

July 20, 2023

JN 23234

Jon Sauer and Alexis Odell
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Mercer Island, Washington 98040
via email: jon.sauer@paccar.com and cfodellmsw@gmail.com

Subject: **Foundation and Critical Area Considerations**
Proposed Deck and Front Porch
Sauer and Odell Residence
8424 S.E. 44th Street
Mercer Island, Washington

Greetings:

This report presents our geotechnical engineering report related to the planned work associated with deck to be reconstructed on the west side of your existing residence and the new, eastern, front porch. The scope of our services consisted of assessing the site surface and subsurface conditions, and then developing this summary report.

Based on our discussions with Kyle Keever of Synapse Construction, and review of the site plan they have developed, we expect that the existing elevated deck on the western side of the house will be replaced with a smaller elevated deck. A set of stairs will extend to the ground off the south end of the deck. The existing front porch will be replaced and enlarged. The only site disturbance expected is the excavation for the new foundations.

The City of Mercer Island GIS maps your entire lot as lying within a Potential Landslide Hazard and an Erosion Hazard. Also, a thin sliver of the southeastern corner of the lot is mapped as a Potential Seismic Hazard. There are no steep slopes mapped on, or around, your property. Our review of *the Mercer Island Landslide Hazard Assessment* (Troost and Wisner, 2009) shows that no documented landslides have occurred within several blocks of the site.

We visited the subject property on June 29, 2023 to observe the existing site conditions and to evaluate subsurface conditions in test holes excavated at the north and south ends of the new deck footprint. The existing residence consists of one story overlying a west-facing daylight basement. The ground surface slopes down toward the northwest at a gentle to moderate inclination. There are no steep slopes on, or near, the site. Based on our observations, it is apparent that fill was originally placed to level the rear yard to the east of the residence.

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 during our site visit. Our firm completed a geotechnical study for the house located immediately to the west. The explorations conducted for that study encountered glacially-compressed, gravelly, silty sand, which is referred to as glacial till. This is consistent with the geologic conditions mapped for the site and the surrounding area. During our visit to the site, test holes were conducted at the north and south ends of the proposed smaller footprint for the western deck. The southern of these test holes found very dense glacial till at a depth of 3 feet below the ground surface. In the northern test pit, 6.5 feet of fill, topsoil and heavily-weathered soil

was found overlying glacial till. Considering the location of the front porch behind the eastern basement wall, this area is likely underlain by backfill having no significant compaction. No groundwater seepage was encountered in the test holes.

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.

Based on our observations and available information, the site is underlain by highly-competent glacial till soils. The foundations for the new deck, stairs, and front porch should be supported on the glacial till. Considering the thickness of the fill present in the north end of the new deck, and underneath the front porch, as well as the limited access for excavation equipment, it appears impractical to excavate to glacial till soils for these new foundations. Considering this, and the need to avoid surcharging the basement wall of the existing house from the new porch foundations, we recommend that the new deck, stairs and front porch be supported on 2-inch-diameter pipe piles. These piles would be driven to refusal in the glacially-compressed soils using portable jackhammers. The use of pipe piles will minimize the amount of ground disturbance necessary for or the project.

Seismic Hazard Area: The glacially-compressed soils beneath the site that will support the planned new construction are not susceptible to seismic liquefaction.

Potential Landslide Hazard Areas: There are no steep slopes on or near the site. The subject property, and surrounding area, are underlain by glacial till, which has a high internal strength and is not susceptible to instability on the gentle to moderate slopes, even in the event of the 1-in-2,475-year Maximum Considered Earthquake (MCE).

There is no potential for instability on this property. It is our opinion that no buffers or setbacks are required for the planned construction. The recommendations presented in the report are intended to prevent adverse impacts to the stability of the site and the neighboring properties, and to avoid the planned new construction from being damaged by slope movement.

Erosion Hazard Areas: The site meets the City of Mercer Island's criteria for an Erosion Hazard Area, due to the soil type and the fact that some areas are sloped at more than 15 percent. However, considering the limited ground disturbance planned, and the existing site conditions, the potential for significant soil erosion from the planned development is low. The temporary erosion control measures needed during the site development will depend heavily on the weather conditions that are encountered during the site work. One of the most important considerations, particularly during wet weather, is to immediately cover any bare soil areas to prevent accumulated water or runoff from the work area from becoming silty in the first place. A straw wattle or wire-backed silt fence should be erected as close as possible to the planned work areas, and the existing vegetation around the work area should be left in place. Soil stockpiles should be minimized. Following rough grading, it may be

necessary to mulch or hydroseed bare areas that will not be immediately covered with landscaping or an impervious surface.

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 alteration 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, glacially-compressed soils beneath the site that will support the pipe piles are not susceptible to seismic liquefaction under the ground motions of the MCE because of their compact nature and high internal strength.

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 any isolated pile caps, in order to prevent eccentric loading on individual piles.

LIMITATIONS

This report has been prepared for the exclusive use of Jon Sauer and Alexis Odell, 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.



7/20/2023

Marc R. McGinnis, P.E.
Principal

cc: **Synapse Construction** – Kyle Keever
via email: kyle@synapseconstruction.com

MRM:kg

September 28, 2023

JN 23234

Jon Sauer and Alexis Odell
8424 S.E. 44th Street
Mercer Island, Washington 98040
via email: jon.sauer@paccar.com and cfodellmsw@gmail.com

Subject: **Review of Plans**
Proposed Deck and Front Porch
Sauer and Odell Residence
8424 S.E. 44th Street
Mercer Island, Washington

Reference: *Foundation and Critical Area Considerations*, same site and project; Geotech Consultants, Inc.; July 20, 2023.

Greetings:

As required by the City of Mercer Island, we have completed a general review of the geotechnical aspects of the plans for the reconstruction of your front porch and rear deck. For our review, we were provided with sheet A-1 (Synapse Construction; 9/6/23) and S1 (ESG Design; 07/17/2023).

The provided plans conform to the recommendations of our July 20, 2023 report. The reconstructed deck and front porch will be supported both by the existing house foundations and by 2-inch-diameter driven pipe piles.

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

“Construction practices are proposed for the alteration that would render the development as safe as if it were not located in a geologically hazardous area and do not adversely impact adjacent properties”

Please contact us if you have any questions, or if we can be of further assistance.

Respectfully submitted,
GEOTECH CONSULTANTS, INC.

Marc R. McGinnis, P.E.
Principal



9/28/2023

cc: **Synapse Construction** – Kyle Keever
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