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## MEMORANDUM

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**DATE:** November 20, 2020

**TO:** Chad Johnson  
North Coast Regional Water Quality Control Board  
Non Point Source Division- Northern Timber Harvest Unit

**FROM:** Sara Gallagher  
Engineering Geologist  
California Geological Survey

**SUBJECT:** Site Inspection for Road Point 01, New Site Revision #6, GDRCo. 2020 MATO

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Date of Inspections: November 10, 2020

Participants-Affiliation:

Jeremy Wright- GDRCo.  
Matt House- GDRCo.  
Nicholas Simpson- CDFW  
Bianca Hayashi- CDFW  
Sara Gallagher – CGS

County: Del Norte

### Introduction:

At the request of Chad Johnson from the North Coast Regional Water Quality Control Board (NCRWQCB) and Nicholas Simpson from the California Department of Fish and Wildlife (CDFW), CGS attended a site inspection for a recently reconstructed bridge in the Green Diamond (GDRCo.) Moore Tract. It is our understanding that the bridge was built to facilitate emergency salvage operations for 1-20EM-00126-DEL and 1-20EM-00109-DEL, and is covered under GDRCo.'s 2020 Annual Work Plan for the Master Agreement for Timber Operations (MATO) and Road Management Waste Discharge Requirements, New Site Revision #6, dated September 28, 2020.

### Site Specific Observations:

The bridge at Road Point 01 is a railroad flatcar bridge with both abutments placed on un-engineered fill. The fillslopes under the bridge are steep, close to a 1:1 slope ratio. The concrete abutments are set close to the top of the fillslope. The right bank abutment is placed right at the top of the fill slope, and the left bank abutment is benched into the fillslope approximately one foot back from the top of the fillslope.

Much of the fill is armored with rock, however it does not appear to be keyed into the channel, and much of the rock appears to be undersized. The D50 median particle size appears to be 1-foot diameter rock. On the right abutment (facing downstream), the rock only comes halfway up the fill slope (approximately 3- to 4-feet up from the stream channel), and the upper half is bare fill.

Discussion:

According to the Forest Practice Rules (CalFire, 2020), the face of fills for logging road watercourse crossings shall not be greater than 65%, which is a 1.5:1 ratio (FPR 923.9 (i) and (p)(2)). The 1:1 fillslopes observed under the bridge are therefore steeper than allowable under the forest practice rules.

The fillslopes do not appear to be sufficiently armored with rock. According to the manning calculations performed by CDFW, the D50 should be 1.5 feet. With the rock being 1) undersized, 2) not keyed into the channel, and 3) only covering the lower 3- to 4-feet of the fillslope on the right abutment, the fillslopes may be subject to scour.

CGS is concerned that with the bridge abutments placed close to the steep fill slopes which are not properly armored with rock, the fill slope may be subject to erosion during high flow events. The condition of the fill slope should be closely monitored for signs of erosion. If any undercutting of the fill slope occurs, the bridge may not be safe for vehicular traffic.

Recommendations:

CGS recommends the crossing be evaluated by a licensed geologist at the end of the winter period to determine if additional rock armoring of the fill is necessary. CGS recommends the bridge be considered temporary if it is not brought up to Forest Practice standards, or GDRCo. may provide engineering specifications for the alternative to the rules for agency review.

Original signed by:



Concur:

Original signed by:



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Sara R. Gallagher PG 9461  
Engineering Geologist

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John A. Oswald CEG 2291  
Senior Engineering Geologist  
Eureka CA

References:

Cafferata, P.; Lindsay, D.; Spittler, T.; Wopat, M; Bundros, G.; Flanagan, S.; Coe, Drew.; Short, W.; 2017, Designing Watercourse Crossings for Passage of 100-Year Flood Flows, Wood, and Sediment, Department of Forestry and Fire Protection, California Forestry Report No. 1

CALFIRE, 2020, California Forest Practice Rules 2020, Title 14 CCR, Chapter 4, 4.5, and 10 Department of Forestry and Fire Protection.

Green Diamond Resource Company, 2020, Annual Work Plan for the Master Agreement for Timber Operations and Road Management Waste Discharge Requirements, New Site Revision #6, Dated September 28, 2020