



1870 Olympic Blvd.  
Suite 100  
Walnut Creek  
California 94596

Tel: 925.935.9771  
Fax: 925.935.9773  
www.caleng.com

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Orinda Planning Department

MAY 09 2011

RECEIVED

Scott Pacheco, AICP  
Planning Department  
City of Orinda  
22 Orinda Way  
Orinda, CA 94563

RE: Second Review Geotechnical & Geologic  
Geotechnical Report for Subdivision 9260  
APN 271-120-011  
Lavenida Lane, Orinda, California

Dear Mr. Pacheco:

At your request, we have completed our review of the 31 March 2011 letter by Alan Kropp & Associates (AKA) titled *Response to Geotechnical and Geologic Review Comments*. The AKA letter was prepared in response to the four review comment contained in our letter of 25 February 2011.

### **REVIEW OF 31 MARCH 2011 AKA LETTER**

Based upon our review of the 31 March 2011 letter, it is our opinion that AKA has adequately addressed Items 1 and 2 contained in our 25 February 2011 letter. However, we are requesting further clarification with respect to Items 3 and 4. The requested clarifications are as follows.

#### **AKA Response Item 3**

In Item 3 we requested that AKA provide geotechnical design parameters for the proposed temporary shoring retaining wall to be constructed along the uphill side of the project. In their response letter AKA recommended, an active equivalent fluid pressure of 40 pounds per cubic foot (pcf) and a passive equivalent fluid pressure of 350 pcf acting on two pile diameters be used to design the temporary shoring walls. The provided passive pressure value is reported to have a factor of safety of 2.0.

We have two concerns with respect to the proposed design parameters. These concerns are as follows:

- The active equivalent fluid pressure of 40 pcf appears to be low for a retaining wall supporting a 3H:1V slope composed of clay soil. For these materials the Naval Facilities Engineering Command Design Manual 7.2 page 64 recommends active earth pressure coefficients of 0.65 to 0.5 for friction angles of 22 to 27 degrees and a 3:1 slope. This would result in an active equivalent fluid earth pressure on the order of 60 pcf to 80 pcf. It is recommended that AKA consider increasing the recommended lateral earth pressures to be used in the design of the temporary shoring walls.
- For the passive equivalent fluid pressure it is not clear if the material is assumed to be soil, weathered bedrock, or bedrock. It is recommended that AKA clarify the composition of materials assumed for their designed parameters. Additionally for temporary structures it may be appropriate to use a factor of safety of less than 2.

#### **AKA Response Item 4**

In Item 4 we requested geotechnical design parameters for gravity type retaining walls which will likely be required as part of the construction of the bioretention/detention basins. In their letter AKA provided preliminary geotechnical design parameters for the mechanically stabilized earth retaining walls (MSEW). Our review indicates that some of the required design parameters for these types of retaining walls were not provided. Specifically, MSEW wall designs require unit weight, friction angle, and cohesion values for the retained, reinforced, and foundation zones. It is recommended that all of the required geotechnical parameters be provided by AKA.

AKA recommended that a friction angle of 22 degrees and an unit weight of 120 pcf be used for the materials in the retained zone. It is our opinion that a friction angle of 22 degrees is too low for design purposes. Using either the National Concrete Masonry Association (NCMA) or American Association of State Highway and Transportation Officials (AASHTO) methods these parameters will result in geogrid lengths which are much greater than 100 percent of the height of the wall. In cases where global stability will be evaluated using conventional methods, we would support using a wall design friction angle on the order of 27 degrees since MSEW designs either completely ignore cohesion or limit it to 50 pounds per square foot (psf). Longer geogrid lengths are generally required for external failure modes which are likely more appropriately modeled by global stability than simplified wall analysis methods. Using this method, the wall geogrid can be lengthened if required by global stability to show the wall to be stable for external failure modes.


**CLOSURE**

This review has been performed by request of the City of Orinda. Our role has been to provide technical advice to assist the City in its discretionary permit decisions, and we are afforded the same protection under state law. Our services have been limited to the review of the referenced report and a review of the property. We have no control over the future construction on this property and make no representations regarding its future conditions.


We have employed accepted geologic and geotechnical engineering procedures, and our professional opinions and conclusions are made in accordance with generally accepted geologic and geotechnical engineering principles and practices. This standard is in lieu of all other warranties, either expressed or implied.

Sincerely,

CAL ENGINEERING & GEOLOGY, INC.

  
Mark Myers, P.E., G.E.  
Senior Engineer



  
Mitchell Wolfe, P.G., E.G.  
Principal Geologist

