

September 22, 2023

JN 23326

Hot Pink Trust and Legman
8030 S.E. 20th Street
Mercer Island, Washington 98040

Attention: Gina and Tim O'Neill

Subject: **Foundation and Critical Area Considerations**
New Covered Entry
8030 S.E. 20th Street
Mercer Island, Washington

Greetings:

This report presents our geotechnical engineering report related to the work associated with the new covered front entry for your existing home. The scope of our services consisted of assessing the site surface and subsurface conditions, and then developing this report.

Based on the information provided by Sturman Architects, and our discussions with Lori Moll, a permit is to be obtained for the roof that was recently constructed to create a covered front entry on the east side of your house. There are two posts that were poured to carry the east side of the roof protrusion on shallow footings.

The City of Mercer Island GIS maps your entire lot as a Potential Landslide Hazard, a Potential Seismic Hazard, and an Erosion Hazard. There are isolated steep slopes mapped along the angled northwestern property line, and at the very eastern edge of the lot.

We are familiar with the native subsurface conditions on the property from review of published geologic maps, explorations that our firm has completed in close proximity to the site, and the results of explorations conducted previously on your southern neighbor's property by another geotechnical firm. The geologic mapping indicates that this area is underlain by glacial till, a highly-competent, glacially-compressed mixture of gravel, silt, and fine-grained sand. Our firm completed test borings for the project site immediately to the north, and reviewed soil logs for the property located to the east. Based on these explorations, we expect that your property is underlain by glacially-compressed silt. There is a variable amount of fill present along the west side of the pool deck north of the house, and that was placed as backfill behind the eastern basement wall of the house when it was constructed. During our visit to the site, we conducted shallow test holes alongside both of the two footings that have been poured to support the new posts for the covered entry. Both of these test holes revealed loose, silty fill extending to at least 4 feet below the footings. This fill is soil that was placed to backfill the eastern basement wall of the house when it was originally constructed.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

THIS SECTION CONTAINS A SUMMARY OF OUR STUDY AND FINDINGS FOR THE PURPOSES OF A GENERAL OVERVIEW ONLY. MORE SPECIFIC RECOMMENDATIONS AND CONCLUSIONS ARE CONTAINED IN THE REMAINDER OF THIS REPORT. ANY PARTY RELYING ON THIS REPORT SHOULD READ THE ENTIRE DOCUMENT.

The site and surrounding area are underlain by competent, glacially-compressed native soils. However, basement wall backfill is present in the area of the new covered front entry. This soil is loose and any footings bearing on it will undergo long-term settlement that will be noticeable and may result in damage to the new structure. We recommend that small-diameter pipe piles (2-inch-diameter) be used to support the new roof over the entry. These piles will be driven to refusal in glacially-compressed soils. The piles could be driven alongside the existing footings, and then be structurally connected to them. Alternatively, the piles could be poured into a new concrete pile cap for each of the support posts.

Seismic Hazard: The underlying glacially-compressed soils beneath the site are not susceptible to seismic liquefaction. The pipe piles will be driven through the fill and any loose upper soils and will be embedded into this dense, non-liquefiable native soil layer.

Steep Slope and Potential Landslide Hazards: The new front entry roof is not close to any steep or tall slope areas. The closest steep slope area is the short cut slope located along the eastern edge of the motorcourt, over 30 feet from the new covered front entry. The stability of the steep slopes on, or around, the site will not be adversely affected by the shallow excavations or the pipe pile foundations needed for the new development. These sloped areas also do not pose a risk to the planned new construction. No buffer or other mitigation measures are required to address the Potential Landslide Hazard mapping of the site.

Erosion Hazard: The site disturbance for the front entry has been limited, and has occurred in a flat area previously covered with concrete, pavers, and landscaping. Reconstruction of the front entry, as well as completing the landscaping, will be appropriate for long-term erosion protection.

We provide the following “statement of risk” to satisfy City of Mercer Island conditions:

“It is our professional opinion that the development practices proposed in this report for the new development would render the development as safe as if it were not located in a geologic hazard area.”

We recommend including this report, in its entirety, in the project contract documents. This report should also be provided to any future property owners so they will be aware of our findings and recommendations.

SEISMIC CONSIDERATIONS

In accordance with the International Building Code (IBC), the site class within 100 feet of the ground surface is best represented by Site Class Type D (Stiff Soil).

The IBC and ASCE 7 require that the potential for liquefaction (soil strength loss) during an earthquake be evaluated for the peak ground acceleration of the Maximum Considered Earthquake (MCE), which has a probability of occurring once in 2,475 years (2 percent probability of occurring in a 50-year period). The dense soils beneath the site are not susceptible to seismic liquefaction under the ground motions of the MCE because of the absence of near-surface groundwater.

PIPE PILES

A 2-inch-diameter pipe pile driven with a minimum 90-pound jackhammer or a 140-pound Rhino hammer to a final penetration rate of 1-inch or less for one minute of continuous driving may be assigned an allowable compressive load of 3 tons. Load tests are not required to verify this allowable capacity.

Extra-strong steel pipe should be used. The site soils are not highly organic, and are not located near salt water. As a result, they do not have an elevated corrosion potential. Considering this, it is our opinion that standard "black" pipe can be used, and corrosion protection, such as galvanizing, is not necessary for the pipe piles. Subsequent pipe sections should be connected together using threaded or slip couplers, or by welding. If slip couplers are used, they must fit snugly into the ends of the pipes. This can require that shims or beads of welding flux be applied to the couplers.

Pile caps and grade beams should be used to transmit loads to the piles. In general, a minimum of two piles should be used in isolated pile caps, in order to prevent eccentric loading on individual piles.

LIMITATIONS

This report has been prepared for the exclusive use of Tim and Gina O'Neill, and their representatives, for specific application to this project and site. Our conclusions and recommendations are professional opinions derived in accordance with our understanding of current local standards of practice, and within the scope of our services. No warranty is expressed or implied. The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design. Our services also do not include assessing or minimizing the potential for biological hazards, such as mold, bacteria, mildew and fungi in either the existing or proposed site development.

ADDITIONAL SERVICES

In addition to reviewing the final plans, Geotech Consultants, Inc. should be retained to provide geotechnical consultation, testing, and observation services during construction. This is to confirm that subsurface conditions are consistent with those indicated by our exploration, to evaluate whether earthwork and foundation construction activities comply with the general intent of the recommendations presented in this report, and to provide suggestions for design changes in the event subsurface conditions differ from those anticipated prior to the start of construction. However, our work would not include the supervision or direction of the actual work of the contractor and its employees or agents. Also, job and site safety, and dimensional measurements, will be the responsibility of the contractor.

During the construction phase, we will provide geotechnical observation and testing services when requested by you or your representatives. Please be aware that we can only document site work we actually observe. It is still the responsibility of your contractor or on-site construction team to verify that our recommendations are being followed, whether we are present at the site or not. We appreciate the opportunity to be of service on this project. Please contact us if you have any questions, or if we can be of further assistance.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.



9/22/2023

Marc R. McGinnis, P.E.
Principal

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