APPENDIX C2

Geologic Peer Review
December 21, 2018
Project No. 1065.rvw

Mr. Domingo Trinidad, Associate Civil Engineer
City of Hayward – Public Works Department
Engineering and Transportation Division
777 B Street
Hayward, CA 94541-5007

SUBJECT: GEOLOGIC PEER REVIEW
RE: Proposed Multi-Unit Residential Development at 25036 to 25096 Carlos Bee Blvd. on APN 445-0170-039-13
Hayward, California

Dear Mr. Trinidad:

At your request, the undersigned has completed a geologic peer review of a fault investigation report that was prepared for the subject application using the following references:


Additionally, we have performed a site reconnaissance and reviewed pertinent documents, maps and aerial imagery from our office files.

DISCUSSION

The applicant is proposing a system of residential units on the above-referenced parcel located at 25036 through 25096 Carlos Bee Boulevard in the Mission/Foothill neighborhood of Hayward, California. The property is bounded by developed properties along Palisade Street to the north, Carlos Bee Boulevard to the south, a YMCA property to the west and Overlook Avenue to the east. As requested, we have completed a geologic review of a site-specific fault investigation report (Reference 1) prepared by Earth Focus Geological Services (EFG), and required by the City for an evaluation of fault rupture hazards at the subject parcel (APN 445-0170-039-13). The report describes results of subsurface fault exploration by trenching and delineates an area considered...
not suitable for residential construction. A proposed development plan and layout showing four clusters of residential units is included as Figure 3 of the report.

A scope of services to be performed for the geologic hazards evaluation was forwarded by EFG on December 1, 2017 and the site was visited by the undersigned peer reviewer on January 7, 2018 for the purpose of observing the site and exposures in a single exploration trench and discussing them with the project geologist, Patrick Drumm, CEG. A memo summarizing our observations was transmitted to the City on Feb. 2, 2018. Various maps and aerial photographs dating to 1939 and recent Lidar imagery and several other reports for previous fault investigations considered to be pertinent to this site have also been researched. Authorization to initiate a review of the finalized report was given on December 7, 2018.

SITE CONDITIONS

The entire parcel is a vacant 1.63-acre site within the lower western front of the East Bay Hills. It is alongside the northern edge of Carlos Bee Boulevard about 900 feet east of its intersection with Mission Boulevard. The elongated, irregular-shaped property is about 500 feet wide in an east-west direction and averages about 130 feet deep in the narrower, north-south dimension. The land has been modified in the past by filling of two coalescing drainage channels that previously carried runoff through the area from upland areas to the east. Several cut/fill building pads were graded along the street side some years ago. A home that previously existed in the southwestern corner of the parcel was removed prior to 2008 and another one in the southeastern corner was removed in 2012. The western half of the land is now a vacant, grassy area and much of the eastern half is occupied by a cluster of trees. The northern side of the property is primarily a moderately steep, partly graded, southerly-facing slope that rises about 20-25 feet to the rear of lots along Palisade Street to the north. A sidewalk along Carlos Bee Boulevard follows the southern property line.

The site area is underlain by bedrock of the Knoxville Formation, which is within the lowest sequence of the Great Valley group. The Knoxville rock types that were encountered in the exploration trench by EFG were primarily northerly-dipping units of shale, siltstone and sandstone. Colluvium and areas of man-made fill mantle the bedrock.

The City of Hayward web map (Reference 2) indicates the western portion of the subject parcel to be within the State of California Earthquake Fault Zone (EFZ) for the active Hayward fault. EFG has reviewed reports from a number of fault evaluation studies which have encountered and/or tracked the main trace of the fault as following a prominent west-facing hillfront, or scarp, near the base of the hills southwest of site parcel and there are many examples of fault-related offset drainages along this hillfront, as well as several aligned locations where evidence of aseismic slip (fault creep) has been noted (Reference 3).

A zone of secondary faults or splays subparallel to the Hayward fault lies outside of the eastern edge of the official EFZ. These include the so-called Carlos Bee fault, which is a secondary fault located about 2,500 feet east of the site property. No evidence has been found indicating such
faults have been active within the Holocene age (past 11,700 years), therefore they are considered pre-Holocene and are thus not included within the State EFZ.

A fault investigation study (Reference 4) was completed by Woodward-Clyde Consultants (WCC) in 1978 on the Hillcrest School property (now YMCA land) which borders western side of the subject parcel. The WCC study ascertained that a creeping trace of the Hayward fault passes about 300 feet west of the subject parcel. A second fault, which was reported to have ruptured during the 1868 Hayward earthquake, was assumed by WCC to more or less follow the boundary between the YMCA land and the western side of subject property. The assumption was based on photo geologic evidence of fault-related features, examination of a cut slope near the property line, and trenching that encroached into the western edge of that fault zone.

**RECENT FAULT TRENCHING**

The subject investigation by Earth Focus Geological Services (Reference 1) excavated a 175-foot-long trench (see photo to the left) downslope through the western portion of the subject parcel during January, 2018. The 36-inch-wide trench had a maximum depth of about 16.5 feet and was generally oriented normal to the regional faulting. It traversed a portion of the eastern margin of the State EFZ and extended about 50 feet outside the easterly edge of it. The trench was appropriately benched and shored for safety. After cleaning of the walls, the exposed subsurface units were logged by the project CEG.

The EFG report provides a detailed log of the northern wall of the fault exploration trench. Substantial horizons of artificial fill, colluvium and residual soils covered a continuous unit of bedded Knoxville Formation siltstone and sandstone bedrock that was exposed in the eastern 125 feet of the trench. EFG reports that no evidence of shears or other active fault features were detected in the bedrock along that reach of the trench. Active groundwater infiltration and resulting collapsing of trench walls prevented direct observation of the geologic relationships in the western 50 feet of the trench. As a result, there is an absence of hard data regarding whether or not diverging fault splays exist through that locality. To avoid any hazard, EFG has designated that area of the property to be a “no residential construction zone”.

**CONCLUSIONS**

Research by EFG has determined that the westernmost end of the proposed residential development is constrained by an active fault that is in proximity to the western property line. As indicated on their Site Plan, *Figure 3* of Reference 1, they have specified a zone within the western portion of the subject parcel where placement of residential structures is to be avoided. The EFG report calls attention to the fact that one of the proposed residential structures intrudes into that zone and states that it will be necessary to shift it outside of the zone.

LOUIS A. RICHARDSON, P.G., C.E.G.
Consulting Engineering Geologist
Taken as a whole, the submitted report by Earth Focus Geological Services, Inc. constitutes an evaluation of possible surface faulting within the western end of the subject property for the purpose of defining an area acceptable for the eventual construction of structures for human occupancy. The report is comprehensive and well documented from a geologic standpoint and adequately addresses guidelines provided in the 2018 revision of CGS Special Publication 42 (Reference 5) for fault investigation reports. As lead agency, the City should submit a copy of the report to the State Geologist (California Geological Survey).

RECOMMENDATIONS

Although no active faulting was found east of the “no residential construction zone”, ground distortion or deformation related to fault rupture can occur for some distance away from any faults that may possibly exist in that zone. The project design team should determine if any engineered mitigation measures will be needed for structures located near it.

It should be noted that the EFG report is not an all-inclusive geotechnical evaluation of the site and was not intended as such. Design level site improvement plans for future construction should ultimately be based on a report speaking to geotechnical engineering and engineering geologic issues including, but not necessarily be limited to, foundation conditions, grading constraints, stability of the hillside on the northern side of the parcel and seismic ground motions and deformation, etc. That report should also evaluate groundwater conditions and any need for subdrainage, particularly in regard to the long term stability of a downward sloping area adjoining the western border of the property.

During construction, the project geologic team should observe excavations and exposures for the existence or nonexistence of active faulting and verify that the locations of specific building sites are in conformance with their recommendations. A confirming letter should be submitted to the City prior to project final.

LIMITATIONS

This geologic peer review is intended to assist the City of Hayward in determining the adequacy of the subject investigation for application in its discretionary permit decisions. These services have been limited to review of the referenced fault investigation report and various documents and a visual observation of the property and the subsurface exploration. The opinions, comments and conclusions are made in accordance with generally accepted principles and practices of a geologic review process. This warranty is in lieu of all other warranties, expressed or implied.

Very truly yours,

Louis A. Richardson, PG, CEG
Reviewing Geologist