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October 6, 2017

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Attn: Mr. Mike Boyle

Geotechnical Report Addendum and
Statement of Risk
Detached Garage
3603 West Mercer Way
Mercer Island, Washington
Parcel No: 3623500260
Doc ID: FatBoyCon.WMercerWay.RGA(1)

This geotechnical report addendum provides our recommendations for earth pressures and our statement of risk for the proposed structure to be constructed at 3603 West Mercer Way, Mercer Island, Washington. We previously prepared a geotechnical engineering report for the site dated March 3, 2016.

Our understanding of the project is based on telephone and email correspondences with you and your structural engineer; a review of the proposed site plan and grading plan; our understanding of the City of Mercer Island Critical Areas Ordinance and Site Development codes; and our past experience on the Mercer Island. We understand that you propose to construct a new detached garage and access to the lower residence. The garage will be constructed at grade with the existing private driveway that bisects the upper, eastern portion of the site. Because of slopes on the site, the garage will be constructed on posts and pilings with a structural deck.

Design of the below grade structures may be performed using the earth pressures and loading diagrams provided in Figures 1 and 2. A 2,500 psf surcharge was used to model the slope above the main cut. This should only be applied in this area. A seismic surcharge is provided based on the IBC seismic coefficient and the Mononobe-Okabe analysis. This surcharge should be applied uniformly as required by the code.

We understand a portion of the upper part of the garage will be designed and constructed using geofoam to reduce the loads on the slope and the structure. We recommend an equivalent active fluid pressures of 3 psf be used for the geofoam. Where geofoam is used below areas that will have parking a geomembrane should be utilized to prevent fuel spills from reaching the foam and causing the foam to disintegrate.

Provided the design and construction are completed using our design recommendations provided in our report and this addendum, it is our opinion that the development will have been designed so that the risk to the lot and the adjacent property is mitigated such that the site should be safe. The risk cannot be completely eliminated,

however, the proposed development should increase the site stability by improving site drainage and increasing the stability of the site slopes.

We have prepared this report for Mr. Mike Boyle, Fat Boy Construction, and other design team members for use in evaluating a portion of this project. The data used in preparing this report and this report should be provided to prospective contractors for their bidding or estimating purposes only. Our report, conclusions and interpretations are based on data from others and our limited site reconnaissance, and should not be construed as a warranty of the subsurface conditions.

Variations in subsurface conditions are possible between the explorations and may also occur with time. A contingency for unanticipated conditions should be included in the budget and schedule. Sufficient monitoring, testing and consultation should be provided by our firm during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork and foundation installation activities comply with contract plans and specifications.

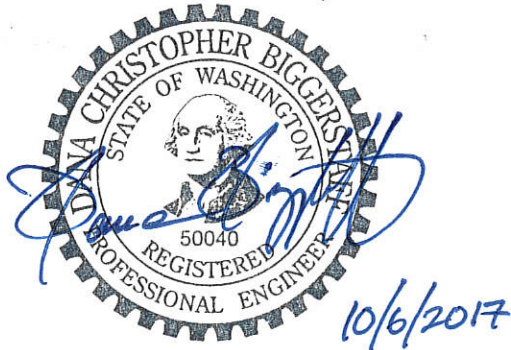
The scope of our services does not include services related to environmental remediation and construction safety precautions. Our recommendations are not intended to direct the contractor's methods, techniques, sequences or procedures, except as specifically described in our report for consideration in design.

If there are any changes in the loads, grades, locations, configurations or type of facilities to be constructed, the conclusions and recommendations presented in this report may not be fully applicable. If such changes are made, we should be given the opportunity to review our recommendations and provide written modifications or verifications, as appropriate.

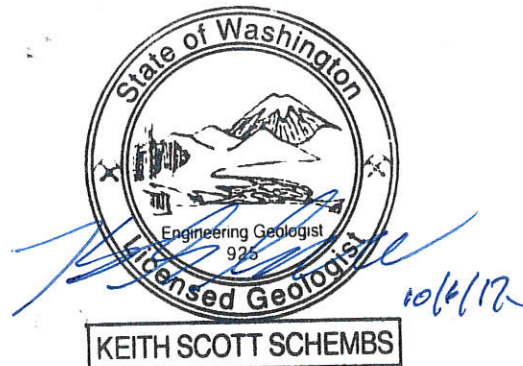


We have appreciated working for you on this project. Please do not hesitate to call at your earliest convenience if you have any questions or comments.

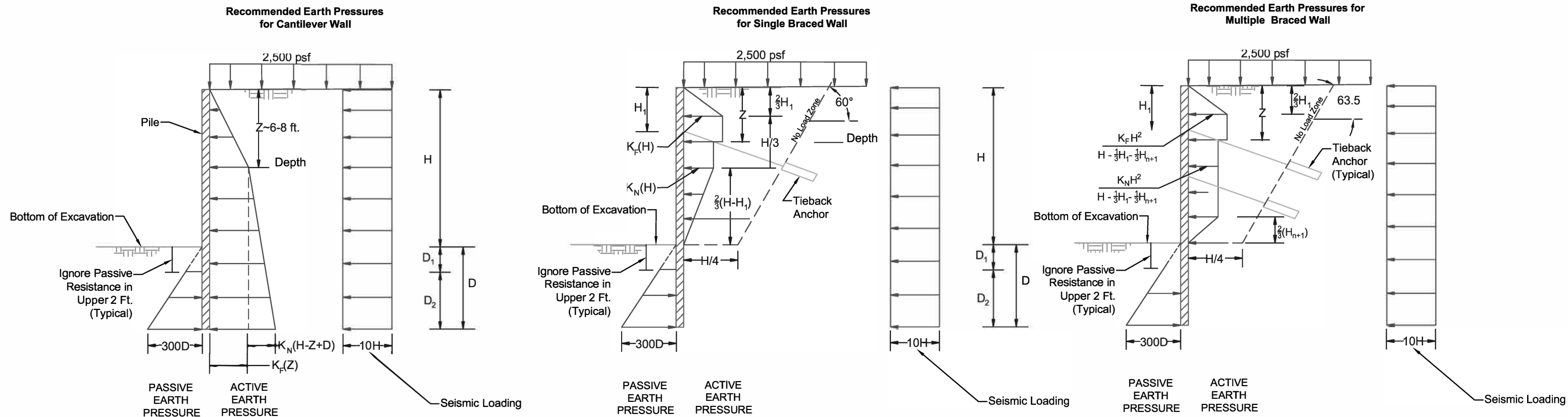
Yours very truly,
GeoResources, LLC



Dana C. Biggerstaff, PE
Senior Geotechnical Engineer



Keith S. Schembs, LEG
Principal



NOTES

- All Earth pressures are in units of pounds per square foot.
- Wall embedment (D) should consider kickout resistance. Embedment should be determined by satisfying horizontal static equilibrium about the bottom of the pile. Minimum recommended embedment is 5 feet.
- Passive pressures include FS = 1.5.
- Surface surcharge of 2,500 psf accounts for the slope above the proposed excavation.
- The recommended pressure diagrams are based on a continuous wall system. If soldier piles with laggings are used, apply active pressure over the width of the soldier piles below bottom of excavation and apply passive resistance over twice the width of the piles or the spacing of the piles, whichever is smaller.
- Free drainage assumed behind the wall.
- Design lagging for 30% of lateral earth pressure if span is 8 ft or less.
- Allowable vertical soldier pile capacity:
Skin Friction = 1.0 ksf
End Bearing = 5 ksf
(After loose/disturbed soil at bottom of hole is removed and if piles are utilized)
- Allowable transfer load for a 6-inch diameter soil anchor that is gravity grouted = 2 klf
- Lateral earth pressure for surcharges due to traffic, construction equipment, and adjacent foundations should be determined based on Figure 5.
- Seismic surcharge should be applied for permanent structures where required by code.

LEGEND

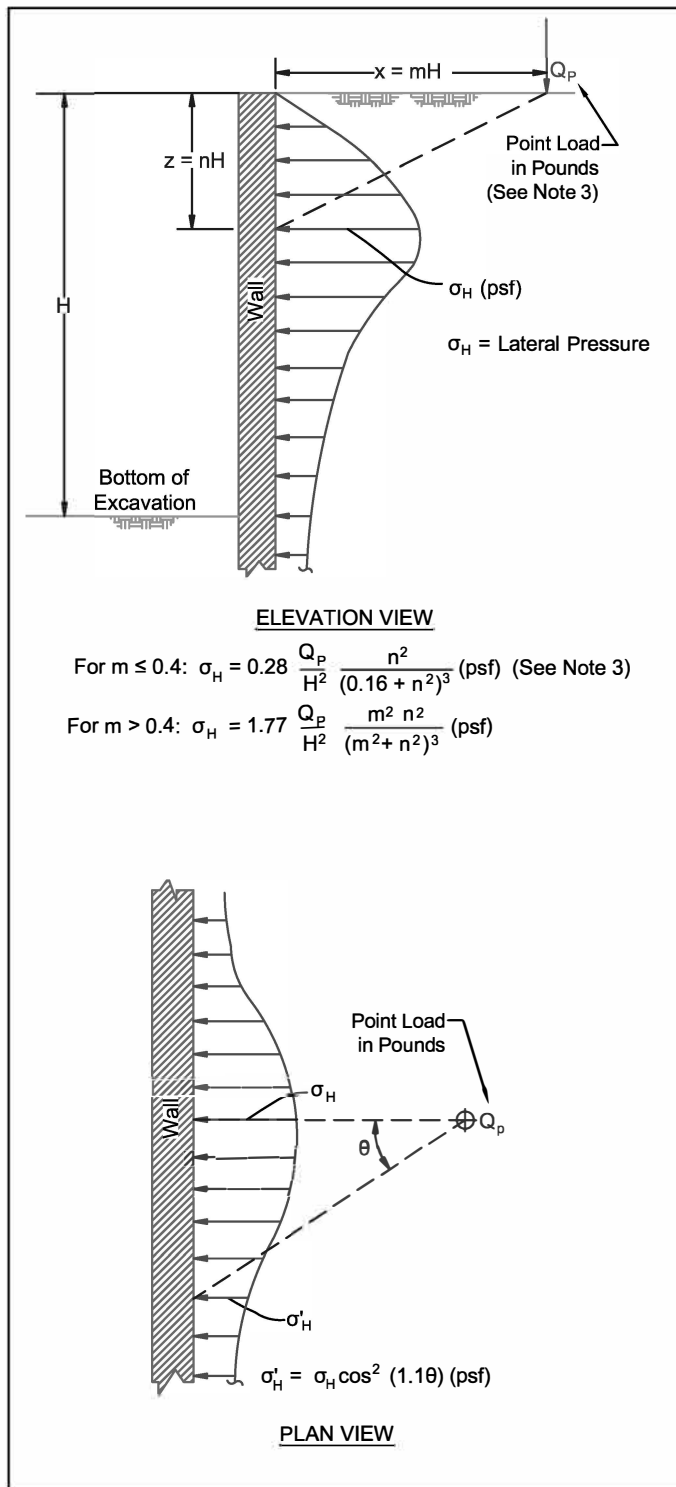
- H Excavation Height (Ft.)
- H₁ Depth to Uppermost Brace Level (Ft.)
- H_s Equivalent Surcharge Height (Ft.)
H_s minimum = 2 Feet
- H_{n+1} Distance from Base of Excavation to Lowermost Brace Level
- D, D₁, D₂ Embedment Depths (Ft.)
- Z Depth of Fill/Weathered Soil, About 6-8 ft.
- K_{FA} Active Earth Pressure - Fill/Weathered Zone
- K_{FO} At-Rest Earth Pressure - Fill/Weathered Zone
- K_{NA} Active Earth Pressure - Native
- K_{NO} At-Rest Earth Pressure - Native

RECOMMENDED EARTH PRESSURES

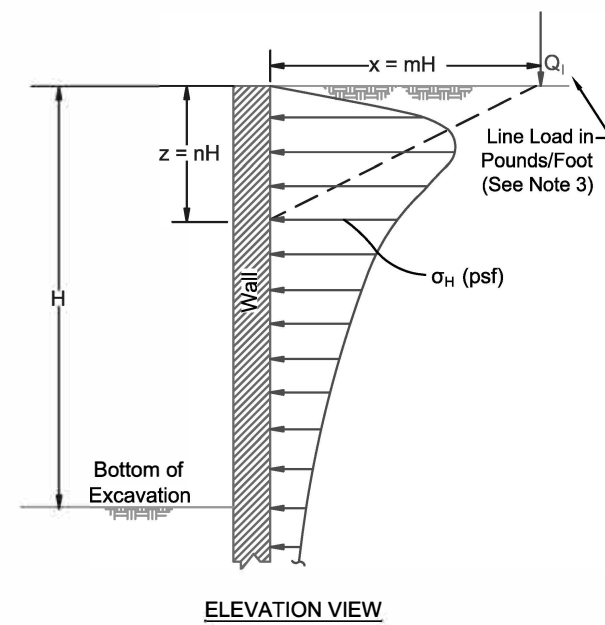
System	Depth (Ft.)	Above		Below	
		K _{FA}	K _{FO}	K _{NA}	K _{NO}
Cantilever/Single Brace	Z	32	51	30	46
Multiple Brace	Z	22	34	20	31



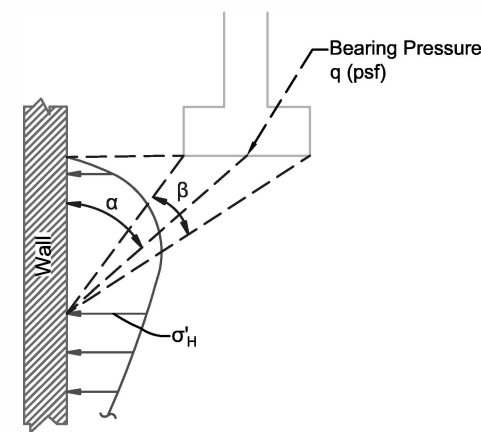
Lateral Earth Pressures
Proposed Single Family Residence
3603 West Mercer Way
Mercer Island, Washington



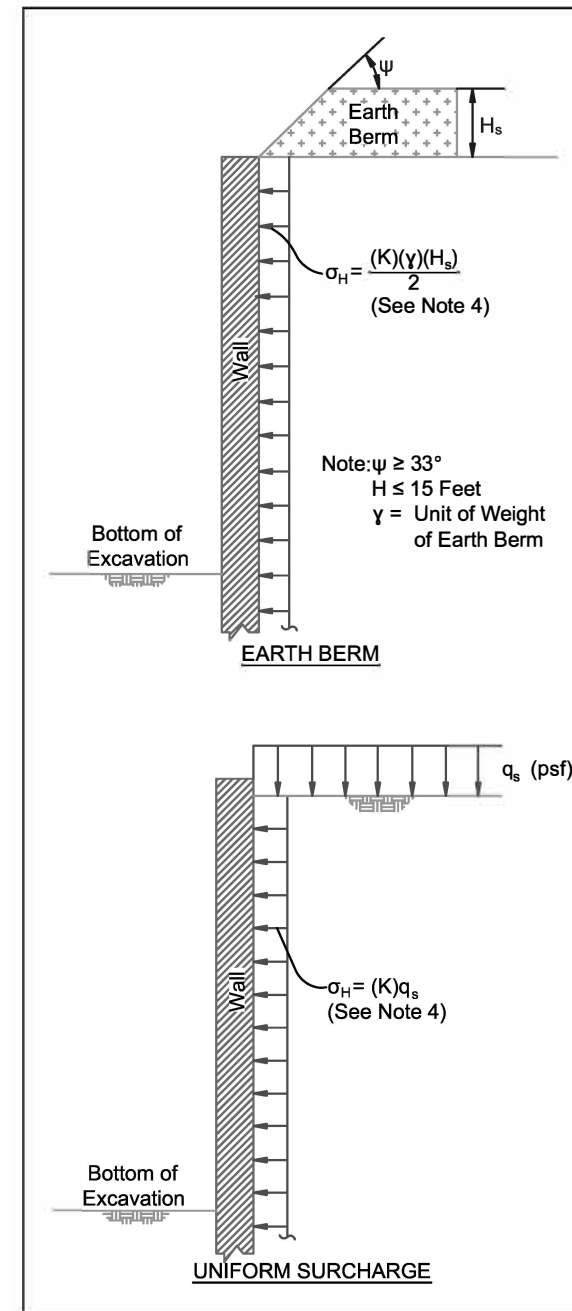
A) LATERAL PRESSURE DUE TO POINT LOAD
i.e. SMALL ISOLATED FOOTING OR WHEEL LOAD
(NAVFAC DM 7.2, 1986)



B) LATERAL PRESSURE DUE TO LINE LOAD
i.e. NARROW CONTINUOUS FOOTING
PARALLEL TO WALL
(NAVFAC DM 7.2, 1986)

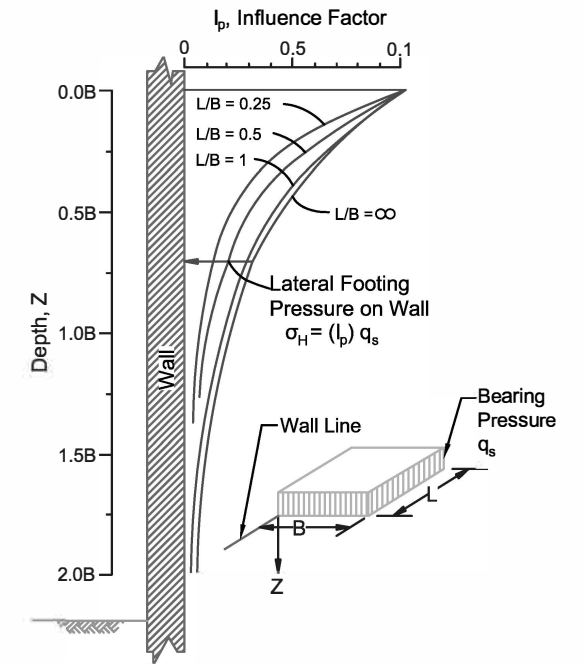


C) LATERAL PRESSURE DUE TO STRIP LOAD
(DERIVED FROM FANG, FOUNDATION
ENGINEERING HANDBOOK, 1991)



D) LATERAL PRESSURE DUE TO EARTH BERM
OR UNIFORM SURCHARGE

(DERIVED FROM POULOS AND DAVIS, ELASTIC SOLUTIONS
FOR SOIL AND ROCK MECHANICS, 1974; AND TERZAGHI AND
PECK, SOIL MECHANICS IN ENGINEERING PRACTICE, 1967)



- NOTES**
- FIGURES ARE NOT DRAWN TO SCALE.
 - APPLICABLE SURCHARGE PRESSURES SHOULD BE ADDED TO THE APPROPRIATE PERMANENT WALL LATERAL EARTH AND WATER PRESSURE.
 - IF POINT OR LINE LOADS ARE CLOSE TO THE BACK OF THE WALL SUCH THAT $m \leq 0.4$, IT MAY BE MORE APPROPRIATE TO MODEL THE ACTUAL LOAD DISTRIBUTION (i.e., DETAIL E) OR USE MORE RIGOROUS METHODS.
 - $K_a = 0.25$, $K_o = 0.4$