

Robbie Lyng  
Alameda Unified School District  
2060 Challenger Drive  
Alameda, California 94501

November 29, 2017

**RE: Will C. Wood Middle School Liquefaction Settlement**

Robbie,

ZFA has reviewed the report titled "Geotechnical Engineering Investigation Evaluation of Liquefaction Risk and Liquefaction Induced Settlement Potential at Will C. Wood Middle School Campus" Report by Miller Pacific dated October 30th, 2017. Parts of the site are expected to experience significant levels of liquefaction during the maximum credible earthquake. This is the earthquake that is expected to occur once every 2475 years on average. The expected total settlement at the school site is expected to be between 1-7 inches. The total differential settlement is expected to be between 0.5-3.5 inches over approximately 50 feet. The Geotechnical investigation identified the area around the multi-purpose building as being the most susceptible to ground settlement.

The two-story classroom building is founded on a deep foundation system and is likely to not experience significant liquefaction settlement. The existing, mostly wood framed, multi-use building is founded on shallow spread footings. These footings could be susceptible to damaging foundation settlements. It should also be noted that the foundations are substantial with significant steel reinforcing. This reinforcing is much heavier than with typical continuous foundation systems of this type. While the current building code does not provide specific guidance for liquefaction settlement, ZFA has found recommendations, contained within ASCE 7-16, that should be adopted by California in 2018. Using this criterion, we believe the existing footing configuration and construction would meet these future requirements. We would expect some effects on the building could occur, including damage, we do not believe it will significantly impact the overall building life-safety performance during a large seismic event. It would be difficult to quantify this damage without significant engineering effort and expense. Based on our interpretation of the future building code as well as the foundation construction, we believe additional steps do not need to be taken at this time.

Should you have questions, please contact the undersigned.

Regards,



Chris Warner, SE 4613  
**ZFA STRUCTURAL ENGINEERS**  
Senior Principal