

February 1, 2010
Project No. 1406.154

City of Orinda Planning Department
22 Orinda Way
Orinda, California 94563

Attention: Ms. Dorothy Dickson-Dodds

Subject: Geotechnical Engineering Peer Review, 2 Irwin Way, Orinda, California

Dear Ms. Dickson-Dodds:

In accordance with your request, Fugro West, Inc., (Fugro) has reviewed the geotechnical engineering aspects of the submitted documents for the proposed new senior housing complex to be located at 2 Irwin Way, in Orinda, California. Our review included the following scope of work:

- A review of a report prepared by Amso Consulting Engineers (ACE), titled "Geotechnical Investigation for Orinda Senior Housing, 2 Irwin Way, Orinda, California," dated November 23, 2009;
- A review of the project architectural drawings for the project prepared by Dahlin Group, Sheets A1 through A11, dated December 11, 2009;
- A review of the project civil drawings for the project prepared by Luk and Associates, Sheets C1.1, C1.2, C2, C3.1 and C3.2, dated December, 2009,
- A review of the project landscape drawings for the project prepared by The Guzzardo Partnership, Sheets L1 through L3, dated December 11, 2009,
- A review of available published geologic information relevant to the proposed project,
- A review of pertinent select aerial photographs of the project vicinity,
- Site reconnaissance by a registered geotechnical engineer on January 27, 2010, and
- Preparation of this peer review letter.

PROJECT SUMMARY

Based on our review of the submitted plans and the geotechnical investigation report provided by your office, it is our understanding that the project will consist of the construction of a new two-building, three to four-story senior housing complex at the former 1.44-acre site of the Orinda Public Library at 2 Irwin Way. Eden Housing, Inc., of Hayward, California, is the developer for this proposed non-profit housing project.



As proposed, the project will consist of the demolition of the existing former library building, and construction of a 71-unit senior housing complex of wood-frame construction. The complex will include a larger T-shaped building, the northeast portion of which to be three stories, and the southwestern "T" extension to be four stories. The lower, at-grade level of the northeastern, three story portion of the building will be used as a parking garage with access provided by a new driveway from Irwin Way. A smaller four-story, rectangular building will be constructed at the southern corner of the property, adjacent to Orinda Way. The larger building will be stepped upward toward the northeast to follow the existing site topography and reduce the amount of required site grading. The parking level will be underlain by a concrete slab on grade, while the living area lower levels will be underlain by a raised wood floor. Project plans provided for our review did not include a site grading plan. The project geotechnical engineer provided an option to support the new buildings by either shallow footing foundations, or by drilled pier and grade beam foundations.

SITE RECONNAISSANCE, AND EXISTING CONDITIONS

Our geotechnical engineer viewed pertinent aerial photographs of the site and vicinity taken in 1957 and 1969. Our geotechnical engineer also conducted a site reconnaissance on January 27, 2010. Generally, the surface conditions encountered at the site were similar to those shown on the submitted plans, and as indicated in the geotechnical report, available published data and aerial photographs.

The subject property is situated northeast of the intersection of Orinda Way and Irwin Way in central Orinda. The property is situated in the Orinda business district north of Highway 24, within the San Pablo creek drainage area, and at the base of hills extending to the northeast of the site. The property is irregularly shaped, and is bounded by Irwin Way to the northwest and north, Orinda Way to the southwest, City tennis courts to the southeast, and the Orinda Senior Village parking lot to the northeast.

The property generally slopes to the southwest (Orinda Way) and appears to have been graded by cut and fill to create two relatively level pads. An upper pad, occupying the central & eastern portion of the property is currently occupied by the abandoned Orinda Library building (Photo Nos. 1 and 2), and a small parking area (Photo No. 3). This pad is separated from an upslope parking area for the neighboring Orinda Senior Village by a landscaped, tree-covered slope. A driveway connects the parking area to the senior village parking lot. A lower pad, situated between the library building and Orinda Way, is occupied by a larger, paved parking lot (Photo No. 4). The elevation of the lower pad/ parking lot is on the order of 10 feet higher than adjacent Orinda Way. Sloped areas not occupied by buildings or pavements were occupied by native oak and pine trees and developed landscaping. Several wood and concrete retaining walls were present across various portions of the property. In general, these walls will be removed as part of the project construction.

The existing pavement areas show significant cracking. Such cracking appears to be a result of a combination of pavement wear and settlement, the latter which has been attributed by the project geotechnical engineer to be the result of underlying fill settlement and deformation.



REVIEW OF GEOTECHNICAL REPORT AND AVAILABLE INFORMATION

Dibblee (2005) mapped the site area as underlain by Quaternary-age, late-Pleistocene older alluvial soils consisting largely of sands and gravels. Underlying bedrock, as exposed in the hills to the northeast of the site and present at relatively shallow depth as identified in test borings, consists of Pliocene-age non-marine sedimentary rock of the Orinda Formation, consisting primarily of siltstone, conglomerate, sandstone, and claystone. Nilsen (1975) showed no photointerpreted landslides in close proximity of the site, but his map does show two small, narrow photointerpreted slides on the steeper slope northeast of the site and the adjacent Orinda Senior Village and Orinda Community Church. This map also maps the site, as well as the adjacent business district, as underlain by Quaternary-age artificial fill, indicating these areas to have been mass graded as a part of the original development of this area. The Rogers/Pacific (R/P) photointerpretation map (1993) similarly shows the site to be located on artificial fill indicative of mass grading development, with the area to northeast occupied by the Orinda Senior Village to be underlain by colluvial soils. The R/P map shows no photointerpreted slides in the vicinity of the site, and shows the area upslope of the Senior Village apartment buildings to be a graded slope. The site is mapped by the Association of Bay Area Governments (2009) as having a very low susceptibility to liquefaction, and the project geotechnical engineer has indicated that liquefiable soils were not encountered below the site, and not a hazard to this property.

The project geotechnical engineer performed a subsurface exploration program for the proposed development, which consisted of drilling a total of eight test borings spread across the property. Six borings (No. B-1 through B-6) were drilled on January 26, 2009 using a truck mounted drill rig equipped with a 4-inch diameter, continuous solid flight auger. Two borings were drilled on February 3, 2009 using a hand auger (B-7) and a portable Minuteman drill rig (B-8) equipped with a solid flight auger. The borings were drilled to depths of 10 to 20 feet, except for hand auger Boring B-7 which encountered refusal at a depth of about 3 feet. Borings drilled in the existing lower parking lot generally encountered 3 to 7 feet of surficial fill, overlying very stiff native clay. The surficial clays were judged to be of low plasticity and low to moderate expansion potential, based on laboratory measured Atterberg liquid limits of 42 and 40 and respective plasticity index values of 18 and 15, as well as a measured zero swell under a 1,500 psf laboratory test load on a recovered sample. Boring B-4, drilled in the upper parking area, encountered about 3 feet of pavement section and underlying clay fill. Weathered siltstone and claystone bedrock were at depths of 1 to 7 feet in four borings, and at a depth of 11 feet in Boring B-1 drilled at the outer edge of the lower parking lot. Bedrock was not encountered in Borings B-6 and B-8, drilled on the western side of the existing building to depths of 18 and 10 feet, respectively. No groundwater was encountered in any of the borings during drilling.

SIGNIFICANT GEOTECHNICAL CONSIDERATIONS

Based on our review of the geotechnical report, available literature, grading plan, air-photo review and site reconnaissance, it is our opinion the following significant geotechnical considerations exist at the site:



- Undocumented fill underlying the existing parking lot and proposed building pad areas, and
- Site and area drainage.

CONCLUSIONS

Based on our review and reconnaissance, it is our opinion the geotechnical information and recommendations for the project as submitted satisfactorily address and account for the geotechnical considerations noted above, and generally conform to accepted local and current geotechnical engineering principles and practices, and the Soils Report Standards for the City of Orinda. We note the project geotechnical engineer has recommended that the undocumented fill soils be removed below building and pavement areas, and replaced with compacted, engineered fill. The geotechnical engineer also recommended that foundations be supported either by compacted, engineered fill or competent native soils underlying the site.

FUTURE DOCUMENTATION

The project geotechnical engineer should review the completed project civil and architectural drawings, and provide a professional certification letter to the City to that effect. The project geotechnical engineer should also be consulted by the project structural engineer during the design process and should review the completed structural plans and calculations for conformance to his geotechnical recommendations, provide supplemental recommendations as necessary, and also provide a professional certification letter to the City to that effect.

The project geotechnical engineer should be retained to observe the geotechnical aspects of the construction. The geotechnical engineer should provide written documentation to the City for the following activities:

- Earthwork operations, including subgrade preparation, earthwork construction, and site drainage installations, as appropriate;
- Recording of test locations and results of field and laboratory compaction tests where determined to be appropriate by the project geotechnical engineer;
- Building foundations, including observation of foundation excavations, and confirmation of individual foundation embedment and supporting materials with respect to the geotechnical engineer's recommendations; and
- Site drainage, including finish grading around and below the residential construction, and discharge of collected surface and subsurface water to appropriate discharge facilities.

LIMITATIONS

Our role as a third-party reviewer has been solely to provide technical advice to assist the City of Orinda in their discretionary permit decisions, and we are afforded the same protection



under law. Our services were limited to the review of the documents described; a visual review of the property; and developing a professional opinion as to the project geotechnical engineer's conformance to local geotechnical engineering standard practice at the time the review was performed, and the intent of the City's Soil Report Standards. We cannot confirm the accuracy of the information provided by others, nor can we confirm their conclusions and design recommendations. In addition, we have no control over the design or construction on this property and make no representations regarding its future condition(s).

The opinions presented in this letter were prepared in accordance with generally accepted, local geotechnical engineering principles and practices at the time this review was performed. Should you have any questions or require additional information, please contact us.

Sincerely,
FUGRO WEST, INC.

A handwritten signature in black ink that reads "Corey T. Dare".

Corey T. Dare, P.E., G.E.
Geotechnical Engineer



CTD:afp

Copies: (2) Addressee + pdf

REFERENCES

Publications and Geologic and Landslide Photointerpretation Maps:

Association of Bay Area Governments, 2009, *Liquefaction Susceptibility Map*: Website: www.abag.ca.gov/bayarea/eqmaps/liquefac/liquefac.html.

California Geological Survey, 2008, *Guidelines for Evaluating and Mitigating Seismic Hazards in California*: Special Publication 117A.

Dibblee, T.W., Jr., 2005, *Geologic map of the Briones Valley Quadrangle, Contra Costa and Alameda Counties, California*: Santa Barbara Museum of Natural History, Dibblee Geology Center Map No. DF-148.

Nilsen, T.H., 1975, *Preliminary photointerpretation map of landslide and other surficial deposits of the Briones Valley 7½" Quadrangle, Contra Costa and Alameda Counties, California*: U.S. Geological Survey Open-File Map 75-277-8.

Rogers/Pacific, 1993, *Photointerpretive landslide features map*: consultant's map prepared for the City of Orinda.

Aerial Photographs:

Pacific Aerial Surveys, May 4, 1957, AV-253-12-17 and 18, 1:12,000 scale.

Pacific Aerial Surveys, May 28, 1969, AV-905-12-18 and 19, 1:12,000 scale.

SITE PHOTOGRAPHS



Photo No. 1: Abandoned Orinda Library Building (Front)



Photo No. 2: Abandoned Orinda Library Building (Side)



Photo No. 3: Upper Parking Area



Photo No. 4: Lower Parking Lot Area