



TERRA ASSOCIATES, Inc.

Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

October 10, 2023
Project No. T-8718

Mr. Jamie Buchan
William E. Buchan Homes
2630 – 116th Avenue NE, Suite 100
Bellevue, Washington 98004

Subject: Response to City of Mercer Island Comments
3036 – 67th Avenue SE
Mercer Island, Washington

- References:
1. Geotechnical Report, 3036 – 67th Avenue SE, Mercer Island, Washington, Project No. T-8718, prepared by Terra Associates, Inc., dated August 22, 2022, 4th revision October 10, 2023
 3. Geotechnical Peer Review Comments, prepared by City of Mercer Island, dated September 2023

Dear Mr. Buchan:

As requested, we have reviewed the referenced comments from the City of Mercer Island regarding the project site. The following is our response to the geotechnical comments.

Page 1 – Comment #1

The location of boring B-2 is at the south edge of the proposed residence. The bottom of the loose layer is at elevation 87 feet. The excavation below the finished floor elevation would be 14 feet. It has been the reviewer's experience that this magnitude of overexcavation, associated dewatering, and replacement with compacted structural fill currently required may be less economical than using other foundation systems such as deep foundations or a structural mat foundation. Both alternative foundation systems are better able to accommodate subsurface uncertainties.

It is not common to conduct potholing program for overexcavation depths of this magnitude given the potential site and offsite impacts.

If the designer's opinion is that the two borings are insufficient to proceed with the project design, additional subsurface information presenting SPT data or some other measure of insitu density will be required.

The reviewer continues to disagree with the use of shallow foundations at this site.

The applicant has the option to have an applicant-paid, outside 3rd party geotechnical engineering review if this differing foundation design approach between the City geotechnical peer reviewer and the geotechnical engineer of record (Terra Associates) cannot be resolved.

Response

The building will be supported on pin piles.

Page 1 – Comment #2

Please review the effective overburden calculations used in determining the residual strength values. The 359 psf residual strength used in a B-1 soil layer should be lower (less than 250) based on the water table being at 7.5 feet not 9.5 feet and the total overburden depth to 14 feet not 23.5 feet currently in the calculation. The same higher overburden pressure value was carried through for the calculated residual strength of 166 psf instead of less than 115 psf if the lower overburden pressure is used.

It was also noted that this 359 psf strength was used for the B-2 soil conditions when the calculations submitted for the B-2 conditions indicated the residual strength should be 241.

Please revise and resubmit the stability analyses for the residual strength condition following recalculation of the residual strengths for B-1 conditions and use of lower value of 241 psf instead of 359 in the stability analysis for the B-2 soil conditions. The recalculation due to the groundwater location is minor, but the current effective overburden calculation results in using a residual strength almost 50% higher and as such could have an impact on the results of the stability results.

Response

We have reviewed the calculations for the residual soil strengths. The strengths were calculated for each layer of material that has the potential to liquefy. For Test Boring B-1, the first layer is located approximately 10 feet below grade with groundwater at approximately 9.5 feet below grade. The previously documented groundwater level was based on observations of wet soils within the sampler but not saturated soils that would indicate actual groundwater. The sample at 10 feet was wet to saturated, indicating a greater probability of groundwater at this elevation. The 7.5 feet was used as a conservative estimate initially but further analysis of the soil and moisture content of the material at the 7.5-foot sample and the 10-foot sample indicate the groundwater is more likely at 10 feet. As the exact level was not observed during drilling, we have placed the estimated groundwater level in B-1 at 9.5 feet. We have revised the deeper layer residual strengths in B-1.

We have revised the slope stability analysis and used a residual strength of 241 for B-2.

Page 1 – Comment #5

The stability analyses shown on pages 34 and 43 of the revised geotechnical report showing the overexcavation should be analyzed as an open cut to verify stability of the open cut to the

depths shown on the cross sections. Please revise analyses to reflect that condition (not a compacted structural fill backfill or structural loading condition).

The stability sections also indicate a 1H:1V cut slope for the proposed overexcavation. The geotechnical report (p.10) recommended temporary open cuts be 1.5H:1V or flatter. Please resolve conflict between the cross section and design recommendation before resubmitting stability analyses.

Please do not use the minimum depth criteria in performing the slope stability analyses. If sliver failure surfaces result as the critical failure surfaces, please indicate where the failure surfaces associated with the minimum FS acceptable for construction loading conditions are located.

Response

The building will be supported on pin piles, removing the need for over excavation.

The slope stability analysis has been done without using the minimum depth criteria.

Page 10 – Comment #1

This comment was previously on the cover sheet of the SUB2 planset. It was copied here since it also pertains to the temporary excavation limits and grading shown on this plan sheet. No revisions addressing this comment were noted on this plan sheet.

Please coordinate with geotechnical engineer and review extent of proposed temporary excavations required along all property lines, easements and trees given the anticipated overexcavations below foundations.

If shoring is required to avoid encroaching on these areas (adjacent properties, easement, protected trees, etc.), please provide shoring recommendations, wall design details, calculations, etc. for review.

Response

With no over excavation needed, there is sufficient space to complete the temporary excavation for the building.

Page 23 – Comment #1

In reviewing the settlement calculation it is unclear where the areal loading from the proposed 8-1/2 feet of fill shown on Section A-A on sheet A8 was taken into account. Please provide calculations showing the impact of the proposed fill loading on the foundation settlements.

Provide mitigation recommendations and coordinate with structural engineer to modify design if appropriate.

Mr. Jamie Buchan
October 10, 2023

Response

The building will be supported on pin piles and the loading will be incorporated into the foundation design by the structural engineer.

We trust the information presented is sufficient for your current needs. If you have any questions or require additional information, please call.

Sincerely yours,
TERRA ASSOCIATES, INC.



Carolyn S. Decker 10-10-2023