Earth Systems
48511 Warm Springs Boulevard, Suite 210 | Fremont, CA 94539 | (510) 353-3833 | www.earthsystems.com

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The Chamberlain Group
Mr. Jack Chamberlain
990 Industrial Road
San Carlos, CA 94070

PROJECT: HIGHLAND ESTATES LOTS 5 THROUGH 8
NORTH SIDE OF TICONDEROGA DRIVE
SAN MATEO, CALIFORNIA

SUBJECT: Updated Geotechnical Engineering Study

REFERENCES: Updated Geotechnical Investigation, Highland Estates Lots 5 through 11, Ticonderoga Drive/Cobblehill Place/Cowpens Way, San Mateo, California, dated October 30, 2015, by Cornerstone Earth Group

Dear Mr. Chamberlain:

Pursuant to your authorization, and as requested by the County of San Mateo, Earth Systems Pacific (Earth Systems) has completed an update geotechnical engineering study for the subject property. This update report is limited to the unimproved Lots 5 through 8 of the Highlands Estates development.

Site Setting

The subject Lots 5 through 8 are located on the north side of Ticonderoga Drive, in an unincorporated area of San Mateo County, California. The approximate center of the subject site is located at 37.51551°N latitude and -122.33826°E longitude on the United States Geological Survey's San Mateo 7.5-Minute Quadrangle.

Purpose and Scope of Work

The purpose of this update report was to verify that the recommendations presented in the October 2015 *Updated Geotechnical Investigation* by Cornerstone Earth Group were still valid for the proposed development and to provide seismic design parameters based on the current 2019 Edition of the CBC.

The scope of this update report included a review of the 2015 *Updated Geotechnical Investigation* report; reconnaissance of the site by a registered Geotechnical Engineer; development of new CBC seismic design parameters; and the preparation of this report. No additional subsurface exploration or laboratory testing was performed. The scope of Earth Systems' update did not

include soil corrosivity testing, or environmental assessment for the presence of hazardous or toxic materials on or adjacent to the site.

Site Description

A site reconnaissance was made on December 10, 2021, by a registered Geotechnical Engineer. The site remains generally the same as described 2015 when Cornerstone Earth Group prepared their *Updated Geotechnical Investigation*. The site is covered with a growth of shrubs and grasses. Previous grading that has occurred on the site consists of cuts along the front of the lots during the construction of Ticonderoga Drive in 1956 and fill placed along the upper portion of the lots for the existing residential development on the north, also in 1956. Cornerstone Earth Group described geologic conditions at the site as consisting of about 10 feet of colluvial soil overlying Franciscan sheared rock. Two landslides are mapped at the site along Ticonderoga Drive. No signs of recent grading or landslide activity were noted.

Project Description

The development calls for the construction of four, multi-level, single-family residential structures set into the hillside above Ticonderoga Drive. The site is mapped as being underlain by Franciscan sheared rock (Fsr). The two landslides mapped on the site include a small slide at the base of the upslope on Lots 5 and 6, and a larger slide at the base of the upslope on Lots 7 and 8. The improvement plans call for the removal of the landslide debris and replacement with drained, engineered fill as recommended by Cornerstone. The structures and associated exterior retaining walls will utilize a drilled pier and grade beam foundation, deriving their support in the underlying bedrock.

Seismic Design Parameters

The seismic design parameters presented in the 2015 report were based on the 2013 CBC. The following seismic design parameters represent the general procedure as outlined in Section 1613 of the CBC 2019 edition and in ASCE 7-16. The values were obtained using the OSHPD Seismic Design Maps Web Application.

Summary of Seismic Parameters - CBC 2019
(Site Coordinates 37.51551 °N, -122.33826 °W)

Mapped Short Term Spectral Response Parameter (S_s)	2.384 g
Mapped 1-second Spectral Response Parameter (S_1)	0.998 g
Site Class	C
Site Coefficient (F_a)	1.2
Site Coefficient (F_v)	1.4
Site Modified Short Term Response Parameter (S_{MS})	2.861 g
Site Modified 1-second Response Parameter (S_{M1})	1.398 g
Design Short Term Response Parameter (S_{Ds})	1.908 g
Design 1-second Response Parameter (S_{D1})	0.932 g

Conclusions

Based on our understanding of the proposed development, our site visit, review of the 2015 report, and our review of the Improvement Plans by BkF Engineers, it is Earth System's opinion that the recommendations of the October 30, 2015, *Updated Geotechnical Investigation* are still valid for the subject project

Closure

This report is valid for conditions as they exist at this time for the type of project described herein. Our intent was to perform the investigation in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project at this time under similar conditions. No representation, warranty, or guarantee is either expressed or implied. This report is intended for the exclusive use by the client as discussed in the Scope of Services section. Application beyond the stated intent is strictly at the user's risk.

If changes with respect to the project type or location become necessary, if items not addressed in this report are incorporated into the plans, or if any of the assumptions stated in this report are not correct, Earth Systems should be notified for modifications to this report. Any items not specifically addressed in this report should comply with the California Building Code and the requirements of the governing jurisdiction.

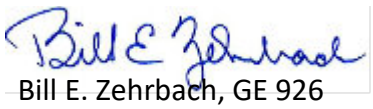
The preliminary recommendations of this report are based upon the geotechnical conditions encountered during the previous investigation and may be augmented by additional requirements of the architect/engineer, or by additional recommendations provided by Earth Systems based on conditions exposed at the time of construction.

This document, the data, conclusions, and recommendations contained herein are the property of Earth Systems. This report should be used in its entirety, with no individual sections reproduced or used out of context. Copies may be made only by Earth Systems, the client, and their authorized agents for use exclusively on the subject project. Any other use is subject to federal copyright laws and the written approval of Earth Systems.

Thank you for this opportunity to have been of service. Please feel free to contact this office at your convenience if you have any questions regarding this report.

Respectfully submitted,

Earth Systems Pacific



Bill E. Zehrbach, GE 926
Principal Engineer

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