ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

May 15, 2007 Job No.: 07-2160I

Impact Sciences
803 Camarillo Springs Road, Suite A
Camarillo, California 93012

Attention: Ms. Minta Schaefer

Subject: **ENGINEERING GEOLOGY AND GEOTECHNICAL REVIEW**

Project: The Master's College Master Plan EIR (Master Caser 04-496)
Placerita Canyon Area, City of Santa Clarita, California

Geotechnical Reports Reviewed: Gorian & Associates, Inc., "Preliminary Geotechnical Investigation, The Master's College, Santa Clarita, California"
Work Order: 2668-0-0-10, dated October 5, 2005.

Gorian & Associates, Inc., "Preliminary Grading Plan Review, The Master's College, Santa Clarita, California"
Work Order: 2668-0-0-100, dated January 17, 2007.

Plans: Preliminary Grading Plan (undated), prepared by Gannfors & Associates, Inc.

Revised Preliminary Grading Plan (undated), prepared by Gannfors and Associates, Inc.

Previous Review: N/A

FINDINGS

Geotechnical Reports

☐ Acceptable with Conditions

☒ Response Required

REMARKS

Based upon our review the consultant should address the following review comments prior to approval.

REPORT REVIEW COMMENTS

RETAINING WALLS

1. Several retaining walls are proposed on the revised Preliminary Grading Plan (PGP), including:

   - Two adjacent 20-foot high walls with a combined height of 40 feet located at the toe of proposed fill slopes in the vicinity of Lot 3.
   - A 28-foot high wall located at the toe of the slope that ascends up to Dockweiler Drive (adjacent to the existing water tanks).
   - Other walls up to 20-ft in height throughout the site.

2. The Geotechnical Consultant should evaluate feasibility of constructing the walls at the locations listed above. This evaluation should account for potential impacts of the walls on existing infrastructure, such as the two existing water tanks.

3. On page 20 of the Gorian & Associates (GAI) Report dated October 5, 2005 (referred to herein as the "GAI Report"), it is stated that, "*Weep holes may be used in lieu of perforated pipes for exterior walls.*" The Geotechnical Consultant should discuss if use of weep holes in lieu of perforated drainage pipes is satisfactory for tall retaining walls (up to 28 ft in height).

4. The seismic lateral earth pressure value recommended on page 20 of the GAI Report appears to be low. The Geotechnical Consultant should revise the recommended value in conformance with the requirements provided in the August 2005 edition of the Manual for Preparation of Geotechnical Reports of the County of Los Angeles Department of Public Works (LADPW).

SLOPE STABILITY

5. The Geotechnical Consultant should obtain representative samples of materials that will be used in proposed fills, perform supplemental Direct Shear tests on samples remolded to expected fill densities, and evaluate the gross and surficial stability of proposed fill slopes based on this supplemental data. If stability of the proposed fill slopes evaluated using the supplemental data does not satisfy the requirements of the City of Santa

Clarita, recommendations for mitigation measures should be developed and revisions to the PGP should be made, as appropriate.

6. The ultimate in-situ, along-bedding strength of the Saugus Formation used for slope stability analyses in the GAI Report (phi = 17 degrees, c = 150 psf) is based on one Direct Shear test performed on a siltstone member of the Saugus Formation; no Atterberg Limits are reported for this sample. Additional shear strength testing will be needed in the Grading Plan phase of work to substantiate the along-bedding strength value assumed in the slope stability analyses.

7. Cut-slope CS-5, which is partially located within an area mapped as artificial fill, is potentially grossly unstable. Recommendations for mitigation of stability of this cut slope (such as avoidance setbacks, cutting back to a shallower angle, or constructing buttresses and/or shear keys with compacted fill) should be provided by the Geotechnical Consultant.

8. The north-facing portion of Cut-Slope CS-6, which may expose daylighted bedding planes of the Pacoima and Saugus Formations, is potentially grossly unstable. Recommendations for mitigation of stability of this cut slope should be provided by the Geotechnical Consultant. Also, the Geotechnical Consultant should evaluate stability of all other proposed cut slopes on which grading may expose daylighted bedding planes, and provide recommendations for buttress fills, if appropriate. Locations of all recommended buttress/stability fills should be shown on the Geologic/Geotechnical Map.

9. Debris basins are shown on the revised Preliminary Grading Plan. Stability of the side slopes of the basins should be evaluated by the Geotechnical Consultant, including rapid drawdown conditions. It should be noted that daylighted bedding may be present at the proposed debris basin locations.

10. Appendix D of The GAI Report includes a slope stability computer run with a pseudo-static safety factor of 1.098 (technically less than 1.1) for a buttressed slope with low-strength clay beds with an inclination of less than 12 degrees. However, the August 2005 edition of the Manual for Preparation of Geotechnical Reports of the LADPW does not require that low-strength bedding planes with an inclination less than 12 degrees from horizontal be considered in pseudo-static evaluations of slope stability.

FILL

11. The Geotechnical Consultant should provide recommendations for settlement monitoring in areas where proposed fill thickness is more than 40 feet. This should include showing proposed locations of settlement monuments on the Geotechnical Map.

12. Proposed fill for the extension of Dockweiler Drive is located over an existing fill, as illustrated on Cross Section 8-8' of the GAI Report. The Geotechnical Consultant should evaluate if the existing fill is documented fill that is suitable for support of the proposed fill (and if appropriate, perform supplemental subsurface exploration to document the existing fill). If the existing fill is not suitable for support of the proposed fill, the Geotechnical Consultant should provide recommendations for removal and replacement of the existing fill, or other appropriate mitigation.

13. On page 10 of the GAI Report, it is stated that, "*the possibility for hydroconsolidation within the site is very low*". However, based on testing presented in the GAI report, soils with significant hydroconsolidation collapse potential are present in some areas of the site (see results of hydroconsolidation testing by GAI on the follow samples: HS-3 at 27 ft, B-1 at 14 ft, B-5 at 70 ft, and B-9 at 60 ft). The Geotechnical Consultant should discuss the hydroconsolidation test results taking into consideration potential infiltration that could occur during periods of surface water flow in the channel of Newhall Creek and revise the grading recommendations, if appropriate.

OMISSIONS IN SUBSURFACE LOGS, GEOLOGIC/GEOTECHNICAL MAP, AND REPORT

14. The Geologic/Geotechnical Consultant should submit **geologic** subsurface exploration logs of conditions observed in exploration borings and trenches. These logs should include detailed graphic depictions of conditions observed in the borings and trenches (see the County of Los Angeles Department of Public Works, Manual for Preparation of Geotechnical Reports, August 2005 edition).

15. The Geotechnical Consultant should perform a geotechnical review of the revised Preliminary Grading Plan, which includes;

- Preparation of a Geologic/Geotechnical map based on the January 2007 revision of the Preliminary Grading Plan.
- Preparation of cross sections through all critical slopes (i.e. highest cut-slope, high fill slope, adverse geologic conditions, significant retaining walls, the existing MWD water tunnel, and any other existing subsurface infrastructure). The cross sections should depict existing and proposed grade, geotechnical/geologic unit types and contacts, highest anticipated groundwater levels, and proposed overexcavation depths.

16. The following items should be included on the Geologic/Geotechnical Map:

- Locations of all keyways of buttress/stabilization fills, as necessary.
- Grading required for construction of buttress/stabilization fills, as necessary.
- Cut-fill line.
- All recommended mitigation measures.

OTHER CONSIDERATIONS

17. The GAI Report recommends that granular drainage material in backdrains of buttresses, subdrains of ravines and canyons, etc. should be encapsulated in filter cloth. The Geotechnical Consultant should evaluate if there is a potential for clogging of filter fabric by chemically "hard" groundwater and revise backdrain and subdrain recommendations, if appropriate.

18. Page 18 of the GAI Report states that the ultimate friction, "between the bottom of the footings and the supporting soils may be taken as 0.5." Explain the rationale for the adopted value of the ultimate friction coefficient. Note that according to conventional geotechnical references such as "Foundation Analysis and Design by J. E. Bowles, the typical range for the ultimate friction coefficient in sandy soils is about 0.3 to 0.4 and the typical range for the ultimate friction coefficient in gravelly soils and rock fill is 0.4 to 0.5.

19. The pavement sections recommended on page 21 of the GAI Report for Traffic Index values of 6.0 and 7.0 should be revised to conform with the Caltrans design procedure for flexible asphalt pavements.

If you have any questions regarding this review letter, please give us a call.

Respectfully submitted,

Eric J. Seward, CEG 2110
Engineering Geologist Reviewer
Vice President

Martin J. Goodman, GE 2146
Geotechnical Engineer Reviewer

Distribution: (3) Addressee