COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

November 16, 2017
T5157

TO: Jian Huang
Associate Civil Engineer
Public Works
CITY OF FREMONT
P.O. Box 5006
Fremont, California 94537-5006

SUBJECT: **Geotechnical Peer Review – Liquefaction Zone**
RE: Canyon View, 7 lots
TO#54, PLN2017-00374
243 Morrison Canyon Rd

At your request, we have completed a geotechnical peer review of the application for construction at the subject property using:

- Geotechnical Investigation (report) prepared by Cornerstone Earth Group., dated August 24, 2017.

In addition, we have reviewed pertinent technical maps and reports from our office files and completed a recent site reconnaissance.

DISCUSSION

The referenced geotechnical report indicates that the applicant proposes to construct a total of 7 single-family homes on a 2.1-acre site. Two existing cul-de-sacs will be extended onto the site, and general site improvements will be completed including driveways and landscaping.

The purpose of this review is to determine whether the referenced geotechnical report is consistent with State criteria for project approval with respect to fault rupture and liquefaction hazards. Our geotechnical peer review does not include evaluation of detailed construction plans and is not intended to address all geotechnical aspects of the proposed project design.

RECENT GEOTECHNICAL EVALUATIONS

Cornerstone Earth Group has recently advanced 4 exploratory borings at the subject property to a maximum depth of 50 feet, and 2 cone penetration tests (CPTs) to depths of 50 feet. The Consultant has also completed a fault trench 125 feet in length with a maximum depth of 14 feet, extending to the northeastern portion of the property near the mapped trace of the Mission Fault. Previous subsurface studies of the Mission fault and surficial mapping completed near the subject property by Woodward-Clyde-Sherard and Associates, as well as Dibblee and Graymer respectively have been reviewed by the Consultant who concludes that there is a lack of evidence to postulate that the Mission Fault is active, as it was not observed to cross-cut Quaternary or Holocene sediments. The Consultant did not encounter disturbed beds (assumed age ranging from Holocene to Late Pleistocene) in their fault trench and concludes that the Mission fault lies northeast of the property. The Consultant recommends a fault setback zone of 25 feet from the mapped fault location for all habitable structure (building exclusion zone illustrated on report Figure 2).

The subsurface stratigraphy includes clayey and silty layers interbedded with sandy, granular units of varying thickness and continuity in the upper 30 feet. The granular beds are commonly encompassed by impermeable material consisting of clays or silts. The Irvington Gravels are present at a depth of 32.5 feet in Boring 1 (EB-1) and consist of angular to sub-angular gravels in a fine to coarse sand and silt matrix. The Consultant anticipates magnitudes of total and differential liquefaction induced settlement up to 0.25 and 0.5 inches over an assumed foundation length of 30 feet, derived from the 2 CPT borings advanced down to 50 feet. The high groundwater is documented at 20 to 30 feet below the ground surface for this site.

CONCLUSIONS AND RECOMMENDED ACTIONS

The submitted geotechnical investigation presents collected subsurface data and conclusions regarding site liquefaction conditions and faulting. The Project Geotechnical Consultant supports conclusions for a lack of recent (Holocene or Quaternary) rupture along the mapped Mission Fault. We do not object to the Consultant's conclusions regarding liquefaction-induced settlement. We conclude that

the mapped hazard zones have been satisfactorily addressed by completed geologic and geotechnical investigations.

We recommend that the following conditions be attached to geotechnical approval of permit applications for site building and grading:

1. **Geotechnical Plan Review** - The applicant's geotechnical consultant should review and approve all geotechnical aspects of the project building and grading plans (i.e., site preparation and grading, site drainage improvements and design parameters for foundations, pavement/hardscape) to ensure that their recommendations have been properly incorporated.

   The results of the plan review should be summarized by the Engineer for review and approval prior to issuance of building permits.

2. **Geotechnical Construction Inspections** - The geotechnical consultant should inspect, test (as needed), and approve all geotechnical aspects of the project construction. The inspections should include, but not necessarily be limited to: site preparation and grading, site surface and subsurface drainage improvements, and excavations for foundations and retaining walls prior to the placement of steel and concrete.

   The results of these inspections and the as-built conditions of the project should be described by the geotechnical consultant in a letter and submitted to the City Engineer for review prior to final (granting of occupancy) project approval.

LIMITATIONS

This geotechnical peer review has been performed to provide technical advice to assist the City with its discretionary permit decisions. Our services have been limited to an independent review the referenced geotechnical report to determine the adequacy of

the liquefaction hazard evaluation and any associated mitigation measures. Our opinions and conclusions are made in accordance with generally accepted principles and practices of the geotechnical profession. This warranty is in lieu of all other warranties, either expressed or implied.

Respectfully submitted,

COTTON, SHIRES AND ASSOCIATES, INC.
CITY GEOTECHNICAL CONSULTANT

Ted Sayre
Principal Engineering Geologist
CEG 1795

David T. Schrier
Principal Geotechnical Engineer
GE 2334

TS:DTS:CS:tms