

ADDITIONAL INFORMATION HANDOUT

MATERIALS INFORMATION

Geotechnical Design Report
Dated June 16, 2008

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Memorandum

*Flex your power!
Be energy efficient!*

To: DAVID FRANKE
Design Manager
Central Region Office of Design I, Branch G

Date: June 16, 2008

File: Mon-101-KP 158.4 PM 98.4
Crazy Horse Canyon Road/
Echo Valley Road IC PIP
EA 05-0161E1

Attn: Dan Massa
Design Engineer

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES

Subject: Geotechnical Design Report

Introduction

A Geotechnical Design Report (GDR) is provided for the above referenced project. Proposed improvements will construct a diamond shaped interchange at the intersection of Highway 101 and Crazy Horse Canyon/ Echo Valley Roads. Proposed improvements are part of the Prunedale Improvement Project (PIP). Layouts and cross sections of the proposed improvements were provided by Design. Review of published geologic data and previous geotechnical reports, subsurface investigations, laboratory testing, and field reconnaissance was performed as part of the geotechnical investigation. Twenty-six power borings were drilled from 2003 to 2007 to provide subsurface information for this report.

The purpose of this report is to document subsurface geotechnical conditions, provide analyses of anticipated site conditions as they pertain to the project described herein, and to recommend design and construction criteria for the roadway portions of the project. This report also establishes a geotechnical baseline to be used in assessing the existence and scope of changed site conditions. This report is intended for use by the project design engineer, construction personnel, bidders and contractors.

Pertinent Reports and Investigations

The following publications were used to assist in the assessment of site conditions:

1. *California Seismic Hazard Map 1996*, Caltrans, Lalliana Mualchin, 1996.

2. *Map Showing Geology and Liquefaction Potential of Northern Monterey and Southern Santa Cruz Counties, CA.* Dupre and Tinsley, 1980.
3. *Preliminary Geotechnical Report Crazy Horse Canyon Interchange*, EA 05-0161E0, Caltrans, Sarah Von Schwind, March 23, 2004.
4. *Geotechnical Impact of Proposed Project, Route 101 Improvement Alternatives – Prunedale Study, Monterey County California, Caltrans District 5, 05-MON-101-91.5/98.7* for DeLeuw Cather and Company by PSC Associates, Inc., dated August 2, 1991.
5. *Preliminary Structure Foundation Report* for 05-Mon-101-98.4 (KP158.4), Echo Valley Road O.C., 05-0161E0, by Geotechnical Services, dated February 17, 2004.
6. *Preliminary Structure Foundation Report* for 05-Mon-101-98.4 (KP158.4), Retaining Walls 2 & 3, 05-0161E0, by Geotechnical Services, dated February 18, 2004.
7. *Geologic Hazards Report* for 05-MON-101-R146.8/161.3 (R91.2/100.2 PM), 05-0161X0 by Geotechnical Services, dated July 23, 2002.

Existing Facilities and Proposed Improvements

Crazy Horse Canyon Road intersects Route 101 on the east side at Route 101 Station 195+10 (PM 98.38) and Echo Valley Road intersects Route 101 on the west side at Route 101 Station 199+30 (PM 98.69). Both existing intersections are at-grade, with turn channelization providing access from the highway. It is proposed to construct a diamond-shaped interchange with an overcrossing bridge at the location of the existing Crazy Horse Canyon Road intersection. A viaduct will be constructed on the east approach to Route 101 on Crazy Horse Canyon Road to raise the roadway elevation to the height of the overcrossing. A viaduct will also be constructed at the off-ramp from northbound Route 101 to Crazy Horse Canyon Road. The east overcrossing bridge abutment and viaducts at the northbound off-ramp and Crazy Horse Canyon Road will terminate on a new fill in the area to the southeast of the existing at-grade intersection of Crazy Horse Canyon Road and Route 101. Echo Valley Road will be realigned to the south beginning at Crazy Horse Canyon/ Echo Valley Road "CHC/EV" Station 23+30 to conform with Crazy Horse Canyon Road at the west abutment of the overcrossing bridge. Southbound on and off ramps and a northbound on-ramp will be constructed in cuts and on fills as part of the interchange. Refer to the following paragraphs for detailed descriptions of each road section and refer to the layouts and cross sections provided by design for exact dimensions and locations.

Improvements to Crazy Horse Canyon Road will begin at Crazy Horse Canyon/ Echo Valley Road "CHC/EV" Station 10+50. From the beginning of the improvements to Station 11+50 the roadway will be in minor cut on the north side of the road and on fill up to approximately 2 meters high on the south side of the road. From Station 11+50 to the beginning of the viaduct at Station 12+50 the roadway will be on embankment increasing in height up to approximately 8 meters near the viaduct abutment. The viaduct will terminate at Station 14+00 and be supported on an embankment approximately 19 meters in height. The embankment will gradually decrease in height to approximately 17 meters at the beginning of the overcrossing bridge at Station 14+96. The northwest end of the overcrossing bridge will terminate on an embankment approximately 11 meters high near Station 15+54, decreasing to a height of approximately 5 meters near Station 16+10. From Station 16+10 to Station 17+10 the roadway is supported primarily on embankment 2-4 meters in height, while the existing slopes to the north of the proposed Crazy Horse Canyon/ Echo Valley Road will be in cuts up to approximately 6 meters deep. From Station 17+10 to Station 19+00 the roadway is supported on minor cuts and fills up to 2 meters. The roadway is entirely in cut beginning at Station 19+00, increasing from approximately 1 meter in depth up to a maximum depth at the top of an existing hill of about 29 meters near Station 21+10. The depth of the cut decreases to approximately 10 meters at Station 21+80, and continues to decrease in height to Station 22+60, where the proposed road elevation approximately matches the existing ground surface. Cuts between Stations 21+80 to 22+60 are primarily on the south side of the proposed road. The roadway is then supported on minor cuts and fills to conform with the existing Echo Valley Road at station 23+30.

Proposed construction of the southbound on-ramp from Echo Valley Road to Route 101 will begin at "CH-3" Station 188+06. From the conform with Route 101 to Station 191+60 the roadway is supported on minor cuts and fills up to 2 meters. Construction of a retaining wall is proposed from Station 190+00 to 191+90 to retain the slopes on the west side of the onramp. From Station 191+60 to Station 192+30 the on-ramp is supported on embankment a maximum of approximately 6 meters in height. The proposed roadway profile roughly matches the elevation of the adjacent ground surface to the west of the on-ramp within these limits. Beginning at Station 192+30 the embankment elevation is above the adjacent ground surface on both sides, increasing to a maximum height of approximately 12 meters near Station 193+80. The embankment gradually decreases in height to approximately 10 meters near the beginning of the on-ramp at Station 194+86 to meet Echo Valley Road.

The southbound off-ramp will terminate at the intersection with Echo Valley Road near "CH-1" Station 195+00 and be supported on embankment approximately 9 meters high. The embankment height will decrease from the end of the ramp to minor cuts and fills near Station 195+50. Beginning at station 195+50 the roadway is entirely in cut, increasing to a maximum depth of 14 meters near Station 196+90. From Station 196+90 the cut depth gradually decreases

to approximately match the existing ground elevation at the beginning of the off-ramp at Station 199+02.

Construction of the northbound off-ramp is proposed to begin at "CH-2" Station 189+75. From Station 189+75 the roadway is supported on minor fills a maximum of approximately 2 meters high near Station 190+40. The height of the embankment gradually increases to a maximum height of approximately 3 meters near Station 191+50. Up-station from Station 191+50 the height of the embankment continues to increase as the roadway parallels an existing drainage beside Route 101. The embankment height reaches a maximum of approximately 13 meters at the beginning of the viaduct at Station 193+24. The viaduct terminates on embankment approximately 19 meters high at Station 194+78. Embankment height gradually decreases to approximately 16 meters at the intersection with Crazy Horse Canyon Road at Station 195+14.

Proposed construction for the northbound on-ramp begins at "CH-4" Station 195+36 on embankment approximately 9 meters high. The height of the embankment increases to a maximum of approximately 11 meters near Station 195+50. Embankment height gradually decreases to approximately match the existing ground surface near Station 199+80. From Station 199+80 to the merge with northbound Route 101 the east side of the ramp will be in cut up to 4 meters. A retaining wall will be constructed beginning at Station 200+27 to support the cuts alongside the east side of the ramp.

Temporary access to Route 101 from Crazy Horse Canyon Road from the east side will be provided by a temporary detour proposed to the south of the existing intersection. The temporary access road will detour from Crazy Horse Canyon Road at "CHC/EV" station 10+00 at "D TOUR-1" station 9+79. The detour will turn toward the south be supported on minor cuts on the south side of the road up to approximately 2 meters at station 12+20. The roadway will then be supported entirely on embankment increasing in height up to a maximum of approximately 9 meters high near station 15+30. The embankment will then widen and decrease in height to approximately match the elevation of Route 101 at 15+64 near Route 101 station 194+18.

Construction of an emergency access road is proposed to begin at "EA" Station 10+00, west of the proposed realignment of Echo Valley Road. The roadway is in minor cut and fill up to 2 meters to Station 10+50. From Station 10+50 to Station 11+66 the roadway is supported on embankment a maximum of approximately 4 meters high near Station 11+20. From Station 11+20 to the end of the road at Station 11+77 the roadway is in minor cut and fill up to 1 meter, where the access road intersects Crazy Horse Canyon/ Echo Valley Road at approximately "CHC/EV" Station 18+26.

Extension of Moro Road, an existing access road to the west of southbound Route 101, is proposed beginning at "MORO" Station 10+00. The roadway is entirely in cut up to 4 meters deep to Station 11+20. Construction of a retaining wall on the east side of Moro Road is proposed beginning at approximately Station 11+19 extending to approximately Station 13+09. From Station 11+20 to 11+80 the road is in cut and fill up to 2 meters. The roadway is then supported on embankment to Station 13+55 with a maximum height of approximately 4 meters near Station 12+80. A widened turn area from approximately Station 13+10 to the end of the extension of Moro Road is proposed to meet the existing paved intersection of Oak Heights Drive and Marjore Drive at approximately the elevation of the existing ground surface.

It is proposed to close Echo Valley Road and infill the road section from "EV" Station 10+80 to the existing intersection with Route 101, and to construct a cul-de-sac at the new end of the road. Access to Route 101 will be provided via the new Crazy Horse Canyon/ Echo Valley Road interchange. Realignment of Echo Valley Road to meet the new alignment of Crazy Horse Canyon/ Echo Valley Road is proposed, beginning at "EV" Station 10+00. The new roadway will be entirely in cut up to 5 meters from the intersection with the realignment to the conform with the existing Echo Valley Road.

Physical Setting

Information regarding site characteristics was obtained from published geologic, topographic, ecological, soil, and seismic hazard maps, the results of field investigations, laboratory tests, and subsurface investigations including mud rotary borings.

Climate

The project is located in the Watsonville Plain-Salinas Valley sub-region of the Central California Coast ecological section. The climate in the project area is warm and foggy in the summers, while winters are cool and moist. The mean annual precipitation is 457 mm (18 inches) and the mean annual air temperature is about 13.4 °C (57° F). Winters are generally mild with occasional freezing temperatures overnight. Nearly all precipitation accumulates during Pacific storms between October and May, with the majority falling during winter months. Vegetation in the project area primarily consists of grasses, brush, oaks, and willows growing near water. Stands of willows were observed growing along Prunedale Creek to the south of Crazy Horse Canyon Road and along the drainage ditch to the north of Crazy Horse Canyon Road. Dense brush and oaks grow in the area proposed for the Crazy Horse Canyon/ Echo Valley Road realignment.

Drainage and Topography

Drainage in the project region is provided by Prunedale Creek, which flows to the south of Crazy Horse Canyon Road. The creek roughly parallels Crazy Horse Canyon Road near the proposed interchange before turning south to follow Route 101 to the southeast of the existing Crazy Horse Canyon Road intersection. Willows and tall weeds grow along Prunedale Creek in the project area. Minor drainage features in the area are within the Prunedale Creek Watershed, which drains to the Tembledaro Slough, to the Old Salinas River, and eventually to Monterey Bay.

Several springs were observed and mapped within the project extents. South of Crazy Horse Canyon road near "CHC/EV" Station 13+00 two springs were observed day- lighting below the road. Refer to the attached layout for mapped locations. A spring box installed in one of the two springs provides a source of water for the cattle living in the field adjacent to the road. Willows and areas of green vegetation were observed growing in the vicinity of both springs. An increased abundance of vegetation and running water was observed in the drainage ditch running parallel to Crazy Horse Canyon Road to the north. An area of increased vegetation was also observed on the south side of Crazy Horse Canyon Road near "CHC/EV" Station 14+00, where an existing cross culvert provides drainage beneath the road and outlets to the south of the road. Although no running water was observed, dense vegetation may be concealing groundwater at or near the surface in these areas.

The area northwest of Route 101 proposed for the Crazy Horse Canyon/ Echo Valley Road realignment contains zones of very dense vegetation. Although no groundwater was encountered in the observation wells installed along the proposed alignment, water may be encountered during construction in the form of perched groundwater springs undetected in the site investigation. After clearing and brushing the existing ground, a determination will be made regarding the requirement for drainage mitigation.

Regional Geology and Seismicity

The project is located in the Gabilan Range of the Coast Ranges Geomorphic Province of California, characterized by northwest trending mountain ranges and intermountain valleys parallel to the San Andreas Fault. The terrain is semi-mountainous with few rock outcrops.

As shown on the attached Geologic map, three Quaternary aged deposits characterize the Crazy Horse area: Aromas Sand (Q_a), Colluvium (Q_c), and Alluvial Deposits (Q_{al}). Santa Lucia Quartz Diorite (pQ) underlies the sedimentary deposits and was encountered in several locations during the subsurface investigation.

Alluvial Deposits (Q_{al}) are found along drainage courses. A heterogeneous sequence of silt and sand with clay lenses and gravel is typical of alluvial soils. Alluvial Deposits may be locally weak and susceptible to consolidation when loaded. Highly variable groundwater levels should be anticipated in Alluvial Deposits. The susceptibility to liquefaction may be moderate to high.

Colluvial (Q_c) soils are typically found at the base of slopes and bordering alluvial deposits. Colluvium is the product of landslide and slope wash processes. Heterogeneous mixtures of silt, sand, and gravel are typical. Colluvial soils may exhibit highly variable groundwater levels. The susceptibility to liquefaction may be low to moderate.

The Aromas Sand (Q_a) near this location consists of interbedded alluvial and eolian deposits. The Aromas Sand will exhibit engineering properties of both subunits. The eolian or dune deposits consist of well-graded sand. Severe erosion of exposed uncemented strata is a significant factor in the design of the proposed project. The fluvial unit of the Aromas Sand, which is a basal alluvial or stream deposited unit, consists of interbedded silty clay, silt, sand and gravel. The beds of well-graded gravel, which range in thickness from 3 to 30 meters, act as local aquifers that can transmit significant amounts of groundwater to cut faces or side hill embankments. Zones of well-cemented sand and fluvial soil contribute to perched groundwater conditions, springs and artesian conditions. Additionally, strata of expansive clay contribute to landslides being common on the natural slopes. In general, liquefaction susceptibility is low in both deposits. Observed natural slopes in the Aromas Sand formation were gentle to moderately steep and appear to be stable. Deeply incised or "badland topography" develops on both natural and cut slopes where not protected from erosion.

Santa Lucia Quartz Diorite (pQ), a granitic rock, was found close to the ground surface in the area of the proposed Echo Valley Road Overcrossing during the drilling operations and it was also noted in the cut slope northwest of the proposed overcrossing bridge. During the drilling operations the Santa Lucia Quartz Diorite was also encountered at depth south and east of the proposed overcrossing.

The project area is located within a seismically active region of California. As determined by Caltrans, the following are the active and potentially active faults that have the greatest potential of influencing the site along with the Moment Magnitude, distance to the site, and the expected maximum bedrock accelerations.

Table 1 Seismic Data

Fault	Magnitude	Distance	Acceleration
San Andreas-North	8.0	7.8 km	0.60g (gravity)
Zayante-Vergales	7.25	1.7 km	0.70g

Liquefaction is a loss of soil strength and stiffness due to an increase in pore water pressure during cyclic loading, such as occurs during an earthquake. Soils with liquefaction potential include loose cohesionless soils that may become saturated. Based on field investigations there are soils that exhibit liquefaction potential in the vicinity of the proposed northbound off-ramp viaduct.

In the vicinity of the northbound off-ramp, the geology of the site consists of thin lenses (0.8 to 1.5 meters thick) of loose sandy material to a depth of 11.6 meters at the southwest viaduct abutment and to a depth of 7 meters at the northeast viaduct abutment. The loose lenses of sand are below the measured groundwater level. Based on the field investigation the liquefaction susceptibility near the viaduct is moderate. It is recommended to found the viaduct abutment foundations in competent material beneath the loose sandy zone.

Soil Survey Mapping

The Soil Survey of Monterey County, California (USDA) identifies the soils at the project site as sandy loam and loamy sand of the Arnold, Danville, and Santa Ynez series. Mainline Route 101 is primarily underlain by Arnold loamy sand (AkD and AkF), which is rated as poor to fair roadfill material, has an erosion "K" factor of 0.15, and stands at natural slopes from 9 to 50 percent. Crazy Horse Canyon Road to the east of Route 101 is underlain by the Arnold loamy sand (AkD) and the Santa Ynez fine sandy loam (ShD). The Santa Ynez series is considered a poor source of roadfill, has an erosion "K" factor of 0.37, and stands at natural slopes between 9 to 15 percent. A narrow zone of Danville sandy clay loam (DaC) runs parallel to the south of Crazy Horse Canyon Road near Prunedale Creek. Soils of the Danville series are considered fair for roadfill construction, have an erosion "K" factor of 0.28, and stand at natural slopes between 2 and 9 percent. Soils obtained from cuts are suitable for use as embankment materials, provided that the recommendations in this report are followed.

Exploration

Drilling and Sampling

Eight 94 mm mud rotary borings (B1-03 through B8-03) were drilled in 2003, and eighteen additional borings (B1-07 through B18-06) were drilled in 2006 and 2007 at the project location. Refer to the attached Logs of Test Borings for specific information regarding boring locations and drilling details. SPT tests were performed during drilling; correlations between SPT blow counts and soil strength parameters for cohesionless soils were estimated for use in design. Undisturbed samples of cohesive soils were also testing using field methods and collected for laboratory testing.

Soil samples were sent to the District Materials Laboratory and Headquarters Geotechnical Testing Laboratory for mechanical analysis, moisture/density testing, Atterburg Limits, corrosion analysis, and undrained-consolidated triaxial shear with pore water measurement tests. The soil strength parameters obtained in the laboratory testing were compared to field observations and used to determine the recommended design strength parameters presented in the following sections. The summarized results of laboratory testing are attached for reference.

Groundwater monitoring wells were installed by placing 3.8 cm (1½") slotted PVC pipe in sand backfill and solid PVC pipe near the surface, with bentonite hole plug seal and a well cap to prevent surface water intrusion. Monitoring wells were installed in 14 selected locations to provide a complete data set from which to estimate the groundwater elevation throughout the project site and monitor fluctuations.

Instrumentation

"Solinst" piezometers were installed in Borings B1-03 and B2-03, to the south of Crazy Horse Canyon Road east of Route 101, to measure the groundwater pressure and ensure that no artesian conditions existed. A vibrating wire piezometer was installed at a depth of approximately 11 meters below the top of the well in Boring B1-03, and a control piezometer was installed near the ground surface in Boring B2-03 to correct for atmospheric pressure. No artesian conditions were observed at the location of the piezometers. Results of the "Solinst" piezometer readings taken since their installation are presented as an attachment to this report.

Mapping

Preliminary field investigations measured approximate slopes and estimated cut/fill depths using hand methods. Surveys has since generated a topographic layout of the project site showing accurate cut and fill depths relative to the existing ground surface. Embankment and cut slope designs are based upon the cut and fill elevations and geometry shown on the provided layouts and cross sections.

Geotechnical Testing

In Situ Testing

Correlations between in situ soil strength parameters and corrected Standard Penetration Test (STP) blow counts were used to approximate the friction angles of cohesionless soils. Estimated friction angles were then used to model cohesionless soils for bearing capacity, settlement, and slope stability analyses.

Laboratory Testing

Particle size analyses were performed on soil samples obtained from borings to determine the particle size distribution of the soils. Results of the soil gradations were used in conjunction with Atterburg Limits test results to identify potential hazards associated with low shear strength and long-term consolidation of fine-grained cohesive materials. Undrained-consolidated triaxial shear tests were also performed to estimate the internal friction angle and cohesion of soil samples proposed for use as embankment fill materials. The results of the laboratory testing are summarized in the following sections as they pertain to design parameters. A material summary sheet with all of the laboratory data is also attached for reference.

Geotechnical Conditions

The information presented in the following sections presents the geotechnical and groundwater conditions to be used in the design and analysis of the proposed improvements.

Site Geology

Lithology

Samples recovered from mud rotary borings consisted of laterally discontinuous alternating layers of varying thickness of sands, silts, and clays overlying granitic bedrock with a varied degree of weathering. The elevation of the granitic bedrock varied throughout the site. Sedimentary rock and soils encountered within the project extents are indicative of alluvial, colluvial, and eolian deposition environments. Soils and rock formations encountered during subsurface investigations appear to match the formations shown on the geologic map.

Groundwater Conditions

Monitoring wells were installed in selected borings to obtain a representative groundwater profile and monitor seasonal fluctuations in groundwater levels. Groundwater is not expected to be encountered during construction. Results of the monitoring well readings are presented in the table on the following page.

Corrosion

The Department considers a site to be corrosive to foundation elements if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: pH of less than 5.5, chloride content greater than 500 ppm, or sulphate content greater than 2000 ppm. Soil and water samples were obtained in borings near the proposed overcrossing structure and

east of Route 101 along Prunedale Creek. Based on the results of the corrosion analyses, the site is considered to be corrosive. Reinforced concrete (including piles) will require corrosion mitigation in accordance with *Bridge Design Specifications, Article 8.22*. Controlling corrosion parameters are as follows: pH 4.7, chloride concentration 38 ppm, sulphate concentration 1850 ppm. A summary of the corrosion analyses is included as an attachment to this report.

Table 2 *Groundwater Monitoring Well*

Boring ID	Date	Surface Elevation (meters)	Depth to Groundwater (meters)	Groundwater Elevation (meters)
B1-03	09/30/03	113.73	4.80	108.93
	10/02/03	113.73	4.83	108.90
	10/15/03	113.73	4.92	108.81
	01/21/04	113.73	5.45	108.28
	03/16/05	113.73	5.39	108.34
	04/28/08	113.73	5.13	108.60
B2-03	09/30/03	113.65	DRY	N/A
	01/21/04	113.65	DRY	N/A
	03/16/05	113.65	DRY	N/A
B3-03	10/15/03	108.34	5.17	103.17
	12/30/03	108.34	5.11	103.23
	01/21/04	108.34	4.76	103.58
	03/16/05	108.34	3.95	104.39
B7-03	12/30/03	102.77	3.30	99.47
	01/21/04	102.77	3.04	99.73
	03/16/05	102.77	2.24	100.53
B8-03	12/30/03	102.78	3.33	99.45
	01/21/04	102.78	3.07	99.71
	03/16/05	102.78	2.24	100.54
B6-07	04/25/07	118.17	1.19	116.98
B11-06	08/17/06	106.17	2.38	103.79
	04/28/08	106.17	3.02	103.15
B12-06	08/17/06	112.35	4.73	107.62
B13-06	10/03/06	120.10	7.23	112.87
	06/01/07	120.10	7.51	112.59
	04/22/08	120.10	7.72	112.38
B14-06	10/03/06	150.80	DRY	N/A
	04/22/08	150.80	DRY	N/A
B15-06	04/22/08	137.70	DRY	N/A
B16-06	04/22/08	174.30	DRY	N/A
B17-06	04/22/08	174.00	DRY	N/A
B18-06	04/22/08	173.50	DRY	N/A

Geotechnical Analysis and Design

The following sections provide a summary of the recommendations for geotechnical and structural design as determined from the geotechnical investigation and analysis results.

Cuts and Excavations

To meet slope stability requirements, it is recommended to construct cut slopes with slope inclinations of 1:2 or flatter for cut slope heights less than 10 meters in height. For cuts in excess of 10 meters in height, a 1:2.5 slope face inclination or a 1:2 slope face with 6 meter wide benches (Highway Design Manual Section 304.3) at not more than 10 meter vertical intervals should be utilized. Benches will help to control surface drainage and reduce erosion of the cut slopes. As an alternative, construction of 2-meter wide benches as 5-meter vertical spacing is also acceptable. Lined ditches should be provided to intercept flow at the rear of the benches. Ditches should have a minimum gradient of 5 percent and a minimum depth of 0.3 meters. Access to the benches should be provided to permit maintenance. The deep cuts for the Crazy Horse Canyon/ Echo Valley Road realignment and other cut slopes will be in fine sand that is highly susceptible to erosion. An aggressive re-vegetation and erosion control program should be implemented by Landscape Architecture to preserve slope integrity.

Embankments

To meet slope stability requirements, it is recommended to construct embankment fill slopes with slope face inclinations of 1:2 or flatter for slope heights less than 15 meters in height. For embankments in excess of 15 meters in height, a 1:2.5 slope face inclination or a 1:2 slope face with 6 meter wide benches (Highway Design Manual Section 304.3) at not more than 10 meter vertical intervals should be utilized. As an alternative, construction of 2-meter wide benches as 5-meter vertical spacing is also acceptable. Lined ditches should be provided to intercept flow at the rear of the benches. Ditches should have a minimum gradient of 5 percent and a minimum depth of 0.3 meters. Access to the benches should be provided to permit maintenance. Some keying and benching of the existing slopes to receive fill will be required.

Embankment fill material to be used in the embankment will be generated from the proposed cuts from the Crazy Horse Canyon/ Echo Valley Road alignment. Silty sands encountered in the proposed borrow area are known to be highly susceptible to erosion. Even with embankment slope face inclinations of 1:2 or flatter there will be a need for substantial erosion control. An active role by the Landscape Architecture Branch will be required to develop sufficient erosion control measures.

Slope Stability

Based upon the slope recommendations presented in the preceding sections, slope angles of 1:2 or flatter on cut and fill slopes will be stable. Care should be taken to aggressively re-vegetate all exposed slopes in order to prevent instabilities due to ground and surface water.

Slope stability analyses of the "worst case" cut and fill slope conditions were analyzed using Bishop's Simplified Method in the computer program "XSTABL". "XSTABL" determines a static and pseudo-static slope stability factor of safety for given soil, groundwater, loading, and geometric inputs. A horizontal force of 0.2 times the vertical force was applied to the model to simulate earthquake loading. The results of the slope stability analyses are presented in the following table and the summarized analyses results are attached. All of the calculated slope stability safety factors for static and pseudo-static loading conditions were greater than 2.0, which is considered to be adequate for highway design.

Soil strength parameters used in the slope stability analysis were estimated from SPT blow counts for in situ materials, and from the results of the triaxial shear testing for recompacted embankment fills. Refer to the attached slope stability analysis summary for complete results including modeled soil strength parameters and slope geometry.

Table 3 *Slope Stability Analysis Summary*

Location	Description	Approximate Station	Static Safety Factor	Pseudo-Static Safety Factor
CHC/EV East Abutment	Embankment	"CHC/EV" 14+00	>2.0	>2.0
SB Off-Ramp	Cut Slope	"CH-1" 196+90	>2.0	>2.0
CHC/EV Rd Cut	Cut Slopes	"CHC/EV" 21+10	>2.0	>2.0

Note: Crazy Horse Canyon/ Echo Valley Road (CHC/EV)

Settlement

Due to the heterogeneous nature of the soils and widespread variation in bedrock elevation throughout the project extents, settlement analyses were performed at two embankments assuming the worst-case soil profiles of loose cohesionless and soft cohesive soils encountered in the borings. Settlement was calculated at the approach embankment from Crazy Horse Road to the east overcrossing abutment and at the south end of the approach embankment to the viaduct on the northbound off ramp.

The maximum calculated short-term settlement that is expected to occur beneath the 19-meter high approach embankment at the east overcrossing bridge abutment is 63 mm (2.5"). Settlement was estimated using correlations to SPT blow counts in cohesionless soils using Hough's method. All of the calculated settlement is expected to occur immediately; no surcharge loading or fill waiting period is required. Significant long-term consolidation is not expected to occur beneath the proposed approach embankment fill due to the absence of thick, continuous layers of under consolidated or normally consolidated clays.

The short-term settlement that is expected to occur beneath the 12-meter high approach embankment at the south end of the viaduct on the northbound off ramp was calculated using two methods. One-dimensional elastic settlement analysis was performed by correlating SPT values in discreet layers to Elastic Soil Modulus (E_s), and then calculating induced strains due to the stress increase imposed by the embankment. The estimate of immediate settlement predicted using this method was 355 mm (14"). Hough's method of correlating SPT values to a bearing capacity index was also performed. Immediate settlement calculated by Hough's method was 165 mm (6.5"). It is recommended to assume the smaller immediate settlement calculated using Hough's method for the cohesionless soils. A 2-meter thick layer of very soft normally consolidated lean clay was encountered in Boring B8-03 in the vicinity of the approach embankment at a depth of approximately 8 meters. The consolidation settlement in the clay layer was estimated using correlations between the liquid limit and moisture content to the consolidation index (C_c) and initial void ratio (e_0). 130 mm (5.1") of consolidation settlement was calculated in the clay layer. The total estimated settlement calculated at the approach abutment to the viaduct is 295 mm (11.6"). It is recommended to provide a sixty-day fill delay period after construction of the embankment prior to driving piles to prevent problems associated with negative skin friction and drag down on the piles.

Construction Considerations

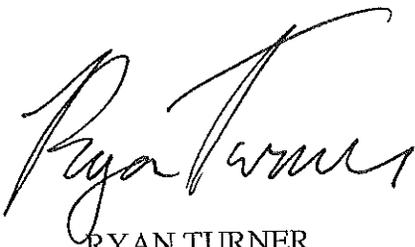
Pumping soils may be encountered during excavations for embankment construction at the east overcrossing abutment. If pumping soils are encountered, it is recommended to sub-excavate 0.45-meters and replace the removed material with Class 3 permeable material encapsulated in an AASHTO specification M288, Class 2 survivability geotextile. It is also recommended that supplemental funds be allocated to cover the cost of the fabric and permeable material. Using a cost basis of \$5 per square meter for the geotextile and \$70 per cubic meter for the permeable material, it is estimated that the cost of removing and replacing the pumping material will be approximately \$510,000.

Recommendations and Specifications

Refer to the preceding sections for detailed recommendations regarding construction techniques and specifications. The following list summarizes the recommendations provided in this report:

- Roadway cut slopes up to 10 meters in height shall not exceed 1:2 slope angles. Cut slopes higher than 10 meters shall not exceed 1:2.5 slope angles, or 1:2 slope angles provided that benches are constructed per the preceding recommendations.
- Roadway embankment fills up to 15 meters in height shall not exceed 1:2 slope angles. Embankment fill slopes higher than 15 meters shall not exceed 1:2.5 slope angles, or 1:2 slope angles provided that benches are constructed per the preceding recommendations.
- Aggressively re-vegetate all exposed slopes to increase resistance to slope instabilities due to high susceptibility to erosion of site soils.
- Provide mitigation measures for corrosive site conditions.
- Notify Geotechnical Staff if unexpected groundwater or other geotechnical conditions not addressed in this report are encountered during construction. A member of the Geotechnical Staff will recommend mitigation after observation and analysis.

If you have any questions or comments, please contact Ryan Turner at (805) 549-3750 or Michael Finegan at (805) 549-3194.



RYAN TURNER
Transportation Engineer
Geotechnical Design – North
Branch D

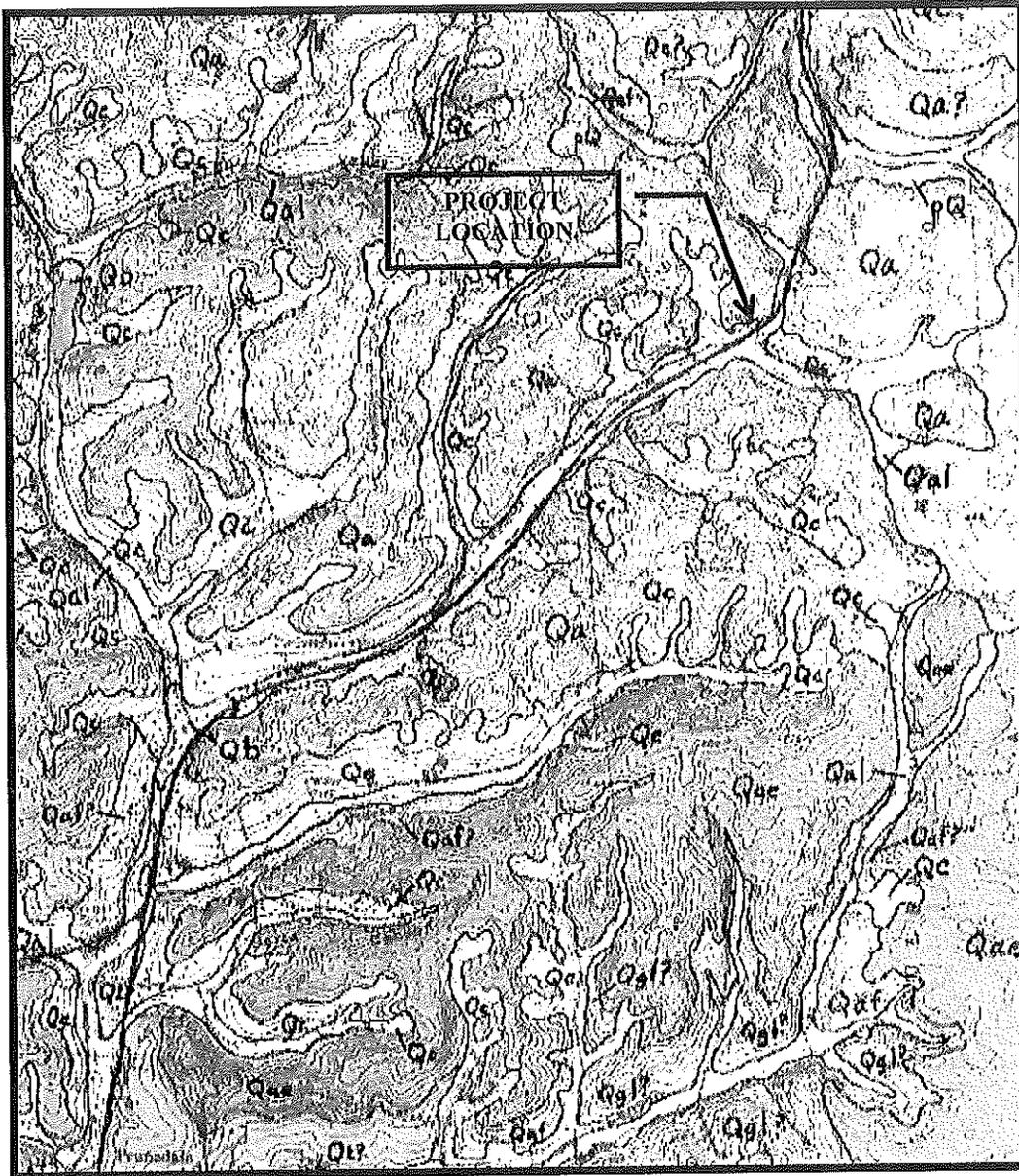


MICHAEL S. FINEGAN, PE
Branch Chief
Geotechnical Design – North
Branch D

c: Roy Bibbens / GDN Records
GS File Room
Job File / Branch D Records

LIST OF ATTACHMENTS

Vicinity Map	Attachment 1
Geologic Map and Legend	Attachment 2
Layouts and Typical Cross Sections	Attachment 3
Logs of Test Borings	Attachment 4
Laboratory Test Results Summary	Attachment 5
Corrosion Analysis Summary	Attachment 6
Slope Stability Analysis Summary	Attachment 7
Solinst Piezometer Data	Attachment 8



SCALE 1:62 500



CONTOUR INTERVAL 20 FEET

DASHED LINES REPRESENT 10 FOOT CONTOURS

MOSS LANDING QUADRANGLE CONTOUR INTERVAL 10 FEET

NATIONAL GEODETIC VERTICAL DATUM 1929

GEOLOGIC MAP

This map is part of:
Map Showing Geology and Liquefaction Potential of
Northern Monterey and Southern Santa Cruz Counties,
California
By: Dupre and Tinsley
1980

GEOLOGIC LEGEND

Qb

BASIN DEPOSITS--Unconsolidated plastic clay and silty clay contain much organic material. Locally contain interbedded thin layers of silt and silty sand. Deposited in a variety of environments including estuaries, lagoons, tidal flats, marsh-filled sloughs, flood basins, and lakes. Thickness highly variable; may be as much as 30 m thick underlying some sloughs. High susceptibility to flooding. Moderate to high liquefaction susceptibility except where water table is more than 10 m below the surface. Highly expansive soils develop on these deposits

Qal

ALLUVIAL DEPOSITS, UNDIFFERENTIATED--Unconsolidated, heterogeneous, moderately sorted silt and sand with discontinuous lenses of clay and silty clay. Locally includes large amounts of gravel. May include deposits equivalent to both younger and older flood-plain deposits in areas where these were not differentiated. Thickness highly variable; may be more than 30 m thick near the coast. Variable permeability and porosity. Depth to water table highly variable. High susceptibility to flooding in areas where not incised by present stream. Liquefaction susceptibility moderate to high where water is close to surface

Qc

COLLUVIUM--Unconsolidated heterogeneous deposits of moderately to poorly sorted silt, sand, and gravel, deposited by slope wash and mass movement. Minor fluvial reworking. Locally includes numerous undifferentiated landslides and small alluvial fans. Contacts generally gradational. Locally grades into fluvial deposits. Generally more than 2 m thick. Moderately well drained and permeable. Mostly moderately low liquefaction potential but can be moderately high locally. Slope stability relatively low; small landslides common where water is close to surface

Qch

ALLUVIAL FAN DEPOSITS OF CHUALAR--Weakly consolidated, moderately to poorly sorted sand, silt, and gravel deposited as a series of alluvial fans flanking the Salinas Valley. Depth to water table generally greater than 10 m because of ground-water pumping. Characterized by well-drained, medially developed soils. Relatively low susceptibility to flooding; low susceptibility for liquefaction

Qt

TERRACE DEPOSITS, UNDIFFERENTIATED--Weakly consolidated to semiconsolidated, moderately to poorly sorted silt, silty clay, sand, and gravels, mostly deposited in a fluvial environment. Thickness highly variable, locally as much as 18 m thick. Deposits capped by moderately to fully completely well-developed soils, some with duripans; expansive soils are locally present. Low susceptibility to flooding and for liquefaction

Qoe

OLDER EOLIAN DEPOSITS--Semiconsolidated, moderately well sorted sand as much as 13 m thick deposited in a series of inland-migrating dune fields. Locally conformably overlying undifferentiated coastal terrace deposits and terrace deposits of Antioch. Capped by moderately well drained, maximally developed soils, some with duripans. Low susceptibility to flooding and for liquefaction

Qp

ALLUVIAL FAN DEPOSITS OF PLACENTIA--Semiconsolidated, moderately to poorly sorted sand, silt, and gravel; gravel content increases toward the head of the fan. Similar to alluvial fan deposits of Chualar, except capped by more well developed soils. Generally low susceptibility to flooding; low liquefaction susceptibility

Qa

AROMAS SAND (Pleistocene)--Heterogeneous sequence of mainly eolian and fluvial sand, silt, clay, and gravel. Slight angular unconformities present throughout the unit; older deposits more complexly folded and faulted than younger deposits. Total thickness may be greater than 250 m. Characterized by maximally developed soils, most with duripans. Low susceptibility to flooding and for liquefaction. Unit locally divided into:

Qae

Eolian deposits--Moderately well sorted sand as much as 60 m thick that contains no intervening fluvial deposits. Several sequences of eolian deposits may be present, each separated by paleosols. The upper 3-6 m of each dune sequence is oxidized and relatively well indurated, and all primary sedimentary structures have been destroyed by weathering; the lower parts of each dune sequence may be relatively unconsolidated below the weathering zone. Porosity and permeability, as well as degree of consolidation, are thus a function of the relative position within the weathering profile. Perched water tables may be present where eolian deposits overlie less permeable fluvial deposits; springs may develop in these areas, and slumps and landslides may develop as well. Severe erosion may occur within this unit when the weathering zone and its protective duripan are breached and the relatively unconsolidated sands are exposed, as evidenced by the extensive colluvial slopes that mantle much of the outcrop area

Qaf

Fluvial deposits--Semiconsolidated, moderately to poorly sorted silty clay, silt, sand, and gravel deposited by meandering and braided streams as well as alluvial fans. Includes beds of relatively well sorted gravel ranging from 3 to 30 m thick that are locally important as aquifers in the region. Locally includes buried soils high in expansive clays, which act as aquicludes. Landslides are common in this unit

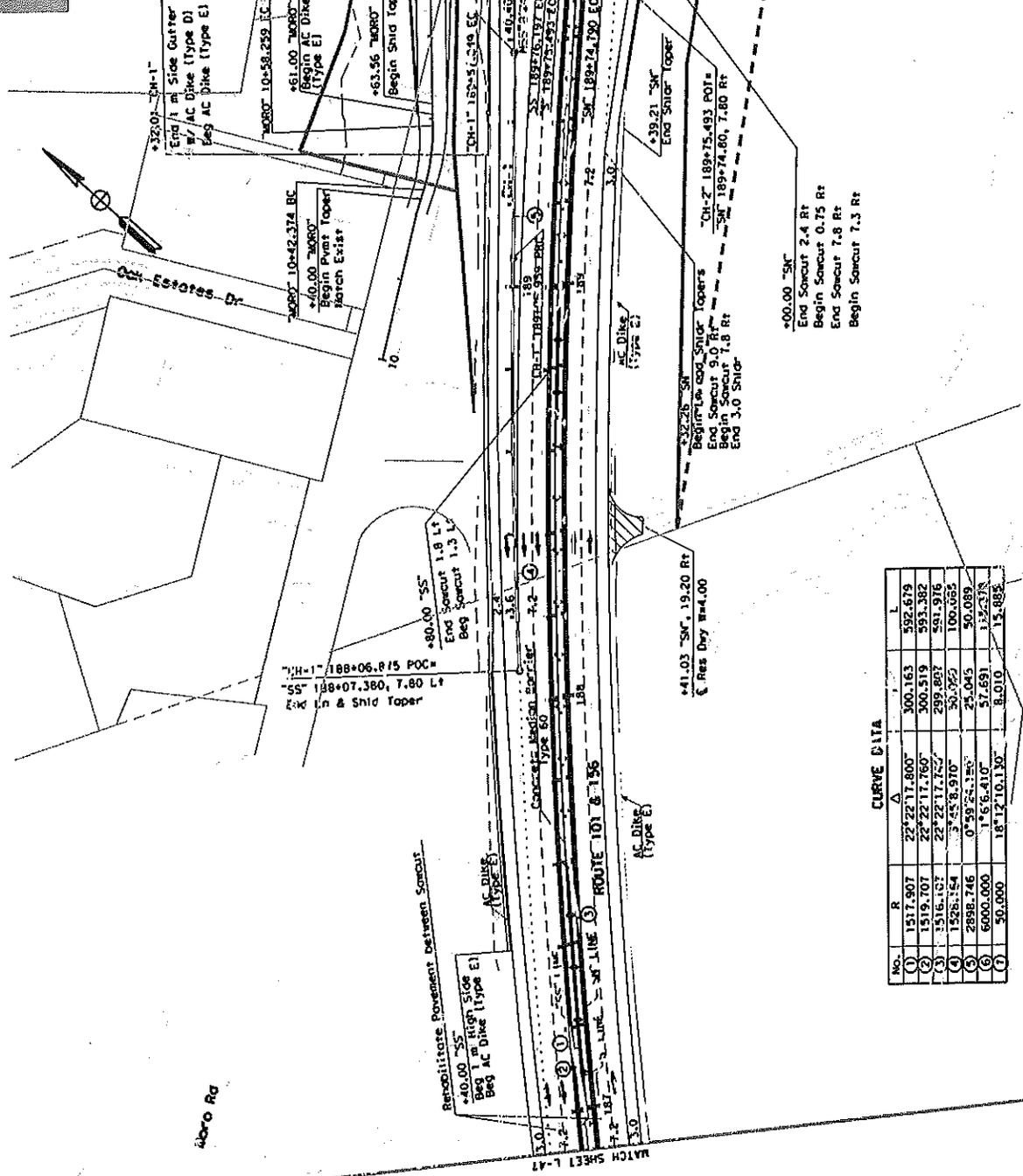
Qgl

ALLUVIAL FAN DEPOSITS OF GLORIA--Moderately consolidated, deeply weathered, moderately to poorly sorted sand, silt and gravel, capped with moderately well drained, maximally developed soils with duripans. Low susceptibility to flooding and for liquefaction

pQ

SEDIMENTARY, IGNEOUS, AND METAMORPHIC ROCKS, UNDIVIDED--
Characterized by very low susceptibility for liquefaction

DIST: COUNTY ROUTE ALLOCATION PER POST SHEET TOTAL
 05 MON 101 R146-B7161-6 48
 REGISTERED CIVIL ENGINEER
 PROFESSIONAL ENGINEER IN CIVIL
 PLANS APPROVAL DATE
 The State of California certifies that the above-named engineer is duly licensed and qualified to prepare and seal the plans and specifications for the construction of the project herein shown.
 To file in the California and file in the State of California.



CURVE DATA

NO.	P	Δ	S
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3	1516.167	22°22'17.747"	299.881
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5	2898.746	0°59'54.150"	25.045
6	2898.000	1°56'41.0"	57.691
7	50.000	18°12'10.130"	8.010

RELATIVE NUMBER SCALE
1" = 100 FEET

0 20 40 60 80
1" = 100 FEET

USE PAPER 12" X 18" SHEET
BOX FILE 15" X 11" X 1"

CU 06226

EA 0161E1

L-48

SCALE: 1"=500

ALL DIMENSIONS ARE IN METERS
UNLESS OTHERWISE SHOWN

PRUNEDALE IMPROVEMENT PROJECT

LAYOUT

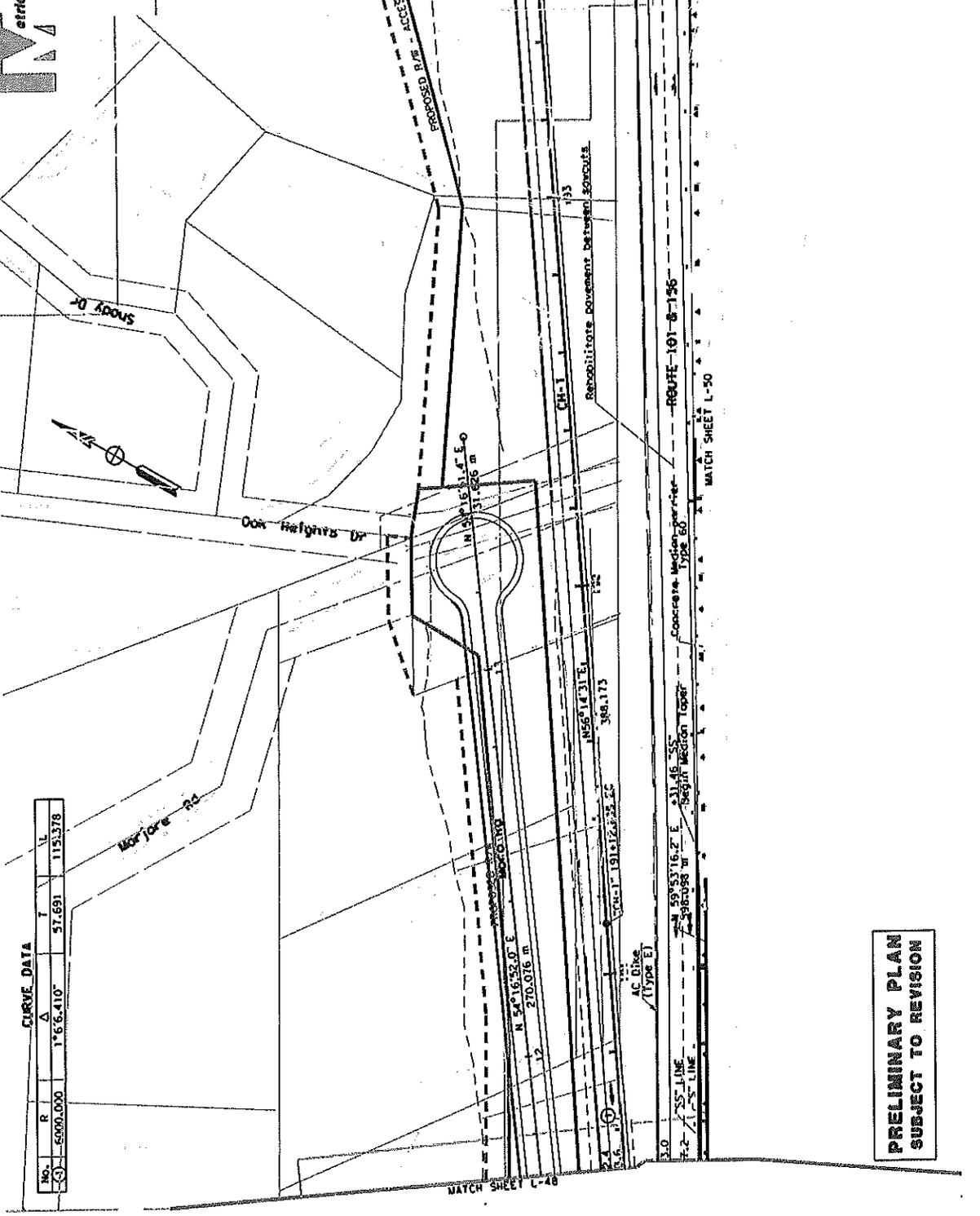
MATCH SHEET L-49

MATCH SHEET L-50

SHEET OF CALIFORNIA - PROJECT DEVELOPMENT
 PROJECT ENGINEER: DAVID S. FRANK
 CHECKED BY: []
 DESIGNED BY: []
 DATE: []
 REVISIONS: []
 DATE REVISD: 8/07

DIST.	COUNTY	ROUTE	SHEET NO.
05	Mon	101	R146-B/161-6/49
			00

REGISTERED CIVIL ENGINEER
 PROFESSIONAL ENGINEER
 CIVIL
 To get to the Collins web site go to: <http://www.mdsd.org>



CURVE DATA

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 SUBJECT TO REVISION**

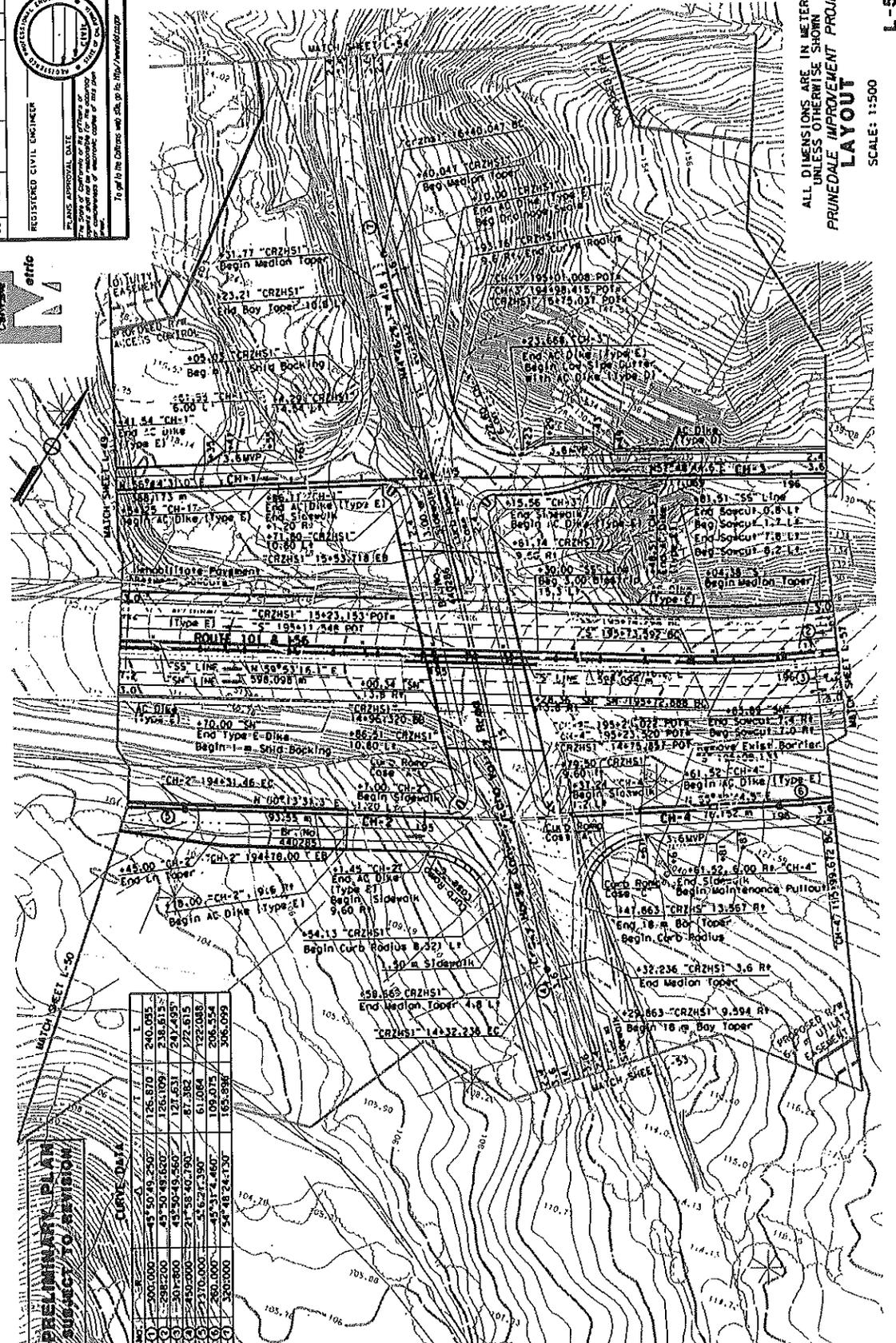
ALL DIMENSIONS ARE IN METERS
 UNLESS OTHERWISE SHOWN
LAYOUT
 SCALE: 1:500
 L-49

DATE	REVISION	BY	DATE	REVISION	BY
PROJECT ENGINEER			PROJECT DEVELOPMENT		
DAVID S. FRANK			DAVID S. FRANK		
CHECKED BY			CHECKED BY		
DESIGNED BY			DESIGNED BY		
CALCULATED BY			CALCULATED BY		

DIST COUNTY ROUTE SECTION SHEETS
 05 101 R146.8/161.6 51
 REGISTERED CIVIL ENGINEER
 PROFESSIONAL ENGINEER
 PLANS APPROVAL DATE
 THE STATE OF CALIFORNIA
 OFFICE OF THE REGISTERED PROFESSIONAL ENGINEERS
 1500 MARKET STREET, SUITE 1000
 OAKLAND, CALIFORNIA 94612-4000
 To get to the California web site go to: <http://www.cesb.ca.gov>



ALL DIMENSIONS ARE IN METERS
 UNLESS OTHERWISE SHOWN
PRUNEDALE IMPROVEMENT PROJECT
LAYOUT
 SCALE: 1:500
 L-51



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PRELIMINARY PLAN
SUBJECT TO REVISION

PROJECT DEVELOPMENT
 DAVID S. FRANKS
 PROJECT ENGINEER

CHECKED BY
 REVISIONS BY
 DATE

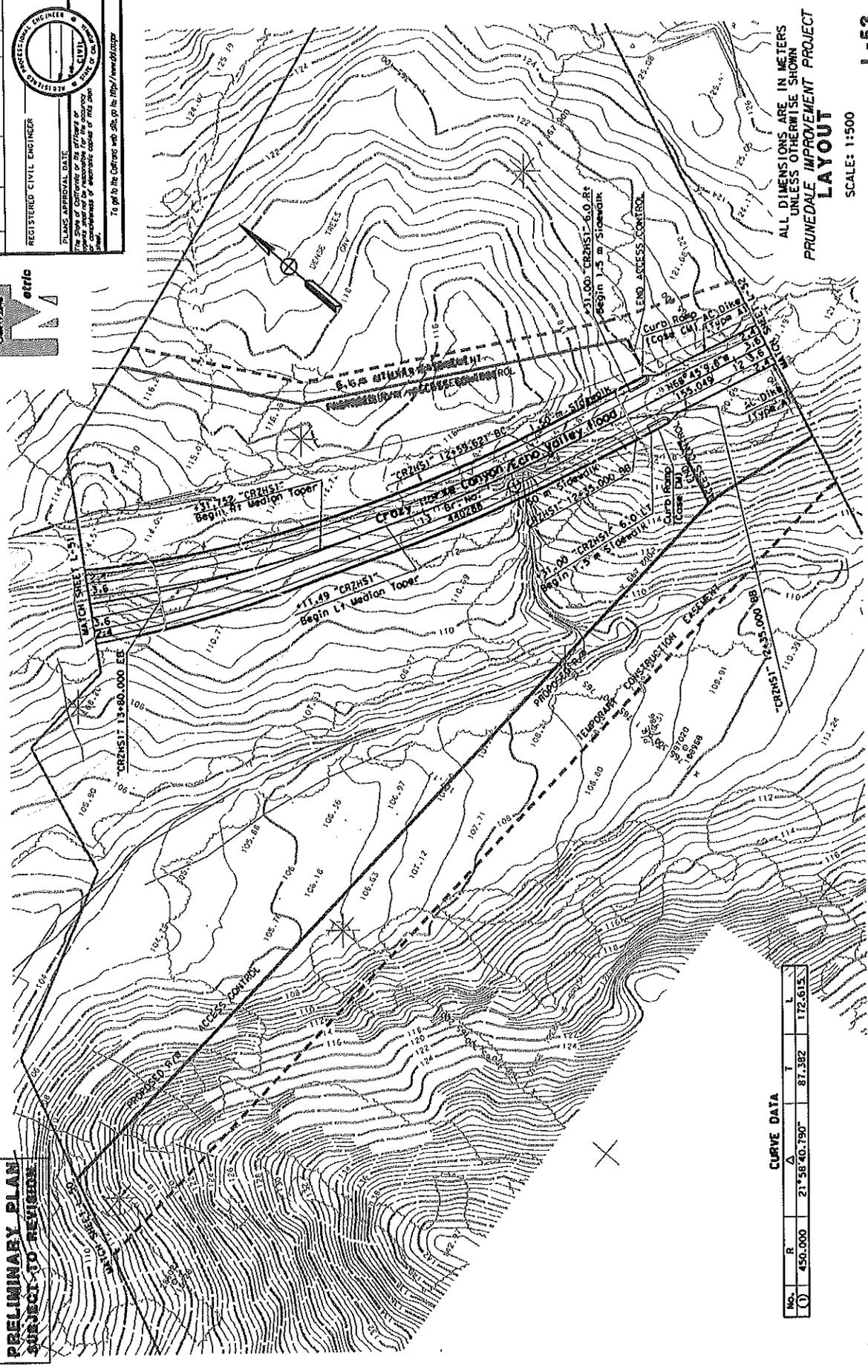
COUNTY: 05 Mont
 ROUTE: 101 R146.8/161.6 53
 REGISTERED CIVIL ENGINEER
 PLANS APPROVAL DATE: _____
 The State of California requires that the engineer or architect of a project shall be a duly licensed professional engineer or architect of this State.
 To get to the California web site, go to: <http://www.dgs.ca.gov>



**PRELIMINARY PLAN
SUBJECT TO REVISION**

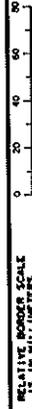
DATE	REVISION	BY
	DATE REVISD 8/07	

CHECKED BY: _____
 PROJECT ENGINEER: **DAVID S. FRANKE**



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RELATIVE HORIZONTAL SCALE
1" = 100 HORIZONTAL FEET

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JOB FILE: 011611

CU 06226

EA 0161E1

ALL DIMENSIONS ARE IN METERS
 UNLESS OTHERWISE SHOWN
**PRUNEDALE IMPROVEMENT PROJECT
LAYOUT**
 SCALE: 1:500

L-53

DIST. COUNTY ROUTE PROJECT NO. TOTAL SHEETS TOTAL SHEETS
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REGISTERED CIVIL ENGINEER
 PROFESSIONAL ENGINEER
 CIVIL
 STATE OF CALIFORNIA

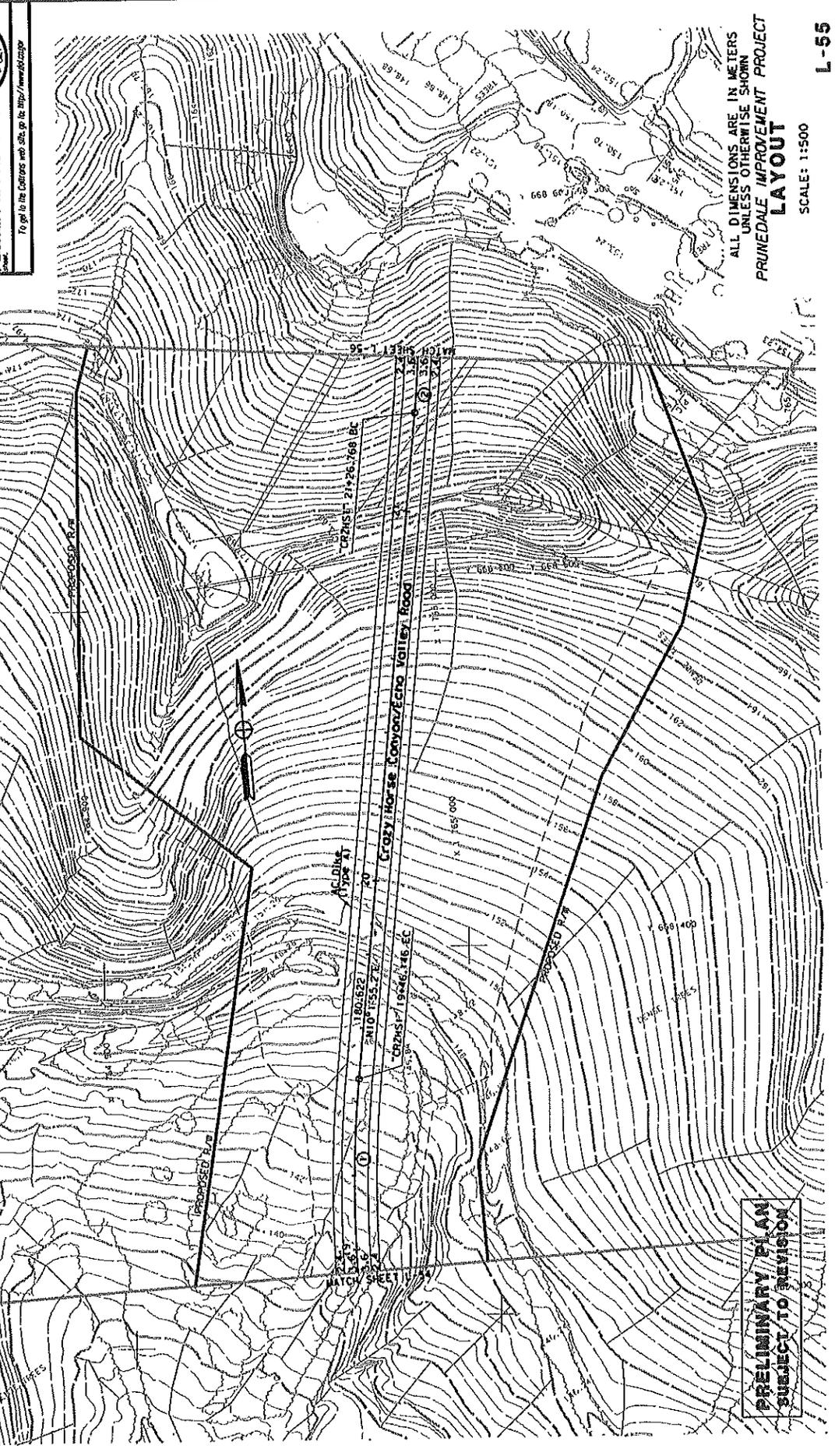
PLANS APPROVAL DATE
 The State of California or its officers or agents shall not be held responsible for any consequences or accidents arising from the use of these plans.

To go to the Caltrans web site, go to: <http://www.fdot.org>



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ALL DIMENSIONS ARE IN METERS
 UNLESS OTHERWISE SHOWN
LAYOUT
 SCALE: 1:500
L-55

DATE	REVISOR	BY	DESCRIPTION
	HG		DATE REVISOR 8/07

CHECKED BY: DAVID S. FRANK
 PROJECT ENGINEER

PRELIMINARY PLAN
SUBJECT TO REVISION

EA 0161E1
 CU 06226
 RELATIVE BORDER SCALE
 1:5 IN MILLIMETERS
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 USE NAME OF BORDER
 FOR FILE AND PLOT

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REGISTERED CIVIL ENGINEER

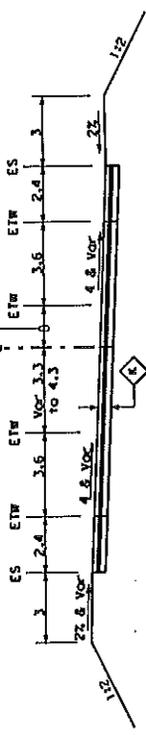
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THE STATE OF CALIFORNIA: I, _____, CIVIL ENGINEER, LICENSE NO. _____, DO HEREBY CERTIFY THAT I AM THE DESIGNER OF THE ABOVE PROJECT AND I AM NOT PROVIDING THESE PLANS FOR CONSTRUCTION OF ANY OTHER PROJECT.

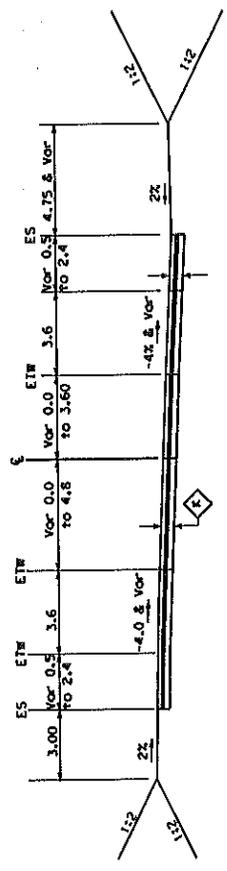
Contractor has a web site. To go to the web site, go to the file://www.abc.com



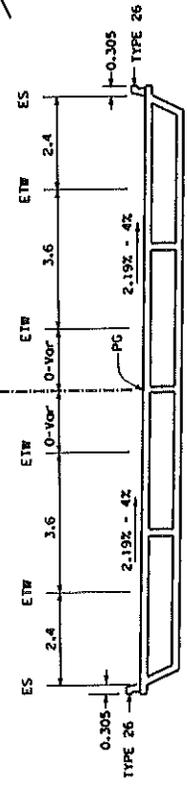
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AB 105 mm
AS 270 mm



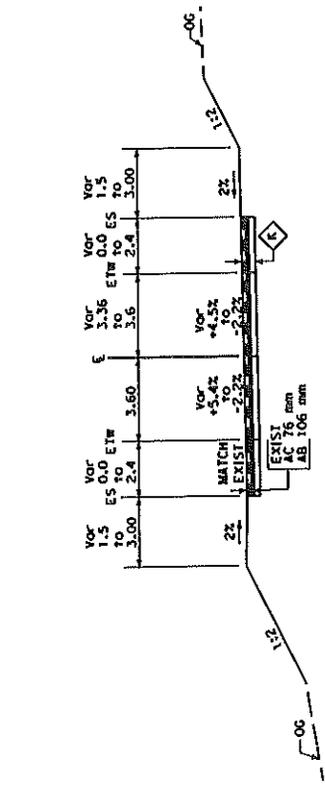
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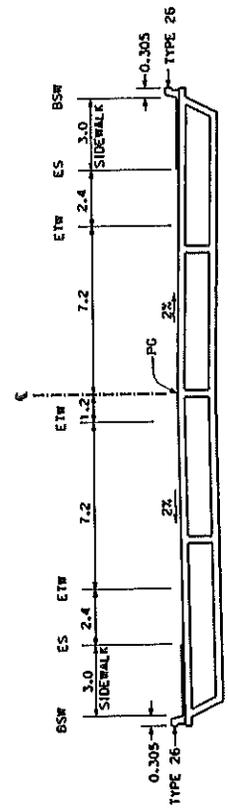
CRAZY HORSE - ECHO VALLEY ROAD
Sta 16+25.033 to Sta 23+30.000



CRAZY HORSE - ECHO VALLEY ROAD VIADUCT
Sta 12+35.000 to Sta 13+80.000



CRAZY HORSE - ECHO VALLEY ROAD
Sta 10+50.000 to Sta 12+35.000



CRAZY HORSE - ECHO VALLEY ROAD OC
Sta 14+96.261 to Sta 15+54.030

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

TYPICAL CROSS SECTIONS
NO SCALE

X-1

CU 06226

USING THE 1:20 SCALE FOR FILE 2; REQUEST

PLEASE USE THE 1:20 SCALE FOR FILE 2; REQUEST

E4 0161E0

DATE	REVISION	BY	DATE	REVISION	BY

PROJECT ENGINEER: _____

CHECKED BY: _____

DESIGNED BY: _____

DATE: _____

PROJECT DEVELOPMENT

DIST	COUNTY	ROUTE	STATIONING	SHEET NO.	TOTAL SHEETS
06	MON	101	8146.8/161.6 (PM 891.2/100.4)		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

PROFESSIONAL SEAL

THE STATE OF CALIFORNIA

REGISTERED CIVIL ENGINEER

DATE

PROJECT ENGINEER

DATE

DESIGNED BY

CAD

CHECKED BY

DATE

REVISOR

DATE

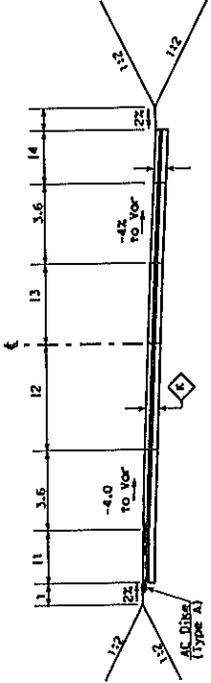
REVISOR

DATE

REVISOR

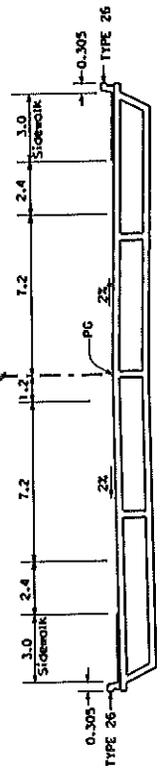


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16+23.03 to 23+30.00	1.00- 0.60- 2.40	3.6- 0.00- 4.80	3.6- 0.00- 3.60	3.6- 0.500- 2.40	4.75 & Vor 2.40



CRAZY HORSE - ECHO VALLEY ROAD

Stations	14+96.32 to 15+53.71	3.0	2.4	7.2	1.2	7.2	2.4	3.0
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CRAZY HORSE - ECHO VALLEY ROAD OC

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

TYPICAL CROSS SECTIONS

NO SCALE

X-2

CU 06226

RELATIVE GRAPHIC SCALE
1:5 IN MILLIMETERS

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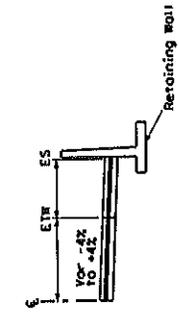
REVISIONS
DO NOT FILE IN RECORDS

PROJECT COUNTY	ROUTE	STATIONING	DATE
REGISTERED CIVIL ENGINEER		PLANS APPROVAL DATE	DATE
		To get to the California web site, go to: http://www.sbs.org	

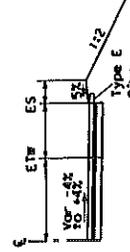


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AB 105 mm
AS 210 mm

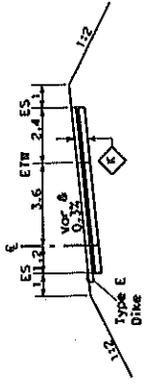
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AB 105 mm
AS 270 mm



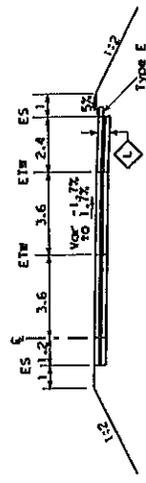
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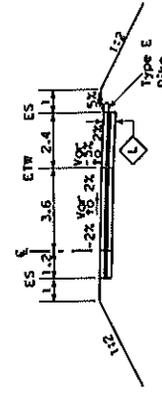
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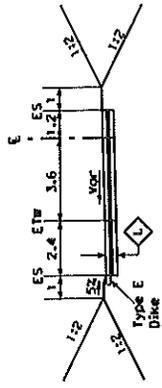
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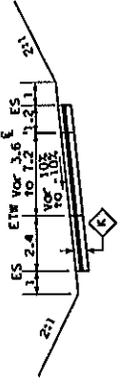
NORTHBOUND OFF-RAMP
Sta 194+78.00 to 195+01.37



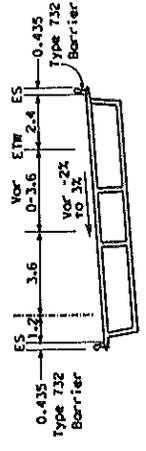
NORTHBOUND OFF-RAMP
Sta 190+57.67 to 193+24.00



SOUTHBOUND ON-RAMP
Sta 189+91.48 to 194+54.25



SOUTHBOUND OFF-RAMP
Sta 189+32.00 to 194+54.25



NB OFF-RAMP (CH-2) VIADUCT
193+24.00 to 194+78.00

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN
TYPICAL CROSS SECTIONS
NO SCALE
X-2

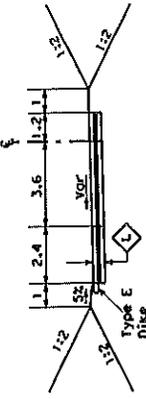
DATE	REVISOR	DATE	REVISOR
CHECKED BY		DESIGNED BY	
PROJECT ENGINEER			

DIST COUNTY ROUTE
 REGISTERED CIVIL ENGINEER
 PLANS APPROVAL DATE
 To get the details and site go to file/number/age



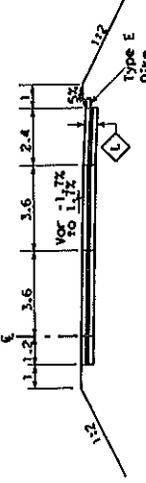
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189+91.48 TO 194+54.25					



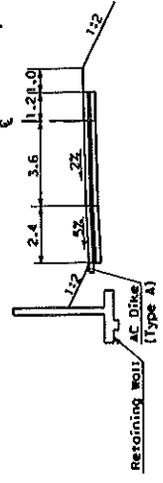
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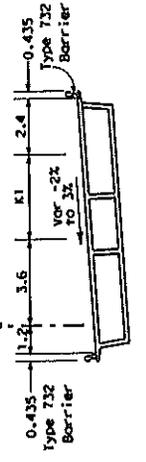
NORTHBOUND OFF-RAMP

Stations	2.4	3.6	1.2	1.0
190+00.00 TO 191+90.00				



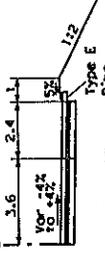
SOUTHBOUND ON-RAMP

Stations	K1	0-3.6	2.4
193+24.00 TO 194+78.00			



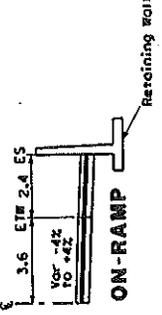
NB OFF-RAMP (CH-2) VIADUCT

Stations	3.6	2.4	1
198+90.56 TO 200+28.73			



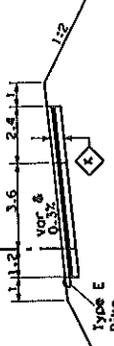
NORTHBOUND ON-RAMP

Stations	3.6	2.4
200+28.73 TO 201+98.54		



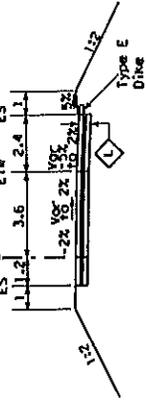
NORTHBOUND ON-RAMP

Stations	1.2	3.6	2.4	1
195+61.21 TO 198+56.91				



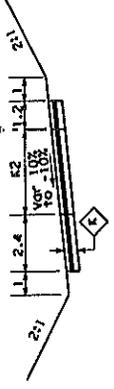
NORTHBOUND ON-RAMP

Stations	1.2	3.6	2.4	1
190+57.67 TO 193+24.00				



NORTHBOUND OFF-RAMP

Stations	E2	3.6 - 7.2	1.2	1
189+32.00 TO 194+54.25				



SOUTHBOUND OFF-RAMP

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN
TYPICAL CROSS SECTIONS
 NO SCALE
X-3



CU 06226 EA 0161E0

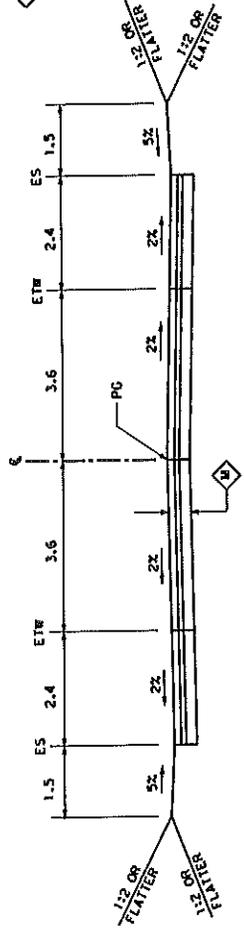
LIST COUNTY ROUTE	101	PROJECT NO.	101
TOTAL PROJECT SHEETS	101	DATE	8/21/16
REGISTERED CIVIL ENGINEER	(PA 951-27100-4)	PROJECT SHEETS	101



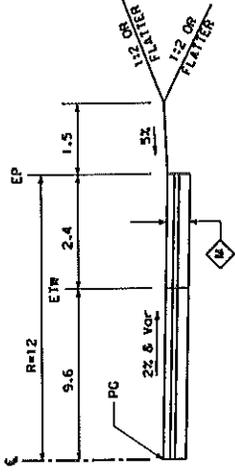
AC 195 mm	AS 165 mm
AB 105 mm	

AC 120 mm	AS 105 mm
AB 105 mm	

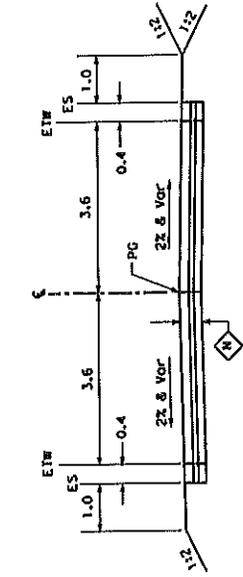
AC 150 mm	AS 225 mm
AB 105 mm	



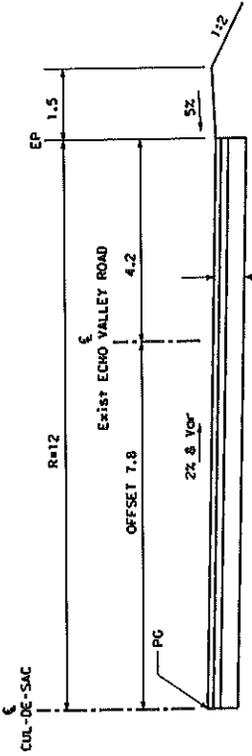
MORO ROAD
STA 10+42.374 TO STA 13+21.894



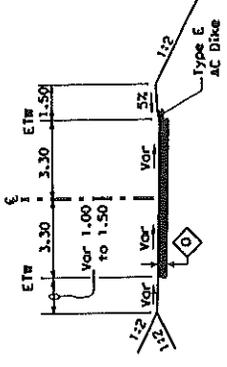
MORO ROAD CUL-DE-SAC
(CENTER BULB CUL-DE-SAC)



DETOUR
STA 9+78.65 TO STA 15+85.52



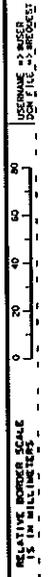
ECHO VALLEY ROAD CUL-DE-SAC



FIRE LANE ROAD
STA 10+00.000 TO STA 11+77.048

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN
TYPICAL CROSS SECTIONS
NO SCALE
X-3

CU 06226 EA 0191EO



DATE	REVISD BY	7/04
DATE REVISD	CJO	
CHECKED BY	DAN MASSA	
DESIGNED BY	PROJECT ENGINEER	
CALCULATED BY	PROJECT DEVELOPMENT	

PROJECT INFORMATION

DIST: COUNTY: ROUTE: 06 MON 101

STATIONING: STA 184+48.63 TO STA 189+32.90

PROJECT NO.: 161.6
 SHEET NO.: 100.41

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE: _____

The State of California, in the Office of _____
 hereby certifies that the above-named _____
 is a duly Licensed Professional Engineer in the State of California.
 To be used in the California and also for the State of _____

California

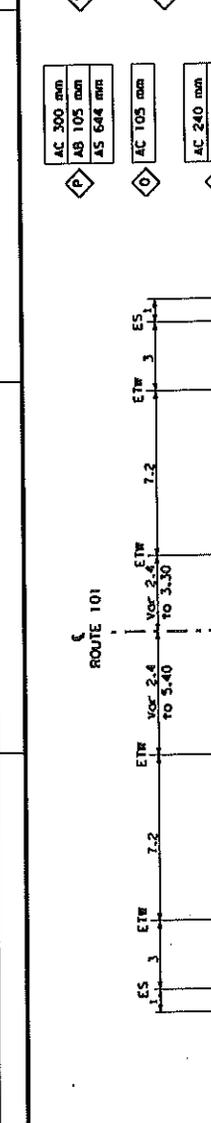
AC 195 min
 AB 105 min
 AS 270 min

AC 195 min
 AB 105 min
 AS 210 min

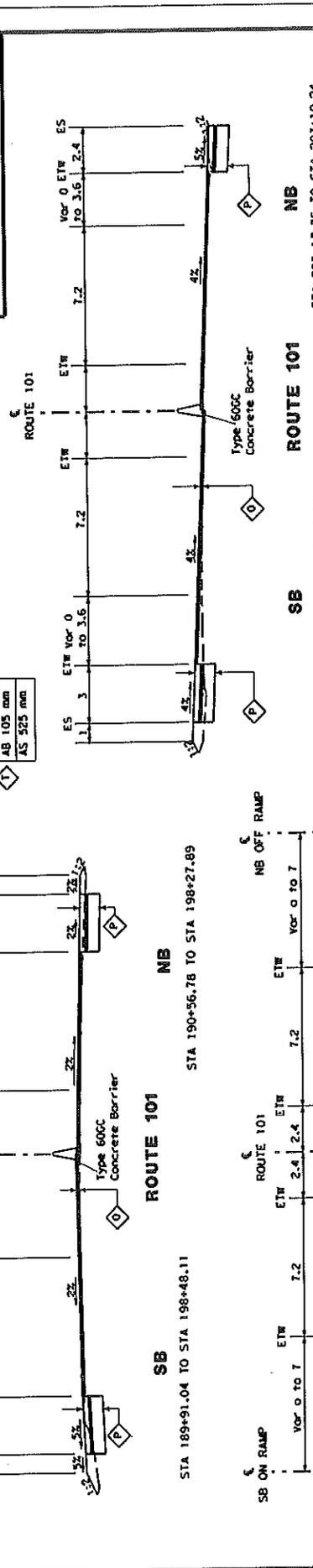
AC 300 min
 AB 105 min
 AS 644 min

AC 105 min
 AB 105 min
 AS 325 min

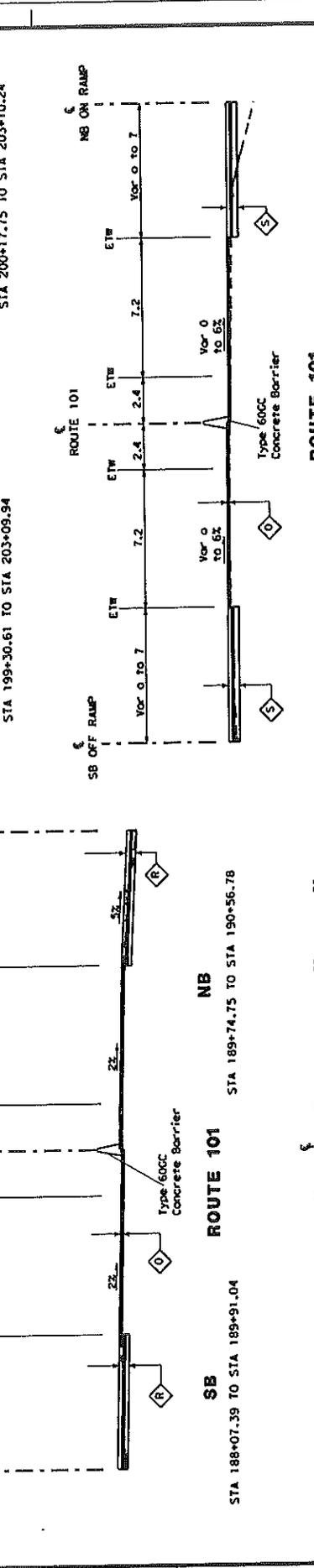
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 AB 105 min
 AS 325 min



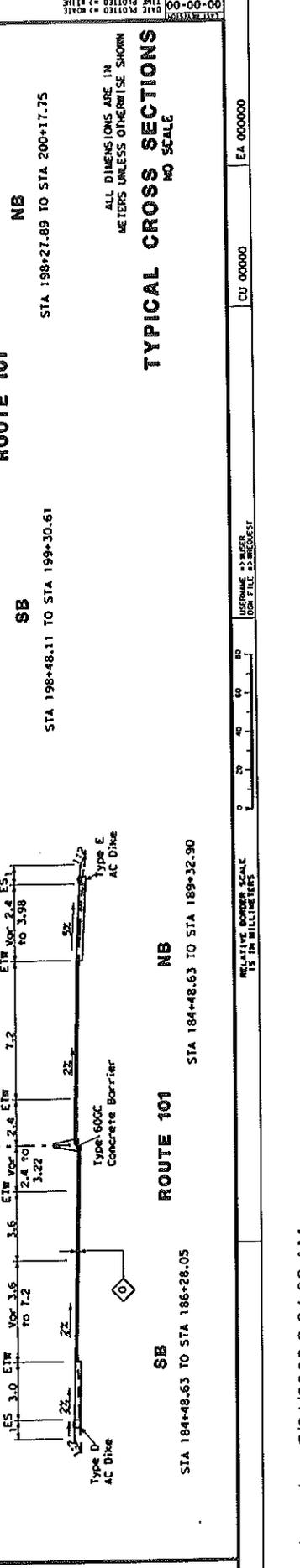
DATE	REVISED BY	DATE	REVISED BY



DATE	DESIGNED BY	DATE	DESIGNED BY



DATE	DESIGNED BY	DATE	DESIGNED BY



DATE	DESIGNED BY	DATE	DESIGNED BY

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN
 NO SCALE





DIST	COUNTY	ROUTE	LOCAL PROJECT NO.	SHEETS
06	MON	101	R146-8/161-6 (PN 199-2/100-6)	1

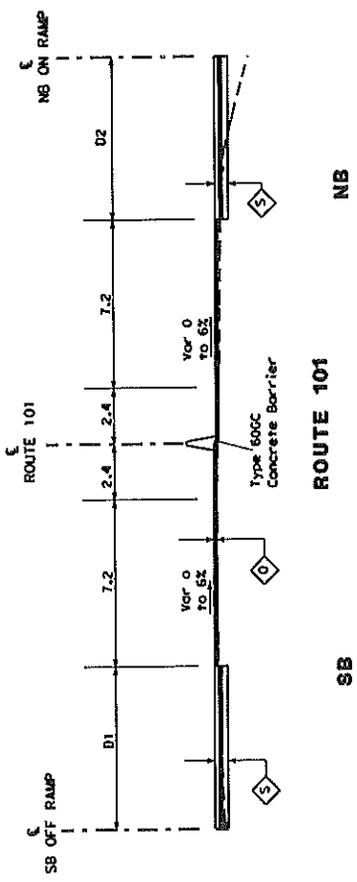
REGISTERED CIVIL ENGINEER

RELINQUISHMENT DATE

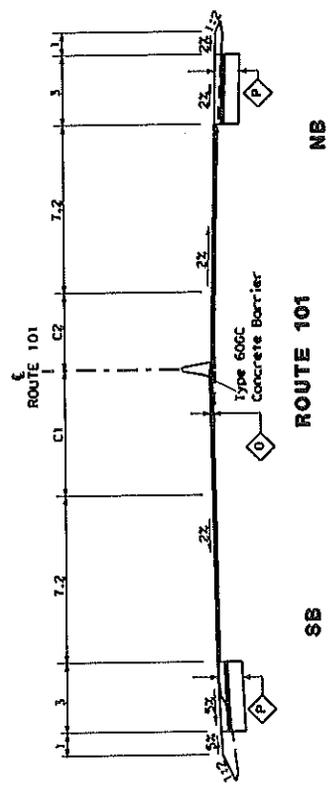
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To get to the Contract and other info, visit <http://www.matic.com>

Stations	D1	2.4	7.2	D2
198+48.11 TO 200+17.75				0.00 - 7.00
198+48.11 TO 200+17.75	0.00 - 7.00	7.2		



Stations	C1	C2	7.2	3	1
189+91.04 TO 198+48.11					
189+91.04 TO 198+48.11	2.40 - 5.40	2.40 - 3.30	7.2		



- AC 300 min
AB 105 min
AS 644 min
- AC 105 min
- AC 195 min
AB 105 min
AS 270 min

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

TYPICAL CROSS SECTIONS

NO SCALE

X-6

CU 00000

EA 000000

RELATIVE BORDER SCALE IS IN MILLIMETERS

0 20 40 60 80

USE NAME AND NUMBER FOR FILE C:\PROJECTS

DATE	DATE	DATE	DATE	DATE
4/06	4/06	4/06	4/06	4/06
REVISOR	REVISOR	REVISOR	REVISOR	REVISOR
WVZ	WVZ	WVZ	WVZ	WVZ
DESIGNED BY				
DAN MASSA				
CHECKED BY				
PROJECT ENGINEER				

DIST	COUNTY	ROUTE	SHEET NO.	TOTAL SHEETS
06	MON	101	8146-8(16)	16
			PROJECT NO.	199-30.61
			DATE	08/16/08



REGISTERED CIVIL ENGINEER

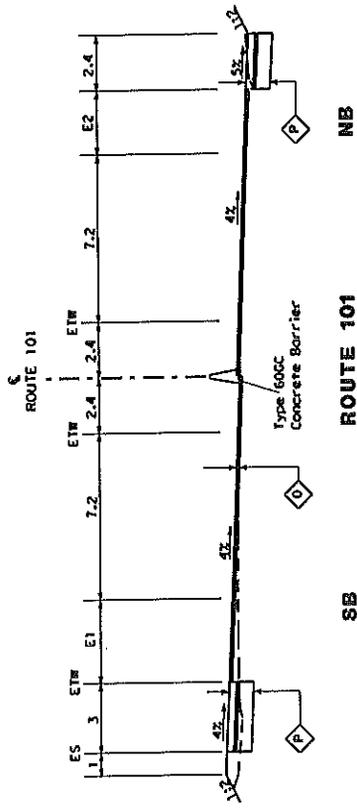
PLANS APPROVAL DATE

The State of California or the Office of Professional Engineers, Architects and Surveyors or the Board of Professional Engineers and Surveyors shall not be responsible for the consequences of any errors or omissions in this document.

To get to the California web site go to: <http://www.boards.org>

- AC 300 mm
- AB 105 mm
- AS 644 mm
- AC 105 mm

Stations	E1	E2
200+17.75 to 203+10.24	7.2	0.00 - 2.4
199+30.61 to 203+09.94	7.2	3.60



ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

TYPICAL CROSS SECTIONS
NO SCALE

X-7

CU 00000

USPS 12-1088

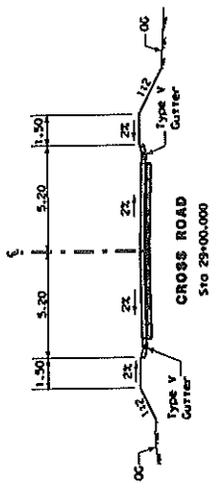
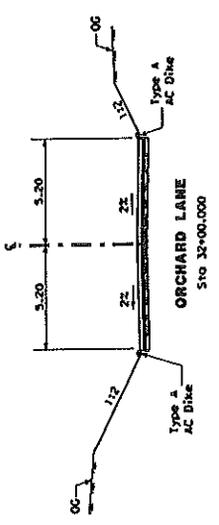
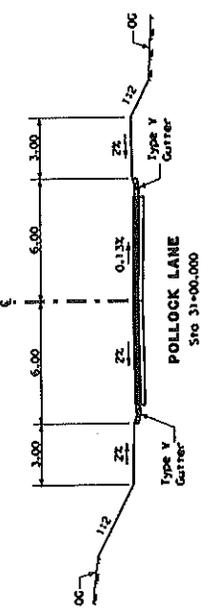
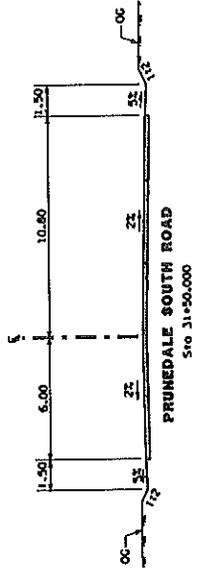
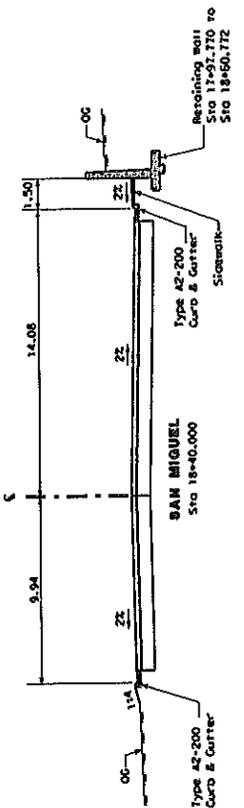
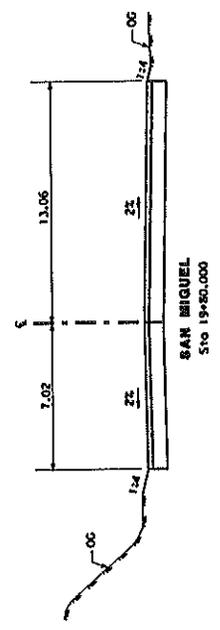
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DISH COUNTY	ROUTE	SECTION	PROJECT NO.
101	101	101	101
DATE	DATE	DATE	DATE
05	05/16/16	05/16/16	05/16/16

REGISTERED CIVIL ENGINEER
 EPR 191-27100-41
 REGISTERED PROFESSIONAL ENGINEER
 STATE OF CALIFORNIA
 No. 11313
 EXPIRES 05/16/2019

PLANS APPROVAL DATE: 05/16/16
 THE STATE OF CALIFORNIA IS THE ENGINEER OF RECORD FOR THIS PROJECT. THE ENGINEER'S LIABILITY IS LIMITED TO THE PROFESSIONAL SERVICES PROVIDED BY THIS FIRM. THE ENGINEER DOES NOT WARRANT THE ACCURACY OF ANY INFORMATION NOT PROVIDED BY THE CLIENT. THE CLIENT IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE ENGINEER'S LIABILITY IS LIMITED TO THE PROFESSIONAL SERVICES PROVIDED BY THIS FIRM.



**PRUNEDALE
IMPROVEMENT
PROJECT XL-4**

**PRELIMINARY PLAN
SUBJECT TO REVISION**

**LOCAL COUNTY ROADS
TYPICAL CROSS SECTIONS**

CU 06226 EA 0161E1

FOR PROJECT PLAN ORIGINAL SCALE IS IN MILLIMETERS

DATE	REVISION	BY	DATE	REVISION	BY
PROJECT ENGINEER			PROJECT DEVELOPMENT		
DAN MASSA			DAN MASSA		
CHECKED BY			CHECKED BY		
HZ			HZ		

LOGGED BY SvS	BEGIN DATE 9-23-03	COMPLETION DATE 9-23-03	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 667849.4 m / 1765328.5 m NAD83	HOLE ID B1-03
DRILLING CONTRACTOR CT	BOREHOLE LOCATION (Offset, Station, Line) ~ 9.8' Lt Sta ~ 12+80 CHC/EV		SURFACE ELEVATION 113.69 m MSL	
DRILLING METHOD Rotary Wash	DRILL RIG CME 75		BOREHOLE DIAMETER 94 mm	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore	SPT HAMMER TYPE 140 lb Autohammer		HAMMER EFFICIENCY, ERI 82%	
BOREHOLE BACKFILL AND COMPLETION Installed Monitoring Well	GROUNDWATER DURING DRILLING READINGS	AFTER DRILLING (DATE) 4.8 m on 9-30-03	TOTAL DEPTH OF BORING 15.7 m	

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 300 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
112.69	0.0		Poorly graded SAND (SP); very loose; black; moist.												
111.69	1.5		SILTY SAND (SM); very loose; greenish gray and yellowish brown; wet.		1	0 0 2	2								
110.69	3.0				2	4 3 8	11								
109.69	4.0		Poorly graded SAND (SP); dense; light olive brown; wet [Aromas].		3	7 14 18	32								
108.69	5.0		SANDY SILT (ML); medium dense; dark yellowish brown; moist.												
107.69	6.0		SANDY lean CLAY (CL); hard; dark yellowish brown; moist; high plasticity fines.												
106.69	6.5		SANDY SILT (ML); medium dense; dark yellowish brown; moist; moderate cementation.		4	8 10 13	23								
105.69	7.0		SANDY lean CLAY (CL); hard; yellowish brown; moist; high plasticity fines.												
104.69	8.0		CLAYEY SAND (SC); medium dense; medium plasticity fines; moderate cementation.		5	6 13 21	34								
	9.0		Poorly graded SAND with CLAY (SP-SC); medium dense; strong brown; moist.		6	7 12 17	29								

(continued)

CALTRANS BORING RECORD MET-ENG FIXED CRAZY HORSE GPJ CALTRANS LIBRARY 040808.GLB 6/5/08



Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

REPORT TITLE BORING RECORD				HOLE ID B1-03	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-13-08	SHEET 1 of 2		

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location		Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
				Sample Number											
10.0	10.0		Poorly graded SAND with CLAY (SP-SC) (continued).												
10.5	10.5		Poorly graded SAND (SP); very dense; strong brown to yellowish brown; wet.	7		14 27 52	79								
102.69	11.0														
101.69	12.0														
100.69	13.0														
99.69	14.0														
98.69	15.0														
97.69	16.0		Installed 9.1 meters of 38 mm (1.5") screened PVC and 6.4 meters of 38 mm (1.5") solid PVC, sand to 5.5 meters below ground surface and bentonite chips to ground surface. Installed Solinst piezometer 11 meters below ground surface. Bottom of borehole at 15.7 m bgs												
96.69	17.0														
95.69	18.0														
94.69	19.0														
93.69	20.0														
92.69	21.0														
	21.5														
	22.0														



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REPORT TITLE BORING RECORD				HOLE ID B1-03	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-13-08	SHEET 2 of 2

LOGGED BY Wade Hoon	BEGIN DATE 2-27-07	COMPLETION DATE 2-27-07	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 668399.5 m / 1765394.6 m NAD83	HOLE ID B1-07
DRILLING CONTRACTOR CT	BOREHOLE LOCATION (Offset, Station, Line) ~ 34.4' Rt Sta ~ 200+00 RTE-101		SURFACE ELEVATION 143.65 m MSL	
DRILLING METHOD Rotary Wash	DRILL RIG Mobile B47		BOREHOLE DIAMETER 94 mm	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore	SPT HAMMER TYPE 140 lb Safety Hammer		HAMMER EFFICIENCY, ERI 57%	
BOREHOLE BACKFILL AND COMPLETION backfilled with native	GROUNDWATER DURING DRILLING		AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING 9.4 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
142.65	0.0		SILTY SAND (SM); dense to very dense; yellowish tan; dry; fine SAND; moderate cementation [Aromas].												
141.65	1.5			X	1	22 23 28	51								
140.65	3.0		Weak to moderate cementation.	X	2	32 29 30	59								
139.65	4.5		At EL. 139.32 m, becomes moist.	X	3	22 33 17 for 3'									
137.65	6.0		Weak cementation.	X	4	20 21 23	44								
135.65	7.5			X	5	14 21 29	50								
134.65	9.0			X	6	16 18 20	38								
	9.5		Backfilled with native material.. Bottom of borehole at 9.4 m bgs												

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REPORT TITLE BORING RECORD				HOLE ID B1-07	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 1 of 1

LOGGED BY SvS	BEGIN DATE 9-24-03	COMPLETION DATE 9-24-03	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 667861.8 m / 1765301.1 m NAD83	HOLE ID B2-03
DRILLING CONTRACTOR CT	BOREHOLE LOCATION (Offset, Station, Line) ~ 16.4' Lt Sta ~ 13+10 CHC/EV		SURFACE ELEVATION 113.63 m MSL	
DRILLING METHOD Rotary Wash	DRILL RIG CME 75		BOREHOLE DIAMETER 94 mm	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore	SPT HAMMER TYPE 140 lb Autohammer		HAMMER EFFICIENCY, ERI 82%	
BOREHOLE BACKFILL AND COMPLETION Installed Monitoring Well	GROUNDWATER READINGS	DURING DRILLING DRY	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING 24.8 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0	0.0		SILTY SAND (SM); loose; black; moist.												
112.63	1.0														
111.63	2.0		Poorly graded SAND with CLAY (SP-SC); loose to medium dense; brownish yellow to strong brown; moist to wet; weak cementation.	X	1	2 4 6	10								
	2.5			X	2	0 8 17	25								
110.63	3.0			X	3	5 7 7	14								
	3.5														
109.63	4.0			X	4	3 7 9	16								
	4.5														
108.63	5.0		Poorly graded SAND (SP); dense to very dense; strong brown to light olive brown to yellowish brown; moist; lenses of weak to strong cementation..	X	5	6 10 14	24								
	5.5														
107.63	6.0			X	6	2 10 13	23								
	6.5														
106.63	7.0														
	7.5														
105.63	8.0			X	7	9 15 16	31								
	8.5														
104.63	9.0			X	8	8 14 19	33								
	9.5														
	10.0														

(continued)

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REPORT TITLE BORING RECORD				HOLE ID B2-03	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-13-08	SHEET 1 of 3

CAL TRANS BORING RECORD MET-HENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	ROD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0			Poorly graded SAND (SP) (continued).												
102.63	11.0			X	9	6 17 26	43								
101.63	12.0			X	10	4 14 21	35								
100.63	13.0														
99.63	14.0			X	11	11 28 33	61								
98.63	15.0														
97.63	16.0														
96.63	17.0			X	12	14 24 30	54								
95.63	18.0														
94.63	19.0			X	13	16 27 35	62								
93.63	20.0														
92.63	21.0			X	14	28 50 for 4"									
22.0															

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REPORT TITLE BORING RECORD				HOLE ID B2-03	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-13-08	SHEET 2 of 3

CALTRANS BORING RECORD METH-ENG FIXED CRAZY HORSE GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks				
90.63	22.5	[Pattern]	Install 38 mm (1.5") screened PVC from 1.5 to 4.5 meters below ground surface, solid 38 mm (1.5") solid PVC to ground surface. Backfill with sand to 1.5 meters below ground surface and seal with bentonite to ground surface. Install Solinst piezometer 4 meters below ground surface. Bottom of borehole at 24.8 m bgs	X	15	19	41	50 for 5.5"					[Pattern]						
89.63	23.0																		
	23.5																		
	24.0																		
	24.5																		
88.63	25.0																		
	25.5																		
87.63	26.0																		
	26.5																		
86.63	27.0																		
	27.5																		
85.63	28.0																		
	28.5																		
84.63	29.0																		
	29.5																		
83.63	30.0																		
	30.5																		
82.63	31.0																		
	31.5																		
81.63	32.0																		
	32.5																		
80.63	33.0																		
	33.5																		
	34.0																		



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REPORT TITLE BORING RECORD				HOLE ID B2-03	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-13-08	SHEET 3 of 3

CALTRANS BORING RECORD MET-ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0	10.0		IGNEOUS ROCK (DIORITE), medium-grained to very coarse-grained or pegmatitic, decomposed, very soft (Santa Lucia Quartz Diorite). IGNEOUS ROCK (Diorite) (continued).												
97.33	11.0				7	40 70 for 4.75									
	11.5				1			100	0						
96.33	12.0				8 2	70 for 4.75		40	0						
	12.5														
95.33	13.0														
	13.5				3			68	0						
94.33	14.0														
	14.5														
93.33	15.0				4			40	0						
	15.5														
92.33	16.0														
	16.5			5			13	0							
91.33	17.0														
	17.5														
90.33	18.0		At EL. 90.34 m, becomes intensely weathered, soft to moderately soft, lenses of white clay infill less than 1 mm thick.	6			69	28							
	18.5														
89.33	19.0			7			42	42							
	19.5														
88.33	20.0			8			39	0							
	20.5														
87.33	21.0			9			83	0							
	21.5		Becomes decomposed to slightly weathered, very soft to hard, iron staining along fractures.	10			89	61							

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REPORT TITLE BORING RECORD				HOLE ID B3-03	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-13-08	SHEET 2 of 3

CALTRANS BORING RECORD METH-HENG FIXED CRAZY HORSE GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
85.33	22.5	[Cross-hatched pattern]	At EL. 85.01 m, becomes slightly weathered, very hard.		10			89	61				[Diamond pattern]		
	23.0				11			70	0						
84.33	23.5				12			93	53						
	24.0				13			77	47						
82.33	25.0	[Cross-hatched pattern]	Becomes decomposed to slightly weathered, very soft to very hard.		14			27	12				[Diamond pattern]		
	25.5														
	26.0														
	26.5														
	27.0														
	27.5		Install 24.4 meters of 38 mm (1.5") screened PVC and 3 meters of 38 mm (1.5") solid PVC in 24.7 meters of sand backfill and bentonite seal to the ground surface.. Bottom of borehole at 27.1 m bgs												
80.33	28.0														
	28.5														
79.33	29.0														
	29.5														
78.33	30.0														
	30.5														
77.33	31.0														
	31.5														
76.33	32.0														
	32.5														
75.33	33.0														
	33.5														
	34.0														



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REPORT TITLE BORING RECORD				HOLE ID B3-03	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-13-08	SHEET 3 of 3

LOGGED BY SvS	BEGIN DATE 10-1-03	COMPLETION DATE 10-1-03	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 667888.1 m / 1765244.4 m NAD83	HOLE ID B4-03
DRILLING CONTRACTOR CT	BOREHOLE LOCATION (Offset, Station, Line) ~ 42.6' Lt Sta ~ 13+70 CHC/EV			SURFACE ELEVATION 111.86 m MSL
DRILLING METHOD Rotary Wash	DRILL RIG CME 75			BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore	SPT HAMMER TYPE 140 lb Autohammer			HAMMER EFFICIENCY, ERI 82%
BOREHOLE BACKFILL AND COMPLETION backfilled with bentonite	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS			TOTAL DEPTH OF BORING 26.1 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0	0.0		SILTY SAND (SM); medium dense; dark gray; dry; fine SAND.												
110.86	1.0		CLAYEY SAND (SC); medium dense; light brownish gray; moist to wet; mostly fine grained with few coarse angular fragments.												
109.86	2.0		CLAYEY SAND (SC); medium dense; light olive brown; wet; fine SAND.		1	7 12 13	25								
108.86	2.5				2	7 10 13	23								
107.86	4.0		Poorly graded SAND (SP); medium dense; fine SAND.		3	4 9 11	20								
	3.5				4	6 11 12	23								
106.86	5.0				5	6 9 11	20								
105.86	6.0		Poorly graded SAND (SP); medium dense; dark yellowish brown and strong brown; wet; weak to moderate cementation (Aromas Sand).		6	6 12 15	27								
104.86	7.0				7	6 12 16	28								
102.86	9.0		At EL. 102.87 m, becomes dense; dark yellowish brown; no cementation.		8	9 13 19	32								

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REPORT TITLE BORING RECORD				HOLE ID B4-03	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-14-08	SHEET 1 of 3

CALTRANS BORING RECORD MET-ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0	10.0		Poorly graded SAND (SP) <i>(continued)</i> .												
100.86	10.5			X	9	7 12 21	33								
	11.0		At EL. 100.89 m, becomes light olive brown.												
99.86	11.5														
	12.0		At EL. 99.82 m, becomes black to very dark grayish brown to yellowish brown to strong brown; thin lenses of weak cementation.	X	10	9 16 20	36								
98.86	12.5														
	13.0														
	13.5		At EL. 98.30 m, becomes dark brown.	X	11	10 19 23	42								
97.86	14.0														
	14.5														
96.86	15.0		At EL. 96.77 m, becomes strong brown; no cementation.	X	12	8 16 26	42								
95.86	15.5														
	16.0														
	16.5														
94.86	17.0			X	13	11 21 26	47								
	17.5														
93.86	18.0														
	18.5														
92.86	19.0														
	19.5														
91.86	20.0		At EL. 92.20 m, becomes very dense; weak cementation.	X	14	27 60 >120									
	20.5														
90.86	21.0														
	21.5														
	22.0														

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REPORT TITLE BORING RECORD				HOLE ID B4-03
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange				
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-14-08	SHEET 2 of 3	

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040303.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
88.86	23.0		At EL. 89.15 m, becomes light olive brown; lenses of weak cementation.	X	15	19 40 58	98								
87.86	24.0														
86.86	25.0		SANDY lean CLAY (CL); hard; dark greenish gray; moist; coarse to fine SAND; coarse angular granitic gravels near BOH.												
85.86	26.0			X	16	23 72									
	26.1		Backfilled with bentonite to ground surface.. Bottom of borehole at 26.1 m bgs												
84.86	27.0														
83.86	28.0														
82.86	29.0														
81.86	30.0														
80.86	31.0														
79.86	32.0														
78.86	33.0														
	34.0														



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REPORT TITLE BORING RECORD				HOLE ID B4-03	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-14-08	SHEET 3 of 3

LOGGED BY SvS	BEGIN DATE 10-2-03	COMPLETION DATE 10-2-03	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 667932.2 m / 1765204.7 m NAD83	HOLE ID B5-03
DRILLING CONTRACTOR CT	BOREHOLE LOCATION (Offset, Station, Line) ~ 23' Lt Sta ~ 14+30 CHC/EV			SURFACE ELEVATION 112.59 m MSL
DRILLING METHOD Rotary Wash	DRILL RIG CME 75			BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore	SPT HAMMER TYPE 140 lb Autohammer			HAMMER EFFICIENCY, ERI 82%
BOREHOLE BACKFILL AND COMPLETION backfilled with bentonite	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE)			TOTAL DEPTH OF BORING 8.1 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0			SILTY SAND (SM); loose; dark gray; dry; fine SAND.												
111.59	0.5		Poorly graded SAND with CLAY (SP-SC); dense; dark yellowish brown; dry to moist.	X	1	11 18 21	39								
110.59	1.0			X	2	19 24 26	50								
109.59	2.0		At EL. 109.55 m, becomes strong brown.												
108.59	3.0		At EL. 109.09 m, becomes strong brown and light gray; wet; organics (roots).												
107.59	3.5			X	3	12 15 16	31								
106.59	4.0		SANDY lean CLAY (CL); hard; dark greenish gray; moist; coarse to fine SAND; angular granite gravels.	X	4	8 9 21	30								
105.59	4.5		IGNEOUS ROCK (DIORITE), medium-grained to coarse-grained, decomposed, very soft, dark yellowish orange to white and black with lenses of light bluish gray (Santa Lucia Quartz Diorite).												
104.59	5.0			X	5	8 9 17	26								
103.59	6.0			X	6	10 21 27	48								
	6.5		Backfilled with bentonite. Bottom of borehole at 8.1 m bgs												
	7.0														
	7.5														
	8.0														
	8.5														
	9.0														
	9.5														
	10.0														

CALTRANS BORING RECORD MET-HENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08



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REPORT TITLE BORING RECORD				HOLE ID B5-03
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange				
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-14-08	SHEET 1 of 1	

LOGGED BY SvS	BEGIN DATE 10-2-03	COMPLETION DATE 10-2-03	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 667964.4 m / 1765164.9 m NAD83	HOLE ID B6-03
DRILLING CONTRACTOR CT			BOREHOLE LOCATION (Offset, Station, Line) ~ 42.7' Lt Sta ~ 14+78 CHC/EV	SURFACE ELEVATION 115.21 m MSL
DRILLING METHOD Rotary Wash			DRILL RIG CME 75	BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore			SPT HAMMER TYPE 140 lb Autohammer	HAMMER EFFICIENCY, ERI 82%
BOREHOLE BACKFILL AND COMPLETION backfilled with bentonite			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS	TOTAL DEPTH OF BORING 3.4 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0	0.0		SILTY SAND (SM); medium dense; dark brown; dry; fine SAND; organics.												
114.21	1.0		CLAYEY SAND (SC); very dense; yellowish brown; dry; coarse to fine SAND; coarse granitic gravels toward bottom of layer.												
113.21	1.5		IGNEOUS ROCK (DIORITE), decomposed, very soft, dark yellowish brown to black and white.		1	16 44 70	114								
112.21	2.0														
112.21	3.0				2	32 70 for 4.5									
	3.5		Bottom of borehole at 3.4 m bgs												
111.21	4.0														
	4.5														
110.21	5.0														
	5.5														
109.21	6.0														
	6.5														
108.21	7.0														
	7.5														
107.21	8.0														
	8.5														
106.21	9.0														
	9.5														
	10.0														

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08



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REPORT TITLE BORING RECORD				HOLE ID B6-03
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange				
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-14-08	SHEET 1 of 1	

LOGGED BY Wade Hoon	BEGIN DATE 10-21-03	COMPLETION DATE 10-21-03	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 667863.9 m / 1764959.7 m NAD83	HOLE ID B7-03
DRILLING CONTRACTOR CT	BOREHOLE LOCATION (Offset, Station, Line) ~ 19.7' Lt Sta ~ 192+83 CH-2		SURFACE ELEVATION 102.78 m MSL	
DRILLING METHOD Rotary Wash	DRILL RIG Mobile B47		BOREHOLE DIAMETER 94 mm	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore	SPT HAMMER TYPE 140 lb Safety Hammer		HAMMER EFFICIENCY, ERI 57%	
BOREHOLE BACKFILL AND COMPLETION Installed Monitoring Well	GROUNDWATER READINGS	DURING DRILLING	AFTER DRILLING (DATE) 2.2 m on 3-16-05	TOTAL DEPTH OF BORING 27.4 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
101.78	0.0		Poorly graded SAND (SP); dense to very dense; light reddish brown; moist; fine SAND [Aromas].												
	0.5														
	1.0				1	9 21 30	51								
	1.5														
	2.0				2	15 23 23	45								
100.78	2.0														
	2.5														
	3.0		At EL. 99.73 m, becomes medium dense.												
	3.5														
	4.0														
	4.5														
	5.0				4	4 8 8	16								
	5.5														
	6.0		Poorly graded SAND (SP); medium dense; tannish gray; wet; medium to fine SAND.												
	6.5														
	7.0														
	7.5		CLAYEY SAND (SC); medium dense; gray; wet; coarse to fine SAND.												
	8.0		SANDY fat CLAY (CH); stiff; gray; moist; coarse to fine SAND.		6	4 5 6	11								
	8.5		CLAYEY SAND (SC); medium dense; grayish tan to orange; moist to wet.												
	9.0														
	9.5		Zone of gravel.												
	9.5		SILT (ML); medium dense; dark greenish gray; moist.												
	9.5		SILTY SAND (SM); medium dense; dark greenish gray;		7	8 9 7	12								
	10.0														

(continued)

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REPORT TITLE BORING RECORD				HOLE ID B7-03
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange				
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-14-08	SHEET 1 of 3	

CALTRANS BORING RECORD METHENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040806.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0	10.0		moist; fine SAND. SILTY SAND (SM) (continued).												
91.78	11.0		At EL. 91.65 m, becomes less silty, more fine grained sand.		8	6 11 13	24								
90.78	12.0		Poorly graded SAND with SILT (SP-SM); medium dense; greenish gray; moist; fine SAND.		9	8 8 14	22								
89.78	13.0		SILTY SAND (SM); dense; greenish gray; moist; fine SAND.												
88.78	14.0				10	7 13 20	33								
87.78	15.0		Poorly graded SAND (SP); dense to very dense; greenish gray; moist to wet; fine SAND.		11	7 12 21	33								
86.78	16.0														
85.78	17.0		Lenses of weak cementation.		12	15 29 36	65								
84.78	18.0														
83.78	19.0														
82.78	20.0		SANDY fat CLAY (CH); hard; dark gray; moist. CLAYEY SAND (SC); very dense; greenish gray; moist; coarse to fine SAND.		14	15 22 30	52					PP = 144 to 431			
81.78	21.0		SANDY fat CLAY (CH); hard; dark greenish gray; moist; coarse to fine SAND; varying amount of sand.		15	22 34 >50									PP = >431
	22.0														

(continued)



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REPORT TITLE BORING RECORD				HOLE ID B7-03	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-14-08	SHEET 2 of 3

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
79.78	22.5		SANDY fat CLAY (CH) (continued).	X	16	25 40 for 3'									
78.78	23.0														
77.78	24.0														
77.78	24.5		CLAYEY SAND (SC); very dense; greenish brown; moist; coarse to fine SAND.	X	17	17 31 >50									
76.78	25.0														
76.78	25.5		SANDY fat CLAY (CH); hard; dark greenish gray; moist; coarse to fine SAND; few gravels.												PP = >431
75.78	26.0														
74.78	27.0		Installed 24.4 meters of 38 mm (1.5") screened PVC and 3.1 meters of 38 mm (1.5") solid PVC with 24.4 meters of sand backfill and bentonite seal. Bottom of borehole at 27.4 m bgs	X	18	23 >50									
74.78	27.5														
73.78	28.0														
72.78	28.5														
71.78	29.0														
70.78	29.5														
69.78	30.0														
	30.5														
	31.0														
	31.5														
	32.0														
	32.5														
	33.0														
	33.5														
	34.0														



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REPORT TITLE BORING RECORD				HOLE ID B7-03	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-14-08	SHEET 3 of 3

LOGGED BY Wade Hoon	BEGIN DATE 10-22-03	COMPLETION DATE 10-23-03	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 667869.2 m / 1764990.2 m NAD83	HOLE ID B8-03
DRILLING CONTRACTOR CT	BOREHOLE LOCATION (Offset, Station, Line) ~ 4.9' Rt Sta ~ 193+13 CH-2		SURFACE ELEVATION 102.78 m MSL	
DRILLING METHOD Rotary Wash	DRILL RIG Mobile B47		BOREHOLE DIAMETER 94 mm	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore	SPT HAMMER TYPE 140 lb Safety Hammer		HAMMER EFFICIENCY, ERI 57%	
BOREHOLE BACKFILL AND COMPLETION Installed Monitoring Well	GROUNDWATER DURING DRILLING READINGS	AFTER DRILLING (DATE) 2.2 m on 3-16-05	TOTAL DEPTH OF BORING 33.8 m	

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
101.78	0.0		Poorly graded SAND with SILT (SP-SM); medium dense to dense; medium stiff; reddish brown; dry to moist.												
100.78	2.0				1	15 17 16	33								
99.78	3.0														
98.78	3.5		Fat CLAY (CH); soft; gray; moist.		2	6 6 8	14								
97.78	4.0		Poorly graded SAND with SILT (SP-SM); loose to medium dense; reddish brown; moist.												
96.78	5.0		CLAYEY SAND (SC); loose; reddish brown; moist; fine SAND; organics.		3	4 3 5	8								
95.78	5.5		Poorly graded SAND (SP); loose to medium dense; gray; moist to wet.												
94.78	6.0				4	5 7 5	12								
93.78	6.5				5	3 8 9	17								
	7.0														
	7.5														
	8.0				6	2 1 2	3								
	8.5		Fat CLAY (CH); soft; black; moist; high plasticity fines.												PP = <96
	9.0		SANDY fat CLAY (CH); soft; dark greenish gray; moist; medium to fine SAND; sand content varies.		7	2 3 3	6								
	9.5		Fat CLAY (CH); soft; very dark gray to black; moist; high plasticity fines; organics.		8	1 2 1	3								PP = <96 to
	10.0														

(continued)

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REPORT TITLE BORING RECORD				HOLE ID B8-03
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange				
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-14-08	SHEET 1 of 4	

CALTRANS BORING RECORD MET-ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040508.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per		Recovery (%)	RCD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
						150 mm	305 mm								
10.0	10.0		Well-graded SAND (SW); medium dense; gray; moist; 1" lenses of SW-SC and 1" lenses of firm, high plasticity CH.		9	9	20					192			
10.5	10.5					12									
11.0	11.0					6	7								
91.78	11.5		Well graded SAND (SW); medium dense; gray; moist ALTERNATING with Clayey SAND (SC); medium dense; gray; moist; fine grained.		10	4									
12.0	12.0					2	13								
12.5	12.5					7	14								
89.78	13.0		At EL. 88.76 m, contains gravels to 12 mm (0.5") and 25 mm chunk of burnt wood.		12	6									
13.5	14.0					8	23								
14.0	14.5					10									
88.78	15.0		SILTY SAND (SM); dense to very dense; greenish gray; moist; fine grained sand with 37 mm (0.75") granitic gravel.		13	13									
15.5	16.0					7	32								
16.0	16.5					14									
86.78	17.0		Fat CLAY (CH); hard; dark greenish gray; moist; high plasticity fines.		14	18									
17.5	18.0					15	51								
18.0	18.5					25									
85.78	19.0		CLAYEY SAND (SC); very dense; gray; moist; coarse to fine SAND.		15	26									
19.5	20.0					11	31					PP =			
20.0	20.5					16	15					>431			
84.78	21.0		SILT (ML); very dense.		16	15									
21.5	22.0					18	57								
22.0	22.5					29									
83.78	22.0		SANDY fat CLAY (CH); hard; gray; moist; medium to high plasticity fines.		17	29									
22.5	23.0					18	39								
23.0	23.5					18									

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REPORT TITLE BORING RECORD				HOLE ID B8-03	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-14-08	SHEET 2 of 4

CALTRANS BORING RECORD MET+ENG FIXED, CRAZY HORSE, GP1, CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks		
79.78	23.0		SANDY fat CLAY (CH) (continued). At EL. 78.55 m, becomes reddish brown; fine sand lenses to 76 mm (3") thick.	X		11 17 22						>431					
78.78	24.0			X	19	18 35 >50											
77.78	25.0			X	20	13 30 >50											
76.78	26.0			X	21	20 38 >50							PP = >431				
74.78	28.0			X	22	16 27 33	60										
73.78	29.0		IGNEOUS ROCK (DIORITE), soft to moderately soft, moderately weathered to decomposed, iron oxide staining throughout, white, improving quality with depth [Santa Lucia Quartz Diorite].														
72.78	30.0																
71.78	31.0																
70.78	32.0																
69.78	33.0																
34.0			Installed 15.2 meters of 38 mm (1.5") solid PVC. 15.2 (continued)														



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REPORT TITLE BORING RECORD				HOLE ID B8-03	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-14-08	SHEET 3 of 4		

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
67.78	35.0		meters of 38 mm (1.5") screened PVC, and 3.4 meters of 38 mm (1.5") solid PVC in 30.5 meters of sand backfill and bentonite seal. Bottom of borehole at 33.8 m bgs												
66.78	36.0														
65.78	37.0														
64.78	38.0														
63.78	39.0														
62.78	40.0														
61.78	41.0														
60.78	42.0														
59.78	43.0														
58.78	44.0														
57.78	45.0														
	46.0														



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REPORT TITLE BORING RECORD				HOLE ID B8-03	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-14-08	SHEET 4 of 4

LOGGED BY Wade Hoon	BEGIN DATE 2-27-07	COMPLETION DATE 2-27-07	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 668436.7 m / 1765408.1 m NAD83	HOLE ID B2-07
DRILLING CONTRACTOR CT			BOREHOLE LOCATION (Offset, Station, Line) ~ 35' Rt Sta ~ 200+40 RTE-101	SURFACE ELEVATION 144.48 m MSL
DRILLING METHOD Rotary Wash			DRILL RIG Mobile B47	BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore			SPT HAMMER TYPE 140 lb Safety Hammer	HAMMER EFFICIENCY, ERI 57%
BOREHOLE BACKFILL AND COMPLETION backfilled with native			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS	TOTAL DEPTH OF BORING 9.4 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RCD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0	0.0		SILTY SAND (SM); medium dense to dense; yellowish tan to dark yellowish tan; moist; fine SAND; weak cementation [Aromas].												
143.48	1.0				1	10 12 16	28								
142.48	2.0				2	8 12 13	25								
141.48	3.0				3	11 19 21	40								
140.48	4.0				4	12 27 19	46								
139.48	5.0				5	13 16 21	37								
138.48	6.0				6	12 15 21	36								
137.48	7.0														
136.48	8.0														
135.48	9.0														
	9.5		Backfilled with native material. Bottom of borehole at 9.4 m bgs												
	10.0														

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REPORT TITLE BORING RECORD				HOLE ID B2-07	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 1 of 1

LOGGED BY Wade Hoon	BEGIN DATE 2-27-07	COMPLETION DATE 2-27-07	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 668473.0 m / 1765423.6 m NAD83	HOLE ID B3-07
DRILLING CONTRACTOR CT			BOREHOLE LOCATION (Offset, Station, Line) ~ 37.4' Rt Sta ~ 200+80 RTE-101	SURFACE ELEVATION 168.68 m MSL
DRILLING METHOD Rotary Wash			DRILL RIG Mobile B47	BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore			SPT HAMMER TYPE 140 lb Safety Hammer	HAMMER EFFICIENCY, ERI 57%
BOREHOLE BACKFILL AND COMPLETION backfilled with native			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS	TOTAL DEPTH OF BORING 9.4 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0	0.0		SILTY SAND (SM); medium dense; yellowish tan; moist (Aromas).												
167.68	1.0				1	8 9 9	18								
166.68	2.0				2	6 9 15	24								
165.68	3.0				3	8 11 15	26								
164.68	4.0				4	10 13 17	30								
163.68	5.0				5	10 13 26	39								
162.68	6.0				6	19 29 23	52								
161.68	7.0		At EL. 161.30 m, becomes dense.												
160.68	8.0														
159.68	9.0		At EL. 159.78 m, becomes very dense.												
	9.5		Backfilled with native material.. Bottom of borehole at 9.4 m bgs												
	10.0														

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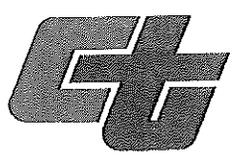
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REPORT TITLE BORING RECORD				HOLE ID B3-07	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 1 of 1

LOGGED BY Wade Hoon	BEGIN DATE 2-28-07	COMPLETION DATE 2-28-07	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 668508.9 m / 1765440.1 m NAD83	HOLE ID B4-07
DRILLING CONTRACTOR CT			BOREHOLE LOCATION (Offset, Station, Line) ~ 37.7' Rt Sta ~ 201+20 RTE-101	SURFACE ELEVATION 144.75 m MSL
DRILLING METHOD Rotary Wash			DRILL RIG Mobile B47	BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore			SPT HAMMER TYPE 140 lb Safety Hammer	HAMMER EFFICIENCY, ERI 57%
BOREHOLE BACKFILL AND COMPLETION backfilled with native			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS	TOTAL DEPTH OF BORING 9.4 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0	0.0		SILTY SAND (SM); medium dense; dark yellowish tan; moist; fine SAND; weak cementation (Aromas).												
143.75	1.0				1	7 10 12	22								
142.75	2.0														
141.75	3.0		At EL. 141.95 m, contains some medium SAND.		2	10 14 16	30								
140.75	4.0														
139.75	5.0				3	11 13 14	27								
138.75	6.0				4	10 12 16	28								
137.75	7.0														
136.75	8.0		At EL. 137.37 m, becomes dense.		5	14 16 20	36								
135.75	9.0				6	16 18 21	39								
9.5	9.4		Backfilled with native material.. Bottom of borehole at 9.4 m bgs												

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY D40808.GLB 6/5/08



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REPORT TITLE BORING RECORD				HOLE ID B4-07	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 1 of 1

LOGGED BY Wade Hoon	BEGIN DATE 2-28-07	COMPLETION DATE 2-28-07	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 668553.0 m / 1765462.9 m NAD83	HOLE ID B5-07
DRILLING CONTRACTOR CT	BOREHOLE LOCATION (Offset, Station, Line) ~ 38.7' Rt Sta ~ 201+70 RTE-101			SURFACE ELEVATION 143.93 m MSL
DRILLING METHOD Rotary Wash	DRILL RIG Mobile B47			BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore	SPT HAMMER TYPE 140 lb Safety Hammer			HAMMER EFFICIENCY, ERI 57%
BOREHOLE BACKFILL AND COMPLETION backfilled with native	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS			TOTAL DEPTH OF BORING 9.0 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Remarks
142.93	0.0		SILTY SAND (SM); medium dense to dense; yellowish tan; moist; fine SAND; weak cementation (Aromas).											
141.93	1.0				1	8 10 13	23							
140.93	2.0				2	7 10 14	24							
139.93	3.0				3	7 11 14	25							
138.93	4.0				4	11 18 21	39							
137.93	5.0				5	11 14 18	32							
136.93	6.0													
135.93	7.0													
134.93	8.0													
134.93	9.0		Backfilled with native material.. Bottom of borehole at 9.0 m bgs		6	13 16 18	34							

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08



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REPORT TITLE BORING RECORD				HOLE ID B5-07	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 1 of 1

LOGGED BY Wade Hoon	BEGIN DATE 3-1-07	COMPLETION DATE 3-1-07	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 667824.0 m / 1765369.8 m NAD83	HOLE ID B6-07
DRILLING CONTRACTOR CT	BOREHOLE LOCATION (Offset, Station, Line) ~ 32.2' Lt Sta ~ 12+32 CHC/EV		SURFACE ELEVATION 118.17 m MSL	
DRILLING METHOD Rotary Wash	DRILL RIG CME 75		BOREHOLE DIAMETER 94 mm	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore	SPT HAMMER TYPE 140 lb Autohammer		HAMMER EFFICIENCY, ERI 82%	
BOREHOLE BACKFILL AND COMPLETION Installed Monitoring Well	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) 1.2 m on 4-25-07		TOTAL DEPTH OF BORING 26.1 m	

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Remarks
				Number	150 mm	305 mm							
0.0	0.0		Well-graded SAND with CLAY (SW-SC); medium dense; gray to yellowish tan; moist; clay content varies; some lenses of moderate cementation up to 76 mm (3").										
117.17	1.0		SANDY fat CLAY (CH); very stiff to hard; gray and tan; moist.	1	3 4 7	11							
116.17	2.0		Well-graded SAND (SW).										
	2.0		SANDY fat CLAY (CH).										
	2.5		CLAYEY SAND (SC); medium dense; gray; moist.										
115.17	3.0			2	0 2 9	11							
	3.5		SILTY SAND (SM); medium dense; gray; moist; fine SAND; weak to moderate cementation.										
114.17	4.0			3	10 11 12	23							
	4.5		At EL. 113.45 m, contains some medium SAND.										
113.17	5.0												
	5.5												
112.17	6.0		SILTY SAND (SM); medium dense; dark yellowish tan; moist to wet; medium to fine SAND; weak to moderate cementation; some zones of brownish gray.	4	9 13 14	27							
	6.5												
111.17	7.0			5	8 13 15	28							
	7.5												
110.17	8.0												
	8.5												
109.17	9.0			6	6 6 12	18							
	9.5												
	10.0												

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REPORT TITLE BORING RECORD				HOLE ID B6-07
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange				
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-15-08	SHEET 1 of 3	

CALTRANS BORING RECORD METH-ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks		
107.17	10.0		SANDY fat CLAY (CH); hard; gray to brownish gray; moist; high plasticity fines; <5% organics.		7	7 12 14	26					PP = >383					
106.17	11.0												PP = >383				
105.17	12.0												PP = >431				
104.17	13.0																
103.17	14.0																
102.17	15.0																
101.17	16.0																
100.17	17.0																
99.17	18.0																
98.17	19.0																
97.17	20.0																
	20.5				CLAYEY SAND (SC); greenish gray; moist; strong cementation; high clay content.												
	21.0				CLAYEY SAND (SC); very dense; greenish gray; moist; fine SAND; cementation varies from weak to strong; clay content varies.												
	21.5						14	16 32 18	50								

(continued)



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REPORT TITLE BORING RECORD				HOLE ID B6-07	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 2 of 3

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
95.17	22.5	[Diagonal hatching pattern]	CLAYEY SAND (SC) (continued).	X	15	19	>50						[Symbolic representation]		
23.0															
23.5															
94.17	24.0	[Dotted pattern]	SILTY SAND (SM); very dense; greenish gray; moist.	X	16	17	27	23 for 3'					[Symbolic representation]		
24.5															
25.0															
92.17	26.0		Installed monitoring well. Bottom of borehole at 26.1 m bgs	X	17	14	24	26 for 4'							
26.5															
91.17	27.0														
27.5															
90.17	28.0														
28.5															
89.17	29.0														
29.5															
88.17	30.0														
30.5															
87.17	31.0														
31.5															
86.17	32.0														
32.5															
85.17	33.0														
33.5															
34.0															



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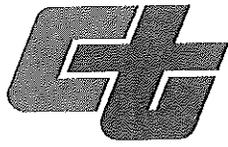
REPORT TITLE BORING RECORD				HOLE ID B6-07	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 3 of 3

LOGGED BY Wade Hoon	BEGIN DATE 3-6-07	COMPLETION DATE 3-6-07	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 667991.0 m / 1765169.5 m NAD83	HOLE ID B7-07
DRILLING CONTRACTOR CT			BOREHOLE LOCATION (Offset, Station, Line) ~ 30.5' Rt Sta ~ 14+95 CHC/EV	SURFACE ELEVATION 121.49 m MSL
DRILLING METHOD Rotary Wash			DRILL RIG CME 75	BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, HQ Core Barrel			SPT HAMMER TYPE 140 lb Autohammer	HAMMER EFFICIENCY, ERI 82%
BOREHOLE BACKFILL AND COMPLETION backfilled with native			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS	TOTAL DEPTH OF BORING 23.9 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 303 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
120.49	0.0		Well-graded SAND with CLAY (SW-SC); medium dense; light brown; moist; occasional decomposed white/black/yellowish tan granitic gravel up to 25 mm (0.5").												
119.49	1.0				1	4	16								
	1.5					7									
	2.0					9									
118.49	2.5		At EL. 119.06 m, becomes very dense.												
	3.0				2	19									
	3.5					45									
	4.0					5									
	4.5					for									
	5.0					0.75"									
116.49	5.0		IGNEOUS ROCK (DIORITE), intensely weathered, very soft to soft, tan, black and white [Santa Lucia Quartz Diorite].		3	>50									
	5.5				1	for		89	55						
	6.0					6"									
115.49	6.0				2			87	59						
	6.5														
114.49	7.0														
	7.5		At EL. 114.18 m, becomes moderately to slightly weathered, medium strong, soft to moderately soft, moderately fractured, fractures contain iron staining.		3			100	84						
113.49	8.0														
	8.5														
112.49	9.0		At EL. 112.56 m, becomes moderately to slightly fractured, black and white.		4			97	65						
	9.5														
	10.0														

(continued)

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REPORT TITLE BORING RECORD				HOLE ID B7-07	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 1 of 3

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ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0			IGNEOUS ROCK (Diorite) <i>(continued)</i> .		4			97	65						
110.49	10.5		At EL. 110.98 m, becomes very soft to soft, increased pyrite and fine grained material.		5			100	70						
109.49	11.0														
	11.5														
108.49	12.0				6			100	85						
	12.5														
107.49	13.0		At EL. 107.99 m, contains crushed zones from 14.3 meters to 14.6 meters below ground surface.		7			95	43						
	13.5														
	14.0														
	14.5														
106.49	15.0				8			100	83						
	15.5														
105.49	16.0														
	16.5														
104.49	17.0				9			90	50						
	17.5														
103.49	18.0		At EL. 103.42 m, contains very intensely fractured and very hard nodules.		10			100	31						
	18.5														
102.49	19.0		At EL. 102.50 m, becomes hard, very intensely to intensely fractured.		11			100	0						
	19.5														
101.49	20.0		At EL. 101.89 m, becomes very intensely weathered, moderately fractured, very soft to moderately soft.		12			93	36						
	20.5														
100.49	21.0				13			93	30						
	21.5														
	22.0														

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REPORT TITLE BORING RECORD				HOLE ID B7-07
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange				
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-15-08	SHEET 2 of 3	

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
22.5	23.0				13			33	30						
98.49	23.5														
97.49	24.0		Backfilled with native material.. Bottom of borehole at 23.9 m bgs												
24.5	25.0														
96.49	25.5														
95.49	26.0														
26.5	27.0														
94.49	27.5														
93.49	28.0														
28.5	29.0														
92.49	29.5														
91.49	30.0														
30.5	31.0														
90.49	31.5														
89.49	32.0														
32.5	33.0														
88.49	33.5														
34.0															



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REPORT TITLE BORING RECORD				HOLE ID B7-07	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 3 of 3

LOGGED BY Wade Hoon	BEGIN DATE 3-7-07	COMPLETION DATE 3-7-07	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 667998.8 m / 1765135.6 m NAD83	HOLE ID B8-07
DRILLING CONTRACTOR CT			BOREHOLE LOCATION (Offset, Station, Line) ~ 30.5' Lt Sta ~ 15+24 CHC/EV	SURFACE ELEVATION 120.55 m MSL
DRILLING METHOD Rotary Wash			DRILL RIG CME 75	BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, HQ Core Barrel			SPT HAMMER TYPE 140 lb Autohammer	HAMMER EFFICIENCY, ERI 82%
BOREHOLE BACKFILL AND COMPLETION backfilled with native			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS	TOTAL DEPTH OF BORING 24.2 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	ROD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0	0.0		Well-graded SAND with CLAY (SW-SC); dense; tan; moist; gravel to 19 mm (0.75").												
119.55	1.0				1	13	38								
	1.5					18									
	2.0					20									
118.55	2.5														
	3.0		IGNEOUS ROCK (DIORITE), decomposed, intensely to moderately fractured, (clay filling on some fractures, iron staining throughout), soft to moderately hard [Santa Lucia Quartz Diorite].		2	50 for 6"		20	7						
117.55	3.5				1										
116.55	4.0														
	4.5				3	50 for 6"		30	11						
115.55	5.0				2										
	5.5														
114.55	6.0		At EL. 114.61 m, becomes intensely weathered, moderately soft, moderately to slightly fractured.		3			80	57						
	6.5														
113.55	7.0				4			81	0						
	7.5														
112.55	8.0														
	8.5		At EL. 112.17 m, becomes moderately hard.		5			100	54						
	9.0														
111.55	9.5		At EL. 111.56 m, becomes fine-grained, moderately to slightly weathered, moderately hard, very intensely to intensely fractured.		6			41	0						
	10.0														

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REPORT TITLE BORING RECORD				HOLE ID B8-07
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange				
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-15-08	SHEET 1 of 3	

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0			IGNEOUS ROCK (Diorite) (continued).		6			41	0						
	10.5				7			100	19						
109.55	11.0														
	11.5														
108.55	12.0		At EL. 108.97 m, becomes coarse-grained, intensely weathered to decomposed; moderately soft to moderately hard. At EL. 108.51 m, with dipping 60°.		8			89	50						
	12.5				9			86	0						
107.55	13.0														
	13.5														
106.55	14.0														
	14.5														
105.55	15.0		At EL. 105.86 m, becomes moderately weathered, moderately hard.		11			100	56						
	15.5				12			91	48						
104.55	16.0														
	16.5														
103.55	17.0														
	17.5														
102.55	18.0		At EL. 102.66 m, becomes intensely to moderately weathered, moderately hard, moderately to slightly fractured.		14			90	58						
	18.5														
101.55	19.0														
	19.5														
100.55	20.0														
	20.5														
99.55	21.0														
	21.5														
	22.0														

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REPORT TITLE BORING RECORD				HOLE ID B8-07	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 2 of 3

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks	
97.55	22.5	Material Graphics	Fracture zone.		17			100	55				Drilling Method	Casing Depth		
	23.0				18			89	69							
96.55	23.5			At EL. 96.93 m, becomes fine-grained, hard, intensely fractured.		19			79	25						
	24.0															
	24.5		Backfilled with native material. Bottom of borehole at 24.2 m bgs													
95.55	25.0															
	25.5															
94.55	26.0															
	26.5															
93.55	27.0															
	27.5															
92.55	28.0															
	28.5															
91.55	29.0															
	29.5															
90.55	30.0															
	30.5															
89.55	31.0															
	31.5															
88.55	32.0															
	32.5															
87.55	33.0															
	33.5															
	34.0															



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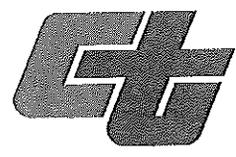
REPORT TITLE BORING RECORD				HOLE ID B8-07	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 3 of 3

LOGGED BY Wade Hoon	BEGIN DATE 7-25-06	COMPLETION DATE 7-25-06	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 667887.1 m / 1765026.5 m NAD83	HOLE ID B9-06
DRILLING CONTRACTOR CT			BOREHOLE LOCATION (Offset, Station, Line) ~ 3.3' Rt Sta ~ 193+53.5 CH-2	SURFACE ELEVATION 103.75 m MSL
DRILLING METHOD Rotary Wash			DRILL RIG Acker Truck Mount	BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore			SPT HAMMER TYPE 140 lb Autohammer	HAMMER EFFICIENCY, ERI 74%
BOREHOLE BACKFILL AND COMPLETION backfilled with native			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS	TOTAL DEPTH OF BORING 29.4 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0	0.0		SILTY SAND (SM); medium dense; light reddish brown; moist; fine SAND; uniformly graded.												
102.75	1.0														
101.75	2.0				9	6	24								
	2.0				1	10									
	2.0					14									
	2.0					6	15								
	2.0					7									
	2.0					8									
100.75	3.0														
	3.5		At EL. 100.40 m, becomes loose.		2	4	7								
	3.5					4									
	3.5					3									
99.75	4.0														
	4.5														
98.75	5.0		At EL. 98.88 m, becomes very loose.		3	2	4								
	5.0					2									
	5.0					2									
	5.0		Gray sand lense.			2									
	5.5														
97.75	6.0														
	6.5				4	1	3								
	6.5					2									
	6.5		SILTY SAND (SM); very loose; gray; moist; medium to fine SAND.			1									
96.75	7.0														
	7.5														
95.75	8.0				5	3	6								
	8.5					3									
	8.5					3									
94.75	9.0		CLAYEY SAND (SC); loose; gray; moist; fine SAND.												
	9.5				6	2	8								
	9.5					3									
	9.5					5									
	10.0														

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REPORT TITLE BORING RECORD				HOLE ID B9-06
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange				
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-15-08	SHEET 1 of 3	

CALTRANS BORING RECORD METH+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0	10.0		SILTY SAND (SM); medium dense; greenish gray; moist; fine SAND; weak cementation.												
92.75	11.0				7	2 7 11	18								
91.75	12.0														
90.75	13.0				8	4 7 8	15								
89.75	14.0														
88.75	15.0														
	15.5		At EL. 88.21 m, becomes dense.		10	8 16 20	36								
	16.0		At EL. 87.75 m, contains occasional lense of weak cementation.												
86.75	17.0				11	8 13 26	39								
85.75	18.0														
	18.5		SANDY fat CLAY (CH); very stiff; greenish gray; moist; fine SAND; breaks with pocket penetrometer.		12	8 13 17	30								
83.75	20.0				13	8 16 17	33								
	21.0														
	21.5		At EL. 82.42 m, contains coarse to fine SAND.		14		64								
	22.0														

(continued)



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REPORT TITLE BORING RECORD				HOLE ID B9-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 2 of 3

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY D40808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
80.75	22.5	[Diagonal Hatching]	At EL. 81.81 m, becomes gray to reddish brown. SANDY fat CLAY (CH) <i>(continued)</i> .	X	15	15						pp = >431	[Casing]		
	23.0					29									
	23.5	[Diagonal Hatching]	IGNEOUS ROCK (DIORITE), decomposed, very soft, tanish white [Santa Lucia Quartz Diorite].	X	15	11	45						[Casing]		
79.75	24.0					19	26								
	24.5	[Cross-hatching]		X	16	6	69						[Casing]		
78.75	25.0					16	53								
	25.5	[Cross-hatching]		X	17	20	44						[Casing]		
77.75	26.0					22	22								
	26.5	[Cross-hatching]		X	18	12	62						[Casing]		
76.75	27.0					22	40								
	27.5	[Cross-hatching]	At EL. 76.02 m, observed reduces to soil with finger pressure.	X	19	50 for							[Casing]		
75.75	28.0					6"									
	28.5	[Cross-hatching]	At EL. 75.41 m, becomes intensely weathered, very soft to soft.	X	19	50 for							[Casing]		
74.75	29.0					6"									
	29.5	[Cross-hatching]	Backfilled with native material. Bottom of borehole at 29.4 m bgs	X	19	50 for							[Casing]		
73.75	30.0					6"									
	30.5	[Cross-hatching]		X	19	50 for							[Casing]		
72.75	31.0					6"									
	31.5	[Cross-hatching]		X	19	50 for							[Casing]		
71.75	32.0					6"									
	32.5	[Cross-hatching]		X	19	50 for							[Casing]		
70.75	33.0					6"									
	33.5	[Cross-hatching]		X	19	50 for							[Casing]		
	34.0					6"									



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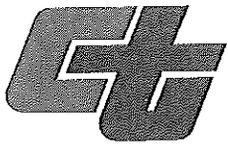
REPORT TITLE BORING RECORD				HOLE ID B9-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 3 of 3

LOGGED BY Wade Hoon	BEGIN DATE 7-26-06	COMPLETION DATE 7-26-06	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 667910.8 m / 1765067.5 m NAD83	HOLE ID B10-06
DRILLING CONTRACTOR CT	BOREHOLE LOCATION (Offset, Station, Line) ~ 3.3' Lt Sta ~ 194+01 CH-2		SURFACE ELEVATION 104.88 m MSL	
DRILLING METHOD Rotary Wash	DRILL RIG Acker Truck Mount		BOREHOLE DIAMETER 94 mm	
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore, HQ Core Barrel	SPT HAMMER TYPE 140 lb Autohammer		HAMMER EFFICIENCY, ERI 74%	
BOREHOLE BACKFILL AND COMPLETION backfilled with native	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS		TOTAL DEPTH OF BORING 27.4 m	

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0	0.0		SILTY SAND (SM); medium dense; reddish brown; moist; fine SAND.												
103.88	1.0														
102.88	2.0				1	5 9 8	17								
101.88	3.0														
100.88	4.0		At EL. 101.53 m, becomes loose.		2	4 4 3	7								
99.88	5.0		At EL. 100.01 m, becomes very loose; gray; moist to wet.		3	0 1 2	3								
98.88	6.0		SILTY SAND (SM); medium dense; gray to orangish tan; moist; coarse to fine SAND; occasional gravel from 10 mm (0.375") to 28 mm (1"); clayey SAND lenses and well-graded SAND with SILT up to 51 mm (2").		4	4 3 14	17								
97.88	7.0														
96.88	8.0		SILTY SAND (SM); medium dense; greenish gray; moist; fine SAND; occasional Iron staining.		5	4 8 10	18								
95.88	9.0														
	9.5				6	5 8 10	18								
	10.0														

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CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08



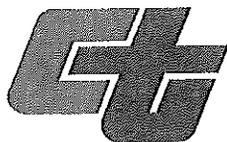
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REPORT TITLE BORING RECORD				HOLE ID B10-06
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange				
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-15-08	SHEET 1 of 3	

CALTRANS BORING RECORD MET-HENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0			SILTY SAND (SM) (continued).												
93.88	11.0			X	7	7 11 12	23								
92.88	12.0														
91.88	13.0			X	8	4 5 8	13								
90.88	14.0			X	9	6 12 20	32								
89.88	15.0														
	15.5		At EL. 89.64 m, becomes dense; weak to moderate cementation.												
88.88	16.0			X	10	13 20 26	46								
	16.5		SANDY fat CLAY (CH); hard; greenish gray; moist; coarse to fine SAND; high sand content.												
87.88	17.0			X	11	12 34 45	79					PP = >431			
86.88	18.0														
	18.5		IGNEOUS ROCK (DIORITE), decomposed, very soft, white and gray; mostly weathered to clay except for quartz constituents [Santa Lucia Quartz Diorite].	X	12	23 51									
85.88	19.0														
	19.5				1			58	58						
84.88	20.0		At EL. 85.07 m, becomes intensely to moderately weathered, soft to moderately soft, slightly fractured, white, tan and gray. At EL. 84.61 m, contains quartz vein; clay filled fractures in quartz vein.		2			100	100						
	20.5														
83.88	21.0														
	21.5		At EL. 83.55 m, becomes Intensely to moderately weathered, soft, slightly fractured, fractures are iron stained.		3			100	100						
	22.0														

(continued)



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REPORT TITLE BORING RECORD				HOLE ID B10-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 2 of 3

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040608.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks	
			IGNEOUS ROCK (Diorite) (continued).		3			100	100							
81.88	22.5	Material Graphics			4			0	0							
	23.0				5			87	87							
	23.5															
80.88	24.0					6			87	70						
	24.5															
79.88	25.0															
	25.5															
78.88	26.0		At EL. 78.97 m, becomes slightly weathered to fresh, very hard, moderately fractured, no to very slight clay filling on fractures; increasing ly fine grained.		7			100	43							
	26.5															
77.88	27.0															
	27.5		Backfilled with native material.. Bottom of borehole at 27.4 m bgs													
76.88	28.0															
	28.5															
75.88	29.0															
	29.5															
74.88	30.0															
	30.5															
73.88	31.0															
	31.5															
72.88	32.0															
	32.5															
71.88	33.0															
	33.5															
	34.0															



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REPORT TITLE BORING RECORD				HOLE ID B10-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 3 of 3

LOGGED BY Wade Hoon	BEGIN DATE 7-27-06	COMPLETION DATE 7-27-06	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 667926.0 m / 1765109.8 m NAD83	HOLE ID B11-06
DRILLING CONTRACTOR CT	BOREHOLE LOCATION (Offset, Station, Line) ~ 21.3' Rt Sta ~ 194+45 CH-2			SURFACE ELEVATION 106.16 m MSL
DRILLING METHOD Rotary Wash	DRILL RIG Acker Truck Mount			BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore, HQ Core Barrel	SPT HAMMER TYPE 140 lb Autohammer			HAMMER EFFICIENCY, ERI 74%
BOREHOLE BACKFILL AND COMPLETION Installed Monitoring Well	GROUNDWATER DURING DRILLING READINGS	AFTER DRILLING (DATE) 2.4 m on 8-17-06		TOTAL DEPTH OF BORING 24.4 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
106.16	0.0		SILTY SAND (SM); medium dense; brown; moist; fine SAND.												
104.16	2.0			X	1	6 6 6	17								
102.16	4.0		At EL. 102.81 m, becomes coarse to fine SAND.	X	2	5 6 8	14								
101.16	5.0		CLAYEY SAND (SC); loose; tan; moist; fine SAND.	X	3	4 5 5	10								
100.16	6.0		CLAYEY SAND (SC); medium dense; dark yellowish tan; moist; coarse to fine SAND; some gravels up to 26 mm (1") near 7 meters below ground surface.	X	4	5 7 7	14								
99.16	7.0			X	5	4 6 9	15								
97.16	9.0		At EL. 97.63 m, becomes dark tan; fine SAND; iron staining and few organics; abundant organics near 11 meters below ground surface.	X	6	4 6 8	14								

(continued)

CALTRANS BORING RECORD METH-ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08



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REPORT TITLE BORING RECORD				HOLE ID B11-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-15-08	SHEET 1 of 3		

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0	10.0		CLAYEY SAND (SC) (continued).												
95.16	11.0		At EL. 95.04 m, becomes dense; greenish gray; moist; medium to fine SAND; abundant organics.	X	7	8 13 21	34								
94.16	12.0		SANDY fat CLAY (CH); hard; dark greenish gray; moist; coarse to fine SAND; some gravel up to 20 mm (0.75").												
93.16	12.5			X	8	16 33 >50						PP = >431			
92.16	14.0		IGNEOUS ROCK (DIORITE), soft to moderately soft, white and greenish gray; intensely weathered to decomposed [Santa Lucia Quartz Diorite].	X	9	>50 for 6"			100	0					
91.16	15.0		At EL. 91.53 m, becomes fresh, very hard, white.		2				100	0					
90.16	15.5		At EL. 90.92 m, becomes white, black and tan; intensely weathered to decomposed; very soft.		3				94	38					
89.16	16.0		At EL. 89.70 m, becomes soft, moderately to intensely weathered.		4				100	58					
88.16	16.5				5				100	68					
87.16	17.0		At EL. 87.87 m, becomes very soft to medium soft; moderately weathered to decomposed.		6				52	0					
86.16	18.5		At EL. 86.35 m, becomes moderately weathered, soft to moderately soft, rock quality improving with depth.		7				87	53					
85.16	20.0				8				62	40					
	21.0														
	21.5														
	22.0														

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CALTRANS BORING RECORD MET-ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08



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REPORT TITLE BORING RECORD				HOLE ID B11-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 2 of 3

CALTRANS BORING RECORD MET-HENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/06

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
	22.5		IGNEOUS ROCK (Diorite) (continued).		8			62	40						
83.16	23.0				9		72	53							
	23.5														
	24.0														
82.16	24.0														
	24.5		Installed 38 mm (1.5") screened PVC in sand backfill with bentonite seal. Bottom of borehole at 24.4 m bgs												
81.16	25.0														
	25.5														
80.16	26.0														
	26.5														
79.16	27.0														
	27.5														
78.16	28.0														
	28.5														
77.16	29.0														
	29.5														
76.16	30.0														
	30.5														
75.16	31.0														
	31.5														
74.16	32.0														
	32.5														
73.16	33.0														
	33.5														
	34.0														



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REPORT TITLE BORING RECORD				HOLE ID B11-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 3 of 3

LOGGED BY Wade Hoon	BEGIN DATE 8-1-06	COMPLETION DATE 8-1-06	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 667882.0 m / 1765280.7 m NAD83	HOLE ID B12-06
DRILLING CONTRACTOR CT			BOREHOLE LOCATION (Offset, Station, Line) ~ 4.9' Rt Sta ~ 13+38 CHC/EV	SURFACE ELEVATION 112.35 m MSL
DRILLING METHOD Rotary Wash			DRILL RIG Acker Truck Mount	BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore			SPT HAMMER TYPE 140 lb Autohammer	HAMMER EFFICIENCY, ERI 74%
BOREHOLE BACKFILL AND COMPLETION Installed Monitoring Well			GROUNDWATER DURING DRILLING READINGS	AFTER DRILLING (DATE) 4.7 m on 8-17-06
				TOTAL DEPTH OF BORING 31.2 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 303 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
111.35	0.0		SILTY SAND (SM); medium dense; lannish gray; moist; fine SAND; some iron staining.												
110.35	2.0			X	1	5 8 10	18								
109.35	3.0														
108.35	4.0		At EL. 109.00 m, becomes dense.	X	2	6 12 20	32								
107.35	5.0		At EL. 107.78 m, contains heavy iron staining.	X	3	8 15 23	38								
106.35	6.0		At EL. 106.25 m, becomes brown; wet.												
105.35	7.0		At EL. 105.95 m, becomes medium dense; gray brown; moist to wet; organics.	X	4	5 10 11	21								
104.35	8.0			X	5	6 10 15	25								
103.35	9.0														
	9.5		At EL. 102.90 m, contains abundant organics.	X	6	6 10 17	27								
	10.0														

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CALTRANS BORING RECORD MET-ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08



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REPORT TITLE BORING RECORD				HOLE ID B12-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 1 of 3

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE GP. CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0	10.0		SILTY SAND (SM) (continued).												
101.35	11.0				7	5 10 13	23								
100.35	12.0														
99.35	12.5		At EL. 99.85 m, becomes wet.		8	6 11 15	26								
98.35	13.0														
97.35	14.0		At EL. 98.33 m, becomes dense; more brown.		9	7 13 29	42								
96.35	15.0														
95.35	15.5		At EL. 96.80 m, becomes very dense; dark reddish brown; moist; occasional 26 mm (0.5") cemented clasts and organics.		10	12 26 34	60								
94.35	16.0														
93.35	17.0				11	12 21 35	56								
92.35	17.5														
91.35	18.0				12	11 21 30	51								
	18.5														
	19.0														
	19.5														
	20.0		At EL. 92.23 m, becomes dense; light reddish brown.		13	9 18 25	43								
	20.5														
	21.0														
	21.5		At EL. 90.71 m, becomes very dense; zones of moderate cementation.		14										
	22.0														

(continued)



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REPORT TITLE BORING RECORD				HOLE ID B12-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 2 of 3

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
89.35	22.5					21 40 >50									
88.35	23.0		At EL. 88.58 m, becomes tan to grayish tan; moderately cemented lenses up to 38 mm (0.5").		15	17 29 36	65								
87.35	24.0		At EL. 87.66 m, becomes dense.		16	11 17 31	48								
86.35	25.0		Fat CLAY with SAND (CH); hard; gray; moist; medium to fine SAND; high plasticity fines.		17	11 14 16	30					PP = >431			
85.35	26.0		SANDY fat CLAY (CH); hard; greenish gray; moist; coarse to fine SAND.		18	9 19 30	49					PP = >431			
84.35	27.0		CLAYEY SAND (SC); dense; dark gray; moist; zones of fine sands; zones of coarse to fine sands.		19	10 17 30	47								
83.35	28.0				20	12 26 42	68								
81.35	28.5		Installed 38 mm (1.5") screened PVC in sand backfill and bentonite seal. Bottom of borehole at 31.2 m bgs												
80.35	29.0														
79.35	29.5														
	30.0														
	30.5														
	31.0														
	31.5														
	32.0														
	32.5														
	33.0														
	33.5														
	34.0														



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REPORT TITLE BORING RECORD				HOLE ID B12-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA	05-0161E1
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER	PREPARED BY R. Turner			DATE 5-15-08	SHEET 3 of 3

LOGGED BY Wade Hoon	BEGIN DATE 8-2-06	COMPLETION DATE 8-2-06	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 668031.6 m / 1765123.7 m NAD83	HOLE ID B13-06
DRILLING CONTRACTOR CT			BOREHOLE LOCATION (Offset, Station, Line) ~ 16.4' Rt Sta ~ 15+55 CHC/EV	SURFACE ELEVATION 120.09 m MSL
DRILLING METHOD Rotary Wash			DRILL RIG Acker Truck Mount	BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, HQ Core Barrel			SPT HAMMER TYPE 140 lb Autohammer	HAMMER EFFICIENCY, ERI 74%
BOREHOLE BACKFILL AND COMPLETION Installed Monitoring Well			GROUNDWATER DURING DRILLING READINGS	AFTER DRILLING (DATE) 7.2 m on 10-3-06
			TOTAL DEPTH OF BORING 22.6 m	

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0	0.0		CLAYEY SAND (SC); medium dense; brown; moist; coarse to fine SAND; occasional gravels to 26 mm (0.5").												
119.09	1.0				1	6 11 18	29								
118.09	2.0		IGNEOUS ROCK (DIORITE), decomposed, very soft, white and gray.												
117.09	3.0				2	36 >50									
	3.5		At EL. 116.59 m, contains area of large pinkish minerals.		1				100	0					
	4.0				2				63	0					
116.09	4.0														
	4.5		At EL. 115.82 m, becomes very soft, moderately to slightly fractured, white/black/gray; intensely weathered to decomposed.		3				95	95					
115.09	5.0														
	5.5														
114.09	6.0				4				0	0					
	6.5														
113.09	7.0														
	7.5				5				0	0					
112.09	8.0														
	8.5				6				23	0					
111.09	9.0														
	9.5				7				100	70					
	10.0														

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CALTRANS BORING RECORD MET-ENG FIXED CRAZY HORSE GPJ CALTRANS LIBRARY 040808.GLB 6/5/06



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REPORT TITLE BORING RECORD				HOLE ID B13-06
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange				
BRIDGE NUMBER	PREPARED BY R. Turner		DATE 5-15-08	SHEET 1 of 3

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0			IGNEOUS ROCK (Diorite) (continued).		7			100	70						
	10.5				8			92	63						
109.09	11.0				9			92	64						
	11.5														
108.09	12.0		At EL. 108.20 m, becomes moderately fractured, very soft; iron staining throughout; clay in fractures.		10			80	27						
	12.5														
107.09	13.0				11			70	0						
	13.5														
106.09	14.0				12			93	0						
	14.5														
105.09	15.0				13			83	27						
	15.5														
104.09	16.0				14			97	30						
	16.5														
103.09	17.0		At EL. 103.63 m, becomes fresh, hard, intensely fractured, white; iron staining and clay in fractures; increasingly fine grained.		15			100	27						
	17.5														
102.09	18.0		At EL. 103.02 m, becomes moderately weathered, moderately soft to moderately hard, intensely fractured, fractures contain iron staining and are unfilled.		16			86	50						
	18.5														
101.09	19.0				17			100	58						
	19.5														
100.09	20.0		At EL. 100.58 m, becomes moderately to slightly weathered, moderately soft to moderately hard, slightly fractured, black and white; iron staining on fractures.		18			100	40						
	20.5														
99.09	21.0				19			100	90						
	21.5														
	22.0				20			100	60						

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REPORT TITLE BORING RECORD				HOLE ID B13-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 2 of 3

CALTRANS BORING RECORD MET-HENG FIXED CRAZY HORSE GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
97.09	22.5	X	At EL. 97.99 m, contains fracture zone; clay and mineral alteration.		20			100	60				X		
97.09	23.0		Installed 38 mm (1.5") screened PVC in sand backfill with bentonite seal. Bottom of borehole at 22.6 m bgs												
96.09	24.0														
95.09	25.0														
94.09	26.0														
93.09	27.0														
92.09	28.0														
91.09	29.0														
90.09	30.0														
89.09	31.0														
88.09	32.0														
87.09	33.0														
	34.0														



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REPORT TITLE BORING RECORD				HOLE ID B13-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 3 of 3

LOGGED BY Wade Hoon	BEGIN DATE 8-3-06	COMPLETION DATE 8-3-06	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 668417.7 m / 1764966.1 m NAD83	HOLE ID B14-06
DRILLING CONTRACTOR CT			BOREHOLE LOCATION (Offset, Station, Line) ~ 49.2' Lt Sta ~ 19+92 CHC/EV	SURFACE ELEVATION 150.79 m MSL
DRILLING METHOD Rotary Wash			DRILL RIG Acker Truck Mount	BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore			SPT HAMMER TYPE 140 lb Autohammer	HAMMER EFFICIENCY, ERI 74%
BOREHOLE BACKFILL AND COMPLETION Installed Monitoring Well			GROUNDWATER DURING DRILLING READINGS DRY	AFTER DRILLING (DATE) DRY
				TOTAL DEPTH OF BORING 18.7 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0	0.0		SILTY SAND (SM); medium dense; reddish brown; moist; fine SAND.												
149.79	1.0														
148.79	2.0														
147.79	3.0		At EL. 147.74 m, becomes loose; reddish tan; occasional organics <10%.		1	5	11								
146.79	4.0														
145.79	5.0														
144.79	6.0		At EL. 144.69 m, becomes medium dense.		2	3	8								
143.79	7.0														
142.79	8.0		At EL. 143.16 m, becomes yellowish tan.		3	3	10								
141.79	9.0														
	9.5														
	10.0				6	6	19								

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REPORT TITLE BORING RECORD				HOLE ID B14-06
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange				
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-15-08	SHEET 1 of 2	

CALTRANS BORING RECORD MET*ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040908.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RCD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0	10.0		SILTY SAND (SM) (continued).												
139.79	11.0			X	7	9 10 14	24								
138.79	12.0			X	8	8 13 15	28								
137.79	13.0														
136.79	14.0		At EL. 137.07 m, becomes medium dense; organics approximately 1% by volume.	X	9	8 14 13	27								
135.79	15.0														
134.79	16.0		At EL. 135.54 m, contains Iron staining.	X	10	8 13 16	29								
133.79	17.0		At EL. 134.63 m, becomes weak to moderate cementation.												
132.79	18.0		At EL. 134.02 m, becomes dense; finer sand.	X	11	11 14 18	32								
131.79	19.0		At EL. 132.50 m, becomes medium dense.	X	12	8 12 16	28								
129.79	21.0		Installed 38 mm (1.5") screened PVC with sand backfill and bentonite seal with flush mount brass cover. Bottom of borehole at 18.7 m bgs												



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REPORT TITLE BORING RECORD				HOLE ID B14-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Tumer		DATE 5-15-08	SHEET 2 of 2

LOGGED BY Mike Finegan	BEGIN DATE 9-26-06	COMPLETION DATE 9-26-06	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 668089.0 m / 1765173.8 m NAD83	HOLE ID B15-06
DRILLING CONTRACTOR CT			BOREHOLE LOCATION (Offset, Station, Line) ~ 265.7' Rt Sta ~ 15+60 CHC/EV	SURFACE ELEVATION 137.71 m MSL
DRILLING METHOD Rotary Wash			DRILL RIG CS 1000	BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore			SPT HAMMER TYPE 163.5 kg Autohammer	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Installed Monitoring Well			GROUNDWATER DURING DRILLING READINGS	AFTER DRILLING (DATE) DRY
				TOTAL DEPTH OF BORING 17.4 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0	0.0		SILTY SAND (SM); dense; reddish orange; moist; fine SAND; weak cementation.												
136.71	1.0														
136.71	2.0				1	14 20 21	41								
134.71	3.0														
134.71	3.5		At EL. 134.51 m, becomes moderate cementation; some organics.		2	14 19 19	38								
133.71	4.0		At EL. 133.75 m, becomes red.												
132.71	5.0				3	11 14 17	31								
131.71	6.0														
131.71	6.5		At EL. 131.46 m, becomes medium dense; tan-orange; weak cementation; no organics.		4	8 13 16	29								
130.71	7.0														
129.71	8.0		At EL. 130.09 m, becomes dense; red-brown; weak cementation with zones of moderate cementation up to 100 mm thick.		5	13 23 25	48								
128.71	9.0														
128.71	9.5				6	16 20 27	47								
10.0	10.0		At EL. 127.96 m, becomes moderate cementation.												

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REPORT TITLE BORING RECORD				HOLE ID B15-06
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange				
BRIDGE NUMBER	PREPARED BY R. Turner	DATE 5-15-08	SHEET 1 of 2	

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ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0			SILTY SAND (SM) (continued).												
126.71	11.0		At EL. 127.04 m, becomes very dense.	X	7	16 28 36	64								
125.71	12.0		At EL. 125.36 m, becomes gray-brown; moderate cementation with strongly cemented zones up to 200 mm thick.	X	8	16 25 34	59								
124.71	13.0		At EL. 124.91 m, becomes weak to moderate cementation.												
123.71	14.0		At EL. 123.99 m, becomes dense; gray-brown and reddish brown mottled; no cementation.	X	9	18 20 23	43								
122.71	15.0														
121.71	16.0			X	10	11 14 22	36								
120.71	17.0			X	11	10 12 18	30								
119.71	18.0		Installed 15.2 meters of 38 mm (1.5") screened PVC and 2.4 meters of 38 mm (1.5") solid PVC in sand backfill with bentonite seal. Bottom of borehole at 17.4 m bgs												
118.71	19.0														
117.71	20.0														
116.71	21.0														
	22.0														



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REPORT TITLE BORING RECORD				HOLE ID B15-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 2 of 2

LOGGED BY Wade Hoon	BEGIN DATE 9-27-06	COMPLETION DATE 9-28-06	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 668521.1 m / 1765034.8 m NAD83	HOLE ID B16-06
DRILLING CONTRACTOR CT	BOREHOLE LOCATION (Offset, Station, Line) ~ 114.8' Rt Sta ~ 21+07 CHC/EV			SURFACE ELEVATION 174.29 m MSL
DRILLING METHOD Rotary Wash	DRILL RIG CS 1000			BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, HQ Core Barrel	SPT HAMMER TYPE 163.5 kg Autohammer			HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Installed Monitoring Well	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS DRY			TOTAL DEPTH OF BORING 24.4 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0	0.0		SILTY SAND (SM); very dense; reddish tan; moist; fine SAND; weak to moderate cementation.												
173.29	1.0														
172.29	2.0				1	34 31 29	60								
171.29	3.0		At EL. 171.24 m, becomes dense; some gray; some small black organics.		2	13 21 22	43								
170.29	4.0														
169.29	5.0														
168.29	6.0		At EL. 168.19 m, becomes medium dense; dark yellowish tan; no cementation; occasional organics.		4	5 8 10	18								
167.29	7.0		At EL. 167.73 m, becomes grayish tan.												
166.29	8.0				5	6 8 10	18								
165.29	9.0				3	6 7 8	15								
	9.5				6	6 8 10	18								
	10.0														

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REPORT TITLE BORING RECORD				HOLE ID B16-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Tumer		DATE 5-15-08	SHEET 1 of 3

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0	10.0		SILTY SAND (SM) (continued).												
163.29	11.0		At EL. 163.16 m, becomes dense; tan.		7	7 12 13	25								
162.29	12.0				8	9 14 18	32								
161.29	13.0				9	12 17 19	36								
160.29	14.0				10	11 16 19	35								
159.29	15.0				11	11 17 24	41								
158.29	16.0				12	12 16 23	39								
157.29	17.0				13	9 12 15	27								
156.29	18.0		At EL. 154.47 m, becomes medium dense.												
155.29	19.0		Some lenses of medium grained sand.												
154.29	20.0				14	11 19 24	43								
153.29	21.0														
	21.5														
	22.0														

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REPORT TITLE BORING RECORD				HOLE ID B16-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 2 of 3

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
151.29	23.0				15	12	44								
150.29	24.0														
149.29	25.0		Installed 38 mm (1.5") screened PVC with sand backfill and bentonite seal. Bottom of borehole at 24.4 m bgs												
148.29	26.0														
147.29	27.0														
146.29	28.0														
145.29	29.0														
144.29	30.0														
143.29	31.0														
142.29	32.0														
141.29	33.0														
	34.0														



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REPORT TITLE BORING RECORD				HOLE ID B16-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 3 of 3

LOGGED BY Wade Hoon	BEGIN DATE 9-28-06	COMPLETION DATE 10-3-06	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 668523.0 m / 1765000.6 m NAD83	HOLE ID B17-06
DRILLING CONTRACTOR CT			BOREHOLE LOCATION (Offset, Station, Line) ~ 3.3' Rt Sta ~ 21+02 CHC/EV	SURFACE ELEVATION 174.01 m MSL
DRILLING METHOD Rotary Wash			DRILL RIG CS 1000	BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore			SPT HAMMER TYPE 163.5 kg Autohammer	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Installed Monitoring Well			GROUNDWATER DURING DRILLING READINGS	AFTER DRILLING (DATE) DRY
				TOTAL DEPTH OF BORING 32.7 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
0.0	0.0		SILTY SAND (SM); dense; reddish tan; moist; fine SAND; weak to moderate cementation.												
173.01	1.0														
172.01	2.0				1	17 19 21	40								
171.01	3.0														
	3.5		At EL. 170.72 m, contains lenses of strong cementation and organics.		2	10 15 20	35								
170.01	4.0														
	4.5														
169.01	5.0		At EL. 169.19 m, becomes medium dense; dark yellowish tan; none to weak cementation.		3	8 11 13	24								
	5.5														
168.01	6.0														
	6.5				4	7 9 11	20								
167.01	7.0														
	7.5														
166.01	8.0				5	5 9 11	20								
	8.5														
165.01	9.0		At EL. 165.38 m, becomes grayish tan.		6	11 14 16	30								
	9.5														
	10.0														

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REPORT TITLE BORING RECORD				HOLE ID B17-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 1 of 3

CALTRANS BORING RECORD METH-ENG-FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0			SILTY SAND (SM) (continued).												
163.01	11.0		At EL. 163.10 m, becomes lenses of weak cementation.	X	7	9 11 12	23								
162.01	12.0														
161.01	13.0														
160.01	14.0			X	9	14 14 16	30								
159.01	15.0		At EL. 159.29 m, becomes wet.												
158.01	16.0														
157.01	17.0		At EL. 157.61 m, becomes no cementation; some medium fine sands.												
157.01	17.0		At EL. 157.00 m, becomes dense; tan.	X	11	14 19 21	40								
156.01	18.0		At EL. 156.24 m, contains organics.												
155.01	19.0														
154.01	20.0		At EL. 155.48 m, becomes moist to wet.	X	12	12 15 19	34								
153.01	21.0														
	21.5														
	22.0			X	14		52								

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REPORT TITLE BORING RECORD				HOLE ID B17-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-08	SHEET 2 of 3

CALTRANS BORING RECORD METH-ENG FIXED CRAZY HORSE GPJ CALTRANS LIBRARY 040808 GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
22.5						26 29 23									
151.01	23.0		At EL. 150.91 m, becomes wet.	X	15	18 23 27	50								
150.01	24.0														
149.01	25.0		At EL. 149.38 m, becomes very dense; moist; fine to medium fine sands; some organics; no cementation.	X	16	24 28 28	66								
	25.5		At EL. 148.93 m, contains weak to moderate cementation.												
148.01	26.0		At EL. 147.86 m, becomes weak cementation.	X	17	16 25 29	54								
147.01	27.0														
146.01	28.0		At EL. 146.33 m, becomes dense; fine grained sand; some organics; some weak cementation.	X	18	17 22 25	47								
145.01	29.0														
144.01	30.0														
143.01	31.0		At EL. 143.29 m, becomes very dense.	X	20	24 33 20 for 3"									
142.01	32.0		At EL. 142.01 m, becomes dense.	X	21	13 17 22	39								
141.01	33.0		Installed 38 mm (1.5") screened PVC with sand backfill and bentonite seal. Bottom of borehole at 32.7 m bgs												
	33.5														
	34.0														



Department of Transportation
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REPORT TITLE BORING RECORD				HOLE ID B17-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER	PREPARED BY R. Turner		DATE 5-15-08	SHEET 3 of 3	

LOGGED BY Wade Hoon	BEGIN DATE 10-3-06	COMPLETION DATE 10-4-06	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 668517.2 m / 1764961.3 m NAD83	HOLE ID B18-06
DRILLING CONTRACTOR CT			BOREHOLE LOCATION (Offset, Station, Line) ~ 118.1' Lt Sta ~ 20+91 CHC/EV	SURFACE ELEVATION 173.49 m MSL
DRILLING METHOD Rotary Wash			DRILL RIG CS 1000	BOREHOLE DIAMETER 94 mm
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT, Punchcore, HQ Core Barrel			SPT HAMMER TYPE 163.5 kg Autohammer	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Installed Monitoring Well			GROUNDWATER DURING DRILLING DRY	AFTER DRILLING (DATE) DRY
				TOTAL DEPTH OF BORING 22.0 m

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
172.49	0.0		CLAYEY SAND (SC); very dense; grayish white and yellowish tan; moist; fine SAND; moderate cementation; tough to punchcore, switch to HQ Core Barrel.												
171.49	2.0			X	1	>50									
170.49	2.5		SEDIMENTARY ROCK (SANDSTONE), gray; moderately hard; fresh.												
170.49	3.0		SILTY SAND (SM); dense; dark yellowish tan; moist; fine SAND; weak to moderate cementation; no organics.	X	2	18 22 21	43								
169.49	4.0														
168.49	5.0			X	3	14 19 22	41								
167.49	6.0			X	4	15 18 20	38								
166.49	7.0		Switch back to Punchcore. At EL. 166.63 m, contains organics.												
165.49	8.0		At EL. 165.87 m, becomes medium dense.	X	5	9 12 12	24								
164.49	9.0		At EL. 164.35 m, becomes yellowish tan; no cementation.	X	6	10 9 10	19								
	10.0														

(continued)

CALTRANS BORING RECORD MET-ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08



Department of Transportation
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REPORT TITLE BORING RECORD				HOLE ID B18-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-00	SHEET 1 of 3

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RCD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
10.0			SILTY SAND (SM) (continued).												
162.49	11.0			X	7	10 11 13	24								
161.49	12.0		At EL. 161.30 m, becomes dense.												
	12.5			X	8	14 18 19	37								
160.49	13.0														
	13.5														
	14.0		At EL. 159.78 m, becomes wet. At EL. 159.47 m, contains lenses of weak cementation.	X	9	14 17 20	37								
158.49	15.0														
	15.5			X	10	15 16 19	35								
157.49	16.0														
	16.5														
	17.0		At EL. 156.73 m, becomes dark tan; moist.	X	11	11 16 17	33								
155.49	18.0														
	18.5			X	12	13 17 19	36								
154.49	19.0														
	19.5														
	20.0		At EL. 153.68 m, becomes very dense.	X	13	17 25 32	57								
152.49	21.0														
	21.5			X	14		61								
	22.0														

(continued)



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REPORT TITLE BORING RECORD				HOLE ID B18-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-00	SHEET 2 of 3

CALTRANS BORING RECORD MET+ENG FIXED CRAZY HORSE.GPJ CALTRANS LIBRARY 040808.GLB 6/5/08

ELEVATION (m)	DEPTH (m)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 150 mm	Blows per 305 mm	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (kN/m ³)	Shear Strength (kPa)	Drilling Method	Casing Depth	Remarks
150.49	22.5		Installed 38 mm (1.5") screened PVC with sand backfill and bentonite seal. Bottom of borehole at 22.0 m bgs			20	29	32							
149.49	23.0														
148.49	23.5														
147.49	24.0														
146.49	24.5														
145.49	25.0														
144.49	25.5														
143.49	26.0														
142.49	26.5														
141.49	27.0														
140.49	27.5														
	28.0														
	28.5														
	29.0														
	29.5														
	30.0														
	30.5														
	31.0														
	31.5														
	32.0														
	32.5														
	33.0														
	33.5														
	34.0														



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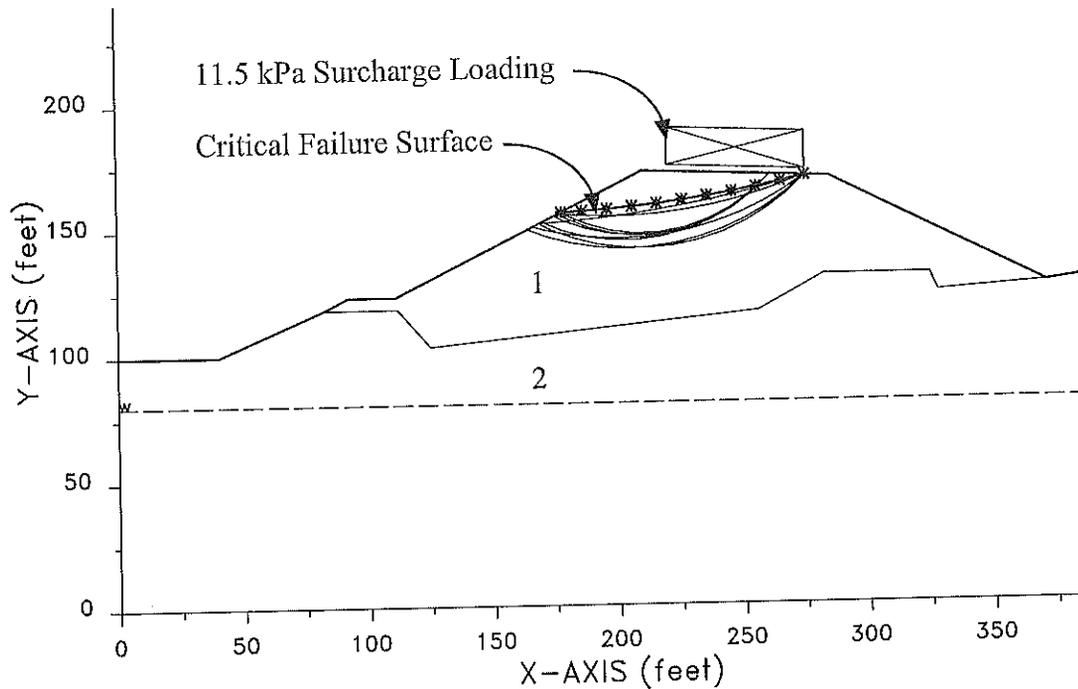
REPORT TITLE BORING RECORD				HOLE ID B18-06	
DIST. 05	COUNTY Monterey	ROUTE 101	POSTMILE D98.4/D98.4	EA 05-0161E1	
PROJECT OR BRIDGE NAME Crazy Horse Canyon Interchange					
BRIDGE NUMBER		PREPARED BY R. Turner		DATE 5-15-00	SHEET 3 of 3

Corrosion Analysis Summary
 05-Mon-101-98.4
 Crazy Horse Canyon Interchange
 EA 05-0161E1

Sample ID	Depth m	Soil or Water	pH	Resistivity ohm-cm	Chloride ppm	Sulphate ppm	Corrosive
B1-03	0.0	Water	7.6	3800	-	-	NO
B1-03	0.2 to 0.9	Soil	5.0	3700	-	-	NO
B1-03	2.0 to 2.7	Soil	6.8	2300	-	-	NO
B1-03	4.0 to 5.2	Soil	7.4	1500	-	-	NO
B1-03	5.0	Water	7.0	3900	-	-	NO
B1-03	5.3 to 6.1	Soil	7.6	730	16	250	YES
B1-03	8.2 to 9.1	Soil	6.8	3500	-	-	NO
B1-03	9.1 to 10.4	Soil	7.4	2800	-	-	NO
B1-03	10.4 to 12.2	Soil	6.6	2200	-	-	NO
B8-03	0.1	Soil	6.0	8450	-	-	NO
B8-03	0.3 to 0.5	Soil	5.6	8450	-	-	NO
B3-03	0.3 to 0.5	Soil	6.4	4200	-	-	NO
B8-03	3.0	Water	7.0	1750	-	-	NO
B3-03	3.0 to 4.6	Soil	7.5	7200	-	-	NO
B8-03	3.4 to 4.9	Soil	6.9	3600	-	-	NO
B3-03	5.5	Water	6.9	2000	-	-	NO
B3-03	7.6 to 9.1	Soil	7.1	1300	-	-	NO
B8-03	6.4 to 7.9	Soil	6.3	5300	-	-	NO
B8-03	12.8 to 14.0	Soil	4.7	5400	-	-	YES
B8-03	16.0 to 17.1	Soil	5.5	1100	-	-	YES
B8-03	18.3 to 18.9	Soil	7.3	460	38.23	1850	YES
B8-03	20.1 to 20.7	Soil	5.3	3000	-	-	YES
B8-03	21.0 to 21.5	Soil	6.3	1300	-	-	YES
B8-03	23.2 to 23.8	Soil	6.6	1400	-	-	YES
B15-06	2.1 to 17.4	Soil	8.0	1800	-	-	NO
B16-06	1.7 to 22.9	Soil	4.8	2900	-	-	YES
B17-06	1.8 to 23.1	Soil	5.5	2600	-	-	NO
B18-06	1.8 to 22.0	Soil	5.5	2400	-	-	YES

SLOPE STABILITY SUMMARY

Crazy Horse Canyon/ Route 101 Interchange



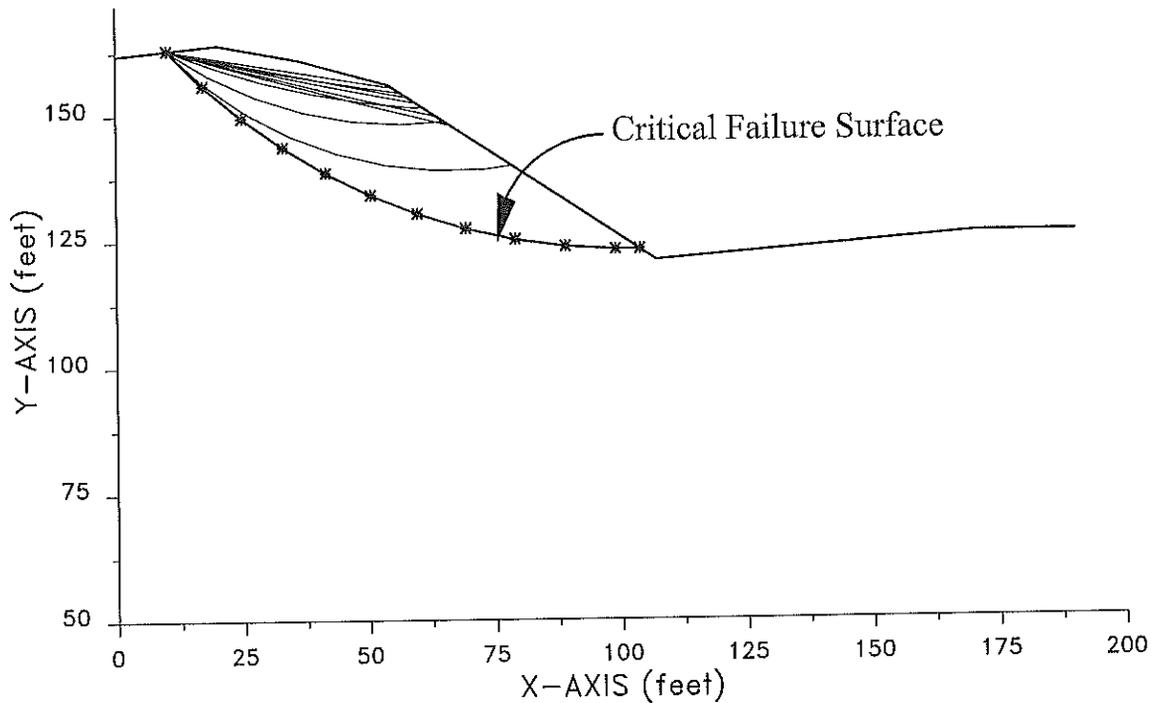
Crazy Horse East Overcrossing Embankment

Minimum Factors of Safety
 Static Loading : > 2.0
 Pseudo-Static Loading : > 2.0

Soil Properties Used in Analysis			
Soil Type	Total Unit Weight (kN/m ³)	Angle of Internal Friction (degrees)	Cohesion (kPa)
1. Silty Sand (Fill)	18.9	29	0
2. Poorly-Graded Sand	18.9	34	0

SLOPE STABILITY SUMMARY

Crazy Horse Canyon/ Route 101 Interchange



Southbound Off Ramp Cut

Minimum Factors of Safety

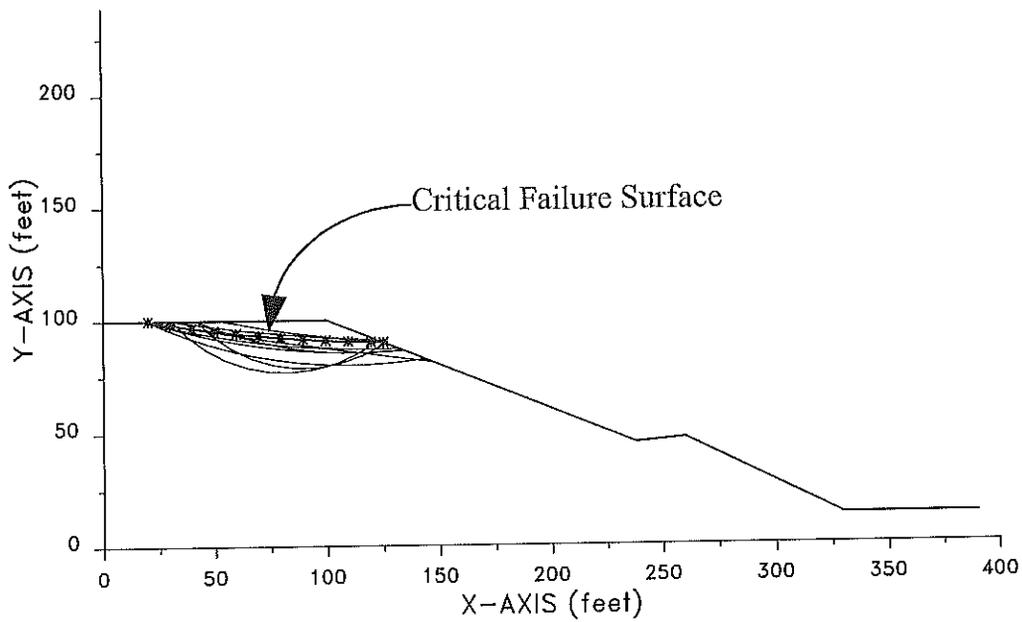
Static Loading >2.0

Pseudo Static Loading >2.0

Soil Properties Used in Analysis			
Soil Type	Total Unit Weight (kN/m ³)	Angle of Internal Friction (degrees)	Cohesion (kPa)
Silty Sand	18.9	34	0

SLOPE STABILITY SUMMARY

Crazy Horse Canyon/ Route 101 Interchange



CHC/EV Cut Station 21+20

Minimum Factors of Safety

Static Loading > 2.0

Pseudo Static Loading > 2.0

Soil Properties Used in Analysis			
Soil Type	Total Unit Weight (kN/m ³)	Angle of Internal Friction (degrees)	Cohesion (kPa)
Silty Sand	18.9	34	0

Groundwater Elevations
Crazy Horse Interchange 05-0161E1
B1-02

