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March 27, 2019

Mr. William F. Gartz
7703 West Mercer Way
Mercer Island, WA 98040

RE: CITY OF MERCER ISLAND PERMIT APPLICATION NUMBER 1410-199, HILLSIDE GRADING AT 7703 WEST MERCER WAY, MERCER ISLAND, WASHINGTON

Dear Mr. Gartz:

This letter describes our geological and geotechnical engineering findings regarding the paving repairs and associated minor grading you propose for the driveway above your house at 7703 W. Mercer Way. The proposed pavement repair is within mapped landslide, steep slope seismic, and erosion hazard areas; therefore, the standards of the Mercer Island City Code (MICC) for geologically hazardous areas (MICC 19.07.160) apply.

BACKGROUND

The repairs you propose for the driveway include:

- All work will be on your private property.
- Remove approximately 600 square feet (sf) of distressed portland cement concrete pavement. The following photograph (Exhibit 1) shows pavement distress that was caused by poor pavement reconstruction following a waterline repair performed by the neighbor to the south.



Exhibit 1: Distressed Pavement from Waterline Repair

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The enclosed Entry Drive Paving Plan shows the areas of distressed pavement that will be removed and replaced.

- Regrade approximately 600 sf of the driveway subgrade to remove a dangerous hump from the driveway into the parking apron as shown in the following photograph (Exhibit 2).



Exhibit 2: Driveway to Paring Apron, Note Hump.

Flattening the hump is necessary because numerous vehicles have been high centered when entering the parking area. The proposed regrading will flatten a steeper section and steepen a flatter section. The enclosed Entry Drive Paving Plan shows the proposed new pavement areas. The enclosed Section Looking SW shows the proposed changes in grade, which will be about 2 feet or less.

- The new pavement slopes will be similar to the adjacent driveway slopes.
- No change will be made to drainage.
- All new paving will be brushed concrete.
- The work will occur after April 1 and be completed before October 1.

A low rockery covered with ivy is present on the northeast side of the driveway, as shown in the following photograph (Exhibit 3):

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Exhibit 3: Ivy-Covered Rockery Northeast of Driveway.

The repaired pavement will remain at the existing grades along the base of the rockery, i.e., the proposed work will not reduce toe support for the rockery.

GEOLOGIC AND GEOTECHNICAL INFORMATION

You commissioned geotechnical studies for remodeling your house and to evaluate geologic and geotechnical hazards on your property. Those reports include:

- Associated Earth Sciences, Inc. (AESI), Subsurface Exploration, Geologic Hazard, and Geotechnical Engineering Report, Gartz-Holt Remodel, Mercer Island, Washington, dated April 17, 2007 (AESI report)
- Liu & Associates, Inc., September 1, 2011, Geotechnical Investigation, Soldier Pile Retaining Wall. Gartz Residence, 7703 West Mercer Way, Mercer Island, Washington. L&A Job No. 11-059.
- Battermann Geotechnical Consulting, PLLC, Robin Holt & William Gartz, 7703 West Mercer Way, Mercer Island, Washington, dated January 11, 2013 (Battermann report)
- Shannon & Wilson, March 25, 2015, City of Mercer Island Permit Application Number 1410-199, Hillside Grading at 7703 West Mercer Way, Mercer Island, Washington.

Our study included reviewing the previous geotechnical reports and other published literature, including:

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- Geologic Map of Mercer Island, Washington, by Kathy Troost and Aaron P. Wisher, October 2006
- Environmental Critical Area maps available on the City of Mercer Island GIS Portal <http://pubmaps.mercergov.org/SilverlightViewerEssentialsExternal/Viewer.html?Viewer=ExternalWebGIS>
- Subsurface data from the GeoMapNW database, available at <https://fortress.wa.gov/dnr/geology/?Theme=subsurf>. This subsurface data includes test pits that were excavated in 1983 for a short plat study.

The geologic map and test pits excavated for the short plat study indicate the driveway area is underlain by Pre-Olympia Glacial Till and possibly Vashon Advance Outwash. The geologic units were deposited directly by and as the continental glaciers advanced through the Puget Sound region. They were subsequently overridden by more than 3,000 feet of glacial ice, which densified the deposits. The till encountered in a test pit excavated near the driveway consists of dense gravelly silty sand. While not encountered in test pits, Advance Outwash typically consists of dense to very dense sand and gravel, with varying amounts of silt.

SITE OBSERVATIONS

We observed the driveway and surrounding features on your property during our 2015 study and during site visits we made on January 5, 2019, and January 7, 2020. We did not observe evidence of slope movement in the proposed pavement repair area, adjacent portions of your driveway, and the rockery above the driveway. The pavement patches made by your neighbor are cracked and show evidence of settlement.

CONCLUSIONS

The distressed pavement where patched, likely is caused by two factors: poor subgrade preparation and poor portland cement pavement construction. We recommend evaluating the subgrade after removing the distressed pavement. Subgrade areas that are not dense and unyielding should be repaired. Repairs could consist of compacting the soil in place if the depth of poorly compacted or yielding soil is less than 12 inches and the moisture content of the soil is suitable for compaction. Deeper poorly compacted soil and/or soil that has a moisture content that is not suitable for compaction should be overexcavated and replaced with soil compacted in lifts. The thickness of a soil layer before compaction should not exceed 10 inches for heavy equipment compactors or 6 inches for hand-operated mechanical compactors. Before constructing the pavement, the prepared subgrade should be dense and unyielding.

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STATEMENT OF RISK

The pavement repair area is within mapped landslide, steep slope, seismic, and erosion hazard areas; therefore, the standards MICC 19.07.160 of the critical areas code apply. The following addresses these hazards and provides our conclusions that the proposed pavement repair will not adversely impact critical areas, the subject property, or adjacent properties.

Per MICC, development within geologic hazard areas and critical slopes may occur if the geotechnical engineer provides a statement of risk with supporting documentation indicating that one of the following conditions can be met:

- a. *The geologic hazard area will be modified, or the development has been designed so that the risk to the lot and adjacent property is eliminated or mitigated such that the site is determined to be safe; or*
- b. *An evaluation of site specific subsurface conditions demonstrates that the proposed development is not located in a geologic hazard area; or*
- c. *Development practices are proposed for the alteration that would render the development as safe as if it were not located in a geologic hazard area; or*
- d. *The alteration is so minor as not to pose a threat to the public health, safety, and welfare.*

In our opinion, condition *a* is met because the proposed pavement repair and associated minor grading will not appreciably change the slope stability in the landslide and steep slope hazard areas. The grading will include less than 2 feet of cut and fill, which will be essentially balanced over the proposed pavement repair area. The pavement repair thickness will be similar to the existing pavement. Therefore, loads on the slope overall should not change.

Further, the proposed pavement repair should reduce the potential for surface water infiltration through cracks that presently exist in the distressed concrete. Reduced surface water infiltration should reduce the potential for pore pressure build up that could trigger instability.

In our opinion, condition *d* is also met because the proposed pavement repair and associated grading will be small in area and in total grading volume. Essentially, the proposed work is a pavement repair and the proposed grading is so minor that it will not pose a threat.

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The proposed pavement repair is about 180 feet from the shoreline. However, runoff that could occur when soil is exposed during construction will be contained to the site. The possibility of sediment laden runoff entering the lake if it were to escape the construction area is remote. Currently, runoff from the driveway is limited to the driveway area and the storm sewer system, i.e., direct runoff to the lake does not occur. In our opinion, the potential for the pavement repair to affect the shoreline is remote.

CONCLUDING REMARKS

The analyses, conclusions, and recommendations contained in this letter are based on site conditions as they presently exist, and further assume that the explorations performed by others are representative of the subsurface conditions throughout the site; that is, the subsurface conditions everywhere are not significantly different from those disclosed by the explorations. If there is a substantial lapse of time between the submission of this letter, or if conditions have changed because of natural forces or construction operations at or adjacent to the site, we recommend that we review our letter to determine the applicability of the conclusions and recommendations.

Within the limitations of scope, schedule, and budget, the analyses, conclusions, and recommendations presented in this letter were prepared in accordance with generally accepted professional geotechnical engineering principles and practice in this area at the time this letter was prepared. We make no other warranty, either express or implied. These conclusions and recommendations were based on our understanding of the project as described in this letter and the site conditions as observed at the time of our explorations.

This letter was prepared for your exclusive use to assist you with obtaining a permit for your driveway repair. Our report, conclusions, and interpretations should not be construed as a warranty of subsurface conditions included in this letter.

The scope of our present services did not include environmental assessments or evaluations regarding the presence or absence of wetlands, or hazardous or toxic substances in the soil, surface water, groundwater, or air, on or below or around this site, or for the evaluation or disposal of contaminated soils or groundwater should any be encountered.

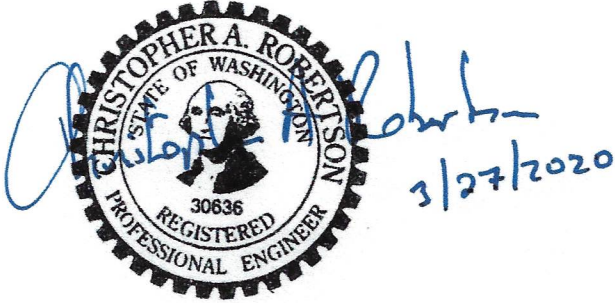
Shannon & Wilson has prepared and included the enclosed, "Important Information About Your Geotechnical Report," to assist you and others in understanding the use and limitations of our report.

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We appreciate the opportunity to be of service to you.

Sincerely,

SHANNON & WILSON



Christopher A. Robertson, PE, LEG
Vice President

CAR:SRM/car

Enc: Entry Drive Paving Plan
Section Looking SW
Important Information About Your Geotechnical/Environmental Report

Important Information About Your Geotechnical/Environmental Report

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

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A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

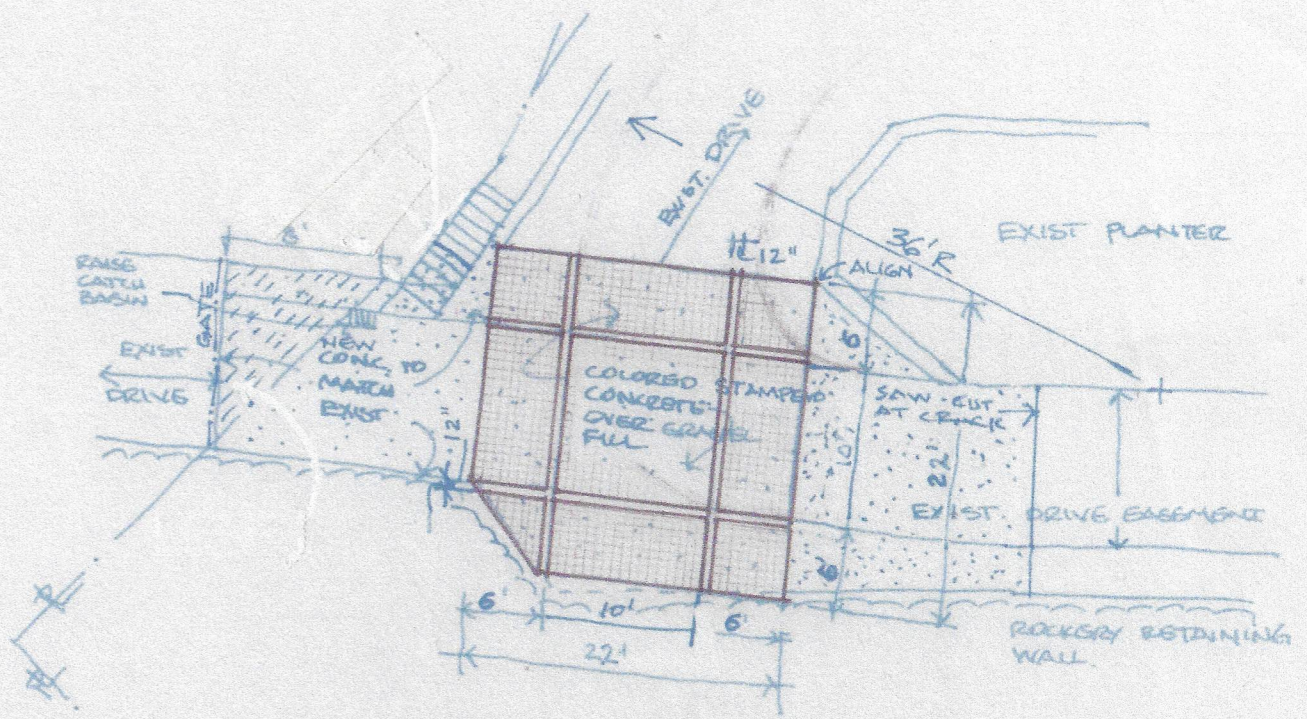
To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

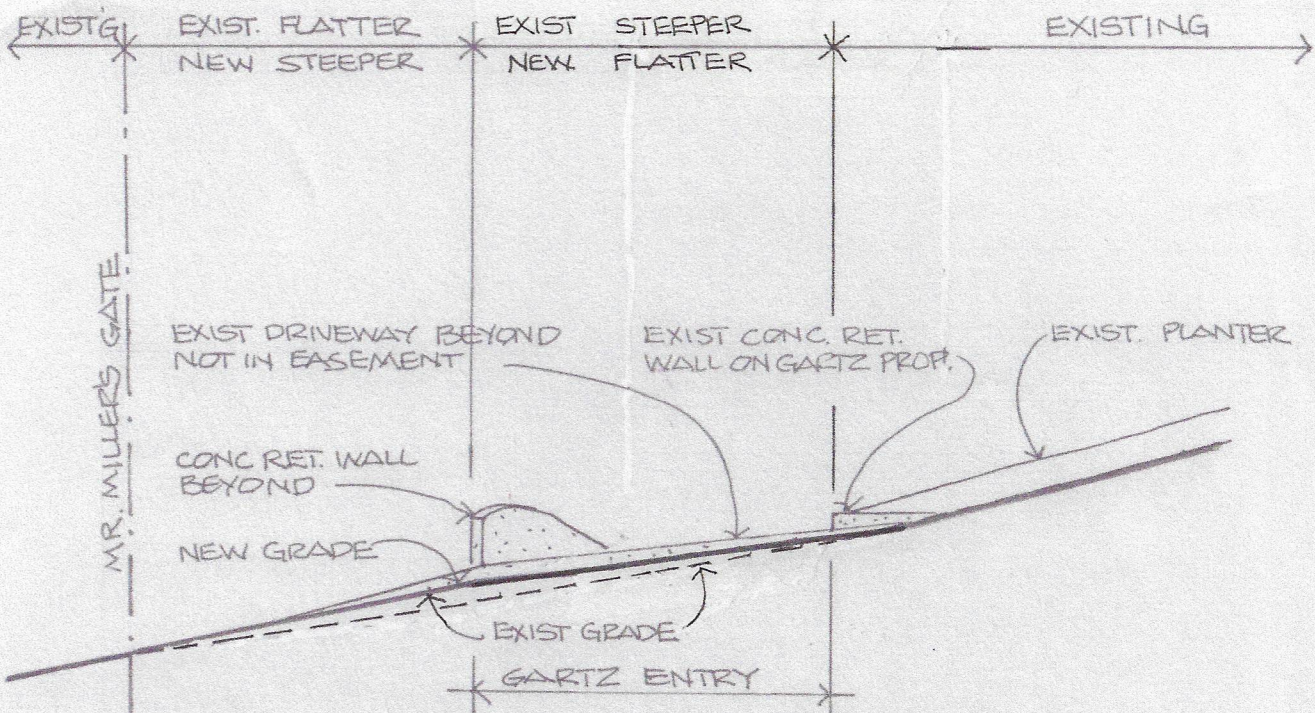
The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

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ENTRY DRIVE
PAVING PLAN
FEB 1, 09
REV. OCT 10, 19
REV. OCT 24, 19
1/8" = 1'-0"

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SECTION LOOKING SW

1/8" = 1'-0"

REV DEC 1, 2019
REV MAR. 20, 2020

GARTZ/HOLT RES.
DRIVEWAY REPAIR