CORNERSTONE EARTH GROUP

Date:	October 20, 2010
Proposal No.:	177-1-7
Prepared For:	Ms. Mary Ann Duggan, P.E. **SAN MATEO COUNTY** **COMMUNITY COLLEGE DISTRICT** 1700 W. Hillsdale Boulevard, Building 6 San Mateo, California 94402-3699
Re:	Response to Engineering Geology and Seismology Review Cañada College Electrical Infrastructure Replacement 4200 Farm Hill Road Redwood City, California **CGS Application No. 01-CGS0363**

Dear Ms. Duggan,

As discussed with Ms. Roopl Chauhan, P.G. with the California Geological Survey (CGS), this letter is in response to CGS request for additional information and clarifications regarding the engineering geology and seismology for the project. As you know, we have completed a Geotechnical Investigation and Geologic Hazards Evaluation with findings and recommendations provided in a report dated April 23, 2010.

For our review, we have received a copy of the review letter by CGS dated August 16, 2010.

Our letter has been prepared to provide the requested information and clarification by CGS and to supplement our April 23, 2010 report. Our report should be referred to for additional recommendations not provided here.

RESPONSE TO CGS REQUEST FOR INFORMATION

For each of our response, we first outline CGS's request for information or clarification follow by our response. Based on our review of the subsurface conditions and CGS's letter, our responses and clarifications are summarized below for your information.

ENGINEERING GEOLOGY AND SITE CHARACTERIZATION

CGS's Item 7, Geologic Cross Sections:
As discussed with Ms. Chauhan, the referenced fill slope located adjacent to the propose structure is a soil stockpile as a result of construction fill materials from other projects on campus. We understand this stockpile is temporary and will be removed or relocated for construction of the new electrical infrastructure replacement project. Therefore, in our opinion, potential hazards associated with the referenced fill slope are not applicable.

CGS's Item 10, Geotechnical Laboratory Testing of Representative Samples:
As noted in Item 7 above, additional laboratory testing to address slope stability is not applicable.

SEISMOLOGY & CALCULATION OF EARTHQUAKE GROUND MOTION

CGS's Item 14, Classify the Geologic Subgrade:
As requested, we have reviewed our borings performed for the new switch gear facility (Building 30) and local geologic maps to determine the Soil Profile Type in accordance with Table 16-J of the 2001 California Building Code (CBC).

Based on our review, the site is underlain by clayey fill to approximately 2 feet which is underlain by serpentinite. Therefore, we recommend the Site Classification be modified from a Site Class B to a Site Class C.

CGS's Item 15, Site Coefficients and Adjusted Maximum Considered Earthquake (MCE) Spectral Response Acceleration Parameters:

As required and per our response comments above, we have updated our site-specific ground motion hazard analysis (GMHA) for the project including the 2007 CBC site categorization and seismic design coefficients. This corresponds to Section 5, CBC Seismic Design Criteria (page 13), of our April 23, 2010 report. We recommend the updated values as provided in Table 1 be used for design. We have updated our ground motion hazard analysis using the following NGA relationships and associated attenuation equation parameters.

- Boore-Atkinson (2008)
- Campbell-Bozorgnia (2008)
- Chiou-Youngs (2007)
- Vs30 – 600 m/s, based on regional studies by Wills and Clahan 2006
- Near Source Effects Method – Huang, Whittaker, and Luco 2008 (maximum)

Table 1: 2007 CBC Site Categorization and Site Coefficients

Classification/Coefficient	Design Value
Site Class	C
Site Latitude	37.448550°
Site Longitude	-122.261279°
0.2-second Period Mapped Spectral Acceleration[1], S_S	2.367g
1-second Period Mapped Spectral Acceleration[1], S_1	1.155g
Site Occupancy Category (per Table 1-1, ASCE/SEI 7-05)	III
Seismic Design Category (per Section 11.6, ASCE/SEI 7-05, where S_1 > 0.75g)	E
Short-Period Site Coefficient – Fa	1.0
Long-Period Site Coefficient – Fv	1.3

Table 1 Continues:

Table 1 Continue:

Classification/Coefficient	Design Value
0.2-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects - S_{MS}	2.367g
1-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects – S_{M1}	1.502g
0.2-second Period, Design Earthquake Spectral Response Acceleration – S_{DS} **(Note S_{DS} may be revised based on Ground Motion Hazard Analysis below)**	1.578g
1-second Period, Design Earthquake Spectral Response Acceleration – S_{D1} **(Note S_{DS} may be revised based on Ground Motion Hazard Analysis below)**	1.001g

Note: 1 – for Site Class B, 5 percent damped

Based on our updated analysis, we recommend revising the site specific response spectrum and accelerations in accordance with Section 21.4 of ASCE 7-05 as shown in Table 2.

Table 2: Site Specific Spectral Response Accelerations

Classification/Coefficient	Design Value
Revised 0.2-second Period, Design Earthquake Spectral Response Acceleration – S_{DS} **(Site Specific Ground Motion Hazard Analysis per ASCE 7-05 and modified as discussed below)**	1.829g
Revised 1-second Period, Design Earthquake Spectral Response Acceleration – S_{D1} **(Site Specific Ground Motion Hazard Analysis per ASCE 7-05 and modified as discussed below)**	1.563g

The final Design Response Spectrum is also shown graphically on the attached Figure 1 for your information. We have determined the design acceleration parameters S_{DS} and S_{D1} based on this final Design Response Spectrum. Accordingly, S_{MS} and S_{M1} should also be revised to 2.743g and 2.3440g, respectively. These acceleration parameters also meet the criteria outlined in ASCE 7-05 Section 21.4.

CGS's Item 16, Design Spectral Acceleration Parameters:

Please see our response to Item 15 above.

CGS's Item 18, Deaggregated Seismic Source Parameters:

Please see our response to Item 7 and Item 15 above.

CGS's Item 19, Site Specific Ground Motion Analysis:

Please see our response to Item 15 above.

SLOPE STABILITY ANALYSIS

CGS's Item 26, 27, 28, 29, 30, and 31:

As discussed above, the temporary soil stockpile will be removed for construction of the new electrical infrastructure replacement project. Therefore, in our opinion, potential hazards associated with the referenced fill slope including slope stability are not applicable.

OTHER GEOLOGIC HAZARDS OR ADVERSE SITE CONDITIONS:

CGS's Item 34, F, Naturally Occurring Asbestos (NOA):

The planned switch gear building, Building 30, has a designed finished floor at approximately Elevation 602 feet. Based on our review of the subsurface condition, the site is currently covered by clayey soil to approximately Elevation 599 to 600 feet. Therefore, site grading for the building pad and footing excavations will most likely not encounter the underlying serpentinite. However, to avoid potential construction delays, we recommend all contractors enaged in soil disturbing activities comply with the Asbestos Airborne Toxic Control Measure (ATCM) requirements. These requirements pertain to specific actions to minimize dust emissions, such as vehicle speed limitations, application of water prior to and during the ground disturbance, keeping storage piles wet or covered, and track-out prevention and removal.

CLOSURE

This letter has been prepared specifically for San Mateo County Community College District for the new Cañada College Electrical Infrastructure Replacement project in Redwood City, California. Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices at this time and location. No warranties are either expressed or implied.

If you have any questions or need any additional information, please call and we will be glad to discuss them with you.

Sincerely,

CORNERSTONE EARTH GROUP, INC.

Dahn T. Tran, P.E.
Principal Engineer

Scott E. Fitinghoff, P.E., G.E.
Principal Engineer

SEF:DT

Copies: Addressee (4 and by email)
DRB Associates (by email)
Mr. Drew Bagdasarian
California Geological Survey, CGS (by email)
Ms. Roopl Chauhan, P.G.

Attachment: Figure 1 – Project Design Response Spectrum

Figure 1: Project Design Response Spectrum and Recommended Acceleration Parameters