

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

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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?