

March 21, 2025

JN 23440

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Subject: **Use of Conventional Foundations**
Remodel of Existing Residence
8265 Southeast 61st Street
Mercer Island, Washington

Reference: *Foundation and Critical Area Considerations*, same site and project; Geotech Consultants, Inc.; December 21, 2023.

Greetings:

On March 7, 2025, the undersigned principal engineer revisited your site to assess the soil conditions within the footprint of the existing residence. During this visit, we were able to evaluate the soil conditions throughout the footprint of the house by excavating test holes both with a backhoe and by hand.

The test holes were located on the east and west sides of the house, as well as in the center. The test holes excavated through the basement slab on the east side and in the center of the basement found medium-dense to dense, native sand within 18 inches of the bottom of the slab. Along the west side of the house, this competent soil was encountered at a depth of 3 to 6 feet below the slab, with the deepest being at the southwest corner of the basement.

CONCLUSIONS

Based on our observations, the medium-dense to dense native sand encountered in the test holes is appropriate to support conventional foundations. These footings can be used to support all new loads for the house remodel, including the moment frame foundations that will be installed at the western perimeter of the structure. Where the bearing soils are deeper, such as near the southwest corner, the additional overexcavation can simply be backfilled with concrete.

Recommendations for design of conventional foundations are presented below.

We recommend that the reconstructed deck foundations, the addition between the house and the garage, and the new landscape/driveway walls remain utilizing pipe pile support. These areas are underlain by deeper fill that would make it difficult to impossible to excavate to reach the competent native sands to utilize conventional foundations.

CONVENTIONAL FOUNDATIONS

Conventional continuous and spread footings should have minimum widths of 12 and 16 inches, respectively. Exterior footings should also be bottomed at least 18 inches below the lowest adjacent finish ground surface for protection against frost and erosion. The local building codes should be

reviewed to determine if different footing widths or embedment depths are required. Footing subgrades must be cleaned of loose or disturbed soil prior to pouring concrete. Depending upon site and equipment constraints, this may require removing the disturbed soil by hand.

An allowable bearing pressure of up to 2,500 pounds per square foot (psf) is appropriate for footings supported on dense, native glacial till. 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-half-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	0.45
Passive Earth Pressure	350 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.

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

Respectfully submitted,
GEOTECH CONSULTANTS, INC.



3/21/2025

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