



FRIENDS OF THE EEL RIVER

Working for the recovery of our Wild & Scenic River, its fisheries and communities.

June 4, 2021

Federal Energy Regulatory Commission
via electronic filing

RE: FERC's May 5, 2021 ORDER MODIFYING AND APPROVING TEMPORARY VARIANCE OF
FLOW REQUIREMENTS UNDER LICENSE ARTICLE 52, Project No. 77-306

Dear FERC staff,

Friends of the Eel River (FOER) is a nonprofit citizens' group that advocates for policies and practices consistent with the protection and recovery of the Wild and Scenic Eel River's outstanding resource values, particularly the salmonid species protected under the federal Endangered Species Act as "threatened." Eel River salmonids, especially steelhead and Chinook salmon, are affected by the operation of the Potter Valley Project dams in a variety of ways. We offer the following comments on behalf of our members, board and staff.

FOER does not object to the temporary variance approved by the Commission under the instant ORDER. As PG&E explained in its April 23, 2021 Flow Variance Request (the "Request"), the reduction in diversions from the Eel River to Potter Valley will make it possible for the utility to "meet minimum flow obligations, including a possible block water release, through January 2022 in the event of extremely low inflow in early winter." Failure to meet the flow requirements set by the Reasonable and Prudent Alternative (RPA) for Eel River fisheries would violate the Endangered Species Act.

Thus, it is essential that PG&E and the Drought Working Group be prepared to further limit diversions to the East Branch Russian River should conditions continue to deteriorate. This may be necessary to conserve the storage pool of water in the Lake Pillsbury reservoir and/or to protect the capacity of Scott dam to release water into the upper Eel River at all. It may also be necessary should water temperatures in the Lake Pillsbury reservoir storage pool continue to rise with atmospheric temperatures expected to remain high relative to historical averages. And it may be necessary if sediment sloughing accelerates with such high temperatures.

Here in northwestern California, 2021 may prove the driest year on record. A combination of very low precipitation and temperatures significantly above historical averages have left stream flows in the Eel River at the lowest levels reported since 1924, when much of the mainstem Eel's flow was held back to fill the Lake Pillsbury reservoir. This year's extreme conditions are consistent both with predicted changes in regional climate resulting from global warming and with observed departures in recent decades from historic temperature and precipitation regimes.

Critically low stream flows and high water temperatures only compound the threats to aquatic ecosystems like the Eel River and to species like salmon and steelhead already listed under the Endangered Species Act. Juvenile steelhead, which spend a year or two in freshwater before heading out to the ocean, are particularly vulnerable to these effects.

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Pacific Gas & Electric (PG&E) is the licensed operator and owner of the Potter Valley Project, including two dams on the upper Eel River and the diversion works which carries Eel River water to the powerhouse in Potter Valley, at the top of the East Branch Russian River. As PG&E explained in its Request, the amount of water stored in the Lake Pillsbury reservoir behind Scott dam is now so low that meeting the flows otherwise required by its license would lower the storage pool to levels that risk catastrophic damage to Scott dam's needle valve.

The problem is the sediment which has accumulated in the bottom and along the sides of the Lake Pillsbury reservoir, and especially at the base of Scott dam. It is our understanding that if a substantial additional amount of sediment were to reach the "grizzly" — the structure protecting the inlet of the needle valve — the valve could be irreparably damaged. PG&E staff reported to the Drought Working Group that the utility has no provisions for releasing water below Scott dam if the needle valve is clogged or damaged.

As PG&E noted in a January 28, 2021 presentation to the Drought Working Group, "If reservoir reaches 5 TAF (1849'), needle valve must be shut down, ceasing reservoir releases, as a dam safety precaution to prevent catastrophic damage to the reservoir low level outlet infrastructure." Nor is the risk limited to water levels that low. PG&E references in its Request a Technical Memo it submitted to FERC on April 3, 2017 which "found a high potential of bank sloughing exists at pools levels between 5 and 12 TAF; the degree of bank sloughing is partially dependent on the drawdown rate of the reservoir."

We note that PG&E staff explained to a January 7, 2021 meeting of the same group that slope sloughing was happening in 2013-14 when average releases were ~30cfs. Again, it seems critical PG&E and the Drought Working Group be prepared to further reduce diversions as necessary if observations reveal that the proposed diversion rate is leading to slope sloughing this year.

Of particular concern is the pile of sediment accumulated below the toe of a large landslide above Scott dam's southern abutment. FOER commissioned an evaluation of that landslide by the Miller Pacific Engineering firm.¹

That analysis focused on the risk of a large volume of the landslide breaking free. It suggested such large releases were likely in two scenarios. The first, an extreme rain event, is already far from uncommon, and climate change models suggest such events are likely to become even more intense. The second would be an earthquake. The Bartlett Springs Fault, which runs under the Lake Pillsbury reservoir, appears capable of generating earthquakes well within the range which Miller Pacific thought likely to break the deeper portion of the landslide free. Of course, smaller earthquakes could release the more superficial portion of the landslide or result in additional sloughing of the sediments already piled in the reservoir.

Even if the bulk of the landslide were to remain immobile, it does seem inevitable that its surface layers will continue to erode toward and ultimately into the reservoir. The Miller Pacific analysis shows the landslide is both ancient and active, with an erosive headscarp. In addition, at least the upper portion of the landslide appears to have burned in the August complex fires of 2020. As the

¹ Miller Pacific Engineering Group, Technical Memorandum 01 (Sept. 6, 2018), available at <https://eelriver.org/wp-content/uploads/2018/09/Miller-Pacific-Technical-Memo-re-Scott-Dam.pdf> and attached as Exhibit A.

roots of those burned trees decay, that portion of the landslide can be expected to become even more mobile.

Between drought and rain, gravity and decay, and maybe even a few earthquakes, more material will inevitably reach the reservoir. If — or, as seems more likely, when — those sediments reach and compromise the needle valve, the whole Potter Valley Project would appear to be at risk. The needle valve is the only low-level release from Scott Dam. It is our understanding that damage to the inlet of the needle valve could be effectively irreparable. Without a way to release water from the Lake Pillsbury reservoir, the Potter Valley Project would cease to be a reliable source of irrigation water for Potter Valley and the upper Russian River. Nor could flows to the upper Eel River be maintained as required by the RPA.

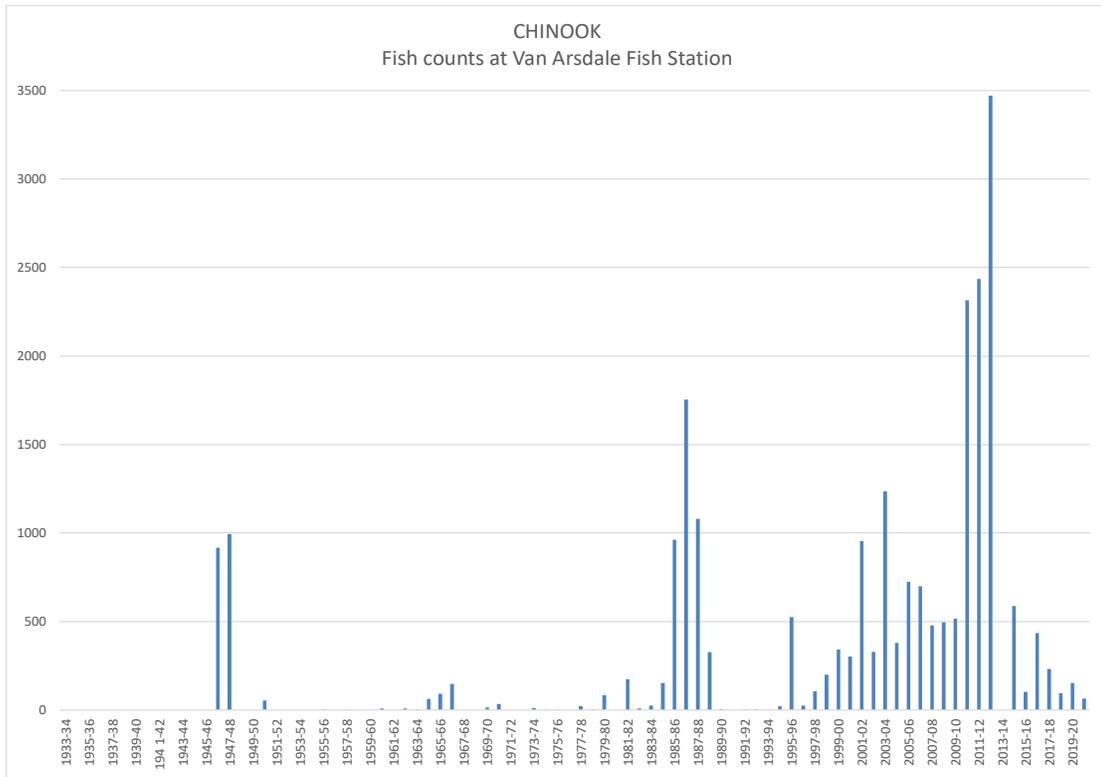
Some things must be prioritized in times of crisis.

FERC is presented in this variance with a number of different factors that must be weighed. It is critical that FERC comprehends the relative priority of the various demands that are routinely made of Eel River water in and through the Potter Valley Project. FERC's ORDER repeats a pattern in the Commission's discussion of fisheries in the Eel and Russian Rivers of conflating as "aquatic resources" populations of fish which could scarcely differ more in their significance.

Both Chinook and steelhead in the Eel River are listed as Threatened under the federal Endangered Species Act. The best available information and science strongly suggest Eel River Chinook and steelhead face a significantly greater risk of extinction than their Threatened status would suggest.

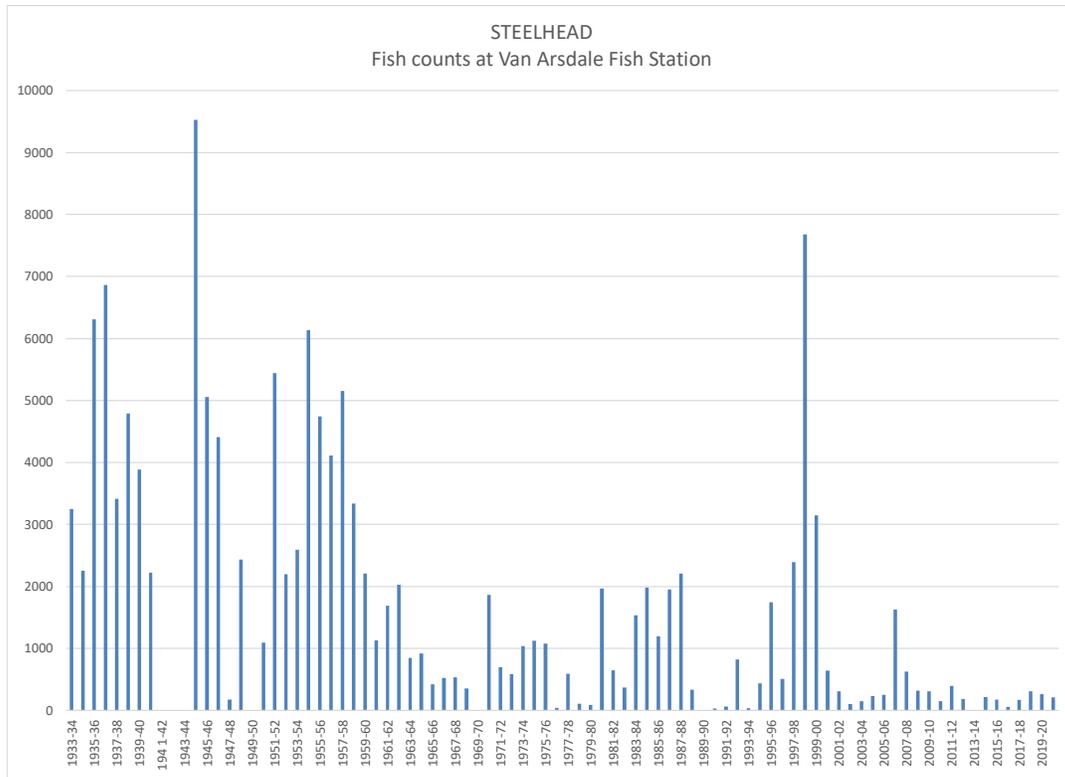
In the most comprehensive review of salmonid science available, Moyle et al's *State of the Salmonids: Status of California's Emblematic Fishes, 2017*, the researchers assign California Coastal Chinook a status score of 2.9 out of 5.0, which they classify as High Concern. They note that the National Marine Fisheries Service's "2010 review concluded the status had not changed but that endangered status was likely in the future (NMFS 2012). Over the last five years, poor ocean conditions, drought (2012-2016, and exploding marijuana cultivation practices throughout the ESU range have had significant negative impacts on the CC Chinook ESU (NMFS 2016), and they remain listed as threatened." As Figure 1 shows, however, Chinook returns to the Van Arsdale Fish Station at Cape Horn dam have collapsed to critically low levels in the last decade.

Figure 1 – Adult Chinook salmon returns at Van Arsdale 1933-2021. CA DFW and PG&E data.



Northern California Steelhead, however, are rated by *State of the Salmonids* as a Moderate Concern, with a status score of 3.3 out of 5.0. Moyle et al note that “Northern California (NC) winter steelhead are in long-term decline and face extirpation over much of their range.” In its 2016 Multispecies Recovery Plan, NMFS recommended as recovery action 5.1.1.4 for Upper Mainstem Eel River steelhead “Investigate the feasibility of decommissioning and removal of Scott Dam.” As Figure 2 shows, steelhead returns to Van Arsdale Fish Station have also collapsed to critically low levels, but for steelhead the collapse has been ongoing for at least the last two decades.

Figure 2. Adult Steelhead returns to Van Arsdale Fish Station, 1933-2021. CA DFW and PG&E data.



Rainbow trout in the East Branch Russian River, by contrast, are neither ESA-listed nor biologically imperiled. In fact, many are hatchery fish planted to support a recreational fishery that would not exist but for the diversion of Eel River water through the PVP. But as FERC’s May 5 ORDER notes, PG&E is required by Article 52 of the project license to comply with the RPA, including by providing flows specified under RPA Condition C.1 as “a minimum flow of 25 cubic feet per second (cfs) in the East Branch Russian River from April 15 through September 15 and 35 cfs from September 16 through April 14 of dry water years for the protection of aquatic species.” As the ORDER acknowledges in paragraph 5, “in the East Branch Russian River, the licensee anticipates that the flow reductions would result in a reduction in aquatic habitat for hatchery rainbow trout and a subsequent reduction in angling opportunities.”

Nonetheless, the variance continues to provide minimum flows of 5 cfs to the East Branch Russian River, nominally for this hatchery trout fishery. The fact that even in this critically dry year, PG&E continues to divert water from the Eel River to support stocked rainbow trout in the East Branch Russian River is a stark reminder of the imbalance between the benefits the PVP has conferred on the Russian River and the costs it continues to impose on the Eel River. FERC’s ORDER states that the agency intends to “be vigilant of any adverse effects to aquatic resources” in the East Branch Russian River. The risks to “aquatic resources” in the two basins, however, are not equivalent. The

Russian River fish are not protected under the ESA and are largely planted for recreational purposes. In the Eel River, in contrast, the ordinary operations of the PVP are helping to drive native, ESA-listed chinook and steelhead extinct.

FERC's ORDER notes that "reductions to water deliveries typically would result in a reduction in irrigated land or an increase in groundwater pumping to make up for the deficit in water deliveries." Our understanding is that while some operators may forgo third croppings of hay, and Potter Valley's vineyards will see reduced yields, no significant reduction in cultivated acreage has been claimed. Potter Valley's groundwater, to the extent it exists, appears to be largely an artifact of leakage from the unlined canals of the PVID. (PVID's continued use of unlined canals to transfer water, particularly as California dries and heats, raises the question whether that is a waste of water prohibited by the state constitution.) Meanwhile, during one of the driest and hottest years on record Eel River Chinook and steelhead are facing extinction. Again, these interests are not equivalent.

Sadly, even in these dire circumstances, the Potter Valley Irrigation District and its allies have continued to press PG&E and FERC to take more water from the Eel River and its fisheries than the RPA — and thus, the Endangered Species Act — allows. PVID member Janet Pauli, writing for the Mendocino County Inland Water and Power Commission, writes that "(t)his is the first time, in our experience, that PG&E has requested a variance in license required flows that the flow reduction has been requested for only the East Branch of the Russian River (EBRR) and not for flows below the Project on the Eel River. The drought has equally impacted both watersheds, but the water condition determination has now been designated Very Dry on the Eel River and Critically Dry on the EBRR." (MCIWPC Motion to Intervene, p 3.)

Similarly, PVID has complained in its own Motion to Intervene that it "is concerned about the decision by PG&E Company to place the entire burden of lowered flow reductions from Lake Pillsbury solely on the East Branch of the Russian River (EBRR) and not to commensurately reduce the license required flows on the Eel River to protect storage levels and infrastructure at Scott Dam." (p. 1) PVID reiterated that "(u)nder the drought conditions we are facing these curtailments [to EBRR] might not seem unreasonable, but to not concurrently reduce the flows on the Eel River [below Cape Horn Dam] as has been done in the past was simply not supportable." (p. 4)

PVID was evidently disappointed that NMFS declined to support increasing PVID's own diversions by reducing critical spring flows down the Eel. PVID complains that "PG&E had been meeting with entities that have license conditioning authority" and that "discussion with the (Potter Valley Drought Working Group) was delayed due to a threat of a law suit and the potential initiation of a Section 7 Consultation regarding operations at Cape Horn Dam passage facilities." (pp. 1-2)

PVID appears to find it objectionable that PG&E and FERC have begun to comply with the requirements of the Endangered Species Act. Compliance with federal law is a mandatory duty, not a policy choice. Nonetheless, for the sake of clarity, FERC should clarify to PVID and other stakeholders why it has initiated consultation with NMFS, what the status of that consultation is, and what its scope will be. It is clear to FOER that under the known facts, a formal status review is required. Because the Van Arsdale fish ladder is integral to the functioning of the Potter Valley Project, the scope of the consultation should include all Project operations and facilities. We note also that the evidence strongly suggests that the Van Arsdale fish ladder continues to cause take of listed salmonids, and that PG&E has no incidental take permit for the ladder or Cape Horn dam itself.

Again, we note that any reduction in flows to the Eel River below those required by the RPA will not only violate the Endangered Species Act but also put Eel River Chinook and steelhead in jeopardy of extinction. That PVID would accept the extinction of Eel River fisheries to protect their diversions is unconscionable.

Continued Operations of the Potter Valley Project

While the urgent need for the present variance is driven by this year's extremely low precipitation and high temperatures, these conditions have exposed deep inadequacies in the Project's facilities. At the most basic level, there is not enough water in the Lake Pillsbury reservoir for the system to function as designed. But that is only the beginning of the matter. As the precarious condition of the Scott dam needle valve discussed above demonstrates, the functionality of the entire structure of the PVP appears to hang by this one fraying thread. Less visible threads are presumably also showing some wear.

Similarly, this crisis is showing that the rules by which the PVP has operated over the last two decades are inadequate under what are now common conditions. Programmed flows to PVID and the East Branch Russian River under the RPA clearly exceed what the PVP can supply in at least some years. By FOER's count, there have been seven variances for lack of water in the last decade. The exceptions are swallowing the rule. The pattern of recent variances alone shows the RPA's flow schedule does not reflect the operational conditions the PVP now faces.

But by far the greater failure of the RPA is the continued decline of Eel River salmon and steelhead populations. As NMFS wrote in 2002, their "finding in the final biological opinion is that the proposed action will jeopardize the continued existence of ... California coastal Chinook salmon and northern California steelhead. Pursuant to ESA regulations ... the jeopardy opinion includes a reasonable and prudent alternative (RPA) designed to modify project operations to avoid jeopardizing these species."

Although California Coastal Chinook are found in both the Eel and Russian River systems, Chinook in the Russian River are not affected by the operation of the PVP. NMFS' 2002 biological opinion clarified that "(w)ith respect to salmonids in the Russian River, it is NMFS' biological opinion that the action, as proposed, is not likely to jeopardize CCC coho salmon or CCC steelhead, or result in the destruction or adverse modification of designated CCC coho salmon critical habitat." Thus, the RPA exists not to protect fisheries in both watersheds, but to prevent the operations of the PVP from driving Eel River salmon and steelhead extinct. Unfortunately, it has only succeeded in driving them extinct more slowly.

As PG&E correctly noted in its Request, without this variance, meeting scheduled diversions to Potter Valley would have left the utility without the ability to release flows required to protect species listed under the Endangered Species Act this fall. This fact alone reveals a fatal inadequacy in the RPA and its flow schedules.

The Biological Opinion and RPA will expire in April 2022. To the extent operations of the PVP continue under an annual license, FERC must include interim protective measures above and beyond those which have proven inadequate in the RPA. As the D.C. Circuit Court of Appeal described them in *Platte River Whooping Crane v. FERC*, "temporary, 'rough and ready' measures to prevent irreversible environmental damage pending relicensing" are clearly required here. 962 F.2d 27, 30-31 (D.C. Cir. 1992).

When PG&E withdrew its application to relicense the PVP, FERC notified the utility that it would no longer be eligible to relicense the PVP. The Commission then opened relicensing of the PVP to any qualified parties. Only the Two Basin Partnership responded. That coalition is currently attempting to complete the relicensing process with a revised project description that includes removal of Scott dam.

However, the Two Basin Partnership has yet to identify a means to fund their relicensing application, including required Study Plans already delayed by PG&E's withdrawal. It is now much more likely than not that the Two Basin Partnership will be unable to complete key steps of the relicensing process over the next several years. Nor has the partnership clarified how it would form the proposed Regional Entity that would take possession of the PVP and hold a new license to operate it from FERC.

Meanwhile, the hydroelectric power generation that is the basis for FERC's jurisdiction over the PVP continues to decline in volume, toward the infinitesimal, and value, now well into the negative. Project power production dropped with diversions after implementation of the RPA, which reversed the previous presumption that water not required to be left in the Eel River would be diverted to Potter Valley whenever possible. PG&E has been frank that it spends in excess of \$20 in operations and maintenance for every dollar it generates from PVP hydropower sales. Truly renewable power sources are much less expensive, readily available, and getting constantly cheaper.

Thus, if the PVP continues to operate, the California Public Utilities Commission will need to inquire into how PG&E ratepayers benefit sufficiently to justify inclusion of PVP maintenance costs in PG&E's rate base going forward.

Given the impacts of continued PVP operations to Eel River fisheries, a protracted relicensing process is likely to lead to the extinction of Eel River Chinook and steelhead. That would be wholly unacceptable. It is the outcome FOER is determined at any cost to prevent.

Nor can an extended relicensing process be justified in view of what is now known about the risk of catastrophic damage to the Scott dam needle valve. This very dry season may, as the Request outlines, result in additional sloughing that could impinge on the needle valve inlet. What is certain is that the sediment behind Scott dam will continue to accumulate and to move downhill. Whether in this year's dry heat or another year's heavy rains, those sediments will move. The potential damage to the needle valve can only be postponed.

To our knowledge it would not be cost effective to prevent this, as by dredging the reservoir, nor would it be cost effective to repair the needle valve itself. When a project loses millions of dollars every year, it is difficult to imagine an economic rationale for what are likely to be very expensive repairs. There is nothing FERC can or indeed should do to fix the economics of the PVP.

In short, the structures and system of PVP are evidently failing and may fail catastrophically. Eel River Chinook and steelhead are being driven to extinction by those systems and structures.

Under these circumstances, no further delays in a relicensing process unlikely to succeed can be tolerated. If the Two Basin Partners cannot find a way to fund their relicensing work, including the full suite of Study Plans scheduled for 2022, then FERC needs to move this project back to the

surrender and decommissioning process. PVID has enjoyed a long and mostly free ride, but that ride is ending. PVID will have to adjust to a new reality in which they pay the costs of securing the water they claim from the Eel River, or go without.

Eel River Chinook and steelhead are threatened with extinction in large part because of the construction and operation of the Potter Valley Project. (In addition to the direct impacts of the dams and diversions, we remind PG&E and FERC that one of the persistent threats to salmon and steelhead throughout the Eel River watershed today are the invasive pikeminnow introduced through the Potter Valley Project.) The extreme streamflow conditions of 2021 significantly compound the threats these species, and the whole freshwater ecosystem of the Eel River, face. To the maximum possible extent, the PVP should be operated to ensure that it causes no additional harm to Eel River Chinook and steelhead in the remaining years of its existence.

Thank you for your careful attention to these comments.

A handwritten signature in black ink, appearing to read 'Scott Greacen', followed by a long horizontal line extending to the right.

Scott Greacen
Conservation Director

1379466.2

EXHIBIT

A



Technical Memorandum 01

To:	Friends of the Eel River, c/o Kamman Hydrology & Engineering Inc.	Project:	Scott Dam
From:	Scott Stephens, GE	cc:	
Date:	September 6, 2018	Job No.:	1323.100
Subject:	Scott Dam Slope Stability Analyses		

Introduction

This technical memorandum summarizes Miller Pacific Engineering Group's slope stability analyses for the existing landslide adjacent to the left (southern) abutment of Scott Dam located in Upper Lake, California. Scott Dam impounds the upper mainstream Eel River, forming Lake Pillsbury. We understand the existing landslide is approximately 500-feet long and 160-feet wide. The landslide initiated at least in the early 1920's and has been subsequently studied by PG&E through 2016. PG&E's studies included performing topographic and geologic mapping, multiple subsurface explorations, inclinometer readings, survey and groundwater monitoring. Based on available data, inclinometers installed in the landslide mass sheared in the mid 1970's. Movement has occurred at various levels within the landslide up to depths of 110 feet below ground surface. The total mass of the landslide complex is over 8 million cubic feet, weighing over 520,000 tons. It is unclear if any of these sheared inclinometers have been replaced or if inclinometer monitoring of the landslide is occurring. PG&E conclusions regarding landslides on the slope overlying the left abutment, outlined in the 2016 FERC Part 12 Safety Review, state the "susceptibility of these slopes to seismic events is not known and has not been studied." The purpose of this study is to perform preliminary evaluation of potential effects of the landslide mass on the dam

Slope Stability Analyses

Because the project area is an active landslide, we are able to back-calculate the strength along known landslide planes. To determine the residual strength of the landslide materials along the slide plane, we input Cross Section D-D' developed by PG&E into a 2-D slope stability program, (SLIDE) developed by Rocscience. Multiple slide plane soil layers were modeled within the cross section based on PG&E inclinometer data. The slide plane soil strength parameters were adjusted until the resulting slope stability factor of safety (F.S.) was 1.0, definition of marginally stable landslide. The results of our back-calculation analyses of landslide soil strengths are presented on Figure 1 and used in the pseudo-static (seismic) analyses.

Pseudo-Static Analysis

Typically, a Probabilistic Seismic Hazard Analysis (PSHA) is utilized to analyze earthquake loads for dams. PSHA analyzes possible earthquake scenarios while incorporating the probability of each individual event to occur. The probability is determined in the form of the recurrence interval, which is the average time for a specific earthquake acceleration to be exceeded. The design earthquake is not solely dependent on the fault with the closest distance to the site and/or the largest magnitude, but rather the probability of given seismic events occurring on both known and unknown faults, and higher magnitude events.

PG&E evaluated the seismicity at the site and determined the controlling ground motions would be the 84th percentile from deterministic seismic hazard analyses of a Magnitude 6.0 earthquake on the Bartlett Springs fault zone located in close proximity to the dam. Deterministic Seismic Hazard Analysis (DSHA) predicts the intensity of earthquake ground motions by analyzing the characteristics of nearby faults, distance to the

faults/rupture zones, earthquake magnitudes, earthquake duration, and site-specific geologic conditions. The calculated DSHA acceleration at the dam site is 0.53 g.

We calculated the peak ground acceleration (PGA) for the 2% chance of exceedance in 50 years (2,475-year statistical return period) and the PGA for a 10% chance of exceedance in 50 years (475-year statistical return period) utilizing the USGS online Uniform Hazard Tool. The results of the analyses indicate the 2% in 50-year and 10% in 50-year PGAs are 0.87 g and 0.44 g, respectively.

For pseudo-static stability analyses, the PGA produced by an earthquake over a slope is reduced due to the variability of the ground motion direction over distance and depth. Based on the procedures outlined in ASCE's Guidelines for Analyzing and Mitigating Landslide Hazards in California (2002), the 10% in 50-year, 84th percentile DSHA, and 2% in 50-year ground motions induced on the landslide mass can be reduced to 0.18 g, 0.21 g, and 0.33 g, respectively.

The reduced ground accelerations discussed above were input into our stability model utilizing the back calculated slide plane soil strength values. The results of our 10% in 50-year, 84th percentile, and 2% in 50-year pseudo-static analyses are presented on Figures 2, 3 and 4, respectively, and indicate calculated factors of safety well below 1.0, indicating landslide displacements will occur during a strong seismic event. The lower the calculated factor of safety, the more unstable the slope is and more seismic movement would be expected to occur.

Seismic Displacement

We analyzed the potential slope displacement based on the procedures outlined by Bray & Travasarou (2007). The results of our analyses indicate that the anticipated range of seismic induced displacements is influenced by the soil strength profile and level of seismic shaking applied. The results of our displacement analyses indicated the landslide mass may move between 3 to 19-feet, as summarized on Figures 2, 3 and 4.

Conclusions

Based on our preliminary geotechnical and slope stability/displacement analyses, it is our professional opinion that the large landslide complex adjacent to, and possibly below the left abutment presents a significant geologic hazard to the dam that requires further investigation. Since the dam acts as strut across Eel River, the landslide mass may be applying significant soil pressure to the dam. In addition, the preliminary calculated seismic displacements are enough to cause concern about uplift or damage to the dam from landslide movement during a strong seismic event.

We recommend that PG&E and/or their geotechnical consultants preform a more detailed and sophisticated analyses of the potential effects of the active landslide mass on the dam. We would anticipate this may require subsurface exploration, laboratory testing of soil and bedrock samples, inclinometer installation and 3-dimensional (finite element) slope stability analyses.

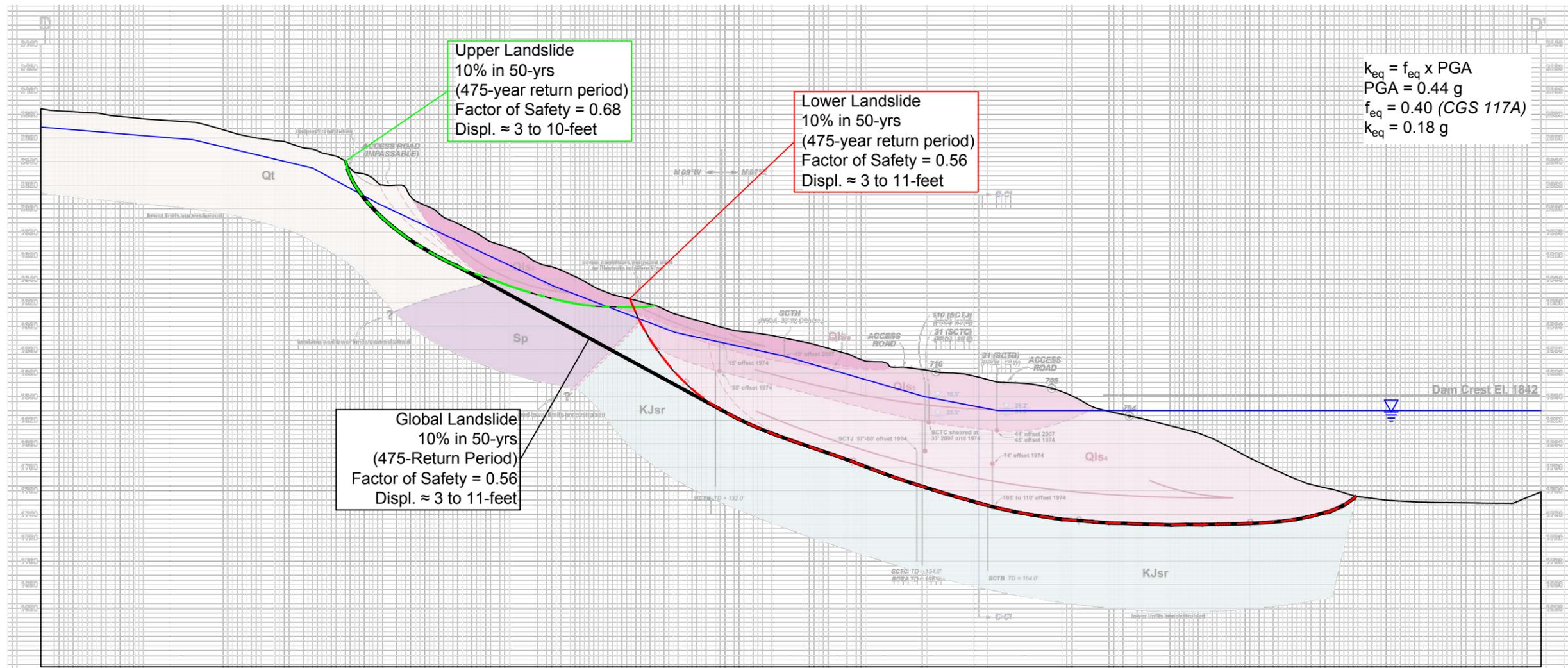
We hope this provides you with the information you require at this time. Please do not hesitate to contact us with any questions or concerns.

Sincerely,
MILLER PACIFIC ENGINEERING GROUP



Scott Stephens
Geotechnical Engineer No. 2398
(Expires 6/30/19)

Attachments: Figures 1 through 4



Upper Landslide
 10% in 50-yrs
 (475-year return period)
 Factor of Safety = 0.68
 Displ. ≈ 3 to 10-feet

Lower Landslide
 10% in 50-yrs
 (475-year return period)
 Factor of Safety = 0.56
 Displ. ≈ 3 to 11-feet

Global Landslide
 10% in 50-yrs
 (475-Return Period)
 Factor of Safety = 0.56
 Displ. ≈ 3 to 11-feet

$$k_{eq} = f_{eq} \times PGA$$

PGA = 0.44 g
 $f_{eq} = 0.40$ (CGS 117A)
 $k_{eq} = 0.18$ g



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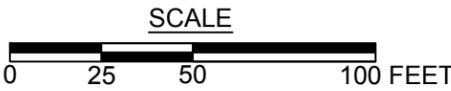
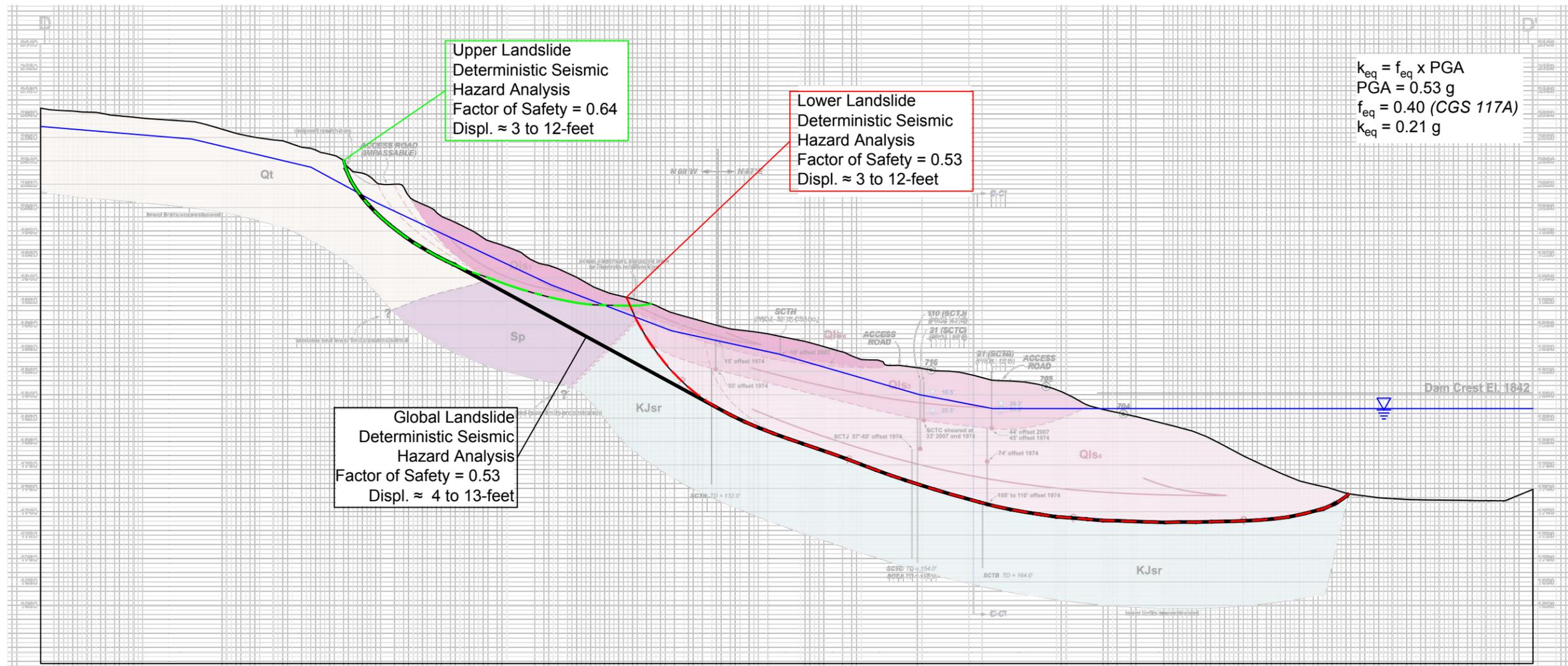
SEISMIC SLOPE STABILITY ANALYSES (10% in 50-yrs)

Scott Dam Evaluation
 Lake County, California

Project No. 1323.100 Date: 7/17/18

Designed	BSP
Drawn	BSP
Checked	

2
 FIGURE



MPEG
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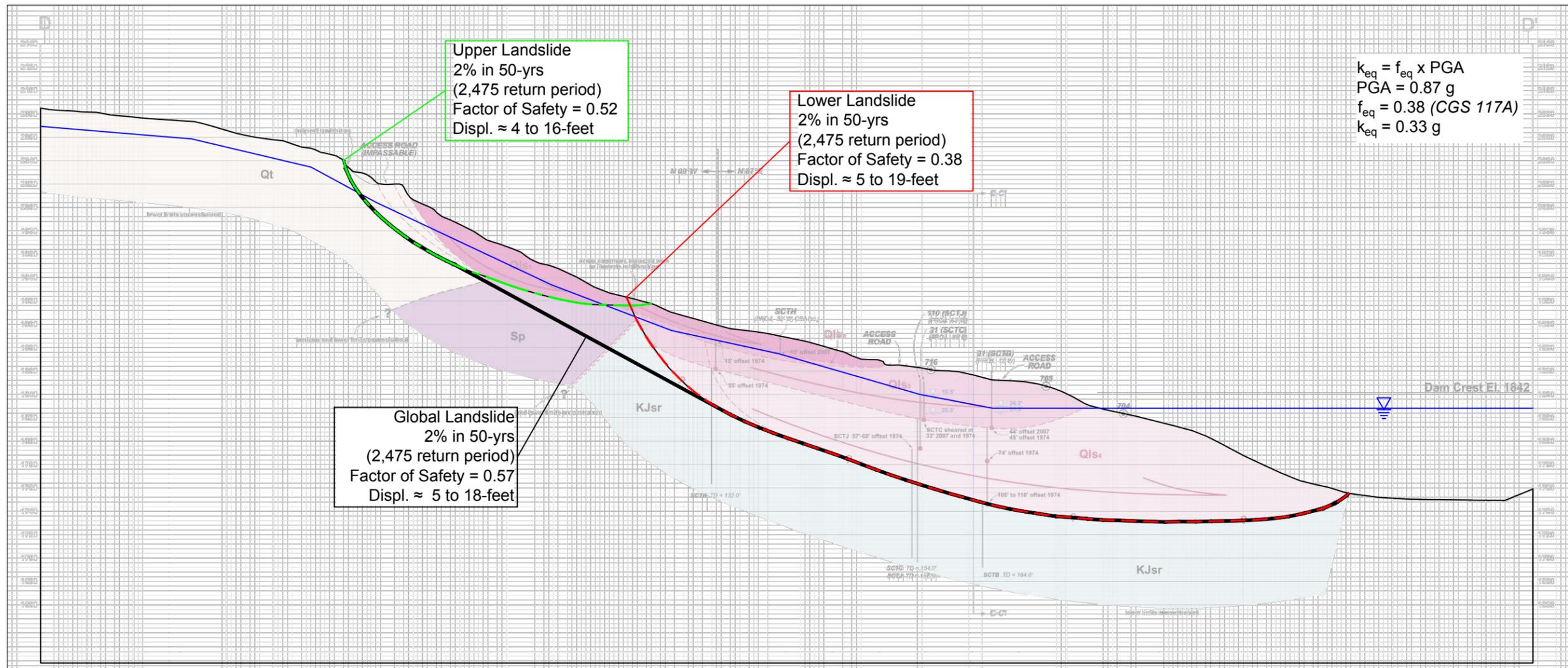
SEISMIC SLOPE STABILITY ANALYSES (DSHA)

Scott Dam Evaluation
 Lake County, California

Project No. 1323.100 Date: 7/17/18

Designed BSP
 Drawn BSP
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3
 FIGURE



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SEISMIC SLOPE STABILITY ANALYSES (2% in 50-yrs)

Scott Dam Evaluation
 Lake County, California

Project No. 1323.100 Date: 7/17/18

Designed	BSP
Drawn	BSP
Checked	

4
 FIGURE

