FOR CONTRACT NO.: 06-471004

INFORMATION HANDOUT

MATERIALS INFORMATION

1. FOUNDATION REPORT FOR AVENUE 12 OH, Br. No. 41C-0207
DATED APRIL 18, 2011

2. FOUNDATION RECOMMENDATIONS FOR ROAD 29 NORTH BRIDGE
Br. No. 41C-0208, DATED APRIL 18, 2011

3. FOUNDATION RECOMMENDATIONS FOR ROAD 29 SOUTH BRIDGE,
Br. No. 41C-0209, DATED APRIL 18, 2011

4. FOUNDATION REPORT FOR AVENUE 12 OC BRIDGE, Br. No. 41-0088
DATED APRIL 18, 2011

5. FOUNDATION RECOMMENDATION FOR DIRECTION ON-RAMP, Br. No. 44-0089G
DATED APRIL 18, 2011

6. FINAL HYDRAULIC REPORT FOR AVENUE 12 INTERCHANGE
DATED AUGUST 4, 2010

7. REVISED FOUNDATION REPORT FOR ROAD 29 NORTH BRIDGE, Br. No. 41C-0208
DATED OCTOBER 27, 2011

8. REVISED FOUNDATION REPORT FOR ROAD 29 SOUTH BRIDGE, Br. No. 41C-0209
DATED OCTOBER 27, 2011

9. REVISED FOUNDATION REPORT FOR DIRECTIONAL ON-RAMP, Br. No. 44-0089G
DATED OCTOBER 27, 2011

10. PORTION OF THE ASBESTOS AND LEAD SURVEY REPORT
DATED DECEMBER 13, 2007

11. GEOTECHNICAL DESIGN REPORT
DATED MARCH 17, 2011

12. SUPPLEMENTAL GEOTECHNICAL DESIGN REPORT
DATED JUNE 27, 2011

13. BATTERY BACKUP SYSTEM DETAILS

14. KINDER MORGAN UTILITY GUIDELINES FOR CONSTRUCTION

PERMITS

15. UNITED STATES ARMY CORPS OF ENGINEERS
NON-REPORTING NATIONWIDE 404 PERMIT

16. CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
401 PERMIT

17. CALIFORNIA DEPARTMENT OF FISH AND GAME
NOTIFICATION NO. 1600-2012-0057-R4

ROUTE: 06-Mad-99-R7.1/R7.9

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: Mr. FRITZ HOFFMAN, Chief
Bridge Design Branch 6
Office of Bridge Design Central

Attention: Talal Sadek

Date: April 18, 2011

File: 06-MAD-99
PM R7.1/7.9
ID 0600000463
EA 06-471001
Avenue 12 OH
Br. No. 41C-0207

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

Subject: Foundation Report

Introduction

This Foundation Report (FR) is presented in response to the request from Bridge Design Branch 6, dated May 11, 2010 to provide foundation recommendations for replacement of the existing Avenue 12 Overhead (OH) as part of the interchange modification at Avenue 12 and State Route (SR) 99 in Madera County.

Scope of Work

The scope of our work for this FR includes review of the General Plan, Foundation Plan, foundation design loads provided by Bridge Design Branch 6, evaluation of subsurface conditions based on the available geotechnical and geologic information including as-built Log of Test Borings (LOTB), a field exploration program, and engineering and seismic analyses.

Project Description

Avenue 12 OH is one of five bridges to be replaced as part of the interchange modification at Avenue 12 and SR 99 in Madera County. Avenue 12 OH has an east-west alignment with a skew of 40 degrees and crosses over Union Pacific (UP) railroad tracks. Cottonwood Creek Bridge has an east-west alignment with a skew of about 17 degrees and crosses over Cottonwood Creek. One bridge will constructed to replace both Avenue 12 OH and Cottonwood Creek Bridge. The new bridge will span both the UP railroad tracks and Cottonwood Creek.

This new structure will be a 3-span continuous closed box girder bridge on short seated abutments. The bents will be round and upward flared multi-column bents. Bridge

construction will be in two stages to facilitate maintaining traffic with stage one consisting of a three-column bridge section and stage two consisting of a two-column bridge section.

Standard Class 200 Alt "W" piles are proposed for the new structure at both the abutments and bents. Foundation and design loads provided by Bridge Design Branch 6 are presented in **Table 1** and **Table 2**.

Table 1. General Foundation Information from Bridge Design

Support No.	Design Method	Pile Type	FG Elev. (ft)	Cut-off Elev. (ft)	Pile Cap Size (ft)		Permissible Settlement Under Service Load (in)	Number of Piles Per Support
					B	L		
Abut 1 Step 1	LRFD/WSD	Class 200	281	272	18	64.3	1	46
Abut 1 Step 2	LRFD/WSD	Class 200	290	277.25	17	46.7	1	29
Abut 1 Step 3	LRFD/WSD	Class 200	296	282.5	14	21	1	12
Abut 1 Step 4	LRFD/WSD	Class 200	302	287.5	14	40.3	1	22
Bent 2	LRFD	Class 200	275	270.5	19	19	1	25
Bent 3	LRFD	Class 200	271	266.5	19	19	1	25
Abut 4	LRFD/WSD	Class 200	290.5	282.75	12	152	1	60

Table 2. Foundation Design Loads from Bridge Design

Support No.	Service-1 Limit State (kips)			Strength Limit State (Control Group, kips)				Extreme Event Limit State			
	Total Load		Permanent Load	Compression		Tension		Compression		Tension	
	Per Support	Max Per Pile	Per Support	Per Support	Max Per Pile	Per Support	Max Per Pile	Per Support	Max Per Pile	Per Support	Max Per Pile
Abut 1	18483	200	17405	NA	NA	NA	NA	NA	NA	NA	NA
Bent 2	4752	NA	4239	6470	300	0	0	---	---	---	---
Bent 3	4364	NA	3854	6104	300	0	0	---	---	---	---
Abut 4	10365	200	9296	NA	NA	NA	NA	NA	NA	NA	NA

Geology

Regional Geology

The Bridge site is situated within the San Joaquin Valley that is located within in the southern part of the Great Valley Geomorphic province. This low lying flat terrain extends from the Cascade Ranges at the north end of the province to the Tehachapi Mountains at the south end of the province and it is bound on the east by the Sierra Nevada Mountains and on the west by the Coast Range Mountains. Structurally, the province is an elongate asymmetric basin that reaches depths of over 29,000 feet. Deposition of marine and non-marine sediments into this basin has been on going since the Mesozoic Era. Recent and Pleistocene soils that underlie the San Joaquin Valley at the project site are composed of interbeds and lenses of gravels, sands, silts and clays eroded primarily from the Sierra Nevada and transported by the San Joaquin River.

Site Geology

The as-built log of test borings (LOTB) for Avenue 12 OH (Br. No. 41C-0047) and Cottonwood Creek Bridge (Br. No. 41C-0025) show that the subsurface materials consist primarily of interbedded layers of loose to medium dense fine to coarse sand, very loose to dense silty very fine to medium sand, and loose to very dense silt to the maximum depth explored of about 82 feet (elevation 195 feet). In general, the soil density increases with depth.

Scour Potential

Potential scour conditions at the bridge site, provided in the Final Hydraulic Report dated August 4, 2010, by Juan Jauregui of Structure Hydraulics & Hydrology are summarized in **Table 3** below.

Table 3. Scour Summary

Scour Type	Scour Depth (ft)			
	Abut 1	Bent 2	Bent 3	Abut 4
Degradation Scour	N/A	N/A	2	N/A
Contraction Scour	N/A	N/A	2.4	N/A
Local Scour	N/A	N/A	11.4	N/A
Total Potential Scour	N/A	N/A	15.8	N/A
Channel Elevation (ft)	N/A	N/A	265.24	N/A
Thalweg migration	N/A	N/A	Yes	N/A
Potential Scour Elevation (ft)	N/A	N/A	249.4	N/A

Notes:

1. Vertical Datum: NAVD 1988
2. Total potential scour is based on 8.5 foot diameter columns.

Ground Water

Department of Water Resources (DWR) well records show that ground water is in excess of 80 feet below the ground surface (below elevation 190 feet). The as-built LOTB for Ave 12 OH shows ground water at a depth of 25 feet (elevation of 255 feet). Ground water conditions may have changed since the time of the above groundwater level recordings and will vary according to variations in rainfall, well pumping, and other activities. For design purposes, ground water was assumed at elevation 274.2 ft (100 year flood water surface elevation).

Corrosion

At the time of this report, laboratory testing of soil samples was not completed for corrosion characteristics. Corrosion test results will be provided when completed.

Seismicity

In accordance to Caltrans 2009 Seismic Design Procedure, the controlling active fault to the site is the San Andreas Fault zone (Creeping section) (Fault ID No. 311) with a maximum magnitude (Mmax) of 7.9. This fault is identified as a right lateral strike slip fault with a vertical dip. The fault is located west of the bridge site, and the rupture distance from the bridge site to the fault plane is estimated to be 65 miles.

Based on the soil data, a shear wave velocity, Vs30, was estimated using the SPT blow counts and the correlation formulas for the granular soil. The estimated Vs30 is about 900 feet per second.

Using the above estimated Vs30, the spectral acceleration (SA) generated from this fault is less than the SA generated for statewide minimum, which is again less than the SA obtained from the USGS probabilistic model of 5% probability of exceedance in 50 years corresponding to a 975 year return period. Therefore, the recommended design Acceleration Response Spectrum (ARS) curve is the SA from the USGS probabilistic model. The recommended design ARS curve with an estimated peak ground acceleration of 0.24g is attached on **Plate No. 1**.

A liquefaction analysis was performed by this Office. The analysis indicates that the potential for detrimental liquefaction during an earthquake is minimal.

The potential for subsurface rupture at the site due to fault movement is considered insignificant as there are no know faults projecting towards or passing directly through the project site.

As-Built Foundation Data

The existing Avenue 12 OH (Br. No. 41C-0047) was constructed on Class I concrete piles (Alternative Z, 45 ton bearing, Raymond step-taper, 8 inch diameter tip, 15 inch diameter top) driven with a 65C double acting steam hammer. The specified tip elevation was 235 feet. According to the driving records, no unusual driving conditions were encountered. All piles were driven to a tip elevation of 232 to 234 feet, and reached a bearing of 45 to 80 tons (ENR). No ground water was encountered.

The existing Cottonwood Creek Bridge (Br. No. 41C-0025) was constructed on Class II concrete piles (Alternative U, 45 ton bearing) driven with a 65C double acting steam hammer. The specified tip elevation was 245 feet. According to the driving records, the piles attained bearing at a depth of 0 to 20 feet below the specified tip elevation. Piles were stopped at specified tip elevation and were re-driven the following morning. However, there was no frictional take up on the piles. Actual pile tip elevations are not available. Average pile tip elevation was 237 feet. Ground water was encountered at an elevation of 263 feet.

Foundation Recommendations

Recommendations for Standard Class 200 Alternative "W" piles at Abutments 1 and 4 are presented in **Table 4**.

Table 4. Foundation Recommendations for Abutment 1 and 4

Supp Loc	Pile Type	Cut-off Elev (ft)	Service Limit State Per Support (kips)		Required Nominal Resistance (kips)				Design Tip Elev (ft)	Spec Tip Elev (ft)	Nominal Driving Resist. Required (kips)
					Strength Limit		Extreme Event				
			Total	Permanent	Comp φ=0.7	Tension φ=0.7	Comp φ=1.0	Tension φ=1.0			
Abut 1 Step 1	16" Class 200 Alt. W	272	18483	17405	NA	NA	NA	NA	(a-I) 200	200	400
Abut 1 Step 2	16" Class 200 Alt. W	277.25	18483	17405	NA	NA	NA	NA	(a-I) 200	200	400
Abut 1 Step 3	16" Class 200 Alt. W	282.5	18483	17405	NA	NA	NA	NA	(a-I) 200	200	400
Abut 1 Step 4	16" Class 200 Alt. W	287.5	18483	17405	NA	NA	NA	NA	(a-I) 200	200	400
Abut 4	16" Class 200 Alt. W	290.5	10365	9296	NA	NA	NA	NA	(a-I) 200	200	400

Notes:

1. Recommendations are based on Working Stress Design (WSD) for abutments and the loads provided by Bridge Design.
2. A factor of safety of 2.0 is used to calculate the available geotechnical resistance in Service Limit State.
3. The design tip elevations recommended herein are controlled by (a-I) compression (Service Limit State).

4. The design tip elevations controlled by settlement is not applicable.
5. The design tip elevations controlled by lateral load is typically provided by Bridge Design.
6. The specified tip elevations recommended herein shall not be raised if controlled by lateral load.

Recommendations for Standard Class 200 Alternative "W" piles at Bents 2 and 3 are presented in **Table 5**.

Table 5. Foundation Recommendations for Bent 2 and 3

Supp Loc	Pile Type	Cut-off Elev (ft)	Service Limit State Per Support (kips)		Factored Nominal Resistance (kips)				Design Tip Elev (ft)	Spec Tip Elev (ft)	Nominal Driving Resist. Required (kips)
					Strength Limit		Extreme Event				
			Total	Permanent	Comp φ=0.7	Tension φ=0.7	Comp φ=1.0	Tension φ=1.0			
Bent 2	16" Class 200 Alt. W	270.5	4752	4239	300	0	---	---	(a-II) 194	194	429[7]
Bent 3	16" Class 200 Alt. W	266.5	4364	3854	300	0	---	---	(a-II) 177	177	479[7]

Notes:

1. Recommendations are based on Load Resistance Factor Design (LRFD) for bents and the loads provided by Bridge Design.
2. A resistance factor of 0.7 is used to calculate the available geotechnical resistance in Strength Limit State. A resistance factor of 1.0 is used to calculate the available geotechnical resistance in Extreme Limit State.
3. The design tip elevations recommended herein are controlled by (a-II) compression (Strength Limit State) and (a-III) compression (Extreme Limit State).
4. The design tip elevations controlled by settlement is not applicable.
5. The design tip elevations controlled by lateral load is typically provided by Bridge Design.
6. The specified tip elevations recommended herein shall not be raised if controlled by lateral load.
7. The nominal driving resistances of 429 and 479 kips are exceeding the nominal axial compressive strength specified for Class 200 piles (Standard Plan B2-8). Structural safety against axial compression of 429 and 479 kips for standard Class 200 Alternative "W" PP16x0.5 is to be evaluated by Bridge Design.

Pile Data recommendations for Standard Class 200 Alternative "W" piles at Abutments and Bents are presented in **Table 6.**

Table 6. Pile Data Table

Support Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
		Compression	Tension			
Abut 1	16" Class 200 Alt. "W"	400	N/A	(a-I) 200	200	400
Bent 2	16" Class 200 Alt. "W"	300	0	(a-II) 194	194	429[7]
Bent 3	16" Class 200 Alt. "W"	300	0	(a-II) 177	177	479[7]
Abut 4	16" Class 200 Alt. "W"	400	N/A	(a-I) 200	200	400

Notes:

1. The design tip elevations recommended herein are controlled by (a-I) compression (Service Limit State), (a-II) compression (Strength Limit State) and (a-III) compression (Extreme Limit State).
2. The design tip elevations controlled by settlement is not applicable.
3. The design tip elevations controlled by lateral load is typically provided by Bridge Design.
4. The specified tip elevations recommended herein shall not be raised if controlled by lateral load.
5. The nominal driving resistances of 429 and 479 kips are exceeding the nominal axial compressive strength specified for Class 200 piles (Standard Plan B2-8). Structural safety against axial compression of 429 and 479 kips for standard Class 200 Alternative "W" PP16x0.5 is to be evaluated by Bridge Design.

PG&E Gas Line, Bent 2

Per information provided by the Office of Bridge Design Branch 6, there is an existing 8" PG&E gas line which parallels the UP railroad tracks to the east. Bent 2 of the proposed OH will lie close to the gas line (approx. 3 feet at the southern most footing and approx. 20 feet at the northern most footing). The elevation of the gas line is about 275 feet, which is about 8 feet higher than the bottom of footing elevation. In order to minimize vibration impacts from the pile driving, it is recommended that for each pile, a casing be installed (oscillated, rotated or pushed, no impact/vibratory hammer may be used) to a depth of 5 feet below the pile cut off elevation with a diameter 6 inches larger than the pile. The soil should be removed from inside the casing before driving the pile. The casing annulus may be backfilled with gravel after pile driving. This casing method should be used for all piles that lie within a 15 foot horizontal distance of the gas line.

Construction Considerations

1. Pile acceptance criteria for all driven piles shall be based on the Gates formula (Caltrans Standard Specifications Section 49-1.08). Central relief drilling may be needed due to possible hard driving condition.

2. Piles, to be driven through embankment fills, shall be predrilled according to Caltrans Standard Specifications Section 49-1.06.

3. Excavated materials shall be handled and disposed of in accordance with the Special Provisions.

4. According to the LOTB for Cottonwood Creek Bridge (Br. No. 41C-0025), the bank areas of the creek consist of fill containing a certain amount of rubble and broken concrete which should be removed prior to pile driving.

5. For excavation of the footings at Bent 2, shoring will be needed between the footings and the gas line. Shoring shall be designed and constructed by the Contractor such that the gas line is not impacted.

Disclaimer and Contact Information

The foundation recommendations included in this report are based on specific project information regarding structure type, location, and design loads provided by the Office of Bridge Design Branch 6. If any changes are made during final project design, OGDN should review the changes to determine if these foundation recommendations are still applicable. Any questions regarding this report should be directed to the attention of Bill Bertucci at 916-227-1055, John Huang at 916-227-1037, or Ben Barnes at 916-227-1039.

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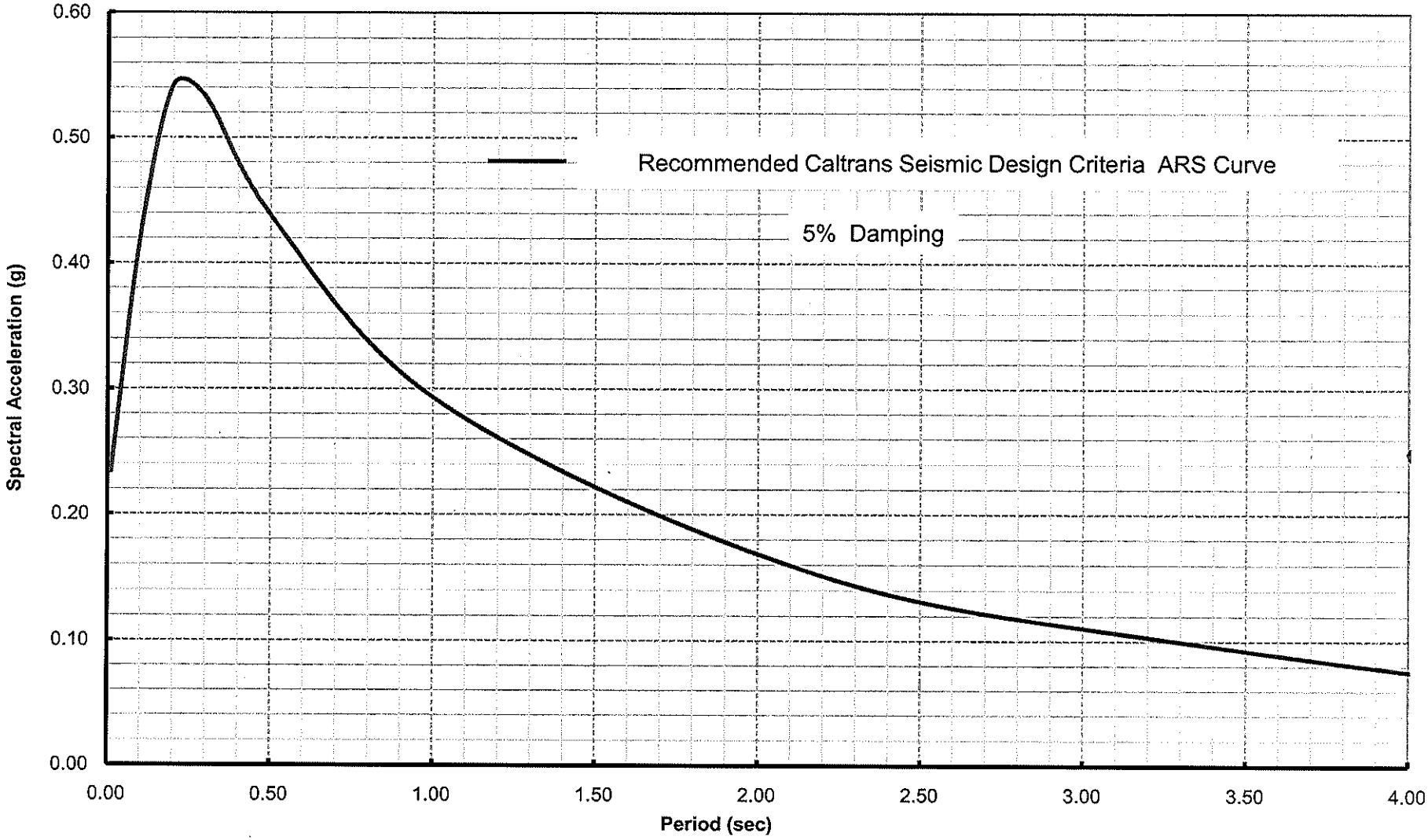
Attachment: Plate No. 1 - ARS Curve

c: Jim Bane (D6 Project Manager)
Mark Willian (GS Corporate)
Structure R.E. Pending File
Rebecca Harnagel (DES Office Engineer, Office of PS&E)
Ted Morradian (D6 DME)



Caltrans

DEPARTMENT OF TRANSPORTATION
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North
(OGDN)

PROJECT NO. /EA:	0600000463 06-471001
DATE:	4/18/2011

06-MAD-99 PM 7.1/7.9
Avenue 12 OH (Replace)
Br. No. 41C-0207

Recommended Acceleration Response Spectrum

Plate No. 1

Memorandum

Flex your power!
Be energy efficient!

To: Mr. FRITZ HOFFMAN, Chief
Bridge Design Branch 6
Office of Bridge Design Central

Attention: Talal Sadek

Date: April 18, 2011

File: 06-Mad-99-R7.1/7.9
Ave 12 Interchange
EA: 06-471001
Rd. 29 North Bridge
Bridge No. 41C-0208

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

Subject: Foundation Recommendations (FR)

Introduction

This report is presented in response to the request from Bridge Design Branch 6, dated May 11, 2010 to provide a foundation report for the proposed Rd. 29 North Bridge over Cottonwood Creek on a new alignment located north of Ave 12. This bridge is one of five bridges to be replaced as part of the interchange modification at Ave 12 and Route 99 in Madera County. The new structure type will be a 3-span P/S solid concrete slab bridge on multicolumn bents supported on 24-inch diameter CISS piles. The abutments will be seat type on pile footings supported on Class 140 Alt. "W" piles.

The scope of our work includes evaluating General and Foundation plans, gravity loads, available information on site geology based on Log of test borings from past and present investigations, and evaluation of the sites seismic and hydrologic environment. This report will provide pile tip elevations including an Acceleration Response Spectrum (ARS) curve.

Geology

Regional

The Bridge site is situated within the San Joaquin Valley that is located within the southern part of the Great Valley geomorphic province. This low lying flat terrain extends from the Cascade Ranges at the north end of the province to the Tehachapi Mountains at the south end of the province and it is bound on the east by the Sierra Nevada Mountains and on the west by the Coast Range Mountains. Structurally, the province is an elongate asymmetric basin that reaches depths of over 29,000 feet. Deposition of marine and non-marine sediments into this basin has been on going since the Mesozoic Era. Recent and

Pleistocene soils that underlie the San Joaquin Valley at the project site are composed of interbeds and lenses of gravels, sands, silts and clays eroded primarily from the Sierra Nevada.

Site Geology

The closest as-built test boring (B-3) shows that the subsurface materials in the vicinity of the proposed bridge site consisted of loose to medium dense fine to coarse SAND to a depth of about 15 feet (elevation 258 feet) followed by a 3 foot very dense layer of partially cement SILT. From a depth of 18 to 43 feet (elevations 254 to 229 feet) the soils consisted of medium dense to dense SANDY SILT, fine to medium SILTY SAND and course SILTY SAND. Below to the maximum depth explored 69 feet (elevation 202 feet) the soils become interbedded dense to very dense SILTY SAND, SAND AND SILT. See Log of Test Borings (LOTB) for detailed description of soil conditions.

Scour Potential

Potential scour conditions at the bridge site, provided by Juan Jauregui of Structure Hydraulics & Scour Mitigation (Report date August 4, 2010) are summarized in Table 1 below.

Table 1 Scour Summary

Scour Type	Bent 2	Bent 3
Degradation	2 ft	2 ft
Contraction Scour	4.6 ft	4.6 ft
Local	5.9 ft	5.9 ft
Total Potential	12.5 ft	12.5 ft
Channel Elev. (ft)	266.5	266.5
Thalweg migration	YES	YES
Potential Scour Elev. (ft)	254.0	254.0

Notes:
1. Total potential scour is based on a 3-foot column diameter.

Groundwater

Ground water conditions will vary according to variations in rainfall, well pumping, and other activities. Groundwater measured in 1961 was at elevation 253.4 ft. which is about 10 lower than what was measured during the 2011 investigation. For design purposes, the groundwater was assumed at elevation of the 274.2 ft (100 year flood water surface elevation).

Corrosion

A site-specific corrosion sampling and testing results will be provided when they are made available.

Seismicity

In accordance to Caltrans 2009 Seismic Design Procedure, the controlling active fault is the San Andreas Fault zone (Creeping section) (Fault ID No. 311) with a Mmax of 7.9. This fault is identified as a right lateral strike slip fault with a vertical dip. The fault is located west of the bridge site, and the rupture distance from the fault plane to the site is estimated to be 65 miles. Based on the local soil data, a shear wave velocity , Vs30 was estimated using the SPT blow counts and correlation formulas for the granular soil. The estimated Vs30 is about 900 feet per second.

Using the above estimated Vs30, the spectral acceleration (SA) generated from this fault is less than the SA generated for statewide minimum, which is again less than the SA obtained from the USGS probabilistic model of 5% probability of exceedance in 50 years corresponding to a 975 return period. Therefore, the recommended design Acceleration Response Spectrum (ARS) curve is based on the USGS probabilistic model. The design ARS curve with an estimated peak ground acceleration of 0.24g is attached in the Appendix of this report.

The liquefaction analysis based on the limited data of as-built test boring B-2 dated September 1961, shows low potential for liquefaction. We will reevaluate our recommendations once the future results of the foundation investigation become available.

Foundation Recommendations

The foundation recommendations are based on the present 2011and 1961 field investigation borings and analysis in conjunction with the preliminary Hydraulic information provided by Structure Hydraulics & Scour Mitigation (August 4, 2010), General Plans, Foundation Plans and foundation loads provided by Fritz Hoffman and Talal Sadek. Class 140 Alternative "W" pipe piles are recommended at the abutments and

24-in driven CISS pile extensions are recommended at the bents.

The pile data is summarized in the tables below.

Table – 2. Abutment Foundation Design Recommendations.

Support Location	Pile Type	Cut-off Elev (ft)	LRFD Service-I Limit State Load per Support –Compression (kips)		LRFD Service-I Limit State Load per Pile-Compression (kips)	Nominal Resistance (kips)	Design Tip Elevation (ft)	Spec Tip Elev (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut 1	14" Class 140 Alt. W	265.0	1960	1960	140	280	217(a)	217	360
Abut 4	14" Class 140 Alt. W	265.0	1960	1960	140	280	217(a)	217	360

Notes:
1) Design tip elevations are controlled by (a) Compression.
2) The specified tip elevation shall not be raised above the design tip elevations for lateral loads.
3) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft/loose, liquefiable, scourable, etc.), which do not contribute to the design resistance.
4) Structure Design typically provides design tip elevation for Lateral Load.

Table 3. Bent foundations Design Recommendations.

Support Location	Pile Type	Cut-off Elevation (ft)	Permanent Load Service-I Limit State Load per Support (kips)	Total Permissible Support Settlement (inches)	Required Factored Nominal Resistance (kips)				Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resist. Required (kips)
					Strength Limit		Extreme Event				
					Comp. (φ=0.7	Tension (φ=0.7)	Comp (φ=1)	Tension (φ=1)			
Bent 2	24" CISS	267.5	N/A	1.0	300	N/A	N/A	N/A	190 (a-I)	190	620
Bent 3	24" CISS	268.5	N/A	1.0	300	N/A	N/A	N/A	190 (a-I)	190	620

Notes:
1) Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (a-II) Compression (Extreme Event).
2) Unsuitable soil layers (very soft, liquefiable and scourable) that do not contribute to the design nominal resistance exists at all abutments and bents
3) There is no design tip elevation for Settlement.

4) Structure Design Typically provides Design tip elevations for Lateral Load.

Table 4- Pile Data Table.

Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut 1	14" Class 140 Alt. "W"	280	N/A	217(a)	217	360
Bent 2	24" CISS	430	N/A	190(a)	190	620
Bent 3	24" CISS	430	N/A	190(a)	190	620
Abut 4	14" Class 140 Alt. "W"	280	N/A	217(a)	217	360

Notes:
1) Design tip elevations for Abutments and Bents are controlled by: (a) Compression.
2) Unsuitable soil layers (very soft, liquefiable, and scourable) that do not contribute to the design nominal resistance exist at all abutment and bents.
3) Structure Design Typically provides Design tip elevations for Lateral Load.
4) There is no design tip elevation for Settlement.

General Notes to Designer

1. The structure engineer shall show on the plans, in the pile data table, the minimum pile tip elevation required to meet the lateral load demands.

2. Should the specified pile tip elevation required to meet lateral load demands exceed the specified pile tip elevation given within this report, the Office of Geotechnical Design North should be contacted for further recommendations.

3. Support locations will be plotted on the Log of Test Borings, in plan view as stated in "Memos to Designers" 4-2 if additional borings are required. There is a conversion table placed of the original boring sheet that converts those borings locations to the present stationing an offset distances.

Construction Considerations

1. Groundwater levels may exceed the bottom of pile cap elevations year around. Therefore, during their construction wet soils and caving should be expected and dewatering in conjunction with shoring and/ or seal course placement shall be required.

2. Pile acceptance criteria for all standard diameter driven piles shall be based on the Gates formula (Caltrans Standard Specifications Section 49-1.08). Central relief drilling may be needed due to possible hard driving condition.

4. Piles, to be driven through embankment fills, shall be predrilled according to Caltrans Standard Specifications Section 49-1.06.

5. Hard driving conditions should be expected at and below the bottom of bent and abutment pile cut off /pile cap elevations. Some center relief drilling may be required. A soil plug of approximately 6 diameters should be maintained.

6. Excavated materials shall be handled and disposed of in accordance with the Special Provisions.

The Preliminary Foundation Recommendations included in this report are based on specific project information regarding structure type and structure location. Any questions regarding the above preliminary recommendations should be directed to the attention of William Bertucci (916) 227-1045 or John Huang (916) 227-1037, Geotechnical Services, Office of Geotechnical Design-North, and Branch E.

Report by:

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STATE OF CALIFORNIA

ARS curve Attachment

cc: Jim Bane (District PM), Peggy Lim (PCE), Mark Willian, Trais Norris (District Env Manager), Ted Morradian (District Materials)

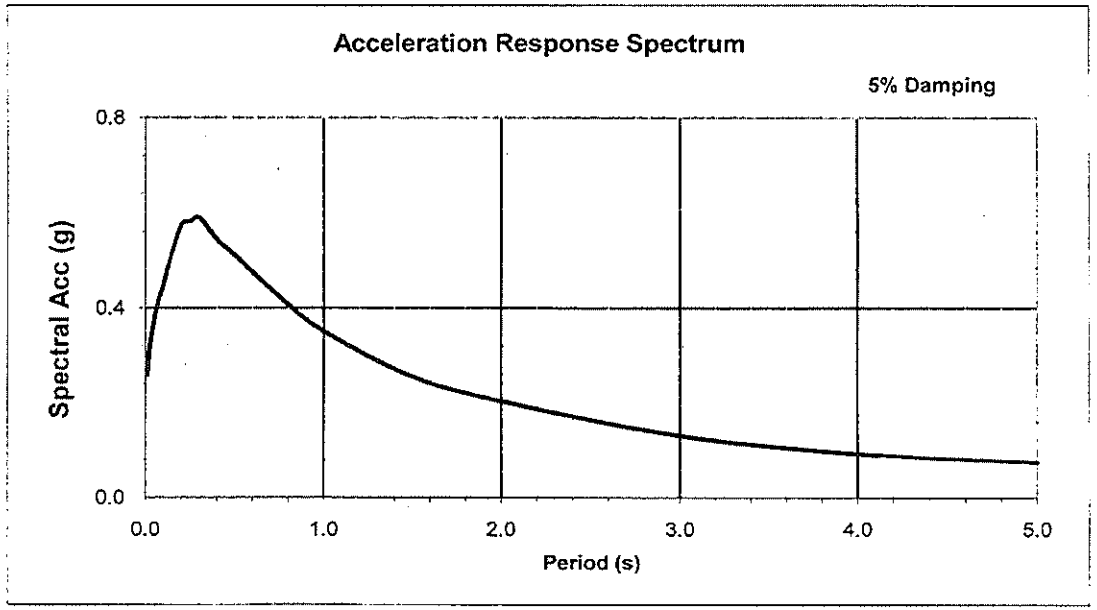
RD 29 N. Cottonwood Creek

Bridge No. 41C-0208
EA 06-471001

Latitude 36.9236
Longitude -120.0222

Control **Probabilistic**

Period (s)	Sa(g)
0.010	0.259
0.020	0.306
0.030	0.337
0.050	0.381
0.075	0.420
0.100	0.449
0.120	0.480
0.150	0.519
0.200	0.575
0.250	0.582
0.300	0.589
0.400	0.543
0.500	0.510
0.750	0.423
1.000	0.351
1.500	0.256
2.000	0.204
3.000	0.131
4.000	0.093
5.000	0.075



Deterministic Procedure Data

Fault	San Andreas fault zone south (Creeping section)		R_{rup}	104.00	km
Fault ID	203		R_{jb}	104.00	km
Style	SS		R_x	104.00	km
Mmax	7.9		V_{S30}	220	m/s
Dip	90	deg	$Z_{1.0}$	N/A	m
Z_{TOR}	0	km	$Z_{2.5}$	N/A	km

Notes

Please note the design ARS curve is based on the USGS 5% probability of Exceedance in 50 years (975 year return period).

Memorandum

Flex your power!
Be energy efficient!

To: Mr. FRITZ HOFFMAN, Chief
Bridge Design Branch 6
Office of Bridge Design Central

Attention: Talal Sadek

Date: April 18, 2011

File: 06-Mad-99-R7.1/7.9
Ave 12 Interchange
EA: 06-471001
Rd. 29 South Bridge
Bridge No. 41-C0209

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

Subject: Foundation Recommendations (FR)

Introduction

This report is presented in response to the request from Bridge Design Branch 6, dated May 11, 2010 to provide a foundation report for replacement of the existing Rd. 29 South Bridge over Cottonwood Creek. This bridge is one of five bridges to be replaced as part of the interchange modification at Ave 12 and Route 99 in Madera County. The new structure type will be a 3-span P/S solid concrete slab bridge on multicolumn bents supported on 24-inch diameter CISS piles. The abutments will be seat type on pile footings.

The scope of our work includes evaluating General and Foundation plans, gravity loads, available information on site geology based on Log of test borings from past and present investigations, and evaluation of the sites seismic and hydrologic environment. This report will provide pile tip elevations including an Acceleration Response Spectrum (ARS) curve.

Geology

Regional

The Bridge site is situated within the San Joaquin Valley that is located within the southern part of the Great Valley geomorphic province. This low lying flat terrain extends from the Cascade Ranges at the north end of the province to the Tehachapi Mountains at the south end of the province and it is bound on the east by the Sierra Nevada Mountains and on the west by the Coast Range Mountains. Structurally, the province is an elongate asymmetric basin that reaches depths of over 29,000 feet. Deposition of marine and non-marine sediments into this basin has been on going since the Mesozoic Era. Recent and

Pleistocene soils that underlie the San Joaquin Valley at the project site are composed of interbeds and lenses of gravels, sands, silts and clays eroded primarily from the Sierra Nevada.

Site Geology

The recent test boring (R-11-003) and as-built test boring (B-3) shows that the subsurface materials at the existing bridge site consist primarily of loose to medium dense SAND and SILT to depths of about 16 to 25 feet (elevations 252 to 263 feet) . Below to the maximum depth explored 76 feet (elevation 201 feet) the soils become primarily medium dense to dense SAND, SILTY SAND and SILT with a few scattered lenses 1 to 3 feet thick of stiff to very stiff SILTY CLAY to SANDY CLAY. The exception occurred below approximate elevation 210 ft. (Boring B-3) were "slightly compacted" SANDY SILT was encountered. See Log of Test Borings (LOTB) for detailed description of soil conditions.

Scour Potential

Potential scour conditions at the bridge site, provided by Juan Jauregui of Structure Hydraulics & Scour Mitigation (Report date August 4, 2010) are summarized in Table 1 below.

Table 1 Scour Summary

Scour Type	Bent 2	Bent 3
Degradation	2 ft	2 ft
Contraction Scour	2.5 ft	2.5 ft
Local	5.9 ft	5.9 ft
Total Potential	10.4 ft	10.4 ft
Channel Elev. (ft)	261.7	261.7
Thalweg migration	YES	YES
Potential Scour Elev. (ft)	251.3	251.3

Notes:
1. Total potential scour is based on a 3-foot column diameter.

Groundwater

Ground water conditions will vary according to variations in rainfall, well pumping, and other activities. Groundwater measurements made in 1961 and 2011 varied little with a elevation of 261.2 ft for the former and a elevation of 262.9 ft for the latter. For design purposes, the groundwater was assumed at the elevation of the 274.2 ft (100 year flood water surface elevation).

Corrosion

A site-specific corrosion sampling and testing results will be provided when they are made available.

Seismicity

In accordance to Caltrans 2009 Seismic Design Procedure, the controlling active fault is the San Andreas Fault zone (Creeping section) (Fault ID No. 311) with a Mmax of 7.9. This fault is identified as a right lateral strike slip fault with a vertical dip. The fault is located west of the bridge site, and the rupture distance from the fault plane to the site is estimated to be 65 miles.
Based on the local soil data, a shear wave velocity , Vs30 was estimated using the SPT blow counts and correlation formulas for the granular soil. The estimated Vs30 is about 900 feet per second.

Using the above estimated Vs30, the spectral acceleration (SA) generated from this fault is less than the SA generated for statewide minimum, which is again less than the SA obtained from the USGS probabilistic model of 5% probability of exceedance in 50 years corresponding to a 975 return period. Therefore, the recommended design Acceleration Response Spectrum (ARS) curve is based on the USGS probabilistic model. The design ARS curve with an estimated peak ground acceleration of 0.24g is attached in the Appendix of this report.

The liquefaction analysis based on Boring R-11-003 indicates the soil layer located from elevation 272 feet to 267 feet has potential to liquefy during an earthquake event. However, the bottom of footing /cut off elevations of the abutment and bent piles are below the liquefaction base elevation therefore, liquefaction will have no effect.

The potential for surface rupture at the site due to fault movement is considered insignificant since there are no known faults projecting towards or passing directly through the project site. We will reevaluate the seismic recommendations if additional soil data becomes available or needed.

Foundation Recommendations

The foundation recommendations are based on the present 2011and 1961 field investigation borings and analysis in conjunction with the preliminary Hydraulic information provided by Structure Hydraulics & Scour Mitigation (August 4, 2010), General Plans, Foundation Plans and foundation loads provided by Fritz Hoffman and Talal Sadek. Class 140 Alternative "W" pipe piles are recommended at the abutments and 24-in driven CISS pile extensions are recommended at the bents.

The pile data is summarized in the tables below.

Table – 2. Abutment Foundation Design Recommendations.

Support Location	Pile Type	Cut-off Elev (ft)	LRFD Service-I Limit State Load per Support –Compression (kips)		LRFD Service-I Limit State Load per Pile-Compression (kips)	Nominal Resistance (kips)	Design Tip Elevation (ft)	Spec Tip Elev (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut 1	14" Class 140 Alt. W	265.0	980	980	140	280	211(a)	211	360
Abut 4	14" Class 140 Alt. W	265.0	980	980	140	280	213(a)	213	360

Notes:
1) Design tip elevations are controlled by (a) Compression.
2) The specified tip elevation shall not be raised above the design tip elevations for lateral loads.
3) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft/loose, liquefiable, scourable, etc.), which do not contribute to the design resistance.
4) Structure Design typically provides design tip elevation for Lateral Load.

Table 3. Bent foundations Design Recommendations.

Support Location	Pile Type	Cut-off Elevation (ft)	Permanent Load Service-I Limit State Load per Support (kips)	Total Permissible Support Settlement (inches)	Required Factored Nominal Resistance (kips)				Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resist. Required (kips)
					Strength Limit		Extreme Event				
					Comp. (φ=0.7	Tension (φ=0.7)	Comp (φ=1)	Tension (φ=1)			
Bent 2	24" CISS	267.5	N/A	1.0	300	N/A	N/A	N/A	190 (a-I)	190	650
Bent 3	24" CISS	268.5	N/A	1.0	300	N/A	N/A	N/A	195 (a-I)	195	490

Notes:
1) Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (a-II) Compression (Extreme Event).
2) Unsuitable soil layers (very soft, liquefiable and scourable) that do not contribute to the design nominal resistance exists at all abutments and bents.
3) There is no design tip elevation for Settlement.
4) Structure Design Typically provides Design tip elevations for Lateral Load.

Table 4- Pile Data Table.

Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut 1	14" Class 140 Alt. "W"	280	N/A	211(a)	211	360
Bent 2	24" CISS	430	N/A	190(a)	190	650
Bent 3	24" CISS	430	N/A	195(a)	195	490
Abut 4	14" Class 140 Alt. "W"	280	N/A	213(a)	213	360

Notes:
1) Design tip elevations for Abutments and Bents are controlled by: (a) Compression.
2) Unsuitable soil layers (very soft, liquefiable, scourable) that do not contribute to the design nominal resistance exist at all abutment and bents.
3) Structure Design Typically provides Design tip elevations for Lateral Load.
4) There is no design tip elevation for Settlement.

General Notes to Designer

1. The structure engineer shall show on the plans, in the pile data table, the minimum pile tip elevation required to meet the lateral load demands.

2. Should the specified pile tip elevation required to meet lateral load demands exceed the specified pile tip elevation given within this report, the Office of Geotechnical Design North should be contacted for further recommendations.

3. Support locations will be plotted on the Log of Test Borings, in plan view as stated in "Memos to Designers" 4-2 if additional borings are required. There is a conversion table placed of the original boring sheet that converts those borings locations to the present stationing an offset distances.

Construction Considerations

1. Groundwater levels may exceed the bottom of pile cap elevations year around. Therefore, during their construction wet soils and caving should be expected and dewatering in conjunction with shoring and/ or seal course placement shall be required.

2. Pile acceptance criteria for all standard diameter driven piles shall be based on the Gates formula (Caltrans Standard Specifications Section 49-1.08). Central relief drilling may be needed due to possible hard driving condition.

4. Piles, to be driven through embankment fills, shall be predrilled according to Caltrans Standard Specifications Section 49-1.06.

5. Hard driving conditions should be expected at and below the bottom of bent and abutment pile cut off /pile cap elevations. Some center relief drilling may be required. A soil plug of approximately 6 diameters should be maintained.

6. Excavated materials shall be handled and disposed of in accordance with the Special Provisions.

The Preliminary Foundation Recommendations included in this report are based on specific project information regarding structure type and structure location. Any questions regarding the above preliminary recommendations should be directed to the attention of William Bertucci (916) 227-1045 or John Huang (916) 227-1037, Geotechnical Services, Office of Geotechnical Design-North, and Branch E.

Report by:

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Reza Mahallati
Senior Materials and Research Engineer
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Division of Engineering Services

REGISTERED PROFESSIONAL ENGINEER
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Exp. 9/30/12
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STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
QIANG HUANG
No. C055671
Exp. 12/31/12
CIVIL
STATE OF CALIFORNIA

ARS curve Attachment

cc: Jim Bane (District PM), Peggy Lim (PCE), Mark Willian, Trais Norris (District Env Manager), Ted Morradian (District Materials)

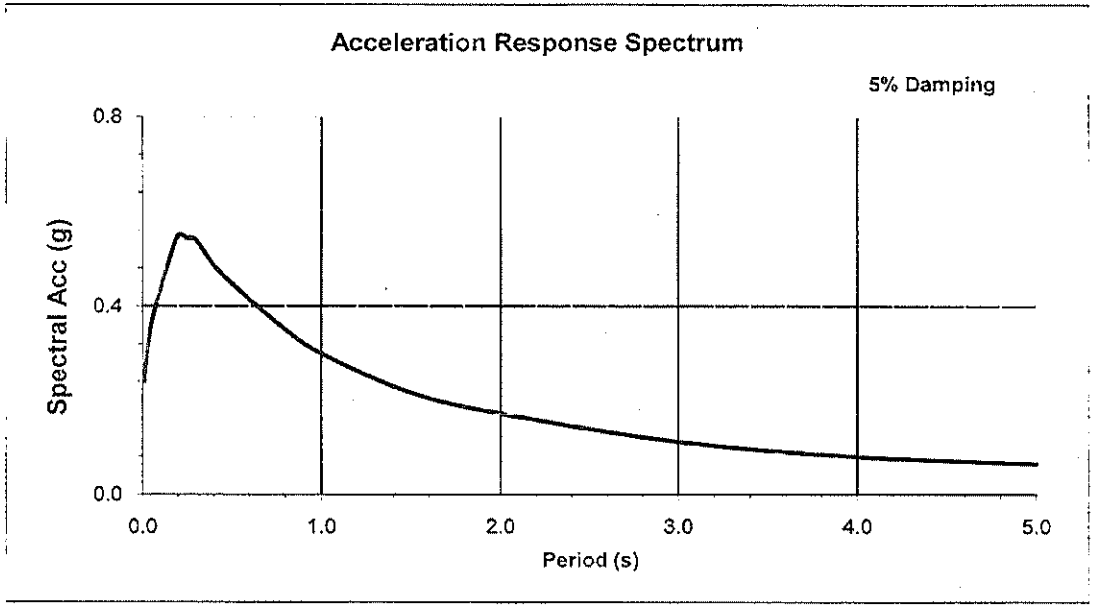
RD 29 S. Cottonwood Creek

Bridge No. 41C-0209
EA 06-471001

Latitude 36.9219
Longitude -120.0205

Control Probabilistic

Period (s)	Sa(g)
0.010	0.239
0.020	0.285
0.030	0.317
0.050	0.362
0.075	0.402
0.100	0.433
0.120	0.460
0.150	0.497
0.200	0.549
0.250	0.544
0.300	0.539
0.400	0.486
0.500	0.448
0.750	0.365
1.000	0.299
1.500	0.215
2.000	0.171
3.000	0.111
4.000	0.079
5.000	0.064



Deterministic Procedure Data

Fault	San Andreas fault zone south (Creeping section)	
Fault ID	203	
Style	SS	
Mmax	7.9	
Dip	90	deg
Z_{TOR}	0	km

R_{rup}	104.00	km
R_{jb}	104.00	km
R_x	104.00	km
V_{S30}	270	m/s
$Z_{1.0}$	N/A	m
$Z_{2.5}$	N/A	km

Notes

Please note the design ARS curve is based on 5% probability of exccedance in 50 years (975 year return period).

Memorandum

Flex your power!
Be energy efficient!

To: Mr. FRITZ HOFFMAN, Chief
Bridge Design Branch 6
Office of Bridge Design Central

Attention: Talal Sadek

Date: April 18, 2011

File: 06-Mad-99-R7.1/7.9
Ave 12 Interchange
EA: 06-471001
EFIS: 0600000463
Ave. 12 OC Bridge
Bridge No. 41-0088

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

Subject: Foundation Report (FR)

Scope of Work

This report is presented in response to the request from Bridge Design Branch 6, dated May 11, 2010 to provide a foundation report for replacement of the existing Ave. 12 OC Bridge as part of the interchange modification at Ave. 12 and Route 99 in Madera County.

The scope of work of this FR includes review of project General Plan, project Foundation Plan, and Foundation Design Loads that are provided by SD, evaluation of subsurface conditions based on the available geotechnical and geologic information including As-Built Log Of Test Borings (LOTBs) pertaining to the site, performing partially field exploration program, performing engineering analyses including seismic analyses, and preparation of this report.

Project Description

Ave. 12 OC bridge is located on State Route 99 at PM R7.1/7.9. The bridge is generally in an east/west alignment with a skew of about 38 degrees. Currently, the bridge consists of one westbound travel lane, one eastbound travel lane, and one eastbound left turn lane onto the northbound Route 99. The project will replace the existing bridge. The replacement new bridge will be a 2-span CIP P/S Box Girder structure. The new bridge will have four west bound travel lanes, three eastbound travel lanes, and two eastbound left turn lane onto the northbound Route 99. The new bridge will be built in two stages in order to maintain traffic through the construction.

Standard Class 140 Alt. "W" and standard Class 200 Alt. "W" pile foundation have been considered to support the new bridge abutments and bent, respectively. Foundation

information and design loads provided by SD are shown in the Tables 1 and 2 below.

Table 1 General Foundation Information Sent by SD

Support No.	Design Method	Pile Type	FG Elev. (ft)	Cut-off Elev. (ft)	Pile Cap Size (ft)		Permissible Settlement Under Service Load (in)	Number of Pile Per Support
					B	L		
Abut 1	WSD	Class 140 Alt. "W"	288	282.5	9	192	1	64
Bent 2	LRFD	Class 200 Alt. "W"	275	271	16	16	1	16
Abut 3	WSD	Class 140 Alt. "W"	298	292.5	9	192	1	64

Table 2 Design Loads Sent by SD

Foundation Design Loads											
Support No.	Service-1 Limit State (kips)			Strength Limit State (Control Group, kips)				Extreme Event Limit State			
	Total Load		Permanent Loads	Compression		Tension		Compression		Tension	
	Per Support	Max. Per Pile	Per Support	Per Support	Max. Per Pile	Per Support	Max. Per Pile	Per Support	Max. Per Pile	Per Support	Max. Per Pile
Abut. 1	7012	140	4528	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bent 2	2436	n/a	2025	4546	300	0	0	3104	400	0	0
Abut. 3	6939	140	4538	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Site Investigation

Two soil test borings, R-11-001 and R-11-002, were performed at the site on January 25 and 26, 20011. Boring R-11-001 was extended to a depth of 91½ feet below the existing ground surface. Boring R-22-002 was extended to a depth of 31½ feet below the existing ground surface. The borings were advanced using the rotary wash method coupled with the Standard Penetration Testing (SPT) and the standard split spoon sampling. The boreholes were backfilled with soil cuttings. Additional soil test borings have been scheduled and are to be performed for verification purposes.

Sheets of LOTBs for R-11-001 and R-11-002, future borings, as well as the previous As-

Built LOTBs, which are to be incorporated in the project plans, are being prepared by Geotechnical Services, Office of Geotechnical Support Branch D – Contracts, Graphics & Records, and will be forwarded when completed. Mrs. Irma Gamarra-Remmen of the Contracts, Graphics & Records branch may be contacted directly for information on the LOTBs.

Topography and Geology

Topography

The terrain in the areas surrounding the project site is generally flat. The ground surface elevations range approximately from 268 to 272 feet above Mean Sea Level (MSL). A majority of the land is used for agriculture purposes. There are commercial, industrial, and residential developments along Ave. 12. A creek and an irrigation cannel are located southeast of the site at distances on the order of about 700 feet.

Geology

The Bridge site is situated within the San Joaquin Valley that is located within in the southern part of the Great Valley Geomorphic province. This low lying flat terrain extends from the Cascade Ranges at the north end of the province to the Tehachapi Mountains at the south end of the province and it is bound on the east by the Sierra Nevada Mountains and on the west by the Coast Range Mountains. Structurally, the province is an elongate asymmetric basin that reaches depths of over 29,000 feet. Deposition of marine and non-marine sediments into this basin has been on going since the Mesozoic Era. Recent and Pleistocene soils that underlie the San Joaquin Valley at the project site are composed of interbeds and lenses of gravels, sands, silts and clays eroded primarily from the Sierra Nevada.

Subsurface Condition

Soil Condition

Based on the results of the soil test borings, R-11-001 and R-11-002, and the As-Built LOTBs, the subsurface materials at the site consist of very loose to vey dense sands and silts, stiff to very hard clays, and their mixtures. The SPT resistance values recorded in these materials range from 2 blows per foot penetration to 50 blows for 5-inch penetration. Based on the boring results, the loose materials appeared to be surfacial and located within 5 feet below the existing ground surface.

Rock was not encountered by the borings at the site.

Groundwater Condition

Groundwater was encountered in boring R-11-001 at a depth of about 26 feet below the existing ground surface. Groundwater was documented in the As-Built LOTBs at depths of 19½ and 20 feet below the ground surface.

It should be noted that groundwater may have changed since the time of the above groundwater were recorded and will vary according to variations in rainfall, well pumping, other activities, and the nearby drainage feature.

Scour Potential

Scour is not a concern at this bridge site.

Corrosion

Testing for corrosion evaluation is to be performed on representative samples collected from the site. Results of the tests and subsequent corrosion evaluation will be provided in the future.

Seismicity and Seismic Hazard

In accordance to Caltrans 2009 Seismic Design Procedure, the controlling active fault to the site is the San Andreas Fault zone (Creeping section) (Fault ID No. 311) with a maximum magnitude (Mmax) of 7.9. This fault is identified as a right lateral strike slip fault with a vertical dip. The fault is located west of the bridge site, and the rupture distance from the bridge site to the fault plane is estimated to be 65 miles.

Based on the soil data, a shear wave velocity, Vs30, was estimated using the SPT blow counts and the correlation formulas for the granular soil. The estimated Vs30 is about 900 feet per second.

Using the above estimated Vs30, the spectral acceleration (SA) generated from this fault is less than the SA generated from statewide minimum, which is again less than the SA obtained from the USGS probabilistic model of 5% probability of exceedance in 50 years corresponding to a 975 year return period. Therefore, the recommended design

Acceleration Response Spectrum (ARS) curve is based on the SA from the USGS probabilistic model. The recommended design ARS curve with an estimated peak ground acceleration of 0.24g is attached in the Appendix of this report.

Our office performed a liquefaction analysis. The result indicates minimum potential for liquefaction at the site during earthquake.

The potential for subsurface rupture at the site due to fault movement is considered insignificant since there is no known fault projecting towards or passing directly through the project site.

As-Built Foundation Data

The existing Ave. 12 OC was built in 1967. The bridge is a four-span, about 277-foot-long, RC box girder structure support on single column bents and diaphragm abutments. The abutments and bents are all founded on Standard driven RC piles with a design load of 90 kips.

Foundation Recommendations

Abutments 1 and 3

Recommendations for standard Class 140, Alternative "W" pile foundation at Abutments 1 and 3 are presented in the Table 3.

Table 3 Foundation Recommendations For Abutments 1 & 3

Support Location	Pile Type	Cut-off Elevation (ft)	Service Limit State Per Support (kips)		Factored Nominal Resistance (kips)				Design Tip Elevations (ft)	Specified Tip Elevation (ft)
					Strength Limit		Extreme Limit			
			Total	Permanent	Comp. ϕ=0.7	Tens. ϕ=0.7	Comp. ϕ=1.0	Tens. ϕ=1.0		
Abut. 1	Class 140 Alt. "W"	282.5	7012	4528	n/a	n/a	n/a	n/a	(a-I) 202.5	202.5
Abut. 3		292.5	6939	4538	n/a	n/a	n/a	n/a	(a-I) 212.5	212.5

Notes:
1. Recommendations are based on Working Stress Design (WSD) for abutments and the load data provided by SD.
2. A factor of safety of 2.0 is used to calculate the available geotechnical resistance in Service Limit State.
3. The Design Tip Elevations recommended herein are controlled by (a-I) compression (Service Limit State).
4. The Design Tip Elevations controlled by settlement is not applicable.
5. The Design Tip Elevation controlled by lateral load is typically provided by SD.
6. The specified Tip Elevation recommended herein shall not be raised if controlled by lateral load.

Bent 2

Recommendations for standard Class 200 Alternative "W" pile foundation at Bent 2 are presented in the Table 4.

Table 4 Foundation Recommendations For Bent 2

Support Location	Pile Type	Cut-off Elevation (ft)	Service Limit State Per Support (kips)		Factored Nominal Resistance (kips)				Design Tip Elevations (ft)	Specified Tip Elevation (ft)
					Strength Limit		Extreme Limit			
			Total	Permanent	Comp. ϕ=0.7	Tens. ϕ=0.7	Comp. ϕ=1.0	Tens. ϕ=1.0		
Bent 2	Class 200 Alt. "W"	275	2436	2025	300[7]	0	400	0	(a-II) 187 (a-III) 191	187

Notes:
1. Recommendations are based on Load Resistance Factor Design (LRFD) for bent and the load data provided by SD.
2. A resistance factor of 0.7 is used to calculate the available geotechnical resistance in Strength Limit State. A resistance factor of 1.0 is used to calculate the available geotechnical resistance in Extreme Limit State.
3. The Design Tip Elevations recommended herein are controlled by (a-II) compression (Strength Limit State) and (a-III) compression (Extreme Limit State).
4. The Design Tip Elevation controlled by settlement is not applicable.
5. The Design Tip Elevation controlled by lateral load is typically provided by SD.
6. The specified Tip Elevation recommended herein shall not be raised if controlled by lateral load.
7. The Factored Nominal Resistance of 300kips is exceeding the Nominal Axial Compressive Strength specified for standard Class 200 pile (Standard Plan B2-8). Structural safety against axial compression of 429kips for standard Class 200 Alternative "W", PP 16 x 0.500 is to be evaluated by SD.

Pile Data recommendations for Abutment 1, Bent 2, and Abutment 3 are provided in Table 5.

Table 5 Pile Data Table

Support Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)
		Compression	Tension		
Abutment 1	Class 140 Alt. "W"	280	n/a	(a-I) 202.5	202.5
Bent 2	Class 200 Alt. "W"	429[5]	0	(a-II) 187 (a-III) 191	187
Abutment 3	Class 140 Alt. "W"	280	n/a	(a-I) 212.5	212.5

Notes:

1. Design tip elevations are controlled by (a-I) compression (Service Limit State), (a-II) compression (Strength Limit State), and (a-III) compression (Extreme Limit State).
2. The Design Tip Elevation controlled by settlement is not applicable.
3. The Design Tip Elevation controlled by lateral load is typically provided by SD.
4. The specified Tip Elevation recommended herein shall not be raised if controlled by lateral load.
5. The Factored Nominal Resistance of 429kips is exceeding the Nominal Axial Compressive Strength specified for standard Class 200 pile (Standard Plan B2-8). Structural safety against axial compression of 429kips for standard Class 200 Alternative "W", PP 16 x 0.500 is to be evaluated by SD.

Construction Considerations

1. Pile acceptance criteria for all standard diameter driven piles shall be based on the Gates formula (Caltrans Standard Specifications Section 49-1.08). Central relief drilling may be needed due to possible hard driving condition.

2. Piles, to be driven through embankment fills, shall be predrilled according to Caltrans Standard Specifications Section 49-1.06.

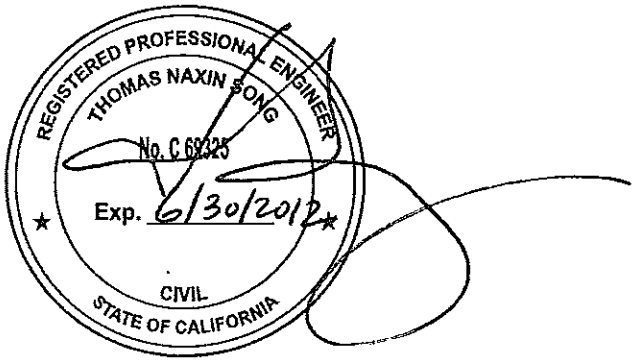
3. Excavated materials shall be handled and disposed of in accordance with the Special Provisions.

FR OC
Ave 12 ~~OH~~ Br.
Br. No. 41-C0207
EA: 06-471001
EFIS: 0600000463

Disclaimer and Contact Information

The Recommendations contained in this report are based on specific project information regarding structure type, location, and design loads that has been provided by the Office of Bridge Design Central, Design Branch 6. If any changes are made during final project design, OGDN should review the changes to determine if these foundation recommendations are still applicable.

If you have any questions, please call William Bertucci at (916) 227-1045, Thomas Song at (916) 227-1057, or John Huang at (916) 227-1037.



William Bertucci
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Office of Geotechnical Design – North
Geotechnical Services
Division of Engineering Services

Thomas N. Song, P.E.
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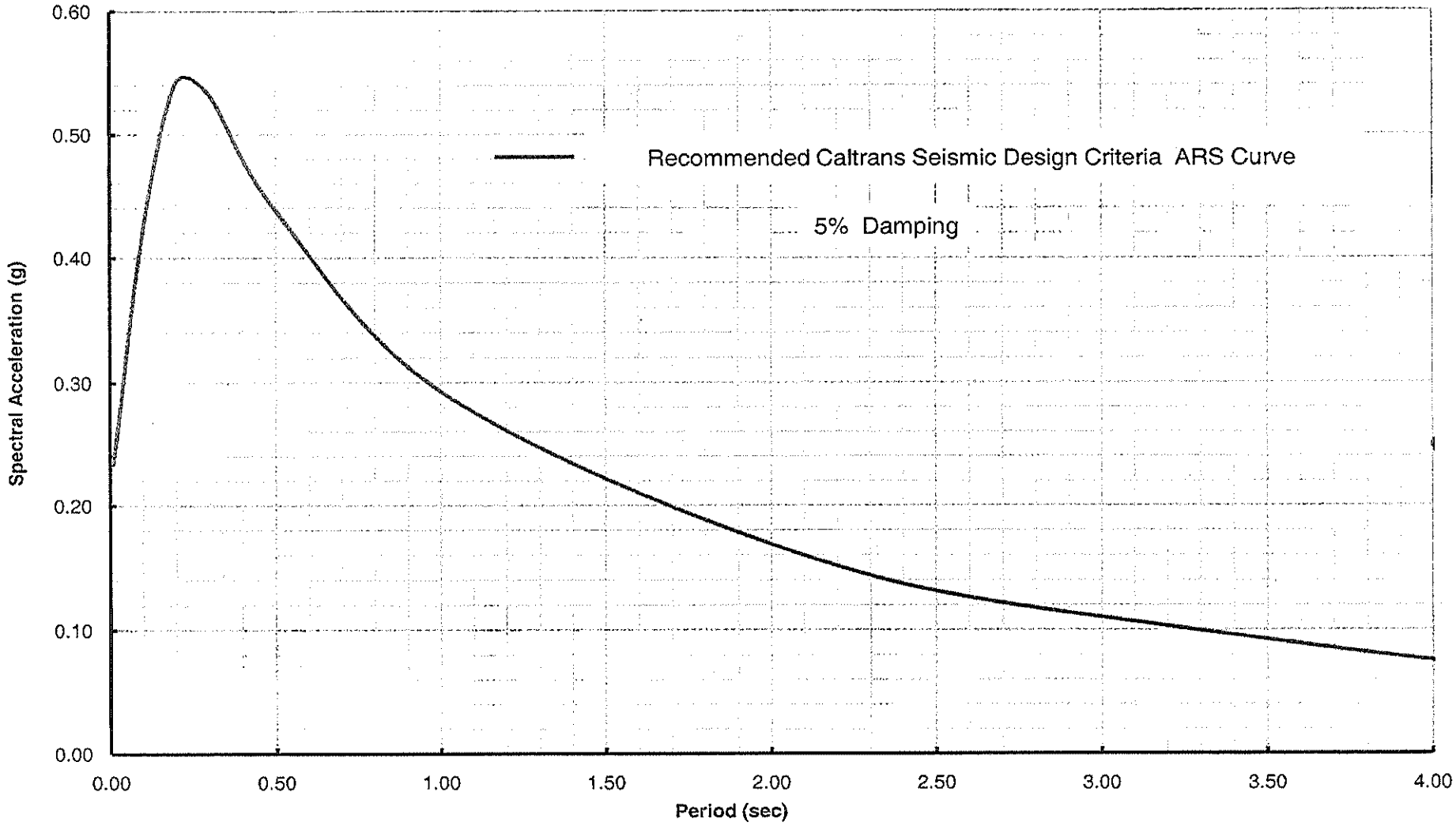
cc: District Project Engineer – Jim Bane
GS Coordination Engineer – Mark Willian
Structure Construction R.E. Pending File
DES Office Engineer, Office of PS&E –
District Materials Engineer – Ted Morradian

ATTACHMENT

Figure 1, Recommended Acceleration Response Spectrum



Caltrans	DEPARTMENT OF TRANSPORTATION Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North (OGDN)	PROJECT NO. /EA:	0600000463 /06-471001
		DATE:	4/13/2011
		06-MAD-99 PM 7.1/7.9 Avenue 12 OC (Replace) Br. No. 41-0088	
	Recommended Acceleration Response Spectrum	Figure	1

Memorandum

Flex your power!
Be energy efficient!

To: Mr. FRITZ HOFFMAN, Chief
Bridge Design Branch 6
Office of Bridge Design Central

Attention: Talal Sadek

Date: April 18, 2011

File: 06-Mad-99-R7.1/7.9
Ave 12 Interchange
EA: 06-471001
Directional Onramp
Br. No. 44-0089

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

Subject: Foundation Recommendations (FR)

Introduction

This report is presented in response to the request from Bridge Design Branch 6, dated May 11, 2010 to provide a foundation report for the proposed Directional Onramp Bridge over Cottonwood Creek. This bridge is one of five bridges to be replaced as part of the interchange modification at Ave 12 and Route 99 in Madera County. The new structure type will be a 4-span P/S solid concrete slab bridge on multicolumn bents supported on 24 inch diameter CISS piles. The abutments will be seat type on pile footings.

The scope of our work includes evaluating General and Foundation plans, gravity loads, available information on site geology based on Log of test borings from past and present investigations, and evaluation of the sites seismic and hydrologic environment. This report will provide pile tip elevations including an Acceleration Response Spectrum (ARS) curve.

Geology

Regional

The Bridge site is situated within the San Joaquin Valley that is located within the southern part of the Great Valley geomorphic province. This low lying flat terrain extends from the Cascade Ranges at the north end of the province to the Tehachapi Mountains at the south end of the province and it is bound on the east by the Sierra Nevada Mountains and on the west by the Coast Range Mountains. Structurally, the province is an elongate asymmetric basin that reaches depths of over 29,000 feet. Deposition of marine and non-

marine sediments into this basin has been on going since the Mesozoic Era. Recent and Pleistocene soils that underlie the San Joaquin Valley at the project site are composed of interbeds and lenses of gravels, sands, silts and clays eroded primarily from the Sierra Nevada.

Site Geology

The recent test boring (R-11-003) and as-built test boring (B-3) shows that the subsurface materials at the existing bridge site consist primarily of loose to medium dense SAND and SILT to depths of about 16 to 25 feet (elevations 252 to 263 feet) . Below to the maximum depth explored 76 feet (elevation 201 feet) the soils become primarily medium dense to dense SAND, SILTY SAND and SILT with a few scattered lenses 1 to 3 feet thick of stiff to very stiff SILTY CLAY to SANDY CLAY. The exception occurred below approximate elevation 210 ft. (Boring B-3) were "slightly compacted" SANDY SILT was encountered. See Log of Test Borings (LOTB) for detailed description of soil conditions.

Scour Potential

Potential scour conditions at the bridge site, provided by Juan Jauregui of Structure Hydraulics & Scour Mitigation (Report date August 4, 2010) are summarized in Table 1 below.

Table 1 Scour Summary

Scour Type	Bent 2	Bent 3	Bent 4
Degradation	2 ft	2 ft	2 ft
Contraction Scour	N/A	N/A	N/A
Local	11.4 ft	11.4 ft	11.4 ft
Total Potential	15.8 ft	15.8 ft	15.8 ft
Channel Elev. (ft)	265.2	265.2	265.2
Thalweg migration	YES	YES	YES
Potential Scour Elev. (ft)	249.4	249.4	249.4

Notes:
1. Total potential scour is based on a 3-foot column diameter.

Groundwater

Ground water conditions will vary according to variations in rainfall, well pumping, and other activities. Groundwater measurements made in 1961 and 2011 varied little with an elevation of 261.2 ft for the former and a elevation of 262.9 ft for the latter. For design purposes, the groundwater was assumed at the elevation of the 274.2 ft (100 year flood water surface elevation).

Corrosion

A site-specific corrosion sampling and testing results will be provided when they are made available.

Seismicity

In accordance to Caltrans 2009 Seismic Design Procedure, the controlling active fault is the San Andreas Fault zone (Creeping section) (Fault ID No. 311) with a Mmax of 7.9. This fault is identified as a right lateral strike slip fault with a vertical dip. The fault is located west of the bridge site, and the rupture distance from the fault plane to the site is estimated to be 65 miles.
Based on the local soil data, a shear wave velocity, Vs30 was estimated using the SPT blow counts and correlation formulas for the granular soil. The estimated Vs30 is about 900 feet per second.

Using the above estimated Vs30, the spectral acceleration (SA) generated from this fault is less than the SA generated for statewide minimum, which is again less than the SA obtained from the USGS probabilistic model of 5% probability of exceedance in 50 years corresponding to a 975 return period. Therefore, the recommended design Acceleration Response Spectrum (ARS) curve is based on the USGS probabilistic model. The design ARS curve with an estimated peak ground acceleration of 0.24g is attached in the Appendix of this report.

The liquefaction analysis based on Boring R-11-003 indicates the soil layer located from elevation 272 feet to 267 feet has potential to liquefy during an earthquake event. The liquefaction analysis based on Boring R-11-003 indicates the soil layer located from elevation 272 feet to 267 feet has potential to liquefy during an earthquake event. However, the bottom of footing /cut off elevations of the abutments and bent piles are below the liquefaction base elevation therefore, liquefaction will have no effect.

The potential for surface rupture at the site due to fault movement is considered insignificant since there are no known faults projecting towards or passing directly through the project site. We will reevaluate the seismic recommendations if additional soil data becomes available or needed.

Foundation Recommendations

The foundation recommendations are based on the present 2011and 1961 field investigation borings and analysis in conjunction with the preliminary Hydraulic information provided by Structure Hydraulics & Scour Mitigation (August 4, 2010), General Plans, Foundation Plans and foundation loads provided by Fritz Hoffman and Talal Sadek. Class 140 Alternative "W" pipe piles are recommended at the abutments and 24-in driven CISS pile extensions are recommended at the bents.

The pile data is summarized in the tables below.

Table – 2. Abutment Foundation Design Recommendations.

Support Location	Pile Type	Cut-off Elev (ft)	LRFD Service-I Limit State Load per Support –Compression (kips)		LRFD Service-I Limit State Load per Pile-Compression (kips)	Nominal Resistance (kips)	Design Tip Elevation (ft)	Spec Tip Elev (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut 1	14" Class 140 Alt. W	265.0	980	980	140	280	213(a)	213	360
Abut 5	14" Class 140 Alt. W	265.0	980	980	140	280	213(a)	219	360

Notes:
1) Design tip elevations are controlled by (a) Compression.
2) The specified tip elevation shall not be raised above the design tip elevations for lateral loads.
3) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft/loose, liquefiable, scourable, etc.), which do not contribute to the design resistance.
4) Structure Design typically provides design tip elevation for Lateral Load.

Table 3. Bent foundations Design Recommendations.

Support Location	Pile Type	Cut-off Elevation (ft)	Permanent Load Service-I Limit State Load per Support (kips)	Total Permissible Support Settlement (inches)	Required Factored Nominal Resistance (kips)				Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resist. Required (kips)
					Strength Limit		Extreme Event				
					Comp. (φ=0.7	Tension (φ=0.7)	Comp (φ=1)	Tension (φ=1)			
Bent 2	24" CISS	262.6	N/A	1.0	300	N/A	N/A	N/A	175 (a-I)	175	690
Bent 3	24" CISS	262.6	N/A	1.0	300	N/A	N/A	N/A	173 (a-I)	173	750
Bent 4	24" CISS	262.6	N/A	1.0	300	N/A	N/A	N/A	186 (a-I)	186	750

Notes:
1) Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (a-II) Compression (Extreme Event).
2) Unsuitable soil layers (very soft, liquefiable and scourable) that do not contribute to the design nominal resistance exists at all abutments and bents
3) There is no design tip elevation for Settlement.
4) Structure Design Typically provides Design tip elevations for Lateral Load.

Table 4- Pile Data Table.

Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut 1	14" Class 140 Alt. "W"	280	N/A	211(a)	211	360
Bent 2	24" CISS	430	N/A	175(a)	175	690
Bent 3	24" CISS	430	N/A	173(a)	173	750
Bent 4	24" CISS	430	N/A	186(a)	186	750
Abut 5	14" Class 140 Alt. "W"	280	N/A	213(a)	213	360

Notes:
1) Design tip elevations for Abutments and Bents are controlled by: (a) Compression.

2) Unsuitable soil layers (very soft, liquefiable, scourable) that do not contribute to the design nominal resistance exist at all abutment and bents.
3) Structure Design Typically provides Design tip elevations for Lateral Load.
4) There is no design tip elevation for Settlement.

General Notes to Designer

1. The structure engineer shall show on the plans, in the pile data table, the minimum pile tip elevation required to meet the lateral load demands.

2. Should the specified pile tip elevation required to meet lateral load demands exceed the specified pile tip elevation given within this report, the Office of Geotechnical Design North should be contacted for further recommendations.

3. Support locations will be plotted on the Log of Test Borings, in plan view as stated in "Memos to Designers" 4-2 if additional borings are required. There is a conversion table placed of the original boring sheet that converts those borings locations to the present stationing an offset distances.

Construction Considerations

1. Groundwater levels may exceed the bottom of pile cap elevations year around. Therefore, during their construction wet soils and caving should be expected and dewatering in conjunction with shoring and/ or seal course placement shall be required.

2. Pile acceptance criteria for all standard diameter driven piles shall be based on the Gates formula (Caltrans Standard Specifications Section 49-1.08). Central relief drilling may be needed due to possible hard driving condition.

4. Piles, to be driven through embankment fills, shall be predrilled according to Caltrans Standard Specifications Section 49-1.06.

5. Hard driving conditions should be expected at and below the bottom of bent and abutment pile cut off /pile cap elevations. Some center relief drilling may be required. A soil plug of approximately 6 diameters should be maintained.

6. Excavated materials shall be handled and disposed of in accordance with the Special Provisions.

The Preliminary Foundation Recommendations included in this report are based on specific project information regarding structure type and structure location. Any questions regarding the above preliminary recommendations should be directed to the attention of William Bertucci (916) 227-1045 or John Huang (916) 227-1037, Geotechnical Services, Office of Geotechnical Design-North, and Branch E.

Report by:

William Bertucci
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Reviewed By:

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ARS curve Attachment

cc: Jim Bane (District PM), Peggy Lim (PCE), Mark Willian, Trais Norris (District Env Manager), Ted Morradian (District Materials)

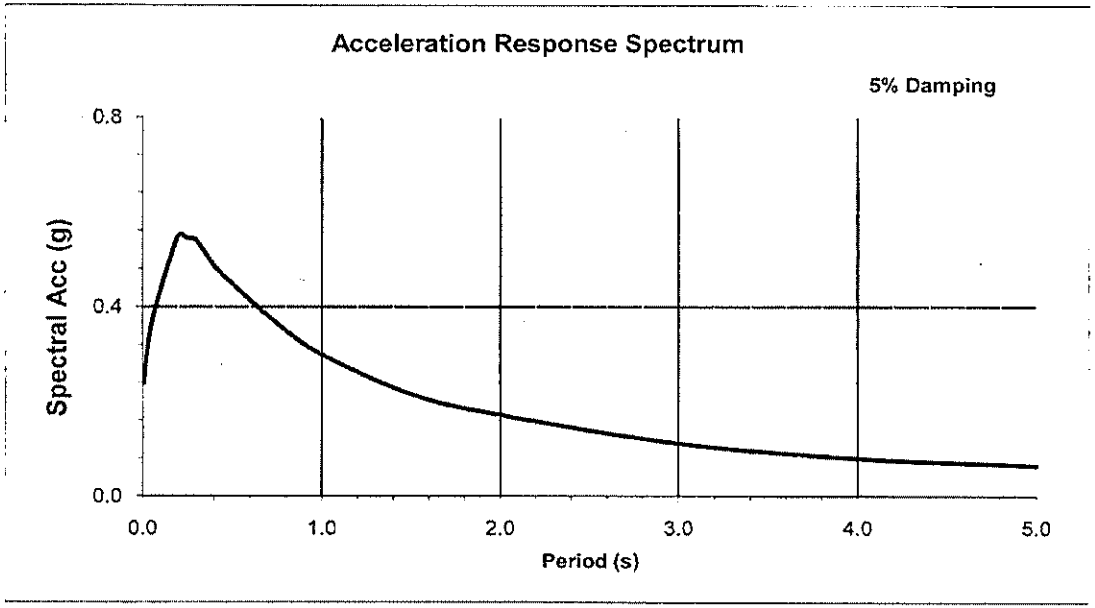
Directional Onramp

Bridge No. 44-0089G
EA 06-471001

Latitude 36.9219
Longitude -120.0205

Control **Probabilistic**

Period (s)	Sa(g)
0.010	0.239
0.020	0.285
0.030	0.317
0.050	0.362
0.075	0.402
0.100	0.433
0.120	0.460
0.150	0.497
0.200	0.549
0.250	0.544
0.300	0.539
0.400	0.486
0.500	0.448
0.750	0.365
1.000	0.299
1.500	0.215
2.000	0.171
3.000	0.111
4.000	0.079
5.000	0.064



Deterministic Procedure **Data**

Fault	San Andreas fault zone south (Creeping section)		R_{rup}	104.00	km
Fault ID	203		R_{jb}	104.00	km
Style	SS		R_x	104.00	km
Mmax	7.9		V_{S30}	270	m/s
Dip	90	deg	$Z_{1.0}$	N/A	m
Z_{TOR}	0	km	$Z_{2.5}$	N/A	km

Notes

Please note the design ARS curve is based on 5% probability of exccedance in 50 years (975 year return period).

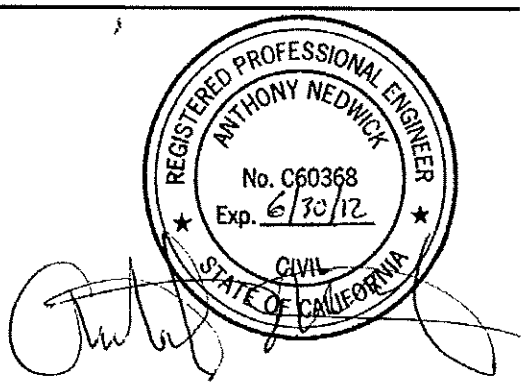
State of California – Department of Transportation
Division of Engineering Services
Structure Design Services

FINAL HYDRAULIC REPORT

Avenue 12 Interchange

Bridge No. 41C0207
Bridge No. 41C0208
Bridge No. 41C0209
Bridge No. 41-0089G
06 - MAD - 99 - PM R7.1-R7.9
EA 06-471001

Prepared by:



Juan Jauregui, PE
Anthony Nedwick, PE
Structure Hydraulics and Hydrology
August 4, 2010

General:

The proposed project includes replacing the existing Avenue 12 Overcrossing, the Avenue 12 Overhead and the Cottonwood Creek Bridge (Br.No.41C0025) with one bridge, adding a directional onramp next to SB 99 Cottonwood Creek Bridge (Br.No.41-0065L), replacing Cottonwood Creek Bridge (Br. No.41C0046) with the Road 29 South Bridge and constructing a new bridge over Cottonwood Creek on Road 29 North, as shown on the Advanced Planning Study General Plans.

This report is based on the plans and information provided on various dates. For Road 29 North (Br. No. 41C0208) and Road 29 South (Br. No. 41C0209) the General Plans were dated 06-09-10. For Ave 12 (Br. No. 41C0207) the General Plan was dated 05-12-10 with clarifications per Talal Sadek noted as 06-28-10. For the Directional Onramp (Br. No. 41-0089G) the General Plan was dated 05-19-10. Based on information provided by Structure Design, the Ave 12 structure was modeled using 8.5 foot diameter columns, while the other structures were modeled using 3 foot diameter columns. **All elevations indicated in this report are based on Vertical Datum NAVD 1988.**

Basin:

At the bridge site, the watershed for Cottonwood Creek encompasses approximately 88.5 square miles. Cottonwood Creek originates in the foothills of the Sierra Nevada mountain range and flows west to the San Joaquin Valley where the project site is located. Elevations in the watershed range from approximately 260 feet at the lower end of the project site to about 1,300 feet in the foothills. Precipitation in the watershed tends to increase with altitude and varies from an average annual precipitation of approximately 12 inches at the bridge site to approximately 17 inches in the higher elevations of the watershed. Land use is mostly native vegetation with annual grasslands comprising almost 70% of the watershed along with some oak and pine woodland accounting for about 10% in the upper reaches of the watershed. There are also some orchards, vineyards and urban residential which together, make up about 15% of the watershed.

Discharges:

Several methods and sources were utilized to estimate flows in Cottonwood Creek, including information from the Soil Conservation Service and the FEMA Flood Insurance Study for Madera County.

For Cottonwood Creek the discharges were based on the FEMA Flood Insurance Study for Madera County. In the vicinity of the bridge site, the 50-year and 100-year peak discharges are 3,850 cfs and 4,810 cfs, respectively. Based on the FEMA study, channel capacity is limited to 3,100 cfs in some areas upstream of the project site Some of this flow does not make its way back to the main channel for several miles downstream of the site.

Hydraulic Analysis:

The channel hydraulics were modeled using the Army Corps of Engineers HEC-RAS modeling program, version 4.0. HEC-RAS was used to determine the water surface elevation, velocities and scour depths throughout the project reach. The 50-year and 100-year discharge stages were evaluated using a Manning's roughness coefficient of 0.038 along with variable slope and channel cross-sections based on survey data.

Cottonwood Creek is not listed as a designated floodway, per the Central Valley Flood Protection Board. Therefore, 2 feet of freeboard between the design flood plane (i.e., 50-year water surface elevation) and the bridge soffit is adequate. The proposed bridge replacements will provide adequate freeboard over the 50-year event.

Streambed:

Available data notes that the channel bed material is sandy silt with some broken concrete lining the banks. This bed material is susceptible to scour, erosion and lateral migration of the thalweg. A comparison of historical cross-sections indicates that degradation has been occurring at a low rate and has exposed some of the pile cans at the structures. Future degradation is estimated at 2 feet for each of the new structures.

Scour Analysis:

The current structures are not considered scour critical. There have been no significant scour or debris problems at the site.

For the Ave 12 structure, local pier scour was estimated using 8.5-foot diameter columns. Only the columns at Bent 3 are subject to scour, as Bent 2 is located outside the channel. Thalweg migration within the channel is assumed.

For the remaining three proposed structures, local pier scour was estimated using 3.0-foot diameter columns at each structure. Thalweg migration within the channel is assumed. Therefore, the columns at both Pier 2 and Pier 3 are subject to scour.

Contraction scour was estimated for the Ave 12, Road 29 North and Road 29 South structures. There was no contraction scour estimated at the Directional Onramp.

Potential scour depths and elevations are summarized in Tables 1A, 1B, 1C and 1D.

Table 1A: Potential Scour for Road 29 North
3' Diameter columns

Scour Type	Scour Depth (ft)	
	Pier 2	Pier 3
Degradation	2 ft	2 ft
General Scour (e.g., contraction scour)	4.6 ft	4.6 ft
Local Scour	5.9 ft	5.9 ft
Total Potential Scour Depth (ft)	12.5 ft	12.5 ft
Channel elevation (ft)	266.5 ft	266.5 ft
Thalweg migration	YES	YES
Potential Scour Elevation (ft)	**254.0**	**254.0**
Vertical Datum: NAVD 1988		

Table 1B: Potential Scour Ave 12 8.5' Diameter columns	
Scour Type	**Scour Depth (ft)**
	Bent 3
Degradation	2 ft
General Scour (e.g., contraction scour)	2.4 ft
Local Scour	11.4 ft
Total Potential Scour Depth (ft)	**15.8 ft**
Channel elevation (ft)	265.24
Thalweg migration	YES
Potential Scour Elevation (ft)	**249.4 ft**
Vertical Datum: NAVD 1988	

Table 1C: Potential Scour for Directional Onramp 3' Diameter columns		
Scour Type	**Scour Depth (ft)**	
	Pier 2	**Pier 3**
Degradation	2 ft	2 ft
General Scour (e.g., contraction scour)	N/A	N/A
Local Scour	5.3 ft	5.3 ft
Total Potential Scour Depth (ft)	7.3 ft	7.3 ft
Channel elevation (ft)	262.6 ft	262.6 ft
Thalweg migration	YES	YES
Potential Scour Elevation (ft)	**255.3**	**255.3**
Vertical Datum: NAVD 1988		

Table 1D: Potential Scour for Road 29 South 3' Diameter columns		
Scour Type	**Scour Depth (ft)**	
	Pier 2	**Pier 3**
Degradation	2 ft	2 ft
General Scour (e.g., contraction scour)	2.5 ft	2.5 ft
Local Scour	5.9 ft	5.9 ft
Total Potential Scour Depth (ft)	10.4 ft	10.4 ft
Channel elevation (ft)	261.7 ft	261.7 ft
Thalweg migration	YES	YES
Potential Scour Elevation (ft)	**251.3**	**251.3**
Vertical Datum: NAVD 1988		

Summary & Recommendations:

Below is a summary of key design parameters based on the hydrology and hydraulic analysis performed for these structures.

All elevations given are referenced to the data provided by Structures Design and Preliminary Investigations-North, using the NAVD 88 vertical datum.

Hydrologic/Hydraulic Summary Road 29 North Br. No. 41C0208 Drainage Area = 88.5 mi^2 Proposed Bridge Minimum Soffit Elevation = 278.0 ft			
	Design Flood	**Base Flood**	**Overtopping Flood / Flood of Record**
Frequency	50-yr	100-yr	*N/A*
Discharge	3,850 cfs	4,810 cfs	*N/A*
Average Velocity	5.2 fps	5.7 fps	*N/A*
Water Surface Elevation (WSEL) at Bridge	276.0 ft	276.8 ft	*N/A*
Elevations are based on Vertical Datum NAVD88			
Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.			

Hydrologic/Hydraulic Summary Ave 12 Br. No. 41C0207 Drainage Area = 88.5 mi^2 Proposed Bridge Minimum Soffit Elevation = 277.2 ft			
	Design Flood	**Base Flood**	**Overtopping Flood / Flood of Record**
Frequency	50-yr	100-yr	*N/A*
Discharge	3,850 cfs	4,810 cfs	*N/A*
Average Velocity	5.0 fps	5.3 fps	*N/A*
Water Surface Elevation (WSEL) at Bridge	275.2 ft	276.1 ft	*N/A*
Elevations are based on Vertical Datum NAVD88			
Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.			

Hydrologic/Hydraulic Summary Directional Onramp Br. No. 41-0089G Drainage Area = 88.5 mi^2 Proposed Bridge Minimum Soffit Elevation = 275.8 ft			
	Design Flood	**Base Flood**	**Overtopping Flood / Flood of Record**
Frequency	50-yr	100-yr	*N/A*
Discharge	3,850 cfs	4,810 cfs	*N/A*
Average Velocity	4.1 fps	4.6 fps	*N/A*
Water Surface Elevation (WSEL) at Bridge	273.8 ft	274.5 ft	*N/A*
Elevations are based on Vertical Datum NAVD88			
Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.			

Hydrologic/Hydraulic Summary Road 29 South Br. No. 41C0209 Drainage Area = 88.5 mi^2 Proposed Bridge Minimum Soffit Elevation = 275.6 ft			
	Design Flood	**Base Flood**	**Overtopping Flood / Flood of Record**
Frequency	50-yr	100-yr	*N/A*
Discharge	3,850 cfs	4,810 cfs	*N/A*
Average Velocity	4.9 fps	5.7 fps	*N/A*
Water Surface Elevation (WSEL) at Bridge	273.6 ft	274.2 ft	*N/A*
Elevations are based on Vertical Datum NAVD88			
Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.			

This report has been prepared under my direction as the professional engineer in responsible charge of the work, in accordance with the provisions of the Professional Engineers Act of the State of California.

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: Mr. FRITZ HOFFMAN, Chief
Bridge Design Branch 6
Office of Bridge Design Central

Attention: Talal Sadek

Date: October 28, 2011

File: 06-Mad-99-R7.1/7.9
Ave 12 Interchange
EA: 06-471001
Rd. 29 North Bridge
Bridge No. 41C-0208

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

Subject: Revised Foundation Report (FR)
(Reference: FR dated April 18, 2011)

Introduction

This revised foundation report presents up dated foundation recommendations based on new boring data. The referenced FR was in response to the request from Bridge Design Branch 6, dated May 11, 2010 to provide a foundation report for the proposed Rd. 29 North Cottonwood Creek Bridge. This bridge is one of five bridges to be replaced as part of the Ave 12 interchange modification in Madera County. The new structure type will be a 3-span P/S solid concrete slab bridge on multicolumn bents. The new boring (RC-11-004) was completed to a depth of 121.5 feet (elevation 153.4 ft) on August 3, 2011 at the bridge site.

Findings

Geology

Refer to referenced FR for Regional Geology description. Based on the new boring information, the subsurface geologic materials at the bridge site are similar to what was reported in the FR but with some differences. A brief summary of the boring log is as follows: The upper 14 ft (to elevation 261 ft) consisted of loose and medium dense SILTY SAND. Thickly Interbedded medium dense, dense and very dense SANDY SILT, SILTY SAND and Well graded SAND was logged from approximately elevation 261ft to 237 ft followed by a 2 foot thick layer of very stiff, medium plasticity SILT with CLAY. Below to the bottom of the boring (elevation 153.4 ft) the soils consisted of very thick interbeds of medium dense and dense SILTY SAND and SANDY SILT and included a hard medium plasticity SANDY lean CLAY from elevation 226 to 224 ft. See Log of Test Borings (LOTB) for detailed description of soil conditions.

Corrosion

Based corrosion testing utilizing the new boring data the soils at the site are considered to be non-corrosive.

Seismicity

The bridge site seismic environment is unaltered based on the new boring (RC-11-004) data. The liquefaction analysis based on the new data shows low potential for liquefaction. The seismic environment presented in the subject FR is included here.

In accordance to Caltrans 2009 Seismic Design Procedure, the controlling active is the San Andreas Fault zone (Creeping section) (Fault ID No. 311) with a Mmax of 7.9. This fault is identified as a right lateral strike slip fault with a vertical dip. The fault is located west of the bridge site, and the rupture distance from the fault plane to the site is 65 miles. Based on the local soil data, a shear wave velocity, Vs30 was estimated using the SPT blow counts and correlation formulas for the granular soil. The estimated Vs30 is about 840 feet per second.

Using the above estimated Vs30, the spectral acceleration (SA) generated from this fault is less than the SA generated for statewide minimum, which is again less than the SA obtained from the USGS probabilistic model of 5% probability of exceedance in 50 years corresponding to a 975 return period. Therefore, the recommended design Acceleration Response Spectrum (ARS) curve is based on the USGS probabilistic model. The design ARS curve with an estimated peak ground acceleration of 0.24g.

Scour Potential

The potential scour conditions remain unaltered based on the new boring data.
Potential scour conditions at the bridge site, provided by Juan Jauregui of Structure Hydraulics & Scour Mitigation (Report date August 4, 2010) are summarized in Table 1 below.

Table 1 Scour Summary

Scour Type	Bent 2	Bent 3
Degradation	2 ft	2 ft
Contraction Scour	4.6 ft	4.6 ft
Local	5.9 ft	5.9 ft
Total Potential	12.5 ft	12.5 ft
Thalweg (Channel) Elev. (ft)	266.5	266.5
Thalweg migration	YES	YES
Potential Scour Elev. (ft)	254.0	254.0

Groundwater

A Groundwater depth of 29 ft (elevation 245.9 ft) was measured at the bridge site on August 4, 2011, a day after completion of Boring RC-11-004. Ground water conditions will vary according to variations in rainfall, well pumping, and other activities. For design purposes, the groundwater was assumed at elevation of the 274.2 ft (100 year flood water surface elevation). For a frame of reference the proposed grade at the abutments is approximately elevation 284 feet (the existing approximate grades are elevation 274.5 feet at Abutment 1 and elevation 273.6 feet at Abutment 4).

Recommendations

The recommendations for foundations are based on the new boring (RC-11-004) including analysis in conjunction with the Hydraulic information provided by Structure Hydraulics & Scour Mitigation (August 4, 2010), General Plans, Foundation Plans and foundation loads provided by Fritz Hoffman and Talal Sadek. Class 140 Alternative "W" pipe piles are recommended at the abutments and 24-in driven CISS pile extensions are recommended at the bents. The pile data is summarized in the tables below.

Table 4- Pile Data Table.

Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut 1	14" Class 140 Alt. "W"	280	N/A	203(a)	203	300
Bent 2	24" CISS	500	N/A	185(a)	185	630
Bent 3	24" CISS	500	N/A	185(a)	185	630
Abut 4	14" Class 140 Alt. "W"	280	N/A	203(a)	203	300

Notes:

1) Design tip elevations for Abutments and Bents are controlled by: (a) Compression.
2) Unsuitable soil layers (very soft, liquefiable, and scourable) that do not contribute to the design nominal resistance exist at all abutment and bents.
3) Structure Design Typically provides Design tip elevations for Lateral Load.
4) There is no design tip elevation for Settlement.

General Notes to Designer

1. The structure engineer shall show on the plans, in the pile data table, the minimum pile tip elevation required to meet the lateral load demands.

2. Should the specified pile tip elevation required to meet lateral load demands exceed the specified pile tip elevation given within this report, the Office of Geotechnical Design North should be contacted for further recommendations.

3. Support locations will be plotted on the Log of Test Borings, in plan view as stated in "Memos to Designers" 4-2 if additional borings are required. There is a conversion table placed of the original boring sheet that converts those borings locations to the present stationing an offset distances.

Construction Considerations

1. Groundwater levels may exceed the bottom of abutment footings and pile cut-off

should be expected and dewatering in conjunction with shoring and/ or seal course placement shall be required.

2. Pile acceptance criteria for all standard diameter driven piles shall be based on the Gates formula (Caltrans Standard Specifications Section 49-1.08).

3. Pile acceptance criteria for the 24-in diameter CISS bent piles will be based on a dynamic monitoring (PDA). The first pile driven at Bent 1 shall be the test pile. The test pile shall be dynamically monitored and the pile acceptance criteria established before the remaining piles can be driven. The first pile driven at Bent 2 will be the indicator pile. The indicator pile shall be monitored for verification purposes only. At the Contractors option, the test pile and indicator pile locations can be reversed.

4. Abutment piles, to be driven through (new) embankment fills, shall be predrilled according to Caltrans Standard Specifications Section 49-1.06.

5. Hard driving conditions should be expected at and below the bottom of bent and Abutment piles cut off /pile cap elevations. Some center relief drilling may be required. A soil plug of approximately 6 diameters shall be maintained. Therefore center relief drilling shall be stopped at least 6 diameters above the tip of the pile.

6. Excavated materials shall be handled and disposed of in accordance with the Special Provisions.

The Foundation Recommendations included in this report are based on specific project information regarding structure type and structure location. Any questions regarding the above recommendations should be directed to the attention of William Bertucci (916) 203-7992 or John Huang (916) 227-1037, Geotechnical Services, Office of Geotechnical Design-North, Branch E.

Report by:

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Geotechnical Services
Division of Engineering Services

Reviewed By:

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Reza Mahallati
Senior Materials and Research Engineer
Office of Geotechnical Design – North
Geotechnical Services
Division of Engineering Services

ARS curve Attachment

cc: Jim Bane (District PM), Peggy Lim (PCE), Mark Willian, Trais Norris (District Env Manager), Ted Morradian (District Materials)

RD 29 N. Cottonwood Creek

Bridge No. 41C-0208

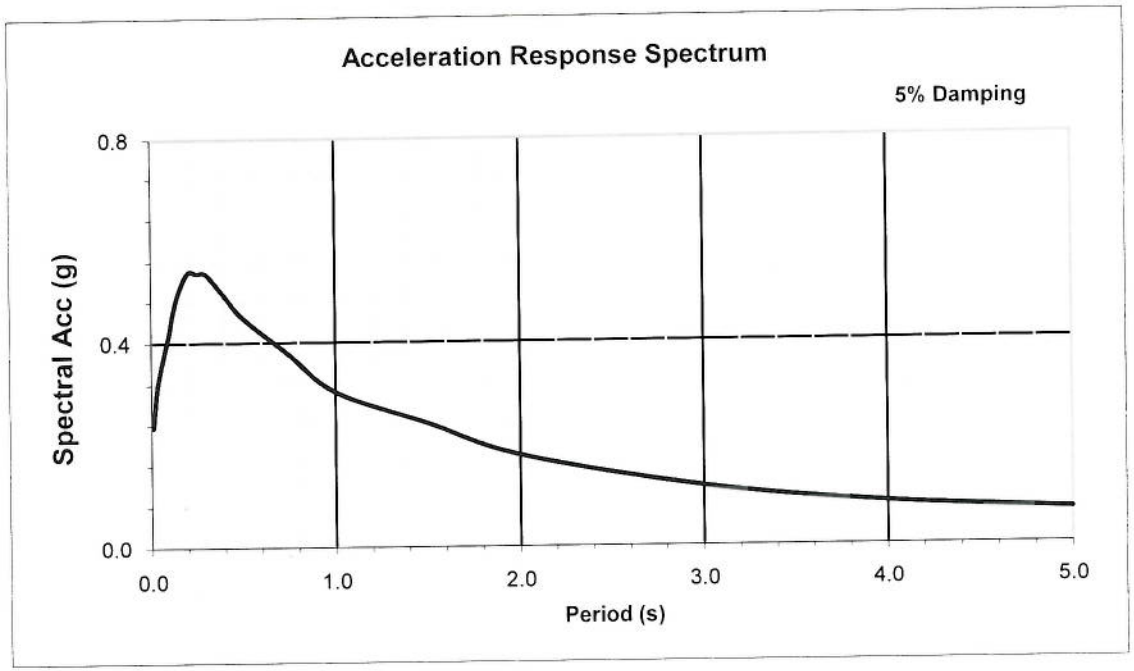
EA 06-471001

Latitude 36.9247

Longitude -120.0185

Control **Probabilistic**

Period (s)	Sa(g)
0.010	0.235
0.020	0.272
0.030	0.309
0.050	0.346
0.075	0.384
0.100	0.421
0.120	0.460
0.150	0.500
0.200	0.539
0.250	0.538
0.300	0.536
0.400	0.492
0.500	0.448
0.750	0.376
1.000	0.305
1.500	0.241
2.000	0.177
3.000	0.115
4.000	0.083
5.000	0.067



Deterministic Procedure Data

Fault	San Andreas fault zone south (Creeping section)	
Fault ID	203	
Style	SS	
Mmax	7.9	
Dip	90	deg
Z_{TOR}	0	km

R_{rup}	104	km
R_{jb}	104	km
R_x	104	km
V_{S30}	255	m/s
$Z_{1.0}$	N/A	m
$Z_{2.5}$	N/A	km

Notes

Please note the design ARS curve is based on the USGS 5% probability of Exceedance in 50 years (975 year return period).

Final

Design Response Spectrum

Memorandum

Flex your power!
Be energy efficient!

To: Mr. FRITZ HOFFMAN, Chief
Bridge Design Branch 6
Office of Bridge Design Central

Attention: Talal Sadek

Date: April 18, 2011

File: 06-Mad-99-R7.1/7.9
Ave 12 Interchange
EA: 06-471001
Rd. 29 South Bridge
Bridge No. 41-C0209

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

Subject: Foundation Recommendations (FR)

Introduction

This report is presented in response to the request from Bridge Design Branch 6, dated May 11, 2010 to provide a foundation report for replacement of the existing Rd. 29 South Bridge over Cottonwood Creek. This bridge is one of five bridges to be replaced as part of the interchange modification at Ave 12 and Route 99 in Madera County. The new structure type will be a 3-span P/S solid concrete slab bridge on multicolumn bents supported on 24-inch diameter CISS piles. The abutments will be seat type on pile footings.

The scope of our work includes evaluating General and Foundation plans, gravity loads, available information on site geology based on Log of test borings from past and present investigations, and evaluation of the sites seismic and hydrologic environment. This report will provide pile tip elevations including an Acceleration Response Spectrum (ARS) curve.

Geology

Regional

The Bridge site is situated within the San Joaquin Valley that is located within the southern part of the Great Valley geomorphic province. This low lying flat terrain extends from the Cascade Ranges at the north end of the province to the Tehachapi Mountains at the south end of the province and it is bound on the east by the Sierra Nevada Mountains and on the west by the Coast Range Mountains. Structurally, the province is an elongate asymmetric basin that reaches depths of over 29,000 feet. Deposition of marine and non-marine sediments into this basin has been on going since the Mesozoic Era. Recent and

Pleistocene soils that underlie the San Joaquin Valley at the project site are composed of interbeds and lenses of gravels, sands, silts and clays eroded primarily from the Sierra Nevada.

Site Geology

The recent test boring (R-11-003) and as-built test boring (B-3) shows that the subsurface materials at the existing bridge site consist primarily of loose to medium dense SAND and SILT to depths of about 16 to 25 feet (elevations 252 to 263 feet) . Below to the maximum depth explored 76 feet (elevation 201 feet) the soils become primarily medium dense to dense SAND, SILTY SAND and SILT with a few scattered lenses 1 to 3 feet thick of stiff to very stiff SILTY CLAY to SANDY CLAY. The exception occurred below approximate elevation 210 ft. (Boring B-3) were "slightly compacted" SANDY SILT was encountered. See Log of Test Borings (LOTB) for detailed description of soil conditions.

Scour Potential

Potential scour conditions at the bridge site, provided by Juan Jauregui of Structure Hydraulics & Scour Mitigation (Report date August 4, 2010) are summarized in Table 1 below.

Table 1 Scour Summary

Scour Type	Bent 2	Bent 3
Degradation	2 ft	2 ft
Contraction Scour	2.5 ft	2.5 ft
Local	5.9 ft	5.9 ft
Total Potential	10.4 ft	10.4 ft
Channel Elev. (ft)	261.7	261.7
Thalweg migration	YES	YES
Potential Scour Elev. (ft)	251.3	251.3

Notes:
1. Total potential scour is based on a 3-foot column diameter.

Groundwater

Ground water conditions will vary according to variations in rainfall, well pumping, and other activities. Groundwater measurements made in 1961 and 2011 varied little with a elevation of 261.2 ft for the former and a elevation of 262.9 ft for the latter. For design purposes, the groundwater was assumed at the elevation of the 274.2 ft (100 year flood water surface elevation).

Corrosion

A site-specific corrosion sampling and testing results will be provided when they are made available.

Seismicity

In accordance to Caltrans 2009 Seismic Design Procedure, the controlling active fault is the San Andreas Fault zone (Creeping section) (Fault ID No. 311) with a Mmax of 7.9. This fault is identified as a right lateral strike slip fault with a vertical dip. The fault is located west of the bridge site, and the rupture distance from the fault plane to the site is estimated to be 65 miles.
Based on the local soil data, a shear wave velocity , Vs30 was estimated using the SPT blow counts and correlation formulas for the granular soil. The estimated Vs30 is about 900 feet per second.

Using the above estimated Vs30, the spectral acceleration (SA) generated from this fault is less than the SA generated for statewide minimum, which is again less than the SA obtained from the USGS probabilistic model of 5% probability of exceedance in 50 years corresponding to a 975 return period. Therefore, the recommended design Acceleration Response Spectrum (ARS) curve is based on the USGS probabilistic model. The design ARS curve with an estimated peak ground acceleration of 0.24g is attached in the Appendix of this report.

The liquefaction analysis based on Boring R-11-003 indicates the soil layer located from elevation 272 feet to 267 feet has potential to liquefy during an earthquake event. However, the bottom of footing /cut off elevations of the abutment and bent piles are below the liquefaction base elevation therefore, liquefaction will have no effect.

The potential for surface rupture at the site due to fault movement is considered insignificant since there are no known faults projecting towards or passing directly through the project site. We will reevaluate the seismic recommendations if additional soil data becomes available or needed.

Foundation Recommendations

The foundation recommendations are based on the present 2011and 1961 field investigation borings and analysis in conjunction with the preliminary Hydraulic information provided by Structure Hydraulics & Scour Mitigation (August 4, 2010), General Plans, Foundation Plans and foundation loads provided by Fritz Hoffman and Talal Sadek. Class 140 Alternative "W" pipe piles are recommended at the abutments and 24-in driven CISS pile extensions are recommended at the bents.

The pile data is summarized in the tables below.

Table – 2. Abutment Foundation Design Recommendations.

Support Location	Pile Type	Cut-off Elev (ft)	LRFD Service-I Limit State Load per Support –Compression (kips)		LRFD Service-I Limit State Load per Pile-Compression (kips)	Nominal Resistance (kips)	Design Tip Elevation (ft)	Spec Tip Elev (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut 1	14" Class 140 Alt. W	265.0	980	980	140	280	211(a)	211	360
Abut 4	14" Class 140 Alt. W	265.0	980	980	140	280	213(a)	213	360

Notes:
1) Design tip elevations are controlled by (a) Compression.
2) The specified tip elevation shall not be raised above the design tip elevations for lateral loads.
3) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft/loose, liquefiable, scourable, etc.), which do not contribute to the design resistance.
4) Structure Design typically provides design tip elevation for Lateral Load.

Table 3. Bent foundations Design Recommendations.

Support Location	Pile Type	Cut-off Elevation (ft)	Permanent Load Service-I Limit State Load per Support (kips)	Total Permissible Support Settlement (inches)	Required Factored Nominal Resistance (kips)				Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resist. Required (kips)
					Strength Limit		Extreme Event				
					Comp. (φ=0.7	Tension (φ=0.7)	Comp (φ=1)	Tension (φ=1)			
Bent 2	24" CISS	267.5	N/A	1.0	300	N/A	N/A	N/A	190 (a-I)	190	650
Bent 3	24" CISS	268.5	N/A	1.0	300	N/A	N/A	N/A	195 (a-I)	195	490

Notes:
1) Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (a-II) Compression (Extreme Event).
2) Unsuitable soil layers (very soft, liquefiable and scourable) that do not contribute to the design nominal resistance exists at all abutments and bents.
3) There is no design tip elevation for Settlement.
4) Structure Design Typically provides Design tip elevations for Lateral Load.

Table 4- Pile Data Table.

Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut 1	14" Class 140 Alt. "W"	280	N/A	211(a)	211	360
Bent 2	24" CISS	430	N/A	190(a)	190	650
Bent 3	24" CISS	430	N/A	195(a)	195	490
Abut 4	14" Class 140 Alt. "W"	280	N/A	213(a)	213	360

Notes:
1) Design tip elevations for Abutments and Bents are controlled by: (a) Compression.
2) Unsuitable soil layers (very soft, liquefiable, scourable) that do not contribute to the design nominal resistance exist at all abutment and bents.
3) Structure Design Typically provides Design tip elevations for Lateral Load.
4) There is no design tip elevation for Settlement.

General Notes to Designer

1. The structure engineer shall show on the plans, in the pile data table, the minimum pile tip elevation required to meet the lateral load demands.

2. Should the specified pile tip elevation required to meet lateral load demands exceed the specified pile tip elevation given within this report, the Office of Geotechnical Design North should be contacted for further recommendations.

3. Support locations will be plotted on the Log of Test Borings, in plan view as stated in "Memos to Designers" 4-2 if additional borings are required. There is a conversion table placed of the original boring sheet that converts those borings locations to the present stationing an offset distances.

Construction Considerations

1. Groundwater levels may exceed the bottom of pile cap elevations year around. Therefore, during their construction wet soils and caving should be expected and dewatering in conjunction with shoring and/ or seal course placement shall be required.

2. Pile acceptance criteria for all standard diameter driven piles shall be based on the Gates formula (Caltrans Standard Specifications Section 49-1.08). Central relief drilling may be needed due to possible hard driving condition.

4. Piles, to be driven through embankment fills, shall be predrilled according to Caltrans Standard Specifications Section 49-1.06.

5. Hard driving conditions should be expected at and below the bottom of bent and abutment pile cut off /pile cap elevations. Some center relief drilling may be required. A soil plug of approximately 6 diameters should be maintained.

6. Excavated materials shall be handled and disposed of in accordance with the Special Provisions.

The Preliminary Foundation Recommendations included in this report are based on specific project information regarding structure type and structure location. Any questions regarding the above preliminary recommendations should be directed to the attention of William Bertucci (916) 227-1045 or John Huang (916) 227-1037, Geotechnical Services, Office of Geotechnical Design-North, and Branch E.

Report by:

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Geotechnical Services
Division of Engineering Services

Reviewed By:

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Division of Engineering Services

Reza Mahallati
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Division of Engineering Services

REGISTERED PROFESSIONAL ENGINEER
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STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
QIANG HUANG
No. C055671
Exp. 12/31/12
CIVIL
STATE OF CALIFORNIA

ARS curve Attachment

cc: Jim Bane (District PM), Peggy Lim (PCE), Mark Willian, Trais Norris (District Env Manager), Ted Morradian (District Materials)

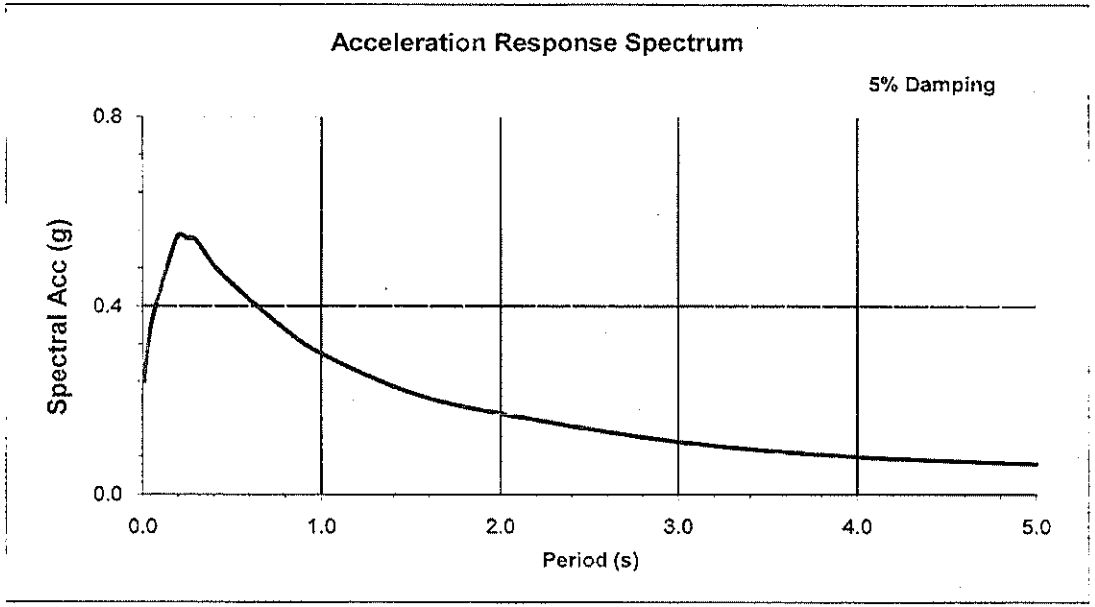
RD 29 S. Cottonwood Creek

Bridge No. 41C-0209
EA 06-471001

Latitude 36.9219
Longitude -120.0205

Control Probabilistic

Period (s)	Sa(g)
0.010	0.239
0.020	0.285
0.030	0.317
0.050	0.362
0.075	0.402
0.100	0.433
0.120	0.460
0.150	0.497
0.200	0.549
0.250	0.544
0.300	0.539
0.400	0.486
0.500	0.448
0.750	0.365
1.000	0.299
1.500	0.215
2.000	0.171
3.000	0.111
4.000	0.079
5.000	0.064



Deterministic Procedure Data

Fault	San Andreas fault zone south (Creeping section)	
Fault ID	203	
Style	SS	
Mmax	7.9	
Dip	90	deg
Z_{TOR}	0	km

R_{rup}	104.00	km
R_{jb}	104.00	km
R_x	104.00	km
V_{S30}	270	m/s
$Z_{1.0}$	N/A	m
$Z_{2.5}$	N/A	km

Notes

Please note the design ARS curve is based on 5% probability of exccedance in 50 years (975 year return period).

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: Mr. FRITZ HOFFMAN, Chief
Bridge Design Branch 6
Office of Bridge Design Central

Attention: Talal Sadek

Date: October 28, 2011

File: 06-Mad-99-R7.1/7.9
Ave 12 Interchange
EA: 06-471001
Directional Onramp
Br. No. 44-0089G

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

Subject: Revised Foundation Report (FR)
(Reference: FR dated April 18, 2011)

Introduction

This revised report presents up dated foundation recommendations based on revised foundation design loads and new boring data. The referenced FR was in response to the request from Bridge Design Branch 6, dated May 11, 2010 to provide a foundation report for the proposed Directional Onramp Bridge over Cottonwood Creek. This bridge is located south of Ave. 12 between the existing County Road 29 South and SR 99, Post Mile 7.46 and is one of five bridges to be replaced as part of the interchange modification at Ave 12 in Madera County. The new structure type will be a 4-span P/S solid concrete slab bridge on multicolumn bents supported on 24 inch diameter CISS piles. The abutments will be seat type on pile footings.

The scope of our work includes evaluating General and Foundation plans, the new gravity loads, available information on site geology based on As Built LOTB (B-3) and present investigation LOTB RC-11-003 and RC-11-003A. The scope also included an evaluation of the sites seismic and hydrologic environment. This report will provide pile tip elevations including an Acceleration Response Spectrum (ARS) curve.

Geology

Regional

The Bridge site is situated within the San Joaquin Valley that is located within in the southern part of the Great Valley Geomorphic province. This low lying flat terrain extends

from the Cascade Ranges at the north end of the province to the Tehachapi Mountains at the south end of the province and it is bound on the east by the Sierra Nevada Mountains and on the west by the Coast Range Mountains. Structurally, the province is an elongate asymmetric basin that reaches depths of over 29,000 feet. Deposition of marine and non-marine sediments into this basin has been on going since the Mesozoic Era. Recent and Pleistocene soils that underlie the San Joaquin Valley at the project site are composed of interbeds and lenses of gravels, sands, silts and clays eroded primarily from the Sierra Nevada.

Site Geology

The recent test boring (R-11-003) and as-built test boring (B-3) shows that the subsurface materials near the existing bridge site consist primarily of loose to medium dense SAND and SILT to depths of about 16 to 25 feet (elevations 252 to 263 feet) . Below to the maximum depth explored 76 feet (elevation 201 feet) the soils become primarily medium dense to dense SAND, SILTY SAND and SILT with a few scattered lenses 1 to 3 feet thick of stiff to very stiff SILTY CLAY to SANDY CLAY. The exception occurred below approximate elevation 210 ft. (Boring B-3) were "slightly compacted" SANDY SILT was encountered. Boring RC-11-003A drilled adjacent to RC-11-003 was sampled starting at approximate elevation 220 ft and extended to elevation 152.2 feet (51 feet deeper than boring RC-11-003). The soils logged in this boring consisted primarily of interbedded medium dense to dense SILTY SAND, well graded and poorly graded SAND and SILT with SAND. From elevation of approximately 161ft to the bottom of the boring the soils became very dense SILTY SAND. See Log of Test Borings (LOTB) for detailed description of soil conditions.

Scour Potential

Potential scour conditions at the bridge site, provided by Juan Jauregui of Structure Hydraulics & Scour Mitigation (Report date August 4, 2010) are summarized in Table 1 below.

Table 1 Scour Summary

Scour Type	Bent 2	Bent 3	Bent 4
Degradation	2 ft	2 ft	2 ft
Contraction Scour	N/A	N/A	N/A
Local	5.3 ft	5.3 ft	5.3 ft
Total Potential	7.3 ft	7.3 ft	7.3 ft
Thalweg (Channel) Elev. (ft)	262.6	262.6	262.6
Thalweg migration	YES	YES	YES
Potential Scour Elev. (ft)	255.3	255.3	255.3

Notes:
1. Total potential scour is based on a 3-foot column diameter.

Groundwater

Ground water conditions will vary according to variations in rainfall, well pumping, and other activities. Groundwater measurements made in 1961 and 2011 varied little with an elevation of 261.2 ft for the former and an elevation of 262.9 ft for the latter. For design purposes, the groundwater was assumed at the elevation of the 274.2 ft (100 year flood water surface elevation). For a frame of reference the ground elevation at the Abutments is approximately 282 feet and the channel elevation at the Bents is approximately 267 feet.

Corrosion

Based on the As-Built LOTB data and corrosion testing for other projects in the area, the soils at the site are anticipated to be non-corrosive.

Seismicity

In accordance to Caltrans 2009 Seismic Design Procedure, the controlling active is the San Andreas Fault zone (Creeping section) (Fault ID No. 311) with a Mmax of 7.9. This fault is identified as a right lateral strike slip fault with a vertical dip. The fault is located west of the bridge site, and the rupture distance from the fault plane to the site is 65 miles.

Based on the local soil data, a shear wave velocity, Vs30 was estimated using the SPT blow counts and correlation formulas for the granular soil. The estimated Vs30 is about 900 feet per second.

Using the above estimated Vs30, the spectral acceleration (SA) generated from this fault is less than the SA generated for statewide minimum, which is again less than the SA obtained from the USGS probabilistic model of 5% probability of exceedance in 50 years corresponding to a 975 return period. Therefore, the recommended design Acceleration Response Spectrum (ARS) curve is based on the USGS probabilistic model. The design ARS curve with an estimated peak ground acceleration of 0.24g is attached in the Appendix of this report.

The liquefaction analysis based on Boring R-11-003 indicates the soil layer located from elevation 272 feet to 267 feet has potential to liquefy during an earthquake event. However, the bottom of footing /cut off elevations of the abutments and bent piles are below the liquefaction base elevation therefore, liquefaction will have no effect.

The potential for surface rupture at the site due to fault movement is considered insignificant since there are no known faults projecting towards or passing directly through the project site. We will reevaluate the seismic recommendations if additional soil data becomes available or needed.

Foundation Recommendations

The foundation recommendations are based on the present 2011and 1961 field investigation borings and analysis in conjunction with the preliminary Hydraulic information provided by Structure Hydraulics & Scour Mitigation (August 4, 2010), General Plans, Foundation Plans and foundation loads provided by Fritz Hoffman and Talal Sadek. Class 140 Alternative "W" pipe piles are recommended at the abutments and 24-in driven CISS pile extensions are recommended at the bents.

The pile data is summarized in the tables below.

Table – 2. Abutment Foundation Design Recommendations.

Support Location	Pile Type	Cut-off Elev (ft)	LRFD Service-I Limit State Load per Support –Compression (kips)		LRFD Service-I Limit State Load per Pile-Compression (kips)	Nominal Resistance (kips)	Design Tip Elevation (ft)	Spec Tip Elev (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut 1	14" Class 140 Alt. W	272.25	554	494	140	280	211(a)	211	360
Abut 5	14" Class 140 Alt. W	272.25	554	494	140	280	223(a)	223	400

Notes:
1) Design tip elevations are controlled by (a) Compression.
2) The specified tip elevation shall not be raised above the design tip elevations for lateral loads.
3) The nominal driving resistance required is equal to the nominal resistance needed to support the factored load plus driving resistance from the unsuitable penetrated soil layers (very soft/loose, liquefiable, scourable, etc.), which do not contribute to the design resistance.
4) Structure Design typically provides design tip elevation for Lateral Load.

Table 3. Bent foundations Design Recommendations.

Support Location	Pile Type	Cut-off Elevation (ft)	Permanent Load Service-I Limit State Load per Support (kips)	Total Permissible Support Settlement (inches)	Required Factored Nominal Resistance (kips)				Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resist. Required (kips)
					Strength Limit		Extreme Event				
					Comp. (φ=0.7)	Tension (φ=0.7)	Comp (φ=1)	Tension (φ=1)			
Bent 2	24" CISS	255.3	N/A	1.0	340	N/A	N/A	N/A	184 (a-I)	184	495
Bent 3	24" CISS	255.3	N/A	1.0	340	N/A	N/A	N/A	184 (a-I)	189	495
Bent 4	24" CISS	255.3	N/A	1.0	340	N/A	N/A	N/A	196 (a-I)	196	570

Notes:
1) Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (a-II) Compression (Extreme Event).
2) Unsuitable soil layers (very soft, liquefiable and scourable) that do not contribute to the design nominal resistance exists at all abutments and bents
3) There is no design tip elevation for Settlement.
4) Structure Design Typically provides Design tip elevations for Lateral Load.

Table 4- Pile Data Table.

Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut 1	14" Class 140 Alt. "W"	280	N/A	211(a)	211	360
Bent 2	24" CISS	415	N/A	184(a)	184	495
Bent 3	24" CISS	440	N/A	184(a)	184	495
Bent 4	24" CISS	415	N/A	196(a)	196	570
Abut 5	14" Class 140 Alt. "W"	280	N/A	223(a)	223	400

Notes:

1) Design tip elevations for Abutments and Bents are controlled by: (a) Compression.
2) Unsuitable soil layers (very soft, liquefiable, and scourable) that do not contribute to the design nominal resistance exist at all abutment and bents.
3) Structure Design Typically provides Design tip elevations for Lateral Load.
4) There is no design tip elevation for Settlement.

General Notes to Designer

1. The structure engineer shall show on the plans, in the pile data table, the minimum pile tip elevation required to meet the lateral load demands.

2. Should the specified pile tip elevation required to meet lateral load demands exceed the specified pile tip elevation given within this report, the Office of Geotechnical Design North should be contacted for further recommendations.

3. Support locations will be plotted on the Log of Test Borings, in plan view as stated in "Memos to Designers" 4-2 if additional borings are required. There is a conversion table placed of the original boring sheet that converts those borings locations to the present stationing an offset distances.

Construction Considerations

1. Groundwater levels may exceed the bottom of abutment footing and pile cut-off elevations year around. Therefore, during their construction wet soils and caving should be expected and dewatering in conjunction with shoring and/ or seal course placement shall be required.

2. Pile acceptance criteria for all standard diameter driven piles shall be based on the Gates formula (Caltrans Standard Specifications Section 49-1.08). Central relief drilling may be needed due to possible hard driving condition.

4. Piles, to be driven through embankment fills, shall be predrilled according to Caltrans Standard Specifications Section 49-1.06.

5. Hard driving conditions should be expected at and below the bottom of bent and abutment pile cut off /pile cap elevations. Some center relief drilling may be required. A soil plug of approximately 6 diameters shall be maintained. Therefore center relief drilling shall be stopped at least 6 diameters above the tip of the pile.

6. Excavated materials shall be handled and disposed of in accordance with the Special Provisions.

The Foundation Recommendations included in this report are based on specific project information regarding structure type and structure location. Any questions regarding the above recommendations should be directed to the attention of William Bertucci (916) 203-7992 or John Huang (916) 227-1037, Geotechnical Services, Office of Geotechnical Design-North, and Branch E.

Report by:

for Bill

William Bertucci
Associate Engineering Geologist
Office of Geotechnical Design – North
Geotechnical Services
Division of Engineering Services

Reviewed By:

John Huang
Senior Materials and Research Engineer
Office of Geotechnical Design – North
Geotechnical Services
Division of Engineering Services

Reza

Reza Mahallati
Senior Materials and Research Engineer
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REGISTERED PROFESSIONAL ENGINEER
REZA MAHALLATI
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9/30/12
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
QIANG HUANG
No. C055671
Exp. 12/31/12
CIVIL
STATE OF CALIFORNIA

ARS curve Attachment

cc: Jim Bane (District PM), Peggy Lim (PCE), Mark Willian, Trais Norris (District Env Manager), Ted Morradian (District Materials)

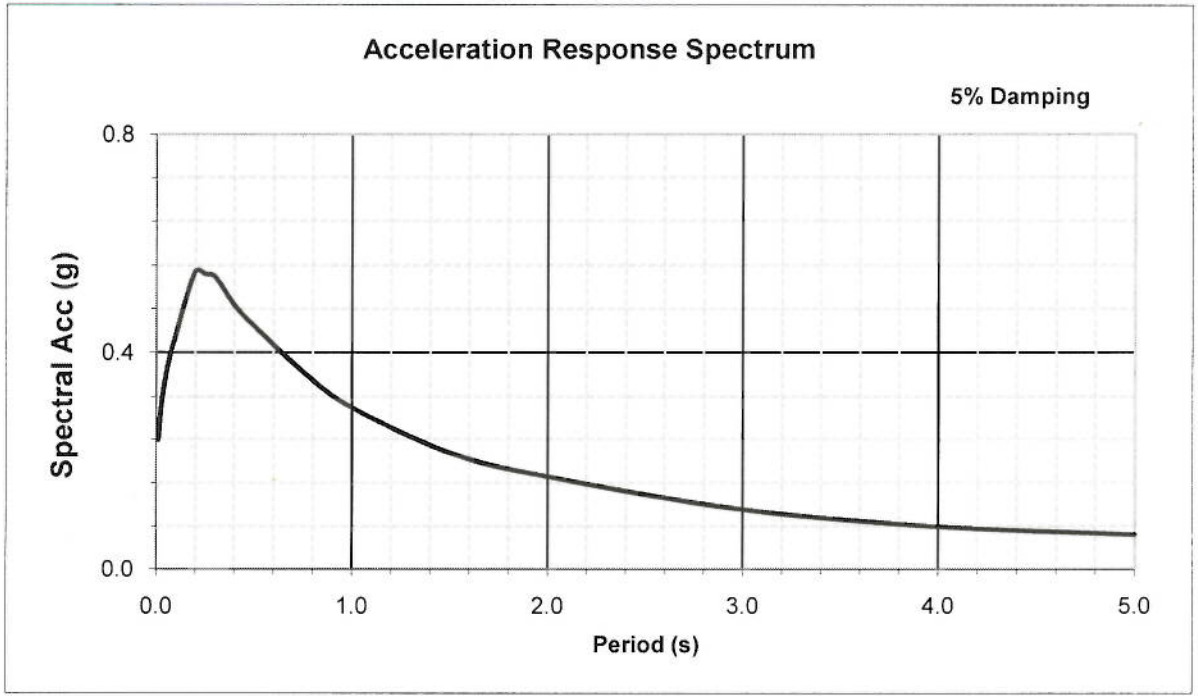
Directional Onramp

Bridge No. 44-0089G
EA 06-471001

Latitude 36.9219
Longitude -120.0205

Control **Probabilistic**

Period (s)	Sa(g)
0.010	0.239
0.020	0.285
0.030	0.317
0.050	0.362
0.075	0.402
0.100	0.433
0.120	0.460
0.150	0.497
0.200	0.549
0.250	0.544
0.300	0.539
0.400	0.486
0.500	0.448
0.750	0.365
1.000	0.299
1.500	0.215
2.000	0.171
3.000	0.111
4.000	0.079
5.000	0.064



Deterministic Procedure Data

Fault	San Andreas fault zone south (Creeping section)		R_{rup}	104.00	km
Fault ID	311		R_{jb}	104.00	km
Style	SS		R_x	104.00	km
Mmax	7.9		V_{S30}	270	m/s
Dip	90	deg	$Z_{1.0}$	N/A	m
Z_{TOR}	0	km	$Z_{2.5}$	N/A	km

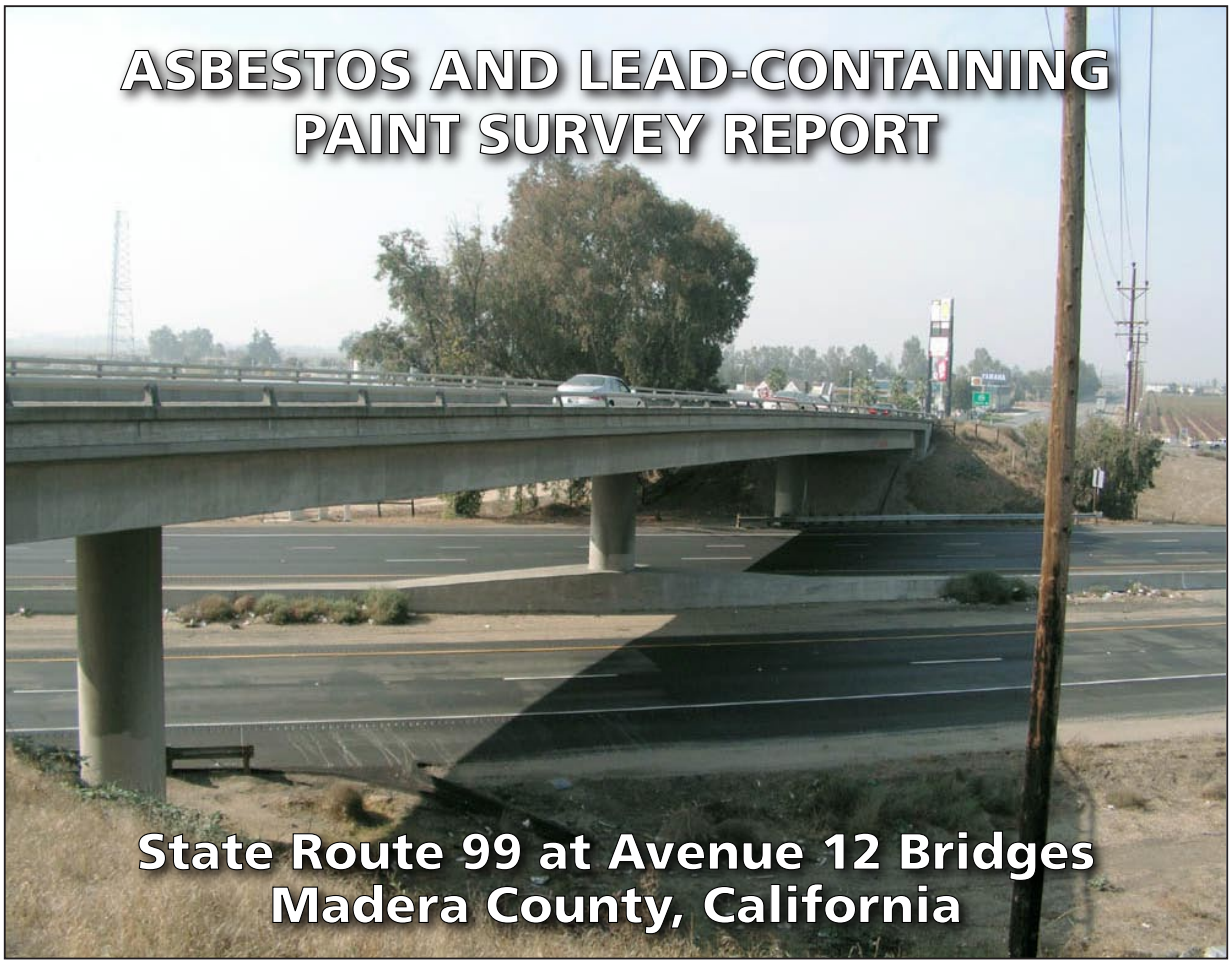
Notes

Please note the design ARS curve is based on 5% probability of exccedance in 50 years (975 year return period).

Preliminary

Design Response Spectrum

ASBESTOS AND LEAD-CONTAINING PAINT SURVEY REPORT



State Route 99 at Avenue 12 Bridges
Madera County, California

PREPARED FOR:

CALIFORNIA DEPARTMENT OF TRANSPORTATION
DISTRICT 6
2015 E. SHIELDS AVENUE, SUITE 100
FRESNO, CALIFORNIA 93726

PREPARED BY:

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DRIVE, SUITE 800
RANCHO CORDOVA, CALIFORNIA 95742

GEOCON PROJECT NO. S9200-06-28
TASK ORDER NO. 28, EA NO. 06-471000

DECEMBER 2007

Project No. S9200-06-28
December 13, 2007

Susan Greenwood, Task Order Manager
California Department of Transportation - District 6
2015 East Shields Avenue, Suite 100
Fresno, California 93726

Subject: STATE ROUTE 99 AT AVENUE 12 BRIDGES (POST MILE R7.1 TO R7.9)
MADERA COUNTY, CALIFORNIA
CONTRACT NO. 06A1141
TASK ORDER NO. 28, EA NO. 06-471000
ASBESTOS AND LEAD-CONTAINING PAINT SURVEY REPORT

Dear Ms. Greenwood:

In accordance with California Department of Transportation Contract No. 06A1141 and Task Order No. 28, we have performed an asbestos and lead-containing paint (LCP) survey at the subject location in Madera County, California. The scope of services included surveying five bridges for suspect asbestos-containing materials and suspect LCP, collecting bulk samples, and submitting the samples to a laboratory for analysis.

The accompanying report summarizes the services performed and laboratory analysis.

The contents of this report reflect the views of Geocon Consultants, Inc., who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

Please contact us if you have questions concerning the contents of this report or if we may be of further service.

Sincerely,

GEOCON CONSULTANTS, INC.

Chris Giuntoli, CAC
Senior Project Scientist

John E. Juhrend, PE, CEG
Project Manager

CG:JEJ:jaj

(2 + 2 CDs) Addressee

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ASBESTOS AND LEAD-CONTAINING PAINT SURVEY REPORT Page

ASBESTOS AND LEAD-CONTAINING PAINT SURVEY REPORT

1.0 INTRODUCTION

This asbestos and lead-containing paint (LCP) survey report was prepared by Geocon Consultants, Inc. under Caltrans Contract No. 06A1141, Task Order No. 28 (TO-28).

1.1 Project Description

The project consists of five bridges located on, crossing, and adjacent to State Route (SR) 99 between Post Miles (PM) R7.1 and R7.9 in Madera County, California. The bridges included in our survey are:

- Bridge 41-0066 (Avenue 12 Overcrossing [OC]);
- Bridge 41-0065L (Cottonwood Creek Bridge/southbound SR 99);
- Bridge 41-0065R (Cottonwood Creek Bridge/northbound SR 99);
- Bridge 41-0065S (northbound SR 99 exit to Avenue 12); and
- County Road 29 Bridge (over Cottonwood Creek).

We surveyed the bridges for suspect asbestos and LCP on November 8, 2007. The project location is depicted on the Vicinity Map, Figure 1, and Site Plans, Figures 2a and 2b.

1.2 General Objectives

The purpose of the scope of services outlined in TO-28 was to determine the presence and quantity of asbestos and LCP prior to improvement activities. Caltrans will use the information obtained from this investigation for waste profiling, determining California Occupational Safety and Health Administration (Cal/OSHA) applicability, and coordinating asbestos and LCP disturbance activities.

2.0 BACKGROUND

2.1 Asbestos

The *Code of Federal Regulations (CFR),* 40 CFR 61, Subpart M, National Emissions Standards for Hazardous Air Pollutants (NESHAP) and Federal Occupational Safety and Health Administration (FED OSHA) classify asbestos-containing material (ACM) as any material or product that contains *greater than* 1% asbestos. Nonfriable ACM is classified by NESHAP as either Category I or Category II material defined as follows:

- **Category I** – asbestos-containing packings, gaskets, resilient floor coverings, and asphalt roofing products.

- **Category II** – all remaining types of nonfriable asbestos-containing material not included in Category I that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Regulated asbestos-containing material (RACM), a hazardous waste when friable, is classified as any manufactured material that contains *greater than* 1% asbestos by dry weight *and* is:

- Friable (can be crumbled, pulverized, or reduced to powder by hand pressure); or
- Category I material that has become friable; or
- Category I material that has been subjected to sanding grinding, cutting or abrading; or
- Category II nonfriable material that has a high probability of becoming crumbled, pulverized, or reduced to a powder during demolition or renovation activities.

Activities that disturb materials containing *any* amount of asbestos are subject to certain requirements of the Cal/OSHA asbestos standard contained in Title 8, CCR Section 1529. Typically, removal or disturbance of more than 100 square feet of material containing more than 0.1% asbestos must be performed by a registered asbestos abatement contractor, but associated waste labeling is not required if the material contains 1% or less asbestos. When the asbestos content of a material exceeds 1%, virtually all requirements of the standard become effective.

Materials containing more than 1% asbestos are also subject to NESHAP regulations (40 CFR Part 61, Subpart M). RACM (friable ACM and nonfriable ACM that will become friable during demolition operations) must be removed from structures prior to demolition. Certain nonfriable ACM and materials containing 1% or less asbestos may remain in structures during demolition; however, there are waste handling/disposal issues and Cal/OSHA work requirements that may make it cost ineffective to do so. Contractors are responsible for segregating and characterizing waste streams prior to disposal.

With respect to potential worker exposure, notification, and registration requirements, Cal/OSHA defines asbestos-containing construction material (ACCM) as construction material that contains more than 0.1% asbestos (Title 8, CCR 341.6).

2.2 Lead Paint

Construction activities (including demolition) that disturb materials or paints containing *any* amount of lead are subject to certain requirements of the Cal/OSHA lead standard contained in Title 8, CCR, Section 1532.1. Deteriorated paint is defined by Title 17, CCR, Division 1, Chapter 8, §35022 as a surface coating that is cracking, chalking, flaking, chipping, peeling, non-intact, failed, stripped, or otherwise separated from the substrate. Demolition of a deteriorated LCP component would require waste characterization and appropriate disposal. Intact LCP on a component is currently accepted by most landfill facilities; however, contractors are responsible for segregating and characterizing waste streams prior to disposal.

For a solid waste containing lead, the waste is classified as California hazardous when: 1) the total lead content equals or exceeds the respective Total Threshold Limit Concentration (TTLC) of 1,000 milligrams per kilogram (mg/kg); or 2) the soluble lead content equals or exceeds the respective Soluble Threshold Limit Concentration (STLC) of 5 milligrams per liter (mg/l) based on the standard Waste Extraction Test (WET). A waste has the potential for exceeding the lead STLC when the waste's total lead content is greater than or equal to ten times the respective STLC value since the WET uses a 1:10 dilution ratio. Hence, when total lead is detected at a concentration greater than or equal to 50 mg/kg, and assuming that 100 percent of the total lead is soluble, soluble lead analysis is required. Lead-containing waste is classified as "Resource, Conservation, and Recovery Act" (RCRA) hazardous, or Federal hazardous, when the soluble lead content equals or exceeds the Federal regulatory level of 5 mg/l based on the Toxicity Characteristic Leaching Procedure (TCLP).

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability; however, for the purposes of this investigation, toxicity (i.e., lead concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or other criteria. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste.

Potential hazards exist to workers who remove or cut through LCP coatings during demolition. Dust containing hazardous concentrations of lead may be generated during scraping or cutting materials coated with lead-containing paint. Torching of these materials may produce lead oxide fumes. Therefore, air monitoring and/or respiratory protection may be required during the demolition of materials coated with LCP. Guidelines regarding regulatory provisions for construction work where workers may be exposed to lead are presented in the Title 8, CCR, Section 1532.1.

2.3 Architectural Drawings

Architectural drawings for the project were not available for our review.

3.0 SCOPE OF SERVICES

Mr. Chris Giuntoli, a California-certified Asbestos Consultant (CAC), certification No. 02-3163 (expiration June 18, 2008), and Certified Lead Paint Inspector/Assessor with the California Public Health Department (CPHD), certification number I-5502 (expiration June 14, 2008), performed the asbestos and LCP survey at the project location on November 8, 2007.

3.1 Asbestos

Suspect ACM were grouped into homogeneous areas with representative samples randomly collected from each. In addition, each potential ACM was evaluated for condition (evidence of deterioration, physical damage, and water damage) and friability. A total of 13 bulk asbestos samples of suspect materials were collected at the project location.

Our procedures for inspection and sampling in accordance with TO-28 are discussed below:

- Collected bulk asbestos samples after first wetting friable material with a light mist of water. The samples were then cut from the substrate and transferred to a labeled container. Note that when multiple samples were collected, the sampling locations were distributed throughout the homogeneous area (spaces where the material was observed).
- Relinquished bulk asbestos samples to EMSL Analytical, Inc., a California-licensed and Caltrans-approved subcontractor, for asbestos analysis in accordance with United States Environmental Protection Agency (EPA) Test Method 600/R-93/116 using polarized light microscopy (PLM) under chain-of-custody protocol. EMSL Analytical, Inc. is a laboratory accredited by the National Institute of Standards and Technology National Voluntary Laboratory Accreditation Program (NIST-NVLAP) for bulk asbestos fiber analysis. The laboratory analyses were requested on a 5-workday turn-around-time.

Sample identification numbers, material descriptions, approximate quantities, friability assessments, and photo references are summarized on Table 1. Approximate sample locations are presented on Figures 2a and 2b. Materials represented by the samples collected are shown in the attached photographs.

3.2 Lead Paint

Painted surfaces were not observed on the bridge structures other than intact yellow and white roadway paint striping. Due to safety constraints, sampling of roadway paint striping was not performed.

4.0 INVESTIGATIVE RESULTS

4.1 Asbestos

A summary of the analytical laboratory test results for asbestos is presented on Table 1. The laboratory analyses indicated the following:

Chrysotile asbestos at a concentration of 80% was detected in samples representing an undetermined quantity of nonfriable asbestos sheet packing used as barrier rail shims on Bridges 41-0066, 41-0065R, 41-0065S, and the County Road 29 Bridge over Cottonwood Creek. Additionally, barrier rail shims were observed, though were inaccessible, on Bridge 41-0065L.

No asbestos was detected in samples of the remaining suspect materials collected.

4.2 Lead Paint

Due to safety concerns (i.e., traffic), we were not able to access areas where roadway paint striping was observed at the project location. However, we did note that paint applied to the road surfaces on the bridges was intact during our survey. Road striping applied to bridge decks at the project location should be assumed to be lead-containing unless/until sampling and analysis indicate otherwise.

5.0 RECOMMENDATIONS

Based on our findings, we recommend the following:

5.1 Asbestos

We recommend that asbestos-containing barrier rail shims (a Category I nonfriable/nonhazardous material) identified on the barrier rail assemblies of Bridges 41-0066, 41-0065R, 41-0065S, and the County Road 29 Bridge over Cottonwood Creek be removed and disposed of by a licensed contractor registered with Cal/OSHA for asbestos-related work (or by a licensed and certified asbestos abatement contractor) prior to renovation, demolition, or other activities that would *disturb* the material. Based on the consistent sample results that identified asbestos in barrier rail shims at four of the five bridges, we also recommend that barrier rail shims observed on Bridge 41-0065L, but that were inaccessible for sampling, also be treated as assumed asbestos-containing material and removed and disposed of as a Category I nonfriable/nonhazardous material.

We also recommend the notification of contractors (that will be conducting renovation, demolition, or related activities) of the presence of asbestos (i.e., provide the contractor[s] with a copy of this report and a list of asbestos removed by asbestos abatement contractor[s] during subsequent abatement activities). Contractors should be instructed not to disturb asbestos during their work. Contractors are responsible for informing the landfill of the contractor's intent to dispose of asbestos waste. Some landfills may require additional waste characterization. Contractors are responsible for segregating and characterizing waste streams prior to disposal.

In accordance with San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Regulation IV, Rule 4002, written notification to SJVUAPCD is required ten working days prior to commencement of *any* demolition activity (whether asbestos is present or not).

5.2 Lead Paint

With the exception of inaccessible paint striping applied to road surfaces on the bridge decks, painted surfaces were not observed at the bridge structures. We recommend that all paints at the project location be treated as lead-containing for purposes of determining the applicability of the Cal/OSHA lead standard during any future maintenance, renovation, and demolition activities. This recommendation is based on the fact that lead was a common ingredient of paints manufactured before 1978 and is still an ingredient of some industrial paints. Construction activities (including demolition) that disturb materials containing *any* amount of lead are subject to certain requirements of the Cal/OSHA lead standard contained in Title 8, CCR Section 1532.1. We recommend the use of personnel who have lead-related construction certification as supervisors or workers, as appropriate, from the CPHD for personnel performing "trigger tasks" as defined in Title 8 CCR Section 1532.1(d).

Common trigger tasks include manual scraping or sanding, heat gun applications, power tool cleaning, spray painting with lead paint, abrasive blasting, welding, cutting, grinding, and torch burning. Contractors should consult the Cal/OSHA lead standard for additional guidance.

In accordance with Title 8, CCR, Section 1532.1(p), written notification to the nearest Cal/OSHA district office is required at least 24 hours prior to certain lead-related work.

Contractors are responsible for informing the landfill of the contractor's intent to dispose of RCRA waste, California hazardous waste, and/or architectural components containing intact LCP. Deteriorated paint is a surface coating that is cracking, chalking, flaking, chipping, peeling, non-intact, failed, stripped, or otherwise separated from the substrate. Demolition of a deteriorated LCP component would require waste characterization and appropriate disposal. Intact LCP on a component is currently accepted by most landfill facilities; however, contractors are responsible for segregating and characterizing waste streams prior to disposal. Some landfills may require additional waste characterization. Contractors are responsible for segregating and characterizing waste streams prior to disposal.

6.0 REPORT LIMITATIONS

The asbestos and LCP survey was conducted in conformance with generally accepted standards of practice for identifying and evaluating asbestos and LCP in structures. The survey addressed only those structures identified in Section 1.1. Due to the nature of structure surveys, asbestos and LCP use, and laboratory analytical limitations, some asbestos and LCP at the project location may not have been identified. Spaces such as cavities, voids, crawlspaces, and pipe chases, may have been concealed to Geocon's investigator. Previous renovation work may have concealed or covered spaces or materials, or may have partially demolished materials and left debris in inaccessible areas. Additionally, renovation activities may have partially replaced asbestos and LCP with indistinguishable non-asbestos and LCP. Asbestos and LCP may exist in areas of the structures that were not accessible or sampled in conjunction with this TO.

During renovation or demolition operations, suspect materials may be uncovered which are different from those accessible for sampling during this assessment. Personnel in charge of renovation/demolition should be alerted to note materials uncovered during such activities that differ substantially from those included in this or previous assessment reports. If suspect asbestos and LCP are found, additional sampling and analysis should be performed to determine if the materials contain asbestos and lead.

This report has been prepared exclusively for Caltrans. The information contained herein is only valid as of the date of the report, and will require an update to reflect additional information obtained.

This report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: MR. GETACHEW ESHETE
Senior Transportation Engineer
District 6 Design
Design 1, Branch L

Attention: Akm Rahman

Date: March 17, 2011

File: 06-MAD-99 PM R7.1/R7.9
EFIS 0600000463 1
EA 06-471001
Avenue 12 Interchange

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
METS AND GEOTECHNICAL SERVICES – MS 5
OFFICE OF GEOTECHNICAL DESIGN NORTH

Subject: Geotechnical Design Report

1. Introduction

Per your request, we are providing this Geotechnical Design Report (GDR) for the Avenue 12 Interchange project, located on State Route 99 PM R7.1/R7.9, approximately 2 miles north of the city of Fresno in Madera County, California. The project proposes to improve the interchange at Avenue 12 and State Route 99. A Vicinity Map is presented as **Plate No. 1**.

2. Pertinent Reports and Investigations

The following publications were reviewed to assist in the assessment of site conditions and to provide foundation recommendations.

- Project Plans and Cross Sections, 11/2/2010
- As-Built LOTB, Avenue 12 OC, Br. No. 41-0066
- As-Built LOTB, Avenue 12 OH, Br. No. 41C-0047
- Geologic Map of California, Santa Cruz Sheet, 1:250,000: CDMG, 1958
- Caltrans 2009 Seismic Design Procedure (SPD)
- Caltrans Standard Plans / Specifications, May 2006

3. Existing Conditions

Highway 99 within the project limits consists of an at grade four lane divided highway aligned in a general north-south direction. Railroad tracks parallel Highway 99 to the east. Cottonwood Creek travels east of the interchange and crosses under Highway 99 to the south. Avenue 12 consists of an east-west two lane roadway which crosses over Highway 99 via the Avenue 12 OC, the railroad tracks via the Avenue 12 OH and Cottonwood Creek via the Cottonwood Creek Bridge. The Avenue 12 interchange is a modified diamond with both northbound and southbound on and off ramps to and from Highway 99. At the interchange, Avenue 12 and the ramps are constructed on fill embankment with a maximum height of approximately 20 feet. The fill embankments appear to be performing favorably.

4. Proposed Improvements

This project proposes to improve the interchange at Avenue 12 and State Route 99. Improvements include widening Avenue 12 from 2 lanes to 6 lanes and realigning the northbound and southbound on and off ramps. The profile of Avenue 12 and the ramps will be raised by approximately 10 feet from existing. Proposed fill embankments will have a maximum height of approximately 30 feet. To facilitate the ramp realignment, five retaining walls will be constructed. Additionally, five new bridges will be constructed. This report provides foundation recommendations for the fill embankments and retaining walls only. Foundation recommendations for the new bridges will be included separately in a Foundation Report for each bridge. A Site Plan, showing the proposed wall locations and the existing / proposed bridge structures, is presented as **Plate No. 2**.

5. Site Geology and Subsurface Conditions

Site Geology

The California Department of Conservation, Division of Mines and Geology Geologic Map of California, Santa Cruz Sheet dated 1958 was used to determine the geologic formations at the project location. The map indicates the geology within the project limits are of recent alluvial fan deposits, which consist of granitic sand, silt and clay.

Subsurface Conditions

For construction of the existing Ave 12 OC, one boring (B-1) was performed at the west end of the bridge and one boring (B-3) was performed at the east end of the bridge. The top of boring elevation for B-1 and B-3 is 269.8 and 272.4 feet, respectively. According to the LOTB, the subsurface soil in boring B-1 consists of fine to medium sand, silty sand, and silt to clayey silt to the maximum depth explored of approximately 56 feet (elevation 214 feet). In general the soil density increased with depth. The density in the top 15 feet (elevation 269.8 feet to 255 feet) is very loose to loose, and becomes dense below elevation 240 feet. According to the LOTB, the subsurface soil in boring B-3 consists of fine to medium silty sand, fine to coarse sand, and silt to sandy silt to the maximum depth explored of approximately 70 feet (elevation 202 feet). In general the soil density increased with depth. The soil is loose between elevation 265 and 258 feet and very dense between elevations 255 and 258 feet and below elevation 230 feet.

For construction of the existing Ave 12 OH, one boring (B-2) was performed at the west end of the bridge. The elevation of the top of the boring is 276.5 feet. According to the LOTB, the subsurface soil consists of fine to medium sand, silty fine to medium sand, and silt to the maximum depth explored of approximately 80 feet (elevation 195 feet). In general the soil density increased with depth. The soil is loose to very loose in the top 12 feet (elevation 276.5 feet to 265 feet). The soil is very dense from elevation 259 feet and 261 feet.

The as-built boring locations for Ave 12 OC and Ave 12 OH are shown on the Site Plan, attached as **Plate No. 2**. The as-built LOTB are attached in **Appendix A**.

Ground Water

Ground water was measured at a depth of approximately 20 feet (approximate elevation 250 feet) during drilling for Ave 12 OC and Ave 12 OH in September 1961. DWR monitoring well data from 2010 indicates that ground water is in excess of 100 feet below the ground surface. The ground water measured in 1961 may be a perched condition. It is anticipated that ground water levels will vary with the passage of time due to seasonal fluctuations, irrigation, surface and subsurface flow, run-off and other factors.

6. Corrosion Evaluation

According to As-Built LOTB for existing bridge structures in the project area, the site is predominately underlain by granular material. Based on the As-Built LOTB and corrosion testing for other projects in the area, the soil is anticipated to be non-corrosive.

7. Seismic Recommendations

In accordance with Caltrans 2009 Seismic Design Procedure (SPD), the nearest active fault to the site is the San Andreas fault zone, Creeping section (Fault ID 311) with an Mmax of 7.9. This fault is about 65 miles west of the project location and is identified as a right lateral strike slip fault (RLSS). The spectral acceleration (SA) generated from this fault is less than the SA generated from the probabilistic method. Therefore, based on the 5% probability of exceedance in 50 years (corresponding to a 975 year return period), and a shear wave velocity of 805 ft/s, the estimated peak ground acceleration is 0.24g.

Liquefaction can occur when relatively loose, saturated granular soil and specific soft, saturated fine-grained soils are subjected to ground shaking sufficient to increase pore pressures to trigger liquefaction. Based upon the density of the soil and ground water conditions encountered in the as-built borings, we consider the potential for detrimental liquefaction at the site to be nonexistent for the estimated peak ground acceleration.

During a seismic event, ground shaking can cause densification of granular soil above the water table that can result in settlement of the ground surface. Based upon the soil and ground water conditions encountered in the as-built borings, we consider the potential for detrimental seismic settlement to be nonexistent for the estimated peak ground acceleration.

8. As-Built Foundation Data

<u>Avenue 12 OC</u>

The existing Avenue 12 OC was constructed on Class II concrete piles (Alternative U, 45 ton bearing, 10.75 inch diameter) driven with a 65C double acting steam hammer and a 15,000 ft-lb. single acting steam hammer. The specified tip elevation was 240 feet. According to the driving records, extremely hard driving was encountered at elevation 257 to 255 feet at bent 4 and elevation 257 to 252 feet at abutment 5. The contractor

predrilled completely through the hard layer at abutment 5 for two piles, which did not attain bearing until 8 feet below the specified tip elevation. The rest of the piles at abutment 5 experienced difficult driving all the way down to 2 feet above the specified tip elevation. All piles were driven to a tip elevation of 232 to 240 feet, and reached a bearing of 45 to 60 tons (ENR).

Avenue 12 OH

The existing Avenue 12 OH was constructed on Class I concrete piles (Alternative Z, 45 ton bearing, Raymond step-taper, 8 inch diameter tip, 15 inch diameter top) driven with a 65C double acting steam hammer. The specified tip elevation was 235 feet. According to the driving records, no unusual driving conditions were encountered. All piles were driven to a tip elevation of 232 to 234 feet, and reached a bearing of 45 to 80 tons (ENR).

9. Geotechnical Recommendations

Fill Embankments

The cross sections provided by the Office of Design for the proposed construction show fill embankments up to 30 feet in height with slope inclinations of 2:1 (H:V). If the embankments will be constructed using local borrow material, it is recommended to design embankment slope inclinations as proposed.

At locations where proposed embankments are compacted against existing fills, the embankment fill should be placed in accordance with Standard Specification 19-6.01, "Embankment Construction, Placing", to assure adequate embankment performance.

The as-built LOTB indicates that the subsurface material consists primarily of granular soil, which is loose within the top 10 feet. Some settlement of this loose soil is expected however, the settlement should be immediate and occur during placement of the fill. As such, a settlement period is not needed.

Retaining Walls

The retaining wall properties and foundation data are presented in **Table 1** and **Table 2**, respectively.

Table 1. Retaining Wall Properties

Wall	Beg Sta	Line	End Sta	Line	Max Ht (ft)	Length (ft)	Remarks
1	66.00' (Rt) Sta 58+90.671	12CL1	10.00' (Lt) Sta 33+16.62	R5CL3	12	390.3	Ramp R-5 line is R5CL3
2	83.00' (Lt) Sta 59+70.921	12CL1	89.76' (Rt) Sta 39+22.29	R4CL2	30	122.8	Ramp R-4 line is R4CL2
3	80.95' (Rt) Sta 48+68.68	12CL1	20.00' (Lt) Sta 49+00	R1CL1	10	285.0	Ramp R-1 line is R1CL1
4	69.70' (Rt) Sta 50+46.104	12CL1	66.00' (Rt) Sta 53+99.76	12CL1	18	352.8	Ave 12 line 12CL1
5	82.00' (Lt) Sta 54+47.66	12CL1	82.00' (Lt) 54+77.66	12CL1	32	30.0	

Table 2. Retaining Wall Foundation Data

Wall	Max Ht (ft)	Bottom of footing elevation	Loading Case	Toe Pressure (ksf)	Recommended Foundation Type
1	12	303.3-292.9	I	2.7	Spread Footing
2	30	276.4-274.2	I	6.3	Piles
3	10	271.4-269.8	I	2.5	Spread Footing
4	18	280.4-274.1	I	4.0	Spread Footing
5	32	268.7-267.3	I	6.3	Piles

Spread footings are recommended for support of retaining walls 1, 3 and 4. The as-built logs for the bridge structures in the project area indicate that the material in the upper 10 feet is very loose to loose. The loose soils may not meet the required toe pressures shown in **Table 2**. In order to mitigate the loose soils and increase the capacity, the soil 5 feet below the bottom of the footings for retaining walls 3 and 4 shall be removed and recompacted to 95% relative compaction. The limits of the over excavation shall extend the entire length of the wall and a distance of 5 feet beyond the toe and 5 feet beyond the heel of the wall.

The cross sections provided by the Office of Design indicate that retaining wall 1 is to be placed within the fill slope of the NB 99 offramp. As this wall will be founded within the compacted fill, removal and recompaction as described above should not be necessary. The horizontal distance from the toe of the footing to the slope surface must be a minimum of 4 feet. Per the May 2006 Standard Plans (B3-8, Retaining Wall Details No, 1, Design and Drainage), the soil cover above the toe of the wall must be a minimum of 1.5 feet.

Driven Standard Plan open-end pipe piles (Class 90, 14 inch diameter) are recommended for support of retaining walls 2 and 5. Due to the presence of thin dense layers of sandy subsurface material, central relief drilling may be necessary. Central relief drilling shall stop 20 feet above the specified tip to ensure there is sufficient soil plug. Please note that Standard Plan retaining walls founded on piles must go through Structure Design. For estimating purposes, the pile tip elevation is estimated to be 232 feet.

The above recommendations for retaining walls 2 and 5 are based upon the walls being founded within original ground. It is our understanding that Design may want to reduce the heights of retaining walls 2 and 5 by building up some of the fill prior to construction of the walls. This is feasible and will be dependent on right of way and the retaining wall slope requirements mentioned previously. If the wall heights are reduced, the walls may be able to be founded upon spread footings instead of piles, which will be dependent on the wall height and how much fill is placed below the wall. As the near surface soils are loose, use of spread footings for these walls may need subsurface removal and recompaction, as mentioned previously. Supplemental recommendations for these walls can be provided, if the design of the walls is revised.

The new fill embankment for Avenue 12 will be approximately 10 feet higher than the existing embankment. Stage 1 of the new fill embankment will be constructed with an MSE wall along existing Ave 12, which will allow traffic to continue to operate on existing Ave 12. Once Stage 1 of the new embankment is complete, traffic will be shifted from existing Ave 12 onto the new embankment. Once traffic is shifted, Stage 2 will complete the new embankment, and the MSE wall will be left in place and buried. Design of MSE walls must go through Structure Design. As the MSE wall will be founded upon the existing Ave 12 embankment, it is anticipated that settlement will be minimal.

10. Construction Considerations

1. Ground water was measured at a depth of approximately 20 feet (approximate elevation 250 feet) during drilling for Ave 12 OC and Ave 12 OH in September 1961. Ground water is not anticipated to affect spread footing excavation (5 feet removal and recompaction below bottom of footing).

2. Hard driving conditions were encountered during pile driving for Avenue 12 OC. Central relief drilling may be used if hard driving conditions are encountered during pile driving. Central relief drilling shall be stopped 20 feet above the specified tip elevation to ensure there is sufficient soil plug.

11. Project Information

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

Data and information attached with the project plans are:

A. As-Built LOTB, Avenue 12 OC, Br. No. 41-0066
B. As-Built LOTB, Avenue 12 OH, Br. No. 41C-0047

Data and Information included in the Information Handout provided to the bidders and Contractors are:

A. Geotechnical Design Report for Ave 12 Interchange, dated 3/17/2011.

Data and Information available for inspection at the District Office:

A. None

Data and Information available for inspection at the Transportation Laboratory are:

A. None

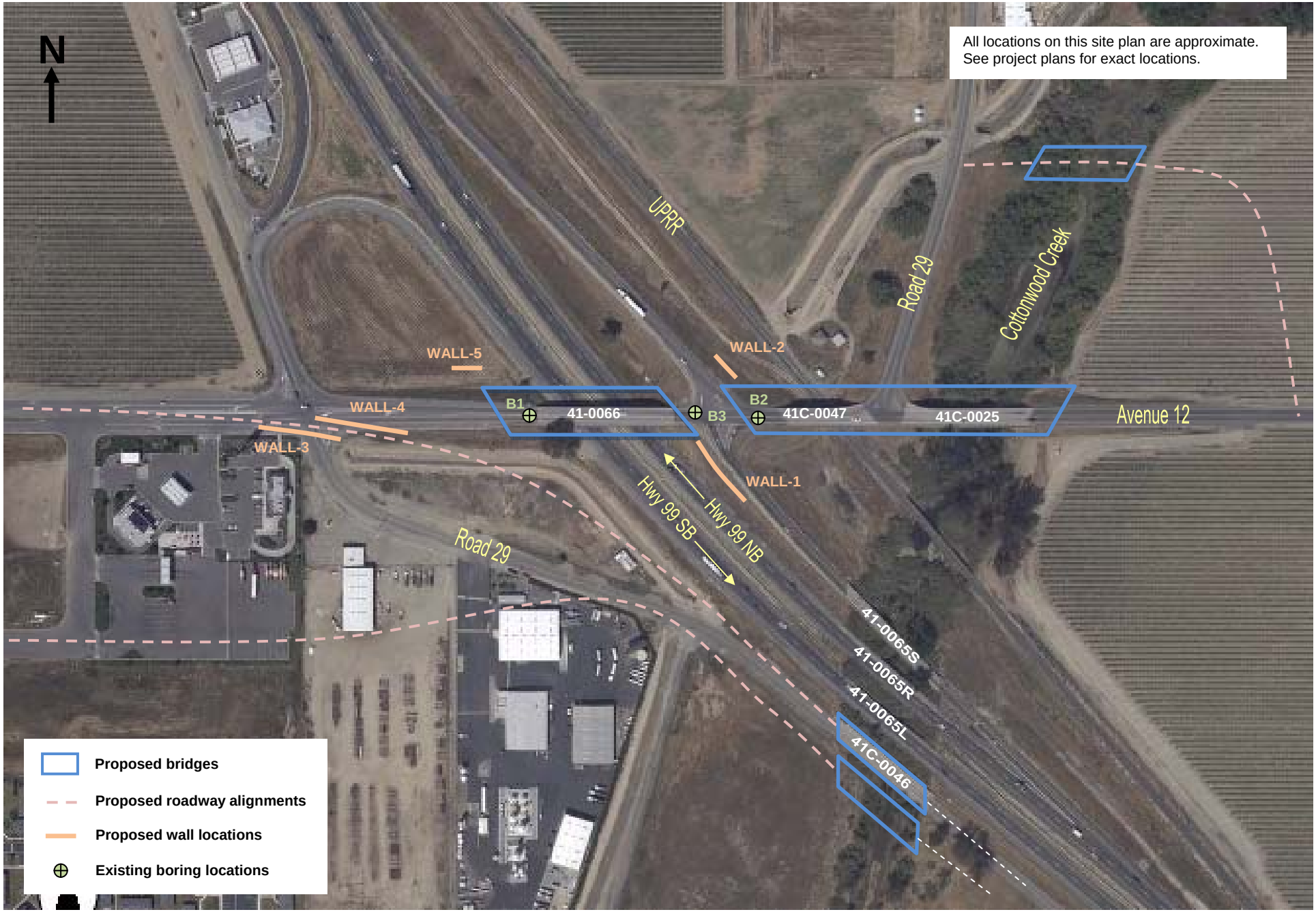
The recommendations contained in this report are based upon site conditions that we observed at the time of our investigation, data from as-built borings and our current understanding of proposed project. If the scope of the proposed project changes from that described in this report, our recommendations should be reviewed to determine if revisions are needed. If you have any questions or comments, please call Ben Barnes at 916-227-1039.

BENJAMIN M. BARNES, PE
Transportation Engineer
Office of Geotechnical Design North
Geotechnical Services
Division of Engineering Services

Attachments:
Plate No. 1: Vicinity Map
Plate No. 2: Site Plan / As-Built Boring Locations
Appendix A: As-Built LOTB

c: Qiang Huang, GS-OGDN
Jim Bane, Project Manager
Mark Willian, GS Corporate
District Construction R.E. Pending
Ted Mooradian, District Materials Engineer
Fritz Hoffman, Office of Structure Design
Talal Sadek, Office of Structure Design

Caltrans Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North	ID 0600000463	VICINITY MAP	Plate No. 1
	EA 06-471001	06-MAD-99 PM R7.1 / R7.9	



Caltrans Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North	ID 0600000463	SITE PLAN / AS-BUILT BORING LOCATIONS	Plate No. 2
	EA 06-471001	06-MAD-99 PM R7.1 / R7.9	

APPENDIX A

As-Built LOTB

Bridge	Bridge No.
Avenue 12 OC	41-66
Avenue 12 OH	41C-47

FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.				

DIST.	COUNTY	ROUTE	POSTMILE	BRIDGE NO.	FEDERAL AID NO.
06	Mad	99	01/R6	87	115

DATE APPROVED June 28, 1965

AS BUILT PLANS
Contract No. 06-016534
Date Completed 2-24-67
Document No. 60000021

BRIDGE DEPARTMENT

FIELD STUDY	R. Hagar	11-65-60
DRAWING	R. Hagar	11-16-60
CHECKED	R. Hagar	11-16-60

Approved Recommended by

To Madera

To Fresno

"C-12" Line

"A-2" Line

393

INFORMATION ON ACTUAL FOUNDATION CONDITIONS ENCOUNTERED IS ON FILE IN BRIDGE GEOLOGY SECTION

14 Lfs. "C-12" Sh. 18'x60'

20 Lfs. "C-12" Sh. 18'x60'

24 Lfs. "C-12" Sh. 27'x26'

B-1 269.8

Loose brown silty fine sand some mica
Loose brown fine to medium sand
Slightly compact buff clayey silt with sand lenses
Compact brown interbedded lenses of silty fine sand & medium to coarse clean sand
Stiff buff clayey silt
Dense brown fine to medium silty sand
Very dense tan silt
Dense grey fine to coarse sand
Compact buff silt
Dense buff silt
Dense grey fine sand
Very dense grey fine sand

GWS El. 243.7 9-9-67

B-1 8-31-61

B-2 269.4

Existing ground line

B-2 8-31-61

B-3 272.4

Slightly compact grey fine to coarse sand
Loose brown fine to medium silty sand
Compact brown fine to medium silty sand
Very dense grey partly cemented silt
Compact to dense brown sandy silt
Slightly compact brown to grey fine to medium silty sand
Slightly compact brown silty coarse sand
Dense sandy silt
Compact brown silty sand
Compact to dense brown to grey silty sand
Dense to very dense brown silt
Dense brown silty sand
Very dense buff silt some silty sand lenses
Very dense brown silt
Dense buff fine to medium silty sand
Compact to dense brown silty fine sand
Dense to very dense grey silt

GWS 67-2535 9-9-67

B-3 8-6-61

T.B.M. #1 R/W Mon. 186.76 Lt. "Mon 6" 383 +12 (30' Lt. "C-12" 20+52) Elev. 270.466

19 20 21

280 270 260 250 240 230 220 210 200

SHEET 7 OF 73

CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SIZE LIMITS

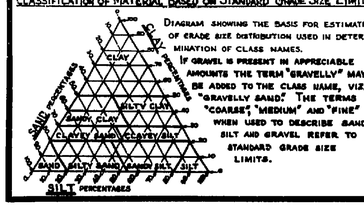


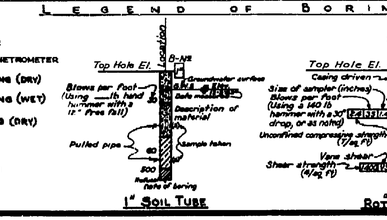
DIAGRAM SHOWING THE BASIS FOR ESTIMATES OF GRADE SIZE DISTRIBUTION USED IN DETERMINATION OF CLASS NAMES. IF GRAVEL IS PRESENT IN APPRECIABLE AMOUNTS THE TERM "GRAVELLY" MAY BE ADDED TO THE CLASS NAME, VIZ. "GRAVELLY SAND." THE TERMS "COARSE," "MEDIUM" AND "FINE" WHEN USED TO DESCRIBE SAND, SILT AND GRAVEL REFER TO STANDARD GRADE SIZE LIMITS.

LEGEND OF EARTH MATERIALS

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

LEGEND OF BORING OPERATIONS

- Penetrometer
- 2½" Cone Penetrometer
- Sampler Boring (Dry)
- Rotary Boring (Wet)
- Auger Boring (Dry)
- Jet Boring
- Core Boring
- Test Pit



NOTE

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

AVENUE 12 OVERCROSSING

LOG OF TEST BORINGS

SCALE	BRIDGE	FILE	DRAWING
1" = 10'	41-66		4/66-7

PR-4/66-7

87

120

FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.				

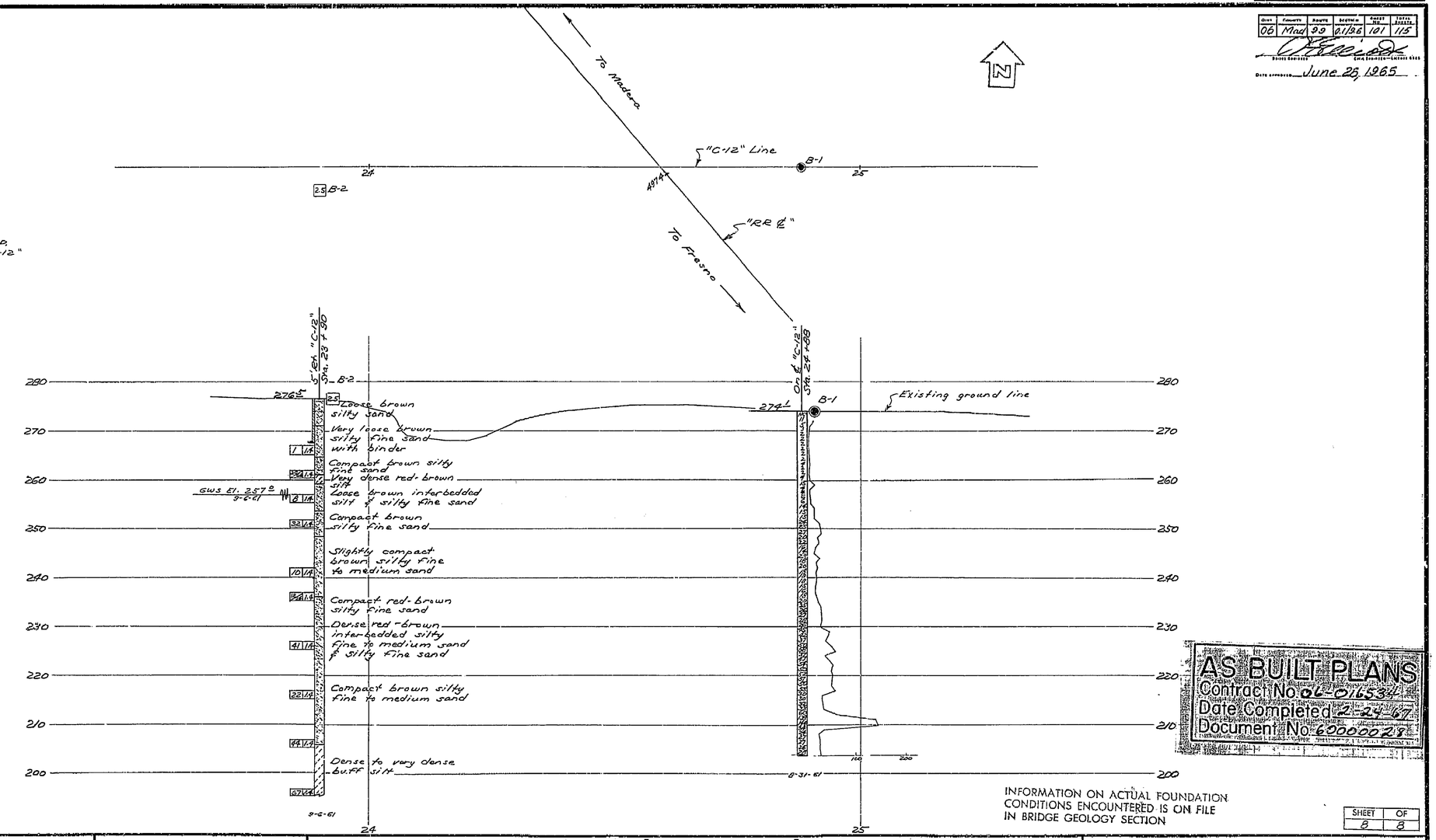
DIST.	COUNTY	ROUTE	SECTION	SHEET NO.	TOTAL SHEETS
06	Mad	99	0.1/R6	101	115

Date approved June 26, 1965

BRIDGE DEPARTMENT

FIELD STUDY	H. R. Hoerr	11-3-60
DRAWN	H. R. Hoerr	11-16-60
CHECKED		

Approved Recommended by: Supervising Bridge Engineer; Bridge Engineer



AS BUILT PLANS
Contract No. 06-016534
Date Completed 2-24-67
Document No. 6000028

INFORMATION ON ACTUAL FOUNDATION CONDITIONS ENCOUNTERED IS ON FILE IN BRIDGE GEOLOGY SECTION

SHEET	OF
8	8

CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SIZE LIMITS

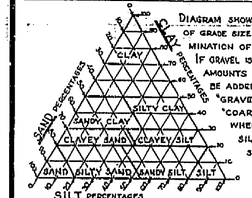


DIAGRAM SHOWING THE BASIS FOR ESTIMATES OF GRADE SIZE DISTRIBUTION USED IN DETERMINATION OF CLASS NAMES. IF GRAVEL IS PRESENT IN APPRECIABLE AMOUNTS THE TERM "GRAVELLY" MAY BE ADDED TO THE CLASS NAME, VIZ. "GRAVELLY SAND." THE TERMS "COARSE", "MEDIUM" AND "FINE" WHEN USED TO DESCRIBE SAND, SILT AND GRAVEL REFER TO STANDARD GRADE SIZE LIMITS.

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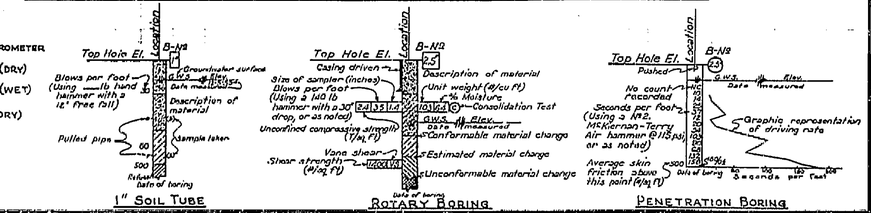
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

LEGEND OF BORING OPERATIONS

- Penetrometer
- 2½" Cone Penetrometer
- Sampler boring (DRY)
- Rotary boring (WET)
- Auger boring (DRY)
- Jet boring
- Core boring
- Test pit



NOTE

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

AVENUE 12 OVERHEAD

LOG OF TEST BORINGS

SCALE	BRIDGE	FILE	DRAWING
1" = 10'	41C-47		41241-8

PREL. DRAWING NO. P-41C47-8

PR-41C47-7

1334

101

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: MR. GETACHEW ESHETE
Senior Transportation Engineer
District 6 Design
Design 1, Branch L

Attention: Akm Rahman

Date: June 27, 2011

File: 06-MAD-99 PM R7.1/R7.9
EFIS 0600000463 1
EA 06-471001
Avenue 12 Interchange

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
METS AND GEOTECHNICAL SERVICES – MS 5
OFFICE OF GEOTECHNICAL DESIGN NORTH

Subject: Supplemental Geotechnical Design Report

Introduction

Per your request, we are providing supplemental recommendations to the Geotechnical Design Report (GDR) dated March 17, 2011 for the Avenue 12 Interchange project, located on State Route 99 PM R7.1/R7.9, approximately 2 miles north of the city of Fresno in Madera County, California. The project proposes to improve the interchange at Avenue 12 and State Route 99.

Per design changes, this supplemental report provides recommendations to retaining walls 2 and 5 only. All other recommendations in the 3/17/2011 GDR remain applicable.

Proposed Improvements

The original design was for retaining walls 2 and 5 to be Standard Plan Type 1 walls founded within original ground with heights of about 30 feet. As the near surface soils at the wall locations are loose, recommendations in the 3/17/2011 GDR included removal and recompaction of the near surface soils or constructing the walls on piles.

Design has proposed reducing the height of the retaining walls by building up fill prior to constructing the walls. For retaining wall 2, about 10 feet of fill will be placed and the wall height will be reduced from a maximum height of about 30 feet to a maximum height of about 24 feet. For retaining wall 5, about 14 feet of fill will be placed and the wall height will be reduced from a maximum height of about 30 feet to a maximum height of about 16 feet.

Geotechnical Recommendations

Revised retaining wall foundation data for walls 2 and 5 is presented in **Table 1**.

Table 1. Retaining Wall Foundation Data

Wall	Max Ht (ft)	Height of fill to be placed below wall (ft)	Bottom of footing elevation	Loading Case	Toe Pressure (ksf)	Recommended Foundation Type
2	24	10	284-287	I	4.9	Spread Footing
5	16	14	280-281	I	3.5	Spread Footing

Note: Toe pressure per 2006 Standard Plan B3-1.

Based on cross sections provided by District 6 Design and available subsurface information, retaining walls 2 and 5 may be constructed on spread footings for the design conditions shown in **Table 1**. The fill embankment constructed from original ground to the bottom of the wall footing must follow current CT fill material specifications and be compacted to 95% relative compaction.

If the fill material is placed and compacted per the requirements shown above, removal and recompaction of the original ground material below retaining walls 2 and 5, as stated in the 3/17/2011 GDR is not needed.

For both walls, the horizontal distance from the toe of the wall footing to the slope surface must be a minimum of 4 feet. Per the May 2006 Standard Plans (B3-8, Retaining Wall Details No, 1, Design and Drainage), the soil cover above the toe of the wall must be a minimum of 1.5 feet.

Project Information

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

Data and information attached with the project plans are:

A. None

Data and Information included in the Information Handout provided to the bidders and Contractors are:

A. Supplemental Geotechnical Design Report for Ave 12 Interchange, dated 6/27/2011.

Data and Information available for inspection at the District Office:

A. None

Data and Information available for inspection at the Transportation Laboratory are:

A. None

The recommendations contained in this report are based upon site conditions that we observed at the time of our investigation, data from as-built borings and our current understanding of proposed project. If the scope of the proposed project changes from that described in this report, our recommendations should be reviewed to determine if revisions are needed. If you have any questions or comments, please call Ben Barnes at 916-227-1039.

BENJAMIN M. BARNES, PE
Transportation Engineer
Office of Geotechnical Design North
Geotechnical Services
Division of Engineering Services

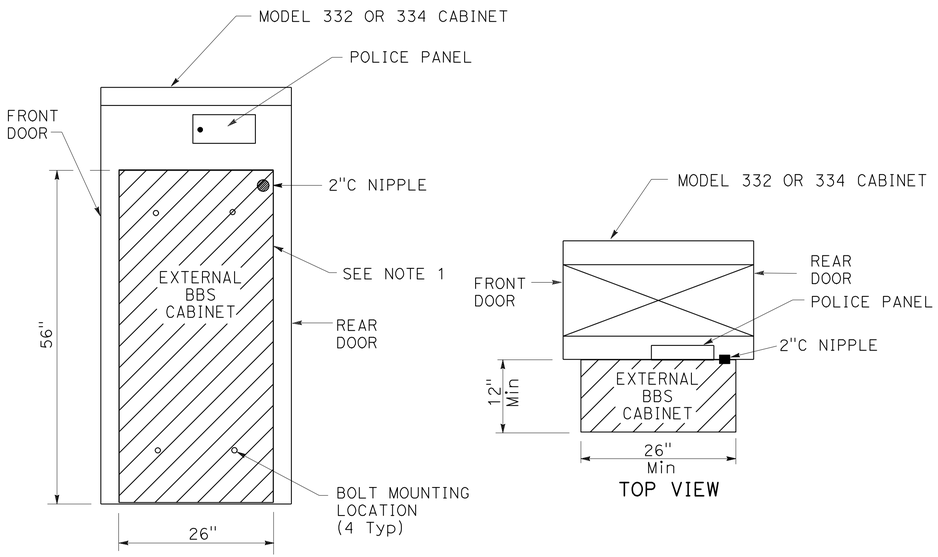
c: Qiang Huang, GS-OGDN
Jim Bane, Project Manager
Mark Willian, GS Corporate
District Construction R.E. Pending
Ted Mooradian, District Materials Engineer

Dist	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Theresa Gabriel — 12-20-07
REGISTERED CIVIL ENGINEER — DATE

REGISTERED PROFESSIONAL ENGINEER
Theresa A. Gabriel
No. E15129
Exp. 6-30-10
ELECT
STATE OF CALIFORNIA

PLANS APPROVAL DATE

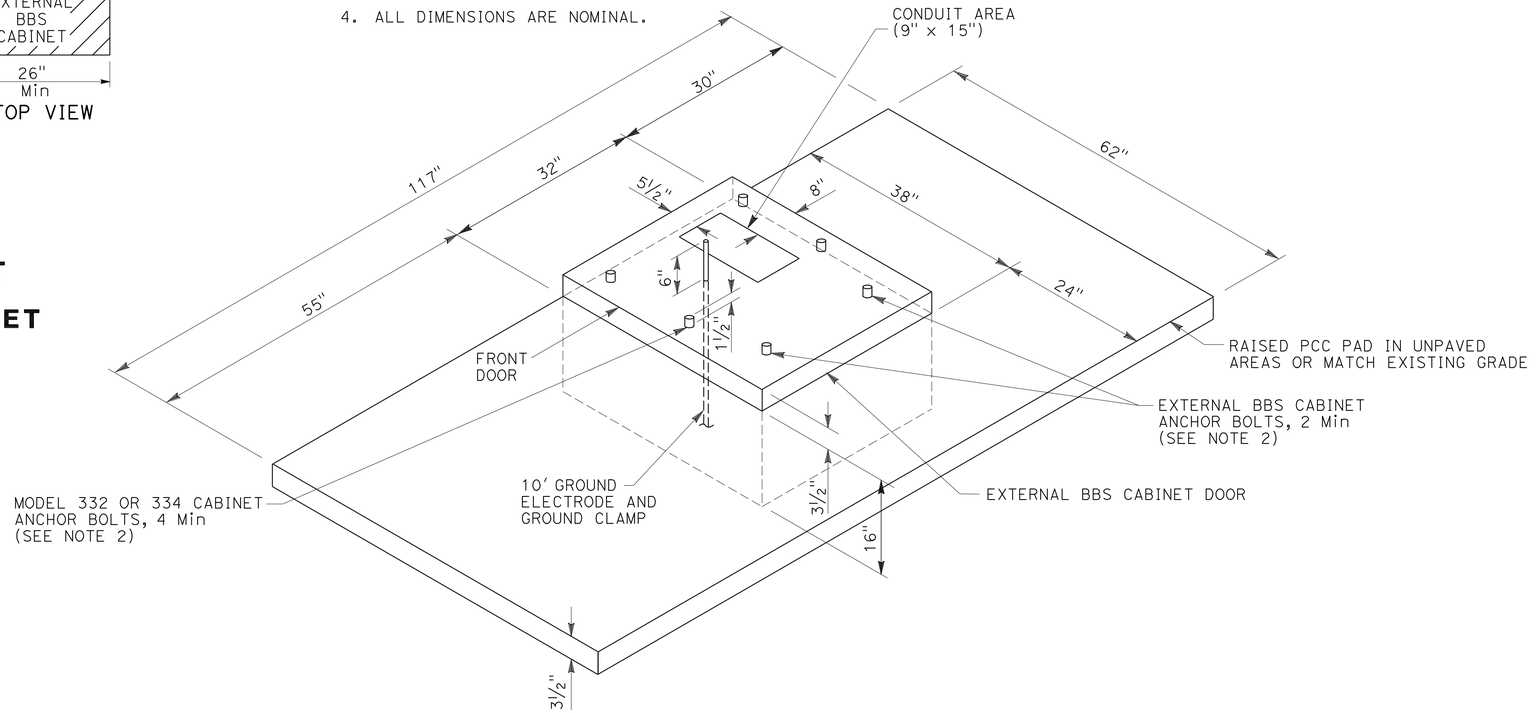


SIDE VIEW

EXTERNAL BBS CABINET MOUNTED TO THE MODEL 332 OR 334 CABINET

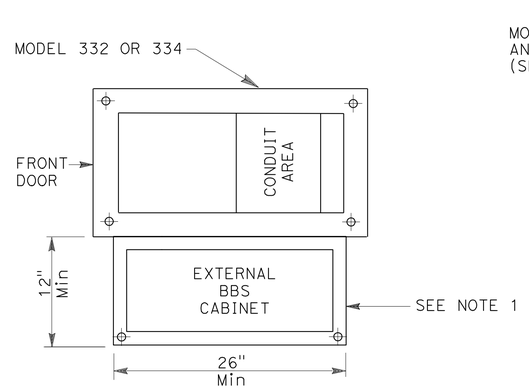
NOTE: (THIS SHEET ONLY)

1. THE EXTERNAL BBS CABINET SHALL BE MOUNTED TO THE MODEL 332 OR 334 CABINET WITH FOUR 18-8 STAINLESS STEEL HEX HEAD, FULLY-THREADED, $\frac{3}{8}$"-16 X 1" BOLTS; TWO WASHERS PER BOLT, DESIGNED FOR $\frac{3}{8}$" BOLTS AND ARE 18-8 STAINLESS STEEL, 1" OUTSIDE DIAMETER, ROUND, AND FLAT; AND ONE K-LOCK NUT PER BOLT THAT IS 18-8 STAINLESS STEEL AND A HEX-NUT. THE ENGINEER WILL HAVE TO APPROVE THE BOLT MOUNTING LOCATION PRIOR TO INSTALLATION.
2. THE ANCHOR BOLTS SHALL BE $\frac{3}{4}$" Dia X 15" WITH A 2"-90° BEND. THE CABINET MANUFACTURER'S SPECIFICATION SHALL DETERMINE THE LOCATION OF THE ANCHOR BOLTS IN THE FOUNDATION. THE ENGINEER WILL HAVE TO APPROVE THE ANCHOR BOLTS AND ITS LOCATION IN THE FOUNDATION PRIOR TO CONSTRUCTION.
3. THE CONTRACTOR SHALL VERIFY THE DIMENSIONS OF THE BBS CABINET PRIOR TO CONSTRUCTING THE FOUNDATION OF THE MODIFIED PORTION OF THE Std MODEL 332 AND 334 CABINET FOUNDATION. THE ENGINEER WILL HAVE TO APPROVE ANY NECESSARY DEVIATIONS PRIOR TO CONSTRUCTION.
4. ALL DIMENSIONS ARE NOMINAL.



MODIFIED MODEL 332 AND 334 CABINET FOUNDATION DETAIL FOR BATTERY BACKUP SYSTEM (BBS)

(FOR DIMENSIONS AND DETAILS NOT SHOWN AND ADDITIONAL NOTES, SEE SHEET ES-3C OF THE STANDARD PLANS FOR MODEL 332 AND 334 CABINETS)



BASE PLAN FOR BBS MOUNTED TO THE MODEL 332 OR 334 CABINET

(FOR DIMENSIONS AND DETAILS NOT SHOWN, SEE SHEET A6-1 TO A6-4, CABINET HOUSING DETAILS OF THE TRANSPORTATION ELECTRICAL EQUIPMENT SPECIFICATION (TEES))

ELECTRICAL SYSTEMS
(BBS FOUNDATION DETAILS)

NO SCALE

THIS PLAN IS ACCURATE FOR ELECTRICAL WORK ONLY.

REVISED BY | DATE REVISED
CALCULATED-DESIGNED BY | CHECKED BY
FUNCTIONAL SUPERVISOR
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

LAST REVISION 2-2-09
DATE PLOTTED => 13-APR-2010
TIME PLOTTED => 11:41

BORDER LAST REVISED 4/11/2008
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
USERNAME => trpierce
DGN FILE => BBS Foundation.dgn
CU 00000
EA 000000

Dist	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Theresa Gabriel — REGISTERED CIVIL ENGINEER — 12-20-07 DATE

REGISTERED PROFESSIONAL ENGINEER — Theresa A. Gabriel — No. E15129 — Exp. 6-30-10 — ELECT — STATE OF CALIFORNIA

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

LEGEND: (THIS SHEET ONLY)

PTS = POWER TRANSFER SWITCH
UPS = UNINTERRUPTIBLE POWER SUPPLY
UPSC = UNINTERRUPTIBLE POWER SUPPLY CONTROLLER
UPSM = UPS MODE
BP = BYPASS
MBPS = MANUAL BYPASS SWITCH
AC+ = UNGROUNDED CONDUCTOR
AC- = GROUNDED CONDUCTOR
C = COMMON
Grn = GREEN
Blk = BLACK
Wht = WHITE
SF = STATE-FURNISHED
TB = TERMINAL BOARD
Cntl = CONTROL
Gnd = GROUND
Temp = TEMPERATURE
Batt = BATTERY

NOTES: (THIS SHEET ONLY)

1. TYPE A REFERS TO THE BBS EQUIPMENT FROM MANUFACTURER A.
2. CASE-1 REFERS TO THE SITUATION WHEN THE ENTIRE BBS EQUIPMENT INCLUDING THE BATTERIES ARE INSTALLED IN THE BBS CABINET.
3. THE LOCATION OF THE 2"C NIPPLE WILL BE DETERMINED BY THE ENGINEER IN THE FIELD.
4. THE CONTRACTOR SHALL FURNISH AND INSTALL A NEMA-1 ENCLOSURE WITH 30 A, 1P, 120/240 VOLTS RATED CIRCUIT BREAKER MANUFACTURED PER UL STANDARD 489.
5. A TEMPERATURE PROBE SHALL BE ATTACHED TO THE BATTERY BY TAPE OR ATTACHED TO THE NEGATIVE TERMINAL OF THE BATTERY.
6. THE ELECTRICAL POWER FOR THE COOLING FAN FOR THE BBS CABINET SHALL BE TAPPED FROM THE BOTTOM OF THE TB IN THE 332 CABINET.
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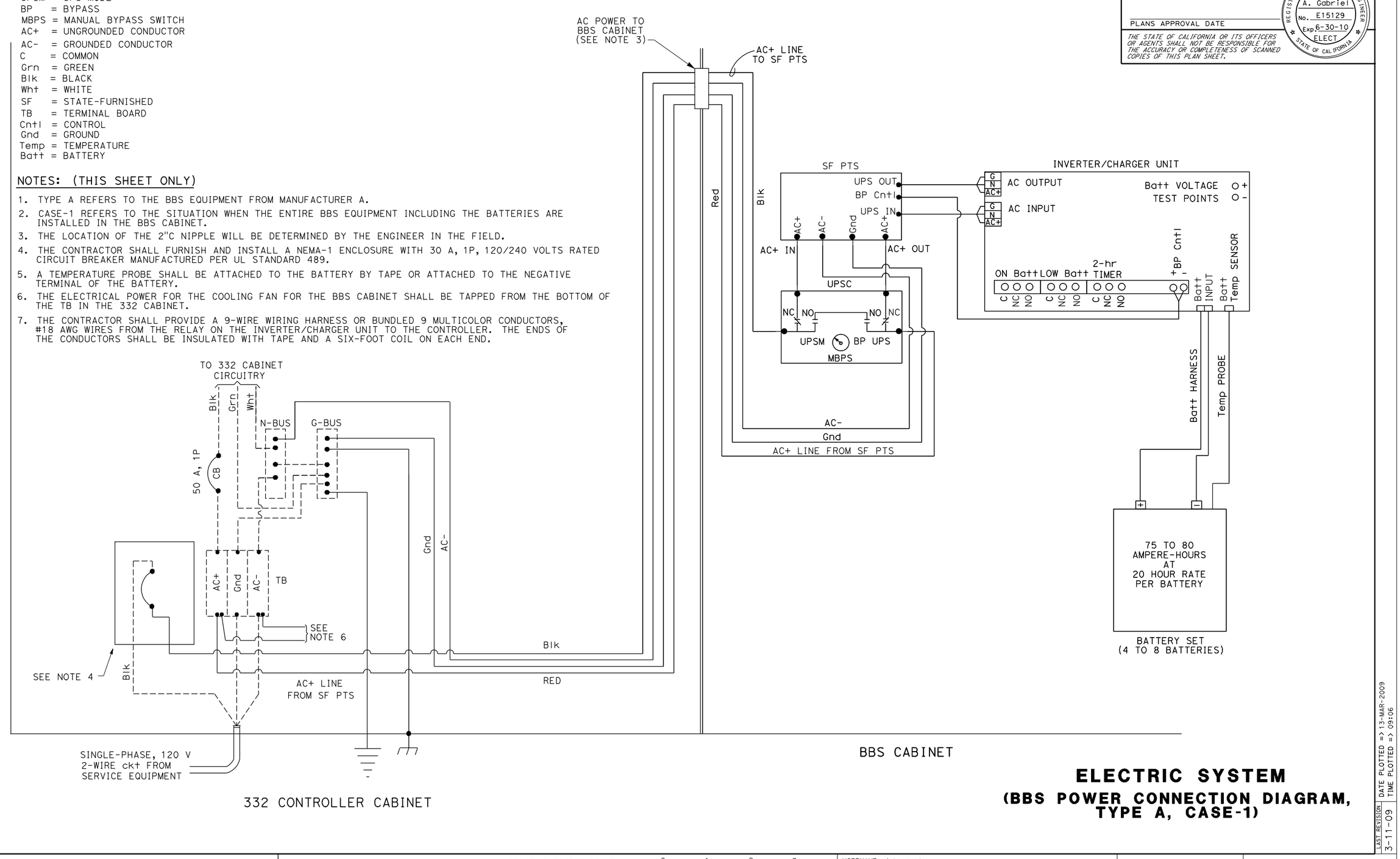

ELECTRIC SYSTEM
(BBS POWER CONNECTION DIAGRAM, TYPE A, CASE-1)

LAST REVISION 3-11-09 | DATE PLOTTED => 13-MAR-2009 | TIME PLOTTED => 09:06

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION | FUNCTIONAL SUPERVISOR | CALCULATED-DESIGNED BY | CHECKED BY | REVISED BY | DATE REVISED

BORDER LAST REVISED 4/11/2008 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => trcarol | DGN FILE => BBS 1250FSM.dgn | CU 00000 | EA 000000

Dist	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Theresa Gabriel — REGISTERED CIVIL ENGINEER — 12-20-07 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Theresa A. Gabriel — No. E15129 — Exp 6-30-10 — ELECT — STATE OF CALIFORNIA

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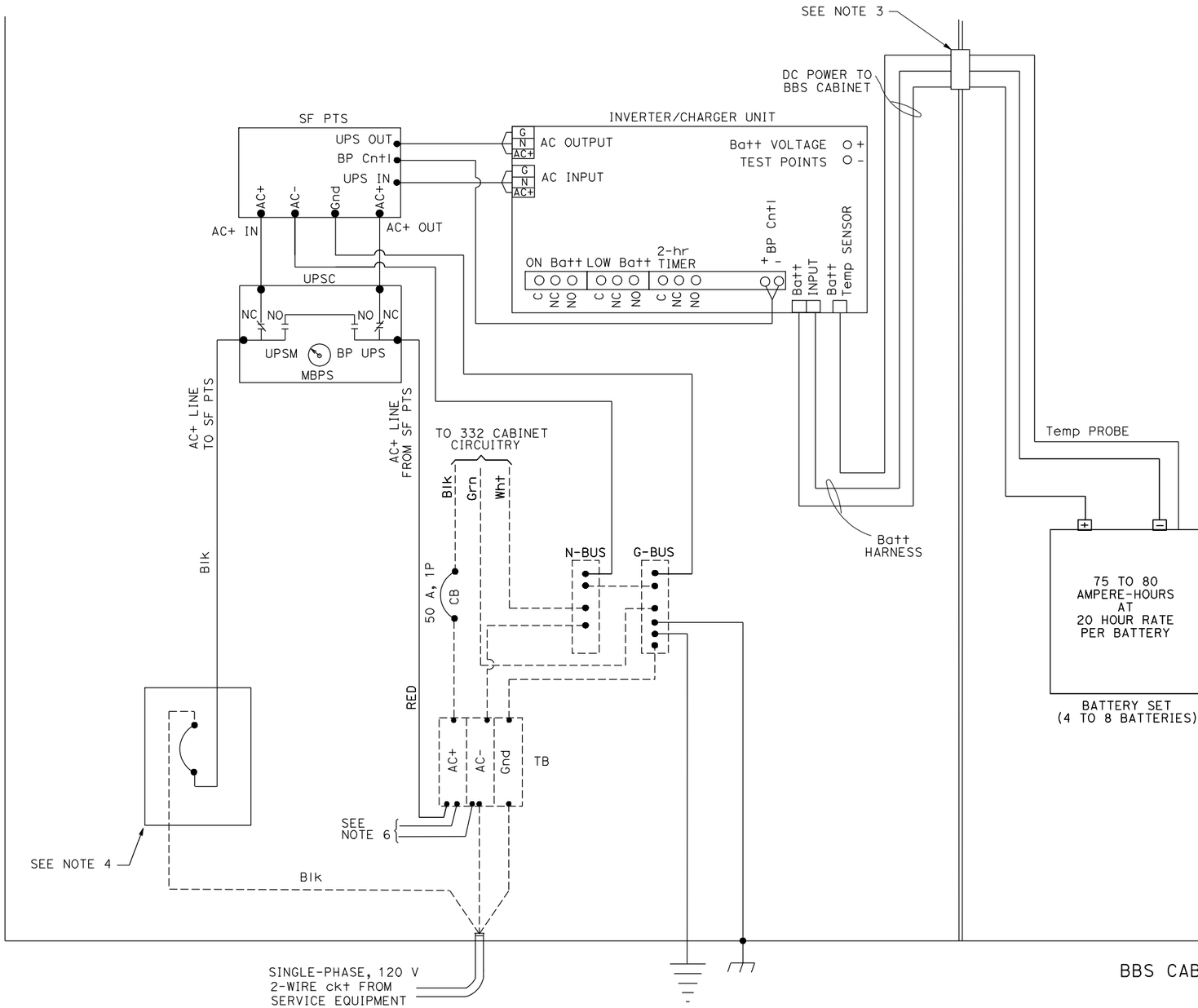

LEGEND: (THIS SHEET ONLY)

PTS = POWER TRANSFER SWITCH
UPS = UNINTERRUPTIBLE POWER SUPPLY
UPSC = UNINTERRUPTIBLE POWER SUPPLY CONTROLLER
UPSM = UPS MODE
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MBPS = MANUAL BYPASS SWITCH
AC+ = UNGROUNDED CONDUCTOR
AC- = GROUNDED CONDUCTOR
C = COMMON
Grn = GREEN
Blk = BLACK
Wht = WHITE
SF = STATE-FURNISHED
Batt = BATTERY
Temp = TEMPERATURE
TB = TERMINAL BOARD
Cntl = CONTROL
Gnd = GROUND

NOTES: (THIS SHEET ONLY)

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2. CASE-2 REFERS TO THE SITUATION WHEN ONLY THE BATTERIES ARE INSTALLED IN THE BBS CABINET. THE REMAINING EQUIPMENT IS PLACED IN THE 332 CONTROLLER CABINET.
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ELECTRICAL SYSTEMS
(BBS POWER CONNECTION DIAGRAM, TYPE A, CASE-2)

NO SCALE

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TIME PLOTTED => 09:07

Dist	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Theresa Gabriel — REGISTERED CIVIL ENGINEER — 12-20-07 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Theresa A. Gabriel — No. E15129 — Exp 6-30-10 — ELECT — STATE OF CALIFORNIA

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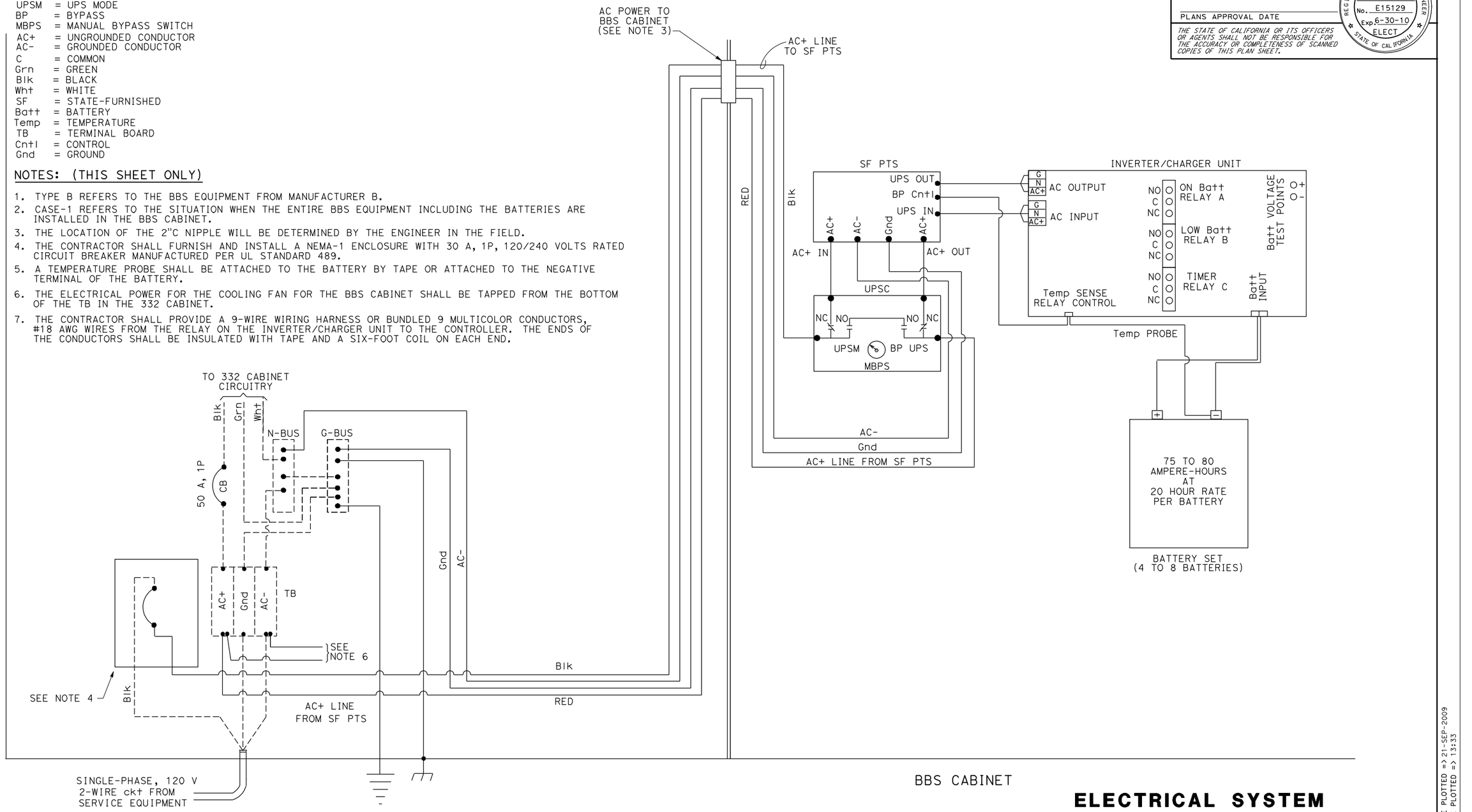

ELECTRICAL SYSTEM

(BBS POWER CONNECTION DIAGRAM, TYPE B, CASE-1)

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DATE PLOTTED => 21-SEP-2009
TIME PLOTTED => 13:33

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Caltrans

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => trcarol
DGN FILE => BBS DUIFSM.dgn

CU 00000

EA 000000

Dist	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Theresa Gabriel — 12-20-07
REGISTERED CIVIL ENGINEER — DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Theresa A. Gabriel — No. E15129 — Exp 6-30-10 — ELECT — STATE OF CALIFORNIA

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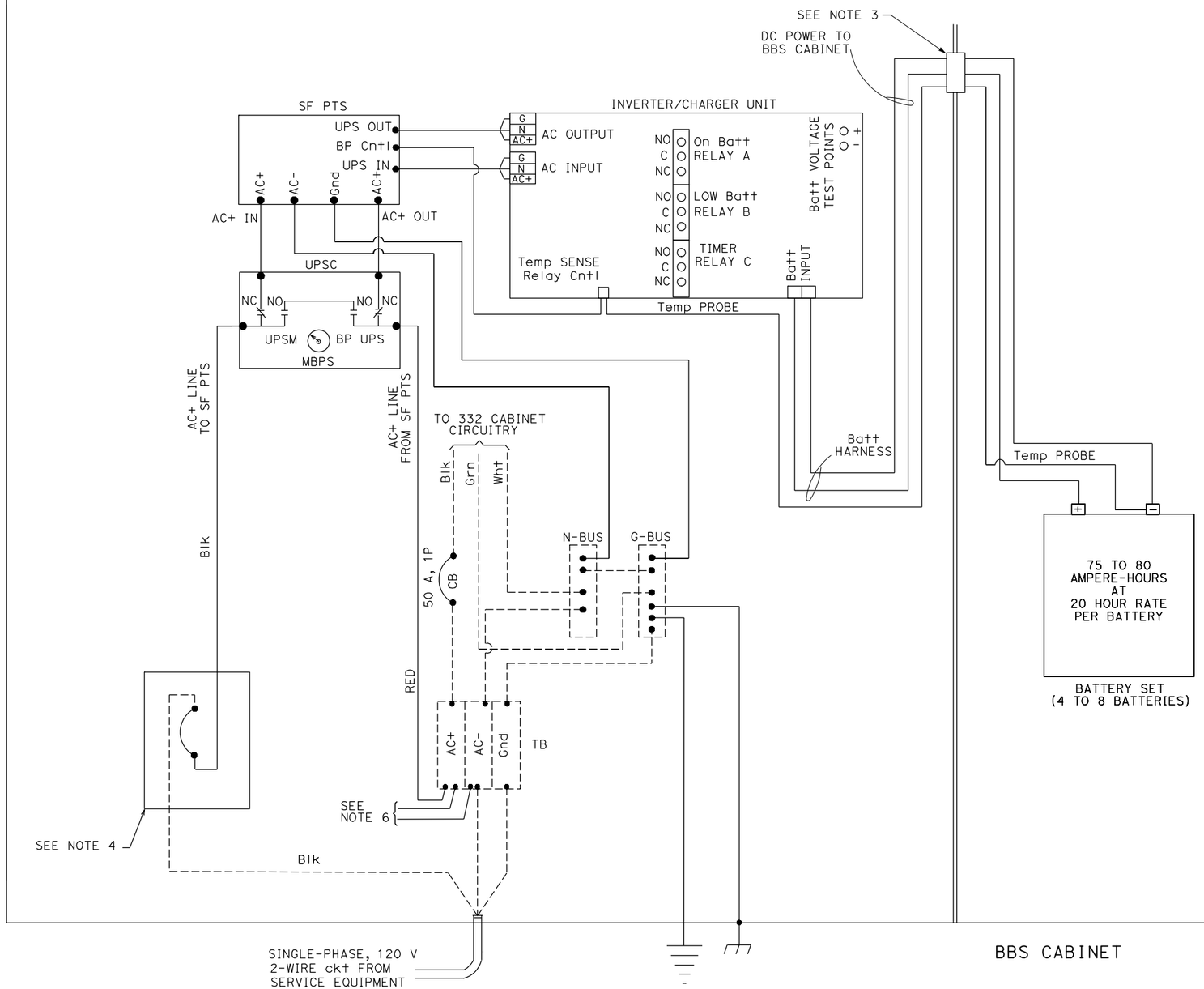

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ELECTRICAL SYSTEM

(BBS POWER CONNECTION DIAGRAM, TYPE B, CASE-2)

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

LAST REVISION 3-11-09
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BORDER LAST REVISED 4/11/2008
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
USERNAME => trcarol
DGN FILE => BBS DUIFSP.dgn
CU 00000
EA 000000

KINDER MORGAN

Guidelines for Design and Construction near Kinder Morgan Hazardous Liquid Operated Facilities

Name of Company: _____

The list of design, construction and contractor requirements, including but not limited to the following, for the design and installation of foreign utilities or improvements on KM right-of-way (ROW) are not intended nor do they waive or modify any rights KM may have under existing easements or ROW agreements. Reference existing easements and amendments for additional requirements. This list of requirements is applicable for KM facilities on easements only. Encroachments on fee property should be referred to the ROW Department.

Design

- KM shall be provided sufficient prior notice of planned activities involving excavation, blasting, or any type of construction on KM's ROW to determine and resolve any location, grade or encroachment problems and provide protection of our facilities and the public **before** the actual work is to take place.
- Encroaching entity shall provide KM with a set of drawings for review and a set of final construction drawings showing all aspects of the proposed facilities in the vicinity of KM's ROW. The encroaching entity shall also provide a set of as-built drawings showing the proposed facilities in the vicinity of KM's ROW.
- Only facilities shown on drawings reviewed by (Company) will be approved for installation on KM's ROW. All drawing revisions that effect facilities proposed to be placed on KM's ROW must be approved by KM in writing.
- KM shall approve the design of all permanent road crossings.
- Any repair to surface facilities following future pipeline maintenance or repair work by KM will be at the expense of the developer or landowner.
- The depth of cover over the KM pipelines shall not be reduced nor drainage altered without KM's written approval.
- Construction of any permanent structure, building(s) or obstructions within KM pipeline easement is **not** permitted.
- Planting of shrubs and trees is not permitted on KM pipeline easement.
- Irrigation equipment i.e. backflow prevent devices, meters, valves, valve boxes, etc. shall not be located on KM easement.
- Foreign line, gas, water, electric and sewer lines, etc., may cross perpendicular to KM's pipeline within the ROW, provided that a minimum of two (2) feet of vertical clearance is maintained between KM pipeline(s) and the foreign pipeline. Constant line elevations must be maintained across KM's entire ROW width, gravity drain lines are the only exception. Foreign line crossings below the KM pipeline must be evaluated by KM to ensure that a significant length of the KM line is not exposed and unsupported during construction. When installing underground utilities, the last line should be placed beneath all existing lines unless it is impractical or unreasonable to do so. Foreign line crossings above the KM pipeline with less than 2 feet of clearance must be evaluated by KM to ensure that additional support is not necessary to prevent settling on top of the KM hazardous liquids pipeline.
- A foreign pipeline shall cross KM facilities at as near a ninety-degree angle as possible. A foreign pipeline shall not run parallel to KM pipeline within KM easement without written permission of KM.
- The foreign utility should be advised that KM maintains cathodic protection on their pipelines. The foreign utility must coordinate their cathodic protection system with KM's. At the request of KM, foreign utilities shall install (or allow to be installed) cathodic protection test leads at all crossings for the purposes of monitoring cathodic protection. The KM Cathodic Protection (CP) technician and the foreign utility CP technician shall perform post construction CP interference testing. Interference issues shall be resolved by mutual agreement between foreign utility and KM. All costs associated with the correction of cathodic protection problems on KM pipeline as a result of the foreign utility crossing shall be borne by the foreign utility for a period of one year from date the foreign utility is put in service.
- The metallic foreign line shall be coated with a suitable pipe coating for a distance of at least 10 feet on either side of the crossing unless otherwise requested by the KM CP Technician.

KINDER MORGAN

Guidelines for Design and Construction near Kinder Morgan Hazardous Liquid Operated Facilities

- AC Electrical lines must be installed in conduit and properly insulated.
- DOT approved pipeline markers shall be installed so as to indicate the route of the foreign pipeline across the KM ROW.
- No power poles, light standards, etc. shall be installed on KM easement
- No pipeline may be located within 50 feet (15 meters) of any private dwelling, or any industrial building or place of public assembly in which persons work, congregate, or assemble.

Construction

- Contractors shall be advised of KM's requirements and be contractually obligated to comply.
- The continued integrity of KM's pipelines and the safety of all individuals in the area of proposed work near KM's facilities are of the utmost importance. Therefore, contractor must meet with KM representatives prior to construction to provide and receive notification listings for appropriate area operations and emergency personnel. **KM's on-site representative will require discontinuation of any work that, in his opinion, endangers the operations or safety of personnel, pipelines or facilities.**
- The Contractor must expose all KM pipelines prior to crossing to determine the exact alignment and depth of the lines. A KM representative must be present. In the event of parallel lines, only one pipeline can be exposed at a time.
- KM will not allow pipelines to remain exposed overnight without consent of KM designated representative. Contractor may be required to backfill pipelines at the end of each day.
- A KM representative shall do all line locating. A KM representative shall be present for hydraulic excavation. The use of probing rods for pipeline locating shall be performed by KM representatives only, to prevent unnecessary damage to the pipeline coating.
- Notification shall be given to KM at least 72 hours before start of construction. A schedule of activities for the duration of the project must be made available at that time to facilitate the scheduling of Kinder Morgan, Inc.'s work site representative. Any Contractor schedule changes shall be provided to Kinder Morgan, Inc. immediately.
- Heavy equipment will not be allowed to operate directly over KM pipelines or in KM ROW unless written approval is obtained from (Company). Heavy equipment shall only be allowed to cross KM pipelines at locations designated by Kinder Morgan, Inc. Contractor shall comply with all precautionary measures required by KM to protect its pipelines. When inclement weather exists, provisions must be made to compensate for soil displacement due to subsidence of tires. Equipment excavating within ten (10) feet of KM Pipelines will have a plate guard installed over the teeth to protect the pipeline.
- Excavating or grading which might result in erosion or which could render the KM ROW inaccessible shall not be permitted unless the contractor/developer/owner agrees to restore the area to its original condition and provide protection to KM's facility.
- A KM representative shall be on-site to observe any construction activities within ten (10) feet of a KM pipeline or aboveground appurtenance. The contractor **shall not** work within this distance without a KM representative being on site. Only hand excavation shall be permitted within two (2) feet of KM pipelines, valves and fittings unless State requirements are more stringent. However, proceed with extreme caution when within three (3) feet of the pipe.
- A KM representative will monitor construction activity within 25 feet of KM facilities during and after the activities to verify the integrity of the pipeline and to ensure the scope and conditions agreed to have not changed. Monitoring means to conduct site inspections on a pre-determined frequency based on items such as: scope of work, duration of expected excavator work, type of equipment, potential impact on pipeline, complexity of work and/or number of excavators involved.
- Ripping is only allowed when the position of the pipe is known and not within ten (10) feet of KM facility unless company representative is present.
- Temporary support of any exposed KM pipeline by Contractor may be necessary if required by KM's on-site representative. Backfill below the exposed lines and 12" above the lines shall be replaced with sand or other selected material as approved by KM's on-site representative and thoroughly compacted in 12" lifts to 95% of standard proctor dry density minimum or as approved by KM's on-site representative. This is to adequately protect against stresses that may be caused by the settling of the pipeline.

KINDER MORGAN

Guidelines for Design and Construction near Kinder Morgan Hazardous Liquid Operated Facilities

- No blasting shall be allowed within 1000 feet of KM's facilities unless blasting notification is given to KM including complete Blasting Plan Data. A pre-blast meeting shall be conducted by the organization responsible for blasting.
  KM shall be indemnified and held harmless from any loss, cost of liability for personal injuries received, death caused or property damage suffered or sustained by any person resulting from any blasting operations undertaken within 500 feet of its facilities. The organization responsible for blasting shall be liable for any and all damages caused to KM's facilities as a result of their activities whether or not KM representatives are present. KM shall have a signed and executed Blasting Indemnification Agreement before authorized permission to blast can be given.

  No blasting shall be allowed within 300 feet of KM's facilities unless blasting notification is given to KM a minimum of one week before blasting. *(note: covered above)* KM shall review and analyze the blasting methods. A written blasting plan shall be provided by the organization responsible for blasting and agreed to in writing by KM in addition to meeting requirements for 500' and 1000' being met above. A written emergency plan shall be provided by the organization responsible for blasting. *(note: covered above)*

- Any contact with any KM facility, pipeline, valve set, etc. shall be reported immediately to KM. If repairs to the pipe are necessary, they will be made and inspected before the section is re-coated and the line is back-filled.

- KM personnel shall install all test leads on KM facilities.

- Burning of trash, brush, etc. is not permitted within the KM ROW.

Insurance Requirements

- All contractors, and their subcontractors, working on Company easements shall maintain the following types of insurance policies and minimum limits of coverage. All insurance certificates carried by Contractor and Grantee shall include the following statement: "Kinder Morgan and its affiliated or subsidiary companies are named as additional insured on all above policies (except Worker's Compensation) and waiver of subrogation in favor of Kinder Morgan and its affiliated or subsidiary companies, their respective directors, officers, agents and employees applies as required by written contract." **Contractor shall furnish Certificates of Insurance evidencing insurance coverage prior to commencement of work and shall provide thirty (30) days notice prior to the termination or cancellation of any policy.**

1. Statutory Coverage Workers' Compensation Insurance in accordance with the laws of the states where the work is to be performed. If Contractor performs work on the adjacent on navigable waterways Contractor shall furnish a certificate of insurance showing compliance with the provisions of the Federal Longshoreman's and Harbor Workers' Compensation Law.
2. Employer's Liability Insurance, with limits of not less than $1,000,000 per occurrence and $1,000,000 disease each employee.
3. Commercial General Liability Insurance with a combined single limit of not less than $2,000,000 per occurrence and in the aggregate. All policies shall include coverage for blanket contractual liability assumed.
4. Comprehensive Automobile Liability Insurance with a combined single limit of not less than $1,000,000. If necessary, the policy shall be endorsed to provide contractual liability coverage.
5. If necessary Comprehensive Aircraft Liability Insurance with combined bodily injury, including passengers, and property damage liability single limits of not less than $5,000,000 each occurrence.
6. Contractor's Pollution Liability Insurance this coverage shall be maintained in force for the full period of this agreement with available limits of not less then $2,000,000 per occurrence.
7. Pollution Legal Liability Insurance this coverage must be maintained in a minimum amount of $5,000,000 per occurrence.

U S Army Corps of Engineers
Sacramento District

Nationwide Permit Summary

33 CFR Part 330; Issuance of Nationwide Permits – March 19, 2007 includes corrections of May 8, 2007 and addition of regional conditions December 2007

14. Linear Transportation Projects. Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds 1/10 acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 27.) (Sections 10 and 404)

Note: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under Section 404(f) of the Clean Water Act (see 33 CFR 323.4)

A. Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as appropriate, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP.

☐ **1. Navigation.**

☐ (a) No activity may cause more than a minimal adverse effect on navigation.

☐ (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

☐ (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

☐ **2. Aquatic Life Movements**. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

☐ **3 Spawning Areas.** Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized**.**

☐ **4. Migratory Bird Breeding Areas.** Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

☐ **5. Shellfish Beds**. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48.

☐ **6. Suitable Material**. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

☐ **7. Water Supply Intakes**. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

☐ **8. Adverse Effects From Impoundments**. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or

restricting its flow must be minimized to the maximum extent practicable.

☐ **9. Management of Water Flows**. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

☐ **10. Fills Within 100-Year Floodplains**. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

☐ **11. Equipment**. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

☐ **12. Soil Erosion and Sediment Controls**. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

☐ **13. Removal of Temporary Fills**. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

☐ **14. Proper Maintenance**. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety.

☐ **15. Wild and Scenic Rivers**. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

☐ **16. Tribal Rights**. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

☐ **17. Endangered Species**.

☐ (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

☐ (b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.

☐ (c) Non-federal permittees shall notify the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed.

☐ (d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

☐ (e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, both lethal and non-lethal "takes" of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide Web pages at http://www.fws.gov/ and http://www.noaa.gov/fisheries.html respectively.

☐ **18. Historic Properties**.

☐ (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

☐ (b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.

☐ (c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

☐ (d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed.

☐ (e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, explaining the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

☐ **19. Designated Critical Resource Waters.** Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the district engineer after notice and opportunity for public comment. The district engineer may also designate additional critical resource waters after notice and opportunity for comment.

☐ (a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

☐ (b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 27, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

☐ **20 Mitigation.** The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

☐ (a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

☐ (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

☐ (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10 acre and require pre-construction notification, unless the district engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. For wetland losses of 1/10 acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the

aquatic environment. Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

☐ (d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream restoration, to ensure that the activity results in minimal adverse effects on the aquatic environment.

☐ (e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2 acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2 acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs.

☐ (f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

☐ (g) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.

☐ (h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

☐ **21. Water Quality.** Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

☐ **22. Coastal Zone Management**. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

☐ **23. Regional and Case-By-Case Conditions**. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

☐ **24. Use of Multiple Nationwide Permits**. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

☐ **25. Transfer of Nationwide Permit Verifications**. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

(Transferee)

(Date)

☐ **26. Compliance Certification**. Each permittee who received an NWP verification from the Corps must submit a signed certification regarding the completed work and any required mitigation. The certification form must be forwarded by the Corps with the NWP verification letter and will include:

☐ (a) A statement that the authorized work was done in accordance with the NWP authorization, including any general or specific conditions;

☐ (b) A statement that any required mitigation was completed in accordance with the permit conditions; and

☐ (c) The signature of the permittee certifying the completion of the work and mitigation.

☐ **27. Pre-Construction Notification.**

☐ (a) **Timing**.. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, as a general rule, will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

☐ (1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

☐ (2) Forty-five calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 17 that listed species or critical habitat might affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 18 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) is completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee cannot begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

☐ (b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

☐ (1) Name, address and telephone numbers of the prospective permittee;

☐ (2) Location of the proposed project;

☐ (3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided result in a quicker decision.);

☐ (4) The PCN must include a delineation of special aquatic sites and other waters of the United States on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters of the United States, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, where appropriate;

☐ (5) If the proposed activity will result in the loss of greater than 1/10 acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

☐ (6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

☐ (7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic

property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

☐ (c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

☐ (d) Agency Coordination:

☐ (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

☐ (2) For all NWP 48 activities requiring pre-construction notification and for other NWP activities requiring pre-construction notification to the district engineer that result in the loss of greater than 1/2-acre of waters of the United States, the district engineer will immediately provide (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy of the PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

☐ (3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

☐ (4) Applicants are encouraged to provide the Corps multiple copies of pre-construction notifications to expedite agency coordination.

☐ (5) For NWP 48 activities that require reporting, the district engineer will provide a copy of each report within 10 calendar days of receipt to the appropriate regional office of the NMFS.

☐ (e) In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If the proposed activity requires a PCN and will result in a loss of greater than 1/10 acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any conditions the district engineer deems necessary. The district engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP.

If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant

submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan.

☐ **(a) 28. Single and Complete Project.** The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

B. Regional Conditions:

I. Sacramento District (All States, except Colorado)

1. When pre-construction notification (PCN) is required, the prospective permittee shall notify the Sacramento District in accordance with General Condition 27 using either the South Pacific Division Preconstruction Notification (PCN) Checklist or a completed application form (ENG Form 4345). In addition, the PCN shall include:

a. A written statement explaining how the activity has been designed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States;

b. Drawings, including plan and cross-section views, clearly depicting the location, size and dimensions of the proposed activity. The drawings shall contain a title block, legend and scale, amount (in cubic yards) and size (in acreage) of fill in Corps jurisdiction, including both permanent and temporary fills/structures. The ordinary high water mark or, if tidal waters, the high tide line should be shown (in feet), based on National Geodetic Vertical Datum (NGVD) or other appropriate referenced elevation; and

c. Pre-project color photographs of the project site taken from designatedlocations documented on the plan drawing.

2. The permittee shall complete compensatory mitigation required by special conditions of the NWP verification before or concurrent with construction of the authorized activity, except when specifically determined to be impracticable by the Sacramento District. When project mitigation involves use of a mitigation bank or in-lieu fee program, payment shall be made before commencing construction.

3. The permittee shall record the NWP verification with the Registrar of Deeds or other appropriate official charged with the responsibility for maintaining records of title to or interest in real property against areas (1) designated to be preserved as part of mitigation for authorized impacts, including any associated covenants or restrictions, or (2) where structures such as boat ramps or docks, marinas, piers, and permanently moored vessels will be constructed in or adjacent to navigable waters (Section 10 and Section 404). The recordation shall also include a map showing the surveyed location of the authorized structure and any associated areas preserved to minimize or compensate for project impacts.

4. The permittee shall place wetlands, other aquatic areas, and any vegetative buffers preserved as part of mitigation for impacts into a separate “preserve” parcel prior to discharging dredged or fill material into waters of the United States, except where specifically determined to be impracticable by the Sacramento District. Permanent legal protection shall be established for all preserve parcels, following Sacramento District approval of the legal instrument.

5. The permittee shall allow Corps representatives to inspect the authorized activity and any mitigation areas at any time deemed necessary to determine compliance with the terms and conditions of the NWP verification. The permittee will be notified in advance of an inspection.

6. For NWPs 29, 39, 40, 42, 43, 44, and 46, requests to waive the 300 linear foot limitation for intermittent or ephemeral waters of the U.S. shall include an evaluation of functions and services provided by the waterbody taking into account the watershed, measures to be implemented to avoid and minimize impacts, other measures to avoid and minimize that were found to be impracticable, and a mitigation plan for offsetting impacts.

7. Road crossings shall be designed to ensure fish passage, especially for anadromous fisheries. Permittees shall employ bridge designs that span the stream or river, utilize pier or pile supported structures, or involve large bottomless culverts with a natural streambed, where the substrate and streamflow conditions approximate existing channel conditions. Approach fills in waters of the United States below the ordinary high water mark are not authorized under the NWPs, except where avoidance has specifically been determined to be impracticable by the Sacramento District.

8. For NWP 12, clay blocks, bentonite, or other suitable material shall be used to seal the trench to prevent the utility line from draining waters of the United States, including wetlands.

9. For NWP 13, bank stabilization shall include the use of vegetation or other biotechnical design to the maximum extent practicable. Activities involving hard-armoring of the bank toe or slope requires submission of a PCN per General Condition 27.

10. For NWP 23, the PCN shall include a copy of the signed Categorical Exclusion document and final agency determinations regarding compliance with Section 7 of the Endangered Species Act, Essential Fish Habitat under the Magnussen-Stevens Act, and Section 106 of the National Historic Preservation Act.

11. For NWP 44, the discharge shall not cause the loss of more than 300 linear feet of streambed. For intermittent and ephemeral streams, the 300 linear foot limit may be waived in writing by the Sacramento District. This NWP does not authorize discharges in waters of the United States supporting anadromous fisheries.

12. For NWPs 29 and 39, channelization or relocation of intermittent or perennial drainage, is not authorized, except when, as determined by the Sacramento District, the relocation would result in a net increase in functions of the aquatic ecosystem within the watershed.

13. For NWP 33, temporary fills for construction access in waters of the United States supporting fisheries shall be accomplished with clean, washed spawning quality gravels where practicable as determined by the Sacramento District, in consultation with appropriate federal and state wildlife agencies.

14. For NWP 46, the discharge shall not cause the loss of greater than 0.5 acres of waters of the United States or the loss of more than 300 linear feet of ditch, unless this 300 foot linear foot limit is waived in writing by the Sacramento District.

15. For NWPs 29, 39, 40, 42, and 43, upland vegetated buffers shall be established and maintained in perpetuity, to the maximum extent practicable, next to all preserved open waters, streams and wetlands including created, restored, enhanced or preserved waters of the U.S., consistent with General Condition 20. Except in unusual circumstances, vegetated buffers shall be at least 50 feet in width.

16. All NWPs except 3, 6, 20, 27, 32, 38, and 47, are revoked for activities in histosols and fens and in wetlands contiguous with fens. Fens are defined as slope wetlands with a histic epipedon that are hydrologically supported by groundwater. Fens are normally saturated throughout the growing season, although they may not be during drought conditions. For NWPs 3, 6, 20, 27, 32, and 38, prospective permittees shall submit a PCN to the Sacramento District in accordance with General Condition 27.

17. For all NWPs, when activities are proposed within 100 feet of the point of groundwater discharge of a natural spring, prospective permittees shall submit a PCN to the Sacramento District in accordance with General Condition 27. A spring source is defined as any location where ground water emanates from a point in the ground. For purposes of this condition, springs do not include seeps or other discharges which lack a defined channel.

II. California Only

1. In the Lake Tahoe Basin, all NWPs are revoked. Activities in this area shall be authorized under Regional General Permit 16 or through an individual permit.

2. In the Primary and Secondary Zones of the Legal Delta, NWPs 29 and 39 are revoked. New development activities in the Legal Delta will be reviewed through the Corps' standard permit process.

III. Nevada Only

1. In the Lake Tahoe Basin, all NWPs are revoked. Activities in this area shall be authorized under Regional General Permit 16 or through an individual permit.

IV. Utah Only

1. For all NWPs, except NWP 47, prospective permittees shall submit a PCN in accordance with General Condition 27 for any activity, in waters of the United States, below 4217 feet mean sea level (msl) adjacent to the Great Salt Lake and below 4500 feet msl adjacent to Utah Lake.

2. A PCN is required for all bank stabilization activities in a perennial stream that would affect more than 100 linear feet of stream

3. For NWP 27, facilities for controlling stormwater runoff, construction of water parks such as kayak courses, and use of grout or concrete to construct in-stream structures are not authorized. A PCN is required for all projects exceeding 1500 linear feet as measured on the stream thalweg, using in stream structures exceeding 50 cubic yards per structure and/or incorporating grade control structures exceeding 1 foot vertical drop. For any stream restoration project, the post project stream sinuosity shall be appropriate to the geomorphology of the surrounding area and shall be equal to, or greater than, pre project sinuosity. Sinuosity is defined as the ratio of stream length to project reach length. Structures shall allow the passage of aquatic organisms, recreational water craft or other navigational activities unless specifically waived in writing by the District Engineer.

V. Colorado Only

1. Final Regional Conditions Applicable to Specific Nationwide Permits within Colorado.

a. Nationwide Permit Nos. 12 and 14, Utility Line Activities and Linear Transportation Projects. In the Colorado River Basin, utility line and road activities crossing perennial water or special aquatic sites require notification to the District Engineer in accordance with General Condition 27 (Pre-Construction Notification).

b. Nationwide Permit No. 13 Bank Stabilization. In Colorado, bank stabilization activities necessary for erosion prevention in streams that average less than 20 feet in width (measured between the ordinary high water marks) are limited to the placement of no more than 1/4 cubic yard of suitable fill* material per running foot below the plane of the ordinary high water mark. Activities greater than 1/4 cubic yard may be authorized if the permittee notifies the District Engineer in accordance with General Condition 27 (Pre-Construction Notification) and the Corps determines the adverse environmental effects are minimal. [* See (g) for definition of Suitable Fill]

c. Nationwide Permit No. 27 Aquatic Habitat Restoration, Establishment, and Enhancement Activities.

(1) For activities that include a fishery enhancement component, the Corps will send the Pre-Construction Notification to the Colorado Division of Wildlife (CDOW) for review. In accordance with General Condition 27 (Pre-Construction Notification), CDOW will have 10 days from the receipt of Corps notification to indicate that they will be commenting on the proposed project. CDOW will then have an additional 15 days after the initial 10-day period to provide those comments. If CDOW raises concerns, the applicant may either modify their plan, in coordination with CDOW, or apply for a standard individual permit.

(2) For activities involving the length of a stream, the post-project stream sinuosity will not be significantly reduced, unless it is demonstrated that the reduction in sinuosity is consistent with the natural morphological evolution of the stream (sinuosity is the ratio of stream length to project reach length).

(3) Structures will allow the upstream and downstream passage of aquatic organisms, including fish native to the reach, as well as recreational water craft or other navigational activities, unless specifically waived in writing by the District Engineer. The use of grout and/or concrete in

building structures is not authorized by this nationwide permit.

(4) The construction of water parks (i.e., kayak courses) and flood control projects are not authorized by this nationwide permit.

d. Nationwide Permits Nos. 29 and 39; Residential Developments and Commercial and Institutional Developments. A copy of the existing FEMA/locally-approved floodplain map must be submitted with the Pre-Construction Notification. When reviewing proposed developments, the Corps will utilize the most accurate and reliable FEMA/locally-approved pre-project floodplain mapping, not post-project floodplain mapping based on a CLOMR or LOMR. However, the Corps will accept revisions to existing floodplain mapping if the revisions resolve inaccuracies in the original floodplain mapping and if the revisions accurately reflect pre-project conditions.

2. Final Regional Conditions Applicable to All Nationwide Permits within Colorado

e. Removal of Temporary Fills. General Condition 13 (Removal of Temporary Fills) is amended by adding the following: When temporary fills are placed in wetlands in Colorado, a horizontal marker (i.e. fabric, certified weed-free straw, etc.) must be used to delineate the existing ground elevation of wetlands that will be temporarily filled during construction.

f. Spawning Areas. General Condition 3 (Spawning Areas) is amended by adding the following: In Colorado, all Designated Critical Resource Waters (see enclosure 1) are considered important spawning areas. Therefore, In accordance with General Condition 19 (Designated Critical Resource Waters), the discharge of dredged or fill material in not authorized by the following nationwide permits in these waters: NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50. In addition, in accordance with General Condition 27 (Pre-Construction Notification), notification to the District Engineer is required for use of the following nationwide permits in these waters: NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37 and 38".

g. Suitable Fill. In Colorado, use of broken concrete as fill material requires notification to the District Engineer in accordance with General Condition 27 (Pre-Construction Notification). Permittees must demonstrate that soft engineering methods utilizing native or non-manmade materials are not practicable (with respect to cost, existing technology, and logistics), before broken concrete is allowed as suitable fill. Use of broken concrete with exposed rebar is prohibited in perennial waters and special aquatic sites.

h. Invasive Aquatic Species. General Condition 11 is amended by adding the following condition for work in perennial or intermittent waters of the United States: If heavy equipment is used for the subject project that was previously working in another stream, river, lake, pond, or wetland within 10 days of initiating work, one the following procedures is necessary to prevent the spread of New Zealand Mud Snails and other aquatic hitchhikers:

(1) Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and keep the equipment dry for 10 days. OR

(2) Remove all mud and debris from Equipment (tracks, turrets, buckets, drags, teeth, etc.) and spray/soak equipment with either a 1:1 solution of Formula 409 Household Cleaner and water, or a solution of Sparquat 256 (5 ounces Sparquat per gallon of water). Treated equipment must be kept moist for at least 10 minutes. OR

(3) Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and spray/soak equipment with water greater than 120 degrees F for at least 10 minutes.

3. Final Regional Conditions for Revocation/Special Notification Specific to Certain Geographic Areas

i. Fens: All Nationwide permits, except permit Nos. 3, 6, 20, 27, 32, 38 and 47, are revoked in fens and wetlands adjacent to fens. Use of nationwide permit Nos. 3, 20, 27 and 38, requires notification to the District Engineer, in accordance with General Condition 27 (Pre-Construction Notification), and the permittee may not begin the activity until the Corps determines the adverse environmental effects are minimal. The following defines a fen:

Fen soils (histosols) are normally saturated throughout the growing season, although they may not be during drought conditions. The primary source of hydrology for fens is groundwater. Histosols are defined in accordance with the U.S. Department of Agriculture, Natural Resources Conservation Service publications on Keys to Soil Taxonomy and Field Indicators of Hydric Soils in the United States (http://soils.usda.gov/technical/classification/taxonomy).

j. Springs: Within the state of Colorado, all NWPs, except permit 47 (original 'C'), require preconstruction notification pursuant to General Condition 27 for discharges of dredged or fill material within 100 feet of the point of groundwater discharge of natural springs. A spring source is defined as any location where groundwater emanates from a point in the ground. For purposes of this regional condition, springs do not include seeps or other discharges which do not have a defined channel.

4. Additional Information

The following provides additional information regarding minimization of impacts and compliance with existing general Conditions:

a. Permittees are reminded of the existing General Condition No. 6 which prohibits the use of unsuitable material. Organic debris, building waste, asphalt, car bodies, and trash are not suitable material. Also, General Condition 12 requires appropriate erosion and sediment controls (i.e. all fills must be permanently stabilized to

prevent erosion and siltation into waters and wetlands at the earliest practicable date). Streambed material or other small aggregate material placed along a bank as stabilization will not meet General Condition 12. Also, use of erosion control mates that contain plastic netting may not meet General Condition 12 if deemed harmful to wildlife.

b. Designated Critical Resource Waters in Colorado. In Colorado, a list of designated Critical Resource Waters has been published in accordance with General Condition 19 (Designated Critical Resource Waters). This list will be published on the Albuquerque District Regulatory home page (http://www.spa.usace.army.mil/reg/)

c. Federally-Listed Threatened and Endangered Species. General condition 17 requires that nod-federal permittees notify the District Engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project. Information on such species, to include occurrence by county in Colorado, may be found at the following U.S. Fish and Wildlife Service website: http://www.fws.gov/mountain%2Dprairie/endspp/name_county_search.htm

C. Further Information

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project.

D. Definitions

Best management practices (BMPs): Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

Compensatory mitigation: The restoration, establishment (creation), enhancement, or preservation of aquatic resources for the purpose of compensating for unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Discharge: The term "discharge" means any discharge of dredged or fill material.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Independent utility: A test to determine what constitutes a single and complete project in the Corps regulatory program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Loss of waters of the United States: Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. The loss of stream bed includes the linear feet of stream bed that is filled or excavated. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities eligible for exemptions under Section 404(f) of the Clean Water Act are not considered when calculating the loss of waters of the United States.

Non-tidal wetland: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. The definition of a wetland can be found at 33 CFR 328.3(b). Non-tidal wetlands

contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open water: For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of standing or flowing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of "open waters" include rivers, streams, lakes, and ponds.

Ordinary High Water Mark: An ordinary high water mark is a line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas (see 33 CFR 328.3(e)).

Perennial stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Pre-construction notification: A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Riparian areas: Riparian areas are lands adjacent to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects waterbodies with their adjacent uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 20.)

Shellfish seeding: The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

Single and complete project: The term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete project must have independent utility (see definition). For linear projects, a "single and complete project" is all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single waterbody several times at separate and distant locations, each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Stormwater management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater management facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal

interruption of normal stream processes. A channelized stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Tidal wetland: A tidal wetland is a wetland (i.e., water of the United States) that is inundated by tidal waters. The definitions of a wetland and tidal waters can be found at 33 CFR 328.3(b) and 33 CFR 328.3(f), respectively. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line, which is defined at 33 CFR 328.3(d).

Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWPs, a waterbody is a jurisdictional water of the United States that, during a year with normal patterns of precipitation, has water flowing or standing above ground to the extent that an ordinary high water mark (OHWM) or other indicators of jurisdiction can be determined, as well as any wetland area (see 33 CFR 328.3(b)). If a jurisdictional wetland is adjacent--meaning bordering, contiguous, or neighboring--to a jurisdictional waterbody displaying an OHWM or other indicators of jurisdiction, that waterbody and its adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)). Examples of “waterbodies” include streams, rivers, lakes, ponds, and wetlands.

4 April 2012

Frank Meraz, Interim Branch Chief, Central Region Biology
California Department of Transportation
855 M Street, Suite 200
Fresno, CA 93721

CLEAN WATER ACT § 401 TECHNICALLY CONDITIONED WATER QUALITY CERTIFICATION FOR DISCHARGE OF DREDGED AND/OR FILL MATERIALS FOR THE AVENUE 12 INTERCHANGE PROJECT, WDID#5B20CR00059, MADERA COUNTY

WATER QUALITY CERTIFICATION STANDARD CONDITIONS:

1. This Certification is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to § 13330 of the California Water Code and § 3867 of Title 23 of the California Code of Regulations (23 CCR).

2. This Certification is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to 23 CCR § 3855(b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

3. The validity of any non-denial certification action shall be conditioned upon total payment of the full fee required under 23 CCR § 3833, unless otherwise stated in writing by the certifying agency.

4. Certification is valid for the duration of the Avenue 12 Interchange Project (Project) described in the attached "Project Information Sheet." This Certification is no longer valid if the Project (as summarized in the "Project Information Sheet" and described in the water quality certification application) is modified, or coverage under the project permit issued by the U.S. Army Corps of Engineers pursuant to § 404 of the Clean Water Act has expired. The California Department of Transportation (Discharger) shall notify the Central Valley Regional Water Quality Control Board (Central Valley Water Board) in writing within seven days of Project completion.

5. All reports, notices, or other documents required by this Certification or requested by the Central Valley Water Board shall be signed by a person described below or by a duly authorized representative of that person.

a. For a corporation: by a responsible corporate officer such as (1) a president, secretary, treasurer, or vice president of the corporation in charge of a principal business function; (2) any other person who performs similar policy or decision-making functions for the corporation; or (3) the manager of one or more manufacturing, production, or operating facilities if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

b. For a partnership or sole proprietorship: by a general partner or the proprietor.

c. For a municipality, State, federal, or other public agency: by either a principal executive officer or ranking elected official.

6. Any person signing a document under Standard Condition No. 5 shall make the following certification, whether written or implied:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

ADDITIONAL TECHNICALLY CONDITIONED CERTIFICATION CONDITIONS:

In addition to the six standard conditions, the Discharger shall satisfy the following:

1. The Discharger shall notify the Central Valley Water Board in writing seven days prior to beginning any in-water activities.

2. Except for activities permitted by the U.S. Army Corps of Engineers under § 404 of the Clean Water Act, soil, silt, or other organic materials shall not be placed where such materials could pass into surface water or surface water drainage courses.

3. All areas disturbed by Project activities shall be protected from washout or erosion.

4. The Discharger shall maintain a copy of this Certification and supporting documentation (Project Information Sheet) at the Project site during construction for review by site personnel and agencies. All personnel (employees, contractors, and subcontractors) performing work on the proposed Project shall be adequately informed and trained regarding the conditions of this Certification.

5. An effective combination of erosion and sediment control Best Management Practices (BMPs) shall be implemented and adequately working during all phases of construction.

6. All temporarily affected areas shall be restored to pre-construction contours and conditions upon completion of construction activities.

7. The Discharger shall perform surface water sampling: 1) when performing any in-water work; 2) in the event that Project activities result in any materials reaching surface waters or; 3) when any activities result in the creation of a visible plume in surface waters. The following monitoring shall be conducted immediately upstream out of the influence of the Project and approximately 300 feet downstream of the active work area. Sampling results shall be submitted to this office by the first day of the second month following sampling. The sampling frequency and monitoring locations may be modified for certain projects with written permission from the Central Valley Water Board Executive Officer.

Parameter	Unit	Type of Sample	Frequency of Sample
Turbidity	NTU	Grab	Every 4 hours during in-water work
Settleable Material	ml/L	Grab	Same as above
pH	Standard units	Grab	Daily during concrete activity
Visible construction related pollutants	Observation	Visible Inspections	Continuous throughout the construction period

8. Activities shall not cause:

   (a) where natural turbidity is less than 1 Nephelometric Turbidity Units (NTUs), increases exceeding 2 NTU;

   (b) where natural turbidity is between 1 and 5 NTUs, increases exceeding 1 NTU;

   (c) where natural turbidity is between 5 and 50 NTUs, increases exceeding 20 percent;

   (d) where natural turbidity is between 50 and 100 NTUs, increases exceeding 10 NTUs;

   (e) where natural turbidity is greater than 100 NTUs, increases exceeding 10 percent.

   In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected. Averaging periods may only be used with prior permission of the Central Valley Water Board Executive Officer.

9. Activities shall not cause settleable material to exceed 0.1 ml/L in surface waters as measured in surface waters downstream from the Project.

10. Activities shall not cause the pH to be depressed below 6.5 nor raised above 8.5.

11. The discharge of petroleum products or other excavated materials to surface water is prohibited. Activities shall not cause visible oil, grease, or foam in the work area or downstream. The Discharger shall notify the Central Valley Water Board immediately of any spill of petroleum products or other organic or earthen materials.

12. The Discharger shall notify the Central Valley Water Board immediately if any of the above conditions are violated, along with a description of measures it is taking to remedy the violation.

13. The Discharger shall comply with all California Department of Fish and Game Code § 1600 requirements for the Project.

14. The Discharger must obtain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction Activities issued by the State Water Resources Control Board for any project disturbing an area of one acre or greater.

15. In the event of any violation or threatened violation of the conditions of this Certification, the violation or threatened violation shall be subject to any remedies, penalties, process, or sanctions as provided for under State law and § 401(d) of the federal Clean Water Act. The applicability of any State law authorizing remedies, penalties, process, or sanctions for the violation or threatened violation constitutes a limitation necessary to ensure compliance with this Certification.

16. If the Discharger or a duly authorized representative of the Discharger fails or refuses to furnish technical or monitoring reports, as required under this Certification, or falsifies any information provided in the monitoring reports, the Discharger will be subject to civil liability, for each day of violation, or criminal liability.

17. In response to a suspected violation of any condition of this Certification, the Central Valley Water Board may require the Discharger to furnish, under penalty of perjury, any technical or monitoring reports the Central Valley Water Board deems appropriate, provided that the burden, including cost of the reports, shall be in reasonable relationship to the need for the reports and the benefits to be obtained from them.

18. The Discharger shall allow staff of the Central Valley Water Board, or an authorized representative(s), upon the presentation of credentials and other documents, as may be required by law, to enter the Project premises for inspection, including taking photographs and securing copies of project-related records, for the purpose of assuring compliance with this Certification and determining the ecological success of the Project.

CENTRAL VALLEY WATER BOARD CONTACT PERSON:

Debra Mahnke, Water Resource Control Engineer
1685 E Street
Fresno, CA 93706
(559) 445-6281
dmahnke@waterboards.ca.gov

WATER QUALITY CERTIFICATION:

I hereby issue an order certifying that the proposed discharge from the California Department of Transportation Avenue 12 Interchange Project, WDID# 5B20CR00059, will comply with the applicable provisions of § 301 ("Effluent Limitations"), § 302 ("Water Quality Related Effluent Limitations"), § 303 ("Water Quality Standards and Implementation Plans"), § 306 ("National Standards of Performance"), and § 307 ("Toxic and Pretreatment Effluent Standards") of the Clean Water Act. This discharge is also regulated under State Water Resources Control Board Water Quality Order No. 2003-0017 DWQ "Statewide General Waste Discharge Requirements For Dredged Or Fill Discharges That Have Received State Water Quality Certification."

Except insofar as may be modified by any preceding conditions, all certification actions are contingent on (a) the discharge being limited to and all proposed mitigation being completed in strict compliance with the Discharger's project description, the attached "Project Information Sheet," and the Discharger's water quality certification application; and (b) compliance with all applicable requirements of the Central Valley Water Board's *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*, Fourth Edition, revised October 2011.

Any person aggrieved by this action may petition the State Water Board to review the action in accordance with California Water Code § 13320 and California Code of Regulations, title 23, § 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this action, except that if the thirtieth day following the date of this action falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

for Pamela C. Creedon
Executive Officer

Enclosure: Water Quality Order No. 2003-0017 DWQ
Attachment: Project Information Sheet

cc: Jason Brush, Supervisor, Wetlands Regulatory Office, U.S. Environmental Protection Agency, Region 9, San Francisco (email)
Paul Maniccia, Chief, Sacramento South Branch, Regulatory Unit, Department of the Army, Corps of Engineers, Sacramento
Bill Orme, Water Quality Certification Unit Chief, Division of Water Quality, State Water Resources Control Board, Sacramento (email)
Jeffrey Single, Regional Manager, San Joaquin Valley-Southern Sierra Region, California Department of Fish and Game, Fresno

PROJECT INFORMATION SHEET

Application Date: 31 January 2012

Applicant: California Department of Transportation

Applicant Representatives: Frank Meraz, Interim Branch Chief, Central Region Biology

Project Name: Avenue 12 Interchange Project

Application Number: WDID# 5B20CR00059

Type of Project: Freeway interchange improvements

Project Location: Sections 4 and 5, Township 12 South, Range 18 East, MDB&M. Latitude: 36.92359° and Longitude: -120.021858°

Project Duration: Proposed schedule from September 2012 through December 2015

County: Madera

Receiving Water: Cottonwood Creek, San Joaquin River Hydrologic Basin, San Joaquin Valley Floor Hydrologic Unit #545.20, Madera HA

Water Body Type: Creek

Designated Beneficial Uses: The *Water Quality Control Plan for the Sacramento River and the San Joaquin River Basins,* Fourth Edition, revised October 2011 designates beneficial uses for surface and ground waters within the region. The designated beneficial uses of Cottonwood Creek are municipal and domestic supply; agricultural supply; industrial process supply; hydropower generation; water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; migration of aquatic organisms; spawning, reproduction and/or early development; and wildlife habitat.

Project Description: The Project will improve the State Route 99/Avenue 12 overcrossing, ramps, and surrounding local roads. Cottonwood Creek will be impacted by the demolition of the Road 29 South and Avenue 12 Overcrossing bridges, and subsequent construction of a new Road 29 South Bridge, Avenue 12 Overcrossing, Road 29 North Bridge, and a directional on-ramp over Cottonwood Creek.

Preliminary Water Quality Concerns: Increased turbidity and potential discharge of construction materials.

Proposed Mitigation to Address Concerns: The Project is designed to avoid and minimize adverse effects to waters to the maximum extent practicable. The bridge in-water columns are designed to minimize permanent fill within Cottonwood Creek. Environmentally Sensitive Areas will be established by orange mesh fencing to avoid impacts to riparian areas. All equipment refueling and maintenance will occur outside creek channels. All equipment and vehicles will be properly maintained in order to avoid leaks of petroleum fluids and to avoid transporting dirt and noxious weed seed material within the project site. Erosion control free of noxious weed materials shall be used. No portions of the old bridge structures will be left in the creek channel, and depressions from abutment removal will be filled with clean gravel of appropriate size.

Fill/Excavation Area: The Project will temporarily impact 0.253 acres and permanently impact 0.003 acres of un-vegetated streambed. The Project includes permanent fill of 15 cubic yards of concrete and temporary fill of 1,111 cubic yards of gravel.

Dredge Volume: None

U.S. Army Corps of Engineers Permit Number: Nationwide Permit #14

Department of Fish and Game Streambed Alteration Agreement: The Discharger applied for a Streambed Alteration Agreement on 18 November 2011.

Status of CEQA Compliance: The California Department of Transportation filed a Mitigated Negative Declaration and approved a Notice of Determination on 8 September 2009 (SCH# 2009061001).

As a Responsible Agency under California Environmental Quality Act (CEQA), the Central Valley Water Board reviewed the Mitigated Negative Declaration and found that impacts to water quality were adequately addressed. Mitigation for impacts to water quality is discussed in the "Proposed Mitigation to Address Concerns" section above.

Compensatory Mitigation: None, as the new bridge design will result in no net loss of jurisdictional waters.

Application Fee Provided: Total fees of $1,983.00 have been submitted as required by 23 CCR § 3833(b)(3)(A) and by 23 CCR § 2200(e).

STATE WATER RESOURCES CONTROL BOARD

WATER QUALITY ORDER NO. 2003 - 0017 - DWQ

STATEWIDE GENERAL WASTE DISCHARGE REQUIREMENTS FOR DREDGED OR FILL DISCHARGES THAT HAVE RECEIVED STATE WATER QUALITY CERTIFICATION (GENERAL WDRs)

The State Water Resources Control Board (SWRCB) finds that:

1. Discharges eligible for coverage under these General WDRs are discharges of dredged or fill material that have received State Water Quality Certification (Certification) pursuant to federal Clean Water Act (CWA) section 401.

2. Discharges of dredged or fill material are commonly associated with port development, stream channelization, utility crossing land development, transportation water resource, and flood control projects. Other activities, such as land clearing, may also involve discharges of dredged or fill materials (e.g., soil) into waters of the United States.

3. CWA section 404 establishes a permit program under which the U.S. Army Corps of Engineers (ACOE) regulates the discharge of dredged or fill material into waters of the United States.

4. CWA section 401 requires every applicant for a federal permit or license for an activity that may result in a discharge of pollutants to a water of the United States (including permits under section 404) to obtain Certification that the proposed activity will comply with State water quality standards. In California, Certifications are issued by the Regional Water Quality Control Boards (RWQCB) or for multi-Region discharges, the SWRCB, in accordance with the requirements of California Code of Regulations (CCR) section 3830 et seq. The SWRCB's water quality regulations do not authorize the SWRCB or RWQCBs to waive certification, and therefore, these General WDRs do not apply to any discharge authorized by federal license or permit that was issued based on a determination by the issuing agency that certification has been waived. Certifications are issued by the RWQCB or SWRCB before the ACOE may issue CWA section 404 permits. Any conditions set forth in a Certification become conditions of the federal permit or license if and when it is ultimately issued.

5. Article 4, of Chapter 4 of Division 7 of the California Water Code (CWC), commencing with section 13260(a), requires that any person discharging or proposing to discharge waste, other than to a community sewer system, that could affect the quality of the waters of the State,[1] file a report of waste discharge (ROWD). Pursuant to Article 4, the RWQCBs are required to prescribe waste discharge requirements (WDRs) for any proposed or existing discharge unless WDRs are waived pursuant to CWC section 13269. These General WDRs fulfill the requirements of Article 4 for proposed dredge or fill discharges to waters of the United States that are regulated under the State's CWA section 401 authority.

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[1] "Waters of the State" as defined in CWC Section 13050(e)

6. These General WDRs require compliance with all conditions of Certification orders to ensure that water quality standards are met.

7. The U.S. Supreme Court decision of *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, 531 U.S. 159 (2001) (the *SWANCC* decision) called into question the extent to which certain "isolated" waters are subject to federal jurisdiction. The SWRCB believes that a Certification is a valid and enforceable order of the SWRCB or RWQCBs irrespective of whether the water body in question is subsequently determined not to be federally jurisdictional. Nonetheless, it is the intent of the SWRCB that all Certification conditions be incorporated into these General WDRs and enforceable hereunder even if the federal permit is subsequently deemed invalid because the water is not deemed subject to federal jurisdiction.

8. The beneficial uses for the waters of the State include, but are not limited to, domestic and municipal supply, agricultural and industrial supply, power generation, recreation, aesthetic enjoyment, navigation, and preservation and enhancement of fish, wildlife, and other aquatic resources.

9. Projects covered by these General WDRs shall be assessed a fee pursuant to Title 23, CCR section 3833.

10. These General WDRs are exempt from the California Environmental Quality Act (CEQA) because (a) they are not a "project" within the meaning of CEQA, since a "project" results in a direct or indirect physical change in the environment (Title 14, CCR section 15378); and (b) the term "project" does not mean each separate governmental approval (Title 14, CCR section 15378(c)). These WDRs do not authorize any specific project. They recognize that dredge and fill discharges that need a federal license or permit must be regulated under CWA section 401 Certification, pursuant to CWA section 401 and Title 23, CCR section 3855, et seq. Certification and issuance of waste discharge requirements are overlapping regulatory processes, which are both administered by the SWRCB and RWQCBs. Each project subject to Certification requires independent compliance with CEQA and is regulated through the Certification process in the context of its specific characteristics. Any effects on the environment will therefore be as a result of the certification process, not from these General WDRs. (Title 14, CCR section 15061(b)(3)).

11. Potential dischargers and other known interested parties have been notified of the intent to adopt these General WDRs by public hearing notice.

12. All comments pertaining to the proposed discharges have been heard and considered at the November 4, 2003 SWRCB Workshop Session.

13. The RWQCBs retain discretion to impose individual or General WDRs or waivers of WDRs in lieu of these General WDRs whenever they deem it appropriate. Furthermore, these General WDRs are not intended to supersede any existing WDRs or waivers of WDRs issued by a RWQCB.

IT IS HEREBY ORDERED that WDRs are issued to all persons proposing to discharge dredged or fill material to waters of the United States where such discharge is also subject to the water quality certification requirements of CWA section 401 of the federal Clean Water Act (Title 33 United States Code section 1341), and such certification has been issued by the applicable RWQCB or the SWRCB, unless the applicable RWQCB notifies the applicant that its discharge will be regulated through WDRs or waivers of WDRs issued by the RWQCB. In order to meet the provisions contained in Division 7 of CWC and regulations adopted thereunder, dischargers shall comply with the following:

1. Dischargers shall implement all the terms and conditions of the applicable CWA section 401 Certification issued for the discharge. This provision shall apply irrespective of whether the federal license or permit for which the Certification was obtained is subsequently deemed invalid because the water body subject to the discharge has been deemed outside of federal jurisdiction.

2. Dischargers are prohibited from discharging dredged of fill material to waters of the United States without first obtaining Certification from the applicable RWQCB or SWRCB.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on November 19, 2003.

AYE: Arthur G. Baggett, Jr.
Peter S. Silva
Richard Katz
Gary M. Carlton
Nancy H. Sutley

NO: None.

ABSENT: None.

ABSTAIN: None.

Debbie Irvin
Clerk to the Board

State of California – The Natural Resources Agency
DEPARTMENT OF FISH AND GAME
Central Region
1234 East Shaw Avenue
Fresno, California 93710
(559) 243-4005
http://www.dfg.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

June 4, 2012

Carrie Swanberg
California Department of Transportation
855 M Street, Suite 200
Fresno, California 93721

Subject: Final Lake or Streambed Alteration Agreement
Notification No. 1600-2012-0057-R4
Cottonwood Creek, Madera County
SR 99 Avenue 12 Interchange Project
06-MAD-99 PM 7.1-7.9 EA 06-47100

Dear Ms. Swanberg:

Enclosed is the final Streambed Alteration Agreement (Agreement) for the SR 99 Avenue 12 Interchange Project (Project). Before the Department of Fish and Game (Department) may issue an Agreement, it must comply with the California Environmental Quality Act (CEQA). In this case, the Department, acting as a Responsible Agency, filed a Notice of Determination (NOD) on the same date it signed the Agreement. The NOD was based on information contained in the Mitigated Negative Declaration the Lead Agency prepared for the Project.

Under CEQA, filing an NOD starts a 30-day period within which a party may challenge the filing agency's approval of the Project. You may begin your Project before the 30-day period expires if you have obtained all necessary local, State, and Federal permits or other authorizations. However, if you elect to do so, it will be at your own risk.

If you have any questions regarding this matter, please contact Laura Peterson-Diaz, Environmental Scientist, at (559) 243-4014, extension 225, or lpdiaz@dfg.ca.gov.

Sincerely,

Jeffrey R. Single, Ph.D.
Regional Manager

Enclosures

cc: Laura Peterson-Diaz
Department of Fish and Game

NOTICE OF DETERMINATION

TO: Office of Planning and Research
Post Office Box 3044
Sacramento, California 95814

FROM: California Department of Fish and Game
Central Region
1234 East Shaw Avenue
Fresno, California 93710

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code

PROJECT TITLE: State Route 99 – Avenue 12 Interchange Project - Agreement 2012-0057-R4

STATE CLEARINGHOUSE NUMBER: 2009061001

LEAD AGENCY: California Department of Transportation
CONTACT: Frank Meraz (559) 445-6456

RESPONSIBLE AGENCY: California Department of Fish and Game
CONTACT: Laura Peterson-Diaz (559) 243-4017, extension 225

PROJECT LOCATION: The Project is located on State Route (SR) 99 where it crosses Cottonwood Creek, in Madera County, State of California; Township 11-12 South, Range 19 East, Sections 32-33 and 4-5, United States Geological Survey (USGS) map Madera, Mount Diablo meridian. Latitude: 36.55'24.94" N, Longitude: -120.1'18.69" W

PROJECT DESCRIPTION: The California Department of Fish and Game (DFG) is executing a Lake and Streambed Alteration Agreement, pursuant to Section 1602 of the Fish and Game Code, to the Project applicant. Caltrans proposes to make improvements to the existing SR 99 – Avenue 12 Interchange including the overcrossing, ramps and surrounding local road network between PM 7.1 and 7.9. This will entail four jurisdictional crossings: Avenue 12 Overhead – The bridge will be 632 feet 8 ¼ inches long and 150 feet wide. It will be supported by two bents consisting of 5 columns each that will be 9 feet in diameter. County Road 29 North – The bridge will be 160 feet long and 64 feet wide. It will be supported by two piers consisting of 9 columns each that will be 2 feet in diameter. County Road 29 South – The bridge will be 212 feet long and 34 feet 10 inches wide. It will be supported by two piers consisting of 6 columns each that will be 2 feet in diameter. Directional Onramp – The bridge will be 226 feet long and 26 feet 10 inches wide. It will be supported by three piers consisting of 4 columns each that will be 2 feet in diameter. For Bridge removal, no portion of the old structure will be left in the channel and where abutments are removed the depressions will be filled with clean gravel of an appropriate size (1/2 inch to 4 inches). Prior to demolition of the existing structure, a Demolition Plan will be submitted for approval by DFG. Construction equipment will need to enter the channel, and water is likely to be present when work is done in Cottonwood Creek so a water diversion will be required. The Project will require the removal of riparian trees, which may include cottonwood (*Populus fremontii*), California black walnut (*Juglans californica*), and Oregon ash (*Fraxinus latifolia*), but the exact species, size and number of trees is not yet known.

This is to advise that the California Department of Fish and Game as a Responsible Agency approved the Project described above and has made the following determinations regarding the above described Project.

1. The Project will not have a significant effect on the environment.
2. A Mitigated Negative Declaration was prepared for this Project pursuant to the provisions of CEQA.
3. Mitigation measures were made a condition of the approval of the Project.
4. A Statement of Overriding Considerations was not adopted for this Project.
5. Findings were not made by DFG pursuant to Public Resources Code § 21081(a). DFG did, however, adopt findings to document its compliance with CEQA.

This is to certify that a copy of the Mitigated Negative Declaration prepared for this Project is available to the general public and may be reviewed at: Caltrans - District 6 Environmental Planning, 855 M Street, Suite 200, Fresno, California 93721. Please contact the person specified above.

Date: 6/5/12

FOR

Jeffrey R. Single, Ph.D., Regional Manager
Central Region
California Department of Fish and Game

Date received for filing at OPR: _____

CALIFORNIA DEPARTMENT OF FISH AND GAME
REGION 4 - CENTRAL REGION
1234 East Shaw Avenue
Fresno, California 93710

STREAMBED ALTERATION AGREEMENT
NOTIFICATION NO. 1600-2012-0057-R4
Cottonwood Creek, Madera County

CALIFORNIA DEPARTMENT OF TRANSPORTATION
CALTRANS DISTRICT 6
Frank Meraz
855 M Street, Suite 200
Fresno, California 93721

SR 99 AVENUE 12 INTERCHANGE PROJECT
06-MAD-99 PM 7.1-7.9 EA 06-47100

This Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Game (DFG) and California Department of Transportation Caltrans District 6 (Permittee) as represented by Frank Meraz acting on behalf of Permittee.

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) Section 1602, Permittee notified DFG on March 21, 2012, that Permittee intends to complete the Project described herein.

WHEREAS, pursuant to FGC section 1603, DFG has determined that the Project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, Permittee agrees to complete the Project in accordance with the Agreement.

PROJECT LOCATION

The Project is located on State Route (SR) 99 where it crosses Cottonwood Creek, in Madera County, State of California; Township 11-12 South, Range 19 East, Sections 32-33 and 4-5, United States Geological Survey (USGS) map Madera, Mount Diablo meridian. Latitude: 36.55'24.94" N, Longitude: -120.1'18.69" W.

PROJECT DESCRIPTION

The Project is limited to:

- The proposed Parent Project will make improvements to the existing State Route (SR) 99 – Avenue 12 Interchange including the overcrossing, ramps and surrounding local road network between Post Mile (PM) 7.1 and 7.9. This will entail four jurisdictional crossings:

- Avenue 12 Overhead – The bridge will be 632 feet 8 ¼ inches long and 150 feet wide. It will be supported by two bents consisting of 5 columns each that will be 9 feet in diameter. There will be 0.053 acres of temporary impacts and no permanent impacts to the bed, channel and banks of Cottonwood Creek.

- County Road 29 North – The bridge will be 160 feet long and 64 feet wide. It will be supported by two piers consisting of 9 columns each that will be 2 feet in diameter. There will be 0.041 acres of temporary impacts and .0013 acres of permanent impacts to the bed, channel and banks of Cottonwood Creek.

- County Road 29 South – The bridge will be 212 feet long and 34 feet 10 inches wide. It will be supported by two piers consisting of 6 columns each that will be 2 feet in diameter. There will be 0.076 acres of temporary impacts and 0.0009 acres of permanent impacts to the bed, channel and banks of Cottonwood Creek.

- Directional Onramp – The bridge will be 226 feet long and 26 feet 10 inches wide. It will be supported by three piers consisting of 4 columns each that will be 2 feet in diameter. There will be 0.053 acres of temporary impacts and 0.0009 acres of permanent impacts to the bed, channel and banks of Cottonwood Creek.

- For Bridge removal, no portion of the old structure will be left in the channel and where abutments are removed the depressions will be filled with clean gravel of an appropriate size (1/2 inch to 4 inches). Prior to demolition of the existing structure, a Demolition Plan will be submitted for approval by DFG.

- Equipment to be used includes an, backhoe, Bidwell and roller screeds, bobcat, bulldozer/loader, chainsaw, compressor, concrete truck mixer and pump, crane, dump truck, excavator, flatbed truck, fork lift, front end loader, genie man lift, grader, haul truck, Jack and Bore machine, roller compactor, roller screeds, scraper, shoulder paver, truck with seed sprayer and water truck.

- Construction equipment will need to enter the channel, and water is likely to be present when work is done in Cottonwood Creek so a water diversion will be required.

- The Project will require the removal of riparian trees, which may include cottonwood (*Populus fremontii*), California black walnut (*Juglans californica*), and Oregon ash (*Fraxinus latifolia*), but the exact species, size and number of trees is not yet known.

PROJECT IMPACTS

This Agreement is intended to avoid, minimize, and mitigate adverse impacts to the fish and wildlife resources that occupy the area of Cottonwood Creek, and the immediate adjacent riparian habitat. Absent implementation of the protective measures required by this Agreement, the following species and habitat types could potentially be impacted within the area covered by this Agreement: State Threatened Swainson's hawk (*Buteo swainsoni*) and Species of Special Concern burrowing owl (*Athene cunicularia*), as well as birds, mammals, fish, reptiles, amphibians, invertebrates and plants that comprise the local riparian ecosystem.

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

1. **Administrative Measures**
Permittee shall meet each administrative requirement described below.

1.1. Documentation at Project Site: Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the Project site at all times and shall be presented to DFG personnel or personnel from another State, Federal, or local agency upon request.

1.2. Providing Agreement to Persons at Project Site: Permittee shall provide copies of the Agreement and any extensions and amendments to the Agreement to all persons who will be working on the Project at the Project site on behalf of Permittee; including but not limited to contractors, subcontractors, inspectors, and monitors.

1.3. Notification of Conflicting Provisions: Permittee shall notify DFG if Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the Project by another local, State, or Federal agency. In that event, DFG shall contact Permittee to resolve any conflict.

1.4. Project Site Entry: Permittee agrees that DFG personnel may enter the Project site at any time to verify compliance with the Agreement.

1.5. Legal Obligations: This Agreement does not exempt the Permittee from complying with all other applicable local, State and Federal law, or other legal obligations.

1.6. Unauthorized "Take": This Agreement does not authorize the "take" (defined in FGC Section 86 as to hunt, pursue, catch, capture, or kill; or

attempt to hunt, pursue, catch, capture, or kill) of State- or Federal-listed threatened or endangered species. Any such "take" shall require separate permitting as may be required.

1.7. Water Diversion: To the extent that the Provisions of this Agreement provide for the diversion of water, they are agreed to with the understanding that the Permittee possesses the legal right to so divert such water.

1.8. Trespass: To the extent that the Provisions of this Agreement provide for activities that require the Permittee to trespass on another owner's property, they are agreed to with the understanding that the Permittee possesses the legal right to so trespass.

1.9. Construction/Work Schedule: The Permittee shall submit a **construction/work schedule** to DFG (lpdiaz@dfg.ca.gov with reference to Agreement 1600-2012-0057-R4) prior to beginning any activities covered by this Agreement. The Permittee shall also notify DFG upon the completion of the activities covered by this Agreement.

1.10. Training: Prior to starting any construction activity, all employees, contractors, and visitors who will be present during Project activities shall have received training from a qualified individual on the contents of this Agreement, the resources at stake, and the legal consequences of non-compliance. A **training sign-in sheet** for the employees and contractors shall be provided to DFG and shall include the date of the training and who gave the training.

2. Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish and wildlife resources identified above, Permittee shall implement each measure listed below.

2.1. Construction/Work Hours: All non-emergency work activities during the construction phase will be confined to daylight hours.

2.2. Flagging/Fencing: Prior to any activity within the stream, the Permittee shall identify the limits of the required access routes and encroachment into the stream. These "work area" limits shall be identified with brightly colored flagging/fencing. Work completed under this Agreement shall be limited to this defined area only. Flagging/fencing shall be maintained in good repair for the duration of the Project. All areas beyond the identified work area limits shall be considered Environmentally Sensitive Areas (ESA) and shall not be disturbed.

2.3. Listed Species: This Agreement does not allow for the "take," or "incidental take," of any State- or Federal-listed threatened or endangered species.

2.3.1. The Permittee affirms that no "take" of listed species will occur as a result of this Project and will take prudent measures to ensure that all "take" is avoided. The Permittee acknowledges that they fully understand that they do not have "incidental take" authority. If any State- or Federal-listed threatened or endangered species occur within the proposed work area or could be impacted by the work proposed, and thus "taken" as a result of Project activities, the Permittee is responsible for obtaining and complying with required State and Federal threatened and endangered species permits or other written authorization before proceeding with this Project.

2.3.2. Liability for any "take," or "incidental take," of such listed species remains the separate responsibility of the Permittee for the duration of the Project.

2.3.3. The Permittee shall immediately (the same day) notify DFG of the discovery of any such rare, threatened, or endangered species prior to and/or during construction.

2.4. Swainson's Hawk (SWHA): While there are no California Natural Diversity Database (CNDDB) records of SWHA within 10 miles of the Project, the area does have suitable habitat and there is the potential that a nesting pair could move into the area before the Project is completed. SWHA Specific Measures:

2.4.1. **Focused SWHA Surveys:** Surveys shall be conducted by a qualified biologist no more than 14 days before the onset of any ground-disturbing activities and no earlier then March 20. See attached SWHA Technical Advisory Committee May 31, 2000 protocol for appropriate survey details (Exhibit B).

2.4.2. No work shall occur which could result in either direct or indirect impacts to nesting SWHA. Between March 1 and September 1, Project activities shall not be conducted within a minimum 0.5 mile of any active SWHA nest. This minimum buffer may be reduced for any particular nest, but only if DFG concurs in writing that a reduced buffer will not result in a direct or indirect adverse impact to any nesting SWHA adults, chicks, or eggs.

2.4.3. A qualified biologist with appropriate raptor experience approved to act as monitor shall be on-site during all activities that could potentially impact nesting SWHA. In the event that the approved monitor determines Project activities are having or could cause an adverse impact to any nesting SWHA adults, chicks, or eggs based on bird behavior or other indicators regardless of the existing buffer, Permittee shall immediately cease the activities and contact DFG for further guidance.

2.5. Fish and Wildlife: If any fish or wildlife is encountered during the course of construction, said fish and wildlife shall be allowed to leave the construction area unharmed.

2.5.1. An approved biologist shall perform **general wildlife surveys** of the Project area (including access routes and storage areas) prior to Project construction start with particular attention to evidence of the presence of the species listed above and shall report any possible adverse affect to fish and wildlife resources not originally reported. If the survey shows presence of any wildlife species which could be impacted, Permittee shall contact DFG and mitigation, specific to each incident, shall be developed. If any State- or Federal-listed threatened or endangered species are found within the proposed work area or could be impacted by the work proposed, a new Agreement and/or a 2081(b) State Incidental Take Permit may be necessary and a new CEQA analysis may need to be conducted, before work can begin.

2.5.2. Bats: Prior to work commencing at any bridge, the bridge shall be surveyed for bats by a qualified bat biologist. Bats shall not be disturbed without specific notice to and consultation with the Department. Impact minimization measures shall be implemented prior to Project activities. Exclusion devices, if required, would not be installed during the maternity season and would be removed once construction is completed. If the bridge is being replaced, new bat habitat shall be incorporated in the new bridge design.

2.6. Birds: Migratory nongame native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918 (50 C.F.R. Section 10.13). Sections 3503, 3503.5 and 3513 of the California FGC prohibits take of all birds and their active nests including raptors and other migratory nongame birds, and prohibits the needless destruction of nests.

2.6.1. To protect nesting birds, no construction shall be completed from February 15 through August 31 unless the following **avian surveys** are completed by a qualified biologist:

- Raptors: Survey for nesting activity of raptors within a 750-foot radius of the construction site. Surveys shall be conducted at appropriate nesting times and concentrate on trees with the potential to support raptor nests. If any active nests are observed, these nests and nest trees shall be designated an ESA and protected (until the young have fledged and are no longer dependent on the nest or parents for survival) with a minimum 500-foot buffer during

Project-construction unless otherwise agreed upon and approved in writing by DFG.

- Other Avian Species: Survey riparian areas for nesting activity within a 500-foot radius of the defined work area two (2) to three (3) weeks before construction begins. If any nesting activity is found, these nests and nest trees shall be designated an ESA and protected (until the young have fledged and are no longer dependent on the nest or parents for survival) with a minimum 250-foot buffer during Project construction unless otherwise agreed upon and approved in writing by DFG.

2.6.2. Swallows: If Permittee cannot avoid work on the bridges where there is the potential for disturbance of nesting swallows (February 15 through August 15), then prior to February 1, of each year, Permittee shall remove all existing inactive nest remnants which would be destroyed by the Project. Permittee shall continue to discourage new nest building in places where they would be disturbed, using methods developed in consultation between the Permittee Biologist and DFG. Prior to nesting season, a swallow exclusion device, with visual warnings for the birds to prevent entanglement must be installed. Where disturbance shall occur, nesting must be discouraged throughout the nesting season.

2.6.3. Burrowing owls: If any ground-disturbing activities will occur during the burrowing owl nesting season (approximately February 1 through August 31), the Department recommends that a pre-construction site survey be conducted by a qualified biologist no more than 30 days before the onset of any ground-disturbing activities. If signs (i.e., pellets, feathers, tracks or scat) of burrowing owls are observed at burrow entrances, within 300 feet of the defined work area a qualified biologist shall perform a Phase III Burrowing Owl Survey as described in the 1997 California Burrowing Owl Consortium's Survey Protocol and Mitigation Guidelines. The Department's Staff Report on Burrowing Owl Mitigation (CDFG 2012) (Exhibit C) recommends that impacts to occupied burrows be avoided by implementation of a no-construction buffer zone of a minimum distance of 250 feet, unless a qualified biologist approved by the Department verifies through non-invasive methods that either: 1) the birds have not begun egg laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival. Failure to implement this buffer zone could cause adult burrowing owls to abandon the nest, cause eggs or young to be directly impacted (crushed), and/or result in

reproductive failure. If burrowing owls occupy the site, during the non-breeding season, a passive relocation effort may be instituted.

2.7. Removal of Trees/Shrubs during Fall/Winter Months: To avoid potential impacts to nesting birds, trees and shrubs designated for removal should be cut down during the time period of September 16 to January 31. Trees/shrubs may be removed between February 1 and September 15 provided the Permittee has received written approval from DFG. A qualified biologist shall survey the proposed work area to verify the presence or absence of nesting birds and submit a detailed survey report including mapping for any nests found. DFG will review the report and at the discretion of DFG, tree/shrub removal may be authorized between February 1 and September 15.

2.8. Vegetation: The disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations and shall only occur within the defined work area. Precautions shall be taken to avoid other damage to vegetation by people or equipment. Vegetation or material removed from the riparian area shall not be stockpiled in the streambed or on its banks without measures to ensure its stability, preventing accidental discharge into the stream.

2.8.1. The Permittee shall document the number and species of all riparian woody-stemmed plants greater than four (4) inches in diameter at breast height (DBH) that are removed or are damaged during construction. Riparian trees and shrubs with a DBH of four (4) inches or greater that are damaged or removed shall be replaced by replanting like species at a 3:1 ratio (replaced to lost). Mitigation for heritage trees 24-inches or greater shall require replanting of like species at a 10:1 ratio. This documentation shall be used as the basis for replacement mitigation. (See Revegetation under Compensation below.)

2.9. Vehicles and Equipment: Any equipment or vehicles driven and/or operated within or adjacent to the stream shall be checked and maintained daily to prevent leaks of materials that, if introduced to water, could be deleterious to aquatic and terrestrial life.

2.9.1. Construction vehicle access to the stream's banks and bed shall be limited to predetermined ingress and egress corridors on existing roads. All other areas adjacent to the work site shall be considered an ESA and shall remain off-limits to construction equipment. Vehicle corridors and the ESA shall be identified by the Permittee's resident engineer in consultation with the Designated Biologist.

2.10. Staging and storage areas: Staging and storage areas for equipment, materials, fuels, lubricants, and solvents shall be located outside of the

stream channel and banks, and to the extent possible, on previously disturbed ground. Stationary equipment such as motors, pumps, generators, compressors and welders, located within or adjacent to the stream, shall be positioned over drip-pans. Vehicles shall be moved away from the stream prior to refueling and lubrication.

2.11. Pollution: The Permittee and all contractors shall be subject to the water pollution regulations found in the Department of Fish and Game Code Sections 5650 and 12015.

2.11.1. Raw cement, concrete or washings thereof, asphalt, drilling fluids or lubricants, paint or other coating material, oil or other petroleum products, or any other substances which could be hazardous to fish or wildlife resulting from or disturbed by Project-related activities, shall be prevented from contaminating the soil and/or entering the "Waters of the State."

2.12. Bridge/Structure Removal: Measures shall be taken to insure that structural failure of the supporting portion of the bridge that remains within the riverbed does not occur during the cutting and removal of the segments. Material of sufficient strength that it will not tear on impact shall be placed under the work area to catch any falling debris. Prior to demolition of the existing structure, a **Demolition Plan** will be submitted for approval by DFG.

2.13. All Project-generated debris, building materials, and rubbish shall be removed from the stream and from areas where such materials could be washed into the stream.

2.14. In the event that a spill occurs, all Project activities shall immediately cease until cleanup of the spilled materials is completed. DFG shall be notified immediately by the Permittee of any spills and shall be consulted regarding cleanup procedures.

2.15. Structures: The Permittee shall confirm that all structures are designed (i.e., size and alignment), constructed, and maintained such that they shall not cause long-term changes in water flows that adversely modify the existing upstream or downstream stream bed/bank contours or increase sediment deposition or cause significant new erosion.

2.16. Fill: Rock, gravel, and/or other materials shall not be imported into or moved within the stream, except as otherwise addressed in this Agreement. Only on-site materials and clean imported fill shall be used to complete the Project. Fill shall be limited to the minimal amount necessary to accomplish the agreed activities. Excess and temporary fill material shall be moved off-site at Project completion.

2.17. Spoil: Spoil storage sites shall not be located within the stream, where spoil will be washed into the stream, or where it will cover aquatic or riparian vegetation. Rock, gravel, and/or other materials shall not be imported into or moved within the bed or banks of the stream, except as otherwise addressed in this Agreement.

2.18. Erosion: No work within the banks of the stream will be conducted during or immediately following large rainfall events, or when there is water flowing within the channel. All disturbed soils within the Project site shall be stabilized to reduce erosion potential, both during and following construction. Temporary erosion control devices may be used as appropriate to prevent siltation of the stream. Any installation of permanent non-erodible materials not described in the original Project description shall be coordinated with DFG. Coordination may include the negotiation of additional Agreement Provisions for this activity.

2.19. Turbidity: Turbid water shall not be discharged into the stream, or created within the stream. The Permittee's ability to minimize siltation shall be the subject of preconstruction planning and feature implementation. Precautions to minimize siltation may require that the work site be isolated so that silt or other deleterious materials are not allowed to pass to downstream reaches. The placement of any structure or materials in the stream for this purpose, not included in the original Project description, shall be coordinated with DFG. If it is determined that silt levels resulting from Project-related activities constitute a threat to aquatic life, activities associated with the siltation shall be halted until effective DFG-approved control devices are installed, or abatement procedures are initiated.

2.20. Stream Diversion: If work cannot be completed when the stream is dry and work must occur within the wetted portion of the channel, the Permittee shall develop a **Stream Diversion Plan**. This Stream Diversion Plan shall be completed and submitted to DFG for approval prior to commencement of any proposed diversion or activities within the wetted portion of the stream. The Plan shall include, at a minimum, the following: flow diversion shall be done in a manner that shall prevent pollution and/or siltation, and which shall provide flows to downstream reaches; flows to downstream reaches shall be provided during all times that the natural flow would have supported aquatic life; said flows shall be of sufficient quality and quantity, and of appropriate temperature to support aquatic life, both above and below the diversion; and normal flows shall be restored to the affected stream immediately upon completion of work at that location.

2.21. Restoration: Excess material must be removed from the Project site, pursuant to Department of Transportation Standard Specifications Section 7-1.13. All disturbed soils and new fill, including recontoured slopes and all other cleared areas, shall be revegetated with riparian vegetation or other plants, as appropriate to prevent erosion. If the Project causes any

exposed slopes or exposed areas on the stream banks, these areas shall be seeded with a blend of a minimum of three (3) locally native grass species and covered with a protective layer of weed-free straw or mulch. One (1) or two (2) sterile non-native perennial grass species may be added to the seed mix provided that amount does not exceed 25 percent of the total seed mix by count. Locally native wildflower and/or shrub seeds may also be included in the seed mix. The seeding shall be completed as soon as possible, but no later than November 15 of the year construction ends. A **seed mixture** shall be submitted to DFG for approval prior to application. At the discretion of DFG, all exposed areas where seeding is considered unsuccessful after 90 days shall receive appropriate soil preparation and a second application of seeding, straw, or mulch as soon as is practical on a date mutually agreed upon.

3. Compensatory Measures

To compensate for adverse impacts to fish and wildlife resources identified above that cannot be avoided or minimized, Permittee shall implement each measure listed below.

3.1. Revegetation: If any vegetation with a DBH four (4) inches or greater shall be damaged or removed from the Project area, the Permittee shall develop a **Revegetation Plan** for the site and submit it to DFG for approval prior to commencement of the proposed work. All Plans shall specifically address what, where, when and how replacement shrubs and trees will be planted.

3.1.1. What species and the number of trees both removed and to be planted should be identified. Native riparian trees and shrubs (e.g., cottonwood, willow, sycamore, valley oak, etc.) between four (4) to 25-inches DBH shall be replaced in-kind at a ratio of 3:1, and trees greater then 25-inches DBH shall be replaced at a ratio of 10:1.

3.1.2. Where should be on-site whenever possible.

3.1.3. When should be the first suitable season after construction is complete.

3.1.4. How should include layout, monitoring, and maintenance to ensure a minimum of 70 percent survival for the plantings after five (5) years.

4. Monitoring and Reporting Measures

Permittee shall meet each reporting and monitoring requirement described below.

4.1. Monitoring Obligations of the Permittee:

4.1.1. The Permittee shall have primary responsibility for monitoring compliance with all protective measures included as "Measures" in this Agreement. Protective measures must be implemented within the time periods indicated in the Agreement. DFG shall be notified immediately if monitoring reveals that any of the protective measures were not implemented during the period indicated in this Agreement, or if it anticipates that measures will not be implemented within the time period specified.

4.1.2. The Permittee (or the Permittee's designee) shall ensure the implementation of the Measures of the Agreement, and shall monitor the effectiveness of these Measures. DFG shall be notified immediately if any of the protective measures are not providing the level of protection that is appropriate for the impact that is occurring, and recommendations, if any, for alternative protective measures.

4.2. Reporting Obligations of the Permittee:

4.2.1. The Permittee shall submit the following Reports described in the Measures above to DFG:

- Construction/work schedule (Measure 1.9).
- Employees and contractors training sign-in sheet (Measure 1.10).
- Results of focused SWHA surveys (Measure 2.4.1).
- Results of general wildlife surveys (Measure 2.5.1).
- Results of avian surveys if construction is scheduled during the nesting season (Measure 2.6.1) or for tree removal Measure 2.7)
- Demolition Plan for bridge removal is required (Measure 2.12).
- Stream Diversion Plan is required (Measure 2.20).
- The seed mixture to be used post Project for erosion control (Measure 2.21).
- Revegetation Plan is required (Measure 3.1).

4.2.2. A Final Project Report shall be submitted to DFG within 30 days after the Project is completed. The final report shall summarize the Project

LIABILITY

Permittee shall be solely liable for any violations of the Agreement, whether committed by Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents or contractors and subcontractors, to complete the Project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute DFG's endorsement of, or require Permittee to proceed with the Project. The decision to proceed with the Project is Permittee's alone.

SUSPENSION AND REVOCATION

DFG may suspend or revoke in its entirety the Agreement if it determines that Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before DFG suspends or revokes the Agreement, it shall provide Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide Permittee an opportunity to correct any deficiency before DFG suspends or revokes the Agreement, and include instructions to Permittee, if necessary, including but not limited to a directive to immediately cease the specific activity or activities that caused DFG to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes DFG from pursuing an enforcement action against Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects DFG's enforcement authority or that of its enforcement personnel.

OTHER LEGAL OBLIGATIONS

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from obtaining any other permits or authorizations that might be required under other Federal, State, or local laws or regulations before beginning the Project or an activity related to it.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in the FGC including, but not limited to, FGC sections 2050 et seq. (threatened and endangered species), 3503 (bird nests and eggs), 3503.5 (birds of prey), 5650 (water pollution), 5652 (refuse

disposal into water), 5901 (fish passage), 5937 (sufficient water for fish), and 5948 (obstruction of stream).

Nothing in the Agreement authorizes Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

AMENDMENT

DFG may amend the Agreement at any time during its term if DFG determines the amendment is necessary to protect an existing fish or wildlife resource.

Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by DFG and Permittee. To request an amendment, Permittee shall submit to DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the corresponding amendment fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

TRANSFER AND ASSIGNMENT

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective, unless the transfer or assignment is requested by Permittee in writing, as specified below, and thereafter DFG approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, Permittee shall submit to DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

EXTENSIONS

In accordance with FGC section 1605(b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to DFG a completed DFG "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). DFG shall process the extension request in accordance with FGC 1605(b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the Project the Agreement covers (Fish & G. Code, § 1605, subd. (f)).

EFFECTIVE DATE

The Agreement becomes effective on the date of DFG's signature, which shall be: 1) after Permittee's signature; 2) after DFG complies with all applicable requirements under CEQA; and 3) after payment of the applicable FGC section 711.4 filing fee listed at http://www.dfg.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement shall remain in effect for five (5) years beginning on the date signed by DFG, unless it is terminated or extended before then. All provisions in the Agreement shall remain in force throughout its term. Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC section 1605(a)(2) requires.

CEQA COMPLIANCE

In approving this Agreement, DFG is independently required to assess the applicability of CEQA. The features of this Agreement shall be considered as part of the overall Project description. The Permittee's concurrence signature on this Agreement serves as confirmation to DFG that the activities that shall be conducted under the terms of this Agreement are consistent with the Project described in Notification No. 2012-0036-R4. Permittee, as CEQA Lead Agency, submitted an Initial Study with Proposed Mitigated Negative Declaration October, 2008, State Clearinghouse No. 2009061001, for the SR 99 - Avenue 12 Interchange Project. A copy of the Notice of Determination, signed by Caltrans September 8, 2009 for the Project was provided with the Section 1602 Notification. DFG, as a CEQA Responsible Agency, shall make findings and submit a Notice of Determination to the State Clearinghouse upon signing this Agreement.

EXHIBITS

The document(s) listed below is included as an exhibit to the Agreement and incorporated herein by reference.

A. Figure 1. Project Location USGS Quad Map.

B. SWHA Technical Advisory Committee May 31, 2000 protocol

C. Department's Staff Report on Burrowing Owl Mitigation (CDFG 2012)

AUTHORITY

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

AUTHORIZATION

This Agreement authorizes only the Project described herein. If Permittee begins or completes a Project different from the Project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify DFG in accordance with FGC section 1602.

CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.

FOR CALIFORNIA DEPARTMENT OF TRANSPORTATION

Dena S Denton for Carrie Swanberg — 6-4-2012

Frank Meraz
Acting Biology Branch Chief
Caltrans Central Region (Districts 5, 6, 9 and 10)

Date

FOR DEPARTMENT OF FISH AND GAME

John C. Baker for — 6/5/12

Jeffrey R. Single, Ph.D.
Regional Manager

Date

Prepared by: Laura Peterson-Diaz
Environmental Scientist

Figure 1

Exhibit A

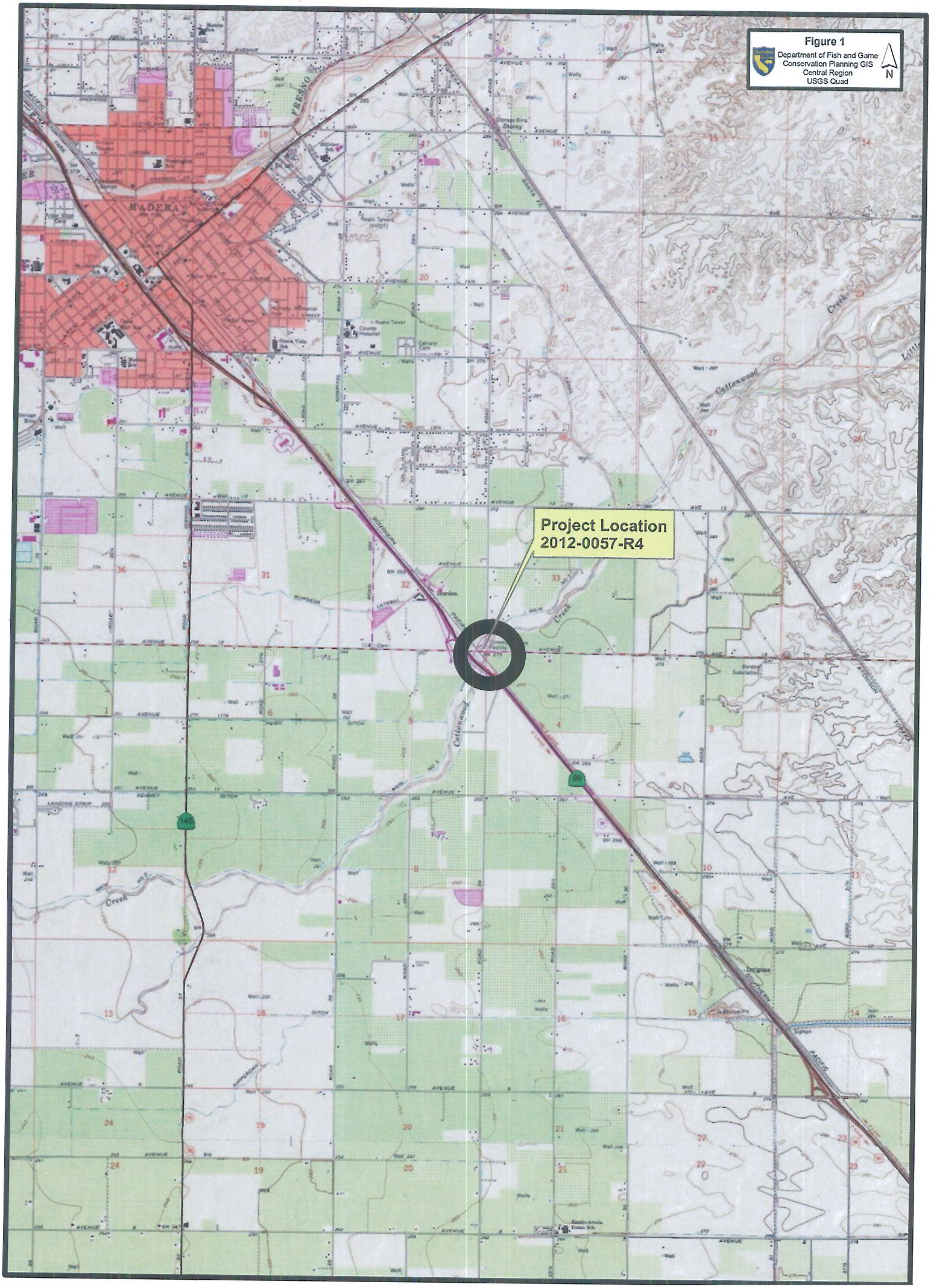

Figure 1
Department of Fish and Game
Conservation Planning GIS
Central Region
USGS Quad
N
Project Location
2012-0057-R4
MADERA
FRESNO
Cottonwood
Creek
99
145

SWHA Technical Advisory Committee May 31, 2000 protocol

Exhibit B

RECOMMENDED TIMING AND METHODOLOGY FOR SWAINSON'S HAWK NESTING SURVEYS IN CALIFORNIA'S CENTRAL VALLEY

Swainson's Hawk Technical Advisory Committee

May 31, 2000

This set of survey recommendations was developed by the Swainson's Hawk Technical Advisory Committee (TAC) to maximize the potential for locating nesting Swainson's hawks, and thus reducing the potential for nest failures as a result of project activities/disturbances. The combination of appropriate surveys, risk analysis, and monitoring has been determined to be very effective in reducing the potential for project-induced nest failures. As with most species, when the surveyor is in the right place at the right time, Swainson's hawks may be easy to observe; but some nest sites may be very difficult to locate, and even the most experienced surveyors have missed nests, nesting pairs, mis-identified a hawk in a nest, or believed incorrectly that a nest had failed. There is no substitute for specific Swainson's hawk survey experience and acquiring the correct search image.

METHODOLOGY

Surveys should be conducted in a manner that maximizes the potential to observe the adult Swainson's hawks, as well as the nest/chicks second. To meet the California Department of Fish and Game's (CDFG) recommendations for mitigation and protection of Swainson's hawks, surveys should be conducted for a ½ mile radius around all project activities, and if active nesting is identified within the ½ mile radius, consultation is required. In general, the TAC recommends this approach as well.

Minimum Equipment

Minimum survey equipment includes a high-quality pair of binoculars and a high quality spotting scope. Surveying even the smallest project area will take hours, and poor optics often result in eye-strain and difficulty distinguishing details in vegetation and subject birds. Other equipment includes good maps, GPS units, flagging, and notebooks.

Walking vs Driving

Driving (car or boat) or "windshield surveys" are usually preferred to walking if an adequate roadway is available through or around the project site. While driving, the observer can typically approach much closer to a hawk without causing it to fly. Although it might appear that a flying bird is more visible, they often fly away from the observer using trees as screens; and it is difficult to determine from where a flying bird came. Walking surveys are useful in locating a nest after a nest territory is identified, or when driving is not an option.

Angle and Distance to the Tree

Surveying subject trees from multiple angles will greatly increase the observer's chance of detecting a nest or hawk, especially after trees are fully leafed and when surveying multiple trees

in close proximity. When surveying from an access road, survey in both directions. Maintaining a distance of 50 meters to 200 meters from subject trees is optimal for observing perched and flying hawks without greatly reducing the chance of detecting a nest/young: Once a nesting territory is identified, a closer inspection may be required to locate the nest.

Speed
Travel at a speed that allows for a thorough inspection of a potential nest site. Survey speeds should not exceed 5 miles per hour to the greatest extent possible. If the surveyor must travel faster than 5 miles per hour, stop frequently to scan subject trees.

Visual and Aural Ques
Surveys will be focused on both observations and vocalizations. Observations of nests, perched adults, displaying adults, and chicks during the nesting season are all indicators of nesting Swainson's hawks. In addition, vocalizations are extremely helpful in locating nesting territories. Vocal communication between. hawks is frequent during territorial displays; during courtship and mating; through the nesting period as mates notify each other that food is available or that a threat exists; and as older chicks and fledglings beg for food.

Distractions
Minimize distractions while surveying. Although two pairs of eyes may be better than one pair at times, conversation may limit focus. Radios should be off, not only are they distracting, they may cover a hawk's call.

Notes and Species Observed
Take thorough field notes. Detailed notes and maps of the location of observed Swainson's hawk nests are essential for filling gaps in the Natural Diversity Data Base; please report all observed nest sites. Also document the occurrence of nesting great homed owls, red-tailed hawks, red-shouldered hawks and other potentially competitive species. These species will infrequently nest within 100 yards of each other, so the presence of one species will not necessarily exclude another.

TIMING

To meet **the minimum level** of protection for the species, surveys should be completed for **at least** the two survey periods immediately prior to a project's initiation. For example, if a project is scheduled to begin on June 20, you should complete 3 surveys in Period III and 3 surveys in Period V. However, it is always recommended that surveys be completed in Periods II, III and V. **Surveys should not be conducted in Period IV.**

The survey periods are defined by the timing of migration, courtship, and nesting in a "typical" year for the majority of Swainson's hawks from San Joaquin County to Northern Yolo County. Dates should be adjusted in consideration of early and late nesting seasons, and geographic differences (northern nesters tend to nest slightly later, etc). If you are not sure, contact a TAC member or CDFG biologist.

Survey dates **Justification and search image**	**Survey time**	**Number of Surveys**
I. *January-March 20 (recommended optional)*	*All day*	*1*

Prior to Swainson's hawks returning, it may be helpful to survey the project site to determine potential nest locations. Most nests are easily observed from relatively long distances, giving the surveyor the opportunity to identify potential nest sites, as well as becoming familiar with the project area. It also gives the surveyor the opportunity to locate and map competing species nest sites such as great homed owls from February on, and red-tailed hawks from March on. After March 1, surveyors are likely to observe Swainson's hawks staging in traditional nest territories.

II. *March 20 to April 5*	*Sunrise to 1000* *1600 to sunset*	*3*

Most Central Valley Swainson's hawks return by April 1, and immediately begin occupying their traditional nest territories. For those few that do not return by April 1, there are often hawks ("floaters") that act as place-holders in traditional nest sites; they are birds that do not have mates, but temporarily attach themselves to traditional territories and/or one of the site's "owners." Floaters are usually displaced by the territories' owner(s) if the owner returns.

Most trees are leafless and are relatively transparent; it is easy to observe old nests, staging birds, and competing species. The hawks are usually in their territories during the survey hours, but typically soaring and foraging in the mid-day hours. Swainson's hawks may often be observed involved in territorial and courtship displays, and circling the nest territory. Potential nest sites identified by the observation of staging Swainson's hawks will usually be active territories during that season, although the pair may not successfully nest/reproduce that year.

III. *April 5 to April 20*	*Sunrise to 1200* *1630 to Sunset*	*3*

Although trees are much less transparent at this time, 'activity at the nest site increases significantly. Both males and females are actively nest building, visiting their selected site frequently. Territorial and courtship displays are increased, as is copulation. The birds tend to vocalize often, and nest locations are most easily identified. This period may require a great deal of "sit and watch" surveying.

IV. *April 21 to June 10*	*Monitoring known nest sites only* ***Initiating Surveys is not recommended***	

Nests are extremely difficult to locate this time of year, and even the most experienced surveyor will miss them, especially if the previous surveys have not been done. During this phase of nesting, the female Swainson's hawk is in brood position, very low in the nest, laying eggs, incubating, or protecting the newly hatched and vulnerable chicks; her head may or may not be visible. Nests are often well-hidden, built into heavily vegetated sections of trees or in clumps of mistletoe, making them all but invisible. Trees are usually not viewable from all angles, which may make nest observation impossible.

Following the male to the nest may be the only method to locate it, and the male will spend hours away from the nest foraging, soaring, and will generally avoid drawing attention to the nest site. Even if the observer is fortunate enough to see a male returning with food for the female, if the female determines it is not safe she will not call the male in, and he will not approach the nest; this may happen if the observer, or others, are too close to the nest or if other threats, such as rival hawks, are apparent to the female or male.

V. ***June 10 to July 30 (post-fledging)*** ***Sunrise to 1200*** ***3***
1600 to sunset

Young are active and visible, and relatively safe without parental protection. Both adults make numerous trips to the nest and are often soaring above, or perched near or on the nest tree. The location and construction of the nest may still limit visibility of the nest, young, 'and adults.

DETERMINING A PROJECT'S POTENTIAL
FOR IMPACTING SWAINSON'S HAWKS

LEVEL OF RISK	REPRODUCTIVE SUCCESS (Individuals)	LONGTERM SURVIVABILITY (Population)	NORMAL SITE CHARACTERISTICS (Daily Average)	NEST MONI-TORING
HIGH	Direct physical contact with the nest tree while the birds are on eggs or protecting young. (Helicopters in close proximity)	Loss of available foraging area.	Little human-created noise, little human use: nest is well away from dwellings, equipment yards, human access areas, etc. *Do not include general cultivation practices in evaluation.*	**MORE**
		Loss of nest trees.		
	Loss of nest tree after nest building is begun prior to laying eggs.	Loss of potential nest trees.		
	Personnel within 50 yards of nest tree (out of vehicles) for extended periods while birds are on eggs or protecting young that are < 10 days old.	Cumulative: Multi-year, multi-site projects with substantial noise/personnel disturbance.		
	Initiating construction activities (machinery and personnel) within 200 yards of the nest after eggs are laid and before young are > 10 days old.	Cumulative: Single-season projects with substantial noise/personnel disturbance that is greater than or significantly different from the daily norm.		
	Heavy machinery only working within 50 yards of nest.		Substantial human-created noise and occurrence: nest is near roadways, well-used waterways, active airstrips, areas that have high human use. *Do not include general cultivation practices in evaluation.*	
	Initiating construction activities within 200 yards of nest before nest building begins or after young > 10 days old.	Cumulative: Single-season projects with activities that "blend" well with site's "normal' activities.		
LOW	All project activities (personnel and machinery) greater than 200 yards from nest.			**LESS**

Department's Staff Report on Burrowing Owl Mitigation (CDFG 2012)

Exhibit C

Staff Report on Burrowing Owl Mitigation

State of California

Natural Resources Agency

Department of Fish and Game

March 7, 2012[1]

[1] This document replaces the Department of Fish and Game 1995 Staff Report On Burrowing Owl Mitigation.

TABLE OF CONTENTS

INTRODUCTION AND PURPOSE

Maintaining California's rich biological diversity is dependent on the conservation of species and their habitats. The California Department of Fish and Game (Department) has designated certain species as "species of special concern" when their population viability and survival is adversely affected by risk factors such as precipitous declines or other vulnerability factors (Shuford and Gardali 2008). Preliminary analyses of regional patterns for breeding populations of burrowing owls (*Athene cunicularia*) have detected declines both locally in their central and southern coastal breeding areas, and statewide where the species has experienced modest breeding range retraction (Gervais et al. 2008). In California, threat factors affecting burrowing owl populations include habitat loss, degradation and modification, and eradication of ground squirrels resulting in a loss of suitable burrows required by burrowing owls for nesting, protection from predators, and shelter (See Appendix A).

The Department recognized the need for a comprehensive conservation and mitigation strategy for burrowing owls, and in 1995 directed staff to prepare a report describing mitigation and survey recommendations. This report, "1995 Staff Report on Burrowing Owl Mitigation," (Staff Report) (CDFG 1995), contained Department-recommended burrowing owl and burrow survey techniques and mitigation measures intended to offset the loss of habitat and slow or reverse further decline of this species. Notwithstanding these measures, over the past 15+ years, burrowing owls have continued to decline in portions of their range (DeSante et al. 2007, Wilkerson and Siegel, 2010). The Department has determined that reversing declining population and range trends for burrowing owls will require implementation of more effective conservation actions, and evaluating the efficacy of the Department's existing recommended avoidance, minimization and mitigation approaches for burrowing owls.

The Department has identified three main actions that together will facilitate a more viable, coordinated, and concerted approach to conservation and mitigation for burrowing owls in California. These include:

1. Incorporating burrowing owl comprehensive conservation strategies into landscape-based planning efforts such as Natural Community Conservation Plans (NCCPs) and multi-species Habitat Conservation Plans (HCPs) that specifically address burrowing owls.
2. Developing and implementing a statewide conservation strategy (Burkett and Johnson, 2007) and local or regional conservation strategies for burrowing owls, including the development and implementation of a statewide burrowing owl survey and monitoring plan.
3. Developing more rigorous burrowing owl survey methods, working to improve the adequacy of impacts assessments; developing clear and effective avoidance and minimization measures; and developing mitigation measures to ensure impacts to the species are effectively addressed at the project, local, and/or regional level (the focus of this document).

This Report sets forth the Department's recommendations for implementing the third approach identified above by revising the 1995 Staff Report, drawing from the most relevant and current knowledge and expertise, and incorporating the best scientific information

available pertaining to the species. It is designed to provide a compilation of the best available science for Department staff, biologists, planners, land managers, California Environmental Quality Act (CEQA) lead agencies, and the public to consider when assessing impacts of projects or other activities on burrowing owls.

This revised Staff Report takes into account the California Burrowing Owl Consortium's Survey Protocol and Mitigation Guidelines (CBOC 1993, 1997) and supersedes the survey, avoidance, minimization and mitigation recommendations in the 1995 Staff Report. Based on experiences gained from implementing the 1995 Staff Report, the Department believes revising that report is warranted. This document also includes general conservation goals and principles for developing mitigation measures for burrowing owls.

DEPARTMENT ROLE AND LEGAL AUTHORITIES

The mission of the Department is to manage California's diverse fish, wildlife and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. The Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitats necessary to maintain biologically sustainable populations of those species (Fish and Game Code (FGC) §1802). The Department, as trustee agency pursuant to CEQA (See CEQA Guidelines, §15386), has jurisdiction by law over natural resources, including fish and wildlife, affected by a project, as that term is defined in Section 21065 of the Public Resources Code. The Department exercises this authority by reviewing and commenting on environmental documents and making recommendations to avoid, minimize, and mitigate potential negative impacts to those resources held in trust for the people of California.

Field surveys designed to detect the presence of a particular species, habitat element, or natural community are one of the tools that can assist biologists in determining whether a species or habitat may be significantly impacted by land use changes or disturbance. The Department reviews field survey data as well as site-specific and regional information to evaluate whether a project's impacts may be significant. This document compiles the best available science for conducting habitat assessments and surveys, and includes considerations for developing measures to avoid impacts or mitigate unavoidable impacts.

CEQA

CEQA requires public agencies in California to analyze and disclose potential environmental impacts associated with a project that the agency will carry out, fund, or approve. Any potentially significant impact must be mitigated to the extent feasible. Project-specific CEQA mitigation is important for burrowing owls because most populations exist on privately owned parcels that, when proposed for development or other types of modification, may be subject to the environmental review requirements of CEQA.

Take

Take of individual burrowing owls and their nests is defined by FGC section 86, and prohibited by sections 3503, 3503.5 and 3513. Take is defined in FGC Section 86 as "hunt, pursue, catch, capture or kill, or attempt to hunt, pursue, catch, capture or kill."

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the United States and Canada, Japan, Mexico, and Russia for the protection of migratory birds, including the burrowing owl (50 C.F.R. § 10). The MBTA protects migratory bird nests from possession, sale, purchase, barter, transport, import and export, and collection. The other prohibitions of the MBTA - capture, pursue, hunt, and kill - are inapplicable to nests. The regulatory definition of take, as defined in Title 50 C.F.R. part 10.12, means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to hunt, shoot, wound, kill, trap, capture, or collect. Only the verb "collect" applies to nests. It is illegal to collect, possess, and by any means transfer possession of any migratory bird nest. The MBTA prohibits the destruction of a nest when it contains birds or eggs, and no possession shall occur during the destruction (see Fish and Wildlife Service, Migratory Bird Permit Memorandum, April 15, 2003). Certain exceptions to this prohibition are included in 50 C.F.R. section 21. Pursuant to Fish & Game Code section 3513, the Department enforces the Migratory Bird Treaty Act consistent with rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Treaty Act.

Regional Conservation Plans

Regional multiple species conservation plans offer long-term assurances for conservation of covered species at a landscape scale, in exchange for biologically appropriate levels of incidental take and/or habitat loss as defined in the approved plan. California's NCCP Act (FGC §2800 et seq.) governs such plans at the state level, and was designed to conserve species, natural communities, ecosystems, and ecological processes across a jurisdiction or a collection of jurisdictions. Complementary federal HCPs are governed by the Endangered Species Act (7 U.S.C. § 136, 16 U.S.C.§ 1531 et seq.) (ESA). Regional conservation plans (and certain other landscape-level conservation and management plans), may provide conservation for unlisted as well as listed species. Because the geographic scope of NCCPs and HCPs may span many hundreds of thousands of acres, these planning tools have the potential to play a significant role in conservation of burrowing owls, and grasslands and other habitats.

Fish and Game Commission Policies

There are a number of Fish and Game Commission policies (see FGC §2008) that can be applied to burrowing owl conservation. These include policies on: Raptors, Cooperation, Endangered and Threatened Species, Land Use Planning, Management and Utilization of Fish and Wildlife on Federal Lands, Management and Utilization of Fish and Wildlife on Private Lands, and Research.

GUIDING PRINCIPLES FOR CONSERVATION

Unless otherwise provided in a statewide, local, or regional conservation strategy, surveying and evaluating impacts to burrowing owls, as well as developing and implementing avoidance, minimization, and mitigation and conservation measures incorporate the following principles. These principles are a summary of Department staff expert opinion and were used to guide the preparation of this document.

1. Use the Precautionary Principle (Noss et al.1997), by which the alternative of increased conservation is deliberately chosen in order to buffer against incomplete knowledge of burrowing owl ecology and uncertainty about the consequences to burrowing owls of potential impacts, including those that are cumulative.
2. Employ basic conservation biology tenets and population-level approaches when determining what constitutes appropriate avoidance, minimization, and mitigation for impacts. Include mitigation effectiveness monitoring and reporting, and use an adaptive management loop to modify measures based on results.
3. Protect and conserve owls in wild, semi-natural, and agricultural habitats (conserve is defined at FGC §1802).
4. Protect and conserve natural nest burrows (or burrow surrogates) previously used by burrowing owls and sufficient foraging habitat and protect auxiliary "satellite" burrows that contribute to burrowing owl survivorship and natural behavior of owls.

CONSERVATION GOALS FOR THE BURROWING OWL IN CALIFORNIA

It is Department staff expert opinion that the following goals guide and contribute to the short and long-term conservation of burrowing owls in California:

1. Maintain size and distribution of extant burrowing owl populations (allowing for natural population fluctuations).
2. Increase geographic distribution of burrowing owls into formerly occupied historical range where burrowing owl habitat still exists, or where it can be created or enhanced, and where the reason for its local disappearance is no longer of concern.
3. Increase size of existing populations where possible and appropriate (for example, considering basic ecological principles such as carrying capacity, predator-prey relationships, and inter-specific relationships with other species at risk).
4. Protect and restore self-sustaining ecosystems or natural communities which can support burrowing owls at a landscape scale, and which will require minimal long-term management.
5. Minimize or prevent unnatural causes of burrowing owl population declines (e.g., nest burrow destruction, chemical control of rodent hosts and prey).
6. Augment/restore natural dynamics of burrowing owl populations including movement and genetic exchange among populations, such that the species does not require future listing and protection under the California Endangered Species Act (CESA) and/or the federal Endangered Species Act (ESA).
7. Engage stakeholders, including ranchers; farmers; military; tribes; local, state, and federal agencies; non-governmental organizations; and scientific research and education communities involved in burrowing owl protection and habitat management.

ACTIVITIES WITH THE POTENTIAL TO TAKE OR IMPACT BURROWING OWLS

The following activities are examples of activities that have the potential to take burrowing owls, their nests or eggs, or destroy or degrade burrowing owl habitat: grading, disking, cultivation, earthmoving, burrow blockage, heavy equipment compacting and crushing burrow tunnels, levee maintenance, flooding, burning and mowing (if burrows are impacted), and operating wind turbine collisions (collectively hereafter referred to as "projects" or "activities"

whether carried out pursuant to CEQA or not). In addition, the following activities may have impacts to burrowing owl populations: eradication of host burrowers; changes in vegetation management (i.e. grazing); use of pesticides and rodenticides; destruction, conversion or degradation of nesting, foraging, over-wintering or other habitats; destruction of natural burrows and burrow surrogates; and disturbance which may result in harassment of owls at occupied burrows.

PROJECT IMPACT EVALUATIONS

The following three progressive steps are effective in evaluating whether projects will result in impacts to burrowing owls. The information gained from these steps will inform any subsequent avoidance, minimization and mitigation measures. The steps for project impact evaluations are: 1) habitat assessment, 2) surveys, and 3) impact assessment. Habitat assessments are conducted to evaluate the likelihood that a site supports burrowing owl. Burrowing owl surveys provide information needed to determine the potential effects of proposed projects and activities on burrowing owls, and to avoid take in accordance with FGC sections 86, 3503, and 3503.5. Impact assessments evaluate the extent to which burrowing owls and their habitat may be impacted, directly or indirectly, on and within a reasonable distance of a proposed CEQA project activity or non-CEQA project. These three site evaluation steps are discussed in detail below.

Biologist Qualifications

The current scientific literature indicates that only individuals meeting the following minimum qualifications should perform burrowing owl habitat assessments, surveys, and impact assessments:

1. Familiarity with the species and its local ecology;
2. Experience conducting habitat assessments and non-breeding and breeding season surveys, or experience with these surveys conducted under the direction of an experienced surveyor;
3. Familiarity with the appropriate state and federal statutes related to burrowing owls, scientific research, and conservation;
4. Experience with analyzing impacts of development on burrowing owls and their habitat.

Habitat Assessment Data Collection and Reporting

A habitat assessment is the first step in the evaluation process and will assist investigators in determining whether or not occupancy surveys are needed. Refer to Appendix B for a definition of burrowing owl habitat. Compile the detailed information described in Appendix C when conducting project scoping, conducting a habitat assessment site visit and preparing a habitat assessment report.

Surveys

Burrowing owl surveys are the second step of the evaluation process and the best available scientific literature recommends that they be conducted whenever burrowing owl habitat or sign (see Appendix B) is encountered on or adjacent to (within 150 meters) a project site

(Thomsen 1971, Martin 1973). Occupancy of burrowing owl habitat is confirmed at a site when at least one burrowing owl, or its sign at or near a burrow entrance, is observed within the last three years (Rich 1984). Burrowing owls are more detectable during the breeding season with detection probabilities being highest during the nestling stage (Conway et al. 2008). In California, the burrowing owl breeding season extends from 1 February to 31 August (Haug et al. 1993, Thompsen 1971) with some variances by geographic location and climatic conditions. Several researchers suggest three or more survey visits during daylight hours (Haug and Diduik 1993, CBOC 1997, Conway and Simon 2003) and recommend each visit occur at least three weeks apart during the peak of the breeding season, commonly accepted in California as between 15 April and 15 July (CBOC 1997). Conway and Simon (2003) and Conway et al. (2008) recommended conducting surveys during the day when most burrowing owls in a local area are in the laying and incubation period (so as not to miss early breeding attempts), during the nesting period, and in the late nestling period when most owls are spending time above ground.

Non-breeding season (1 September to 31 January) surveys may provide information on burrowing owl occupancy, but do not substitute for breeding season surveys because results are typically inconclusive. Burrowing owls are more difficult to detect during the non-breeding season and their seasonal residency status is difficult to ascertain. Burrowing owls detected during non-breeding season surveys may be year-round residents, young from the previous breeding season, pre-breeding territorial adults, winter residents, dispersing juveniles, migrants, transients or new colonizers. In addition, the numbers of owls and their pattern of distribution may differ during winter and breeding seasons. However, on rare occasions, non-breeding season surveys may be warranted (i.e., if the site is believed to be a wintering site only based on negative breeding season results). Refer to Appendix D for information on breeding season and non-breeding season survey methodologies.

Survey Reports

Adequate information about burrowing owls present in and adjacent to an area that will be disturbed by a project or activity will enable the Department, reviewing agencies and the public to effectively assess potential impacts and will guide the development of avoidance, minimization, and mitigation measures. The survey report includes but is not limited to a description of the proposed project or proposed activity, including the proposed project start and end dates, as well as a description of disturbances or other activities occurring on-site or nearby. Refer to Appendix D for details included in a survey report.

Impact Assessment

The third step in the evaluation process is the impact assessment. When surveys confirm occupied burrowing owl habitat in or adjoining the project area, there are a number of ways to assess a project's potential significant impacts to burrowing owls and their habitat. Richardson and Miller (1997) recommended monitoring raptor behavior prior to developing management recommendations and buffers to determine the extent to which individuals have been sensitized to human disturbance. Monitoring results will also provide detail necessary for developing site-specific measures. Postovit and Postovit (1987) recommended an analytical approach to mitigation planning: define the problem (impact), set goals (to guide mitigation development), evaluate and select mitigation methods, and monitor the results.

Define the problem. The impact assessment evaluates all factors that could affect burrowing owls. Postovit and Postovit (1987) recommend evaluating the following in assessing impacts to raptors and planning mitigation: type and extent of disturbance, duration and timing of disturbance, visibility of disturbance, sensitivity and ability to habituate, and influence of environmental factors. They suggest identifying and addressing all potential direct and indirect impacts to burrowing owls, regardless of whether or not the impacts will occur during the breeding season. Several examples are given for each impact category below; however, examples are not intended to be used exclusively.

Type and extent of the disturbance. The impact assessment describes the nature (source) and extent (scale) of potential project impacts on occupied, satellite and unoccupied burrows including acreage to be lost (temporary or permanent), fragmentation/edge being created, increased distance to other nesting and foraging habitat, and habitat degradation. Discuss any project activities that impact either breeding and/or non-breeding habitat which could affect owl home range size and spatial configuration, negatively affect onsite and offsite burrowing owl presence, increase energetic costs, lower reproductive success, increase vulnerability to predation, and/or decrease the chance of procuring a mate.

Duration and timing of the impact. The impact assessment describes the amount of time the burrowing owl habitat will be unavailable to burrowing owls (temporary or permanent) on the site and the effect of that loss on essential behaviors or life history requirements of burrowing owls, the overlap of project activities with breeding and/or non-breeding seasons (timing of nesting and/or non-breeding activities may vary with latitude and climatic conditions, which should be considered with the timeline of the project or activity), and any variance of the project activities in intensity, scale and proximity relative to burrowing owl occurrences.

Visibility and sensitivity. Some individual burrowing owls or pairs are more sensitive than others to specific stimuli and may habituate to ongoing visual or audible disturbance. Site-specific monitoring may provide clues to the burrowing owl's sensitivities. This type of assessment addresses the sensitivity of burrowing owls within their nesting area to humans on foot, and vehicular traffic. Other variables are whether the site is primarily in a rural versus urban setting, and whether any prior disturbance (e.g., human development or recreation) is known at the site.

Environmental factors. The impact assessment discusses any environmental factors that could be influenced or changed by the proposed activities including nest site availability, predators, prey availability, burrowing mammal presence and abundance, and threats from other extrinsic factors such as human disturbance, urban interface, feral animals, invasive species, disease or pesticides.

Significance of impacts. The impact assessment evaluates the potential loss of nesting burrows, satellite burrows, foraging habitat, dispersal and migration habitat, wintering habitat, and habitat linkages, including habitat supporting prey and host burrowers and other essential habitat attributes. This assessment determines if impacts to the species will result in significant impacts to the species locally, regionally and range-wide per CEQA Guidelines §15382 and Appendix G. The significance of the impact to habitat depends on the extent of habitat disturbed and length of time the habitat is unavailable (for example: minor – several days, medium – several weeks to months, high - breeding season affecting juvenile survival,

or over winter affecting adult survival).

Cumulative effects. The cumulative effects assessment evaluates two consequences: 1) the project's proportional share of reasonably foreseeable impacts on burrowing owls and habitat caused by the project or in combination with other projects and local influences having impacts on burrowing owls and habitat, and 2) the effects on the regional owl population resulting from the project's impacts to burrowing owls and habitat.

Mitigation goals. Establishing goals will assist in planning mitigation and selecting measures that function at a desired level. Goals also provide a standard by which to measure mitigation success. Unless specifically provided for through other FGC Sections or through specific regulations, take, possession or destruction of individual burrowing owls, their nests and eggs is prohibited under FGC sections 3503, 3503.5 and 3513. Therefore, a required goal for all project activities is to avoid take of burrowing owls. Under CEQA, goals would consist of measures that would avoid, minimize and mitigate impacts to a less than significant level. For individual projects, mitigation must be roughly proportional to the level of impacts, including cumulative impacts, in accordance with the provisions of CEQA (CEQA Guidelines, §§ 15126.4(a)(4)(B), 15064, 15065, and 16355). In order for mitigation measures to be effective, they must be specific, enforceable, and feasible actions that will improve environmental conditions. As set forth in more detail in Appendix A, the current scientific literature supports the conclusion that mitigation for permanent habitat loss necessitates replacement with an equivalent or greater habitat area for breeding, foraging, wintering, dispersal, presence of burrows, burrow surrogates, presence of fossorial mammal dens, well drained soils, and abundant and available prey within close proximity to the burrow.

MITIGATION METHODS

The current scientific literature indicates that any site-specific avoidance or mitigation measures developed should incorporate the best practices presented below or other practices confirmed by experts and the Department. The Department is available to assist in the development of site-specific avoidance and mitigation measures.

Avoiding. A primary goal is to design and implement projects to seasonally and spatially avoid negative impacts and disturbances that could result in take of burrowing owls, nests, or eggs. Other avoidance measures may include but not be limited to:

- Avoid disturbing occupied burrows during the nesting period, from 1 February through 31 August.
- Avoid impacting burrows occupied during the non-breeding season by migratory or non-migratory resident burrowing owls.
- Avoid direct destruction of burrows through chaining (dragging a heavy chain over an area to remove shrubs), disking, cultivation, and urban, industrial, or agricultural development.
- Develop and implement a worker awareness program to increase the on-site worker's recognition of and commitment to burrowing owl protection.
- Place visible markers near burrows to ensure that farm equipment and other machinery does not collapse burrows.
- Do not fumigate, use treated bait or other means of poisoning nuisance animals in areas where burrowing owls are known or suspected to occur (e.g., sites observed with nesting

owls, designated use areas).

- Restrict the use of treated grain to poison mammals to the months of January and February.

Take avoidance (pre-construction) surveys. Take avoidance surveys are intended to detect the presence of burrowing owls on a project site at a fixed period in time and inform necessary take avoidance actions. Take avoidance surveys may detect changes in owl presence such as colonizing owls that have recently moved onto the site, migrating owls, resident burrowing owls changing burrow use, or young of the year that are still present and have not dispersed. Refer to Appendix D for take avoidance survey methodology.

Site surveillance. Burrowing owls may attempt to colonize or re-colonize an area that will be impacted; thus, the current scientific literature indicates a need for ongoing surveillance at the project site during project activities is recommended. The surveillance frequency/effort should be sufficient to detect burrowing owls if they return. Subsequent to their new occupancy or return to the site, take avoidance measures should assure with a high degree of certainty that take of owls will not occur.

Minimizing. If burrowing owls and their habitat can be protected in place on or adjacent to a project site, the use of buffer zones, visual screens or other measures while project activities are occurring can minimize disturbance impacts. Conduct site-specific monitoring to inform development of buffers (see Visibility and sensitivity above). The following general guidelines for implementing buffers should be adjusted to address site-specific conditions using the impact assessment approach described above. The CEQA lead agency and/or project proponent is encouraged to consult with the Department and other burrowing owl experts for assistance in developing site-specific buffer zones and visual screens.

Buffers. Holroyd et al. (2001) identified a need to standardize management and disturbance mitigation guidelines. For instance, guidelines for mitigating impacts by petroleum industries on burrowing owls and other prairie species (Scobie and Faminow, 2000) may be used as a template for future mitigation guidelines (Holroyd et al. 2001). Scobie and Faminow (2000) developed guidelines for activities around occupied burrowing owl nests recommending buffers around low, medium, and high disturbance activities, respectively (see below).

Recommended restricted activity dates and setback distances by level of disturbance for burrowing owls (Scobie and Faminow 2000).

Location	Time of Year	Level of Disturbance		
		Low	Med	High
Nesting sites	April 1-Aug 15	200 m*	500 m	500 m
Nesting sites	Aug 16-Oct 15	200 m	200 m	500 m
Nesting sites	Oct 16-Mar 31	50 m	100 m	500 m

* meters (m)

Based on existing vegetation, human development, and land uses in an area, resource managers may decide to allow human development or resource extraction closer to these area/sites than recommended above. However, if it is decided to allow activities closer than

the setback distances recommended, a broad-scale, long-term, scientifically-rigorous monitoring program ensures that burrowing owls are not detrimentally affected by alternative approaches.

Other minimization measures include eliminating actions that reduce burrowing owl forage and burrowing surrogates (e.g. ground squirrel), or introduce/facilitate burrowing owl predators. Actions that could influence these factors include reducing livestock grazing rates and/or changing the timing or duration of grazing or vegetation management that could result in less suitable habitat.

Burrow exclusion and closure. Burrow exclusion is a technique of installing one-way doors in burrow openings during the non-breeding season to temporarily exclude burrowing owls, or permanently exclude burrowing owls and close burrows after verifying burrows are empty by site monitoring and scoping. Exclusion in and of itself is not a take avoidance, minimization or mitigation method. Eviction of burrowing owls is a potentially significant impact under CEQA.

The long-term demographic consequences of these techniques have not been thoroughly evaluated, and the fate of evicted or excluded burrowing owls has not been systematically studied. Because burrowing owls are dependent on burrows at all times of the year for survival and/or reproduction, evicting them from nesting, roosting, and satellite burrows may lead to indirect impacts or take. Temporary or permanent closure of burrows may result in significant loss of burrows and habitat for reproduction and other life history requirements. Depending on the proximity and availability of alternate habitat, loss of access to burrows will likely result in varying levels of increased stress on burrowing owls and could depress reproduction, increase predation, increase energetic costs, and introduce risks posed by having to find and compete for available burrows. Therefore, exclusion and burrow closure are not recommended where they can be avoided. The current scientific literature indicates consideration of all possible avoidance and minimization measures before temporary or permanent exclusion and closure of burrows is implemented, in order to avoid take.

The results of a study by Trulio (1995) in California showed that burrowing owls passively displaced from their burrows were quickly attracted to adjacent artificial burrows at five of six passive relocation sites. The successful sites were all within 75 meters (m) of the destroyed burrow, a distance generally within a pair's territory. This researcher discouraged using passive relocation to artificial burrows as a mitigation measure for lost burrows without protection of adjacent foraging habitat. The study results indicated artificial burrows were used by evicted burrowing owls when they were approximately 50-100 m from the natural burrow (Thomsen 1971, Haug and Oliphant 1990). Locating artificial or natural burrows more than 100 m from the eviction burrow may greatly reduce the chances that new burrows will be used. Ideally, exclusion and burrow closure is employed only where there are adjacent natural burrows and non-impacted, sufficient habitat for burrowing owls to occupy with permanent protection mechanisms in place. Any new burrowing owl colonizing the project site after the CEQA document has been adopted may constitute changed circumstances that should be addressed in a re-circulated CEQA document.

The current scientific literature indicates that burrow exclusion should only be conducted by qualified biologists (meeting the Biologist's Qualifications above) during the non-breeding

season, before breeding behavior is exhibited and after the burrow is confirmed empty by site surveillance and/or scoping. The literature also indicates that when temporary or permanent burrow exclusion and/or burrow closure is implemented, burrowing owls should not be excluded from burrows unless or until:

- A Burrowing Owl Exclusion Plan (see Appendix E) is developed and approved by the applicable local DFG office;
- Permanent loss of occupied burrow(s) and habitat is mitigated in accordance with the Mitigating Impacts sections below. Temporary exclusion is mitigated in accordance with the item #1 under Mitigating Impacts below.
- Site monitoring is conducted prior to, during, and after exclusion of burrowing owls from their burrows sufficient to ensure take is avoided. Conduct daily monitoring for one week to confirm young of the year have fledged if the exclusion will occur immediately after the end of the breeding season.
- Excluded burrowing owls are documented using artificial or natural burrows on an adjoining mitigation site (if able to confirm by band re-sight).

Translocation (Active relocation offsite >100 meters). At this time, there is little published information regarding the efficacy of translocating burrowing owls, and additional research is needed to determine subsequent survival and breeding success (Klute et al. 2003, Holroyd et al. 2001). Study results for translocation in Florida implied that hatching success may be decreased for populations of burrowing owls that undergo translocation (Nixon 2006). At this time, the Department is unable to authorize the capture and relocation of burrowing owls except within the context of scientific research (FGC §1002) or a NCCP conservation strategy.

Mitigating impacts. Habitat loss and degradation from rapid urbanization of farmland in the core areas of the Central and Imperial valleys is the greatest of many threats to burrowing owls in California (Shuford and Gardali, 2008). At a minimum, if burrowing owls have been documented to occupy burrows (see Definitions, Appendix B) at the project site in recent years, the current scientific literature supports the conclusion that the site should be considered occupied and mitigation should be required by the CEQA lead agency to address project-specific significant and cumulative impacts. Other site-specific and regionally significant and cumulative impacts may warrant mitigation. The current scientific literature indicates the following to be best practices. If these best practices cannot be implemented, the lead agency or lead investigator may consult with the Department to develop effective mitigation alternatives. The Department is also available to assist in the identification of suitable mitigation lands.

1. Where habitat will be temporarily disturbed, restore the disturbed area to pre-project condition including decompacting soil and revegetating. Permanent habitat protection may be warranted if there is the potential that the temporary impacts may render a nesting site (nesting burrow and satellite burrows) unsustainable or unavailable depending on the time frame, resulting in reduced survival or abandonment. For the latter potential impact, see the permanent impact measures below.
2. Mitigate for permanent impacts to nesting, occupied and satellite burrows and/or burrowing owl habitat such that the habitat acreage, number of burrows and burrowing owls impacted are replaced based on the information provided in Appendix A. Note: A

minimum habitat replacement recommendation is not provided here as it has been shown to serve as a default, replacing any site-specific analysis and discounting the wide variation in natal area, home range, foraging area, and other factors influencing burrowing owls and burrowing owl population persistence in a particular area.

3. Mitigate for permanent impacts to nesting, occupied and satellite burrows and burrowing owl habitat with (a) permanent conservation of similar vegetation communities (grassland, scrublands, desert, urban, and agriculture) to provide for burrowing owl nesting, foraging, wintering, and dispersal (i.e., during breeding and non-breeding seasons) comparable to or better than that of the impact area, and (b) sufficiently large acreage, and presence of fossorial mammals. The mitigation lands may require habitat enhancements including enhancement or expansion of burrows for breeding, shelter and dispersal opportunity, and removal or control of population stressors. If the mitigation lands are located adjacent to the impacted burrow site, ensure the nearest neighbor artificial or natural burrow clusters are at least within 210 meters (Fisher et al. 2007).
4. Permanently protect mitigation land through a conservation easement deeded to a non-profit conservation organization or public agency with a conservation mission, for the purpose of conserving burrowing owl habitat and prohibiting activities incompatible with burrowing owl use. If the project is located within the service area of a Department-approved burrowing owl conservation bank, the project proponent may purchase available burrowing owl conservation bank credits.
5. Develop and implement a mitigation land management plan to address long-term ecological sustainability and maintenance of the site for burrowing owls (see Management Plan and Artificial Burrow sections below, if applicable).
6. Fund the maintenance and management of mitigation land through the establishment of a long-term funding mechanism such as an endowment.
7. Habitat should not be altered or destroyed, and burrowing owls should not be excluded from burrows, until mitigation lands have been legally secured, are managed for the benefit of burrowing owls according to Department-approved management, monitoring and reporting plans, and the endowment or other long-term funding mechanism is in place or security is provided until these measures are completed.
8. Mitigation lands should be on, adjacent or proximate to the impact site where possible and where habitat is sufficient to support burrowing owls present.
9. Where there is insufficient habitat on, adjacent to, or near project sites where burrowing owls will be excluded, acquire mitigation lands with burrowing owl habitat away from the project site. The selection of mitigation lands should then focus on consolidating and enlarging conservation areas located outside of urban and planned growth areas, within foraging distance of other conserved lands. If mitigation lands are not available adjacent to other conserved lands, increase the mitigation land acreage requirement to ensure a selected site is of sufficient size. Offsite mitigation may not adequately offset the biological and habitat values impacted on a one to one basis. Consult with the Department when determining offsite mitigation acreages.
10. Evaluate and select suitable mitigation lands based on a comparison of the habitat attributes of the impacted and conserved lands, including but not limited to: type and structure of habitat being impacted or conserved; density of burrowing owls in impacted and conserved habitat; and significance of impacted or conserved habitat to the species range-wide. Mitigate for the highest quality burrowing owl habitat impacted first and foremost when identifying mitigation lands, even if a mitigation site is located outside of

a lead agency's jurisdictional boundary, particularly if the lead agency is a city or special district.

11. Select mitigation lands taking into account the potential human and wildlife conflicts or incompatibility, including but not limited to, human foot and vehicle traffic, and predation by cats, loose dogs and urban-adapted wildlife, and incompatible species management (i.e., snowy plover).
12. Where a burrowing owl population appears to be highly adapted to heavily altered habitats such as golf courses, airports, athletic fields, and business complexes, permanently protecting the land, augmenting the site with artificial burrows, and enhancing and maintaining those areas may enhance sustainability of the burrowing owl population onsite. Maintenance includes keeping lands grazed or mowed with weed-eaters or push mowers, free from trees and shrubs, and preventing excessive human and human-related disturbance (e.g., walking, jogging, off-road activity, dog-walking) and loose and feral pets (chasing and, presumably, preying upon owls) that make the environment uninhabitable for burrowing owls (Wesemann and Rowe 1985, Millsap and Bear 2000, Lincer and Bloom 2007). Items 4, 5 and 6 also still apply to this mitigation approach.
13. If there are no other feasible mitigation options available and a lead agency is willing to establish and oversee a Burrowing Owl Mitigation and Conservation Fund that funds on a competitive basis acquisition and permanent habitat conservation, the project proponent may participate in the lead agency's program.

Artificial burrows. Artificial burrows have been used to replace natural burrows either temporarily or long-term and their long-term success is unclear. Artificial burrows may be an effective addition to in-perpetuity habitat mitigation if they are augmenting natural burrows, the burrows are regularly maintained (i.e., no less than annual, with biennial maintenance recommended), and surrounding habitat patches are carefully maintained. There may be some circumstances, for example at airports, where squirrels will not be allowed to persist and create a dynamic burrow system, where artificial burrows may provide some support to an owl population.

Many variables may contribute to the successful use of artificial burrows by burrowing owls, including pre-existence of burrowing owls in the area, availability of food, predators, surrounding vegetation and proximity, number of natural burrows in proximity, type of materials used to build the burrow, size of the burrow and entrance, direction in which the burrow entrance is facing, slope of the entrance, number of burrow entrances per burrow, depth of the burrow, type and height of perches, and annual maintenance needs (Belthoff and King 2002, Smith et al. 2005, Barclay et al. 2011). Refer to Barclay (2008) and (2011) and to Johnson et al. 2010 (unpublished report) for guidance on installing artificial burrows including recommendations for placement, installation and maintenance.

Any long-term reliance on artificial burrows as natural burrow replacements must include semi-annual to annual cleaning and maintenance and/or replacement (Barclay et al. 2011, Smith and Conway 2005, Alexander et al. 2005) as an ongoing management practice. Alexander et al. (2005), in a study of the use of artificial burrows found that all of 20 artificial burrows needed some annual cleaning and maintenance. Burrows were either excavated by predators, blocked by soil or vegetation, or experienced substrate erosion forming a space beneath the tubing that prevented nestlings from re-entering the burrow.

Mitigation lands management plan. Develop a Mitigation Lands Management Plan for projects that require off-site or on-site mitigation habitat protection to ensure compliance with and effectiveness of identified management actions for the mitigation lands. A suggested outline and related vegetation management goals and monitoring success criteria can be found in Appendix E.

Mitigation Monitoring and Reporting

Verify the compliance with required mitigation measures, the accuracy of predictions, and ensure the effectiveness of all mitigation measures for burrowing owls by conducting follow-up monitoring, and implementing midcourse corrections, if necessary, to protect burrowing owls. Refer to CEQA Guidelines Section 15097 and the CEQA Guidelines for additional guidance on mitigation, monitoring and reporting. Monitoring is qualitatively different from site surveillance; monitoring normally has a specific purpose and its outputs and outcomes will usually allow a comparison with some baseline condition of the site before the mitigation (including avoidance and minimization) was undertaken. Ideally, monitoring should be based on the Before-After Control-Impact (BACI) principle (McDonald et al. 2000) that requires knowledge of the pre-mitigation state to provide a reference point for the state and change in state after the project and mitigation have been implemented.

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Appendix A. Burrowing Owl Natural History and Threats

Diet

Burrowing owl diet includes arthropods, small rodents, birds, amphibians, reptiles, and carrion (Haug et al. 1993).

Breeding

In California, the breeding season for the burrowing owl typically occurs between 1 February and 31 August although breeding in December has been documented (Thompson 1971, Gervais et al. 2008); breeding behavior includes nest site selection by the male, pair formation, copulation, egg laying, hatching, fledging, and post-fledging care of young by the parents. The peak of the breeding season occurs between 15 April and 15 July and is the period when most burrowing owls have active nests (eggs or young). The incubation period lasts 29 days (Coulombe 1971) and young fledge after 44 days (Haug et al. 1993). Note that the timing of nesting activities may vary with latitude and climatic conditions. Burrowing owls may change burrows several times during the breeding season, starting when nestlings are about three weeks old (Haug et al. 1993).

Dispersal

The following discussion is an excerpt from Gervais et al (2008):

> "The burrowing owl is often considered a sedentary species (e.g., Thomsen 1971). A large proportion of adults show strong fidelity to their nest site from year to year, especially where resident, as in Florida (74% for females, 83% for males; Millsap and Bear 1997). In California, nest-site fidelity rates were 32%–50% in a large grassland and 57% in an agricultural environment (Ronan 2002, Catlin 2004, Catlin et al. 2005). Differences in these rates among sites may reflect differences in nest predation rates (Catlin 2004, Catlin et al. 2005). Despite the high nest fidelity rates, dispersal distances may be considerable for both juveniles (natal dispersal) and adults (postbreeding dispersal), but this also varied with location (Catlin 2004, Rosier et al. 2006). Distances of 53 km to roughly 150 km have been observed in California for adult and natal dispersal, respectively (D. K. Rosenberg and J. A. Gervais, unpublished data), despite the difficulty in detecting movements beyond the immediate study area (Koenig et al. 1996)."

Habitat

The burrowing owl is a small, long-legged, ground-dwelling bird species, well-adapted to open, relatively flat expanses. In California, preferred habitat is generally typified by short, sparse vegetation with few shrubs, level to gentle topography and well-drained soils (Haug et al. 1993). Grassland, shrub steppe, and desert are naturally occurring habitat types used by the species. In addition, burrowing owls may occur in some agricultural areas, ruderal grassy fields, vacant lots and pastures if the vegetation structure is suitable and there are useable burrows and foraging habitat in proximity (Gervais et al 2008). Unique amongst North

American raptors, the burrowing owl requires underground burrows or other cavities for nesting during the breeding season and for roosting and cover, year round. Burrows used by the owls are usually dug by other species termed host burrowers. In California, California ground squirrel (*Spermophilus beecheyi*) and round-tailed ground squirrel (*Citellus tereticaudus*) burrows are frequently used by burrowing owls but they may use dens or holes dug by other fossorial species including badger (*Taxidea taxus*), coyote (*Canis latrans*), and fox (e.g., San Joaquin kit fox, *Vulpes macrotis mutica*; Ronan 2002). In some instances, owls have been known to excavate their own burrows (Thompson 1971, Barclay 2007). Natural rock cavities, debris piles, culverts, and pipes also are used for nesting and roosting (Rosenberg et al. 1998). Burrowing owls have been documented using artificial burrows for nesting and cover (Smith and Belthoff, 2003).

Foraging habitat. Foraging habitat is essential to burrowing owls. The following discussion is an excerpt from Gervais et al. (2008):

> "Useful as a rough guide to evaluating project impacts and appropriate mitigation for burrowing owls, adult male burrowing owls home ranges have been documented (calculated by minimum convex polygon) to comprise anywhere from 280 acres in intensively irrigated agroecosystems in Imperial Valley (Rosenberg and Haley 2004) to 450 acres in mixed agricultural lands at Lemoore Naval Air Station, CA (Gervais et al. 2003), to 600 acres in pasture in Saskatchewan, Canada (Haug and Oliphant 1990). But owl home ranges may be much larger, perhaps by an order of magnitude, in non-irrigated grasslands such as at Carrizo Plain, California (Gervais et al. 2008), based on telemetry studies and distribution of nests. Foraging occurs primarily within 600 m of their nests (within approximately 300 acres, based on a circle with a 600 m radius) during the breeding season."

Importance of burrows and adjacent habitat. Burrows and the associated surrounding habitat are essential ecological requisites for burrowing owls throughout the year and especially during the breeding season. During the non-breeding season, burrowing owls remain closely associated with burrows, as they continue to use them as refuge from predators, shelter from weather and roost sites. Resident populations will remain near the previous season's nest burrow at least some of the time (Coulombe 1971, Thomsen 1971, Botelho 1996, LaFever et al. 2008).

In a study by Lutz and Plumpton (1999) adult males and females nested in formerly used sites at similar rates (75% and 63%, respectively) (Lutz and Plumpton 1999). Burrow fidelity has been reported in some areas; however, more frequently, burrowing owls reuse traditional nesting areas without necessarily using the same burrow (Haug et al. 1993, Dechant et al. 1999). Burrow and nest sites are re-used at a higher rate if the burrowing owl has reproduced successfully during the previous year (Haug et al. 1993) and if the number of burrows isn't limiting nesting opportunity.

Burrowing owls may use "satellite" or non-nesting burrows, moving young at 10-14 days, presumably to reduce risk of predation (Desmond and Savidge 1998) and possibly to avoid nest parasites (Dechant et al. 1999). Successful nests in Nebraska had more active satellite burrows within 75 m of the nest burrow than unsuccessful nests (Desmond and Savidge

1999). Several studies have documented the number of satellite burrows used by young and adult burrowing owls during the breeding season as between one and 11 burrows with an average use of approximately five burrows (Thompsen 1984, Haug 1985, Haug and Oliphant 1990). Supporting the notion of selecting for nest sites near potential satellite burrows, Ronan (2002) found burrowing owl families would move away from a nest site if their satellite burrows were experimentally removed through blocking their entrance.

Habitat adjacent to burrows has been documented to be important to burrowing owls. Gervais et al. (2003) found that home range sizes of male burrowing owls during the nesting season were highly variable within but not between years. Their results also suggested that owls concentrate foraging efforts within 600 meters of the nest burrow, as was observed in Canada (Haug and Oliphant 1990) and southern California (Rosenberg and Haley 2004). James et al. (1997), reported habitat modification factors causing local burrowing owl declines included habitat fragmentation and loss of connectivity.

In conclusion, the best available science indicates that essential habitat for the burrowing owl in California must include suitable year-round habitat, primarily for breeding, foraging, wintering and dispersal habitat consisting of short or sparse vegetation (at least at some time of year), presence of burrows, burrow surrogates or presence of fossorial mammal dens, well-drained soils, and abundant and available prey within close proximity to the burrow.

Threats to Burrowing Owls in California

Habitat loss. Habitat loss, degradation, and fragmentation are the greatest threats to burrowing owls in California. According to DeSante et al. (2007), "the vast majority of burrowing owls [now] occur in the wide, flat lowland valleys and basins of the Imperial Valley and Great Central Valley [where] for the most part,...the highest rates of residential and commercial development in California are occurring." Habitat loss from the State's long history of urbanization in coastal counties has already resulted in either extirpation or drastic reduction of burrowing owl populations there (Gervais et al. 2008). Further, loss of agricultural and other open lands (such as grazed landscapes) also negatively affect owl populations. Because of their need for open habitat with low vegetation, burrowing owls are unlikely to persist in agricultural lands dominated by vineyards and orchards (Gervais et al. 2008).

Control of burrowing rodents. According to Klute et al. (2003), the elimination of burrowing rodents through control programs is a primary factor in the recent and historical decline of burrowing owl populations nationwide. In California, ground squirrel burrows are most often used by burrowing owls for nesting and cover; thus, ground squirrel control programs may affect owl numbers in local areas by eliminating a necessary resource.

Direct mortality. Burrowing owls suffer direct losses from a number of sources. Vehicle collisions are a significant source of mortality especially in the urban interface and where owls nest alongside roads (Haug et al. 1993, Gervais et al. 2008). Road and ditch maintenance, modification of water conveyance structures (Imperial Valley) and discing to control weeds in fallow fields may destroy burrows (Rosenberg and Haley 2004, Catlin and Rosenberg 2006) which may trap or crush owls. Wind turbines at Altamont Pass Wind Resource Area are known to cause direct burrowing owl mortality (Thelander et al. 2003). Exposure to

pesticides may pose a threat to the species but is poorly understood (Klute et al. 2003, Gervais et al. 2008).

Appendix B. Definitions

Some key terms that appear in this document are defined below.

Adjacent habitat means burrowing owl habitat that abuts the area where habitat and burrows will be impacted and rendered non-suitable for occupancy.

Breeding (nesting) season begins as early as 1 February and continues through 31 August (Thomsen 1971, Zarn 1974). The timing of breeding activities may vary with latitude and climatic conditions. The breeding season includes pairing, egg-laying and incubation, and nestling and fledging stages.

Burrow exclusion is a technique of installing one-way doors in burrow openings during the non-breeding season to temporarily exclude burrowing owls or permanently exclude burrowing owls and excavate and close burrows after confirming burrows are empty.

Burrowing owl habitat generally includes, but is not limited to, short or sparse vegetation (at least at some time of year), presence of burrows, burrow surrogates or presence of fossorial mammal dens, well-drained soils, and abundant and available prey.

Burrow surrogates include culverts, piles of concrete rubble, piles of soil, burrows created along soft banks of ditches and canals, pipes, and similar structures.

Civil twilight - Morning civil twilight begins when the geometric center of the sun is 6 degrees below the horizon (civil dawn) and ends at sunrise. Evening civil twilight begins at sunset and ends when the geometric center of the sun reaches 6 degrees below the horizon (civil dusk). During this period there is enough light from the sun that artificial sources of light may not be needed to carry on outdoor activities. This concept is sometimes enshrined in laws, for example, when drivers of automobiles must turn on their headlights (called lighting-up time in the UK); when pilots may exercise the rights to fly aircraft. Civil twilight can also be described as the limit at which twilight illumination is sufficient, under clear weather conditions, for terrestrial objects to be clearly distinguished; at the beginning of morning civil twilight, or end of evening civil twilight, the horizon is clearly defined and the brightest stars are visible under clear atmospheric conditions.

Conservation for burrowing owls may include but may not be limited to protecting remaining breeding pairs or providing for population expansion, protecting and enhancing breeding and essential habitat, and amending or augmenting land use plans to stabilize populations and other specific actions to avoid the need to list the species pursuant to California or federal Endangered Species Acts.

Contiguous means connected together so as to form an uninterrupted expanse in space.

Essential habitat includes nesting, foraging, wintering, and dispersal habitat.

Foraging habitat is habitat within the estimated home range of an occupied burrow, supports suitable prey base, and allows for effective hunting.

Host burrowers include ground squirrels, badgers, foxes, coyotes, gophers etc.

Locally significant species is a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (CEQA §15125 (c)) or is so designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). Examples include a species at the outer limits of its known range or occurring in a unique habitat type.

Non-breeding season is the period of time when nesting activity is not occurring, generally September 1 through January 31, but may vary with latitude and climatic conditions.

Occupied site or occupancy means a site that is assumed occupied if at least one burrowing owl has been observed occupying a burrow within the last three years (Rich 1984). Occupancy of suitable burrowing owl habitat may also be indicated by owl sign including its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance or perch site.

Other impacting activities may include but may not be limited to agricultural practices, vegetation management and fire control, pest management, conversion of habitat from rangeland or natural lands to more intensive agricultural uses that could result in "take". These impacting activities may not meet the definition of a project under CEQA.

Passive relocation is a technique of installing one-way doors in burrow openings to temporarily or permanently evict burrowing owls and prevent burrow re-occupation.

Peak of the breeding season is between 15 April and 15 July.

Sign includes its tracks, molted feathers, cast pellets (defined as 1-2" long brown to black regurgitated pellets consisting of non-digestible portions of the owls' diet, such as fur, bones, claws, beetle elytra, or feathers), prey remains, egg shell fragments, owl white wash, nest burrow decoration materials (e.g., paper, foil, plastic items, livestock or other animal manure, etc.), possible owl perches, or other items.

Appendix C. Habitat Assessment and Reporting Details

Habitat Assessment Data Collection and Reporting

Current scientific literature indicates that it would be most effective to gather the data in the manner described below when conducting project scoping, conducting a habitat assessment site visit and preparing a habitat assessment report:

1. Conduct at least one visit covering the entire potential project/activity area including areas that will be directly or indirectly impacted by the project. Survey adjoining areas within 150 m (Thomsen 1971, Martin 1973), or more where direct or indirect effects could potentially extend offsite. If lawful access cannot be achieved to adjacent areas, surveys can be performed with a spotting scope or other methods.
2. Prior to the site visit, compile relevant biological information for the site and surrounding area to provide a local and regional context.
3. Check all available sources for burrowing owl occurrence information regionally prior to a field inspection. The CNDDB and BIOS (see References cited) may be consulted for known occurrences of burrowing owls. Other sources of information include, but are not limited to, the Proceedings of the California Burrowing Owl Symposium (Barclay et al. 2007), county bird atlas projects, Breeding Bird Survey records, eBIRD (http://ebird.org), Gervais et al. (2008), local reports or experts, museum records, and other site-specific relevant information.
4. Identify vegetation and habitat types potentially supporting burrowing owls in the project area and vicinity.
5. Record and report on the following information:
   a. A full description of the proposed project, including but not limited to, expected work periods, daily work schedules, equipment used, activities performed (such as drilling, construction, excavation, etc.) and whether the expected activities will vary in location or intensity over the project's timeline;
   b. A regional setting map, showing the general project location relative to major roads and other recognizable features;
   c. A detailed map (preferably a USGS topo 7.5' quad base map) of the site and proposed project, including the footprint of proposed land and/or vegetation-altering activities, base map source, identifying topography, landscape features, a north arrow, bar scale, and legend;
   d. A written description of the biological setting, including location (Section, Township, Range, baseline and meridian), acreage, topography, soils, geographic and hydrologic characteristics, land use and management history on and adjoining the site (i.e., whether it is urban, semi-urban or rural; whether there is any evidence of past or current livestock grazing, mowing, disking, or other vegetation management activities);
   e. An analysis of any relevant, historical information concerning burrowing owl use or occupancy (breeding, foraging, over-wintering) on site or in the assessment area;
   f. Vegetation type and structure (using Sawyer et al. 2009), vegetation height, habitat types and features in the surrounding area plus a reasonably sized (as supported with logical justification) assessment area; (Note: use caution in discounting habitat based on grass height as it can be a temporary condition variable by season and conditions (such as current grazing regime) or may be distributed as a mosaic).

g. The presence of burrowing owl individuals or pairs or sign (see Appendix B);
h. The presence of suitable burrows and/or burrow surrogates (>11 cm in diameter (height and width) and >150 cm in depth) (Johnson et al. 2010), regardless of a lack of any burrowing owl sign and/or burrow surrogates; and burrowing owls and/or their sign that have recently or historically (within the last 3 years) been identified on or adjacent to the site.

Appendix D. Breeding and Non-breeding Season Surveys and Reports

Current scientific literature indicates that it is most effective to conduct breeding and non-breeding season surveys and report in the manner that follows:

Breeding Season Surveys

Number of visits and timing. Conduct 4 survey visits: 1) at least one site visit between 15 February and 15 April, and 2) a minimum of three survey visits, at least three weeks apart, between 15 April and 15 July, with at least one visit after 15 June. Note: many burrowing owl migrants are still present in southwestern California during mid-March, therefore, exercise caution in assuming breeding occupancy early in the breeding season.

Survey method. Rosenberg et al. (2007) confirmed walking line transects were most effective in smaller habitat patches. Conduct surveys in all portions of the project site that were identified in the Habitat Assessment and fit the description of habitat in Appendix A. Conduct surveys by walking straight-line transects spaced 7 m to 20 m apart, adjusting for vegetation height and density (Rosenberg et al. 2007). At the start of each transect and, at least, every 100 m, scan the entire visible project area for burrowing owls using binoculars. During walking surveys, record all potential burrows used by burrowing owls as determined by the presence of one or more burrowing owls, pellets, prey remains, whitewash, or decoration. Some burrowing owls may be detected by their calls, so observers should also listen for burrowing owls while conducting the survey.

Care should be taken to minimize disturbance near occupied burrows during all seasons and not to "flush" burrowing owls especially if predators are present to reduce any potential for needless energy expenditure or burrowing owl mortality. Burrowing owls may flush if approached by pedestrians within 50 m (Conway et al. 2003). If raptors or other predators are present that may suppress burrowing owl activity, return at another time or later date for a follow-up survey.

Check all burrowing owls detected for bands and/or color bands and report band combinations to the Bird Banding Laboratory (BBL). Some site-specific variations to survey methods discussed below may be developed in coordination with species experts and Department staff.

Weather conditions. Poor weather may affect the surveyor's ability to detect burrowing owls, therefore, avoid conducting surveys when wind speed is >20 km/hr, and there is precipitation or dense fog. Surveys have greater detection probability if conducted when ambient temperatures are >20° C, <12 km/hr winds, and cloud cover is <75% (Conway et al. 2008).

Time of day. Daily timing of surveys varies according to the literature, latitude, and survey method. However, surveys between morning civil twilight and 10:00 AM and two hours before sunset until evening civil twilight provide the highest detection probabilities (Barclay pers. comm. 2012, Conway et al. 2008).

Alternate methods. If the project site is large enough to warrant an alternate method, consult current literature for generally accepted survey methods and consult with the Department on the proposed survey approach.

Additional breeding season site visits. Additional breeding season site visits may be necessary, especially if non-breeding season exclusion methods are contemplated. Detailed information, such as approximate home ranges of each individual or of family units, as well as foraging areas as related to the proposed project, will be important to document for evaluating impacts, planning avoidance measure implementation and for mitigation measure performance monitoring.

Adverse conditions may prevent investigators from determining presence or occupancy. Disease, predation, drought, high rainfall or site disturbance may preclude presence of burrowing owls in any given year. Any such conditions should be identified and discussed in the survey report. Visits to the site in more than one year may increase the likelihood of detection. Also, visits to adjacent known occupied habitat may help determine appropriate survey timing.

Given the high site fidelity shown by burrowing owls (see Appendix A, Importance of burrows), conducting surveys over several years may be necessary when project activities are ongoing, occur annually, or start and stop seasonally. (See Negative surveys).

Non-breeding Season Surveys

If conducting non-breeding season surveys, follow the methods described above for breeding season surveys, but conduct at least four (4) visits, spread evenly, throughout the non-breeding season. Burrowing owl experts and local Department staff are available to assist with interpreting results.

Negative Surveys

Adverse conditions may prevent investigators from documenting presence or occupancy. Disease, predation, drought, high rainfall or site disturbance may preclude presence of burrowing owl in any given year. Discuss such conditions in the Survey Report. Visits to the site in more than one year increase the likelihood of detection and failure to locate burrowing owls during one field season does not constitute evidence that the site is no longer occupied, particularly if adverse conditions influenced the survey results. Visits to other nearby known occupied sites can affirm whether the survey timing is appropriate.

Take Avoidance Surveys

Field experience from 1995 to present supports the conclusion that it would be effective to complete an initial take avoidance survey no less than 14 days prior to initiating ground disturbance activities using the recommended methods described in the Detection Surveys section above. Implementation of avoidance and minimization measures would be triggered by positive owl presence on the site where project activities will occur. The development of avoidance and minimization approaches would be informed by monitoring the burrowing owls.

Burrowing owls may re-colonize a site after only a few days. Time lapses between project activities trigger subsequent take avoidance surveys including but not limited to a final survey conducted within 24 hours prior to ground disturbance.

Survey Reports

Report on the survey methods used and results including the information described in the Summary Report and include the reports within the CEQA documentation:

1. Date, start and end time of surveys including weather conditions (ambient temperature, wind speed, percent cloud cover, precipitation and visibility);
2. Name(s) of surveyor(s) and qualifications;
3. A discussion of how the timing of the survey affected the comprehensiveness and detection probability;
4. A description of survey methods used including transect spacing, point count dispersal and duration, and any calls used;
5. A description and justification of the area surveyed relative to the project area;
6. A description that includes: number of owls or nesting pairs at each location (by nestlings, juveniles, adults, and those of an unknown age), number of burrows being used by owls, and burrowing owl sign at burrows. Include a description of individual markers, such as bands (numbers and colors), transmitters, or unique natural identifying features. If any owls are banded, request documentation from the BBL and bander to report on the details regarding the known history of the banded burrowing owl(s) (age, sex, origins, whether it was previously relocated) and provide with the report if available;
7. A description of the behavior of burrowing owls during the surveys, including feeding, resting, courtship, alarm, territorial defense, and those indicative of parents or juveniles;
8. A list of possible burrowing owl predators present and documentation of any evidence of predation of owls;
9. A detailed map (1:24,000 or closer to show details) showing locations of all burrowing owls, potential burrows, occupied burrows, areas of concentrated burrows, and burrowing owl sign. Locations documented by use of global positioning system (GPS) coordinates must include the datum in which they were collected. The map should include a title, north arrow, bar scale and legend;
10. Signed field forms, photos, etc., as appendices to the field survey report;
11. Recent color photographs of the proposed project or activity site; and
12. Original CNDDB Field Survey Forms should be sent directly to the Department's CNDDB office, and copies should be included in the environmental document as an appendix. (http://www.dfg.ca.gov/bdb/html/cnddb.html).

Appendix E. Example Components for Burrowing Owl Artificial Burrow and Exclusion Plans

Whereas the Department does not recommend exclusion and burrow closure, current scientific literature and experience from 1995 to present, indicate that the following example components for burrowing owl artificial burrow and exclusion plans, combined with consultation with the Department to further develop these plans, would be effective.

Artificial Burrow Location

If a burrow is confirmed occupied on-site, artificial burrow locations should be appropriately located and their use should be documented taking into consideration:

1. A brief description of the project and project site pre-construction;
2. The mitigation measures that will be implemented;
3. Potential conflicting site uses or encumbrances;
4. A comparison of the occupied burrow site(s) and the artificial burrow site(s) (e.g., vegetation, habitat types, fossorial species use in the area, and other features);
5. Artificial burrow(s) proximity to the project activities, roads and drainages;
6. Artificial burrow(s) proximity to other burrows and entrance exposure;
7. Photographs of the site of the occupied burrow(s) and the artificial burrows;
8. Map of the project area that identifies the burrow(s) to be excluded as well as the proposed sites for the artificial burrows;
9. A brief description of the artificial burrow design;
10. Description of the monitoring that will take place during and after project implementation including information that will be provided in a monitoring report.
11. A description of the frequency and type of burrow maintenance.

Exclusion Plan

An Exclusion Plan addresses the following including but not limited to:

1. Confirm by site surveillance that the burrow(s) is empty of burrowing owls and other species preceding burrow scoping;
2. Type of scope and appropriate timing of scoping to avoid impacts;
3. Occupancy factors to look for and what will guide determination of vacancy and excavation timing (one-way doors should be left in place 48 hours to ensure burrowing owls have left the burrow before excavation, visited twice daily and monitored for evidence that owls are inside and can't escape i.e., look for sign immediately inside the door).
4. How the burrow(s) will be excavated. Excavation using hand tools with refilling to prevent reoccupation is preferable whenever possible (may include using piping to stabilize the burrow to prevent collapsing until the entire burrow has been excavated and it can be determined that no owls reside inside the burrow);
5. Removal of other potential owl burrow surrogates or refugia on site;
6. Photographing the excavation and closure of the burrow to demonstrate success and sufficiency;

7. Monitoring of the site to evaluate success and, if needed, to implement remedial measures to prevent subsequent owl use to avoid take;
8. How the impacted site will continually be made inhospitable to burrowing owls and fossorial mammals (e.g., by allowing vegetation to grow tall, heavy disking, or immediate and continuous grading) until development is complete.

Appendix F. Mitigation Management Plan and Vegetation Management Goals

Mitigation Management Plan

A mitigation site management plan will help ensure the appropriate implementation and maintenance for the mitigation site and persistence of the burrowing owls on the site. For an example to review, refer to Rosenberg et al. (2009). The current scientific literature and field experience from 1995 to present indicate that an effective management plan includes the following:

1. Mitigation objectives;
2. Site selection factors (including a comparison of the attributes of the impacted and conserved lands) and baseline assessment;
3. Enhancement of the conserved lands (enhancement of reproductive capacity, enhancement of breeding areas and dispersal opportunities, and removal or control of population stressors);
4. Site protection method and prohibited uses;
5. Site manager roles and responsibilities;
6. Habitat management goals and objectives:
    a. Vegetation management goals,
        i. Vegetation management tools:
            1. Grazing
            2. Mowing
            3. Burning
            4. Other
    b. Management of ground squirrels and other fossorial mammals,
    c. Semi-annual and annual artificial burrow cleaning and maintenance,
    d. Non-natives control – weeds and wildlife,
    e. Trash removal;
7. Financial assurances:
    a. Property analysis record or other financial analysis to determine long-term management funding,
    b. Funding schedule;
8. Performance standards and success criteria;
9. Monitoring, surveys and adaptive management;
10. Maps;
11. Annual reports.

Vegetation Management Goals

- Manage vegetation height and density (especially in immediate proximity to burrows). Suitable vegetation structure varies across sites and vegetation types, but should generally be at the average effective vegetation height of 4.7 cm (Green and Anthony 1989) and <13 cm average effective vegetation height (MacCracken et al. 1985*a*).
- Employ experimental prescribed fires (controlled, at a small scale) to manage vegetation structure;

- Vegetation reduction or ground disturbance timing, extent, and configuration should avoid take. While local ordinances may require fire prevention through vegetation management, activities like disking, mowing, and grading during the breeding season can result in take of burrowing owls and collapse of burrows, causing nest destruction. Consult the take avoidance surveys section above for pre-management avoidance survey recommendations;
- Promote natural prey distribution and abundance, especially in proximity to occupied burrows; and
- Promote self-sustaining populations of host burrowers by limiting or prohibiting lethal rodent control measures and by ensuring food availability for host burrowers through vegetation management.

Refer to Rosenberg et al. (2009) for a good discussion of managing grasslands for burrowing owls.

Mitigation Site Success Criteria

In order to evaluate the success of mitigation and management strategies for burrowing owls, monitoring is required that is specific to the burrowing owl management plan. Given limited resources, Barclay et al. (2011) suggests managers focus on accurately estimating annual adult owl populations rather than devoting time to estimating reproduction, which shows high annual variation and is difficult to accurately estimate. Therefore, the key objective will be to determine accurately the number of adult burrowing owls and pairs, and if the numbers are maintained. A frequency of 5-10 years for surveys to estimate population size may suffice if there are no changes in the management of the nesting and foraging habitat of the owls.

Effective monitoring and evaluation of off-site and on-site mitigation management success for burrowing owls includes (Barclay, pers. comm.):

- Site tenacity;
- Number of adult owls present and reproducing;
- Colonization by burrowing owls from elsewhere (by band re-sight);
- Evidence and causes of mortality;
- Changes in distribution; and
- Trends in stressors.