

August 11, 2025

JN 25259

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Subject: **Geotechnical and Critical Area Study**
Proposed New Residence
3427 – 72nd Avenue Southeast
Mercer Island, Washington

Greetings:

This report presents our geotechnical engineering report related to the new residence to be constructed on the subject property. The scope of our services consisted of assessing the site surface and subsurface conditions, and then developing this summary report.

Based on the information provided by Centerline Design, and our discussions with you, the existing house will be replaced with a new, larger home centrally located on the lot. The new residence will consist of two floors overlying a basement that will daylight to the west. A carport will extend to the north of the garage, and decks are planned on the west side. The north and south walls of the basement are indicated to be set back approximately 18 feet and 10 feet from the property lines, respectively.

SITE CONDITIONS

We visited the subject property on August 6, 2025 to observe the existing conditions and to complete subsurface explorations in the areas of the proposed work. The subject lot is situated on the west side of 72nd Place S.E. The existing residence is situated on the eastern half of the lot, with a driveway extending to the garage that occupies the north portion of the house. The western half of the property is covered mostly by grass yard and landscaping. There is a small decrepit shed situated in the very southwest corner of the lot.

The ground surface on the site and the neighboring lots slopes gently down toward the west. Along the southwestern corner of the lot is a short backfilled rock wall that retains the yard above the level of the adjacent western property. This wall has a maximum height of 4 feet. The neighboring western lots also slope gently down toward the west.

We saw no indications of recent slope movement on, or around, the site. The closest mapped landslide on the *Mercer Island Landslide Hazard Assessment* (Troost and Wisher) is approximately 425 feet to the southwest of the site.

The City of Mercer Island GIS maps the western edge of the lot to lie within Potential Landslide Hazard and Erosion Hazard areas. This is likely due to the sharp grade change caused by the manmade wall, which has been inaccurately interpreted by aerial photography to indicate a ground inclination of steeper than 15 percent.

The adjacent lots are developed with single-family homes. There is a newer residence (#3419) on the property to the north. Review of City of Mercer Island records indicates that the same Potential Landslide Hazard and Erosion Hazard areas cross the southwest corner of that lot. However, a geotechnical assessment does not appear to have been required for the development of that property. The storm runoff from impervious surfaces for this neighboring house is discharged to the storm sewer located on the east side of 72nd Place S.E.

During our visit to the site, we observed the excavation of three test holes at the locations shown on the attached Site Exploration Plan. Logs for the test holes are also attached. All three of the test holes found similar subsurface conditions. Beneath the grass and/or landscaping was an approximate 12-inch layer of gravelly, silty sand fill that had been spread over the original topsoil, likely during the development of the current home. Beneath the topsoil was a layer of loose, heavily-weathered, gravelly silty sand. At a depth of approximately 3 feet, the test holes revealed dense, gravelly, silty sand that has been glacially compressed. This soil is referred to as glacial till (aka "hardpan"). Geologic maps of the area confirm that glacial till is the geologic unit underlying the site and surrounding lots. No groundwater was encountered in the test holes. The impervious nature of the glacial till prevents the downward migration of water. It is not uncommon to find at least localized zones of subsurface water perched on top of the impervious glacial till following extended wet weather.

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 test holes conducted on the site found competent glacial till soils suitable to support the new house using conventional foundations. It will be important that the bearing surfaces are cleaned of any loosened or disturbed soils, and they should be protected with several inches of clean crushed rock in wet conditions.

Glacial till is very dense and is comprised of fine-grained sand, with a high silt (fines) content. As a result, there are no large or continuous pore spaces in the soil that can transmit water. This soil is essentially impermeable, preventing downward percolation of water, which often causes a perched water table to form following extended heavy rainfall. A 1997 study published by U.S. Geologic Survey (USGS) in cooperation with the Washington Department of Ecology (WDOE) determined the infiltration capacity of various Washington till soils to vary between 0.0005 and 0.005 inches/hour. We have found similar extremely low infiltration rates in Pilot Infiltration Tests (PITs) our firm has conducted in glacial till soils. Often, the impermeable nature of the glacial till causes a shallow seasonal perched water table to form where the ground surface is not covered by an impervious layer. This is a common problem in the wet season throughout the Pacific Northwest. Considering the observed impervious soil conditions, it is our professional opinion that infiltration of concentrated storm water runoff from impervious surfaces is infeasible for this site. Attempting to disperse or infiltrate large amounts of runoff from the site will increase the potential for both surface and subsurface drainage problems on the adjacent western properties, which are downgradient of the site.

CRITICAL AREA STUDY

Potential Landslide Hazard: The site does not contain any steep slopes and is not near any mapped landslide features. The grade change in the western portion of the site is actually a short backfilled rock wall. The glacially-compressed soils that underlie the site and which will support the new construction are not susceptible to instability, even during a strong earthquake. The stability of the gently- to moderately-inclined ground on, and around, the site will not be adversely affected by the excavations needed for the new development. The stability of the surrounding properties will not be adversely affected by the planned development. No buffer or other mitigation measures are required to address the Potential Landslide Hazard mapping of the site.

Erosion Hazard: The site disturbance for will occur primarily on the flat to gently-sloped portions of the property. The mapped Erosion Hazard can be mitigated by implementing proper temporary erosion control measures that will depend heavily on the weather conditions that are encountered. We recommend that a silt fence or straw wattle be installed around the downslope sides of any work areas. Existing ground cover and landscaping should be left in place wherever possible to minimize the amount of exposed soil. Small soil stockpiles should be covered with plastic during wet weather. Soil and mud should not be tracked onto the adjoining streets, and silty water must be prevented from traveling off the site. It should be possible to complete the planned remodel/expansion during the wet season without adverse impacts to the site and neighboring lots. As with any construction project, it can be necessary to periodically maintain or modify temporary erosion control measures to address specific site and weather conditions.

Buffers and Mitigation: As noted above, the western portion of the property contains a mapped Potential Landslide Hazard Area, and the prescriptive buffer would extend far beyond the boundaries of the property and the planned development area. No Steep Slope buffer would apply to this project, and no buffer is required by the MICC for an Erosion Hazard Area.

We recognize that the planned development will occur within the designated critical areas. The recommendations presented in this geotechnical report are intended to allow the project to be constructed in the proposed configuration without adverse impacts to critical areas on the site or the neighboring properties. The geotechnical recommendations presented in this report will mitigate any potential hazards to critical areas on the site.

Statement of Risk: In order to satisfy the City of Mercer Island's requirements, a statement of risk is needed. As such, we make the following statement:

The construction practices proposed in this report for the alteration would render the development as safe as if it were not located in a geologically hazardous area and do not adversely impact adjacent properties.

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 C (Very dense 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 glacially-compressed 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.

CONVENTIONAL FOUNDATIONS

An allowable bearing pressure of 2,500 pounds per square foot (psf) is appropriate for new footings supported on dense, native soils. A one-third increase in this design bearing pressure can be used when considering short-term wind or seismic loads. For the above design criteria, it is anticipated that the total post-construction settlement of footings founded on competent native soil will be less than one inch, with differential settlements on the order of one-quarter-inch in a distance of 25 feet along a continuous footing with a uniform load.

Lateral loads due to wind or seismic forces may be resisted by friction between the foundation and the bearing soil, or by passive earth pressure acting on the vertical, embedded portions of the foundation. For the latter condition, the foundation must be either poured directly against relatively level, undisturbed soil or be surrounded by level, well-compacted fill. We recommend using the following ultimate values for the foundation's resistance to lateral loading:

PARAMETER	ULTIMATE VALUE
Coefficient of Friction	0.40
Passive Earth Pressure	300 pcf

Where: pcf is Pounds per Cubic Foot, and Passive Earth Pressure is computed using the Equivalent Fluid Density.

If the ground in front of a foundation is loose or sloping, the passive earth pressure given above will not be appropriate. The above ultimate values for passive earth pressure and coefficient of friction do not include a safety factor.

LIMITATIONS

This report has been prepared for the exclusive use of Artoush Fanaiyan and his 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.



8/11/2025

Marc R. McGinnis, P.E.
Principal

Attachments:

- Vicinity Map
- Site Exploration Plan
- Test Hole Logs

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(Source: Microsoft MapPoint, 2013)

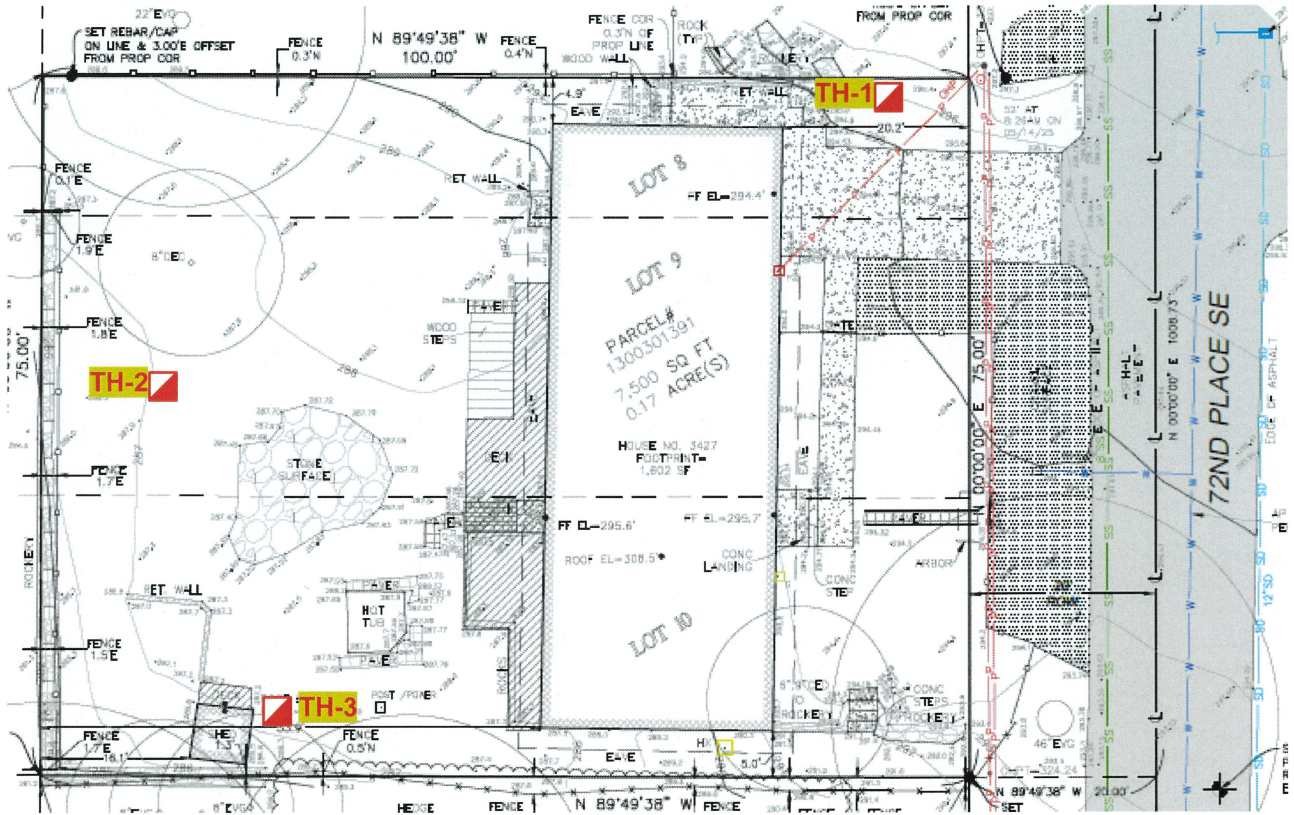
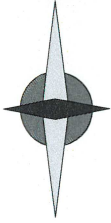


GEOTECH
CONSULTANTS, INC.


VICINITY MAP
3427 - 72nd Place S.E.
Mercer Island, Washington

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NORTH



Legend:

 Test Hole Location



SITE EXPLORATION PLAN
3427 - 72nd Place S.E.
Mercer Island, Washington

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TEST HOLE 1

Depth (feet)	Soil Description
0 – 1.0	Sod over brown, slightly gravelly, silty SAND, fine-grained, moist, loose (FILL)
1.0 – 2.0	Old Topsoil
2.0 – 3.0	Brown, mottled, gravelly, silty SAND, fine-grained, moist, loose
3.0 – 6.0	Grayish-brown, gravelly, silty SAND, fine-grained, moist, dense (Glacial Till)

Test Hole was terminated at a depth of 6.0 feet on August 6, 2025.
No groundwater seepage was observed.

TEST HOLE 2

Depth (feet)	Soil Description
0 – 1.0	Sod over brown, slightly gravelly, silty SAND, fine-grained, moist, loose (FILL)
1.0 – 2.0	Old Topsoil
2.0 – 3.0	Brown, mottled, gravelly, silty SAND, fine-grained, moist, loose
3.0 – 3.5	Grayish-brown, gravelly, silty SAND, fine-grained, moist, dense (Glacial Till)

Test Hole was terminated at a depth of 3.5 feet on August 6, 2025.
No groundwater seepage was observed.

TEST HOLE 3

Depth (feet)	Soil Description
0 – 1.0	Sod over brown, slightly gravelly, silty SAND, fine-grained, moist, loose (FILL)
1.0 – 2.0	Old Topsoil
2.0 – 3.0	Brown, mottled, gravelly, silty SAND, fine-grained, moist, loose
3.0 – 3.5	Grayish-brown, gravelly, silty SAND, fine-grained, moist, dense (Glacial Till)

Test Hole was terminated at a depth of 3.5 feet on August 6, 2025.
No groundwater seepage was observed.



TEST HOLE LOGS 3427 - 72nd Place S.E. Mercer Island, Washington			
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