



ECTYPOS

ARCHITECTURE

February 6, 2022

Revised August 25, 2022 Sub1

Community Planning and Development Department
City of Mercer Island

Memo: CAO22-006-Sub1 Revised Written Report

In February of 2021 Susan and Dan Steinborn purchased the above referenced vacant lot with the intention of building a new single family residence. The design has, in large part, been determined by the nature of the site and the Steinborn's desire to preserve its natural qualities to the greatest extent possible.

The site is categorized as a **Critical Area Geologically Hazardous: Steep Slope with a potential for slide, erosion and seismic vulnerability**. We are submitting this CAR2 along with a building permit application for concurrent review. The Critical Area Study consists of:

- This written report and attached photographs of the site today prior to proposed development.
- The following documents have been submitted for the simultaneous consideration of the Critical Area Review and the Building Permit:
 - The geotechnical report/Critical Area Study;
 - The drawing set consisting of the survey—which includes the graphic delineation of the steep slope; site plans including a CAR plan on Sheet A1.3 and Excavation grading plan on sheet A1.4; Civil Design; Shoring Design; Architectural Design and Structural Design.
 - Shoring and Structural Design Calculations.

We have designed this project utilizing the Best Available Science to mitigate any potential impacts to this site or neighboring sites. For example, currently during large storm events, water runs off the site on to the right of way and neighboring properties. The Civil Design will collect water not only from all hard surfaces, but any run-off uphill of the shoring and drain it into detention tanks that will disperse that water into the City stormwater infrastructure.

We are aware that the uphill lots are under review by the City of Mercer Island for redevelopment/development. We are concerned that there is the potential for leakage from that development's tanks. Water seepage onto our steep slope could cause damage. We request that the City require the detention tanks be WATER TIGHT.

Please note that the Geotechnical Engineer, in his initial report, identified soldier piles as the best means of shoring. In discussing the design and construction of the project on such a steep site and with tight access, he suggested, as an alternative, nail-shoring that will have less impact on the site and neighborhood.

Following is the outline for Mitigation Sequencing. After that is a discussion of the various aspects of the development.



MICC 19.07.100 - Mitigation Sequencing: It should be noted that, unlike streams and wetlands, geologically hazardous sites do not require the same immutable setbacks and buffers IF the Geotechnical Engineer evaluates the site and provides the criteria necessary to develop a design and build a structure that will “*render the development as safe as if it were not located in a geologically hazardous area and will not cause adverse geotechnical impacts to the adjacent properties.*”

- A. **Avoid Impact altogether:** The entire site is determined to be Geologically Hazardous.
- B. **Minimizing Impacts:** The design minimizes the impacts to the largest degree possible through multiple means:
- Limit the size of development: The allowed Gross Floor Area is 40% of the site area or 7,744 SF. The proposed residence and associated structures is 4,989 SF
 - Clearly defined **Limits of Disturbance (L.O.D.)** are tight to minimized areas of work, minimizing impacts to the greater site.
 - Limit the amount of impervious surface: All hard surfaces combined (roofs, drivable surfaces, retaining walls and miscellaneous paving) have been limited 6,075. The area of the impervious surface is due to a large degree because of the driveway required to get to the residence which is perched on the existing “shelf”. Normally the required driveway width, however, would be required to be 20’. Due to the need to retain trees and minimize impervious surfaces we have been able to reduce that to 14’ in width after discussion with the MIFD Fire Marshall.
 - The Civil Design, in addition to collecting water from all hard surfaces, also collects water coming off the hill behind the shoring. All storm water will be collected and distributed to City stormwater infrastructure. This design will improve the existing situation considerably.
 - Excavation has been carefully considered and is phased so as to minimize large cuts until permanent shoring can be installed. As noted below, after excavation, grading will return the site to its near natural state.
- C. **Rectifying the impact:** The design of the development is intended to nestle the structure into the hillside and leave areas beyond development as natural as possible.
- After construction the site will be regraded to reflect the natural grading and improve/reduce extreme steepness through the use of nail shoring and small retaining walls.
 - Maintain as many existing trees as possible: (4) trees are proposed to be removed with (6) proposed as replacements.
 - Only the immediate area around the house will be developed. The rest of the site will be landscaped with native or adapted species, with particular care to secure the steep slopes. Invasive species will be removed.
- D. **Reducing or eliminating the impact over time:** Permanent nail shoring is being employed to stabilize the hillside uphill from the development. Any undeveloped area beyond the nail shoring will remain in its natural state to the greatest extent possible. Exposed shoring walls will eventually be covered in vegetation which will contribute to hillside stability and stormwater mitigation.
- E. **Compensating for the Impact by replacing, enhancing, or providing substitute resources of environments:** As stated above (6) replacement trees will be installed at the completion of construction. In the permit set is a tree plan (AR-1) indicating the new trees, those to be removed and protection requirements for the remaining existing trees.
- F. **Monitoring the impact and taking appropriate corrective measures:**
- The replacement trees will be monitored for the time required by the City to determine they are established.
 - The site will be monitored and maintained to make sure systems, such as storm drainage, continue to function in the ways intended.



Grading: The proposed project utilizes the existing graded elements to the best of its ability. The geotechnical report identified fill and loose native soil overlaying dense glacial till. It is recommended to remove the material overlaying the glacial till for bearing. At the garage and driving surfaces, additional excavation may be needed to achieve the Fire Marshall's required 20% driveway slope. Grading will take place in two phases with the upper part graded and foundation installed first, before beginning the lower part. As soon as is feasible the site will be regraded to its original state where applicable

Shoring: The Geotechnical report recommends soldier pile shoring. During discussions with the General Contractor, however, expressed a concern about getting trucks to the site with the necessary steel beams required for the shoring via the narrow neighborhood road. The Geotechnical Engineer recommended nail shoring as an alternative. The nail shoring has been designed by a firm specializing in this technique. It will be executed along the line indicated in the site plan and referred to throughout the project drawings, and at the driveway uphill side. The shoring will be permanent and any exposed walls will have a finished shotcrete surfaces. This will maintain the stability of the hillside.

Storm water management on the site will be extremely important. The civil design reflects the recommendations of the geotechnical report for managing both ground water that may be encountered, and run-off from impervious surfaces. It breaks the detention tanks into two separate units to collect water from the house and uphill development and at the base of the driveway to collect that runoff. Impervious surfaces planned for the site have been minimized to the greatest extent possible.

A Fire Code Alternate is required for this project. Typically a 20' wide driveway would be required by the MIFD for trucks to access the house. We have asked to reduce the driveway width to 14' in order to reduce impact to the uphill trees and provide planting space at the base of the shoring. This reduces the impervious surface of the driveway and consequential run-off, improving the stability of the hillside by protecting trees and providing additional planted material.

Trees are an important part of slope stabilization. To that end we have attempted to design the house and related site work to minimize impacts to these trees through siting and a more compact footprint. The Steinborns have engaged a Landscape Architect who will design the site to be densely vegetated with native and non-invasive species.

The house design has been developed to take advantage of existing grades and minimize impact to onsite trees. While the actual square footage is not small, it is compact, stacked over three stories. The garage is located at elevation 264 due to the driveway slope requirement. The entry and ADU are located at elevation +/-268 taking advantage of that natural grade. The main level is stacked on top of the garage/entry/adu. The master suite stacks over the main living area and bridges to upper grades beyond the nail shoring line. Ample outdoor space has been included with roof decks and a patio off the back. This minimizes the necessity for additional structured outdoor space. A building pad, slightly larger than the proposed building footprint, has been proposed to accommodate any unforeseen additions. It too has been sited to minimize impact to the site.



It is our intention to build a project that is respectful of the site and utilizes Best Practices. We believe that the design improves the overall stability of the steep hillside and enhances its natural qualities through the elimination of damaging invasive species, structured improvements, tree preservation and post construction planting.

Sincerely,

Lucia Pirzio-Biroli, AIA
Ectypos Architecture





August 25, 2022

Re: **CAO22-006-SUB1** MICC 19.07.110(B)(6) Photographic Records of the site before proposed alteration



View looking north toward the site from SE 47TH PL.



Looking from street at start of proposed driveway. The site is very overgrown but years ago the site was graded probably for a future home. The project proposes to use these graded areas.



Looking from start of proposed driveway south along the street and uphill at the site. Shelf where proposed structure will be sited is behind the clump of maples covered in ivy.



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On “shelf” where residence is intended looking up-hill to northerly property line.



On “shelf” look westerly toward access road.