



**City of Bellevue
Development Services Department
Land Use Staff Report**

Proposal Name: Petrescu Retaining Wall

Proposal Address: 16710 SE 34th Street

Proposal Description: The applicant requests a Critical Areas Land Use Permit for replacement and upgrade of a failed retaining wall within the steep slope critical area buffer. The proposal includes native plant restoration of the disturbed portion at the top of the slope. Proposal is associated with enforcement action file # 13-104358-EA.

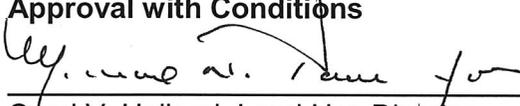
File Number: 13-111805-LO

Applicant: Constantin and Mariana Petrescu

Decisions Included: Critical Areas Land Use Permit
(Process II. LUC 20.30P)

Planner: Kevin LeClair, Planner

**State Environmental Policy Act
Threshold Determination:** Exempt per WAC 197-11-800(1)

Director's Decision: **Approval with Conditions**


Carol V. Helland, Land Use Director
Development Services Department

Application Date: March 27, 2013
Notice of Application Publication Date: April 25, 2013
Decision Publication Date: May 16, 2013
Project/SEPA Appeal Deadline: May 30, 2013

For information on how to appeal a proposal, visit Development Services Center at City Hall or call (425) 452-6800. Comments on State Environmental Policy Act (SEPA) Determinations can be made with or without appealing the proposal within the noted comment period for a SEPA Determination. Appeal of the Decision must be received in the City's Clerk's Office by 5 PM on the date noted for appeal of the decision.

CONTENTS

I. Proposal Description	1
II. Site Description, Zoning, Land Use and Critical Areas	1
III. Consistency with Land Use Code Requirements:.....	3
IV. Public Notice and Comment.....	6
V. Summary of Technical Reviews	6
VI. State Environmental Policy Act (SEPA).....	6
VII. Changes to proposal as a result of City review.....	6
VIII. Decision Criteria.....	7
IX. Conclusion and Decision.....	8
X. Conditions of Approval	8

Attachments

1. Environmental Checklist
2. Site Plan

I. Proposal Description

The applicant is requesting a Critical Areas Land Use Permit for the replacement and upgrade of a failed retaining wall in steep slope critical area buffer. The original wall was constructed of small landscape blocks and was used to retain and maintain a level portion of the landscaped portion of the yard adjacent to the existing residence. The wall failed during the winter of 2013 as a result of excess saturation of the soils behind the wall. The new, upgrade wall is constructed of 2 foot by 6 foot concrete “ecology blocks.” The proposal includes native plant restoration of the disturbed portion of the top of the steep slope.

Land Use Code (LUC) 20.25H.015 specifies that if a proposal involves disturbance to or modification of a critical area or critical area buffer, then in addition to the required development permit, the proposal shall require a Critical Areas Land Use Permit (LUC 20.30P).

The proposal is classified as an expanded stabilization measure and is considered an allowed use in a critical area or critical area buffer, provided the proposal complies with certain performance standards. The standards include: LUC 20.25H.055.C.3.m and LUC 20.25H.125.

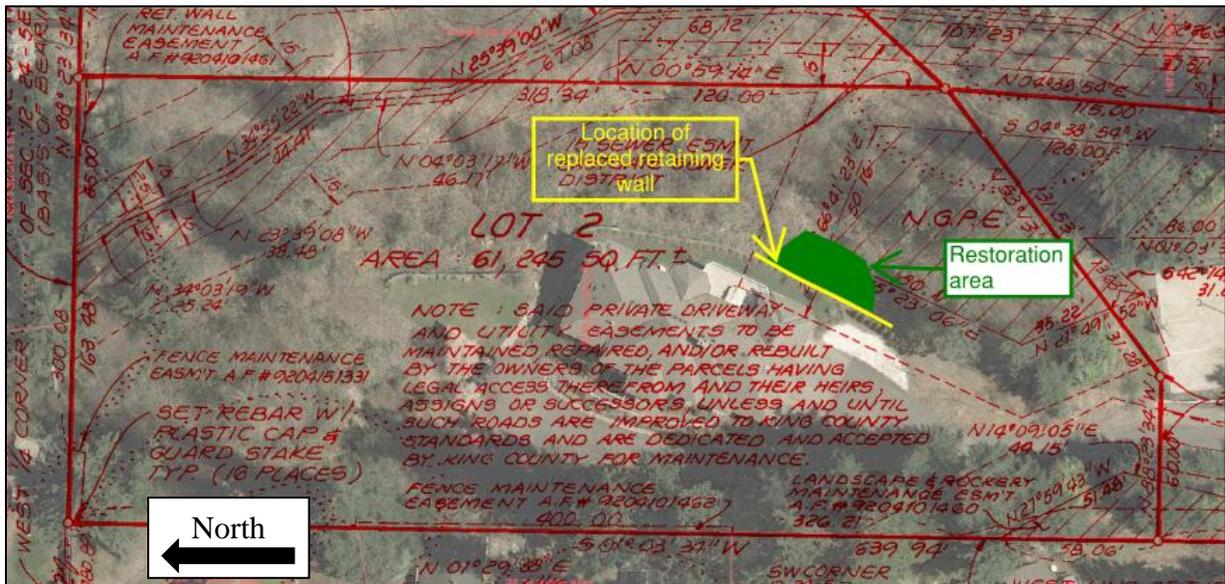


Figure 1: Short Plat Map Overlay with Project Area

II. Site Description, Zoning, Land Use and Critical Areas

A. Site Description

The site is located at 16710 SE 34th Street. The site is accessed from SE 34th Street via an access easement that crosses a neighboring property to the south (16716 SE 34th Street).

The property is 61,245 square feet and is developed with a single-family residential

structure in its approximate center. The property is nearly 164 feet wide (east-west) and 400 feet deep (north-south).



due to the presence of the steep slope critical area and riparian corridor.

C. Land Use Context

The property is located within the Sammamish/East Lake Hills Neighborhood Enhancement Area and the Eastgate Subarea. The context of the property is that of a developed single-family residential property among other developed properties. However, the property, along with the three other properties in the Dakota Park short plat area significantly larger, at greater than one acre, than the surrounding residential properties, which average around 1/4 to 1/3 of an acre. Given the property's larger size and the steep slope and riparian corridor NGPE along its eastern boundary, there is a relative dense screen of vegetation surrounding the property. In fact, the property is not visible from the public right-of-way and the project area can only be seen from the neighboring property to the east on the other side of the riparian area NGPE.

D. Critical Areas Functions and Values

i. Geologic Hazard Areas

Geologic hazards pose a threat to the health and safety of citizens when commercial, residential, or industrial development is inappropriately sited in areas of significant hazard. Some geologic hazards can be reduced or mitigated by engineering, design, or modified construction practices. When technology cannot reduce risks to acceptable levels, building in geologically hazardous areas is best avoided (WAC 365-190).

Steep slopes may serve several other functions and possess other values for the City and its residents. Several of Bellevue's remaining large blocks of forest are located in steep slope areas, providing habitat for a variety of wildlife species and important linkages between habitat areas in the City. These steep slope areas also act as conduits for groundwater, which drains from hillsides to provides a water source for the City's wetlands and stream systems. Vegetated steep slopes also provide a visual amenity in the City, providing a "green" backdrop for urbanized areas enhancing property values and buffering urban development.

III. Consistency with Land Use Code Requirements:

A. Zoning District Dimensional Requirements:

The site is located in the R-5 land use zoning district. The site currently complies with the zoning district dimensional standards. The proposed retaining wall replacement, although located within the NGPE structure setback, is considered conforming because it was constructed at the time the home was constructed to provide feasible access around the home.

B. Consistency with Stabilization Performance Standards LUC 20.25H.055.C3.m:

Proposed stabilization measures within a critical area or critical area buffer to protect against landslide hazards may be approved in accordance with this subsection.

New or enlarged stabilization measures shall be allowed only to protect existing primary structures and infrastructure. Stabilization measures shall be allowed only where avoidance measures are not technically feasible.

There is no other technically feasible alternative to the proposal for stabilization measures in the location of the replaced retaining wall. The topography slopes steeply down just below the retaining wall, which is necessary to provide reasonable access around the southeast corner of the home. The wall is located approximately 8 feet from the foundation of the home and provides surface and subsurface stability for the existing home.

Avoidance of the stabilization measure could result in continued failure of the surface soils, subsequent degradation to the adjacent NGPE, and potentially contamination of the riparian corridor with eroded soil.

The applicant supplied a geotechnical report that discusses the existing site conditions, the need for the stabilization measure, and mitigation measures that, when implemented, will ensure the minimum impact on the critical area and critical area buffer. The proposed hard stabilization measure is the appropriate construction technique due to the proximity of the existing residential structure and the potential for additional soil erosion and landsliding.

**C. Consistency with Steep Slope Critical Area Performance Standards LUC
20.25H.125:**

Development within a landslide hazard or steep slope critical area or the critical area buffers of such hazards shall incorporate the following performance standards in design of the development, as applicable. The requirement for long-term slope stability shall exclude designs that require regular and periodic maintenance to maintain their level of function.

i. Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography;

The proposed retaining structure maintains the natural topography below the wall and provides for a clear demarcation of the developed portion of the property and the NGPE below the wall.

ii. Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation;

The retaining wall preserves the existing vegetation within the NGPE and the steep slope that leads down to the riparian corridor below.

iii. The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties;

The applicant's geotechnical engineer has made several recommendations, that when implemented, will ensure that risk is not increased and increased buffers are not necessary on neighboring properties.

- iv. The use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes where graded slopes would result in increased disturbance as compared to use of retaining wall;**

The retaining wall will allow the natural slope below the wall to be maintained, while also providing a separate, maintainable area adjacent to the home.

- v. Development shall be designed to minimize impervious surfaces within the critical area and critical area buffer;**

The proposed retaining wall does not increase the area of impervious surface on the property, with the exception of the foot print of the wall itself. The applicant's geotechnical engineer has provide recommendations for drainage to be provided behind the wall that will ensure that the impact will be minimized to the greatest extent possible, while also providing the necessary stability.

- vi. Where change in grade outside the building footprint is necessary, the site retention system should be stepped and regrading should be designed to minimize topographic modification. On slopes in excess of 40 percent, grading for yard area may be disallowed where inconsistent with this criteria;**

It is believed that the retaining structure that failed was installed at the time of home construction in order to provide for a limited amount of maintainable space around the home. The fill material behind the failed wall, was likely excavated spoils from the home's foundation. The maintenance of the retaining wall in its present location will prevent further migration of this soil into the NGPE.

- vii. Building foundation walls shall be utilized as retaining walls rather than rockeries or retaining structures built separately and away from the building wherever feasible. Freestanding retaining devices are only permitted when they cannot be designed as structural elements of the building foundation;**

The proposal is not for a building foundation. The building foundation has already been constructed. This standard does not apply.

- viii. On slopes in excess of 40 percent, use of pole-type construction which conforms to the existing topography is required where feasible. If pole-type construction is not technically feasible, the structure must be tiered to conform to the existing topography and to minimize topographic modification;**

The retaining wall is founded on the underlying glacial till. Pole type construction is not a feasible construction technique for the proposal.

- ix. On slopes in excess of 40 percent, piled deck support structures are required where technically feasible for parking or garages over fill-based construction types; and**

The proposal is for a retaining wall only. This standard is not applicable.

- x. Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and/or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210.**

The applicant's geotechnical engineer has proposed a mitigation and restoration

plan that will restore the area of temporary disturbance below the replaced retaining wall.

IV. Public Notice and Comment

Application Date: March 27, 2013
Public Notice (500 feet): April 25, 2013
Minimum Comment Period: May 9, 2013

The Notice of Application for this project was published in the City of Bellevue weekly permit bulletin on April 25, 2013. It was mailed to property owners within 500 feet of the project site. No comments have been received from the public as of the writing of this staff report.

V. Summary of Technical Reviews

Clearing and Grading:

The Clearing and Grading Division of the Development Services Department has reviewed the proposed development for compliance with Clearing and Grading codes and standards. The Clearing and Grading staff found no issues with the proposed development.

Utilities:

The Utilities Department's Development Review Division has reviewed the proposed development for compliance with Bellevue Utilities' codes and standards. The Utilities Development Review staff found no issues with the proposed development. There is a sanitary sewer service line that goes from home to the sewer stub on the east side of the property. The existing sewer service line is well to the north of the replace retaining wall.

VI. State Environmental Policy Act (SEPA)

The environmental review indicates no probability of significant adverse environmental impacts occurring as a result of the proposal. The proposal is exempt for additional environment reviewed as it is considered minor construction per WAC 197-11-800(1) and it is not located within the critical area itself.

VII. Changes to proposal as a result of City review

As a result of City of Bellevue review, a geotechnical engineer was required to be consulted on the wall design and provide recommendations for its design and construction. In addition, a native plant restoration plan was required to be submitted along with the wall design.

VIII. Decision Criteria

A. Critical Areas Land Use Permit Decision Criteria 20.30P

The Director may approve or approve with modifications an application for a critical areas land use permit if:

1. The proposal obtains all other permits required by the Land Use Code;

Finding: The proposal is required to obtain a clearing and grading permit in order to ensure compliance with the city's clearing and grading development standards and the conditions of approval in Section X of this report.

2. The proposal utilizes to the maximum extent possible the best available construction, design and development techniques which result in the least impact on the critical area and critical area buffer;

Finding: The applicant has supplied a geotechnical report that provide recommendations that, when implemented, represent the best available construction and design techniques and will result in the least impact on the critical area and critical area buffer.

3. The proposal incorporates the performance standards of Part 20.25H to the maximum extent applicable, and ;

Finding: As discussed in Section III, the proposal incorporates the applicable performance standards of LUC 20.25H.

4. The proposal will be served by adequate public facilities including street, fire protection, and utilities; and;

Finding: The property is currently served by adequate public facilities. The proposal will not increase the need for public facilities on the property.

5. The proposal includes a mitigation or restoration plan consistent with the requirements of LUC Section 20.25H.210; and

Finding: The proposal includes a mitigation and restoration plan that is consistent with LUC 20.25H.210. The plan is lacking a monitoring component, but this will be included as a condition of approval in Section X. The monitoring will follow the Director's guidelines.

6. The proposal complies with other applicable requirements of this code.

Finding: As discussed in Section III and V of this report, the proposal complies with all other applicable requirements of the Land Use Code.

IX. Conclusion and Decision

After conducting the various administrative reviews associated with this proposal, including Land Use Code consistency, SEPA, City Code and Standard compliance reviews, the Director of the Development Services Department does hereby **approve with conditions** the proposal to replace a failed retaining within the critical area buffer at 16710 SE 34th Street.

Note- Expiration of Approval: In accordance with LUC 20.30P.150 a Critical Areas Land Use Permit automatically expires and is void if the applicant fails to file for a Clearing and Grading Permit or other necessary development permits within one year of the effective date of the approval.

X. Conditions of Approval

The applicant shall comply with all applicable Bellevue City Codes and Ordinances including but not limited to:

<u>Applicable Ordinances</u>	<u>Contact Person</u>
Clearing and Grading Code- BCC 23.76	Janney Gwo, 425-452-6190
Land Use Code- BCC 20.25H	Kevin LeClair, 425-452-2928
Noise Control- BCC 9.18	Kevin LeClair, 425-452-2928

The following conditions are imposed under the Bellevue City Code or SEPA authority referenced:

1. Restoration for Areas of Temporary Disturbance: A restoration plan for all areas of temporary disturbance is required to be submitted for review and approval by the City of Bellevue prior to the issuance of the Clearing and Grading Permit. The plan shall include documentation of existing site conditions and shall identify the restoration measures to return the site to its existing conditions per LUC 20.25H.220.H. At a minimum, the plan shall include native plant restoration that includes the following species and at 3 feet on-center spacing across the entire disturbed area below the retaining wall:

- Snowberry (6" pot)
- Oregon grape (6" pot)
- Sword fern (6" pot)

Authority: Land Use Code 20.25H.220.H
Reviewer: Kevin LeClair, Land Use

2. Rainy Season restrictions: Due to the proximity to steep slopes, no clearing and grading activity may occur during the rainy season, which is defined as October 1 through April 30 without written authorization of the Development Services Department. Should approval be granted for work during the rainy season, increased

erosion and sedimentation measures, representing the best available technology must be implemented prior to beginning or resuming site work.

Authority: Bellevue City Code 23.76.093.A
Reviewer: Janney Gwo, Clearing and Grading

3. Pesticides, Insecticides, and Fertilizers: The applicant must submit as part of the required Clearing and Grading Permit information regarding the use of pesticides, insecticides, and fertilizers in accordance with the City of Bellevue's "Environmental Best Management Practices".

Authority: Land Use Code 20.25H.220.H
Reviewer: Kevin LeClair, Land Use

4. Noise Control: Noise related to construction is exempt from the provisions of BCC 9.18 between the hours of 7 am to 6 pm Monday through Friday and 9 am to 6 pm on Saturdays, except for Federal holidays and as further defined by the Bellevue City Code. Noise emanating from construction is prohibited on Sundays or legal holidays unless expanded hours of operation are specifically authorized in advance. Requests for construction hour extension must be done in advance with submittal of a construction noise expanded exempt hours permit.

Authority: Bellevue City Code 9.18
Reviewer: Kevin LeClair, Land Use

5. Geotechnical Recommendations and Inspection: To ensure there is not an increased risk of slope failure, or a need for increased buffers on neighboring properties, the applicant's geotechnical engineer shall perform site inspections and submit post-construction documentation to the City of Bellevue to verify that the recommendations included in the geotechnical report and recommendations are followed. The recommendations include:

- i. 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 tight-lined to the bottom of the existing slope east of the wall.
- ii. 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.
- iii. 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.

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

Authority: Bellevue City Code 23.76
Reviewer: Janney Gwo, Clearing and Grading

6. Native Landscape Restoration Monitoring and Reporting: In order to ensure the critical area or critical area buffer native landscape restoration successfully establishes, the restoration shall meet the following performance standards for a period of three years following installation:

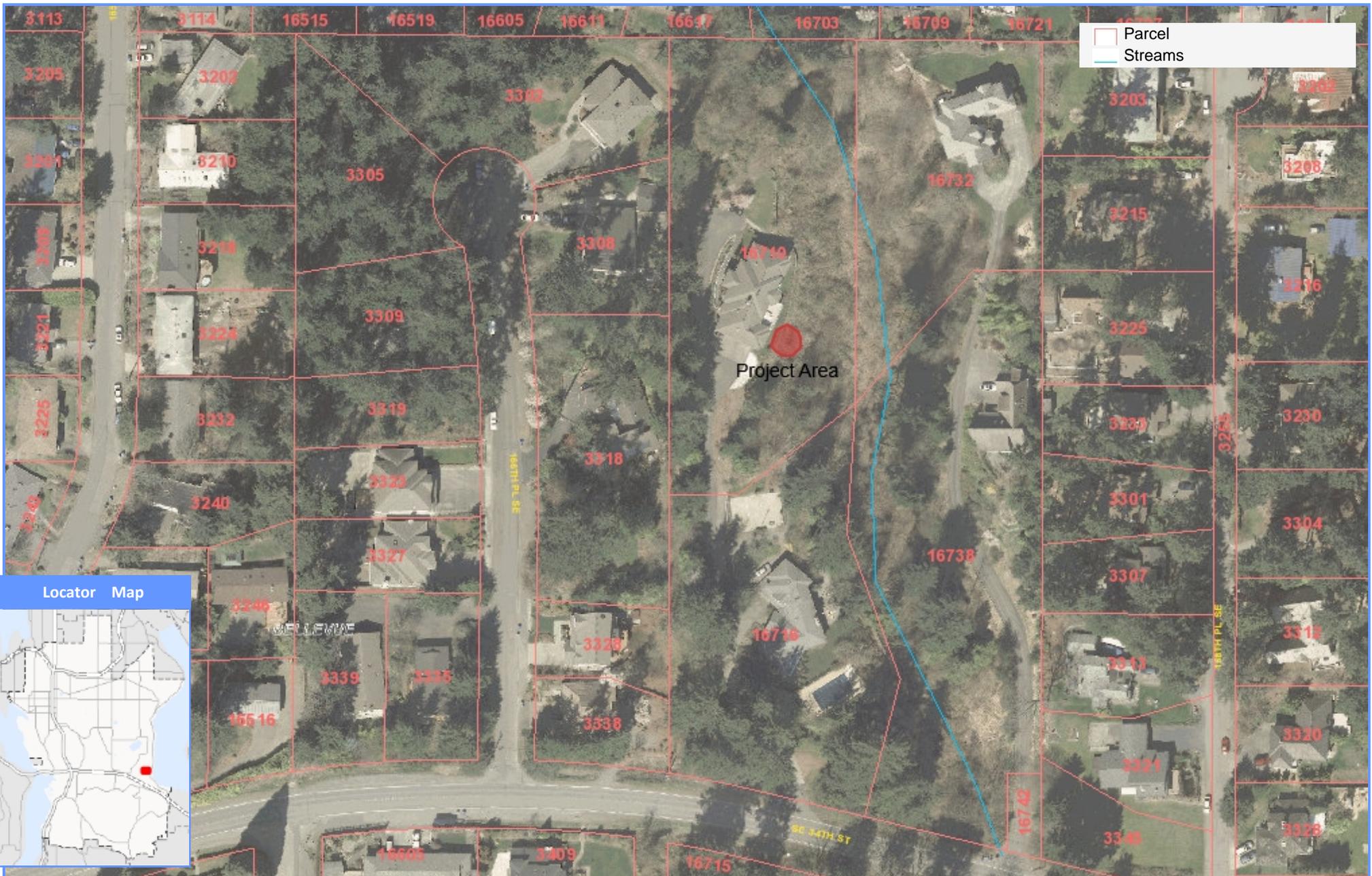
Year 1: 100% survival of all installed plants & 0% invasive coverage
Year 2: 90% survival of all installed plants & <10% invasive coverage
Year 3: 85% survival of all installed plants, >35% native coverage & <10% invasive coverage.

A monitoring report meeting the minimum monitoring and reporting standards establish by the director shall be submitted annually to verify success.

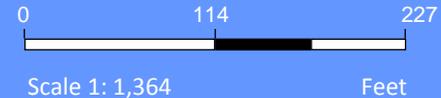
Authority: Land Use Code 20.25H.220.D
Reviewer: Kevin LeClair, Land Use

7. Hold Harmless Agreement: In order to ensure the release the City of Bellevue from any liability for any damage arising from the location of improvements approved as part of this critical areas land use permit and clearing and grading permit for the construction of the proposed stabilization measure, the applicant execute a “hold harmless” agreement with the King County Recorder’s office prior to issuance of the clearing and grading permit.

Authority: Land Use Code
Reviewer: Kevin LeClair, Land Use



Petrescu Retaining Wall



Associated Earth Sciences, Inc.



Serving the Pacific Northwest Since 1981

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.

Kirkland ▪ Everett ▪ Tacoma
425-827-7701 425-259-0522 253-722-2992
www.aesgeo.com

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

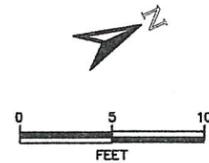
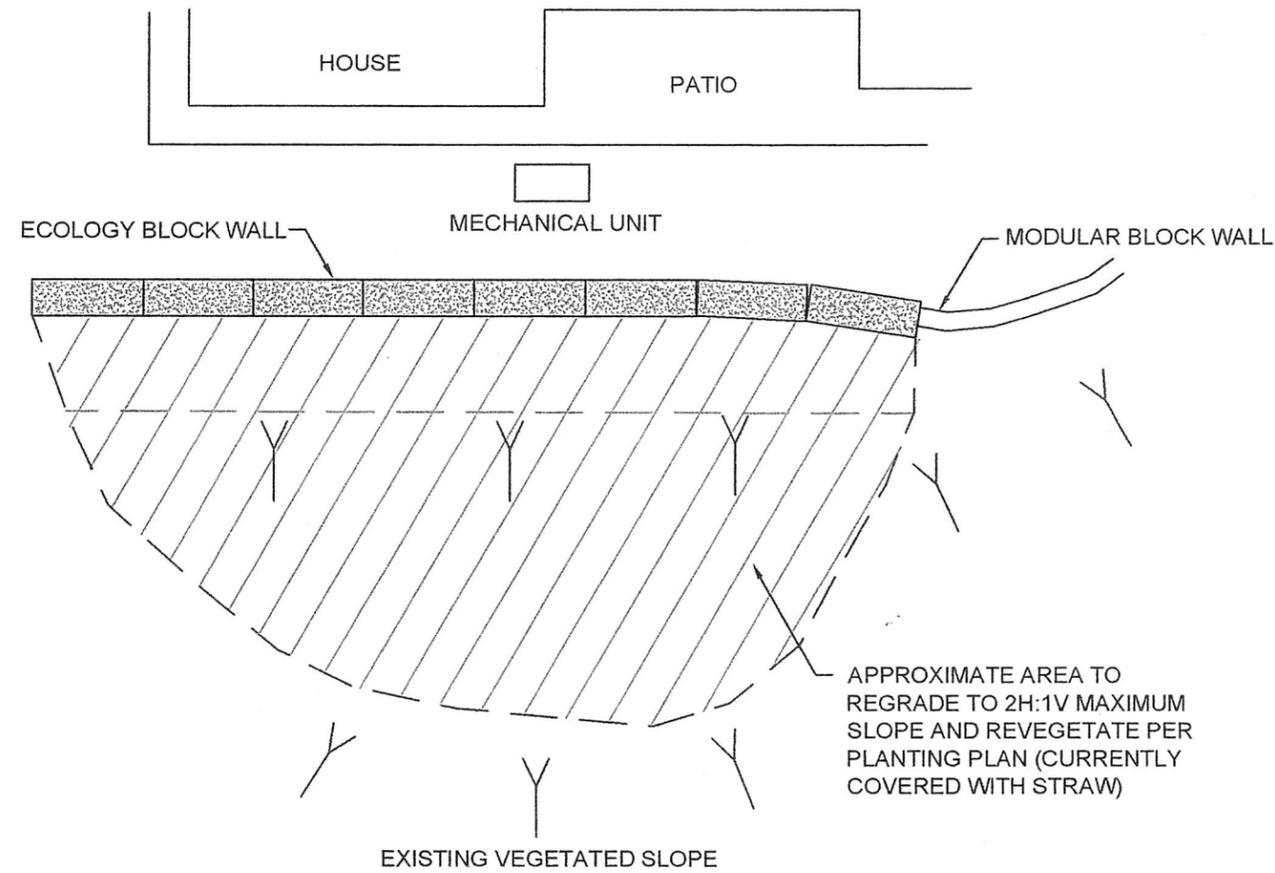


Jeffrey P. Laub, L.G., L.E.G.
Senior Project Engineering Geologist

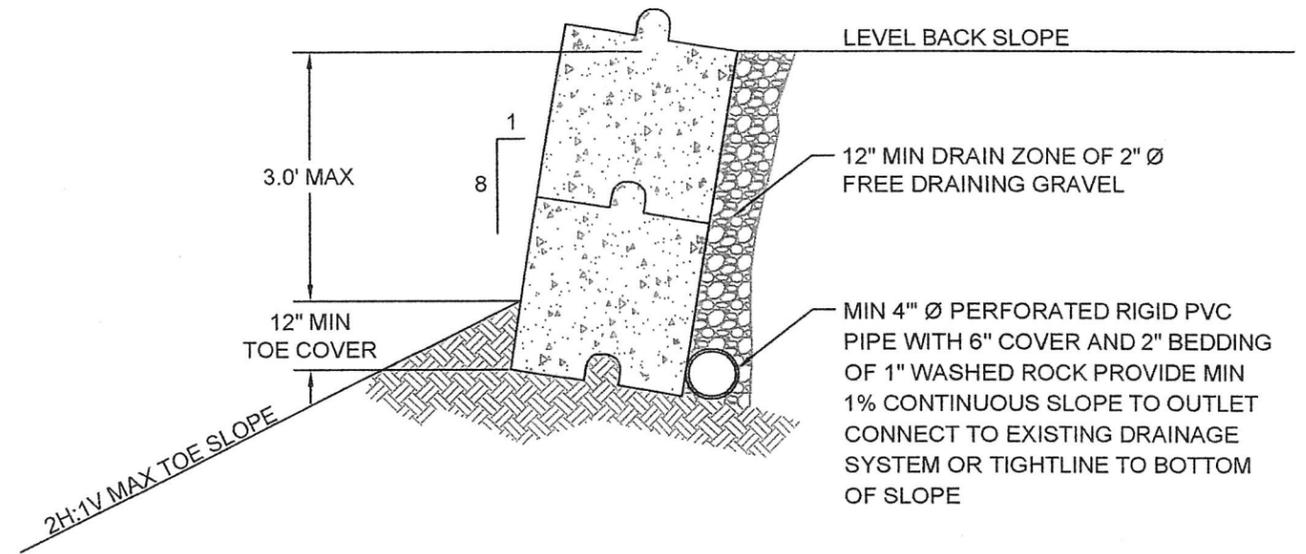


Jon N. Sondergaard, L.G., L.E.G.
Senior Principal Geologist

Attachment: Figure 1 - Grading Mitigation and Revegetation Plan

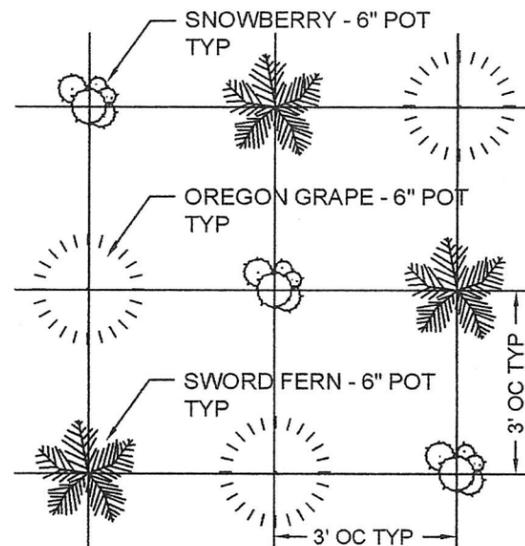


SITE PLAN



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

ECOLOGY BLOCK WALL DETAIL



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.

TYPICAL PLANTING PLAN

