

**FINAL
PRELIMINARY ENGINEERING
GEOTECHNICAL INVESTIGATION
VOLUME I
STATE ROUTE 75 AND 282
TRANSPORTATION CORRIDOR PROJECT
CORONADO, CALIFORNIA**

April 12, 2006

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A Report Prepared for:

Parsons Brinckerhoff Quade & Douglas, Inc.
707 Broadway, Suite 1700
San Diego, California 92101

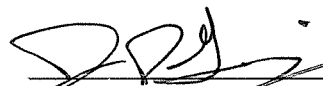

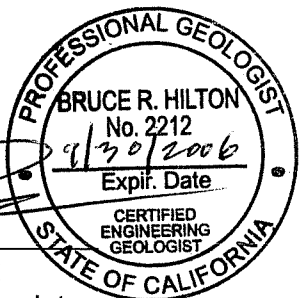
Attention: Mr. Brian Pearson

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VOLUME I
STATE ROUTE 75 AND 282
TRANSPORTATION CORRIDOR PROJECT
CORONADO, CALIFORNIA**

Kleinfelder Project No. 43314

Prepared by:

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April 12, 2006

APPENDIX J

Caltrans Technical Advisory Panel Correspondence

LETTER OF TRANSMITTAL

To: Mr. Brian Pearson
Company: Parsons Brinckerhoff, Inc.
Address: 707 Broadway, Suite 1700
San Diego, California 92101

Date: December 16, 2005
Project No.: 43314
Project: State Route 75/282
Transportation Corridor
Project

From: Kleinfelder, Inc.: James Gingery; Bruce Hilton; Rick Larson; Zia Zafir

Subject: Kleinfelder Response to Caltrans Technical Advisory Panel Comments

Copy via email: Ms. Gail Brydges, City of Coronado :
Dr. Jinrong Wang, Caltrans
Mr. Farhad Nourbakhsh, HMM
Mr. Dave Young, HMM
Mr. Stuart Warren, HMM
Dr. Tom Rockwell, ECI/SDSU

WE ARE TRANSMITTING THE FOLLOWING:

This transmittal contains Kleinfelder's responses to comments made by the Caltrans Technical Advisory Panel during the October 25, 2005 meeting. We understand that this document will be forwarded to the TAP members and appropriate Caltrans personnel as necessary.

CALTRANS TECHNICAL ADVISORY PANEL COMMENTS AND RESPONSES

PROJECT NAME: SR 75/282 Transportation Corridor Project, Draft Geotechnical and Fault Capability Reports by Kleinfelder
 REVIEWER: First Technical Advisory Panel (TAP) assembled by Caltrans
 SUBJECT: Response to comments made by TAP members during the 10/25/05 meeting in Oakland, California
 PROJECT NO. 43314 DATE 12/16/05

No.	Plan/SSP/ Sheet No./Page No.	Comments	Response Code	Response/Actions
Ground Motions and Wave Passage:				
G1	Draft Fault Capability Report	How far south does the Rose Canyon fault extend and how would other interpretations modify the ground motion model? Is there consistency between Kleinfelder's report and the Coronado bridge report in considering the Silver Strand fault as an extension of the Rose Canyon fault?	A	<p>Due in large part to the dense urban development in the area, the southern extent of the main trace of the Rose Canyon fault is not well constrained. However, our PSHA seismic source model for the Rose Canyon fault was the same as that used for the 2002 USGS PSHA which included the Silver Strand fault as a southern extension of the Rose Canyon fault. Inclusion of the Silver Strand segment extends the Rose Canyon fault zone approximately 15 km south of downtown San Diego.</p> <p>WWC (1994) used several different fault rupture segmentation scenarios in their PSHA logic tree that involved the Rose Canyon, Silver Strand, and Descanso faults. Some of these segmentation models included the Silver Strand fault as a continuation of the Rose Canyon fault, and some included the Silver Strand fault as a continuation of the Descanso fault. Kleinfelder's seismic source characterization, which included the Silver Strand fault as an extension of the Rose Canyon fault, with the Descanso fault as a separate seismogenic source, agrees with some of the segmentation models used in the WWC (1994) PSHA.</p>
G2	Draft Geotechnical Report	Compare our results to Woodward Clyde Consultants (WCC, 1994) ARS curves and comment and USGS/CGS PSHA maps and comment.	A	The response to this comment is attached hereto.

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G3	Draft Geotechnical Report	How significant were different source contributions? Were individual fault sources with more specific aerial sources considered in the analyses?	A	Different source contributions to the seismic hazard for this project will be presented in the final report. We have not included local individual fault sources with more specific aerial sources in our analyses. The Coronado and the Spanish Bight faults have not been considered as individual seismogenic sources in our model. Seismicity associated with these faults has been included as background seismic source per the USGS/CGS model in our analyses. In addition, the Silver Strand fault has been included in the model as the southern extension of the Rose Canyon fault per the USGS/CGS model. We believe that the difference in the results between the two approaches would not be significant since significant source contributions to the hazard are from the Rose Canyon fault and background seismic source.
G4	Draft Geotechnical Report	How would the Probabilistic Seismic Hazard Analysis (PSHA) change if the new Coronado fault information from the Kleinfelder's investigation were included?	A	We anticipate little change because of the low seismicity associated with the Coronado fault (see slip rate discussion in Response F7) and its low contribution to the seismic hazard.
G5	Draft Geotechnical Report	The spectral acceleration values for the 975-year in the Kleinfelder report seem low. The results should be revisited to confirm.	A	We revisited our analyses to confirm the reported values. Although our results are lower than the WCC (1994) values, they compare well with the USGS values. In addition, there are several differences in our analyses and WCC analyses, which may have contributed towards the discrepancies. Discussions about these differences have already been made in response to comment G2.
G6	Draft Geotechnical Report	Which magnitudes dominate for the Operational Level Event (OLE, now referred to as FEE) and the Maximum Level Event (MLE, now referred to as SEE) in the PSHA model?	A	The results of our deaggregation analyses indicate that both the MLE (SEE) and the OLE (FEE) events are dominated by magnitude 7.

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G7	Draft Geotechnical I Report	Tm should be based on the period of the displacement pulse and not the acceleration pulse, which Kleinfelder has used. The structural engineers indicated that the present estimates of longitudinal and transverse strains, being conservative, are still not significant for the tunnel.	A	The response to this comment is attached hereto.
G8	Draft Geotechnical I Report	Horizontally propagating shear wave velocity should not be used in estimating wave passage effects. Instead of using the approximate relationship by Hashash et al. to estimate peak ground displacement, site-specific response spectra should be used. An approximate method to calculate the peak ground displacement is to use the 4 second spectral displacement values from the spectra and divide it by a certain factor.	A	<p>We used an apparent shear wave velocity for traveling waves of 2 km/sec, which is consistent with the Hashash et al. (2001) recommendation to use a shear wave velocity that is consistent with wave propagation through deep rock, rather than the shallow soil the tunnel would be embedded in.</p> <p>We revised our peak ground displacement (PGD) estimates using the following relationship by Dr. Norm Abrahamson (personal communication, 2005) relating PGD (in cm) to the 4 second spectral acceleration (SA_{4sec} in g's) and magnitude, M: $(5.22+a)$</p> $PGD = (SA_{4sec})^{(5.22+a)}, (SA_{4sec}) \cdot e$ <p>where $a = 0.58 \cdot (M-6.5)$ for $M > 6.5$ and $a = 0$ for $M \leq 6.5$. The resulting PGDs are 75 cm for the 975-year SEE, 15 cm for the 150-year FEE; and 10 cm for the 72-year FEE.</p>
<i>Liquefaction and Lateral Spreading</i>				
L1	Draft Geotechnical I Report	Provide SPT and CPT values in tables of data.	A	These data will be included in our revised geotechnical report.
L2	Draft Geotechnical I Report	Review the liquefaction data to make sure the modified Chinese criteria has not been used. If the Chinese criteria was used, revise and use Idriss, Boulanger, and Bray methods instead.	A,B	The response to this comment is attached hereto.

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L3	Draft Geotechnical Report	How much fine-grained constituent exists in the sand, and how might it influence the potential for lateral spreading?	A,B	Gradation test results indicate fines contents between 4 and 23 percent in the hydraulic fill. We anticipate there will be additional study of the liquefaction susceptibility and consequences in the area east of Glorietta Boulevard in final design. The additional analysis should take into account the effect of fines on lateral spreading.
L4	Draft Geotechnical Report	Geologically demonstrate and explain why the liquefiable layers within the Bay Point Formation are discontinuous.	A	The following explanation was given orally during the 10/25/05 TAP meeting. The Bay Point Formation was deposited in a brackish water estuarine and near-shore terrestrial environment. Given the potential variability of the hydraulic energy levels present during deposition, the occasional "pockets" of less dense liquefiable material in the Bay Point Formation are not surprising. However, since this material is at least 120,000 years old and it is predominantly dense, the overall liquefaction susceptibility is expected to be low.
L5	Draft Geotechnical Report	Wide spread liquefaction and lateral spreading in the Bay Point formation is not a problem. Kleinfelder should confirm this.	A	The liquefaction analyses presented in our geotechnical report clearly demonstrate that wide spread liquefaction is not expected in the Bay Point Formation under the design ground motions.
<i>Soil-Structure Interaction</i>				
S1	Tunnel Seismic Design by HMM	Review LA Metro tunnel deformation analyses and compare methods to those employed for this study. Summarize in report or addendum letter.	C	We defer this question to Hatch Mott MacDonald since tunnel lining design and the soil-tunnel interaction analyses that support it are within their purview.
<i>Fault Rupture</i>				

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F1	Draft Fault Capability Report	Quantify the slip model used in the Coronado Bridge study. Uniformity of B-lams suggests little lateral movement.	A	Refer to our response to comment F15. We agree that the uniformity of the B-lams suggests relatively little strike slip movement. This qualitative observation is consistent with the predictions of our strike slip models.
F2	Draft Fault Capability Report	The conjugate fault model is not appropriate because faults west of the Rose Canyon Fault Zone (RCFZ) are not perpendicular and the 14% conjugate-master relationship is not well constrained. Delete the conjugate-master fault model from Superstition Hills.	A	Kleinfelder concurs. The conjugate-master fault model will not be included in our final fault capability report.
F3	Draft Fault Capability Report	When using the Wells & Coppersmith model, provide further substantiation of the southwest extent of the Coronado Fault Zone (CFZ) and overall fault length of 12 kilometers. (<i>See note "a" at bottom of table</i>)	A	Kennedy and Welday (1980) established the southern extent of the Coronado fault using high-resolution offshore acoustic reflection surveying. Kleinfelder reviewed the map and report produced by Kennedy and Welday (see attached excerpt from this map, Figure F3-1). The acoustic profiling performed for this study extends 8 km south of the mapped southern terminus of the Coronado fault. A total of 12 seismic lines were performed in the 8 kilometers south of the southern terminus of the Coronado fault. This information suggests the southern terminus of the Coronado fault is well constrained and that the maximum length of the fault of 12 kilometers used in our Wells & Coppersmith fault rupture estimate is prudent.

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F4	Draft Fault Capability Report	Add a "horsetail" model as included in the original geotechnical report since it is still a viable model. Using this model, transfer right-lateral strike-slip displacement along the RCFZ to the Spanish Bight, Coronado, and Silver Strand Fault. Account for the change in orientation between the RCFZ and the step over faults. It may make sense to include other faults such as the Point Loma and Bay Faults in this model also. <i>(See note "b" at bottom of table)</i>	A	The response to this comment is attached hereto. Note that we interpret comment F4 and F8 to be essentially the same, and one response addresses both of these comments.
F5	Draft Fault Capability Report	Back calculate the movement on the Rose Canyon for the pull-apart model?	A	The response to this comment is attached hereto.
F6	Draft Fault Capability Report	The flower structure of faulting may be indicative of strike-slip movement.	A	In our experience we have encountered flower structures in tectonic environments where strike slip movement was and was not present. In our opinion the flower structure does not provide conclusive evidence that strike slip movement does or does not occur on the Coronado fault. For this and other reasons (as discussed in our draft fault report), we performed modeling to estimate potential strike slip faulting, and recommended strike slip faulting be considered for the tunnel design.
F7	Draft Fault Capability Report	Develop vertical slip along CFZ based on each model and compare predicted to observed vertical slip in trench to assess models. Develop vertical slip rate for CFZ based on trench findings (i.e. 3m in 200,000 yrs = 0.015 mm/yr). Compare to return period from master-conjugate model to further assess this model (see F2 above).	A	The response to this comment is attached hereto.
F8	Draft Fault Capability Report	Add a "horsetail" model where RCFZ is southern termination of Newport-Inglewood-RCFZ.	A	The response to this comment is attached hereto. Note that we interpret comment F4 and F8 to be essentially the same, and one response addresses both of these comments.

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