

February 4, 2016
File No. 14-032.200

Barcelo Homes, LLC
32505 138th Place SE
Auburn, WA 98092
Attn: Bogdan Maksimchuk

**Subject: Geotechnical Report Addendum
Temporary Excavation and Soldier Pile Wall Recommendations
Proposed Single-Family Residence
4634 E Mercer Way, Mercer Island, WA**

Dear Mr. Maksimchuk,

This letter is prepared to provide our additional geotechnical recommendations for the temporary excavations and soldier pile wall design for the above-referenced project. We understand that the temporary excavations up to 20 feet will be required to construct the proposed basement and foundation walls along the west building line and for the parking areas. As such, temporary shoring will be needed to support excavations and reduce excavation quantity. Additionally, we further understand that concrete and soldier pile walls will be needed retain the permanent cuts. The following sections present our additional recommendations for the temporary excavation support and soldier pile wall design for the above project.

ULTRABLOCK SHORING WALL

Ultrablock wall (2½x2½x5½ feet in dimension) may be considered one temporary shoring method. If used, the Ultrablock wall should have a maximum height of 7½ feet (three blocks high) and installed with a 1H:8V batter, or flatter, combined with a 1H:1V slope (maximum 5 feet high) above the wall. We recommend that the following be incorporated into the project plans:

- The maximum wall height of staggered blocks is 7½ feet (i.e., 3 blocks in height);

- The vertical wall face is no steeper than 1H (Horizontal):8V (Vertical);
- The 1H:V slope above the ultrablock wall should have a maximum height of 5 feet;
- The subgrade at the base of the ultrablock blocks shall consist of dense native soil or leveling crushed rock placed on dense soil;
- The grade in front of the block wall should have a minimum of 10 feet level ground;
- No excavation shall be made until blocks are available on site;
- The width of unsupported cut face for block placement shall be limited to no more than about 10 feet at any given time;
- Blocks shall be placed immediately after the cut is made, otherwise the cut face shall be buttressed with on-site soils until the blocks can be placed;
- Any voids behind blocks shall be backfilled with gravel immediately after the block wall are installed; and

SOLDIER PILE SHORING WALL

Soldier pile walls may be used as temporary shoring walls to support the excavations or as permanent site retaining walls to retain the cuts. We recommend that the following design parameters be used for the design of soldier pile shoring walls:

Active Earth Pressure:	35 pcf for level backslope 48 pcf for maximum 2H:1V backslope
Passive Resistance:	300 pcf (allowable)
Lagging:	250 psf (uniform distribution)
Surcharges:	A lateral load coefficient of 0.3 should be used to compute the lateral pressure on the shoring wall resulting from surcharge loads located within a horizontal distance of one-half wall height

- Seismic Pressure: If the soldier pile walls will be designed as permanent walls, a uniform lateral earth pressure of $8H$ psf (where H is the wall height) should be added to the static pressure for evaluating the seismic condition
- Wall Deflection: Soldier pile walls should be designed with less than one inch of top of wall deflection

The active earth pressure should be applied over the full width of pile spacing above the base of excavation, and over one pile diameter (i.e. diameter of drilled hole) below the base of excavation. The passive resistance should be applied over two pile diameter or one pile spacing, whichever is less. The minimum soldier pile embedment should be determined by the shoring wall designer, and should extend at least 10 feet below the bottom of the proposed excavation.

The recommended passive earth pressure assumes level ground surface at the bottom of the excavation, and the level bench extends at least 15 feet in front of the wall. If the ground surface in front of the wall needs to be sloped to accommodate the difference in finish floor elevation, the passive resistance in the sloped portion of the ground should be ignored or reduced for design calculations.

We recommend that any voids behind the timber lagging be backfilled with 5/8" clean crushed rock or Controlled Density Fill (CDF), depending on the soil conditions.

CLOSURE

We trust that the information presented herein meets your need at this time. Please call if you have any questions.

Sincerely,



Michael H. Xue, P.E.
Senior Geotechnical Engineer