

**FOR CONTRACT NO.: 06-0N3804**

# **INFORMATION HANDOUT**

## **MATERIALS INFORMATION**

UPDATED GEOTECHNICAL REPORT Dated January 4, 2013

**ROUTE: 06-Ker-14.3, 16.7**

# Memorandum

*Flex your power!  
Be energy efficient!*

**To: RANJEEV KUMAR**  
Project Engineer

**Date:** January 4, 2013

**File:** 06-Ker-178  
PM 13.8/15.8  
06-0N3801  
Major Damage Restoration

**From: DEPARTMENT OF TRANSPORTATION  
DIVISION OF ENGINEERING SERVICES  
GEOTECHNICAL SERVICES – MS 5**

**Subject:** Updated Geotechnical Report

## **Introduction**

As requested on December 4, 2012, the Office of Geotechnical Design North (OGDN) is providing an Updated Geotechnical Report for a SHOPP program to permanently restore storm damage observed at four locations on Highway 178, in Kern County (Figure 1). The damage occurred at PM 14.3, 14.35, 15.5 and 15.7. A site visit and Damage Assessment Form (DAF) was prepared by Mr. Sam Katich, D06 Maintenance Engineering. According to the DAF, storm damage consisted of rockslides and slip-outs in embankment fill.

Our office previously prepared a “Preliminary Geotechnical Report” on September 19, 2011 for four locations with embankment erosion. The report recommended the option of a barrier slab to preserve the pavement in those areas.

The project has now proposed to construct two concrete slabs/dowelled gravity walls between Stations 135+25 and 139+58 (Location 1) and between Stations 209+17 and 210+60 (Location 2). The slabs are anticipated to be keyed or dowelled into underlying boulder fill/bedrock.

## **Pertinent Reports and Investigations**

The following presents a list of references used in preparation of this report.

- Caltrans, Preliminary Geotechnical Report, September 19, 2011.
- Caltrans, Damage Assessment Form, DAF #DVH-CT06-002-0
- Caltrans, Director’s Order Request/Approval, February 24, 1998
- Caltrans, Director’s Order Request/Approval, January 26, 1999
- Caltrans, Plan and Profile of Proposed State Highway in Kern County, from Cottonwood Creek to First Crossing Kern River, Contract No. 06-396, 1922
- Caltrans, Project Plans for Construction on State Highway in Kern County at Various Locations from Side Hill Viaduct Bridge 50-137, about 12 miles East of Bakersfield to

0.2 mile east of Edison Company Kern River Powerhouse No. 1, Contract No. 06-118804, 1972

- Caltrans, Project Plans for Construction on State Highway in Kern County at Various Locations, Contract No. 06-164704, 1977
- Caltrans, Project Plans for Construction on State Highway in Kern County East of Bakersfield about 1.6 miles east of the Edison Powerhouse, Contract No. 06-275704, 1990
- Project Plans for Construction on State Highway in Kern County east of Bakersfield at 0.3 miles east of the Mouth of the Kern River Canyon and from 0.2 mile west to 0.1 mile east of Cow Flat Creek, Contract No. 06-281104, 1994
- USGS Topographic Map of the Rio Bravo ranch Quadrangle, 1:24000, 1968.
- Smith, A.R., 1964, Geologic map of California: Bakersfield sheet: California Division of Mines and Geology, scale 1:250000

### **Existing Facilities and Proposed Improvements**

The locations are situated on Highway 178 in Kern County, east of Bakersfield and west of the Lake Isabella. This section of roadway trends roughly northeast-southwest in this area and was constructed on a cut/fill with a cut to the east and an embankment fill to the west. The slip-outs are located on the westerly (westbound) side of the roadway, in the embankment fill.

Previous repairs along this portion of Highway 178 were documented in the earlier report.

This project proposes to construct modified concrete pavement slabs that are dowelled into the underlying granitic bedrock. Location 1, situated at PM 14.3 is anticipated to be approximately 433-feet in length and Location 2, situated at PM 15.7 is proposed to be 143-feet in length. The maximum retained heights of the “walls” are anticipated to be 2.5-feet. The slabs will be dowelled 24-inches into underlying boulder fill/bedrock with 2 #8 bars, spaced every ten-feet.

### **Physical Setting**

The physical setting of the project site and the surrounding area was reviewed to provide climate, topography and drainage, man-made and natural features, geology characteristics to aid in project design and construction planning. The following is a discussion of the review:

#### Climate

The Western Regional Climate Center temperature data from the Kern River PH1 Station (044520) which is located one-mile north of the project site, gives an average maximum monthly temperature of 99.9° F in July and an average minimum of 42.2 ° F in January from 1906 to 1991. The average of annual precipitation total is 10.59 inches and average snow fall is ½-inch with a maximum of 0.2-inches in December and January.

### Topography and Drainage

Based on the United States Geological Survey (USGS) topographic map of the Rio Bravo Ranch quadrangle (1968, Figure 3), the overall topography of the area ranges from about 950-feet at road level to over 3000-feet above mean sea level at the adjacent peaks. The map indicates the Kern River lies adjacent to the west side of the roadway. The map also indicated that aqueducts lie to the east and west of the Kern River tying into a powerhouse situated on the Kern River at about PM 15.4.

Surface water is generally handled by side swales, overside drains and culverts.

### Site Geology

According to the Geologic Map of California: Bakersfield Sheet (CGS, 1964), the bedrock observed outcropping in the cutslope and in the Kern River consists of Pre-Cretaceous granitic rocks (gr). Figure 4 depicts the geology of the area.

Based on site photography and reconnaissance, the embankment fills are relatively thin over granitic bedrock.

As-built documents for the Sidehill Viaduct No. 1 (Bridge No. 50-0137) located at PM 13.74 indicate bedrock depths about five-feet below pavement surface.

As-built documents for the Sidehill Viaduct No. 3 (Bridge No. 50-0140) located at PM 13.76 indicate bedrock depths up to five-feet below pavement surface.

As-built documents for the Sidehill Viaduct No. 3 (Bridge No. 50-0182) located at PM 13.78 indicate bedrock depths about 12-feet below pavement surface.

As-built documents from Contract No. 06-281104 indicate that a Type 1 retaining wall was constructed between PM 23.2 and PM 23.5. The wall was constructed on spread footings with a maximum retained height of about four to six-feet. The Log of Test Borings prepared for that project indicated that solid granitic bedrock was about 18 to 22-feet below existing pavement surface.

Based on surrounding as-built information as well as photolog and site reconnaissance, the site geology consists of embankment fill over granitic bedrock. Cut slopes on the eastbound side of the roadway are composed completely of very hard, granitic rock. The fill, on the westbound side of the roadway, is anticipated to contain numerous boulders of very hard, granitic rock. The fill/bedrock contact in this area is extremely undulatory with bedrock depths ranging from a couple of feet below the ground surface to over ten-feet below ground surface.

## Considerations

The project anticipated to construct a dowelled gravity wall/barrier slab pavement to prevent further erosion of the pavement at PM 14.3 and PM 15.7. The walls retained height is anticipated to be about one-foot. The “wall” will be dowelled into underlying boulder fill/granitic bedrock. It is anticipated that solid granitic bedrock is between five to ten feet below pavement surface in these areas. The concrete slab will also be keyed into underlying earth materials where feasible. If the materials encountered at the keyway location are not rippable, it is proposed to dowel the slab into rock. Parameters for the rock and soil can be provided upon request.

The embankment fill is anticipated to be rippable. The boulders contained in the fill, depending on size, may not be rippable. The underlying granitic bedrock will not be rippable but may be excavated with the aid of hydraulic hammers and similar equipment.

## Project Information

Standard Special Provision S5-280, “Project Information”, discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

*Data and information attached with the project plans are:*

None

*Data and information included in the Information Handout provided to the bidders and contractors are:*

Updated Geotechnical Report for EA 06-0N3801, dated January 4, 2013.

*Data and information available for inspection at the District Office:*

None.

*Data and information available for inspection at the Transportation Laboratory are:*

None.

If you have any questions or comments, please call me at (916) 227-1046.

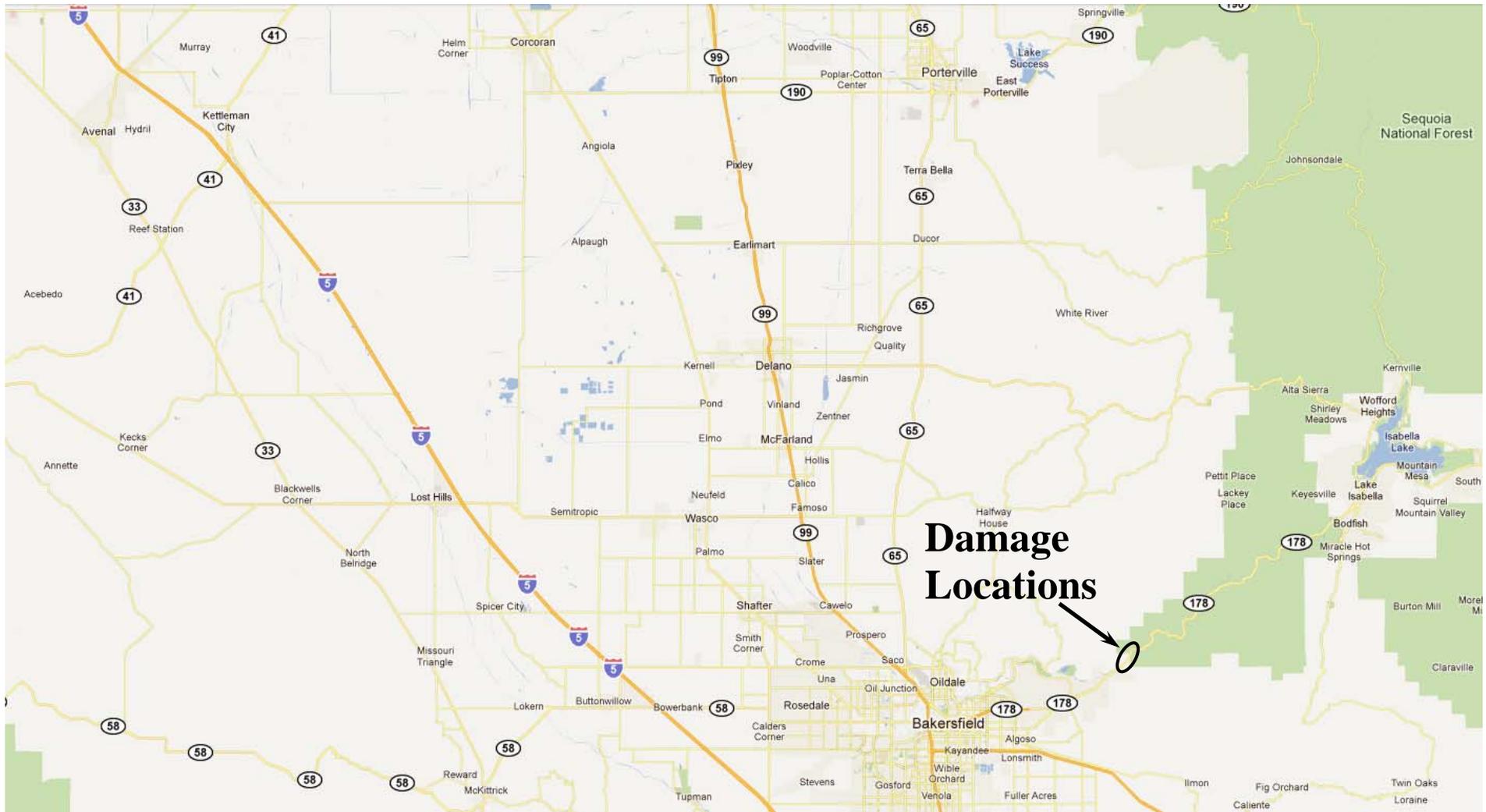


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Office of Geotechnical Design – North  
Branch E

- c: John Huang (Geotechnical Services, Geotechnical Design North)  
Frank Momen (D06 Project Manager)  
Shira Rajendra (Geotechnical Services, Corporate Unit)  
Ted Mooradian (D06 District Materials Engineer)  
District Construction R.E. Pending File  
Julie A Gonzalez (D06 Office Engineer)

Attachments:

- Figure 1 – Vicinity Map  
Figure 2 – Aerial Photograph  
Figure 3 – Topographic Map  
Figure 4 – Geologic Map  
Figure 5 – Photographs



Map adapted from Google Maps, 2011



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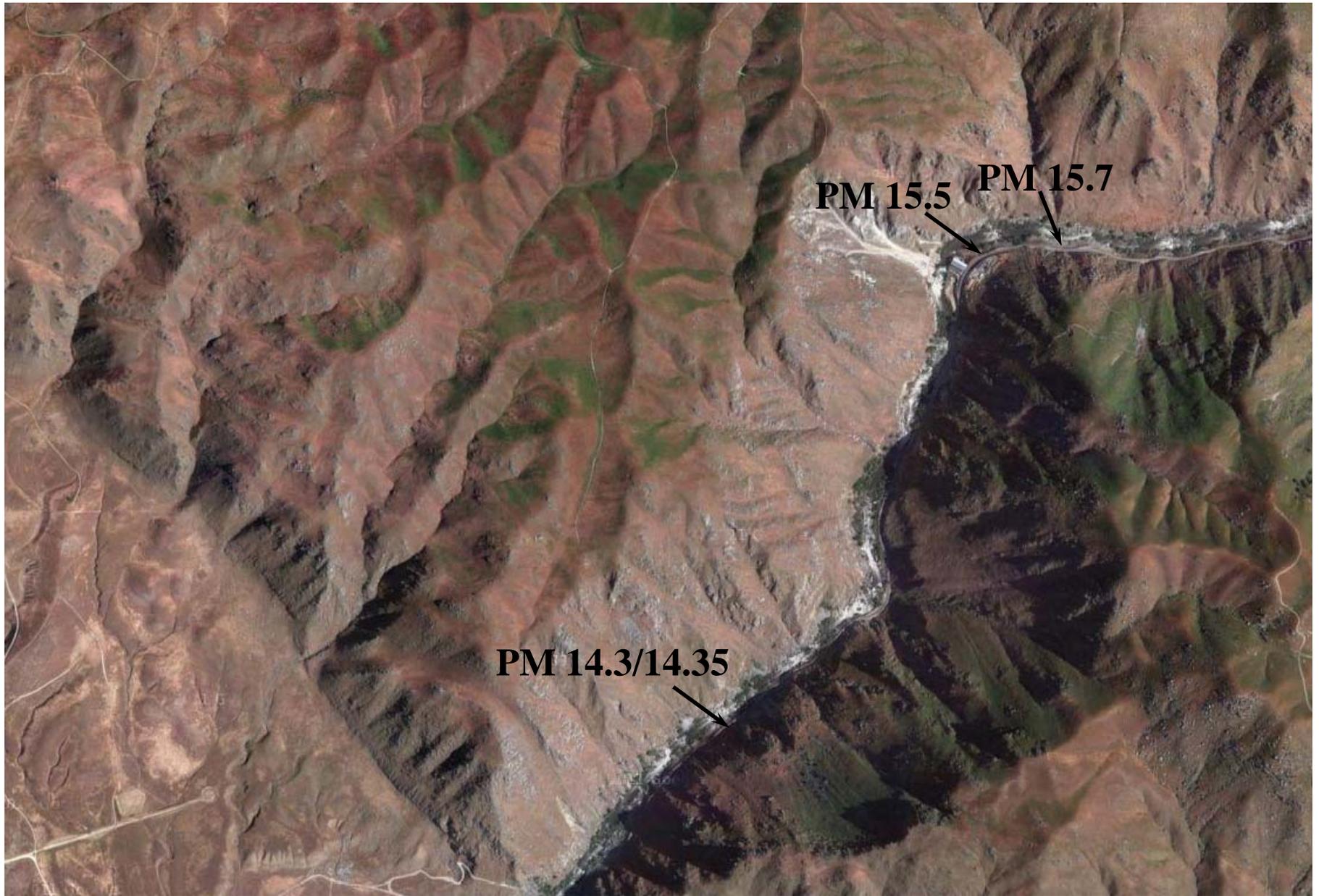
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## Vicinity Map

Figure 1

06-Ker-178 PM 13.8/15.8



Map adapted from Google Maps, 2011



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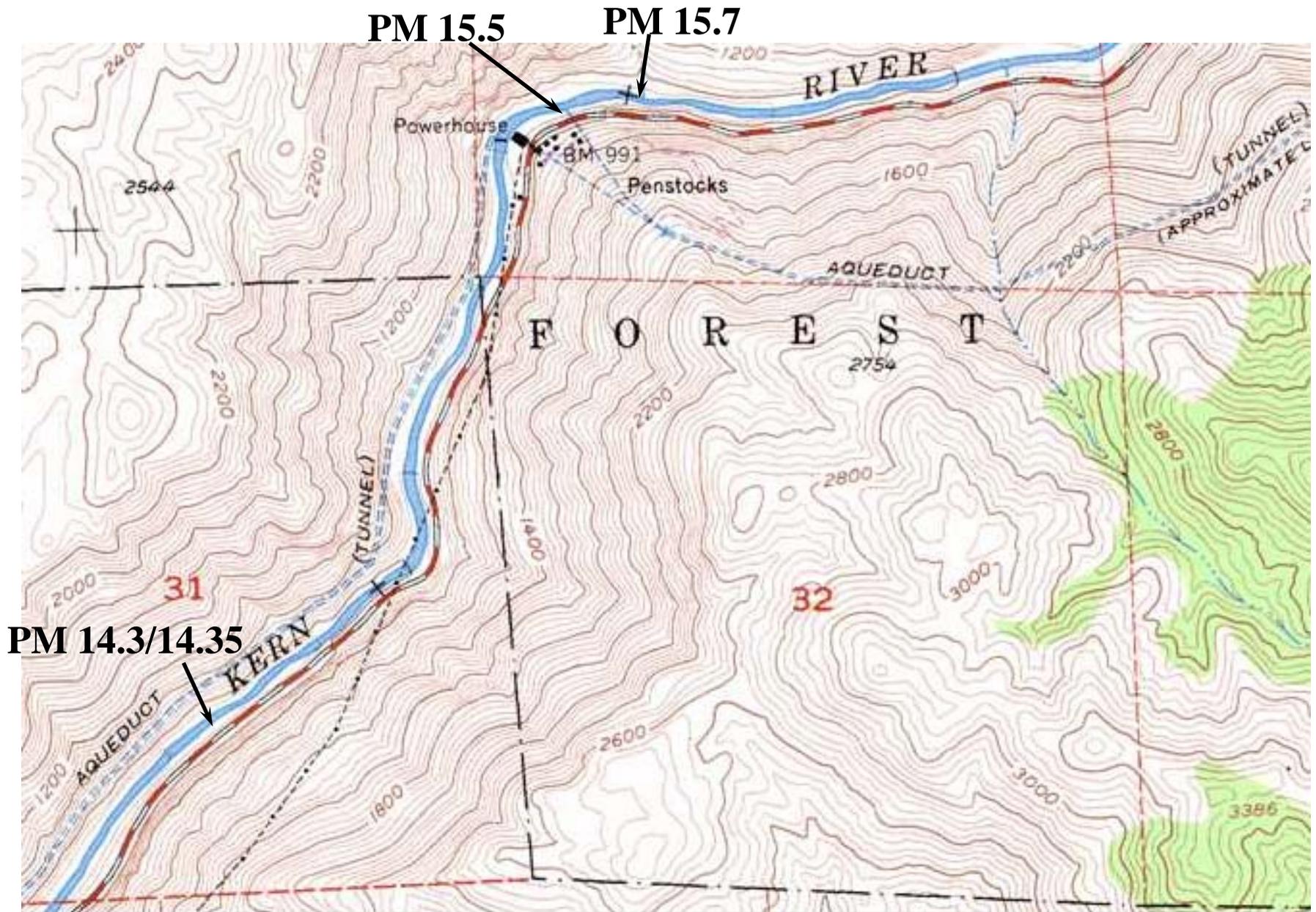
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**Aerial Photograph**

Figure 2

**06-Ker-178 PM 13.8/15.8**



Map adapted from the USGS topographic map of the Rio Bravo Ranch quadrangle, 1968



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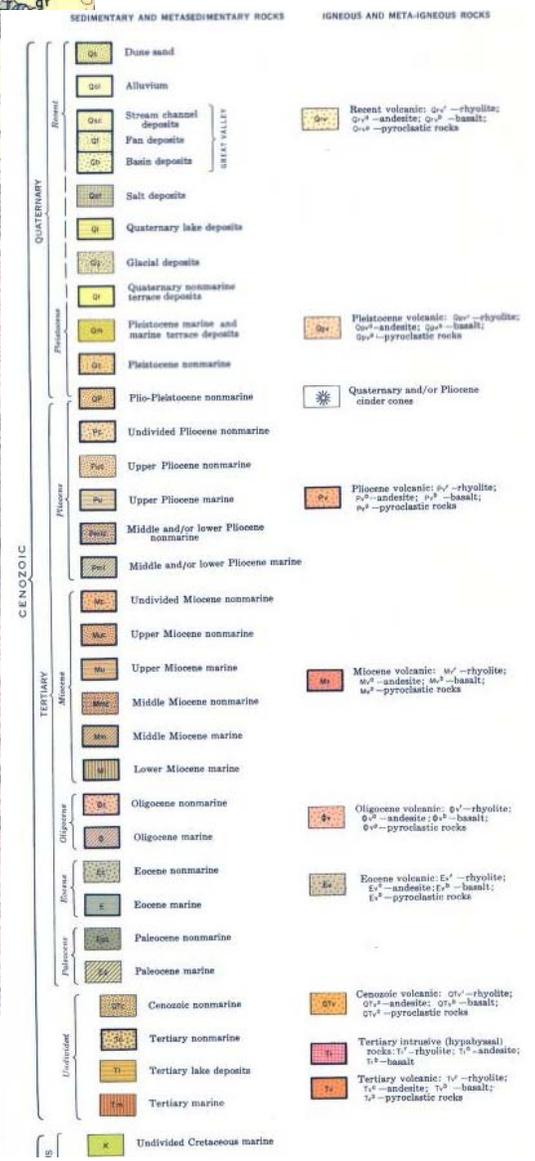
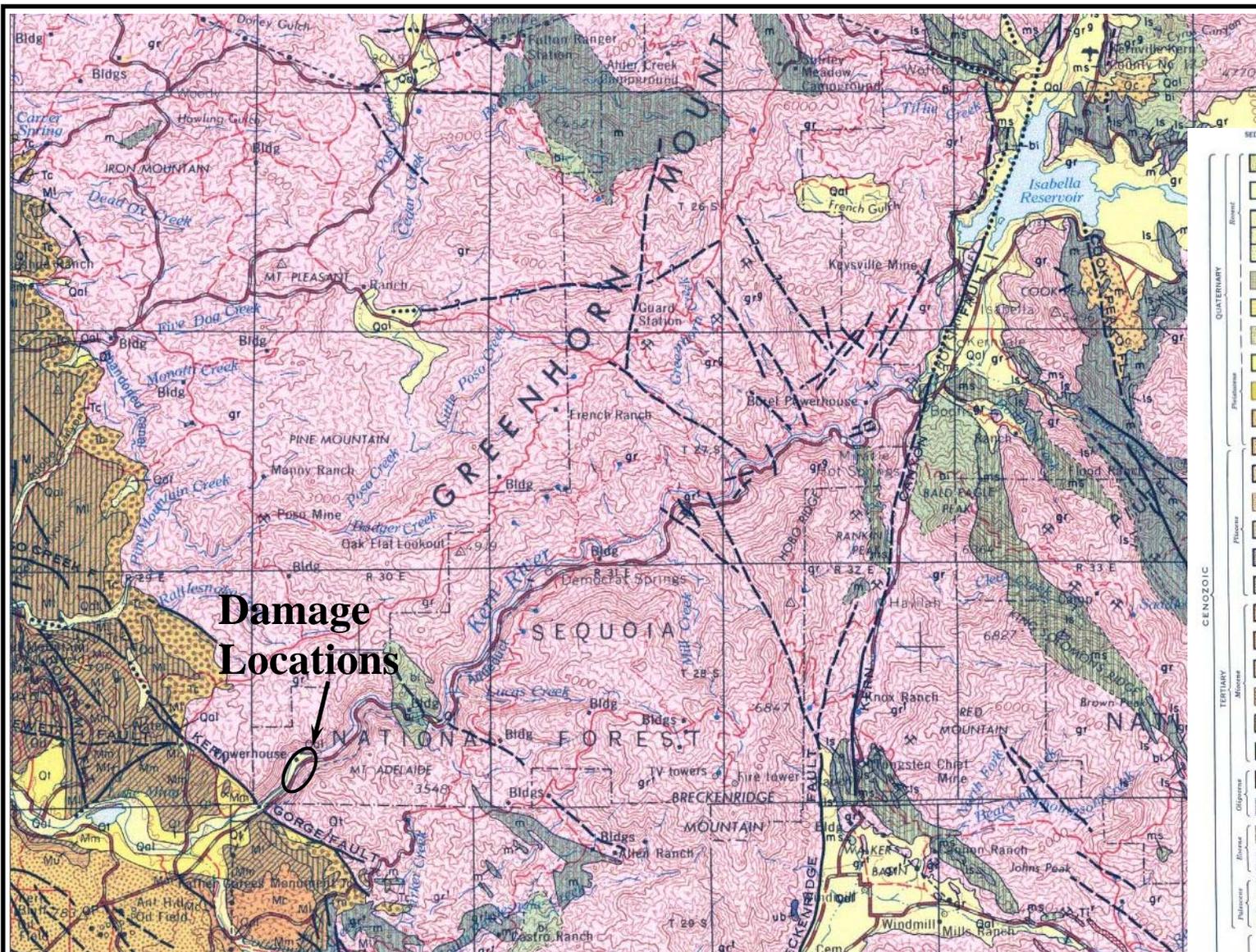
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## Topographic Map

Figure 3

06-Ker-178 PM 13.8/15.8



Map adapted from Smith, A.R., 1964, Geologic map of California: Bakersfield sheet: California Division of Mines and Geology, scale 1:250000



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# Geologic Map

Figure 4

06-Ker-178 PM 13.8/15.8



Photograph showing the roadway at PM 14.35. Note the granitic bedrock in the cutslope as well as embankment.



Photograph showing the major damage at PM 14.35. Note the outcrop of granitic bedrock ore extremely large boulder in the embankment fill.



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## PHOTOGRAPHS

Figure 5

06-Ker-178 PM 13.8/15.8