Petrescu Retaining Wall

0 114 227

Scale 1: 1,364 Feet

Map Generated on: 04/17/2013

Associated Earth Sciences, Inc.

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March 8, 2013
Project No. KE130063A

Mariana and Constantin Petrescu
17014 SE 14th Lane
Bellevue, Washington 98008

Subject: Slope Restoration and Ecology Block Wall Recommendations
16710 SE 34th Street
Bellevue, Washington

Dear Mr. and Mrs. Petrescu:

Per your request, Associated Earth Sciences, Inc. (AESI) completed a limited geologic hazard reconnaissance at the residential property located at 16710 SE 34th Street in Bellevue, Washington.

Authorization to proceed with this study was granted by your acceptance of our proposal, dated February 11, 2013. Our study was accomplished in general accordance with our discussions with the City of Bellevue and the resulting scope of work outlined in our revised proposal, dated February 15, 2013. This letter has been prepared for the exclusive use of Mariana and Constantin Petrescu, and their agents, for specific application to this project. Within the limitations of scope, schedule, and budget, our services have been performed in accordance with generally accepted geotechnical engineering and engineering geology practices in effect in the area at the time our letter was prepared. It must be understood that no recommendations or engineering design can yield a guarantee of stable slopes. Our observations, findings, and opinions are a means to identify and reduce the inherent risks to the owner. No other warranty, express or implied, is made.

PROJECT UNDERSTANDING

We understand that you attempted to repair a failed modular block wall located near the top of a steep slope on the east side of the house at the above-referenced address. The repair consisted of replacing the failed portion of the wall with a new ecology block wall.

We understand that the City of Bellevue issued a stop work order on the project pending completion of a geotechnical engineering report and receipt of the proper permits required for the project. In a letter dated January 17, 2013, a geotechnical study required by the City would require a comprehensive subsurface exploration program and numerical slope stability analysis for the wall. However, based on our recent discussion with Mr. Kevin LeClair with the City of Bellevue, we understand that, in lieu of the above-mentioned comprehensive scope of work, the City will consider accepting a letter from AESI providing our opinion regarding the stability of the slope and our recommendations for site restoration and enhancement of the ecology block wall.

We visited the subject site on February 26, 2013 to perform a limited geologic reconnaissance and to delineate the extent of the affected area. The purpose of our reconnaissance was to review the general surface condition of the steep slope as it relates to the wall failure and subsequent repair/replacement efforts that recently took place and, based upon our site visit and knowledge of the geology in this area of Bellevue, provide recommendations for mitigation of the impacts to the slope resulting from the wall failure and replacement.

SITE CONDITIONS

The existing home (circa 1998) was constructed at the north end of a shared driveway extending from SE 34th Street. The property includes a one-story, single-family residence with an attached basement-level garage. The area surrounding the existing residence is a ridge crest which generally slopes downward to the south, with steep slopes leading downward to the west and east away from the residence. The terrain to the east of the residence includes a steep slope which extends downward to the bottom of a north-south trending drainage ravine. Several medium- to large-sized deciduous and evergreen trees are scattered across both the steep slopes, and we observed that many of the mature evergreen trees along the slopes immediately below the subject residence were vertically oriented, suggesting that ongoing, deep-seated slope movement is not occurring at the subject site.

The subject wall consists of two rows of stacked concrete ecology blocks (2'x2'x6') trending parallel to and approximately 9 to 10 feet from the east side of the residence. The area between the residence and the wall includes a sidewalk/patio area and a grassy backyard. The exposed height of the 48-foot-long wall is roughly 2 to 2½ feet. We probed the area near to the wall toe and encountered firm and non-yielding soil at the wall base. We observed the in-place portion of the existing modular block wall continuing northward along a similar alignment as the ecology block wall.

The "affected" area immediately below the ecology block wall includes a roughly 4- to 6-foot-wide level bench leading to an approximate 1.5H:1V (Horizontal:Vertical) slope. The affected area extends roughly 20 feet downslope and consists of exposed, loose soil currently covered with straw. We observed shallow surface cracks along the transition between the level and steep portions of the affected area. Several, discarded random modular blocks were observed along the lower portion of the affected area. The steep slope below the affected area was well vegetated, with both trees and native underbrush.

Review of the regional geologic map titled *Geologic Map of the Issaquah 7.5' Quadrangle, King County, Washington*, by D.B. Booth et al. (2006), indicates that the area of the subject site is underlain by Vashon lodgement till (Qvt). Lodgement till is a high-shear strength, relatively low-permeability material and is not overly sensitive to deep-seated landsliding given the topographic conditions at the site. Other than the affected area directly below the ecology block wall, we did not observe indications of erosion across the steep slope area, nor did we observe indications of surface water flowing from the residence or the flat-lying backyard area onto the steep slope.

CONCLUSIONS AND RECOMMENDATIONS

Based on our observations, we recommend that drainage elements be incorporated into the existing ecology block wall, along with a moderate amount of remedial grading followed by revegetation of the slope with erosion-resistant plantings. Figure 1 shows the existing residence and the area of the recommended mitigation measures. Based on our limited site and document review, we have the following comments:

- Figure 1 includes a recommended detail for the existing ecology block wall. A minimum 1-foot-wide blanket of 2-inch-diameter drain rock should be placed along the back face of the ecology block wall. A 4-inch-diameter, perforated drainpipe should be placed at the base of the drainage zone and routed by gravity to a suitable discharge. If not tied to the existing house drainage system, the wall drainage should be tightlined to the bottom of the existing slope east of the wall.

- We recommend that the affected portion of the slope below the ecology block wall be regraded to a maximum slope of 2H:1V, with the resulting ground surface compacted to a firm condition. Excess soil should be removed from the slope area. The distances shown on Figure 1 from the wall and recommended mitigation area to the residence should be considered approximate.

- The steep slopes below the affected area were well vegetated, with both trees and native underbrush. This vegetation helps protect the face of the slope from shallow soil erosion and earth movement. We recommend that this vegetation remain in place to provide root reinforcement for the near-surface soils on the slope. Much of the affected area was covered with straw, which provides a temporary mitigation for soil erosion outside of the growing season.

- Figure 1 includes a planting plan with recommended plant species. Temporary erosion and sediment control (TESC) measures for the recommended mitigation area are also recommended. For most sites with active grading, the TESC measures include a perimeter silt fence. Since the "grading" at this particular site will be limited to regrading the upper portion of the slope and the placement of potted plants, we consider the trenching associated with silt fence installation to create a greater impact than the proposed re-planting activities. Instead, we recommend that the sequence of planting is arranged such that the plants planned for the lowest portions of the mitigation area are planted first. As these plants are placed, we recommend that bark mulch be spread in the low areas to provide a temporary erosion control perimeter for the re-planting area. Subsequent planting and mulching can then continue upslope through the mitigation/revegetation area.

- For sites adjacent to steep slopes, we typically recommend that storm water runoff from impermeable surfaces be collected, routed, and discharged through a properly designed storm water system. Uncontrolled discharge from impermeable surfaces should not be allowed to flow towards or onto the steep slope. As stated above, we did not observe indications of surface water flowing from the residence or the flat-lying backyard area onto the steep slopes at the subject site. Therefore, drainage improvements for the impermeable surfaces at the subject site are not warranted at this time.

- We recommend planting in early spring to avoid the increased impacts to the slopes through winter-time disturbance.

Because of our limited scope and the limited visual windows into the slopes, there was much that we were unable to observe. Should you desire that a quantitative risk assessment be performed, additional research, exploration (including exploration borings), and evaluation by our firm would be needed. However, we are confident in our conclusions, based on experience, literature review, and site observations. Therefore, please keep in mind that there is always an inherent risk of earth movement associated with any steep slope.

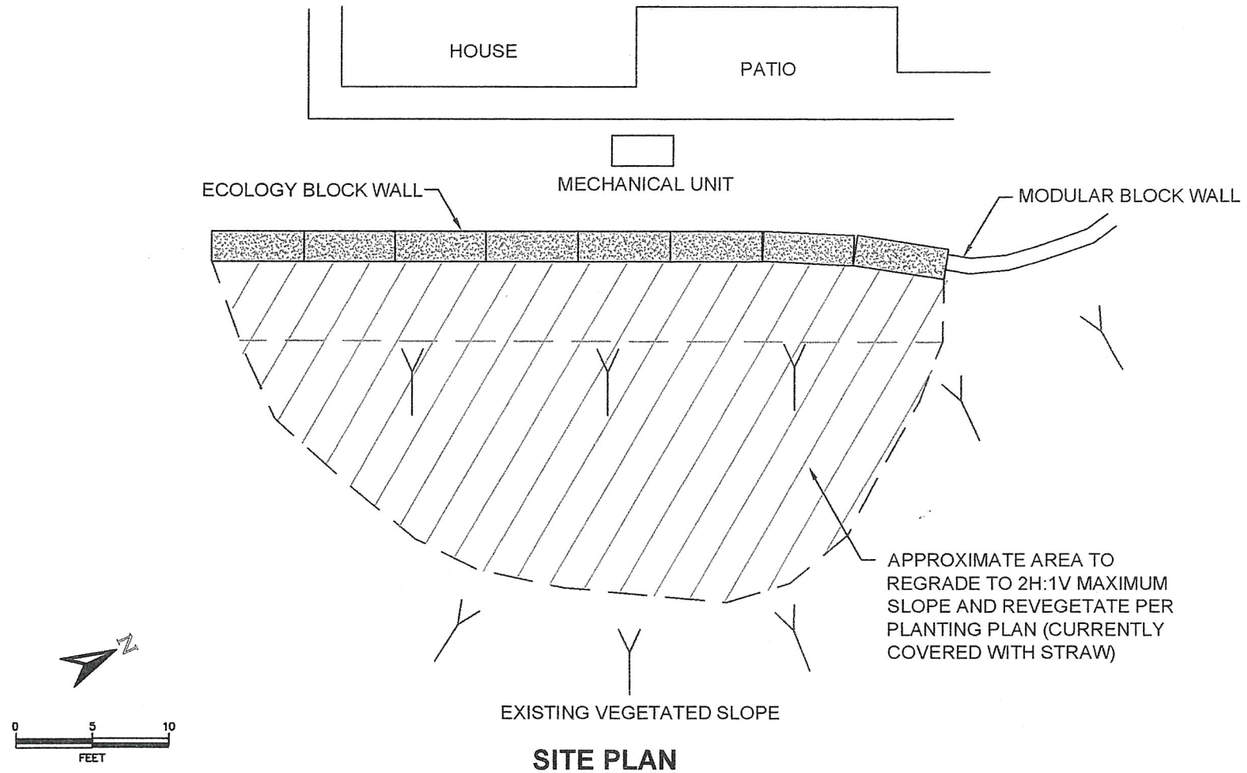
We have enjoyed working with you on this study and are confident that these recommendations will aid in the successful completion of your project. If you should have any questions or require further assistance, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington

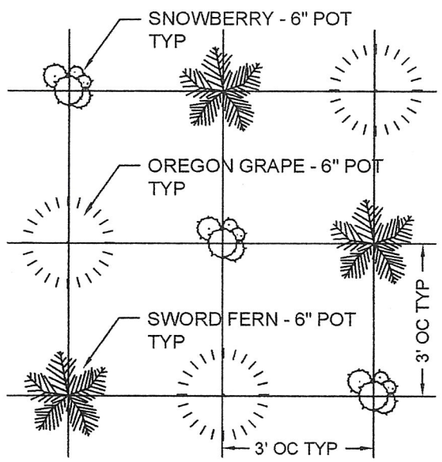
Jeffrey P. Laub, L.G., L.E.G.
Senior Project Engineering Geologist

Jon N. Sondergaard, L.G., L.E.G.
Senior Principal Geologist

Attachment: Figure 1 - Grading Mitigation and Revegetation Plan



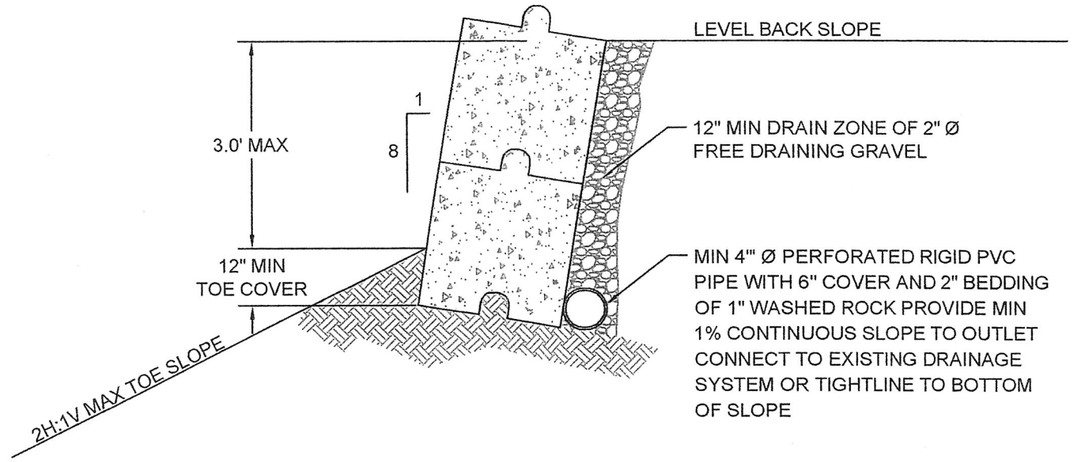
SITE PLAN



TYPICAL PLANTING PLAN

TESC NOTE:

BARK MULCH SHOULD PROVIDE SUITABLE EROSION AND SEDIMENTATION CONTROL. PLACE MULCH AT LOWEST PORTIONS OF REVEGETATION AREA IN SUCH A MANNER AS TO CREATE A PERIMETER BARRIER. AFTER LOWER REGION OF PERIMETER IS ESTABLISHED, REVEGETATE AND CONTINUE PERIMETER UPSLOPE. NO SILT FENCE IS NEEDED IF MULCH PERIMETER IS CORRECTLY ESTABLISHED.



NOTE: OBSERVATION OF DRAINAGE INSTALLATION BY GEOTECHNICAL ENGINEER OR THEIR REPRESENTATIVE IS REQUIRED.

ECOLOGY BLOCK WALL DETAIL

Associated Earth Sciences, Inc.

GRADING MITIGATION AND REVEGETATION PLAN
PETRESCU RESIDENCE
BELLEVUE, WASHINGTON

FIGURE 1
DATE 3/12
PROJECT NO. KE130063A