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October 24, 2016
Project No. 20172547.001A

Mr. Curt Dittman
City of Torrance
3031 Torrance Blvd.
Torrance, CA 90503

Subject: Geotechnical Peer Review
Proposed Multi-Family Residential Development
Southwest Corner of Hawthorne Blvd. and Via Valmonte
Torrance, California

Dear Mr. Dittman:

At the request of the City of Torrance, we have completed a geotechnical engineering peer review of the following documents for the above-referenced project:

- *Preliminary Geotechnical Investigation, Proposed Multi-Family Residential Development, Hawthorne Boulevard and Via Valmonte, Torrance, California.* Develop by GEOCON West, Inc. Dated March 03, 2016. Project No. A9201-06-01C.

- *Fault Rupture Hazard Investigation, Proposed Multi-Family Residential Development, Hawthorne Boulevard and Via Valmonte, Torrance, California, by* GEOCON West, Inc. Dated January 21, 2016. Project No. A9201-06-01C.

We understand that the project is proposed to consist of multi-family residential development consisting of four to five-story residential units and common areas over two levels of parking. In addition, three-story flats are planned along the northeastern portion of the site adjacent to the parking structure.

The property is an approximately 23.35-acre irregular-shaped parcel and is currently vacant. The project area is bounded by Via Valmonte on the north and west, Hawthorne Boulevard on the east, and a 200- to 250-foot-high, north-facing, former quarry slope on the south.

Our scope of services in performing this peer review included review of the above referenced reports, a meeting with City personnel, Reylenn Properties (Developer) and Geocon West (Geotechnical Consultant) at the City of Torrance on May 24, 2016, sites visits by our Geotechnical Engineer and Engineering Geologist on May 24, 2016, and a site visit by our Geological Engineer on August 9, 2016.

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Our review focuses on three areas:

- Stability and the potential for rockfall associated with the existing quarry slopes
- General Geotechnical Engineering Approach and Recommendations
- Fault Rupture Hazard Potential

Slope Stability

One of primary geotechnical concerns for the project is the slope stability of the existing quarry slope and the potential for rockfall from the slope onto the proposed project area and residential development. The purpose of this brief review was to evaluate the geotechnical report to assist the City of Torrance in the identification of geotechnical concerns with the existing north-facing quarry slope and areas where clarification could benefit the project regarding this slope. Our slope stability comments on the provided documents are summarized in the attached table.

Geotechnical Engineering Review

We have reviewed the referenced Preliminary Geotechnical Investigation report for adherence with the standard of care and standard of practice for the project area. Based on our review, we found the report to be generally complete and well presented. However, we did identify a few items that require additional clarification and/or consideration by the geotechnical consultant. Our review comments are presented in the attached table.

Fault Rupture Potential

We have reviewed the Fault Rupture Hazard Investigation report prepared for the site. The purpose of the report was to identify faults that may traverse the site and evaluate the potential for surface fault rupture. The findings of the investigation were based on review of available geologic information related to faulting, subsurface investigation including three exploratory trenches and potholing, and evaluation and interpretation of the data. The major geologic feature in the area is the Palos Verdes Fault Zone and inferred splays of this fault zone are interpreted to be offsite and do not traverse the subject property. However the trench excavations exposed minor shears in mod-Pleistocene-age San Pedro Sand. The minor shears are interpreted to be not active faults by definition of the State of California and the result of folding rather than tectonic generated features.

Although the minor shears are not considered tectonic, the report concluded that differential movement along the shears could occur during an earthquake event and therefore present a “very minor risk that a future earthquake may generate minor secondary slip along these features.” Recommendations were presented in the report to mitigate the potential effects of differential movement along the minor shears.

It is our professional opinion that the scope of work performed by Geocon West, Inc. was sufficient to adequately address the potential for surface fault rupture and was performed in a professional manner and in accordance with generally accepted practice in the State of California. The recommendations presented in the report relating to the potential for minor secondary slip on the minor shears should be incorporated in the design and construction of the project.

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LIMITATIONS

The brief review of the documents referenced above was conducted as an independent third party reviewer. The recommendations in the project geotechnical report by GEOCON West, Inc. are not revised by this letter. GEOCON West, Inc. remains the geotechnical engineer-of-record for the project.

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions, and at the date the services are provided. Our conclusions, opinions, and recommendations are based on a limited number of observations and data, as provided for our review. Kleinfelder makes no other representation, guarantee, or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

CLOSURE

We appreciate the opportunity to be of service to you. Please call us if you would like to discuss this project further.

Sincerely,
KLEINFELDER

Eric W. Noel, PE, GE
Principal Geotechnical Engineer

Chad Lukkarila, LEG (WA), PE (WA)
Director of Engineering Geology

Richard F. Escandon, PG, CEG
Principal Engineering Geologist

Attachment: Table of Review Comments

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Table 1: Geotechnical Peer Review Comments
Proposed Multi-Family Residential Development
Southwest Corner of Hawthorne Blvd. and Via Valmonte
Torrance, California

Comment No.	PDF Document Page	Document Section	Comment
1	16	7.5	Include discussion of the existing Slope 3 conditions. There are large overhanging areas, large fractured areas, and existing sloughing/rockfall "chutes" present on the slope. Is there a concern or recommendation to address existing slope mitigation on the slope (scaling, rock anchors, etc) along with the rockfall containment areas?
2	37	8.15.2	In Section 8.7, a Building Code requirement for a setback from slopes is discussed with a horizontal distance of 40 feet. In Section 8.15.2, the setback is discussed "in combination" with the rockfall catchment area or barrier. The rockfall area is described and analyzed as about 40-feet wide. Based on the Building Codes, can this Setback area be used for a rockfall catchment area or is additional area required? This should be reviewed and discussed.
3	38	8.15.3	Please include a table of recommended heights and widths of catchment areas/barriers in your discussion.
4	38	8.15.3 and Figure 8	From Figure 8, it looks like the barrier is built directly against the wall of the foundation or parking level. Is this a concern for energy from rockfall transferring to the building from potential rockfall? This concern should be discussed with the structural engineer and in the report.
5	38	8.15.4 and Figure 8	The report should discuss how rockfall that builds up against the barrier at the top of the retaining wall will be cleaned out or how the barrier will be repaired if damaged by rockfall. Will it be accessible and feasible to address these concerns? This is briefly discussion in 8.15.6, but more discussion is needed especially for the barrier on top of the planned retaining walls (Detail 4 in Figure 8).
6	38	8.15.5	Please provide a detail/figure and further discussion of this option. Please discuss construction, runout distance needed, and how this will contain rockfall versus the berms, or barriers.
7	52	Figure 3B	Provide more detail on the proposed grade and the 2H:1V sloped "rockfall catchment area" shown on the Figure. This model doesn't match one of the details shown on Figure 8. Include the detail number for the recommended catchment.
8	57	Figure 3G	Provide more detail on the proposed grade and the 2H:1V sloped "rockfall catchment area" shown on the Figure. Does this go with Detail 4 on Figure 8? Include the detail number for the recommended catchment on each Figure.
9	62	Figure 8	Detail 1 is not assessed or discussed in the GSI report provided in Appendix D. Provide analyses and discussion to show that this catchment area provides adequate catchment.

Comment No.	PDF Document Page	Document Section	Comment
10	62	Figure 8	In Details 1 and 2, the rockfall catchment berm extends to the final floor of level 1 above the parking. It is difficult to tell from the plans and details if this area will be accessible to the public. Is there a concern for public access to the rockfall berm and catchment area? Was a fence or barrier at the top of the berm considered to address public safety?
11	146	Appendix D	The analyses included were completed by modeling a 3-foot diameter rock block. In the 2nd paragraph, you state the barrier and 40-foot contained ALL the potential rockfalls. What is your confidence to contain 100%. Did you analyze other rock block sizes for the slope?
12	146	Appendix D	The model results show a higher maximum kinetic energy of over 50 kJ. Provide discussion and justification for assuming a 20 kJ energy for the rockfall barrier. The maximum bounce height of 3 feet was discussed, but not the maximum potential kinetic energy.
13	146	Appendix D	The attached analysis was completed with a 5-foot barrier. Although the max bounce height just before the barrier was modeled to be about 3 feet, did you complete an analysis to show that a 42" jersey barrier or GSC with the proper face angles also meets this requirement?
14	148	Appendix D	The model results show a higher maximum kinetic energy of over 60 kJ. Provide discussion and justification for assuming a 20 kJ energy for the rockfall barrier.
15	2	2.0, Appendix A and Figure 3A	The report notes that the topographic low for the site was previously mined to approximately Elevation 150. Boring B4 indicates artificial fill to an elevation of 141.5. In addition, Geologic section A-A' presents an artificial fill contact (queried) extending to an elevation of approximately 120 feet at the end of the section. These elements should be reviewed and revised as needed.
16	11	7.4	The site soils are described as ranging from loose to dense. Historic high groundwater is estimated to be below a depth of 80 feet. The potential for liquefaction beneath the site is described as very low. Seismically-induced settlement (i.e. dry settlement) should also be evaluated and the total and differential seismic settlement reported.
17	13	7.5	Soil properties for both Engineered Fill and Artificial Fill are included in the summary table. Artificial fill is shown on Section C-C' behind the retaining wall and below the building pad. Section D-D' shows artificial fill beneath a layer of engineered fill within the building pad. Is the intention to leave the undocumented artificial fill in place or remove and replace as engineered fill?
18	15	7.5 and Figures E1 and E2	The slope stability analysis for slope 1, Section C-C' shows search zones above the proposed retaining wall. Were searches extended in front of the wall considered?

Comment No.	PDF Document Page	Document Section	Comment
19	19	8.1.2	The report indicates that the existing artificial fill is not suitable to support the proposed structures. Has the feasibility of removal and replacement of approximately 50 feet of fill been considered? This evaluation could require cross-sections showing temporary slope configurations and stability analyses for the temporary conditions. Please advise.
20	20 and 37	8.1.8 and 8.20	Section 8.1.8 indicates excavations up to 60 feet deep are anticipated during construction. Section 8.20 recommends temporary excavations be sloped at 2:1 or flatter. Given the depths of fill encountered in the borings, is it feasible to remove the fill while maintaining 2:1 slopes?
21	28	8.9	Section 8.9 indicates total and differential settlement will be on the order of 2 inches and 1 inch, respectively. Section 2 of the report indicated that artificial fill was encountered ranging from 2½ to 50½ feet. Was the varying thickness of fill factored into the settlement calculations, particularly the differential settlement estimate?
22	29	8.11.1	This section recommends that resistance to lateral loading may be provided by friction acting at the base of foundations. However, section 8.8.5 recommends that the structures be decoupled from the engineered fill. Will a decoupled foundation still provide resistance to lateral loads?