Appendix F

Second Engineering Geology and Seismology Review for Central Administrative Center at Cole Campus – New Buildings

California Geological Survey, October 2, 2020

Tadashi Nakadegawa
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October 2, 2020

Subject: **Second Engineering Geology and Seismology Review for Central Administrative Center at Cole Campus – New Buildings 1011 Union Street, Oakland, CA CGS Application No. 01-CGS4511**

Dear Mr. Nakadegawa:

In accordance with your request and transmittal of additional documents received on July 17 and September 28, 2020, the California Geological Survey (CGS) has reviewed the engineering geology and seismology aspects of the consulting reports prepared for the subject project at the Central Administrative Center at Cole Campus in Oakland. It is our understanding that this project involves construction of a new two-story office building and a single-story multi-purpose building. This review was performed in accordance with Title 24, California Code of Regulations, 2019 California Building Code (CBC) and followed CGS Note 48 guidelines. We reviewed the following report for this additional review of the project:

> **Response to CGS Review Comments, Cole Campus – Central Administrative Center, 1011 Union Street, Oakland, California 94607:** Consolidated Engineering Laboratories, 2001 Crow Canyon Road, Suite 200, San Ramon, California 94583; company Project No. 84-04726-B, letter report dated September 25, 2020, 2 pages, 2 attachments (includes a revised Geotechnical Report dated September 25, 2020).

In addition, we previously reviewed the following report:

> **Geotechnical Engineering and Geologic Hazards Study, Cole Campus – Central Administrative Center, Oakland, California:** Consolidated Engineering Laboratories, 2001 Crow Canyon Road, Suite 200, San Ramon, California 94583; company Project No. 84-04726-PWA, report dated May 22, 2020, 42 pages, 7 plates, 4 appendices.

CGS previously submitted our findings regarding this project in a review letter dated September 10, 2020, in which CGS requested the consultants revise their site-specific ground motion analysis. This was based on the recommendation that the consultants include the possibility of rupture of all segments of the Hayward fault together, as is considered in the UCERF 3 community fault model, for their deterministic MCE_R spectrum. In addition, the consultants were requested to update their liquefaction analyses with the updated PGA_M resulting from the revised ground motion analysis, as needed.

Discussion of Site-Specific Ground Motion Analysis

Based on this second review, the consultants revised their site-specific ground motion analyses and include the possibly of a rupture of all segments of the Hayward fault together in their deterministic analyses. The consultants' updated deterministic and probabilistic MCE spectra both appear reasonable based on comparison with results from the National Seismic Hazard Model (from Petersen and others, 2014). The consultants report their site-specific seismic design parameters are: S_{DS} = **1.185*g*** and S_{D1} = **1.100*g***. Alternatively, S_a values presented in the last column of Table 5 (on page 25 of the revised Geotechnical Report dated September 25, 2020) may be used with the equivalent lateral force procedure, per ASCE 7, Section 21.4. The site-specific ground motion analysis presented in their revised Geotechnical Report dated September 25, 2020 appears to be reasonable and in accordance with ASCE 7-16.

Discussion of Liquefaction Analyses

Based on this second review, the consultants revised their liquefaction analyses based on an updated **PGA_M of 0.7*g*** resulting from their revised ground motion analysis. They report liquefaction-induced seismic vertical settlement on the order of 0.34 to 0.66 inches and up to 0.1 inches of dynamic compaction settlement, resulting in total potential vertical settlement estimates of 0.42 to 0.72 inches. They estimate differential settlement to be half to two-thirds of the maximum total vertical settlement. They note that the liquefiable layer is at a depth of 15 to 18 feet and so overlain by 5 meters of non-liquefiable materials and thus they do not expect any manifestation of this settlement to significantly impact the bearing capacity of the soils. These results and conclusions appear reasonable based on the data presented.

Based on the discussions above, the consultants have now addressed our earlier concern regarding the site-specific ground motion analysis and liquefaction analyses for this site. The consultants have provided a thorough evaluation of engineering geology and seismology issues with respect to the proposed improvements. The principal concerns identified by the consultants are the potential for strong ground shaking, potential liquefaction-induced total vertical settlement of less than 1.0 inch, and the presence of loose undocumented fill in some areas at the site. The consultants recommend design spectral acceleration parameters of S_{DS} = **1.185*g*** and S_{D1} =**1.100*g***, which are considered reasonable. Their evaluation indicates surface fault rupture and deep-seated slope instability are not design concerns for the project.

In conclusion, ***the engineering geology and seismology issues at this site are adequately assessed in the referenced reports, and no further information is requested***. If you have any further questions about this review letter, please contact the primary reviewer at Jacqueline.Bott@conservation.ca.gov.

Respectfully submitted,

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Concur:

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