Redwood National and State Parks</u></p> <ul style="list-style-type: none"> • Leonel Arguello, Chief, Resource Management and Science • Keith Bensen, Fish and Wildlife Biologist, Redwood National Park <p><u>Resighini Rancheria</u></p> <ul style="list-style-type: none"> • Kathy Dowd, THPO, Councilperson (Att. 3/1) <p><u>State Water Resources Control Board</u></p> <ul style="list-style-type: none"> • Susan Stewart, North Coast Regional Water Control Board <p><u>US Army Corps of Engineers</u></p> <ul style="list-style-type: none"> • Daniel B. Breen, Senior Regulatory Project Manager <p><u>US Environmental Protection Agency</u></p> <ul style="list-style-type: none"> • Carolyn Mulvihill, NEPA Reviewer - Transportation <p><u>US Fish and Wildlife Service</u></p> <ul style="list-style-type: none"> • Gregory Schmidt, Fish and Wildlife Biologist 	<p><u>California Coastal Commission</u></p> <ul style="list-style-type: none"> • Tami Grove, Transportation Program Manager <p><u>California Department of Fish and Wildlife</u></p> <ul style="list-style-type: none"> • Jennifer Olson, Senior Environmental Scientist, Coastal Conservation Planning <p><u>California State Parks</u></p> <ul style="list-style-type: none"> • Victor Bjelajac, District Superintendent II (Att. 3/3 & 3/4) • Shannon Dempsey, North Coast Redwoods District • Amber Transou, Environmental Scientist - North Coast Redwoods District • Brett Silver, District Superintendent I <p><u>County of Del Norte</u></p> <ul style="list-style-type: none"> • Taylor Carsley, Planner <p><u>Elk Valley Rancheria</u></p> <ul style="list-style-type: none"> • Crista Stewart, THPO (Att. 3/1) • Kevin Mealue, Cultural Resource Specialist (Att. 3/3) <p><u>National Oceanic and Atmospheric Administration</u></p> <ul style="list-style-type: none"> • Dan Free, Fisheries Biologist • Jeffrey Jahn, Branch Chief, West Coast Regional Office • Mike Kelly, Fisheries Biologist <p><u>National Park Service</u></p> <ul style="list-style-type: none"> • David Best, GIS Coordinator, Redwood National Park <p><u>National Park Service / Redwood National and State Parks</u></p> <ul style="list-style-type: none"> • Dave Roemer, Deputy Superintendent (Att. 3/3 & 3/4) <p><u>Resighini Rancheria</u></p> <ul style="list-style-type: none"> • Brad Norman, Wetlands Coordinator • Megan Van Pelt, Executive Director (Att. 3/1 & 3/4) • Erika Partee, Natural Resources Director • Karin Levy, Cultural Resource Specialist <p><u>US Army Corps of Engineers</u></p> <ul style="list-style-type: none"> • Sarah M. Firestone • L.K. Sirkin, Lead Biologist <p><u>US Environmental Protection Agency</u></p> <ul style="list-style-type: none"> • Jennifer Siu, Wetlands Section <p><u>Yurok Tribe</u></p> <ul style="list-style-type: none"> • Chris West, Senior Wildlife Biologist • Dave Hillemeier, Director, Fisheries Department • Joseph James, Chairman • Louisa McCovey, Environmental Director • Matthew Hanington, Water Division Manager • Richard Nelson, Director, Watershed Restoration • Rosie Clayburn, THPO • Suzanne Fluharty, Division Manager, Community and Ecosystems

Biological Resources Working Group
Tuesday, March 2, 2021, 3:00 – 5:00 p.m.

Attended	Invited, Did Not Attend
Project Staff	
<p><u>Caltrans District 1 Staff</u></p> <ul style="list-style-type: none"> • Alex Arevalo, NPDES Storm Water Coordinator • Steven Croteau, Senior Environmental Planner, North Region Environmental • Kellie Eldridge, Environmental Planner • Stephanie Frederickson, Senior Resource Specialist • Alexis Kelso, Project Planning Liaison • Jaime Matteoli, Last Chance Grade Project Manager • Alexandra Thiel, Environmental Planning, Biologist <p><u>Project Team (Consultants)</u></p> <p><u>HNTB</u></p> <ul style="list-style-type: none"> • Dina Potter, Project Manager • John Litzinger, Group Director / Senior Project Manager <p><u>ICF</u></p> <ul style="list-style-type: none"> • John Cook, Environmental Planning Principal <p><u>Area West Environmental</u></p> <ul style="list-style-type: none"> • Aimee Dour-Smith <p><u>MIG</u></p> <ul style="list-style-type: none"> • Joan Chaplick, Public Engagement Manager • Maria Mayer, Senior Project Associate 	<p><u>Caltrans District 1 Staff</u></p> <ul style="list-style-type: none"> • Brandon Larsen, Senior Environmental Planner <p><u>Project Team (Consultants)</u></p> <p><u>ICF</u></p> <ul style="list-style-type: none"> • Karin Lilienbecker, Environmental Manager

Partner Working Group
Wednesday, March 3, 2021, 3:00 – 5:00 p.m.

Attended	Invited, Did Not Attend
Stakeholders	
<p><u>California State Parks</u></p> <ul style="list-style-type: none"> • Victor Bejlaiac, District Superintendent II <p><u>Elk Valley Rancheria</u></p> <ul style="list-style-type: none"> • Kevin Mealue, Cultural Resource Specialist <p><u>National Park Service / Redwood National and State Parks</u></p> <ul style="list-style-type: none"> • Steve Mietz, Superintendent, Redwood National and State Parks • Dave Roemer, Deputy Superintendent <p><u>Tolowa Dee-Ni' Nation</u></p> <ul style="list-style-type: none"> • Zack Chapman, TERO Director 	<p><u>California State Parks</u></p> <ul style="list-style-type: none"> • Brett Silver, District Superintendent I <p><u>Elk Valley Rancheria</u></p> <ul style="list-style-type: none"> • Crista Stewart, THPO (Att. 3/1) • Richard Warner, Vice-Chairman, Transportation (Att. 3/1) <p><u>Green Diamond Resource Company</u></p> <ul style="list-style-type: none"> • Craig Compton, North Coast Director <p><u>Resighini Rancheria</u></p> <ul style="list-style-type: none"> • Kathy Dowd, THPO, Councilperson (Att. 3/1) • Moonchay Dowd, Vice-Chairperson, General Assistance Program (GAP) Manager • Megan Van Pelt, Executive Director (Att. 3/1 & 3/4) <p><u>Tolowa Dee-ni' Nation</u></p> <ul style="list-style-type: none"> • Tim Hoone, Transportation Planning Director • Amanda O'Connell, Tribal Historic Preservation Officer (THPO) (Att. 3/1) <p><u>Yurok Tribe</u></p> <ul style="list-style-type: none"> • Rosie Clayburn, Tribal Historic Preservation Officer (THPO) • Joseph James, Chairman • Brandi Natt, Transportation (no longer employed by Tribe)
Project Staff	
<p><u>Caltrans District 1 Staff</u></p> <ul style="list-style-type: none"> • Steven Croteau, Senior Environmental Planner, North Region Environmental • Alexis Kelso, Project Planning Liaison • Jaime Matteoli, Last Chance Grade Project Manager <p><u>Project Team (Consultants)</u></p> <p><u>HNTB</u></p> <ul style="list-style-type: none"> • Dina Potter, Project Manager • John Litzinger, Group Director / Senior Project Manager <p><u>ICF</u></p> <ul style="list-style-type: none"> • John Cook, Environmental Planning Principal <p><u>MIG</u></p> <ul style="list-style-type: none"> • Joan Chaplick, Public Engagement Manager • Maria Mayer, Senior Project Associate 	<p><u>Caltrans District 1 Staff</u></p> <ul style="list-style-type: none"> • Sara Atchley-Thomas, District Native American Liaison • Tim Keefe, Senior Environmental Planner (Att. 3/1) • Rebecca Law, Project Management Support <p><u>Project Team (Consultants)</u></p> <p><u>ICF</u></p> <ul style="list-style-type: none"> • Karin Lilienbecker, Environmental Manager <p><u>Area West Environmental</u></p> <ul style="list-style-type: none"> • Aimee Dour-Smith (Att. 3/2)

Huffman Stakeholder Group
Thursday, March 4, 2021, 3:00 – 5:00 p.m.

Attended	Invited, Did Not Attend
Stakeholders	
<p><u>California State Parks</u> <ul style="list-style-type: none"> • Victor Bjelajac, District Superintendent II </p> <p><u>Community Representative</u> <ul style="list-style-type: none"> • Kurt Stremberg </p> <p><u>Crescent City</u> <ul style="list-style-type: none"> • Jason Greenough, Mayor </p> <p><u>Crescent City-Del Norte Chamber of Commerce</u> <ul style="list-style-type: none"> • Cindy Vosburg, Executive Director </p> <p><u>Del Norte County Board of Supervisors</u> <ul style="list-style-type: none"> • Valerie Starkey, Supervisor, 2nd District </p> <p><u>Del Norte Local Transportation Commission</u> <ul style="list-style-type: none"> • Gerry Hemmingsen, Commissioner; Del Norte County Board of Supervisors, District 4 </p> <p><u>EPIC</u> <ul style="list-style-type: none"> • Tom Wheeler, Executive Director </p> <p><u>Friends of Del Norte</u> <ul style="list-style-type: none"> • Don Gillespie </p> <p><u>Green Diamond Resource Company</u> <ul style="list-style-type: none"> • Craig Compton, North Coast Director </p> <p><u>Humboldt County Association of Governments</u> <ul style="list-style-type: none"> • Gordon Johnson, Council Member, City of Rio Dell </p> <p><u>Humboldt County Board of Supervisors</u> <ul style="list-style-type: none"> • Steve Madrone, Supervisor, 5th District </p> <p><u>Office of Representative Jared Huffman</u> <ul style="list-style-type: none"> • Ciara Emery, Field Representative • John Driscoll, District Representative </p> <p><u>Redwood National Parks</u> <ul style="list-style-type: none"> • Dave Roemer, Deputy Superintendent </p> <p><u>Resighini Rancheria</u> <ul style="list-style-type: none"> • Megan Van Pelt, Executive Director </p>	<p><u>C. Renner Petroleum</u> <ul style="list-style-type: none"> • Sabina Renner, CEO / Secretary </p> <p><u>California Highway Patrol</u> <ul style="list-style-type: none"> • Lieutenant Larry Depee, Commander </p> <p><u>California State Parks</u> <ul style="list-style-type: none"> • Brett Silver, District Superintendent I </p> <p><u>Elk Valley Rancheria</u> <ul style="list-style-type: none"> • Richard Warner, Vice-Chairman, Transportation (Att. 3/1) </p> <p><u>Rumiano Cheese</u> <ul style="list-style-type: none"> • Gary Smits </p> <p><u>Save the Redwoods League</u> <ul style="list-style-type: none"> • Laura Lalemand, Forest Ecologist </p> <p><u>Yurok Tribe</u> <ul style="list-style-type: none"> • Joseph James, Chairman </p>

Huffman Stakeholder Group <i>Thursday, March 4, 2021, 3:00 – 5:00 p.m.</i>	
Attended	Invited, Did Not Attend
Project Staff	
<p><u>Caltrans District 1 Staff</u></p> <ul style="list-style-type: none"> • Steven Croteau, Senior Environmental Planner, North Region Environmental • Alexis Kelso, Project Planning Liaison • Clayton Malmberg • Jaime Matteoli, Last Chance Grade Project Manager • Charlie Narwold, Chief of Geotechnical Services • Karen Sanders, Transportation Engineer, RE, Emergency LCG Projects • Matt Smith, Design <p><u>Project Team (Consultants)</u></p> <p><u>National Center for Conflict Resolution</u></p> <ul style="list-style-type: none"> • Joy Keller-Weidman, Senior Program Manager, Huffman Stakeholder Group Facilitator <p><u>HNTB</u></p> <ul style="list-style-type: none"> • John Litzinger, Group Director / Senior Project Manager <p><u>ICF</u></p> <ul style="list-style-type: none"> • John Cook, Environmental Planning Principal <p><u>MIG</u></p> <ul style="list-style-type: none"> • Joan Chaplick, Public Engagement Manager • Maria Mayer, Senior Project Associate 	<p><u>Caltrans District 1 Staff</u></p> <ul style="list-style-type: none"> • Sebastian Cohen, Construction Management <p><u>Project Team (Consultants)</u></p> <p><u>HNTB</u></p> <ul style="list-style-type: none"> • Dina Potter, Project Manager (attended all other meetings, had conflict on this date) <p><u>ICF</u></p> <ul style="list-style-type: none"> • Karin Lilienbecker, Environmental Manager <p><u>Area West Environmental</u></p> <ul style="list-style-type: none"> • Aimee Dour-Smith (Att. 3/2)

Last Chance Grade Working Group Alternatives Analysis Methodology Workshop 2 - Polling Results

What is your level of support for the alternatives assessment process as discussed today?	Highly supportive		Somewhat supportive		Neutral		Somewhat unsupportive		Do not support		Total #
	%	#	%	#	%	#	%	#	%	#	
Cultural Resources Working Group	43%	3	14%	1	43%	3	0%	0	0%	0	7
Biological Resources Working Group	82%	9	0%	0	18%	2	0%	0	0%	0	11
LCG Partners	100%	4	0%	0	0%	0	0%	0	0%	0	4
Huffman Stakeholder Group	62%	8	31%	4	0%	0	8%	1	0%	0	13

MURAL Whiteboard Notes
Cultural Resources Working Group, 3-1-2021
Page 1

KEY			
Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team

Is X no build or the construction higher up the hill?	Response from Jaime Matteoli: Developed after feasibility study; FHWA requested landslide mitigation	This will improve stability without major change in location	Minor changes in horizontal position of roadway	Potential to retreat toward hill, possibly new retaining walls	Will analyze data to understand if we can remove water	Need time to develop concept
Happy to see that F consistently ranked high	Hoping to discuss cultural resources	Response from JM: More important to have conversation about concerns than use as a metric	Waiting concerns from tribes very heavily, e.g. Wilson Creek	Happy to present and hear concerns at tribal councils	Would like cultural resources documented on map to show how they're being avoided	Show general area, and for tribal council presentations only
I didn't think it was being removed. I thought it was to qualify it as process-based and then use a tiered scale to assess Tribal involvement in that process.	JM: What would tiered scale show - level of involvement?	Response from D1: Showing general significance - plan was not to show as numerical value	Inappropriate for Caltrans to provide values	Previously ranked risk of each location in terms of closeness to site and risk of impacting it	Haven't assessed many factors with cultural resources	Cultural resources working group will get more details for own assessment
Okay, because the other tiered scale assessments are actually based on quantifiable measures then? Am I understanding that right?	Project team responds with footprint maps	D1: Footprint map is preliminary; do not have all data	JM: re footprint map - yes, will give more detail	Have varying amounts of data on different areas	Large fill areas may change to structures, making footprint smaller	
I agree that assessing the risk rather than "prioritizing" cultural resources is a better way to be productive in this.	(Agreement received from several stakeholders)	Also, thank you for mentioning traditional cultural properties and gathering areas.	The natural resources are significant culturally to the tribes	Natural resources and cultural resources are one in the same for the Tribes.	Although the laws don't define them that way	- however, gathering areas that don't have archaeological deposits in them are still highly significant for the Tribe
Good map, shows what you're been doing, but more in-depth study needed	Parks - no comments	I know for sure that any oak groves will be a concern of mine. If those can somehow be recorded by biological that would be great.	SOD has entered Del Norte County. Keeping oak groves healthy is a priority as acorns are a staple traditional food.	JM: re. "natural and cultural resources being the same"	Assessing natural resources should also cover cultural values for the purposes of this assessment	

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Cultural Resources Working Group, 3-1-2021
Page 2

KEY			
Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team

D1: Should natural resources then be given more weight?	D1: can we include oak in the trees category? Or was it already included?	Project Team Response: Different types of trees / vegetation included; no separate category for oaks	Tan oaks mostly in coastal scrub, low density	Can we see vegetation metrics on a map?	Project team: Yes, map can be shown; maps showing other metrics are available as well
This map will be important to have at Tribal Council meeting	Could the map be sent before a meeting with council?	Yes if that vegetation map can be emailed out to our CRWG that would be helpful.	Include the alternatives map that shows topography/elevation and/or "scenery" base map.	So they can clearly see where the alternatives are on the landscape.	In addition to cultural and natural resources, Elk Valley will be interested in discussing operational measures as closures, both temporary and intermittent, have had a profound impact to government.
If cultural value of natural resources were integrated, would that increase their value?	ICF: Yes, would increase weight score but it wouldn't change the outcome of ranking for alternatives	Is that true for all the natural resources and not just Redwood? i.e. animals and other plant species?	ICF: True - demonstration provided using scoring table	Changes resultant score of alts but not their ranking; X and F still top 2	The area of impact is much less for X & F than for A; much smaller footprint
In the near future, preferably before Council meeting, can you email out the breakdown of the natural resources metric.	Important to note concerns expressed even though they don't change score	D1: Yes, that data is included in the overall table tracking all metrics	Will be included in overall report	List of specific vegetation concerns passed on to Caltrans biologist and ICF	Rare, threatened or endangered species will be documented Can't capture every single plant but areas of high density will be documented
Would still like to see, for instance, oak groves recorded regardless of size	Plan on not mapping trees below a certain size	Have a plan to ID as much info as possible given time / funding constraints	Thanks, also helps us give feedback on these assessments		

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Cultural Resources Working Group, 3-1-2021
Page 3

KEY			
Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team

Haven't seen much info on fauna located in area	How much has that been studied or documented?	Didn't look at entire spectrum of resources for alts analysis	Looked at most predictive: owl, marten, murrelet	Will survey for all animals later in process		
JM response: Have connectivity measure: new edge, stream crossings, etc.	Alt F would be a one-mile wildlife crossing; this factor included	ICF: There are elk, but picking things easily quantified for this study	Will definitely assess all moving forward	When will the ethnographic interviews with tribes occur?	D1: We hope to begin this spring/summer. We will be setting up another focused meeting soon.	Probably right after we address monitoring for wetland delineation.
Looking at all 7 alts - pleased w/those ranking highest, seem least impact	Concern re. what is lost when changes made	Makes it difficult to share knowledge with young people if not easy access to resources	Resources impacted by growing population, etc.	Will weigh in further at council meetings		
JM: ideally council mtgs near the end of March - early April	Will bring more info re. resources to those meetings	D1: Need to set up various meetings - wetland designations, ethnographic interviews	Prioritizing all - council meetings sooner than later.	Will have biologists present		
I would also suggest making sure to have overall timeline of the project - what studies are currently going on and which are coming up soon.	Please contact [specific contacts w/ Tolowa Dee-Ni' Nation identified]	Need to communicate what's happening in each working group to all				
Need communication at tribal level and info from all	Ethnographic meetings need to happen soon; please prioritize	JM: considering one large meeting for final workshop	Tolowa Dee-Ni' would appreciate that	Others agree	Facilitator: Any feedback from those who are "neutral" in support of process discussed today?	NPS is neutral because a lot of this discussion weights on Tribe input.

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Biological Resources Working Group, 3-2-2021
Page 1

KEY

Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team
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Based on what we talked about in all the different Biological Resources Working Group meetings, this ranking is entirely consistent with what we discussed.	No big surprises here. Good to see the rigorous analysis process laid out so clearly.						
How did climate change resiliency figure into these metrics?	Specifically, planning for extreme weather events	ICF: Not expressly considered; didn't come up in previous meetings	Used a narrower band of factors based on information we have	Will be getting more date later	Not a direct factor but indirect factors that speak to it		
		Jaime: Geotech team considering potential for higher rainfall events and sea level rise	Plays into risk for alternatives on west side of ridge	HNTB: Goes back to geotech factors	Represented although not considered specifically as a separate factor		
Based on BRWG meetings, there have been some preliminary studies	Have you summarized that information to help us understand how you're narrowing range of alternatives?	Can you show us how resources have been assessed thus far?	ICF showing how analysis was done in more detail	Master spreadsheet analyzing all metrics based on first round of workshops	Example: Cost to Construct (see slides)		
Does any of the scoring take into account the engineering feasibility?	HNTB: Yes, several criteria assessed and compared between alternatives	Not a baseline but comparative approach	X and L are still in landslide areas; F is below landslide	Geology more favorable on east side	Looked at years for time to construct, impact on existing roadway	Amount of cut and fill and where deposited	A variety of engineering factors; includes earthworks, tunnels, walls & bridges
Has it been figured out that Alt F is actually possible, given the geotechnical/driver safety concerns?	HNTB: At this time, it appears feasible; can be built below slip plain of landslides	Once tunnel is in place, it has resiliency vs. earthquakes and other factors	Free from landslides, slip plains, landflows	Continuing to gather geotech info and refine picture	Jaime: X is in infancy for developing scope; need to know more about water and instability	Uncertainty taken into account in geotech analysis	

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Biological Resources Working Group, 3-2-2021
Page 2

KEY			
Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team

Are \$1M of construction costs weighted similarly to \$1M of mitigation?	ICF: Construction and mitigation costs given highest weight	Not estimating \$ yet; based on engineering / environmental experience	Not dollar for dollar; weighted evenly	Jaime: ROW included in cost of mitigation. Didn't separate by higher or lower	The # of acres is related to that as well?	Jaime: Yes, and location		
ICF summarizing how natural resources factors affected the analysis	Can we get a copy of these analyses?	Would like a closer look at fragmentation / new edge	Is that mapped out somewhere?	Some edges might be more dangerous / fragmented than others	Jaime: Will provide these analyses once ready	ICF showing series of maps which show edge effects of each alternative		
Have you split new edge in parklands vs. Green Diamond?	Yes, maroon color is Green Diamond land	Park land weighted higher than Green Diamond (known to be diminished natural resources)	Those maps are great. This is the first time I've seen a "true" footprint for each route/alternative. Really informative.					
How far below the surfact is the tunnel in Alt F in relation to forested landscape on surface / roots?	HNTB: assuming a 20 ft. depth as a no-disturb zone					Bored tunnel at least 60 ft. below ground	Under higher land, several 100 ft. underground	Footprint impact area higher at the ends

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Biological Resources Working Group, 3-2-2021
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KEY

Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team
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MIG: Comfort level with removing G alternatives from study?	No decisions today - wondering if anything is missing from analysis that would make you uncomfortable in removing them	Getting rid of the G alternatives seems very logical to me based on the analysis and everything we've discussed in the past.	Asked about degree to which there is core scale analysis so far	No issue with honing the list to be efficient		
Coastal development permit evaluation - will be important to track level of analysis done for all alternatives to track what went into honing list	Will want to understand what went into eliminating alts		Clearly, some are less desirable; won't just be Caltrans relying on this analysis	Must analyze rejected alts in EIR to clarify to public why they are no longer being studied / considered		Show why selected alternatives are best
D1: yes, will be a robust section explaining this in the EIR	Will show evidence why not moving forward	HNTB: A alts mostly drop out because they are long with significant disposal	Gs perform similar to As but have geoflow issues; also in the middle of park	L creating more geotech hazard than X by going into slope	Will also include alts eliminated in earlier rounds	
Approximately how many redwood trees will be removed per alternative?	D1: showing estimated tree removal table	Rough estimates of numbers of trees removed by diameter for each alternative	Took sample data throughout area; extrapolated #s based on acreage	Oldest trees tended to be smaller diameter (due to instability of area)	Not less valuable, but not what people typically think of as old growth	Those areas mostly in Alternative L - further up on slope compared to other alts
For the L alternative - highest # of old growth trees to be removed	Yet it scored low on the graph. How do the two relate to each other?	ICF: L scored poorly. X and F scored best.	Great graphs (tree removal chart)	Jaime: Update from construction team on ongoing repair work - about 20-30 small conifers have come down	Reminder that trees at risk even with no-build option	

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Biological Resources Working Group, 3-2-2021
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KEY

Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team
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Old growth trees are within portion of park considered to be old growth?	D1: yes, that is considered the community type, not largest trees; includes Doug Firs, etc.	Showing vegetation map; negligible effect on A's and G's, none in X, F, L	Trees in parkland mostly alder and coastal scrub; no old growth or mature site compromised on Green Diamond Land			
How and where is Caltrans looking at mitigation?	Are you considering lands offsite, etc.?	Would be ideal to see planning for advanced mitigation	Jaime: have thought more about process than mitigation at this point	Need more data to discuss mitigation - will be engaged, complex, and require agreement on what will best mitigate	Need to know more about impacts, then bring people to and keep them at the table	Caltrans preparing a document for work at Red Schoolhouse; possible opportunities for advance mitigation
D1: mitigation top of our priority list; will have group meetings, make sure all is considered	Are you thinking about costs in terms of land acquisition?	Remind us how you're considering that	Jaime: thinking in terms of some land acquisition	Best approach is to work with working groups; go with what is already considered a good idea!		
Neutral on poll because I'm just listening and learning at this point	I agree that you could probably drop the G alternatives	Jaime: what do people think of having one big workshop for Round 3? Any concerns?	I like the idea	Yes, a big meeting would be good	Large group meeting sounds good	

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Partner Working Group, 3-3-2021
Page 1

KEY

Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team
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Please explain why cultural resources were removed as a metric	Jaime: The process of speaking to the tribes is more important than assigning our own value assessment	Need to respect tribes' assessment of resource value	The tribes have all information; we will discuss further and get feedback during meetings with tribal councils	Please review alignment of Alt X	Jaime: Assuming retaining walls entire length - footprint very similar with minor cuts into the hill	Map doesn't show drainage system; will go toward ocean. Must be developed
Curious why L and X weren't more distinct in analysis.	Specifically with regards to operations.	Hoped that L would offer advantages for being upslope, providing more stable geometry.	Jaime: Geotech team doesn't see a huge increase in stability for Alt L	HNTB: L and X cross the same landslide; need more study & data to differentiate	L has less hill above it that can come down, but still lacking data	HNTB: Performance was similar but impacts greater for L
Will the planned geotech work reveal if you're able to anchor to something more stable?	HNTB: yes, it will. Also, with L, you're blazing a new trail up the slope	Will also create more edges which shows up in the rankings as more impact	Is dewatering needed for both?	After you log, heavy winds will create blow-overs; have you considered whether there will be blow-overs on new road edges / ridgeline?	Jaime: have not heard a discussion of that; will make a note of it	
Can we weigh in on additional or eliminating alternatives?	Have we talked to either cultural or natural resource depts. from Yurok or Tolowa Dee-ni' about these impacts?	The footprint for the A and G alts overlaps those lands	Jaime: yes, they are involved in working groups	HNTB: We are proposing that L, A1, A2 and G2 be dropped	That will leave X and F with a tunnel - minor cut and fill, no need to go offroad	

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Partner Working Group, 3-3-2021
Page 2

KEY

Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team
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Thanks for previewing the final scene! I'll be interested to hear the things we've learned about F that keeps it in the analysis.	I had previously thought that the tunnel might land on the dropped alternative side.	Curious to hear more about that. Had heard that tunnel performed low	Jaime: tunnel performed well but thought cost was prohibitive; we were also surprised	Cost estimate was lower than tunnel cost for A1	Put it ahead of A1 and G1; cost comparable and mitigation less	
Tunnel entrance and exit clearcut zones - what is the extent of that for each alignment?	ICF: reviewed how costs and impacts were weighted to arrive at these results	Suggest that you label the data points more clearly on the chart in the "Cost to Construct" slide	How were the tree removal estimates arrived at - through LIDAR?	D1: Mapped sample plots and extropolated	ICF: Plan for a more precise tree census; estimation adequate for assessment	Impressive analysis!
D1: Re slight compromise: identifying areas where trees are in slides	versus trees on the other side or in a more stable geologic formation	If the slides continue to move, the trees will shift as well	Jaime: Some trees have come down in current slide	The video of slide damage is a great demonstration	Estimated tree removal graph is clear and very helpful	
Again, surprised that L isn't more of a contender	HNTB: It's virgin ground, gain nothing by going farther uphill	L carves through Green Diamond land; A alternatives more in parkland	A alternatives have huge footprint	What about considering impacts on animals?	ICF / D1: showing how natural resource impacts re animals and habitat were considered	

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Partner Working Group, 3-3-2021
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KEY

Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team
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Is there an "ask" today?	D1: It is - are you comfortable with this methodology now that you have seen "under the hood?"	Will come to you w/a recommendation in April w/alts to be eliminated	First want to ensure you're comfortable			
HNTB: How do you feel about F and X going forward?	Makes sense after seeing the analysis; seems solid, good process, I feel satisfied	Happy with eliminating Alternative L	Like the analysis and how well it has been explained	Makes sense to me	Surprises: thought tunnel would be priced out and that L would be closer to X	Comfortable with results
HNTB: with Huffman group, should we show details first?	"Spoiler" at front end makes it easier to understand	This are good metrics; I was also surprised at results	Understand now that L is a new footprint	Would like to see more map detail on most likely alts; hillside	Zoom in on details and structures	
Have you considered emotional reaction that people will have to on-alignment alt?	Probably tunnel vs. current alignment will be polarizing	Many will object to current alignment; tunnel never popular	Think carefully about how to frame these results	Explain that there is more certainty about stability of tunnel due to completed and ongoing studies	Clarify how metrics are being used to make decision	
Film aerial view with outline to give better impression of how timber, mountain, etc. will look	Put it on a loop at the opening of the meeting	Note: drones not usually permitted on state park land	D1: also have 3D modeling / topo maps that may help			

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Partner Working Group, 3-3-2021
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KEY			
Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team

Thinking ahead: what happens to balance extra costs with tunnel option?	How does Caltrans make that choice between X and F?	Jaime: good question. Will need to have clear concept for Alt X	Will have a better model, conceptual design for de-watering and maybe a preliminary design	Will have a much better design and sense of whether we have confidence in it or not	Hopefully can determine within 3 years
If public support, may be able to accept latent risk in an alt that otherwise performs better	F is a big ask when compared with X	Is there any flat land that could be offered as a new state park or other asset for some additional profit?	Jaime: Biggest economic consideration is having a reliable road	There are opportunities for recreational assets; e.g., Devil's Slide trail	Will be considered and discussed
MIG: what else can we do to increase comfort level with a tunnel?	Bridge outside of Eugene on I-5 plays a melody as you cross	Use similar music or sound effects in tunnel to relieve stress / claustrophobia	Art installations also a possibility; turn it into an amenity	Note how it reduces impacts on surface	

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KEY

Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team
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Have you considered bike lane in tunnel?	There will be a standard width shoulder in tunnel	Jaime: what do you think people will think of X?	Everyone's pretty finished with the existing alignment	Seems like a neverending process of repair		
Is it sliding because we keep digging or just because that's what it does?	Jaime: That's what it does	Haven't detected movement on the east side; little risk of reactivating dormant slides	Curent road is moving because of water and weather	Hope to demonstrate and prove that water is the issue	The question: can we address that root cause?	
Tribes seeking alternative without devastation to the environment	Jaime: haven't yet taken a global proactive approach to addressing landslides	Fixing areas one at a time; have not previously considered proactive mitigation	That's the distinction between current situation and Alt X	Characterize X as proactive, holistic, global, addressing root causes	And emphasize that it is a new build!	Hard to get people to believe you're not just fixing the existing road
MIG: do you think there will be a call for one more alt because they don't trust X?	Or will analysis clarify?	Depends on how you present it. Use marketing techniques	If you focus on lack of tree impacts, it will go over well	Cost savings to be put back into existing road	Tolowa tribal council is very visual; maps are helpful	Push the alts that are the top performers first, those that perform less well last
Re. people wanting to bring A alts back online; be prepared to clarify how they perform less well as demonstrated by metrics	Demonstrate that they provide no more advantage for the larger costs and impacts					

MURAL Whiteboard Notes
Huffman Stakeholder Group, 3-4-2021
Page 1

KEY

Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team
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Thanks, Caltrans, for the work on keeping the road open during the current slides	I want to just express how impressed I am by all of the good work that Caltrans has put into this project. Nice job y'all! ✓	Have the construction costs for Alt F been revised? They were previously very high.	ICF: F still among highest cost alternatives	Construction cost, along with mitigation cost and old growth impacts, weighted most heavily	However, F is lower impact / smaller footprint than most others so it still comes out on top
The alignment for L has changed. Surprised by the # of old growth redwoods.	ICF: showing maps comparing the footprint of alternatives	F has a smaller footprint than several other alts	L will require a large footprint with lots of tree removal, cut & fill		
Can moving higher upslope improve geotech stability?	D1 Geotech: the idea was to retreat from coastal erosion	Also get closer to headscarp and stabilize	There is relief in terms of drainage	However, during studies found a lot of large diameter redwoods on the slope - more than expected	

KEY

Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team
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How much would it take in time to find out how X would rank given the research needed to compare?	Jaime: will take a couple years.	Will study geotech, ground water and movement	Will have an answer after publication of EIR but prior to choosing final alternative	D1 Geotech: Environmental and Engineering progressing at the same time
So it will be carried forward along with other alts to be studied to provide more time to study?	Yes, and we'll continue to study until we know whether or not it's feasible	If it proves unfeasible, we'll drop it from consideration	Based on suggestion from FHWA to consider global mitigation approach	
Does X require closing roadway during construction?	Jaime: we'd keep the road open but there would be traffic impacts	Down to one lane at times during construction		

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KEY

Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team
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If X involves dealing with waterflow on that bank - wouldn't that be part of ongoing process now to salvage road bank we have?	Would you start drilling to capture water and steer it away from the road?	If chosen, will you start spending money on mitigating water problems?	Why is this not happening already?			
Jaime: good question! Have never been able to do this.	Have not had global, holistic program to study the groundwater	Had to drop rigs in state parks	Have never understood the groundwater	Took 3 years to get the borings in place; now able to study	Can't just drill a hole and try it; will be a very specific, dynamic design	Will take much design, consideration and analysis
D1 Geotech: lowering the groundwater surface elevation within the landslide	Large dewatering system on I-80: entails large diameter shaft	Thousands of feet of horizontal drains - runs on a series of pumps	Once constructed & turned on; no longer any water in landslide.	If proves to be feasible, will be done.	Like pulling a drain while it's draining	
Doesn't removing the groundwater effect the erosion of the toe?	Jaime: part of overall mitigation strategy	Studying whether toe erosion is part of the problem	May be part of Alt X, will generate environmental issues; needs to be studied	Geotech: dewatering only effective if we can mitigate landslide depredation	Must partially retreat as well as mitigate erosion	
Jaime: move road inland and also retaining walls along entire length of landslide	Doing everything we can to mitigate, will be millions of \$ of mitigation	I would like to get an electronic copy of all of these excellent slides of the analysis of options. Thanks for all the great work.				

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KEY

Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team
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Can you go back to the "Operations" consideration please?	When discussing operations and closures - seems the whole point of project is to deter that	If picking a project that will spend millions of dollars and still have 3-week closures, what's the point?	Understand need to care for natural resources, but trying to make road safer and open for a long period of time	Finding metrics frustrating	Low marks in metrics equate to safety risk	
Jaime: same concerns on our mind.	If X is not a safe, reliable roadway, we won't build it, but there is potential it can be.	Disturbed that it's still at the top - many don't think it's a viable option	Understand it's there as a control group			
Geotech / ICF: looked at "what if" scenarios	F and X keep coming out on top even if tripling weight of core factors	Same if trees are weighted more heavily	Even weighting all factors equally, they still come out on top	What would need to change to disrupt that dominance?	If operations are weighted twice as high as all other factors, X would drop to fourth after A1 and A2	
What is most disturbing?	Eliminating options without knowing if X is feasible	Jaime: studying A alts - such a large footprint that it would have resource impacts	in addition to more cost and time for studies	Want to spend \$10M on analyzing what seem to be more likely solutions	Will be spending some money on design	If we had all money in the world, would study all of them
Transportation dollars are limited	Take the decision very seriously, won't propose anything that won't keep people safe					

KEY

Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team
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So are you advocating a tunnel or the existing roadway?	As a newer member to this group I remember my shock when I discovered that ALL THE OPTIONS came with great disadvantages.	And I remember Jaime looking at me and nodding, that yes, the choices were not good but were the best we had.	Looks like "what if" scenarios would eliminate the G options		
Are you suggesting road closure be a "core" item then? Or weight it more, perhaps?	ICF: was in the operations grouping with weight of 4	Showed X and L doing very poorly	If included in core factors and weighted more heavily - would add a few points to total score	Simply moving it to core factors wouldn't change results	Giving it a much higher weight would change results
When looking at current alignment - X would be a significant change	If you could dewater and tore up the toe, would it lower the risk?	Jaime: likely, but possible it remains high risk and then we'd weigh heavily	Does this include funding for current repairs?	Jaime: No, that is emergency funding that is completely separate	
Agree with Jaime re cost / probability of litigation with many alts	We're probably looking at a long tunnel and needing to get a billion in funding	Can eliminate a lot of alts here			

KEY

Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team
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Is X a relatively new suggestion? Or has this been an option all along?	It has been an option for a number of years. L is a newer option.	Interesting point re time to study As and Gs. Do we have data to decide if F is viable?	Jaime: have early data, need more geotech investigation	In design and possibly in current phase
Trying to grasp X; understand why it's being considered	Is X not an alternative route? Is it subject to this process? Can it be evaluated differently?	Question raised by FHWA; have you considered mitigation alternatives?	Would need that if funding	Introduced to this group in 2018 and group agreed
For NEPA/CEQA purposes, X is a new alternative and not the "no build" alternative.	X would effectively be a "new build" of the road, relatively (but not wholly) within the current alignment. Right?	Yes	It is a build alternative; current highway is no-build, all agree not sustainable	ICF: No build is required to be on the table
G options do not look like viable options	If we eliminate "bypass" alts, does that speed up EIR process?	Jaime: if we can do, that can probably deliver EIR one year early	Will help keep us on schedule, although tunnel will take about 7 years to build	

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KEY

Comments	Questions	Responses from Jaime Matteoli, Caltrans Project Manager	Responses from Caltrans D1 / project team
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Was surprised that cost and impacts of F were not greater	Also surprised that L didn't score higher	Walking through analysis makes it clear that X and F perform better	Think there's a strong rationale for focusing on those two alts	Second that response; surprised by old growth impacts for L	This process helps to figure real costs	
Still don't like A2 but surprised impacts were lower than expected	This has helped change my mind	Just what this group is for; thank you Caltrans	Agreed	Many in group agree with idea of one large meeting for Round 3	Jaime: will also be presenting same information to tribal council meetings	This communication more important than including cultural resources as a metric
This group has been key; dialogue between different backgrounds great	Getting down to manageable # of alts: great accomplishment	As stakeholders, our voice is important	Encourage reaching out to Jaime with additional concerns	Jaime: would love to meet one-on-one		
D1 Geotech: Any benefit to sharing information from other groups' workshops?	MIG: Cultural resources group identified what would be of greatest value to tribal councils	Many questions going deeper into metrics, high level of support for process	Jaime: stated importance of documenting process	Have mostly heard supportive, a few neutral		
Great work on the analysis, much appreciated. Really helps the decision making process!	Looking forward to seeing the presentation and dialog with the Resighini Tribal Council next month.	NCECR: Often lack of support for process rests in concern re. an outcome	Encourage speaking to Jaime to determine what was behind that	I sooo appreciate this presentation. As the new kid, I am grateful to have really understood the information	Thanks everyone for your time and work	

B3. Workshop 3

Last Chance Grade Permanent Restoration Project Alternatives Analysis Methodology Workshop #3 Summary of Results - Final

Submittal #SUB-030
July, 2021



EA# 01-0F280
Project EFIS# 0115000099
Del Norte County, U.S. 101,
PM 12.0/15.5



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Appendix

A: Workshop Materials

B: Workshop Results

I. Introduction

Workshop Purpose and Format

The Last Chance Grade (LCG) Permanent Restoration Project is a project proposed by the California Department of Transportation (Caltrans) to find a permanent solution to the instability and roadway failure on a 3-mile segment of U.S. Highway 101 in Del Norte County. As part of the process in selecting a safe and reliable long-term solution to this problem, Caltrans conducted an alternatives analysis to determine which of the seven build alternatives should be studied further in the environmental impact analysis. The alternatives analysis process was developed with input from the four working groups. The analysis was based on criteria and performance measures related to the project's major objectives, which include providing a long-term safe and reliable roadway, reducing maintenance costs, and protecting the economy and natural and cultural resources. The analysis resulted in Alternatives X and F being selected for further study.

The purpose of the alternatives analysis was to:

- Assess the range of possible alternatives and determine how well they performed when evaluated using specific criteria and performance metrics
- Identify the technically and economically feasible alternatives for further detailed study in the environmental document
- Save time and resources by conducting detailed studies on a smaller footprint area
- Reduce the area and extent of ground-disturbing studies for selection of the final alternative
- Provide a higher level of certainty and lowered risk of schedule delay

Caltrans hosted a series of workshops to solicit and refine LCG stakeholder input on the methodology and criteria. The purpose of each round of workshops was as follows:

- **Workshop Round 1:** Present initial alternatives analysis methodology and obtain initial stakeholder input. Based on stakeholder input, consider data needed to achieve each metric, determine whether another metric could serve as a proxy, or if the metric is useful in differentiating one alternative from another.
- **Workshop Round 2:** Discuss initial alternatives analysis results and recommended alternatives for further study using refined methodology and criteria. Assess further refinements to methodology and criteria based on stakeholder input.
- **Workshop Round 3:** Share the final alternative analysis results and the alternatives selected for further study as completed using the refined criteria and methodology. Allow stakeholders to review and support the process and understand the alternatives selected. Assess the level of support for Caltrans' decision.

The structure of Rounds 1 and 2 of the process was to conduct the same workshop with each of the four working groups. These groups include:

- Cultural Resources Working Group: Members have responsibilities for cultural resources management.
- Biological Resources Working Group: Members have responsibilities for natural resource management and permitting.

- Last Chance Grade Partners: Members have land ownership and land management responsibilities.
- Congressman Huffman's Stakeholder Group: Members include representatives from local governments, tribal groups, businesses, agencies, and environmental groups who provide feedback to all the partners involved.

The first workshop of this series was conducted with each of the four working groups between December 14 and 17, 2020. Participants identified the metrics of greatest importance and identified additional metrics for consideration. The results of the workshops were documented in a summary report, dated February 2021, that was provided to workshop participants.

During the second round of workshops, which was again conducted with each of the four working groups between March 1 and 4, 2021, the Project Team presented the results of the initial alternatives analysis using the refined methodology based on stakeholder input, an assessment of each alternative, and solicited stakeholder input on these results.

Workshop 3 was convened as one workshop for all four working groups, so that everyone could hear each other's questions and comments. It was held using Webex and designed to be interactive. Participants viewed a presentation (Appendix A) on the alternatives analysis process, timeline, value, and results, including clarification on the alternatives either selected for or removed from further detailed study, and the reasons behind those selections.

The presentation explained how the alternatives analysis process was used to select alternatives for further study and it detailed why these alternatives were being studied further.

Criteria and performance metrics were grouped into four general categories. They included:

- **Core factors** identified as most important across all working groups. These included major trees including old growth redwoods, construction costs, and mitigation costs, and were weighted most heavily in the analysis.
- **Operational factors:** road closure potential and cost to maintain
- **Construction factors:** time to construct, cut and fill amounts, etc.
- **Natural resource factors:** impacts on animals, vegetation, and waters

The Project Team developed numeric-based metrics and identified high, medium, and low risk ranges with corresponding color-coding in red, yellow, and green. The lowest scores, coded green, were considered most desirable in terms of each of the metrics. The performance of each alternative was assessed based on the metrics and assigned weighting. The team also varied the assigned weights for the metrics and tested the results to demonstrate how weighting variations could change the score. Of the seven build scenarios under consideration, Alternatives F and X consistently ranked most desirable in terms of the metrics. Next steps will include environmental field studies; a value analysis/constructability review; a CEQA/NEPA scoping meeting; engineering and environmental technical studies; release of a draft Environmental Document; a public hearing on the draft document; and release of a Final Environmental Document.

For more information on the alternatives, see section II.A below, as well as the presentation reproduced in Appendix A.

Following the presentation, participants were asked to provide feedback using the videoconferencing Chat feature, answering the question: “What’s still on your mind?” Participants were asked to share any lingering questions, comments, and requests for clarification. Stakeholders were asked to enter comments or questions, or, if they had no further questions and felt satisfied with the process and conclusions, they were asked to identify themselves and enter “Ok” in the Chat. Once all had responded, there was a ten-minute break while project staff entered a breakout room to clarify responses to the questions received. After the break, project staff provided responses to stakeholders’ questions, and invited further questions or comments either via the Chat feature or through spoken discussion.

At the conclusion of the discussion, participants were asked to identify their level of support for the overall alternatives assessment process, the recommendations for further study of Alternatives X and F, and the recommendations to remove Alternatives L, A1, A2, G1 and G2 from further study. Options for levels of support included: highly supportive, somewhat supportive, neutral, somewhat unsupportive, or do not support. Stakeholders participating by phone, who were unable to participate in the polling, were contacted after the workshop with an opportunity to provide their responses. The full polling results are included in Appendix B.

Workshop Attendance

In addition to Caltrans District 1 and project team staff, the following organizations were represented at Workshop 3:

- California Coastal Commission
- California Department of Fish and Wildlife
- California State Parks
- City of Crescent City
- Community Representative Kurt Stremburg
- Crescent City-Del Norte Chamber of Commerce
- Del Norte County Board of Supervisors
- Del Norte Local Transportation Commission
- Elk Valley Rancheria
- Environmental Protection Information Center (EPIC)
- Friends of Del Norte
- Green Diamond Resource Co
- Humboldt County Association of Governments
- Humboldt County Board of Supervisors
- National Oceanic and Atmospheric Administration
- National Park Service
- Office of Representative Jared Huffman
- Office of Senator Mike McGuire
- National Park Service
- Save the Redwoods League
- State Water Resources Control Board
- Tolowa Nation
- US Army Corps of Engineers
- US Environmental Protection Agency
- US Fish and Wildlife Service
- Yurok Tribe

II. Final Alternatives Assessment Results

The Project Team developed numeric metrics and identified ranges (high, medium, and low) with corresponding colors red, yellow, and green. High scores correlated with high impacts and were coded red. Scores in the medium range were coded yellow and low scores, considered most desirable, were coded green.

The Project Team assessed the performance of each alternative. The team also assigned weights and tested the results to demonstrate how weighting could influence the final score. The team looked at a variety of scenarios that changed the final scores but there were few modifications that resulted in a change in the rankings.

Alternatives X and F, which ranked the most desirable in overall performance, were recommended for further study. They are the best performers using the agreed-upon criteria and performance metrics. Due to their smaller project footprint, Caltrans will save \$10 million and can potentially reduce the project schedule by up to one year. Alternatives A1, A2, G1, G2, and L were found to perform less well and had higher potential impacts. As a result, they were recommended for removal from further study at this time. All have substantially higher environmental impacts; G1, G2, and L have an assessment of “medium” geotechnical risk, and both Alternatives A and G would have a much longer duration of construction.

There are two elements necessary for creating a long-term safe, reliable alternative at Last Chance Grade: landslide stabilization and avoidance. The Project Team described how the current process of making emergency repairs differed substantially from Alternatives X and F. Emergency repairs are localized and make use of very limited stabilization methods—chiefly retaining structures such as ground anchors and steel-reinforced concrete walls. Alternatives X and F, by contrast, both cover Last Chance Grade from end-to-end. Alternative X provides mitigation for the landslide and multiple purpose-engineered solutions including retaining structures, dewatering / subsurface drainage, and soil/rock removal, regrading, and benching. Alternative F provides landslide avoidance through creating a tunnel realignment, plus retaining structures and dewatering / subsurface drainage for stabilization at both portals.

Alternative X – Holistic Re-Engineering and Mitigation

Alternative X was developed at the request of the Federal Highway Administration (FHWA). FHWA wanted to ensure there was full consideration given to a holistic effort to reengineer a roadway generally along the current alignment to increase long-term stability through large-scale dewatering, walls and other structures, terracing, alignment retreat in specific locations and other improvements. To date, most repairs and improvements made to Last Chance Grade have been in reaction to earth movement.

Alternative X had positive performance on most of the criteria and performance metrics. For example, Alternative X has the lowest construction cost and the smallest project footprint (in the ranking with Alternative F), limiting potential impacts. However, Alternative X performed relatively poorly on the operations metrics related to potential for road closure and maintenance costs, eliciting concerns from some participants. Caltrans responded to such concerns by noting its successful implementation of dewatering activities at other locations and intention to further develop and refine this alternative prior to the environmental document.

Alternative X is notably distinct from the current practice of continuing to repair the existing alignment. It is an intentionally engineered end-to-end alternative, adding a much wider range of purpose-built engineering elements to what has been deployed for emergency repairs, and approaching the entire slide holistically to shift from reactive to proactive mode. Alternative X may include an end-to-end underground dewatering system. At certain locations along its limits, it would retreat inland from the current alignment and be buffered by walls both uphill and

downhill. It would likely include multiple retaining structures including tiered walls, soldier pile-lagging / ground anchors, and steel-reinforced concrete walls, and also remove soil and rock to allow for regrading at a flatter angle.

Alternative X is being studied further because it is currently considered technically feasible, with lower environmental impacts and costs relative to Alternatives A1, A2, G1, G2, and L. Caltrans has a fiduciary responsibility to study this alternative in more detail. Further study of Alternative X does not mean it would be built, only that it must be studied further to confirm feasibility.

Alternative F – LCG Tunnel

Alternative F includes approximately one mile of tunnel that runs generally parallel to the existing alignment to greatly reduce potential impacts to natural and cultural resources including old growth trees. While Alternative F is the second highest cost alternative, Alternative F has lower resource and construction impacts and performs well on operational metrics. Alternative F's relatively lower environmental impacts also correlate with reduced mitigation costs.

The tunnel would be designed based on solutions that have proven effective in similar areas and would be constructed to avoid the slide plane, with monitoring and safety systems in place. For stabilization at each portal, it would utilize tiered retaining walls and may require dewatering /subsurface drainage. Its south portal would be approached through a cut, with cross passages constructed between bores, and the north portal would have a bridge approach. Several examples were provided, including the Tom Lantos Tunnel at Devil's Slide in San Mateo County, California and the tunnel crossing the Bosphorus Strait in Istanbul, Turkey, which is constructed using a "seismic joint" system that can safely withstand geologic instability. At this time, it is anticipated that the tunnel would be constructed using a hard-rock tunnel boring machine (TBM), a high-tech solution which would create no surface disturbance along the alignment.

A. Stakeholder Questions and Comments

The bulk of the meeting provided an opportunity for participants to ask questions and share their comments. The following organizes and summarizes the questions and comments received. It is not intended as a transcription but serves to provide a summary of the response provided by Caltrans and the Project Team.

Overall Process

- *Question:* Is electing to move forward with studying Alternatives F and X a decision which has been made?
 - *Project Team Response:* It is the Project Team's recommendation. However, District leadership has been very clear that stakeholders must weigh in, and Caltrans is welcoming stakeholder feedback on that recommendation.
- Some participants expressed concern that it may be premature to remove more alternatives given that Alternative F is very expensive and it's uncertain whether Alternative X is feasible or would sufficiently stabilize the road to be worth pursuing. Alternative X will be a tough sell to the public; many people do not understand that Alternative X is different from what Caltrans is currently doing and are uncomfortable with the idea of having the road on or near the current alignment.

- Others expressed the opinion that while the concern and frustration is understandable, it's more cost-effective and time-saving to narrow the field, since studying more alternatives would increase project costs and lengthen the timeline for a solution to be found. They are willing to trust the engineers' expertise and feel that Caltrans has done their due diligence in terms of assessing the impacts and researching other sites in similar environments. They also agree that it's necessary to study Alternative X. It was stated that the process of choosing an alternative should be data driven, with a solution purpose-built for the geography, minimizing resource impacts as much as possible.
- It's important to clarify the distinction between alternatives on the west side of the ridge, and those on the east side which would have a much larger footprint. It would also be helpful to understand what is added to the timeline and cost to study a single other "eastside" alternative. The question can be asked: do we really want to add time, cost, and impacts to study options that already do not appear very feasible? There would be considerable lack of support for the east side alternatives due to the extensive environmental and other impacts.
 - *Project Team Response:* Studying one additional alternative would add \$10 million and one year. For context: studying Alternatives F and X would include about 150 acres. Once the east side is added, the study would include about 470 acres, due to terrain, amount of cut and fill, bridges, disposal areas needed, etc.
- It was noted that the public's concern about Alternative X is predicated on fear of a catastrophic failure of the entire hillside, which is considered to be unlikely; it would be helpful to clarify this.
 - The Project Team explained that it was clear from the beginning of the project that understanding the geology is a major risk factor. There is a possibility that both Alternatives F and X could potentially prove to be unfeasible, but this is considered a very small probability. If that does happen, Caltrans would reconsider other alternatives or develop new ones.
- *Question:* What are the estimated timelines for completion of Alternatives X or F?
 - *Project Team Response:* The estimated timelines for construction are 3.5 years for X, 7 years for F. Caltrans will work to reduce these timelines as much as possible, so the estimates may be reduced in the future.
- *Question:* if F is not feasible, could the alternatives currently considered for dismissal be ranked?
 - *Project Team Response:* They have been ranked; Alternatives A1 and A2 are the highest ranking of the alternatives removed from study, so they would likely be the next in line for consideration.

Specific Alternatives

Alternative X

- Concern was stated that some stakeholders and members of the public are not supportive of Alternative X, and that it will be difficult to convince them that it should be studied or considered. They are uncertain whether Alternative X is feasible or would sufficiently stabilize the road to be worth pursuing. To some it appeared unclear that Alternative X is different from what Caltrans is currently doing and they were uncomfortable with the idea of having the road on or near the current alignment.

- The Project Team once again clarified the distinction between Alternative X and the “no-build” option, which is what they are currently doing. The “no-build” option, which Caltrans is legally required to include as an option, but which is unfeasible as a long-term alternative, is continuing to repair the existing alignment, going back to the FHWA each time for just enough money to fix the current issues. Alternative X is an intentionally engineered end-to-end alternative, adding a much wider range of purpose-built engineering elements to what has been deployed for emergency repairs. It’s looking at the whole slide holistically and shifting from reactive to proactive mode. While Alternative X could potentially have slightly higher long-term maintenance costs compared to the other alternatives, they would be a small fraction of the costs for continuing to repair the current alignment.
- Other stakeholders expressed that it is appropriate to study Alternative X, and that they trust the engineers’ expertise and Caltrans’ due diligence.
- *Question:* How would the wells used for dewatering be powered? There have been issues with insufficient power on the grade in the past for uses such as monitoring. And would these wells be an active or passive system?
 - *Project Team Response:* The preference would be for a passive system with intersecting drains and a pump at one end, but more study will be required to learn if this would be effective. Sufficient power would be made available, but again, the requirements won’t be clear until more study has been completed.
- *Question:* Is there a ballpark estimate of the amount of water affected by the dewatering?
 - *Project Team Response:* This is not known yet; it would require onsite testing to determine firstly if dewatering is feasible, and secondly, what the volumes would be.
- It was suggested that, in order to provide long-term stability for Alternative X, buttressing would be required at the toe of the slide to protect against erosion at its base caused by ocean waves.

Alternative F

- Concern was stated that Alternative F is very expensive, and many members of the public are not supportive. However, it was noted that the lessened environmental impact justifies the additional expense.
 - The Project Team noted that alternatives A1, A2, G1, and G2 are also in the same price range, with much more environmental impact.
- *Question:* How long would the tunnel be?
 - *Project Team Response:* The current alignment is about 5,000 feet—just under a mile; approximately the same length as the Devil’s Slide tunnel.
- *Question:* Is it one tunnel or two?
 - *Project Team Response:* Twin tunnels of the same diameter, with one for in each direction. The directions could be switched as necessary, in the event of an emergency.
- *Question:* If one tunnel failed or wasn’t usable, are they wide enough to accommodate two-way traffic and bikes or would it be alternating one way?
 - *Project Team Response:* There would likely be one lane with wide shoulders in each tunnel, wide enough to allow for two directions in one tunnel, if necessary. The

- Project Team could consider including bike lanes; doing so would require additional ventilation. Bicycle access would be provided no matter what. If proceeding with Alternative F, a separate bike path may be considered in addition.
- Stakeholder comment: Tunnels would not be hospitable for either pedestrians or bikers. There is currently a lot of bike use on the 101 corridor, so this needs to be planned for. If Alternative F is selected, Alternative X could be that trail but, as pointed out, it would still require maintenance.
 - *Question:* Is it true that there is a geologic failure plane at 300 feet? Where is the tunnel alignment in relation to the deepest failure plane?
 - *Project Team Response:* Studies to date have encountered postulated failure planes, with the deepest at 275 feet. All possible efforts would be made to site the tunnel so that it does not cross these planes; if it is absolutely necessary to do so, there are technological solutions that could be added.
 - *Question:* Has the articulated tunnel lining approach been tested in a real-world seismic scenario?
 - *Project Team Response:* Yes, the Bosphorus Strait tunnel in Istanbul shown as an example was completed three years ago. There has been significant seismic activity since with no issues.
 - *Question:* Where is the disposal site for Alternative F? With 600,000 cubic yards of disposal, a dedicated site is needed.
 - *Project Team Response:* As described during the presentation, it is likely that the tunnel would be constructed using a hard-rock tunnel boring machine (TBM), a high-tech solution which would create no surface disturbance along the alignment. A small stockpile of the soil disposed near the portal would be trucked out each day, so there would be no need for a separate disposal site next to the construction site. The soil removed would be clean material useful for fill or other applications.
 - *Question:* What will become of the existing roadway if Alternative F goes forward?
 - This would be determined in coordination with the State Coastal Commission, California State Parks, and the National Park Service.
 - *Question:* Would there be aesthetic design considerations to blend the tunnel portals in with the landscape?
 - *Project Team Response:* This is easily addressed; there are many things that could be done to make a portal blend in.
 - *Question:* Does any type of wildlife—for instance, bats—use the type of tunnel at Devil's Slide likely to be used here?
 - *Project Team Response:* There would probably be controls to avoid nesting birds, etc., but because the tunnel would be an inhospitable environment, wildlife would likely be disinclined to settle there and would not be an issue. An additional benefit would be that wildlife would be able to roam freely above the tunnel.

III. Polling on Level of Support

Participant comments and feedback from the workshop indicated there was general support for the recommendation to proceed with further study of Alternatives F and X, and to remove

Alternatives L, A1, A2, G1 and G2 from further study at this time. There was concern voiced related to narrowing the field to only two build alternatives, based on perceptions that Alternatives F and X are not feasible, are too expensive, and/or lack popular support. However, the majority of stakeholders expressed trust in the process and satisfaction with progress made.

At the conclusion of the discussion, participants were asked to identify their level of support for the overall analysis process and conclusions. The polling was not considered a binding vote but was crucial to gauging the stakeholders' comfort in Caltrans' moving ahead with their recommendations based on the analysis. The stakeholders' support as partners in the process is vital to successfully creating a safe and reliable roadway at Last Chance Grade. Thirty-five (35) participants participated in the polling. Participants were asked to identify their level of support for the following topics. Levels of support were identified as supportive, somewhat supportive, neutral, somewhat unsupportive, and not supportive.

Through the polling, Caltrans concluded: Not all participants answered every question. A few had difficulties with technology during the meeting and shared their responses in follow-up emails to Caltrans.

- There was positive support for the process used to analyze the alternatives.
- All but two of 34 stakeholders supported further study of Alternative X. These stakeholders expressed their concerns and Caltrans is aware that local residents may share some of these same concerns.
- There was stakeholder support for further study of Alternative F.
- All but two stakeholders (out of 32), were supportive of Alternatives L, A1, A2, G1 and G2 being removed from further study.

The specific questions asked included:

1. What is your level of support for the overall process used to analyze the alternatives?
2. What is your level of support for Alternative X being studied further in the impact analysis?
3. What is your level of support for Alternative F being studied further in the impact analysis?
4. What is your level of support for Alternatives L, A1, A2, G1 and G2 being removed from further study?

Appendix A. Workshop Materials

Appendix A: Workshop Materials



Alternatives Analysis Methodology – Workshop #3

Thursday, April 22, 2021
2:00 p.m. – 4:30 p.m.

Workshop Objectives:

- Review and Endorse the Alternatives Assessment Methodology and Process
- Review and Confirm the alternatives selected by Caltrans (X & F) for further study in the impact analysis

Topic	Speaker	Discussion Tool
Welcome and Agenda Review	Jaime Matteoli, Caltrans Joan Chaplick, MIG	Chat and Raise Hands
Review Alternatives Process & Results	Dina Potter, HNTB John Cook, ICF	Chat and Raise Hands
Review Alternatives X & F and why they were selected for further study	Dina Potter, HNTB John Cook, ICF	Chat and Raise Hands
Review Alternatives L, A1, A2, G1 & G2 and why they were not selected for further study	John Cook, ICF	Chat and Raise Hands
Group Discussion	Joan Chaplick, MIG All participants	Chat
Poll Level of Support	Joan Chaplick, MIG Karen Wang, HNTB	Polling
Discuss Next Steps	Jaime Matteoli	Chat and Raise Hands



LAST CHANCE GRADE

Alternatives Analysis Workshop #3

April 22, 2021

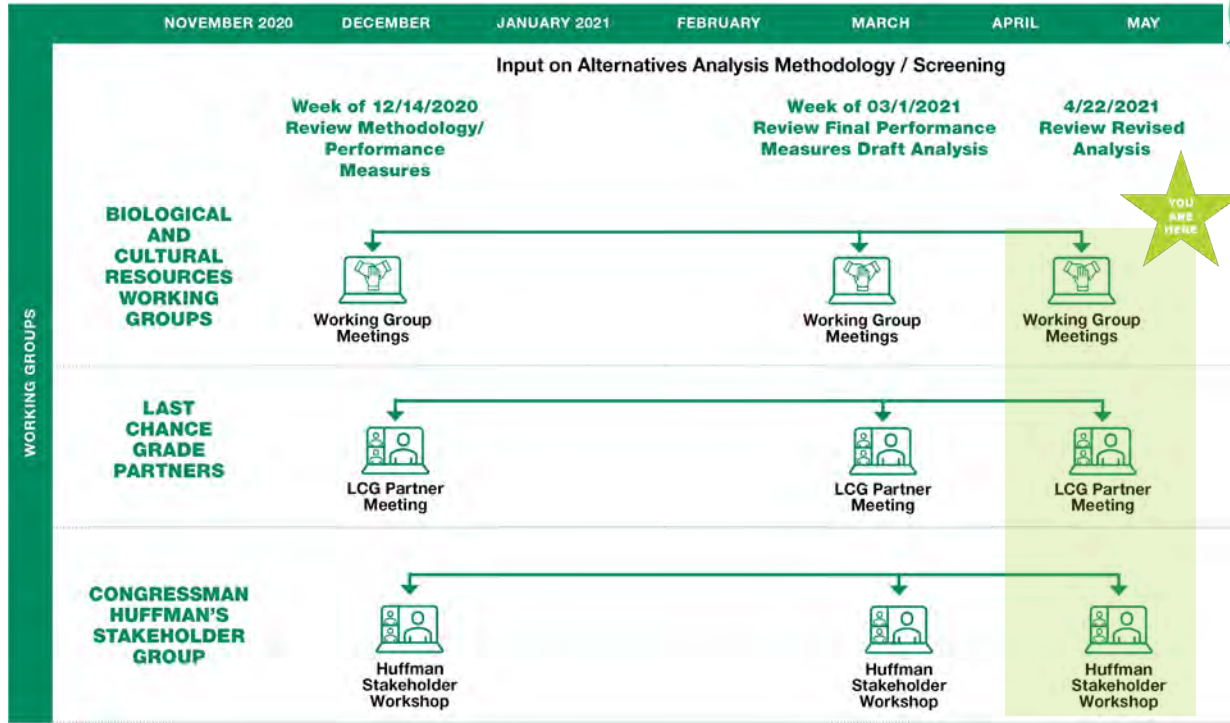


Workshop Objectives



- Review and support the Alternatives Assessment Process
- Understand the alternatives (F and X) selected by Caltrans for further detailed study in the environmental document
- Assess the level of support for Caltrans' decision
- Hear from each other and share perspectives

Alternatives Analysis Process



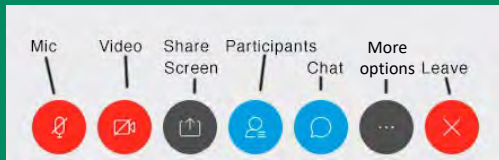
Agenda



- Review alternatives analysis process and results
 - Alternatives F and X and why they were selected for further detailed study
 - Alternatives A1, A2, G1, G2 and L and why they were not selected for further detailed study
- Stakeholder Questions and Comments
- Polling on Levels of Support
- Next Steps



Virtual participation on Webex



1 Audio & Video

Computer

- Use the toolbar

Phone

- Access dial-in number

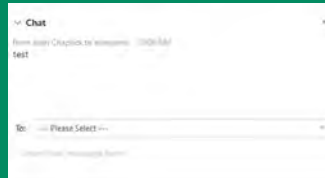
Video

- Use “+” and “-” controls to zoom in or out

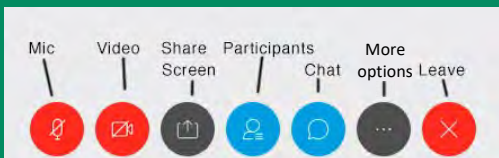


2 Chat

- Click on the chat and type your comments and questions
- We’ll take comments throughout the workshop

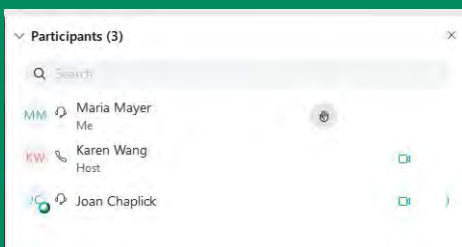


Virtual participation on Webex

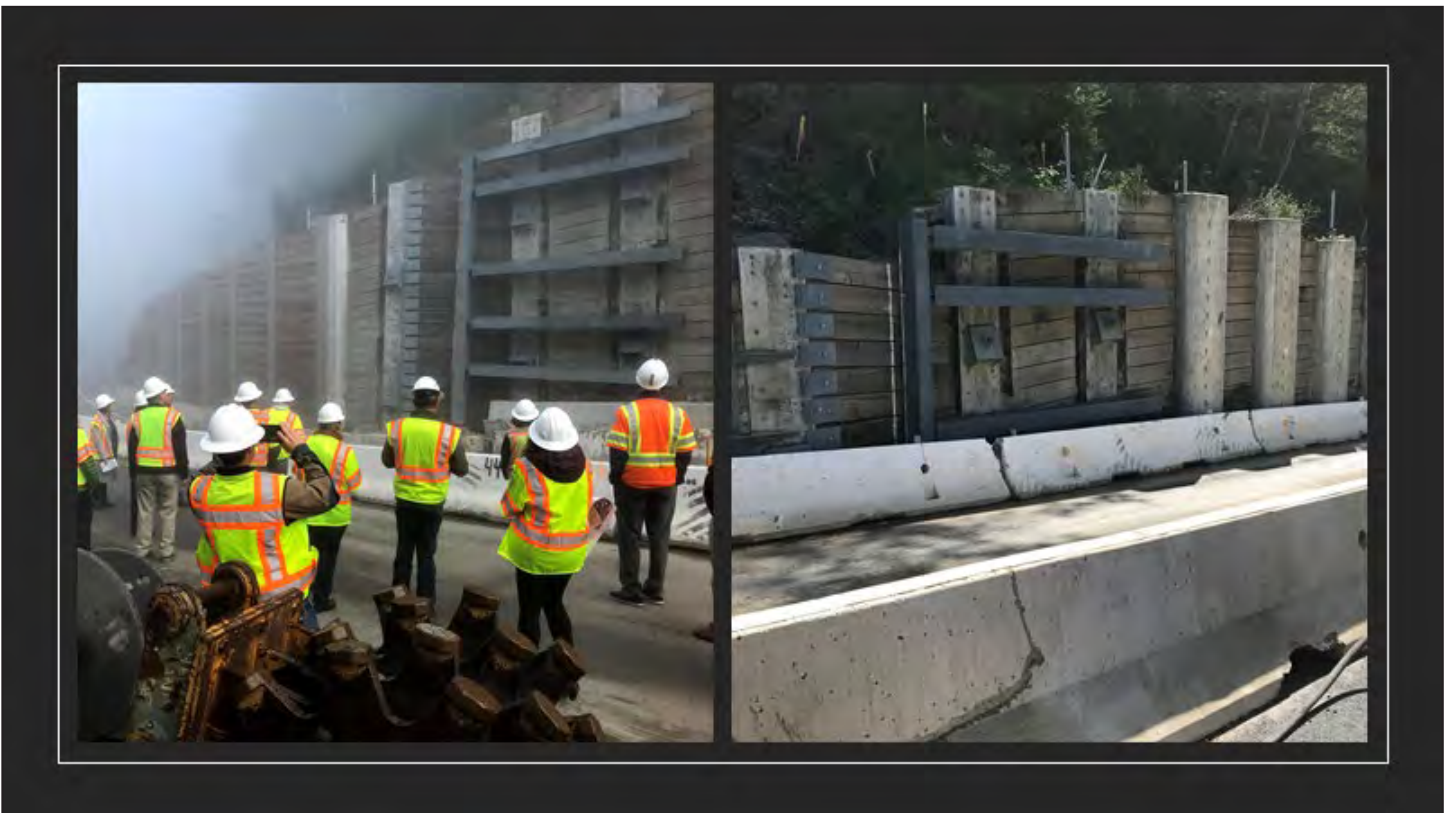
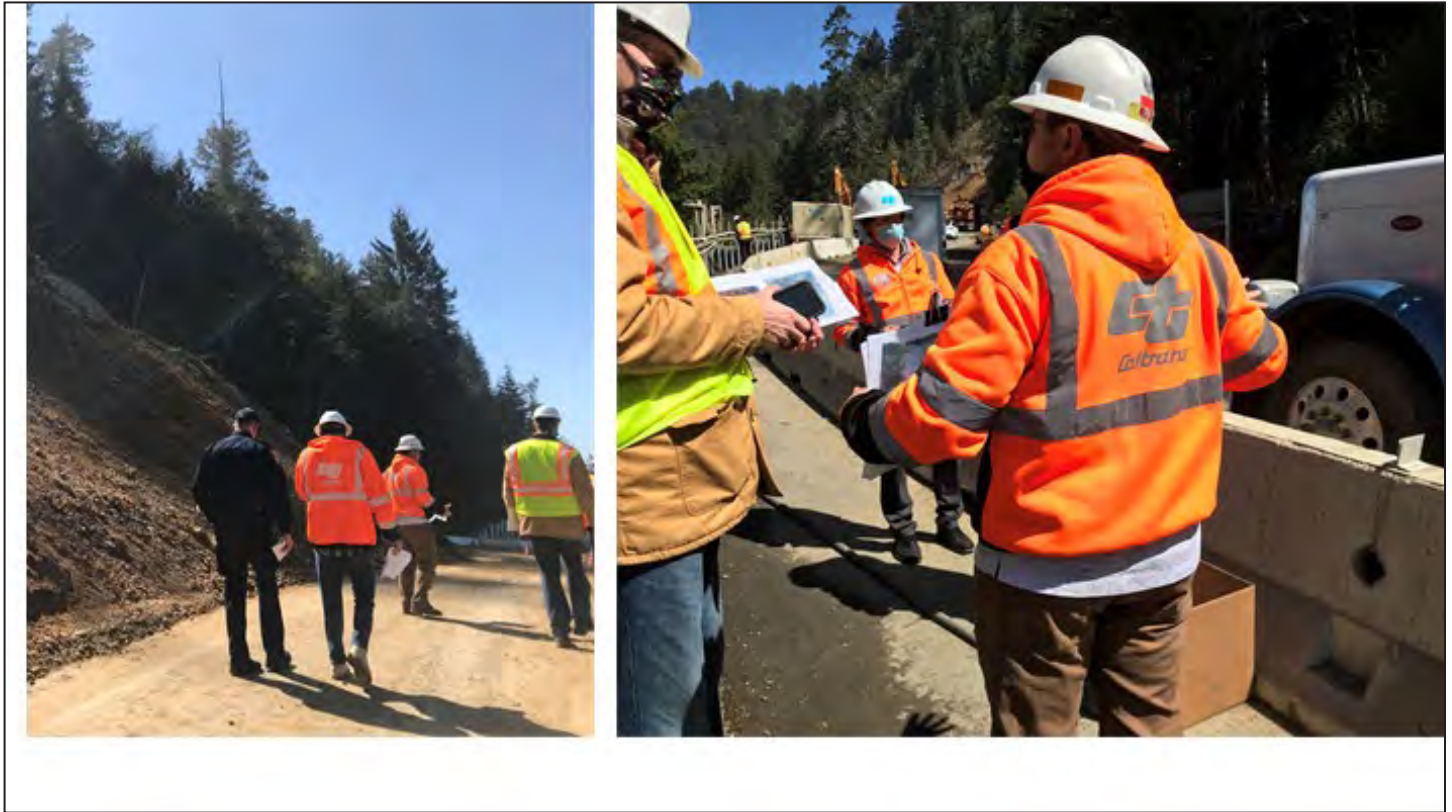


Participants

- Select icon on the toolbar to open the participants’ window
- Select ‘Raise Hand’ button



Note: The following 3 slides depict a field trip to Last Chance Grade provided on April 21, 2021, with Caltrans' Chief Deputy Director, James Davis, in attendance, showing substantial progress made on recent repairs to damaged caused by landslides



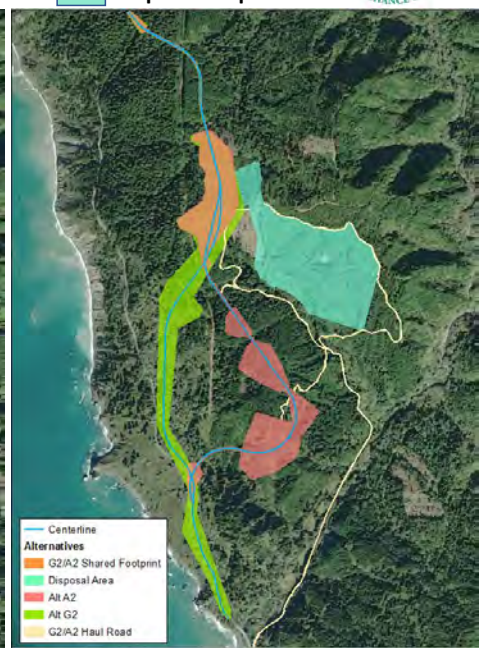
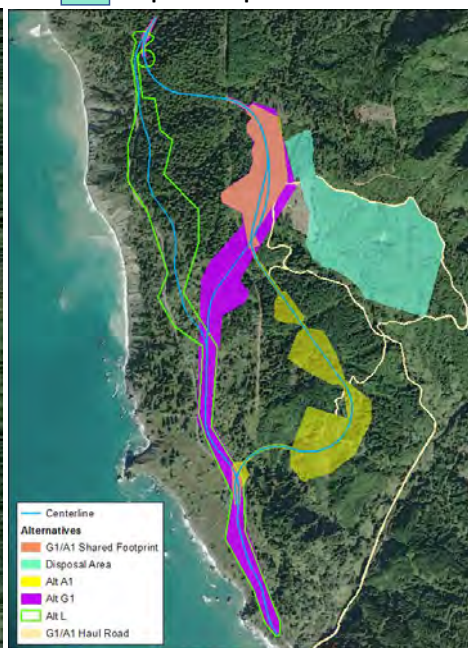


Alternatives Overview

- X - Yellow
- F - Red

- L - Green
- A1 - Yellow
- G1 - Purple
- A1/G1 Overlap - Peach
- Disposal - Aqua

- A2 - Brick red
- G2 - Green
- A1/G1 Overlap - Peach
- Disposal - Aqua



Value of Alternatives Assessment to Identify Alternatives for Further Detailed Studies



- Assesses the range of possible alternatives
- Identifies the technically and economically feasible alternatives for further detailed study in the environmental document
- Saves time and resources by conducting detailed studies on a smaller footprint area
- Reduces the area and extent of ground-disturbing studies for selection of final alternative
- Provides higher level of certainty, lowered risk of schedule delay

Final Alternatives Assessment Results



- F and X are top two in overall performance
 - F ranks high in all factors (landslide avoidance)
 - X strong except in Operations (landslide mitigation)
- All other alternatives perform lower than F or X

	X	L	F	A1	A2	G1	G2
Core Factors (Trees, Construction and Mitigation Costs)	1	3	2	3	3	7	3
Operational Factors	6	6	1	1	1	4	4
Construction Factors (Time to Construct, Cut and Fill, etc)	2	3	1	5	3	5	5
Natural Resource Factors (Animals, Vegetation, Waters)	2	3	1	4	4	6	6
All Factors Together	2	5	1	4	4	7	6

Why Not Further Study A1/A2, G1/G2, L?

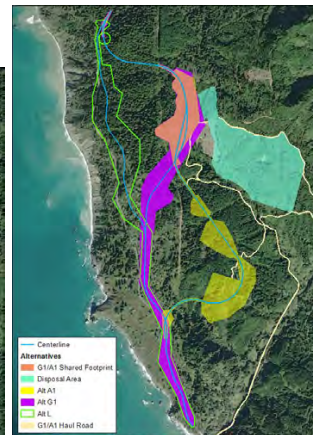


A2, G2

- All have substantially higher environmental impacts
- Gs and L have “medium” geotechnical risk
- As and Gs have longer construction duration

F and X

A1, G1, L



Why Further Study F and X?



- Best performers using agreed criteria
- Saves \$10M this year
- Reduces environmental schedule by one year
 - 2026 becomes 2025
- Reduces risk of delays and cost increases



Why is X Being Studied Further?



- Environmental document must include a reasonable number of alternatives that are technically and economically feasible with fewer environmental impacts – **currently F and X are the most feasible**
- X is currently technically feasible with lower environmental impacts and costs relative to A1/A2, G1/G2 and L. Caltrans has a fiduciary responsibility to study this alternative in more detail
- **Further study of X does not mean it will be built!**

Landslide Stabilization and Avoidance

Emergency Repairs

Localized

1. Avoidance - None
2. Stabilization
 - Retaining structures
 - Soldier pile-lagging/ ground anchors
 - Steel-reinforced concrete walls

Alternative X

End-to-End

1. Avoidance – Mitigation
2. Stabilization
 - Retaining structures
 - Tiered walls
 - Soldier pile-lagging/ ground anchors
 - Steel-reinforced concrete walls
 - Dewatering/ Subsurface Drainage
 - Soil/Rock Removal
 - Regrade at a flatter angle
 - Benching

Alternative F

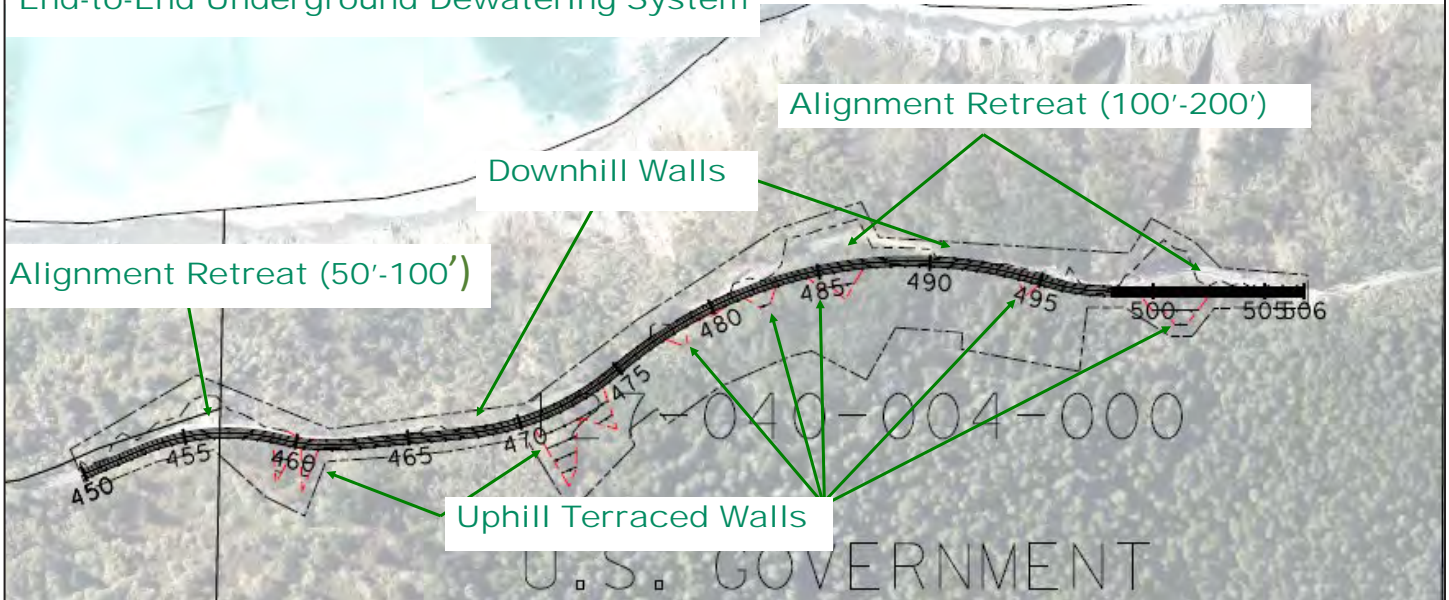
End-to-End

1. Avoidance – Realignment w/ Tunnel
2. Stabilization at Portals
 - Retaining structures
 - Tiered walls
 - Dewatering/ Subsurface Drainage

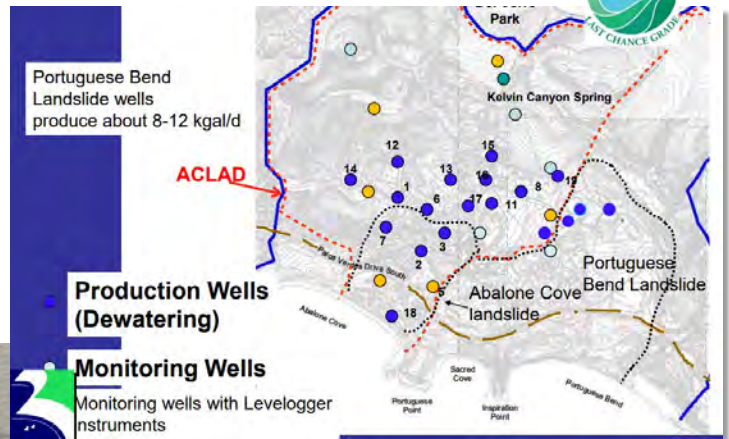
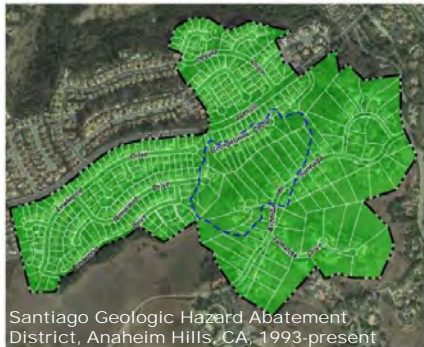
Alternative X – Holistic Mitigation



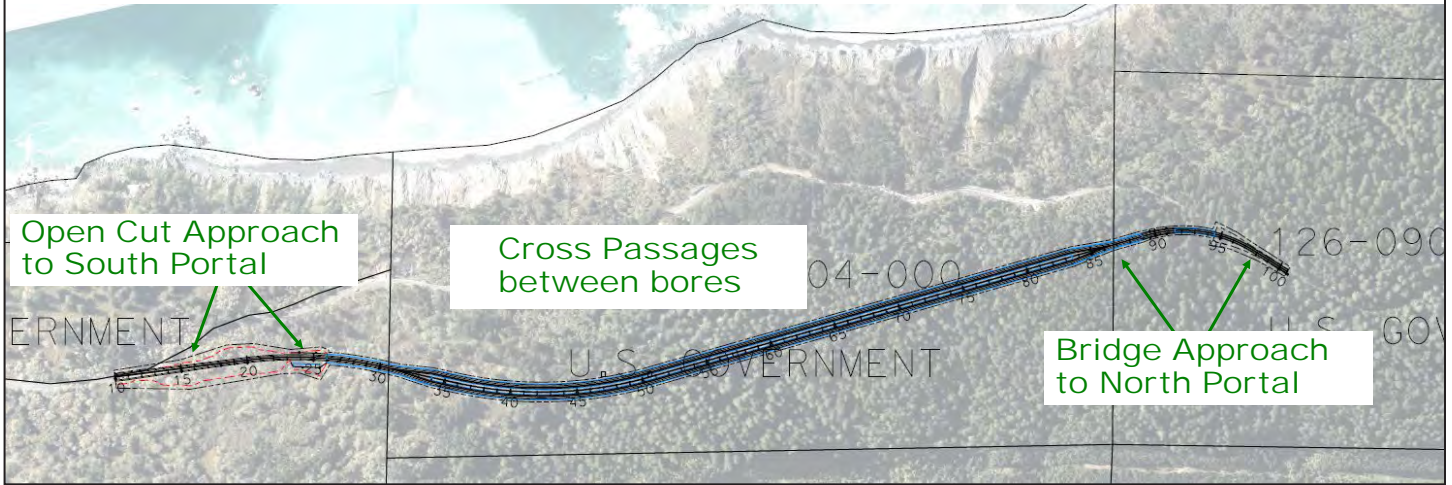
End-to-End Underground Dewatering System



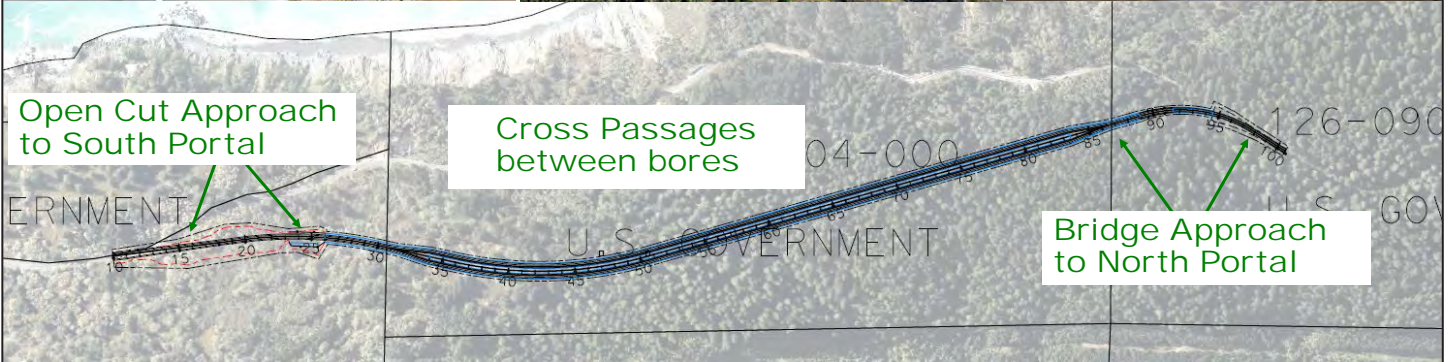
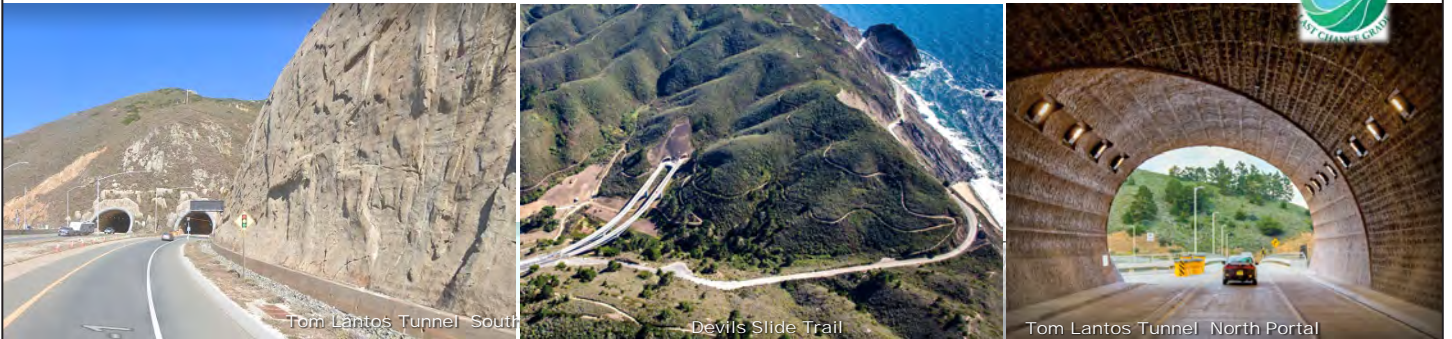
Dewatering System Examples (SoCal)



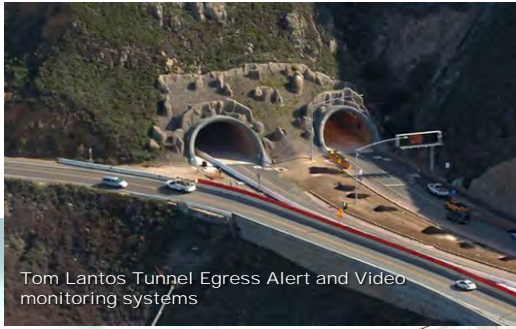
Alternative F Tunnel -Avoidance



Tunnel Portal Examples



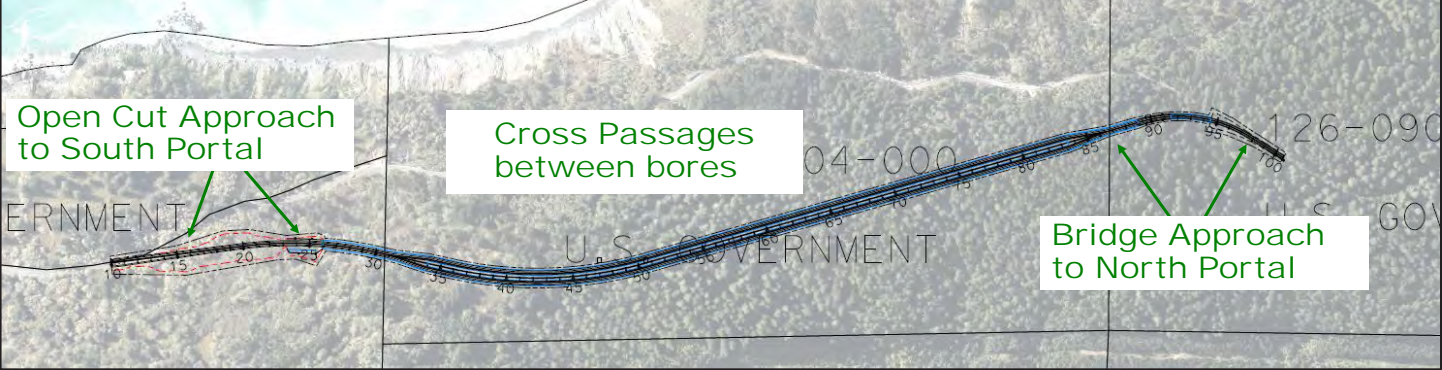
Tunnel Safety Examples



Open Cut Approach to South Portal

Cross Passages between bores

Bridge Approach to North Portal



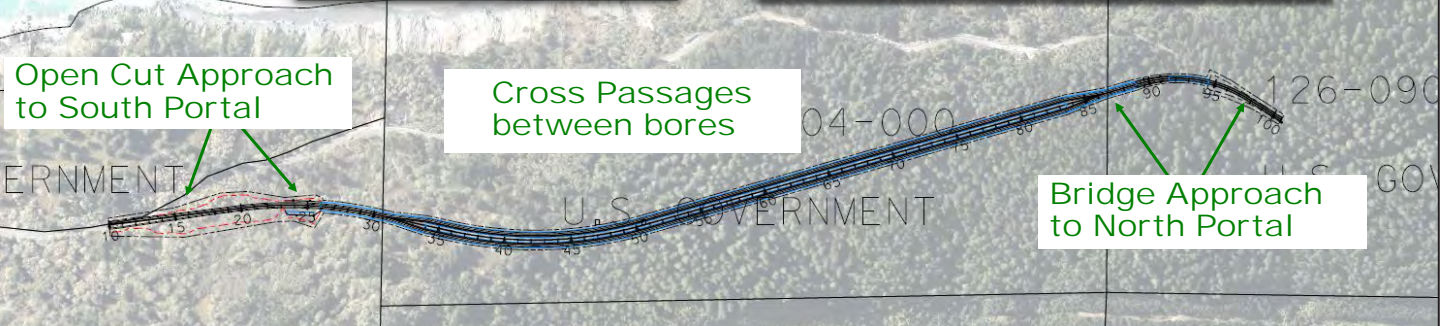
Tunnel Construction Examples



Open Cut Approach to South Portal

Cross Passages between bores

Bridge Approach to North Portal



What's still on your mind?



Participants, please take a moment to:

- Enter any thoughts and questions in the chat.
- We'd like a response from everyone
- If you don't have a question, please enter "ok" in the chat.

Polling Slides – 4 Questions

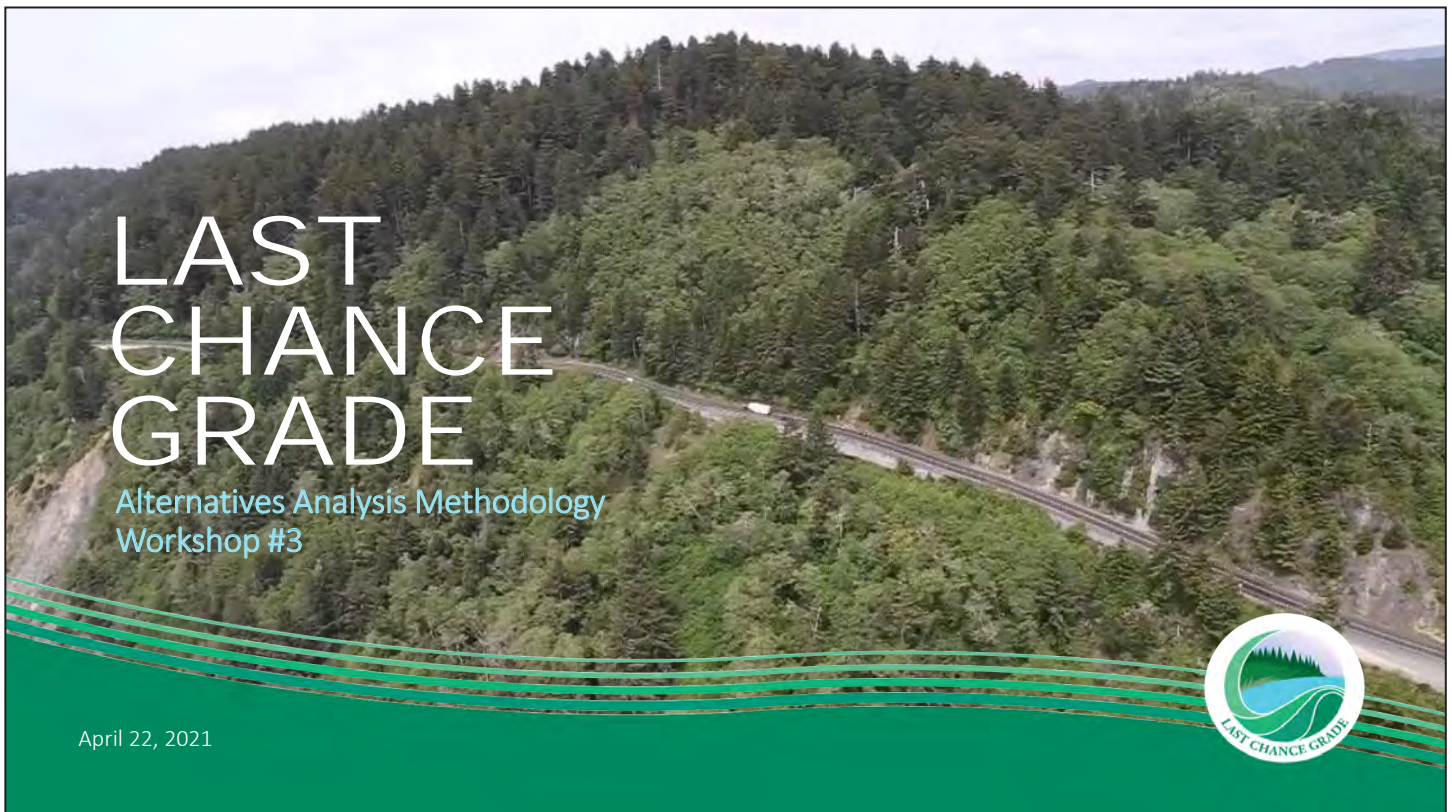


1. Level of support for the overall process used to analyze the alternatives
2. Level of support for X being studied further in the impact analysis
3. Level of support for F being studied further in the impact analysis
4. Level of support for L, A1, A2, G1 and G2 being removed from further study

Next Steps



- Environmental field studies
- Value Analysis/ Constructability review
- CEQA/ NEPA scoping meeting
- Engineering and environmental technical studies
- Draft Environmental Document
- Public Hearing
- Final Environmental Document



Appendix B. Workshop Results

Appendix B: Workshop Results

**Last Chance Grade Permanent Restoration Project
Alternatives Analysis Methodology – Workshop #3
Thursday, April 22, 2:00-4:30 p.m.
Record of Stakeholder Invitations and Attendance**

Attended—Stakeholders

California Coastal Commission

- Tamara Gedik, Coastal Program Analyst
- Amber Leavitt, Transportation Program Analyst
- Bob Merrill, North Coast Director

California Department of Fish and Wildlife

- Jennifer Olson, Senior Environmental Scientist, Coastal Conservation Planning

California State Parks

- Amber Barton, Associate State Archaeologist
- Victor Bjelajac, District Superintendent II
- Rosalind Litzky
- Amber Transou, Environmental Scientist - North Coast Redwoods District
- Carol Wilson, Environmental Scientist

City of Crescent City

- Ray Altman, Council Member
- Jason Greenough, Mayor

Community Representative

- Kurt Stremberg

Crescent City-Del Norte Chamber of Commerce

- Cindy Vosburg, Executive Director

Del Norte County Board of Supervisors

- Valerie Starkey, Supervisor, District 2

Del Norte Local Transportation Commission

- Gerry Hemmingsen, Commissioner; Del Norte County Board of Supervisors, District 4
- Tamera Leighton, Director

Elk Valley Rancheria

- Kevin Mealue, Cultural Resource Specialist
- Crista Stewart, Tribal Historic Preservation Officer (THPO)
- Richard Warner, Transportation, Vice Chairman

EPIC

- Tom Wheeler, Executive Director

Friends of Del Norte

- Don Gillespie

Green Diamond Resource Co

- Craig Compton, North Coast Director

Humboldt County Association of Governments

- Gordon Johnson, Council Member, City of Rio Dell

Humboldt County Board of Supervisors

- Steve Madrone, Supervisor, 5th District

National Oceanic and Atmospheric Administration

- Mike Kelly, Fisheries Biologist

National Park Service

- Keith Bensen, Fish and Wildlife Biologist, Redwood National Park
- Kevin McCardle, Historical Landscape Architect
- Steve Mietz, Superintendent, Redwood National and State Parks
- Saylor Moss, Historical Landscape Architect

Office of Representative Jared Huffman

- Ciara Emery, Field Representative
- John Driscoll, District Representative

Office of Senator Mike McGuire

- May Johnson
- Kerrie Lindecker, District Director / Communications Coordinator

Redwood National Parks

- David Roemer, Deputy Superintendent

Save the Redwoods League

- Richard Campbell, Director of Restoration

State Water Resources Control Board

- Susan Stewart, North Coast Regional Water Control Board

Tolowa Nation

- Charlene Storr, North Coast Director

US Army Corps of Engineers

- Daniel B. Breen, Senior Regulatory Project Manager

US Environmental Protection Agency

- Carolyn Mulvihill, NEPA Reviewer - Transportation

US Fish and Wildlife Service

- Gregory Schmidt, Fish and Wildlife Biologist

Yurok Tribe

- Rosie Clayburn, Tribal Historic Preservation Officer (THPO)

Attended—Project Staff

Caltrans District 1 Staff

- Steven Croteau, Senior Environmental Planner, North Region Environmental
- Kellie Eldridge, Environmental Planner
- Alexis Kelso, Project Planning Liaison
- Jaime Matteoli, Last Chance Grade Project Manager
- Charlie Narwold, Chief of Geotechnical Services

Project Team (Consultants)

HNTB

- Mala Ciancia, Principal Tunnel Geologist
- John Litzinger, Group Director / Senior Project Manager
- Dina Potter, Project Manager
- Karen Wang, Associate Vice President

ICF

- John Cook, Environmental Planning Principal

Area West Environmental

- Aimee Dour-Smith

MIG, Inc.

- Joan Chaplick, Public Engagement Manager
- Maria Mayer, Senior Project Associate

National Center for Conflict Resolution

- Joy Keller-Weidman, Senior Program Manager

Invited, Did Not Attend—Stakeholders

C. Renner Petroleum

- Sabina Renner, CEO / Secretary

California Coastal Commission

- Tami Grove, Transportation Program Manager

California Highway Patrol

- Lieutenant Larry Depee, Commander

California State Parks

- Greg Collins, Supervisor, Cultural Resources Program, North Coast Redwoods District
- Shannon Dempsey, North Coast Redwoods District
- Lathrop Leonard, Forester I
- Brett Silver, District Superintendent I
- Keith Slauson, Ecologist

County of Del Norte

- Heidi Kunstal, Community Development Director (contacted re replacement for prior representative Taylor Carsley, Planner, who no longer works for County)

Del Norte County Board of Supervisors

- Bob Berkowitz, Vice-Chair, Supervisor, District 5 (Board represented by alternate Valerie Starkey)

National Oceanic and Atmospheric Administration

- Dan Free, Fisheries Biologist
- Jeffrey Jahn, Branch Chief, West Coast Regional Office (briefed by Mike Kelly, who did attend)

National Park Service

- David Best, GIS Coordinator, Redwood National Park
- Leonel Arguello, Chief, Resource Management and Science

Redwood National Parks

- Karin Grantham, Chief, Resource Management and Science

Resighini Rancheria

- Kathy Dowd, THPO, Councilperson
- Moonchay Dowd, Vice-Chairperson, General Assistance Program (GAP) Manager
- Shaunna McCovey, Director of Natural Resources & Governmental Affairs
- Bradford Norman, Wetlands Coordinator
- Megan Van Pelt, Executive Director

Invited, Did Not Attend—Caltrans District 1 Staff

- Tim Keefe, Senior Environmental Planner
- Clayton Malmberg
- Matt Smith, Design
- Alexandra Thiel, Environmental Planning, Biologist
- Stacey Zolnoski, Associate Environmental Planner / Archaeologist

Rumiano Cheese

- Gary Smits

Tolowa Dee-ni' Nation

- Leann Babcock, Chair
- Zack Chapman, TERO Director
- Tim Hoone, Transportation Planning Director
- Karin Levy, Cultural Resource Specialist
- Amanda O'Connell, Tribal Historic Preservation Officer (THPO)
- Erika Partee, Natural Resources Director
- Marvin Richards, Senior Tribal Council

Tolowa Nation

- Max Keyes, Chairman
- Raja Storr

US Army Corps of Engineers

- Sarah M. Firestone
- L.K. Sirkin, Lead Biologist

US Environmental Protection Agency

- Jennifer Siu, Wetlands Section

Yurok Tribe

- Don Barnes, Director, Office of Self-Governance
- Suzanne Fluharty, Division Manager, Community and Ecosystem
- Matthew Hanington, Water Division Manager
- Dave Hillemeier, Director, Fisheries Department
- Joseph James, Chairman
- Grant Klopmeyer, Transportation Planner
- Louisa McCovey, Environmental Director
- Richard Nelson, Director, Watershed Restoration
- Samantha Reid, Cultural Resource Specialist
- Chris West, Senior Wildlife Biologist

Last Chance Grade Working Group Alternatives Analysis Methodology Workshop 3 - Polling Results

Question	Highly supportive		Somewhat supportive		Neutral		Somewhat unsupportive		Do not support		Total #
	%	#	%	#	%	#	%	#	%	#	
1. What is your level of support for the overall process used to analyze the alternatives?	57%	20	34%	12	9%	3	0%	0	0%	0	35
2. What is your level of support for X being studied further in the impact analysis?	65%	22	18%	6	12%	4	0%	0	6%	2	34
3. What is your level of support for F being studied further in the impact analysis?	73%	22	17%	5	10%	3	0%	0	0%	0	30
4. What is your level of support for L, A1, A2, G1 and G2 being removed from further study?	38%	12	34%	11	22%	7	6%	2	0%	0	32

ATTACHMENT C

**MEMORANDUM: ENVIRONMENTAL CONDITIONS –
CONSTRAINTS MAP (APRIL 2021)**

SAMPLE GIS MAP ANALYSIS

Last Chance Grade Permanent Restoration Project Environmental Conditions – Constraints Map Final

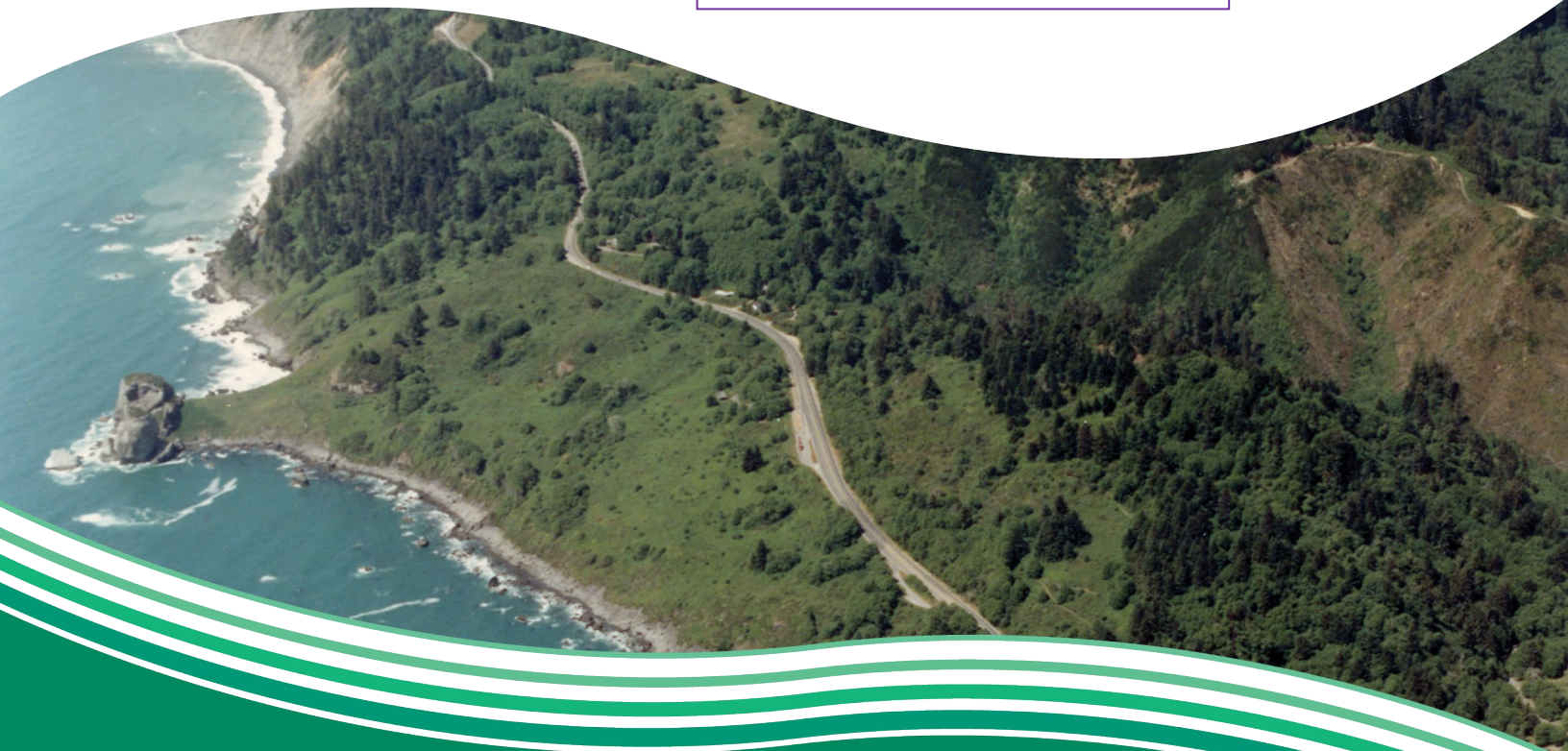
Submittal #020

March 4, 2021

Visual Check 03/26/21

Dina Potter

Include names/dates of file referenced
thar are ported on AGOL.



EA# 01-0F280
Project EFIS# 0115000099
Del Norte County, U.S. 101,
PM 12.0/15.5



DRAFT MEMORANDUM

To:	California Department of Transportation (Caltrans), District 1: Jaime Matteoli, Steve Croteau, Kellie Eldridge, Ali Thiel HNTB: Dina Potter, John Litzinger, Karen Wang
From:	Project Environmental Consultant Team: ICF: John Cook, Eric Link, Manna Warburton
Date:	April 1, 2021
Re:	Environmental Conditions – Constraints Map (165.05.15)

ICF has compiled a map of preliminary environmental constraints (constraints map). The purpose of the constraints map is to help inform the alternatives analysis and initial design, leading to preparation of the draft environmental document.

ICF has compiled the constraints map in electronic format, specifically ArcGIS Online (sometimes known by the acronym “AGOL”). The electronic format facilitates sharing of this vital information among the entire project development team, any periodic updating of project information, and incorporating new information that may be obtained. ICF’s initial preparation of the constraints map reflected Environmental Survey Limits (ESL) for each project alternative current as of February 2021 (referred to internally as “Revision 4”). The ESL includes all areas where ground disturbance is anticipated, including cut and fill areas, temporary construction easements, disposal areas, and haul roads. The GIS tool allows for users to see (and calculate) how specific alternatives overlay various environmental resource areas (described below) and thus to test how modifications to such alternatives change potential impacts on resources constraining the design.

As further detailed in Table 1 below, the content of the constraints map includes “base” information about existing features, including the existing roadway (US 101), haul roads and culverts within the Green Diamond Resource Company (GDRC) portion of the project area, and boundaries of the National and State Parks (including designated trails).

The majority of constraints concern biological resources. Habitats of botanical and wildlife species of concerns are drawn from the California Natural Diversity Database (CNDDDB), the United States Fish and Wildlife Service, and other sources including those provided by Caltrans District 1. The constraints map also includes relevant information such as the extent of the Coastal Zone and planned timber harvest areas within GDRC land.

Table 1: Initial Data Sources for Last Chance Grade Constraints Mapping

ArcGIS Online Data Layer Name	Source	Date
Project Engineering Information		
LCG V4 Alternatives ROW Footprints Compiled 20210128	HNTB - ArcGIS Online Shared Layer	2/15/2021
LCG V4 Alternatives Disposal Sites Compiled 20210128	HNTB - ArcGIS Online Shared Layer	2/5/2021
Ortho Aerial 2016 Footprint Tile Index - Pure Vector	HNTB - ArcGIS Online Shared Layer	11/12/2020
Access Roads Compiled V4	HNTB - ArcGIS Online Shared Layer	2/8/2021
Existing Exploration Access Paths - Road	HNTB - ArcGIS Online Shared Layer	2/4/2021
Existing Exploration Access Paths - name	HNTB - ArcGIS Online Shared Layer	2/4/2021
Natural Resource Information		
LCG Vegetation	Caltrans	2/8/2021
MAMU Critical Habitat	United States Fish and Wildlife Service	9/17/2020
MAMU Habitat on Green Diamond Resource Company Property	Caltrans/Green Diamond Resource Company ¹	9/30/2020
Caltrans_LCG_Geo_P2_Veg_Types	Caltrans	10/15/2019
Caltrans_LCG_Geo_P2_Rare_Plants	Caltrans	9/30/2019
Rare Plants GDRC	Caltrans/Green Diamond Resource Company	2/10/2021
DNCRSP - Plants	Caltrans/Redwood National & State Parks ²	5/13/2020
Wolf's evening-primrose (Oenothera wolfii)	Caltrans/Redwood National & State Parks	5/13/2020
Salmonid Species Distribution	Green Diamond Resource Company	5/13/2020
Coastal Marten	Coastal Marten Connectivity Analysis (https://www.fws.gov/arcata/shc/marten/)	10/1/2020
Natural Landscape Blocks - California Essential Habitat Connectivity (CEHC) [ds621]	ESRI Arc GIS On Line/California Department of Fish and Wildlife	3/19/2020
Potential Riparian Connections - CEHC [ds622]		2/12/2020
Natural Areas Small - California Essential Habitat Connectivity (CEHC) [ds1073]		2/12/2020
LCG CNDDDB - Plants	California Department of Fish and Wildlife	1/1/2021

¹ All data regarding Green Diamond Resource Company was provided to the ICF team via Caltrans.

² All data regarding Redwood National and State Parks was provided to the ICF team via Caltrans.

ArcGIS Online Data Layer Name	Source	Date
LCG CNDDDB - Animals	California Department of Fish and Wildlife	1/1/2021
NSO Activity Center	California Department of Fish and Wildlife	11/17/2020
Other Information		
State and National Parks	California Protected Areas Database (CPAD) www.Calands.org	6/30/2019
Park Trails	HNTB - ArcGIS Online Shared Layer	1/6/2021
Inland Coastal Zone	HNTB - ArcGIS Online Shared Layer	6/30/2020
Green Diamond Road Network	HNTB - ArcGIS Online Shared Layer	1/6/2021
GDRCO Harvest Planning 10yr	Caltrans/Green Diamond Resource Company	6/4/2020
Hydrography	Caltrans/Green Diamond Resource Company	5/13/2020
Culvert Locations (GDRC)	Caltrans/Green Diamond Resource Company	6/19/2020

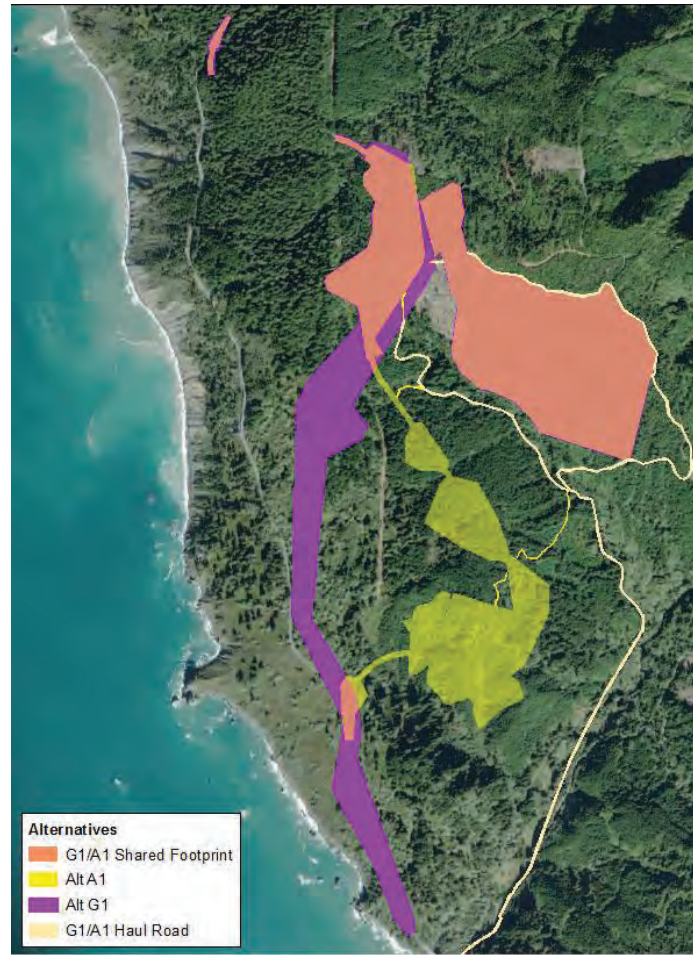
Alternatives Overview

“West Side”

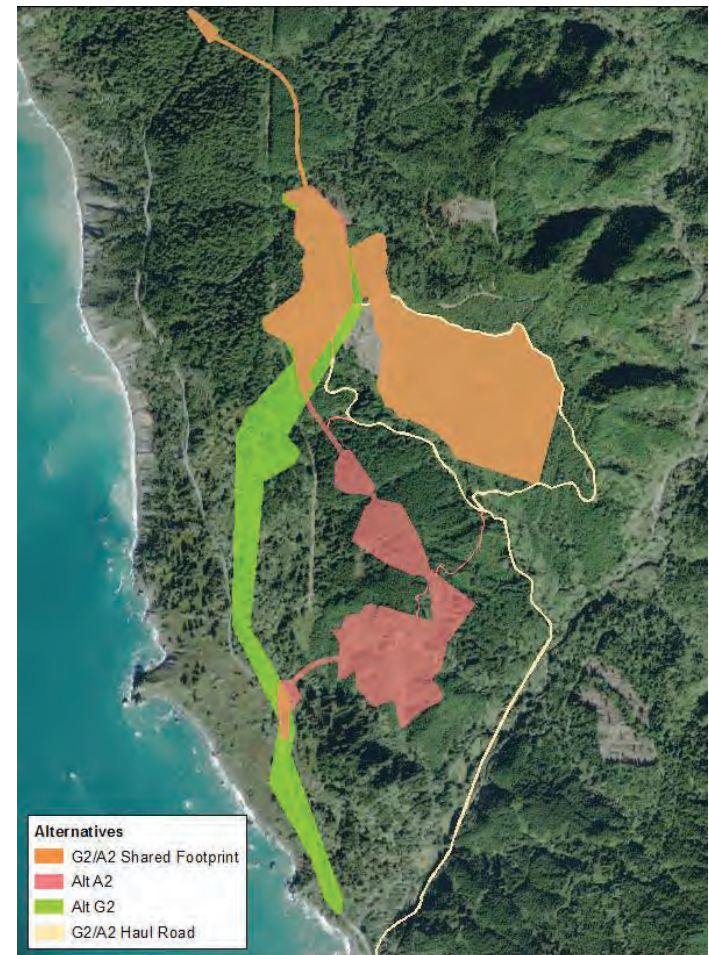
X (Yellow), F (Red), and L (Peach)



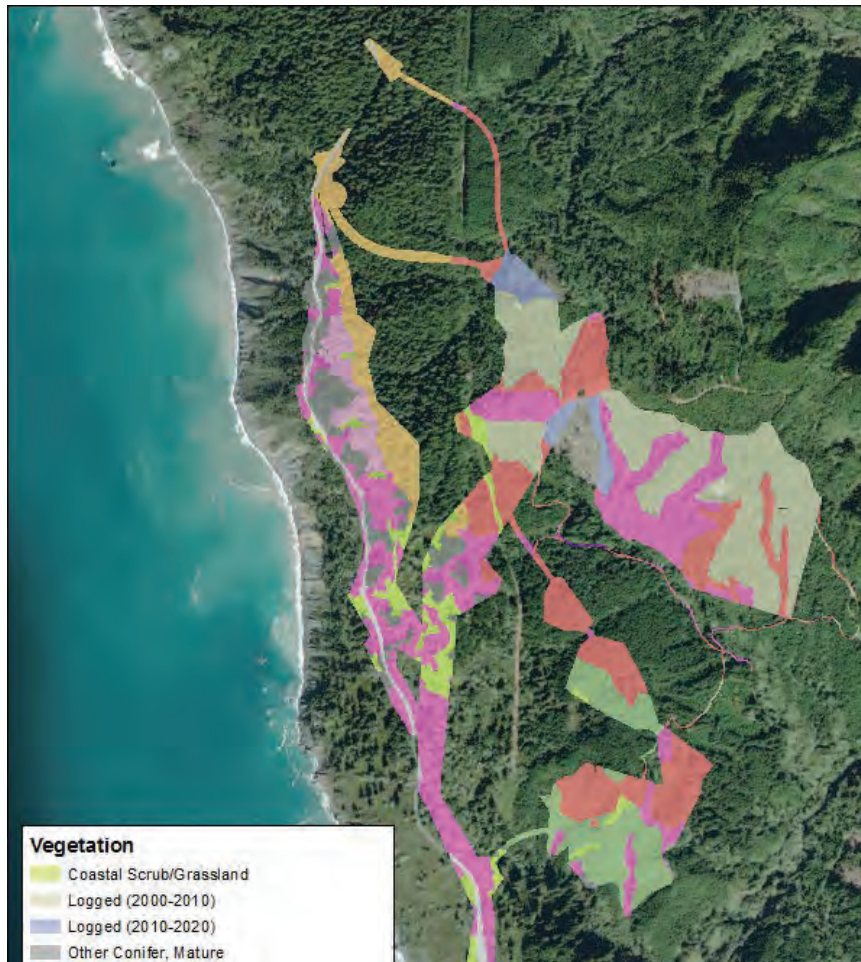
A1 and G1



A2 and G2



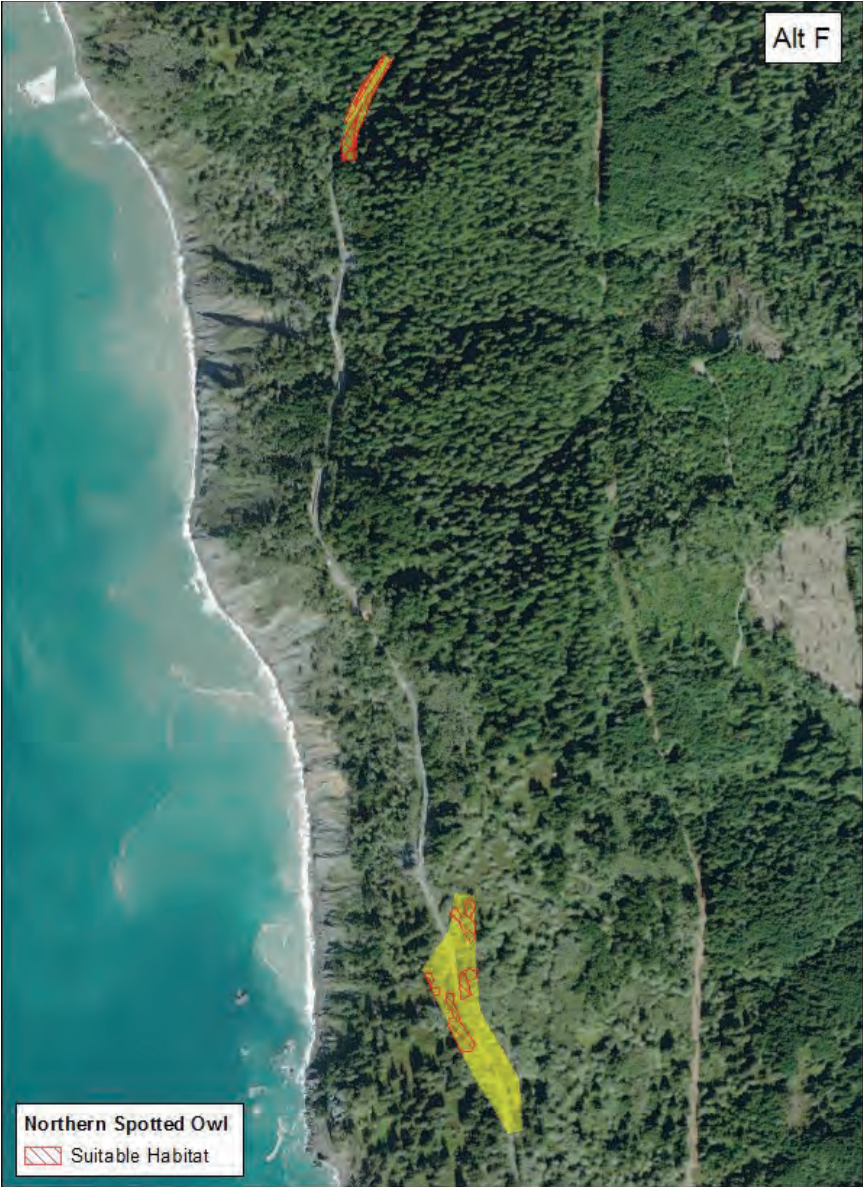
Vegetation Overview

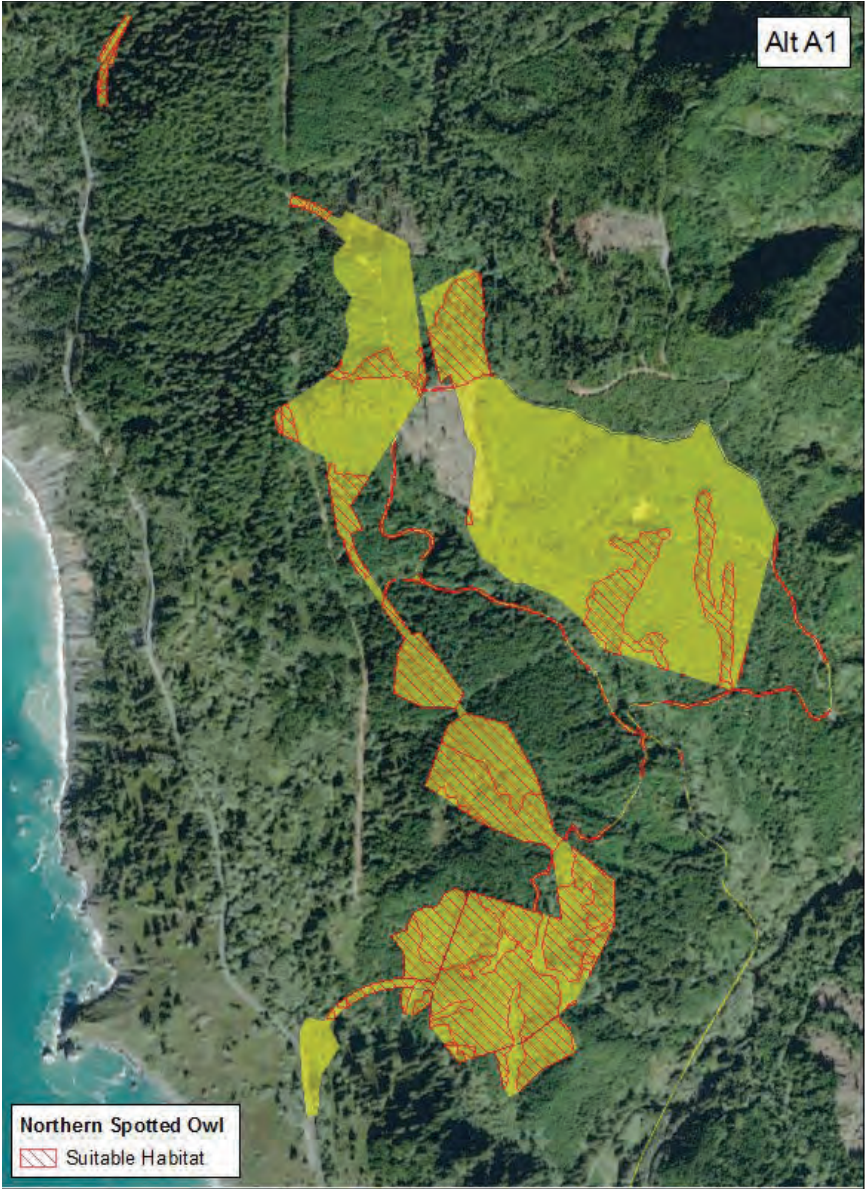


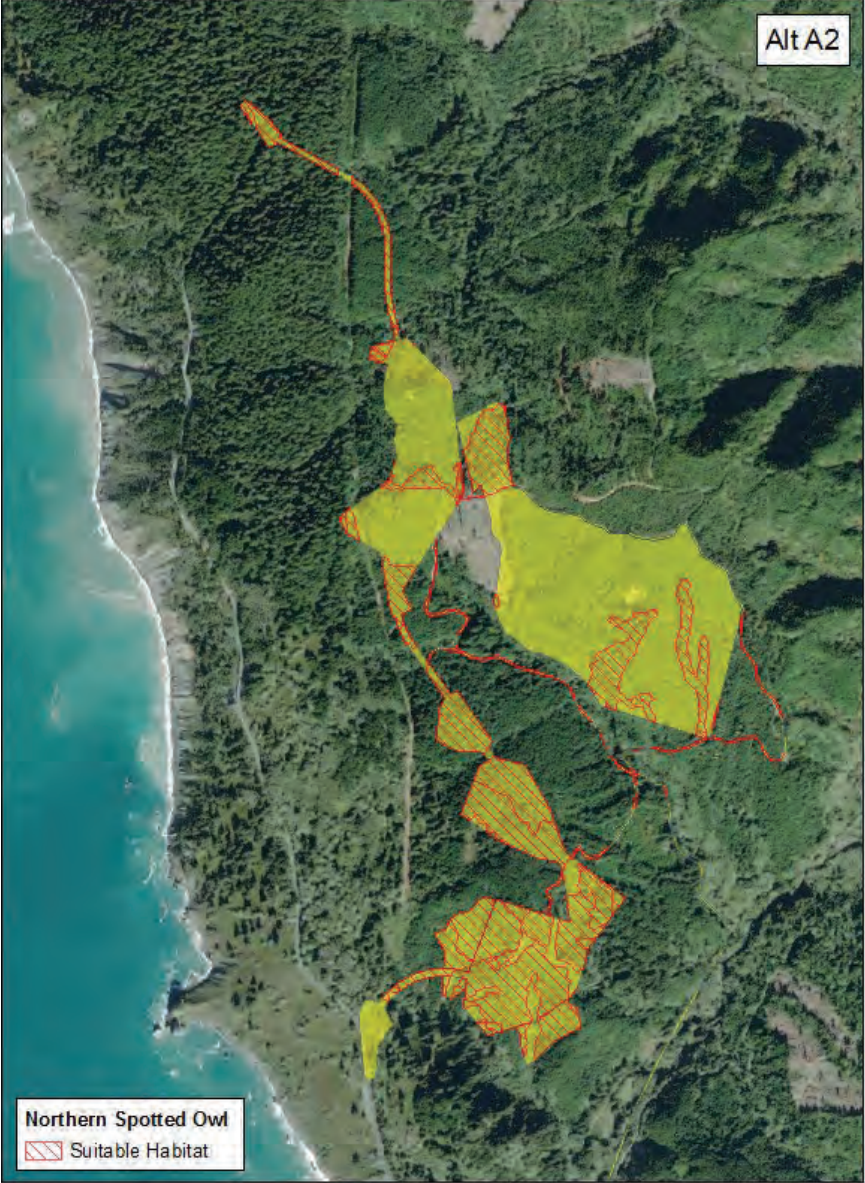
Northern Spotted Owl Habitat Overview

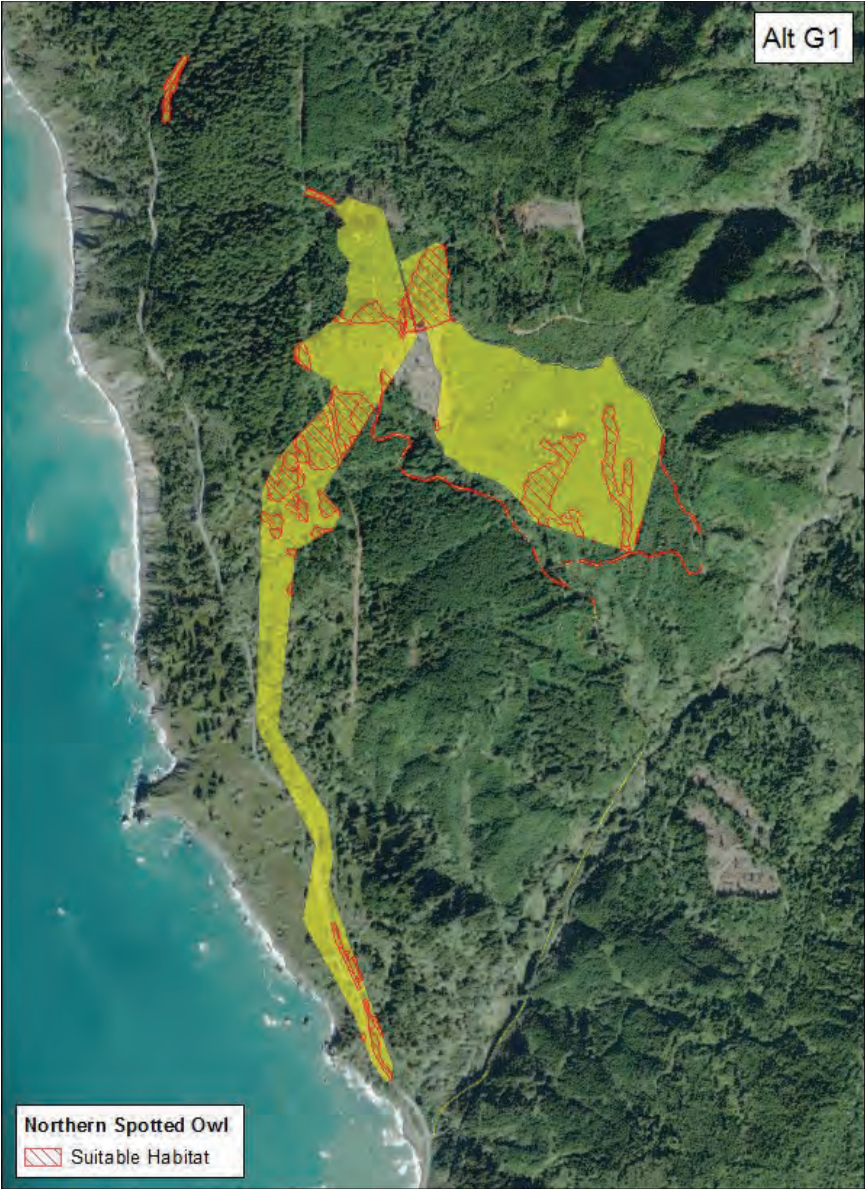










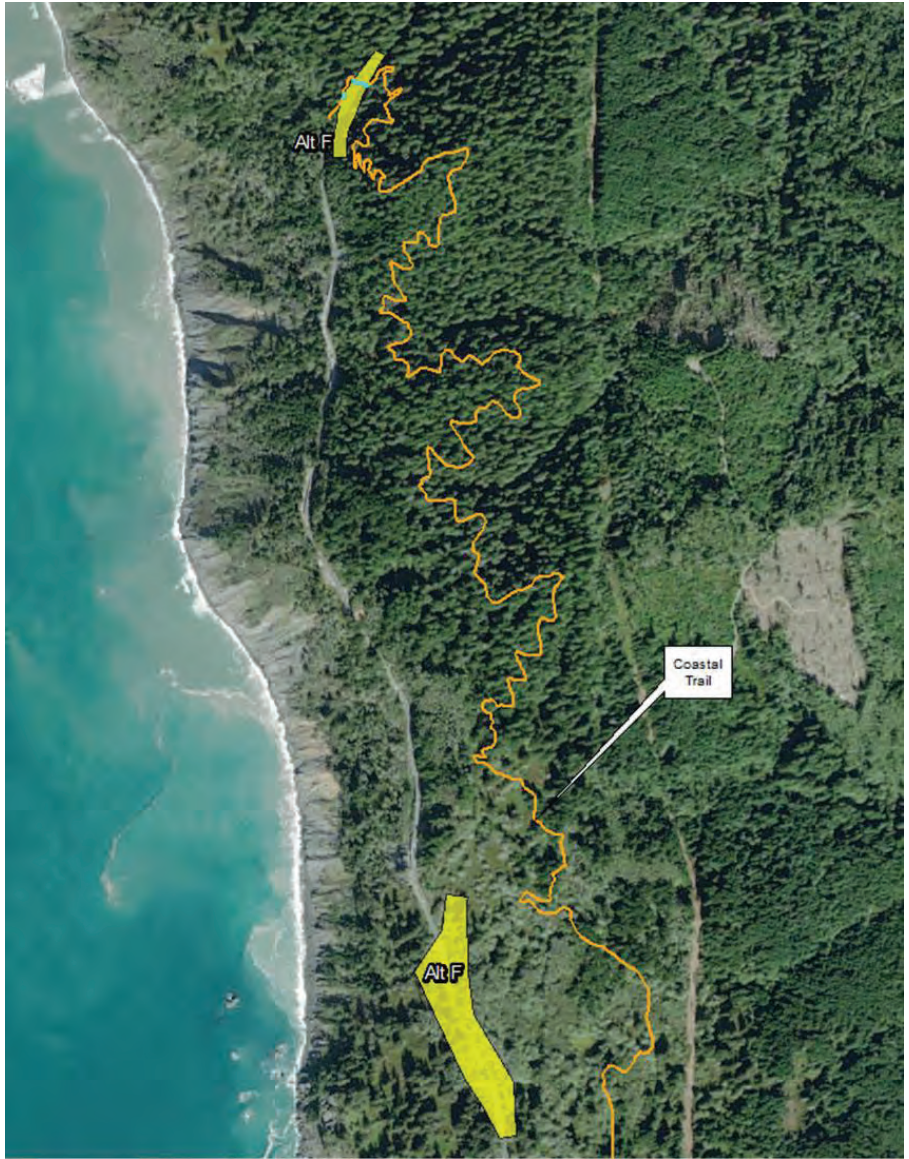




Trails

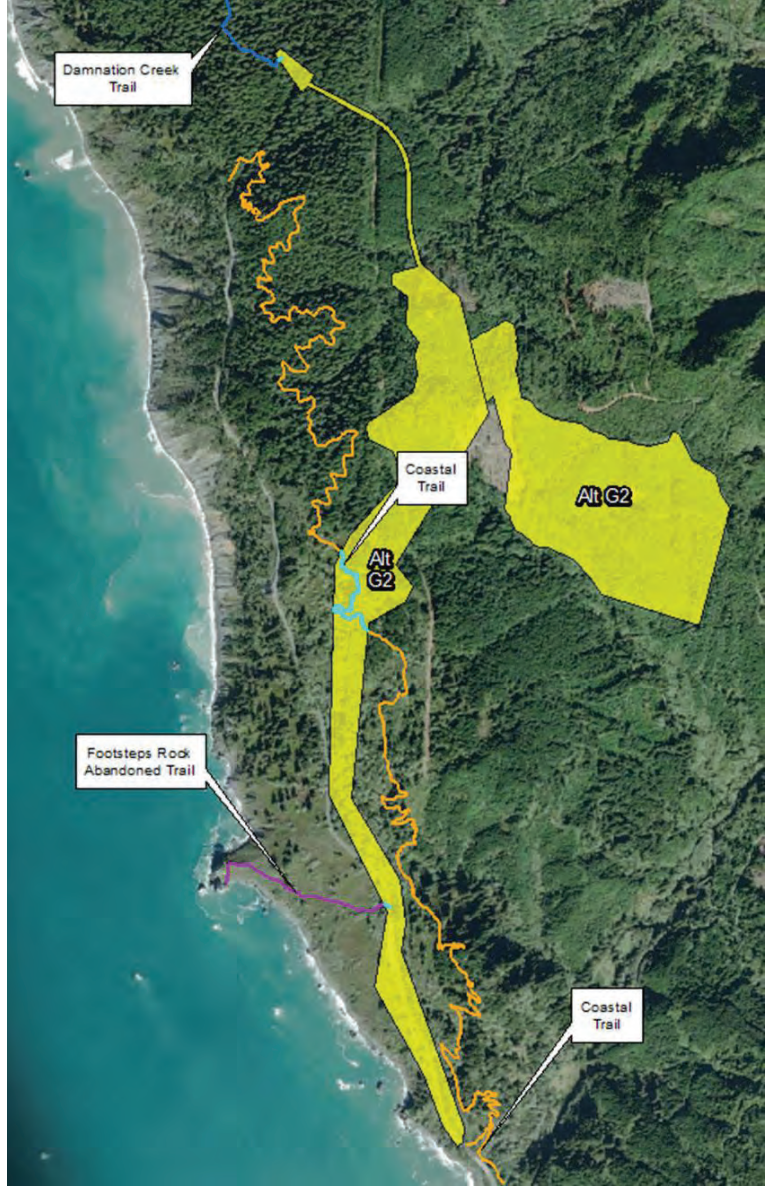












ATTACHMENT D
ALTERNATIVES ANALYSIS RESULTS WORKSHEET –
FEBRUARY 2021

LCG Project Alternatives Analysis Results Worksheet

Performance Measures	X	L	F	A1	A2	G1	G2	Factor Weight
CORE FACTORS								
Trees (Sum of all Redwoods [incl GDRC MAMU Preserve] + Other Mature Conifers - acres)	13.9	72.5	1.6	2.3	4.7	4.9	7.2	5
Normalized Score	3	5	1	1	3	3	3	
<i>Trees Weighted Score (Normalized Score x Factor Weight)</i>	15	25	5	5	15	15	15	
Cost to construct, millions	\$220	\$360	\$930	\$1,078	\$690	\$880	\$520	5
Normalized Score	1	1	5	5	3	5	3	
<i>Cost to Construct Weighted Score</i>	5	5	25	25	15	25	15	
Cost of Mitigation	Medium	Very High	Medium	Very High	Very High	Very High	Very High	5
Normalized Score	3	5	3	5	5	5	5	
<i>Cost of Mitigation Weighted Score</i>	15	25	15	25	25	25	25	
Total Score, Core Factors	35	55	45	55	55	65	55	
<i>Best Possible Core Factors Score</i>								
	15							
<i>Worst Possible Core Factors Score</i>								
	75							
Alternative Ranking 1-7, Core Factors only	1	3	2	3	3	7	3	
OPERATIONAL FACTORS								
Road Closure Potential	H	H	L	L	L	M	M	4
Normalized Score	5	5	1	1	1	3	3	
<i>Road Closure Weighted Score</i>	20	20	4	4	4	12	12	

LCG Project Alternatives Analysis Results Worksheet

Performance Measures	X	L	F	A1	A2	G1	G2	Factor Weight
Cost to Maintain (relative to existing)	H	H	L	L	L	M	M	1
Normalized Score	5	5	1	1	1	3	3	
<i>Cost to Maintain Weighted Score</i>	5	5	1	1	1	3	3	
Traffic Mobility	H	H	L	L	L	M	M	3
Normalized Score	5	5	1	1	1	3	3	
<i>Traffic Mobility Weighted Score</i>	15	15	3	3	3	9	9	
Total Score, Operational Factors	40	40	8	8	8	24	24	
<i>Best Possible Operational Score</i>								
	8							
<i>Worst Possible Operational Score</i>								
	40							
Alternatives Ranking (1-7), Operational Factors only	6	6	1	1	1	4	4	
CONSTRUCTION FACTORS	X	L	F	A1	A2	G1	G2	Factor Weight
Footprint Size (acres)	35.7	167.5	15.4	359.9	371.6	348.7	359.5	4
Normalized Score	1	3	1	5	5	5	5	
<i>Footprint Size Weighted Score</i>	4	12	4	20	20	20	20	
Time to Construct (years)	3.5	3.5	7	5	3	5	3	3
Normalized Score	3	3	3	3	3	3	3	
<i>Time to Construct Weighted Score</i>	9	9	9	9	9	9	9	
CY of cut/fill deposited within project area	0	0	0	6.8M	7.1M	5.6M	5.9M	4
Normalized Score	1	1	1	5	5	5	5	
<i>CY cut/fill deposited onsite weighted score</i>	4	4	4	20	20	20	20	

LCG Project Alternatives Analysis Results Worksheet

Performance Measures	X	L	F	A1	A2	G1	G2	Factor Weight
CY of cut/fill to be deposited offsite	400K	2.4M	650K	0	0	0	0	4
Normalized Score	3	5	3	1	1	1	1	
CY cut/fill deposited off site weighted score	12	20	12	4	4	4	4	
Trail Relocation Potential (number of trail intersections)	3	7	2	4	2	3	3	2
Normalized Score	3	5	1	3	1	3	3	
Trail Relocation Weighted Score	6	10	2	6	2	6	6	
Total Score, Construction Factors	35	55	31	59	55	59	59	
Best Possible Construction Score								
	17							
Worst Possible Construction Score								
	85							
Alternatives Ranking (1-7), Construction Factors only	2	3	1	5	3	5	5	
NATURAL FACTORS	X	L	F	A1	A2	G1	G2	Factor Weight
Other Vegetation-Related Natural Factors (Excludes Redwoods and Mature Conifers - see Core Issues)								
Red Alder (Parks + GDRC) (acres)	12.3	61.1	8.0	69.4	69.4	102.9	103.2	3
Normalized Score	1	3	1	3	3	5	5	
Red Alder Weighted Score	3	9	3	9	9	15	15	
Coastal Scrub/Grassland (Parks + GDRC) (acres)	2.5	19.7	0.5	6.0	6.0	23.2	23.4	3
Normalized Score	1	5	1	1	1	5	5	
Coast Scrub/Grassland Weighted Score	3	15	3	3	3	15	15	
New Edges - Natl + State Parks (miles)	1.4	2.7	1.7	0.8	0.5	2.2	1.9	3
Normalized Score	1	5	3	1	1	3	3	
New Edges - Natl + State Parks Weighted Score	3	15	9	3	3	9	9	

LCG Project Alternatives Analysis Results Worksheet

Performance Measures	X	L	F	A1	A2	G1	G2	Factor Weight
New Edges - GDRC (miles)	0.0	0.0	0.0	2.2	2.5	1.0	1.3	1
Normalized Score	1	1	1	5	5	3	3	
<i>New Edges - GDRC Weighted Score</i>	1	1	1	5	5	3	3	
Other Green Diamond Land (e.g., logged 2000-2010, logged 2010-2020, other conifer young, and young redwood) (acres)	0	0	0	273.3	282.9	192	200.2	2
Normalized Score	1	1	1	5	5	5	5	
<i>Other Green Diamond Land Weighted Score</i>	2	2	2	10	10	10	10	
Total Score, Other Vegetation-Related Natural Factors	12	42	18	30	30	52	52	
Best Possible Other Vegetation Score	12							
Worst Possible Other Vegetation Score	60							
Alternatives Ranking (1-7), Vegetation Factors only	1	5	2	3	3	6	6	
Wildlife-Related Natural Factors	X	L	F	A1	A2	G1	G2	Factor Weight
MAMU Occupied Habitat (acres)	0.0	0.0	0.0	0.4	0.4	0.4	0.4	4
Normalized Score	1	1	1	1	1	1	1	
<i>MAMU Occupied Habitat Weighted Score</i>	4	4	4	4	4	4	4	
MAMU Designated Critical Habitat (acres)	57.2	137.7	13.7	7.60	10.0	54.8	57.1	2
Normalized Score	3	5	1	1	1	3	3	
<i>MAMU Critical Habitat Weighted Score</i>	6	10	2	2	2	6	6	

LCG Project Alternatives Analysis Results Worksheet

Performance Measures	X	L	F	A1	A2	G1	G2	Factor Weight
Marten Core habitat (acres)	17.2	36.6	2.4	44.70	56.9	46.1	56.2	3
Normalized Score	3	3	1	3	3	3	3	
<i>Marten Core Habitat Weighted Score</i>	9	9	3	9	9	9	9	
Potential to Disrupt Wildlife Connectivity (Rating)	Low (1.5)	Low (2)	Low (1.0)	High (4.5)	High (5)	High (3.5)	High (4)	3
Normalized Score	1	1	1	5	5	5	5	
<i>Wildlife Connectivity Weighted Score</i>	3	3	3	15	15	15	15	
NSO Suitable Habitat (acres)	14.0	72.5	3.9	146.6	152.5	72.6	79.2	4
Normalized Score	1	3	1	5	5	3	3	
<i>NSO Suitable Habitat Weighted Score</i>	4	12	4	20	20	12	12	
Total Score, Wildlife-Related Natural Factors	26	38	16	50	50	46	46	
Best Possible Wildlife Score								
16								
Worst Possible Wildlife Score								
80								
Alternatives Ranking (1-7): Wildlife Factors only	2	3	1	6	6	4	4	
Waters-Related Factors	X	L	F	A1	A2	G1	G2	Factor Weight
New Tributary Crossings (number of crossings)	0	1	0	7	8	5	7	3
Normalized Score	1	1	1	3	3	3	3	
<i>New Tributary Crossings Weighted Score</i>	3	3	3	9	9	9	9	
Wilson Creek Watershed Disturbance (acres)	1	66.2	4.5	159	177.6	83.6	91.2	1
Normalized Score	1	3	1	5	5	3	3	
<i>Wilson Creek Watershed Disturbance Weighted Score</i>	1	3	1	5	5	3	3	

LCG Project Alternatives Analysis Results Worksheet

Performance Measures	X	L	F	A1	A2	G1	G2	Factor Weight
Total Score, Waters-Related Natural Factors	4	6	4	14	14	12	12	
Best Possible Waters Score								
4								
Worst Possible Waters Score								
20								
Alternatives Ranking (1-7): Waters Factors only	1	3	1	6	6	4	4	
	X	L	F	A1	A2	G1	G2	Factor Weight
Total Score, All Natural Factors (Vegetation + Wildlife + Waters)	42	86	38	94	94	110	110	
Best Possible Natural Factors Score								
32								
Worst Possible Natural Factors Score								
160	X	L	F	A1	A2	G1	G2	
Alternatives Ranking (1-7): All Natural Factors	2	3	1	4	4	6	6	
ALL FACTORS SUMMARY RESULTS								
	X	L	F	A1	A2	G1	G2	
ALL FACTORS COMBINED - WEIGHTED	152	236	122	216	212	258	248	
Best Possible Score								
72								
Worst Possible Score								
360								
Alternatives Ranking (1-7): All Factors Combined	2	5	1	4	3	7	6	

LCG Project Alternatives Analysis Results Worksheet

Performance Measures	X	L	F	A1	A2	G1	G2	Factor Weight
SENSITIVITY CALCULATIONS								
	X	L	F	A1	A2	G1	G2	
ALL FACTORS COMBINED - ALL FACTORS WEIGHTED EQUALLY (3)	147	225	105	207	201	243	237	
Best Possible Score								
72								
Worst Possible Score								
360								
Alternatives Ranking (1-7): All Factors Equal Weight	2	5	1	4	3	7	6	
SENSITIVITY CALCULATIONS								
	X	L	F	A1	A2	G1	G2	
Core Factors + Natural Factors	77	141	83	149	149	175	165	
Best Possible Score								
47.0								
Worst Possible Score								
235								
Alternatives Ranking (1-7): Core Factors + Natural Factors	1	3	2	4	4	7	6	