



DEPARTMENT OF CONSERVATION

CALIFORNIA GEOLOGICAL SURVEY

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Memorandum

To: Mr. Stormer Feiler
North Coast Regional Water Quality Board
5550 Skylane Boulevard, Suite A
Santa Rosa, CA 95403

From: David Longstreth
Department of Conservation
California Geological Survey
135 Ridgway Avenue
Santa Rosa, CA 95401

Date: August 14, 2013

Subject: Preliminary Engineering Geologic Assessment of Water Storage Bladder Failure and Erosion, Portion of Section 34, T18N, R11W, MD BL&M; Potter Valley Area, CA.

References:

California Department of Fish and Wildlife (CDFW), 2013, Incident Involving Failure of a Water Storage Bladder Affecting an Unnamed Class II Stream and the Eel River below Lake Pillsbury on the Franklin Property, unpublished memo to Warden Steven Crowl, California Department of Fish and Wildlife, Prepared by Rick Macedo, dated May 30.

California Geological Survey (CGS), 1994, Engineering Geologic Review of Timber Harvesting Plan 1-94-375 MEN, unpublished memo to Lloyd Keefer, Chief, Region I, California Department of Forestry and Fire Protection, P.O. Box 670, Santa Rosa, CA 95402, prepared by Julie Bawcom, dated August 29.

Durham, J., 1979, Potter Valley 15' Quadrangle: California Department of Forestry, Title II Geologic Data Compilation Project, Unpublished, scale 1:62,500.

Introduction:

The California Geological Survey (CGS) was requested by the North Coast Regional Water Quality Board (NCRWQCB) to evaluate reported erosion within a Class II tributary to the Eel River portion in the Potter Valley area. The site is located on steep ($80\pm$ percent) northwest facing slopes that drain to the main stem Eel River. A site visit was conducted on May 24, 2013 by Rick Macedo (CDFW), Steven Crowl (CDFW), Stormer Feiler (NCRWQCB), Dave Longstreth (CGS), and Daniel Franklin (landowner). The erosion site is located within a portion of Unit 3 of 1-00NTMP-019 MEN/LAK. Review of records indicates that geologic field review of the NTMP was not conducted.

The Department of Conservation's mission is to balance today's needs with tomorrow's challenges and foster intelligent, sustainable, and efficient use of California's energy, land, and mineral resources.

Geologic Conditions:

The site area is located approximately 4 miles northeast of Potter Valley, Mendocino County, California. The slopes are underlain by Cretaceous age sedimentary bedrock of the Upper Great Valley Sequence (Durham, 1979, Figure 1) described as interbedded sandstone, siltstone and mudstone. CGS (1994, Figure 2) performed a pre-harvest inspection of THP 1-94-375 MEN describing site rocks as highly sheared and deeply weathered sandstone and gray mudstone. Site observations during this inspection concur with the bedrock descriptions.

Observations: (keyed to Figure 3)

Map Point 1 - Water Bladder Failure. Reportedly a 50,000 gallon water bladder (measured to be 70 feet long and 25 feet wide) used for irrigation purposes catastrophically failed during the night of April 24/25, 2013 and released water into a Class II tributary of the Eel River. The bladder was placed on a graded pad located just above the watercourse. According to the landowner the gravity fed water supply to the bladder was left open during a storm event filling the bladder to beyond its capacity and to a point where it burst along a seam. Apparently all the water from the bladder was released and concentrated into the Class II watercourse at one time. CDFW (2013) estimates that approximately 80,000 gallons of water was released. Although little erosion of the pad area that contained the bladder was observed it was noted that fill materials appeared to be perched immediately above the watercourse.

Map Point 2 - Channel Bank Erosion and Scour. Based on observations during our site visit it appears that approximately 2000 feet of a Class II watercourse channel was eroded and scoured as a result of the water release. The eroded watercourse consists of a "V" shaped watercourse on 50 to 80 percent slopes. It appears that the concentrated release of water eroded and scoured the watercourse channel bottom and transported material down slope to the Eel River. The volume of eroded material may have increased (bulked) as it flowed downslope, ultimately forming a small debris flow. Scour of channel banks was observed to range from 2 to 5 feet in depth and 2 to 6 feet in width. Boulders on the order of 2 to 4 feet in diameter appeared to be involved in the debris flow. Very little sediment was observed deposited on the banks of the Eel River. It appears that most of the sediment generated during the water release and subsequent debris flow were delivered to the Eel River. Using an average V shaped scour channel of 3.5 feet of depth and 4 feet of width it is estimated that on the order of 500 cubic yards of sediment and debris was delivered to the Eel River as a result of the water bladder failure.

$$((3.5 \text{ feet} \times 4 \text{ feet}) \div 2) \times 2000 \text{ feet} = 14,000 \text{ cubic feet}$$

$$14,000 \text{ cubic feet} \div 27 \text{ cubic feet/cubic yard} = 518 \text{ cubic yards}$$

Map Point 3 – Logging Road Watercourse Crossing. The outside edge of a logging road located approximately 700 feet downstream of the failed water bladder was eroded by material that overtopped the road. A gully on the order of 12 feet wide, 15 feet long and 2 to 5 feet deep was observed in the outside edge of the road. An 8 inch diameter metal culvert was observed to be washed about 10 feet downstream of the watercourse crossing and wrapped around a tree. Because additional fill material was observed to remain in the crossing it appears that additional erosion and sediment delivery can occur at this location.

Map Point 4 - M8 Road Watercourse Crossing. A publically used road known as the M8 Road is located near the base of the slopes where the watercourse drains into the Eel River. What appears to be a 24 inch diameter metal culvert used as a watercourse crossing was buried by sediment at the inlet. While much of the debris had been removed prior to our site visit it appears that debris was deposited on the roadway by an apparent debris flow. The outside fill face appeared eroded with rills and gullies on the order of 1 to 2 feet deep. Because the culvert inlet is plugged it appears likely that seasonal flow within the watercourse will be diverted down the M8 road increasing the potential for future sediment delivery.

Existing Road System Unrelated to the Bladder Failure. The existing road system within the site area appeared to contain areas of gullying and erosion not related to the water bladder failure. It appears likely that some of the erosion is resulting in sediment delivery to site watercourses. Evaluation of the road system was not the primary goal of our site visit and volumes of sediment delivery from the existing road system was not estimated during our site visit.

Recommendations:

1). Erosion Control Plan. An erosion control plan should be developed by California licensed Professional Geologist or California licensed Civil Engineer for the site area. Among other things the plan should include evaluation and mitigation of:

- Map Point 1. Perched fills in the pad area where the water bladder is located.
- Map Point 3. The watercourse crossing on the logging road located approximately 700 feet downstream of the water bladder.
- Map Point 4. The watercourse crossing on the M8 Road.
- The erosion control plan should evaluate the existing road system and infrastructure with regard to the potential for sediment delivery. The erosion control plan should include mitigations developed to minimize the potential for road generated erosion and sediment delivery.

It is critical that such a plan be implemented before this winter's rains.

2). Any water storage system (existing or proposed) at the site should be evaluated, mitigated and/or designed by a California licensed Civil Engineer. Water storage systems should be designed in such a way as to have either/or emergency automatic shut off valves and non-erosive overflow spillways incorporated into the system so that water can be released during storm events without eroding stream channels. Graded pad areas that support such facilities should be properly designed by a California licensed Civil Engineer to support the load of the water storage system (for example a 50,000 gallon water bladder would weigh: 50,000 gallons x 8.33 pounds/gallon = 416,500 pounds) such that the potential for settlement and/or failure of the pad area is minimized, thus minimizing potential adverse effects to the water storage system.

3). A copy of this memo and all associated documentation shall be provided to the Mendocino County Department of Building and Planning.

Public Safety Issues and Comments to County of Mendocino:

Because the M8 Road is a publically used road issues regarding impacts to public safety are discussed in this memo. It is not clear if the County of Mendocino would be the permitting agency for road repair on the M8 road. We recommend that the county be informed of such repairs. The county may require evaluation by a California Engineering Geologist (CEG) and/or a Civil Engineer.

Disclosure: This memo should in no way be considered an Engineering Geologic Report and should not be substituted in any way for such evaluations and reports recommended and requested in this memo.

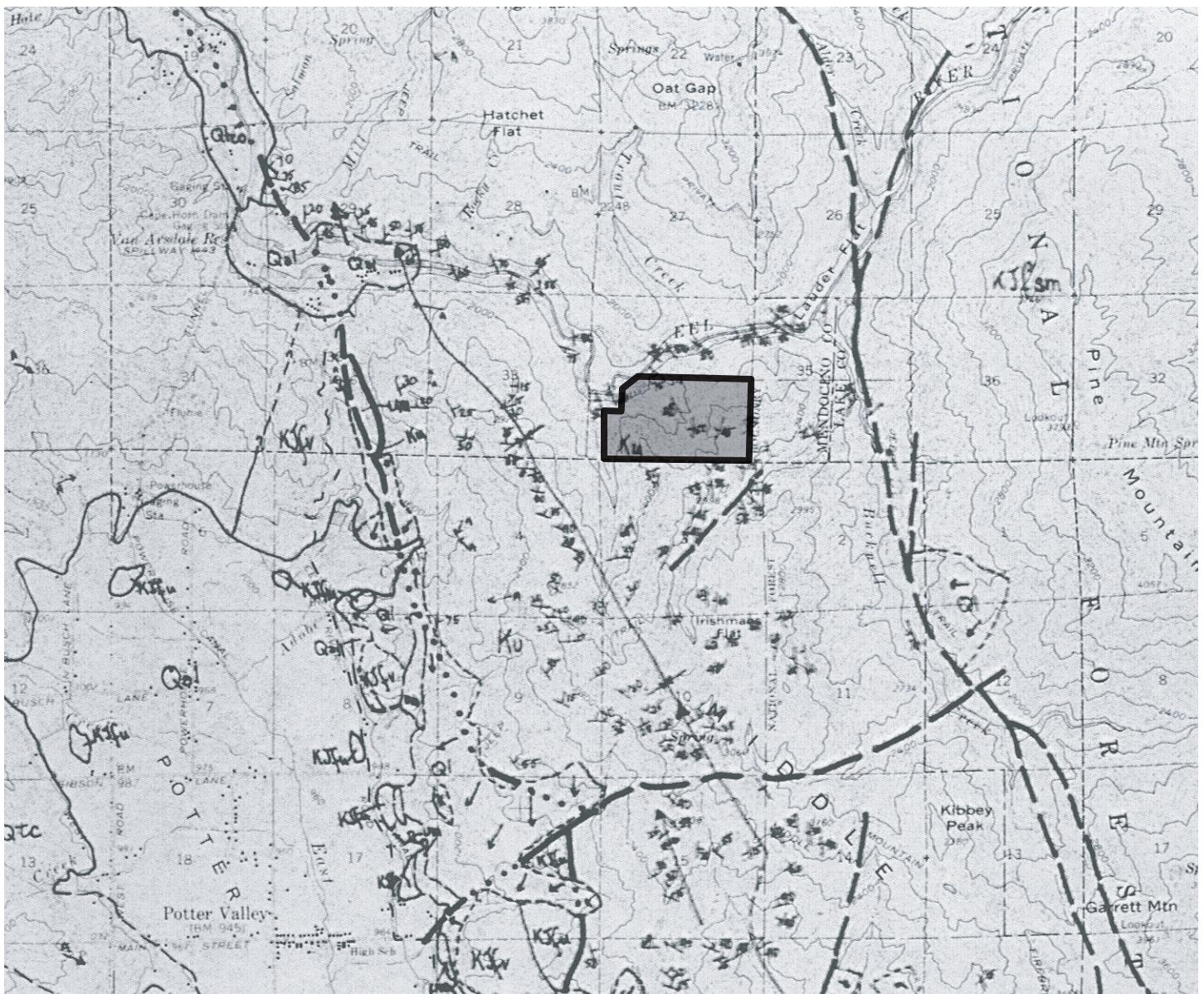
original signed by
David Longstreth, CEG # 2068
Senior Engineering Geologist



Concur

08/19/2013 original signed by
Date William R. Short, CEG # 1429
Supervising Engineering Geologist
Attachments: Figures 1, 2, and 3.





Explanation

- Qa Alluvium
- Qte Alluvial Terrace
- Qtc Continental Terrace Deposits
- QI Landslide, undifferentiated
- KJfu Central Belt Franciscan Formation
- KJfv Franciscan Volcanics
- KJfs Skunk Rock Melange
- KJfsm San Hedrin Member
- Ku Upper Great Valley Sequence

— — Geologic contact, dashed where approximately located

↗ Landslide

↗ 75 Strike and dip of bedding

Shaded area represents estimated limits of proposed harvest area.



0 2604' 5208'

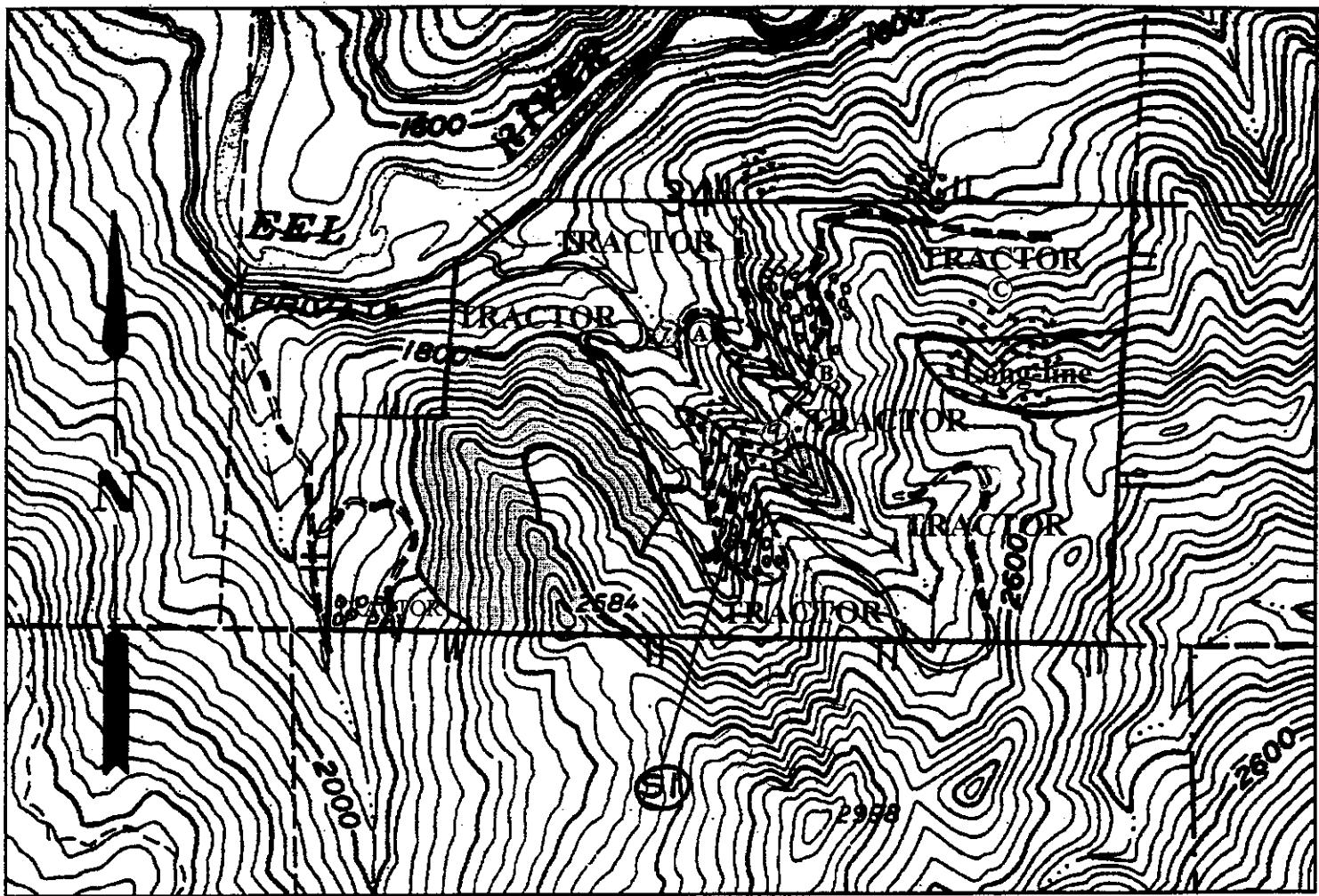
Base Map: Modified from Durham, J., 1979, Potter Valley 15' Quadrangle: California Department of Forestry, Title II Geologic Data Compilation Project, Unpublished, scale 1:62,500.

Date: Aug 2013

Scale: 1" = 5208'

Regional Geologic Map To Accompany Engineering
Geologic Inspection of Water Storage Bladder Failure
Franklin Property, Sec. 34, T18N, R11W MDB&M,
Potter Valley 15 minute quadrangle, California

Figure:
1



MAP A Geologic Report
THP 1-94-375 MEN

**TIMBER HARVEST PLAN MAP
"BIG MAX" THP**

Comprising a portion of the S1/2 Section 34 T18N R11W MDB&M
Potter Valley 15 min. Quad.

MAP #4 YARDING/COMMENT

THP Boundary

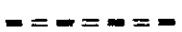


Yarding Boundaries

Permanent Road



Existing Seasonal Road



Helicopter

Proposed Seasonal Road



TRACTOR

Comment Symbol



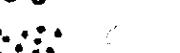
Tractor



Long-line



Disrupted ground



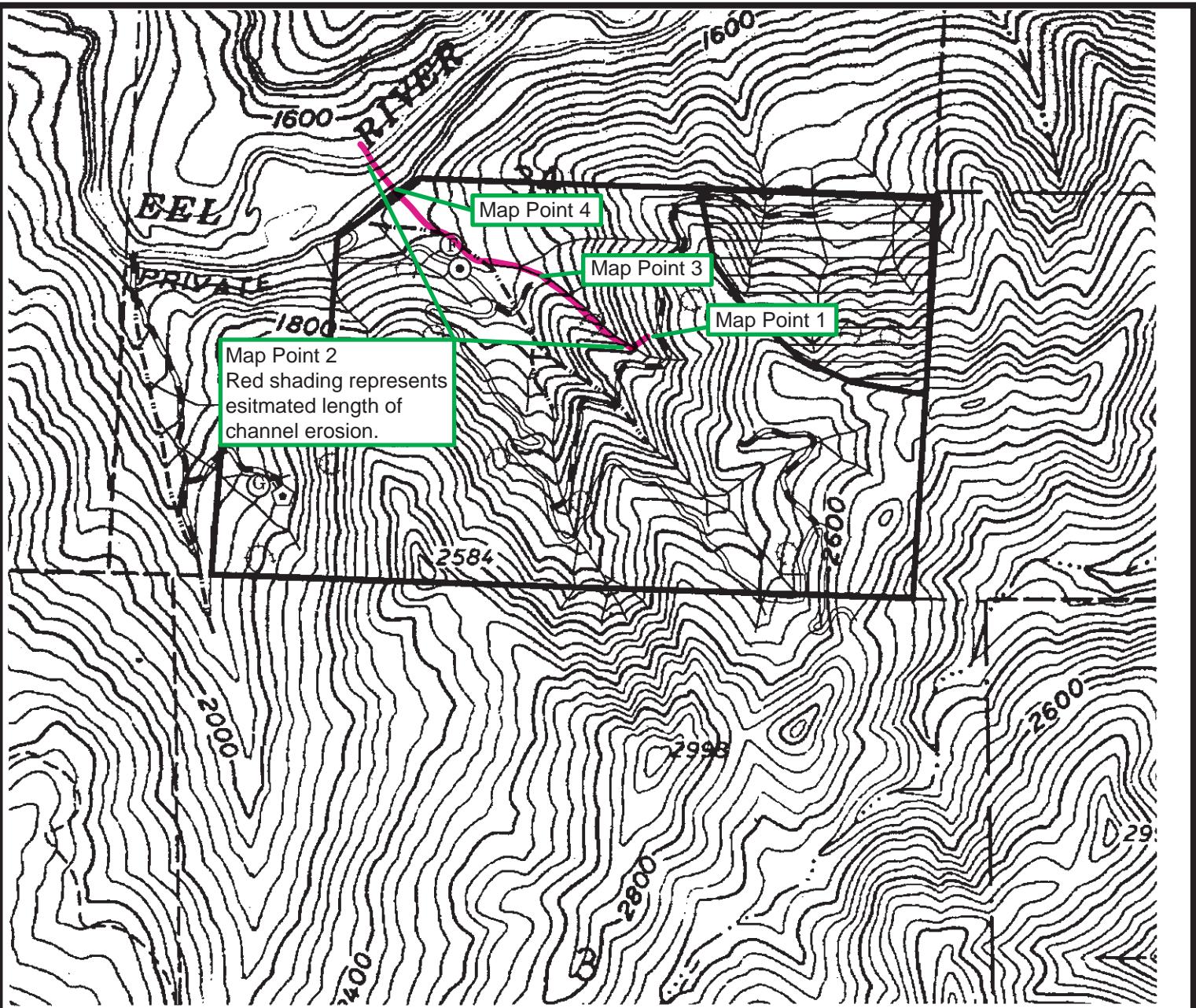
Debris Slide slopes

Scale 1 : 12,000

Scale: 1" = 1000'

Site Map Included in CGS Engineering Geologic Review of THP 1-94-375 MEN.

Figure: 2



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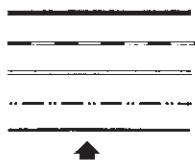
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COAST AREA OFFICE
RESOURCE MANAGEMENT

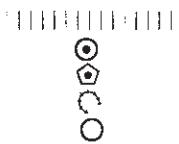
**McKee NTMP
Unit 3 Operations Map**

= Estimated Observation Location

Project Area:
Existing Seasonal Road:
Existing Permanent Road:
Class II Watercourse:
Class III Watercourse:
Structure:



WLPZ Road or Skid Trail:
WLPZ landing:
ELZ Landing:
Slide Area:
Point in Text:



PART OF PLAN

T18N R11W MDB&M
Portions of Section 34
Potter Valley 7.5' Quad

Selection areas:
All other areas Transition
All areas Site III



Scale: 1" = 1000'

**Site Map To Accompany Engineering Inspection
of Water Bladder Failure, Franklin Property** (revised 5/12/2015)

Figure: 3